

The Sacro-Iliac Joint and Low Back Pain
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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 Pain' (NSLB). It is a nihilistic exercise and ultimately, an admission of the inability to establish an accurate or specific clinical diagnosis. Absence of a specific diagnosis creates difficulty in devising effective therapeutic strategies, whether pharmacological, physical or chemical. Recent literature suggests that surgical interventions such as spinal fusions under these circumstances can be disastrous, particularly in the setting of work-related disability [3].

The contribution of the Sacro-Iliac Joint (SIJ) to low back pain has been a conundrum for over 100 years. Back pain due to dysfunction of the SIJ was first recorded in the medical literature in 1905 [4]. As with the history of genetics and the work of Mendel, this was pushed into the background and disappeared from view with publication of the seminal paper of Mixter and Barr in the New England Journal of Medicine 30 years later [5]. This paper propelled rupture of the lumbar intervertebral disc to be perceived as the major source of low back pain to this day, such that lateralising lower back pain with a non-diagnostic Magnetic Resonance Imaging (MRI) calls into question the integrity of the complaint [6]. Like the re-discovery of Mendel's work more than 35 years after its publication by Correns, de Vries, Jasper and von Tschermak, interest in the SIJ as a source of lateralising lower back pain was re-awakened in the Northern European literature in the 1990s and 2000s. Multiple publications on the pelvic girdle pain syndrome began to appear, addressing a disabling condition in peri-partum women [7-15]. Contemporaneously, an opus of work has subsequently confirmed that only 15% of lateralising lower back pain may be attributed to intervertebral disc prolapse, the remainder being classified as NSLB [2].

Since the 1980's a growing interest has evolved in the study of the role of the SIJ in the biomechanics of the lumbar spine and as a discrete source of pain. The early contributions of Vleeming [16-19], Snijders [20], and others [21-25] preceded a growing body of work in the Northern European literature in relation to pelvic girdle pain and pregnancy. The World Congresses of Low Back & Pelvic Pain, initially held in 1992 and every three years since then, have witnessed the dialogue between clinicians and scientists that has delivered much of the progress made in the past 25 years, with multidisciplinary contributions from all over the world, from the Scandinavian countries to Canada, US and Australia. The dual mechanical role of load transmission and absorption of torsional stresses led to the proposed integrated model of function [26,27] and the concepts of force and form closure of the joint, to cater for the apparent contradiction of its dual mechanical role. Various studies suggest that the SIJ may be responsible for 20-25% of patients with 'non specific low back pain', which in turn has been estimated to account for 85% of cases of low back pain.

Importantly, the initial premise that the pain generator in SIJ dysfunction was the joint has been laid to rest with the work of Murakami et al [28]. They elegantly demonstrated in a cross-over trial of lidocaine injection into the joint versus the dorsal sacroiliac joint ligaments that the ligament was the main pain generator.

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 [29].

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 [6].

The term sacroiliac joint incompetence was coined to encompass either 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 in patients in the peri-partum period or after pelvic trauma. 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 [6].

More recently, the concept of stability/instability is being replaced by the more sound concepts of dynamic control, which could be defined as adequate stability for the required functional demands of spine and pelvis. Science and good clinical medicine has opened up a new field of therapeutics for the treatment of a disease that may benefit 20% of patients with lateralising low back pain. Targeted physiotherapy after an accurate diagnosis can avoid a non-diagnostic fate for a large number of patients with potential for vast social benefit and cost-savings. Those that fail such therapy due to extensive dorsal SIJ ligament damage may go on to targeted image-guided prolotherapy [29] or platelet-enriched plasma injection into the ligaments, which is currently under study and showing promise (J. Saunders –personal communication). All that remains is to find acceptance in the controversial multi-disciplinary arena that the diagnosis and treatment of low back pain occupies.

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