

Transversus abdominis performance with rehabilitative ultrasound imaging feedback*I.B. Almeida¹, R. Matias¹*¹Health College of Polytechnic Institute of Setúbal, Physiotherapy Department, Setúbal, Portugal

Objectives: To assess the effectiveness of ultrasound as a means of real time biofeedback, as well as measure the contribution of different types of biofeedback on transversus abdominis (TrA) and internal oblique (IO) performance, in healthy subjects, through changes in thickness and lateral slide of TrA anterior fascia during abdominal hollowing exercise (AHE).

Methods: Seventy-five healthy subjects were divided randomly into 3 groups that received: group 1 control group (CG), no feedback; group 2 verbal and palpatory feedback (VPF), and group 3, real-time ultrasound feedback (RUF). The TrA and IO performance of each subject was assessed twice (before and after receiving feedback) when performing the AHE in a supine hook-lying position. Analysis of variance and *T* test were used for the independent and paired samples, respectively, to determine significant changes in the performance of TrA and IO, based on intra and inter group analysis.

Results: Group 1 (CG) had no differences between moments; group 2 (VPF) had significant differences concerning TrA thickness ($p = 0.000$) with up to 0.84 mm thickness difference; group 3 (RUF) had significant differences concerning TrA thickness ($p = 0.000$) with up to 1.94 mm difference. The ability to perform the AHE differed only among group 3 and in group 1 ($p = 0.056$) only for changes in thickness of TrA muscle. No differences were found among groups. Neither for the lateral slide of TrA anterior fascia, nor for the internal oblique thickness.

Conclusions: From the results of this study we conclude that real-time ultrasound feedback, when used alone during an AHE, can give rise to larger increase in TrA thickness when compared to verbal and palpatory feedback. The use of real time ultrasound was shown to be

effective as a feedback tool to facilitate the performance of the AHE in a supine hook-lying position in healthy subjects. Discussion of the clinical implications and utility of different types of biofeedback strategies will be presented.