The Multiple Array Probe Leiden (MAPLe): a new tool capable of measuring EMG of and differentiate between individual pelvic floor muscles.

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Introduction
A new multiple array electrode probe, the Multiple Array Probe Leiden (MAPLe), has been developed for biofeedback registration of the individual pelvic floor muscles (PFM). The MAPLe is designed to optimally register EMG signals from the various sides and layers of PFM. The aim of this study was to determine whether there are different EMG values for the different PFM layers in healthy volunteers.

Materials and methods
Healthy volunteers not seeking treatment and not using medication for symptoms of Pelvic Organ Prolapse (POP), lower urinary tract, bowel, pain and/or sexual function related to FPD were qualified to participate. The mean EMG values and their standard errors for the right side of the M. Pubococcygeus, M.Puborectalis and the external anal sphincter for tone at rest, for the MVC and endurance were acquired.

Results

Anal measurements
In men there were significant differences between the EMG values of the puborectal muscle and the external anal sphincter for tone at rest and between the pubococcygeal muscle and the external anal sphincter for MVC (p ≤ 0.02). Tone at rest showed differences in women nulliparous premenopausal between the pubococcygeal and puborectal muscle (p=0.004) and between the puborectal muscle and the external anal sphincter (p ≤ 0.02). In women parous premenopausal there were no significant differences between the muscles. The EMG values in women parous postmenopausal showed interesting differences between the pubococcygeal and puborectal muscle for tone at rest, between the puborectal muscle and external anal sphincter for MVC and between the pubococcygeal muscle and puborectal muscle and for endurance (p ≤ 0.05).

Vaginal measurements
Significant differences were seen between the left and right side of the pelvic floor for women of all groups (p ≤ 0.05). The average EMG values on the right side were higher in all cases. In women nulliparous premenopausal significant differences were seen between the pubococcygeal and puborectal muscle and between the puborectal muscle and the bulbospongiosus and ischiocavernosus muscle for tone at rest, MVC and endurance (p ≤ 0.001).

Within the group of women parous premenopausal significant differences were seen between the average EMG values of the pubococcygeal muscle and puborectal muscle in MVC and between the pubococcygeal and the bulbospongious and ischiocavernosus muscles for endurance (p ≤ 0.05). MVC showed in women parous postmenopausal significant differences between the puborectal muscle and the bulbospongious and ischiocavernosus muscle (p ≤ 0.05).

Conclusions
The MAPLe appeared to be highly effective in measuring EMG values of individual muscular components (external anal sphincter, puborectal and the pubococcygeal and bulbospongiosus and ischiocavernosus muscles) at different sides of the pelvic floor in men and women. The MAPLe can be used for the diagnosis and treatment of patients with pelvic floor dysfunctions.

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