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Sukces czy porażka? Czyli jak wygląda sytuacja w zakresie szczepień ochronnych w Polsce?

Cztery uczelnie – Centrum Medyczne Kształcenia Podyplomowego, Warszawski Uniwersytet Medyczny, Akademia Leona Koźmińskiego i Uniwersytet SWPS zorganizowały konferencję naukową w ramach Projektu „Budowanie zaufania do szczepień ochronnych z wykorzystaniem najnowszych narzędzi komunikacji i wpływu społecznego”.
Podczas czterech paneli dyskusyjnych eksperci, naukowcy, lekarze, psycholodzy, przedstawiciele instytucji publicznych dyskutowali na temat szans i wyzwań stojących przed system szczepień w Polsce.

Nie da się zaprzeczyć faktom – szczepienia ochronne są najefektywniejszą metodą zwalczania chorób zakaźnych. Podnoszenie zaufania do szczepień, które przekłada się na poziom wyszczepienia populacji, jest więc kluczowym wyzwaniem stojącym przed wszystkim odpowiedzialnymi za zdrowie publiczne w Polsce.

Dużym sukcesem i krokiem w dobrym kierunku było wprowadzenie szczepień w aptekach – podkreślił prof. Jarosław Pinkas, Konsultant Krajowy w dziedzinie zdrowia publicznego.

Niemniej, mimo szeroko prowadzonej kampanii medialnej, Polska należy do krajów o najniższym poziomie wszczepienia przeciw COVID-19 w Europie (niespełna 60% populacji zostało w pełni zaszczepionych). Co roku w naszym kraju przeciw wirusowi grypy szczepi się jedynie 4-6% osób. Według danych PZH-NIPZ liczba uchyleń od szczepień obowiązkowych wśród dzieci w okresie od 2016 do 2020 roku wzrosła 2-krotnie z 23 tys. do 50.5 tys.

„Szczepienia przeciwko grypie u pracodawców bardzo zmniejszają absencję w pracy, ta sama prawidłowość dotyczy szczepień rotawirusowych” – mówił prof. Marcin Czech

Z danych uzyskanych przez Warszawski Uniwersytet Medyczny wynika, że postawy mieszkańców Polski wobec szczepień nie są spójne. Może to w przyszłości spowodować dalszy spadek poziomu wyszepienia populacji, a w dalszej perspektywie wzrost zagrożenia epidemiologicznego.

W ramach panelu prowadzonego przez Uniwersytet SWPS zastanawiano się nad przyczynami postaw wobec szczepień. Pierwszym skojarzeniem, jakie większość Polaków wypowiada po haśle „szczepienia” jest „koronawirus”. I choć rzeczywiście od końca 2020 roku szczepienia przeciwko COVID-19 stały się jednym z bardzo ważnych elementów debaty publicznej, to przecież rosnąca liczba osób uchylających się od szczepień na takie choroby jak odra czy krztusiec była ważną kwestią społeczną już przed marcem 2020 roku.

Jednym z kluczowych wyzwań stojących przed system szczepień w Polsce jest walka z fake newsami, podkreślali eksperci Akademii Leona Koźmińskiego.
Czy dezinformację naukową można interpretować w kategoriach cyberwojny?
Czy jest to zagrożenie porównywalne z katastrofą klimatyczną, bądź rozwojem technik AI? Jaką rolę odgrywają w tym procesie media społecznościowe? To pytania z którymi musimy się jak najszybciej zmierzyć.

Mimo wszystko wysoka wyszczepialność w Polsce to sukces wszystkich profesjonalistów medycznych i osób działających na rzecz zdrowia publicznego. Wciąż zdecydowana większość Polaków dokonuje właściwych wyborów zdrowotnych. To optymistyczny wniosek płynący z konferencji CMKP, WUM, SWPS i ALK. Jednak nic nie jest dane raz na zawsze – pojawiające się wyzwania powinny mobilizować lekarzy, naukowców, edukatorów, przedstawicieli administracji publicznej do szukania nowych sposobów dotarcia z komunikatem zachęcającym do szczepień i podejmowania zdecydowanych działań na rzecz walki z dezinformacją.

Effect of progressive resistance training on post prostatectomy stress urinary incontinence: A randomized controlled study

Wpływ progresywnego treningu oporowego na wysiłkowe nietrzymanie moczu po prostatektomii: randomizowane badanie kontrolowane

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Abstract

Purpose. The aim of this study was to investigate the effectiveness of progressive resistance training on post prostatectomy stress urinary incontinence. Materials and Methods. Sixty male patients who complaint from post prostatectomy stress urinary incontinence were participated in this study, their ages were ranged from 40 to 75 years and they were randomly assigned into two equal groups. Group (A) (Study group): This group included 30 patients who had post prostatectomy stress urinary incontinence and they received progressive resistance training in addition to interferential current stimulation and routine medical treatment three sessions per week for 12 weeks. Group (B) (Control group): This group included 30 patients who had post prostatectomy stress urinary incontinence and they received interferential current stimulation and routine medical treatment three sessions per week for 12 weeks. Pre- and post-treatment assessment using DANTIC UD 5000/5500 Urodynamic investigation system & Severity index scale were done for all patients. Results. The obtained results of the present study indicated significant difference of all measured variables when comparing between pre and post- treatment values of the groups (A and B) and revealed significant difference when comparing between post- treatment values of the groups (A and B) in favor of group (A). Conclusion. Progressive resistance training had an effect on reducing post prostatectomy stress urinary incontinence and there was significant difference when comparing between post-treatment values of the groups (A and B) in favor of group (A).

Keywords

progressive resistance training, post prostatectomy, stress urinary incontinence

Streszczenie

Cel. Celem niniejszego badania było zbadanie skuteczności progresywnego treningu oporowego w wysiłkowym nietrzymaniu moczu po prostatektomii. Materiały i metody. W badaniu wzięło udział 60 pacjentów płci męskiej, którzy skarżyli się na wysiłkowe nietrzymanie moczu po prostatektomii, w wieku od 40 do 75 lat, przydzielonych losowo do dwóch równych grup. Grupa (A) (Grupa badana) obejmowała 30 pacjentów z wysiłkowym nietrzymaniem moczu po prostatektomii, która oprócz stymulacji prądami interferencyjnymi i rutynowego leczenia medycznego - trzy sesje w tygodniu przez 12 tygodni - realizowała progresywny trening oporowy. Grupa (B) (grupa kontrolna) obejmowała 30 pacjentów, u których zdiagnozowano wysiłkowe nietrzymanie moczu po prostatektomii, była poddawana stymulacji prądem interferencyjnym i rutynowemu leczeniu medycznemu - trzy sesje w tygodniu przez 12 tygodni. U wszystkich pacjentów przeprowadzono ocenę przed i po leczeniu za pomocą systemu DANTIC UD 5000/5500 do badania urodynamicznego oraz na podstawie skali wskaźnika ciężkości. Wyniki. Uzyskane wyniki niniejszego badania wykazały istotną różnicę wszystkich mierzonych zmiennych przy porównywaniu wartości przed i po leczeniu grup (A i B) oraz ujawniły istotną różnicę przy porównywaniu wartości po leczeniu grup (A i B) na korzyść grupy (A). Wniosek. Progresywny trening oporowy miał wpływ na zmniejszenie wysiłkowego nietrzymania moczu po prostatektomii i wystąpiła istotna różnica przy porównaniu wartości po leczeniu grup (A i B) na korzyść grupy (A).

Słowa kluczowe

progresywny trening oporowy, stan po prostatektomii, wysiłkowe nietrzymanie moczu

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Introduction

Open laparotomy and laparoscopic surgery utilising standard laparoscopic devices or robotic instruments are two types of radical prostatectomy. Each surgical procedure has a different approach to the prostate. The basic goal of these surgeries is to remove the prostate, bilateral seminal vesicles, vas, and enough surrounding tissue to avoid a positive resection margin while preserving the urethral sphincter and neurovascular bundle. Several surgical approaches for reducing urine incontinence, particularly after radical prostatectomy, have been devised and implemented to date [1].

Damage to the urethral sphincter muscle or the nerves that regulate it during surgery might cause urinary incontinence. Stress-type incontinence, which occurs when coughing or doing daily tasks, can raise intra-abdominal pressure and is difficult to treat with medical therapy. Failure to manage postoperative urine incontinence could have a negative impact on patients' social and sexual lives, as well as be a significant factor in lowering health-related quality of life. When post-prostatectomy incontinence is severe, it has been linked to a poorer level of patient satisfaction with the surgical procedure [2].

The most generally used approaches for conservative management of post-prostatectomy incontinence include kegel exercises, and several pelvic floor muscle exercise programs have been created and regularly used in incontinence research. Those earlier investigations, on the other hand, haven't looked into the process of recovery from post-prostatectomy incontinence and haven't come up with any convincing hypotheses. There is a limit to how accurate the pelvic floor muscles can be measured because they are not a muscle that enters the surface. Thus, in the current investigation, it was determined that contraction of the hip adductors, pelvic area muscles, gluteal region muscles, and abdominal muscles, collectively known as core muscles, might cause stimulation and contraction of the pelvic floor muscles [3, 4]. Therefore, this study aimed to investigate the effectiveness of progressive resistance training on post prostatectomy stress urinary incontinence.

Materials and Methods

Design

A randomized control trail was conducted to investigate the effectiveness of progressive resistance training on post prostatectomy stress urinary incontinence. Data were collected pre and post interventions from January 2020 to August 2021. Research protocol was approved by Ethical Committee, Faculty of Physical Therapy, Cairo University, Egypt. [No. P.T.REC/012/002614].

Participants

Sixty male patients, ranging in age from 40 to 75 years, were diagnosed with post prostatectomy stress urine incontinence. They were chosen at random from Cairo, Egypt's AL Kasr EL Ainy Hospital, National Cancer Institute, and National Institute of Urology and Nephrology. Exclusion criteria include adjuvant or neoadjuvant chemo-radiation therapy, significant postoperative problems, a history of pelvic surgery, disorders that influence voiding function, and activity limits, such as for individuals with serious cardiovascular events, spinal or articular disease.

Randomization

The recruited patients were randomly assigned, after signing consent form, into two equal groups. A single blind randomization was carried out by assigning the odd numbers to group (A) (experimental group) and the even numbers were assigned to group (B) (control group). Following randomization, there was no dropping out of subjects from the study, Figure 1.

Interventions

Group A (experimental group) included 30 patients who received progressive resistance training in addition to guideline protocol (Interferential current stimulation and routine medical treatment) for 12 weeks, whereas Group B (Control group) included 30 patients who received guideline protocol (Interferential current stimulation and routine medical treatment) for 12 weeks.

The guideline protocol

All participants in both groups (A & B) received interferential current stimulation in which patients performed the treatment by using two channel electrotherapy unit Duo 200, gymna manufacture, gymna Uniphy N.V., made in Holland, Four pole Medium frequency, carrier wave 4.0 KHZ, F min. 100 HZ, F Max 100 HZ, CC/CV: CC, and treatment time of 15 minutes. It was used to exercise the pelvic floor muscles and inhibiting the involuntary detrusor muscle contractions. This system did not cause any unpleasant sensation for the patient.

Interferential current was delivered through surface electrodes

• Two electrodes were placed symmetrically on the abdomen above the inguinal ligament, 3 cm apart.
• Two electrodes were placed on the inside of the thighs below the inferior border of the femoral triangle. The painful sensation not be detected.

It was conducted to the patients in the following manner:

1. All subjects in the groups were asked to evacuate their bladder before starting the treatment sessions to ensure that they were relaxed and comfortable during the session.
2. The therapist had to wash his hands and wear sterile disposable gloves before starting the treatment session.
3. The areas of placement of electrodes were cleaned by using savlon solution.
4. Interferential current electrodes were fixed to those areas by using adhesive plaster.
5. The lead wire was connected to the stimulating unit.
6. Parameters of the stimulator unit were adjusted as: carrier wave 4.0 KHZ, F Min, is 100 HZ, CC/CV is CC and the treatment time was 15 minutes.
7. The current intensity increased until the patient felt a definite prickling, and then left for one minute.
8. The current intensity was increased again until the patient reported as light muscular contraction.
9. The procedure was repeated three times weekly for 12 successive weeks.

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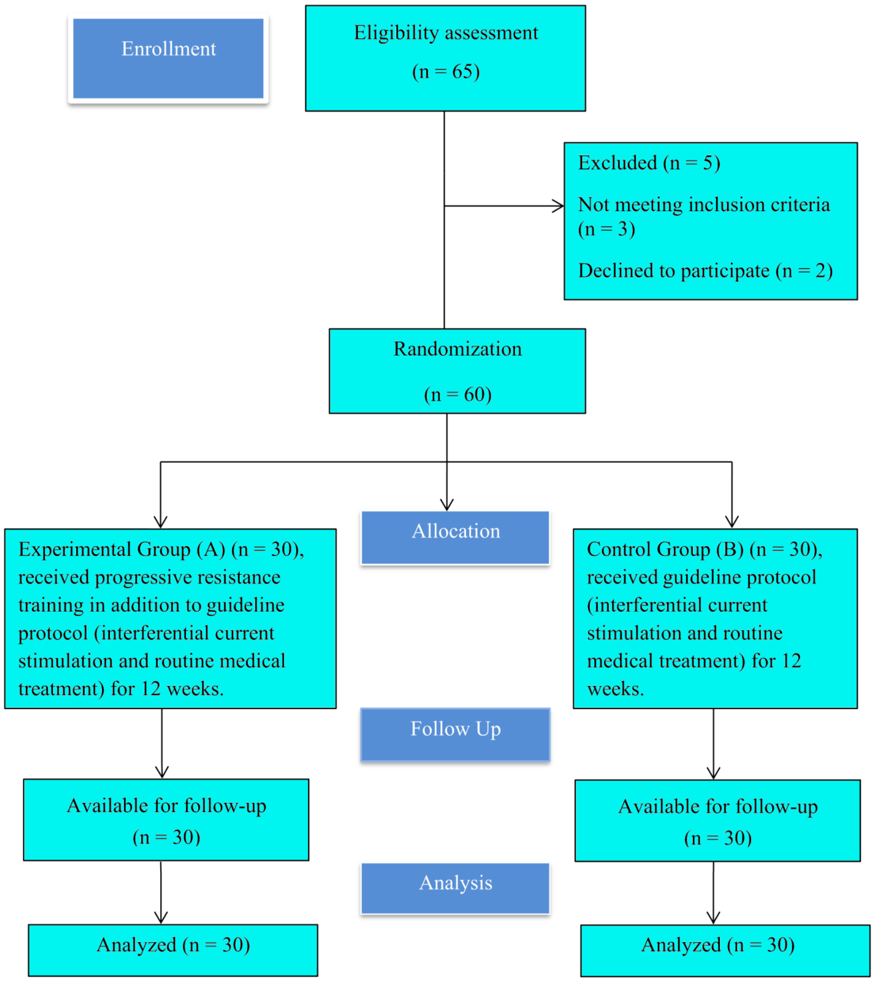

Figure 1. Flow chart of the study

To reduce the chance of skin irritation, the following procedure was performed:
1. Hair was shaved before applying an electrode to encourage better contact and connectivity between the skin and the electrode.
2. Electrodes were cleaned.
3. The electrodes were firmly pressed onto the skin to ensure complete contact
4. Electrodes were removed through gentle pull.
5. Electrodes were not applied over broken skin as this might produce discomfort.
6. Electrodes and skin did not allow to be stretched.

Progressive resistance training for group A (experimental group)
Within two weeks of surgery, progressive resistance training focusing on the pelvic floor muscles was started and continued for another 12 weeks. This strategy suggested starting Kegel-based weight-bearing activity at 0–4 weeks postoperatively (phase 1), followed by elastic-band-based high-speed power training till 8 weeks (phase 2). A 10-minute warm-up, 40 minutes of Kegel-based exercise training, and a 10-minute cool-down were included in each session. Between sets, 1 minute of rest was permitted, and 2 minutes between exercises. High-speed resistance training is described as a contraction phase that is supposed to be completed as rapidly as possible, with a one-second break and an eccentric contraction that lasts longer than two seconds. The usage of elastic exercise bands is crucial to high-speed resistance workout routines. Two to three sets of 10–12 repetitions were used in each high-speed resistance training activity. The workout was done three times per week. In addition, we conducted different sets and repetitions to determine the intensity of each exercise. Following that, the elastic band was employed to enhance the intensity of the activity through testing following an intermediate visit. The exercise program was based on the American College of Sports Medicine's Guide to Exercise and Cancer Survivorship [5, 6].

Outcome measures
• DANTIC UD 5000/5500 Urodynamic investigation system was used to perform the urodynamic investigation; voiding cystometry. It was comprised of a trolley-mounted unit with integral printer and monitor, a mobile patient unit with built in H_2O and CO_2 pumps, a stand-mounted uroflow transducer and a stand-mounted puller mechanism. Cystometry was used to measure the pressure-volume relationship of the bladder. This method provided information concerning accommodation of the bladder to increasing filling volumes and central nervous control of the detrusor reflex. The patient was investigated from supine position and various provocation tests might be required.

• Severity index scale: was used to measure frequency and amount of urine loss to calculate severity of incontinence.
  ◦ Frequency of urine loss grades (Never = 0, less than once a month = 1, once to several times a month = 2, once to several times a week = 3, Every day and/or night = 4).
  ◦ Amount of urine loss grades (No drop (completely dry) = 0, A few drops = 1, A little = 2, More = 3).

Finally, the severity index of urine incontinence was calculated by this equation:
Severity index of incontinence = (Points for frequency of urine loss) × (Points for amount of urine loss)
Which has the following grades (No urinary incontinence = 0, slight incontinence = 1–2, moderate incontinence = 3–6, Severe incontinence = 8–9, very severe incontinence = 12)

Statistical analysis

The statistical analysis was carried out with the statistical SPSS Package application for Windows version 25. (SPSS, Inc., Chicago, IL). Data were screened, for normality assumption test and homogeneity of variance. The results revealed that all data were normally distributed and were subjected to parametric analysis. Quantitative descriptive statistics such as the means and standard deviations were calculated for all variables in both groups. Within groups (A) and (B), a paired t-test was used to compare before and after interventions in the same group of individuals (for follow up) to assess the effect of progressive resistance training on post prostatectomy stress urinary incontinence. Unpaired T-test to compare between both groups. Chi-square tests were used to assess differences between groups and McNemar tests were used to assess within groups differences for detrusor stability and bladder compliance. At the statistical level, all statistical analyses were significant at a probability threshold of less than 0.05 ($p \leq 0.05$) and highly significant at $p \leq 0.001$.

Results

At baseline, both groups were similar in terms of age ($p > 0.05$) (Tables 1). The obtained results of the present study indicated significant difference of all measured variables when comparing between pre and post- treatment values of the groups (A and B) and revealed significant difference when comparing between post- treatment values of the groups (A and B) in favor of group (A). In addition, the number of participants with Bladder compliance and Detrusor stability in the post condition was significantly higher average compliance and higher detrusor stability in the group (A) ($p < 0.05$) compared to the group (B).

Table 1. Demographic data of the patients in both groups

Items	Group A Mean ± SD	Group B Mean ± SD	Comparison t-value	Comparison P-value
Age [year]	55.55 ± 2.57	55.05 ± 2.73	0.84	0.41

SD: Standard Deviation, t-value: Un-paired t-test value. p-value: Probability value

Table 2. Urodynamic investigation and severity index scale in both groups

		Group (A) (Exercise group) Mean ± SD	Group (A) P-Value Pre- and post-treatment	Group (B) (Control group) Mean ± SD	Group (B) P-Value Pre- and post-treatment	Group t-test P-Value Between both groups
Bladder volume at first desire to void [ml]	Pre-treatment Post-treatment	208.43 ± 17.77 149.23 ± 13.79	0.0001^{S}	205.6 ± 14.37 161.32 ± 13.3	0.0001^{S}	0.5^{NS} 0.001^{S}
Bladder volume at cystometric capacity [ml]	Pre-treatment Post-treatment	357.92 ± 12.68 392.72 ± 38.43	0.0001^{S}	360.64 ± 17.35 373.96 ± 18.31	0.0001^{S}	0.49^{NS} 0.02^{S}
Detrusor pressure at maximum flow rate [ml/sec]	Pre-treatment Post-treatment	42.89 ± 6.48 28.65 ± 6.08	0.0001^{S}	41.17 ± 5.55 34.08 ± 5.06	0.0001^{S}	0.274^{NS} 0.0001^{S}
Detrusor pressure at cystometric capacity [cmH_2O]	Pre-treatment Post-treatment	34.37 ± 4.73 26.96 ± 4.25	0.0001^{S}	35.65 ± 5.59 30.5 ± 5.05	0.0001^{S}	0.342^{NS} 0.005^{S}
Maximum flow rate [ml/sec]	Pre-treatment Post-treatment	11.25 ± 2.26 17.21 ± 1.8	0.0001^{S}	10.67 ± 1.71 14.07 ± 1.99	0.0001^{S}	0.263^{NS} 0.0001S
Flow time [sec]	Pre-treatment Post-treatment	16.58 ± 1.57 11.76 ± 1.45	0.0001^{S}	16.92 ± 1.23 13.68 ± 1.62	0.0001^{S}	0.351^{NS} 0.0001^{S}
Severity index scale	Pre-treatment Post-treatment	8.9 ± 1.16 4.93 ± 1.08	0.0001^{S}	8.67 ± 1.27 6.27 ± 1.17	0.0001^{S}	0.459^{NS} 0.0001^{S}

NS $p > 0.05$ = non-significant, S $p < 0.05$ = significant, p = probability

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Table 3. Frequency of Bladder compliance and Detrusor stability, Chi-square (between groups) and McNemar (within groups) p values in the both groups in the "pre" and "post" test condition

Outcome measures		Group (A) (n = 30)		Group (B) (n = 30)		X²
		Low	Average	Low	Average	p value
Bladder compliance	Pre	21 (70%)	9 (30%)	19 (63.33%)	11 (36.67%)	0.876
	Post	8 (26.67%)	22 (73.33%)	15 (50%)	15 (50%)	0.005*
McNemar p value		0.035*		0.03*		
Detrusor stability	Pre	11 (36.67%)	19 (63.33%)	10 (33.33%)	20 (66.67%)	0.862
	Post	20 (66.67%)	10 (33.33%)	14 (46.67%)	16 (53.33%)	0.00*
McNemar p value		0.009*		0.029*		

**Significant at alpha level < 0.05.*

Discussion

This controlled randomized study was designed to compare between the effectiveness of progressive resistance training on reducing post prostatectomy stress urinary incontinence. Sixty male patients who were previously diagnosed as post prostatectomy stress urinary incontinence were participated in this study. Their ages were ranged from 40 to 75 years and they were selected from Kasr EL-Ainy Hospital, National Cancer Institute and National Institute of Urology and Nephrology. Urinary incontinence and overacting bladder are common conditions in the adult populations, with impact on physical, psychological and social well-being, and represents an important burden to the economy of health services [7].

Urinary incontinence is a prominent syndrome in geriatric medicine and its varied pathogenic mechanisms differ according to the clinical characteristics of the patients. Most of the published papers attribute to urinary incontinence in elderly to overactive bladder. The International Continence Society defines the overactive bladder as the presence of uninhibited bladder contraction during the storage phase that overcomes the urethral resistance but is associated with an efficient voiding mechanism. This is important because some elderly patients can exhibit a urodynamic phenomenon called detrusor hyperactivity with impaired bladder contractility (DHIBC) [8].

The internal sphincter's urine continence mechanism is damaged during radical prostatectomy. The major causes of urine incontinence are sphincter insufficiency and detrusor overactivity (DO) [9]. In many patients, the cause of these symptoms is DO which is most cases is idiopathic with no obvious underlying neurological abnormality. Patients with DO also suffer from sleep disturbance, psychological distress from embracement due to incontinence and disruption to social and work life [10]. The symptoms of overactive bladder include frequent urination, urgency of urination and urge incontinence. Overactive bladder may cause significance social, psychological, occupational, physical and sexual problems [11].

Overactive bladder is a common problem in the United States, affecting over 33 million persons. Despite the significant impact on patients' quality of life, overactive bladder is underdiagnosed and undertreated as a result of patient acceptance and unwillingness to seek medical care, as well as a lack of proactive physician questioning [12]. For years, standard therapy for urinary incontinence had been surgery for stress incontinence and anticholinergic therapy for urge incontinence [13]. Although the medical and surgical treatments are effective, both of these treatments has significant draw backs, the complications, side effects and failure of these traditional approaches lead many patients to refuse these kinds of treatment and seeking for another alternative with fewer side effects [14]. Rehabilitation of bladder dysfunction is a combination of medical, surgical and physical therapy modalities, the medical treatment either to strengthen, or to lower the detrusor muscle contraction, or to strengthen or lower the bladder outlet resistance [15]. The majority of male urine incontinence is caused by sphincter weakening as a result of prostatic surgery. Male incontinence is becoming more common as the geriatric population grows and the frequency of surgical treatments for prostate cancer rises. As a result, urologists are becoming more interested in the management of male incontinence. For early postoperative and mild incontinence, noninvasive therapy is recommended. Despite the introduction of various more minimally invasive procedures, the artificial urinary sphincter is still considered the gold standard for surgical therapy [16].

On the other hand, the surgical treatment of such problem include; the treatment of the primary cause as removing the large prostate, injection of bulking agents as collagen, or the implantation of artificial urethral sphincter [17]. There are several techniques used for post-prostatectomy UI within the scope of physiotherapeutic treatment, such as kinesiotherapy, biofeedback, and electro stimulation, whose goal is to re-educate and strengthen the pelvic floor muscles (PFM) in order to regain urine continence, allowing the process of urination and urination voluntarily [18].

Electrical stimulation with stress incontinence claims to improve the function of the pelvic muscles. Pelvic floor electrical stimulation (PFES) activates pudendal nerve afferents, which in turn results in activation of pudendal and hypogastric nerve efferents, causing contraction of striated periurethral muscles and striated PFM [20].

Electrical stimulation is a neuromodulation therapy that affects the neural signaling which control incontinence. Stimulation of afferent sacral nerves in either the pelvis or lower extremities

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increases the stability stimuli to the efferent pelvic nerve and reduces the detrusor contractility [21].

Electrical stimulation was useful in treating urinary incontinence due to detrusor instability with improvement of 70% of their patients as electrical stimulation is an effective and safer modality in the treatment of the bladder dysfunction, therefore electrical stimulation was strongly recommended due to its low coast if compared to other modality, easy application and good results [22].

Peripheral nerve stimulation produce a statistical significance improvement in lower urinary tract symptoms specially day time and night time voiding frequency and volume, leakage episodes. [23].

The improvement rate in stress incontinent patients was 66%, while it was 72% in patients with detrusor instability after applying electrical stimulation. The application of various forms of electrical stimulation is considered as a therapeutic option to manage different types of lower urinary tract dysfunction. [24].

Muscular overactivity was suppressed by electrical stimulation without reducing its contractile force and detrusor instability became stable in 89% of men with detrusor instability and it was noted that long term electrical stimulation of the peripheral nerves with sufficient intensity to result in appropriate response in the effectors organ did not induce neural damage [25].

Also, Muscular overactivity was suppressed by electrical stimulation without reducing its contractile force [26]. 80% of improvement rate of bladder overactivity by using surface electrical stimulation [27]. Increased ß adrenergic activity in the detrusor muscle after pelvic floor electrical stimulation, whereas cholinergic receptor activity was reduced [28].

These findings are in agreement with Lima et al. [29], who stated that physical therapy modalities used to treat urinary incontinence increase the interval between urination and, as a result, reduce urinary frequency, in addition to increasing the strength of perineal contraction and decreasing urinary loss.

There are four key principles that needs to be considered when designing the exercise protocol; 1) specificity of muscle training, 2) overload principle for muscle training, 3) individualizing exercise regimes and 4) reversibility of training effects. Optimum goal achievement is when tainting a muscle dependent on how specific the training is in relation to the function of the muscle [30].

The component of the exercise prescription is; 1) length of hold of contraction, 2) length of relaxation between contraction, 3) number of repetition, 4) total number of contraction a day, 5) number of time per day and 6) strength of contraction (maximum or sub-maximum). The inherent function of the muscles such as power versus postural can influence the specificity of training and thus the type of contraction used; isotonic, isokinetic and isometric [31]. Regardless of the type of the exercise training regimes used, the muscles being trained must develop tension to the point of the overload in order to build strength. Progressive resistive exercises stimulate continued adaptation, leading to muscle hypertrophy and increased muscle strength [32].

Pelvic floor muscle training (PFMT) is widely used to treat stress urinary incontinence (SUI). The biological justification for PFMT in the treatment of SUI is that a strong and rapid contraction of the pelvic floor muscle clamps the urethra, increasing urethral pressure and preventing leakage during a sudden increase in intra-abdominal pressure. All women with stress or mixed urine incontinence should be administered PFMT as a first-line treatment [20]. PFM exercise entailed the voluntary contraction of the pelvic floor muscles, PFM exercise regimens generally involve rapid and sustained contraction in order to strengthen the fast-and slow-twitch fibers [33].

The PFM exercise increase muscle volume and strength, so it is recommended as a treatment for men with urinary frequency, terminal dribbling and urinary incontinence. The PFM exercise seems to help in reducing symptoms and provides better psychological and social quality [19]. Also, PFM exercise may help patients suffering from stress or urge incontinence, it may be practiced during lying down, sitting and standing or even during walking and the patients is instructed to contract as if he tries to interrupt his urine stream [34].

Moreover, PFM exercises has slight improvements in the severity of patients' urinary incontinence were evident over time. The impact of incontinence on daily life and on the extent of anxiety and depression also gradually ameliorated after surgery. Resistance band PFM exercise precisely induces contraction of the muscle group of the pelvic floor, taking advantage of the strength applied by the abductor of the hip joint plus the rectus [35].

PFMT promotes increased muscle strength and endurance, improving urinary incontinence by tightening the urethra and increasing intra-urethral pressure when intra-abdominal pressure increases [9]. Despite the effectiveness of the PFM exercise in controlling incontinence, there are limited numbers of published PFM exercise protocols for male patient. Physiotherapists used varied PFM exercise protocols when treating post-prostatectomy related urinary incontinence. This variation may be attributed to the diverse level of education, knowledge and experience with post-prostatectomy urinary incontinence [36].

According to Lin et al. [37] in the experimental study on the effects of early muscle exercise on the pelvic floor for sexual dysfunction in radical prostatectomy recipients, many men develop sexual dysfunction in response to erectile dysfunction, being present in 25% to 97% of patients who underwent radical prostatectomy, however the training demonstrated that pelvic floor exercises can strengthen the external sphincter and improve urinary incontinence and sexual dysfunction.

Lima et al. [29] carried out a bibliographic review based on controlled clinical trials in which physiotherapeutic techniques for strengthening the pelvic floor muscles were used for treatment in the perioperative period of radical prostatectomy. The study demonstrated that several approaches and samples showed promising results in minimizing postoperative urinary incontinence, mainly accelerating recovery and healing or decreasing symptoms.

Park et al. [38] found that the strength and resistance changes of the hip muscles were significantly greater in the continent group of the lower limbs than in the incontinent group in their prospective study in two groups to evaluate the effectiveness of resistance training for post prostatectomy urinary incontinence.

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This suggests that the change in strength and resistance of these muscles may be related to achieving urinary continence.
The effectiveness in training is based on targeting a muscle group, taking in to consideration the composition of the muscle fibers such as the ratio of type I and type II fibers. Consideration is also given to the contractile properties and endurance capacity of the muscle fibers in order to increase its performance for specific needs. Overloading muscle an adequate intensity and duration is required in order to increase strength of specific muscles. Skeletal muscle is capable of adapting to repetitive episodes of contraction that occur during exercise [39].
Parekh et al. [40] proved that when training for strength, the frequency, intensity and duration of exercise are prescribed with a higher focus with the intensity of the exercise to promote muscle hypertrophy. When training a muscle for endurance, a lower level of intensity but a higher level of frequency and duration is prescribed. The low intensity and higher frequency taxes the cardiovascular system more aerobically this makes it possible for muscles to work over longer periods of time and increase its functional endurance.
Continuing to work the muscle at a maintenance level once optimum strength has been achieved can slow the rate of decrease of training effects. Reduced level of exercise will continue to keep achieved level of strength and function in the muscle for up 18 weeks once intensive strengthening has been stopped [41]. In contrast, Geirson et al. [42] reported that electrical stimulation has no difference in voiding frequency, mean and maximum void volume. Blaivas J, [43] stated that electrical stimulation had no significant value in the bladder compliance before and after treatment. Also, Fjorback et al. [44] rejected that electrical stimulationhas no effect or suppress detrusor contraction on neurologic detrusor overactivity patients but the bladder volume during the first contraction and cystometric bladder capacity was increased. Many studies have reported an absence of any significant association between prostate volume and final urinary incontinence status [45]. 253 patients who underwent radical prostatectomy and were segregated into two subgroups according to their prostate volume as measured by transrectal ultrasound, more specifically into prostate volume < 40 g or ≥ 40 g [46].

Study limitations
The study was limited by extraneous factors that may have interfered with the results of this study, these factors are related to psychological status of patients at time of performance or measurement might affect the result, Physiological variation from subject to subject. Another limitation was possible errors during the measurement.

Conclusion

Progressive resistance training had an effect on reducing post prostatectomy stress urinary incontinence and there was significant difference when comparing between post-treatment va-

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