

EFFECT OF PHYSIOTHERAPY ON PELVIC FLOOR MORPHOMETRY IN WOMEN WITH AND WITHOUT AVULSION INJURY OF THE PUBORECTALIS MUSCLE AFTER VAGINAL DELIVERY: A RANDOMISED PILOT STUDY

Hypothesis / aims of study

The pelvic floor muscles (PFM) are subject to considerable stretching during a vaginal birth. In approximately 21 to 36% of women, this stretching will result in an avulsion injury (i.e. disconnection of the puborectalis portion from its insertion points on the pubis). It has been shown that avulsion injury significantly affects PFM morphometry resulting in a marked enlargement of the levator hiatus and an altered contractility [1]. Importantly, avulsion has also been associated with the development of urogynecologic symptoms such as pelvic organ prolapse and incontinence in the postpartum period. International clinical guidelines in agreement with meta-analysis recommend PFM physiotherapy as a first line treatment for these symptoms [2]. However, it is unclear whether women with PFM lesions as severe as a complete avulsion injury could respond to physiotherapy. The main objectives of this pilot study were 1-to evaluate the effect of physiotherapy for improving PFM morphometry in primiparous women with a diagnosed avulsion injury and compare this to standard postpartum care and 2- to compare the effect of physiotherapy for improving PFM morphometry in women with and without avulsion injury.

Study design, materials and methods

The design of this pilot trial entails a randomized controlled study arm allocating women with avulsion randomly to either physiotherapy (AVU-physio) or standard care (AVU-stand) combined with a quasi-experimental arm evaluating women without avulsion who received physiotherapy treatment (control-physio). Participants were recruited in two centers located in two different countries. Inclusion criteria were primiparous women three month postpartum who had known risk factors for avulsion (e.g use of forceps for delivery, advanced maternal age, prolonged or precipitous second stage, 3rd-4th degree perineal lesion and fetal occipito-posterior position). Ultrasound diagnosis of PFM avulsion was determined by three assessors blinded to delivery outcomes, using validated protocols [3].

Physiotherapy treatment consisted in 12-weekly sessions (AVU-physio and control-physio) including education, biofeedback, electrical stimulation and home PFM exercises. Women in the standard postpartum care received regular follow up with their physician.

Primary outcome measures included PFM morphometry evaluated at baseline and post-treatment using 4D transperineal ultrasound by physiotherapist-assessors blinded to the treatment group allocations. Levator hiatus area (LHarea), antero-posterior diameter (LHAP) and left to right-lateral diameter (LRLat) were assessed at rest and during maximal PFM contraction. Intention to treat analysis was conducted using Wilcoxon ranked tests to evaluate changes from baseline to post-treatment for each group. Mann-Whitney-U tests were conducted to compare changes between the groups.

Results

A total of 29 women were diagnosed with an avulsion injury and were randomized into the AVU-physio and AVU-stand groups. Among these, one woman in the AVU-physio group and three assigned to standard care dropped out at an early stage of the study because of coccydynia requiring intervention and refusal to remain in the standard care. A total of 26 women without avulsion followed the physiotherapy intervention. Women in the three groups were similar in age and body mass index and obstetric history (duration of the second stage, 3rd/4th degree tears) with the only exception that women with avulsion had more forcep-assisted delivery. In the AVU-physio group, 7 women had unilateral and 9 bilateral avulsion while the AVU-stand group include 9 women with unilateral and 3 bilateral avulsion.

Physiotherapy was found to be effective in reducing LHarea in women with avulsion and in women with intact muscle at rest and during contraction. Non-significant changes were observed in women with avulsion following standard care. In women with avulsion, physiotherapy resulted in significantly larger changes in LHarea at rest and during contraction compared to standard care. Moreover, non-significant differences were found in women with and without avulsion regarding morphometry changes (Table 1).

Table 1 Baseline and change of scores in PFM morphometry from baseline to after treatment

| | AVU-physio group (n=16) | | AVU-stand (n=12) | | Control-physio group (n=26) | |
|----------------|-------------------------|-----------------------------|-----------------------|--------------------------|-----------------------------|---------------------------|
| | Baseline | Δ | Baseline | Δ | Baseline | Δ |
| <i>At rest</i> | | | | | | |
| LHarea | 14.08 (13.11-17.76) | -1.03 (-0.11 to -2.91)*† | 12.6 (11.95-14.13) | 0.11 (-0.77 to 1.25) | 12.67 (11.70-14.15) | -0.88 (-2.22 to 0.08)* |
| LHAP | 5.31 (5.08-5.67) | -0.12 (-0.28 to 0.03) | 5.40 (4.92-5.74) | -0.01 (-0.60 to 0.65) | 5.23 (4.75-5.46) | -0.08 (-0.50 to 0.10) |
| LRLat | 4.70 (4.24-5.13) | -0.48 (-1.15 to 0.15)* | 4.25 (3.73-4.76) | -0.01 (-0.45 to 0.33) | 3.79 (3.57-4.14) | -0.02 (-0.50 to 0.22) |

During PFM Maximal contraction

| | | | | | | |
|--------|------------------------|------------------------------|------------------------|-------------------------------|-----------------------|---------------------------|
| LHarea | 13.25 (11.52-16.09) | -1.53 (-2.76 to -0.06)*† | 11.34 (10.40-12.61) | -0.01 (-1.12 to 1.09) 1.49 | 10.58 (9.44-12.14) | -0.46 (-2.09 to 0.37)* |
| LHAP | 5.00 (4.66-5.34) | -0.28 (-0.55 to 0.02)* | 4.68 (4.33-5.15) | -0.01 (-0.45 to 0.23) | 4.18 (3.95-4.96) | -0.18 (-0.60 to 0.10)* |
| LRLat | 4.38 (3.72-4.87) | -0.48 (-0.22 to -0.84)*†‡ | 3.85 (3.45-4.19) | -0.05 (-0.28 to 0.34) | 3.52 (3.28-3.80) | -0.17 (-0.40 to 0.02)* |

Data are presented as medians and 25th to 75th percentiles.

Δ: changes score from pre-treatment (pre-tx) to post-treatment (post-tx)

* Significantly different from baseline to post-treatment (Wilcoxon ranked tests)

† Significantly different from AVU-stand at the 5% level (Mann-Whitney U tests).

‡ Significantly different from pelvic floor plus abdominal group at the 5% level (Mann-Whitney U tests).

Interpretation of results

Physiotherapy treatment was found to be effective in improving PFM morphometry at rest and during PFM contraction in women with puborectalis avulsion in comparison with women receiving standard care. Results also suggest that women with avulsion respond similarly to women without avulsion in terms of PFM morphometry when receiving physiotherapy.

Concluding message

Findings from this pilot study support the rationale that PFM physiotherapy can improve PFM morphometry in women with puborectalis avulsion. However, a larger sample size is required to confirm the efficacy of physiotherapy in women with avulsion for alleviating urogynecological symptoms such as incontinence and prolapse symptoms.

References

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2. Incontinence, 2013, Health Publication Limited: Paris. p.1101-1228.
3. Ultrasound Obstet Gynecol, 2007. 29(3): p. 329-34.

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