

Impact of Early Pelvic Floor Rehabilitation After Transurethral Resection of the Prostate

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We examined the results of teaching pelvic floor muscle exercises (PME) on micturition parameters, urinary incontinence, post-micturition dribbling, and quality of life in patients after transurethral prostatectomy (TURP). Fifty-eight consecutive patients who were selected to undergo TURP for benign prostatic hyperplasia (BPH) were admitted into the study: 28 were randomly assigned to a control group (A), 30 formed the investigational group (B) during an initial visit conducted before surgery. In group B patients, perineal exercises were demonstrated in detail, and tested for their correct use via simultaneous rectal and abdominal examination. After the removal of the urethral catheter, these patients were instructed to perform pelvic floor muscle exercises at home and were evaluated before the exercises and at weekly intervals postoperatively. The American Urological Association Symptom Score improved significantly after TURP in both groups. The average quality of life score improved more significantly in group B after TURP, from 5.5 to 1.5 ($P < 0.001$). The grade of muscle contraction strength after 4 weeks of PME increased from 2.8 to 3.8 in group B ($P < 0.01$); it was unchanged in the group A. The number of patients with incontinence episodes and post-micturition dribbling was significantly lower in the group B at weeks 1, 2, and 3 ($P < 0.01$). Our results show that pelvic floor muscle re-education produces a quicker improvement of urinary symptoms and of quality of life in patients after TURP. Its early practice reduces urinary incontinence and post-micturition dribbling in the first postoperative weeks. The exercises are simple and easy to perform in the clinical setting and at home, and therefore should be recommended to all cooperative patients after TURP. *Neurourol. Urodynam.* 20:53–59. © 2001 Wiley-Liss, Inc.

Key words: pelvic floor exercise; TURP; voiding symptoms; post-prostatectomy incontinence

INTRODUCTION

Urinary frequency, terminal dribbling, and urinary incontinence are common postoperative symptoms of transurethral prostatectomy (TURP). Pelvic floor muscle exercises (PME) may provide men with an acceptable option for long-term management, and there have been several reports that explored PME as a treatment for men

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with urinary incontinence, urinary frequency, and terminal dribbling [Paterson et al., 1997; Chang et al., 1998].

Some authors [Moulouguet et al., 1981; Ceresoli et al., 1993] reported their striking experience of the effectiveness of early functional treatment of urinary incontinence after prostatectomy. They showed that, with their treatment, improvement and cures in urinary incontinence after prostatectomy occur much earlier with the aid of functional treatment than spontaneously. Thus, such treatment is worth undertaking. A favorable result was obtained with six weeks of treatment.

Meaglia et al. [1990] reviewed a number of patients who were incontinent between 5 and 198 months after either radical retropubic, total perineal, or TURP and found that a significant number of patients who are incontinent after prostatectomy (especially those without a prior transurethral resection) can improve dramatically with a behavioral training program that provides a strong support system.

Kegel [1951] was the first to describe PME in the treatment of stress urinary incontinence in women. He reported a cure rate of 84%. Few reports followed this first presentation; however, during the past two decades, there has been renewed interest for this non-invasive treatment modality.

According to the medical literature, the treatment of post-prostatectomy incontinence is almost always limited to pharmacological or surgical therapy. Because of the failure of the standard treatment options, many men are left to live with their incontinence. The guidelines for the treatment of urinary incontinence recommend the use of behavioral methods as first-line treatment for stress and urge incontinence [Harris, 1997].

We describe the results of PME on urinary incontinence, micturition frequency, terminal dribbling, and its impact on quality of life in patients after TURP.

MATERIALS AND METHODS

Sixty-three consecutive patients with a diagnosis of symptomatic benign prostatic hyperplasia (BPH) were selected to undergo TURP. Fifty-eight were admitted to this study from October 1998 to April 1999. Patients aged over 80 years old or with a history of urethral or pelvic surgery, neurogenic bladder, or prostatic carcinoma were excluded from study. Twenty-eight of them were randomly selected to form the control group (group A), 30 patients were randomly selected to form the investigational group (group B). Three patients, one assigned to group A and two to group B, dropped out; they did not attend all the established visits at the Clinic, therefore their data were not available to be included into the study. Mean age was 66 years (range, 53–71) of the control group and 67.5 years (range, 55–73) in the investigational group.

Informed consent was given by all patients. The American Urological Association (AUA) Symptom Score and a quality of life questionnaire were administered before TURP and 30 days after surgery in both groups. The ICS *male* questionnaire was used to assess quality of life [Donovan et al., 1996; Peters et al., 1997]. There were seven specific questions concerning quality of life, including three fixed-format questions, two global quality of life questions, and two open-ended questions that allow men to describe their worries about their urinary problems in free text. Uroflowmetry was obtained before TURP and repeated 1 month after discharge in both groups. In all patients, a preoperative pressure-flow study confirmed the existence of

a bladder outflow obstruction (BOO). The initial visit was conducted before surgery: for group B patients, the program was explained to each patient and an evaluation was made of his motivation, physical abilities, and appropriateness of the program. One urologist, who was blinded to the study group of the patients, performed only the digital evaluation of the pelvic floor muscle contraction and established and reported the grading during all the visits; the training session at follow-up visits (weeks 1, 2, 3, and 4) was not performed by the same urologist who assessed pelvic floor muscle contraction. The patient was placed into the lateral decubitus position, and a finger was inserted into the rectum. The patient then was invited to contract the anal muscles around the finger while the examiner's second hand was placed in the lower abdomen to detect contraction of the abdominal musculature. After digital evaluation of the extent of perineal and anal contraction, a grade was assigned from 0 (none) to 4 (strong). The endurance and strength of muscle contractions were assessed using a grading method similar to that reported by McIntosh et al. [1993].

For group B patients, verbal instruction, feedback on contractions, and verbal reinforcement of appropriate responses were used to teach selective contractions of anal sphincter muscles and relaxation of abdominal muscles. Verbal and written instructions for home PME were given to them with instructions to practice them 45 times a day, divided into three sessions of 15 exercises each.

Both groups of patients began voiding diaries immediately after removal of the catheter, and then every week for 4 weeks postoperatively. The voiding diary was for a 48-hour period and recorded times of voiding, volume voided, urges to void, and episodes of incontinence. The strength of pelvic floor muscles was reassessed after removal of the Foley catheter and at each weekly visit in both groups of patients.

Student's *t*-test was used to measure the statistical significance of differences between the groups. Differences before and after PME were measured using paired *t*-test. Chi-square test was calculated to compare differences in the strength of pelvic floor musculature between the two groups. The analysis of variance (ANOVA) for correlated proportions was used to compare patient satisfaction.

RESULTS

Symptom score. The average symptom score changed significantly after TURP in both groups, from 24 to 10 in group A and from 22 to 9 in group B. There was no statistically difference between the two groups.

Quality of life. The improvement of quality of life was statistically different in both groups after surgery, and there was a significantly better satisfaction with life of patients in group B than those in group A. Average score values were comparable in groups A and B before surgery, 5.5 and 5.8, respectively. Four weeks after TURP, they were 3.2 in group A and 1.5 in group B ($P < 0.001$).

Muscle contraction strength. There was a significant increase in the grade of muscle contraction strength after 4 weeks of exercise in group B, the average score increasing from 2.8 to 3.8 ($P < 0.01$) (Table I); muscle contraction strength was not significantly changed after 4 weeks in group A, 2.5 and 2.4 (Fig. 1; Table I). Muscle assessment was performed at the initial visit before TURP, and then repeated after removal of the catheter and at each weekly visit.

Voiding diary. When analyzing the voiding diaries, the volume of daily water

TABLE I. Grade of Pelvic Floor Muscle Contraction in Patients Who Underwent TURP

	Average score for muscle contraction \pm SD	
	Group A	Group B
Before PME	2.5 \pm 0.4	2.8 \pm 0.3
Week 1	2.5 \pm 0.3	2.8 \pm 0.4
Week 2	2.6 \pm 0.4	3.0 \pm 0.3
Week 3	2.6 \pm 0.3	3.4 \pm 0.2
Week 4	2.4 \pm 0.2	3.8 \pm 0.3

intake and average voided volume were similar in the two groups. The voiding interval showed a significant difference between the two groups 2 and 3 weeks after TURP ($P < 0.01$). However, after 4 weeks, the difference did not reach statistical significance (Fig. 2).

The peak flow rate, average flow rate, and voided volume increased significantly after TURP in both groups; there was no statistically significant difference in these parameters between the two groups.

Urinary incontinence. The evaluation of continence status was conducted by means of the voiding diary after surgery and after catheter removal, before the patient was discharged and before PME were initiated at home. Urge and dribbling incontinence were the symptoms most commonly reported. The number of patients with incontinence episodes and post-micturitional dribbling was comparable, 20 and 21, in the two groups after catheter removal. It was significantly lower in group B, to whom instructions were given for home practice of PME, than in the control group at weeks 1, 2, and 3 ($P < 0.01$), nine versus 17, five versus 16, and four versus 12, respectively; however, the difference was not significant between the two groups at week 4 (Fig. 3).

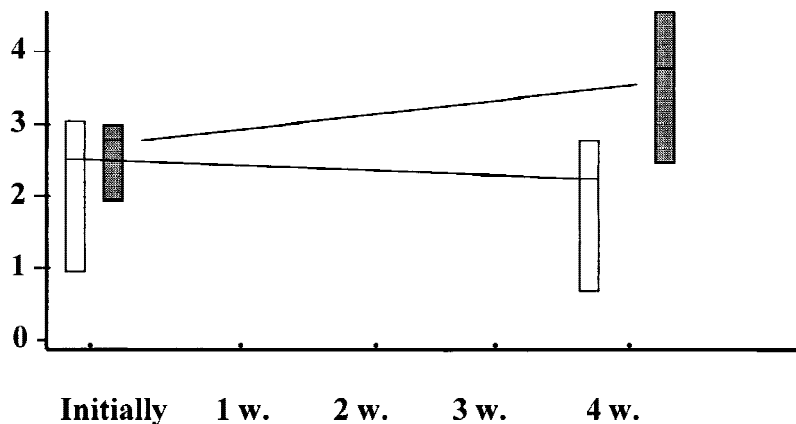


Fig. 1. Average pelvic floor muscle contraction strength before and 4 weeks after TURP in groups A and B. Columns illustrate 95% confidence intervals of the means. Means are shown were horizontal lines. Group A, open columns, group B, shaded columns.

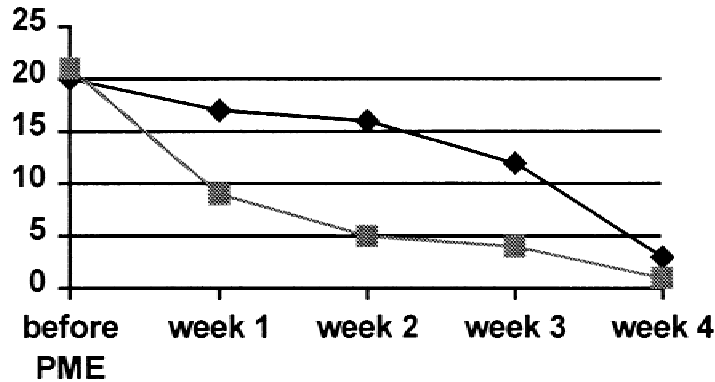


Fig. 2. Voiding interval after TURP groups A (diamonds) and B (squares). Group A: average minimum \pm SD: before PME, 50.5 ± 12 ; week 2, 75 ± 15 ; week 4, 110 ± 23 . Group B: average minimum \pm SD: before PME, 55 ± 10 ; week 2, 110.5 ± 17 ; week 4, 118.5 ± 24 . * $P < 0.01$.

DISCUSSION AND CONCLUSIONS

The success rates using PME for urinary incontinence vary in the literature from 20 to 80% [Burgio et al., 1986; Henalla et al., 1988]. The premise of Kegel's procedure [1951] was that stress incontinent women need first to gain awareness of the function of the pubococcygeal muscle.

Some authors [Ceresoli et al., 1993] reviewed their experience with patients who were incontinent 10 to 24 months after prostatectomy. These patients were treated with bladder training. Perineal exercises were taught in detail; all patients improved in the number of incontinence episodes, five patients achieved total continence, and only one showed little change.

Our study focused on the results of pelvic floor muscle re-education on urinary symptoms and quality of life after TURP. As other authors previously reported

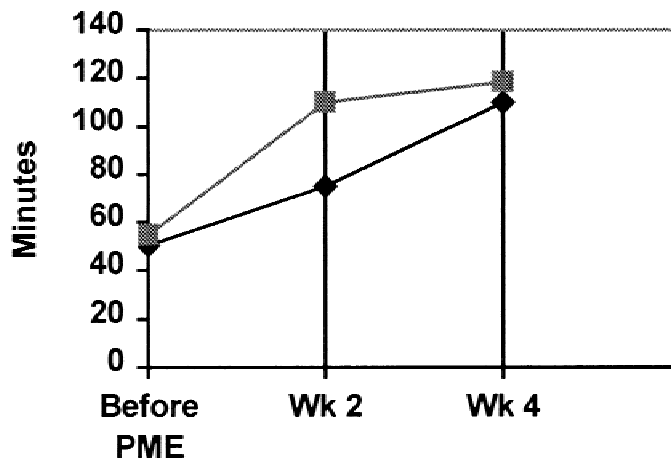


Fig. 3. Decrease in the number of patients with episodes of incontinence and terminal dribbling in groups A (diamonds) and B (squares) before PME and at weeks 1, 2, 3, and 4.

[Chang et al., 1998], the analysis showed a quicker improvement of symptoms and of quality of life in patients who performed PME than in control patients. It is important that patients learn to perform PME appropriately; the first step is to establish awareness of function of the muscles, then regular exercise is encouraged to improve muscle coordination and strength. Muscle contraction strength increased after 4 weeks in the investigational group. The changes observed during PME are consistent with those found in other skeletal muscle training programs, in which changes of 30% were commonly found [Dougherty et al., 1993].

Terminal and post-micturition dribbling are common symptoms after TURP. They involve the loss of relatively small amounts of urine after each void, causing urinary incontinence. Both urethral milking and PME are effective for post-micturition dribbling in men [Paterson et al., 1997], but patients express more satisfaction with PME, even if it takes longer to build up the muscle tone.

Moulonguet et al. [1981] performed early functional treatment after prostatic surgery; results showed a marked improvement in 43 of 50 patients (86%), including 15 complete cures (30%), with six weeks of treatment. It appeared that the results were better when treatment was started earlier. The authors found that improvement and cures of urinary incontinence after prostatectomy occur much earlier with the aid of functional treatment than spontaneously.

In the female population, some authors observed that patients tended to decrease the frequency of practicing PME with time [Ferguson et al., 1990; McIntosh et al., 1993].

In our male population, composed of patients who had undergone TURP for benign disease, pelvic rehabilitation was shown to quicken normal voiding function after surgery; in fact, it significantly reduced several bothersome voiding symptoms, such as frequency, post-micturitional dribbling, and urinary incontinence during the first 3 weeks. After 4 weeks, a nearly normal voiding function was restored in both groups of patients, with little difference, suggesting that perhaps if one waits long enough, lower urinary tract function is expected to get progressively back to normal. When considering the voiding interval at 4 weeks, our results are slightly different from those of Chang et al. [1998], who found a significant difference between the two groups of patients. Perhaps a different rate of postoperative detrusor instability could account for this. In accordance with the same authors, we found an increase of muscle contraction strength at week 4 as a result of PME (Fig. 1).

Some authors [Wyndaele et al., 1996] evaluated the reliability and reproducibility of the digital testing of pelvic floor muscles in men. Muscle strength, endurance, and exhaustion were evaluated in 39 young healthy male volunteers. They came to the conclusion that digital testing proved easy to perform and was well tolerated in all patients. Test-retest showed reproducible results. Between investigators no difference was found between scores except for strength of the bulbocavernous muscle.

Isolated stress incontinence is relatively rare after TURP [Fitzpatrick et al., 1979]. In our study, one patient in group B had mild urinary incontinence and three in group A 4 weeks after TURP. Urinary incontinence after TURP or prostatectomy is usually temporary; however, PME can reduce distress. Figure 3 clearly shows how PME quicken the progressive improvement of urinary incontinence, particularly during the first 3 postoperative weeks. PME do not require sophisticated equipment or a specialized technician and can be performed easily in the clinical setting or at home. Teaching selective sphincter control is useful in reducing voiding frequency and

improving urinary incontinence and terminal dribbling in patients after TURP. Patients also expressed an improvement of satisfaction with life.

REFERENCES

- Burgio KL, Robinson JC, Engel BT. 1986. The role of biofeedback in Kegel exercise training for stress urinary incontinence. *Am J Obstet Gynaecol* 154:58–61.
- Ceresoli A, Seveso M, Zanetti G, Meligrana C, Trinchieri A, Guarneri A, Tzoumas S, Austoni E. 1993. Treatment of urinary incontinence in the patient operated on for benign prostatic hyperplasia. *Arch Ital Urol Androl* 65:555–8.
- Chang PL, Tsai LH, Huang ST, Wuang TM, Hsieh ML, Tsui KH. 1998. The early effect of pelvic floor muscle exercise after transurethral prostatectomy. *J Urol* 160:400–5.
- Donovan JL, Abrams P, Peters TJ, Kay HE, Reynard J, Chapple C, de la Rosette JJMCH, Kondo A. 1996. The ICS-‘BPH’ Study: the psychometric validity and reliability of the ICS male questionnaire. *Br J Urol* 77:554–7.
- Dougherty M, Bishop K, Mooney R, Gimotty P, Williams B. 1993. Graded pelvic muscle exercise. Effect on stress urinary incontinence. *J Reprod Med* 38:684–90.
- Ferguson KL, McKey PL, Bishop KR. 1990. Stress urinary incontinence: effect of pelvic floor muscle exercise. *Obstet Gynecol* 75:671–6.
- Fitzpatrick JM, Gardiner RA, Worth PHL. 1979. The evaluation of 68 patients with post-prostatectomy incontinence. *Br J Urol* 51:552–5.
- Harris JL. 1997. Treatment of postprostatectomy urinary incontinence with behavioral methods. *Clin Nurse Spec* 11:159–66.
- Henalla SM, Kirwan P, Castleden CM. 1988. The effect of pelvic floor exercises in the treatment of genuine urinary stress incontinence in women in two hospitals. *Br J Obstet Gynaecol* 95:602–5.
- Kegel A. 1951. Physiologic therapy for urinary stress incontinence. *JAMA* 146:915–7.
- McIntosh LJ, Frahm JD, Mallett VT, Richardson DA. 1993. Pelvic floor rehabilitation in the treatment of incontinence. *J Reprod Med* 38:662–5.
- Meaglia JP, Joseph AC, Chang M, Schmidt JD. 1990. Post-prostatectomy urinary incontinence: response to behavioral training. *J Urol* 144:674–6.
- Moulouguet A, Verges J, Delmas V. 1981. Towards early functional treatment of urinary incontinence after prostatectomy. *J Urol* 87:599–602.
- Paterson J, Pinnock CB, Marshall VR. 1997. Pelvic floor exercises as a treatment for post-micturition dribble. *Br J Urol* 79:892–7.
- Peters TJ, Donovan JL, Kay HE, Abrams P, de la Rosette JJMCH, Porru D, Thuroff JW, the ICS-‘BPH’ Study Group. 1997. The International Continence Society ‘Benign prostatic hyperplasia’ study: the bothersomeness of urinary symptoms. *J Urol* 157:885–9.
- Wyndaele JJ, Van Eetvelde B. 1996. Reproducibility of digital testing of the pelvic floor muscles in men. *Arch Phys Med Rehabil* 77: 179–81.