

INFLUENCE OF A DISTRACTION TASK ON THE INVOLUNTARY REFLEX CONTRACTION OF THE PELVIC FLOOR MUSCLES FOLLOWING COUGH.

Hypothesis / aims of study:

To explore the involvement of cognition in involuntary reflex pelvic floor muscles contraction following abdominal straining situations.

Study design, materials and methods:

Informed consent was obtained from 33 healthy volunteers. Involuntary contraction of the external anal sphincter (EAS) was induced by means of coughing. Cough efforts were elicited by electronic order. The electromyographic (EMG) activity of the external anal sphincter (EAS) was recorded during involuntary contraction elicited by coughing. The trials were carried out twice: combined (or not) with a mental distraction task, Paced auditory serial additional test (PASAT). Reaction time (RT) defined as latency between the stimulus and maximum EAS EMG activity (RT1), latency between the stimulus and EIC EMG activity (RT2), latency between EIC EMG activity and EAS EMG activity (RT3), duration of the contraction, and the area under the EAS EMG activity curve (perineal contraction) were measured (figure 1).

Results:

Distraction task altered the anticipation of the PFM contraction: RT3 were respectively -80.00 ms (IQR -107;-56) without the PASAT versus -56.67 ms (IQR : -94;-2) with distraction task (ratio 0.71, $p=0.0045$, wilcoxon's test). In the same way RT2 was altered during distraction task: 583.33 ms (IQR: 344-775) without PASAT vs. 652.71 ms (503-790) during PASAT (ratio 1.12, $p=0.031$, wilcoxon's test). Finally, when the two conditions (respectively with and without the mental distraction task) were compared, significant difference was also founded between the area under the EAS EMG activity curve (0,0115 mv sec vs. 0,0103 mv sec, ratio 0.90, $p= 0.023$).

Interpretation of results

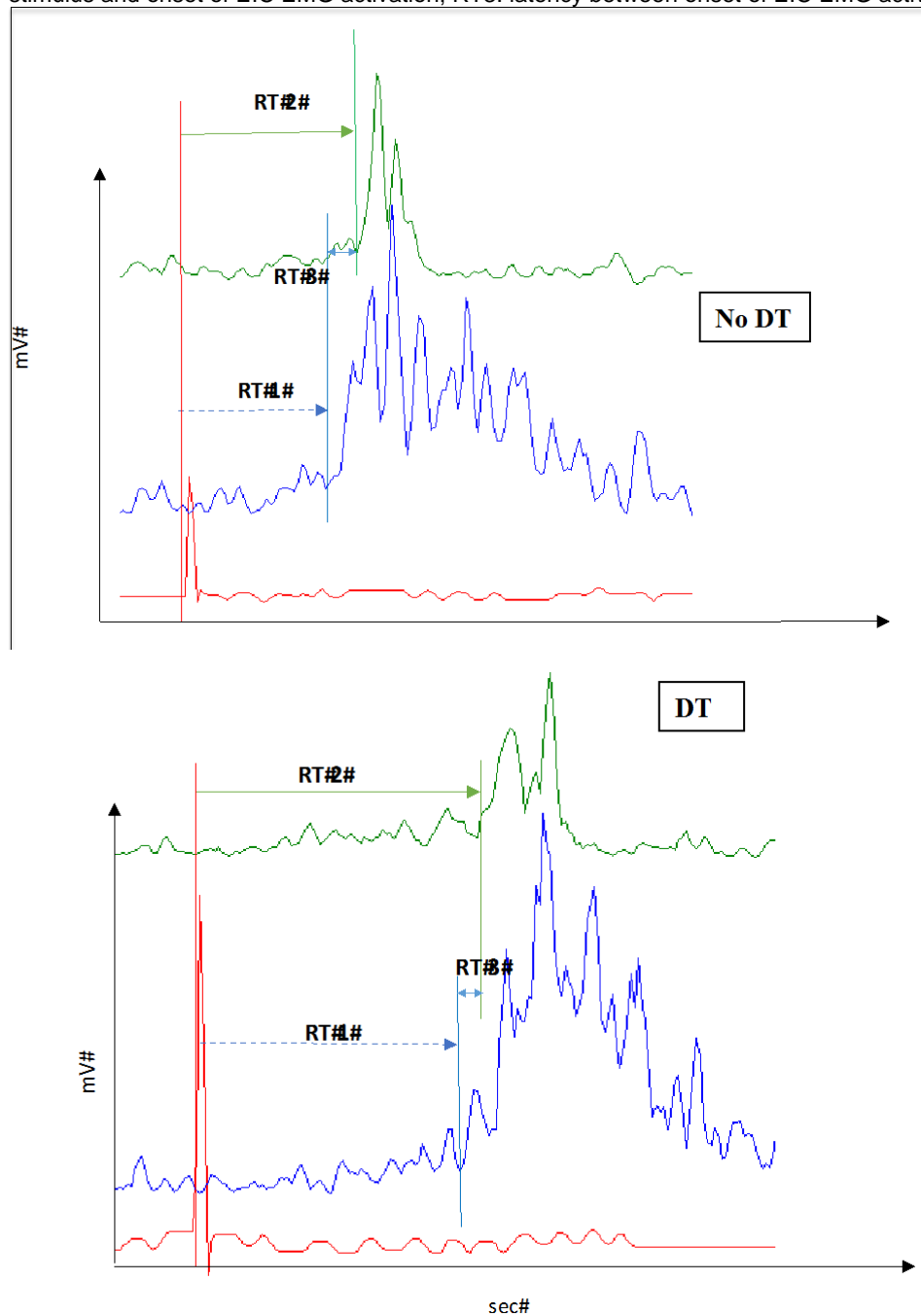
To the best of our knowledge, this is the first study, which investigated the influence of dual-task on involuntary contraction of the PFM. Similarly to previous findings on the voluntary PFM contraction [1], we highlighted that distraction task altered the anticipation of the PFM contraction. Previous studies seemed to show that cough anal reflex is a modulated reflex influenced at least by modulation of abdominal pressure and continence status. Our study highlighted that the contraction of PFM during cough effort and more generally abdominal straining effort [2], was also modulated by cognitive factor. Given our results we can hypothesized that "pre program" contractions of PFM seems to involve a complex coordinated neural activity implying brain participation in addition to vegetative pathways. According to our findings, we could hypothesize that if women were more able to make dual task activity, meaning distraction task and/or other motor activity associated to PFM contraction, the pre activation could probably be more anticipated. To analyse these hypothesis, further studies involving patients suffering from SUI should be carried out. It would be of interest to establish rehabilitation program focusing on dual task activity in order to improve the timing of pre activation and thus urinary continence.

Concluding message

Distraction task led to a modification of involuntary reflex PFM contraction. It is possible that such task potentiate urinary incontinence, through an alteration of the temporal course between intra abdominal pressure and PFM contraction. Further studies involving women with SUI and PFM program focusing on dual task and more especially cognitive task should be carried out.

Figure 1 : Denoise and recalibrated curve of one involuntary contraction of the external anal sphincter recorded by means of Student Lab Pro® Software. Top: experiment without distraction task. Bottom: experiment with distraction task.

Abbreviation:DT: distraction task; RT1: latency between stimulus and onset of EAS EMG activation; RT2: latency between stimulus and onset of EIC EMG activation; RT3: latency between onset of EIC EMG activation and onset of EAS EMG activation



References

1. Thubert T, Deffieux X, Jousse M, Guinet-Lacoste A, Ismael SS, Amarenco G. Influence of a distraction task on pelvic floor muscle contraction. *Neurourol Urodyn.* 2015 34(2):139-432
2. Deffieux X, Hubeaux K, Porcher R, Ismael SS, Raibaut P, Amarenco G. External intercostal muscles and external anal sphincter electromyographic activity during coughing. *Int Urogynecol J Pelvic Floor Dysfunct.* 2008 Apr;19(4):521-4.

Disclosures

Funding: none **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Comité Consultative de Protection des Personnes dans la Recherche Biomédicale, "Ile-de-France VII", France approval number : ID-RCB :2011-A01690-41 **Helsinki:** Yes **Informed Consent:** Yes