Efficacy of Adding Active Technique as Biofeedback to Pelvic Floor Muscles Training on Cure of Female Stress Urinary Incontinence- A Systematic Review

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Abstract

Background: Stress urinary incontinence is the most common type of urinary incontinence in women. It involves involuntary leakage of urine in response to abdominal pressure caused by activities, such as sneezing and coughing. The condition affects millions of women worldwide, causing physical discomfort as well as social distress and even social isolation.

Objectives: The purpose of this study is to assess whether biofeedback provide additional benefits to PFMT in treating women with stress urinary incontinence.

Methods: Search of published studies was performed in the electronic database through PubMed, Cochrane controlled trials registers (Central) and PEDro from 1990 to 2015, data collection was performed by 2 reviewers. When there was a discrepancy, the opinion of the third reviewer was asked. A standard data extraction form used to extract the following information: Characteristics of the study (design, participants, interventions and outcomes). Assessment risk of bias done by Cochrane risk of bias assessment tools used for assessing the included trials.

Results: 6 trials involving 323 women met the inclusion criteria; 4 trials contributed data to analysis of the primary outcome (cure). The other 2 trials contributed data to improvement of case. There was no statistically significant difference in the cure rate after adding biofeedback to pelvic floor muscles training (risk ratio 1.22 95% confidence interval 0.84 to 1.78).

Conclusion: This review demonstrated that cure rate was high, and the reduction in urinary leakage after treatment was statistically significant in both groups. However, there was no statistically significant difference in adding biofeedback to PFMT.

Key Words: PFMT: Pelvic Floor Muscles Training – SUI: Stress Urinary Incontinence.

Introduction

IF a woman reports involuntary urine leakage with physical exertion (symptom) or a clinician observes urine leakage at the same time as the exert ion (sign) this is called Stress Urinary Incontinence (SUI). When urodynamic studies demonstrate involuntary loss of urine during increased intra-abdominal pressure, but the leakage is not accompanied by a contraction of the detrusor muscle (bladder smooth muscle), this is called urodynamic stress incontinence (USI) [1].

Treatments for urinary incontinence include conservative treatments (physical therapies, lifestyle changes and behavioral therapies), drug or pharmaceutical therapy and surgical treatments. Physical therapies include Pelvic Floor Muscle Training (PFMT) with or without biofeedback [2], electrical stimulation, and the use of vaginal cones physical therapies are used more often in SUI and mixed urinary incontinence [3].

Pelvic floor muscle training is the mainstay of conservative (non-surgical) treatment for stress incontinence. This is based on the premise that identification or strength training, or both, of the pelvic floor muscles will counteract weakness by increasing support for the urethra and bladder, and improve the muscle's sphincteric action around the urethra. It has been shown that women with mild or moderate SUI may improve their ability to hold urine significantly simply by learning how to control the pelvic floor muscle strength that they already have [4].

Biofeedback has been defined as “a group of experimental procedures where an external sensor
is used to give an indication on bodily processes, usually in purpose of changing the measured quality [8]. Biofeedback equipment has been developed within the area of psychology, mainly for measurement of sweating, heart rate, and blood pressure during different forms of stress. In the area of pelvic floor muscle training, both vaginal and anal surface electromyograms and urethral and vaginal squeeze pressure measurements have been used with the purpose of making the patients more aware of muscle function, and to enhance and motivate patients' effort during training [6]. Today, a wide variety of biofeedback apparatus is commonly used in clinical practice to assist with pelvic floor muscle training [7].

Material and Methods

Criteria for considering selection of studies for the review:
- Randomized controlled trials.
- Studies published between (1990-2015) were included.
- The search was seeking both published and unpublished studies.

323 women with stress urinary incontinence from 6 met the inclusion criteria.

Inclusion criteria:
- All women diagnosed with stress urinary incontinence on the basis of symptoms, signs, or urodynamic evaluation, as defined by the investigators.
- Trials that recruited men and women are eligible for inclusion, demographic and outcome data that are reported separately for women was included.

Exclusion criteria:
- Studies of women with urinary incontinence whose symptoms that might be due to significant factors outside the urinary tract, e.g. systemic neurological disorders, cognitive impairment and lack of independent mobility.
- Studies investigating nocturnal enuresis in women.
- Studies including patients with other forms of urinary incontinence.

Types of intervention:

One aim of the study must have included the use Pelvic Floor Muscle Training (PFMT) comparators include PFMT added to biofeedback.

Comparators:
- Pelvic Floor Muscle Training (PFMT) versus PFMT + Biofeedback.

Outcomes:

Primary outcomes:
- Cure of stress urinary incontinence.

Secondary outcomes:
- Any sing of improving in case.

Search strategy for identification of studies:
- Search of published studies was performed in the electronic database through PubMed, Cochrane controlled trials registers (CENTRAL) and PEDro from 1990 to 2015.
- Searching of reference lists in other reviews.
- Searching of unpublished thesis was performed through the library catalogue Faculty of Physical Therapy Cairo University.
- The search term used were stress urinary incontinence, pelvic floor muscle training, and biofeedback.
- Limits used were randomized controlled trials and studied published from 1990.

Assessment of risk of bias in included studies:
- Two review authors independently assessed risk of bias for each study; any disagreement resolved by discussion or by involving a third assessor.
- Cochrane risk of bias assessment tools used for assessing the included trials.
- The following four domains used: Random sequence generation, allocation concealment, blinding, and incomplete outcome data.

Meta-analysis:

A meta-analysis was used for pooling the data across studies to generate summary (pooled) estimates of effects. Data was entered into RevMan and analyzed according to the guidelines of the Cochrane Handbook for Systematic Reviews of intervention. Dichotomous outcomes were expressed as a Risk Ratio (RR) and continuous outcomes were expressed as a Mean Difference (MD), both with 95%CI. Random effect model was used for combining data.

Results

The electronic database search identified 74 abstract, then 66 articles were excluded because they were irrelevant by title and abstract while 8 potentially relevant publications were identified and screened for retrieval. 2 articles were excluded and only 6 studies fulfilled inclusion criteria of this review.
Included studies:

1- Aksac 2003:
Title: Biofeedback and pelvic floor exercises for the rehabilitation of urinary stress incontinence.

2- Aukee 2004:
Title: The effect of home biofeedback training on stress incontinence.

3- Burns 1990:
Title: Treatment of stress incontinence with pelvic floor exercises and biofeedback.

4- Glavian 1996:
Title: Randomized prospective trial on physiotherapy versus physiotherapy and biofeedback in treatment of genuine stress urinary incontinence.

5- Morkved 2002:
Title: Effect of adding biofeedback to pelvic floor muscle training to treat urodynamic stress incontinence.

6- Tomoe 2013:
Title: Randomized controlled trial of pelvic floor muscle training with or without biofeedback for urinary incontinence.

Assessment risk of bias:

The total number of included RCTs was 6. The studies were between March 1990 till January 2013 (burns 1990 and tomoe 2013). The total number of female with stress urinary incontinence in the 6 studies was 323 women. Methods of randomization was reported only in 5 studies which representing 83.3 of the studied and it was unclear in one study. Also, concealed treatment allocation was applied in 3 trial representing 50% of the studies while, it was unclear in the other 3 trial. Natural of the intervention prevent blinding of the participants in all the studies. Also, blinding of outcome assessor was carried out in 3 articles which representing 50% of the studies and it was unclear in 2 studies and it was un-blinded in one study. Compliance mentioned in all studies it was less than 15%.

Meta-analysis:

1- First outcome cure:
No statistically significant difference in the cure rate after adding biofeedback to pelvic floor muscles training (risk ratio 1.22 95% confidence interval 0.84 to 1.78).

2- Second outcome improvement:
No statistically significant difference in improving of the case after adding biofeedback to pelvic floor muscles training (risk ratio 1.12 95% confidence interval 0.89 to 1.42).
Conservative treatment has an important role in the management of USI. PFM exercises are the basis of conservative modalities. These exercises were first described by Arnold Kegel [8] in 1948. He taught his patients how to use their pubococcygeal muscles and reported an improvement of 84% in 500 patients [9]. Following studies confirmed the effectiveness of PFM exercises for the treatment of USI [10-13].

Biofeedback is one of the ways of teaching PFM contraction. This method provides both visual and auditory feedback in teaching to contract the muscles correctly. The term biofeedback is often used as something different from pelvic floor muscle training. However, biofeedback is not a treatment on its own. It is an adjunct to training, measuring the response while the patient is contracting.

Several randomized; controlled trials have aimed to compare the effect of pelvic floor muscle training with additional biofeedback versus pelvic floor muscle training with no biofeedback on stress and urodynamic stress incontinence or mixed incontinence [14].

The studies included in this review [15-20] show that there was increase in cure rate and reduction in urinary leakage in both treatment group either pelvic floor muscles training with or without biofeedback but 5 of them (Aksac, Aukee, Burns, Morkved, Tomoe) show that adding biofeedback to PFMT has no statistically significant difference only Glavian show that adding biofeedback is more effective. Pooling effect of all included studies show that adding biofeedback is not effective. This result corresponds with conclusions meta-analysis by Hay-Smith [21]. It has been suggested that use of biofeedback can teach the patient to contract correctly and that the patient may learn faster how to contract by use of either electromyograms or pressure measurements. There are no studies investigating the effect of biofeedback in a population who are not able to contract the pelvic floor muscles
so farther studies are need to assess if using an apparatus during training may motivate many women, and this should therefore be an option in clinical practice.

Conclusion:

Adding biofeedback to pelvic floor muscles training don’t have more effect in cure or improvement in stress urinary incontinence but it may effective in teaching the patients how to contract the muscles correctly and give motivation for the patients.

References
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قياس مدى فاعلية الوسائل النشطة مثل التغذية الرجعية إلى تمارين العضلات الراfaقة للحوض في الشفاء من السلس البولي الإجهاد لدى السيدات - دراسة ممنهجة

الخلفية: يعد السلس البولي الإجهاد لدى السيدات من أكثر أنواع السلس البولي إنتشاراً وخاصة لدى السيدات. ويمكن تسرب البول نتيجة زيادة ضغط البطن الداخلي أثناء السعال والعطس. تصب هذه الحالة ملايين السيدات حول العالم وتدوم إلى مشاكل جسدية واجتماعية بروز إجتماعية أيضاً.

الهدف من هذه الدراسة: قياس مدى فاعلية إضافة التغذية الرجعية إلى تمارين العضلات الراfaقة للحوض في علاج السلس البولي الإجهاد لدى السيدات.


النتائج: المشاريع تضمنت 6 دراسات شاركت مهم 323 مريضة، 4 دراسات صlies المخرج الأساسي، وهو الشفاء بينما درست تضمنت مخرج تحسن الحالة، أثبتت مجموع نتائج الدراسة أنه ليس هناك فاعلية من إضافة التغذية الرجعية لتمارين العضلات الراfaقة للحوض في الشفاء أو تحسن حالة السلس البولي الإجهاد لدى السيدات.