

A Study to Compare Three Types of Assisted Pelvic Floor Muscle Training Programmers in Women with Pelvic Floor Muscle Weakness

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ABSTRACT

Objective: To compare the effects of three types of Assisted Pelvic floor rehabilitation programmes over Pelvic floor muscle strength in subjects with Pelvic floor muscle weakness. **Study Design:** Experimental study design. **Subjects:** Thirty subjects with pelvic floor weakness were taken in the study, age group between 38 to 50 years and pelvic floor muscle strength 3-6mmhg according to Pfx2, and divided into 3 groups(10-group A,10-groupB,10groupC) **Interventions:** 10 subjects in the group A were trained to contract pelvic floor musculature along with transversus abdominis,10 subjects in the group B were trained to contract pelvic floor musculature along with theraband exercises and 10 subjects in the group C were trained to contract pelvic floor musculature along with ball squeezes. **Outcome Measure:** Pfx2 **Results:** statistical analysis was done by using ANNOVA test. Results showed no significant difference in Pfx2 measurements between three groups in the study, but clinically group C showed improvement. **Conclusion:** It is concluded that there is no statistically significant improvement of three types of assisted pelvic floor rehabilitation programmes over pelvic floor muscle strength in subjects with pelvic floor muscle weakness, but clinically group C showed improvement. Studies with Large sample size and digital Periton perineometer has to be carried out for better clinical outcome.

Keywords: Pelvic floor muscles, Pfx2.

INTRODUCTION

The pelvic floor (PFM) is a hammock of muscles that connect the pubis bone at the front to the coccyx and ischial tuberosities at the back. The pelvic floor supports the bladder as well as the reproductive organs and connects the inferior aspect of the innominate (hip bones) and the sacrum. The urethra, vagina and rectum pass through these muscles and are affected by their function¹. The three important functions of pelvic floor muscles are sexual, sphincteric and supportive. They must work in cooperation with the multifidus and transversus abdominis to stabilize lumbar spine, sacroiliac joints and bladder¹⁻³. Changes in recruitment of the Pelvic floor muscles can occur as a result of pain, poor movement patterns. The pelvic floor dysfunction may be hypotonus or hypertonus. The causes of pelvic floor muscles hypotonus dysfunction are multifactorial, and are mostly due to human evolution, childbirth, lifestyle and aging. The principal function of pubococcygeus in four-legged animals is to wag the tail. With the evolution to upright posture, two-legged gait and the demands of childbirth, the pelvic floor became vulnerable to forces that disrupt the integrity of the pelvic floor muscles and compromise the support these structures provide to the pelvic viscera¹. Many other factors also negatively impact the function of the pelvic floor, such as constipation, a sedentary life, the effects of menopause and advancing age, surgery or childbirth which causes altered recruitment that often results in over activation of some muscles and under activation of others - the patterns are

highly variable According to wall (1999) the risk of pelvic floor dysfunction are associated with pregnancy, duration of second stage of labour, difficulty in fetal extraction during a cesarean section, perineal trauma, birthweight over 4 kg. In earlier days, the principal recommendation for the treatment of pelvic floor muscle weakness, according to the First International Consultation on Incontinence in 1998 is to increase Pelvic floor muscle strength. There is no consensus on the amount of exercise necessary to improve pelvic floor muscle (PFM) function. More than half a century ago, Gynaecologist Arnold kegel in 1948 proposed that pelvic floor exercises (also known as kegle's). Kegel introduced the concept of pelvic floor awareness and the benefits of strength of pelvic floor muscles. He also proposed that Pelvic floor muscle training has important role in prevention and treatment for pelvic floor muscle weakness². Recently hulme and sapsford had designed a protocol that uses the accessory muscles to contract with pelvic floor. This protocol concentrates on co-contraction of pelvic floor muscles with accessory muscles like transversus abdominis, multifidus, hip rotators and adductors^{1,2}. Transversus abdominis exercises along with pelvic floor muscle training work with co contraction mechanism. Contraction of the transverse abdominis muscle increases the intraabdominal pressure, Pelvic floor muscles should contract automatically with sufficient strength to counteract the downward impact on the pelvic from the abdominal muscle contraction Squeezing the ball along

with pelvic floor muscle training superimposes hip adductor muscle contraction onto the pelvic floor muscle contraction^{2,3}. Elastic band or Thera band training along with pelvic floor muscle training, superimposes the hip abductor muscles on to pelvic floor muscle contraction^{2,3}. In recent studies, vaginal pressure device connected to a pressure manometer that shows the air pressure through an arbitrary scale from 0 to 12 (PFX 2-Pelvic Floor Exerciser) was used to assess the strength of pelvic floor muscles²⁸. Less Studies prevail on the comparison of different assisted pelvic floor muscle contraction. So in this study we had compared the effectiveness of three types of assisted pelvic floor muscle training over pelvic floor muscle strength in women with pelvic floor weakness.

MATERIALS AND METHODS

30 subjects were selected conveniently from SRM Medical College Hospital and Research Centre, Arjun Nursing Home, Chennai. Initially, Subjects were explained clearly about the procedure and written informed consent was taken. The subjects were assessed prior to the study for the details of Parity, Age, Type of birth. Age Between 38 to 50 years were included in the study. Brink score procedure was assessed for measuring palpable vaginal contractions and the subjects were included if they were found to have muscle power ≤ 3 . Prior to testing, subjects were asked to complete a subjective formation questionnaire providing details of symptom burden, quality of life. Pretest for the subjects was done by using PFX2 tool, Pelvic floor muscle strength 3- 6mmhg according to Pfx2. Subjects with Inability demonstrate a palpable Pelvic floor muscle contraction, Endometriosis, Pregnancy were excluded from the study. Then they were randomly allocated into group A, group B and group C in the form of lottery method. The treatment protocol was scheduled to the subjects with pelvic floor weakness in the respective groups as below.

Group A

Group A subjects were trained to contract the pelvic floor musculature along with Transversus abdominis

Long Contraction

Position: Supine with knees bent

Duration: 10 Seconds hold

Repetition: 10 Repetitions

Rest Period: 5-10 Seconds rest between contractions.

Short Contracton

Position: Supine with knees bent

Duration: 1-2 Seconds hold

Repetition: 10 Repetitions

Rest period: 1-2 Seconds rest between contractions.

Group B

Group B was trained to contract the pelvic floor musculature along with theraband exercises.

Theraband: The Subject was asked to tie theraband around the thighs and try to abduct the both legs slightly along with pelvic floor muscle contraction (as above).

GROUP C

Pelvic Floor Exercises Along with Ball Squeezes

Ball squeezes: The subject were asked to place a ball between the knees, contract pelvic floor muscles along with that squeeze the ball with your knees (as above).

Three groups performed the exercises of their respective groups twice a day, once in the morning and once in the evening for 7 days in a week. After 3 months Posttest measurements was taken with PFX2 tool.

RESULTS

Table-1

Comparison of Pretest and Posttest values of PFX2 measurements of Group A subjects trained with Pelvic floor muscle training along with Transversus abdominis training. In this table, p is greater than .05 which shows that there is no significant difference in pelvic floor muscle strength in Group A subjects trained with Pelvic floor muscle training along with Transversus abdominis training.

Table-2

Comparison of Pretest and Posttest values of PFX2 measurements of Group B subjects trained with Pelvic floor muscle training along with Thera band training. In this table, p is less than 0.01 which shows that there is a significant difference in pelvic floor muscle strength in Group B subjects trained with Pelvic floor muscle training along with Thera band training.

Table-3

Comparison of Pretest and Posttest values of PFX2 measurements of Group C subjects trained with Pelvic floor muscle training along with Ball squeeze training. In this table, p is less than 0.01 which shows that there is a significant difference in pelvic floor muscle strength in Group B subjects trained with Pelvic floor muscle training along with Ball squeeze training.

Table-4

Comparison of Posttest values of PFX2 measurements between Group A trained with Pelvic floor muscle training along with Transversus abdominis training, Group B subjects with Pelvic floor muscle training along with Thera band training and Group C subjects trained with Pelvic floor muscle training along with Ball squeeze training. In this table p is equal to 0.05, which shows that there is a significant difference in PFX2 measurements between Group A trained with Pelvic floor muscle training along with Transversus abdominis training, Group B subjects with Pelvic floor muscle training along with Theraband training and Group C subjects trained with Pelvic floor muscle training along with Ball squeeze training.

Graph-1

Comparison of Pre-test and Post-test of PFX2 measurements between Group A trained with Pelvic floor muscle training along with Transversus abdominis training, Group B subjects with Pelvic floor muscle training along with Thera band training and Group C subjects trained with Pelvic floor muscle training along with Ball squeeze training. There is a significant difference in PFX2 measurements between Group A trained with Pelvic floor muscle training along with Transversus abdominis training, Group B subjects with Pelvic floor muscle training along with Thera band training and Group

Table 1:

Group A	Mean	S.D.	T-test	sig
Pre-test	4.30	1.418	1.857	0.96
Post-test	5.50	1.780		

P>0.05

Table 2:

Group A	Mean	S.D.	T-test	sig
Pre-test	4.40	1.350	6.708	0.00
Post-test	6.40	1.430		0

P<0.01

Table 3:

Group A	Mean	S.D.	T-test	sig
Pre-test	4.00	1.247	12.829	0.000
Post-test	7.20	1.229		

P<0.01

Table 4:

	Mean	S.D.	S. E	F-test	sig
Group A	5.50	1.780	.563	3.228	0.05
Group B	6.40	1.430	.452		
Group C	7.20	1.229	.389		

P<0.05

C subjects trained with Pelvic floor muscle training along with Ball squeeze training.

DISCUSSION

This study focused on to compare three types of assisted Pelvic floor muscle training programmes in women with Pelvic floor muscle weakness. The pelvic floor muscle weakness is most common among women after child birth, Pelvic surgery or idiopathic causes. Providing patients with Pelvic floor muscle training exercises for these muscles may provide them the opportunity to decrease the risk of incontinence or prolapse. Over the years, lot of training programmes has evolved, so the aim of this study is to compare three types of assisted Pelvic floor muscle training programmes in women with Pelvic floor muscle weakness. The statistical results of this study shows that there was no statistically significant increase in Pfx2 measurement in Group A subjects trained with Pelvic floor

exercises along with transverses abdominis for a period of 12 weeks. (p>0.05). This result goes in hand with kari B, sivmrkved et al, (2009) who concluded that Pelvic floor muscle training along with transverses abdominis exercises did not further improve the outcome of Pelvic floor rehabilitation beyond specific Pelvic floor muscle training¹². The statistical results of this study shows there was statistically significant increase in Pfx2 measurement in Group B subjects trained with Pelvic floor muscle training along with theraband for a period of 12 weeks. (p<0.01). This results goes in hand with, Betsy Donahoe-fillmore et al, (2012) who concluded that there was significant improvement with Pelvic floor muscle training along with theraband². The results of the study show statistically significant improvement increase in Pfx2 measurement in Group C subjects trained with Pelvic floor muscle training along with ball squeezes for a period of 12 weeks. (P<0.01). This result goes in hand with Betsy Donahoe-fillmore et al, (2012) who concluded that there was significant improvement with Pelvic floor muscle training along with ball squeezes². Measures to prevent and treat Pelvic floor weakness not only have the potential to produce major health savings but can reduce the physical, psychological, social and sexual problems for the women involved. The statistical results has shown both Group B subjects trained with Pelvic floor muscle training along with theraband and Group C subjects trained with Pelvic floor muscle training along with ball squeezes had shown a statistical improvement in Pfx2 measurements post 12 weeks of training but The aim of the study was to compare three different Pelvic floor muscle training programmes, the intent of this study was to determine specific exercise regimen for practicing physiotherapists to utilize during patient care in an attempt to strength Pelvic floor muscle weakness. The statistical analysis of the study showed the Pfx2 measurements were not different or the improvements are the same between three groups in the study, but clinically Group C subjects trained with Pelvic floor muscle training along with ball squeezes showed better improvement in Pelvic floor muscle strength after treatment duration of 12 weeks, hence although not statistically significant, Group c subjects trained with Pelvic floor muscle training along with ball squeezes had a better clinical outcome especially with patient satisfaction and Pfx2 measurement than Group A trained

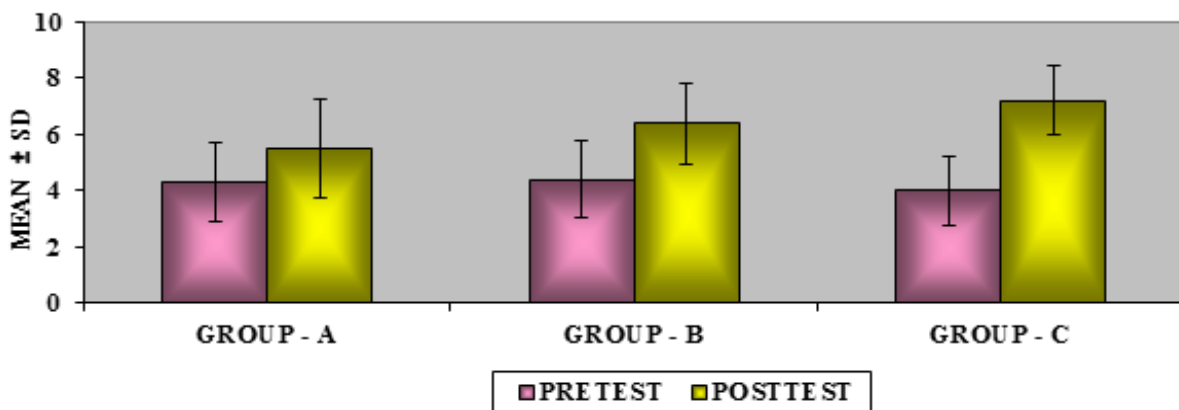


Figure 1:

with Pelvic floor muscle training along with transverses abdominis and Group B subjects trained with Pelvic floor muscle training along with Thera band. Future studies can be done using Digital Periton Perineometer can be used for evaluation of Pelvic floor muscle contraction, Biofeedback training can be incorporated, Needle EMG method can be used for better diagnosis of isolated muscle power of pelvic floor muscles. So Pelvic floor muscle training along with ball squeezes exercises can be of value therapeutically for improving Pelvic floor muscle strength than Pelvic floor exercises along with transverses abdominis or Pelvic floor muscle training along with theraband.

CONCLUSION

This study focused to compare three types of assisted Pelvic floor muscle training programmes in women with Pelvic floor muscle weakness. The results of this study were not statistically significant indicating no difference between Pelvic floor muscle exercises along with transverses abdominis, Pelvic floor muscle training along with theraband and Pelvic floor muscle training along with ball squeezes. But Pelvic floor muscle training along with ball squeezes shows a clinically significant improvement rather than other forms of assisted Pelvic floor muscle training programmes. So as among these three groups, Pelvic floor muscle training along with ball squeezes exercises shows more value therapeutically for improving Pelvic floor muscle strength in subjects with Pelvic floor muscle weakness. Thus this study concludes that there is no significance difference between three types of Assisted Pelvic floor muscle training (APFMT) in improving Pelvic floor muscle strength.

REFERENCES

1. Ruth Sapsford, Rehabilitation of pelvic floor muscles utilizing trunk stabilization, 14 October 2003.
2. Betsy Donahoe- Fillmore, Wendy Chorny, C. Jayne Brahler, Allison Ingely, Jennifer Kennedy et al, A comparison of two Pelvic floor muscle training programs in female with stress urinary incontinence: A pilot study, a journal of applied research, vol.11, no, 2.2012.
3. Nancy Muller, Strong Pelvic floor muscles support continence and Pelvic vitality in older adults, The Journal on Active Aging May June 2005.
4. Angélica Mércia Pascon Barbosa I, Gabriela Marini II, Fernanda Piculo III, Cibele Vieira Cunha Rudge IV, Iracema Mattos Paranhos, Calderon IV, Marilza Vieira Cunha Rudge IV, Prevalence of urinary incontinence and Pelvic floor muscle dysfunction in primiparae two years after cesarean section: cross-sectional study, Sao Paulo Med J. 2013; 131(2): 95-9.
5. Tahereh Eftekhari; M.D., Zinat Ghanbari; M.D., Farbod Kalantari; M.D. Mamak Sharit; M.D. Fedyeh Haghollahi. M.Sc. The Frequency of Pelvic Floor Dysfunctions and their Risk Factors in Women aged 40-55, Journal of Family and Reproductive Health, Vol. 6, No. 2, June 2012.
6. Jose Mary Sangeetha. X, Sheela Rao, The efficacy of a comprehensive Pelvic floor muscle rehabilitation program of stress urinary incontinence in women, the Indian journal of occupational therapy: vol. xlii: no. 1 (january 2010 - april 2010).
7. Maryam Kashanian, Shadab Shah Ali, Mitra Nazemi, Shohreh Bahasadri, Evaluation of the effect of Pelvic floor muscle training (PFMT or Kegel exercise and assisted Pelvic floor muscle training (APFMT) by a resistance device (Kegel master device) on the urinary incontinence in a woman "comparison between them: a randomized trial" European Journal of Obstetrics & Gynecology and Reproductive Biology, 2010 -7398; pages 6.
8. Shadab Shahali, Maryam Kashanian, Afsaneh Azari, Reza Salehi, Effects of Pelvic floor muscle exercises on quality of life outcomes in women with stress urinary incontinence Medical Journal of the Islamic Republic of Iran. Vol. 24, No. 3, November 2010. Pp.159-162.
9. Chitra T.V, Professor, Baranitharan R, promoting continence in stress urinary incontinent female- A case study Indian Journal of Physiotherapy and Occupational Therapy-An International Journal Year: 2010, Volume: 4, Issue: 4
10. Delgado, Debbie, A randomized controlled trial of the Pelvic toner device in female stress urinary incontinence, the journal of bjui.org. website, 2010.
11. P. J. Isherwood, A. Rane, Comparative assessment of Pelvic floor strength using a perineometer and digital examination British Journal of Obstetrics and Gynaecology, August 2000, V01107, pp. 1007-1011.
12. Kari Bø, Siv Mørkved, Helena Frawley, and Margaret Sherburn, Evidence for Benefit of Transversus Abdominis Training Alone or in Combination with Pelvic Floor Muscle Training to Treat Female Urinary Incontinence: A Systematic Review, The journal of Neurourology and Urodynamics 28:368-373 (2009).
13. Patrícia Brentegani Barbosa, Maíra Menezes Franco, comparison between measurement obtained with three different perineometer, The journal of clinical science 2009;64(6):527-33.
14. Philip EV Van Kerrebroeck, Con J Kelleher, et al, Correlations among improvements in urgency urinary incontinence, health-related quality of life, and perception of bladder-related problems in incontinent subjects with overactive bladder treated with tolterodine or placebo, the journal of Health and Quality of Life Outcomes 2009, 7:13.
15. Diane F Borello-France et al, Continence and Quality-of-Life Outcomes 6 Months Following an Intensive Pelvic-Floor Muscle Exercise Program for Female Stress Urinary Incontinence: A Randomized Trial Comparing Low- and High-Frequency Maintenance Exercise, the journal of Physical Therapy, 2008 December; 88(12): 1545-1553.
16. Mônica Orsi Gameiro et al, Comparison of Pelvic floor muscle strength evaluations in nulliparous and primiparous women: a prospective study, the journal of bju international, 2007
17. B K, Owe KM, Nystad W, Which women do Pelvic floor muscle exercises six months' postpartum journal from Pubmed, 2007 Jul; 197(1):49. e1-5,

18. Gin-Den Chen, M.D., Soo-Cheen Ng, M.D, Functional and Structural Changes of the Pelvic Floor in Ageing Women, the journal of Incont Pelvic Floor Dysfunct 2007; 1(3):81-84.
19. Jean M. Lawrence, et al, Pelvic Floor Disorders, Diabetes, and Obesity in Women the journal of health service research, the journal of Diabetes Care 30:2536–2541, 2007.
20. Mary P FitzGerald, Pelvic floor strength assessed with incontinence assessed by the brink scale, physical therapy journals, 2007; 87:1316-1324. doi: 10.2522/ptj.20060073
21. Lautenschlager, Figueiredo, quality of life -king's health questionnaire - outcomes one year after inside-out transobturator tape (tv-t) surgery for treatment of recurrent stress urinary incontinence, the journal of obstetrics and gynecology, 2004
22. Jose T. N. Tamanini, Miriam Dambros, concurrent validity, internal consistency and responsiveness of the portuguese version of the king's health questionnaire (khq) in women after stress urinary incontinence surgery, Journal of the Brazilian Society of Urology Vol. 30 (6): 479-486, November - December, 2004,
23. Davis K, Kumar D, Pelvic floor dysfunction: a conceptual framework for collaborative patient-centred care, Pubmed, 2003 Sep; 43(6):555-68.
24. H. Cammu et al, A 10-year follow-up after Kegel Pelvic floor muscle exercises for genuine stress incontinence, the journal of BJU International, Volume 85, Issue 6, pages 655–658, April 2000.
25. Isherwood PJ, Rane A, Comparative assessment of pelvic floor strength using a perineometer and digital examination BJOG: an international journal of obstetrics and gynaecology 107:8 2000 Aug pg 1007-11.
26. Badia llachx, castroodiaz D et al, Validity of the King's Health questionnaire in the assessment of quality of life of patients with urinary incontinence. The King's Group, pubmed, 2000.
27. P.E. Chiarelli and D.R. O'Keefe, the Pelvic floor, the journal of Australian physiotherapy, 27.4, 1981.
28. Francine Chevalier, Carolina Fernandez-Lao Normal reference values of strength in pelvic floor muscle of women: a descriptive and inferential study, BMC Women's Health 2014, 14:143 doi:10.1186/s12905-014-0143-4.