

Original Article

Urinary Incontinence in Elite Female Athletes and Dancers

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Abstract: The aim of this study was, to determine the frequency of urinary loss in elite women athletes and dancers. Elite athletes in eight different sports, including ballet, filled in an evaluated questionnaire about urinary incontinence while participating in their sport/dancing and during daily life activities. A total of 291 women with a mean age of 22.8 years completed the questionnaire, providing a response rate of 73.9%. Overall, 151 women (51.9%) had experienced urine loss, 125 (43%) while participating in their sport and 123 (42%) during daily life. The proportion of urinary leakage in the different sports was: gymnastics 56%, ballet 43%, aerobics 40%, badminton 31%, volleyball 30%, athletics 25%, handball 21% and basketball 17%. During sport 44% had experienced leakage a few times, 46.4% now and then, and 9.6% frequently. During daily life the figures were: 61.7% a few times, 37.4% now and then, and 0.8% frequently. Of those who leaked during sport, 95.2% experienced urine loss while training versus only 51.2% during competition ($P < 0.001$). The activity most likely to provoke leakage was jumping. Sixty per cent (91/151) occasionally wore pads or panty shields because of urine loss. Urinary leakage is common among elite athletes and dancers, particularly during training, but also during daily life activities.

Keywords: Female elite athletes; Urinary incontinence

Introduction

Urinary incontinence is a common problem even among young women [1,2]. In a population of nulliparous elite

athletes, Nygaard et al. [3] found that 28% had urine loss while participating in their sport. The frequency of leakage varied from 0 to 67%, depending on the physical stress involved in the different sporting activities. The aim of this study was to elaborate on the problem of urinary incontinence among elite athletes and dancers while participating in their sport and during daily life activities.

Materials and Methods

A questionnaire about urinary symptoms was distributed to elite athletes in eight different sports, including professional ballet. The sports clubs all competed at Danish national level.

A total of 396 women were included in the study; 291 answered the questionnaire [4], providing a response rate of 73.7%. The eight sports represented were gymnastics ($n = 158$ women), badminton ($n = 16$), basketball ($n = 29$), volleyball ($n = 10$), track athletics ($n = 12$), handball ($n = 28$), aerobics ($n = 15$) and ballet ($n = 23$).

The women were first asked if they experienced urine loss while participating in their sport or in daily life. If their answers to both these questions were negative they did not complete the rest of the questionnaire. All women who had experienced urine leakage completed the questionnaire. They were asked about medication, deliveries, incontinence during training, competition and daily life activities, incontinence treatment, use of pads and voiding habits. Statistic analysis was performed using McNemars test. The study was approved by the local scientific ethical committee, and informed consent was obtained from all the women.

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Results

The average age of the 291 athletes answering the questionnaire was 22.8 years (range 14–51 years). A total of 151 (51.9%) had experienced urine loss while participating in their sport or in daily life situations. Thirteen (8.6%) of the 151 women had given birth. Forty women took oral hormonal contraceptive treatment, 14 medication for asthma, 10 non-steroidal anti-inflammatory agents and 1 woman insulin for diabetes.

A total of 125 women (43.0%) had experienced urine loss while participating in their sport (Fig. 1), 55 women (44%) had noted leakage a few times, 58 (46.4%) now and then, and 12 (9.6%) frequently. Of the 125 women, 119 (95.2%) had experienced urine loss during training, but only 64 (51.2%) during competition ($P < 0.001$). Eighty-two women had noticed the activity most likely to provoke urine loss: 71 mentioned jumping and 7 running.

A total of 123 women (42.2%) had experienced urine loss during daily life activities (Fig. 1), 76 (61.7%) had noted leakage a few times, 46 (37.4%) now and then, and 1 (0.8%) frequently.

Fourteen athletes (11.4%) had experienced urine loss without physical exertion.

Of the 151 athletes who had experienced urine loss either during sport or during daily life activity, 91 (60.2%) occasionally wore a pad or panty shield because of leakage. Ten (6.6%) claimed that they reduced their liquid intake to reduce leakage.

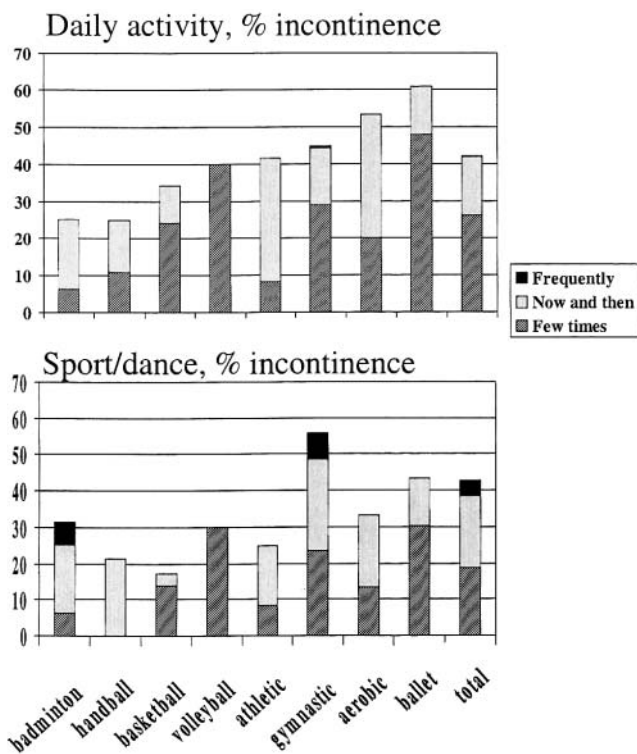


Fig. 1. The percentage of elite athletes who experienced urinary leakage during daily life activities and while participating in their sport/dance.

Fifty-one (33.8%) considered the urine leakage as a problem, 32 (21.1%) as a hygienic problem. Only 5 (3.3%) had discussed the problem with their doctor. Six women (4.6%) had completed a pelvic floor training program because of urine loss.

Twenty-two women (14.6%) reported a daytime frequency between one and three voids; 3 women (2.0%) had 11 or more voids per day; 43 women reported one or two voids per night, and 2 (1.3%) had three or more voids per night.

Discussion

This study demonstrates that more than 50% of elite athletes and professional ballet dancers have experienced urine loss. Approximately one-third of the women who had experienced urine leakage considered it to be a social or hygienic problem, and 60% occasionally wore pads.

Of the total population, 4% had urine leakage frequently when participating in their sport, whereas only 0.3% had urine loss frequently during daily life activities. Thus the physical exertion seems to be a significant provocative factor. Only the incontinent women completed the questionnaire, for which reason we cannot make comparisons between incontinent and continent athletes.

The prevalence of urinary incontinence in fertile women varies according to definition and the design of the study. Based on questionnaire studies, as in this one, Samuelsson [5] found that 3.5% of women between 20 and 59 years of age had daily incontinence, and Højbjerg et al. [6] found that 3% of women at 16 weeks of gestation had leakage at least weekly. Compared to these two studies, a prevalence of 0.3% of frequent leakage during daily life activities seems to be low. This difference may be explained by the fact that 91.2% were nulliparous and all were physically well trained. However, the present population may be subject to selection bias, as some athletes may have quit their sport because of stress urinary leakage. Nygaard [7] reported that 20% of young women exercisers stopped because of urine leakage. Consequently, the frequency of regular urinary incontinence in a 'normal population' seems to be significantly higher than the findings in the present population of elite athletes and dancers.

The activity most likely to provoke leakage was jumping. This explains why gymnastics, which involves many high-impact jumps, has the highest degree of leakage of the different sports.

The study demonstrates that significantly more athletes experienced urine loss during training rather than competition: 95.2% versus 51.2%, respectively. This is an interesting finding that may be explained by the higher catecholamine levels during competition versus training [8,9]. As the urethra contains α -receptors, the higher catecholamine level during competition may

tend to keep it closed. Other factors, such as the ritual bladder and bowel emptying which is common before competition, or changes in diuresis, may also play a role.

Our findings are partly similar to those reported by Nygaard et al. [3], although the numbers in the different subgroups are small. In their study 67% of the gymnastics and 50% of the tennis players had experienced urine loss while participating in their sport, but no golf players had the problem. The golf players were also completely dry during daily life activities, whereas 83% of the tennis players and 53% of the gymnasts had urine leakage. It is remarkable that the golf players had leakage neither during sport nor during daily life activities, as they must have been exposed to some degree of physical exertion. In our study all the different athletes had urine loss during both sport and daily life activities, although the relative proportion was not always parallel.

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EDITORIAL COMMENT: This article provides more evidence as to the surprisingly high prevalence of urinary incontinence in young, physically fit athletes. Even though relatively few women experienced frequent symptoms, we traditionally would not expect any incontinence at all in this group. It seems that the relatively high pressure generated by certain activities, especially jumping, is sufficient to overcome the continence mechanism in these women.

Now that we know the prevalence of incontinence is higher in athletes than previously suspected, the next step will be investigating the pathophysiology. Do repeated impacts somehow damage pelvic supporting structures? Despite their overall level of physical fitness, is their pelvic muscle function abnormal for some reason? Just as isolated enzyme deficiencies have led to a greater understanding of cellular biochemistry, out of proportion to the actual incidence of those clinical conditions, unraveling the pathophysiology of incontinence in unusual study populations may help advance our understanding of continence and incontinence.

Reviews of Current Literature

A Transvaginal Approach to Repair of Apical and other Associated Sites of Pelvic Organ Prolapse with Uterosacral Ligaments

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The purpose of the study was to assess a repair for pelvic organ prolapse using uterosacral ligaments in 302 consecutive patients. Preoperatively and postoperatively, prolapse was characterized by using the Baden-Walker halfway scoring system. All cases were repaired using permanent sutures in uterosacral ligament pedicles, and pubocervical and rectovaginal fascia. Three sutures were used on each side to support the fascial tissues to the uterosacral ligaments. Midline plication of pubocervical and rectovaginal fascia added length to the fascial segments and vaginal canal. Defects in the perineal body were repaired, and stress incontinence was corrected by a Burch procedure. At follow-up, 87% of patients had no prolapse and only 5% had grade 2 or greater support defects. There were 10 patients with grade 2 or 3 defects in the anterior segment. There was one ureteral injury requiring extensive intraoperative repair, and 3 other cases of ureteral compromise treated

intraoperatively. Suture placement in the uterosacral ligaments was always lateral to medial, and the site of initial suture placement was identified posterior and medial to the ischial spines at 4 and 8 o'clock, and held with a long Allis clamp. Subsequent sutures were placed on the sacral side of the first suture.

Comment

The success of this approach to the repair of apical defects is excellent at 1 year follow-up. It is noted that those patients followed for over 2 years had a greater number of support defects. One must ponder the duration of the desired effect, and would look forward to a 5-year follow-up. The most frequent site of defect was the anterior segment, which is very similar to results from other support operations, especially sacrospinous vault suspension. It is vital to extend the repair fully across the fascia of the pubocervical and rectovaginal defects, because if the center portion is not supported equally as well as the lateral portion there will be a rapid recurrence of the midline defects. It is noteworthy that specific repair for enterocele was included by reapproximating anterior and posterior fascial segments.