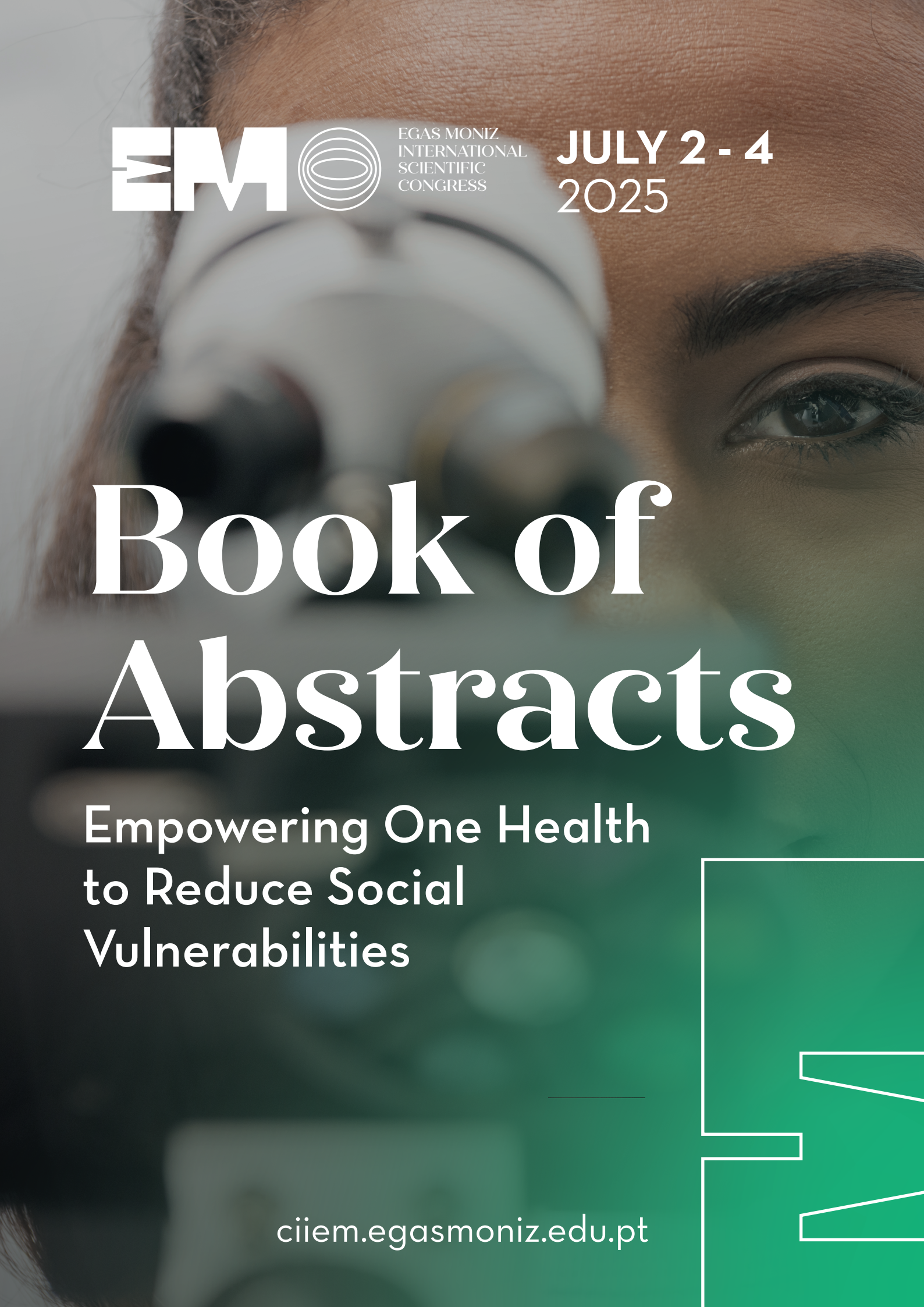

EGAS MONIZ INTERNATIONAL SCIENTIFIC CONGRESS

JULY 2 - 4 2025

Book of Abstracts

Empowering One Health to Reduce Social Vulnerabilities

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INTRODUCTORY NOTE

In face of today's complex global challenges — from climate change and pandemics to widening social inequalities — the One Health approach has emerged as a vital framework for building a more resilient, inclusive, and sustainable future. The **7th CiiEM International Congress**, held under the theme *"Empowering One Health to Reduce Social Vulnerabilities"*, aimed to contribute meaningfully to this vision by fostering dialogue, showcasing cutting-edge research, and promoting cross-sector collaboration.

Held from **2 to 4 July 2025** in **Caparica, Portugal**, and organised by the **Egas Moniz Center for Interdisciplinary Research (CiiEM)**, this edition brought together an interdisciplinary community of researchers, practitioners, and stakeholders united by a common purpose: transforming science into societal impact.

The scientific programme was structured around several key themes that reflect both the urgency and the complexity of applying a One Health lens in today's world. Topics ranged from the role of technological innovation in advancing biomedical research to the challenges of digital exclusion and equitable access to health-enabling technologies. Sessions also explored the intersection of urban planning and public health, highlighting how the design of our cities can support physical, mental, and environmental well-being. Other central themes included mental health and psychological resilience, sustainable food systems, antimicrobial resistance, and the social dimensions of healthcare access.

By addressing these interdependent areas, the Congress aimed to promote scientific literacy, foster intersectoral collaboration, and support the translation of research into impactful policies and practices that reduce social vulnerabilities and strengthen community health.

The Congress offered a rich platform for collaboration and innovation, supported by symposia, poster sessions, and fruitful networking opportunities. It welcomed over **200 participants**, including **20 invited speakers**, and featured around **130 scientific contributions** — presented as oral or poster communications — selected through a rigorous peer-review process.

On behalf of the Organising Committee, we extend our sincere thanks to all participants for their engagement and contributions, to the Scientific and Executive Committees for their dedication, and to the reviewers for their essential role in ensuring the quality of the scientific programme.

We also gratefully acknowledge the continued support of the **Egas Moniz School of Health and Science**, as well as the invaluable contribution of our external partners and sponsors.

We hope this Congress has inspired new ideas, forged meaningful partnerships, and sparked lasting contributions toward a healthier, fairer, and more sustainable world.

The Congress Chairs

Cristina Soeiro, PhD

João R. Vaz, PhD

| List of Abstracts

ORAL COMMUNICATIONS

POSTER COMMUNICATIONS

ORAL COMMUNICATIONS

O.1 POLYMERIC NANOPARTICLE DELIVERY OF VEGFR1-SILENCING siRNA FOR TARGETED TREATMENT OF OCULAR NEOVASCULARIZATION†

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Diabetes mellitus is a major global health concern, frequently leading to ocular complications such as pathological angiogenesis and inflammation. Vascular endothelial growth factor receptor 1 (VEGFR1) is a key regulator in these processes, with its overactivation driving abnormal blood vessel formation and increased vascular permeability. Thus, targeting VEGFR1 signalling represents a promising therapeutic approach. Small interfering RNAs (siRNAs) are powerful therapeutic agents capable of silencing specific disease-related genes post-transcriptionally. However, their delivery remains challenging due to their high molecular weight (14 kDa) and negative charge. To selectively silence VEGFR1 expression, polymeric nanoparticles (NPs) were developed and designed to deliver VEGFR1-silencing siRNA. The NPs were formulated via ionic complexation by magnetic stirring of a) polyethylenimine (PEI), a cationic polymer commonly used as a gene carrier, and b) 6-mercaptohexanoic acid polyphosphazene (6MHA-PPZ), an anionic biodegradable polymer synthesized in the laboratory. The optimized siRNA-NPs were characterized in terms of particle size (dynamic light scattering), surface charge (zeta potential analysis), and morphology (transmission electron microscopy). Cell viability was assessed in ARPE-19 cells (human retinal epithelial cell line) using a resazurin-based assay. Cellular uptake of Cy5-labeled siRNA-NPs was assessed by confocal microscopy. To evaluate the efficacy of the siRNA-NPs in silencing VEGFR1 protein expression *in vitro*, cells were transfected with NPs and controls (naked siRNA and siRNA complexed with Lipofectamine RNAiMAX, a benchmark transfection agent). Protein levels of VEGFR1 after treatment were determined by Western blot. The resulting siRNA-NPs exhibited adequate particle sizes (<100 nm), with a low polydispersity index (< 0.2), positive zeta potential (~+30 mV), and a spherical and compact morphology. Cell viability assays indicated minimal cytotoxicity of the siRNA-NPs up to a concentration of 50 nM, 24 hours after treatment. Confocal microscopy confirmed enhanced cellular uptake of Cy5-labeled siRNA-NPs compared to naked siRNA, and the uptake was similar to siRNA complexed to Lipofectamine-complexed siRNA. One day post-transfection, siRNA-NPs achieved a reduction of about 75% in VEGFR1 protein expression in ARPE-19 cells compared to naked siRNA. Our results demonstrate that this novel PEI/6MHA-PPZ-based nanoparticles possess favourable physicochemical properties to be used as siRNA carriers for ocular therapy. Given the VEGFR1 silencing effect with minimal cytotoxicity, this NP formulation holds strong potential for the development of targeted therapies for angiogenesis-related complications in diabetic eye disease. Future works will evaluate the platform's efficacy in different retinal cell lines, such as retinal endothelial and microglial cells.

Keywords: OCULAR DRUG DELIVERY; GENE THERAPY; siRNA; POLYMERIC NANOPARTICLES; ANGIOGENESIS

O.2 IS THERE A LINK BETWEEN DIET AND PAINFUL TEMPOROMANDIBULAR DISORDERS? A CROSS-SECTIONAL STUDY†

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Temporomandibular disorders (TMDs) are a common source of non-dental orofacial pain, frequently linked to psychosocial distress and reduced quality of life, especially among women of working age. Within the context of One Health and social vulnerability, identifying modifiable behavioural and nutritional factors may improve prevention and enable personalized care. This cross-sectional study aimed to investigate the association between diet quality, inflammatory dietary patterns, psychosocial distress, and pain sensitivity in individuals with painful TMD. A total of 92 participants (45 with TMD and 47 healthy controls), aged 20–50 years, were recruited in Portugal and Spain. TMD diagnosis was based on the Diagnostic Criteria for TMD (DC/TMD). Psychosocial status was assessed using the Patient Health Questionnaire for depression (PHQ-9), somatic symptoms (PHQ-15), and the Oral Behaviour Checklist (OBC). Dietary intake was evaluated using a 24-hour recall and assessed via the Healthy Eating Index (HEI), the Dietary Inflammatory Index (DII), and the Mediterranean Diet Adherence Screener (MEDAS), validated in Portuguese. Pain sensitivity was measured through pressure pain thresholds (PPTs) at the temporomandibular joint (TMJ), masseter, and temporalis muscles. Data were analysed using independent t-tests, Mann–Whitney U tests, and orthogonal partial least squares discriminant analysis (OPLS-DA), selected for its ability to identify variables that best discriminate between multivariate groups. Participants with painful TMD showed significantly lower HEI scores ($p < 0.001$) and reduced PPTs across all sites (Temporalis: $p = 0.03$; TMJ: $p = 0.01$; Masseter: $p = 0.04$). They also reported higher levels of somatic symptoms (PHQ-15: $p < 0.001$), depressive symptoms (PHQ-9: $p < 0.001$), and more frequent maladaptive oral behaviours (OBC: $p < 0.001$). No significant differences were found for DII ($p = 0.05$) or MEDAS ($p = 0.47$). OPLS-DA identified maladaptive oral behaviours (VIP = 1.4; p(corr) = 0.8), somatic symptoms (VIP = 1.3; p(corr) = 0.7), and lower HEI scores (VIP = 1.3; p(corr) = -0.7) as the most discriminative variables ($R^2 = 0.644$; $Q^2 = 0.572$; CV-ANOVA $p < 0.001$). Painful TMD is associated with greater psychosocial distress and lower overall diet quality, rather than adherence to a specific dietary pattern. These findings support the inclusion of nutritional assessment and psychosocial screening in the clinical management of TMD and highlight the importance of interdisciplinary strategies in chronic pain care. This study contributes to the One Health perspective by linking individual lifestyle factors to broader health determinants, suggesting that improved dietary habits and behavioural interventions may help reduce the burden of chronic orofacial pain in vulnerable populations.

Keywords: TEMPOROMANDIBULAR DISORDERS; DIET; NUTRITION; PSYCHOSOCIAL DISTRESS; ONE HEALTH

O.3 THERAPEUTIC HYDROGELS FOR CANCER-RELATED WOUNDS†

Diana C. Silva[1], Lara Leote[1], Alfredo Pozuelo[1], Madalena Salema-Oom[2], Ricardo F. S. Pereira[3], Carla C.C.R de Carvalho[3], Maria Vivero-Lopez[4], Ana Paula Serro[1]

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Chronic wounds affect over 2 individuals per 1,000 worldwide, substantially diminishing both quality and expectancy of life. Among these, malignant fungating wounds (MFW) are particularly debilitating, resulting from tumour infiltration or metastasis to the skin and surrounding vasculature. Although their prevalence is not precisely known, it is estimated that 5–15% of patients with advanced cancer may develop MFW, typically presenting with pain, excessive exudate, bleeding, and malodour. Current therapeutic approaches are largely palliative, focusing on symptom management through dressings. This study aims to develop advanced drug-device combination hydrogels for enhanced management of cancer-related wounds through incorporation of either natural bioactives (*Curcuma longa, Calendula officinalis*) or the antiseptic Octiset®. Hydrogels were formulated using polyvinyl alcohol (PVA), polyethylene glycol (PEG), carboxymethyl cellulose (CMC), and chitosan (CHI) through a freeze-thaw technique. Active agents were loaded by soaking under optimised conditions. Comprehensive physicochemical characterisation was performed, including morphological assessment, water content, swelling capacity, surface wettability, and mucoadhesion. Biological evaluations comprised cytotoxicity, irritability, and hemocompatibility testing (the last using blood collected from voluntary donors, with informed consent approved by the Ethical Committee of Egas Moniz - ref. no. 1047/2022). Drug release kinetics were investigated under sink conditions, and antibacterial efficacy was assessed against *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*. Antioxidant activity was determined using the DPPH radical scavenging assay. The hydrogels demonstrated excellent performance characteristics for wound dressing applications, including a superabsorbent swelling capacity of 350% at physiological temperature. Calendula-loaded samples exhibited potent antioxidant activity (90.4 ± 0.4% DPPH scavenging after 24 h), while Octiset®®-loaded hydrogels showed effective antibacterial action. These results indicate that the developed hydrogels hold significant promise as multifunctional wound dressings for MFW treatment, combining symptom management with therapeutic bioactivity, and potentially improving patient outcomes in chronic and cancer-related wound care.

Keywords: WOUND DRESSINGS; NATURAL THERAPEUTIC AGENTS; CANCER-RELATED WOUNDS; ANTIOXIDANT; ANTIBACTERIAL

O.4 ASSESSMENT OF THE RISK OF EXPOSURE TO METHYLMERCURY THROUGH THE ANALYSIS OF HUMAN HAIR SAMPLES†

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In environments with low oxygen availability, such as the great depths of the sea, mercury (Hg) can be methylated by the action of sulfate-reducing bacteria, resulting in the formation of methylmercury (MeHg). Methylmercury enters the food chain and tends to bioaccumulate, being eliminated very slowly. For this reason, many aquatic organisms have high concentrations of MeHg, representing a threat to humans who consume significant amounts of fish. As such, although fish consumption is important for a healthy diet, it is also the main source of exposure to MeHg, mainly through the consumption of predatory fish, which have a greater accumulation of Hg, such as blue shark, ray and black scabbardfish. This problem is particularly significant in regions where fish consumption is high and, given that Portugal is the European Union country with the highest fish consumption (57 kg per capita per year), the proportion of the population at risk is potentially significant. In fact, several studies have already been carried out showing high exposure to MeHg in the main risk groups (namely pregnant women and children), thus justifying the need for a broader assessment of the population's exposure. Human hair is a major site of mercury accumulation and the relationship between exposure to MeHg and the accumulation of Hg in the hair is well established. The amount of mercury in the hair reflects the exposure to this metal, being approximately 250 times higher than the blood levels and 50 times higher than in the central nervous system (the main target organ). This high concentration makes hair the ideal biomarker for routinely assessing exposure and internal dose of methylmercury in human populations, due to the ease and non-invasiveness of sample collection. The main objective of this project is to validate and apply an analytical method in a real population for determining mercury in hair samples for the purpose of assessing toxicity risk. As secondary objectives, this project aims to: i) assess population exposure to methylmercury; ii) estimate risk based on hair compared to food frequency survey analysis; iii) identify fish consumption profiles in the Portuguese population associated with a higher risk of mercury exposure; iv) establish the relationship between recent and continued exposure to MeHg. Hair sampling is being carried out following World Health Organization (WHO) standards, which recommend cutting a lock of ~1 cm in diameter in the occipital region, followed by washing with isopropyl alcohol (70%) and subsequent storage in a properly identified paper envelope. The analysis of this hair samples is being performed directly by atomic absorption spectroscopy (AAS) and the results obtained so far, of 147 samples, suggest that, based on hair sample analysis, the study population generally showed a low risk of toxicity due to exposure to MeHg; In most cases, the risk estimated based on food frequency surveys tend to overestimate actual exposure; Fractional analysis of the samples (last year of consumption) revealed that the most recent segment-based Hg quantification appears to be a reliable indicator of cumulative exposure over the past year.

Keywords: METHYLMERCURY; HUMAN HAIR; ATOMIC ABSORPTION SPECTROSCOPY; RISK OF EXPOSURE

O.5 PERIODONTITIS INFLUENCE TOWARDS FEMALE INFERTILITY IN ANIMAL MODEL: PRELIMINARY RESULTS†

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Periodontal diseases, particularly gingivitis and periodontitis, are chronic inflammatory conditions highly prevalent across populations. These disorders affect the supporting structures of teeth and have been increasingly associated with systemic complications. Infertility, defined as the inability to achieve a clinical pregnancy after 12 months of unprotected intercourse or following therapeutic donor insemination, is a complex condition influenced by multiple factors. A growing body of evidence has proposed an association between periodontitis and adverse pregnancy outcomes, including preterm birth and infertility. However, the underlying biological mechanisms remain poorly understood. This study aimed to assess the fertility rate in female rats with experimentally induced periodontitis compared to healthy controls. The study followed the European Directive 2010/63/EU for animal research and was approved by the Ethics Committee for Animal Experimentation of the Faculty of Pharmacy, University of Lisbon (approval no. 6/2021). Fifty-three female Wistar rats were allocated into two groups: Control (n = 21) and induced periodontitis (n = 32). Periodontitis was induced by placing 5-0 silk ligatures around the upper second molars for six weeks to promote plaque accumulation and chronic inflammation. On day 42, a mating protocol was initiated. Fertile male rats were housed with three females each for one oestrous cycle (4 days). Out of the 53 female rats included in the analysis, 36 became pregnant after the first mating attempt (67.9%), while 17 (32.1%) did not. In the Induced Periodontitis group (n = 32), 21 became pregnant after the first attempt (65.6%) and 11 did not (34.4%). After a second mating attempt, 7 of the 11 remaining rats became pregnant (63.6%), resulting in a total of 28 pregnancies (87.5%) and 4 remaining non-pregnant (12.5%). In the Control group (n = 21), 15 became pregnant after the first attempt (71.4%) and 6 did not (28.6%). Following a second attempt, 4 of the 6 non-pregnant rats conceived (66.7%), totalling 19 pregnancies (90.5%) and 2 remaining non-pregnant (9.5%). Female rats with experimentally induced periodontitis exhibited a slightly lower overall fertility rate and a higher proportion of preterm births compared to healthy controls. These findings reinforce the hypothesis that periodontitis may adversely affect reproductive outcomes, possibly by interfering with systemic inflammatory pathways. Further studies are warranted to better understand the mechanisms linking periodontal inflammation and fertility.

Keywords: PERIODONTITIS; FEMALE FERTILITY; ANIMAL MODEL

O.6 CHARACTERISATION OF THE PATIENT POPULATION ATTENDING THE INTERSTITIAL LUNG DISEASE CLINIC AT HOSPITAL GARCIA DE ORTA: IMPLICATIONS FOR PULMONARY REHABILITATION†

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Interstitial lung diseases (ILDs) comprise a heterogeneous group of chronic respiratory disorders marked by varying degrees of inflammation and fibrosis, frequently leading to progressive dyspnoea, impaired exercise tolerance, and reduced quality of life. Pulmonary rehabilitation (PR) is a well-established intervention for patients with ILD, with proven benefits in improving physical function, symptom control, and overall well-being. Despite its effectiveness, access to PR in Portugal is extremely limited, with only about 1% of eligible patients enrolled in such programmes, highlighting a significant gap between clinical need and service availability. This study aimed to characterise the clinical and functional profile of patients attending the Interstitial Lung Disease Clinic at Hospital Garcia de Orta, to identify those who may benefit from PR and inform strategies to improve access. A retrospective descriptive analysis was conducted, including all patients followed in the ILD clinic between July and December 2024. Data were collected from electronic clinical records and included demographics, diagnosis, pulmonary function tests, symptoms, risk factors, and comorbidities. Ethical approval was granted by the hospital's Ethics Committee on 3 July 2024, and all data were anonymised in accordance with data protection regulations. A total of 61 patients were included, with a mean age of 74.7 years; 54% were female. The most common diagnosis was idiopathic pulmonary fibrosis (44%), followed by progressive pulmonary fibrosis (17%), chronic pulmonary fibrosis (12%), and hypersensitivity pneumonitis (10%). Exertional dyspnoea was reported by 67.2% of patients, and 27.8% experienced chronic cough. Pulmonary function tests indicated moderate disease severity in 49% of cases. Relevant risk factors, including smoking history or occupational/environmental exposures, were identified in 59% of patients. The most frequent comorbidities were diabetes mellitus (18%), obstructive sleep apnoea (18%), and cardiovascular disease (14.7%). These findings suggest that a substantial proportion of patients exhibit clinical features compatible with PR eligibility, such as symptomatic burden, reduced lung function, and comorbid conditions that may further impact functional capacity. Nevertheless, the low rate of access to PR in Portugal reflects a disconnect between patient needs and service provision. Systematic assessment for PR during routine ILD care and the establishment of structured referral pathways could help address this gap and ensure timely intervention for those most likely to benefit. Expanding access to PR should be prioritised as part of comprehensive ILD management strategies to improve patient outcomes and quality of life.

Keywords: INTERSTITIAL LUNG DISEASE; PULMONARY REHABILITATION; IDIOPATHIC PULMONARY FIBROSIS; FUNCTIONAL IMPAIRMENT; OUTPATIENT CARE

O.7 MULTIDISCIPLINARY MANAGEMENT OF CHRONIC PAIN: THE IMPACT OF PHARMACEUTICAL CARE IN A UNIVERSITY IN BRAZIL†

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Chronic pain affects approximately 30% of the global population and represents a significant public health challenge due to its extensive physical, social, and economic repercussions. This study investigated the impact of pharmaceutical care on chronic pain management in patients participating in the 'Educador' extension program at the Federal University of Alfenas (UNIFAL-MG), Brazil. The primary objective was to assess how pharmaceutical interventions contribute to effective pain control and treatment adherence within a multidisciplinary care model. A descriptive, quantitative, prospective, and cross-sectional study was conducted involving 22 patients diagnosed with chronic pain who participated in at least three pharmaceutical consultations over a five-month period. Pharmaceutical care was delivered as part of a multidisciplinary team, which included neurologists and physiotherapists, and employed the SOAP (Subjective, Objective, Assessment, and Plan) methodology for clinical data collection and patient management. Interventions focused on improving medication adherence, optimizing analgesic regimens, minimizing adverse drug reactions, and preventing pharmacotherapy-related complications. Clinical records were reviewed to collect demographic data, medical history, pain intensity (via visual analogue scale), medication use, and outcomes of the pharmaceutical interventions. Key indicators evaluated included patient-reported improvements in medication adherence, changes in pain intensity, reduction in adverse effects, withdrawal of inappropriate medications, enhancement in overall pain management, improved access to health services, reduction in pain-related complications, decreased polypharmacy, lower frequency of primary care visits, and improved compliance with prescribed treatments. Statistical analysis was conducted using BioEstat software. Paired t-tests were applied to compare continuous variables before and after the interventions, while McNemar's test assessed changes in proportions for dependent samples. Descriptive statistics were used to characterise the study population and support result interpretation. The results demonstrated a significant positive impact of pharmaceutical care on the clinical outcomes of patients with chronic pain. Pain scores decreased from a mean of 9.4 to 3.7 on a 10-point scale ($p < 0.05$), and the average number of medications per patient declined from 8.65 to 5.74. All patients exhibited improved adherence to their medication regimens, and 81% reported fewer adverse drug events. Additionally, healthcare visits related to pain decreased by 86%, suggesting more effective symptom management and a reduced burden on health services. Although the study design did not include a control group or stratified analysis to isolate the specific impact of pharmaceutical care versus other disciplines, the consistent improvements across pharmaceutical care indicators—such as adherence, polypharmacy reduction, and adverse effect minimization—point to a meaningful contribution by pharmacists within the multidisciplinary framework. The study adhered to ethical standards by maintaining participant confidentiality and obtaining informed consent from all individuals involved; approved by the ethics committee of UNIFAL-MG (CLAEE 46727215.7.0000.5142). This study underscores the importance of integrating pharmaceutical care into multidisciplinary strategies for managing chronic pain. By enhancing pharmacological treatment, reducing inappropriate prescriptions, and improving patient outcomes, pharmacists play a pivotal role in addressing the complex and multifactorial nature of chronic pain.

Keywords: PHARMACEUTICAL CARE; CLINICAL PHARMACY SERVICES; CHRONIC PAIN; MEDICATION ADHERENCE; PAIN MANAGEMENT

O.8 AGING INDUCES CHANGES IN THE INTESTINAL MUCOSA THAT MAY REDUCE ABSORPTION AND THE RESPONSE TO NUTRITIONAL SUPPORT†

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There is a widespread agreement that age is a significant predictor of impaired response to nutritional support. For the same amount of protein and energy provided, the increase in weight and fat-free mass is significantly lower in older persons. This is generally attributed to the anabolic resistance of older people, and impaired absorption is usually considered non-existent or irrelevant. Nevertheless, in older rats gradual changes of the intestinal mucosa are observed, including reductions in villus height/width, villus density and mucosal thickness, which reduce absorption. Despite this, the aging influence on human intestinal mucosa is a matter of debate, and the lack of knowledge is partially explained by the exclusion criteria of older patients from most research protocols. We aim to evaluate potential histological and ultrastructural changes associated with aging that may reflect reduced absorption in older people. The present single-centre study is observational and prospective. Younger (18-45 years) and older (≥70 years) adults referred for upper endoscopy for reasons unrelated with intestinal alterations were included and underwent duodenal biopsies. Those biopsies were analysed for histological, histomorphometric and ultrastructural changes. Histologic analysis was performed using optical microscopy with haematoxylin–eosin staining observed by two pathologists, including one expert gastrointestinal pathologist. All samples were analysed for the presence of mucosal atrophy according to the adapted Marsh–Oberhuber classification and histomorphometric evaluation of duodenal villi length in micrometres, with at least two villi being measured through the use of an automatic scale. For transmission electron microscopy, duodenal fragments were fixed in 3% glutaraldehyde in cacodylate buffer (0.1 M, pH 7.4) overnight at 4 °C. The fixed fragments were rinsed and post-fixed in 1.0% osmium tetroxide for 1 h in the same buffer and dehydrated in graded ethanol passages. The fragments were embedded in a mixture of Epon and Araldite after two 15-min passages in propylene oxide. Thin sections, cut on a Reichert Ultracut II Ultramicrotome with a diamond knife, were stained on the grid with uranyl acetate and lead citrate and examined with a JEOL 1200EX electron microscope. Histologic and ultrastructural features from young and older patients were compared. A total of 84 patients were included (38 men/46 women), 34 with 18-45 years and 50 with ≥70 years. There were no duodenal endoscopic or microscopic changes apart from one older adult mucosal atrophy. The median villi length was 0.35 mm (0.23-0.43 mm) in older people, lower than in younger adults (0.57 mm; 0.37-0.71 mm) ($p<0.01$). Aging is associated with changes in the intestinal mucosa that can be linked with reduced absorptive capacity. Besides anabolic resistance, this could be a reason for the reduced response to nutritional support found in older citizens.

Keywords: AGING; CLINICAL NUTRITION; DUODENAL MUCOSA; HISTOLOGY; ULTRA-STRUCTURE

O.9 PARKINSON DISEASE HANDWRITING REHABILITATION KIT – A FORENSIC EXPLORATORY STUDY†

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Graphoscopy is a branch of forensic science that involves the study and analysis of handwriting, aiming to attribute questioned handwriting to an author and provide a scientifically valid forensic report. In this context, alterations resulting from neurodegenerative diseases such as Parkinson's disease (PD), which affect motor skills (rigidity, bradykinesia and tremor), can compromise handwriting performance. Evidence suggests that physiotherapy and physical exercise programmes can promote the recovery of motor skills, while occupational therapy can facilitate the recovery of handwriting and contribute to the improvement of instrumental activities of daily living (IADLs). This work aims to develop a handwriting rehabilitation kit designed to improve fine motor skills, in the elderly. This kit was created to facilitate at-home self-administration of occupational therapy exercises and improve adherence to the rehabilitation programme (RP). The kit consisted of 1 ping-pong ball, 1 anti-stress ball, 1 plastic coin, 2 rubber bands, 2 beans and 10 paper clips, along with a registration handbook for handwriting occupational therapy exercises ($H_2$2OTE), which enabled patients to follow the programme and perform fine motor exercises (hand manipulation, finger isolation, finger flexion and extension and coordination). The RP was implemented in Portuguese and includes handwriting exercises. The procedures implemented in this exploratory study were subject to registration (www.clinicaltrials.gov), scientific approval (Egas Moniz Scientific Council), and ethical approval (EM Ethics Committee), in accordance with the Declaration of Helsinki (Declaration of 1975, revised in 2000). Ten participants were recruited through Clínica de Fisioterapia Egas Moniz (Monte da Caparica), who, on their own initiative, began attending the clinic. Subjects who met the eligibility criteria following the initial clinical diagnosis were invited to participate and were fully briefed on the tests and rehabilitation program conditions. Those who agreed to participate in this study were asked to sign an informed-consent form. The collection, processing and dissemination of data were carried out anonymously. The rehabilitation kit was offered to the four subjects allocated to the Intervention Group (IG), while the remaining six were allocated to the control group (CG). Graphoscopic assessments were conducted at baseline (t0) and after 12 weeks (t1). Despite the limited number of participants, substantial improvements were observed in IG while results remained stable or showed minimal variation between T0 and T1 in CG. Specifically, in IG, handwriting scores decreased from 1.50 (SD=±0.577) to 0.500 (SD=±0.577); bradykinesia scores dropped from 11.3 (SD=±4.50) to 4.00 (SD=±2.94); and tremor scores were reduced from 2.25 (SD=±2.63) to 1.25 (SD=±1.26). These improvements represent clinically relevant gains in fine motor control and are particularly significant in the forensic context, where a reduction in micrographia (commonly influenced by bradykinesia and tremor) can enhance the consistency and legibility of handwriting, thus improving the reliability of forensic document examination. Based on the potentially beneficial clinical results and the qualitative feedback from participants' satisfaction questionnaires, which revealed a high level of adherence and satisfaction, the current kit will be further improved to integrate a sustainable approach, in which the inclusion of disposable clinical waste is intended prior to future clinical implementation.

Keywords: NEUROREHABILITATION; OCCUPATIONAL THERAPY; WRITING TRAINING INSTRUMENTS; IADL; GRAPHOSCOPIC ASSESSMENT

O.10 FUNGAL AND BACTERIAL GROWTH IN FOOD AS FORENSIC TIMERS: AN INDOOR PILOT STUDY†

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The use of microbial growth to estimate time intervals in forensic investigations has attracted increasing attention. Food remnants in domestic settings provide a suitable substrate for microbial colonisation, especially by fungi and bacteria. These organisms can serve as temporal indicators in cases such as unattended deaths, neglect, or prolonged absence from a residence. The objective of this study was to identify time-related microbial markers on common food items, with a particular focus on the relationship between elapsed time and the state of microbial colonisation. Consequently, 'elapsed time' denotes the number of days since the food was first left in the environment, thus simulating a postmortem or abandonment interval in forensic scenarios where the precise timing of the event is unknown. Banana and soup samples were placed in three indoor environments, observed and photographed regularly, with daily monitoring of temperature and humidity. Microorganisms were identified using morphological analysis and molecular techniques, including PCR and sequencing. The selection of food matrices was based on two criteria: their forensic relevance and their frequent occurrence in domestic settings. The utilisation of banana as a relatively homogeneous substrate facilitates enhanced experimental control and reproducibility. Conversely, soup constitutes a multifaceted and heterogeneous matrix, comprising numerous ingredients that collectively serve as proxies for the diversity of food residues commonly present in domestic environments. While complex matrices are known to present greater microbial variability and less predictable spoilage dynamics, their inclusion increases the applicability of findings to real forensic scenarios. Bananas produced the most consistent results. A progressive darkening of the peel was noted before visible microbial growth, suggesting potential as a time marker. Fungal colonies appeared around day 20, with *Meyerozyma caribbica* and *Penicillium citrinum* consistently detected in all environments. These species may serve as reliable indicators under moderate indoor conditions. *Penicillium citrinum* is a common contaminant of fruits and food products, frequently associated with spoilage *Meyerozyma caribbica* has been reported as a colonizer of plant substrates and a biocontrol agent in postharvest environments, indicating its adaptability in food-related settings. Based on the results, predictive models were developed to link time with banana peel changes and fungal growth. These models use accessible variables and offer practical value for forensic investigations in domestic settings. Early findings indicate that combining visual changes in banana peels with specific fungal patterns could significantly improve time estimations. The study continues with additional food types and replications, but current results underline the potential of forensic mycology as a supplementary method for determining post-event timelines.

Keywords: FUNGI; BACTERIA; FOOD; BIOMARKERS; FORENSIC MICROBIOLOGY

O.11 SEXUAL HARASSMENT IN HIGHER EDUCATION STUDENTS†

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In the European Union, from the age of 15, one in two women has experienced sexual harassment at least once in their lifetime. This complex phenomenon, although globally recognized, presents many gaps regarding its characteristics and diversity of impacts, particularly in the Portuguese context. The present study aims to improve a better understanding of sexual harassment in the context of Higher Education in Portugal, as well as some of the psychosocial factors associated with it, namely: distress, intrusive negative thoughts, academic investment, and resilience. A sample of 541 students from public and private Higher Education institutions (M = 22.57; SD = 4.71; Min = 18.00; Max = 60.00) participated in the study. The majority of participants were women (n = 420; 77.6%) and were currently enrolled in bachelor's (n = 271; 50.1%) or master's (n = 175; 32.3%) programs. Participants completed the following self-report instruments online: Sexual Experiences Questionnaire, Attitudes Toward Sexual Harassment Scale, Distress Scale, Intrusive Negative Thoughts Scale, Academic Investment Questionnaire, and Resilience Scale. The Egas Moniz School of Health and Science Ethics Committee approved this study (Protocol No. 1307). Statistical analysis was performed with a significance level of $p \leq 0.05$. Initially, a descriptive analysis of the participants' sociodemographic characteristics and psychological variables was conducted in order to assess the normality of the sample and the reliability of the instruments through Cronbach's alpha. Following this, group comparisons were conducted based on gender, age, and victimization experience, using Chi-square tests, T-tests, or ANOVA. In addition, Pearson's correlation was used to analyse the association between the variables under study. Finally, a content analysis was carried out on the participants' answers regarding the meaning of sexual harassment. A prevalence of 14.4% of sexual harassment experiences was found, with 89.3% of the victims being women. The main perpetrators were male colleagues, with institutional parties and classrooms/laboratories being reported as the contexts where these unwanted behaviours most frequently occurred. Positive correlations were found between unwanted sexual experiences and distress, intrusive negative thoughts, and academic investment. These results highlight the need to develop more effective policies to prevent sexual harassment in the context of Higher Education, as well as to implement psychological intervention programs aimed at the victims of this abusive behaviour.

Keywords: SEXUAL HARASSMENT; UNWANTED SEXUAL EXPERIENCES; HIGHER EDUCATION STUDENTS; PSYCHOLOGICAL IMPACT; DISTRESS

O.12 IMPACT OF ANATOMY LEARNING USING CONVENTIONAL AR AND SIMPLIFIED AR LENSES†

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Learning anatomy demands memorizing massive amounts of textual information, accompanied by photos and illustrations, overloaded with labels, annotations and captions. Textual descriptions limit the understanding of spatial relationships among anatomical structures. Augmented Reality (AR) implementations have increased steadily since 2015 and have abridged a large swathe of health education, also in anatomy education. AR allows overlaying anatomical data on a user's own body, or that of their colleagues, creating a see-through scenario. Research Question 1 (RQ1): How effective are different forms of Augmented Reality (AR) lenses in enhancing anatomical concept retention and refreshment? Research question 2 (RQ2): Does the complexity of the anatomical concepts evaluated and the complexity with which they are presented influence concept retention and refreshment? Hypothesis 1 (H1) suggests participants engaging with Simplified AR (SAR) lenses will achieve superior outcomes compared to those using Conventional AR (CAR) lenses; Hypothesis 2 (H2) suggests participants will achieve superior outcomes in questions relating to less complex anatomical concepts. Methods: 2 types of anatomical lenses were developed (Lens Studio 5.7.1 by Snap Inc. to promote user created content for Snapchat): lenses that relied on CAR visualisation assets (high fidelity Three dimensional (3D) models), and lenses that relied on SAR visualisation assets (line-based representations of anatomical features), both providing on-body projection. Selected study subjects: muscles of the anterolateral thoracic wall and muscles of the anterolateral abdominal wall. 24 participants were randomly distributed into 2 groups: CAR group (12 participants, 12 females, mean age 20 (SD = 1.63)) and SAR group (12 participants, 8 females, 4 males, mean age 19.38 (SD = 0.62)). Protocol: 1. Explanation of the experimental protocol ; 2. Informed Consent form; 3. Demographic form; 4. 10 minutes for the pre-task anatomy knowledge quiz (10 multiple-choice questions with 1 correct option: 5 text-based and 5 image-based); 5. 2 to 3 min to experiment the AR lenses (without relevant anatomical content); 6. 10 minute study; 7. 10 minutes for the post-task anatomy quiz (same as pre-task); 8. VisEngage questionnaire; 9. System Usability Scale (SUS) questionnaire; 10. NASA-TLX questionnaire; 11. Semi-structured interview. All data were anonymised and statistically analysed. This work was submitted to and authorised by the Egas Moniz's ethics committee. Regarding Completion Times, VisEngage, SUS and NASA-TLX questionnaires, no differences were observed. Regarding scores, within-group improvements were only observed in the CAR group. Statistical significance was found in between the groups' raw quiz scores, with the CAR group consistently scoring better in the post-task test. Looking at groups individually, the SAR group showed the highest mean gain. Regarding efficiency gain, while both groups did not demonstrate statistically superior outcomes across the between group analyses, CAR consistently showed greater within-group improvement. H1 was not only unsupported but instead opposite to what was observed. The CAR group achieved better results than the SAR, particularly in questions related to less complex structures. This may indicate that high-fidelity 3D models, despite their complexity, provide more intuitive spatial cues for learners. Additionally, H2, was partially validated, in the CAR group.

Keywords: ANATOMY; ANATOMICAL LENSES; CONVENTIONAL; SIMPLIFIED

O.13 ROBOTIC GAIT TRAINING IN AN ADOLESCENT WITH IDIOPATHIC TRANSVERSE MYELITIS: A CASE REPORT†

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Transverse myelitis is a neurological condition characterized by acute focal inflammation of the spinal cord, often resulting in varying degrees of motor, sensory, and autonomic dysfunction. Its heterogeneous presentation, ranging from mild to severe motor deficits, presents diagnostic and therapeutic challenges—especially in paediatric populations. Early and intensive rehabilitation is essential to optimize neurological recovery and functional outcomes. Robotic-assisted gait training (RAGT), such as with the EKSO Bionics exoskeleton, has emerged as a promising modality. By promoting biomechanical alignment, enhancing motor control, and stimulating neural plasticity, RAGT facilitates gait re-education. In paediatric, it represents an innovative approach with the potential to improve walking, postural stability, and overall gross motor function. This case report aims to describe the functional impact of RAGT on gait quality in a teenager with incomplete spinal cord injury (SCI) secondary to idiopathic transverse myelitis. A 16-year-old male, diagnosed with idiopathic transverse myelitis involving the conus medullaris and extending cranially to D8, was classified as AIS B paraplegia with a neurological level of T11, underwent an intensive and multidisciplinary rehabilitation program. Four months post-injury, RAGT using the EKSO exoskeleton was introduced as an adjunct intervention to support sensorimotor integration, improve postural stability, and encourage symmetrical weight distribution during ambulation. Special emphasis was placed on correcting the difficulty in transferring weight onto the left lower limb while walking with a knee-ankle-foot orthosis. Following one month of twice-daily interventions conducted on weekdays, integrating conventional SCI rehabilitation with 11 sessions of RAGT administered 2 to 3 times per week, significant improvements were observed in biomechanical gait alignment—most notably in the capacity to transfer weight onto the more affected lower limb—as well as in upper trunk mobility, attributed to the attenuation of previously identified fixation patterns. Quantitative assessments demonstrated functional gains: gait speed increased (10-Meter Walk Test time reduced from 22 to 18 seconds), dynamic balance improved (Timed Up and Go Test time decreased from 22 to 17 seconds), effort tolerance was enhanced (distance in the 6-Minute Walk Test increased from 163 to 205 meters), and overall functional balance showed marked progress (Berg Balance Scale score rose from 14/56 to 25/56). The improvements in walking tests exceeded Minimal Clinically Important Difference criteria, reflecting meaningful functional progress and reinforcing the clinical validity of the intervention. No adverse events or excessive fatigue were reported during RAGT sessions. Robotic exoskeleton-assisted gait training, integrated into the rehabilitation protocol, proved to be a promising adjunct for functional recovery in an adolescent with incomplete paraplegia due to idiopathic transverse myelitis. Beyond improvements in spatiotemporal gait parameters, the intervention enhanced weight distribution, reduced compensatory strategies, and improved trunk mobility—key for safe, efficient ambulation. This case highlights the potential of robotic technologies as a complementary tool to conventional rehabilitation in SCI, especially in youth, where neuroplasticity and long-term quality of life are critical. Despite the single-subject design, it offers meaningful clinical insight into the feasibility and therapeutic value of RAGT in paediatric populations. Further studies are needed to confirm these findings and assess long-term outcomes.

Keywords: TRANSVERSE MYELITIS; NEUROLOGICAL REHABILITATION; PHYSIOTHERAPY; ROBOTIC EXOSKELETON; GAIT TRAINING

O.14 THE IMPACT OF A MODULAR CURRICULUM ON VETERINARY STUDENTS' QUALITY OF LIFE AND ACADEMIC KNOWLEDGE: PROOF OF CONCEPT†

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The veterinary programmes at Egas Moniz School of Health and Science (MIMV and LEV), follow a sequential, modular, and integrated curriculum that uses active learning to promote deep learning, making it ideal for studying innovative teaching strategies. Institutions are increasingly recognising key contributors to student's success, beyond individual ability, which include well-being and academic environment. Furthermore, there is a growing shift away from surface learning, which is based on memorisation, towards deep learning, which emphasises transforming knowledge for deeper understanding. In parallel, the importance of student mental health as a vital component of academic success is gaining recognition, prompting many institutions to implement strategies such as stress management to enhance the student experience. This pilot study aims to assess how the current curriculum impacts student well-being and "deep learning", thus supporting a healthier and more effective learning environment. A longitudinal study was conducted with two groups of veterinary students: those enrolled in the Veterinary Medicine (VM) programme from 2020/2021 to 2023/2024 (n = 143), and those enrolled in the Veterinary Nursing (VN) programme from 2022/2023 to 2023/2024 (n = 66). The WHOQOL-BREF questionnaire was used to assess students' quality of life in four different domains: physical, psychological, social relations and environment, being administered three times per academic year with a score range of 0-100. To evaluate deep learning, unannounced assessment tests were administered twice per academic year (once per semester) for completed course units with a score range of 0-20. A mean of all curricula units (CUs) per semester was calculated to compare both cohorts. Among VM students, the psychological domain consistently had the lowest well-being scores, ranging from 66.67 to 70.83. As the course continued, a decline was evident in several domains: a) in physical domain (67.86, 69.64, 53.57% for the 2ndnd, 3rdrd and 4thth years of the cohort 2021, respectively) b) in psychological domain (70.83, 66.67 and 64.58, for the 1ststst, 2ndnd and 3rdrd years of the cohort 2022). For VN students, a decline was observed in the environmental domain of the for the 1ststst, 2ndnd, 3rdrd years of the cohort 2022 (68.75, 62.50, 59.38). When we compared the two groups, VM consistently had higher well-being scores than VN students', even in the first survey. Regarding the VM assessment tests, the 2ndnd year of both cohorts (2021 and 2022 - first semester) showed lower mean scores (11 and 11.4). In the VN assessment tests, a lower mean was also found in the 2ndnd year (first semester), with a mean of 9.9 for cohort 2022 and 11.9 for cohort 2023. This pilot study highlights the complexity of studying two important factors that can directly affect academic outcomes in veterinary education: student well-being and deep learning. Overall, the quality of life of students appears to decrease throughout the course, and in the second-year course, students appear to struggle to retain knowledge. The results underscore the importance of continuous monitoring and support for student well-being. Furthermore, this study helped refine a new protocol that is set to begin in September 2025.

Keywords: MODULAR CURRICULUM; VETERINARY STUDENTS; WELL-BEING; ASSESSMENT TEST

O.15 A NEW HOPE FOR ANGELMAN SYNDROME: CHEMICAL PROFILING OF TURPENTINE OILS FOR THERAPEUTIC INTERVENTION†

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Essential oils are generally a complex mixture of volatile organic compounds extracted from plants, consisting mainly of terpenoids, mostly monoterpenes and sesquiterpenes, and are known for their bioactive properties. Recent studies have highlighted the neuroprotective potential of α-pinene and β-pinene, two major monoterpenes found in several essential oils, particularly in preclinical models of neurodegenerative diseases such as Parkinson's disease. These compounds have drawn growing interest due to their anti-inflammatory, antioxidant, and neuromodulatory properties. In this context, essential oils of turpentine (EOT), traditionally distilled from pine resin and rich in α- and β-pinene, have emerged as promising candidates for therapeutic exploration. Notably, their potential application has recently expanded to Angelman Syndrome (AS), a rare genetic neurodevelopmental disorder caused by loss of function of the *UBE3A*UBE3A gene in neurons. Currently, the product "Diamond G Forest 100% Pure Gum Spirits of Turpentine" is being used in an observational study involving AS patients, following anecdotal evidence from a caregiver who reported marked neurological improvements in her child after incidental exposure to turpentine. However, as the demand for essential oils increases, so does the risk of adulteration, which poses significant challenges to both their authenticity and therapeutic reliability. Therefore, this project aims to characterise the volatile organic compounds present in EOTs available on the market using gas chromatography coupled with mass spectrometry. The development and validation of a method for quantifying the main terpenoids identified in the EOTs is addressed. Verification of the labels was also performed to ensure that the information provided was according with the mandatory EU legislation in force. The results show that 6 of 8 EOTs analysed mainly comprise monoterpenes, with no significant difference in the percentage of α- and β-pinene (≈75%). However, variations were observed in the terpenoid profiles of 2 EOTs samples. Remarkably, one sample contained a relatively low percentage of α-pinene (≈30%) and showed the presence of eucalyptol. Another sample exhibited a very low percentage of β-pinene (≈3%) and a more complex analytical profile. These results suggest possible adulteration, as eucalyptol is not typically found in the pine species from which this EOT originated. Furthermore, the pinene content in both samples falls below the threshold required for classification as EOT, under ISO 11020:1998. Generally, the EOT labels analysed are in compliance with EU legislation, although within different legal frameworks: food supplements (2 in 8), food flavourings (1 in 8), cosmetics (1 in 8), and chemical products (2 in 8). The remaining EOTs are chemical products from USA, namely solvents (2 in 8). These findings highlight the importance of quality control of these products.

Keywords: ANGELMAN SYNDROME; ESSENTIAL OILS; GAS CHROMATOGRAPHY; TURPENTINE

O.16 ADVERSE CHILDHOOD EXPERIENCES AND PERSONALITY IN SEX OFFENDERS AND THE GENERAL POPULATION†

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Adverse childhood experiences (ACEs), such as abuse, neglect, family dysfunction, and violence, have a negative impact in adulthood, including an increase in criminal behaviour. Additionally, these experiences also influence the development of personality traits, such as conscientiousness and emotional stability, which are linked to self-regulation and psychological resilience. This study aims to compare a sample of the general population with a sample of sex offenders and a sample of rapist with a sample of child abusers on ACEs and personality. The study also aims to analyse the relationship between ACEs and personality in those samples. The sample consisted of 213 adult males from general population, 98 child molesters and 55 rapists. The participants answered a sociodemographic questionnaire, the Adverse Childhood Experiences Questionnaire, and the Ten-Item Personality Inventory. The Egas Moniz School of Health and Science Ethics Committee approved this study, and all the ethical and deontological aspects indicated in the Declaration of Helsinki were respected. Results showed that sex offenders score significantly higher than the general population in ACEs, extroversion, and emotional stability. When comparing child molesters and rapists, child molesters reported more frequent experiences of parental divorce during childhood than rapists. Rapists scored higher on extroversion and conscientiousness personality traits. In the sample of sex offenders, significant positive correlations were found between agreeableness and several ACEs subscales, including emotional abuse, emotional neglect, parental divorce, substance abuse in the family, imprisonment of a family member, and total ACEs. In the general population sample, a significant correlation was observed between openness to experience and exposure to violence. The study identifies the importance of addressing ACEs due to their potential influence on the development of maladaptive personality traits and association with an increased risk of sexual aggression. These findings emphasise the need for early intervention, awareness-raising campaigns, or the development of intervention protocols that meet the needs of individuals.

Keywords: SEX OFFENDERS; GENERAL POPULATION; ADVERSE CHILDHOOD EXPERIENCES; PERSONALITY.

POSTER COMMUNICATIONS

P1

One Health & Public Health

P.1 EXPLORING NITAZENES' CELLULAR TOXICITY†

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Drug abuse is a major contemporary issue, with numerous consequences for society. Synthetic opioids are the New Psychoactive Substances group with higher recent growth. Within this family, benzimidazole-opioids, commonly known as nitazenes, currently stand out, having been responsible for countless fatal and non-fatal intoxications worldwide. Due to the reported potency of nitazenes family, it is expected that target compounds may increase oxidative stress and other cellular dysfunctions, leading to cell autophagy and death. Nevertheless, given the novelty of these compounds, there is currently limited information available on the interaction of nitazenes with human cells. Therefore, the main objective of this work is to study the cytotoxicity mechanism of nitazenes and their metabolites. The cytotoxic properties of the selected nitazene derivatives were evaluated using SH-SY5Y (human neuroblastoma) cell lines. The cell culture procedure was optimised to ensure optimal performance in subsequent cytotoxicity tests. The impact on cell metabolic activity and cellular viability was screened using the MTT assay. The best conditions were obtained when 2 x $10^4$4 cells per well were used. Methanol, acetonitrile and DMSO were tested at several percentages under 1 % to assess their suitability as drug vehicles. Microscopy observation showed that DMSO is the most toxic among the three solvents. Between acetonitrile and methanol, there were no observable differences by microscopy. The same result was obtained using the MTT assay, where a 2-way ANOVA revealed no statistically significant differences in viability for all percentages under evaluation. In these assays, for methanol and acetonitrile, the cell viability results were higher than 80 %. Preliminary MTT assay results with nitazenes indicate that isotonitazene has a higher effect on cell viability than metonitazene, and that both nitazenes have a greater impact on cell viability than morphine. The obtained results clarify the extent of nitazenes' threat and provide insight into the possible relationship between their chemical structure and their toxicological effects on human health. This work is financed by national funds through the FCT - Fundação para a Ciência e a Tecnologia, I.P., under the project 2024.00812.BDANA. Centro de Química Estrutural is a Research Unit funded by Fundação para a Ciência e a Tecnologia through projects UIDB/00100/2020 (https://doi.org/10.54499/UIDB/00100/2020) and UIDP/00100/2020 (https://doi.org/10.54499/UIDP/00100/2020). Institute of Molecular Sciences is an Associate Laboratory funded by Fundação para a Ciência e a Tecnologia through project LA/P/0056/2020 (https://doi.org/10.54499/LA/P/0056/2020). CiiEM has provided support through Project 10.54499/UIDB/04585/2020, funded by FCT.

Keywords: DRUG ABUSE; NITAZENES; CYTOTOXICITY; HUMAN CELLS

P.2 AN LC-MS/MS APPROACH FOR THE DETECTION OF ALCOHOL BIOMARKERS (PETH HOMOLOGUES) AND RECREATIVE DRUGS IN BLOOD†

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The use of alcohol and other substances of abuse presents significant risks, including dependency, health complications, and amplified dangers from polysubstance use. In this study, a multianalyte liquid chromatography tandem mass-spectrometry (LC–MS/MS) method was developed for the determination of cocaine and its alcohol-derived metabolites, as well as three PEth (phosphatidylethanol) homologues and ten other drugs and metabolites in whole blood. Sample preparation was performed by liquid-liquid extraction using a solvent mixture of heptane/ethyl acetate/2-propanol. Chromatographic separation was achieved on a C_{18}18 column, with a mobile phase of 0.025 % ammonia, pH 10.7 and methanol. The method was fully validated. Inter-assay precision and accuracy were < ± 16 % for the PEth homologues at five of the seven tested concentrations; the local anaesthetics, buprenorphine and lysergide (LSD) were < ± 15 % at six concentrations; the opioids, cocaine and its metabolites were < ± 16 % at all concentrations. Recovery was within 42-79 % for 15 compounds and 11 % for benzoylecgonine. Matrix effects were minimal for eight compounds, while LSD and four of the five opioids presented ion enhancement, and the PEth homologues showed ion suppression. However, internal standards compensated for these effects. The validated method is precise, accurate, robust and sensitive. It is designed for the determination of cocaine, cocaethylene, crack cocaine, PEth homologues and other drugs and their metabolites in whole blood. Additionally, by including multiple drug classes in one analytical run, the method permits the detection of polysubstance use. Furthermore, including three PEth homologues allows for a more accurate estimation of time of consumption and the level of alcohol intake. This makes it highly useful in forensic toxicology for drug identification, clinical monitoring to assess drug use, and legal or workplace drug testing.

Keywords: LC-MS/MS; PHOSPHATIDYLETHANOL; DRUGS; BLOOD

P.3 ASSESSMENT OF THE 4-AMINOPHENOL COLORIMETRIC METHOD TO DIFFERENTIATE BETWEEN CANNABIDIOL-RICH AND Δ9-TETRAHYDROCANNABINOL-RICH CANNABIS PLANTS†

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Portugal currently holds the position of the second-largest producer of medical cannabis within the European Union, with a documented production of approximately 32.5 tonnes for the year 2024. Portugal also sustains a substantial production of hemp for industrial purposes, encompassing a diverse range of applications that include animal feed, textile manufacturing, and even medicinal uses due to its high concentration of Cannabidiol (CBD). Differentiation between medicinal cannabis and hemp depends on their concentration of Δ9-Tetrahydrocannabinol (Δ9-THC). Plants are categorised as hemp solely if they possess a maximum Δ9-THC concentration of 0.2% (w/w) relative to the dry weight of the plant. Precise differentiation between these two varieties of plants is essential for law enforcement, regulatory compliance, and the legal distribution of cannabis products. Nonetheless, among the traditional colorimetric methods employed for the identification of Δ9-THC and CBD, only the 4-aminophenol (4-AP) assay possesses the capability to differentiate between plants characterised by a high content of Δ9-THC and those with an elevated content of CBD, as it generates a pink hue in the presence of CBD and a blue hue in the presence of Δ9-THC. Previous studies have demonstrated that this test possesses an observation window ranging from five minutes to two hours [4,5]. Beyond this period, a black by-product generated from the oxidation of the excess 4-AP begins to significantly affect the colouration of the solutions. To mitigate this issue, this test should be conducted using a stoichiometric ratio of 1:1 between the 4-AP and the cannabinoid in order to decrease the amount of available 4-AP subject to oxidation. To assess the stability of reaction products formed between CBD or Δ9-THC and 4-AP, specifically the CBD-indophenol and THC-indophenol chromophores, we monitored the absorbance (at 636 nm for THC and 510 nm for CBD) of various reaction mixtures over a 24-hour period using a Tecan Microplate Reader Infinite 200 Pro. These mixtures incorporated solely one of the cannabinoids at concentrations of 0.86, 0.43, 0.086, 0.043, 0.0086, and 0.0043 mg/ml, which correspond to stoichiometric ratios of 1:1, 1:5, 1:10, 1:50, 1:100, and 1:500 between 4-AP and the cannabinoid. The obtained results indicated an increase in absorbance over the initial two hours for both compounds, followed by a significant decrease in absorbance over the subsequent twenty-two hours for CBD, whereas Δ9-THC remained relatively stable. This increase in absorbance during the initial two hours was similarly observed in the reference solutions, in which the cannabinoid was substituted with methanol, indicating that, within the first two hours, alongside chromophore formation, oxidation of the 4-AP also occurs to a substantial extent. The 4-aminophenol (4-AP) provides a straightforward methodology for distinguishing between CBD- and Δ9-THC-dominant cannabis based on distinct chromophores. While both complexes exhibit strong initial absorption, the excess 4-AP undergoes rapid oxidation, particularly in reactions involving CBD (slower reaction with 4-AP), which diminishes the reliability beyond the first few minutes. These findings emphasise the necessity for stoichiometric control and prompt measurement, thereby reinforcing the assay's utility as a rapid screening tool for short-term analysis.

Keywords: COLORIMETRIC ASSAY; 4-AMINOPHENOL; CANNABIDIOL (CBD); Δ9-TETRAHYDROCANNABINOL (Δ9-THC); CANNABIS DIFFERENTIATION

P.4 COMPARATIVE ANALYSIS OF TETRAHYDROCANNABINOL AND CANNABIDIOL LEVELS IN CANNABIS SATIVA L. SAMPLES COLLECTED AT MUSIC FESTIVALS IN PORTUGAL†

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Cannabis sativa L. is cultivated for industrial purposes in more than 86 countries, and this practice is permitted by law. The primary psychoactive constituent, delta-9-tetrahydrocannabinol (Δ9-THC), exerts its effects by interacting with CB1 receptors within the central nervous system, thereby inducing a range of physiological and neuropsychological responses. The rising interest in cannabinoids, both natural and synthetic, has prompted forensic and toxicological investigations, particularly in recreational contexts such as music festivals. In such settings, the detection and characterisation of active compounds are imperative for public health monitoring and intervention. Current legislation in the European Union, as well as in Portugal and the United States, permits the cultivation of industrial hemp with a Δ9-THC content of up to 0.3% (w/w). The objective of this study is to evaluate the variations in the levels of various cannabinoids, with a particular emphasis on Δ9-tetrahydrocannabinol (THC), cannabidiol (CBD), and synthetic cannabinoids in cannabis samples obtained from multiple music festivals held in Portugal during the summers of 2023 and 2024. The analyses were conducted at the Egas Moniz Forensic and Psychological Sciences Laboratory, employing high-performance liquid chromatography with diode array detector (HPLC-DAD) and gas chromatography coupled to mass spectrometry (GC-MS). These methodologies have been validated as effective analysis techniques for complex matrices. This is the first study in Portugal to integrate chemical analysis of authentic cannabis samples with socio-demographic and behavioural data collected at music festivals. The study's findings suggest the imperative for persistent vigilance, encompassing both laboratory detection and the evaluation of consumption contexts. Furthermore, the use of robust methodologies such as HPLC-DAD and GC-MS in identifying natural cannabinoids and potential adulterants contributes to the development of more effective public policies and evidence-based health interventions. A total of 73 samples were analysed, 51 from 2023 and 22 from 2024. During the study, the presence of Δ9-THC and CBN was detected in all of the samples from both years. Furthermore, the CBN amount found was higher than expected, suggesting the possibility of oxidative degradation of Δ9-THC. The presence of CBD and CBG was detected in many, but not all, samples from both years. The analysis failed to identify the presence of synthetic cannabinoids in any of the samples at the time. However, the presence of cocaine was detected in a sample from 2023, indicating the potential contamination or intentional adulteration. Concurrently, 2,476 questionnaires were collected from festival attendees, aiming to characterise festival attendees' consumption profile of psychoactive substances. The socio-demographic analysis indicated a high prevalence of cannabis use, especially among individuals with an age range from 19 to 26, predominantly males. Approximately 45 per cent of respondents indicated that the festival environment exerted a direct influence on their consumption patterns.

Keywords: CANNABIS; DELTA-9-TETRAHYDROCANNABINOL; CANNABIDIOL; HPLC-DAD; GC-MS

P.5 MEASLES VACCINATION†

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Measles is a contagious viral infection, the prevention of which relies on vaccination. Despite the proven efficacy of the vaccine, recent outbreaks – such as those reported by the World Health Organization (WHO) in 2023 – highlight the vulnerability of herd immunity when vaccination coverage declines. In Portugal, coverage remains above 95%; however, epidemiological surveillance continues to be crucial, as demonstrated by the 35 confirmed cases in 2024. This study aimed to assess the knowledge and perception of students at the Egas Moniz School of Health & Science regarding measles and its corresponding vaccine, as well as their level of confidence in the vaccine. An observational, descriptive, and cross-sectional study was carried out using an online questionnaire via Google Forms, consisting of multiple-choice questions and two evaluation tests with a numerical scale, resulting in 197 valid responses. The sample was predominantly female, of Portuguese nationality (65.5%), with an average age of 20.5 years. It was found that 89.8% of respondents had been vaccinated against measles, and 86.8% had completed the full two-dose schedule. In terms of knowledge, 72.6% incorrectly believed that measles can be caused by both viruses and bacteria, and 19.8% thought that the disease had been eradicated. A good level of confidence in the vaccine was observed (mean score of 7.93/10). The perceived health risk associated with vaccination was moderate (mean score of 2.55/5). Given the recent increase in measles cases, this study highlights the importance of strengthening health literacy, combating misinformation among future healthcare professionals, and contributing to adherence to the National Vaccination Programme. The study was conducted in accordance with ethical standards. An online questionnaire included an informed consent section, where participants explicitly authorized the anonymous use of their responses for research purposes. Participation was voluntary, and respondents could choose not to participate or withdraw at any time.

Keywords: MEASLES; VACCINATION; HEALTH LITERACY; UNIVERSITY STUDENTS; HEALTHCARE

P.6 CLINICAL PILATES AS A STRATEGY TO PROMOTE PHYSICAL ACTIVITY IN HEALTHCARE PROFESSIONALS OF THE LOCAL HEALTH UNIT (ULS) ALMADA-SEIXAL WITH MUSCULOSKELETAL PAIN†

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Regular physical activity is essential in the prevention and management of low back and neck pain, both musculoskeletal conditions that are highly prevalent among healthcare professionals. Due to the nature of their work, which involves long periods of standing, repetitive movements, and physical effort, these professionals are particularly vulnerable. Regular physical activity can help preventing the development of musculoskeletal pain conditions, improving functionality and quality of life for these professionals, and consequently enhancing their work performance and well-being. Our goal was to analyse a physical activity program involving Clinical Pilates and its benefits in terms of pain, functional disability, and quality of life among employees of the Local Health Unit of Almada-Seixal (ULSAS) experiencing neck and low back pain. Forty-six healthcare professionals participated in a supervised Clinical Pilates program, divided into two groups: neck pain (n=22; mean age 52.2±6.8 years; 95%♀) and low back pain (n=24; mean age 48.29±10.1 years; 92%♀). The participants underwent an 8-week supervised clinical Pilates program, with two 40-minute sessions per week, and were assessed at baseline and 8 weeks later. Each session was structured into three phases: warm-up (4 exercises, 8-10 repetitions, 1-2 sets), stability exercises (8-10 exercises, 10-12 repetitions, 1-2 sets) and stretching (4 exercises, 30-45 seconds each). The exercises progressed on a weekly basis, either by increasing motor complexity or by introducing external resistance with thera-bands, dumbbells or medicine balls. The neck pain group performed exercises focused on the deep neck flexors (DNF), as well as the scapular and lumbar-pelvic stabilizers, while the low back pain group performed exercises focused to the lumbar-pelvic stabilizers. Prior to the intervention, participants underwent a comprehensive assessment including flexibility (toe-touch test), muscle activation assessment, as well as pain and functional evaluations. Muscle activation was evaluated using the craniocervical flexion test (targeting the DNF) and palpation to assess the transversus abdominis muscle activation. Pain was assessed using the Numeric Pain Rating Scale (NPRS). Functionality was evaluated with the Neck Disability Index (NDI-PT) and the Quebec Back Pain Disability Scale (QBPDS-PT). Global perceived improvement was measured using the Global Perceived Effect Scale (GPES-PT), and health-related quality of life was assessed with the EuroQol (EQ-5D-PT) instrument. Helsinki principles were respected. The participants showed statistically significant benefits ($p<0.05$) compared to baseline values, with clinically relevant improvements in neck pain and lumbar function. This was followed by a perceived improvement reported by all participants (5.4±1.1 points), as well as gains in flexibility (10±10.2 to 5±6.7 cm) and activation of the target muscles - DNF in the cervical group (23±1.9 to 27±2.4 mmHg) and transverse abdominis in the lumbar group (11.1±2.6 to 34.7±6.7 sec). Supervised Clinical Pilates highlights the potential of structured physical activity as an effective strategy for managing low back and neck pain, particularly among healthcare professionals. In addition to its relevance for this population, the approach can be adapted and extended to other populations with similar needs.

Keywords: PHYSICAL ACTIVITY; NECK PAIN; LOW BACK PAIN; CLINICAL PILATES

P.7 ATTITUDES TOWARD COMMUNITY SERVICE AMONG HEALTH SCIENCES STUDENTS: A CROSS-SECTIONAL STUDY AT EGAS MONIZ SCHOOL OF HEALTH & SCIENCE†

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University Social Responsibility (USR) has become a cornerstone of higher education, integrating institutional goals with ethical principles, civic participation, and sustainable development. As higher education institutions evolve to meet 21st-century demands, students are increasingly expecting meaningful engagement with social issues as an integral component of their academic journey. This study evaluated attitudes toward community service among students at the Egas Moniz School of Health & Science, focusing on four key dimensions: *Perceived Need to respond, Moral Obligation to respond*, *Reassessment*, and Engaging in *Helping Behaviour*. A descriptive, observational, cross-sectional design was used. Data was collected via Google Forms from March to July 2024 through the Portuguese Community Service Attitudes Scale (CSAS-P), a validated 46-item instrument based on a seven-point Likert scale. The study was approved by the Egas Moniz Ethics Committee (Process No. 1106 of 30/06/2022), and participation was voluntary, anonymous, and based on informed consent. A total of 529 students responded (mean age 20.7 ± 4.5 years; 74.5% female). Most were Bachelor's students (87.5%), followed by Master's (12.3%) and PhD students (0.2%). Most respondents (55.5%) were in their second or third year of a Bachelor program. Participants represented a range of health science disciplines: Dental Medicine (DM) (51.6%), Physiotherapy (PT) (27.8%), Psychology (Psy) (10.2%), Pharmacy (PH) (5.3%), Nursing (N) (2.5%), and Biomedical Sciences (BMC) (2.6%). While 52.9% had prior volunteer experience, 75.2% reported no participation in community service since beginning their academic studies, indicating a drop in civic engagement during university years. Only 4.3% reported weekly participation. Chi-square analysis revealed a significant association between academic program and prior community experience ($p < 0.001$), particularly among Dental Medicine and Physiotherapy. While no significant gender differences were observed, program-specific differences emerged. Pharmacy students scored significantly higher in *Ability* (vs. BMC: $p = 0.006$; DM: $p = 0.022$; PT: $p = 0.030$), *Connectedness* (vs. PT: $p = 0.019$; Psy: $p = 0.044$), and *Norms* (vs. BMC: $p = 0.007$; Psy: $p = 0.006$; PT: $p = 0.004$; DM: $p = 0.016$). Dental Medicine students scored higher in perceived *Benefits*Benefits (vs. PT: $p = 0.040$). A marginal association was found between year of study and involvement in community work ($p = 0.064$), suggesting greater engagement during later academic years or clinical phases. Although the results do not show statistically significant differences across all dimensions, the findings highlight important program-specific trends. Disciplines with more immediate patient interaction or practical training appear to foster a stronger identification with social responsibility and service-oriented behaviour. However, intensive academic schedules may limit students' ability to engage in community service, despite considerable prior volunteer experience. This low current involvement suggests a disconnect between students' motivations and the structure of academic life. To bridge this gap, higher education institutions should integrate structured, discipline-specific community engagement into their curricula—especially within health-related programs. This approach will enhance civic responsibility as a cornerstone of professional identity, foster USR, and align educational practices with the United Nations Sustainable Development Goals.

Keywords: UNIVERSITY SOCIAL RESPONSIBILITY; COMMUNITY SERVICE; HIGHER EDUCATION; STUDENT ATTITUDES; CIVIC ENGAGEMENT

P.8 A ONE HEALTH PERSPECTIVE ON THE CLINICAL, BEHAVIOURAL, AND ENVIRONMENTAL RISKS OF CHRONIC PROTON PUMP INHIBITOR USE IN THE ELDERLY†

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The One Health concept, which recognizes the interdependence of human, animal, and environmental health, underscores the importance of protecting vulnerable populations such as older adults, who are particularly susceptible to environmental stressors, chronic illness, and the cumulative effects of polypharmacy. This study investigates the long-term use of proton pump inhibitors (PPIs) in community-dwelling older adults, focusing on clinical safety, lifestyle choices, and environmental implications. Data were collected from two consecutive cohorts assessed during 2023–2024 and 2024–2025, comprising 246 individuals aged 65 years and older. Among these, 80 participants (32.5%) were identified as chronic PPI users. Esomeprazole (20–40 mg) emerged as the most frequently prescribed agent, followed by pantoprazole (20–40 mg) and omeprazole (20 mg), with average treatment durations exceeding six months in most cases. The average age of PPI users exceeded 75 years. Polypharmacy was prevalent, with PPI users taking an average of 7.5 concurrent medications. A pharmacological review identified 293 moderate drug interactions (affecting 70% of PPI users) and 48 serious interactions (31.3%). Additionally, 28.8% of patients on PPIs were also prescribed corticosteroids, non-steroidal anti-inflammatory or other drugs associated with gastric toxicity, potentially justifying PPI co-prescription but also underscoring the need for regular benefit-risk assessments. In elderly patients, age-related pharmacokinetic changes increase the likelihood of adverse outcomes from prolonged PPI use, including nutrient malabsorption, increased infection risk, and potentially even cognitive decline. Emerging evidence suggests an association between chronic PPI use and heightened risk of dementia, reinforcing the call for cautious, individualized prescribing and ongoing therapy review. Importantly, PPIs are photosensitizing drugs that may contribute to UV-induced skin damage. Yet, in our analysis, 90% of users reported rarely or never using sunscreen, revealing a gap in preventive education. Lifestyle analysis showed additional behavioural risk factors: 6.25% of users were current smokers, 58.8% consumed coffee regularly, and 53.8% consumed alcohol—all of which can exacerbate gastrointestinal symptoms or interfere with drug metabolism, potentially prolonging or complicating treatment. Despite 83.8% of PPI users having a designated family doctor, the data suggest limited therapeutic reassessment and little emphasis on behavioural counselling, representing missed opportunities for deprescribing and lifestyle optimization. From an ecological perspective, PPIs are increasingly detected as emerging contaminants in wastewater and surface water. Their persistence in the environment raises concerns about their potential role in promoting antimicrobial resistance and disrupting aquatic ecosystems. Given the widespread and chronic nature of PPI use in aging populations, the ecological footprint of these pharmaceuticals cannot be overlooked. These findings highlight the need for a comprehensive, One Health–aligned approach to PPI prescribing in older adults. Interventions should include regular medication reviews, enhanced photoprotection education, and behavioural counselling to address modifiable lifestyle risks. Healthcare systems can lessen vulnerabilities and encourage patient-centred, sustainable care that is consistent with One Health principles by incorporating clinical, behavioural, and environmental factors into geriatric pharmacotherapy.

Keywords: ONE HEALTH; PROTON PUMP INHIBITORS; ELDERLY; POLYPHARMACY; ENVIRONMENTAL CONTAMINANTS

P.9 SCREENING OF MEDICINAL PLANT EXTRACTS FOR ANTIRETROVIRAL ACTIVITY: PRELIMINARY INSIGHTS TOWARDS HIV THERAPY†

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HIV/AIDS remains a well-known global infectious disease, with a disproportionate burden in tropical regions. These areas face numerous risk factors that contribute to increased transmission and the development of drug resistance, posing a serious threat to global health. As a result, there is an urgent need for the development of new antiretroviral therapies. We seek new and more potent plant-derived molecules with antiretroviral activity. Based on ethnopharmacology and phytochemistry literature, five medicinal plants that grow in Portugal and have compounds showing activity against HIV/AIDS were selected: *Thapsia villosa* L., *Dittrichia viscosa* (L.) Greuter subspecies *viscosa* and *revoluta*, *Carpobrotus edulis* (L.) N.E. Br and *Brassica oleracea* (L.) var. *italica* (*B. o. italica*). Each plant was chosen based on taxonomic identification, geographical distribution, biomass availability, seasonal growth patterns, and optimal collection periods. Phytochemicals reported in these plants, with antiretroviral properties, were assessed for oral bioavailability using Lipinski's Rule of Five, an essential criterion for drug-likeness. Plant parts were cleaned and lyophilised for dry weight determination. Crude extracts were prepared using appropriate methods depending on compound class, including Soxhlet (dichloromethane) for *Thapsia villosa* L. roots and leaves; ethanolic maceration for *Dittrichia viscosa ssp. viscosa* leaves and inflorescences at flowering and fruiting stages, as well as *Dittrichia viscosa ssp. revoluta* leaves; aqueous maceration for *Carpobrutus edulis* L. leaves; and aqueous maceration plus dichloromethane liquid-liquid separation for *B.o. italica* leaves and inflorescences. Plant material extraction yield was determined. A total of nine extracts were obtained. Stock solutions were prepared in dimethyl sulfoxide at 25 mg/ml to uniformise the concentration of the extracts. The 50% cytotoxicity concentration (CC_{50}50) of extracts and reference compounds (100-0.78 µg/ml), reported in *B. o. italica*, was determined by a fluorometric method on TZM-bl cells. Anti-HIV screening activity of the extracts and reference compounds, at a single dose of 25 µg/ml, was conducted on TZM-bl cells against primary HIV-1 isolate 01PTHDECJN to determine the maximum percentage of inhibition (MPI). Extracts and/or compounds with ≥70% MPI were selected as potential candidates and underwent 50% inhibition concentration (IC_{50}50) estimation. Selectivity index (SI=CC_{50}50/IC_{50}50) was calculated. All selected plant species analysed have medicinal compounds with favourable bioavailability Lipinski's profiles. Cytotoxicity and anti-HIV screening activity results showed that all extracts presented antiretroviral activity and were not cytotoxic at 25 µg/ml. Four extracts, *Thapsia villosa* L. roots and leaves, and *Dittrichia viscosa ssp. viscosa* inflorescences at flowering and fruiting stages, showed ≥70% MPI and were selected for IC_{50} 50 estimation. All four extracts exhibited low IC_{50} 50 values (< 5µg/ml) and SI values > 10, providing maximum antiviral activity with minimal cell toxicity. These findings support further investigation of these extracts, including phytochemical characterisation and evaluation of antiplasmodial activity against *Plasmodium falciparum*, aiming at identifying dual-action candidates for HIV/AIDS and malaria co-endemic regions.

Keywords: MEDICINAL PLANTS; PHYTOCHEMISTRY; CO-INFECTION THERAPY; ANTIRETROVIRAL ACTIVITY; DRUG RESISTANCE

P.10 THE TRENDS OF PORTUGAL'S 100 MOST POPULAR SUNSCREENS: A COSMETIC CONSUMER PROFILING STUDY†

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Due to its high exposure compared to other organs, the skin is highly susceptible to physical aggressions. Among these stressors, ultraviolet (UV) radiation is particularly significant, as it is the leading cause of photoageing, sunburn, skin sensitisation, and malignancies such as skin cancer. With the rise of an ageing population and increasing health literacy, the use of sunscreens is becoming more prominent. No longer reserved solely for beach outings, sunscreens are increasingly recognised as essential cosmetic products for daily use. This study aims to present a comprehensive and up-to-date overview of the 100 most popular sunscreens available on the Portuguese market. The top 100 best-selling sunscreens in Portugal were identified using the IQVIA® database. The products were selected based on sales from the previous year, with a minimum threshold of 100,000 units sold. Solely products available in pharmacies and parapharmacies were considered. For each product, the name, dosage form, composition, and number of units sold in Portugal were collected. Ingredients were listed according to the International Nomenclature of Cosmetic Ingredients. The data was subsequently organised according to the following parameters: UV filters, dosage forms, excipients and their functions, presence of natural ingredients, and the leading commercial brands in the market. The results revealed that the top four cosmetic brands in the sunscreen market are: Avène® (396,447 units sold in the last year, represented by 40 products), Isdin® (269,489 units, 33 products), La Roche-Posay® (108,225 units, 12 products), and finally Uriage® (107,643 units, 25 products). Among the analysed products, fluid sunscreens were the most common (35.5%) and preferred dosage forms among consumers, followed by traditional creams, lotions, and stick formulations. The most frequently used UV filters were: (i) diethylamino hydroxybenzoyl hexyl benzoate; (ii) ethylhexyl triazone; (iii) phenylene bis-diphenyltriazine; (iv) bis-ethylhexyloxyphenol methoxyphenyl triazine. These filters are part of a new generation of chemical sunscreens, available in Europe. At present, 25 organic UV filters are regulated as cosmetic ingredients by the European Commission (Regulation (EC) Nº1223/2009, Annex VI). However, the FDA is far stricter, only allowing 16 filters. All formulations contained humectants aimed at improving skin hydration. Glycerine was the most common excipient across all four leading brands, followed by caprylyl glycol and panthenol. Furthermore, all products featured natural ingredients of botanical origin, most frequently including *Oryza sativa* (L.) starch, *Butyrospermum parkii* (shea butter), and *Helianthus annuus* (L.) seed oil. The inclusion of natural ingredients in sunscreen formulations is important from a consumer point of view, but also because some natural compounds can help to decrease the UV-filters concentration, which is highly beneficial as some filters present a detrimental impact on marine ecosystems, such as coral reefs. Experimental studies performed with shea butter, showed an improvement in the chemical photostability of formulations, as shea butter acted as a sacrificial substrate, but also in an enhanced SPF by 35%. This study provides a detailed overview of the most widely used sunscreens in Portugal, reflecting current consumer preferences and formulation trends.

Keywords: SUNSCREENS; MARKET; DOSAGE FORMS; COMPOSITION

P.11 CHARACTERIZATION OF POTENTIALLY INAPPROPRIATE MEDICINES IN INSTITUTIONALISED ELDERLY USING THE EU(7)-PIM LIST†

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Demographic ageing represents an increasing challenge for healthcare systems due to the high prevalence of chronic conditions and the complexity of therapeutic management in the elderly population, who are frequently exposed to polypharmacy and a heightened risk of iatrogenesis. The use of potentially inappropriate medications (PIMs), whose benefit-risk ratio is unfavourable under certain clinical circumstances, constitutes a major risk factor for adverse drug reactions, functional decline, and avoidable morbidity and mortality. The EU(7)-PIM list, developed by experts from seven European countries, is a valuable tool for identifying PIMs. This study aimed to apply the version of the list adapted to the Portuguese context to an institutionalised population in the Setúbal region, in order to identify and characterise the prescription of PIMs, assess the associated risks, and propose clinically appropriate therapeutic alternatives where necessary. A retrospective, observational, and descriptive study was carried out, with collection of clinical and pharmacotherapeutic data from 11 randomly selected institutionalised patients who agreed to participate in the study, following informed consent and pre-established inclusion criteria. The data were anonymised and analysed individually for the presence of PIMs, potential adverse drug reactions, and relevant pharmacological interactions. The average age was 86.5 years, with 8 female patients. The mean number of prescribed medications was 12.2 per patient, with a total of 25 PIMs identified, corresponding to an average of 2.3 PIMs per patient. Only one patient had no PIMs, and the maximum observed was nine. A total of 160 drug interactions were recorded, 42 of which involved PIMs. The most frequently implicated therapeutic classes included proton pump inhibitors (A02B), antidepressants, laxatives (A06A), opioids (N02A), and antipsychotics (N05A), all associated with relevant risks such as bone fractures, vitamin B12 deficiency, gastrointestinal infections, anticholinergic effects, sedation, confusion, and falls. These findings reveal a significant prevalence of inappropriate prescribing and clinically relevant interactions in institutionalised elderly patients. The application of tools such as the EU(7)-PIM list can reinforce and aid the pharmacist's role as a clinical key player in promoting safer, more effective, and individualised pharmacotherapy in institutional settings.

Keywords: POTENTIALLY INAPPROPRIATE MEDICATIONS (PIMS); INSTITUTIONALISED OLDER ADULTS; POLYPHARMACY; MEDICATION REVIEW; EU(7)-PIM LIST

P.12 UNDERSTANDING THE CROWD EFFECT: BEHAVIOURAL AND EEG RESPONSES TO NATURAL AND URBAN DENSITY AND THEIR IMPLICATIONS FOR SOCIAL VULNERABILITY†

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While crowds significantly influence our emotional and cognitive experiences, the neural mechanisms underlying human responses to varying levels of crowd density in everyday built and natural environments remain poorly understood. As urbanisation intensifies, elucidating these mechanisms is crucial for informing domains such as urban planning, environmental design, and mental health. This study examines the impact of crowd density on behaviour and brain activity, with a focus on how these effects differ between built and natural urban environments. Specifically, it aims to: (1) assess how varying levels of crowd density influence emotional responses, particularly in terms of valence and arousal; and (2) investigate how the interaction between environmental context (natural vs built) and crowd density modulates neural responses. The sample comprised 20 participants (13 Portuguese and 7 foreign nationals), aged between 20 and 36 years (M = 26.15; SD = 4.13), with an approximately normal distribution and a median age of 25 years. Of the participants, 9 identified as female (M = 26.44; SD = 2.74) and 11 as male (M = 25.91; SD = 5.13). Female participants ranged in age from 22 to 31 years, while males ranged from 20 to 36 years. In this study, participants watched first-person videos of urban environments, and their individual neural affective responses were analysed. The task of this experiment consisted of three phases: (1) a fixation phase with a white screen (250–500 ms) followed by a black dot (250 ms); (2) a video phase, beginning with a still frame of a location in Lisbon (1 s), followed by a 20-second video; and (3) a self-assessment phase, during which participants rated the video for valence and arousal. This sequence was repeated for a total of 72 videos. Throughout the entire task, neural activity was recorded using a high-density 256-channel EEG system (EGI 400 series). The primary variables under investigation include crowd density (low vs high), environmental context (natural vs built), emotional responses (valence and arousal), and neural activity, measured via EEG. The study protocol was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of the Faculty of Medicine, University of Lisbon (Ref. No. 81/22, dated 26/12/2022). Findings indicate that high crowd density is associated with lower valence and higher arousal, suggesting that crowded environments are perceived as less pleasant and more emotionally intense. EEG data reveal increased neural activation under high-density conditions, reflecting elevated cognitive or emotional engagement. These effects were consistent across both natural and built settings. However, natural environments with low crowd density elicited the highest pleasantness ratings. This research highlights the complex interplay between social density and environmental context in shaping emotional experience and neural activity. These insights have practical implications for urban design and public health, offering evidence-based strategies to promote mental wellbeing in densely populated areas.

Keywords: CROWD DENSITY; EEG; URBANISATION; EMOTIONAL RESPONSE; NEURAL ACTIVATION

P.13 BEHIND WORDS: INTERPRETING THE UNSPOKEN LANGUAGE†

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Paediatric orthodontic consultations rely extensively on non-verbal communication—including gestures, facial expressions, tone of voice, and environmental signals—which is pivotal in establishing trust, alleviating anxiety, and facilitating cooperation. Within this silent dialogue, dental practitioners must act as perceptive interpreters of children's and adolescents' often subtle behavioural cues. This study investigates how non-verbal exchanges are perceived and evaluated by both dental practitioners and their young patients during clinical orthodontic encounters. A cross-sectional study design was employed, involving a convenience sample of 180 dental practitioners and 180 paediatric patients (aged 6–24 years), all engaged in orthodontic appointments. Participants completed one of two purpose-developed, 34-item Non-Verbal Language Scales (NVLS): the NVLS-DP for Dental Practitioners and the NVLS-PP for Paediatric Patients. These Likert-type instruments assess five domains—facial expression, body gestures, paralinguistics, consultation environment, and psychosomatic manifestations. Demographic data, including age, sex, education level (patients), academic qualification and years of experience (practitioners), were also collected. Psychometric reliability was assessed using Cronbach's alpha, McDonald's omega, and average inter-item correlations. Comparative analysis of patient and dentist responses was conducted using Kendall's Tau correlations and visualised through density and bar plots. Comparative analysis of patient and dentist responses was conducted using Kendall's Tau correlations with significance levels adjusted via the False Discovery Rate (FDR) method and visualised through density and bar plots. Both NVLS versions demonstrated strong internal consistency (NVLS-DP: α = 0.81, 95% CI [0.77–0.85]; NVLS-PP: α = 0.85, 95% CI [0.82–0.88]), supporting their reliability in assessing perceptions of non-verbal exchanges. Dentists with less than two years of experience displayed more critical communicative behaviours. In contrast, those with over ten years of experience were more attentive to patients' psychosomatic indicators, such as elevated heart rate and fear-related gestures. Conversely, patient responses indicated high variability based on age, with older adolescents (18–24 years) perceiving the practitioner's tone as softer and expressing greater discomfort with certain procedural elements such as syringe usage. While FDR-adjusted tests did not reveal statistically significant demographic effects, unadjusted trends highlighted perceptual differences between subgroups. Comparative analysis across the 34 items revealed some divergences in interpretation; for instance, 68% of patients reported dental instruments as "frightening", in contrast to the much lower concern reported by practitioners. Notably, dentists also overestimated their ability to perceive patient pain. The NVLS constitutes a valid and internally coherent tool for evaluating non-verbal communication in paediatric orthodontic consultations. The study highlights the perceptual gap between practitioners and patients, which is shaped by differences in age, clinical experience, and psychosocial context. These findings support the integration of structured training in relational and nonverbal communication into dental education curricula, particularly at the undergraduate and postgraduate levels. Bridging the dentist-patient perceptual divide through targeted educational interventions may improve therapeutic alliances, reduce anxiety, and enhance treatment outcomes in paediatric orthodontic care. No ethical conflicts to declare.

Keywords: PAEDIATRICS DENTISTRY; NON-VERBAL LANGUAGE; DENTAL CARE; HEALTH COMMUNICATION

P.14 COMPARATIVE EVALUATION OF SONIC AND LASER-ACTIVATED IRRIGATION IN ROOT CANAL DISINFECTION USING 3D-PRINTED-TOOTH-REPLICAS†

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Advances in microbiology have clarified the complex nature of the microbiota involved in endodontic infections, showing that these microorganisms often organize into biofilms that adhere to root canal walls. This biofilm structure contributes significantly to the persistence of infections and increases the difficulty of effective treatment. Major challenges in endodontics include complex root canal anatomy and the resilience of microbial biofilms. Following mechanical shaping, irrigation plays a critical role by combining mechanical and chemical actions to enhance canal disinfection. To this end, various irrigation protocols have been developed to improve the removal of necrotic tissue, smear layer, and bacteria, thereby increasing treatment success. This study aimed to compare the effectiveness of sonic activation (EDDY) and Er,Cr:YSGG laser activation (2780 nm) in eliminating *Enterococcus faecalis* biofilms using a standardized in vitro model. Forty 3D-printed mandibular molar replicas with two mesial and one distal canal were used to simulate natural root canal morphology. The canals were inoculated with *E. faecalis* and incubated for 21 days to allow mature biofilm development. Three irrigation protocols were evaluated: conventional needle irrigation (CNI), sonic activation using the EDDY system (SA), and laser activation using an Er,Cr:YSGG laser (LA). A control group received phosphate-buffered saline (PBS) without activation. Two independent experiments were performed, each using 20 replicas (n=5 per group). The bacterial load was quantified by colony-forming unit (CFU) counts. Descriptive and inferential statistical analyses were conducted to assess CFU/mL differences across groups, with significance set at 5% ($p <= 0.05$). In both experiments, the CNI, SA, and LA groups demonstrated significantly lower CFU counts compared to the control ($p < 0.001$). In the first experiment, only the LA group reached the lower detection limit ($< \log_{10}$ CFU/mL of 1.00), indicating near-complete eradication. However, in the second experiment, both SA and LA achieved this threshold. This discrepancy may be attributed to the age of the sodium hypochlorite (NaOCl) solution used. In the first experiment, the NaOCl solution had been prepared 20 days earlier, and although stored in a dark container and shielded from light, its efficacy may have declined. In contrast, the second experiment used a freshly prepared NaOCl solution. These findings highlight the importance of using freshly prepared irrigants with reliable antimicrobial activity and support the premise that the effectiveness of sonic activation depends on the quality of the irrigating solution, whereas laser activation appears to be less affected by it. Overall, laser activation with Er,Cr:YSGG (2780 nm) demonstrated superior and more consistent performance in disrupting E. faecalis biofilms, highlighting its potential as a valuable adjunctive technique for enhancing disinfection in anatomically complex root canal systems.

Keywords: BIOFILM; ENDODONTIC IRRIGATION; SONIC ACTIVATION; LASER ACTIVATION.

P.15 DENTAL EROSION IN A COHORT OF ATHLETES: A CROSS-SECTIONAL STUDY†

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Dental erosion is a progressive loss of dental hard tissue caused by non-bacterial acids. Athletes may be at increased risk due to frequent consumption of acidic beverages such as sports drinks and adherence to specific nutritional routines. This condition can negatively impact both oral health and athletic performance. The aim of this cross-sectional study was to evaluate the prevalence of dental erosion in a cohort of adult athletes and to assess its association with behavioural and dietary habits. A total of 80 athletes (mean age: 24.2 ± 4.0 years; 70.0% male) participated. Data were collected through a self-administered questionnaire focused on dietary patterns and oral hygiene behaviours, followed by a clinical examination using the Basic Erosive Wear Examination (BEWE) index to determine the presence and severity of dental erosion. The results showed a dental erosion prevalence of 40.0%. Athletes who rated their oral health as "good" or "very good" had significantly lower BEWE scores ($p < 0.01$). Additionally, irregular dental appointments were associated with higher erosion scores ($p < 0.05$), while uncertainty regarding the frequency of meals correlated with lower erosion scores. Consumption of isotonic drinks was reported by 31.2% of participants, which is lower than typically observed in elite athletic populations. These findings suggest that dental erosion is a relevant concern among young adult athletes and highlight the importance of preventive strategies. Promoting regular dental visits, oral health awareness, and education about the risks of dietary habits—particularly the intake of acidic beverages—may contribute to reducing the prevalence and severity of erosion in sports populations.

Keywords: DENTAL EROSION; ATHLETES; ORAL HEALTH; BEWE INDEX; SPORTS DRINKS; SPORTS DENTISTRY; DIETARY BEHAVIOUR

P.16 OCCLUSION IN THE DECIDUOUS DENTITION†

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The prevalence of malocclusion is an important issue and needs to be detected early in childhood to ensure a healthy development of the occlusion and its stability in adulthood. Different occlusion parameters were analysed, such as the prevalence of diastems, primate spaces, overbite and overjet. For each of these parameters, with the exception of overbite and overjet, only the age and gender were taken into account, as well as the location (maxillary or mandibular). This clinical examination was carried out on a sample of 172 children of both sexes, aged 3-5 years, from the nursery schools "A Casinha Mágica", "O Nosso Jardim", "O Piparote" and "Seixal International School" and approved by Ethics Committee of Egas Moniz School of Health and Science. The clinical examination was carried out in the classroom using observation kits and disposable gloves. The study sample showed a high prevalence of malocclusion (98.8%), higher than other similar studies. Among the children observed, 24.4% had an increased overbite and 27.3% had an increased overjet. This last variable had a statistically significant negative correlation with age. The prevalence of diastems was 62.8% and had no statistically significant relationship between gender and age. The prevalence of overjet in the superior arch was 82%, with no significant correlation between sex and age, and in the inferior arch it was 66.3%. This existing correlation between overjet and age, that overjet decreases with age, has also been shown by other previous studies. The maxillary bone growth, the correlation of the nasopharynx and the reduction of deleterious habits are probably the reason for this decrease. In conclusion, the prevalence of malocclusion is increasing in the Sanitary District of Lisbon and Tagus Valley. In comparison with studies carried out in this area, it increased from 44.0% to 98.8%.

Keywords: PEDIATRIC DENTISTRY; DECIDUOUS DENTITION; MALOCCLUSION; CHILD; ORAL HEALTH

P.17 PREVALENCE OF MALOCCLUSION WITH CHILD EATING PATTERNS IN CHILDREN WITH MIXED DENTITION: AN OBSERVATIONAL STUDY†

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Malocclusion refers to a set of dento-facial anomalies that impair proper orofacial function or cause facial deformities. It results from complex interactions between genetic, behavioural, and environmental factors, especially during childhood and adolescence when the orofacial complex is developing. Approximately 79.4% of children with mixed dentition present with some form of malocclusion, highlighting its significance as a public health concern. Despite its high prevalence, there is a lack of studies in Portugal that comprehensively assess the factors influencing orofacial development and their impact on occlusal outcomes. This study aimed to estimate the prevalence of malocclusion in children with mixed dentition and its association with nutritional and non-nutritional habits during the first two years of life. This project was evaluated by the Egas Moniz Ethics Committee (process number: PT-277/24). This cross-sectional observational study was conducted on children attending the Egas Moniz Dental Clinic (Almada, Portugal) between January and May 2025. Prior to child inclusion, the parents/legal guardians signed the consent form and answered a self-reported questionnaire regarding the child on sociodemographic, nutritional, and non-nutritional habits during the child's first two years of life and oral hygiene habits. Clinically, occlusion was evaluated on the sagittal, vertical and transverse planes of reference and diagnosed based on Angle's classification. Overjet, overbite, crossbite, scissor bite, dental crowding and diastemas were evaluated in all cases. In total, 111 participants were included in the study, with a majority being female (50.5%), Caucasian (66.7%), and Portuguese (80.2%). Among the participants, the average age was 11 years. A significant proportion, 67.6%, reported brushing their teeth twice daily, while only 45% frequently used dental floss. Of the participants, 82.9% had been breastfed, with the majority with a duration between 1-24 months. 58.6% used a pacifier, and out of those participants 40% continued its use until the age of two. Additionally, 15.3% of the children had a history of thumb sucking, with 5.4% persisting in this habit at the time of observation. The prevalence of malocclusion was 72.1%, with class II malocclusion being the most prevalent (30.6%), comprising 18.9% division 1 and 4.5% division 2, and 7.2% regular class II, followed by an anterior crossbite at 20.7%. Overall, the prevalence of normal occlusion among the participants was 27.9%. This study showed a high prevalence of malocclusion (72.1%) among children with mixed dentition, which is within the values reported by other studies in similar age groups and dentition stages. The main result of this study points to a potential protective factor of breastfeeding when not associated with non-nutritional sucking habits. These findings reinforce the importance of identifying and controlling potentially deleterious oral habits early in childhood, as the mixed dentition period is considered a time for interceptive measures to stop the development of severe malocclusions and avoid their impact on aesthetics, function and quality of life.

Keywords: MALOCCLUSION; MIXED DENTITION; BREASTFEEDING; NON-NUTRITIONAL HABITS

P.18 THE EFFECT OF TEA TREE ESSENTIAL OIL IN THE TREATMENT OF GINGIVITIS†

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Gingivitis, considered the most prevalent periodontal disease, is an inflammatory condition limited to the free and attached gingiva, resulting from the accumulation of bacterial biofilm at or slightly below the gingival margin, without periodontal attachment loss. Chlorhexidine (CHX) is widely recognized as the gold standard in chemical plaque control and the treatment of gingivitis, due to its broad-spectrum antimicrobial activity and high substantivity in the oral cavity. When used as an adjunct to mechanical oral hygiene measures, it is the most commonly prescribed antimicrobial mouthwash, significantly reducing plaque accumulation and gingival inflammation. However, prolonged use of CHX is associated with several adverse effects, such as staining of dental surfaces and restorations, dysgeusia, paraesthesia, increased calculus formation, burning sensation, mucosal ulcerations, black hairy tongue, and parotid gland swelling. Tea Tree essential oil (TTO) (Melaleuca alternifolia) is known for its antibacterial, antiviral, anti-inflammatory, antifungal, immunomodulatory, antiseptic, and healing properties. Recent studies have demonstrated its bactericidal efficacy against *Streptococcus mutans*, without reporting significant adverse effects in the oral cavity. Although *S. mutans* is not directly associated with gingivitis, it plays a role in biofilm formation, the accumulation of which favours the onset of gingival inflammation. In this context, a randomised, controlled, single-blind clinical trial was conducted with 30 participants meeting inclusion and exclusion criteria including the presence of gingivitis and the absence of periodontitis, who were randomly allocated into two groups: the test group (n=15), which used a TTO-based mouthwash, and the control group (n=15), which used a CHX-based mouthwash. At the initial visit, participants underwent a questionnaire, photographic records, saliva collection to bacterial isolation and quantification, measurements of the Plaque Index (PI) and Gingival Index (GI), and scaling. Each participant received a coded bottle containing the assigned mouthwash and was provided with oral hygiene instructions and mouthwash usage guidelines for 15 days. After this period, the same clinical procedures were repeated, and saliva samples were also analysed in the laboratory to quantify bacterial content. Several *in vitro* tests were previously conducted to determine the optimal concentration of TTO to be used in the mouthwash. In both groups, there was a significant reduction in microorganism counts, as well as an improvement in PI and GI. However, in the control group, several side effects were reported, including taste disturbances, oral burning, staining of dental surfaces, intense taste, altered oral sensitivity, and tingling sensations. In the test group, significant improvements were also observed, with minimal adverse effects reported, limited to an intense taste and, in one case, a sensation of dry mouth. It is concluded that TTO represents a promising and well-tolerated alternative to CHX in the treatment of plaque-induced gingivitis.

Keywords: TEA TREE; CHLOROHEXIDINE; GINGIVITIS; *STREPTOCOCCUS MUTANS*

P.19 STUDY OF THE PREVALENCE OF TEMPOROMANDIBULAR DISORDERS ON TRADITIONAL BRETON MUSIC PLAYERS†

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This study aimed to assess the presence of signs and symptoms of temporomandibular disorders (TMD) in practitioners of wind instruments used in Traditional Breton Music. A total of 34 individuals, all aged between 18 and 62 years and regularly playing such instruments, participated in the study. Among them, 18 were Bombarde players and 16 were Biniou Braz (Breton bagpipe) players. Each participant was evaluated using the DC/TMD diagnostic protocol to determine whether a direct relationship exists between the practice of traditional Breton music and the presence of TMD signs and symptoms. The study also aimed to explore whether the prevalence of these disorders differed depending on the specific instrument played. The findings revealed that 59% of the participants presented with signs and symptoms of TMD, and 26.5% specifically exhibited pain-related disorders. Notably, 79.4% of the musicians reported having experienced pain or discomfort following their instrumental practice. Regarding the localization of TMJ-related signs, 59% of participants showed signs bilaterally, 50% on the right TMJ, and 32.4% on the left TMJ. The prevalence of TMD was higher among women (81.8%) compared to men (47.8%), and slightly higher among Bombarde players (52.9%) than among Biniou Braz players (47.1%). These results suggest that, within our sample, the practice of wind instruments commonly used in traditional Breton music is associated with a significant prevalence of signs and symptoms of TMD. Given the data obtained, further studies are needed, as well as the need to alert musicians to the risk of TMD.

Keywords: TMD; DC/TMD; WIND INSTRUMENTS; BAGAD

P.20 PREVALENCE OF MOLAR AND CANINE RELATIONSHIPS IN A PAEDIATRIC DENTAL POPULATION†

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The evaluation of molar and canine relationships in children plays a fundamental role in the early diagnosis of malocclusions, enabling timely orthodontic intervention and supporting adequate occlusal development. Understanding the prevalence of these relationships in paediatric populations contributes to public health planning and the implementation of effective early prevention strategies. This study consisted of a cross-sectional, observational design involving 172 children aged 3 to 5 years in deciduous dentition, enrolled in the 1st Cycle of Basic Education in the parish of "Fernão Ferro, Portugal" and approved by Ethics Committee of Egas Moniz School of Health and Science. Regarding molar relationships, on the right side, the mesial terminal step was observed in 61.6% of the children, a vertical step in 30.2%, and a distal step in 8.1%. Analysis by sex revealed a higher frequency of mesial steps in both genders, with no statistically significant differences. On the left side, the mesial step was present in 64.5% of the sample, followed by the vertical step (25.0%) and the distal step (10.5%). A similar pattern was observed bilaterally, again with no significant gender differences. When analysed by age, the mesial step was most prevalent among 4-year-old children on both sides. In relation to canine relationships, Class I was identified in 52.9% of the children on the right side, with 43.0% exhibiting Class II and 4.1% Class III. On the left side, Class I relationships were observed in 58.7% of cases, followed by Class II (36.6%) and Class III (4.7%). Class I was the most prevalent canine relationship bilaterally, consistently observed across all ages and sexes. The overall prevalence of malocclusion in this population was 98.8%, suggesting a marked increase in recent years and reinforcing its classification as a major public health issue. The mesial step was the most common terminal molar relationship, with no statistically significant differences across sex or age groups. These findings are consistent with previous studies that have identified the mesial step as the most frequent molar terminal relationship. Similarly, the predominance of Class I canine relationships, particularly on the left side, aligns with existing literature. In conclusion, compared with other epidemiological data, this study confirms a growing trend in the prevalence of malocclusions within the "Lisboa e Vale do Tejo" Health District. This rise warrants attention from public health authorities. The high frequency of malocclusions justifies the implementation of early diagnostic strategies. School-based screening programs and parental education initiatives could play a key role in preventing the progression of occlusal deviations and reducing the future need for complex orthodontic treatment.

Keywords: MOLAR RELATIONSHIP; CANINE RELATIONSHIP; MALOCCLUSION; DIAGNOSIS.

P.21 EROSIVE AND CARIOGENIC POTENTIAL OF NATIONALLY CONSUMED ENERGY DRINKS†

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Energy drink consumption has risen significantly worldwide, particularly among adolescents and young adults. These beverages, often perceived as harmless, are frequently acidic and may contain fermentable sugars, posing a potential threat to oral health through dental erosion and caries. Despite a growing shift toward sugar-free alternatives, concerns remain regarding the role of acidity in enamel demineralization, regardless of whether sugar is present. This study aimed to evaluate the erosive and cariogenic potential of energy drinks available on the Portuguese market by analysing their pH levels at different temperatures and assessing their implications for enamel integrity. An ex vivo study was conducted on thirty-eight commercially available energy drinks, which were analysed and categorised into two groups: Group A – beverages containing both acidic preservatives and cariogenic sugars (with erosive and cariogenic potential); Group B – beverages containing only acidic preservatives (with erosive potential). Each sample underwent pH analysis at two temperatures (4 °C and 25 °C) using a CRISON® pH Meter GLP 21 with a pH 50 14 electrode, calibrated within the pH 2–4 range. Temperature measurements were taken using a C.AT Pt 1000 CRISON® temperature probe. Three samples were tested per beverage, and five pH readings were taken per sample to determine the mean pH value. Statistical analysis revealed significant differences ($p < 0.05$) in pH values between 4 °C and 25 °C in 22 out of 38 beverages, with lower pH values observed at room temperature. Thirteen beverages showed no significant variation, while three exhibited lower pH values at 4 °C. Importantly, none of the drinks exceeded the critical pH threshold for enamel demineralization (pH 5.5) at either temperature. The mean pH values for Group A beverages were 3.4 (± 0.23) at 4 °C and 3.3 (± 0.23) at 25 °C, while for Group B beverages they were 3.5 (± 0.28) at 4 °C and 3.4 (± 0.26) at 25 °C. No statistically significant differences were found between the two groups, suggesting that acidic content alone is sufficient to compromise enamel integrity, regardless of sugar presence. All energy drinks analysed presented a pH below the critical enamel threshold, indicating a high erosive potential. The findings challenge common perceptions by demonstrating that sugar-free beverages can be as erosive as those containing sugar, and may also be detrimental to dental structure. These findings highlight the importance of assessing acidity as an independent risk factor while also recognising the protective function of saliva in the oral environment. Saliva plays a crucial role in neutralising acids and supporting enamel remineralisation, thanks to its buffer capacity and the presence of ions such as calcium, phosphate, and fluoride. While pH remains a central indicator of erosive potential, it alone does not capture the full complexity of the process. The interaction between acidic exposure and endogenous defence mechanisms underscores the multifactorial nature of enamel erosion in real-life conditions and reinforces the need for greater public awareness and regulatory oversight regarding these products.

Keywords: ENERGY DRINKS; DENTAL EROSION; ENAMEL DEMINERALIZATION; PH; CARIOGENIC POTENTIAL

P.22 INFLUENCE OF LOCAL AND SYSTEMIC ANTIBIOTICS IN NON-SURGICAL PERI-IMPLANTITIS TREATMENT: A SYSTEMATIC REVIEW AND META-ANALYSIS UPDATE†

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This systematic review and meta-analysis synthesise and update current evidence on the efficacy of adjunctive antibiotics, both local and systemic, combined with mechanical debridement (MD) for the non-surgical treatment of peri-implantitis. In accordance with the PRISMA 2020 guidelines and PROSPERO registration (CRD4202238040), the data from 10 randomised controlled trials (RCTs) with 3–12 months of follow-up were analysed. The primary outcomes were treatment success (dichotomous), bleeding on probing reduction (BOPr), and probing pocket depth reduction (PPDr). A random-effects meta-analysis was conducted, and multivariable meta-regression models were adjusted for follow-up duration (standardised to six months). The moderators that were the focus of the study encompassed age, probing pocket depth (PPD) at the baseline stage, and the number of implants per patient. Mechanical debridement (MD) was utilised as the reference comparator in this study. Systemic antibiotic regimens have been demonstrated to exhibit superior efficacy. The MD combined with a systemic regimen of either amoxicillin/clavulanic acid (AMC) or cefadroxil (CD), plus serratiopeptidase, a proteolytic enzyme with anti-inflammatory properties, yielded the most significant reduction in PPD (3.82 mm, 95% CI: 2.09–5.55) and BOPr (69.4%, 95% CI: 37.7–101.1). Meta-regression analysis revealed significant associations for the reduction of PPDr with age (β = -0.09 per year, 95% CI: -0.14 to -0.04; $p < 0.001$), initial PPD (β = 0.74 per mm, 95% CI: 0.33 to 1.16; $p < 0.001$), and the ratio of implants per patient (β = -0.69, 95% CI: -1.35 to -0.04; $p = 0.039$). The use of adjunctive systemic antibiotics significantly enhances clinical outcomes compared to MD alone, with amoxicillin-based regimens demonstrating robust efficacy. Greater probing depth reductions are associated with younger patients, deeper initial pockets, and a lower number of implants. No significant associations were observed for BOPr or treatment success. Caution is warranted due to heterogeneity in study designs, limited trials for specific modalities, and potential side effects of systemic agents. Future RCTs should standardise success criteria and prioritise long-term follow-up.

Keywords: DENTAL IMPLANTS; PERI-IMPLANTITIS; PERIODONTITIS; PERI-IMPLANTITIS THERAPY; PERI-IMPLANTITIS TREATMENT

P.23 ELITE ATHLETES' OVERALL ORAL HEALTH, VALUES AND RELATED QUALITY OF LIFE: A CROSS-SECTIONAL STUDY†

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The present observational study aimed to identify the prevalence of oral health issues in this population and explore the relationship between oral health and factors relevant to athletic performance. One hundred and fourteen elite athletes were included for oral health assessment, self-reported periodontitis, basic erosive wear examination, and dental caries experience. The research was conducted at the Sports Dentistry department of a university clinic (Egas Moniz Dental Clinic, Almada, Portugal) and approved by the Review Institutional Board (Ethics Committee ID nº. 1101). This research has been performed in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants. Data collection occurred between July 2023 and November 2024 encompassing a fourteen-month period. Thus, the final sample size was based on a time-predefined sampling procedure. They answered a sociodemographic questionnaire, oral health impact profile 14 to measure OHRQoL and OHV scale. Descriptive and inferential statistics assessed oral health outcomes and demographic or sport-related factors. Multivariable logistic regression explored predictors of poor oral health outcomes. The results reveal a high prevalence of oral health issues among elite athletes, with over half of the participants (51.8%) presenting two or more pathological or functional findings. Periodontal disease (55.1%), particularly gingivitis (51.8%), and dental caries (47.4%) were the two most common conditions, affecting nearly half of athletes. This high prevalence of oral conditions did not associate with worse OHRQoL and OHV. These results suggest that elite athletes face unique challenges regarding oral health, with some sex differences in oral health behaviours. Despite the high prevalence of oral diseases, related quality of life and values did not show any association, possibly due to the low perception of athletes. Our findings underscore the need for integrating oral health into sports medicine protocols as previously advocated. Limitations should be noted and include the cross-sectional design precludes causal inferences, and the convenience consecutive sample, mainly of football athletes, may limit generalizability to other populations of elite athletes. Additionally, the absence of paralympic athletes in our cohort limits the scope of our findings, and future studies should aim to include this population to better understand their specific oral health challenges. Future research should explore longitudinal outcomes and intervention strategies to improve oral health and its impact on athletic performance.

Keywords: SPORTS DENTISTRY; DENTAL CARIES; PERIODONTAL HEALTH; DENTAL WEAR

P.24 ANTIBIOTICS IN PERIODONTAL TREATMENT: AN UMBRELLA REVIEW†

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Antimicrobial stewardship envisions the appropriate use of antimicrobials, including antibiotics. Antibiotic therapy in Periodontology has been widely investigated over the years. This umbrella review aimed to appraise the methodological quality and meta-analytical strength and validity of the evidence of systematic reviews (SRs) on systemic and local antibiotics in periodontal therapy. After registration of the protocol (PROSPERO CRD42024527222), an extensive search, up to March 2024, for SRs that have assessed the effect of antibiotics in periodontal therapy, either nonsurgical and surgical, regardless of the types of patients and type of antibiotic. The methodological quality of SRs was judged using A MeaSurement Tool to Assess systematic Reviews 2. Fail-safe number of Rosenberg explored the number of nonsignificant, unpublished, or missing studies that would be required to change the direction of that evidence. Forty-four SRs, consisting of 221 meta-analyses, were included. The overall methodological quality was low, with only four and two SRs of high or moderate quality, respectively. Out of 221 meta-analyses, 69 indicated that the effect of systemic or local antibiotics was statistically not significant. Twenty-nine meta-analyses - ranging from suggestive to strong strength of evidence - derived from one high-quality and three low-quality SRs indicated that systemic or local antibiotics had a beneficial and statistically significant effect on periodontal health parameters, including average clinical attachment loss, bleeding on probing, and percentage of pocket closure. Of those, four strong evidence meta-analyses from a low-quality systematic review indicated significant and meta-analytically robust but with negligible effect. About 65.5% of the meta-analyses with suggestive to strong evidence are unlikely to change with more future studies. There is no robust evidence to support the use of antibiotics for periodontal management. Systemic antibiotics have a minimal effect on periodontitis and the evidence on local antibiotics is equally weak. Additional studies are unlikely to change the level of evidence.

Keywords: PERIODONTAL DISEASE; PERIODONTITIS; ANTIBIOTICS; ORAL HEALTH; PERIODONTAL TREATMENT

P.25 EFFECTS OF A 6-WEEK MANUAL THERAPY AND THERAPEUTIC EXERCISE PROGRAM COMBINED WITH AEROBIC EXERCISE ON MUSCULAR TEMPOROMANDIBULAR DISORDER†

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Temporomandibular disorders (TMD) are conditions that affect the masticatory muscles, leading to pain and a reduced quality of life. Over the past few decades, multiple strategies have been described for managing TMD, including manual therapy and therapeutic exercise. Due to the complexity of this condition, it is necessary to explore additional treatment approaches, such as aerobic exercise. Aerobic exercise has been demonstrated to induce hypoalgesia, which consists of a reduction in sensitivity to painful stimuli during or after 30 minutes of exercise. This study aims to compare the effects of a manual therapy and therapeutic exercise programme with a similar programme combined with aerobic exercise over six weeks on pain intensity, maximum mouth opening, pressure pain threshold, anxiety and oral health-related quality of life in individuals with muscular TMD. This is a controlled clinical trial involving 18 participants diagnosed with muscular TMD according to the Diagnostic Criteria for Temporomandibular Disorders (DC-TMD). Participants were divided into two groups: G1 (average age 26.8 years, SD 7.92), consisting of 11 participants who underwent a manual therapy and therapeutic exercise programme (30 minutes, once a week), and G2 (average age 26.9 years, SD 6.62), consisting of seven participants who underwent the same programme as G1 (30 minutes, once a week) combined with moderate-intensity (50% of heart rate reserve (HRR)) aerobic exercise (30 minutes, twice a week). Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS) and pressure pain threshold (PPT) was measured using an algometer. Maximum comfortable mouth opening (MFO) and forced mouth opening (MCO) were measured using a calliper. Anxiety was assessed using the Generalized Anxiety Disorder-7 (GAD-7) and oral health-related quality of life (OHRQoL) was assessed using the Oral Health Impact Profile-14 (OHIP-14). The first assessment (T1) was conducted before the intervention and the second (T2) 48 hours after completing the six-week programme. Significant decreases in NPRS scores and significant increases in MFO, MCO and OHIP-14 scores were observed in both G1 and G2 between T1 and T2. Regarding PPT, a significant increase was observed in the right masseter (RM) and left temporalis (LT) muscles in both groups. However, the left masseter (LM) and right temporalis (RT) muscles showed a significant increase only in G2. Both groups exhibited significant differences in PPT improvement, with G2 achieving better results. No significant differences were found in GAD-7 scores. After six weeks of intervention, the manual therapy and therapeutic exercise program and the manual therapy and therapeutic exercise program combined with aerobic exercise led to a reduction in pain, an increase in mouth opening amplitude, and an improvement in quality of life. The programme that included aerobic exercise promoted a greater increase in the pressure pain threshold, suggesting an additional benefit of this combined approach.

Keywords: TEMPOROMANDIBULAR DISORDER; PAIN; ANXIETY; ORAL HEALTH-RELATED QUALITY OF LIFE; MOUTH OPENING RANGE.

P.26 DENTAL CALCULUS AS A PALAEOPATHOLOGICAL INDICATOR: A CASE STUDY FROM MEDIEVAL / EARLY MODERN PORTUGAL†

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Human palaeopathology is the study of disease and health conditions in past populations. In recent years, dental calculus – a mineralized form of dental plaque – has emerged as a valuable resource in bioarchaeological and palaeopathological research. Formed *in vivo* through the precipitation of calcium and phosphate from saliva, dental calculus is resistant to postmortem degradation and can persist for centuries after death. It entraps various microremains and microorganisms, including starch grains, pollen, plant fibres and textile fibres, offering direct evidence of dietary practices, and cultural behaviours. Additionally, it preserves ancient oral microbiome DNA, enabling the study of pathogen evolution and antibiotic resistance over time. The accumulation of calculus can contribute to oral diseases such as caries, periodontitis, and tooth loss, and may reflect individual health, oral hygiene, and access to healthcare. This study aims to investigate the causes of the severe dental calculus deposit in a middle-aged male individual, and to explore its palaeopathological significance. In 2012, an archaeological excavation was conducted in the churchyard of *Igreja de Nossa Senhora da Salvação*, in Arruda dos Vinhos, Portugal. The associated necropolis was dated to the 14thth to 16thth centuries. A total of 80 individuals were exhumed, including 41 adults and 39 non-adults. Among them, Skeleton 35 was notable for the severe deposition of dental calculus. Dental analysis involved macroscopic examination of the dentition and Scanning Electron Microscopy coupled with Energy Dispersive X-ray Spectroscopy (SEM-EDX) to assess the calculus's elemental composition and morphology. A greyish dental calculus deposit, approximately 15 mm thick, was observed on the left maxillary teeth, including two molars, premolars, and the canine. The deposit covered all surfaces except the occlusal surfaces of the premolars and canine. The lower anterior teeth exhibited smaller deposits on the lingual and both interproximal surfaces, with a particularly severe accumulation on the left second premolar. Across both upper and lower arches, five carious lesions, periodontitis, antemortem teeth loss and moderate dental wear were identified. SEM-EDX analysis revealed an elemental composition consistent with that of typical dental calculus. No microremains were detected. Diagenesis cannot be ruled out, given the burial context. The volume and asymmetrical distribution of the calculus deposits may reflect severely compromised oral hygiene, pain associated with facial or temporomandibular joint dysfunction, or even facial paralysis. Although microbiological analysis has not yet been conducted, it remains a critical next step for identifying adhered microorganisms and evaluating their potential role in oral and systemic diseases. In conclusion, the pronounced accumulation of dental calculus in Skeleton 35 underscores its diagnostic and interpretive potential in palaeopathological research. Beyond reflecting oral health, calculus serves as a "biological archive", preserving microscopic traces of the individual's diet, health, environment, and behaviours. This case study highlights the value of integrating dental calculus analysis into bioarchaeological investigations and reinforces its role in reconstructing the lived experiences and health conditions of past populations.

Keywords: PALAEOPATHOLOGY; PAST POPULATIONS; DENTAL CALCULUS; ORAL HEALTH

P.27 PCR-BASED DETECTION OF BOVINE PAPILLOMAVIRUS TYPE 1 (BPV-1) IN OCULAR SQUAMOUS CELL CARCINOMA SAMPLES FROM CATTLE IN THE AZORES†

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Bovine Ocular Squamous Cell Carcinoma (BOSCC) is the most prevalent ocular malignancy in cattle, primarily affecting the nictitating membrane but also involving other ocular and periocular structures, including the cornea, sclera, eyelids, third eyelid, limbus, and conjunctiva. Originating from keratinocytes, BOSCC is a significant cause of economic loss due to carcass rejection, increased veterinary costs, and decreased productivity. The disease has a multifactorial aetiology, with contributing factors including prolonged exposure to ultraviolet radiation, geographical elements such as latitude and altitude, as well as genetic predispositions, such as breed susceptibility and lack of eyelid pigmentation. Biological factors also play a role, particularly viral infections such as herpes viruses types 1 to 5 and papillomaviruses. Among these, bovine papillomaviruses (BPVs) — especially BPV-1 — have been associated with both benign and malignant tumours in cattle across various anatomical locations. The aim of this study was to identify the presence of BPV-1 DNA in bovine ocular squamous cell carcinoma samples, to better understand a potential viral contribution to tumorigenesis. A total of 134 samples was analysed. Tumour DNA and the corresponding normal mucosa were extracted from each sample. Genetic analysis for BPV-1 was performed through PCR followed by electrophoretic analysis. Eighteen per cent of the samples were positive (n=24 samples) for BPV-1 infection. The statistical analysis was conducted using a Bayesian Generalized Linear Mixed Model with fixed effects (log-odds scale), leading to the following conclusions: There is no strong evidence that island or virus status significantly predicts the presence of carcinoma in this sample. Extremely high variation at the tissue level highlights the importance of tissue-specific factors. The model estimates are imprecise, likely due to the small sample size or the complex data structure. These findings suggest a possible association between BPV-1 infection and the development of BOSCC ($p>0,05$), although further studies with a larger sample size and additional viral markers like other BPV types are needed to confirm a causal relationship. Understanding the role of BPV-1 in ocular carcinogenesis in cattle may contribute to future strategies for prevention and control of this pathology, including potential vaccination or breeding programs aimed at reducing susceptibility to viral oncogenesis.

Keywords: BOSCC; DNA-EXTRACTION; PCR; ELECTROPHORESIS; BPV-1

P.28 RELATION BETWEEN ALCOHOL INGESTION AND HANDWRITING MODIFICATIONS - EXPLORATORY STUDY†

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According to Jean Gayet "each individual has a writing that is his own and that differs from the others". The graphic identity can be influenced by intrinsic and extrinsic factors, including psychoactive substances such as alcohol. Several research studies suggest that the ingestion of intoxicants can be related with variability in handwriting, which may compromise the reliability of forensic handwriting analysis. Regarding alcohol intake, some controversial results have been reported. While some studies have revealed observable changes in handwriting, such as tremors, irregular spacing, slower writing speed and loss of line fluency; others suggest that higher doses of alcohol seem to have a minimal impact on psychomotor performance. With the aim of contributing to the clarification of the possible relationship between changes in writing and alcohol intake, an exploratory study was carried out. This study involved a convenience sample of participants who were asked to write a sentence under anonymous and controlled conditions, before (t0) drinking alcohol *ad libitum* ad libitum. The individuals were asked to rewrite the same sentence and self-report the amount of alcohol ingestion, after *ca*ca two hours, (t1) based on a qualitative scale with three levels: low (0-300mL), medium (300mL–600mL) and high (>600mL). Handwriting samples were analysed in both (t0 and t1) stages based on parameters such as line quality, writing speed, pressure, spatial arrangement, and signature integrity, in order to identify signs of graphic changes. The results revealed a progressive pattern of handwriting changes across the three self-reported alcohol ingestion levels. Participants in the high ingestion group showed more noticeable alterations, including increased letter size, loss of line alignment, and more frequent tremors, while those in the medium group exhibited moderate disruptions such as reduced writing speed and slight spatial inconsistencies. In contrast, the low ingestion group presented only minimal deviations from baseline samples. The observed changes in handwriting following alcohol ingestion highlight a critical challenge for forensic handwriting analysis, particularly in the attribution of graphic identity. The alcohol-induced alterations above mentioned can obscure or distort the distinctive features used to identify individuals through handwriting. Therefore, these modifications may compromise the reliability of authorship attribution, especially in questioned document examination where the potential influence of psychoactive substances is not accounted. It is therefore essential that experts consider the possibility of alcohol intake when assessing graphic identity, which could lead to changes that jeopardise the conclusion of the expert analysis.

Keywords: FORENSIC HANDWRITING ANALYSIS; PSYCHOACTIVE SUBSTANCES; DOCUMENT EXAMINATION

P.29 FROM WASTE TO SAFETY: BLACK SOLDIER FLY LARVAE MITIGATE PATHOGENS AND PROTEINS FROM ANIMAL ORIGIN IN FOOD WASTE VALORISATION†

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Every year, 59 million tonnes of food are wasted in the European Union (EU). This threatens the sustainability and resilience of our agrifood systems and contributes to public health problems. In recent years, black soldier fly larvae (BSFL) have emerged as a potential waste management solution, as they can transform organic matter into new products such as animal feed and soil fertiliser. The larvae can also bioremediate contaminants, removing or reducing them to acceptable levels. However, the EU currently prohibits using food waste as an insect substrate due to the potential presence of contaminants that cause foodborne illnesses, and animal proteins. This study evaluated the bioremediation potential of foodborne pathogens (specifically bacteria) by BSFL and determined whether the larvae bioaccumulate animal proteins. An industrial-scale trial was performed over 14 days using a food waste-based substrate and a Gainesville diet (a standard insect feed) as a control substrate. Two tonnes of food waste, sourced from restaurants from Santarém municipality, Portugal, were collected and prepared by removing physical contaminants, such as plastic, cutlery and cans. Microbiological analyses of the substrates and the larvae were performed in accordance with ISO standards for food and feed microbiology to enumerate microorganisms. A polymerase chain reaction was performed on the substrates, the BSFL, the BSFL meal and the frass to detect DNA from pork, chicken and beef, with agarose gel electrophoresis used for fragment visualisation. Our results showed that BSFL can significantly bioremediate pathogenic bacteria, such as *Bacillus cereus*, *Vibrio spp.*, and *Salmonella spp.* (Mann-Whitney U test, *P*P = 0.015). These results highlight the potential of BSFL to transform food waste into valuable resources while mitigating microbial risks. Results revealed that the BSFL did not present DNA from pork, chicken and beef (*P = 0.029*P = 0.029), however, DNA was still present in the frass, suggesting excretion rather than accumulation. These findings emphasise the potential of BSFL for the safe bioremediation of food waste containing pathogenic bacteria and proteins from animal origin, thus supporting their integration into circular, One Health-aligned systems.

Keywords: ONE HEALTH; FOOD AND FEED SAFETY; CIRCULARITY; FOOD SUSTAINABILITY; HERMETIA ILLUCENS

P.30 ORAL PALEOMICROBIOME OF A MEDIEVAL/EARLY MODERN PORTUGUESE COMMUNITY†

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Human skeletal remains and the burial context in which they are exhumed are valuable sources of information about the lifestyle, health, disease, diet, and environment of past populations. Dental calculus has emerged as a privileged repository for the study of the oral paleomicrobiome, containing microorganisms, food particles, and biomolecules that offer a direct window into the lives of past communities. The Church of Nossa Senhora da Salvação's necropolis in Arruda-dos-Vinhos dates from the 14th to 16th centuries. A total of 80 individuals were exhumed, including 41 adults and 39 non-adults. This study focuses on the characterisation of the biological and pathological profiles, and the oral microbiome of individuals exhumed in the necropolis. The sample comprised 14 individuals from both sexes (nine males, three females, and two of indeterminate sex), in which the calculus is present. The individuals of this sample were characterised demographically (sex and age at death), morphologically (stature), and pathologically, with particular attention to oral health. The oral pathologies were macroscopically analysed, including caries, occlusal dental wear, periodontal disease, periapical inflammations, and dental calculus. After collecting dental calculus samples, DNA extraction was carried out using a specific commercial kit. Amplification of the 16S rRNA (Ribosomal RNA) gene was performed via qRT-PCR (Quantitative Real-Time PCR), allowing for the detection of microbial profiles and assessment of sample integrity. The sequencing phase is currently being prepared to identify the bacterial communities in the calculus by analysing the 16S rRNA gene. Although the sequencing results are not yet available, the data obtained so far confirm the approach's feasibility and the presence of microbial DNA in the 14 samples. This study represents an innovative contribution to the study of the oral microbiome, combining methods from bioarchaeology and microbiology. Finally, it is expected to enhance our understanding of the health, diseases, dietary practices, and living conditions of this Arruda-dos-Vinhos community.

Keywords: DENTAL CALCULUS; 16S RRNA GENE; BIOARCHAEOLOGY; ARRUDA DOS VINHOS

P.31 CHEMICAL CHARACTERIZATION OF EMERGING SYNTHETIC OPIOIDS (NITAZENES) WITH HIGH TOXICOLOGICAL POTENTIAL†

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New Psychoactive Substances (NPS) are substances of abuse that are not regulated under the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, according to information from the United Nations Office on Drugs and Crime (UNODC). The term "new" describes substances that have recently appeared on the recreational drug market, often developed to avoid current drug legislation. Globally, over 1,300 NPS have been reported, including many highly potent synthetic opioids. Between 2009 and 2023, the European Union Drugs Agency (EUDA) detected 81 new synthetic opioids in Europe, with six out of seven newly reported opioids in 2023 classified as Nitazenes. These benzimidazole-derived synthetic opioids have been linked to a rising number of overdoses and deaths worldwide, posing serious challenges for public health and forensic science. Due to limited knowledge regarding their structural diversity and toxic effects, further investigation is essential. This study focuses on the synthesis of Nitazene derivatives based on the 2-benzylbenzimidazole core structure, aiming to explore their diversity through structural modifications of the benzyl ring and benzimidazole scaffold. The synthesised compounds were characterised by Nuclear Magnetic Resonance spectroscopy and High-Resolution Mass Spectrometry to confirm their molecular structure and purity. Subsequent *in vitro* toxicological tests will assess their biological activity and potential risks. Findings from this research will aid in the identification and monitoring of these substances in forensic and clinical toxicology settings and contribute to the development of public health strategies and regulatory measures to address the growing threat posed by Nitazenes in the drug market.

Keywords: NEW PSYCHOACTIVE SUBSTANCES; NITAZENES; 2-BENZYLBENZIMIDAZOLES; SYNTHETIC OPIOID; TOXICOLOGICAL EVALUATION

P.32 PILOT STUDY ON ANTIBIOTIC RESIDUES IN POULTRY: RELATION TO BACTERIAL RESISTANCE AND IMPACT ON HUMAN HEALTH†

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Antimicrobial resistance (AMR) is a global health problem, responsible for more than 35,000 deaths a year in the European Union/European Economic Area (EU/EEA), according to the Organisation for Economic Co-operation and Development (OECD). Although often associated with hospital environments, the agri-food sector also plays a significant role in the spread of resistant bacteria, due to the incorrect use of antibiotics in farm animals. In 2022, a scientific report published by the European Food Safety Authority (EFSA) and the European Centre for Disease Prevention and Control (ECDC) identified frequent resistance to common antibiotics in *Salmonella* and *Campylobacter* isolates from humans and animals, particularly poultry, with high resistance to fluoroquinolones reported in several countries. Given this reality, and the fact that this subject is still little explored in Portugal, an exploratory study was carried out with the aim of verifying the presence of antibiotic residues in poultry available to consumers. The methodology used was based on the Premi®Test Starter Kit, a microbiological screening test based exclusively on the growth of the bacterium *Geobacillus stearothermophilus*, which is sensitive to various groups of antibiotics. The culture medium contains spores of the microorganism that germinate at 67°C, producing acid that changes the original colour of the medium (purple) to yellow. If there are antibiotic residues that inhibit the growth of the microorganism, no colour change is observed. Twenty samples were analysed in duplicate, comprising a mixture of different chicken parts (breast, leg, wing, liver, heart and gizzards), purchased from 10 butchers and 10 supermarkets in the Greater Lisbon area. The samples were macerated and then frozen, after which they were thawed to obtain the exudate that was used as a matrix in the test. A negative control sample was also included, from a chicken reared in an environment with no known exposure to antibiotics. All the samples showed a colour change in the culture medium from purple to yellow, which indicates the growth of the bacteria under study and therefore the absence of antibiotic residues. These results suggest that, within the sample universe considered, the risk of consumer exposure to antibiotic residues is minimal. However, the size of the sample and the qualitative nature of the method reinforce the need for further research using quantitative analytical techniques. This work is therefore intended not only to serve as a basis for formulating hypotheses and identifying questions that justify future studies with larger samples, but also to call for the correct use of antibiotics in animal production.

Keywords: ANTIMICROBIAL RESISTANCE; ANTIBIOTIC RESIDUES; POULTRY; PUBLIC HEALTH

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P.33 ENVIRONMENTAL DETERMINANTS OF *CALLIPHORIDAE* AND *SARCOPHAGIDAE* ACTIVITY AND OVIPOSITION ON BAITS †

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Forensic medico-legal entomology employs entomological methods to estimate the *post-mortem* interval (PMI). A key technique involves determining the minimum PMI by assessing the developmental stage of insects found on a corpse. However, this method does not account for the time between death and the first oviposition, known as the pre-oviposition PMI. Estimating the pre-oviposition PMI is complex, as it requires consideration of environmental conditions at the site, such as temperature and light, as well as the seasonal presence of scavenger insects. While the method for estimating minimum PMI is well established, there is a significant lack of knowledge regarding the estimation of pre-oviposition PMI. To address this gap, the present study investigates the effect of meteorological conditions and the abundance of two well documented scavenger insects: *Calliphoridae* and *Sarcophagidae* on their activity and time to oviposition. The abundance of scavenger insects was determined by counting specimens trapped on pig liver (*Sus scrofa domesticus*, L.) bait after identification using a morphological key. Conversely, time-lapse videos were used to record the activity and oviposition of insects over other outdoor pig liver baits. Early ovipositors were identified by applying morphological identification keys to the dissected body parts of third-instar larvae grown from their eggs. Molecular methods were used for posterior validation of taxonomic identification. This involved manually extracting DNA from third-instar larvae, followed by sequencing the COI (cytochrome oxidase subunit 1) and ITS2 (internal transcribed spacer 2) genes. The first trials of the study were conducted during the transition from warmer to colder weather, revealing different dynamics among the adult species caught in the traps, and showing that temperature (ºC) and total rainfall (mm) were the main factors influencing activity and oviposition. During the warmer season, there was a greater abundance and diversity of adult insect species belonging to the target families. Conversely, abundance and diversity decreased significantly during the colder season, with one species, *Calliphora vicina* (*C. vicina*), predominating. Lastly, morphological analysis of the dissected body parts confirmed the previous finding that oviposition, on both weathers, belonged to *C. vicina* with an average time to oviposition of 1 minute. This methodological approach allows to increase the precision of *post-mortem* interval estimations in forensic entomology by incorporating a model to estimate the pre-oviposition period, and therefore, this enhances the accuracy of PMI assessments based on insect evidence in forensic investigations.

Keywords: FORENSIC ENTOMOLOGY; ENVIRONMENT; INSECT SCAVENGERS.

P.34 KOSMICARE DRUG CHECKING SERVICE: TRENDS AND ANALYTICAL RESULTS†

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Recreational drug markets offer a wide range of illicit substances. Individuals who purchase these substances are typically aware of the associated risks and, for this reason, seek information on harm reduction and strategies to minimize potential problems related to their use. One of the main risks is the high variability in the composition of the products being sold. To address this, some users opt to test the samples to be certain of what they are consuming. Psychoactive substances, which are sold illegally, are often adulterated and mixed with other substances that can cause more serious health problems. Based on available information, the scale and complexity of illicit substance production continue to increase in Europe, with hundreds of synthetic drug production facilities dismantled in 2022. The main objective of this study is to analyse samples collected by the Kosmicare drug checking service between 2020 and 2022. The substances present in the samples were identified using gas chromatography coupled with mass spectrometry (GC-MS) and Fourier-transform infrared spectroscopy (FTIR), to contribute to a better understanding of the recent consumption trends and the potential emergence of psychoactive substance. A total of 1253 samples were analysed, revealing an increase in the number of cocaine and heroin samples submitted for drug checking between 2020 and 2022, while a decrease was observed in synthetic stimulants and other substances over the same period. Among all the analysed samples, a notable finding was one of the samples from 2021 contain hexahydrocannabinol, a semi-synthetic cannabinoid, that was only identified in Europe in 2022 according to European Union Drugs Agency report. This suggest that the cannabinoid was already in circulation in Europe at least a year earlier. The most common adulterants or cutting agents found were paracetamol, phenacetin and caffeine, particularly in cocaine and heroin samples. These analyses help anticipating the emergence of new substances on the market, which the toxicological effects are unknown, as well as trends in the use of new adulterants or cutting agents.

Keywords: ADULTERANTS/CUTTING AGENTS; DRUG CHECKING; FTIR; GC-MS; TRENDS

P.35 VALIDATION OF DUTCH PERIODONTAL SCREENING USING SELF-REPORTS IN PORTUGUESE PEOPLE†

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This study aims to externally validate a Dutch screening model by Nijland et al. for severe periodontitis (PD) in a Portuguese population. A cross-sectional study was performed between February and October 2024. The eligible participants who were aged between 18 and 80 years old and possessed at least one natural tooth were consecutively recruited at a dental clinic (Almada, Egas Moniz School of Dental Medicine). Predictors included the questions in the validated self-reported oral health questionnaire (SROH) and demographic data. Outcome was severe PD, defined as code 4 of the Community Periodontal Index of Treatment Needs (CPITN), measured via full-mouth periodontal examination. A minimum number of 100 patients with severe PD (CPITN score 4) was required based on the sample size calculation. Performance of the model was assessed, in aspects of discrimination (i.e. area under the curve [AUC]), calibration (i.e. O/E [observed/exposed ratio]), sensitivity, specificity, accuracy, and precision. A total of 201 participants were included (100 with severe PD and 101 without). This sample was evenly composed with men and women (50.8 % and 49,3%, respectively) with an average of 55 years old (±15.2). The model had AUC of 0.704 (95.0% CI: 0.632,0.776) and an O/E ratio of 0.91 (0.74,1.11) for predicting severe PD, indicating an acceptable discrimination and calibration. Additionally, the model had a sensitivity of 75.0% and a specificity of 68.3%, an accuracy of 70.2%, and a precision of 68.2%. This prediction model showed adequate performance to be applied in Portuguese cohorts, demonstrating its potential as a valuable tool for early screening and risk stratification, aimed at disease prevention and management. Future studies should validate its applicability in diverse populations and explore its integration into routine healthcare practices.

Keywords: PERIODONTITIS; PERIODONTAL SCREENING; PREDICTION MODEL; PUBLIC HEALTH DENTISTRY; CROSS-SECTIONAL STUDIES

P.36 ASSOCIATION BETWEEN INTAKE OF SUGARY AND SPORTS-SPECIFIC FOODS AND ORAL HEALTH OUTCOMES IN COMPETITIVE ATHLETES†

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Nutrition plays an important role in both overall health and athletic performance, and it can also affect oral health. Athletes often consume specific types of foods and drinks, including carbohydrate-rich sports products like isotonic beverages and energy gels, which are different from what non-athletes typically eat. While these sports foods help athletes meet their energy needs, many contain sugars that could impact oral health if consumed frequently. This cross-sectional study aimed to describe how often adult athletes consume sugary foods and sports-specific products and to explore the relationship between these dietary habits and oral health risks. We surveyed 80 athletes (average age 24.2 ± 4.0 years; 70% male) using a structured questionnaire alongside clinical oral examinations. The questionnaire assessed meal frequency, consumption of sugary foods (such as sweets and soft drinks), and intake of sports products (like isotonic gels and drinks). Although we did not use a fully validated dietary questionnaire, a registered nutritionist helped design the survey to ensure it was clear and relevant. Future studies will aim to use validated tools for more precise dietary assessment. Results showed that 53.8% of athletes ate 2–3 meals per day, while 45% ate 4–5 meals daily. Over half (53.8%) reported occasional consumption of sugary foods or drinks, and 36.3% consumed them regularly. About 31.2% regularly used sports products like isotonic gels. We found a significant association between less frequent sugar intake and fewer dental caries ($p < 0.001$). Participants who rated their oral health positively also tended to follow healthier dietary patterns. These findings highlight the need to clearly differentiate between general sugary foods and sports-specific carbohydrate products when considering their effects on oral health. While sports foods are important for athletic performance, their sugar content can pose a risk if not managed properly. The study supports developing tailored education programs involving both nutrition and dental health professionals to help athletes balance performance needs with oral health. In summary, this research suggests a clear link between sugar intake from both regular and sports-related foods and oral health risk in athletes. Further research with validated dietary assessment methods will strengthen understanding and improve preventive strategies.

Keywords: SPORTS NUTRITION; ORAL HEALTH; ATHLETES; PERFORMANCE; DIETARY HABITS; SPORTS DENTISTRY

P.37 CARIES AND ASTHMA MEDICATION†

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The purpose of this study was to examine the impact of medication on asthma treatment and the occurrence of dental caries in children aged 3 to 15 years old (Hospital da Luz Lisboa). The frequency of dental caries in 3 different groups was examined. In addition, the possible association of dental caries with different asthmatic medication was also assessed. A descriptive observational study was conducted on children aged 3 to 15 years old, who attended the immunology-allergology and dentistry services at the Hospital da Luz Lisboa between January 2021 and February 2022. The sample was divided into 3 groups (medicated asthmatics, unmedicated asthmatics, and healthy children without asthma). An intraoral examination was performed to collect the DMFT index (decayed, missing, and filled teeth) to assess the presence of caries. Clinical and dietary data were supplemented with a questionnaire and medical history in all groups. All variables used were qualitative and described using absolute frequencies and percentages. Statistical analysis was carried out using R software version 4.1.2, considering p-values <0.05 as statistically significant and a confidence level of 95%. The chi-square test was employed to compare two or more groups. The study population consisted of 159 children (52.8% boys and 47.2% girls). Among medicated asthmatic children, 50.3% have at least one tooth affected by caries. The average number of missing, decayed, and filled teeth is significantly higher in the group of children with 'Asthma and medication' (Average = 1.34). The mean number of missing, decayed, and filled teeth in the 'Asthma without medication' group (0.87) is slightly higher than that in the 'No Asthma' group (0.74). These results showed that anti-asthmatic medications may influence the development of dental caries. The occurrence of caries is more prominent in medicated asthmatic children when compared to unmedicated asthmatic children.

Keywords: CARIES; ASTHMA; ASTHMA MEDICATION; CHILDREN

P.38 MICROBIOME PROFILING IN PERI-IMPLANTITIS: COMPARATIVE INSIGHTS FROM IMPLANT SITES AND SALIVA†

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The rising use of dental implants for tooth replacement has been accompanied by an increased prevalence of peri-implant diseases, particularly peri-implantitis (PI). PI is a biofilm-mediated, chronic inflammatory condition characterized by progressive peri-implant bone loss, often resulting in implant failure. Despite its clinical significance, the microbial mechanisms driving PI remain insufficiently understood. Clarifying the microbial dysbiosis involved is crucial for advancing understanding of PI pathogenesis and developing better diagnostic and management strategies. This study aimed to characterize the composition, diversity, and functional potential of the subgingival microbiome in both healthy and PI-affected dental implants. It also assessed whether the salivary microbiome could serve as a non-invasive indicator of peri-implant health. A total of 40 participants were recruited under approved ethical protocols, divided into individuals with entirely healthy implants (n=20; group HI) and individuals with both healthy and PI-affected implants (n=20; group PI). Saliva samples and subgingival samples (healthy and/or PI-affected) were collected from each participant, resulting in five study groups (each with 20 samples): HI_Sa, HI_HIS, PI_Sa, PI_HIS, and PI_PIS. In total, 40 saliva and 60 subgingival samples were subjected to shotgun metagenomic sequencing and bioinformatic analysis. Fifty-eight bacterial species were identified with relative abundance >1% in at least one group. The cumulative relative abundances were 78.95% (HI_Sa), 76.75% (HI_HIS), 79.07% (PI_Sa), 77.95% (PI_HIS), and 69.56% (PI_PIS). Alpha diversity, assessed by Hill diversity metrics (species richness, Shannon, Simpson indices), showed no significant differences between the saliva groups or among the subgingival groups ($p > 0.05$, Kruskal-Wallis). Beta diversity analysis (PERMANOVA based on Bray-Curtis and Jaccard indices) also revealed no significant differences in community structure between any two subgingival biofilm groups ($p > 0.1$). Log-ratio abundance and differential ranking analysis identified key bacterial species distinguishing health from disease. PI-associated species included *Mogibacterium timidum*, *Schaalia cardiffensis*, *Parvimonas micra*, *Filifactor alocis*, *Porphyromonas endodontalis*, *Porphyromonas gingivalis*, and *Olsenella uli*ï, suggesting their involvement in disease progression. In contrast, *Neisseria spp.*, *Haemophilus parainfluenzae*, *Actinomyces naeslundii*, *Rothia mucilaginosa*, and *Rothia aeria* were more abundant in healthy implants, indicating possible protective roles. Functionally, PI-associated microbiomes were enriched in arginine and polyamine biosynthesis pathways, which are linked to microbial virulence and inflammation. Healthy sites displayed higher activity in nucleotide biosynthesis, glucose metabolism, and tetrapyrrole biosynthesis, which support microbial stability and tissue homeostasis. Notably, similar microbial shifts were observed in saliva. Individuals with PI exhibited increased salivary levels of *Veillonella atypica*, *Veillonella parvula*, *Porphyromonas spp., Bifidobacterium dentium*, and *Neisseria sicca*, indicating the potential of saliva as a non-invasive proxy for peri-implant microbiome monitoring. Interestingly, healthy implants in individuals with concurrent PI lesions displayed microbial and functional profiles resembling those of diseased implants, suggesting a possible field effect or microbial cross-contamination within the oral cavity. In conclusion, this study provides insights into the microbial and functional features of peri-implant health and disease, emphasizing the potential of the salivary microbiome as a biomarker and highlighting broader ecological shifts influencing disease development.

Keywords: PERI-IMPLANTITIS; MICROBIOME; SHOTGUN METAGENOMICS; PERI-IMPLAMT BIOFILM; SALIVA

P.39 EPIDEMIOLOGICAL AND CLINICAL PROFILE OF ORAL CANCER IN PORTUGAL: A DECADE OF CASES AT A NATIONAL REFERENCE CENTRE†

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Oral cancer represents a significant global public health burden, ranking among the most common malignancies worldwide. In Portugal, the incidence of oral cancer is projected to rise by 7.6% by 2040, highlighting the importance of monitoring epidemiological patterns and improving care pathways. This study aimed to characterise the epidemiological and clinical profile of oral cancer cases diagnosed at the Portuguese Oncology Institute of Lisbon Francisco Gentil (IPOLFG) between 2012 and 2022, contributing to a more comprehensive understanding of disease distribution, patient outcomes, and regional disparities. The analysis included a total of 2,794 cases. Variables analysed included gender, age at diagnosis, municipality of residence, tumour topography and morphology, staging (TNM), date of diagnosis, treatment initiation, and date of death where applicable. The study was approved by the Health Ethics Committee of IPOLFG, and the data used were anonymised to ensure patient confidentiality. Derived metrics such as time from diagnosis to treatment and overall survival were calculated and statistically assessed. Data analysis was performed using IBM SPSS Statistics v. 29.0 (IBM Corp., Armonk, NY, USA). The majority of cases occurred in male patients, with squamous cell carcinoma being the predominant histological type. The tongue was the most frequently affected anatomical site, followed by the lip. Most tumours were diagnosed at advanced stages, particularly stage IVA. The mean age at diagnosis was approximately 65 years, with a broader age range from 10 to 99 years, and the average survival time was around five years, slightly higher in women. Notably, delays in treatment initiation were common, with most patients waiting over 65 days post-diagnosis. A statistically significant association was found between clinical stage and treatment delay, with more advanced tumours linked to longer waiting times. Possible contributing factors include the complexity of advanced cases, which often require multidisciplinary team discussions and additional diagnostic procedures with variable waiting periods. A spatial analysis using the NUTS III classification revealed geographical disparities. Regions in Alentejo exhibited high incidence and below-average survival, possibly due to an ageing population and limited healthcare infrastructure. Conversely, the Oeste region performed favourably in terms of incidence, survival, and treatment timeliness. The Autonomous Region of the Azores showed low incidence but concerning delays and reduced survival. These findings underscore the impact of socio-demographic and systemic factors on oral cancer outcomes. By identifying patterns of late-stage diagnosis and treatment delays, particularly in more vulnerable regions, this study contributes to the development of targeted strategies aimed at improving early detection, reducing treatment delays, and optimising healthcare service delivery. Such efforts may support the objectives of Sustainable Development Goal 3, which seeks to reduce premature mortality from non-communicable diseases, including oral cancer, by improving access to timely and equitable care.

Keywords: ORAL CANCER; EPIDEMIOLOGY; PUBLIC HEALTH; TREATMENT DELAY; SQUAMOUS CELL CARCINOMA

P.40 MISDIAGNOSIS BETWEEN MPOX AND CHICKENPOX: EVIDENCE FROM LABORATORY SURVEILLANCE IN PORTUGAL†

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Differential diagnosis plays a crucial role in distinguishing mpox, caused by the monkeypox virus (MPXV), from other clinically similar diseases, particularly in outbreak settings where the public health response depends on diagnostic accuracy. During the initial mpox outbreak in Portugal, clinical features such as fever and vesicular skin lesions overlapped significantly with those of chickenpox, caused by the varicella-zoster virus (VZV), thereby increasing the risk of misclassification in the absence of specific laboratory confirmation. This study aimed to assess the extent of chickenpox cases misdiagnosed as mpox, by analysing 484 MPXV-negative samples collected between May and December 2022 from patients aged 0 to 39 years. Real-time PCR was used to detect VZV DNA, excluding individuals attending high-risk sexually transmitted infection consultations. This research complies with all relevant ethical regulations. INSA is the national reference laboratory, being the Portuguese laboratory authorized by the General Directorate of Health (through the Technical Orientation N° 004/2022 of May 31, 2022) to process samples for MPXV detection and genetic characterization. Furthermore, in this study, samples were processed in an anonymized fashion to enable differential diagnosis, and no patient-identifiable metadata was accessed or used. Of the samples analysed, 119 (24.6%) tested positive for VZV. The majority of VZV-positive patients were male (76.5%), with a median age of 27 years, and 53.8% belonged to the 20–29 age group. Positive cases were reported nationwide, with 55.5% concentrated in the Lisbon Metropolitan Area. MPXV testing peaked in August, coinciding with heightened public and clinical awareness, whereas VZV detection peaked in June, aligning with the known seasonal pattern of chickenpox in Portugal. Notably, the VZV positivity rate increased from 8,6% to approximately 42,0% in the final months of the study, suggesting that misdiagnosis remained prevalent despite growing clinical familiarity with mpox. These findings demonstrate that clinical criteria alone are insufficient for accurate diagnosis during outbreaks involving overlapping symptomatology. Chickenpox accounted for a substantial proportion of MPXV-negative suspected cases, underscoring the persistent diagnostic challenge. The study highlights the importance of integrating laboratory diagnostics into outbreak responses strategies to improve case identification, guide treatment, and avoid misallocated resources, especially when emerging and endemic pathogens co-circulate.

Keywords: MPOX; CHICKENPOX; DIFFERENTIAL DIAGNOSIS; CLINICAL LABORATORY; OUTBREAK RESPONSE

P.41 ISOLATION AND CHARACTERIZATION OF ENVIRONMENTAL BACTERIA AND SUSCEPTIBILITY TESTING TO DISINFECTANTS†

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Surface disinfection is a critical measure for preventing infections and controlling the spread of pathogens in institutional and healthcare settings. However, inappropriate or excessive use of disinfectants may contribute to the development of bacterial resistance, potentially compromising biosafety practices. This study aimed (1) to collect and analyse surface samples from the Egas Moniz School of Health & Science in order to isolate, identify, and characterize bacterial species and determine their antibiotic resistance profiles, and (2) to evaluate the antibacterial activity of three disinfectants commonly used at the institution. Samples were obtained using swabs soaked in peptone water, incubated in Brain Heart Infusion (BHI) medium, and plated on selective agar media: Tryptone Bile X-Glucuronide (TBX) agar for *Escherichia coli*, MacConkey agar for Gram-negative bacteria, Cetrimide agar for *Pseudomonas aeruginosa*, Mannitol Salt agar for *Staphylococcus* spp., and Bile Esculin Azide agar for *Enterococcus* spp. Antibiotic susceptibility was assessed using the agar diffusion method in accordance with current European guidelines. The antibacterial activity of 70% ethanol, 7% sodium hypochlorite, and 0.5% didecyldimethylammonium chloride was evaluated by determining the minimum inhibitory concentration (MIC) against both reference strains and environmental isolates. A total of 24 isolates were obtained, including strains of presumptive *E. coli* (n = 3), *P. aeruginosa* (n = 2), *Staphylococcus* spp. (n = 12 four of which were coagulase-negative) and *Enterococcus* spp. (n = 7). Definitive identification of selected isolates using the API biochemical gallery confirmed three as *Escherichia coli* and two as *Enterococcus faecium*; identification of the remaining isolates is ongoing. A low level of antibiotic resistance was observed across isolates, with no multidrug-resistant strains detected. The *E. coli* and *Staphylococcus aureus* isolates showed susceptibility to the disinfectants comparable to that of reference strains, suggesting no evidence of resistance to these agents. This may reflect effective adherence to disinfection protocols and judicious use of biocides at the institution. Nevertheless, the adaptive potential of bacteria, especially under prolonged exposure to sub-inhibitory concentrations of biocidal or antibiotic agents, remains a concern. Continued vigilance is therefore essential. Establishing a routine microbiological monitoring program is recommended to support early detection of shifts in resistance profiles and changes in the composition of the environmental microbiota.

Keywords: BIOCIDES; ANTIBIOTIC RESISTANCE; ONE HEALTH; DISINFECTION; SUSCEPTIBILITY TESTING

P.42 MACROPLASTIC-ASSOCIATED ANTIBIOTIC-RESISTANT BACTERIA ON PORTUGUESE BEACHES: ARE THERE SEASONAL AND POLYMER-TYPE VARIATIONS?†

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The Portuguese coastline is increasingly impacted by microbial contamination and plastic pollution, both of which pose risks to environmental and public health. Plastic surfaces can be colonised by several microorganisms, creating a new ecosystem called plastisphere. Within the plastisphere, antibiotic-resistant bacteria (ARB) and pathogenic bacteria were already detected in previous studies. This study assessed the presence of ARB on macroplastics collected from beaches along the Portuguese coast, focusing on seasonal variations and differences among polymer types. Samples of seawater and macroplastics —specifically polyamides (PA), polystyrene (PS), and high-density polyethylene (PEAD)— were collected from six beaches close to 3 urban areas (Beaches A1 and A2, Aveiro; F1 and F2, Figueira da Foz; and P1 and P2, Peniche) across three different seasons (i.e. winter 2023, spring and winter 2024). The seawater was filtered (0.2µm, mixed cellulose), and the filters were placed onto Chromocult agar for enumeration of total coliforms (TC) and faecal coliforms (FC), and onto Slanetz and Bartley agar for enterococci. Macroplastics were washed to remove unattached organisms, and biofilms were extracted by vigorous vortexing. Macroplastic suspensions were inoculated onto selective media (mFC for Coliforms and TCBS for *Vibrio*Vibrio), each supplemented with six antibiotics (amoxicillin, cefotaxime, ciprofloxacin, colistin, gentamicin, and meropenem). After the incubation (37°C for Coliforms and 30°C for *Vibrio*Vibrio), the colony-forming units per gram of plastic (CFU.g^{-1}-1) were calculated. Our results revealed that FC and enterococci levels in water exceeded legal limits in winter 2023 in several locations (2 out of 6 beaches and 3 out of 6, respectively). Particularly in A1 (5133 ± 1060 and 200 ± 16 CFU.100mL^{-1}-1, respectively) and in A2 (3033 ± 1137 and 274± 74 CFU.100mL^{-1}-1, respectively), and for enterococci in F2 (146 ± 59 CFU.100mL^{-1}-1). These values decreased more than 200-fold in spring and winter 2024. For locations A1, A2 and F2, TC levels were higher than the maximum recommended in winter 2023, decreasing almost 200-fold in the next seasons. In PEAD, the highest values of antibiotic-resistant (AR) *Vibrio*Vibrio were observed with cefotaxime and colistin supplemented media at beach P2 during winter 2023. For AR Enterobacterales, growth in cefotaxime medium also showed the highest counts, recorded at beach F2 during winter 2024. In PS, Enterobacterales counts were consistently high at several locations and sampling dates, when compared to the other two polymers. PS-bound *Vibrio*Vibrio was generally not very abundant, though high counts were registered on occasion in 4 out of 6 antibiotics, with the pattern repeated in PA. Ciprofloxacin was the antibiotic with the least common AR *Vibrio*Vibrio, whereas AR Enterobacterales were less frequent in colistin and gentamicin. There is no clear seasonal pattern, but high AR *Vibrio*Vibrio counts seem to be more frequent in the winter, whereas AR Enterobacterales often peak in the spring season. Sites near river mouths, which are subjected to agricultural and livestock runoff, appear to show higher contamination levels. These findings highlight the presence of ARB on marine macroplastics, emphasising the importance of incorporating plastic-associated microorganisms monitoring in coastal water quality assessments within a One Health framework.

Keywords: ANTIBIOTIC-RESISTANT BACTERIA; MACROPLASTIC; VIBRIO; ENTEROBACTERALES

P.43 UNVEILING THE MICROBIOME AND RESISTOME IN PAST POPULATIONS- PRELIMINARY RESULTS†

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The interdisciplinary approach between Bioarchaeology and Paleomicrobiology enhances our understanding of pathogen evolution and microbial communities. Bioarchaeology studies human remains from archaeological contexts, focusing on past populations' health, disease, diet, and lifestyle. On the other hand, Paleomicrobiology allows the identification of pathogenic microorganisms and genetic mutations responsible for antibiotic resistance in human remains, aiding in understanding resistance evolution, a key factor for modern medicine. The oral microbiome is crucial for understanding changes in dental plaque, preserved as mineralised dental calculus on skeletal remains. Dental calculus forms through complex biological and physicochemical interactions involving bacterial accumulation and mineralisation by calcium and phosphate ions. Bone tissue is a valuable reservoir for detecting bacterial biofilms and antibiotic-resistance genes over time. We aim to investigate the oral and systemic health of the nuns of the Convent of Jesus of Setúbal from the 15th to 19th centuries. Historical records indicate that some nuns died from respiratory diseases such as tuberculosis, hectic fever, pleurisy, strokes, and related illnesses. The focus is on the pathology identification, oral microbiome characterisation, and the detection of genes associated with antibiotic resistance in ancient DNA samples. Consequently, it contributes to understanding the evolution of bacterial resistance and oral microbiome in historical contexts. The skeletal remains of 15 adult female individuals were analysed. Of these, 10 presented dental calculus. The teeth selection was based on tartar presence, prioritising premolars and molars. Additionally, fragments of femurs and ribs were used to study the microbiome and antibiotic resistance. Ancient DNA extraction was performed using the NZY Soil gDNA Isolation Kit (Nzytech), optimised for dental calculus and bone, and based on the protocol by Weyrich et al. (2015). Procedures were conducted in a sterile environment with strict contamination control. It was possible to extract ancient bacterial DNA from both sample types. Preliminary tests (PCR with universal primers) confirmed the material's viability for 16S rRNA gene analysis, allowing sequencing assays to be performed. The macroscopic analysis of these remains allowed the identification of dental occlusal wear, antemortem tooth loss, and periodontitis in several individuals. Dental calculus suggests a diet rich in carbohydrates and limited oral hygiene. In conclusion, this work highlights the potential of dental calculus as a repository of palaeopathological, dietary, and microbial data. The recovery of ancient bacterial DNA validates the applied methodology and enables progression towards metagenomic analysis aimed at reconstructing this nun community's oral microbiome and resistome. Finally, this study underscores the importance of integrating bioarchaeology, palaeopathology, and molecular microbiology to better understand health and disease in past populations. Notes: The changes have been made in accordance with your recommendations. The conclusion regarding dental calculus has already been included in the initial text. We do not yet have all results, as the sequencing is still ongoing.

Keywords: PALEOMICROBIOLOGY; DENTAL CALCULUS; ANTIMICROBIAL RESISTANCE; BIOARCHAEOLOGY; POST-MEDIEVAL PORTUGAL

P.44 PATTERNS OF SUPPLEMENT CONSUMPTION AND INTERACTION RISKS AMONG POLYMEDICATED OLDER ADULTS: A DESCRIPTIVE STUDY†

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Polypharmacy is increasingly common among older adults due to the rising burden of chronic diseases. Concurrently, the use of food supplements (FS)—including vitamins, minerals, and herbal products—is widespread and often unsupervised. Unlike medicines, FS are not reimbursed or subjected to stringent regulation, potentially exacerbating pharmacological and financial vulnerabilities in this population. Although perceived as safe, FS can interact with prescribed drugs, particularly in the elderly, due to age-related changes in drug metabolism and the cumulative risks of multiple therapies. Despite the recognition of the risks, there is a scarcity of systematic data on the utilisation of FS among polymedicated older adults, particularly within community settings. As such, the aim of this work was to describe patterns of FS use among polymedicated older adults and identify potential supplement–drug interactions using validated pharmacological databases. The study's findings are expected to provide valuable insights that will inform clinical practices and health policy. This cross-sectional study was conducted within the ESPIEM 2024/2025 cohort under the Healthy Ageing – Egas Moniz Interdisciplinary Project. A convenience sample of 98 community-dwelling individuals aged ≥65 years and on polypharmacy was recruited by third-year pharmacy students. Informed consent was obtained from all subjects involved in the study. Data collection included demographic details, medication and FS profiles (product, duration, motivation, cost), and recommendation source (professional or self-initiated). Potential FS–drug interactions were assessed using DrugBank and Medscape interaction tools, focusing on CYP isoenzymes and P-glycoprotein pathways. Of 98 participants, 18 (18.4%) reported FS use, corresponding to 21 distinct products. Users took an average of 4.6 medications alongside FS; the latter were most commonly for musculoskeletal (43%) or cognitive (38%) support. The majority of FS were oral solids (e.g., tablets, capsules), and 66.7% of users were women. While 57% of FS were recommended by health professionals, 38% were self-initiated. Duration of use exceeded 3 months for 72% of users, with an average monthly cost of €18.23 (up to €55). Importantly, 71% of FS had potential interactions via CYP or P-gp pathways (induction or inhibition), indicating pharmacokinetic and pharmacodynamic concerns. However, no combinations were classified as life-threatening. FS use among polymedicated older adults reflects a complex intersection of pharmacological risk, financial burden, and regulatory gaps. Despite a low prevalence in the sample, the sustained and largely unsupervised use of FS underscores the need for improved medication reviews and patient education. Limitations of the study include a small number of FS users, reducing statistical power and generalizability, and the possibility of underreporting. Nevertheless, the findings support integrating FS monitoring into clinical practice and health policy, especially within a One Health framework aimed at promoting safe and equitable ageing.

Keywords: POLYPHARMACY; FOOD SUPPLEMENTS; DRUG–SUPPLEMENT INTERACTIONS; GERIATRIC PHARMACOTHERAPY; ONE HEALTH

P.45 PHARMACEUTICAL PROFILING OF FENTANYL USE IN PORTUGAL: CONSUMPTION PATTERNS AND ABUSE DETERRENCE GAPS†

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Fentanyl is a synthetic opioid widely used in severe pain management due to its high potency and rapid action. However, its pharmacokinetic profile and formulation characteristics make it highly prone to misuse and diversion. Globally, fentanyl-related morbidity and mortality have risen dramatically, prompting calls for regulatory vigilance and harm-reduction strategies. In Portugal, although fentanyl has been primarily prescribed for legitimate medical use, recent trends show a significant increase in its outpatient use, raising concerns over misuse, improper disposal, and associated environmental and veterinary risks. This study aims to characterize fentanyl consumption trends in Portugal, examine the distribution of dosage forms, and evaluate the potential for abuse based on formulation properties. A retrospective analysis was conducted using sales data for all outpatient opioid analgesics dispensed in Portuguese community pharmacies between 2015 and 2022. Data were obtained from the National Pharmacies Association (ANF) and cross-referenced with the Infarmed database. Variables included year, dosage form, brand vs. generic status, and total number of doses. Each fentanyl formulation was assessed for abuse potential based on pharmacokinetic properties, route of administration, and presence or absence of abuse-deterrent features. Descriptive statistics were applied to identify consumption trends and correlate them with misuse liability. Fentanyl ranked as the fourth most dispensed opioid in Portugal, following tramadol, tapentadol, and buprenorphine. Over the study period outpatient fentanyl consumption increased by approximately 90%, both in packages and total doses dispensed. The annual average increase was 22,468 packages/year, highlighting a strong and consistent upward trend. Transdermal patches and sublingual tablets dominated the market, representing 58–60% and 27–36% of fentanyl doses sold, respectively. The use of sublingual tablets increased by over 30%, while oral transmucosal lozenges saw a steep decline from 11.7% in 2015 to 2.8% in 2022, possibly due to safety concerns. Buccal films and nasal sprays, introduced more recently, remained marginal, accounting for less than 1% of total consumption by 2022. Generic products saw increasing market penetration, particularly in transdermal forms, supporting policy efforts to promote cost-effective prescribing. However, none of the fentanyl formulations available in Portugal include recognized abuse-deterrent formulations (ADFs). Formulation analysis showed that rapid-onset and short-duration products (e.g., sublingual tablets, buccal films, nasal sprays) present high misuse potential, especially in outpatient settings. Although transdermal patches contain large drug loads, their slow onset and partial tamper resistance (e.g., matrix systems) confer a relatively lower risk of misuse under prescribed use. The marked rise in fentanyl use—particularly of high-risk formulations—underlines the urgent need for regulatory and pharmaceutical interventions. The absence of ADFs, combined with increased outpatient prescribing, reveals a significant vulnerability in Portugal's current opioid strategy. Recommended actions include integrating ADFs into formularies, enhancing prescription monitoring, and implementing targeted education on safe use and disposal. Furthermore, improper disposal and veterinary use, although limited, pose risks to animal and environmental health. A One Health approach to opioid stewardship that integrates human, animal, and environmental health perspectives and contemplates cross-sectoral collaboration is essential to mitigate these interconnected risks and ensure the sustainable and responsible use of fentanyl.

Keywords: FENTANYL; DOSAGE FORMS; ABUSE-DETERRENT FORMULATIONS; DRUG ABUSE POTENTIAL; PORTUGAL

P.46 RETHINKING SCIENCE TEACHING FOR THE 21ST CENTURY: A SWOT ANALYSIS OF A MULTI-STRATEGIC MODEL†

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The rapid progress of scientific knowledge and the increasing professional demands in science-related fields require innovative educational approaches to be adopted. Traditional lecture-based teaching often fails to foster essential skills such as autonomy, critical thinking, and lifelong learning. The Integrated Multi-Strategy Teaching in Science (IMST) model addresses these needs by combining diverse, evidence-based teaching methodologies within a structured, student-centred framework. Originally developed for the pharmaceutical sciences, IMST promotes active learning through flipped classrooms, self-directed study, scenario-based activities, and peer assessment. It is designed to enhance not only knowledge acquisition but also key professional competencies relevant to 21st-century graduates. This study aims to introduce the IMST model and evaluate its implementation in a fourth-year pharmaceutical course (*Advanced Therapeutic Systems*), exploring its strengths, weaknesses, opportunities, and threats (SWOT) based on the perspectives of both students and professors. The analysis seeks to inform future refinements and support broader institutional adoption. The IMST model is structured around three pillars—knowledge, skills, and attitudes—and unfolds in three phases: pre-class, in-class, and post-class. Students engage with curated content, perform autonomous and collaborative tasks, and receive continuous formative feedback, including peer evaluations conducted via the Moodle Workshop tool. The final assignment is a group project, for which students propose a theme. The project is then refined in class and culminates in a presentation, an abstract and a scientific poster, as well as an individual oral discussion. Assessment is multi-faceted, including written, oral, peer-reviewed, and an Objective Structured Clinical/Practical Examination (OSCPE). An online survey using Mentimeter was conducted among 64 fourth-year pharmacy students (2024–2025 cohort) at the end of the course. The survey included 16 quantitative items (0–10 scale; voting outputs were invisible to participants) and open-ended questions addressing structure, effectiveness, engagement, and comparison with traditional approaches. Independent reflections were also gathered from the two faculty members. Both qualitative and quantitative data were analysed using a SWOT framework. The survey had a 96.9% response rate, and students reported meaningful gains in research (7.56), communication (6.87), critical thinking (7.10), and responsibility for learning (7.11). However, the model was also perceived as demanding in terms of time (8.35), with only moderate enjoyment (6.52) and enthusiasm for study (5.81). Open responses emphasized the desire for more in-class work time and improved scheduling of tasks. Faculty reflections acknowledged the model's pedagogical value but highlighted implementation challenges, including workload intensity, scalability issues, and difficulties supporting students with limited autonomy or English language proficiency. The SWOT analysis revealed strong alignment in recognizing the model's strengths and critical divergences regarding logistical constraints and sustainability concerns. The IMST model demonstrates significant potential for developing critical scientific and professional skills in higher education. Students and faculty appreciate its relevance, integrative structure, and active learning focus. Nonetheless, to ensure sustainability and wider applicability, structural adjustments are needed—particularly regarding workload management, digital tool optimization, and motivational strategies. Addressing these barriers is crucial to scaling IMST within science curricula and supporting inclusive, engaging, and skill-oriented learning environments.

Keywords: ACTIVE LEARNING; SCIENCE EDUCATION; PEDAGOGICAL INNOVATION; STUDENT-CENTRED LEARNING; SWOT ANALYSIS

P.47 INFLUENCE OF COCA-COLA ON THERMOPLASTIC DEGRADATION IN CLEAR ORTHODONTIC ALIGNERS†

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In recent years, there has been a marked increase in the preference for clear orthodontic aligners. These devices are primarily composed of thermoplastic resin polymers, which may degrade via thermal, chemical, or mechanical processes, potentially releasing microplastics. The biopersistence of microplastics has been linked to adverse biological effects, including inflammation, oxidative stress, and necrosis. Although patients are generally advised to avoid consuming solids or liquids while wearing aligners, this guidance is often disregarded, particularly with beverages, thereby increasing the risk of plastic particle release. This pilot study investigates the release of microplastics from clear orthodontic aligners subjected to mechanical friction and exposed to different simulated oral environments. The objective was to determine whether beverages such as Coca-Cola favour the degradation and release of microplastic particles compared to artificial saliva. Since the release of microplastics in the presence of artificial saliva has already been demonstrated, this condition was used as a control. Aligners from two commercial brands were subjected to a seven-day regimen consisting of daily cycles: 5 hours of low-speed agitation in either Coca-Cola or artificial saliva, followed by 19 hours of static immersion in fresh artificial saliva. This cycle was repeated daily. The agitation was calibrated to simulate physiological dental friction and the aligners were kept at 37ºC during the entire treatment. At the end of the experimental period, all the solutions in contact with each aligner pair—along with the respective rinsing waters—were combined and vacuum-filtered. Residues retained on the filtration membrane were examined under a stereomicroscope and characterised using Fourier-transform infrared spectroscopy (FTIR). Spectra of the released particles were compared with those of the original aligners to determine the presence and type of microplastics. Results showed that microplastic particles were released even under control conditions. However, aligners exposed to Coca-Cola released a significantly higher number of particles, suggesting a more aggressive degradation mechanism, likely due to the beverage's low pH and acidic composition. The polymers identified included polyethylene terephthalate (PET) and polyurethane (PU), depending on the brand. FTIR spectra confirmed that released particles matched the original material spectra, indicating genuine microplastic generation rather than external contamination. In conclusion, although artificial saliva alone can cause the release of microplastics, the presence of acidic and fizzy drinks, such as Coca-Cola, seems to promote this effect. These findings underscore the need for patient education regarding beverage consumption during orthodontic treatment to reduce potential health and environmental risks linked to microplastic exposure.

Keywords: CLEAR ORTHODONTIC ALIGNER; MICROPLASTIC; THERMOPLASTIC

P.48 GRAPHOSCOPIC EVALUATION AFTER A FINE MOTOR SKILL REHABILITATION PROGRAM IN PARKINSON'S DISEASE - EXPLORATORY STUDY†

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Legal documents signed by individuals with Parkinson's disease are often disputed due to inconsistencies in their signatures when compared to those executed prior to the onset of the disease. This neurological disorder can lead to progressive alterations in handwriting due to bradykinesia, tremor, and rigidity, which limit movement, contribute to muscular pain, and compromise the control of fine motor skills. Generally, rehabilitation programmes focus on the lower limbs to improve gait and prevent falls. However, since these individuals also face other daily challenges with potential legal implications involving the control of fine motor skills, such as handwriting and preserving their graphic identity, a preliminary study was conducted over a twelve-week intervention period with the main objective of evaluating the effect of a fine motor skill rehabilitation programme on the handwriting of individuals with Parkinson's disease. The procedures implemented in this exploratory study were subject to registration (www.clinicaltrials.gov), scientific approval by the Egas Moniz Scientific Council, and ethical approval by the EM Ethics Committee, in accordance with the Declaration of Helsinki (Declaration of 1975, revised in 2000). This study involved 10 subjects, recruited through *Clínica de Fisioterapia Egas Moniz (Monte da Caparica),* who, on their own initiative, began attending the clinic. Subjects who met the eligibility criteria after the initial clinical diagnosis were invited to participate and were fully briefed on the conditions under which they would perform the tests and rehabilitation programme procedures. An informed consent form was signed for the use of these results for research purposes. The collection, processing, and dissemination of data were carried out anonymously. Of the ten subjects, four participated in the fine motor skill rehabilitation programme (Intervention Group - IG), while the remaining six were allocated to the control group (CG). Over the intervention period, all participants underwent the conventional physiotherapy rehabilitation programme. The IG participants were also encouraged to perform occupational therapy exercises using a kit designed to promote fine motor rehabilitation. All subjects were instructed to write specific sentences, before (t0) and after the twelve weeks intervention (t1). The handwriting samples were submitted to a graphoscopic analysis to identify any potential changes in handwriting features. The main qualitative changes observed between groups, were in features such as tremors, which a tendency to decreased was observed in IG and to increase in CG; retouching/overwriting where a tendency to decreased was observed in IG and no changes were observed in CG; size where no tendency was observed in IG while an increase was observed in CG; and in overall appearance were a better legibility and execution of the letters was achieved in the IG while legibility and letters execution decreased in CG. In conclusion, these preliminary results suggest that individuals with Parkinson's disease engaging in a handwriting rehabilitation programme can improve their graphomotor skills, which will promote the recovery of their handwriting skills as well as their graphic identity. In future work, a larger sample size would be desirable to validate these results and enhance the characterisation of variability in Parkinson's disease handwriting.

Keywords: NEUROREHABILITATION; OCCUPATIONAL THERAPY; FINE MOTOR SKILLS.

P.49 DETERMINANTS OF EXCLUSIVE BREASTFEEDING DURATION: A POPULATION-BASED STUDY FROM SOUTHERN PORTUGAL†

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Exclusive breastfeeding during the first six months of life is considered the gold standard in infant nutrition, offering well-established benefits for both mothers and infants. Despite global efforts to promote breastfeeding, exclusive breastfeeding rates remain below WHO recommendations, particularly in Europe. Multiple factors have been associated with early cessation, including maternal, perinatal, and social determinants. In Portugal, although some studies have examined breastfeeding practices, there is a notable lack of data from the Algarve region. This study aimed to determine the prevalence and the factors influencing breastfeeding during the first six months of life in the Algarve region. An observational, descriptive, cross-sectional study was conducted with data collection between July 1 and September 30, 2023, using an online, self-administered questionnaire. The sample included 464 mothers of infants aged 6–24 months residing in the Algarve. Ethical approval was granted by the Health Ethics Committee and the Board of Directors of the Regional Health Administration of Algarve, I.P. (Approval No. 06/2023). Participation was voluntary, anonymous, and informed consent was obtained from all subjects involved in the study. The results showed a decrease in exclusive breastfeeding prevalence over the first six months (75.9% in the first month to 38.1% in the sixth month). Factors associated with a shorter duration of exclusive breastfeeding included: primiparity ($p=0.02$), no attendance at breastfeeding classes ($p=0.038$), no previous breastfeeding experience ($p=0.011$), negative previous experience ($p<0.001$), shorter duration of previous experience ($p<0.001$), use of formula in the hospital ($p<0.001$), lower educational level ($p=0.011$), lack of skin-to-skin contact ($p<0.001$), and caesarean section ($p<0.001$). Multiple regression analysis identified two independent predictors of exclusive breastfeeding duration: use of formula in the hospital (Beta = -0.402, $p<0.001$) and the duration of previous breastfeeding experience (Beta=0.206, $p=0.003$). This study provides key insights into breastfeeding patterns in the Algarve region, reflecting a national trend of low exclusive breastfeeding rates at six months. These findings reinforce the need for integrated strategies across healthcare, workplace, and policy sectors, including extended, fully paid parental leave. Strengthening support systems and ensuring alignment between public policies and the lived experiences of women are essential to protect and promote breastfeeding as a public health priority.

Keywords: EXCLUSIVE BREASTFEEDING; BREASTFEEDING DURATION; BREASTFEEDING SUPPORT; MATERNAL DETERMINANTS; SOUTHERN PORTUGAL

P.50 SATISFACTION WITH PHYSIOTHERAPY CARE FOR INDIVIDUALS WITH CYSTIC FIBROSIS ACROSS FACE-TO-FACE, ONLINE AND BLENDED REHABILITATION SETTINGS†

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Satisfaction assessment is a key indicator of healthcare service quality and an essential component in evaluating the effectiveness and potential of the treatment. Cystic fibrosis (CF), a complex multi-systemic condition, requires multidisciplinary care in which physiotherapy plays a crucial role. Assessing patient satisfaction is therefore particularly relevant. While face-to-face programmes are the traditionally standard approach, online programmes have demonstrated great advantages in managing patients with chronic diseases such as CF. Moreover, blended rehabilitation has also emerged as an alternative that incorporates the benefits of both physiotherapy programmes settings. This study aimed to assess the perception of satisfaction levels of individuals with CF (aged 16 or older) or their legal representatives (for those aged 15 or younger) regarding physiotherapy services provided by the Cystic Fibrosis National Association (ANFQ), across different care settings. A cross-sectional observational study was conducted in May 2025, following approval by the Egas Moniz Ethics Committee (Process No. 1593 of 30/04/2025). Participants were recruited from ANFQ database (a universe of 41 individuals). Participation was voluntary, anonymity was assured, and written informed consent was obtained. Data was collected using the 43-item instrument: The Patient Feedback Questionnaire (PFQ), administered via Google Forms. The sample comprised 40 participants: 5 individuals with CF (mean age = 19.2) and 35 legal representatives of children with CF (mean age = 41.9; children's mean age: 8.02). Most respondents were female (85%). Treatment modalities included online (N = 14; 35%), face-to-face (N = 13; 32.5%), and blended (N = 13; 32.5%) rehabilitation. Overall satisfaction was high: individuals with CF (M = 4.80, SD = 0.40) and legal representatives (M = 4.94, SD = 0.23), with 95% reporting their expectations were met. Participants showed strong engagement and motivation. Key satisfaction drivers included interpersonal relationships and active listening (questions related to these factors endorsed approval by 95-100% of the respondents), effective communication and active patient involvement in intervention planning (65-100%). Participants who received face-to-face care over a period of three to four years, with weekly follow-up sessions, reported the highest levels of satisfaction (M = 5.0, SD = 0.0). A one-way ANOVA was conducted on 39 items to compare the three rehabilitation settings. The analysis revealed statistically significant differences ($p < 0.05$) in two items comparing face-to-face and online modalities. The face-to-face group reported more favourable outcomes with the item "The physiotherapists asked me to participate in activities I was not comfortable with," while the online group reported greater satisfaction for "The physiotherapists provided feedback on my progress." These limited findings constrained the potential for further comparative analysis across settings. Although the participants in this study—who represent nearly the entire population receiving physiotherapy care through ANFQ—reported notably high levels of satisfaction, particularly with face-to-face services, these findings cannot be generalized to all individuals with CF in Portugal due to the localized sample and the subjective nature of satisfaction measures. Nonetheless, these findings highlight the importance of systematically assessing satisfaction to better understand user perceptions across the three modalities of physiotherapy care—face-to-face, online, and blended.

Keywords: CYSTIC FIBROSIS; TREATMENT MODALITIES; PHYSIOTHERAPY; QUALITY; SATISFACTION

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Innovative Health Technologies

P.51 ROSMARINIC ACID-RELEASING CONTACT LENSES: A PLANT-BASED APPROACH TO THE DIABETIC EYE†

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With the global rise of diabetes, addressing its ocular complications, including diabetic retinopathy, macular oedema, and cataracts, has become increasingly urgent to prevent permanent vision loss. However, the current standard of care for diabetes-related eye conditions is often invasive, poorly tolerated, offers limited bioavailability, or is unsuitable for long-term management. In light of this, drug-eluting contact lenses (CLs) emerge as a compelling non-invasive and patient-friendly strategy that, compared to eye drops, can increase a drug's ocular residence time and thus its bioavailability whilst reducing patient compliance issues and systemic absorption. In this work, CLs were designed for the sustained delivery of rosmarinic acid (RA), a natural polyphenol known for its antioxidant, anti-inflammatory, and neuroprotective properties, which have been proposed as alternatives to anti-VEGF and corticosteroids in the treatment of diabetic ocular complications. Acrylic and silicone-based hydrogels were tailored to support a controlled release of RA, with vitamin E-treated silicone hydrogels emerging as the most effective system. The system demonstrated a sustained release of RA for up to 7 hours under static conditions, and when subjected to a hydrodynamic microfluidic test capable of simulating ocular conditions (tear volume and renovation rate), it demonstrated a sustained release of RA in conditions mimicking the eye for over 24 hours. Comprehensive characterisation confirmed that the system's transparency, liquid uptake, wettability, surface morphology, and mechanical properties met commercial CLs standards. Surface wettability was assessed with a goniometer, the surface morphology was analysed by scanning electron microscopy, and the material's Young's modulus was evaluated through tensile testing. Additionally, no signs of ocular irritation and cytotoxicity were observed *in vitro,* in vitro, as determined by a HET-CAM assay and an indirect contact assay with NIH/3T3 mouse fibroblasts. *Ex vivo* Ex vivo porcine permeability assays confirmed the drug's permeation through the cornea and sclera. These data were then integrated into a previously established mathematical model, which predicted therapeutically relevant concentrations across the ocular tissues. To validate the system's therapeutic significance, a series of assays were performed, confirming that the delivered RA maintains its antioxidant, anti-inflammatory, and neuroprotective activity, highlighting its potential as a therapeutic alternative for managing diabetic eye disease. Overall, the developed system holds promise as an innovative therapeutic vehicle, leveraging the benefits of natural products to enhance non-invasive treatment strategies for diabetic eye diseases.

Keywords: ROSMARINIC ACID; CONTACT LENSES; DRUG DELIVERY; DIABETIC EYE; HYDROGEL

P.52 SOLVENT-FREE RECOVERY OF FUNCTIONAL CASEINS FROM DAIRY SIDE-STREAMS FOR CIRCULAR ONE-HEALTH BIOMATERIALS†

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Casein is a renewable, multifunctional protein with growing potential in One Health biomaterials, owing to its biocompatibility, biodegradability, non-toxicity, and cost-effectiveness. However, conventional extraction methods often involve organic solvents, which compromise sustainability. At the same time, substantial volumes of dairy by-products — including spoiled and antibiotic-contaminated milk — are routinely discarded, representing an untapped opportunity for valorisation. This study aimed to develop a solvent-free method for recovering functional caseins from underutilised dairy sources and to evaluate their structural and biofunctional properties for circular bio-based applications. Caseins were extracted via acid precipitation from four industrially relevant dairy streams: raw antibiotic-contaminated milk, whole bovine milk, spoiled skimmed milk, and fresh skimmed milk. Laboratory-grade bovine casein was used as a control. Protein content and purity were determined using the Kjeldahl method, and amino acid and mineral profiles were characterised. Emulsifying capacity was assessed in olive, sweet almond, and sunflower oils. Foaming ability and stability were also evaluated. Structural characterisation included Fourier-transform infrared spectroscopy (FTIR), sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE), circular dichroism (CD), differential scanning calorimetry (DSC), and thermogravimetric analysis (TGA). Zeta potential was measured using laser Doppler micro-electrophoresis, and in vitro cytocompatibility was assessed using standard assays. All eco-caseins exhibited high protein purity and preserved the characteristic α-, β-, and κ-casein subunit profiles. Emulsifying and foaming performance was robust across all samples, with some outperforming the control. Thermal characterisation indicated high stability and low residual mass, supporting their use in thermally processed systems. All samples showed low cytotoxicity, confirming their suitability for biomedical applications. This study demonstrates that solvent-free extraction enables the recovery of high-quality, functional caseins from dairy side-streams typically considered waste. These eco-caseins combine structural integrity, thermal resilience, and biofunctionality with cytocompatibility, making them promising candidates for sustainable emulsions, foams, and protein-based medical devices. The approach adds value particularly to antibiotic-contaminated streams, contributing to waste reduction and circular resource utilisation. In conclusion, this work offers a practical, scalable route to align dairy waste valorisation with One Health goals and the principles of a circular bioeconomy.

Keywords: CASEIN; DAIRY BY-PRODUCTS; SUSTAINABILITY; BIOMATERIALS; CIRCULAR BIOECONOMY

P.53 BESPOKE BIOMARKER COMBINATIONS FOR CANCER SURVIVAL PROGNOSIS USING ARTIFICIAL INTELLIGENCE ON TUMOUR TRANSCRIPTOMICS†

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Accurate cancer survival prognosis remains a major challenge in oncology, with single biomarker approaches often lacking sufficient specificity and sensitivity for clinical application. Recent advances in transcriptomic profiling and artificial intelligence (AI) offer promising new directions to identify combinations of molecular features that better predict patient outcomes. In this study, we applied our proprietary AutoML algorithm, O2Pmgen, via the Digital Phenomics platform to tumour transcriptomic datasets from The Cancer Genome Atlas (TCGA) for breast, lung, and renal cancers. A curated set of 58 gene candidates was selected, representing key signalling cascades implicated in Epithelial-to-Mesenchymal Transition (EMT), a critical process in cancer invasion and metastasis. We used BMfinder to assess and rank individual biomarkers for comparison with optimal combinations that enhance predictive performance. Our models revealed compact biomarker panels of five to seven genes that outperformed the single-marker approach. Performance evaluation of these bespoke combinations via analysis of the Receiver Operating Characteristic (ROC) curve through computing the area-under-the-curve (AUC) resulted in scores of 79% for breast cancer, 73% for lung cancer, and 78% for renal cancer. Sensitivity ranged from 70% to 84%, while specificity ranged from 60% to 82%. The gene combinations identified were associated with the upregulation of distinct signalling components across each cancer type, suggesting tumour-specific molecular signatures for prognosis. These results highlight the potential of AI-driven approaches for bespoke biomarker discovery and demonstrate that combining expression degrees of carefully selected genes can substantially improve the predictive power of survival models in oncology. This work further demonstrates that AI-driven AutoML approaches, leveraging small and biologically meaningful gene panels, can enable the development of affordable and efficient prognostic tools for cancer management.

Keywords: AI; MACHINE LEARNING; CANCER PROGNOSTICS; BIOMARKER DISCOVERY

P.54 MORPHOLOGICAL CHARACTERISTICS OF THE MEDIAN AND SCIATIC NERVES VIA MAGNETIC RESONANCE IMAGING AND FREEHAND 3D ULTRASOUND†

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1) Background: Magnetic resonance imaging (MRI) and ultrasound have been used to assess the morphological characteristics of peripheral nerves. However, previous studies focused on specific anatomical regions rather than considering potential anatomical variations along the entire nerve course. Furthermore, morphological outcomes such as peripheral nerve volume have never been quantified before. The aim of this study was to evaluate the median and sciatic nerve shape and three-dimensional (3D) geometry (i.e., cross sectional area (CSA), volume and length) between MRI and freehand 3D ultrasound (F3DUS) imaging methods. 2) Methods: Ten healthy adult volunteers participated in the study. MRI and F3DUS scans of the median and sciatic nerves along the forearm and thigh were acquired on two separate imaging sessions. Three-dimensional reconstruction of the nerves from both imaging methods was performed using Stradview software (Version 7.2). All MRI and F3DUS images were manually segmented. The CSA and nerves volume were derived by delineating the CSA in a series of transverse sections and were processed directly from the 3D reconstructed images through the Stradview software. For length measurement, the starting and ending references for manual segmentation were set as 0% and 100% of both nerves' length. Nerves length was calculated as the cumulative sum of the distances between consecutive 3D centroid points. 3) Results: A 3D surface model of each nerve was created from the MRI and F3DUS methods. The median nerve CSA tended to be higher close to articular regions and lower at mid-forearm level. At the humeral trochlea, mid-forearm and wrist crease, CSA were 7.26 $mm^2$2, 5.13 $mm^2$2, 7.81 $mm^2$2 on MRI and 6.73$mm^2$2, 6.27$mm^2$2, 8.35$mm^2$2 on F3DUS, respectively. The median nerve volume derived from MRI was 1.44 ± 0.19$cm^3$3 and 1.534 ± 0.22cm^3 3 from F3DUS. The corresponding nerve length was 23.52 ± 1.34cm on MRI and 24.650 ± 3.836cm on F3DUS. The sciatic nerve CSA was larger at the ischial tuberosity (i.e., 43.74$mm^2$2 on MRI and 50.92$mm^2$2 on F3DUS) and decreased along the thigh to the popliteal region (i.e., 28.82$mm^2$2 on MRI and 28.92$mm^2$2 on F3DUS). The volume and length of the sciatic nerve quantified by MRI and F3DUS were 9.6 ± 0.93 $cm^3$3 vs 11.48 ± 1.37$cm^3$3 and 32.11 ± 1.62cm vs 34.06 ± 2.20cm, respectively. Overall, there was a tendency for the F3DUS to overestimate the nerve's CSA, volume and length compared to MRI. 4) Conclusion: MRI and F3DUS can be considered equivalent methods for estimating the shape and 3D geometry of the median and sciatic nerves. These results make F3DUS an attractive alternative to MRI, considering the cost-benefit.

Keywords: MEDIAN NERVE; SCIATIC NERVE; FREEHAND 3D ULTRASOUND; MAGNETIC RESONANCE IMAGING; 3D GEOMETRY

P.55 PRELIMINARY STUDIES ON A CLINDAMYCIN-LOADED HYDROGEL FOR INFECTION CONTROL IN ENDODONTICS†

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In cases of infection, conventional endodontic therapies often fail to eliminate persistent biofilms and residual bacteria in root canals, underscoring the need for innovative drug delivery systems with potent antimicrobial capacity. In this context, clindamycin emerges as a promising antibiotic due to its proven efficacy against more than 70% of endodontic pathogens and its relatively low incidence of allergic reactions, ensuring a safer therapeutic profile. Furthermore, nanoparticles serve as ideal carriers for delivering antimicrobial agents, offering advantages such as controlled drug release, enhanced bioavailability, targeted delivery to infection sites, and reduced drug dosages necessary to achieve therapeutic effects. This study aimed to develop a chitosan (CH) and polyvinyl alcohol (PVA) hydrogel containing clindamycin-loaded nanoparticles for endodontic applications, designed for administration through specific syringes and tips within root canals. To ensure the safety of the formulation, all reagents employed are FDA-approved and have been extensively studied and validated for potential human use in similar biomedical applications. Nanoparticles of poly(lactic-co-glycolic acid) (PLGA) encapsulating clindamycin were synthesized using a double emulsion method. The nanoformulation process was performed using both blank and drug-loaded nanoparticles, each prepared and analysed in triplicate. The average results for blank nanoparticles were: particle size 194.99 ± 1.87 nm, polydispersity index (PDI) 0.131 ± 0.02, and zeta potential (ZP) −39.08 ± 0.97 mV. For clindamycin-loaded nanoparticles, the average size was 207.00 ± 2.50 nm, PDI 0.143 ± 0.175, and ZP −38.23 ± 1.13 mV, demonstrating consistent formulation parameters and stability. The hydrogel was formulated by mixing a CH/PVA solution in a 60:40 ratio, and its viscoelastic properties were assessed through rheological testing at 4ºC, 25ºC, and 37ºC, simulating clinical conditions. Rheological evaluations included viscosity measurement, gelation analysis, and frequency sweep testing. These analyses revealed optimal consistency for syringe application while maintaining structural integrity. Preliminary microbiological tests have also been carried out, showing promising antimicrobial activity against endodontic pathogens such as *Prevotella intermedia* (DSM 20706), *Pseudomonas aeruginosa* (ATCC 15442), and *Streptococcus mutans* (ATCC 12344). These results suggest that the clindamycin-loaded hydrogel offers encouraging antimicrobial efficacy and rheological stability, supporting its potential as a targeted drug delivery system for endodontic infections. The project is now advancing into the next experimental phase, which includes concrete preclinical evaluations. Cytotoxicity testing and drug release studies are being initiated to further validate the biocompatibility and therapeutic potential of the hydrogel system prior to clinical application.

Keywords: ENDODONTICS; HYDROGEL; NANOPARTICLES; DRUG DELIVERY SYSTEM

P.56 MUPIRUCIN-LOADED DRESSING FOR THE TREATMENT OF CHRONIC WOUNDS†

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Chronic wounds represent a significant clinical challenge, requiring advanced dressings capable of controlled drug delivery while absorbing exudate and maintaining structural integrity. A polymeric film composed of polyvinyl alcohol (PVA 87) and xanthan gum (XG) was developed and characterized, incorporating D-a-tocopherol polyethylene glycol 1000 succinate (TPGS 1000)-based micelles for controlled drug delivery. Mupirocin (MUP), an antibiotic that inhibits bacterial isoleucyl-tRNA synthetase, was loaded as the active drug. Gamma irradiation was applied as a single-step strategy to simultaneously sterilize and crosslink the material, offering an effective alternative to autoclaving for thermosensitive compounds. The effects of crosslinking were evaluated in terms of swelling behaviour and degradation, release profiles of TPGS and MUP, surface wettability, and mechanical properties. Thermal analyses (TGA and DSC) provided insight into thermal stability and phase transitions, while scanning electron microscopy (SEM) of swollen and freeze-dried samples revealed a porous internal structure, supporting water uptake and drug diffusion. Preliminary antimicrobial and cytotoxicity tests were performed, with further analyses ongoing. Additional ongoing studies include antioxidant activity, irritation potential via the HET-CAM assay, as well as hemocompatibility and adhesion. In terms of results, the film exhibited excellent swelling capacity and hygroscopicity, confirming its suitability for exudate management, swelling up to a swelling index of 3384.29 ± 228.84% after 24 hours in PBS (pH 7.4). Physicochemical and mechanical evaluations supported its responsiveness in aqueous environments and its applicability as a topical system. The gamma-crosslinked film displayed a contact angle of 49.85 ± 4.62°, indicating good surface hydrophilicity. It also demonstrated antioxidant activity, with DPPH radical scavenging of 17.26 ± 0.90% after 1 hour and 34.87 ± 3.69% after 24 hours, highlighting a time-dependent increase in radical scavenging capacity. After 8 hours, the system released 100% of the loaded drug and 40% of the incorporated TPGS, demonstrating its potential for controlled delivery. In terms of antimicrobial performance, the unloaded film inhibited 16.60 ± 2.69% of S. aureus and 20.99 ± 3.24% of E. coli, while the MUP-loaded film achieved significantly higher antibacterial activity, inhibiting 63.13 ± 0.21% of S. aureus and 67.82 ± 2.74% of E. coli. Overall, the developed platform shows promise for chronic wound treatment by combining drug release, exudate absorption, antimicrobial and antioxidant activity, and mechanical functionality in a single dressing.

Keywords: POLYMERIC MICELLES; TPGS; MUPIROCIN; WOUND DRESSING; CONTROLLED RELEASE

P.57 DEVELOPMENT OF A CASEIN-BASED HYDROGEL INCORPORATING APPLE PEEL EXTRACT FOR ENHANCED CHRONIC WOUND TREATMENT†

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Chronic wounds present a high risk of infection and constitute a significant clinical challenge due to prolonged healing times. Their impact on both healthcare systems and patients' quality of life can be quite high. These wounds often fail to progress through the normal stages of healing, necessitating innovative strategies that actively support tissue regeneration. Natural biomaterials have emerged as promising alternatives for developing more effective and biocompatible wound dressings. In this context, casein—a milk-derived protein—shows potential as a structural component in wound dressings, offering biodegradability and the ability to release bioactive peptides upon interaction with wound exudate, which may enhance healing and reduce inflammation. Additionally, apple peel extract, which is rich in polyphenols with well-documented antioxidant and anti-inflammatory properties, holds promise for accelerating wound healing and improving outcomes in chronic wound management. In the present study, a hydrogel composed of casein, polyvinyl alcohol, polyethylene glycol, and carboxymethyl cellulose was prepared via a freeze-thawing method. Comprehensive characterization of its morphology, water content, swelling capacity, wettability, tensile strength, and mucoadhesiveness demonstrated that the material possesses suitable properties for wound dressing applications. After 48 hours of soaking in an aqueous apple peel extract solution, the hydrogel exhibited a significant increase in antioxidant activity (from 3.0% to 88.3%), as determined by the DPPH assay. In terms of antibacterial performance, the loaded hydrogel was highly effective, showing inhibition rates of 58.0% against *Staphylococcus aureus*, 45.2% against *Pseudomonas aeruginosa* and 97.0% against *Streptococcus pyogenes*. Furthermore, cell viability assays using 3T3 fibroblasts, along with hemocompatibility tests using human blood samples, indicated no cytotoxic effects and demonstrated high hemocompatibility. Overall, these results underscore the potential of this multifunctional, bioactive hydrogel as a promising candidate for the treatment of chronic wounds.

Keywords: CASEIN HYDROGEL; CHRONIC WOUND HEALING; APPLE PEEL EXTRACT; ANTIOXIDANT ACTIVITY; ANTIBACTERIAL ACTIVITY

P.58 HYDROGEL-BASED WOUND DRESSINGS CONTAINING ZNO NANOPARTICLES AND HONEY FOR DIABETIC WOUND TREATMENT†

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The escalating global incidence of diabetes, driven by an aging population and rising obesity rates, presents significant public health challenges. Among its complications, diabetic wounds are particularly concerning due to their chronic nature, high susceptibility to infection, and potential progression to necrosis, which may lead to amputation or even death. Current treatments encompass glycaemic control, debridement, and wound dressing applications. However, the complex healing process of these wounds is hindered by elevated levels of reactive oxygen species (ROS), persistent inflammation, and frequent infections, underscoring the urgent need for more effective, multifunctional dressings. This work aims to develop a new hydrogel-based wound dressing integrating natural bioactives, namely manuka honey and zinc oxide nanoparticles (ZnO), known for their antimicrobial and regenerative properties. ZnO nanoparticles were produced by green synthesis method using apple-derived phytochemicals, by dissolving zinc nitrate in apple extracts, followed by the addition of KOH to form a ZnO nanoparticles suspension, which was subsequently filtered and dried overnight at 80°C. To obtain the hydrogels, a solution containing polyvinyl alcohol, polyethylene glycol, carboxymethyl cellulose and casein was prepared, poured into Petri dishes and submitted to one freeze-thawing cycle. Honey (5% w/v), zinc oxide (0.033% w/V) or a combination of both were added in distinct formulations. The hydrogels were characterized regarding several key properties relevant to dressings (e.g., morphology, water content, swelling, wettability, and tensile strength). The antibacterial activity of the produced materials was tested against *Staphylococcus aureus* and *Pseudomonas aeruginosa* which are common bacteria in chronic wounds. Antioxidant capacity was analysed through the 2,2-Diphenyl-1-picrylhydrazyl (DPPH)test. SAED and XRD analyses showed that ZnO nanoparticles present a crystalline structure, with characteristic ZnO crystallographic planes identified and peaks matching JCPDS card 036-1451. ATR-FTIR analysis revealed the presence of organic functional groups, including O-H, C-H, C=C, and C-O, indicating the successful binding of apple-derived phytochemicals to the ZnO surface. A distinct Zn-O stretching band at 827 cm^{-1} further confirmed nanoparticle formation and organic molecule incorporation. The hydrogels' demonstrated suitable physical properties to be used in dressings. The honey+ZnO formulation exhibited antibacterial effects – 80% against *S. aureus* and 25% against *P. aeruginosa* – and the highest antioxidant activity (29% scavenging effect), highlighting its potential as a multifunctional dressing for diabetic wound care.

Keywords: WOUND DRESSING; DIABETIC WOUNDS; ZNO NANOPARTICLES; HONEY; HYDROGELS

P.59 STUDENTS' PERCEPTIONS OF OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE): A CONTRIBUTION TO THE CULTURAL ADAPTATION OF A SURVEY†

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The Objective Structured Clinical Examination (OSCE) is widely used for assessing clinical competencies among students in health-related professions. Self-administered questionnaires report on students' perceptions of the assessment's equity, fairness, content relevance, organizational quality and ability to accurately measure clinical skills. The questionnaire developed by Pierre et al (2004), has already been validated and translated in several non-English speaking countries, although not to European Portuguese. Recognising the need to initiate such a process, the present preliminary study aimed to (1) verify whether students had difficulties in understanding the OSCE, since some students' native language was French, and (2) test the use of a short version of the questionnaire. A descriptive, observational, and cross-sectional study was conducted, carried out in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Sports Faculty of the University of Porto (Process No. CEFADE 28_ 2024, 11/12/2024). Student participation was voluntary, anonymity was guaranteed, and written informed consent obtained from all participants after the study's nature and objectives were fully explained. The original questionnaire's items were translated into Portuguese and evaluated by a panel of physiotherapy experts for clarity and appropriateness. The questionnaire consisted of 14 items scored on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree". It was completed by all participating students immediately after the first-semester OSCE. Descriptive measures were determined as median score attributed to each question. Differences between Portuguese and French native speaking students were determined through Mann-Whitney U tests. All 86 respondents were newcomers to OSCE methodology. Average age was 19,6 (SD=1,30) years, 57% were females, 51% Portuguese native speakers and 49% French native speakers. There were no significant differences between native Portuguese and French speakers regarding appreciation on: (1) instruction's clarity and unambiguity, (2) task's fairness, (3) clarity and efficiency of the route employed, and (4) preliminary briefing adequacy before the OSCE. Median for all items in both groups, Portuguese and French speakers, was "agree", with over 75% respondents rating all items as "agree" or "strongly agree". Mann-Whitney U tests showed statistically significant differences in the scores of both native language groups regarding logistical aspects such as: (1) availability of schedules before the OSCE, and (2) timely disclosure of rooms and procedures with median response for both items being "strongly agree" among Portuguese native speakers and "agree" among French native speakers. In contrast, only 17% students rated the item "The OSCE is less stressful than other forms of assessment" as "agree" or "strongly agree". The vast majority of students perceived the OSCE as appropriate and fair, although not less stressful than other forms of assessment. These perceptions were similar irrespective of students' native language, reflecting both students' good response to the methodology and sound questionnaire comprehension. The next stages of the questionnaire's validation will afford an evaluation of its potential for a generalized application and usefulness to others. Regarding OSCE methodology, equal evaluation conditions may contribute to a perception of fairness through standardized practices.

Keywords: OSCE; QUESTIONNAIRE; PHYSIOTHERAPY; EDUCATION; PORTUGUESE

P.60 IS THERE A RELIABLE COLOUR MEASURING DEVICE FOR RESIN COMPOSITE LABORATORY SAMPLES? A PRE-CLINICAL COMPARATIVE STUDY BETWEEN THREE OPTIONS†

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The increase in the aesthetic demand of patients and the unsolved subjectivity in colour measurement in dentistry makes research in colour pertinent and urgent. Despite recent material advances, there is no gold standard consensus in digital colour measuring devices, neither in the clinical or pre-clinical setting, thus, this requires investigation. The Filtek™TMSupreme XTE (nanofilled; 3M ESPE) and Filtek Z250 (microhybrid; 3M ESPE) resin composites (RC) were tested, and 12 discs of each (n=6) were made in two different shades (A1/A4). In each group, discs were randomly allocated to 2 subgroups (n=3), according to different polishing techniques. In one, they were light-cured [20 s at a mean intensity of 950 mW/cm^2 2 with Elipar Deep-Cure-S LED, at 0 mm distance (3M ESPE, USA)] on a *Mylar*Mylar matrix strip, without any additional modifications, and others were polished with silicon carbide sandpaper (360 grit SiC). Subsequently, the colour was assessed using two different commercial equipment – (*Spectroshade*™ Micro and *OptiShade*™ - on different backgrounds and compared to an experimental spectrophotometric device (*Sarspec* Flex). Data were analysed using SPSS 28.0 (α=5%). Regarding *Spectroshade*, the type of RC was significant in the a* and b* parameters (p<0.001), while for *Optishade* only in b* (p<0.001). Colour variation was significant (p<0.001) in all the devices. The background variation was also significant in the commercial devices (p<0.001). The colour evaluation showed significant differences between the commercial and experimental devices in the L* and a* parameters (p<0.001). The devices varied from one to another, but the black background showed greater agreement. The variables inherent to the RCs under study had an influence on colour measurement. Specific guidelines cannot yet be established as further studies are needed.

Keywords: RESIN COMPOSITES; COLOUR; SPECTROPHOTOMETRY; OPTICAL PROPERTIES; DENTAL AESTHETICS

P.61 DRY VS GEL ELECTRODES IN CANINE SURFACE ELECTROMYOGRAPHY: A STEP TOWARDS MORE PRACTICAL VETERINARY ELECTROMYOGRAPHY?†

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Surface electromyography (sEMG) is a non-invasive diagnostic tool that records the electrical activity of muscles. It can be used in various disciplines, including basic research, clinical diagnostics, sports medicine and rehabilitation, and has proven to be a valuable technique for assessing neuromuscular disorders, monitoring treatment progress and evaluating therapeutic interventions, allowing clinicians to evaluate muscle function in dynamic activities. In the context of veterinary rehabilitation, sEMG has emerged as a promising tool for the non-invasive measurement of neuromuscular function in conscious patients, in equine medicine, where research output in this area has increased in recent years, but also in companion animal medicine. With the present study, we evaluate the feasibility of dry electrodes (SoftPulse Flex, Datwyler^{Ò}Ò, Switzerland), never used before in veterinary applications, comparatively to conventional gel-based electrodes (Kendall™H124SG, UK) in canine subjects. A preliminary analysis focusing on the erector spinae muscles (T12-L2) was performed on twelve healthy adult Dachshund dogs (8 males and 4 females, from 1 to 7 years old, mean of 3.6 years), a breed predisposed to myelopathies and commonly treated in rehabilitation settings. The animals were chosen from a questionary shared on social media. Before entering the study, all subjects went throw a thorough orthopaedic and neurologic exam, performed by a veterinarian specialised in rehabilitation medicine. There were initially 13 subjects, but 2 were excluded due to the presence of neurologic/orthopaedic abnormalities at a pre-study exam. Muscle activity was then recorded (BITalino^{Ò}Ò EMG, Portugal) during controlled locomotion on a veterinary treadmill (FitFurLife^{Ò}Ò Professional Treadmill, UK), for 1 minute, at proximally 1.2 miles per hour, after the animal stabilized ambulation frequency to ensure consistent muscle contraction. Signal acquisition was performed with and without trichotomy to assess the effect of hair on data quality, and both electrode types were tested under identical conditions and in the same place. Dry electrode configuration consistently produced higher amplitude and root mean square values, while in power spectral density median and maximum values, both electrode configurations were broadly comparable, with a slight tendency towards higher spectral power in the pre-gelled configuration. Although it is advisable to use pre-gelled electrodes whenever possible, our observations suggest that dry electrodes may offer practical advantages in terms of easier use and reduced preparation time, without compromising signal integrity. Dry electrodes are also less harmful for the environment, as they can be reused several times, unlike the pre-gel configuration, which are single use. Given the limited body of knowledge and lack of standardised protocols for of sEMG in the veterinary field, where reliable and repeatable functional assessments are critical, further investigation into the use of dry electrodes is required. Considering the dynamic context of the text subjects (i.e. monitored during treadmill walking, and naturally excited and mobile), studying in greater detail the susceptibility of dry electrodes to noise and motion artefacts is of utmost importance.

Keywords: SURFACE ELECTROMYOGRAPHY; DRY ELECTRODES; CANINE; MUSCLE ACTIVITY

P.62 PHYSICOCHEMICAL AND ANTIMICROBIAL PROPERTIES OF CHITOSAN EXTRACTED FROM BLACK SOLDIER FLY PUPARIA†

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The insect industry has grown exponentially in recent years, with species such as the Black Soldier Fly (BSF, *Hermetia illucens*) playing an important role in sustainable animal feed production and agro-industrial byproducts management. A by-product of BSF rearing is the puparium - the cocoon-like exoskeleton left after the fly emerges, a valuable source of chitin, which may be converted into a versatile application material - chitosan. Chitosan is a biomaterial with great potential for dental applications with antioxidant, antimicrobial, anti-inflammatory and healing effects. Its ability to inhibit biofilm formation makes it a promising biopolymer for oral health applications. This study aims to obtain and characterize the chitosan produced from BSF puparium envisaging its use in dentistry, namely in the development of an adhesive gel for dentures with antimicrobial potential. For this purpose, a chemical extraction protocol was implemented to isolate chitin from BSF puparia through sequential steps of demineralisation, deproteinization and depigmentation. Chitosan was subsequently produced through repeated deacetylation cycles, according to published protocols. The physicochemical properties of the resulting biopolymer were assessed by spectroscopic techniques and microscopy, namely FTIR (Fourier-Transform Infrared Spectroscopy), WDXRF (Wavelength Dispersive X-Ray Fluorescence spectrometry, MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization Time-Of-Flight) mass spectrometry, SEM (Scanning Electron Microscopy) and TEM (Transmission Electron Microscopy). Additionally, a preliminary evaluation of the potential antimicrobial activity of chitosan was carried out *in vitro* using, at this stage, only *Pseudomonas aeruginosa* ATCC 15442 and *Staphylococcus aureus* ATCC 6538 as model microorganisms. The obtained chitosan exhibited a degree of deacetylation of approximately 70% and an average molecular weight of around 200 kDa. As solubility is a critical property for its potential biomedical applications, being influenced by factors such as particle size, molecular weight, and degree of deacetylation, our findings highlight the need to introduce minor changes in our current protocol to obtain a lower molecular weight chitosan. These changes will help to modulate the parameters mentioned above, enhancing solubility and increasing the material's usability. Notably, the chitosan obtained in this study has already demonstrated antimicrobial activity against both microorganisms tested. Nevertheless, by refining the production protocol, we aim to further improve its bioactivity and advance toward the development of a clinically applicable antimicrobial adhesive gel for dentures. This study is under the scope of a FCT PhD scholarship UI/BD/154566/2023 and a CiiEM Research Grant "Chitosan gel produced from Black Soldier Fly exuviae for applications in oral and teeth health – ChiTeeth.

Keywords: BIOPOLYMER; CHITOSAN; INSECT-DERIVED BIOMATERIALS; SUSTAINABILITY

P.63 EVALUATION OF THE ACCURACY AND RELIABILITY OF DIGITAL SCANNERS IN DETECTING AND DETERMINING CONTACT POINTS IN MAXIMUM INTERCUSPATION†

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In recent years, dentistry has undergone a significant digital transformation, particularly with the integration of intraoral scanners (IOS) into clinical practice, which have emerged as promising tools for occlusal analysis. These devices offer an alternative to traditional occlusal registration methods and are increasingly used to enhance diagnostic accuracy. However, there is still a lack of consensus regarding their reproducibility and consistency, particularly in identifying occlusal contact points in maximum intercuspation. This investigation aimed to clinically assess the accuracy and reliability of three different digital intraoral scanners in detecting and determining maximum occlusal contacts in maximum intercuspation. The intermaxillary relationship in maximum intercuspation was digitalised in a sample of ten students from the Integrated Master's Degree in Dental Medicine (MIMD) at Egas Moniz School of Health and Science. The number of occlusal contact points was counted on the calibrated occlusal records (distance ≤100 µm), and the area of maximum contact points was determined using Netfabb® software via Boolean intersection of the digital models. The Intraclass Correlation Coefficient and Spearman's Correlation Coefficient were calculated, with a significance level set at 5% ($p \leq 0.05$). The strongest correlation in the number of contact points was observed between TRIOS® and iTero™ ($r=0.694$, $p=0.026$), while the area of contact points showed a significant correlation only between the same two scanners ($r=0.721$, $p=0.019$). CEREC® demonstrated the highest correlation between contact areas and number of points ($r=0.709$, $p=0.022$). Despite the similarity in the identification of contact points between some of the scanners evaluated, there is variability and subjectivity in the interpretation of these results, highlighting the need for further studies into the causes of such discrepancies and the development of standardised scanning protocols to improve their reliability.

Keywords: DIGITAL FLOW; INTRAORAL SCANNER; OCCLUSAL CONTACTS; MAXIMUM INTERCUSPATION

P.64 COMPARING THE COMPOSITION AND BOND STRENGTH OF A COST-EFFECTIVE AGAINST MASS-MARKET DENTAL ADHESIVE†

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The growing demand for simplified and time-efficient adhesive protocols has led to significant developments in dental materials. In particular, less technique-sensitive adhesive protocols have become a key focus, as they help minimize operator-dependent variability and promote more predictable outcomes. This trend has prompted manufacturers to develop and optimize single-bottle universal adhesive systems. However, the clinical effectiveness and precise chemical composition of many of these systems remain unclear. This study aimed to evaluate a novel cost-effective universal adhesive – Maxima ® Natural Elegance 7 Universal (Henry Schein) - by comparing its immediate microtensile bond strength to dentin and its ATR-FTIR spectra to a popular universal adhesive control, Scotchbond Universal® Plus (3M ESPE). For the microtensile bond strength test, twenty extracted human molars were divided into two groups (n =10) according to the adhesive system used, following self-etch protocols. Composite build-ups were constructed, and the specimens were stored in distilled water at 37 °C for 24 h. After storage, the teeth were sectioned to obtain beams with a cross-sectional area of approximately 1 mm2 and a microtensile bond strength test was performed using a universal testing machine (1 kN; 0.5 mm/min). To investigate its chemical composition, ATR-FTIR spectra were acquired before, during, and after light-curing (n=3). The adhesive was light-cured for 10 s, as recommended by the manufacturer, using a cordless, single-peak emission light-curing device, at a distance of 2 mm (DB-686-1B – Coxo, Foshan, China) with a power output of 1200 mW/cm² and a spectral emission range of 420–480 nm. Component modelling was based on reference spectra for solvents, methacrylate monomers, and inorganic fillers. Gravimetric analysis quantified filler content. The resulting spectra were analysed and the respective conversion degree (DC (%)) calculations were performed. The DC (%) was calculated using an equation that relates the height of the C=O stretching peak of the methacrylate group before and after polymerization. Kinetic parameters were performed using the Spectrum TimeBase v software. 3.1.4. Statistical analyses of results for charged particles, bond strength, and DC were carried out using IBM SPSS for Mac, version 29.0.2.0 (IBM Corp., Armonk, NY, USA) (α=5 %). There were no statistically significant differences (t-test, $p > 0.05$) in dentin bond strength between the two adhesives tested. FTIR modelling suggested that both adhesives shared similar chemical compositions, including TEGDMA, HEMA, 10-MDP, water, and ethanol. The cost-effective adhesive, as suggested by the formulation, contained UDMA instead of Bis-GMA and presented a slightly lower degree of conversion (48% vs. 67%). Regarding the percentage of filler particles (wt %) (12.4 % for Scotchbond Universal® and 9.9 % for Maxima ® Natural Elegance 7 Universal) and the conversion rate, there were no significant differences (t-test, $p > 0.05$). The novel cost-effective universal adhesive demonstrated comparable bonding performance and similar chemical characteristics to Scotchbond™ Universal Plus, supporting its potential as an effective and economically advantageous alternative for clinical application.

Keywords: ADHESION; UNIVERSAL ADHESIVES; MICROTENSILE; FTIR; CHEMICAL COMPOSITION

P.65 COMPARATIVE ANALYSIS OF THE DIAGNOSTIC ACCURACY OF AN ARTIFICIAL INTELLIGENCE SOFTWARE AND DENTAL PRACTITIONERS IN ASSESSING CARIES (USING THE CPO-D INDEX) AND PERIAPICAL LESIONS ON PANORAMIC RADIOGRAPHS†

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Artificial-intelligence (AI) systems are increasingly proposed to support radiographic diagnosis in dentistry, yet their real-world performance relative to experienced clinicians remains uncertain. This retrospective comparative study evaluated whether a commercially available AI software (WeDiagnostiX) matches or surpasses the diagnostic accuracy of dentists with more than five years' experience in identifying dental caries, expressed by the Decayed, Missing and Filled Teeth (DMFT) index, and periapical lesions on digital panoramic radiographs. Two hundred high-quality grade-1 (no technical errors) orthopantomographs, randomly drawn from an anonymised database of 780 adult panoramic radiographs acquired between January 2023 and December 2024 at the Egas Moniz University Clinic, were analysed independently by three calibrated dentists; the modal judgement per tooth constituted the reference standard (κ 0.74–0.76). The same images were processed in two operating modes of the AI (optimal, WD-O; sensitive, WD-S). Diagnostic metrics were calculated tooth-by-tooth. For caries detection, WD-O demonstrated sensitivity 55.5 %, specificity 99.0 % and overall accuracy 96.2 %, whereas WD-S achieved higher sensitivity (85.3 %) at the cost of lower specificity (88.7 %) and accuracy (88.5 %). In identifying periapical lesions, WD-O yielded sensitivity 75.0 %, specificity 99.2 % and accuracy 98.9 %; WD-S again raised sensitivity to 88.2 % but reduced specificity to 95.9 % and accuracy to 95.8 %. Areas under the receiver-operating-characteristic curve ranged from 0.77 (WD-O caries) to 0.92 (WD-S periapical). The AI consistently delivered very high specificity and negative predictive values, suggesting reliable exclusion of disease, while the sensitive mode improved lesion pick-up at the expense of false positives. Within the constraints of a single-centre image set and the absence of formal inter-examiner calibration, these findings indicate that contemporary AI can approach expert performance and may serve as a valuable adjunct for screening panoramic radiographs, provided its limitations in sensitivity–specificity trade-off are understood. Further prospective, multi-centre studies integrating diverse imaging conditions are warranted before routine clinical deployment. Ethical approval was granted by the Egas Moniz Ethics Committee (PT-262/24).

Keywords: ARTIFICIAL INTELLIGENCE; ORTHOPANTOMOGRAPHS; DENTAL CARIES; PERIAPICAL LESIONS; DIAGNOSTIC ACCURACY

P.66 COMPARATIVE ANALYSIS OF DNA EXTRACTION PROTOCOLS AND THE DYNAMICS OF DNA AND RNA TRANSFER†

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Deoxyribonucleic acid (DNA) profiling represents a fundamental tool in forensic investigations involving illicit activities. Understanding the mechanisms underlying DNA transfer is critical for interpreting the activity level and contextual relevance of recovered genetic material. The occurrence of secondary (indirect) transfer highlights the potential for detecting an individual's DNA on an item without direct physical contact. Furthermore, Ribonucleic acid (RNA) analysis has emerged as a promising approach for identifying the cellular origin of biological material and enhancing the resolution of the association between a suspect and forensic evidence. This study had two primary objectives: a) assess and compare the efficiency of extraction protocols—*Chelex* Vs. a co-extraction method enabling the simultaneous isolation of DNA and RNA—; and b) apply the co-extraction protocol to investigate the dynamics of secondary (indirect) transfer of DNA and RNA from the interior surface of a previously handled bag to a plastic wrapping. A total of 20 samples were processed using both tested extraction protocols. Following extraction, all DNA samples were subjected to the same downstream processing workflow. The co-extraction method was employed in the study of indirect transfer, which involved placing plastic bags inside previously used bags (n = 20). After a 24-hour incubation period, a total of 40 samples were collected from both the interior surfaces of the used bags and the inner plastic bags using moistened swabs. DNA and RNA were co-extracted from all collected samples, followed by quantification, amplification, and fragment analysis. Comparative analysis revealed that the co-extraction method resulted in higher DNA yields and a greater number of detectable alleles (mean DNA concentration = 0.0226 ng/µl; mean allele count = 38.210) when compared to the Chelex method (mean DNA concentration = 0.0216 ng/µl; mean allele count = 34.368). In the indirect transfer experiment, samples from the interior surfaces of the bags, obtained an average DNA concentration of 0.0358 ng/µl, while samples from the plastic surfaces yielded an average of 0.040 ng/µl. Transfer rates were calculated based on the proportional recovery of DNA associated with each individual donor. Messenger RNA (mRNA) profiling identified the presence of blood in one sample, and sporadic detection of various body fluids (including saliva, blood, mucosa, and menstrual blood) in seven additional samples. Overall, our findings demonstrate that the co-extraction method is more effective for recovering DNA from low template. Moreover, our results confirm the feasibility of detecting both DNA and RNA from secondary transfer events between distinct surfaces.

Keywords: EXTRACTION; INDIRECT TRANSFER; DNA; RNA

P3

Clinical & Translational Research

P.67 TACKLING FORMULATION COMPLEXITY IN BIOEQUIVALENCE ASSESSMENT OF TOPICAL GENERIC PRODUCTS†

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Hitherto, the regulatory authorities required that the evaluation of therapeutic equivalence of a topical generic product (TGP) be documented primarily through comparative clinical endpoint studies, which are extremely costly. This limitation has led to price increases due to the shortage of multisource TGP, but also due to an increasing reluctance of manufacturers to develop these products. As ensuring the access to affordable and high-quality generics is a public health priority, this issue has sparked attention of regulators, and has resulted in new guidelines. FDA and EMA now advise on a modular strategy for bioequivalence (BE) documentation; nevertheless, there are significant differences between both agencies. This work aims to tackle BE assessment issues of TGP starting by statistical implications of the EMA/FDA approaches concerning the documentation qualitative (Q1), quantitative (Q2), microstructure (Q3), performance requirements (Q4) and local availability sameness. Three case studies were considered – dimetindene maleate 1 mg/g gel, embodying a simple formulation, bifonazole 10 mg/g cream and diclofenac 20 mg/g emulgel, representing increasingly complex formulations. The reference products (RP) for these formulations were compared with commercially available generic products or, alternatively, test products. For the dimethindene gel, although the rheological tests revealed minor batch-to-batch differences, these were not perceptible in Q4. Therefore, for low complexity formulations, if equivalence of Q1 and Q2 is assured, an adequate and comprehensive characterization of Q4 may be sufficient to demonstrate BE. High rheological variability was observed in the RP of bifonazole cream. Nevertheless, the impact of these differences on Q4 appeared to be negligible. Pilot IVPT studies were then carried out assuming the worst-case scenario: a RP batch displaying a lower viscosity and a RP presenting high viscosity. Although equivalence could be inferred when applying the FDA scaled average BE assessment criteria, this was not possible when the EMA criteria were considered. Taking these results into account, an alternative methodology is herein proposed: an infected skin disease model. In this model, *ex vivo* human skin (obtained with ethical consent, either from Centro Hospitalar de Lisboa Central, or Genoskin®) was infected and ATP levels used as a biological marker for monitoring antifungal activity after product application. The results showed no statistically significant differences between batches. Clinically, this is a more realistic outcome than that from IVPT, as the study involved different batches of the same RP. Nevertheless, it should be referred that the lowest permeant formulation evidenced a higher antifungal in vitro activity. Finally, for the diclofenac formulation, equivalence pertaining to Q3 was not established. In terms of Q4, equivalence was only found for some batch combinations and when applying the FDA criteria. The IVPT studies also failed to demonstrate equivalence. However, since the generic product used in the present study had a pharmacokinetic profile equivalent to that of RP, the observed differences in Q3, Q4 and local availability parameters are not expected to translate into clinically significant differences. Such findings intend to shed light on the hurdles concerning the implementation of the new regulatory guidances on this subject.

Keywords: TOPICAL BIOEQUIVALENCE; REGULATORY SCIENCE; DISEASE MODEL; IVPT

P.68 CORRELATION BETWEEN TINNITUS, OTOLOGICAL SYMPTOMS, AND ORAL BEHAVIOURS†

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Oral behaviours are repetitive activities involving the oral structures, classified as functional (e.g., chewing, speaking) or non-functional (e.g., bruxism, nail biting). When persistent, these behaviours may contribute to the onset or exacerbation of temporomandibular disorders (TMD), a condition involving musculoskeletal and articular alterations that can manifest with pain, joint sounds, limited mandibular mobility, and otological symptoms such as tinnitus, aural fullness, earache, and dizziness. These symptoms may arise from anatomical and functional connections between the temporomandibular joint (TMJ), the trigeminal nerve, and middle ear structures. Tinnitus has a multifactorial origin, including emotional, hormonal, and infectious factors, and is often associated with auditory changes. The aim of this study was to explore the associations between oral behaviours, tinnitus, and otological symptoms, contributing to a more integrated clinical understanding. A cross-sectional, quantitative, and correlational study was conducted with 142 patients from the Department of Occlusion at the Egas Moniz Dental Clinic. Three validated questionnaires were applied: the Oral Behaviours Checklist (OBC), the Tinnitus Handicap Inventory (THI), and a specific Otological Symptoms Questionnaire. The results showed a moderate correlation between tinnitus and otological symptoms ($r = 0.45$), indicating that auditory complaints are often interrelated. Additionally, a weaker but significant correlation was found between oral behaviours and tinnitus ($r = 0.28$), suggesting that non-functional habits, particularly bruxism and clenching, may influence tinnitus perception, likely due to mechanical and neurofunctional interplays between the TMJ and auditory system. The correlation between oral behaviours and otological symptoms ($r = 0.22$), though lower, reinforces the need to include assessment of the stomatognathic system in patients presenting with ear-related complaints. These findings highlight the relevance of a multidisciplinary diagnostic and therapeutic approach involving both orofacial pain and otolaryngology professionals. In conclusion, the study supports a significant interaction between oral behaviours, tinnitus, and otological symptoms, providing evidence for the inclusion of oral and parafunctional assessments in the management of patients with complex auditory complaints. This integrative perspective may enhance clinical outcomes through more comprehensive, patient-centred strategies.

Keywords: TINNITUS; ORAL BEHAVIOURS; TEMPOROMANDIBULAR DISORDERS; OTOLOGICAL SYMPTOMS; BRUXISM

P.69 EFFICACY OF TOPICAL SIALOGOGUES IN THE TREATMENT OF XEROSTOMIA IN CHRONIC RESIDENTS OF THE C.H.P.L.†

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Institutionalized patients with psychiatric disorders are more susceptible to developing oral diseases, due to the administration of Antipsychotics and other medications, including first-generation antipsychotics, second-generation antipsychotics, anticholinergics may often disturb the saliva secretion and cause drug induced hyposialia. The long-term use of xerogenic drugs can lead to physiological changes in the salivary glands, compromising their function/secretion and subsequently causing mouth dryness (xerostomia) associated with hyposialia. This dramatically can cause negative impacts in oral health and quality of life of the patients since the saliva performs as a physical barrier because of its numerous immune and nonimmune defense components. In this context, it is crucial to achieve acknowledgement concerning effective and accessible strategies that can improve the symptoms of drugs induced xerostomia in this vulnerable population. The aim of the study is to evaluate the effectiveness of topical sialogogues in institutionalized patients with drugs induced xerostomia at the Lisbon Psychiatric Hospital Centre (C.H.P.L.). A cross-sectional study, 81 institutionalized of the General Psychiatry at the C.H.P.L., of both genders, aged between 18 and 85 years who consented to participate in this study. Approved by the Ethics Committee of the Lisbon Psychiatric Hospital Centre and the Instituto Universitário Egas Moniz. Subsequently, a questionnaire was applied regarding sociodemographic variables and sialometry was performed for unstimulated (USFR) and stimulated (SSFR) salivary flow rates and Saliva Check-buffer® in T0 and T1 with a 15-day interval. During this period, have administered the topical sialagogue Xeros Dentaid Gel®, containing betaine (1%), aloe vera (0.05%), xylitol (10%) and sodium fluoride (0.0033%), twice per day. Hyposalivation was considered when USFR <0,1 mL/min and/or SSFR <0,7 mL/min. A statistical analysis was performed using the software IBM SPSS® Statistics. The average age of the population was 47.83 ± 15.39 years, most prevalent gender was males (81.5%). The prevalence of xerostomia decreased from 16% to 7.4% after administration of the topical sialagogue. Regarding USFR and SSFR, there´s significant improvement in salivary flow rates, 0.28 ml/min and 0.15 ml/min ($p < 0.001$), respectively and the pH values increased significantly. Thus, the saliva buffer capacity remains unaltered. The administration of Antipsychotics medications mostly causes adverse drugs effect leading the mouth dryness (xerostomia) because of hyposialia compromising patients' quality of life but the administration of the topical sialogogue over a period of 15 days have showed to be effective in increasing salivary flow rates (USFR and SSFR), as well as saliva pH.

Keywords: PSYCHOTIC DISORDERS; HYPOSIALIA; XEROSTOMIA

P.70 MUSCLE COMPENSATORY ACTIVITY INHIBITION WITH KINESIOTAPE APPLICATION TO THE UNAFFECTED HEMIFACE IN THE PERSON WITH PERIPHERAL FACIAL PALSY†

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Facial palsy (FP) is a common cranial nerve disorder, often of unknown etiology, that results in unilateral facial muscle paralysis. This condition compromises facial symmetry and affects emotional expression and non-verbal communication, potentially leading to social isolation. Physiotherapy intervention has shown promise in improving functional recovery and facial balance, and kinesiotape (KT) has recently been incorporated as an adjunct in FP rehabilitation. There is some evidence in the KT application to stimulate the muscles of the affected hemiface; however, its inhibitory potential when applied to the unaffected side, for the control of muscle hyperactivity, remains largely unexplored. This study aims to describe two clinical cases of idiopathic FP in which KT was applied to the unaffected hemiface. By using a specific inhibitory application— KT applied with no tension, in muscle stretch, performed from the muscle's insertion to its origin to reduce muscle hyperactivity—alongside the other techniques in physiotherapy, we sought to assess improvements in facial symmetry and psychosocial outcomes. Two patients were included: a 65-year-old woman presenting one-month post-onset and a 48-year-old man with a two-week history, both of whom had been treated with corticosteroids. Written informed consent was obtained from both participants. Both patients had respectively 54 and 52 Physiotherapy sessions of a combined treatment protocol. The intervention integrated facilitation techniques to activate weak facial muscles on the affected side, with inhibitory KT techniques on the unaffected side, designed to curb hyperactivity, restore balance in muscle activity and therefore facilitate the facial symmetry. Outcome measures included the Sunnybrook Facial Palsy Scale (SBFPS) to evaluate facial symmetry and movement, and the Hospital Anxiety and Depression Scale (HADS) to assess psychological well-being. These measures were recorded at baseline, at session 13, and at the end of treatment. This study followed the reporting guidelines of the CARE checklist and complied with the principles of the Helsinki Declaration. Both patients demonstrated improvements. For the first participant, the SBFPS score increased from 25 to 88 and the HADS score improved from 13 to 10. The second participant's SBFPS score improved from 25 to 96, and his HADS score decreased from 9 to 3. While these improvements are promising, they may be attributed to variables such as the combined effect of physiotherapy, placebo effects, or the natural recovery process. Caution is necessary when interpreting these results due to the limitations of a small sample size inherent to case reports. These cases suggest that the inhibitory application of KT on the unaffected hemiface—when used as an adjunct to other techniques in physiotherapy—might enhance facial symmetry and improve psychological outcomes in patients with FP. Nonetheless, the limitations of this case report, including the small sample size, absence of a control group, and other potential confound variables, underscore the need for further research. Studies involving larger samples and varied methodologies, such as controlled studies are essential to confirm these preliminary findings, optimize KT application techniques, and better understand its role within the broader context of FP rehabilitation.

Keywords: PHYSIOTHERAPY; PERIPHERAL FACIAL PALSY; KINESIOTAPE

P.71 COMPARISON OF CENTRAL HAEMODYNAMICS AND ARTERIAL STIFFNESS RESPONSES TO ACUTE RESISTANCE EXERCISE WITH AND WITHOUT BLOOD FLOW RESTRICTION IN YOUNG AND OLDER ADULTS: A PARALLEL GROUP CROSSOVER RANDOMIZED TRIAL†

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Aging is characterized by progressive arterial stiffening—reflected in elevated aortic pulse wave velocity (aPWV)—and increased wave reflection, measured by augmentation index (Aix). These hemodynamic changes elevate central blood pressure in arteries such as the aorta and carotid, increasing mechanical load on vital organs like the heart and brain. As arterial compliance declines with age—due to reduced wall distensibility and endothelial dysfunction—vascular function becomes compromised. This deterioration is associated not only with cardiovascular disease but also with neurodegeneration, reduced muscle strength, and increased fatigue. After age 50, the loss of type II muscle fibres contributes to irreversible muscle atrophy and strength decline, which may be partly vascularly mediated. While high-intensity resistance training (HIRT, 60–80%1RM) benefits musculoskeletal health, its vascular effects in older adults remain debated. Low-intensity resistance training (LIRT, 40–50%1RM), often preferred due to comorbidities, can be enhanced with blood flow restriction (BFR), although BFR may acutely impair vascular responses. This study compared the acute effects of HIRT and LIRT+BFR on arterial stiffness and central and peripheral hemodynamics in young versus older adults. We hypothesized that older adults would exhibit greater pressor response and stiffening of central arteries to LIRT+BFR than younger adults, with effects comparable to HIRT. We also expected any transient vascular impairments to normalize within 30 minutes post-exercise, supporting the safety and feasibility of LIRT+BFR in aging populations. Forty-one participants (21 young:21.8±2.7 years; 20 older:70.2±9.1 years) completed three randomized conditions: HIRT, LIRT+BFR (1.1–1.3× ankle BP), and control (ClinicalTrials.gov:NCT06596304; CEIEM:1428/2024). aPWV was measured via Vicorder®, and Aix and aortic systolic blood pressure (aSBP) were derived from its Pulse Wave Analysis function at baseline and 5/30-min post-exercise. Linear mixed models (GROUP×TIME×CONDITION) with Satterthwaite adjustment were applied. Physical activity patterns nor BMI classifications differed between groups. Still, older adults showed significantly higher baseline values in aSBP (+27.7 mmHg), and braquial SBP (bSBP; +21.3 mmHg), aPP (+16.9 mmHg), Aix (+9.4%), and aPWV (+1.4 m/s) compared to young adults (all $p<0.001$), confirming age-related vascular dysfunction. Significant GROUP×TIME×CONDITION interactions were found for aSBP ($F(4,309)=5.09$, $p<0.001$, $\omega^2=0.05$), bSBP ($F(4,309)=2.45$, $p=0.046$, $\omega^2=0.02$), and aPP ($F(4,309)=6.35$, $p<0.001$, $\omega^2=0.06$). In older adults, HIRT acutely reduced aSBP (−9.8 mmHg) but led to a rebound above baseline at 30 minutes (+13.5 mmHg, both $p<0.001$). Similar biphasic responses were observed for bSBP (+8.5 mmHg) and aPP (+11 mmHg). LIRT+BFR elicited minimal changes in aSBP, bSBP, and aPP ($\Delta<5.4$ mmHg, all $p>0.05$), with only a delayed aPP increase (+5.2 mmHg, $p=0.02$). No significant interactions were observed for aPWV ($F(3.0, 234.3)=1.39$, $p=0.245$) or aAix ($F(3.1, 238.1)=0.70$, $p=0.557$), regardless of group. Sex did not influence any of the results. Older adults demonstrated greater baseline vascular impairment and more pronounced post-exercise hemodynamic responses, particularly following HIRT, which induced transient elevations in central pressures. LIRT+BFR did not acutely worsen arterial stiffness or central haemodynamics, supporting

its short-term vascular safety. However, due to potential discomfort from cuff pressure, BFR protocols should be carefully individualized and closely monitored in older populations to ensure tolerability and safety.

Keywords: AORTIC PULSE WAVE VELOCITY; BLOOD FLOW RESTRICTION; HIGH-INTENSITY RESISTANCE TRAINING; VASCULAR AGING; CENTRAL SYSTOLIC BLOOD PRESSURE

P.72 INCIDENCE OF THE SLC6A3 VNTR-40PB POLYMORPHISM IN A UNIVERSITY POPULATION†

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Aggression can be defined as a hostile, injurious or destructive behavioural pattern employed to assert dominance in a given situation, and it can manifest itself either verbally or physically. Several studies have shown a correlation between aggressive behaviour and genetic predisposition. The present study aims to analyse the prevalence of different genotypes for the VNTR-40pb polymorphism of the SLC6A3 gene (which is involved in dopamine reuptake) in a university population, and to investigate whether there is an association between these genotypes and aggressive behaviour. Genetic material was collected from 68 volunteers (all students at Egas Moniz School of Health and Science) via buccal swabs. The sample consisted of 18 males (26%) and 50 females (74%). DNA was extracted using a kit employing a column extraction technique. After extraction, a Polymerase Chain Reaction (PCR) technique was used to amplify the desired region and electrophoresis was performed on a 3% agarose gel to determine the genotypes. So far, 18 of the 68 samples have been analysed, revealing absolute dominance of the 10R and 9R alleles of the SLC6A3 gene. There was also a tendency towards 10R homozygosity (44,5%), with 9R homozygosity being the least common genotype (22,2%). Previous studies have shown that heterozygotes tend to be more aggressive, particularly those with the 9R/10R genotype, which was also present in this sample, albeit less frequently (33,3%).

Keywords: GENETICS; AGGRESSION; VNTR SLC6A3; DOPAMINE

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P.73 STRIDE-TO-STRIDE FLUCTUATIONS IN INDIVIDUALS WITH ACL-DEFICIENT KNEES COMPARED TO HEALTHY CONTROLS: A CROSS-SECTIONAL STUDY†

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The anterior cruciate ligament (ACL) rupture is a common musculoskeletal injury, particularly among young adult athletes. This ligament is essential for stabilizing the knee joint through its mechanical properties and mechanoreceptors, which provide critical afferent input to the central nervous system. Its absence compromises knee stability and impairs the ability to respond to perturbations. This limited adaptability is evident in the altered joint movement patterns seen during locomotion in ACL-deficient knees. While healthy gait displays complex stride-to-stride fluctuations that help maintain stability, individuals with ACL deficiency are expected to struggle in achieving a steady gait. Indeed, literature shows that aging and various neurological conditions disrupt these fluctuations, which we speculate also occurs in ACL injuries due to the loss of afferent feedback. Thus, we aimed to investigate how stride-to-stride fluctuations differ in individuals with ACL deficiency compared to healthy controls. Thirteen young adult athletes with an ACL-deficient knee and thirteen healthy athletes (CON) participated in this study. Ethical approval was obtained from the Ethics Committee of the Egas Moniz School of Health and Science (approval #1368), and all participants provided informed consent. Each athlete visited the lab once and walked for 12 minutes on an instrumented treadmill at a constant speed, with 0% of inclination, and looking straight ahead. Walking speed was determined using the equation: v = SQRT(0.25 x g x L), where v represents the displacement speed in meters per second, gg denotes the acceleration due to gravity (i.e., ~ 9.81 m/s2), and L the leg length, in meters. Metrics of stride-to-stride fluctuations and magnitude of fluctuations were assessed using detrended fluctuation analysis (α-ISIs) and coefficient of variation (CV-ISIs), respectively. We observed stride-to-stride fluctuations shifted towards a more irregular pattern in individuals with ACL deficiency (0.77 ± 0.08) compared to healthy controls (0.84 ± 0.09, $t_{(24)}$ (24) = -2.105, p = 0.023, d = -0.826), while the magnitude of fluctuations remained consistent across groups (dACL: 1.57 ± 0.43; CON: 1.58 ± 0.40; $t_{(24)}$(24) = -0.023, p = 0.491, d = -0.009). Our findings suggest that ACL deficiency leads to a breakdown in the healthy stride-to-stride fluctuations' pattern. Specifically, individuals with an ACL-deficient knee exhibit a more irregular gait, indicating reduced capacity of the neuromuscular system to adaptively regulate gait. This group appears to develop functional adaptations that facilitate locomotion despite injury. Specifically, the neuromuscular system freezes degrees of freedom proximally as a compensatory and security mechanism which implies alterations to their global walking pattern, ultimately resulting in more irregular gait patterns. Altogether, these insights emphasize the significant impact of ACL injuries on gait dynamics. Recognising it could lead to refined rehabilitation strategies, shifting the focus beyond joint stabilisation to a more comprehensive approach that seeks to restore movement adaptability. This perspective is particularly relevant for athletes, as restoring neuromechanical fluctuations may enhance motor resilience and reduce the risk of reinjury. Moreover, this study also highlights the importance of considering gait stride-to-stride fluctuations as a biomarker for motor adaptability in individuals with ACL deficiency.

Keywords: ANTERIOR CRUCIATE LIGAMENT; STRIDE-TO-STRIDE FLUCTUATIONS; LOCOMOTION; FRACTALS; DETRENDED FLUCTUATION ANALYSIS

P.74 COMPARING POSTURAL CONTROL VARIABILITY IN 4TH YEAR DENTAL STUDENTS WITH AND WITHOUT NECK PAIN IN THEIR FIRST YEAR OF CLINICAL PRACTICE: A CROSS-SECTIONAL STUDY†

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Neck pain (NP) is a highly prevalent occupational health problem among dental professionals, with over 58.5% experiencing it, often starting early in clinical practice. This condition significantly impairs cervical proprioception and sensorimotor control, thereby affecting posture and balance. While previous research has addressed ergonomics and visible postural changes in dental students, a gap still remains in understanding the specific impact of NP on the complexity of postural control using sensitive non-linear methods. This cross-sectional study aimed to compare postural control variability in fourth-year dental students with and without NP, using Sample Entropy (SampEn) to assess the complexity of centre of pressure (CoP) oscillations. Twenty-nine voluntary fourth-year dental students participated. Participants had an average age of 22.7±1.3 years and an average BMI of 21.7±2.6 kg/m². The cohort included 69.0% women (n=20) and 31.0% men (n=9). Participants were divided into a control group (CG, n=17) with Neck Disability Index (NDI) < 6, and a neck pain group (NP, n=12) with NDI ≥ 6. The sex distribution was uneven between groups (CG: 47.1% male, 52.9% female; NP: 8.3% male, 91.7% female; p=0.070). This study was approved by the Egas Moniz School of Health & Science Ethics Committee (CEEM-1122) in September 2022. Participants were evaluated using a force platform across eight static conditions. These combined four stances (neutral narrow, neutral tandem right foot forward, 60° left cervical rotation with narrow, 60° left cervical rotation with tandem right foot forward). Each stance was tested with both eyes open and eyes closed and held for 45 seconds. SampEn was calculated with a pattern length (m) of 2, an error tolerance (r) of 0.2, and a data length (N) of 2250 points. Statistical analysis used parametric (t-test) or non-parametric (Mann-Whitney U test) tests with α=0.05. Results showed students with NP exhibited significantly lower postural control variability in the medio-lateral (ML) direction across several demanding conditions. Specifically, in narrow stance with eyes closed, ML variability was significantly lower in the NP group (M=0.58, SD=0.54) compared to the control group (M=1.12, SD=0.52; p=0.011). Similar significant reductions were observed in ML variability during narrow stance with 60° cervical rotation (eyes open: p=0.019; eyes closed: p=0.017), tandem stance with eyes closed (p=0.038), and tandem stance with 60° cervical rotation and eyes closed (p=0.034). No significant difference was observed in the antero-posterior (AP) direction. This reduced variability suggests a more rigid motor strategy in the NP group, likely adopted to stabilize the painful cervical segment, which could be potentially harmful in the long term by increasing tissue damage and dysfunctional movement. The greater sensitivity in the ML plane aligns with the body's inherent lateral instability and reliance on proprioception. These findings highlight the need for targeted preventive strategies, including postural education and sensorimotor exercises, early in dental students' training to reduce chronic musculoskeletal disorder risk. Future studies should consider fatigue control and evaluate psychological factors to guide effective interventions.

Keywords: ENTROPY; CERVICAL PAIN; COMPLEXITY; DENTISTRY STUDENT; ADAPTATIVE POSTURE

P.75 VENTILATORY PROFILE OF BIG WAVE SURFERS – AN EXPLORATORY STUDY†

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Big wave surfing is a sport, performed by man and women who ride waves greater than 30 feet and that, in the event of falling (wipeout), their cardiorespiratory capacity is taken to the limit, as the surfers must hold their breath (apnoea) for several seconds or a few minutes, until being able to return to the surface of the water to breathe again. Despite being a growing sport with its own world championship, no studies are known regarding these athletes' profile, namely the physiological effects of their specific training and activity. As the first study addressing the Big Wave Surfers (BWS) health characteristics, the goal was to identify their respiratory profile and eventual morphological and ventilatory adaptations resulting from big wave surfing practice and specific training, as well as possible respiratory compromises in the mid-long term. For this epidemiological, cross-sectional, retrospective and exploratory study, 17 (14 male, 3 female) elite BWS aged 33±8.50 years, with years of practice (<5years (n=3; 17,64%), 6 to 7 (n=4; 23,52%) and > 9 (n=10; 58,82%)), were assessed regarding their surf-related demographics, lung function variables (Forced Vital Capacity – FVC; Forced Expiratory Volume in one second - FEV1; FEV1/FVC – Tiffeneau-Pinelli index; Peak Expiratory Flow – PEF; and Forced Expiratory Flow - FEF25-75%) and respiratory muscles strength (Maximum Inspiratory Pressure – MIP; and Maximum Expiratory Pressure – MEP). This study was approved by the Ethics Committee of ESSATLA (PCE05_2022). The data of the respiratory parameters analysed did not revealed any correlations with age or years of big wave surfing practice. However, BWS had higher FVC, FEV1, PEF ($p<0.001$), FEV1/FVC ($p<0.05$) and lower FEF25-75% ($p<0.05$) than the predicted values. Male BWS had higher MIP values than predicted ($p<0.001$), and when compared to healthy individuals, BWS showed increased MIP an MEP values, being similar to those presented by competition apnoea divers. The practice of glossopharyngeal breathing and the prolonged periods of apnoea may be the cause of the ventilatory changes found in BWS, namely a tendency towards obstruction of the small airways, which should be the subject of other complementary diagnostic tests in future studies, to address possible acute and long-term effects on the pulmonary function of these athletes. This study findings suggest that prolonged apnoea and glossopharyngeal breathing practiced in big wave surfing led to enhanced respiratory capacity, particularly in forced vital capacity (FVC) and respiratory muscle strength (MIP, MEP) in this sample. This could inform tailored training programs emphasizing respiratory muscle conditioning to improve performance and safety during wipeouts. Additionally, the observed tendency towards obstruction in small airways raises concerns about potential long-term pulmonary health risks, such as reduced airflow in the bronchioles. This highlights the need for regular pulmonary assessments for big wave surfers, as well as the development of preventive strategies and physiotherapy interventions to mitigate respiratory compromise, optimize training and improve safety in big wave surfing.

Keywords: RESPIRATORY MUSCLES; SPIROMETRY; APNOEA; WATER SPORTS; RESPIRATORY MECHANICS

P.76 ALLERGIES TO NSAIDS AND ANTIBIOTICS REPORTED IN AN ADULT EMERGENCY DENTAL DEPARTMENT: A RETROSPECTIVE OBSERVATIONAL STUDY†

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Drug allergies can lead to severe adverse reactions and are of particular concern in emergency dental settings, where pain and infection management frequently involve non-steroidal anti-inflammatory drugs (NSAIDs) and antibiotics. This study aimed to estimate the prevalence of self-reported allergies to NSAIDs and antibiotics among adult patients attending the triage and emergency consultation of the Egas Moniz University Clinic between January 2021 and March 2025. We retrospectively analysed anonymised clinical records from a total of 4,276 patients aged 18 years or older. Cases were included if the medical history clearly reported either the presence or absence of drug allergies; patients with missing or uncertain information were excluded. From the total population, 442 individuals (10.3%) reported being allergic to at least one medication. Among them, 87 (19.7%) reported allergies to penicillin or derivatives, and 50 (11.3%) to NSAIDs such as ibuprofen, aspirin or diclofenac. The remaining 305 individuals (69.0%) indicated other drug allergies. Overall, the prevalence of NSAID allergy in the full population was 1.17%, while penicillin allergy was reported by 2.03% of patients. Descriptive statistics and chi-square tests were used to explore associations between allergy reports, age groups, and gender. No significant differences were found between genders, but a higher prevalence was observed in older age groups. These findings are consistent with international data, where approximately 10% of adults report drug allergies, 0.3–6% report NSAID hypersensitivity, and up to 10% self-report penicillin allergy (though less than 1% are confirmed by testing). Our results align with these benchmarks and contribute local evidence to the global understanding of drug allergy patterns in dental emergency care. This supports the importance of accurate drug history taking and reinforces the need for strategies to confirm or exclude allergy diagnoses when appropriate.

Keywords: ALLERGIES; NON-STEROIDAL ANTI-INFLAMMATORY DRUGS; ANTIBIOTICS

P.77 *IN VIVO* EVALUATION OF A COLORIMETER FOR SHADE DETERMINATION IN DENTISTRY†

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Currently, several methods are available for tooth colour determination, including both manual and instrumental approaches. The *Optishade Style Italiano* TM (OSI, Smile Line, St-Imier, Switzerland) is an instrumental colorimeter used in Dentistry, offering advantages over traditional methods by reducing subjectivity and variability. However, despite being introduced in 2015, no studies have yet evaluated its reliability. This pilot study aimed to evaluate the reliability of the OSI colorimeter for tooth colour measurement in Dentistry, based on the L*, a*, and b* parameters of the CIELab system. Forty patients were selected according to predefined inclusion and exclusion criteria for colour assessment of the maxillary anterior incisors. Inclusion criteria required the presence of the sound teeth without enamel alterations, restorations, or prior bleaching treatments. Two calibrated operators conducted the colour measurements under standardized clinical conditions, using the OSI. The instrument was calibrated and used according to the manufacturer's instructions. L*, a*, and b* values were recorded for each third (cervical, middle, and incisal) of the maxillary anterior incisors by both operators across two appointments. Intra- and inter-operator reliability were assessed using the intraclass correlation coefficient (ICC) [IBM SPSS Statistics software v. 28.0 (IBM Corp., Armonk, NY, USA]. For the L* and a* parameters of the CIELab system, the concordance between appointments and operators showed ICC values between 0.5 and 0.75, indicating a moderate reliability of the instrument. In contrast, higher ICC values were obtained for b*, reflecting excellent reliability for this parameter. In conclusion, the OSI colorimeter, when used to evaluate the parameters of the CIELab system for colour measurement in Dentistry, demonstrated greater reliability for the b* parameter, while its reliability was only moderate for the L* and a* parameters.

Keywords: COLORIMETER; SPECTROPHOTOMETER; TOOTH COLOUR; AESTHETICS

P.78 ANALYSIS OF THE VARIATION IN BIOCHEMICAL PARAMETERS IN ROOT COVERAGE WITH ENAMEL MATRIX DERIVED PROTEINS ASSOCIATED WITH CONNECTIVE TISSUE GRAFT†

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Periodontal surgery is a widely used procedure for the treatment of gingival recessions, particularly when patients exhibit symptoms such as of tooth sensitivity, aesthetic concerns, or a high risk of lesion progression. The objective of this work was to understand the behaviour of two inflammatory biomarkers, interleukin 8 (IL-8) and vascular endothelial growth factor (VEGF), in gingival crevicular fluid (GCF) of patients undergoing periodontal surgery for root coverage using the coronal advancement flap (CAF) technique with palatal connective tissue autograft (CTG), with or without the addition of enamel matrix derivative (EMD). The purpose of measuring IL-8 and VEGF was to serve as markers for the initial phase after injury and the subsequent phase of healing, characterised by the stimulation of angiogenesis. A total of twenty-four surgical patients were analysed divided into two groups: a test group (n = 13) that received EMD and a control group (n = 11). Patients were included in the study if they were > 18 years of age, presented with at least one site of gingival recession classified as Cairo RT1, and had a minimum of 1 millimetre of keratinised tissue at the site. Exclusion criteria comprised the presence of gingivitis, uncontrolled periodontitis, or endo-periodontal lesions; smoking > 10 cigarettes per day; pregnancy; use of systemic antibiotics or chronic anti-inflammatory medication within the past six months; current or previous use of bisphosphonates; a plaque index or gingival index >15%; and cases in which cemento-enamel junction (CEJ) was not visible. Gingival crevicular fluid samples were collected using paper strips at four time-points during the healing process (the day of surgery, and then 7, 14, 21 days post operatively) at the Egas Moniz Dental Clinic. The concentrations of IL-8 and VEGF were then measured using an ELISA kit at the Molecular Biology LAB of the Egas Moniz School of Health and Science. A statistical analysis was conducted using the non-parametric Mann-Whitney U test, since the data did not present a normal distribution, in order to compare the control and test groups at different times. Analysis of VEGF levels only revealed statistically significant differences in the test group on day 14 after surgery ($p = 0.015$). With regard to IL-8, significant differences were identified in the test group ($p = 0.023$) between days 0 and 7 and in the control group ($p = 0.021$) between days 7 and 14. The absence of statistical significance in the other evaluation moments, could be explained by the modest sample size, and further studies with greater statistical power are needed to substantiate this trend. These results contribute to a better understanding of the biological mechanisms underlying periodontal regeneration. The significant increase in VEGF observed within the test group suggests that EMD may contribute to the angiogenic and healing process. However, IL-8 values were inconclusive, challenging the anti-inflammatory capacity of EMD.

Keywords: GINGIVAL RECESSION; CAF; BIOMARKERS; IL-8; VEGF

P.79 PERIODONTITIS ASSOCIATION WITH METABOLIC SYNDROME CONSIDERING ANTHROPOMETRIC AND MEDICATION INFORMATION†

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We aimed to explore the bidirectional relation between metabolic syndrome (MetS) and periodontitis (PD) in an adult Portuguese population. A cross-sectional representative study was conducted, geographically stratified, targeting individuals aged 18 years and older (adults and elderly) residing in the municipalities of Almada and Seixal, Portugal. This study was approved by the Research Ethics Committee of the Regional Health Administration of Lisbon and Tagus Valley, IP (Portugal) (Approval numbers: 3525/CES/2018 and 8696/CES/2018) and in accordance with the Declaration of Helsinki, as revised in 2013. The diagnosis of MetS was based on the International Diabetes Federation (IDF) consensus using anthropometric measurements and medication information. The diagnosis of PD was based on a circumferential examination with a manual periodontal North Carolina probe, excluding third molars, implants and retained roots. Staging was done based on the World Workshop case definition. We measured Periodontal Pocket Depth, Recession and Clinical Attachment Loss. With these measurements, we calculated Periodontal Inflamed Surface Area (PISA) and Periodontal Epithelial Surface Area (PESA). We performed a Student's t-test for continuous measures, chi-square test for categorical variables, and adjusted logistic regression (considering age, sex, and smoking status). Overall, out of the 1,064 participants, 637 were diagnosed with PD (132 with MetS) and 427 without (71 with MetS). Among the 1,064 participants, individuals with periodontal disease (PD) were significantly older (65.1 vs. 54.6 years, $p_p < 0.001$), more likely to be male ($p_p < 0.001$), and more often active smokers (15.5% vs. 10.8%, $p_p = 0.033$) compared to those without PD. Participants with metabolic syndrome (MetS) were also significantly older (66.1 vs. 59.6 years, $p_p < 0.001$) and had a lower prevalence of active smoking (7.4% vs. 15.1%, $p_p = 0.006$). Severe periodontitis (Stage III–IV) was more common among individuals with MetS (29.6% vs. 16.6%, $p_p = 0.047$). Both PISA and PESA scores were significantly higher among those with PD (both $p_p < 0.001$), while no significant differences were observed in these scores between participants with and without MetS. Logistic regression analyses, adjusted for age, sex, and smoking status, revealed no statistically significant associations between metabolic syndrome (MetS) and periodontal disease (PD) in either direction. MetS was not significantly associated with PD (OR = 1.09; 95% CI: 0.78–1.53; p = 0.6190) or severe PD (Stage III–IV) (OR = 1.26; 95% CI: 0.88–1.79; p = 0.2027). Conversely, neither PD (OR = 1.06; 95% CI: 0.76–1.49; p = 0.7259) nor severe PD (OR = 1.30; 95% CI: 0.92–1.85; p = 0.1388) was significantly associated with the presence of MetS. MetS diagnosed with anthropometric and medication information does not show a bidirectional relationship with PD in this population. Future studies should confirm if these findings persist using clinical markers of MetS.

Keywords: PERIODONTITIS; PERIODONTAL DISEASE; METABOLIC SYNDROME; ORAL HEALTH; TRANSLATIONAL PERIODONTAL MEDICINE

P.80 SOFT TISSUE AUGMENTATION AROUND IMPLANTS: A CASE REPORT†

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Although the soft tissue around implants is histologically similar to periodontal tissue, it has reduced vascularisation and weaker epithelial attachment. This can affect the inflammatory response. Therefore, maintaining the integrity and stability of the peri-implant mucosa is crucial for preventing conditions such as mucositis and peri-implantitis. However, the precise role of the keratinised tissue in disease prevention is still being debated. The presence of keratinised mucosa has been associated with greater soft tissue stability, reduced probing depths, less plaque accumulation and enhanced comfort and hygiene, particularly in areas susceptible to mechanical trauma. Nevertheless, successful implants can still occur in its absence. A 50-year-old non-smoking female patient with no relevant medical history presented with an absence of keratinized mucosa around implants 45 and 46. She reported pain and discomfort when brushing, which contributed to inadequate plaque control in the affected area. To address this, a free gingival graft was performed in combination with vestibule deepening, aiming to increase the width of keratinized mucosa and facilitate improved oral hygiene. The graft was harvested from the palatal mucosa. The donor site was sutured with 4/0 silk sutures and protected post-operatively with a haemostatic sponge and flowable resin. Simple and crossed 5/0 nylon sutures were used to secure the graft to the periosteum at the recipient site. Postoperative instructions included refraining from brushing the recipient area for 15 days, consuming soft and cold foods, avoiding physical exercise during the healing period, and adherence to a prescribed medication regimen consisting of amoxicillin, ibuprofen, and paracetamol to prevent infection and manage pain and inflammation. The surgical procedure successfully increased the width of the keratinised mucosa around implants 45 and 46. Consequently, the patient experienced reduced pain and discomfort when brushing. The improved tissue architecture also made it easier to use interdental brushes, which contributed to better oral hygiene and more effective plaque control. Postoperative healing was uneventful, with no complications. At the follow-up appointment, probing depths did not exceed 3 mm and there was no bleeding on probing. In this case, the combination of the patient's symptoms, the absence of keratinised mucosa and the accumulation of plaque justified surgical intervention. Given the evidence suggesting that keratinized mucosa supports peri-implant health, the decision was made to perform a free gingival graft with vestibule deepening. This effective and relatively straightforward procedure resolved the symptoms, improved hygiene, and prevented long-term complications.

Keywords: IMPLANTS; KERATINISED TISSUE; FREE GINGIVAL GRAFT

P.81 IN VITRO FIBROBLASTS AND OSTEOBLASTS UNDER ORTHODONTIC COMPRESSION: INSIGHTS INTO MATRIX METALLOPEPTIDASES†

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Orthodontic tooth movement results from the application of mechanical forces to teeth, which induce periodontium remodelling, thereby allowing for tooth repositioning. This process creates two distinct zones: a compression side, associated with resorption, and a tension side, where tissue apposition occurs. Fibroblasts within the periodontal ligament (PDL) and osteoblasts at the PDL/alveolar bone interface are key mechanosensitive cells involved in this biological response. Both cell types produce matrix metallopeptidases, which are enzymes responsible for the degradation of the extracellular matrix and play a critical role in PDL remodelling during orthodontic tooth movement. Despite their relevance, the types and precise behaviour of matrix metallopeptidases under compression mechanical stimuli still require further clarification. The objective of this in vitro study is to simulate orthodontic forces and clarify the presence and enzymatic activity of matrix metallopeptidases in PDL fibroblast and osteoblast cultures exposed to compression forces. PDL fibroblasts (HPLF) and osteoblasts (MG-63) were cultivated in a three-dimensional collagen gel and subjected to a static compressive force for 24 hours using a weight-based technique. Cell viability was assessed using staining techniques, while morphology was analysed under an inverted optical microscope. The enzymatic activity of matrix metallopeptidases was evaluated through collagen zymography, in comparison with control cells. Preliminary findings indicated that fibroblasts and osteoblasts exposed to compressive force retained their viability. However, changes in their morphology were detected. Cells that had been subjected to stress appeared to be less elongated and had fewer filopodia, suggesting that there has been an alteration in their interaction with the matrix. Zymography revealed an increased intensity of specific bands in cell culture supernatants, suggesting enhanced proteolytic activity under compression. The two cell types exhibited distinct enzymatic profiles. This study evidenced a cell-specific response to mechanical forces involving alterations in both morphology and matrix metallopeptidases activity. These results support the hypothesis that the periodontal ligament and alveolar bone contribute differently to tissue remodelling during orthodontic tooth movement.

Keywords: ORTHODONTIC COMPRESSION; MATRIX METALLOPEPTIDASES; PERIODONTAL LIGAMENT

P.82 IMPACT OF TEMPOROMANDIBULAR DYSFUNCTION AND PROBABLE BRUXISM ON SLEEP QUALITY AND QUALITY OF LIFE†

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The aim of this study was to assess the impact of a diagnosis of probable bruxism and painful temporomandibular disorder (TMD) on the quality of life and sleep quality of adult individuals. A clinical diagnosis was carried out on 93 adult patients at the Egas Moniz University Clinic, in accordance with the DC/TMD Protocol and standardised measurements. Participants included in the study agreed to and signed the informed consent form and met the inclusion and exclusion criteria, which were as follows: inclusion of patients from the Egas Moniz University Clinic; adults aged 18 years or older; and exclusion of patients with orofacial pain of dental origin (such as dental caries lesions, dental abscesses, periodontal disease, among others), or those undergoing treatment for TMD, bruxism and/or sleep disorders initiated within the past three months. Patients were subsequently organised into four groups according to their diagnosis: Group I consisted of individuals with painful TMD and without probable bruxism (PB); Group II included individuals without painful TMD and with PB; Group III comprised individuals with both painful TMD and PB; and Group IV, the control group, included individuals without painful TMD and without PB. Group I, which comprised only five individuals, was excluded from the study, and the investigation proceeded to the second phase with 88 participants. All participants were invited to complete questionnaires assessing quality of life (Oral Health Impact Profile-14 – OHIP-14) and sleep quality (Pittsburgh Sleep Quality Index – PSQI). The correlations between the groups were then analysed statistically by the Kruskal–Wallis test. The results showed that a diagnosis of painful TMD and PB was significantly associated with poorer quality of life ($p = 0.017 < 0.05$). However, no significant relationship was found between the groups and sleep quality. A correlation was observed between sleep quality and quality of life, Rho = 0.417 ($p < 0.001$), as well as between chronic pain and quality of life. In conclusion, a diagnosis of TMD and probable PB is associated with a lower quality of life. A lower quality of life is also associated with poorer sleep quality. The study was approved by the Scientific Committee of the Integrated master's degree in dental medicine (MIMD) at the Egas Moniz University Institute (IUEM). Subsequently, it was reviewed and approved by the Ethics Committee of the Egas Moniz School of Health & Science.

Keywords: BRUXISM; QUALITY OF LIFE; SLEEP QUALITY; DTM

P.83 HALITOSIS AND PERIODONTAL STATUS: CLINICAL RELEVANCE FOR PATIENT-CENTERED CARE†

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Periodontitis is a chronic inflammatory disease caused by polymicrobial subgingival biofilm, leading to irreversible destruction of periodontal support tissues. It is often clinically silent but severely impacts oral function and quality of life. Periodontitis is also the second most common cause of intraoral halitosis, due to the production of volatile sulphur compounds (VSCs) by anaerobic Gram-negative bacteria such as *Porphyromonas gingivalis* and *Prevotella intermedia*. Halitosis has psychological and social consequences, further worsening the burden of periodontal disease. Understanding patients' self-perception is crucial to improving awareness and adherence to treatment. In this study, we aim to investigate the association between periodontitis and halitosis, and their impact on individuals' quality of life and oral health self-perception. A pilot cross-sectional study included patients from the Periodontology Department at Egas Moniz Dental Clinic (Monte da Caparica, Portugal), undergoing periodontal treatment. Participants age 18–65 years with diagnosis of periodontitis based on European Federation of Periodontology/American Academy of Periodontology 2018 Classification. Exclusion criteria were plaque/gingival index >25%, previous periodontal treatment, head/neck radiotherapy or chemotherapy within 6 months, systemic conditions affecting outcomes, pregnancy, recent flu or COVID-19, antibiotic use within 2 months, extra-oral halitosis, and incomplete data. Halitosis was screened via quantified using the Halimeter® (VSCs). Psychometric assessments included the Oral Health Impact Profile (OHIP-14) and the Oral Health Values Scale (OHVS). Clinical and questionnaire data were collected by two calibrated researchers using anonymized forms. A total of 49 participants were included (25 male, 24 female), with a mean age of 57.19 ± 11.96 years. Twenty-two participants reported brushing their teeth twice daily. Ten individuals had dental prostheses, of which eight were removable. The mean Halimeter® reading was 61.5 ± 42.2 ppb. Mean OHVS and OHIP-14 scores were 45.0 ± 5.9 and 12.0 ± 8.6, respectively. Statistical analysis revealed a significant association between periodontal grade and OHVS score ($p = 0.014$), suggesting that the severity of periodontal disease influences patients' perceived value of oral health. However, no significant associations were found between Halimeter® readings and either OHVS or OHIP-14 scores ($p > 0.05$). While halitosis is a common concern in periodontal patients, its objective measurement did not correlate with self-perceived oral health or quality of life in this sample. However, the observed relationship between periodontal severity and oral health values underscores the importance of disease awareness in shaping patient attitudes.

Keywords: PERIODONTITIS; HALITOSIS; VOLATILE SULPHUR COMPOUNDS; ORAL HEALTH VALUE SCALE; ORAL HEALTH IMPACT PROFILE

P.84 GUIDED TISSUE REGENERATION IN A VERTICAL BONE DEFECT IN A PATIENT WITH PERIODONTITIS†

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Periodontitis is defined as a chronic, multifactorial inflammatory disease that leads to the progressive destruction of the tissues that support the teeth. Bone regeneration surgeries are indicated in the presence of intrabony defects 3mm or deeper, with the aim of re-establishing bone architecture and support for tooth roots. Guided Tissue Regeneration (GTR) is a surgical approach that uses the placement of membranes and osteoconductive/osteoinductive biomaterials, such as bone grafts, to promote the regeneration of alveolar bone, periodontal ligament and root cementum. The biomaterials employed encompass both resorbable and non-resorbable membranes, in addition to autologous and xenogenous grafts. Systemic and local factors, such as poor oral hygiene, smoking, or non-adherence to periodontal maintenance appointments, have been demonstrated to compromise clinical results. A 69-year-old female patient with a history of hypertension, fibromyalgia and depression was referred to the Periodontology Department due to a probing depth (PD) of 11 mm and bleeding on probing (BOP) distal to tooth 42, which had previously been endodontised. Radiographic analysis revealed a distal vertical defect. The tooth was diagnosed as exhibiting grade 2 mobility in conjunction with occlusal trauma. Subsequent interventions included occlusal adjustment, ferulisation, and non-surgical periodontal treatment. Following non-surgical treatment, the residual PD was measured at 10 mm. Intrasulcular incisions were made between teeth 41 and 44 to facilitate access to the defect. Following the removal of the granulation tissue, Bio-Oss® (xenograft, 0.25-1 mm) was applied to the defect, which was then covered with Cytoplast® TXT-200 non-resorbable membrane. The flap was then repositioned and sutured using simple stitches. Post-operatively, the patient was prescribed a combination of antibiotics, anti-inflammatories, analgesics, and 0.2% chlorohexidine mouthwash. A medical examination was conducted on the 7th day, and on the 15th day, the sutures were removed and a further X-ray was taken. At the 8-week stage, the non-resorbable membrane was removed and a new radiographic examination conducted. Post-operative complications were not observed. Radiographic analysis demonstrated evidence of new bone formation within the alveolar defect, accompanied by a measurement indicating a gain of 6,2 mm in alveolar bone volume. At the 6-month stage, the PD had reduced to 3 mm without BOP, thus demonstrating the efficacy of GTR in repairing vertical defects.

Keywords: PERIODONTITIS; GUIDED TISSUE REGENERATION; VERTICAL INTRAOSSEOUS BONE DEFECT; BONE GRAFT; NON-RESORBABLE MEMBRANE

P.85 LATE COMPLICATION IN IMPLANT-SUPPORTED ORAL REHABILITATION: CLINICAL CASE REPORT†

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The placement of dental implants is widely regarded as the contemporary gold standard for tooth replacement therapy, offering an effective and predictable solution for the replacement of missing teeth. However, there has been a corresponding rise in the prevalence of implant procedures, which has resulted in a proportional increase in complications, both in the early and late stages, that may potentially compromise the long-term success of the treatment. Implant fracture is a rare but serious form of late implant failure, occurring after successful osseointegration and functional loading. This condition is regarded as a mechanical complication, frequently associated with excessive occlusal forces, and may be accompanied by significant bone loss. Despite constituting a minor proportion of late failures (6.2%) (Manor *et al.*, 2009), implant fractures necessitate intricate clinical management, encompassing explantation and potential bone regeneration, in order to restore the site for subsequent rehabilitation. (Paquette *et al*., 2006). The poster presents a clinical case involving a late complication related to dental implants in a 42-year-old female patient previously rehabilitated with implants in the posterior mandibular region. The patient reported localized pain and a sensation of implant mobility. Following a comprehensive evaluation, it was ascertained that the prosthetic components were not the causative factor for the mobility issues. A comprehensive clinical and radiographic evaluation was conducted, which revealed peri-implant bone loss, thereby raising concerns about the potential for implant fracture. Following the initial non-surgical treatment, a surgical procedure was performed, during which the implant fracture was identified as the cause of the mobility issue. Following the definitive diagnosis, the fractured implant was explanted, and guided bone regeneration was carried out to allow for the future placement of a new implant. This case underscores the significance of systematic clinical follow-up and maintenance protocols in the prevention and management of implant-related complications.

Keywords: DENTAL IMPLANTS; IMPLANT FRACTURE; BONE LOSS; GUIDED BONE REGENERATION

P.86 EFFECT OF A 6-WEEK MULTIMODAL PROGRAM VERSUS OCCLUSAL SPLINT ON PAIN, MOUTH OPENING AND QUALITY OF LIFE IN ADULTS WITH TEMPOROMANDIBULAR DISORDER (TMD): A CONTROLLED CLINICAL TRIAL†

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Temporomandibular disorders (TMD) is a multifactorial condition affecting the temporomandibular joint (TMJ), masticatory muscles and associated structures. It is considered the most common cause of non-odontogenic orofacial pain and the second most prevalent musculoskeletal disorder, significantly impacting individuals' quality of life. As demonstrating the effectiveness of various first-line intervention approaches becomes increasingly demanding in a field that has evolved over time and where research plays a pivotal role, there is a clear need to enhance the quality of existing evidence on this topic. This study aimed to evaluate and compare the effects of a multimodal programme (manual therapy combined with therapeutic exercises) versus an occlusal splint on pain modulation, oral opening range and oral health-related quality of life (OHRQoL) in adults with muscular TMD and limited mouth opening over a six-week period. A controlled clinical trial was carried out involving 24 participants of both sexes, aged between 18 and 50 years, diagnosed with muscular TMD according to the *Diagnostic Criteria for Temporomandibular Disorders* (DC/TMD). Participants were randomly assigned to two experimental groups: G1 underwent weekly 30-minute physiotherapy sessions, comprising standardised manual therapy and therapeutic exercises (massage, compression and stretching of the masticatory muscles, followed by strengthening and mandibular coordination exercises); G2 used a 3 mm thermoplastic occlusal splint prescribed for nightly use. Assessments were performed at baseline (T0) and after six weeks (T1), evaluating pain intensity (*Numerical Pain Rating Scale* – NPRS), maximum comfortable and maximum forced mouth opening (MCO and MFO, measured with a digital calliper), pressure pain threshold (PPT, measured using an algometer), and OHRQoL (*Oral Health Impact Profile* – OHIP-14). All participants completed the intervention and follow-up assessments, resulting in a 100% adherence rate. A significant reduction in pain intensity was observed in both groups over time ($p<0.001$), with more consistent responses in G2. Both MCO and MFO significantly increased after the intervention ($p=0.006$; $p=0.005$), with G1 presenting greater gains in MFO ($p=0.035$). PPT increased significantly only in G1 ($p<0.05$), with statistically significant between-group differences at T1 in the right masseter ($p=0.033$), right temporalis ($p=0.020$) and left temporalis ($p=0.016$) muscles. OHRQoL improved significantly in both groups ($p<0.001$), with no significant differences between them. The multimodal programme proved superior in improving oral opening and PPT, while the occlusal splint was more effective in reducing pain intensity. The only statistically significant difference between groups was noted for PPT, with improvements restricted to G1. These findings suggest that physiotherapy may play a key role in activating descending pain inhibitory pathways, potentially through specific stimuli induced by manual therapy and therapeutic exercises, which may trigger neurotransmitter release and modulate pain sensitivity. Additionally, the results support the effectiveness of both conservative approaches in managing muscular TMD, reinforcing the importance of a personalised and multidisciplinary intervention to optimise clinical outcomes.

Keywords: TEMPOROMANDIBULAR DYSFUNCTION; PHYSIOTHERAPY; OCCLUSAL SPLINT; PAIN MODULATION; ORAL HEALTH-RELATED QUALITY OF LIFE.

P.87 OLFACTORY FUNCTION AND HALITOSIS IN PERIODONTITIS: A PILOT CROSS-SECTIONAL STUDY†

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Periodontitis is a chronic inflammatory disease that leads to the progressive destruction of the supporting structures of the teeth. A common manifestation is halitosis, caused by volatile sulphur compounds (VSCs) produced by anaerobic bacteria in periodontal pockets. Recent evidence suggests that prolonged exposure to VSCs and local inflammation may impair olfactory capacity. This dysfunction can affect quality of life and reduce awareness of one's own breath, delaying diagnosis and treatment. This study aims to investigate the association between periodontitis and halitosis, with special emphasis on the role of olfactory capacity in shaping patients' subjective perception and experience. A pilot cross-sectional study was conducted at the Periodontology Department of Egas Moniz Dental Clinic (Monte da Caparica, Portugal). Patients aged 18–65 years undergoing periodontal treatment and diagnosed with periodontitis according to the 2018 EFP/AAP Classification were recruited. Exclusion criteria included: plaque/gingival index >25%, prior periodontal treatment, recent radiotherapy or chemotherapy (within 6 months), systemic conditions affecting outcomes, pregnancy, recent flu or COVID-19 infection, antibiotic use within 2 months, extra-oral halitosis, and incomplete records. Halitosis was measured with a Halimeter® (VSC concentration in ppb), and olfactory capacity was assessed using the Sniffin' Sticks Identification Test (Burghardt®, Germany), a validated psychophysical tool composed of 12 odour-identification tasks with four multiple-choice answers per item. A total of 49 participants were included (25 male [51.0%], 24 female [49.0%]), with a mean age of 57.19 ± 11.96 years. Of these, 22 participants (44.9%) reported brushing their teeth twice daily. Ten individuals (20.4%) wore dental prostheses, eight of which (16.3%) were removable. The mean Halimeter® reading was 61.5 ± 42.2 ppb. The average correct response rate in the Sniffin' Sticks test was 72.0 ± 19.7%. Based on the test, 26 participants (53.1%) were diagnosed with hyposmia, while 22 participants (44.9%) were classified as normosmic. Statistical analysis revealed that increased age was significantly associated with reduced olfactory capacity ($p = 0.047$). Additionally, periodontal grade was significantly associated with sex ($p = 0.045$), with a higher proportion of males presenting Grade C periodontitis compared to females. This pilot study suggests that olfactory dysfunction is prevalent among individuals with periodontitis and halitosis, with more than half of the sample displaying hyposmia. Age appears to be a contributing factor to olfactory decline, and sex-based differences in periodontal severity were observed. These findings highlight the importance of integrating olfactory assessment in the clinical management of periodontitis and support the relevance of sensory perception in patient-centred care.

Keywords: PERIODONTITIS; OLFACTORY FUNCTION; HALITOSIS

P.88 COMPARATIVE ANALYSIS OF CORTICAL DRIVE BETWEEN SYMPTOMATIC AND ASYMPTOMATIC SIDES IN INDIVIDUALS WITH TEMPOROMANDIBULAR DISORDERS (TMD): A CROSS-SECTIONAL STUDY†

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Temporomandibular disorders (TMD) encompass a range of conditions involving pain and dysfunction of the masticatory muscles, among other structures. Myogenous TMD shares clinical features with central sensitisation-related conditions, and evidence suggests that central nervous system mechanisms, including altered cortical excitability, may underlie chronic TMD pain. Although numerous studies on TMD have assessed the symptomatic hemisphere using inter-individual comparisons, investigations in conditions such as tendinopathy that utilize intra-individual designs have demonstrated that pain processing can exhibit bilateral cortical involvement. This study aims to evaluate corticospinal excitability (CSE) and inhibition (SP), as well as intracortical facilitation (ICF) and short intracortical inhibition (SICI) on both symptomatic and asymptomatic sides in individuals with unilateral TMD using transcranial magnetic stimulation (TMS). Eleven female participants with chronic unilateral TMD underwent TMS targeting the cortical representation of the masseter muscle in both hemispheres. Single-pulse stimulation was used to measure resting motor threshold (rMT), CSE, and SP; paired-pulse stimulation assessed SICI and ICF. Authorisation to administer the measurement instruments was obtained from the relevant institutional authorities, along with a presentation of the study's aims, procedures, and questionnaires. All ethical, legal, and professional standards were upheld throughout the research process, from the literature review to data collection and analysis. The study followed the Ethical Principles for Medical Research Involving Human Subjects outlined in the Declaration of Helsinki (World Medical Association, October 2013). The research protocol was reviewed and approved by the Ethics Committee of Egas Moniz School of Health & Science on October 30, 2024 (reference number: 1441). Demographic and clinical characteristics were reported as mean ± standard deviation for continuous variables and as frequencies (%) for categorical variables (e.g., sex). Data were analysed using paired-sample t-tests. The symptomatic side was reported as left in 54.5% and right in 45.5% of cases. Our results revealed poor sleep quality (M= 5.91) and moderate stress (M= 22.18) among participants, reinforcing the role of psychosocial factors in symptom persistence. No statistically significant differences between symptomatic and asymptomatic sides for any TMS-derived measures: CSE ($p = 0.077$), ICF ($p = 0.503$), SP ($p = 0.450$), and SICI ($p = 0.586$). Although corticospinal excitability (CSE) was elevated in the symptomatic hemisphere, differences were not statistically significant, suggesting the need for larger sample sizes to confirm potential intrahemispheric asymmetries. No significant hemispheric differences were observed in other neurophysiological measures, including silent period (SP), intracortical facilitation (ICF), and short-interval intracortical inhibition (SICI), supporting the hypothesis of bilateral central nervous system involvement in TMD-related pain. These findings align with the concept of nociplastic pain, characterized by altered nociceptive processing in the absence of clear peripheral or structural pathology. We propose that supraspinal mechanisms, particularly those involving impaired inhibitory control and enhanced excitatory transmission, may explain the predominance of ICF over SICI and contribute to cortical disinhibition. These trends are consistent with neurophysiological profiles observed in other chronic pain conditions such as fibromyalgia and myofascial pain.

Keywords: TEMPOROMANDIBULAR DISORDERS; CORTICAL DRIVE; TRANSCRANIAL MAGNETIC STIMULATION

P.89 MINIMALLY INVASIVE ROOT COVERAGE IN A HIGH-AESTHETIC DEMAND CASE: A COMBINED TUNNELING AND L-PRF APPROACH†

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Gingival recession is a frequent clinical finding in young adults and may arise from multiple contributing factors. It often leads to dentin hypersensitivity, aesthetic concerns, and increased susceptibility to root caries. In this context, trauma from toothbrushing and a history of orthodontic treatment are well-established etiological factors that can act synergistically in the development of mucogingival defects. In the presence of generalized recessions, particularly in patients with high aesthetic expectations, surgical intervention may be indicated to restore soft tissue architecture and reduce discomfort. Among the available techniques, the tunnelling approach has gained popularity due to its minimally invasive nature, preservation of vascular supply, and excellent aesthetic outcomes. This case report describes the treatment of a 25-year-old healthy female patient who presented with generalized gingival recessions and reported dentin hypersensitivity affecting multiple teeth. Clinical history and examination revealed that the recessions were associated with traumatic brushing habits and a previous course of orthodontic treatment. The patient was re-educated on proper oral hygiene practices and instructed to switch to an electric toothbrush with a pressure sensor prior to undergoing surgery. Coverage surgery was planned to use the tunnelling technique and a subepithelial connective tissue graft was harvested from the palate. To enhance postoperative healing and minimize discomfort at the donor site, leukocyte- and platelet-rich fibrin (L-PRF) membranes were applied over the palatal wound. Additionally, a custom-made palatal stent was fabricated to protect the donor area and provide mechanical stability during healing. The procedure was performed uneventfully and was well tolerated by the patient. Postoperative follow-up showed minimal pain and no functional limitations. Rapid healing of the donor site was observed, with low inflammation and satisfactory tissue response. Complete root coverage (100%) was successfully achieved in the treated areas, which included 2 mm of recession at tooth 12, 14, and 3mm at tooth 13; on the contralateral side, 2 mm at tooth 22/24, and 3 mm at tooth 23, with good graft integration and aesthetic harmony in both areas. This case highlights the importance of identifying etiological factors in mucogingival defects and illustrates the clinical value of combining the tunnelling technique with L-PRF and palatal protection. This approach not only contributed to enhanced postoperative comfort, but also to favourable regenerative and aesthetic outcomes in the management of generalized gingival recession in a young adult patient.

Keywords: ROOT COVERAGE; TUNNELING APPROACH; AESTHETICS; L-PRF

P.90 GINGIVAL SMILE CORRECTION WITH PERIODONTAL PLASTIC SURGERY†

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Gingival smile is one of the main aesthetic complaints in dentistry and can have a negative impact on the patient's self-esteem and psychological well-being. This condition, characterised by the exposure of more than 2 mm of gingival tissue during smiling, can have a multifactorial aetiology, including altered passive eruption, dentoalveolar extrusion, vertical excess of the jaw and hyperactivity of the labial muscles. Clinical diagnosis should include assessment of clinical crown length, probing depth, width of keratinised gingiva, frenulum insertion, horizontal and vertical overbite, as well as the vertical limits of the smile. Radiographic analysis is also essential to determine the bone level and identify any structural changes in the jaw. Gingivectomy is an effective surgical approach to correcting this condition, restoring dentogingival architecture, eliminating excessive gingival exposure and promoting aesthetic harmony in the smile. In this clinical case, the 21-year-old male patient, with no known allergies or relevant medical history, went to the clinic for aesthetic reasons, presenting a gummy smile from teeth 14 to 24, due to altered passive eruption, with bone probing greater than 6 mm. A gingivectomy was performed using an electric scalpel, which offers advantages such as precise cutting, immediate haemostasis, rapid healing and optimised aesthetic results - factors that are particularly important in this type of procedure. The aim was to remove excess soft tissue in order to restore gingival balance and dental aesthetics, without compromising papillary tissue. In the immediate post-operative period, the patient showed an increase in confidence when showing off his smile, which suggests that this type of intervention, despite its relative simplicity, can represent a significant transformation in the individual's daily life, especially with regard to their psychological well-being and self-esteem. After two mouths of follow-up, there were no post-operative complications and the aesthetic parameters remained stable, namely gingival contours with symmetrical and natural margins, firm gingiva with no signs of inflammation, and a reduction in gingival exposure of 3 mm on the central incisors and approximately 5 mm on the remaining teeth during smiling.

Keywords: GUMMY SMILE; GINGIVECTOMY; PERIODONTAL SURGERY; OROFACIAL HARMONIZATION

P.91 PERIODONTAL HEALTH IN PORTUGUESE AIR FORCE†

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Periodontitis is a chronic inflammatory disease that affects the supporting structures of the teeth. Globally, its prevalence is approximately 62% among adults, making it one of the most prevalent human diseases. Periodontitis is associated with systemic conditions and reduced quality of life and is influenced by modifiable risk factors such as smoking, poor oral hygiene, stress, and limited access to dental care. The aviation environment introduces unique stressors, including hypobaric conditions, vibrations, acceleration forces, and irregular sleep, which may worsen oral and systemic health. Given the critical role of pilot officers in national defense and international cooperation missions, assessing their periodontal health is essential. This study aimed to characterize the periodontal status of Portuguese Air Force pilot cadets (PILAV) and explore potential associations with quality of life and oral health values. This observational, analytical, and cross-sectional study, conducted between December 2024 and March 2025 at the Portuguese Air Force Academy, assessed the periodontal status and oral health-related quality of life of 90 PILAV cadets (72% of the overall contingent), with a single appointment carried out at the Health Unit of Air Base No. 1 in Sintra (Portugal). The clinical periodontal status was assessed through a clinical evaluation and categorized according to the 2018 EFP/AAP classification. Additionally, three self-reported questionnaires were administered: one on sociodemographic information, another on oral health-related quality of life (OHIP-14), and a third on the individual values attributed to oral health (OHVS). According to the results, the majority were male (95.6%) with a mean age of 21.1 years and most cadets were periodontally healthy (55.6%), whereas 22.2% had gingivitis and 22.2% had periodontitis (staged as I: n=10; II: n=9; III: n=1). All female cadets were diagnosed as either healthy or with gingivitis. While 16.7% were current smokers, 38.9% were former smokers. Most trainees reported brushing their teeth twice a day (87.7%), although only 34.4% practiced interproximal cleaning regularly and 45.6% did not practice it at all. Globally, the OHIP-14 and OHVS revealed no statistically significant association between participants' periodontal status and their perceived impact of oral health on quality of life or the values they attributed to it. ($p>0.05$) These findings reveal a notable prevalence of periodontal disease among Portuguese Air Force and highlight gaps in oral hygiene habits and an undervaluation of oral health values, reinforcing the need for targeted preventive and educational programs in military settings. Additional studies are recommended to better understand the factors associated with periodontal and oral health in this population.

Keywords: PERIODONTITIS; PORTUGUESE AIR FORCE; QUALITY OF LIFE; ORAL HEALTH VALUES

P.92 NITRIC OXIDE METABOLITES AND THEIR ASSOCIATION WITH PERIODONTAL DISEASE – A CLOSER LOOK TO THE CREVICULAR FLUID.†

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Nitric oxide (NO) is a versatile signalling molecule involved in several critical physiological mechanisms, including neural communication, regulation of vascular tone and blood pressure, protection against cellular damage, inhibition of platelet aggregation, and immune responses. The main enzymatic source of NO is the endothelial nitric oxide synthase (eNOS), which is essential for maintaining vascular function. However, under low-oxygen (hypoxic) conditions, the body may not produce enough NO through this enzymatic pathway. In such cases, an alternative biochemical route—the reduction of nitrate to nitrite and subsequently to NO—becomes particularly important for sustaining NO-dependent processes. The efficiency of this alternative NO pathway is influenced by multiple factors, including dietary intake of nitrates and nitrites, and the composition of the oral microbiota. The presence of conditions such as periodontal disease (PD), can alter the oral microbiome, thereby potentially impacting nitrate metabolism and NO production. Emerging evidence suggests that disturbances in the nitrogen cycle within the oral cavity may have broader implications for systemic health and be reflected in the salivary levels of NO metabolites such as nitrite. In this context, a study is currently being conducted at the Egas Moniz Dental Clinic based on the hypothesis that quantifying nitrite at the level of the gingival sulcus/periodontal pocket (crevicular fluid, CF) may provide a more accurate indication of disease activity, eliminating some confounding factors in the quantification of nitrite at the salivary level. The primary objective of the study is to quantify nitrite in CF samples from patients with periodontal health and PD. The quantification of nitrite in CF is being carried out with proprietary biosensors, and the sample is collected using Periopapers. In addition, a blood sample is taken to quantify plasma nitrite using chemiluminescence to compare it with CF concentrations. Furthermore, samples are obtained for subsequent analysis of the microbiome of the dorsum of the tongue and CF. Herein, we will present and discuss the preliminary results obtained on the nitrite variation in CF samples from two study groups: PD patients (N = 10) and healthy participants (N = 10) using an optimized protocol based on the biosensing approach. Accordingly, nitrite concentrations tended to be higher in patients with periodontal health compared to those in the periodontitis (PD) group, in which nitrite levels were often below the detection limit of 0.5 micromolar. These preliminary findings contradict earlier studies by other research groups, which reported higher nitrite levels associated with periodontal disease. To better understand these results, a detailed analysis of the microbiome in the crevicular fluid is required, with special focus on the nitrate-reducing capacity of oral bacteria.

Keywords: NITRITE; PERIODONTAL DISEASE; BLOOD PRESSURE; CREVICULAR FLUID; ORAL MICROBIOME

P.93 KRAS GENE GENOTYPING IN TATTOOED INDIVIDUALS†

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Mutations in the *RAS* family of proto-oncogenes, particularly the *KRAS* gene, are known to play a significant role in the development of various skin cancers, including melanoma and squamous cell carcinoma. The most frequent mutation occurs in codon 12, altering the activity of the GTPase protein, which is involved in key cellular signalling pathways. This disruption can lead to uncontrolled cell growth and malignant transformation. Reports of skin neoplasms arising in tattooed areas have prompted scientific inquiry into potential causal factors such as the chemical composition of tattoo inks, the mechanical trauma caused by the needles used in the tattooing process, and the impact of photoaging. However, despite these observations, there is still a lack of robust scientific evidence directly linking tattoos to specific genetic mutations. The aim of this study was to characterise the presence or absence of mutations in codon 12 of the KRAS gene in tattooed students from the Egas Moniz School of Health and Science, and to assess the feasibility of detecting these mutations under controlled laboratory conditions. An experimental pilot study was carried out with sixteen tattooed students, who met the following inclusion criteria: they were healthy without dermal diseases; their tattoos were black and located on their upper limbs; and each tattoo was at least two centimetres in diameter and had been applied more than two years previously. DNA was collected by scraping the skin with wet swabs and extracted using silica-coated centrifugation columns (NZYtech kit). The *KRAS* gene was amplified using Nested PCR. Mutation analysis involved digesting the amplified product with the BstNI restriction enzyme, followed by gel electrophoresis. Of the 16 samples collected, only five were of sufficient quality for molecular interpretation and were considered valid. Four of these exhibited a fragmentation pattern indicative of the wild-type genotype (111 bp), suggesting an absence of mutations in codon 12 of the *KRAS* gene. One sample showed a 140 bp band, which is consistent with a homozygous mutant genotype. It is believed that the mutation exhibited by the sole participant is hereditary and that there is no follow-up plan. Despite the small number of valid samples, the detection of this mutation demonstrates the potential of this approach as a basis for future research. However, the results also highlight important limitations of the methodology used, particularly regarding DNA quality, which may have compromised the efficiency of the amplification process in most of the samples. Alternative approaches could include cleaning the skin with an alcohol solution beforehand to remove dead cells or extracting DNA from hair follicles instead of scraping the skin. The cobas® KRAS Mutation Test from Roche Diagnostics is a multiplex real-time PCR test capable of detecting mutations in codons 12, 13 and 61. However, as our goal is to make a fundamental discovery, we only tested codon 12, as this is where the most prevalent mutation occurs. Further research involving a larger sample size and more robust laboratory techniques is essential to validate the feasibility of genotyping the *KRAS* gene in tattooed individuals.

Keywords: KRAS GENE; MUTATIONS; TATTOOS; GENETIC VARIABILITY

P.94 RETHINKING MMP-8 AS A BIOMARKER IN PERIODONTITIS: EVIDENCE FROM GENETIC AND PROTEIN EXPRESSION ANALYSIS†

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Periodontitis is a chronic, multifactorial inflammatory disease, whose clinical diagnosis is often made at an advanced stage, by which time the destruction of the supporting tissues has already begun. The onset and progression of the disease may be related to polymorphisms in genes of proteins responsible for the destruction of the periodontium ligament such as matrix metallopeptidases (MMPs). Single nucleotide polymorphisms in the promoter region may influence the binding of regulatory factors, thereby resulting in alterations to mRNA and protein levels. Several studies have been conducted examining the correlation between MMP-8 (-799C>T) and MMP-8 (+17 C>G) along with the levels of MMP-8 enzyme with the risk of developing periodontitis. However, the findings from these studies have not yet reached a consensus. The objective of this study was two-fold: firstly, to explore the relationship between genetic traits in the MMP-8 gene and, secondly, the levels of MMP-8 as detected in gingival crevicular fluid in relation to the occurrence of periodontitis, validating these levels as biomarker to early diagnostic. The study population comprised 62 patients of whom 36 were diagnosed with periodontitis and 26 exhibited healthy periodontal tissue, thus forming the test and control groups, respectively. The gingival crevicular fluid samples were collected using paper strips, and the concentrations of MMP-8 were then measured using an ELISA kit. Concurrently, buccal mucosa cells were collected from the same patients using swabs, with the subsequent extraction of DNA. The analysis of polymorphisms was conducted by PCR and RFLP followed by electrophoresis. Generalised linear models (gamma distribution, log link) were employed to analyse non-normally distributed outcomes. The models incorporated variables such as age, sex, smoking habits, and MMP-8 polymorphisms. Non-significant terms were excluded unless they demonstrated clinically relevance. The effects of disease stage effects were assessed in age-adjusted models. The model's fit was assessed through the utilisation of likelihood ratios, Wald statistics, and AIC/BIC. The results obtained are expressed as B coefficients and exponentiated B with pairwise contrasts utilising the least significant difference correction. The results provide no evidence to suggest a significant association between the periodontitis susceptibility and each of the polymorphisms or with the genotype analysed. Furthermore, no correlation was identified between the concentration of MMP-8 or concentration of active MMP-8 and periodontitis. While the small sample size may have limited the statistical power, these findings align with a trend that has been observed in the recent literature, which highlights the limitations of MMP-8 as a standalone diagnostic biomarker. This may be due to the complex and dynamic nature of the disease, suggesting the need for a multi-marker approach. In this model, age is the only factor significantly associated with MMP-8 levels ($p = 0.027$), with a slight but statistically significant negative effect, suggesting a gradual reduction in enzyme activity with ageing, which may reflect age-related immune changes. These results give rise to questions regarding the use of MMP-8 as a biomarker for periodontal disease, suggesting the necessity for further studies with larger sample sizes and the inclusion of other matrix metallopeptidases.

Keywords: BIOMARKER; GINGIVAL CREVICULAR FLUID; MMP-8; PERIODONTITIS

P.95 FROM MUSCLE TO SCREEN: HOW FOCUS OF ATTENTION SHAPES MOTOR CORTEX EXCITABILITY AND MOVEMENT VARIABILITY†

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Health and exercise professionals frequently instruct individuals to adopt an internal focus of attention during exercise, such as concentrating on a specific muscle. However, this strategy may inadvertently constrain motor system flexibility by narrowing the range of movement solutions available to the performer. An internal focus tends to promote conscious control, which can interfere with automatic motor processes. In contrast, an external focus of attention, directed toward the intended movement outcome (e.g., lifting a bar), has been shown to enhance motor performance by promoting more efficient and adaptable movement strategies. Expanding on this concept, a visual focus of attention, such as projecting real-time performance feedback onto a screen, may further enhance motor adaptability by increasing the number of viable motor solutions available. This expansion of the motor repertoire is reflected in increased movement variability, which is often interpreted as a marker of functional adaptability. These behavioural changes are hypothesized to be underpinned by neurophysiological mechanisms within the primary motor cortex, particularly changes in corticospinal excitability and inhibition. The present study aimed to investigate whether a single exercise bout of seated calf raises on a Smith machine, performed under different attentional focus conditions (internal, external, visual), acutely influences force variability, corticospinal excitability, and inhibition. Force variability was analysed through the non-linear measure of sample entropy, which quantifies force fluctuations along the time series. Prior to participation, all participants signed an informed consent approved by the institutional ethics committee under number 1236 and in conformity with the Declaration of Helsinki. Twenty-seven participants were randomly assigned to one of three groups: internal focus (attention on the muscle), external focus (attention on the bar), or visual focus (attention on a screen displaying real-time feedback). Assessments were conducted at baseline (pre), immediately post-exercise (post), and 30 minutes post-exercise (post30). A linear mixed-effects model for repeated measures was used with focus condition and time as fixed effects and a participant-by-time interaction as a random effect. Preliminary results revealed a significant main effect of time on force variability, with an increase observed at post30 ($p < 0.01$) and a trend at post ($p = 0.057$). Corticospinal excitability increased significantly from pre to post ($p < 0.001$) and remained elevated at post30 ($p = 0.017$). A significant interaction effect showed that the visual focus group exhibited a pronounced increase in excitability from pre to post ($p < 0.001$). Additionally, at post, this group demonstrated a trend toward higher excitability compared to the internal ($p = 0.19$) and external ($p = 0.16$) groups. A single session of exercise can acutely enhance motor system adaptability, as indicated by increased corticospinal excitability and movement variability. Notably, directing attention toward a distant, visually mediated goal appears especially effective. These findings support the potential of visual focus strategies to promote richer motor repertoires through underlying neurophysiological mechanisms, with implications for both performance and rehabilitation settings.

Keywords: MOTOR CONTROL; NON-LINEAR DYNAMICS; NEUROPHYSIOLOGY; TRANSCRANIAL MAGNETIC STIMULATION; STRENGTH TRAINING

P.96 COMPARISON OF EXTERNAL LOAD VARIABILITY IN INJURED AND UNINJURED YOUTH ELITE FOOTBALL MALE ATHLETES: A CROSS-SECTIONAL STUDY†

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Non-contact soft tissue injuries are a prevalent issue in elite youth football, often occurring without obvious trauma but with significant performance and recovery implications. While Global Positioning System (GPS) technology has enhanced training load monitoring, conventional linear metrics, such as total distance covered or sprint counts, have shown limited ability to anticipate injury. This study aimed to assess whether nonlinear analysis of external load could detect subtle changes in training dynamics preceding injury. A retrospective cross-sectional design was applied to a sample of 38 male elite youth football players (aged 13–24 years) from a Portuguese academy, divided into injured and non-injured groups matched by team, age, and playing position. External load data were collected across ten consecutive training sessions before injury using 10 Hz and 18 Hz GPS devices (Apex, STATSports). Linear metrics included total distance, high-speed running, sprint distance, acceleration and deceleration loads, and velocity above 80% of each player's maximum. Nonlinear analysis involved Detrended Fluctuation Analysis (DFA), used to calculate the fractal scaling exponent alpha (α) from velocity time series, quantifying the temporal structure of load variability. No significant differences were found between groups for any linear variables ($p > 0.05$). However, the DFA α value was significantly lower in injured players ($\alpha = 0.84 \pm 0.03$) compared to non-injured peers ($\alpha = 0.86 \pm 0.03$, $p = 0.039$), indicating greater randomness in load distribution. This suggests that injured athletes experienced less structured and more unpredictable patterns in their training loads in the days leading up to injury, which may reflect underlying neuromuscular fatigue or impaired movement control. These results support the idea that nonlinear metrics can reveal early warning signs of injury risk not detectable through conventional GPS outputs. This study is, to our knowledge, the first to demonstrate significant differences in load variability structure between injured and non-injured youth football players using DFA. While preliminary, the findings suggest that integrating nonlinear monitoring techniques into existing load tracking systems may improve injury prevention strategies by offering a more nuanced understanding of an athlete's response to training demands. Importantly, the use of a single nonlinear metric alone is not proposed as a standalone predictor of injury but rather as a complementary tool within a broader, multimodal monitoring approach. Future studies should validate these findings in larger cohorts, consider other sports contexts, and explore combinations of nonlinear dynamics with subjective and physiological fatigue indicators to build a more holistic model of injury risk.

Keywords: WORKLOAD; LOAD MONITORING; NON-CONTACT INJURY; ELITE FOOTBALL

P.97 THE EFFECTS OF DIFFERENT TEMPORALLY STRUCTURED METRONOMES ON KNEE JOINT LOADING VARIABILITY IN HEALTHY YOUNG ADULTS DURING TREADMILL WALKING: AN EXPERIMENTAL STUDY†

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While sensorimotor synchronization using isochronous metronomes is a common gait rehabilitation strategy, this approach disregards the naturally complex and fractal-like variability observed in healthy human gait. Although previous studies have shown that fractal cues preserve or restore spatiotemporal gait complexity, their impact on biomechanical parameters like knee joint loading variability remains unexplored. Load modulation, particularly at the knee joint, is of clinical interest due to its relevance in conditions such as knee osteoarthritis. Yet, no evidence exists on how temporally variable cues, specifically fractal-like structures, influence joint loading dynamics during gait. This study aimed to investigate how different temporally structured metronomes (isochronous vs. fractal) affect the variability and complexity of knee joint loading during treadmill walking in healthy young adults. Fourteen healthy participants (23.4 ± 1.5 yrs; 9 males) completed three 12-minute treadmill walking trials: one uncued and two visually cued (isochronous and fractal, randomized). The visual cues consisted of a vertically moving bar synchronized to heel strikes. Stride time mean and standard deviation from the uncued trial were used to personalize the metronome cues. The primary dependent variable was the fractal scaling exponent (α-load) of the knee joint moment time series, calculated using Detrended Fluctuation Analysis (DFA). Secondary outcomes included the coefficient of variation of knee joint load (CV-load) and fractal scaling of inter-stride intervals (α-ISIs). Three-dimensional kinematics and ground reaction forces were collected using a motion capture system and force-instrumented treadmill. Knee joint moments were derived using Visual3D and analysed in MATLAB. A one-way repeated-measures ANOVA was used to compare conditions for all outcomes, with post-hoc Tukey tests and partial eta squared for effect sizes. Statistical significance was set at $p<0.05$. No significant main effects were observed for knee joint loading variability across conditions (α-load: $p = 0.165$; CV-load: $p = 0.509$), indicating that neither metronome type altered the variability or complexity of joint loading. However, a significant effect was found for α-ISIs ($p < 0.001$), with the fractal (0.87 ± 0.07) and uncued (0.90 ± 0.11) conditions maintaining statistical persistence ($\alpha > 0.5$), while the isochronous condition showed anti-persistent behaviour (0.35 ± 0.17), resembling gait patterns typical of aging or neurological disease. While temporally structured metronomes significantly influence spatiotemporal gait dynamics, they do not affect knee joint loading variability in healthy adults. This suggests that joint-level variability is governed by different control mechanisms, possibly influenced by motor redundancy and compensatory strategies. Despite the null findings in load variability, the fractal cues preserved healthy gait dynamics and statistical persistence in inter-stride intervals, supporting their relevance in rehabilitation contexts. Future studies should explore whether similar effects extend to other joints and clinical populations, particularly those with altered joint mechanics or reduced gait complexity.

Keywords: FRACTALS; CUEING; COMPLEXITY; GAIT REHABILITATION; SYNCHRONIZATION

P.98 THE EFFECTS OF DIFFERENT TEMPORALLY STRUCTURED CUES ON GAIT VARIABILITY IN ANTERIOR CRUCIATE LIGAMENT INJURED ATHLETES†

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Anterior cruciate ligament (ACL) injuries have significant implications for joint stability, proprioception, and neuromuscular control, often resulting in persistent changes in gait variability and reduced motor adaptability. Increasing evidence indicates that the temporal structure of gait variability—especially its fractal properties—reflects the health and flexibility of the neuromotor system, where higher complexity is associated with greater physiological adaptability. However, most rehabilitation protocols overlook this aspect. This study investigated the immediate effects of two temporally structured visual cues—isochronous (ISO) and fractal (FRC)—on gait variability in adult athletes with acute ACL injuries. Seventeen MRI-confirmed ACL-injured athletes (aged 18–35) signed consent form prior to completing two 12-minute walking trials on a split-belt treadmill: one under an uncued condition and one under a cued condition, where participants synchronized right heel strikes with visual cue. Each participant walked at a theoretically derived optimal walking speed, calculated using the dimensionless Froude number to ensure standardized energetic demand. Participants were randomly assigned to either the ISO or FRC cueing group. Gait variability was quantified through inter-stride intervals, and their temporal structure assessed using detrended fluctuation analysis (DFA), which calculates a fractal scaling exponent (α). Values of α close to 1 reflect structured, long-range correlations in gait, which are consistent with healthy motor control. A significant interaction between group and condition was found: in the ISO group, α-values decreased from 0.84 ± 0.11 (uncued) to 0.43 ± 0.24 (cued), indicating reduced complexity and a shift toward less structured gait patterns. In contrast, the FRC group maintained their baseline values (uncued: 0.76 ± 0.07; cued: 0.80 ± 0.14), suggesting preserved neuromotor organisation. Although the fractal cueing did not immediately enhance gait complexity, it prevented the deterioration observed with isochronous cueing. These findings suggest that rigid cueing strategies may disrupt natural motor patterns in ACL-injured individuals, while fractal cueing may help preserve physiological variability and adaptability - highlighting its promise for early rehabilitation to prevent exacerbation of motor rigidity. Despite limitations, such as a small sample size and single-session design, the study supports the inclusion of complexity-based principles in rehabilitation and highlights the need to explore long-term effects and psychological moderators such as kinesiophobia.

Keywords: ANTERIOR CRUCIATE LIGAMENT INJURY; CUEING; GAIT VARIABILITY; REHABILITATION; ADULT ATHLETES.

P.99 EFFECTS OF INTERNAL VERSUS EXTERNAL FOCUS OF ATTENTION ON CORTICAL DRIVE IN THE INJURED LIMB POST-ACL RECONSTRUCTION: A PRELIMINARY RANDOMIZED CROSSOVER STUDY†

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Anterior cruciate ligament reconstruction (ACLr) often results in persistent quadriceps weakness, largely attributed to arthrogenic muscle inhibition and altered corticospinal excitability (CSE). Neurophysiological disturbances such as imbalances in short interval intracortical inhibition (SICI) and intracortical facilitation (ICF) have been observed as early as two weeks post-surgery. These changes may contribute to neuromuscular dysfunction and increase the risk of re-injury. While conventional rehabilitation programs primarily address musculoskeletal recovery, there is growing clinical interest in incorporating strategies that promote neuroplasticity. One such strategy is attentional focus modulation, which involves manipulating where individuals direct their attention during movement. An external focus (EF)—directing attention to the effect of the movement—has been associated with enhanced motor learning and performance in various populations. However, the neurophysiological effects of EF compared to internal focus (IF)—directing attention to the movement itself—are not yet fully understood in individuals recovering from ACLr. This preliminary study aimed to examine the acute effects of EF versus IF on corticospinal and intracortical excitability during a knee extension exercise in individuals post-ACLr. Three participants (2–3 months post-surgery) completed two experimental sessions in a randomized crossover design. Each session involved a standardized leg extension exercise protocol performed under either EF or IF instructions. Corticospinal and intracortical excitability of the injured limb were assessed before and after each session using transcranial magnetic stimulation (TMS). Outcome measures included motor evoked potential (MEP) amplitude to assess CSE, paired-pulse TMS paradigms to evaluate SICI and ICF, and silent period (SP) duration as a measure of cortical inhibition. This study was approved by the Egas Moniz Ethics Committee. Instructions were standardized across sessions: for the EF condition, participants were told, "By extending your leg against the machine, control the ball you see on the screen to follow the pattern shown." For the IF condition, participants were instructed, "Think about the muscle of your leg as you push to extend your leg against the machine." Statistical analyses were conducted using linear mixed-effects models to examine the main effects of focus (EF vs. IF), time (PRE vs. POST), and their interaction (FOCUS × TIME). Random intercepts and slopes were modelled at the participant level. Results seem to indicate a significant interaction for CSE ($F(1, 114) = 27.08$, $p < .001$), with increased excitability following EF and a slight decrease following IF. SICI showed a significant interaction ($F(1, 112) = 9.01$, $p = 0.003$), suggesting increased inhibition post-IF and stability post-EF. ICF decreased post-EF with no change in IF ($F(1, 113.96) = 33.75$, $p < .001$). SP duration showed significant main effects of time and focus, but no interaction. These preliminary results suggest that EF may enhance corticospinal excitability, while IF may affect intracortical inhibition differently. Although findings should be interpreted with caution, this study highlights the potential role of attentional focus strategies in ACLr rehabilitation.

Keywords: NEUROPLASTICITY; QUADRICEPS WEAKNESS; TRANSCRANIAL MAGNETIC STIMULATION (TMS); MOTOR EVOKED POTENTIAL (MEP)

P.100 CHANGES IN THE ORAL MICROBIOME BY THE USE OF ALIGNERS: PROSPECTIVE *IN-VIVO* STUDY†

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Orthodontic aligners have gained prominence in recent decades, presenting themselves as more aesthetically harmonious alternatives to fixed orthodontic appliances. Although several studies have emphasized the easy relationship between these devices and oral hygiene, questions remain regarding their interaction with the microflora of the oral cavity. In this context, the formation of biofilms in dental practice is relevant and requires control, since contamination of orthodontic materials can influence the oral balance. The aim of this study was to investigate whether the use of aligners in orthodontic therapy induces changes in the subgingival oral microbiome and in the space/aligner tooth surface that could lead to the development of oral pathology. This work was approved by ethical committee of Egas Moniz (PT 501/24). The sample consisted of 16 patients who had started orthodontic treatment exclusively with aligners. Samples were taken at two different times: at the initial appointment (t0) and at the second appointment (t1), with an average interval of 1 month and 3 days. The samples were taken from four specific sites, covering the buccal surfaces and crevicular grooves of the upper lateral incisors and second premolars of the upper quadrants. The quadrants were randomly selected, ensuring equal distribution and keeping the same side in the samples at es. At time t0, samples of the buccal surfaces were obtained by scraping the corresponding tooth surfaces with a swab. Samples were taken from the crevicular grooves using 1st grade paper cones. In the collections carried out at time t1, the participants were instructed to wear the aligners continuously, without removing or sanitising them, for a period of two to three hours immediately before the collection. At t1, the sample collection procedure on the buccal surfaces differed from t0. Sampling included scraping the inner surface of the aligner in the areas corresponding to the upper lateral incisors and upper second premolars. Sampling in the crevicular grooves followed the same procedure as t0. Samples were placed in TE (1x) and transported to the laboratory for analysis. Isolation was performed in Columbia agar 5% blood and Mitis Salivarius agar, by spread plate method, for the detection and quantification of viable microorganisms, with special emphasis on haemolytic microorganisms and oral *Streptococcus*. DNA extraction and sequencing (16S rRNA gene) were also performed for microbiome analysis. The data were subjected to descriptive and inferential statistical analysis techniques (parametric and nonparametric comparative tests). A significance level of 5% ($p<0.05$) was established for the inferential analysis. The results revealed a significant increase in the relative abundance of viable microorganisms between t0 and t1, particularly of species associated with dysbiosis, such as *Streptococcus mutans* and *Enterococcus faecalis*. The results of the microbiome analysis are pending and are expected to offer a more comprehensive understanding of the alterations occurring within the oral environment. However, the data obtained so far already allow us to conclude that orthodontic aligners influence oral balance, promoting microbiological changes that may predispose to the development of pathological conditions.

Keywords: ORTHODONTICS; ALIGNERS; ORAL MICROBIOME; ORAL PATHOLOGY

P.101 LINGUAL FRENOTOMY IN A PAEDIATRIC ANKYLOGLOSSIA AND LASER TREATMENT: A CLINICAL CASE REPORT†

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Ankyloglossia refers to a reduced mobility of the tongue caused by a restrictive lingual frenulum. This condition may lead to breastfeeding difficulties, such as painful latch or poor weight gain, as well as articulation and occlusion problems. Frenotomy or frenectomy are the most common therapeutic approaches and can be performed with or without laser technology. To describe the clinical outcome of laser frenotomy in a paediatric patient with ankyloglossia. A 6-month-old female infant, exclusively breastfed, presented with poor weight gain, breastfeeding difficulties, and signs of sucking-swallowing discoordination, including gulping and choking episodes during feeding. Oral evaluation showed poor vacuum maintenance and a posteriorized tongue position. A type 3 lingual frenulum was identified (according to Coryillo's classification), with a score of 5 on the Bristol Tongue Assessment Tool, indicating significant functional restriction. Laser frenotomy was performed using a diode laser (SiroLaser Blue, 970 nm, continuous wave mode with repeated pulse settings: 1,0 W power, used 445 nm wavelength) suitable for children frenectomy. The procedure was carried out under sedation with sevoflurano, administered by a paediatric anaesthetist. The procedure lasted 5 minutes and was followed by rectal administration of paracetamol. The intervention and recovery were uneventful, with improved tongue function post-treatment. Laser frenotomy resulted in significant functional improvement with no complications. This technique proved to be safe and effective. Laser frenotomy/frenectomy should be considered a therapeutic option, especially in paediatric patients, due to its effectiveness, higher parental acceptance, and lower risk of postoperative complications.

Keywords: LINGUAL FRENOTOMY; LASER DIODE; ANKYLOGLOSSIA

P.102 ASSESSMENT OF THE DIAGNOSTIC DELAY IN A PORTUGUESE POPULATION OF PATIENTS WITH BURNING MOUTH SYNDROME – A PRELIMINARY STUDY†

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Burning Mouth Syndrome (BMS) is a chronic pain condition characterized by a persistent or recurrent burning sensation in the oral cavity, without identifiable systemic or local pathology. This study, part of a broader doctoral research project, aimed to assess diagnostic delay, triggering factors, and the use of psychotropic medication among BMS patients. A retrospective review of 300 clinical records from the "Clínica Integrada de Medicina Oral" (CIMO) in Lisbon was conducted, collecting data on age, sex, diagnostic delay, triggering factors, and psychotropic drug use. Descriptive and inferential statistical analyses were performed, with a significance level set at 5%. Most patients were female (82.0%), and 33.7% were using psychotropic medication. Use of these drugs was significantly more common in women (42.7%) than in men (17.8%, p=0.002). Stressful events emerged as the most frequently reported triggering factor (21.3%). Although women were diagnosed at a slightly older age than men (60.3 vs. 56.6 years), this difference was not statistically significant (p=0.075). However, patients taking psychotropic medication were diagnosed at a significantly older age than those not medicated (62.9 vs. 58.9 years, p=0.009). Additionally, younger patients were more likely to receive a faster diagnosis, with significantly shorter diagnostic delays observed in those under 0.5 years of delay (p=0.021). These findings suggest that age is associated with both diagnostic delay and psychotropic medication use, while sex influences only medication rates. Reducing diagnostic delay, particularly in older individuals, remains a critical responsibility for healthcare professionals to improve treatment outcomes in BMS.

Keywords: BURNING MOUTH SYNDROME; PSYCHOTROPIC MEDICATION; DIAGNOSTIC DELAY

P4

Environmental & Social Determinants of Health

P.103 AIR POLLUTION AND MORTALITY IN PORTUGAL: AIRQ+ ANALYSIS AND COVID-19 IMPACT†

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This study investigates the relationship between atmospheric pollution and mortality in Portugal from 2010 to 2021, with particular attention to the effects of the COVID-19 pandemic on environmental and health outcomes. Using the World Health Organization's AirQ+ model in conjunction with Linear Mixed Models, we analysed national air quality data to estimate pollutant-attributable mortality and examine temporal trends. The analysis included key pollutants such as nitrogen dioxide ($NO_2$2), fine particulate matter ($PM_{2.5}$2.5), and ozone ($O_3$3), with mortality impacts assessed for all-natural causes and specific respiratory outcomes. Results show a significant reduction in $NO_2$2 and $PM_{2.5}$2.5 concentrations during the 2020–2021 period coinciding with pandemic-related mobility restrictions, while $O_3$3 levels exhibited a modest increase. The estimated annual mortality attributable to $NO_2$2 and $PM_{2.5}$2.5 exceeded 5000 deaths, with an additional 139 deaths annually associated with $O_3$3-related respiratory diseases over the study period. Despite methodological constraints, including limited assessment of pollutant interactions and climate variability, findings indicate a temporary decrease in $NO_2$2-related health burdens during the pandemic. The observed trends reflect short-term shifts in emissions rather than long-term environmental policy successes. This research underscores the utility of AirQ+ as a decision-support tool for public health strategy and highlights the need for sustained integrated efforts to reduce air pollution as part of achieving the United Nations 2030 Sustainable Development Goals.

Keywords: ATMOSPHERIC POLLUTANTS; DISEASE BURDEN; ENVIRONMENTAL RISKS; ENVIRONMENTAL HEALTH; QUANTITATIVE METHODS.

P.104 EVALUATING THE IMPACT OF LONG-TERM EXPOSURE TO AMBIENT PM2.5 ON LUNG CANCER INCIDENCE AND MORTALITY: A COMPREHENSIVE META-ANALYSIS†

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Lung cancer is recognised as one of the most common causes of cancer morbidity and mortality worldwide, and it is the second leading cause of death, with the highest number of years of life lost in highly developed regions. It is widely recognized that ambient exposure to particulate matter with a diameter below 2.5 μm (PM2.5) represents the foremost global environmental risk factor, being associated with several health outcomes, including lung cancer, ischemic heart disease, and chronic obstructive pulmonary disease. As part of the Horizon Europe project BEST-COST, we conducted a systematic review and a meta-analysis. A comprehensive search was performed across multiple literature databases for studies published between January 2010 and July 2023. Based on predefined eligibility criteria, a total of 27 studies were included in the final analysis. A random-effects meta-analysis was performed, standardizing effect sizes to a 10 μg/m³ increase in PM2.5. Beta-coefficients were used in random-effects models, and heterogeneity was estimated using restricted maximum likelihood. Between-study heterogeneity was assessed with the I^2 statistic and tau^2, with $I^2 > 80\%$ indicating substantial heterogeneity. Risk estimates, 95% confidence intervals, and prediction intervals were reported. Subgroup and sensitivity analyses were conducted to explore sources of variability and assess the robustness of findings. Publication bias was evaluated using funnel plots and Egger's regression test, provided enough studies was available. Analyses were conducted using the 'meta' package in R (version 4.3.2). The random-effects meta-analysis revealed that a 10 μg/m³ increase in long-term PM2.5 exposure was associated with a 25% increase in the combined risk of lung cancer incidence and mortality (pooled risk estimate: RR = 1.25; 95% CI: [1.11; 1.41]). When analysed separately, PM2.5 exposure was associated with an 11% increase in lung cancer incidence risk (RR = 1.11; 95% CI: [1.04; 1.18]) and a 14% increase in mortality risk (RR = 1.14; 95% CI: [1.04; 1.25]). Substantial heterogeneity was observed across all meta-analyses ($I^2 > 80\%$), suggesting considerable variability between studies. Egger's test indicated no statistically significant evidence of publication bias for incidence. Long-term exposure to PM2.5 is significantly associated with an increased risk of lung cancer. Nevertheless, given the considerable heterogeneity observed, in addition to the potential impact of small-study effects, a cautious interpretation of these results is imperative. It is recommended that future research endeavours focus on the identification of sources of variability and the conduct of comprehensive analyses. This will facilitate more precise estimation of the long-term health and economic impacts. The dissemination of findings from such research will inform the development of targeted prevention strategies and policy support. The authors would like to acknowledge the support from the BEST-COST project members (https://best-cost.eu/). No ethical approval was required as the study used only publicly available data from previously published studies.

Keywords: LUNG CANCER; INCIDENCE; MORTALITY; META-ANALYSIS; PM2.5

P.105 USING FORENSIC MICROBIOLOGY TO ASSOCIATE VEHICLES AND THEIR COMPONENTS†

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The conventional forensic techniques employed for the identification of vehicles primarily focus on the analysis of trace evidence, including fingerprints and DNA. However, microbial communities in vehicle-associated dust are emerging as a valuable source of forensic markers. The surfaces of vehicle parts, such as side mirrors and wheel rims, tend to accumulate environmental debris, thereby providing insight into the history of these parts and any associations between them. This approach is particularly beneficial in cases of hit-and-run, where evidence may be left at the scene. This pilot study aims to assess the viability of establishing a connection between vehicle parts through the analysis of fungal communities present in dust samples. The vehicles were chosen according to their daily routes and the geographical region of Portugal in which they operate, in order to increase the geographical diversity of the sample. Samples are collected from vehicles at three exterior locations (grille, wheel, wing mirror) and three interior locations (carpet, steering wheel, upholstery) using sterile swabs, which are dipped in peptone water before and after sampling. In addition, one internal negative control and one external negative control are collected for each vehicle, bringing the total to 20 inoculated plates per vehicle. However, only 18 of these plates are analysed, as the controls do not exhibit fungal growth. After collection, the swabs are agitated in a vortex to release the particulate material into the peptone water. The resulting suspension is then inoculated onto Sabouraud agar supplemented with antibiotics. The plates are incubated in an incubator at 25 °C, and fungal growth is monitored over time, since different fungi exhibit variable growth rates. So far, 21 culture plates from two vehicles have been analysed: 9 plates from one vehicle and 12 from another. These plates were observed macroscopically for colony morphology, including features such as colour, texture, and surface characteristics, which aid in preliminary identification. Microscopic examination was performed using lactophenol cotton blue stain for morphological identification. The most prevalent fungi identified between the two vehicles are those of the genera *Cladosporium*, *Aspergillus* and *Penicillium*. While genera such as *Cladosporium*, *Aspergillus* and *Penicillium* are common environmental fungi, their presence alone may not provide sufficient discriminatory power. Therefore, forensic relevance may depend on species- or strain-level differentiation and patterns of community composition rather than presence or absence. Furthermore, each isolate will be identified by DNA sequencing. Subsequently, a statistical analysis is conducted to assess the associations between microbial profiles. Future analyses will incorporate environmental fungal baselines from each geographic region, with a view to assessing the specificity of vehicle-associated profiles. The results obtained so far demonstrate the potential of forensic mycology as an additional tool for vehicle tracking, crime scene investigation and environmental tracing, particularly in instances where conventional evidence is limited.

Keywords: FORENSIC MYCOLOGY; VECHILE-ASSOCIATED DUST; FUNGAL COMMUNITIES; CRIME SCENE INVESTIGATION; ENVIRONMENTAL TRACING

P5

Society, Behaviour & Mental Health

P.106 ONLINE SEXUAL VIOLENCE: PREVALENCE, CHARACTERIZATION, AND POTENTIAL RISK FACTORS FOR VICTIMIZATION IN A SAMPLE OF THE PORTUGUESE ADULT POPULATION†

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While technology's development and expansion offer positive aspects to daily life, it's crucial to be aware of the risks that its non-consensual use can pose, particularly concerning intimacy and sexuality. Alongside technological evolution, we've seen a growing transition of aggressive behaviours from the real world to the virtual world, with sexual violence being a prime example. Over the past decade, online sexual violence (OSV) has become a rising concern. Between 70% and 80% of the population has already experienced some of this abusive behaviour, which reflects the phenomenon's seriousness and wide scope. Due to limited information about its characterization in the adult population, OSV is frequently underestimated and inadequately understood. Given the undeniable and continuous growth and progress of digital technologies, we can expect to see an increase in OSV victimization. The present study aims to describe online sexual violence within a sample of the Portuguese adult population, specifically regarding its prevalence, characterization, and potential risk factors for victimization. This work intends to leverage investment in scientific research on online sexual violence to promote digital literacy focused on cybersecurity and respect for human dignity. In addition, we seek to contribute to the development of public and legal policies regarding victims' support and the creation of legislation that addresses the specificities of OSV. The Egas Moniz School of Health and Science Ethics Committee approved this study protocol number. The participant selection criteria were an age of 18 years or older, Portuguese nationality, and informed consent, resulting in a non-probability convenience sample, recruited online via the snowball method. A sample of 341 participants answered to a sociodemographic questionnaire, questions about internet usage, and the following instruments: the Technology-Facilitated Sexual Violence Scale, the Cyberstalking Assessment Scale, and the External and Internal Shame Scale. Results revealed that 66% of respondents were OSV victims, with higher prevalence rates among younger participants, women, heterosexual individuals, and those with more liberal sexual tendencies. Digital sexual harassment was the most reported abusive behaviour, followed by gender and sexuality-based harassment. Perpetrators were predominantly identified as male and unknown to the victim. Non-heterosexual orientation, more liberal attitudes toward sexuality, cyberstalking higher levels (specifically, lower transition of persecutory behaviours from digital to real-life contexts and greater exposure to online threats) and higher levels of shame feelings were predictors of OSV victimization, explaining 42% of the phenomenon variance in the Portuguese adult sample. These findings underscore the urgent need for appropriate prevention and intervention strategies, the restructuring of public and legal policies, as well as the promotion of digital literacy.

Keywords: ONLINE SEXUAL VIOLENCE; CYBERCRIME; CYBERSTALKING; DIGITAL ERA; TFSV-VS

P.107 ALCOHOL HANGOVER SYNDROME IN PORTUGUESE UNIVERSITY STUDENTS: PREVALENCE AND MANAGEMENT†

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Alcohol Hangover Syndrome (AHS) is characterized by a variety of physical and psychological symptoms, such as headache, nausea, fatigue, and dehydration, which occur after excessive alcohol consumption. Despite its high prevalence, particularly among young adults, AHS remains an underexplored phenomenon, with no validated treatments available. Common strategies to mitigate symptoms include the use of nonsteroidal anti-inflammatory drugs, paracetamol, and vitamin or mineral supplements. This study aimed to evaluate the prevalence and patterns of AHS, as well as the pharmacological practices adopted for symptom relief, among university students in Portugal. A confidential and anonymous questionnaire was disseminated via social media platforms to individuals aged 18 years or older, attending higher education, and living in Portugal. The study was approved by the Egas Moniz Ethics Committee (PT-223/24), and all participants provided informed consent. A total of 563 university students participated in this study, including 387 females and 176 males. Among them, only 3.4% reported total abstinence from alcohol, whereas 36.3% consumed alcoholic drinks more than once weekly. Additionally, 36.8% of the students typically consumed three to four drinks per occasion. Beer was the most consumed alcoholic beverage 59.4%. Most students (58.1%) reported an increase in alcohol consumption after entering university. A total of 78.3% of participants reported experiencing hangover symptoms following alcohol consumption, with 8.5% experiencing these symptoms frequently or very frequently, and 50.2% rating the severity of symptoms as moderate. Approximately 45.0% of respondents indicated using medication to manage hangover symptoms and 75.6% frequently/always used non-pharmacological strategies. Notably, the majority (79.6%) also stated that they would not increase their alcohol intake even if an effective treatment for AHS was available. Statistical analyses using Pearson's chi-square test ($\alpha=0.05$) demonstrated significant associations between the severity of hangovers and their frequency ($p<0.001$), as well as between hangover frequency and the use of medication to alleviate symptoms ($p<0.001$); a similar association was observed between hangover severity and medication use ($p<0.001$). Conversely, no significant association was observed between the frequency of alcohol consumption and the severity of hangover ($p>0.05$). The Mann-Whitney U test results revealed significant sex-related differences in both hangover frequency ($p<0.05$) and alcohol consumption frequency ($p<0.001$). This study highlights the high prevalence of alcohol consumption, especially beer, among Portuguese university students, with increased intake post-enrolment in higher education. Most students did not resort to pharmacological measures for hangover relief and did not alter their drinking behaviour in the presence of treatment. Aligned with Horizon Europe 2025–2027 priorities for public health and youth well-being, these insights provide a valuable foundation for developing culturally adapted prevention strategies aimed at mitigating alcohol-related harm among young adults in academic environments.

Keywords: DRINKING BEHAVIOUR; ALCOHOL HANGOVER SYNDROME; UNIVERSITY STUDENTS; SYMPTOM MANAGEMENT; PUBLIC HEALTH

P.108 PERCEPTIONS OF THERAPEUTIC STRATEGIES FOR ANXIETY DISORDERS: AN EXPLORATORY COMPARISON BETWEEN PORTUGAL AND FRANCE†

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Anxiety disorders (AD) are among the most prevalent psychiatric conditions worldwide, significantly affecting individuals' mental health, emotional stability, and daily functioning. This study aimed to explore self-reported therapeutic approaches used in the management of AD, including general patterns of medication use and non-pharmacological strategies, with a comparative focus on populations residing in Portugal and France. This research combined an extensive literature review and the implementation of an exploratory questionnaire (Q-TUA) in both countries. The Q-TUA was developed for this study but is not yet validated. The study was approved by the Egas Moniz Ethics Committee (1394, PT152/23) and all participants provided informed consent. A total of 570 individuals participated (398 in Portugal and 172 in France), providing data on diagnosis, treatment duration and frequency, side effects, perceived effectiveness, and the use of non-pharmacological approaches. Correlation analyses revealed generally weak correlations ($r = 0.32$) between the experience of medication side effects and higher levels of depression, anxiety, and stress, particularly anxiety ($r = 0.32$). In contrast, the perception of symptom improvement was negatively correlated with these measures, particularly stress ($r = -0.33$). The use of non-pharmacological strategies showed negative correlations with anxiety ($r = -0.24$) and stress ($r = -0.27$), supporting their role as effective complementary interventions. Although the correlation coefficients are mainly weak, we can say that there is a trend and that the size of the sample may limit the strength of the correlation. Between-group comparisons demonstrated statistically significant differences in anxiety ($t(568) = -3.52$, $p < 0.001$) and stress ($t(568) = -3.26$, $p = 0.001$), with higher scores among French participants. No significant difference was found for depression ($t(568) = -1.81$, $p = 0.071$), suggesting nuanced contextual differences in emotional distress between the two populations. Regarding therapeutic engagement, both groups tended to prefer long-term pharmacological treatment and expressed general satisfaction. However, Portuguese university students reported shorter treatment durations, whereas French students indicated greater satisfaction with nonpharmacological approaches. Relaxation techniques, psychotherapy, and meditation were the most commonly adopted non-drug strategies. This study highlights the value of integrative and culturally informed approaches to anxiety disorder management. These findings emphasize the importance of tailoring mental health interventions to local contexts and preferences, although the limited depth of clinical data should be considered when interpreting these findings. This research aligns with the Horizon Europe 2025–2027 objectives by advancing the knowledge of mental health care through cross-national analysis. By identifying therapeutic trends and user perceptions in different European settings, it provides actionable insights for fostering more sustainable and person-centred models of care.

Keywords: ANXIETY DISORDERS; THERAPEUTIC STRATEGIES; NON-PHARMACOLOGICAL INTERVENTIONS; CROSS-CULTURAL COMPARISON

P.109 RELATIONSHIP BETWEEN POSITIVE SEXUALITY AND PROBLEMATIC PORNOGRAPHY CONSUMPTION IN ADOLESCENTS†

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Positive sexuality is the positive experience and perception of sexuality, which has an impact on interpersonal relationships and lifelong development. However, factors such as pornography consumption at an early age can influence the experience of sexuality. Problematic pornography consumption can affect the development of sexual identities and preferences, influencing expectations regarding sexual relations, pleasure and sexual well-being. The aim of this study is to analyse the relationship between the perception and positive experience of sexuality and the problematic consumption of pornography in adolescents. The sample includes 274 Portuguese adolescents aged between 12 and 18. The participants answered the Sociodemographic Questionnaire which included questions about pornography consumption patterns, the Positive Sexuality in Adolescence Scale (PSAS) and the Short Version of the Problematic Pornography Consumption Scale in Adolescents (PPCS-6-A). The Egas Moniz School of Health and Science Ethics Committee approved this study (N. 1402), and all the ethical and deontological aspects were respected. Informed consent was sought from the heads of school, the adolescents' legal representatives and the adolescents whose legal representatives consented. Most adolescents reported having consumed pornography at least once in their lives, often on pornography sites and/or social networks. Adolescents who have never consumed pornography have higher indicators of positive sexuality. In adolescents who have already consumed pornography, fewer indicators of problematic pornography consumption are associated with higher indicators of positive sexuality. There were statistically significant differences between boys and girls, with girls showing higher indicators of positive sexuality and boys showing higher consumption of pornography. Adolescents who start consuming pornography later tend to have less problematic pornography consumption and higher indicators of positive sexuality. Pornography consumption can influence positive sexuality and vice versa, demonstrating the need to invest in these issues as a way of promoting healthy attitudes, beliefs and relationships.

Keywords: POSITIVE SEXUALITY; SEXUALITY IN ADOLESCENCE; PORNOGRAPHY CONSUMPTION IN ADOLESCENCE; PROBLEMATIC PORNOGRAPHY CONSUMPTION.

P.110 EMOTIONAL INTELLIGENCE AND ANXIETY IN ADULTHOOD: DIFFERENCES BETWEEN MEN AND WOMEN†

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High levels of emotional intelligence (EI) are linked to lower levels of anxiety, and this relationship tends to be more evident in women when compared to men. Individuals with lower levels of EI tend to deal negatively with anxiety and may have more difficulty understanding and managing emotions appropriately. This research aims to analyse the relationship between EI and anxiety in a sample of Portuguese adults and to verify whether there are differences between men and women in EI and anxiety. The sample consisted of 103 Portuguese adults (18 to 67 years of age): 66 women (64.1%) and 37 men (35.9%). Most participants (56.3%) were single, and the majority (54.4%) completed secondary school education. The Egas Moniz School of Health and Science Ethics Committee approved this study (N.1119). The participants answered an online Sociodemographic Questionnaire, the Wong and Law Emotional Intelligence Scale (WLEIS), and the Depression, Anxiety, and Stress Scale (DASS). Correlation analyses were performed to examine the association between EI and anxiety, and T-tests to assess the differences between men and women. The results revealed that self-emotion appraisal, use of emotion, and regulation of emotions are negatively correlated with anxiety. Higher levels of emotional regulation were observed in males, and higher levels of anxiety in females. EI can act as a protective factor against anxiety in adulthood, enabling individuals to develop better emotional, psychological, and social adjustment strategies. Promoting emotional regulation is especially important, as it is associated with a decrease in anxiety symptoms and a higher level of EI. This research contributes to the understanding of the relationship between EI and anxiety symptoms and the identification of differences between men and women in these variables, allowing intervention strategies to be identified that are better adapted to each individual's specific characteristics.

Keywords: EMOTIONAL INTELLIGENCE; ANXIETY; SEX DIFFERENCES; ADULTS

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P.111 ASSOCIATIONS BETWEEN CHILDHOOD MALTREATMENT, SEXUAL, PEER, AND SIBLING VICTIMISATION, AND NON-CONSENSUAL DISSEMINATION OF INTIMATE IMAGES IN ADOLESCENTS†

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Childhood victimisation has a significant impact on emotional, social, and psychological development, increasing vulnerability to future experiences of interpersonal violence. In recent years, the non-consensual dissemination of intimate images (NCDII) has emerged as a prevalent form of technology-facilitated abuse among young people. This study aimed to analyse the association between NCDII and prior victimisation experiences in childhood in Portuguese adolescents. A cross-sectional study was conducted with 246 Portuguese adolescents aged between 12 and 19 years (M = 15.43, SD = 1.89), predominantly attending regular secondary education. Participants answered a sociodemographic questionnaire, a checklist assessing experiences of NCDII, and some modules of the Juvenile Victimization Questionnaire (JVQ), which included measures of childhood maltreatment, peer and sibling victimisation, and sexual victimisation. The Ethics and Scientific Committees of the Egas Moniz School of Health & Science approved the study. Informed consent was obtained from both the participants' legal guardians and the participants themselves. The results showed that victimisation by NCDII was more prevalent among older participants, with those aged 18–19 reporting the highest prevalence rates. The findings reveal that young people who are victims of NCDII reported higher levels of prior victimisation experiences than non-victims of NCDII, including childhood maltreatment, peer and sibling victimisation, and sexual victimisation, compared to non-victims. These results reinforce the need for early, targeted intervention strategies in schools, focused on digital safety, emotional literacy, and support for trauma-exposed youth, to reduce the emotional consequences and prevent revictimization in digital contexts.

Keywords: ADOLESCENT VICTIMISATION; NON-CONSENSUAL IMAGE SHARING; CHILDHOOD MALTREATMENT

P.112 INVISIBLE SCARS: THE PSYCHOLOGICAL SYMPTOMS AND COGNITIVE IMPACT OF EMOTIONAL ABUSE†

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Emotional abuse in childhood is a form of psychological violence that can go unnoticed, due to not leaving visible marks. Emotional abuse tends to encompass tactics such as gaslighting, invalidation, continuous criticism, and emotional disregard, gradually eroding the victim's confidence and ability to believe their perceptions. Depression and anxiety are common effects of childhood emotional abuse. In some cases, those victims still carry the emotional trauma long after the emotional abuse experience, highlighting the need for lengthy and ongoing psychological counselling. Positive thinking, rather famous in positive psychology, is central to developing resilience and self-compassion, helping victims to overcome the adverse impact of emotional abuse in childhood. Therapeutic approaches like cognitive-behavioural therapy (CBT) have been found useful to help victims reframe inaccurate cognitions, develop positive thinking, and incorporate the affective significance of abuse. This study aims to analyse the relation between emotional abuse in childhood, psychological symptoms, and positive thinking in adulthood, and explore the differences between victims and non-victims of emotional abuse in psychological symptoms and positive thinking. The Egas Moniz School of Health & Science Ethics Committee approved this study. Data was collected via Qualtrics and disseminated online. Participants completed a sociodemographic questionnaire, the Portuguese version of the Adverse Childhood Experiences (ACE) questionnaire, which assesses ten types of childhood adversity, the Brief Symptoms Inventory (BSI-18) to measure psychological distress, and the Positive Thinking Skill Scale (PTSS) to assess positive thinking. The sample consists of 84 Portuguese-speaking adults, with ages ranging from 20 to 65 (M = 31.58, SD = 12.43). There are 24 males (29%) and 60 females (71%), 48 victims of childhood emotional abuse (57%) and 36 non-victims (43%). Results show that emotional abuse in childhood is positively correlated with somatization, depression, and anxiety in adulthood, and positive thoughts show a negative correlation with depression. Victims of emotional abuse show higher levels of somatization, depression, and anxiety, and lower levels of positive thoughts. These results are consistent with earlier research, which shows that emotional abuse has severe, long-term psychological distress. The observed lower levels of positive thinking in victims of emotional abuse also reveal the lack of a key protective factor that has been shown to support psychological resilience and emotional recovery. The results highlight the importance of developing prevention programs with children to avoid emotional abuse consequences in adulthood.

Keywords: CHILDHOOD EMOTIONAL ABUSE; POSITIVE THOUGHTS; ANXIETY; DEPRESSION; SOMATIZATION

P.113 PARENTAL SATISFACTION IN SHORT-STAY PAEDIATRIC EMERGENCY UNIT: A CROSS-SECTIONAL, DESCRIPTIVE AND OBSERVATIONAL STUDY†

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Evaluating parental satisfaction with nursing care in paediatric emergency departments (PED) is essential for improving service quality and enhancing patient and family care. During short-term hospitalizations, the quality of nursing care is often a determining factor in parental satisfaction, especially in high-stress environments such as the PED. This study aimed to assess parental satisfaction with nursing care during short-term paediatric hospitalization in the emergency department and to identify potential areas for improvement in nursing practice. A descriptive, cross-sectional study was conducted in the short-stay unit of a PED. The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee for Health of Hospital Garcia de Orta. Data were collected using the validated instrument *Citizen Satisfaction with Nursing Care Scale (CSNCS)*, which measures satisfaction across various dimensions of nursing care. A total of 205 parents of hospitalized children participated in the study. Sociodemographic data of the parents and clinical data of the children were also collected to explore possible associations with satisfaction levels. High levels of parental satisfaction with nursing care in the short-stay unit of the PED were consistently observed. Most parents were female, aged 30 years or older, and employed. The majority of hospitalized children were male, younger in age, including newborns, and were admitted under urgent circumstances. No meaningful associations were observed between satisfaction scores and parental sociodemographic characteristics, suggesting that satisfaction may be more strongly influenced by the quality and nature of the nursing care itself than by background variables. While parents of newborns reported the highest satisfaction scores, the differences across child age groups were not statistically significant. Similarly, employed parents demonstrated slightly higher satisfaction levels compared to their unemployed counterparts, though this difference also lacked statistical significance. Despite this, the observed trends—particularly the higher satisfaction among parents of newborns and those who are employed—may reflect unique expectations, emotional needs, or experiences within these subgroups. These findings point to potential areas for deeper investigation, particularly through qualitative approaches that can capture the nuances of parental satisfaction in the emergency context. The overall high satisfaction scores indicate that nursing care is being delivered effectively within this PED setting. However, to ensure sustained quality and responsiveness, ongoing evaluation that includes both subjective measures (such as satisfaction) and objective clinical outcomes is essential. Integrating structured feedback mechanisms into routine care processes may further enhance the ability of nursing teams to meet the specific needs of parents. Parental satisfaction with nursing care in the short-stay paediatric emergency setting was generally high, independent of sociodemographic differences. While no statistically significant associations were observed, the trends identified suggest that future research—particularly using qualitative methods—may help uncover deeper insights into parental perceptions and improve paediatric nursing care delivery. Fostering a culture of continuous quality assessment and parent engagement is vital for sustaining excellence in emergency paediatric services.

Keywords: PATIENT SATISFACTION; HOSPITALS; PEDIATRIC; NURSING CARE; CHILD; HOSPITALIZED; PARENT

P.114 THE PROMOTE PROJECT IN PORTUGAL: RETHINKING REINTEGRATION THROUGH THE NATIONAL ADAPTATION WORKSHOP†

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The PROMOTE Project (Promoting Integrated Professional Development for Prison Practitioners), co-funded by the European Union (PROMOTE – 101144006 — ERASMUS-EDU-2023-PEX-COVE), aims to validate professional profiles and identify training needs, challenges, and recommendations for professionals involved in the reintegration of convicted individuals. Addressing fragmented professional development and limited intersectoral cooperation across correctional services, the project seeks to create a harmonised and practical framework applicable across European contexts. In Portugal, a National Adaptation Workshop was conducted to validate and contextualise findings previously collected through a multi-method data collection strategy. The workshop was informed by data gathered from DACUM (Developing A Curriculum) workshops, surveys, interviews, policy reviews, and the mapping of good practices. DACUM is a participatory method for occupational analysis, engaging experienced professionals to identify duties, tasks, skills, knowledge, tools, and behaviours essential to their roles, i.e. is a qualitative methodology. The Portuguese workshop aimed to bring together 20 multidisciplinary participants from sectors including prisons, probation, health, education, social services, and civil society. Eleven professionals attended. All participants provided informed consent, and the study adhered to the Declaration of Helsinki, the General Data Protection Regulation, and the Code of Ethics of the Portuguese Psychologists' Association. Participants were presented with preliminary findings and asked to reflect critically on their accuracy and relevance to their institutional contexts. The discussions were documented using standardised templates and analysed nationally and comparatively. Despite the lower-than-expected turnout, the workshop facilitated meaningful dialogue among prison officers, psychologists, re-education technicians, and reintegration professionals. The results were analysed by content analysis. Contributions focused on three key areas: 1. Validation of professional profiles: Participants largely endorsed the proposed profiles but identified specific aspects requiring revision. These included clarifying the scope of responsibilities for prison officers, redefining psychologists' roles in mental health policy implementation, and adjusting reintegration staff duties related to court-mandated measures. 2. Challenges and recommendations: Most of the challenges identified through earlier research were confirmed, although some were considered irrelevant by certain groups. Psychologists emphasised the need for structured mentoring, continuous training, mobility opportunities, and interdisciplinary learning. Re-education technicians called for an increase in the minimum mandatory training hours. 3. Inspiring practices: Participants evaluated the applicability of international practices to the Portuguese context. While some, such as training based on the Nelson Mandela Rules, were recognised as relevant, they were also seen as requiring adaptation. Others were considered unsuitable by specific professional groups. The Portuguese National Adaptation Workshop successfully validated key aspects of professional roles in the correctional sector and identified practical areas for improvement. It reinforced the need for clearer role definitions, enhanced training opportunities, and context-sensitive adoption of international best practices. Although limited in participant numbers, the workshop fostered strong engagement and cross-sector collaboration. The insights gathered will inform the development of the PROMOTE framework, ensuring its relevance, applicability, and potential for impact across correctional services in Europe. Future workshops would benefit from wider participation and a more structured approach to evaluating and integrating international practices.

Keywords: PROMOTE; REINTEGRATION; PRISON

P.115 LEGITIMISING BELIEFS ABOUT INTIMATE PARTNER VIOLENCE: INSIGHTS FROM PORTUGUESE FORENSIC CASES†

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Intimate partner violence (IPV) remains a critical public health issue, partly sustained by legitimising beliefs that normalise or excuse abusive behaviour. These beliefs are shaped by various sociodemographic and psychosocial factors, including gender, age, educational level, and exposure to family violence. Previous research consistently shows that men tend to hold more tolerant attitudes towards IPV (Almeida et al., 2023; Han et al., 2017; Mota, 2021), potentially influenced by persistent patriarchal norms (Boaventura, 2021). Younger individuals also appear more accepting of IPV, possibly due to intergenerational transmission of beliefs within the family. Conversely, higher educational attainment is generally associated with less support for such beliefs. Additionally, witnessing parental violence and a history of aggressive behaviour have both been linked to the endorsement of legitimising beliefs and to IPV perpetration. These findings reflect the complex interplay between personal history and cultural norms in shaping attitudes towards IPV (Weningmann et al., 2024). This study aims to determine whether Portuguese IPV offenders endorse legitimising beliefs about violence and to identify the most prevalent beliefs within this population. This research was based on psychological reports from the Forensic Psychology Office (GPF), part of the Laboratory of Forensic and Psychological Sciences at Egas Moniz. The strictness of ethical and deontological principles is safeguarded once criminal records have been restricted access by law (including judicial secrecy). Therefore, all assessed subjects gave their informed consent, and their data were processed anonymously. This study was conducted by the Declaration of Helsinki, and all ethical standards of scientific research were respected, as well as the Code of Ethics of the Order of Portuguese Psychologists and the General Data Protection Regulation. Specifically, we analysed cases in which the Belief Scale of Conjugal Violence (*Escala de Crenças sobre a Violência Conjugal* – E.C.V.C.; Machado et al., 2000) had been applied. The sample comprised 45 individuals (24 women and 21 men), aged between 18 and 75 years (M = 41.40; SD = 13.84). Men generally scored higher on legitimising beliefs across most ECVC factors. These beliefs were also more prevalent among individuals with lower levels of education. Notably, IPV perpetrators showed higher scores on beliefs that legitimise "minor" forms of violence. The findings suggest that men are more likely than women to endorse legitimising beliefs about IPV, although statistically significant gender differences emerged in only one of the four ECVC factors. This suggests that such beliefs may also be present among victims. Furthermore, lower educational attainment was associated with greater endorsement of these beliefs. These results emphasise the complexity of IPV-related attitudes and reinforce the need for educational and preventive strategies tailored to different genders and educational backgrounds.

Keywords: INTIMATE PARTNER VIOLENCE; BELIEFS; FORENSIC CASES

P.116 BEHIND THE BEHAVIOUR: SUPPORTING YOUNG OFFENDERS THROUGH FORENSIC PSYCHOLOGY†

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Forensic psychology plays a crucial role in supporting juvenile offenders throughout legal proceedings by providing a developmental, contextualised and evidence-based understanding of their behaviours. In the Portuguese justice system, the involvement of forensic psychologists in juvenile cases—particularly those involving young offenders under the Law on the Protection of Children and Young People in Danger and the Educational Guardianship Law—is essential to ensure that responses to offending behaviour are fair, proportionate, and informed by the psychological characteristics and life contexts of the minors involved. The psychologist's presence during procedural steps—such as interviews by police or judicial authorities, court hearings, or pre-sentencing evaluations—ensures that the juvenile understands the nature of the proceedings and is supported in expressing their version of events in a psychologically safe and age-appropriate manner. This is particularly important in preventing secondary victimisation and in safeguarding the minor's procedural rights, as enshrined in national and international legal standards (UNCRC, 1989; Council of Europe Guidelines on Child-Friendly Justice, 2010). In the Portuguese context, forensic psychologists also collaborate with multidisciplinary teams within child protection commissions (CPCJ), juvenile courts, and detention centres, contributing to the formulation and monitoring of individualised educational plans. These plans aim not only at legal compliance but at the juvenile's reintegration, social rehabilitation and development of prosocial life projects. This study is part of a protocol established among the Portuguese Public Prosecutor's Office and Egas Moniz School of Health & Science to assess and analyse the characteristics of offenders in the field of violence. The strictness of ethical and deontological principles is safeguarded once criminal records have been restricted access by law (including judicial secrecy). Therefore, all assessed subjects gave their informed consent, and their data were processed anonymously. This study was conducted by the Declaration of Helsinki, and all ethical standards of scientific research were respected, as well as the Code of Ethics of the Order of Portuguese Psychologists and the General Data Protection Regulation. The goal of this study is to show the role of forensic psychology in supporting juvenile offenders during legal proceedings. In the Victims Information and Assistance Office (GIAV), inserted in Public Prosecutor's Office, the forensic psychologists supporting 85 juvenile offenders (51 boys and 32 girls) between 2020 and 2025. The results show us that the most committed crime is theft follow by drug trafficking. The results show too that girls are more associated with theft and boys with drug trafficking. In conclusion, forensic psychology provides a critical added value to the juvenile justice system by integrating psychological science into judicial decision-making, ensuring that interventions are grounded in a nuanced understanding of young offenders' psychosocial realities. By focusing on rehabilitation, capacity building, and the prevention of reoffending, forensic psychologists help promote a justice system that is both effective and ethically sound.

Keywords: YOUNG OFFENDERS; FORENSIC PSYCHOLOGY; CRIMINAL JUSTICE SYSTEM

P.117 COMPASSION FATIGUE IN FIREFIGHTERS: PRELIMINARY RESULTS OF THE COMPASSION FATIGUE SCALE†

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Burnout and, specifically, compassion fatigue, a distinct form of burnout that can occur in persons regularly exposed to trauma and suffering (as is the case with hospital emergency and pre-emergency professionals), is an emergent health topic, due to its medium- and long-term impact on health. However, to the best of our knowledge, there is only one measure of compassion fatigue, directed to the general population. Thus, the present study was carried out with the main purpose of creating and studying the psychometric properties of a Compassion Fatigue Self-report in Portuguese firefighters. A convenience sample of 286 participants from all over the country was collected, aged between 18 and 63 years (M = 38.48 SD = 10.19), 69% males, and 78% of reported previous exposure to a limit situation. All participants were assessed after their informed consent through an online protocol, composed of a section of sociodemographic data, the Compassion Fatigue Scale (CFS), developed in the present study, and the Portuguese version of the Professional Quality of Life scale (ProQOL; Carvalho, 2011). An initial pool of 35 items was developed and submitted to a panel of experts and non-experts to assess their facial and content validity. Before data collection, a pilot test was carried out. After data collection, exploratory factor analyses, reliability and validity analyses were performed. The internal structure of the Compassion Fatigue Scale, evidenced a two-dimensional structure, composed of 27 items, which explained 47.7% of the total variance: Compassion Fatigue (17 items) and Compassion Satisfaction (10 items). The internal consistency of the two dimensions was excellent, with Cronbach's alpha equal to .91 (Compassion Fatigue) and .93 (Compassion Satisfaction). The two obtained dimensions also revealed adequate homogeneity and a low, although significant, intercorrelation. Convergent validity was studied through Pearson correlations between CFS and ProQOL dimensions, which revealed significant correlations, in the expected direction, between Compassion Fatigue and the dimensions of Burnout (r = .36) and Secondary Traumatic Stress (r = .63) of ProQOL and between Compassion Satisfaction and the dimensions of Compassion Satisfaction (r = .61) and Burnout (r = -.49) of ProQOL, all significant for $p < .001$. Female firefighters showed higher levels of Compassion Fatigue (M = 46.90 SD = 10.33) than male participants (M = 42.26 SD = 10.38). No significant gender differences were obtained for Compassion Satisfaction, t (284) = 1.44, p = .15, and differences between participants exposed and not exposed to a limit situation for Compassion Fatigue and Compassion Satisfaction were also not significant, t (284) = -.29, pp =.77 and t (284) = -1.17, p = .24, respectively, which suggests that the criterion validity of the CFS must be further studied. The obtained results evidenced that CFS can be a reliable and valid self-report measure of compassion fatigue in firefighters. Although the study presented some limitations, related to the sample (not representative) and the study nature (cross-sectional), the results highlight the relevance of the inclusion of sociodemographic variables in the interventions designed to prevent compassion fatigue in vulnerable populations.

Keywords: COMPASSION FATIGUE; COMPASSION SATISFACTION; FIREFIGHTERS; BURNOUT; SECONDARY TRAUMATIC STRESS.

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