

Management and Treatment of Lumbar Sacralization in a College Volleyball Player

Andres Enriquez, Shawn D. Felton, Jason C. Craddock

Sports Medicine Research Laboratory, Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL USA



Abstract

Background: This Level 4 CASE report presented an athlete who was a 21-year-old female NAIA volleyball player standing, (167.64 cm, 60.32 kg) and is of Hispanic ethnicity. Athlete did not have any previous history of low back pain or symptoms prior to the end of a prior volleyball season 1 year ago. Athlete reported to the athletic trainer after a practice during junior volleyball season complaining of achy, low back pain that recently began to affect her performance. Athlete stated she first felt the pain in her low back after a “twisting” motion occurred during practice the day before. Initial evaluation did not reveal any obvious deformities or signs of trauma. Athlete stated that most of her pain was over the SI joint and tailbone, mild pain in the gluteal region, but had full active ROM. **Differential Diagnosis:** SI joint sprain, Lumbar sprain, Lumbar Disc herniation, Sciatica. **Treatment:** Athlete began a conservative approach to treatment with emphasis on pain management. When athlete first reported to the athletic training room for treatment, conservative contemporary therapeutic modalities including heat and electrical stimulation, set on symmetrical biphasic, were utilized for pain management. The athlete reported an increase of lower back tightness the next day; thus treatment modalities were modified to ice and pre-modulated settings for electrical stimulation were utilized instead. Athlete still reported no change in symptoms and pain level so she was referred to the team physician to be evaluated. Athlete underwent a full evaluation and an X-ray was conducted. X-ray imaging revealed athlete had lumbar sacralization, meaning her L5 vertebrae was fused to her S1 creating a sixth lumbar joint. Treatment after diagnosis entailed manual therapy, ultrasound, and stretching of the surrounding musculature. Athlete was also held from team activities for three weeks to limit stresses placed on her low back and then began spinal stabilization exercises. **Uniqueness:** Sacralization of the fifth lumbar vertebrae is a congenital anomaly that can affect the daily living of an individual as well as affect the functionality of the spine and limit certain movements. Many ensuing problems can occur from the fusion of L5 and S1 including nerve entrapment, low back pain, and increased load to the L1 to L4 lumbar vertebrae causing disc herniation. Currently, treatment focuses on pain management with the possibility of removal of the extra lumbar joint created from the fusion through surgical intervention. **Conclusion:** This case report illustrated the diagnosis, treatment, and management of an athlete with lumbar sacralization and her ability to continue to participate in collegiate sports. This case also served as an example of an athlete who was asymptomatic before a certain movement/action led to the medical diagnosis. This case study also discussed the implications of lumbar sacralization on the human body and its effects on movement as well as analyzed the effects of conservative treatments and the literature surrounding this condition.

Introduction

Sacralization of the fifth lumbar vertebrae is a congenital anomaly that can affect the daily living of an individual as well as affect the functionality of the spine. Several ensuing problems can occur from the fusion of L5 and S1 including nerve entrapment, low back pain, and increased load to the L1 to L4 lumbar vertebrae causing disc herniation. Currently, treatment focuses on pain management with the possibility of removal of the extra lumbar joint created from the fusion through surgical intervention. This case study presented the current literature surrounding lumbar sacralization which will include general information surrounding this condition, current treatment options, and discuss the findings of some studies that may have implications for future research and treatment.

Purpose

The purpose of this case report was to introduce a 21 year-old NAIA volleyball athlete who suffered from chronic low-back pain. This case report demonstrated the effective evaluation, diagnosis, treatment of rehabilitation of a unique presentation of a congenital abnormality. Furthermore the case report illustrated the diagnosis, treatment, and management of an athlete with lumbar sacralization and her ability to continue to participate in collegiate sports. This case also served as an example of an athlete who was asymptomatic before a certain movement/action led to the medical diagnosis

Patient Demographics

A 21-year-old female NAIA volleyball player standing, (167.64 cm, 60.32 kg) and is of Hispanic ethnicity. Athlete had no prior previous history of low back pain or symptoms prior to the end of a prior volleyball season 1 year ago. Athlete reported to the athletic trainer after a practice during junior volleyball season complaining of “achy” low back pain that recently began to affect her performance. Athlete stated she first felt the pain in her low back after a “twisting” motion occurred during practice the day prior. Initial evaluation did not reveal any obvious deformities or signs of trauma. Athlete stated most of her pain was over the SI joint and tailbone, mild pain in the gluteal region, but had full active ROM.

Differential Diagnosis

- SI joint sprain
- Lumbar sprain
- Lumbar Disc herniation
- Sciatica.

Clinical Evaluation

➤ During the initial evaluation, the athlete presented with no observable deformities or signs of swelling

➤ No discoloration, or point tenderness noted.

➤ The athlete was capable of full lumbar range of motion but had pain in the end ranges of lumbar rotation and lateral flexion.

Diagnostic Evaluation

➤ X-ray imaging revealed athlete had lumbar sacralization, suggesting the athlete’s L5 vertebrae was fused to her S1 creating a sixth lumbar joint.

Treatment

Athlete began a conservative approach to treatment with emphasis on pain management. When athlete first reported to the athletic training room for treatment, conservative contemporary therapeutic modalities including heat and electrical stimulation, set on symmetrical biphasic, were utilized for pain management. The athlete reported an increase of lower back tightness the next day; thus treatment modalities were modified to ice and pre-modulated settings for electrical stimulation were utilized instead. Athlete still reported no change in symptoms and pain level so she was referred to the team physician to be evaluated. Athlete underwent a full evaluation and an X-ray was conducted. X-ray imaging revealed athlete had lumbar sacralization, meaning her L5 vertebrae was fused to her S1 creating a sixth lumbar joint. Treatment after diagnosis entailed manual therapy, ultrasound, and stretching of the surrounding musculature. Athlete was also held from team activities for three weeks to limit stresses placed on her low back and then began spinal stabilization exercises. **Uniqueness:** Sacralization of the fifth lumbar vertebrae is a congenital anomaly that can affect the daily living of an individual as well as affect the functionality of the spine and limit certain movements. Many ensuing problems can occur from the fusion of L5 and S1 including nerve entrapment, low back pain, and increased load to the L1 to L4 lumbar vertebrae causing disc herniation. Currently, treatment focuses on pain management with the possibility of removal of the extra lumbar joint created from the fusion through surgical intervention.

Discussion

Sacralization of the fifth lumbar vertebrae is a congenital anomaly that can affect the daily living of an individual as well as affect the functionality of the spine and limit certain movements. Many ensuing problems can occur from the fusion of L5 and S1 including nerve entrapment, low back pain, and increased load to the L1 to L4 lumbar vertebrae causing disc herniation. Currently, treatment focuses on pain management with the possibility of removal of the extra lumbar joint created from the fusion through surgical intervention.

Discussion cont.

Lumbar sacralization occurs in 3% to 21% of people (Kurt et al, 2016) and they may or may not present with any signs or symptoms.. Currently, conservative treatment entails therapeutic exercise, manual therapy, and medication which includes muscle relaxants, steroid injections, and anti-inflammatory drugs (Kurt et al, 2016). Surgical options include laminectomy and lumbar discectomy Therapeutic exercise entails strengthening of the core and back muscles and stretching of the back and hip musculature. In one study, it was found that therapeutic exercise was beneficial and effective in treating the patient’s low back pain caused by the fusion. This case is an example of surgical intervention not being needed or necessary for every individual and demonstrates the benefits of physiotherapy. For those deciding to pursue a surgical means of treatment, lumbar discectomy is a popular option. This type of surgery consists of removing the herniated disc material in the lumbar spine that is causing pain due to compressing nearby nerve roots. Although this appears to be a solution to the pain caused by disc herniation, it may not be a permanent solution for some people. In a study conducted by Webb et al (2017), they examined the reasons for hospital readmissions following lumbar discectomies. 533 patients were readmitted within thirty days of their surgery with pain issues being one of the common reasons. Other problems patients faced post-surgery were thromboembolic events and infection of the site.

Conclusions

This case demonstrated that therapeutic exercise and management of symptoms over a period of time was effective in treating the athlete and prevented the need for surgical intervention to be considered. Conservative treatment was followed and created with a rehabilitation protocol from the sports medicine staff that allowed for the athlete to return in a quicker time frame. This case was also another example of how it is possible for an individual to be asymptomatic before being medically diagnosed. The literature and research surrounding lumbar sacralization is plentiful and offers valuable information for those needing to educate themselves on the subject. As it pertains to current and future treatment and management practices, more research should be done in regards to studying other non-invasive surgical options as well as more research being conducted in regards to the connection between lumbar sacralization and low back pain.

References

Brenner, A. K. (2005). Use of Lumbosacral Region Manipulation and Therapeutic Exercises for a Patient With a Lumbosacral Transitional Vertebra and Low Back Pain. *Journal of Orthopaedic and Sports Physical Therapy*, 35(6), 368-376. doi:10.2519/jospt.2005.1769

Bull, M., Ugar, B. Y., Ugar, D., Azdoz, I., Demiras, A., Alendrar, C. B., & Cokul, E. (2013). Is Sacralization Really a Cause of Low Back Pain? *ISRN Orthopaedics*, 1-4. doi:10.1155/2013/893013

Dar, G., & Patel, N. (2014). The association between sacralization and spondylolysis. *Anatomical Sciences International*, 89(3), 156-160. doi:10.1007/s12565-013-0213-y

Janackova, J. M., Spivak, J. M., & Berdo, J. A. (2015). A Review of Symptomatic Lumbosacral Transitional Vertebrae: Bertolotti's Syndrome. *International Journal of Spine Surgery*, 9(42). http://doi.org/10.14444/2042

Kurt, E. E., Turkyilmaz, A. K., Daskal, Y., Erdem, H. B., & Turkoz, F. (2016). Are Transitional Vertebrae and Spina Bifida Occula Related with Lumbar Disc Herniation and Clinical Parameters in Young Patients with Chronic Low Back Pain? *The Eurasian Journal of Medicine*, 48(2), 177-180. http://doi.org/10.5152/eurasianjmed.2016.0285

Mull, J. M. (2012). Partial lumbosacral transitional vertebrae: 2 cases of unilateral sacralization. *Journal of Chiropractic Medicine*, 11(2), 77-83. http://doi.org/10.1016/j.jcm.2011.12.002

Murumajulu, B. V., Prabhu, L. V., Pal, M. M. C. G., & Sarvepalli, A. (2011). Lumbosacral Transitional Vertebrae: A Case Report and Clinical Implications. *International Journal Of Morphology*, 29(4), 1123-1125.

Murugan, K., & Kean, W. (2008). The clinical assessment of transitional vertebrae and back pain. *Inflammopharmacology*, 16(6), 278-283. doi:10.1007/s10787-008-9011-1

Son, K., Lee, S., Lee, G. W., Ahn, M., & Son, J. (2016). The Impact of Lumbosacral Transitional Vertebrae on Therapeutic Outcomes of Transforaminal Epidural Injection in Patients with Lumbar Disc Herniation. *Pain Practice*, 16(6), 688-695. doi:10.1111/ppap.12315

Webb, M. L., Nelson, S. J., Gave, A. Y., Smithson, J. C., Lukaszewicz, A. M., Samuel, A. M., & Cole, J. J. (2017). Of 20,376 Lumbar Discectomies, 2.6% of Patients Readmitted Within 30 Days: Surgical Site Infection, Pain, and Thromboembolic Events Are the Most Common Reasons for Readmission. *Spine* (08922436), 42(16), 1267-1273.