Original Article – Functional Urology
Grand J Urol 2023;3(3):97-101
DOI: 10.5505/GJU.2023.27147

Effect of Preoperative Kegel Exercises on Continence Rates After Open Radical Prostatectomy

Ameliyat Öncesi Kegel Egzersizlerinin Açık Radikal Prostatektomi Sonrası Kontinans Oranlarına Etkisi

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Cite as: Cinar C, Ayranci A. Effect of preoperative Kegel exercises on continence rates after open radical prostatectomy. Grand J Urol 2023;3(3):97-101

Submission date: 18 August 2023 **Acceptance date:** 22 August 2023 **Online first:** 01 September 2023 **Publication date:** 20 September 2023

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Abstract

Objective: To reveal the effect of preoperative Kegel exercises on early period continence rates after open radical prostatectomy

Materials and Methods: Data of patients with open radical prostatectomy between January 2019 and July 2022, in a tertiary academic health center were retrospectively reviewed. Patient' characteristics, perioperative parameters and postoperative follow-up results were recorded. Patients were divided into two groups as those who did Kegel exercises in the preoperative period and those who did not, and groups were compared.

Results: There were 38 patients in the Kegel exercise group and 40 patients in the other group. Postoperative 1st month and postoperative 3rd month incontinence rates were similar between the groups (p=0.406, and p=0.387). At 6th months postoperatively, the rate of incontinence in the Kegel group was 7.9%, while it was 25.0% in the other group (p=0.043). Similarly, the rate of incontinence at 1st year postoperatively was significantly lower in the Kegel group (5.3% vs 20.0%, p=0.001). At 6 months postoperatively, the QoL score in the Kegel positive group was 86, while it was 65 in the other group (p=0.001). In the postoperative 1st year controls, the quality of life (QoL) score was statistically significantly higher in patients with preoperative Kegel exercise (p=0.001).

Conclusion: Our study demonstrated that preoperative Kegel exercises had a significant positive effect on continence rate after radical prostatectomy in the postoperative 6th month and in the first year follow-up, and preoperative Kegel exercises were significantly associated with higher quality of life scores at 6th months and 1st year follow-up.

Keywords: Kegel exercise, incontinence, prostate cancer, radical prostatectomy

Öz

Amaç: Preoperatif Kegel egzersizlerinin açık radikal prostatektomi sonrası erken dönem kontinans oranlarına etkisini ortaya koymak.

Gereçler ve Yöntemler: Üçüncü basamak bir akademik sağlık merkezinde Ocak 2019 ile Temmuz 2022 arasında açık radikal prostatektomi yapılan hastaların verileri retrospektif olarak incelendi. Hastaların özellikleri, perioperatif parametreler ve postoperatif takip sonuçları kaydedildi. Hastalar ameliyat öncesi dönemde Kegel egzersizleri yapanlar ve yapmayanlar olarak iki gruba ayrıldı ve gruplar karşılaştırıldı.

Bulgular: Kegel egzersiz grubunda 38, diğer grupta 40 hasta vardı. Postoperatif 1. ay ve postoperatif 3. ay inkontinans oranları gruplar arasında benzerdi (p=0.406 ve p=0.387). Postoperatif 6. ayda inkontinans oranı Kegel grubunda %7.9 iken diğer grupta %25.0 idi (p=0.043). Benzer şekilde ameliyat sonrası 1. yılda inkontinans oranı Kegel grubunda anlamlı olarak daha düşüktü (%5.3'e karşı %20.0, p=0.001). Postoperatif 6. ayda Kegel pozitif grupta QoL skoru 86 iken diğer grupta 65 idi (p=0.001). Ameliyat sonrası 1. yıl kontrollerinde ameliyat öncesi Kegel egzersizi yapan hastalarda yaşam kalitesi (QoL) skoru istatistiksel olarak anlamlı derecede yüksekti (p=0.001).

Sonuç: Çalışmamız, ameliyat öncesi Kegel egzersizlerinin, radikal prostatektomi sonrası postoperatif 6. ay ve 1. yıl takibinde kontinans oranı üzerinde anlamlı pozitif etkiye sahip ve daha yüksek yaşam kalitesi skorları ile anlamlı şekilde ilişkili olduğunu gösterdi.

Anahtar kelimeler: Kegel egzersizi, idrar kaçırma, prostat kanseri, radikal prostatektomi

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Introduction

Prostate cancer is the most diagnosed cancer in men, and surgery has a pivotal role in the treatment of prostate cancer. Although radical prostatectomy surgery has satisfactory oncological results, the possibility of encountering problems such as urethral stricture, erectile dysfunction and urinary incontinence in the postoperative period causes patients to be suspicious of the surgery [1]. Since the definition of urinary incontinence after radical prostatectomy is not the same in different clinics, the rates of urinary incontinence after radical prostatectomy have been found in a wide range in studies [2]. Even, Peyromaure et al. found that postoperative urinary incontinence rates could reach 30% [3]. Previous studies have shown that urinary incontinence after radical prostatectomy may cause more hospital admissions, more drug use, increased costs in the healthcare system, and social isolation of patients in the postoperative period [4].

Kegel exercises are defined to strengthen the muscles of pelvic floor, involving rapid and sustained voluntary contractions of the pelvic floor muscles to improve sexual function and urinary incontinence [5]. Studies examining the effect of Kegel exercises on urinary incontinence after radical prostatectomy have obtained conflicting results. Lilli and colleagues analyzed 90 patients' data who underwent radical prostatectomy, and authors concluded that pelvis floor muscles exercises did not significantly improve urinary incontinence recovery following radical prostatectomy [6]. In contrast, Ribeiro et al. found that Kegel exercises associated with significant improvements in urinary incontinence severity after radical prostatectomy [7].

Although previous studies have examined the effect of post-operative pelvic floor exercises on post-radical incontinence, the number of studies examining the effect of preoperative Kegel exercises on continence after radical prostatectomy is limited. In this study, we aimed to reveal the effect of preoperative Kegel exercises on early period continence rates after open radical prostatectomy.

Materials and Methods

In this study, data of patients with open radical prostatectomy between January 2019 and July 2022, in a tertiary academic health center were retrospectively reviewed. Patients from this group with at least 1 year follow-up were included in the study. Before the study was planned, permission was obtained from the Haseki Training and Research Hospital local ethics committee with registration number 2023-12. All patients included in the study were informed in detail about prostate cancer and all treatments to be applied in prostate cancer. In addition, possible complications that may occur after prostate cancer surgery and the follow-up process were explained in detail to all patients. Informed consent for radical prostatectomy was signed by each patient 24 hours before surgery.

Patient' characteristics such as age, body mass index (BMI), smoking status, comorbidities, Prostate Specific Antigen (PSA) level, and tumor-related parameters were noted. In addition, perioperative parameters and postoperative follow-up results were recorded for each patient. Patients who underwent salvage radical prostatectomy surgery, patients who received prior pelvic radiotherapy, and patients with previous nerve or muscle disease affecting the pelvic floor muscles (Parkinson's disease, stroke, multiple sclerosis, spinal disorders etc.) were excluded from the study. Other exclusion criteria were undergoing laparoscopic or robotic radical prostatectomy, had transurethral resection of the prostate (TURP) before radical prostatectomy, and failed to complete the one-year follow-up period.

Preoperative Kegel Exercises, Radical Prostatectomy Procedure, and Follow up Procedure

Kegel exercises were started after the patient was diagnosed with prostate cancer pathologically and the patient chose prostate cancer surgery among the treatment options. The time from the diagnosis of prostate cancer to the operation of all patients was between 1-2 months. Kegel exercises were explained to all patients in detail by a professional health worker without any time limit. In addition, to avoid possible misunderstandings, all patients were provided with written and visual resources describing how to do Kegel exercises. All patients were taught to tighten their pelvic floor muscles and keep them tight until they counted one to five, and when patients relax their pelvic floor muscles, they have finished one Kegel exercise. Patients were advised to do 15- 20 Kegel exercises three to four times each day. In radical prostatectomy, the classical method described by Walsh et al. was used as a standard technique [8]. All operations were performed by the same team experienced in open radical prostatectomy. In the post-operative period, Kegel exercises were recommended to the patients for one year, the same as in the preoperative period.

In order to demonstrate the effect of Kegel exercise performed in the preoperative period on continence after radical prostatectomy, the patients were divided into two groups as those who did Kegel exercises in the preoperative period and those who did not. Patients who did and did not perform Kegel exercises in the preoperative period were compared in terms of preoperative demographic characteristics, operative parameters, postoperative patients' life quality and postoperative continence status.

Statistical Analysis

Statistical analysis was done with 'Statistical Package for the Social Sciences' (SPSS) 27 program. The normality assessment of data distribution was analyzed with the Shapiro-Wilk test and Q-Q plots. Independent Samples t-test was used for continuous variables. Quantitative data were presented as mean ± standard deviation. Chi-square test was used to compare qualitative data. The data were analyzed at 95% confidence level and the values with $p<0.05$ were noted statistically significant.

Results

Demographic data of patients are compared between groups in **Table 1**. There were 38 patients in the Kegel exercise group and 40 patients in the other group. While the mean age was 63.5 years in the Kegel group, it was 61.8 in the other group ($p=0.196$). There was no difference between the groups in terms of BMI, PSA, and prostate volume ($p=0.144$, $p=0.557$, and

p=0.147; respectively). Comorbidities and smoking rates were similar between the groups. Radical prostatectomy pathologies were compared according to International Society of Urological Pathology (ISUP) degrees, and no significant difference was observed between the groups (p=0.876).

Comparison of patients' incontinence status between groups is given in **Table 2**. Postoperative 1st month and postoperative 3rd month incontinence rates were similar between the groups (p=0.406, and p=0.387; respectively). At 6th months postoperatively, the rate of incontinence in the Kegel group was 7.9%, while it was 25.0% in the other group (p=0.043). Similarly, the rate of incontinence at 1st year postoperatively was significantly lower in the Kegel group (5.3% vs 20.0%, p=0.001).

The patients' life quality at the postoperative 1st month and 3rd month were statistically similar between the groups. At 6 months postoperatively, the QoL score in the Kegel positive group was 86, while it was 65 in the other group (p=0.001). In the postoperative 1st year controls, the quality of life (QoL) score was statistically significantly higher in patients with preoperative Kegel exercise (p=0.001) (**Figure 1**).

Discussion

Prostate cancer is a common disease all over the world and radical prostatectomy is an effective and safe treatment method in prostate cancer [9]. However, urinary incontinence occurring after radical prostatectomy adversely affects the general health of the patient and studies to prevent this situation continue [10]. On the other hand, there is strong evidence that Kegel exercises are effective in preventing incontinence by strengthening the pelvic floor muscles, and many centers recommend that patients do Kegel exercises after radical prostate surgery [4,11]. In this study, we aimed to investigate the effect of preoperative Kegel exercises on continence after radical prostatectomy, and our findings revealed that preoperative Kegel exercises had a significant positive effect on continence after radical prostatectomy in the postoperative 6th month and in the first year follow-up. In addition, preparative Kegel exercises were significantly associated with higher quality of life scores at 6th months and 1st year follow-up.

Urinary incontinence is not life-threating but disturbing complication of radical prostatectomy. Hodges and colleagues performed literature analyses to define relation between pelvic muscle training and post-prostatectomy continence, and authors stated the importance of pelvic floor muscle training to prevent and treat incontinence after radical prostatectomy [12]. In different study, Overgard et al. recommended that patients with radical prostatectomy perform pelvic floor exercises under the guidance of a specialist physiotherapist, and those who accepted this offer had a significantly lower rate of incontinence at first-year follow-up than those who did not. However, Overgard et al found that pelvic floor work did not affect continence rates at 3rd, 6th, and 9th month follow-ups [13]. In their meta-analysis, Levy et al. determined that pelvic endurance was important in early incontinence after radical prostatectomy and stated that pelvic floor exercises increased pelvic endurance and significantly decreased continence at the 3rd month postoperatively [14]. In present study, we found that preoperative Kegel exercises had a significant positive effect on continence after radical

Table 1. Comparison of preoperative demographic data and postoperative pathology results between groups

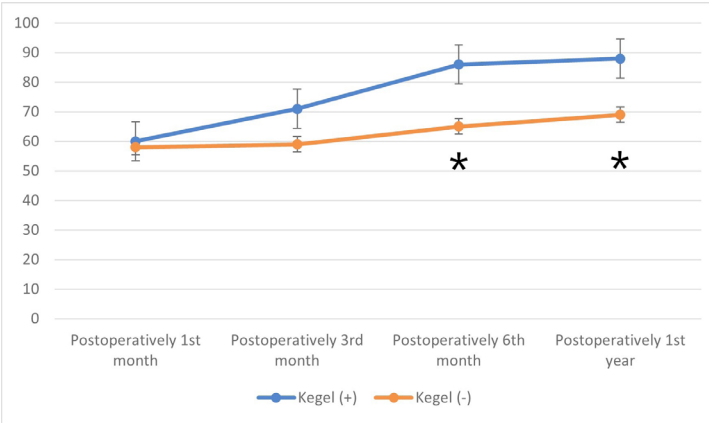
	Kegel + (n:38)	Kegel - (n:40)	P value
Age (years)*	63.5±5.8	61.8±5.7	0.196
BMI (kg/m^2)*	26.9±3.0	26.7±2.7	0.144
PSA (ng/ml)*	7.1±2.5	6.8±2.6	0.557
Prostate volume (cc)*	54.7±24.6	62.6±22.9	0.147
Comorbidities, n (%)			
Hypertension	7 (18.4%)	10 (25.0%)	0.482
Diabetes Mellitus	9 (23.7%)	9 (22.5%)	0.901
CAD	7 (18.4%)	8 (20.0%)	0.860
COPD	4 (10.5%)	5 (12.5%)	0.785
CKD	2 (5.3%)	2 (5.0%)	0.958
Smoking status, n (%)	18 (47.4%)	17 (42.5%)	0.666
Final Pathology, n (%)			
ISUP Grade 1	12 (31.6%)	14 (35.0%)	0.876
ISUP Grade 2	9 (23.7%)	8 (20.0%)	
ISUP Grade 3	8 (21.0%)	9 (22.5%)	
ISUP Grade 4	7 (18.4%)	6 (15.0%)	
ISUP Grade 5	2 (5.3%)	3 (7.5%)	

*mean ± standard deviation; BMI: body mass index; PSA: prostate specific antigen; CAD: coronary artery disease; COPD: chronic obstructive pulmonary disease; CKD: chronic kidney disease; ISUP: International Society of Urological Pathology

Table 2. Comparison between incontinence groups at different postoperative periods

	Kegel + (n:38)	Kegel - (n:40)	P value
Stress incontinence, n (%)			
Postoperatively 1st month	10 (26.3%)	14 (35.0%)	0.406
Postoperatively 3rd month	8 (23.7%)	13 (32.5%)	0.387
Postoperatively 6th month	3 (7.9%)	10 (25.0%)	**0.043**
Postoperatively 1st year	2 (5.3%)	8 (20.0%)	**0.042**

Figure 1. Comparison of quality of life between groups at different postoperative periods



prostatectomy in the postoperative 6th month and in the first year follow-up. Because of these results, we recommend that all patients undergoing radical prostatectomy perform Kegel exercises before surgery.

Previous reports demonstrated relation between urinary incontinence and embarrassment, social isolation and deterioration of quality of life. Bernardes and colleagues investigated the life quality of patients undergoing radical prostatectomy, and authors determined that urinary incontinence is one of the most important factors that impair the quality of life after surgery [15]. In another study, Nyarangi-Dix recommended to perform bladder neck preservation during radical prostatectomy to achieve higher urinary incontinence rate and higher patient satisfaction [16]. In this study, we found higher patients' life quality with radical prostatectomy at the 6th month and 1st year follow-up, we think that this result is associated with a significant decrease in incontinence rates in the same period.

Present study included small patient number, which accepted as study limitation. Moreover, this study only focused on short term results of preoperative Kegel exercises on post radical prostatectomy continence, and we believe that effect of Kegel exercises on long-term incontinence after radical prostatectomy may be the subject of a different study. Finally, we accepted on the basis of patient statements whether the patients did the Kegel exercises or did them correctly. In addition, the fact that the study was single-centered and the peroperative data were not taken into account can be shown as other limitations.

Conclusion

Our study demonstrated that preoperative Kegel exercises had a significant positive effect on continence rate after radical prostatectomy in the postoperative 6th month and in the first year follow-up, and preparative Kegel exercises were significantly associated with higher quality of life scores at 6th months and 1st year follow-up. Kegel exercises should be offered to patients who will be scheduled for radical prostatectomy operation, starting before the procedure.

Ethics Committee Approval: This study was approved by the local institutional review board (University of Health Sciences, Haseki Training and Research Hospital, approval date and number: 05.06.2023-12).
Informed Consent: An informed consent was obtained from all the patients.
Publication: The results of the study were not published in full or in part in form of abstracts.
Peer-review: Externally peer-reviewed.
Authorship Contributions: Any contribution was not made by any individual not listed as an author. Concept – C.C., A.A.; Design – C.C., A.A.; Supervision – C.C., A.A.; Resources – C.C., A.A.; Materials – C.C., A.A.; Data Collection and/or Processing – C.C., A.A.; Analysis and/or Interpretation – C.C., A.A.; Literature Search – C.C., A.A.; Writing Manuscript – Â.U., S.G.U.; Critical Review – C.C., A.A.
Conflict of Interest: The authors declare that they have no conflicts of interest.
Financial Disclosure: The authors declare that this study received no financial support.

References

[1] Sacco E, Prayer-Galetti T, Pinto F, Fracalanza S, Betto G, Pagano F, et al. Urinary incontinence after radical prostatectomy: incidence by definition, risk factors and temporal trend in a large series with a long-term follow-up. BJU Int 2006;97:1234-41. https://doi.org/10.1111/j.1464-410X.2006.06185.x

[2] Cambio AJ, Evans CP. Minimising postoperative incontinence following radical prostatectomy: considerations and evidence. Eur Urol 2006;50:903-13. https://doi.org/10.1016/j.eururo.2006.08.009

[3] Peyromaure M, Ravery V, Boccon-Gibod L. The management of stress urinary incontinence after radical prostatectomy. BJU Int 2002;90:155-61. https://doi.org/10.1046/j.1464-410x.2002.02824.x

[4] Kim PH, Pinheiro LC, Atoria CL, Eastham JA, Sandhu JS, Elkin EB. Trends in the use of incontinence procedures after radical prostatectomy: a population based analysis. J Urol 2013;189:602-8. https://doi.org/10.1016/j.juro.2012.08.246

[5] Bridgeman B, Roberts SG. The 4-3-2 method for Kegel exercises. American journal of men's health 2010;4:75-6. https://doi.org/10.1177/1557988309331798

[6] Lilli P, Mercuriali M, Fiori M, Hanitzsch H, Gunelli R, Bercovich E. Impact of preoperative biofeedback on incontinence in cancer patients undergoing radical prostatectomy. Arch Ital Urol Androl. 2006;78:92-6. https://pubmed.ncbi.nlm.nih.gov/17137022/

[7] Ribeiro LH, Prota C, Gomes CM, de Bessa J Jr, Boldarine MP, Dall'Oglio MF, et al. Long-term effect of early postoperative pelvic floor biofeedback on continence in men undergoing radical prostatectomy: a prospective, randomized, controlled trial. J Urol 2010;184:1034-9. https://doi.org/10.1016/j.juro.2010.05.040

[8] Costello AJ. Considering the role of radical prostatectomy in 21st century prostate cancer care. Nat Rev Urol 2020;17:177-88. https://doi.org/10.1038/s41585-020-0287-y

[9] Cathelineau X, Sanchez-Salas R, Barret E, Rozet F, Galiano M, Benoist N, et al. Radical prostatectomy: evolution of surgical technique from the laparoscopic point of view. Int Braz J Urol 2010;36:129-39. https://doi.org/10.1590/s1677-55382010000200002

[10] Kirschner-Hermanns R, Jakse G. Quality of life following radical prostatectomy. Crit Rev Oncol Hematol 2002;43:141-51. https://doi.org/10.1016/s1040-8428(02)00026-4

[11] Aydın Sayılan A, Özbaş A. The Effect of Pelvic Floor Muscle Training On Incontinence Problems After Radical Prostatectomy. Am J Mens Health 2018;12:1007-15. https://doi.org/10.1177/1557988318757242

[12] Hodges PW, Stafford RE, Hall L, Neumann P, Morrison S, Frawley H, et al. Reconsideration of pelvic floor muscle training to prevent and treat incontinence after radical prostatectomy. Urol Oncol 2020;38:354-71. https://doi.org/10.1016/j.urolonc.2019.12.007

[13] Overgård M, Angelsen A, Lydersen S, Mørkved S. Does physiotherapist-guided pelvic floor muscle training reduce urinary incontinence after radical prostatectomy? A randomised controlled trial. Eur Urol 2008;54:438-48. https://doi.org/10.1016/j.eururo.2008.04.021

[14] Levy A, Fleishman A, Jackson M, Waisman A, Chan M, Kleeman A, et al. Using Preoperative Pelvic Floor Assessment to Predict Early Return of Continence after Robotic Radical Prostatectomy. Urology 2021;155:160-4. https://doi.org/10.1016/j.urology.2021.04.029

[15] Bernardes MFVG, Chagas SC, Izidoro LCR, Veloso DFM, Chianca TCM, Mata LRFPD. Impact of urinary incontinence on the quality of life of individuals undergoing radical prostatectomy. Rev Lat Am Enfermagem 2019;27:e3131. https://doi.org/10.1590/1518-8345.2757.3131

[16] Nyarangi-Dix JN, Radtke JP, Hadaschik B, Pahernik S, Hohenfellner M. Impact of complete bladder neck preservation on urinary continence, quality of life and surgical margins after radical prostatectomy: a randomized, controlled, single blind trial. J Urol 2013;189:891-8. https://doi.org/10.1016/j.juro.2012.09.082