



PELVIC REHABILITATION FOR URINARY INCONTINENCE AFTER RADICAL PROSTATECTOMY

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SUMMARY: Radical prostatectomy (RP) performed by open, laparoscopic, or robotic approach is considered the gold standard for localized prostate cancer (PCa). However, it carries the risk of post-prostatectomy urinary incontinence (UI) and erectile dysfunction (ED) which significantly reduce patients' satisfaction with surgery and quality of life (QoL), therefore it is important to decrease the possibility or severity of these complications to a minimum.

There are several preoperative prognostic factors such as urethral length and closing pressure obtained by magnetic resonance imaging and profilometry, as well as several variations in the surgical approach such as preservation of the neurovascular bundle (NVB) and puboprostic ligaments, sparing or reconstruction of bladder neck, Retzius-sparing approach, and meticulous surgical dissection, used to predict or prevent unwanted side effects of RP. In addition, there are postoperative methods that can help reduce complications. In this review, we will present the role of pelvic rehabilitation with an emphasis on pelvic floor muscle training (PFMT) in reducing consequences of radical surgery.

Key words: *radical prostatectomy, urinary incontinence, pelvic rehabilitation, pelvic floor muscle training*

Introduction

Urinary incontinence after radical RP is a common side effect especially in the early postoperative period, with unknown real incidence. In any case, depending on its definition, assessment tools and follow-up, it is present in a significant number of patients with a major impact on many aspects of their lives, from limiting daily activities and sex life, to unwillingness to additional procedures.¹ UI has been shown to be a greater

burden for patients compared to other consequences of surgery such as ED, despite a lower incidence.^{2,3} Furthermore, as the number of RPs increases, as does the number of younger patients undergoing surgery, the impact of UI is becoming an increasing problem that requires an optimal approach to its prevention and treatment.

The aetiology of urinary incontinence is complex and can be caused by bladder or sphincter dysfunction or a combination of both. Although there may be pre-existing bladder changes that may affect UI after RP, sphincter dysfunction due to tissue injury associated with prostate dissection is considered to be the most important. RP reduces the length and the maximal closure pressure of the urethra, and although

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there are controversies about concerning which treatment is more important for continence preservation, both are significantly affected by surgery.¹ RP affects not only the urethra and prostate, but also the bladder by placing it lower than it was originally located producing anatomical defects and suboptimal position, mimicking pelvic organ prolapse and related stress urinary incontinence (SUI) in women. Most patients report symptoms of stress incontinence after RP, but, it has also been shown that concomitant urgency/urge incontinence can be present in up to 50% of patients.^{4,5}

Treatment of postprostatectomy UI should be individualized and based on several parameters such as the degree of incontinence, patient expectations, impact on QoL, and duration. In general, there are two approaches, non-invasive and surgical. Surgical treatment that has a wide range of procedures from minimally invasive, such as bulking agents, to more demanding, like male slings and artificial sphincters, is usually recommended after more than a year of postprostatectomy UI and entails additional requirements, but also risks for the patient and higher costs for the health system, so a non-invasive approach is a logical alternative. The non-invasive approach offers several advantages since it is available as an outpatient procedure, painless, inexpensive, and virtually without significant side effects. The non-invasive approach can be used before and/or after RP, and it is based on diet modification or lifestyle interventions, bladder training, PFMT, functional electrical stimulation and pharmaceutical interventions.⁶ PFMT is considered to be the most common non-invasive intervention for postprostatectomy UI.⁷

Pelvic floor muscle training

Although pelvic floor exercises and strengthening have been known since ancient times, their application in modern medicine began with the American gynaecologist Arnol Kegel, who used them to successfully treat women with SUI.⁸ Kegel exercises cause cranial movement of the pelvic floor muscles (squeezing and lifting inwards) constriction of the urethra, increase in urethral pressure, and consequent decrease in SUI. PFMT can be performed with or without biofeedback. Biofeedback methods allow the patient to become immediately acquainted with the condition of the pelvic floor muscles, and thus, the necessary corrections can be made to improve training. Today, this type of training is often performed using a computer.⁹

Effective PFMT increases blood supply and muscle strength and achieves structural pelvic support by elevating the levator ani plate, preventing the descent caused by an increase in abdominal pressure.¹⁰

The studies of the effect of PFMT on continence recovery have ended with conflicting conclusions, and the best approach to PFMT is not well defined.¹¹⁻¹⁵ A Cochrane review of randomized studies could not find a beneficial effect of PFMT, but the question arises as to how good a meta-analysis can be performed in such high levels of heterogeneity with various variable study design.¹⁶ Furthermore, it is not the same if the patient has undergone individualized training led by a physiotherapist with regular follow-up or has only been instructed on how to perform PFMT as shown by Overgard *et al.* where 92% of patients with an individualized approach were continent within 12 months, compared with 72% of those in control group.¹⁷ It is very important to make the patients familiar with proper exercises, as it often happens that they exercise, however not the pelvic floor muscles, but the surrounding groups such as gluteal, hip, and abdominal muscles, thus not achieving the desired effect. The optimal training protocol is a matter of debate, especially for male patients, and can vary significantly referring to all variables, i.e., the number of contractions per day, the maximum length of holding period (squeeze) and the duration of training period.¹⁰ For effective training, three sets of 8-12 slow velocity close to maximum contractions 2-4 days a week are recommended.¹⁸ But can this skeletal muscle training be applied to the pelvic floor and how detailed should we approach the patient?

In the highly cited study by Van Kampen *et al.*, the education of patients began with an introduction to anatomy and function of the pelvic floor, followed by individual treatment with active pelvic floor muscle exercises and biofeedback in an outpatient clinic once a week. For patients with inadequate muscle contractions, electrical stimulation with an anal probe was used to teach them how to do it properly. Training was followed at home with 90 contractions per day in any of three positions supine, sitting or standing. Furthermore, patients were told to integrate contractions into daily activities. Such a detailed approach resulted in a continence rate of 95% one year after RP.¹⁹ In a study by Patel *et al.*, a PFMT program led by a physiotherapist for 4 weeks before RP also showed a significant reduction in the duration and severity of early urinary incontinence.²⁰ On the other hand, Dubbelman *et al.*

did not show in their study any beneficial effect on the continence recovery within the first 6 months after RP compared to instruction folder-guided approach, however, as they stated, due to under-powering, there was a high risk of type II error, and the difference could be shown in a larger number of patients.²¹ In a 2021 meta-analysis, Sciarra A *et al.*, analysed 26 published articles and showed that a biofeedback-guided pelvic floor muscle electric stimulation program can improve the recovery of continence after RP, emphasizing the importance of additional instructions and patient guidance.²² Probably the inability to identify muscles and exercise them properly is the most common reason for the failure of this method.

In any case, maintaining and improving the training program, as well as patient compliance, is just one of the important roles of the physiotherapist's responsibility for high continence after RP.²³ Although this approach may require a significant amount of time and resource, after the initial training led by a physiotherapist, there are additional materials such as training DVDs that can help maintain a home training program, which has already been proven in treating women with SUI.²⁴⁻²⁷ We must also take into account the fact that the total estimated costs for direct and indirect consequences of incontinence after RP may be higher than the costs of the procedure itself.²⁸ Therefore, additional time and effort are justified to prevent or reduce these costs by inexpensive and non-invasive method without any significant side effects.

PFMT may be advised especially to elderly patients as they have been shown to be at higher risk of postprostatectomy UI and also need more time to recover continence.^{29,30} But the question is how much they will really benefit from PFMT, as it has been shown that patients older than 70 years experience atrophic and degenerative changes that reduce their response to treatment, although it can be argued that training will prevent further deterioration of their continence.³¹⁻³³ PFMT can also be recommended in patients at higher risk of postprostatectomy UI, such as previous transurethral resection of the prostate, preoperative detrusor abnormalities, or who have a higher clinical and pathological stage of the tumor.^{34,35}

There is also the question how long and with what intensity should patients train after RP? Although it is not easy to answer this question since different studies used different protocols, when training achieves a goal, it seems that much less effort is needed to main-

tain it then to achieve it.³⁶ To determine the optimal approach, training frequency and ideal time, we need better studies with a larger number of highly motivated and properly guided patients. To achieve full potential of PFMT, urologists should offer their patients individual training under the supervision of a physiotherapist, additionally supported by DVDs or Web-based applications. If applied correctly, this non-invasive method without any risk or side effects can help regain continence after RP.

Conclusion

Although the improvements in different areas of diagnosis and treatment of PCa have provided the decline in the incidence of postprostatectomy UI, the overall rate will be increased due to increased number of RP performed annually. Therefore, it is very important to start a program which will prevent or reduce these side effects. PFMT has been shown as a promising non-invasive method of improving muscle strength and related continence, probably the results would be even better if we better taught our patients how to perform PFMT with optimal frequency, intensity, and duration.

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Sažetak

ZDJELIČNA REHABILITACIJA URINARNE INKONTINENCIJE NAKON RADIKALNE PROSTATEKTOMIJE

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Otvorena, laparoscopska ili robotska radikalna prostatektomija predstavlja zlatni standard za liječenje karcinoma prostate. Međutim, ona također nosi rizik postprostatektomijske inkontinencije i erektilne disfunkcija koje značajno smanjuju zadovoljstvo bolesnika operacijom i njegovu kvalitetu života, zbog toga je važno njihovu pojavnost smanjiti na minimum.

Postoji nekoliko preoperativnih prognostičkih faktora kao što su dužina i tlak zatvaranja uretre dobiveni magnetskom rezonancom i profilometrijom te nekoliko varijacija u kirurškom pristupu kao što su očuvanje neurovaskularnog snopa i puboprostatičnih ligamenata, očuvanje i rekonstrukcija vrata mokraćnog mjehura, očuvanje Retziusovog prostora, ali i pedantna kirurška tehnika kojima se neželjene posljedice radikalne prostatektomije predviđaju, odnosno preveniraju. Postoje i postoperativne metode koje mogu pomoći u smanjenju komplikacija. U ovom radu prikazati ćemo ulogu rehabilitacije zdjelice s naglaskom na vježbe mišića dna zdjelice na smanjenje posljedica radikalne kirurgije.

Ključne riječi: *radikalna prostatektomija, urinarna inkontinencija, rehabilitacija zdjelice, vježbanje mišića dna zdjelice*