Case report

Pubic symphysis diastasis sustained from a waterslide injury

Michael Williamson, Felice Vanacore*, Caroline Hing

Trauma and Orthopaedics Department, St George's University Hospitals NHS Foundation Trust, London SW17 0QT, United Kingdom

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ABSTRACT

Pubic symphysis diastasis injuries typically occur following a high velocity force such as road traffic accidents, horse riding, crush injuries and falls from a height. There are reports of a range of injuries caused by waterslides including spinal fractures, head injuries and vaginal injuries. Here we report the case of a 50-year-old female who suffered a pelvic diastasis injury during the use of a waterslide.

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1. Case presentation

A previously fit and well 50 year-old female was on holiday in a Jamaican holiday resort. She rode a jet flow closed flume waterslide without a tube ring. As she exited the slide, her legs caught on the sides of the slide resulting in hyper-abduction of her hips as she landed in the pool and hit the water. She immediately felt severe pain in her groin but was able to weight bear with discomfort. On returning to the UK, four days after the injury, she presented to our tertiary care pelvic specialist centre. She was complaining of pelvic pain, which was alleviated when sitting. She reported no other complaints such as urogenital symptoms. On examination, the patient was able to bear full weight with pain. There was bruising in the suprapubic region and tenderness over the anterior aspect of the pelvis. There were no clinical abnormalities on examination of her hips and lumbar spine.

A radiograph showed diastasis of the pubic symphysis and no other injuries (Fig. 1). The patient was admitted and underwent a computed tomography scan (CT) of the pelvis, which showed a 12 mm gap at the pubic symphysis in keeping with diastasis. There were no other associated pelvic fractures, including no evidence of injury to the sacro-iliac joints.

The patient was taken to theatre for examination under anaesthesia of the pelvis. The patient was found to have a 2 cm pubic symphysis diastasis when the symphysis was stressed in distraction. However, the symphysis was stabilised when stressed in

compression and vertical shear. There was no evidence of instability of her sacro-iliac joints.

The patient was followed up in the orthopaedic clinic with repeat radiographs one month, five months and one year following the initial presentation (Fig. 2). At one-year post injury, the radiograph showed no further widening of the pubic symphysis and the patient was able to bear full weight pain free.

2. Discussion

The pubic symphysis is a midline secondary cartilaginous joint which unites the superior pubic rami. This anterior joint together with the posterior sacro-iliac joints creates the pelvic ring, and movement across it, including rotation and expansion, aids the pelvis to compensate during axial loading. The inferior pubic ligament provides most of the joint's stability and is also supported by the superior, anterior and posterior pubic ligaments.¹ Injuries to the pelvis are commonly seen in trauma centres in the UK, with one study in the UK reporting 8% of trauma patients sustaining a pelvic fracture. These are associated with an increased risk of death among trauma patients. Patients suffering this injury display a bimodal distribution of age with most injuries occurring in the age ranges 15–30 and over 60 years.² The mechanisms leading to major pelvic disruption are generally well recognised. With modern trauma departments being very effective at injury pattern prediction and classification to plan further treatment.³

Diastasis of the pubic symphysis is one type of pelvic injury and has been reported to occur in 13–16% of pelvic ring injuries.⁴ These injuries typically occur following a high velocity force such as road traffic accidents and particularly in those involving motorcyclists.

* Corresponding author.

E-mail address: f.vanacore@imperial.ac.uk (F. Vanacore).

Fig. 1. Radiograph of pubic diastasis five days after injury.

Fig. 2. Radiograph of pubic diastasis one year after injury showing no further widening of the pubic symphysis.

Other common mechanisms include horse riding, crush injuries and falls from a height. Other less common causes include symphitis secondary to radiotherapy, pregnancy, infection and a number of metabolic and congenital abnormalities.¹

Traditionally adult pelvic ring injuries have been described using the Young and Burgess classification system. This illustrates the radiographic fracture patterns that are related to the causative mechanism, being either antero-posterior compression (APC), lateral compression, vertical shear or a combination of these. Symphyseal diastasis commonly presents in APC type injuries, though it can occur in any of the above mechanisms. Cases that are

left untreated or missed, can present many years down the line with symptoms resulting from mal-union. These symptoms include anterior symphyseal pain, sacroiliac pain and problems during childbirth.⁵

Waterslides are now commonly found in many swimming pools and leisure complexes and are popular amongst swimmers of all ages. They usually consist of a tube or trough starting at a height above a pool. A water film carries swimmers to the end body of water using gravity and sometimes water jets. In the UK, there are over 300 facilities and with this growth in popularity, only sporadic stories of injuries have appeared in the popular press.⁶ The

majority of injuries are minor and occur with a low incidence,⁷ though some waterslides cause more injuries than others. One waterslide in Washington State, USA over a period of two months, caused 46 injuries which needed hospital treatment, including seven lumbar compression fractures, one renal contusion, and nine cases of concussion.⁸

Various waterslide injuries have been reported including lacerations, head injuries, fractures including spinal fractures, renal contusions, dental injuries and vaginal injuries (two reported).⁸ Several deaths have been reported in the literature including one major head trauma combined with craniocervical junction dislocation.⁹ Most injuries occur at drops in the slide or at the exit,⁸ with the exit seemingly being the main site of injuries.⁹ This is due to entering the water at an unfavourable speed or position and hitting the pool's floor or opposite wall. Other causes of injury reported include sliding head first and sliding immediately after another person or "riding tandem" enabling collisions mid ride or at the exit into the pool.⁹

Following an extensive search of the literature, we were able to find only one report describing pelvic diastasis from high energy waterslide injuries, with all three cases occurring on a water slide again in Jamaica.¹⁰ In our case study, the diastasis was a result of a relatively low energy distraction which limited the injury to the anterior ring. It can be classified as an antero-posterior compression type I (APC-I) injury, which was accordingly managed conservatively.⁵ We would recommend that when patients present with pelvic pain following a waterslide injury, a radiograph should be performed to exclude a symphyseal diastasis.

3. Learning points

- Diastasis of the pubic symphyseal joint typically occurs following a high velocity force.
- Pubic symphysis diastasis injury sustained from a waterslide injury, involving a relatively low distraction force when hitting the water.
- Clinicians should be aware of a pubic symphysis diastasis injury in patients presenting with pelvic pain, after suffering a distraction force to their legs when hitting water at speed.

Authors' contribution

All authors have made substantial contributions to the conception and design of the study, or acquisition of data, or analysis and interpretation of data, drafting the article or revising it

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Conflict of interest

The authors have none to declare.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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