There is not yet strong evidence that exercise regimens other than pelvic floor muscle training can reduce stress urinary incontinence in women: a systematic review

Kari Bø[1] and Robert D Herbert[2]

[1]Norwegian School of Sport Sciences, Department of Sports Medicine, Oslo, Norway, [2]Neuroscience Research Australia, Sydney, Australia

Question: What evidence is there for alternative exercises to specific pelvic floor muscle training for treatment of stress urinary incontinence in women? **Design**: A systematic review was conducted with searches of PubMed and PEDro to January 2013. The quality of randomised trials was evaluated using the PEDro scale. Each type of exercise was classified as being in a Development Phase, Testing Phase, or Refinement and Dissemination Phase. **Participants**: Women with stress or mixed urinary incontinence with predominantly stress urinary incontinence. **Intervention**: Exercise regimens other than pelvic floor muscle training. **Outcome measures**: The primary outcome was urinary leakage. **Results**: Seven randomised controlled trials were found: three on abdominal training, two on the Paula method, and two on Pilates exercise. The methodological quality score ranged between 4 and 8 with a mean of 5.7. There was no convincing evidence for the effect of these exercise regimens so they remain in the Testing Phase. Because no randomised trials were found for posture correction, breathing exercise, yoga, Tai Chi, and general fitness training, these were classified as being in the Development Phase. **Conclusion**: There is not yet strong evidence that alternative exercise regimens can reduce urinary leakage in women with stress urinary incontinence. Alternative exercise regimens should not yet be recommended for use in clinical practice for women with stress urinary incontinence. **Bø K, Herbert RD (2013) There is not yet strong evidence that exercise regimens other than pelvic floor muscle training can reduce stress urinary incontinence in women: a systematic review. *Journal of Physiotherapy* 59: 159–168]**

Key words: Alternative, Exercise, Fitness, Pelvic floor, Stress urinary incontinence

Introduction

Urinary incontinence is a common complaint in women. Reported prevalence rates vary between 32% and 64% (Milsom et al 2009). The most common types of female urinary incontinence are *stress urinary incontinence*, defined as complaint of involuntary loss of urine on effort or physical exertion (eg, sporting activities), sneezing or coughing, and *urgency urinary incontinence*, defined as complaint of involuntary loss of urine associated with urgency (Haylen et al 2010). Many women also present with mixed urinary incontinence, which is a combination of the two. Urinary incontinence affects quality of life and participation in social activities, especially physical activity and exercise (Milsom et al 2009).

Kegel was the first to report the effect of regular, specific strength training of the pelvic floor muscles on female urinary incontinence and pelvic organ prolapse (Kegel 1948). He claimed that 84% of a series of gynaecological patients were cured of urinary incontinence after pelvic floor muscle training. Now many randomised controlled trials have evaluated the effects of pelvic floor muscle training for female urinary incontinence. These trials have compared the effect of pelvic floor muscle training to no treatment or to training regimens with and without biofeedback, electrical stimulation, or vaginal weighted cones (Dumoulin and Hay-Smith 2010, Herderschee et al 2011, Hay-Smith et al 2011). The broad findings of these trials are clear: supervised intensive pelvic floor muscle training reduces the risk of remaining incontinent. The absolute reduction in incidence proportion of women with incontinence reported in randomised trials comparing effects of pelvic floor muscle training and regular care varies greatly between studies (ARR 5–85%, NNT 1 to 20), but most studies report clinically important reductions in risk (Shamliyan et al 2008). Training may be conducted in a variety of ways (for example, it may be supervised or unsupervised, with or without vaginal cones, biofeedback, or electrical stimulation). The best results are obtained with supervised individual training and close follow-up (Hay-Smith et al 2011). Systematic reviews of randomised controlled trials in the general female population conclude

What is already known on this topic: Urinary incontinence is common in women, affecting quality of life and participation in social activities. Extensive high-quality evidence confirms that specific pelvic floor muscle training reduces stress urinary incontinence and mixed urinary incontinence.

What this study adds: Abdominal training, the Paula method, and Pilates have each been examined as adjuncts or alternatives to pelvic floor muscle training in several randomised trials, but the data do not support their effectiveness. The efficacy of yoga, Tai Chi, breathing exercises, postural training and general fitness training in treating stress urinary incontinence has not been examined in any randomised trials.

that there is Level 1, Grade A evidence of the effectiveness of pelvic floor muscle training, and there is consensus that pelvic floor muscle training should be first-line treatment for stress urinary incontinence and mixed urinary incontinence (Dumoulin and Hay-Smith 2010).

In spite of the strong evidence of the effectiveness of pelvic floor muscle training for treatment of stress urinary incontinence and mixed urinary incontinence there seems to be increasing interest in using other exercise regimens to treat stress urinary incontinence (Sapsford 2004, Hay-Smith et al 2011). We will refer to these as 'alternative exercises'. Alternative exercises include training of the deep abdominal muscles, contraction of the ring muscles of the mouth and eyes (the Paula method), Pilates exercise, yoga, Tai Chi, breathing exercises, posture correction, and general fitness training. The effectiveness of some alternative exercise regimens was also explored by Hay-Smith et al (2011), but these exercises were not the focus of that Cochrane review. A framework for this review is provided by our paper on how new therapies become incorporated into clinical practice (Bø and Herbert 2009). In that paper we presented a three-phase protocol for the introduction of new therapies into clinical practice (Box 1). The central idea is that the *development* phase for new therapies involves clinical observation, laboratory studies, clinical exploration, and pilot clinical trials. Once there are sufficient data from such studies to believe that the therapy could be effective, its effectiveness is tested with a randomised controlled trial. We argued, as have many before us (eg, Chalmers 1977), that new therapies should not be considered to have been shown to be effective, or be introduced into routine clinical practice, until they have been shown to have clinically important effects in properly conducted randomised controlled trials. Thus the *testing* phase involves the conduct of randomised trials. Lastly, once an intervention has been shown to be effective, usually with more than one randomised trial (Ferreira et al 2012), further trials may be conducted to examine how best to administer the therapy and to whom the therapy is best administered. This is the *refinement and dissemination* phase. It is only at this last phase that clinicians should be actively encouraged to adopt the new therapy. However, not all therapies thought to be effective in the first phase will be shown to be effective in clinical trials. We will classify alternative interventions for treatment of stress urinary incontinence or mixed urinary incontinence according to whether they are currently in the Development Phase, the Testing Phase, or the Refinement and Dissemination Phase.

Box 1. A six-stage protocol for the introduction of new therapies into clinical practice.

Stage 1: Clinical observation or laboratory studies	Development Phase
Stage 2: Clinical exploration	
Stage 3: Pilot studies	
Stage 4: Randomised clinical trials	Testing Phase
Stage 5: Refinement	Refinement and Dissemination Phase
Stage 6: Active dissemination	

We conducted a systematic review to examine evidence of the effectiveness of these alternative exercise regimens. The aim was to critically appraise the current evidence of the effectiveness of alternatives to pelvic floor muscle training for treatment of stress urinary incontinence or mixed urinary incontinence to answer the following question:

> What evidence is there for alternative exercises to specific pelvic floor muscle training for treatment of female stress urinary incontinence?

Method

Identification and selection of studies

We searched specifically for trials investigating one of eight alternative exercise regimens (training of the deep abdominal muscles, the Paula method, Pilates exercise, yoga, Tai Chi, breathing exercises, posture correction, or general fitness training for other parts of the body not including specific pelvic floor muscle contractions) for women with stress urinary incontinence or mixed urinary incontinence with predominantly stress urinary incontinence. A computerised search was conducted of the PubMed database using the search terms: ((urinary AND incontinen*) OR pelvic floor) AND (Yoga OR Tai Chi OR Pilates OR breathing OR posture OR transversus abdominis OR fitness). The advanced search on PEDro used the terms 'incontinence' and 'clinical trial'. In PubMed the search was limited to randomised controlled trials reported in the English, Scandinavian, or German languages. The final searches were conducted on 4 January 2013.

Studies were included in the review if they were randomised controlled trials investigating the effectiveness of exercise regimens other than specific pelvic floor muscle training. Pelvic floor muscle training could be carried out with or without biofeedback, electrical stimulation, vaginal cones, and resistance devices (Dumoulin and Hay-Smith 2010, Hay-Smith et al 2011, Herderschee et al 2011, Parsons et al 2012). The inclusion criteria for the review are presented in more detail in Box 2. Exclusion criteria were: studies on women with other forms of urinary incontinence or lower urinary tract symptoms, studies on women with neurological diseases, and studies on bladder training.

Assessment of characteristics of studies

The included trials were classified according to preset criteria: type of alternative exercise regimens, comparison intervention, participants and diagnoses, interventions, primary outcome measures, and results. We considered methodological limitations of each of the trials. The PEDro scale for rating quality of randomised controlled trials was used to score methodological quality (Maher et al 2003). Two researchers classified and scored each trial independently. Disagreements were resolved by discussion.

The results are presented in the following way. Each alternative exercise regimen is considered in turn. First we provide a brief description of the theoretical justification for the therapy. Then the evidence supporting the intervention is presented, beginning with the evidence from laboratory studies and observational (epidemiological) studies and