

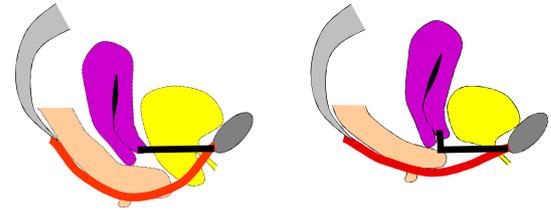
Does a pelvic floor muscle contraction elevate the uterus?



Background

Pelvic floor muscle training has been shown to alleviate pelvic organ prolapse symptoms, probably due to reduction of hiatal size and less pelvic organ descent. An adequate pelvic floor muscle contraction (PFMC) is visible on perineal ultrasound (PUS) and elevates the bladder neck. It is unclear, whether a PFMC affects the position of the uterus.

The aim of this study was to assess whether a PFMC elevates the uterus in standing women employing perineal ultrasound.

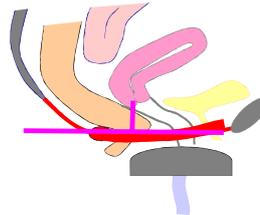


Methods

- Analysis of stored records of 109 women with stress or mixed incontinence and 18 healthy continent women in whom cervix/uterus were identifiable on PUS during maximal and submaximal PFMC.
- Women with previous pelvic floor surgery and those with prolapse beyond the hymen were excluded.
- Instruction: perform a maximal PFMC for 10 s, after a short break perform a submaximal PFMC of about half the strength of the maximum PFMC
- Videos were stored on a PC using Noraxon TeleMyo software allowing an offline analysis and also on-screen vector measurements.
- As uterine elevation has not been described on PUS, we based our power calculation on data on bladder neck elevation (1). Twelve women are necessary to demonstrate a cranial lift of 5.7+ 4.7 mm with a power of 80% and $\alpha=0.05$. The minimal detectable change was established to be 3 mm (2).



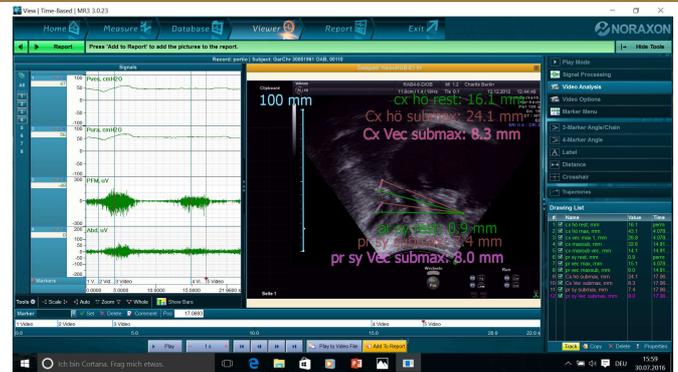
- Women were standing with the legs slightly apart to be able to place ultrasound probe
- Comfortably full bladder of maximal 300 ml



- Perineal ultrasound (GE Voluson 8): Measurement of height of the cervix and puborectalis muscle in relation to a horizontal line at the level of the dorsal edge of the pubic symphysis

Results

- Complete analysis in 9 healthy controls aged 42±12 years and 35 incontinent women aged 45±11 years ($p>.05$).
- BMI was similar in both groups (23.6±2.1 vs 24.2±4.2)
- There were no significant differences in PFM and uterine elevation between incontinent women and controls
- The puborectalis muscle was elevated on average by 9.5±5.6 mm (cranio-ventral vector movement) whereas uterine elevation was measured at 11.3±4.1 mm during maximal PFMC and 7.2±2.7 mm during submaximal PFMC.



Example of PUS measurements during submax. PFMC. Complete EMG max-submax PFMC on the left

	Incontinent women N=35	Controls N=9
Cervix max. PFMC		
Height difference	9.0 ± 4.3	8.2 ± 3.4
Vector	12.0 ± 4.4	11.1 ± 2.9
Cervix submax. PFMC		
Height difference	6.4 ± 5.8	4.5 ± 2.7
Vector	7.2 ± 2.7	5.9 ± 2.6
Puborectalis max. PFMC		
Vector	9.3 ± 5.8	10.3 ± 4.8
Puborectalis submax. PFMC		
Vector	6.9 ± 3.6	7.4 ± 3.4

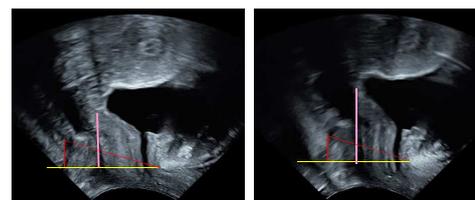


Illustration of typical cervical elevation (pink line) during maximal PFMC in comparison to rest (left image)

Conclusions

This study is powered to conclude that there is a clinically and statistically significant elevation of the uterus during maximal and submaximal pelvic floor muscle contractions in continent and incontinent women.

This passive elevation presumably reduces load on the uterosacral ligaments and helps explain how pelvic floor muscle training may improve prolapse symptoms.

A PFMC before coughing and lifting e.g. might increase resistance to raised intraabdominal pressures and might help prevent descent of pelvic organs.

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- References:**
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 - 2 Comparison of transperineal and transabdominal ultrasound in the assessment of voluntary pelvic floor muscle contractions and functional manoeuvres in continent and incontinent women. Thompson JA1, O'Sullivan PB, Briffa NK, Neumann P. Int Urogynecol J (2007) 18:779–786.