

# Relationship between pelvic floor muscle function and morphometry and symptoms of stress urinary incontinence after pelvic floor muscle training

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## Hypothesis / aims of study

- To identify the relationship between the symptoms of stress urinary incontinence, the pelvic floor muscle function and morphometry after Pelvic floor muscle training with stabilization exercises (PFMT)

## Methods

- Patients with urinary incontinence from regional gynecological clinics were recommended for PFMT

## Intervention

- PFMT with stabilisation for 12 weeks- training of PF muscles in various positions, diaphragmatic breathing, strength and endurance of PFM during bridge, diagonal stabilization, push ups, squats, side bridge

## Outcome measures

- SUI symptoms were assessed by the International Consultation on Incontinence Questionnaire (ICIQ-UI SF)
- Pelvic floor muscle function was evaluated using a perineometer
- Pelvic floor muscle morphometry (PFMM) was evaluated by the size of the urogenital hiatus (HA in cm<sup>2</sup>) at rest (R), at contraction (C) and during the Valsalva manoeuvre (V) by 3D/4D USG

## Inclusion criteria

- Willing to provide written informed consent, over 18 years who experience uncomplicated SUI, score on the ICIQ UI SF of  $\geq 6$  points, symptoms of urinary incontinence for at least three consecutive months, degree of pelvic organ prolapse  $\leq 2$ , willingness to accept the randomization process and fully participate in tests

## Exclusion criteria

- History of anti-incontinence surgery in the past 12 months, history of pelvic prolapse repair or urethral surgery in the past 12 months, history of pelvic floor muscle training in the past 12 months, history of interstitial cystitis or bladder-related pain, chronic severe constipation, clinically significant renal or hepatic impairment clinically significant heart impairment, pregnant, lactating or actively trying to become pregnant, positive urinary tract infection, use of rehabilitation aids (pessary, urethral plugs, vaginal beads, etc.), insufficient understanding of pelvic floor exercises and/or omitting exercises, incomplete questionnaire, refusal to participate in the study.

## Result

- The sample consisted of 68 / 86 included women (79 %), three women did not complete the study due to low adherence
- Mean age of the women:  $40.4 \pm 9.1$  years, duration of SUI:  $23.5 \pm 22.8$  months
- Average number of childbirths:  $1.7 \pm 0.7$ , mean child weight:  $3620.6 \pm 550.3$  g
- Number of incontinence episodes/week:  $8.7 \pm 6.1$ , average number of pads per day:  $1.2 \pm 1.3$ , average ICIQ-UI SF score:  $9.8 \pm 3.1$  points
- Muscle tone: normal, pelvic organ prolapse was not present,
- Correlations: mild correlation between the ICIQ-UI SF score and pelvic floor muscle function by (Perineometer) the MvC ( $r=-0.236$ ) or duration of contraction ( $r=-0.326$ ), ( $p < 0.01$ )
- The correlation between the ICIQ-UI SF score and the PERFECT scheme , ( $p < 0.01$ ):
- A mild to moderate negative correlation: the performance ( $r = -0.237$ ), endurance ( $r = -0.370$ ), number of MvC repetitions ( $r = -0.406$ ) and the number of fast MvCs ( $r = -0.338$ )
- Correlation for the ICIQ-UI SF score and pelvic floor muscle morphometry according to 3D/4D ultrasound:
  - The statistically significant ( $p < 0.01$ ) moderate correlation was for the urogenital hiatal area during rest ( $r = 0.453$ ), contraction ( $r = 0.533$ ) and the Valsalva manoeuvre ( $r = 0.442$ )

## Interpretation of results

- Correlations revealed that the reduction in SUI symptoms after PFMT is due to improved PERFECT scheme parameters: power, endurance, number of repetitions of MvC, and number of fast MvCs
- The stronger the MvC and the longer its duration was, the more visible the reduction of hiatal area during rest, contraction and the Valsalva manoeuvre
- The data support the significant efficacy of PFMT with stabilization exercises due to confirmation of significant correlations between the reduction of SUI symptoms by ICIQ-UI SF and improvement of pelvic floor muscle function through a perineometer and PERFECT scheme and pelvic floor muscle morphometry through 3D/4D transperineal ultrasound



Figure 1 a) hiatal area at rest

b) hiatal area at maximal voluntary contraction

c) hiatal area at Valsalva Maneuver

## Conclusion

Pelvic floor muscle training with stabilization exercises for 12 weeks confirmed significant correlation between reduction of SUI symptoms and improvement of pelvic floor muscle function and pelvic floor muscle morphometry.