Journal of Spine
ISSN: 2165-7939

Landi, et al., J Spine 2016, 5:4
DOI: 10.4172/2165-7939.1000321

Review Open Access

The impact of Sacro-Iliac Joint Dysfunction in the Management of Low Back Pain and Failed Back Surgery Syndrome

Alessandro Landi[1*], Giovanni Grasso[2], Cristina Mancarella[1] and Roberto Delfini[1]

[1]*Department of Neurology and Psychiatry, Division of Neurosurgery, "Sapienza" University of Rome, Italy*

[2]*Neurosurgical Clinic, Department of Experimental Biomedicine & Clinical Neurosciences, University of Palermo, Italy*

[*]**Corresponding author:** Alessandro Landi, Department of Neurology and Psychiatry, Division of Neurosurgery, "Sapienza" University of Rome, Viale del Policlinico 155, Rome 00166, Italy, Tel: +39 06 49979105; E-mail: dott.alessandro.landi@gmail.com

Rec Date: June 29, 2016; **Acc Date:** July 18, 2016; **Pub Date:** July 20, 2016

Abstract

Only 25% of patients with Low Back Pain (LBP) have a clear clinical and radiological evidence of a lumbar spine disease and about 30% of patients surgically treated for LBP develop a Failed Back Surgery Syndrome (FBSS). So in the light of this is necessary to ask some questions: is the origins of the LBP always located in the lumbar spine or are there any other pain generators which can provoke it? Why so many patients operated for lumbar disease develop FBSS? Is the FBSS always related to a failure of the procedure or may it be attributable to other causes? The sacroiliitis is responsible for about ¼ of cases of LBP and FBSS. This is due to the fact that the lumbosacral fusion alters the biomechanics of complex sacrum-pelvis causing a joint overload that ends in a real adjacent segment disease. The LBP is a multifactorial condition in which the pain generator must be carefully studied before planning any therapeutic strategy.

Keywords: Sacro-iliac joint; Sacroiliitis; Low back pain; FBSS

Introduction

About 99% of people have experienced an episode of "back pain" at least once in a lifetime and about 14% of outpatient visits is related to episodes of Low back pain (LBP); this makes it clear that the problem of LBP is taking a social connotation. However only 25% of patients with LBP have a clear clinical and radiological evidence of a lumbar spine disease; Moreover, about 30% of patients surgically treated for LBP develop a Failed Back Surgery Syndrome (FBSS). So in the light of this is necessary to ask some questions: is the origins of the LBP always located in the lumbar spine or are there any other pain generators which can provoke it? Why so many patients operated for lumbar disease develop FBSS? Is the FBSS always related to a failure of the procedure or may it be attributable to other causes? These issues have been already discussed in the scientific literature in the attempt to give an explanation to the high rate of failures and FBSS. Scientific evidence has shown that a key role as a pain generator in LBP is played by Sacroiliac Joint Dysfunction (SIJD). It is an alteration of SI joint function that causes LBP and is due to a movement alteration that brings to the joint misalignment and consequently to a misalignment of the sacrum and ileum. In the 2008 a report highlighted how, in cases of LBP, the pain generator is in 16% a SIJD, while in 10% of cases it is not possible to identify a clear pain generator [1]. In the year 2007, Wecksler reported that SI dysfunction was prevailing in patients with LBP, variable from 13% to 30%, this was demonstrable through joint infiltration [2]. The prevalence reached 63% in cases of FBSS and in cases of patient neurologically negative. It's so high incidence is to be found in its biomechanical peculiarity.

Biomechanics of the SI joint

The SI joint, compared with the lumbar spine, has a 6 times greater resistance to the medially directed forces, but has 50% less resistance to the torsional forces and only 1/20 of resistance to the axial load [3,4]. Besides it is a diartrodial synovial joints which connects the **sacrum** with the pelvis and has an extremely small and direct movements based on the sacral base movement. Such movements are always synergistic; consequently a SI joint will never move unilaterally [4]. This joint acts as a shock absorbing structure, transmits all the forces of the upper body to the pelvis (hips) and legs, transmits the weight and rotational forces from the right portion to the left portion of the body. His range of motion depends on the active control of the quadratus lumborum, multifidus and iliopsoas muscles, which are also responsible for the flexion-extension movement and the axial rotation of the lumbar spine. These features make the L4-L5-S1-SI complex a synergistic system that controls and distributes the axial loads and the movements of the trunk to the lower limbs [5]. It is also important to highlight that the sacrum angular movement increases when a lumbar stabilization is performed and this increases proportionally to the arthrodesis extension; consequently the angular stress exerted on the SI joint progressively increases in patients whose lumbar fusion is performed, with a higher incidence in stabilization which involve S1 [6,7]. This explains how SI can negatively influence the course of a lumbar stabilization, taking shape as a pain generator in FBSS.

Etiology and Management of Sacroiliitis

The causes are various; from trauma to infection to neoplastic disease, but surely the main causes are degenerative arthritic conditions and rheumatic diseases. For sure the relationship between LBP, FBSS and dysfunctional sacroiliac joint exist in the fact that the clinical frame is slight and absolutely comparable with discoarthrosic diseases or hip diseases [3,4,8-11]. A careful differential diagnosis is necessary to properly frame the problem. The SIJD is suspected when

the pain irradiates from the groin area to the knee, when it is accentuated under axial load, in the supine position, during rotational movements\twisting of the body and intra-external rotation of the lower limb, when it improves with walking and when there is the absence of neurological involvement [10,11]. This clinical picture is nevertheless evident whole or in part also in other diseases such as herniated discs, lumbar stenosis, spondylolisthesis and hip osteoarthritis [9,10]. It is important therefore, in the clinical suspicion of sacroiliac dysfunction, to perform instrumental investigations including the pelvic X-Ray and MRI with gadolinium (fundamental to show the arthritic joint or his involvement in inflammatory rheumatic diseases). The gold standard for the diagnosis is the positive response to the joint block test performed under fluoroscopic control with corticosteroid and anaesthetic drugs.

Treatment

First line of treatment, when there is a sure diagnosis of sacroiliitis, often include NSAIDs associated with manipulation and physical therapy, intended as stretching in case of joint stiffness, or muscle strengthening in case of laxity. Alternatively, an infiltrative treatment with corticosteroids and anesthetics may play a both diagnostic and therapeutic role. If the infiltration allows obtaining good results in terms of pain regression, then it is possible to perform the radiofrequency ablation, which can allow a complete regression of the symptoms, even for long periods of time. In rare cases in which the conservative and infiltrative treatments don't give benefits, it is necessary to perform a joint arthrodesis. The surgical procedure can be performed with a minimally invasive technique and with dedicated instruments [12,13]. Obviously, in patients who underwent lumbar stabilization one of the goal of treatment is the prevention of post-surgical sacroiliitis; the first precautionary aspect is the extension of stabilization to S1 only when firmly necessary. Moreover sacroiliac function should be evaluated in each patient who has to undergo lumbar fusion because these patients will need a proper postoperative physiotherapy to reinforce the SI muscles.

Conclusion

The sacroiliitis is responsible for about ¼ of cases of LBP and FBSS. This is due to the fact that the lumbosacral fusion alters the biomechanics of complex sacrum-pelvis causing a joint overload that ends in a real adjacent segment disease. The LBP is a multifactorial condition in which the pain generator must be carefully studied before planning any therapeutic strategy. The treatment is essentially conservative, and surgical arthrodesis is performed when the conservative option fails. In the surgical cases minimally invasive fusion techniques allow rapid execution and rapid mobilization of the patient, reducing the time of hospitalization and functional recovery.

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