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Sacroiliac joint biomechanics and its potential clinical implications

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The sacroiliac joint (SIJ) is the largest axial joint in the body, with an average surfacearea of 17.5 cm^2. SIJ is a true diarthrodial joint and is innervated by branches of theposterior rami of L4-S3 nerve roots. For several authors, SIJ is a potential pain generator that must be considered within the differential diagnosis of low back pain. Various studies have reported SIJas the primary pain source in 10% to 26.6% of cases in the control group, comparedto anesthetic blocs group qualified as "Gold standard" by the International Association for the Study of Pain (IASP). According to Robert et al. SIJ is a joint with only few degrees of movement and is designated to a spontaneous arthrodesis and is also a transmitter of load between spine and ilium. SIJ is supported by a strong passive, viscoelastic ligamentous system for providing stability. Pain of SIJ can be expressed by structures, immediatelysurrounding the joint or sometime at distance, through entesopathies in front or at distancefrom SIJ. Some SIJ pain could have especially their source in the ligaments, but thereforealso more difficult to differentiate them, from pain arising from structures in the neighboring SIJ: i.e., thoracolumbar fascia, lumbosacral plexus, branches from sacral nerve roots, sciaticnerve, posterior cutaneous nerve of thigh, nerves from thoraco-lumbar junction. The difficulty of the clinical assessment of its dysfunction, and uncertainties as to thepathogenicity of blockages or conversely extreme laxity of the SIJ, allow plenty ofspeculation as to the responsibility of the SIJ in the occurrence of buttock pain or lumbar.The range of motion of the SIJ is estimated to be about 2 to 4 degrees. Most ofbiomechanical studies detected a helical axis, which indicates the existence of a three dimensional movement of the SIJ. The major movement is situated in the sagittal plane. Thispresupposes that the intersection point of the axes of motion in the sagittal plane is situatedbehind the sacrum, in the region of posterior ligaments and the iliac tuberosities. On the other hand, the IASP lists four criteria for the syndrome of SIJ. A key criterion is a normal joint from a morphological point of view without the presence of a radiograph pathognomonic abnormality. This important criterion is supplemented by the following three criteria: Pain in the region of the SIJ, the reproduction of pain by manual tests that stress the joint and finally the relief of pain by intra-articular injections. Finally for McGrath putative SIJ pain, of the "SIJ syndrome" presents a number of substantial clinical challenges. First, where is the pain generator in the absence of discernible pathology? Second, do SIJ pain provocations tests achieve what they purport to achieve? Third, do physical tests stress the joint to the exclusion of all other potential generators? Fourth, are all pain generators in the region identified? Fifth, is intra-articular injection an effective "gold standard" for the elimination of putative SIJ pain?

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