

DYNAMOMETRIC MEASUREMENT OF PELVIC FLOOR MUSCLE STRENGTH IN WOMEN WITH SYMPTOMATIC PELVIC ORGAN PROLAPSE

Hypothesis / aims of study

The most reliable method of measuring the pelvic floor muscle (PFM) strength is dynamometry. In comparison to manual methods it gives an objective measurement and opposed to EMG and pressure measurements it provides a direct indication of PFM strength.

Dynamometric measurements of PFM is obtained in supine position of the patient and is possible after the insertion of the dynamometer branches into the vagina. Women with pelvic organ prolapse (POP) in supine position usually have the whole prolapse replaced into the vagina. The strength of PFM is measured during the contraction of these muscles what counteracts the prolapse.

The aim of our study was to determine if the women with symptomatic pelvic organ prolapse (POP) have the different muscle strength than women with normal pelvic floor anatomy.

Study design, materials and methods

One hundred thirty women were included into the study. Study group consisted of 81 patients with symptomatic prolapse (POPQ>II) whereas healthy 49 women without any symptomatic prolapse (POPQ≤II) served as the control. All women gave written inform consent to participate in the study, which was approved by the local ethical committee. All women from the study group were scheduled to reconstructive vaginal surgery due to POP. Before the measurement the patient adopt a supine position, hips and knees flexed and supported, feet flat on a conventional medical couch. The exclusion criteria were inability to replace the prolapse into the vagina and achieve a stable position of these organs before contraction of PFM, pushing instead of contraction of muscle during examination, dementia, past urogynecologic surgery, previous physiotherapy treatment of PFM, active urine or vaginal infection, excessive vaginal scarring or any disease that may interfere with PFM measurements. Before the dynamometric measurement vaginal palpation was used to teach the patient how to perform a PFM contraction correctly without compensation by other muscles. When their ability to contract had been confirmed, the dynamometric speculum was inserted in the vagina to the depth of 5cm to allow assessment of the PFM located 3,5cm from the opening (1).

The dynamometric device was constructed by engineers according to Dumoulin design (2). The only difference was that instead of strain gauges glued to the lower moveable branch of the speculum we used two tensometric beams. One tensometric beam was in the anterior branch of the speculum and the other was in the posterior branch. It allowed us to record separately the contraction of PFM around anterior and posterior branch of the speculum. The maximum strength values of PFM were obtained by subtracting the baseline value recorded before the effort from the maximum peak value. The measurement were taken at vaginal apertures of 24mm without patient discomfort

We compared the PFM force (PFMF) separately in the anterior part of pelvic floor and the posterior part of pelvic floor in both groups (Mann-Whitney U test). We compared also the difference between anterior and posterior PFMF in each group separately (Wilcoxon signed-rank test). In both tests p value lower than 0.05 was considered statistically significant.

Results

Tab. I. The comparison of BMI and PFMF in anterior and posterior compartment in both groups.

Parameter	POP group (n=81) (mean±SD)	Control group (n=49) (mean±SD)	Mann-Whitney U test
Max PFMF anterior part (N)	4.56 ±3.41	6.25±4.19	p=0.01*
Max PFMF posterior part (N)	4.63±2.64	7.13±4.42	p=0.0005*
BMI (kg/m ²)	27.15±3.57	27.58±6.12	p=0.94

Tab.II. The comparison of anterior to posterior PFMF in each group.

	Wilcoxon test
POP group (n=81) max PFMFant vs max PFMFpost	p=0.67
Control group (n=49) max PFMFant vs max PFMFpost	p=0.001*

Interpretation of results

According to our knowledge this is the first direct and reliable measurement of PFMF in women with symptomatic POP. This is an additional proof that weakening of pelvic floor muscles even in comparable BMI plays an important role in promotion of pelvic organ prolapse. Application of dynamometry with separate measurement of the posterior and anterior compartment force gave us knowledge that posterior part of PFM is especially strong in women with normal pelvic floor anatomy.

Concluding message

Women suffering from pelvic organ prolapse have significantly weaker pelvic floor muscles than women with normal anatomy. Women with normal pelvic floor anatomy have strongest posterior part of these muscles what is not observed in case of prolapse.

References

1. Neurourol Urodyn, 1992,11,107-13
2. Neurourol Urodyn 2003,22,648-653

Disclosures

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