Low Back Pain and sport; what role the pelvic ring?

Dolor lumbar y deporte: ¿cuál es el papel del anillo pélvico?

Mel Cusí

MBBS, FACSEP, FFSEM (UK), PhD. Sport & Exercise Physician. Adjunct Associate Professor. University of Notre Dame Australia. School of Medicine, Sydney. Australia.

The twentieth century epidemic of low back pain has continued unabated into the 21st century, Up to 20% of the Australian population will experience low back pain at some stage of their lives[1]. Causes of low back pain remain protean and obscure to the point where 85% of patients[2] will be classified as having 'non-specific low back ain' (NSLB). It is a nihilistic exercise and ultimately, an admission of the inability to establish an accurate or specific clinical diagnosis. The world of sport has not escaped the problem: a review of the literature suggests that in the context of sport up to 15% of injuries involve the spine[3] regardless of the type of sport: soccer[4], sailing[5], hockey[6,7], golf[8,9], swimming[10], gymnastics and dancing[11], among others. These studies do not include injuries involving muscle attachments to the pelvic ring (hamstrings, adductors, etc.), which is technically part of the lower back[12] and has evident biomechanical and functional connections with the spine.

Extensive research into hamstring and groin injuries has yielded increased knowledge and consensus statements, but frustratingly poor results in terms of primary prevention and avoidance of recurrences[13]. Several years ago Mendiguchia *et al*[14] had already raised the obvious question in their insightful editorial: "are we heading in the right direction?" It is difficult to achieve meaningful results by looking at single parameters, when the origin of these pathologies is multifactorial. A different approach is warranted to remove the sports medicine community from this frustrating scenario. There is now emerging evidence that a multifactorial rehabilitation algorithm appears to yield better results[15].

Since the 1980's there has been a growing interest in the role of the sacro-iliac joint (SIJ) in the biomechanics of the lumbar spine and as a source of pain. The three yearly World Congresses on Low Back and Pelvic Pain have witnessed a dialogue between clinicians and researchers that has delivered much of the progress made in the last 25 years. From the 6th World Congress in Barcelona (2007) the sports medicine community has been an integral part of this dialogue. The dual mechanical role of load transmission and absorption of torsional stresses led to the proposed integrated model of function and the concepts of force and form closure[16], a model that could greatly assist researchers in the sports medicine field.

The early work of Mens[17] and colleagues established that in 40% of footballers with groin pain the cause of the problem was poor load transfer through the SIJ. This basic understanding of pelvic biomechanics has facilitated the establishment of validated clinical examination standards. The European Guidelines - COST ACTION B13 "Low back pain: guidelines for its management" was issued by the European Commission, Research Directorate-General, Department of Policy, Coordination and Strategy. It included a Working Group B4 to work on the European guidelines for the diagnosis and treatment of pelvic girdle pain[18]. These evidence-based guidelines stated that pelvic girdle pain is a group within the general classification of low back pain, and that the SIJ is a contributor to both. Diagnostic and treatment guidelines have become available for the practicing clinician to alleviate the burden of disease to what has been estimated 20-25% of patients diagnosed with "low back pain". This has shown success in approximately 80% of cases with directed physiotherapy[19].

The traditional imaging of the SIJ (X-rays, CT scan, scintigraphy and more recently magnetic resonance imaging) has proved its success in the diagnosis of many conditions, from trauma (fractures) to infection, tumours and inflammatory arthropathies. Only in recent years has the combination of scintigraphy with low-dose x-ray computed tomography (CT) – single photon emission computed tomography SPECT/CT been able to confirm the biomechanics of the SIJ both in a disease-free population and in those with mechanical failure of the joint[20].

The term sacroiliac joint incompetence was coined to encompass both the post-partum variant of the pelvic girdle pain syndrome and localised trauma to the joint or pelvis. This is a relatively common condition that may account for over 20% of low back pain, especially after repeated pelvic micro-trauma (overuse due to falls, dismounts, jumps, in the sporting field), very low speed motor vehicle accidents or in women in the peri-partum period or in the puerperium. Many of these patients have previously been classified as either NSLBP or worse, as malingerers or manifestations of psychiatric disease. The clinical diagnosis requires meticulous attention to detail and expertise in physical examination that may be problematic in general usage. The majority of patients in one study had reportedly normal MRI studies, adding to the difficulty in identification by the standard medical paradigms. More recently, in a cohort of 1200 patients with the clinical diagnosis of SIJ incompetence and radiological confirmation (with SPECT/CT significant enthesopathies

Correspondencia: Mel Cusí
E-mail: manuel.cusi@gmail.com

were identified: hamstringss), adductors in over 70% of patients BEFORE they had developed clear symptoms of tendinitis, tendinosis or frank muscular tears[21]. Gluteus medius tendinopathy and hip impingement paralleled these findings. A significant small group of elite athletes (n=23) were part of this large cohort as their presenting pathology was a hamstring strain or tear rather than low back pain. It is therefore reasonable to think that many of these hamstrings (which have a predominance of Type II fibres) are forced on to a dual function of core stability in addition to fast movement, and the injuries the result of overuse.

In the context of sport, notably soccer, Nordic eccentric strengthening of hamstrings has been advocated as an effective strategy for the rehabilitation of hamstring injuries. Mendiguchia, *et al.* have argued however that this requires eccentric strengthening of knee flexors with the hip in a fixed position. Furthermore, this requires a stable pelvis, i.e. a sacro-iliac joint that transmits loads correctly, in other words, appropriate core stability. This begs the question: are Nordic hamstring exercises effective as a result of a stable pelvis (i.e. with adequate dynamic neuromotor control)? An interesting question that warrants further research.

Bibliography

1. Briggs A, Buchbinder R. Back pain: a National Health Priority Area in Australia? *Med J Aust*. 2009;190(9):499-502.
2. Andersson G. Epidemiological features of chronic lower back pain. *Lancet*.1999;354 (9178):581-5.
3. Bono, C.M., Low-back pain in athletes. *J Bone Joint Surg Am.* 2004;86(2):382-96.
4. Waldén, M, Hägglund,M , Ekstrand, J., Injuries in Swedish elite football—a prospective study on injury definitions, risk for injury and injury pattern during 2001. *Scand J Med Sci Sports.* 2005;15:118-25.
5. Rosenbaum, DA, Dietz ET. Windsurfing Injuries. *Phys Sportsmed.* 2002;30(5):15-24.
6. Murtaugh, K., Field hockey injuries. *Curr Sports Med Rep.* 2009;8(5):267-72.
7. Murtaugh, K., Injury patterns among female field hockey players. *Med Sci Sports Exerc.* 2001;33(2):201-7.
8. Vad VB, Bhat, AL, Basrai D,Gebeh A, Aspergren DD, Andrews JR., Low Back Pain in Professional Golfers. *Am J Sports Med.* 2004;32(2):494-7.
9. Horton JF1, Lindsay DM, Macintosh BR. Abdominal muscle activation of elite male golfers with LBP. *Med Sci Sports Exerc.* 2001;33(10):1647-54.
10. Nyska M, Constantini N, Calé-Benzoor M, Back Z, Kahn G, Mann G. Spondylolysis as a Cause of Low Back Pain in Swimmers. *Int J Sports Med.* 2000;21(05):375-9.
11. Micheli LJ, Solomon R, Solomon J, Gerbino PG. Low back pain in dancers. *Medscape Orthopaed Sports Med.* 1999;3:5.
12. Vleeming A, Volkers ACW, Snijders CJ, Stoeckart R Relation between form and function in the sacroiliac joint. Part II: biomechanical aspects. *Spine.* 1990;15(2):133-6.
13. Brukner P., Hamstring injuries: prevention and treatment— an update. *Br J Sports Med.* 2015;49:1241-4.
14. Mendiguchia J, Alentorn-Geli E, Brighelli M., Hamstring strain injuries: are we heading in the right direction? *Br J Sports Med.* 2012;46:81-5.
15. Mendiguchia J, Martinez-Ruiz E, Edouard P, Morin JB, Martinez-Martinez F, Idoate F, *et al* A Multifactorial, Criteria-based Progressive Algorithm for Hamstring Injury Treatment. *Med Sci Sports Exerc*. 2017;49(7):1478-92.
16. Lee DG, Vleeming A . An integrated therapeutic approach to the treatment of pelvic girdle pain. In: Vleeming A, Mooney V, Stoeckart R, eds. *Movement, stability & lumbopelvic pain*, 2nd. London: Elsevier, 2007 p. 621.
17. Mens J,Inklaar H, Koes B, Stam H., A new view on adductor-related groin pain. *Clin J Sport Med.* 2006;16:15-9.
18. Vleeming A, Albert HB, Ostgaard HC, Sturesson B, Stuge B . European guidelines for the diagnosis and treatment of pelvic girdle pain. *Eur Spine J.* 2008;17(6):794-819.
19. Cusi M, Saunders J, Hungerford B, Wisbey-Roth T, Lucas P, Willson S. The use of prolotherapy in the sacroiliac joint. *Br J Sports Med*. 2010;44(2):100-4.
20. Cusi M, Saunders J, Van der Wall H, Fogelman I. Metabolic disturbances identified by SPECT-CT in patients with a clinical diagnosis of sacroiliac joint incompetence. *Eur Spine J* . 2013;22(7):1674-82.
21. Cusi M, Saunders J, Van der Wall H. Functional imaging of the sacro-iliac Joint in Health and Mechanical Injury. 9th Interdisciplinary World Congress on Low Back and Pelvic Pain, Progress in evidence based diagnosis and treatment. Vleeming A, *et al,* eds. Singapore October 31- November 4, Merc Ltd Pub. 2016; p 173-4.