

## TESTING AND TRAINING OF THE PELVIC FLOOR MUSCLES AFTER CHILDBIRTH

Aino Jonasson, Bertil Larsson and Helmut Pschera

From the Department of Obstetrics and Gynecology, Karolinska Institutet, Huddinge University Hospital, Huddinge, Sweden

**Abstract.** In a prospective study of 83 women, two different physiotherapy methods for strengthening the pelvic floor muscles after childbirth were evaluated. The training program was carried out by the patients at home for 12 weeks, starting 8 weeks after spontaneous uneventful delivery. Forty-two women did pelvic floor exercises in accordance with the method presented by Kegel (1). Forty-one women used standard vaginal cones with weights increasing in 10 g stages from 20 to 100 g, to be retained in the vagina both when standing erect and moving. Pelvic floor muscle strength, defined as the weight in grams of the heaviest cone that could be retained in the vagina, was recorded before and after the 12-week training period. Training with vaginal cones produced significantly better pelvic floor muscle strength than did exercise without cones.

Pelvic floor muscles are often weak after childbirth. As the aim of pelvic floor exercises (PFE) is to increase the static tonus and strengthen the rapid response of the levator ani muscles, they consist of repetitive contractions.

To evaluate contractile ability before and after different types of pelvic floor muscle training, various methods have been tried out, using perineometers, cuffed catheters (1,2,3), or digital tests (4).

The aim of this prospective study was to compare

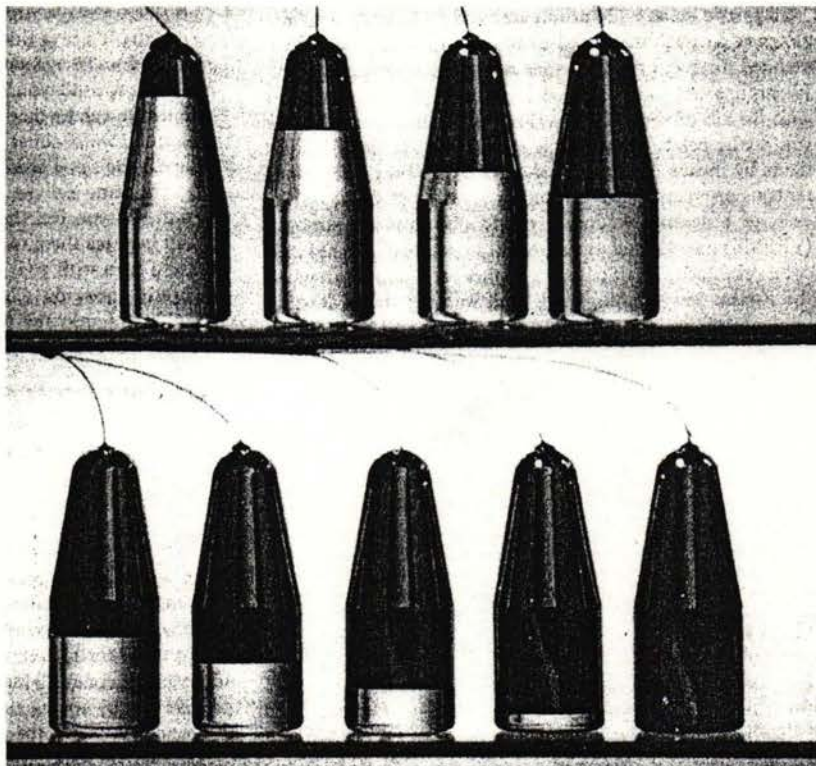


Fig. 1. A set of 9 standardized vaginal cones with weights increasing in 10 g stages from 20 to 100 g (numbers 1-9).

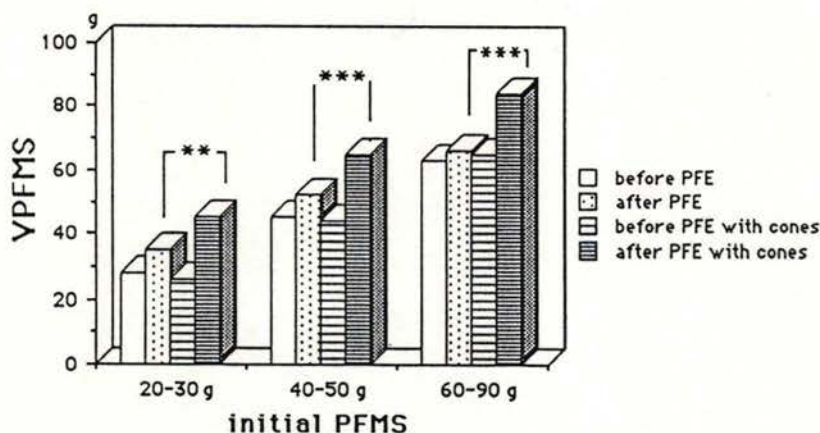


Fig. 2. Mean VPFMS before and after PFE with or without vaginal cones. Women categorized according to initial voluntary PFMS. Comparison between the two physiotherapy groups.

two different methods recommended for training of the pelvic floor muscles, and to present a simple method for the objective evaluation of pelvic floor muscle strength (PFMS).

#### PATIENTS AND METHODS

The series comprised 83 women aged 19–36 (mean 24 years), 46 primiparae and 37 multiparae, none of whom suffered from post partum complications. They were randomly assigned to one of two physiotherapy groups.

Forty-two women (24 primiparae and 18 multiparae) were assigned to PFE to be self-conducted in accordance with detailed instructions. Forty-one women (22 primiparae and 19 multiparae) were assigned to PFE to be self-conducted with the aid of vaginal cones (Fig. 1). Voluntary and resting contractile pelvic floor muscle strength was tested in all patients by means of vaginal cones, both 8 weeks after spontaneous uneventful delivery and again after 12 weeks on the exercise program. Voluntary pelvic floor muscle strength (VPFMS) was defined as the weight in grams of the heaviest cone voluntarily retained in the vagina for 2 min, both when the patient was standing erect, and walking about. Resting pelvic floor muscle strength (RPFMS) was defined as the weight in grams of the heaviest cone retained in the vagina for 5 min without voluntary muscle contractions, again with the patient both standing and moving about. After the recording of their initial VPFMS and RPFMS, all patients were ran-

domly assigned to one of the two physiotherapy groups, as follows:

#### Self-conducted Pelvic floor exercises

All patients were given detailed verbal information and a written instruction sheet describing the PFE to be performed at home over a period of 12 weeks.

#### Written instruction given to the patient

The following exercise should be carried out, twice daily in 15-min sessions.

1. Lie on your back with your legs slightly apart and relax. Tighten the pelvic floor muscles and hold the contraction for 3–5 s. Then relax completely again. Breathe calmly and check with your hands the lower part of your abdomen to ensure that the muscles are relaxed. Repeat the exercise 15–20 times.
2. Repeat the same exercise, but with your legs flexed.
3. Do the same exercise standing up with your feet slightly apart. As you feel the contractions getting stronger you may increase them to 25 times.
4. Stand erect with your heels together and your feet turned slightly outwards. Contract the pelvic muscles and hold the contraction for 5–10 s; then relax. Repeat 15–20 times.

#### Pelvic floor exercises performed with the aid of vaginal cones (Fig 1)

All patients were given detailed verbal and written instructions describing the exercises to be performed at home over a period of 12 weeks.

#### Written instructions given to the patients:

Begin with the cone that you can comfortably retain. While standing up, insert the cone into the vagina with its tip pointing down. Use some lubricant to facilitate insertion. Try to retain the cone for 15 min twice daily while standing or walking around. The cone will tend to slip out, and you should try to prevent this by contracting the muscles—the situation with the cone will dictate the required reaction.

After several successful exercises, you can try with the next heavier cone.

Table 1. Distribution by group according to initial voluntary PFMS

Initial PFMS	Number of women on PFE	
	without vaginal cones	with vaginal cones
20–30 g	10	15
40–50 g	21	20
60–90 g	10	7
Total	41	42



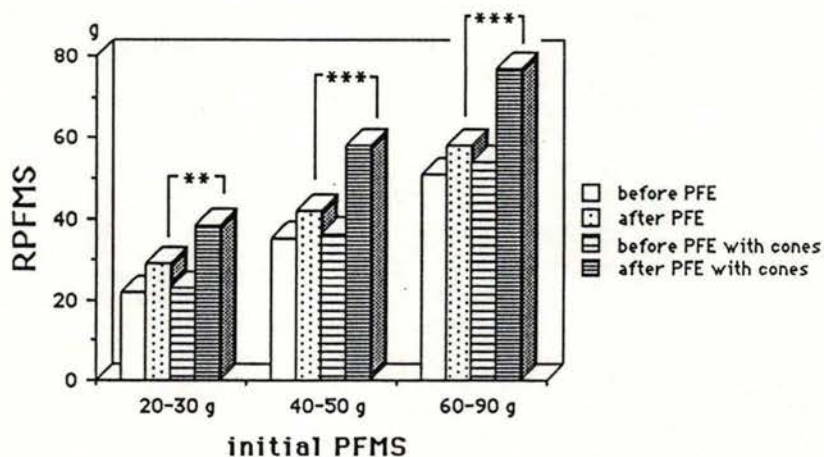


Fig. 3. Mean RPFMS before and after PFE with or without vaginal cones. Women categorized according to initial voluntary PFMS. Comparison between the two physiotherapy groups.

Use the string to withdraw the cone, wash and rinse it after use.

#### STATISTICS

The Mann-Whitney U-test and the Wilcoxon matched pair test were used for statistical evaluation.

#### RESULTS

The initial voluntary PFMS was similarly distributed in the two groups (Table I). Table II shows VPFMS and RPFMS before and after training with and without vaginal cones. Figs. 2 and 3 show the VPFMS and RPFMS, respectively, after PFE, with the women grouped according to their initial voluntary PFMS. Among women with an initial PFMS of 20–30 g, both VPFMS and RPFMS values were significantly higher after PFE in women using vaginal cones as well as in the groups carrying out self-conducted PFE without cones.

However, the increase in PFMS was significantly greater in women exercising with vaginal cones than in those exercising without. At an initial PFMS of 40 g or

more, this difference was even more pronounced ( $p < 0.001$ ) and increasing PFMS was registered only in those who exercised with vaginal cones (Figs. 2 and 3).

#### DISCUSSION

The results of the objective assessments clearly indicate the superior benefit of physiotherapy with the aid of vaginal cones. The tendency of a vaginal cone to slip out again when inserted, giving the patient a feeling of "losing the cone", produces a powerful sensory feedback, triggering pelvic contraction around the cone to prevent its dropping out (5).

PFE without cones strengthen the pelvic floor muscles, although the PFMS achieved with this self-conducted method was significantly lower than the PFMS achieved by training with vaginal cones. Of the 42 women on PFE without cones, 15 (36%) showed no improvement in RPFMS, whereas all women using vaginal cones increased their RPFMS. Thus, the vaginal cone method not only ensures reliable training of the pelvic floor muscles, but also provides the patients with an objective indication of the progress

Table II. Mean  $\pm$  SEM values of VPFMS and RPFMS before and after PFE with and without vaginal cones  $\Delta$  represents the difference in PFMS before and after exercising

	Women performing PFE		Significance
	with vaginal cones	without vaginal cones	
No. of patients	41	42	
VPFMS before exercising	45 $\pm$ 2	42 $\pm$ 2	NS
VPFMS after exercising	65 $\pm$ 3	48 $\pm$ 2	$P < 0.001$
$\Delta$ VPFMS	20 $\pm$ 1	6 $\pm$ 1	$P < 0.001$
RPFMS before exercising	37 $\pm$ 2	33 $\pm$ 2	NS
RPFMS after exercising	58 $\pm$ 3	40 $\pm$ 2	$P < 0.001$
$\Delta$ RPFMS	21 $\pm$ 1	7 $\pm$ 1	$P < 0.001$

achieved, which encourages her to continue with the exercises. This is an important consideration with the cone method, as the success of the treatment is highly dependent on the patient's motivation. In our experience, patients find the cones easy to handle. Moreover, as our results indicate that a statistically significant effect is observed already within 3 months, long-term treatment is not necessary. We would recommend that the patients are instructed to check their own PFMS with vaginal cones twice yearly, and to start exercises again if their PMFS has weakened.

It can be concluded that women with weak PFMS (20–30 g) after delivery can improve their PFMS irrespective of type of training performed. By contrast, women with stronger PFMS (40–90 g) can improve significantly by training with vaginal cones. In the present series, vaginal cones have been used for training as well as for testing. However, this might not spoil the beneficial effect of the cones with regard to the high significance in effect, registered between the two groups of patients. Moreover, it emphasizes the fact that the cones can be used for two clinical purposes, viz. for training and for objective evaluation of clinical efficiency. We also find it worthwhile to consider pelvic floor muscle physiotherapy with vaginal cones, most probably useful for the prevention of utero-

vaginal prolapse, urinary incontinence, and as an aid to enhanced sexual satisfaction.

## REFERENCES

1. Kegel AH. Progressive resistance exercises in the functional restoration of the perineal muscle. *Am J Obstet Gynecol* 1948; 56:238–8.
2. Kegel AH. Physiologic treatment of poor tone and function of genital muscles and of urinary stress incontinence. *West J Surg Obstet Gynecol* 1949; 57:527–9.
3. Brown M, Wickham JGA. The urethral pressure profile. *Br J Urol* 1969; 41:211–7.
4. Laycock MCSP. Graded exercise for the pelvic floor muscles in the treatment of urinary incontinence. *Physiotherapy* 1987; 7:371–3.
5. Plevnik S. From: Proceedings of Fifteenth International Continence Society 1985; 267–8.
6. Stanton, S. L.: The cause of incontinence in young women. *J Maternal Child Health* 1979; 2:50–5.

*Submitted for publication April 7, 1988*

*Accepted September 29, 1988*

Aino Jonasson  
Department of Obstetrics and Gynecology  
Huddinge University Hospital  
S-141 86 Huddinge  
Sweden