



# *In vitro* erosive dental wear measured with a 3D intraoral scanner – a pilot study

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**ABSTRACT**

**Introduction:** In the oral cavity, there are usually several pathogenic microorganisms capable of forming oral/dental infections and subsequent systemic infections [1]. The main reason for the patients to seek medical-dental care is usually condition where pain is always present [2]. Medication like pain killers and antibiotics are frequently used [1]. Prescription is a personalised act, where it is necessary to define a diagnosis, specify the therapeutic objective, consider the different options and finally choose an effective and safe treatment. Currently, the most common prescribed medication in dentistry are antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs) [3,4]. This study aimed to answer the following questions: How often are medication prescribed in the emergency appointment at Egas Moniz Dental University Clinic and what kind of medication are prescribed? This study follows the principles of the Declaration of Helsinki.

**Materials and Methods:** Pilot Study Observational and Retrospective. Of the 388 emergency appointments, carried out between 1 March 2019 and 31 March 2019 at Egas Moniz Dental University Clinic 249 cases were randomly selected and analysed. Inclusion criteria were all patients who were prescribed medication. Frequency tables were performed according to gender, age and the type of drug prescribed (antibiotic, analgesic and/or NSAIDs).

**Results:** In 249 emergency appointments, only 50 were prescribed medication. The most common prescribed were antibiotics ( $n=33$ ), followed by NSAIDs ( $n=30$ ), analgesics ( $n=10$ ) and others ( $n=2$ ). The most common antibiotic prescribed was amoxicillin + clavulanic acid – 875 mg + 125 mg ( $n=17$ ), followed by amoxicillin – 1 g ( $n=11$ ).

**Discussion and conclusions:** Medication by itself is not as successful as the dentist local intervention treatment procedure [3]. Studies show that the most prescribed medication in dentistry are antibiotics and NSAIDs [3,4]. Our results confirm that idea. According to our data, the prevalence of prescription in emergency appointments is approximately 20%. Furthermore, it is important to have a rational prescription in order to reduce the disease duration, systemic repercussions and also the appearance of resistance and high costs [5,6]. Future research should include a bigger sample and a longer period.

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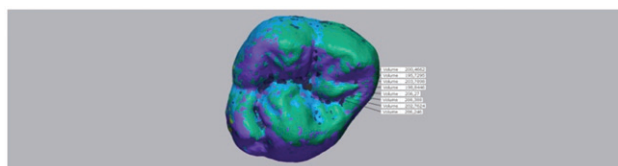
## ***In vitro* erosive dental wear measured with a 3D intraoral scanner – a pilot study**

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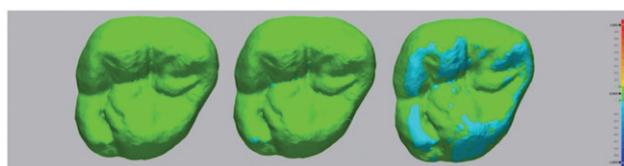
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**ABSTRACT**

**Introduction:** Erosive tooth wear is a common condition in modern societies. Without preventive measures, it can lead to dentine hypersensitivity, loss of vertical dimension of occlusion and aesthetic problems [1]. Suitable diagnostic tools need to be developed for use in prevalence studies in order to compare the results of different investigations as well as for monitoring the progression of tooth wear, as highlighted in the European Consensus statement on management guidelines for severe tooth wear [2]. The use of 3D intraoral scans has increased, however surface alignment for comparison of sequential scans is a complex process. The goal of this *in vitro* pilot study was to develop a protocol for a future study on the accuracy of an intraoral scanner and software for the measurement of erosive wear. Focus was made on the development of a reliable method for superimposition and subtraction of intraoral scans, facilitating the measurement of wear progression using volume change.



**Figure 1.** Volume determination.




**Figure 2.** 3D comparison at the baseline, 4 h and 7 h.

**Materials and methods:** Ethical approval was obtained. An extracted sound third molar was cut in the mesiodistal direction, approximately 4 mm above the cemento-enamel junction. The apical part was discarded. The coronal part was bonded to a ceramic block with pre-heated composite resin and scanned at baseline with an intraoral scanner (IOS) (3M True Definition Scanner, 3M, USA). Erosion was simulated by immersion of the sample in the soft drink Sprite® (not degassed, pH of 2,81), under controlled agitation, 7 times 1 h. A baseline scan was made before erosion and the scans were repeated after each erosive challenge of 1 h. All measurements were made with Geomagic Control (3D Systems, Darmstadt, Germany). The scans were imported one by one and aligned with a baseline scan. Then with all the scans aligned with the baseline, they were altogether cut at the same plane resulting in 3D images for which was possible to determine the volume (Figure 1). Wear was calculated using volume change.

**Results:** Calculated volume change after 1, 2, 3, 4, 5, 6, and 7 h erosion was  $-5.63$ ,  $3.48$ ,  $0.02$ ,  $-2.48$ ,  $-3.32$ ,  $-1.62$  and  $-3.12$  mm<sup>3</sup>, respectively. Macroscopic enamel demineralisation was observed with the naked eye after 2 h erosion. Areas of enamel loss were clearly observed in the scans and seemed to increase in area and depth with increasing erosion time (Figure 2).

**Discussion and conclusions:** Under the limitations of this pilot study, it can be concluded that the present protocol allows enamel loss detection with the IOS, and that the customised alignment of the scans is necessary for reliable volume measurements.

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## Inflammatory dentigerous cyst – a clinical case

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### ABSTRACT

**Introduction:** One of most frequent benevolent odontogenic cysts in the jaws is the dentigerous cyst. It usually occurs in the second and third decades of life and it's barely seen in the childhood era [1]. They are unilocular and always