

PASIG MONTHLY CITATION BLAST: No.85

August 2013

Dear Performing Arts SIG members:

This month's citation blast is on *Female Dancers and Elite Performers with Incontinence*, compiled by my intern, Sherine Aubert, SPT, Doctor of Physical Therapy Program, Western University of Health Sciences, Class of 2014.

It is refreshing for me as a clinical instructor to have an intern who not only has a vision for combining orthopaedics, women's health, and dance medicine into a unique practice, but is able to search the literature and have future studies in mind. Very exciting!!

The practice of compiling abstracts has been an easy way for my interns to provide content for a citation blast as well as prepare for a clinical inservice or case study report. I want to encourage you to bring your interns, residents, and fellows into this process. Please consider compiling Performing Arts-related abstracts for a citation blast this year. It's easy to do, and a great way to become involved with PASIG! Just take a look at our Performing Arts Citations and Endnotes, look for what's missing, and email me your contribution or ideas on future citation blasts.

[http://www.orthopt.org/content/special\\_interest\\_groups/performing\\_arts/citations\\_endnotes](http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes)

Best regards,

Annette

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Reminder to those interested in participating in the production of a wellness screen for the young, pre-professional dancer:  
contact Brooke Winder, PT, DPT, OCS, [brookeRwinder@gmail.com](mailto:brookeRwinder@gmail.com)



## PERFORMING ARTS CONTINUING EDUCATION, CONFERENCES, AND RESOURCES

Orthopaedic Section Independent Study Course. *20.3 Physical Therapy for the Performing Artist.*

Monographs are available for:

- Figure Skating (J. Flug, J. Schneider, E. Greenberg),
- Artistic Gymnastics (A. Hunter-Giordano, Pongetti-Angeletti, S. Voelker, TJ Manal), and
- Instrumentalist Musicians (J. Dommerholt, B. Collier).

Contact: Orthopaedic Section at: [www.orthopt.org](http://www.orthopt.org)

Orthopaedic Section-American Physical Therapy Association,  
Performing Arts SIG

[http://www.orthopt.org/content/special\\_interest\\_groups/performing\\_arts](http://www.orthopt.org/content/special_interest_groups/performing_arts)

Performing Arts Citations and Endnotes

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ADAM Center

<http://www.adamcenter.net/>

Publications:

<http://www.adamcenter.net/#!vstc0=publications>

Conference abstracts:

<http://www.adamcenter.net/#!vstc0=conferences>

Dance USA

<http://www.danceusa.org/>

Research resources:

<http://www.danceusa.org/researchresources>

Professional Dancer Annual Post-Hire Health Screen:

<http://www.danceusa.org/dancerhealth>

Dancer Wellness Project

<http://www.dancerwellnessproject.com/>

Becoming an affiliate:

<http://www.dancerwellnessproject.com/Information/BecomeAffiliate.aspx>

Harkness Center for Dance Injuries, Hospital for Joint Diseases

<http://hjd.med.nyu.edu/harkness/>

Continuing education:

<http://hjd.med.nyu.edu/harkness/education/healthcare-professionals/continuing-education-courses-cme-and-ceu>

Resource papers:

<http://hjd.med.nyu.edu/harkness/dance-medicine-resources/resource-papers-and-forms>

Links:

<http://hjd.med.nyu.edu/harkness/dance-medicine-resources/links>

Informative list of common dance injuries:

<http://hjd.med.nyu.edu/harkness/patients/common-dance-injuries>

Research publications:

<http://hjd.med.nyu.edu/harkness/research/research-publications>

International Association for Dance Medicine and Science (IADMS)

<http://www.iadms.org/>

The 23rd Annual Meeting of the International Association for Dance Medicine & Science (IADMS) will be held in [Seattle, Washington, USA](#) from October 17 - 19, 2013. Meeting activities and sessions will be held at the [Renaissance Seattle Hotel](#). On Sunday, October 20, 2013, Special Interest Groups (SIG) Day will be held, with special programs available.

Resource papers:

<http://www.iadms.org/displaycommon.cfm?an=1&subarticlenbr=186>

Links:

<http://www.iadms.org/displaycommon.cfm?an=5>

Medicine, arts medicine, and arts education organization links:

<http://www.iadms.org/displaycommon.cfm?an=1&subarticlenbr=5>

Publications:

<http://www.iadms.org/displaycommon.cfm?an=3>

Performing Arts Medicine Association (PAMA)

<http://www.artsmed.org/>

<http://www.artsmed.org/symposium.html>

Interactive bibliography site:

<http://www.artsmed.org/bibliography.html>

Related links:

<http://www.artsmed.org/relatedlinks.html>

Member publications:

<http://artsmed.org/publications.html>

*(Educators, researchers, and clinicians, please continue to email me your conference and continuing education information and I will include it in the upcoming blasts.)*

### **Female Dancers and Elite Performers with Incontinence**

Dance is the collaboration between strength and beauty. A dancer's body is his/her instrument, a tool to tell a story, like a paint brush to an easel or a spray can to a graffiti wall. But what happens when part of the dancer is faulty? Or, if you will, the spray can springs a leak? Many dancers experience an injury at some point in their dance career, but what about incontinence? It is a topic many women are embarrassed to discuss, let alone young dancers, which poses a difficulty in diagnosis and treatment for female dancers with incontinence.

Dancers spend many hours in class, Pilates, yoga and other activities to maintain strength and flexibility. We strengthen almost every muscle in the body to achieve optimum strength to jump higher, turn faster, or maintain alignment; but what about the pelvic floor musculature? This is a muscle group that is pushed to the limits during jumping and landing, yet is not addressed in dance classes. Dancers of various body types, strength, age, and level are experiencing incontinence. This can be detrimental to their training, performance, and sense of womanhood.

My goal is to help women, and specifically dancers, relinquish their embarrassment around incontinence issues and address the pelvic floor, much as a Physical Therapist would address any other muscle group. Treating, educating, and motivating dancers with incontinence are very important factors in addressing their ability to continue to train and perform with confidence. Enjoy the read!

Sherine Aubert

Western University of Health Sciences

Doctor of Physical Therapy Class of 2014

Bo, K. (2004). "Urinary incontinence, pelvic floor dysfunction, exercise and sport." Sports Med **34**(7): 451-464.

Urinary incontinence is defined as "the complaint of any involuntary leakage of urine" and is a common problem in the female population with

prevalence rates varying between 10% and 55% in 15- to 64-year-old women. The most frequent form of urinary incontinence in women is stress urinary incontinence, defined as "involuntary leakage on effort or exertion, or on sneezing or coughing". The aim of this article is to systematically review the literature on urinary incontinence and participation in sport and fitness activities with a special emphasis on prevalence and treatment in female elite athletes. Stress urinary incontinence is a barrier to women's participation in sport and fitness activities and, therefore, it may be a threat to women's health, self-esteem and well-being. The prevalence during sports among young, nulliparous elite athletes varies between 0% (golf) and 80% (trampolinists). The highest prevalence is found in sports involving high impact activities such as gymnastics, track and field, and some ball games. A 'stiff' and strong pelvic floor positioned at an optimal level inside the pelvis may be a crucial factor in counteracting the increases in abdominal pressure occurring during high-impact activities. There are no randomised controlled trials or reports on the effect of any treatment for stress urinary incontinence in female elite athletes. However, strength training of the pelvic floor muscles has been shown to be effective in treating stress urinary incontinence in parous females in the general population. In randomised controlled trials, reported cure rates, defined as <2g of leakage on pad tests, varied between 44% and 69%. Pelvic floor muscle training has no serious adverse effects and has been recommended as first-line treatment in the general population. Use of preventive devices such as vaginal tampons or pessaries can prevent leakage during high impact physical activity. The pelvic floor muscles need to be much stronger in elite athletes than in other women. There is a need for more basic research on pelvic floor muscle function during physical activity and the effect of pelvic floor muscle training in female elite athletes.

Bo, K. and J. S. Borgen (2001). "Prevalence of stress and urge urinary incontinence in elite athletes and controls." Med Sci Sports Exerc **33**(11): 1797-1802.

**PURPOSE:** The purposes of the present study were to examine the prevalence of stress and urge incontinence in female elite athletes and controls, assess a possible association between urge and stress incontinence and eating disorders, and assess a possible association between stress and urge incontinence and menstrual irregularity.  
**METHODS:** This was a two-stage study including a screening part by questionnaire and a clinical interview. Questions included in the questionnaire were related to training history, menstrual history, eating behavior, and stress and urge incontinence. DSM-IV criteria were used in the clinical part of the study to diagnose eating disorders in those classified as being at risk. The total population of female elite athletes,

defined as one representing the national team for junior or senior (N = 660), and age-matched nonathlete controls (N = 765) aged 15-39 were asked to answer the questionnaire. The response rate was 87% and 75% for athletes and controls, respectively. RESULTS: Four percent of the athletes and 33% of the controls had delivered ( $P < 0.05$ ). There was no significant difference in prevalence of stress urinary incontinence (SUI) in the athletes and controls, 41% and 39%, respectively. No significant difference was observed between sport groups. No difference in the frequency of urge incontinence was found when athletes (16%) and controls (19%) were compared. Twenty percent of the elite athletes and 9% of the controls met the DSM-IV criteria for eating disorder. The prevalence of SUI (49.5%) and urge incontinence (20%) in eating disordered athletes was significantly higher than in healthy athletes, 38.8% ( $P = 0.003$ ) and 15% ( $P = 0.048$ ). No difference in prevalence was observed when eating disordered nonathletes (39%) and healthy nonathletes (39%) were compared ( $P = 0.426$ ). CONCLUSION: There is a high prevalence of stress and urge incontinence in female elite athletes. The frequency of SUI and urge incontinence was significantly higher in eating disordered athletes compared with healthy athletes.

Bo, K. and J. Sundgot-Borgen (2010). "Are former female elite athletes more likely to experience urinary incontinence later in life than non-athletes?" Scand J Med Sci Sports **20**(1): 100-104.

The aim of the present study was to investigate whether former female elite athletes are more likely to experience urinary incontinence (UI) later in life than non-athletes and to assess possible risk factors for UI in athletes. Three hundred and thirty-one former elite athletes (response rate 81%) and 640 controls replied to a postal questionnaire including validated questions on UI. While competing in sport, 10.9% and 2.7% of the former elite athletes reported stress urinary incontinence (SUI) and urge incontinence, respectively. Presently, 36.5% of the former elite athletes and 36.9% of the controls reported SUI. 9.1% and 9.4% reported urge incontinence. Among former elite athletes, those with two or three children were more likely than nulliparous women to have UI now. Also, among former athletes, UI was more common in women with vs those without UI while competing (odds ratio 8.57, 95% confidence interval: 3.55-20.71). Age, menopause and being regularly physically active now were not associated with UI in either group. Based on this study, the prevalence of UI does not seem to be higher in former athletes than in controls. However, the results indicate that UI early in life, as reported during elite sport, is a strong predictor of UI later in life.

Broso, R. and R. Subrizi (1996). "[Gynecologic problems in female athletes]." Minerva Ginecol **48**(3): 99-106.

More than 6 million women now compete in strenuous exercise, worldwide.

The sports participation is a sage experience for the teenage athlete. But intense exercise had been reported to delay menarche when the sports activity was begun before puberty. It has been shown to increase beta-endorphins and catecholamine in women. Menstrual cyclicity is influenced by prior and concomitant exercise intensity and/or duration in long-distance runners, gymnasts, ballet dancers, fencers, rowers. Altered menstrual cyclicity can approach 70% in strenuously exercising women. Menstrual dysfunction has been associated with significant weight loss, decreased body fat, previous history of menstrual dysfunction, stress and intensity of athletic training. A complication of amenorrhea is the loss of bone mineral content and bone density. Urinary incontinence during physical stresses is common in young nulliparous women. Some female athletes to increase their sports performance artificially take illegal steroid substances. Perineo-sphincter exercise must be started very early during the post-partum, before the start of sports. Most of the athletes of all ages resulted to prefer the oral contraceptive method.

Caylet, N., P. Fabbro-Peray, et al. (2006). "Prevalence and occurrence of stress urinary incontinence in elite women athletes." Can J Urol **13**(4): 3174-3179.

OBJECTIVE: 1) To assess the prevalence of stress urinary incontinence (SUI) and urge urinary incontinence (UI) in elite women athletes versus the general female population, and 2) to analyze the conditions of occurrence of urine loss in search of etiological clues in elite athletes. DECISION: An anonymous self-questionnaire was collected transversally from women aged 18 to 35 years. The exposed group was composed of elite female athletes; the non-exposed group was made up of women in the same age range accepting to answer the questionnaire. RESULTS: A total of 157 answers from elite athletes and 426 from control subjects were available for analysis. Urinary incontinence prevalence was 28% for athletes and 9.8% for control subjects ( $p = .001$ ). There was no significant difference in the relative prevalence of SUI between the athletes and control subjects. Athletes reported urine loss more frequently during the second part of the training session ( $p < 0.0003$ ), and the second part of competition ( $p < 0.05$ ). Urinary incontinence prevalence was 9.87% in physically-active control subjects versus 9.84% in sedentary control subjects (NS). Even a small quantity of urine loss was felt to be embarrassing. Most incontinent women did not dare to speak of their condition to anybody. CONCLUSIONS: There is a very high prevalence of urinary incontinence in women athletes. Detailed studies of the pathophysiology of this problem are necessary to formulate preventive recommendations.

Di Benedetto, P., A. Coidessa, et al. (2008). "Rationale of pelvic floor muscles training in women with urinary incontinence." Minerva Ginecol **60**(6): 529-541.

Urinary incontinence (UI) is a frequent condition in women and has a

significant impact on their quality of life. Its prevalence varies between 10% to 40% and stress urinary incontinence (SUI) is the most frequent condition. In the past surgery was considered the milestone of treatment in women with SUI. Nowadays, conservative approach is commonly considered by the International Continence Society the first line therapy in uncomplicated UI. In particular pelvic floor muscle training (PFMT) has acquired a fundamental role in the prevention and treatment of female UI (FUI), often incited or promoted by occupation, sport activities, vaginal childbirth, menopause or ageing. The rationale of PFMT for SUI is that a strong pelvic floor muscle contraction will clamp the urethra, increasing the urethral pressure to prevent leakage during an abrupt increase in intra-abdominal pressure. In urge urinary incontinence PFMT may inhibit reflexively or voluntarily the involuntary detrusor contraction. The core of PFMT is the pelvic floor muscle (PFM) awareness, followed by sequential program until the concomitant automatic PFM contraction during daily life activities. The last Cochrane review asserted that PFMT is an effective treatment in women with stress and mixed UI. But it is mandatory to emphasise the fundamental role of PFMT in the prevention of FUI, as could be assured by more extensive programs of adaptive physical activity in this field.

Dumoulin, C. and J. Hay-Smith (2010). "Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women." Cochrane Database Syst Rev(1): CD005654.

**BACKGROUND:** Pelvic floor muscle training is the most commonly used physical therapy treatment for women with stress urinary incontinence. It is sometimes recommended for mixed and less commonly urge urinary incontinence. **OBJECTIVES:** To determine the effects of pelvic floor muscle training for women with urinary incontinence in comparison to no treatment, placebo or sham treatments, or other inactive control treatments. **SEARCH STRATEGY:** The Cochrane Incontinence Group Specialised Trials Register (searched 18 February 2009) and the reference lists of relevant articles were searched. **SELECTION CRITERIA:** Randomised or quasi-randomised trials in women with stress, urge or mixed urinary incontinence (based on symptoms, signs, or urodynamics). One arm of the trial included pelvic floor muscle training (PFMT). Another arm was a no treatment, placebo, sham, or other inactive control treatment arm. **DATA COLLECTION AND ANALYSIS:** Trials were independently assessed for eligibility and methodological quality. Data were extracted then cross-checked. Disagreements were resolved by discussion. Data were processed as described in the Cochrane Handbook (Higgins 2008). Trials were subgrouped by diagnosis. Formal meta-analysis was not undertaken because of study heterogeneity. **MAIN RESULTS:** Fourteen trials involving 836 women (435 PFMT, 401 controls) met the inclusion criteria; twelve trials (672) contributed data to the analysis. Many studies



were at moderate to high risk of bias, based on the trial reports. There was considerable variation in interventions used, study populations, and outcome measures. Women who did PFMT were more likely to report they were cured or improved than women who did not. Women who did PFMT also reported better continence specific quality of life than women who did not. PFMT women also experienced fewer incontinence episodes per day and less leakage on short office-based pad test. Of the few adverse effects reported, none were serious. The trials in stress urinary incontinent women which suggested greater benefit recommended a longer training period than the one trial in women with detrusor overactivity (urge) incontinence. AUTHORS' CONCLUSIONS: The review provides support for the widespread recommendation that PFMT be included in first-line conservative management programmes for women with stress, urge, or mixed, urinary incontinence. Statistical heterogeneity reflecting variation in incontinence type, training, and outcome measurement made interpretation difficult. The treatment effect seems greater in women with stress urinary incontinence alone, who participate in a supervised PFMT programme for at least three months, but these and other uncertainties require testing in further trials.

Eliasson, K., T. Larsson, et al. (2002). "Prevalence of stress incontinence in nulliparous elite trampolinists." Scand J Med Sci Sports **12**(2): 106-110.

During trampoline jumping the pelvic floor is exposed to high forces. There has been a general belief that physically fit women have a strong pelvic floor as a result of their regular training, thus preventing urinary incontinence. The aim of this study was to survey the prevalence of stress urinary incontinence in female elite trampolinists. The prevalence of urinary incontinence was assessed by a questionnaire, sent to all 35 elite trampolinists (mean age 15, range 12-22 years) in Sweden. Eighty percent of the trampolinists reported involuntary urinary leakage, but only during trampoline training. The leakage started after 2.5 (range 1-4) years of training. Age ( $P < 0.001$ ), duration of training ( $P = 0.04$ ), and training frequency ( $P = 0.01$ ) were significantly associated with leakage. All women above 15 years of age ( $n = 23$ ) reported urinary leakage ( $P < 0.001$ ). Eighteen incontinent women continued the study and their leakage was verified by a pad test. The leakage averaged 28 g during a jump session. The muscle strength was measured with perineometry in 10 women and showed good strength in the pelvic floor muscles.

Goldstick, O. and N. Constantini (2013). "Urinary incontinence in physically active women and female athletes." Br J Sports Med.

A literature review was performed on the topic of urinary incontinence during physical activity and sports. This paper reviews the prevalence, risk factors, pathophysiology and treatment modalities of urinary incontinence in physically active women and female athletes. Urinary incontinence

affects women of all ages, including top female athletes, but is often under-reported. The highest prevalence of urinary incontinence is reported in those participating in high impact sports. Pelvic floor muscle training is considered the first-line treatment, although more research is needed to determine optimal treatment protocols for exercising women and athletes. Trainers, coaches and other athletes' caregivers should be educated and made aware of the need for proper urogynaecological assessment.

Nygaard, I. E. (1997). "Does prolonged high-impact activity contribute to later urinary incontinence? A retrospective cohort study of female Olympians." Obstet Gynecol **90**(5): 718-722.

**OBJECTIVE:** To determine whether women engaged in strenuous, provocative exercise are more likely to be incontinent in future life than similarly fit women who participated in less provocative exercise.  
**METHODS:** In this retrospective cohort study, female American Olympians who competed in swimming (low-impact group) and in gymnastics and track and field (high-impact group) between 1960 and 1976 completed a structured questionnaire. Primary outcome measures included the prevalence of the symptoms of stress and urge incontinence. Statistical analyses of results included chi<sup>2</sup>, Fisher exact test, two-tailed t tests, Wilcoxon rank sum test, and stepwise multiple logistic regression.  $P < .05$  was considered significant. **RESULTS:** One hundred four women responded (response rate 51.2%). High-impact athletes were older (46.2 compared with 42.4 years) and were more likely to report incontinence when they were doing their sport as Olympians (35.8% compared with 4.5%) than low-impact athletes; low-impact athletes were more likely to be parous (83.3% compared with 60.7%). There was no difference in the prevalence of the symptom of stress incontinence between the high-versus low-impact groups: any incontinence, 41.1% compared with 50%; daily or weekly incontinence, 10.7% compared with 8.3%; and incontinence that bothered them moderately or greatly, 10.7% compared with 4.2%. With our sample size, this study had 80% power to detect a fourfold difference in daily or weekly incontinence between groups, but only a 30% power to detect a twofold difference, given a baseline prevalence of 10%. When age, body mass index (BMI), parity, Olympic sport group, and incontinence during Olympic sport were entered into stepwise logistic regression analyses, only BMI was significantly associated with regular stress or urge incontinence symptoms. **CONCLUSION:** Participation in regular, strenuous, high-impact activity when younger did not predispose women to a markedly higher rate of clinically significant urinary incontinence in later life.

Nygaard, I. E., F. L. Thompson, et al. (1994). "Urinary incontinence in elite nulliparous athletes." Obstet Gynecol **84**(2): 183-187.

**OBJECTIVE:** To determine the prevalence of the symptom of urinary incontinence during athletic endeavors among a group of nulliparous, elite college varsity female athletes. **METHODS:** All women currently participating in varsity athletics at a large state university were asked to fill out a questionnaire about the occurrence of urinary incontinence while participating in their sport and during activities of daily life. One hundred forty-four of 156 eligible women (92%) responded. **RESULTS:** The mean age was 19.9 years, and all women were nulliparous. Overall, 40 athletes (28%) reported urine loss while participating in their sport. The proportions in different sports were: gymnastics 67%, basketball 66%, tennis 50%, field hockey 42%, track 29%, swimming 10%, volleyball 9%, softball 6%, and golf 0%. Two-thirds of the women who noted urine loss during athletics were incontinent more often than rarely. There were no statistically significant relations between incontinence and amenorrhea, weight, hormonal therapy, or duration of athletic activity. Activities most likely to provoke incontinence included jumping, high-impact landings, and running. Forty percent and 17% of the women first noted incontinence during their sport while in high school and junior high school, respectively. **CONCLUSIONS:** Incontinence during physical stresses is common in young, highly fit, nulliparous women. This suggests that there is a continence threshold which, when exceeded, can result in urine loss, even in the absence of known risk factors for incontinence.

Ree, M. L., I. Nygaard, et al. (2007). "Muscular fatigue in the pelvic floor muscles after strenuous physical activity." *Acta Obstet Gynecol Scand* **86**(7): 870-876. **BACKGROUND:** It is not clear why young nulliparous women may leak urine during exercise. The aim of this study was to investigate whether strenuous physical activity can produce pelvic floor muscle fatigue. **METHODS:** Participants in this crossover study included 12 nulliparous women with mild symptoms of stress urinary incontinence during strenuous physical activity. Participants were randomized to start with either the intervention (a 90-min interval training program) or the control period (rest in sitting position for 90 min). Maximal voluntary contraction pressure (cm H<sub>2</sub>O), vaginal resting pressure (cm H<sub>2</sub>O), and holding time (s) were measured before and after intervention and rest by a fiberoptic microtip transducer connected to a balloon catheter inserted into the vagina. **RESULTS:** Mean age of the group was 24 years (+/-1.7). The mean maximal voluntary contraction pressure decreased 20% (+/-24.4) after physical activity. The mean difference in maximal voluntary contraction pressure was significantly larger after physical activity than after rest (-4.4 versus 0.6 cm H<sub>2</sub>O difference, respectively, p<0.01). There were no statistically significant differences in resting pressure or holding time. **CONCLUSIONS:** In young nulliparous women with symptoms of mild stress urinary incontinence, strenuous physical exercise results in lower maximal voluntary vaginal contraction pressure, indicating


pelvic floor muscle fatigue. Further research is needed to understand the long-term impact of this finding.

Shade, A. R. (1983). "Gynecologic and obstetric problems of the female dancer." Clin Sports Med **2**(3): 515-523.

The effect of athletics and exercise on women is a new area of medicine, and little factual information is currently available. This discussion briefly reviews some of the gynecologic and obstetric information available to give guidelines for the woman involved in strenuous physical activity.

Thyssen, H. H., L. Clevin, et al. (2002). "Urinary incontinence in elite female athletes and dancers." Int Urogynecol J Pelvic Floor Dysfunct **13**(1): 15-17.

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.



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