Low Frequency Current Versus Pelvic floor Exercises in Treatment of Female Stress Urinary Incontinence

Azza B. Nashed, PT.D.*, Magda S. Mourssy, PT.D.* and Ahmed A. Moharam, M.D.**
* Department of Physical Therapy of Obstetrics and gynaecology, Faculty of Physical Therapy, Cairo University.
** Department of Urology and Urosurgery, Faculty of Medicine, Cairo University.

ABSTRACT

This study was designed to detect the efficacy of low frequency current versus exercises for pelvic floor muscles (PFMs) in the treatment of female stress urinary incontinence. Thirty volunteer women, diagnosed with mild stress urinary incontinence, selected from outpatient clinic of gynaecology, at EL-Galaa Teaching Maternity Hospital. Their age ranged from 30-40 years (34.66±3.56). They were divided randomly into two groups equal in number. Group (A) received low frequency currents for the pelvic floor muscles 3 sessions/week for 12 weeks, while, group (B) was treated with pelvic floor exercises by using the perineometer 3 sessions/week for 12 weeks. Assessment of vaginal, as well as leak point pressures in addition to subjective assessment were done before starting the treatment, and after the end of the 36th session. The obtained results showed a statistically highly significant (P<0.01) increase in vaginal and leak point pressures of both groups (A and B), yet this improvement was highly significant (P<0.01) in group (B) when compared with group (A). Comparative analysis in group (A) to that of group (B) indicated highly significant (P<0.01) improvement in subjective assessment scores in favouring to group (B) at the end of the treatment program. Accordingly, it could be concluded that the use of electrical stimulation for PFMs appears to be effective, but the pelvic floor exercises were found to be more superior in the management of mild degree of stress urinary incontinence.

Key words: *Stress Urinary Incontinence - Electrical Stimulation - Urodynamic - Pelvic Floor Exercises.*

INTRODUCTION

Stress urinary incontinence (SUI) is a common condition that affects at least 14% of women who are > 30 years of age. SUI often has a severe negative impact on the daily lives of women, and it rarely improves spontaneously[7].

Stress urinary incontinence (SUI) is a medical, social and/or hygienic problem[12], It has a profound psychosocial impact not only to patients but also on their families and caregivers, resulting in loss of selfstem, sexual dysfunction, withdrawal from social as well as, physical and fitness activities, which may threat women's general health, wellbeing and decrease her ability to maintain an independent life style[11].

Several studies demonstrate a higher prevalence of urinary incontinence in parous compared to nulliparous women as well as a positive correlation between occurrence of stress incontinence and number of births[20].

Pelvic floor muscles may be weakened due to a variety of causes. The most common factor being vaginal delivery at childbirth. These muscles have been shown to be involved in the maintenance of continence in caseof increased intra-abdominal pressure[15].

Also, SUI may result from urethral hypermobility or intrinsic sphincter deficiency, urethral hypermobility, the most common cause, occurs when the anatomic support of the bladder neck is lost and allows the proximal urethral pressure zone during straining less than the intravesical pressure[8].

Certain physical therapy procedures have been shown to control or improve the problem. Pelvic floor exercises are established as first line of treatment for female stress urinary incontinence, pelvic floor exercises advocate in an attempt to strengthen weak perineal and pelvic floor muscles in patients with stress urinary incontinence and their success depend on high level of patient's motivation and compliance, with an individual exercise programs[14].

Because approximately 30% of the women are unable to perform an isolated pelvic floor contraction following written or verbal instruction[21], most pelvic floor muscle exercises may be accompanied by inappropriate responses such as contraction of gluteal muscles as well as, the tendency to tense abdominal muscles, which increases bladder pressure and therefore, increases the probability of incontinence[1].

The Key factors for successful pelvic floor muscle exercises program are the ability to localize, isolate and contract the proper muscle and promote the patient motivation[5].

The use of biofeedback training for the pelvic floor muscles seems to be effective in the management of mild and moderate genuine stress urinary incontinence especially if associated by traditional exercises which may be recommended to obtain better results[10].

Neuromuscular electrical stimulation by using either intra-vaginal or surface perineal electrodes has also been used in treating urinary incontinence with promising results[10].

So, this study was conducted to determine the effectiveness of low frequency current versus pelvic floor muscle exercises in the treatment of mild stress urinary incontinence.

SUBJECTS, MATERIAL AND METHODS

Subjects

This study was carried out on 30 ladies, selected from outpatient clinic of gynaecology, at EL-Galaa Teaching Maternity Hospital. Their ages ranged from 30-40 years old, their BMI not exceed 30 kg/m^2 and the number of parity not exceed two times. They were referred from gynecologists and urologist after gynecological and urological examinations. Patients with urinary tract infection, unstable bladder, pregnancy, pelvic tumor, diabetes mellitus, smoking, a history of neurological and respiratory disorders or low back pain were excluded from this study.

None of the patients had been taken any medication or specific treatment for stress urinary incontinence during the course of the study.The patients were randomly divided into two groups equal in number (A&B).

Group A (Electro- stimulation group)

Consisted of 15 patients who received low frequency current for the pelvic floor muscles, 3 sessions per week for 12 weeks (36 sessions), and the duration of each treatment session was 20 minutes, at frequency of 20 Hz, intensity of (30-35 mA)as high as the patients tolerated, pulse duration of 200 µs, and pause duration of 400 µs.

Group B (Pelvic floor exercises group)

Consisted of 15 patients who performed pelvic floor exercises by using the perineometer, 3 sessions per week for 12 weeks (36 sessions), and the duration of each treatment session was 20 minutes. Each patient was asked to contract her pelvic floor muscles strongly and hold the contraction for 3, 10, 30 & 60 seconds followed by relaxation which was equal to the time of contraction.

Physical characteristics of patients in both groups (A&B) are summarized in table (1).

Table (1): Physical characteristics of the patients in both group (A&B).

	Age (yrs)		Weight (kgs)		Height (Cms)		BMI (Kg/m^2)	
	Group (A)	Group (B)	Group (A)	Group (B)	Group (A)	Group (B)	Group (A)	Group (B)
Mean	34.93	34.66	74.30	74.30	159.00	161.60	28.73	28.15
SD	±3.45	±3.55	±5.59	±4.32	±5.41	±4.17	±0.89	±1.01
MD	-0.27		0.00		2.60		-0.58	
t-value	0.20		0.00		1.47		1.66	
P-value	0.80		1		0.15		0.10	
Significance	Non Sig.		Non Sig.		Non Sig.		Non Sig.	

Instrumentations

1) Weight-height scale for measuring the patient's body weight and height to calculate the body mass index (BMI).
2) Condoms for covering the probe of the preniometer to avoid cross infections.
3) Subjective assessment of the patient symptoms was scored on a simple ordinal scale after completion of 3 months' treatment as following: 1= worse, 2 = same, 3 = slightly improved, 4 = greatly improved and 5 = cured.
4) 4) Electrical stimulation machine (phyaction 787): It is a universal device for electro-stimulation; with a frequency of 0- 200 Hz, pulse shape of rectangular or triangular, pulse time of 0.1- 1000 µs, pause time of 2-9999 µs, contraction time of 0.05- 100 sec., rest time of 0.05-100 sec., surge of 0-100 % and output current of 0-80mA. It was used for stimulating the patient's pelvic floor muscles in group(A) through the vaginal electrode.
5) Preniometer (Peritron 9300): The preniometer used in this study was Peritron 9300 with vaginal sensor. It has a range of 0-300cm water pressure with 1 cm resolution. Accuracy 95% of readings are correct ±1cm. Display liquid crystal of 3.5 digits 12.7mm high with indicator for battery low charge and output option of 0-3.5 DC into 3.5K ohms\min proportional to sensor pressure. It is used for pelvic floor muscles education as well as, objective assessment for measuring strength and endurance of the pelvic floor muscles.
6) Urodynamic device (Merkur 2000): It is designed to perform urodynamic measurements of patients exhibiting incontinence or voiding disorders and also, to test the functionality of the bladder as well as, the urethra, by recording pressure, flow rate, and EMG under quiet and/or stressful situations.It was used to confirm the diagnosis of stress urinary incontinence and was done for subtract cystometry and valsalva leak point pressure before and after the treatment for all women of both groups.

Procedures

1- Evaluative procedures:

Evaluation of each patient in both groups (A&B) was done before starting and after the end of the treatment programs.The evaluative procedures include:

A- History taking:

A detailed medical and gynaecological history was taken from each patient including a characterization of the voiding patterns, stresses that evoke a loss of urine, use of medication, history of urinary tract infection and history of neurological or spinal cord disorders.

B- Urodynamic evaluation:

Each patient was evaluated by leak point pressure test which is a relatively quick as well as, valid test and easy to perform.

Catheterization of the patient was done by using two sterile catheters, one introduced into the urethra and bladder through single lumen technique, to record the intra-vesical pressure and the other catheter was introduced into the rectum to record the intra-abdominal pressure.

The urethral catheter records the total intra-vesical pressure (P ves.), while the rectal catheter records the intra-abdominal pressure (P abd.). However, detrusor pressure component was obtained from the following equation:

P det. = P ves. - P abd.

C- Vaginal pressure:

Vaginal pressure was measured by using the vaginal probe of the biofeedback apparatus. Each patient was trained on localization and isolation of pelvic floor muscles contraction, to achieve full awareness of the needed muscular contraction. Then the sterile vaginal probe introduced into the vagina and the patient was asked to contract her pelvic floor muscle as she could, then she was asked to relax (five times). However, this maximum vaginal pressure of five muscular contractions; was recorded and considered the evaluative value.

D- Subjective assessment scale:

It was scored on a simple ordinal scale after completion of 3 months' treatment (36 treatment sessions) as following: 1= worse, 2 = same, 3 = slightly improved, 4 = greatly improved and 5 = cured.

2-Treatment procedures:

Group A (Electro-Simulation group):

Each patient in this group received low frequency current for the pelvic floor muscles, by using vaginal electrode, at frequency of 20 Hz, Intensity of (30-35mA) as high as the patients tolerated, pulse duration of 200 µs, and pause duration of 400 µs for 20 minutes, 3 sessions/week for 12 weeks (36 sessions) in addition to an exercise program as a home routine.

Before starting the treatment session the patient was asked to evacuate her bladder. The treatment table was prepared and covered by a sterile sheet. After that the patient was asked to lie in crock lying position. Then, Phyaction 787 apparatus was prepared by connecting the main cable supply to the main unit and connecting the main plug to an earth wall socket. The main unit was switched on using the main switch, the unit carried out a self testing, at the end of the test a beep can be heard.

And, the vaginal electrode was disinfected by using petadene solution. This disinfecting solution may decrease the conductivity of the electrodes; so the vaginal electrode was moistened by using saline solution or warm tap water and inserted inside the vagina, then each patient was covered by another sheet.

Group B (Pelvic floor exercises group):

Each patient in this group performed pelvic floor exercises by the use of preniometer. The patient was asked to carry the main unit on her hand so that, allowing clear vision of the screen (visible feedback).

The main unit was turned on, while at the same time the therapist turn on the stop watch. The patient was asked to contract her pelvic floor muscle. strongly as she could and hold for 3, 10, 30 and 60 seconds followed by time of relaxation equal to that of contraction (9 sessions for each duration as a progression & graduation), after 10 repetitions the patient had a rest for 1 minute. The duration of treatment was 20 minutes, 3 sessions/week for

12 weeks (36 sessions) in addition to an exercise program as a home routine.

Daily home routine

All patients in both groups (A&B) were asked to perform pelvic floor exercises from crock lying position through contracting their pubococcygeus muscle in 3-steps as the following:

1) First step for pubovaginalis muscle: Patients were asked to contract the anterior fibers of pubococcygeus muscle 15 repetitions, each of which consisted of contraction and holding for 10 counts followed by relaxation for 10 counts.
2) Second step for puborectalis muscle: Patients were asked to contract the posterior fibers of pubococcygeus muscle 15 repetitions each consists of contraction and holding for 10 counts followed by relaxation for 10 counts.
3) Third step for the whole pubococcygeus muscle: Patients were asked to contract the anterior and posterior fibers of pubococcygeus muscle 15 repetitions; each of which consists of contraction and holding for 10 counts followed by relaxation for 10 counts.

The daily home routine for both groups (A&B) were repeated at:

- Early morning before getting from bed from crock lying position.
- Afternoon from standing and sitting positions.
- Evening from standing and sitting positions.
- Night after going to the bed from crock lying position.

Statistical Analysis

The collected data was statistically analyzed by using t- test for comparing each group before and after treatment and comparing between the two groups in addition to descriptive statistics including mean, standard deviation and percentage. Significance level of 0.05 was used throughout all statistical tests within this study; P-value< 0.05 will indicate a significant result, P-value< 0.01 will indicate a highly significant result[3].

RESULTS

All data had been collected and statistically analyzed and presented under the following headings:

I- Vaginal pressure.
II- Leak point pressure.
III- Subjective assessment at the end of the treatment program.

I- Vaginal pressure in both groups (A &B):

The mean value of vaginal pressure for patients in group (A) before starting the study was 51.25±6.47 µv and it was increased after the end of the treatment program to 77.40±10.34 µv, revealed a high significant (P<0.01) increase with percentage of 51% improvement in the vaginal pressure at the end of the treatment program.

While, the mean value of vaginal pressure for patients in group (B) before starting the study was 52.45±7.84 µv and it was increased after the end of the treatment program to 87.05±5.88 µv, revealed a high significant (P<0.01) increase with percentage of 66 % improvement in the vaginal pressure at the end of the treatment program.

Comparison between the mean values of both groups (A&B) showed a highly statistical significant (P<0.01) improvement at the end of the treatment program, in favouring to group (B) as shown in table (2) and Fig. (1).

Table (2): Mean values of vaginal pressure at pre and post treatment for patients in both groups (A&B).

	Group (A)		Group (B)		Comparison after treatment	
	Pre-Treatment	Post-Treatment	Pre-Treatment	Post-Treatment	Group (A)	Group (B)
Mean	51.25	77.40	52.45	87.05	77.40	87.05
SD	6.47	10.34	7.84	5.88	10.34	5.88
%of Change	51%		66 %		12.5%	
t-value	17.3		16.3		3.9	
P-Value	<0.001		<0.001		<0.01	
Significance	Highly Sig.		Highly Sig.		Highly Sig.	

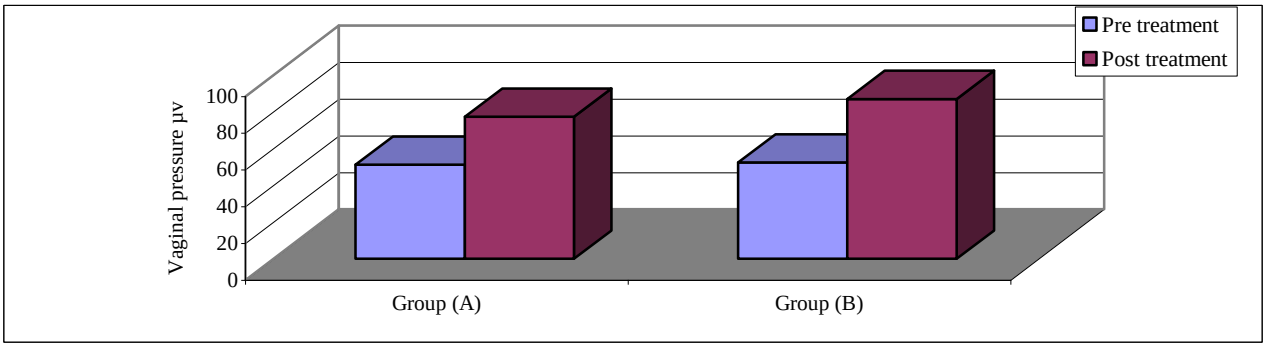

Fig. (1): Mean values of vaginal pressure at pre and post treatment for patients in both groups (A&B).

II- Leak Point Pressure in both groups (A&B):

The mean value of leak point pressure for patients in group (A) before starting the study was 78.59±9.85 CmH_2O and it was increased after the end of the treatment program to 87.85±9.70 CmH_2O. This statistically differences revealed a high significant (P<0.01) increase with percentage of 11.9% improvement in the vaginal pressure at the end of the treatment program.

While, the mean value of leak point pressure for patients in group (B) before starting the study was 76.25±11.18 CmH_2O and it was increased after the end of the treatment program to 96.70±11.45 CmH_2O,. This statistically differences revealed a high significant (P<0.01) increase with percentage of 26.9% improvement in the leak point pressure at the end of the treatment program.

Comparison between the mean values of both groups (A&B) showed a highly statistical significant (P<0.01) improvement at the end of the treatment program, in favouring to group (B) as shown in table (3) and Fig. (2).

Table (3): Mean values of leak point pressure pre and post treatment for patients in both groups (A&B).

	Group (A)		Group (B)		Comparison after treatment	
	Pre-Treatment	Post-Treatment	Pre-Treatment	Post-Treatment	Group (A)	Group (B)
Mean	78.59	87.85	76.25	96.70	87.85	96.70
SD	9.85	9.70	11.18	11.45	9.70	11.45
%of Change	11.9%		26.9 %		10.1%	
t-value	8.1		11.3		2.6	
P-Value	<0.01		<0.01		<0.01	
Significance	Highly Sig.		Highly Sig.		Highly Sig.	

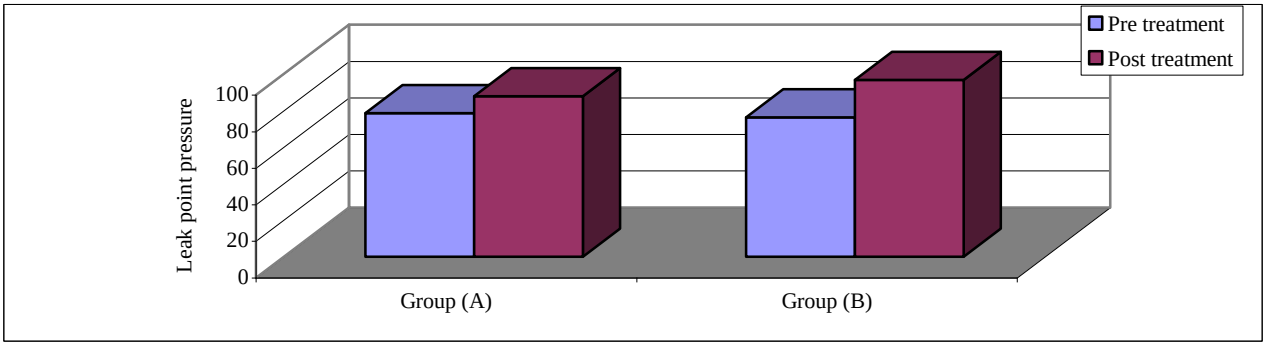

Fig. (2): Mean values of leak point pressure at pre and post treatment for patients in both groups (A&B).

III- Subjective assessment at the end of the treatment program:

For Group (A) the subjective assessment revealed that there were 6 patients (40%) reported score (2) which indicated that these patients remained without any changes, while there were 3 patients (20%) reported score (3), which revealed slight improvement and the other six patients (40%) achieved score (4) which indicated greater improvement .There was no patient reported score (1) or score (5) which indicated worse or complete curing of symptoms respectively at the end of the treatment program.

While, For Group (B) the subjective assessment revealed the following; there were 3 patients (20%) reported score (3) which indicated slight improvement, while there were 12 patients (80%) reported score (4) which indicated greater improvement and there were no patient reported score (1) or score (5) which indicated worse or complete curing of symptoms respectively at the end of treatment program.

The comparative analysis between both groups (A&B) indicated that there was a highly significant ($P<0.01$) improvement was found in subjective assessment score in favouring to group (B) at the end of the program as shown in table (4).

Table (4): The percentage of the subjective assessment for both groups (A&B).

Subjective assessment scores	Group (A)		Group (B)	
	Number	Percentage	Number	Percentage
Score (1)	--	--	_	--
Score(2)	6	40%	_	--
Score (3)	3	20%	3	20%
Score (4)	6	40%	12	80%
Score (5)	--	--	_	--
Mean rank	11.90		19.10	
t-value	2.55			
P-value	0.01			
Significance	Highly Sig.			

DISCUSSION

Stress urinary incontinence is a sudden involuntary loss of urine that occurs during physical activity, such as coughing, sneezing, laughing, or exercise[9], It may occur as a result

of weakened pelvic muscles that support the bladder and urethra or because of malfunction of the urethral sphincter prior trauma to the urethral area[17].

Pelvic floor muscle exercises are established as a first line of treatment for female stress urinary incontinence. However, by this method of treatment the incontinence requires a long term effort by the patients. For that reason, another methods of treatment such as electrical stimulation of the pelvic floor, biofeedback, vaginal cones and a combination of more than one of them may be used[16].

The effectiveness of electrical stimulation has been verified in a randomized, placebo-controlled study however, its superiority over other conservative treatments, such as pelvic floor exercises, has not been discussed[6].

This study was designed to compare the efficacy of low frequency current versus pelvic floor muscle exercises in the treatment of female stress urinary incontinence. Thirty volunteer women, their ages ranged from 30-40 years and diagnosed as having mild stress urinary incontinence, were referred from outpatient clinic at El-Galaa Teaching Maternity Hospital to participate in this study.

Patients were divided randomly into two groups equal in number (A & B) and relative in age, weight, height and body mass index. Patients of group (A) were treated by low frequency electrical stimulation while, patients of group (B) were treated by pelvic floor exercises. The vaginal pressure and leak point pressure were evaluated before starting the study and after the 36th session of the treatment to confirm the diagnosis as well as, to measure the strength of the pelvic floor muscles for all patients in both groups (A & B).

Regarding the vaginal pressure, the results of this study showed a highly statistically significant ($P<0.01$) increase in both groups (A&B). However, when both groups were compared together, the results revealed a statistically highly significant ($P<0.01$) increase for vaginal pressures of patients in group B than those of group A.

Also, results of this study, showed a highly statistically significant ($P<0.01$) increase of leak point pressure in both groups (A&B). However, when both groups were compared together, the results revealed a statistically highly significant ($P<0.01$) increase for leak point pressures of patients in group B than those of group A.

The comparative analysis between both groups (A&B) indicated that there was a highly statistically significant ($P<0.01$) improvement of the subjective assessment scores in favouring to group (B) at the end of the treatment program.

Regarding to the effect of electrical stimulation for pelvic floor muscles on stress urinary incontinence, results of this study are in agreement with those of Sand et al., (1995) [18]; who studied the effect of pelvic floor electrical stimulation in the treatment of genuine stress urinary incontinence, they stated that a significant improvement from baseline was found after the treatment program with an improvement rate exceeded 50% of the cases.

Accordingly, the results of the current study are supported by that of Brubaker et al., (1997) [6] who studied the effect of pelvic floor electrical stimulation in the treatment of stress urinary incontinence when compared with placebo controlled trial, and they reported that there was a significant improvement of the active device group with a rate of 60% and cure rate of 45%, although there was an improvement of 8% and curing of 7.7% of dummy device group.

Regarding to the effect of pelvic floor muscle exercises, results of this study are

agreed with those reported by Kuo, (2003)[13]; who studied the videourodynamic results in stress urinary incontinence patients after pelvic floor muscle training, it was concluded that when pelvic floor contractions were performed voluntarily, the bladder neck elevation and pelvic floor contraction pressure were significantly greater after pelvic floor muscle training than at the baseline.

These results are also, agreed with that of Aukee et al., (2002)[2], who studied the increase in pelvic floor muscle activity after 12 weeks training, and they concluded that pelvic floor muscle activity was increased and the amount of leaked urine was decreased after 3 months of pelvic floor muscle training.

Also, the results of this study are supported by Yalcin et al., (1998)[22]; they reported a subjective cure rate of 20.7% and objective cure rate of 13.8% for patients with type II stress urinary incontinence when treated by Kegel exercises for twelve months.

While, the results of this study are not in agreement with the results of Smith, (1996)[19]; who reported an improvement of 99% and curing rate of 59% of urinary stress incontinence cases who were treated by intra-vaginal electrical stimulation for three weeks with long lasting results of this improvement maintained from two months up to two years.

In agreement with the results of the current study, Berghmans, (1998)[4] studied the effect of different physical therapy modalities as a conservative treatment for urinary incontinence in women, he stated that there was no evidence that pelvic floor muscle exercise with biofeedback were more effective than other conservative therapies in treating urinary incontinence in women.

Accordingly, it could be concluded that electrical stimulation or pelvic floor exercises are effective in treating mild cases of female SUI. Yet, the pelvic floor exercises appears to be superior for obtaining better results.

REFERENCES

1- Aksac, B., Aki, S., Karan, A. and Yalcin, O.: "Biofeedback and pelvic floor exercises for the rehabilitation of urinary stress incontinence" Gynaecol. Obstet. Invest., 56(1): 23-27, 2003.

2- Aukee, P., Immonen, P., Laaksonen, D. and Airaksinen, O.: "The effect of home biofeedback training on stress incontinence". Acta. Obstet. Gynaecol. Scand., 83(10): 973-977, 2004.

3- Bendate, J. and Piersol, A.: Random data, analysis and measurement procedures. John Willy & Sons, Inc., New York, 407-413, 1991.

4- Berghmans, L., Hendricks, H. and Bo, K.: "Conservative treatment of stress urinary incontinence in women: A systematic review of randomized clinical trials". Br. J. Urol., 82: 181-191, 1998.

5- Bo, K. and Talseth, T.: "Long term effect of pelvic floor muscle exercise 5 years after cessation of organized training". Obstet. Gynaecol., 87: 261-265, 1996.

6- Brubaker, L., Benson, J., Bent, A., Clark, A. and Shott, S.: "Transvaginal electrical stimulation for female urinary incontinence". Am. J. Obstet. Gynaecol., 177: 536-540, 1997.

7- Cammu, H., Van Nylen, M., Blckeel, C., Kaufman, L and Amy, J.: "Who will benefit from Pelvic floor muscle training for stress urinary incontinence". Am. J. Obstet. Gynecol., 191: 1152-1157, 2004.

8- Cardozo, L.: Urinary incontinence. In Keith, E. (ed.): Dewhurst's text book of obstetric and gynaecology for postgraduates, 6th ed., Blackwell Science Ltd., 474-476, 1999.

9- Gray, M.: "Assessment and management of urinary incontinence". Nurse Pract., 30:32-43, 2005.

10- Knight, S.J. and Laycock, J.: "The role of biofeedback in pelvic floor re-education". Physiotherapy, 80(3): 145-148, 1994.

11- Knight, S., Layvock, J. and Naylor, D.: "Evaluation of neuromuscular electerical stimulation in the treatment of genuine stress incontinence". Physiotherapy, 84(2): 61-70, 1998.
12- Kohli, N.: Urogynaecology. In David, B., Philip, S. and Douglas, A. (eds.): The physiologic basis of gynaecology and obstetrics. 1st ed., Lippincott Williams & Wikins, Philadelphia, 317-319, 2001.
13- Kuo, H.: "Videourodynamic results in strss urinary incontinence patients after pelvic floor muscle training". J. of Formos. Med. Assoc., 102(1): 23-29, 2003.
14- Markwell, S. and Sapsford, R.: Physiotherapy management of pelvic floor dysfunction. In Sapsford R.; Bullock J. and Markwell S. (eds.): Women's health: A text book for physiotherapist, 1st ed., WB Saunders Company, London, 383-407, 1998.
15- Morkved, S. and Kari, B.: "The effect of post-natal exercises to strength the pelvic floor muscles". Acta. Obstet. Gynaecol. Scand., 75: 382-385, 1996.
16- Newman, D.: "New Technology for Women for Stress Incontinence". Obstet. Gynaecol, 15: 79-83, 2000.
17- Newman, D.: "Stress urinary incontinence in women: involuntary urine leakage during physical exertion affects countless women". Am. J. Nurs. 103:2-11, 2003.
18- Sand, P.; Richardson, C.; Staskin, D. and Swift, S.: "Pelvic floor electrical stimulation in the treatment of genuine stress incontinence. A multi-center, placebo-controlled trial". Am. J. Obstet. Gynaecol., 173: 72-79, 1995.
19- Smith, J: "Intravaginal stimulation: randomized trial". J. Urol., 155: 126-130. 1996.
20- Sommer, P., Bauter, J., Nelson, K. and Herman G.: "Voiding patterns and prevalence of incontinence in women. A questionnaire survey". Br. J. Urol., 66: 12-16, 1990.
21- Wang, A., Want, Y. and Chen, M.: "Single blind, randomized trial of pelvic floor muscle training, biofeedback-assisted pelvic floor muscle training and electrical stimulation in the management of overactive bladder". Urol., 63:61-66, 2004.
22- Yalcin, O., Hassa, H., Ozalp, S. and Sener, T.: "Results of the anti-incontinence operations and Kegel exercises in patient with type II anatomic stress incontinence". Acta Obstet. Gynaecol. Scand., 77: 341-346, 1998.

الملخص العربي

مقارنة التيار الكهربائي منخفض التردد بتمرينات عضلات الحوض الرافعة في علاج السلس البولي الاجهادى لدى السيدات

تهدف هذه الدراسة إلى مقارنة كفاءة التيار الكهربائي منخفض التردد بتمرينات تقوية عضلات الحوض الرافعة في علاج السلس البولي الاجهادى البسيط لدى السيدات . وقد أجريت الدراسة على ثلاثين سيدة تتراوح أعمارهن بين٣٠-٤٠ سنة تم اختيارهن من العيادة الخارجية لأمراض النساء والتوليد بمستشفى الجلاء ال تعليمي وتم تقسيمهن عشوائيا إلى مجموعتين متساويتين في العدد . مجموعة (أ) عولجت باستخدام التيار الكهربائي منخفض التردد لعضلات الحوض الرافعة ، مجموعة (ب) عولجت باستخدام تمارين تقوية عضلات الحوض الرافعة، وذلك بمعدل ثلاثة جلسات أسبوعية لمدة 12 أسبوع (36 جلسة علاجية) وقد أستخدم مقياس التقييم الذاتي مع قياس الضغط المهبلي وقياس ديناميكية البول كوسيلة للتقييم قبل بداية العلاج وبعد الانتهاء من الجلسة السادسة و الثلاثين . وقد أسفرت النتائج عن وجود زيادة ذات دلالة إحصائية في كلتا المجموعتين (أ ، ب) في الضغط المهبلي وكذلك في قياسات ديناميكية البول وكان التحسن دو دلالة إحصائية أفضل في المجموعة(ب) عند مقارنتة بالمجموعة (أ) . وباستخدام التقييم الذاتي لوحظ أن هناك تحسن دو دلالة إحصائية لصالح المجموعة (ب) عند مقارنتها بالمجموعة (أ) . ومن ثم يمكن أن نستخلص أن كلا من استخدام التيار الكهربائي منخفض التردد و تمارين تقوية عضلات الحوض الرافعة لهما تأثير فعال في علاج السلس البولي الاجهادى البسيط لدى السيدات ولكن تمرينات تقوية عضلات الحوض الرافعة تبدو أكثر فعالية في علاج هذه الحالات .

الكلمات الدالة : السلس البولي- التنبيه الكهربائي- ديناميكية البول - تمارين عضلات الحوض .