

DETERMINING THE EFFECTS OF PELVIC FLOOR EXERCISES IN URINARY INCONTINENCE TREATMENT ON PELVIC FLOOR MUSCLE STRENGTH BY NON-INVASIVE METHOD, RANDOMIZED TRIAL

Hypothesis / aims of study

To understand whether the effects of pelvic floor exercises in urinary incontinence treatment on pelvic floor muscle strength by non-invasive method could be determined or not.

Study design, materials and methods

This study is a prospective and randomized controlled study. Patients who diagnosed with stress and mixed urinary incontinence by urodynamic analysis were included in the urogynecology unit. The study began with 282 cases. Ninety one patients who did not meet inclusion criteria and 51 patients who refused to participate were excluded. 140 subjects randomly divided (random number table) into two groups. First group received pelvic floor exercises for 12 weeks (n=70), second group formed as a control group as they did not receive any intervention (n=70). According to based on the findings of PERFECT system, an individual exercise prescription was created for the first group and was changed due to improvement in two weeks. Both groups were assessed by body mass index, waist to hip ratio, waist to thigh ratio, transabdominal transvers-longitudinal ultrasound measurements, strength evaluation with PERFECT, stop test and pad test initially and at the end of 12 weeks. Assessment procedure and treatment program was administered by different physiotherapists who did not know which group they evaluated and treated (single blind). Continuous data were checked for normality of distribution with Kolmogorov–Smirnov analysis. t test for dependent group was used for statistical analysis of before and after exercises, differences between groups was analyzed by t test for independent groups.

Results

The study was completed with the exercise group of 65 people and a control group of 51 people. Exercise group subjects (n=65) has mean age of 52±9.69 where control group (n=51) has 49.6±7.56. There was a statistically meaningful increase in values of PERFECT, transabdominal transvers USG and transabdominal longitudinal USG of the exercise group between before and after exercises (p=0.00). Transabdominal transvers USG and transabdominal longitudinal USG values of the control group had no significant changes between before and after 12 weeks. The PERFECT strength values of subjects in exercise group and control group increased with USG strength measurement values both before and after exercises (p=0.00, r=0.632, p=0.00, r=0.642). The mean pad test, and stop test after the treatment were significantly lower in exercise group than the control group (p=0.00). The results for control group were similar after treatment. In exercise group, proportions of increase in muscle power were identified by USG (The mean difference between pre and post exercise in USG 4.83±2.64) as well as those determined by POWER (The mean difference between pre and post exercise in POWER: 1.72±0.76). A statistically significant relationship between these two proportions was found (p=0.014, r=0.303). In control group, there was no difference between pre-treatment and post-treatment values of POWER and USG force measurement. While significant improvements in all measured values of the exercise group after the treatment were detected (Table 1), there were not observed any improvements in values of the control group (Table 1).

Interpretation of results

There are studies that examine the relationship between TA ultrasound and digital palpation. In literature, it appears to be a positive correlation between ultrasound and digital palpation (1-4). The results of our study were similar to above studies.

Intra-vaginal approach should be applied at regular intervals to identify the increase of muscle power during pelvic floor muscle training and to create appropriate exercise prescription. Being shown the role of USG on determining the improvements can reduce intra-vaginal examination. The reason of determining pelvic floor muscle strength is to create the individual exercise prescription. Further studies are needed to understand if USG can be used to create exercise prescription or how to use it.

Concluding message

The results of our study showed improvement in pelvic floor muscle with pelvic floor muscle training which shows compatibility with the corresponding literature. Our study showed that in treatment results evaluation improvement in muscle strength could be determined by a non-invasive method as ultrasonography. In our study, it was displayed(our study points out/suggests) that USG may determine improvements in muscle power after pelvic floor exercises. There wasn't any source of funding for this study

Table 1: The PERFECT, Transabdominal transvers USG and Transabdominal longitudinal USG Values of Exercise and Control Groups Before and After Treatment

| PFM Exercise Group (n=65) | Control Group (n=51) | | p* | Before exercise Mean ±SD | After exercise Mean ±SD | p* |
|------------------------------|-------------------------------|-------------------------------|------|--------------------------------|-------------------------------|------|
| | Before exercise Mean±SD | After exercise Mean ±SD | | | | |
| POWER | 2.27±1.19 | 4.00±1.21 | 0.00 | 3.08±1.34 | 3.33±1.34 | 0.66 |
| ENDURANCE | 24.94±18.29 | 36.60±17.63 | 0.00 | 46.10±33.31 | 46.22±31.66 | 0.51 |
| REPITATION | 7.3±4.98 | 15.2±5.63 | 0.00 | 13.3±8.52 | 13.6±7.63 | 0.09 |
| FAST | 7.86±4.84 | 15.03±5.0 | 0.00 | 14.42±9.85 | 14.31±10.2 | 0.24 |
| T-A transvers USG (mm) | 3.15±2.76 | 8.21±4.77 | 0.00 | 3.15±2.76 | 7.26±11.39 | 0.35 |
| Pad Test (gr) | 3.10±2.35 | 0.22±0.49 | 0.00 | 3.44±6.31 | 3.65±6.90 | 0.08 |
| Stop Test (sn) | 12.58 | 0.86±1.95 | 0.00 | 6.51±16.90 | 6.56±17.82 | 0.72 |

* Kolmogorov–Smirnov: Median value

TA: Transabdominal, USG: Ultrasound, SD: Standart Deviation , PFM: Pelvic Floor Muscle

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Disclosures

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