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Athletes at London 2012: too elite to leak?

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Abstract

Although elite athletes are known to have strong pelvic floor muscles (PFMs), studies have shown that more than 50% may experience urinary incontinence (UI) during their sporting activities. No more than 5% of these individuals will have discussed this issue with a medical practitioner. Of those who admit that they experience UI, approximately 15% find it to be a moderate to severe problem. Very few of them will be undertaking systematic training for their PFMs, which are known to be related to continence. High-impact athletic activity may have long-term effects, including an increased risk of UI and prolapse. The effect of UI on performance is unknown, although it has been proposed that this condition may affect concentration, and athletes have reported that it has a negative impact on their sporting performance. Adaptive behavioural tactics such as fluid restriction may also have a negative effect on performance. The PFMs are also known to be important with regard to lumbopelvic health, although this has not been investigated specifically in athletes. In the general population, UI has been reported to be a barrier to exercise and lifelong fitness. The London 2012 Olympic Games presented an opportunity to introduce and establish education and assessment programmes with respect to PFM training for the athletes who competed, as well as to leave a legacy for future Olympics. It also had the potential to provide an excellent platform from which to educate the public about UI, many of whom are both surprised and reassured to hear that athletes suffer from this condition. This article presents the results of a literature review, discusses UI in athletes, and describes the journey undertaken by the organization Chartered Physiotherapists Promoting Continence, which, in collaboration with the University of Hertfordshire, attempted to exploit the opportunities presented by London 2012.

Keywords: athletes, pelvic floor muscles, urinary incontinence.

Introduction

In May 2009, a discussion day for Move for Health (MfH) Champions was hosted by the Chartered Society of Physiotherapy (CSP). As an MfH Champion for Chartered Physiotherapists Promoting Continence (CPPC), the present author was aware of the phenomenon of urinary incontinence (UI) in elite athletes, and therefore, she attended the event in order to explore opportunities for continence promotion in this population group.

There were many eminent speakers at the discussion day, in particular Dr Pamela Venning, the Head of Medical Services for the London Organising Committee of the Olympic and Paralympic Games (LOCOG), who was responsible for establishing the polyclinic in the Athletes' Village, and fellow physiotherapist Lynn Boothe, who was in charge of the recruitment of rehabilitation personnel for the Games. The main themes around which the 2012 Olympics would be organized by LOCOG were to be legacy and sustainability.

By the end of the day, the present author was inspired by the theme of legacy, and had formed some ideas about how continence professionals

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could leave something of value behind after the Games had finished. She was invited by Dr Venning to submit a plan. In preparation for this, the present author decided to draft some proposals to take back to the CPPC committee, but some research needed to be done first.

Incontinence in athletes

Prevalence of incontinence in athletes

The disproportionate prevalence of UI during high-impact activity in both nulliparous and parous elite athletes has been described by a number of authors over the past quarter of a century (Bø *et al.* 1989; Nygaard *et al.* 1994; Nygaard 1997; Bø & Sundgot-Borgen 2001, 2010; Eliasson *et al.* 2002, 2008; Thyssen *et al.* 2002; Kruger *et al.* 2005, 2007; Carls 2007; Simeone *et al.* 2010; Jácome *et al.* 2011). These studies reported that the average prevalence of UI across all sports is 50%, with stress urinary incontinence (SUI) being the most common lower urinary tract symptom. Urge UI and frequency were reported to have a prevalence of almost 40%. Stress UI is most prevalent in high-impact sports such as gymnastics, track and field, basketball, trampolining, and tennis. Faecal incontinence (FI) in athletes is not well documented, although a study by Vitton *et al.* (2011) found a higher prevalence than in age-matched controls. Conversely, Bø & Backe-Hansen (2007) found no incidence of FI.

Aetiology of urinary incontinence in athletes

The aetiology of UI in athletes is not well understood, although it has been suggested that repeated high-impact activity may cause the personal continence threshold to be exceeded (Nygaard 1997). Athletes are constantly subject to repeated sudden and considerable rises in intra-abdominal pressure (e.g. during heel striking, jumping, landing, dismounting and racquet loading) that may be too great for even the best-functioning continence system. A feasibility study of computer modelling to investigate SUI on landing demonstrated that leakage in a bladder with a urine volume of 200 mL is estimated to be 50 times greater when landing from a height of 30 cm (Zhang *et al.* 2009). Therefore, it is easy to appreciate how a sphincter may be unable to cope with such taxing demands.

Nevertheless, the phenomenon still raises the question of why athletes do not have pelvic floor muscles (PFMs) that are strong enough to with-

stand repeated physical stress. The answer is that they do have strong PFMs and a significantly larger cross-sectional area of pelvic floor musculature than controls. However, they have also been found to have significantly greater urethral hypermobility on straining compared with control subjects, suggesting both a deficiency in urethral support and a significantly greater levator hiatus area on straining than controls (Huang *et al.* 2006). Such hiatal distensibility is interesting in terms of both urethral support and pelvic organ prolapse (POP). Positive correlations between levator hiatus dimensions and urethral hypermobility, as well as a reduced urethral pressure profile, were identified in a retrospective study of almost 400 sets of case notes for women with UI (Huang *et al.* 2006). Hiatal ballooning has been found to be an independent risk factor for POP (Dietz *et al.* 2012). Furthermore, a randomized controlled trial of PFM training showed that an improvement in the symptoms of POP following training correlated significantly with decreased hiatal parameters (Brækken *et al.* 2010).

Most sportsmen and women do not undertake systematic training of their PFMs, although this is recommended in the literature (Bø & Sundgot-Borgen 2001).

It is difficult to estimate how many athletes retire because of UI, although it is estimated that this condition is a barrier to fitness in 50% of women suffering from it in the wider population (Brown & Miller 2001).

Proposals by Chartered Physiotherapists Promoting Continence

Based on the above literature review and in response to the invitation received from Dr Venning in 2009, the present author prepared a document on behalf of CPPC, which was to be presented to the LOCOG medical team. The proposals were to promote continence in athletes participating in the 2012 Olympics, and to use the strapline “athletes are not too elite to leak” as a springboard to reach as many women as possible in the wider population for whom UI is a barrier to exercise and fitness. The document also proposed an anonymous survey of the incidence of UI and felt need in athletes, which was to be supported by a confidential drop-in clinic at the polyclinic in the Athletes’ Village, where CPPC might be able to advise athletes with hitherto unreported UI. Chartered Physiotherapists Promoting Continence’s vision was

that this would generate media interest with which to get its message across to women nationwide. This would potentially be a lasting legacy of the Games if it was emulated at subsequent meetings.

Unfortunately, it was 2011, more than 2 years after the initial invitation and with less than 12 months to go until the London Olympics, before the present author was able to present her work at the enormously imposing LOCOG head offices at Canary Wharf. The author was warmly welcomed by Dr Pam Venning and Lynne Boothe. Also present was Helen Bristow, the CSP's professional advisor, who had been a great source of encouragement during the interim period. However, it was soon apparent that the proposals could not be taken on board, at least not for 2012.

The long delay in meeting had been a result of the many challenges faced by LOCOG in their work with the International Olympic Committee (IOC). Hands were apparently frequently tied and innovation was difficult. The IOC have also been arguably slow to embrace physiotherapy, having only recently admitted a physiotherapist to the Committee. Furthermore, only research projects concerned with injuries sustained at the Games were being accepted for inclusion in the scientific programme. In short, there was nowhere to go at the 2012 Olympics. Therefore, the meeting was spent gathering ideas and recommendations from those in the know as to where CPPC might go from there.

The present author was extremely grateful for the support and enthusiasm that were imparted, and left with two proposals:

- (1) to create an online survey for walking and seated Paralympians, and submit this to the International Paralympic Committee (IPC) Sport Science Committee (SSC) for inclusion at the Paralympics; and
- (2) to apply for an Inspire mark, the official logo awarded to non-commercial organizations delivering projects and events genuinely inspired by the London 2012 Games, and use this to promote continence among the wider population (Fig. 1).

The journey

With only 3 weeks to go before the closing date, CPPC managed to submit the survey to the IPC SSC, and were delighted to have it accepted in January 2012, pending ethical approval. Because the CSP does not yet have a scientific ethics



Figure 1. The London 2012 Inspire mark. Copyright © London Organising Committee of the Olympic Games and Paralympic Games Ltd 2008. All rights reserved.

department for researchers acting outside an institution, the present author approached Dr Mindy Cairns, her supervisor at the University of Hertfordshire, Hatfield, Hertfordshire, UK, who was happy to accept the project. Chartered Physiotherapists Promoting Continence submitted for approval, making it clear that the survey would be translated into the four other principal languages of the Games (i.e. French, Spanish, Russian and Arabic) and would also be available in Braille. Ethical approval was granted, although there were concerns about equity for potential participants who were unable to use a computer, and therefore, it was made a condition that paper copies would be produced as well. Final approval was granted in April 2012, although little did CPPC know that this was only the beginning of an epic journey.

Chartered Physiotherapists Promoting Continence had simultaneously been doing much work in order to gain permission to use the Inspire mark for a promotional campaign. The plan was to produce a leaflet to be displayed in the waiting rooms of every general practice surgery in the UK. Other strategies would also be involved, although it was fortunate that CPPC waited for approval before developing these. Eventually, after much to-ing and fro-ing, it transpired that CPPC was not eligible to use the logo because it was not staging an event. Going back to the drawing board, the organization committed to staging an awareness day involving volunteers manning posts at shopping centres in at least five major cities, and it was hoped, some radio coverage as well. After submission, CPPC waited for a response, but never received one.

Slightly deterred, CPPC pressed on with translations by calling in favours from bilingual friends, to whom it paid an honorarium. The

services of a professional translation company were only needed for the Arabic version, and the present author managed to find an excellent firm who turned this around in 3 days at a price that was not unreasonable.

Meanwhile, Dr Anthony Herbrand, Educational Technologist at the University of Hertfordshire, spent hours formatting the survey in the five languages using the Bristol format (<http://www.survey.bris.ac.uk/>), a grid design that allows a combination of all question types in a table of rows and columns that directly drops results into the Microsoft Excel spreadsheet application (Microsoft Corporation, Redmond, WA, USA). This may seem straightforward, but Dr Herbrand devoted many painstaking hours to this process, which included numerous phone calls during evenings and weekends. There were also various last-minute problems, such as having to change sentences here and there to accommodate the online consent page. This was risky because the present author has only a rudimentary knowledge of French and Spanish, and with time running out, she had to hope that she had moved the correct Arabic and Russian sentences.

With a week to spare, the finished product was e-mailed to the IPC SSC in readiness for upload to their electronic research platform (<http://www.paralympic.org/research>). There was also a scramble to print off and collate 20 sets of information pages, consent forms, surveys and stamped addressed envelopes, which were to be held for distribution by the IPC SSC secretariat at the Athletes' Village. With no fanfare, the surveys disappeared on the back of a courier's bike heading for East London. The present author saw only one envelope again, which was given to her by an athlete on the Indian team who was also returning a catering survey.

The strategies to publicize the research to athletes were outlined by the IPC SSC. Projects would be advertised in/by:

- *The Paralympian*, the official magazine of the Paralympic Movement, which is distributed to over 2500 people and also read online by around 1500 people per month;
- IPC SSC press releases, which are distributed to 3000 media outlets world-wide;
- *IPC Newsflash*, a bi-weekly electronic newsletter that is sent to all 200 of the IPC SSC's members;
- a targeted mailshot to the National Paralympic Committees;

- a presentation at the meeting of the team physicians upon their arrival in London; and
- a generic flyer, "IPC SSC research projects at London 2012 Paralympic Games", which was to be distributed on-site in London.

With no direct input from researchers allowed, CPPC could only wait. At the time of writing (September 2012), the survey has not yet closed. This extension beyond the Games was initially made in order that athletes who might have been too busy while competing could complete the survey at a later date. However, in the past few days, it has become apparent that our survey has had an extremely poor response rate of less than 2% (450 potential participants), and therefore, it is an absolute necessity that the survey stays open until 31 October 2012 and possibly longer.

There are a few possible explanations for these results. First, the Games will have been probably the most important event in the lives of many Paralympians, who may have felt too pressurized to complete the survey while in London. Secondly, it is known that UI is often under-reported because of shame and embarrassment, and despite the survey being anonymous, some athletes may have avoided it for fear of being recognized. However, both of these issues were anticipated and covered extensively in our information pages.

The present author has received correspondence from the IPC SSC since the results became apparent. This not only stated that the above strategies were employed, but also that:

"[The IPC SSC] divided an overview of all research projects in pigeonholes of all National Paralympic Committees, in the waiting rooms at the polyclinic and at the reception desks of all the apartments in the Village. We have tried hard to create awareness and interest when talking to coaches and team doctors."

Therefore, it would seem that the publicity programme was considered reasonably robust, although Beverly Everton, Lead Support Officer for the British wheelchair rugby team, and another guest speaker at ACPWH Conference 2012, was not aware of any research at the Games when the present author spoke to her.

The most probable explanation for the low response rate is that the survey was not easily accessible. Athletes would need to have either memorized or copied the website domain from an advertisement, or retained one of the generic

leaflets. There is every likelihood that the flyers were likely to be mislaid or lost at such a busy time. A good alternative would have been to advertise the research projects on the official Paralympian website (<http://www.paralympic.org/>). The present author became aware prior to the start of the Games that there was neither an obvious invitation to participate in research on the homepage of the official site, nor an obvious tab to link through to the research pages. The only indication was a sentence that talked generally about research in such away as to attract the scientific community rather than athletes.

Correspondence is now in progress with the IPC SSC to ask what the Committee believe to be the possible reasons for the low response rate. Apparently, the fate of the CPPC survey is in common with the other projects that were accepted. Thus far, the answers are that international meetings are very busy for athletes, and also that London 2012 was the first Paralympic meeting to invite researchers to submit projects for inclusion. Therefore, it is likely that the evaluation after the Games will lead to modifications at future meetings. The present author believes that useful amendments would include advertising projects prominently on the homepage of the official Paralympic website, and giving researchers the opportunity to personally present their project at the team physician meeting at the start of the Games.

It is possible that the current situation can be salvaged to some extent. The IPC SSC are currently examining ways of increasing the number of responses before the website closes. Beyond the umbrella of London 2012, the present author is now also embarking on gaining permission from both the University of Hertfordshire ethics committee and the IPC SSC to extend the invitation directly to Paralympians in the UK.

Conclusions

The experience gained in conducting research at London 2012 has been enormously hard work, as well as being frustrating and disappointing at times. The present author is not in a position to say whether or not this is typical of trying to conduct research at an international meeting. However, the experience for CPPC and not least the author has been invaluable. This work will be progressed further by pursuing other opportunities that derive from it. These may include

repeating the survey at the Glasgow 2014 Commonwealth Games, at which a more hands-on approach to the research than was possible at London 2012 may be proposed.

However, CPPC does remain indebted to the IPC SSC for giving it the opportunity to do research at the 2012 Paralympics, and the present author and her colleagues look forward to a continued warm and cordial relationship with the Committee as the final results emerge.

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