A pilot study to investigate the effects of wearing support shorts during exercise on women with Stress Urinary Incontinence.

Final report

Sophie Reynolds (Second year physiotherapy student, funded from the RCSI Research Summer School 2014))
Mary Boyd, MMedSc, MEd, MScLHPE
School of Physiotherapy, Royal College of Surgeons in Ireland

Abstract

Purpose: Bladder control problems can be very embarrassing and a deterrent to undertaking physical activity. The purpose of this study is to assess the effect of wearing support shorts during exercise in women with stress urinary incontinence. To achieve this aim, a pad test to assess leakage in subjects was analysed under two conditions: wearing EVB support shorts and wearing normal running shorts.

Methods: Seven healthy women (mean age 44.6 ± 8.8yrs) with a history of stress urinary incontinence attended the School of Physiotherapy, RCSI for two visits. During both visits, participants undertook a series of six exercises. Participants were requested to complete two questionnaires, the Incontinence Impact Questionnaire and the International Consultation Incontinence Questionnaire – Short Form. In addition, weight, height and weight circumference were also measured. All participants were provided with a pre-weighed pad. On completion of the exercises, the pad was weighed and the net weight calculated. A positive pad test was defined as more than 1 gram of leakage.

Results: There was a reduction in leakage in the EVB support shorts though not statistically significant as $p>0.134$. The mean pad weight was reduced from 17.6 grams whilst wearing the ordinary shorts to 8 grams in the presence of the EVB sport shorts.

Conclusion: This study suggests that the EVB support shorts are effective in reducing the amount of leakage in women with stress urinary incontinence during exercise.

Introduction

Urinary incontinence is the complaint of involuntary loss of urine (ICS/IUGA terminology 2010) and is a common occurance in women (Bø and Herbert, 2013). Reported prevalence rates vary between 32% and 64% (Bø and Herbert, 2013). Stress urinary incontinence (SUI) is defined as a complaint of involuntary loss of urine on effort or physical exertion (e.g. sporting activities), coughing or sneezing (Haylen et al, 2010). Stress urinary incontinence is the most frequent type of incontinence reported affecting approximately 49% of incontinent and mostly occurring in young and perimenopausal women (Hunskaar et al, 2004). Risk factors for developing SUI are pregnancy, spontaneous vaginal and instrumental deliveries, respiratory problems, excessive weight gain and straining at stool (Sangsawand and Serisathien, 2011).

Women have been found to have some degree of SUI prior to pregnancy (Brown et al, 2010). Women tend to control the incontinence by emptying their bladder more frequently, drinking less, wearing pads, changing their life style, wearing dark clothes and limiting or stopping physical activities. As excessive weight gain is a contributing factor for urinary incontinence, having to reduce exercise that generally helps to lose weight, further compounds the problem. A pad test is a simple, non-invasive and effective method to quantify the amount of urine loss in patients with urinary incontinence. Various types of pad tests have been described in the literature, with the standardized 1-hour pad test being more reliable with standard bladder volume and provocative exercises.

Recently the EVB support shorts have been designed with a pouch to hold a disposable pad to deal with leakage and with compressive panels to provide uplift support to the pelvic floor muscles during exercises. Preliminary results show no significant difference on physiological, metabolic or perceptual responses during a 30 minute run but no objective measure of leakage was undertaken (Moyna et al, 2012).

Aims and objectives

The aim of this pilot study was to assess whether the passive supporting effects of wearing support shorts has an influence on stress urinary incontinence during exercise. The objectives were to compare leakage under two conditions:

(i) wearing non-supportive shorts

(ii) wearing EVB support shorts

and to explore participants experience of living with stress urinary incontinence.

Materials and Methods

Study design: A same subject experimental study design with repeated measures was employed in this research study.

Participants: A total of 7 women between the ages of 27- 55 were recruited through a local Physiotherapy Private Practice, specialising in Women's Health and through the noticeboard on the RCSI Intranet. Participants had a history of stress urinary incontinence, were in good health and involved in exercise at least 30 minutes three times a week. Exclusion criteria included pregnancy, surgery for stress incontinence, symptoms of urgency incontinence and any other

medical condition that may contraindicate exercise participation. The study was approved by the Research Ethics Committee, RCSI and informed consent was obtained prior to participation.

Study overview

The study took place in the Movement Laboratory, School of Physiotherapy, RCSI. Participants made two separate visits to the laboratory. During both visits, they undertook a series of six exercises while wearing either EVB support shorts or normal non-supporting shorts. The participants were asked to choose one envelope from a choice of two. Each envelope contained a piece of paper stating either EVB support shorts or ordinary shorts. The envelope chosen determined the type of shorts the participant wore on their first visit.

Participants were requested to empty their bladder two hours prior to testing and to refrain from voiding again until after testing had been completed. Participants were provided with a pre-weighed pad to be worn during the exercises. The ICS 1-hour pad test is started without the patient voiding and the participant drinks 500 ml of sodium-free liquid. During the resting period, (15 minutes) the participant's anthropometric measurements (height, weight and waist circumference) were recorded using a wall standiometer, tape measure and electronic balance (Seca). Footwear was removed prior to height and weight being taken. Height was measured to the nearest cm and weight to the nearest 0.1kg. Body Mass Index (BMI, weight / height^2) were calculated as a measure of obesity. Participants were requested to complete a Physical Activity Readiness Questionnaire (Par-Q) medical screening questionnaire prior to participation. To assess the severity and how the women were affected, the International Consultation Incontinence Questionnaire (ICIQ) and the Incontinence Impact Questionaire (IIQ-7) quality of life questionnaires were completed by the participants.

Prior to initiation of the exercise programme (Appendix A), a series of stretches were carried out as part of a warm-up period. This included 5 minutes on an electronic bicycle with zero resistance. Participants were instructed in the six exercises (step-ups with 20cm Rebox step, high knees, side lunges, lunges, skipping and squats) and undertook the prescribed exercises under the supervision of the researcher. The exercises chosen were those believed to best replicate normal movements that occurred in most sporting activities, ranging from relatively low intensity to high impact.

On completion of the exercises, the pad was weighed and the net weight calculated by subtracting the original dry weight to achieve a measure of total urine loss during the exercises. A positive pad weight was defined as more than 1gram of leakage.

Results

Seven women with stress urinary incontinence were included in the study. Demographic data are shown in Table 1. Five of the participants were recruited through the Physiotherapy practice and two self-referred. Six of the seven reported their stress urinary incontinence following pregnancy. One participant did not have any pregnancies.

Table 1. Demographic of the study population (n=7)

	Age	Height(m)	Weight (kg)	Waist Circumference (cm)	BMI
Mean	44.6	1.6	73.2	83.9	27.1
Standard Deviation	8.8	0.06	11.63	9.89	3.30
Range	27-55	1.6-1.7	62-94.6	71-96	22.9-33.3

Five of seven participants were classified as overweight, one as moderately obese and one within normal range as described by the National Health Service (NHS) with a mean BMI of 27.78 as seen in Table 1.

Table 2 shows the pad tests results under the two conditions, i.e. wearing the EVB support shorts and normal shorts. A reduction in urine leakage is seen in the presence of the EVB shorts though not statistically significant $p>0.134$, with a mean weight of 8 grams in comparison to the 17.6 grams in the ordinary shorts. In addition, range has reduced from that of 4-60 grams with ordinary shorts in contrast to 0-24 grams whilst using the EVB shorts.

Table 2 Pad Test Results

	EVB Sport Shorts (n=7)	Ordinary Shorts (n=7)
Mean	8	17.6
Standard Deviation	8.2	20.8
Range	0-24	4-60
0-2 g essentially dry	2	0
2-10g slight to moderate urine loss	3	4
10-50g severe urine loss	2	2
>50g very severe urine loss	0	1

Table 3 shows the distribution of item scores for the IIQ. All of the women reported that they were incontinent during physical activity and coughing.

Table 3. IIQ distribution (n=7)

	Physical Activity	Travel	Social / relationships	Emotional Health
0 not at all	0	3	4	2
1 slightly	3	2	3	1
2 moderately	1	1	0	3
3 greatly	3	1	0	1

The majority of the participants reported a moderate loss of urine daily, with an average score of 11.4 ± 4.7 with the ICIQ (scores ranging from 0 no impact to 21 maximum impact).

All participants reported feeling supported and more confident with the EVB support shorts. Participants were anxious in relation to the amount of leakage that may occur during the exercise activity. Three of the participants were receiving physiotherapy treatment, and one other participant was encouraged to attend.

Discussion

Stress urinary incontinence is a common and often unspoken condition suffered by many women, resulting in embarrassment and distress and often significant psychological consequences. Pregnancy is one of the leading contributors to SUI as a result of increased pressure on the abdominal wall and pelvic floor muscles (Sansawang and Serisathien, 2012). This condition inhibits many women in taking part in sports and other physical activities which both increases risk of obesity and heart disease, but also their quality of life, with SUI affecting quality of life parameters in 54.3% of all pregnant women (Dolan et al, 2004). Obesity is an outstanding risk factor in the etiology of stress incontinence. Five of the seven participants in this study were classified as overweight, one as moderately obese and one within normal range as described by the National Health Service (NHS) with a mean BMI of 27.1. Qiu et al, (2011) reported a positive correlation for SUI and a waist circumference between 70-75 cm. Overweight and obesity is an increasing risk factor for SUI although the link is unclear, it may be due to extra weight being places on the pelvic floor tissues, causing strain, stretching and

weakening of the muscles. Six of the seven participants in this study had a waist circumference greater then 76cm.

In this study, we evaluated pad testing under two conditions, while wearing EVB support shorts and normal shorts while exercising. The participants easily accepted the pad test as it is a simple, non-invasive and objective measure. Participants reported incontinence during the exercises, in particular with the skipping and lunge exercises. This study suggests that the EVB support shorts are effective in reducing the amount of leakage in women with stress urinary incontinence during exercise. This reduction may improve confidence in patient cohorts in the exercise setting and encourage women to resume their normal physical activity and allow women to return to exercise and improve their quality of life. Moreover, some changes resulted in a reduction of moderate to mild incontinence. The severity of incontinence of the participants varied from mild (1.3 to 20 grams) to moderate (21 to 74 grams) (O'Sullivan et al 2004).

Conclusion

Stress urinary incontinence is a common and often unspoken condition suffered by many women, resulting in embarrassment and distress. Although the small sample may limit interpretation of the results, this study suggest that the EVB support shorts are effective in reducing the amount of leakage in women with SUI during exercise.

References

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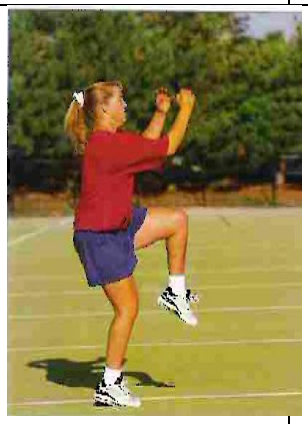
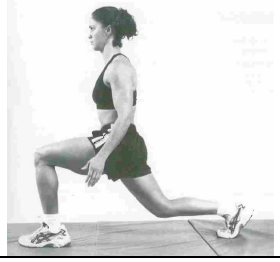
Appendix A: Exercise programme

Exercise	Instructions		Additional Comments
Warm –up	• 5 minutes on stationary bicycle, no resistance • Stretches – 6 sec hold, 2 reps – Hamstrings – 1 length – Quadriceps – 1 length – Calfs – 1 length – Adductors – side lunge – Upper limb – shoulders + triceps		
Steps –ups	20 cm Rebox step 3 sets of 10 reps 10 second rest between each set		
Rest	1min		
High Knees	Walking on the spot, lifting knees to hip level, touching knees with palm of hands, 3 sets x 10 reps		
Rest	1 min		
Side stepping & touch floor	2 sets of 10 reps Participant will reach to tape placed within their limit		
Rest	1 min		

Step and Lunge	1 length of room by 2 sets 10 second break in between		
Rest	1 min		
Skipping	2 sets of 10 reps Participant should jump approximately 2.5 inches (simulated skipping without rope)		Without rope
Rest	1 min		
Squat	3 sets of 10 reps Exercise ball can be used if participant is unable to achieve full squat		
Cool down	5 minutes walking around Movement while doing stretches as done prior to commencement of exercises		