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Case studies

Management of chronic recurrent *osteitis pubis*/pubic bone stress in a Premier League footballer: Evaluating the evidence base and application of a nine-point management strategy

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ABSTRACT

Background/Aim: The aim of this paper was to use a clinical example to describe a treatment strategy for the management of recurrent chronic groin pain and evaluate the evidence of the interventions.
Methods: A professional footballer presented with chronic recurrent OP/PBS. The injury was managed successfully with a nine-point programme –
1. Acute pharmacological management.
2. Tone reduction of over-active structures.
3. Improved ROM at hips, pelvis and thorax.
4. Adductor strength.
5. Functional movement assessment.
6. Core stability.
7. Lumbo-pelvic control.
8. Gym-based strengthening.
9. Field-based conditioning/rehabilitation.
The evidence for these interventions is reviewed.
Results: The player returned to full training and match play within 41 and 50 days, respectively, and experienced no recurrence of his symptoms in follow up at 13 months.
Conclusion: This case report displays a nine-point conservative management strategy for OP/PBS, with non-time dependent clinical objective markers as the progression criteria in a Premier League football player.

1. Introduction

Groin injuries have a prevalence ranging from 0.5% to 6.2% of all sport-related injuries (Johnson, 2003). This incidence is more prevalent in sports where sprinting, kicking, twisting and cutting are dominant movements such as soccer (Hagglund, Walden, & Ekstrand, 2008; Hawkins & Fuller, 1999), rugby (Brooks, Fuller, Kemp, & Reddin, 2005a, 2005b), Australian Rules football (Orchard & Seward, 2002), ice hockey (Agel, Dompier, Dick, Putukian, & Marshall, 2007) and Gaelic Games (Wilson, Caffrey, King, & Gissane, 2007).

Osteitis pubis (OP) or pubic bone stress (PBS) is associated with inflammation of the pubic bones, symphysis and adjacent structures (Fricker, Taunton, & Ammann, 1991; Williams, Thomas, & Downes, 2000). It has been reported to include some presence of periosteal trauma and erosion at the pubic symphysis joint (PSJ) (Fricker et al., 1991; Lynch & Renstrom, 1999). Originally OP was used as a radiographic finding for inflammatory markers and changes seen at the symphysis pubis. Much discussion has arisen regarding the terms used in reference to the hip and groin, with some authors disputing the use of OP as a general term for long-standing adductor related groin pain (LSARGP), and instead proposing the more specific term of pubic bone stress (Bradshaw & Holmich, 2009; Verrall, Hamilton, et al., 2005). The amount of structures within this complex region and the possible multiple simultaneous pathologies that may emanate from the region have

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left diagnosis and terminology complicated (Bradshaw & Holmich, 2009; Falvey, Franklyn-Miller, & McCrory, 2009; Holmich et al., 1999; Robinson et al., 2004; Verrall, Slavotinek, Barnes, & Fon, 2005; Vleeming, Albert, Ostgaard, Sturesson, & Stuge, 2008). However for the purposes of this study and to avoid confusion, the term pubic bone stress will be defined as pain originating at the pubic symphysis and possibly referring to the lower abdomen, hip, groin, scrotum or perineum (Fricker et al., 1991; Johnson, 2003; Lynch & Renstrom, 1999; Williams et al., 2000).

PBS (Mandelbaum & Mora, 2005) has been classified into four clinical types: (1) non-infectious PBS associated with invasive urologic and gynaecologic procedures and pregnancy; (2) local or distant infections manifesting in the pubic symphysis such as osteomyelitis; (3) sports related PBS; and (4) rheumatologic PBS. The authors recommend that all these possible factors are considered when PBS is being managed.

Whilst PBS can occur in isolation, it is common for the condition to be present with other pathologies in the area – particularly herniation, enthesopathies, muscle tears (abdominal or adductor) and hip joint pathology. Some of these pathologies can therefore possibly be the primary injury and thus the PBS becomes the secondary pathology due to altered mechanics or muscle activation (Holmich et al., 1999). Therefore the pattern of PBS remains unclear, and inevitably, so too is the treatment (Batt, McShane, & Dillingham, 1995; Cunningham et al., 2007; Lynch & Renstrom, 1999; Wollin & Lovell, 2006). This also highlights the element of chronicity associated with PBS, with many patients reporting a history of LSARGP, hip or abdominal symptoms (Bradshaw & Holmich, 2009; Choi, McCartney, & Best, 2011; Falvey et al., 2009; Holmich et al., 1999).

Numerous authors have reported predisposing factors to groin and hip pathologies, most notably reduced total hip range of motion (ROM) (Malliaras, Hogan, Nawrocki, Crossley, & Schache, 2009; Tyler, Nicholas, Campbell, & McHugh, 2001; Verrall, Hamilton, et al., 2005; Verrall, Slavotinek, Barnes, et al., 2007; Williams, 1978) and hip strength profiles, particularly into abduction and adduction (Delahunt, McEntee, Kennedy, Green, & Coughlan, 2011; Emery & Meeuwisse, 2001; Malliaras et al., 2009; O'Connor, 2004; Thorborg et al., 2011; Tyler et al., 2001). Other factors mentioned include reduced trunk control seen in chronic 'groin pathologies (Bradshaw & Holmich, 2009; Cowan et al., 2004; McCarthy & Vicenzino, 2003).

Management of the condition has seen the application of many techniques with varying results. Some authors have utilized surgical stabilization of the pubic symphysis joint to alleviate symptoms, but most are in agreement that this step should only be utilized when conservative techniques fail and particularly so within an athletic population (Beer, 1924; Holt, Keene, Graf, & Helwig, 1995; Kavroudakis, Karampinas, Evangelopoulos, & Vlamis, 2011; Mandelbaum & Mora, 2005; Mehin, Meek, O'Brien, & Blachut, 2006; Paajanen, Heikkinen, Hermunen, & Airo, 2005, Paajanen, Hermunen, Karonen, 2008; Radic & Annear, 2008; Williams et al., 2000). Other clinicians have utilised injection therapy to equivocal degrees of success, mainly using corticosteroid (Batt et al., 1995; Holt et al., 1995; O'Connell, Powell, McCaffrey, O'Connell, & Eustace, 2002). However it is difficult to draw conclusions from these studies owing to the various medications used and the variability of the dosages (Choi et al., 2011).

Overall outcomes from conservative management of PBS are difficult to determine due to the various methods used and also the level of functional capacity needed for successful return to sport. Time for return to play seems correlated to the level of dysfunction experienced, with an earlier diagnosis leading to improved rehabilitation time frames (Rodriguez, Miguel, Lima, & Heinrichs, 2001; Verrall, Slavotinek, Fon, & Barnes, 2007; Wollin & Lovell, 2006).

The aim of this paper is to use a clinical case of a Premier League footballer to detail a management strategy of chronic recurrent pubic bone stress and to evaluate the evidence for each intervention.

2. Clinical presentation and subsequent investigations

A 23-year old professional footballer reported insidious onset of bilateral adductor origin pain over the course of 2–3 months. With further questioning, the player reported an initial onset of abdominal symptoms in the lateral margin of *rectus abdominus* (RA) following a strenuous pre-season training session, where he began wrenching. He reported a tearing sensation in the muscle fibres along the left lateral margin of his RA during this episode. He did not report the incident or subsequent abdominal symptoms over the course of the coming weeks, as he was keen to cement his position within the team. With no reduction in his training and playing exposure, the player additionally reported centralised pubic symphysis pain in conjunction with his previous symptoms. Tenderness was reported bilaterally in the adductors, PSJ and superior pubic rami, similar to what other authors have reported (Robinson et al., 2004; Verrall, Slavotinek, et al., 2005). On MRI, the patient demonstrated pubic para-articular bone marrow oedema, with the right side much more severely affected. The patient also showed a secondary cleft sign (Cunningham et al., 2007) on the right side, demonstrating enthetic microtear of adductor longus (see Fig. 1). The patient also demonstrated surface irregularity (R > L) consistent with chronic PBS (Cunningham et al., 2007; Robinson et al., 2004). Clinically (Rodriguez et al., 2001) (Table 1) and radiologically (Besjakov, von Scheele, Ekberg, Gentz, & Westlin, 2003; Cunningham et al., 2007; Robinson et al., 2004; Verrall, Slavotinek, et al., 2005) (Fig. 1) he presented with moderate-severe pubic bone stress, although the existing terminology and grading requires more rigid definition (Branci, Thorborg, Bachmann Nielsen, & Holmich, 2013). However MRI pathology interpretation needs to be viewed in conjunction with the patient's clinical findings, with many athletes exhibiting PSJ pathology despite being asymptomatic (Verrall, Slavotinek, et al., 2005).

Past injuries included osteitis pubis 6 years previously, which resolved in 15 weeks with reduced activity and physiotherapy modalities. He had a grade 1 L5-S1 spondylolisthesis diagnosed 24 months previously; right shoulder subluxation 20 months prior; left hamstring strain 8 months prior and right Achilles reactive tendinopathy onset 3 months prior.

The player reported 3 months of gradually worsening adductor and pubic pain with a decrease in sprinting power and reluctance to stretch for balls outside his base of support. GPS data from training

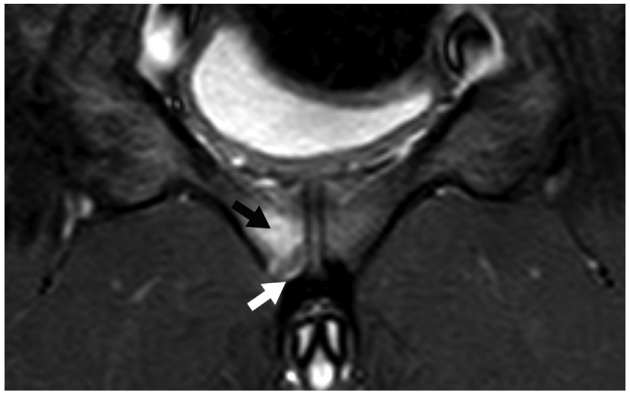

Fig. 1. Coronal T1 weighted image showing secondary cleft sign (white arrow), para-rticular bone oedema (black arrow), subchondral sclerosis and blurred pubic symphysis contours right > left.