

# Femoroacetabular Impingement and Levoscoliosis in a College Soccer Athlete

Annie Sanabria ATS, Jason C. Craddock EdD, ATC, LAT, CSCS

Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL USA

## Abstract

**Background:** Athlete is a 22-year-old male NCAA soccer player. Athlete's prior medical history includes right hip femoroacetabular impingement (FAI) with no surgical intervention, also reports having a sports hernia at a young age. Athlete reported to the athletic trainer following practice complaining of low back pain with severe pain while in extension. Athlete reports mechanism from a knee to his back during practice. Initial evaluation revealed no obvious deformities, or signs of trauma. Full active ROM with flexion, side bending, and rotation. Extension was reported as limited and with pain (P!). Quadrant test (- / + for P! while in extension), Faber's Test for Pain, (-) Slump Test. (-) SLR test (+), Ober and Thomas tests (-). **Differential Diagnosis:** Spondyls, SI joint dysfunction, bone contusion. **Treatment:** Athlete began conservative treatment with no significant relief after 1 week. Athlete was then referred to a physician due to no change in signs and symptoms. Athlete underwent physician evaluation with X-ray. The results came back and it revealed lumbar levoscoliosis. Athlete was further treated with therapeutic exercises. With the exercises provided for him the athlete reported better improvement to his lower back but complained of deep hip pain. Due to his history, he does have still FAI on his right hip. Rehabilitative exercises were reinforced to help with his pain and to increase functional ability. **Uniqueness:** FAI is very common in young athletes resulting in the altered change of the femoral head and/or acetabulum. They are classified into three different types of lesions. The different types that FAI can present are Cam or pincer lesion or the combination of both. Levoscoliosis is a type of scoliosis located in the lumbar spine where the curvature is presented on their left side in a sagittal view, but as you move to the posterior view, the lumbar spine is considered vertical with no curvature. As for these two pathologies and the significance and the one another, one could be the cause of the other. Literature has stated that adolescent athletes with FAI may be susceptible to injuries, such as spondylolysis. The athletic training staff found him having FAI first before his levoscoliosis. Surgical intervention is appropriate when FAI is present. This athlete has yet to do surgery but will prepare after season is over. There is a controversy with pursuing open versus arthroscopic intervention. Research has explained their preference on what is a better surgical option when it comes to FAI. Specifically, research has suggested that arthroscopic intervention is another method of surgery and in the literature, it demonstrated a better follow up postoperatively, and a lower rate of complications compared that to the open dislocation. Further research has indicated newer methods of surgical intervention and treatment. These techniques can benefit with advanced imaging. **Conclusion:** This case highlights the diagnosis treatment of an athlete suffering from a right hip FAI and lumbar levoscoliosis and his modified competition intervention. This case further highlights modern and future surgical interventions and treatment efforts that succeeded and failed. This case further highlights the complexities of treating athletes related to hip and lumbar pain

## Introduction

There are sports all around us. There are high schools, youth, collegiate and professional settings. No matter what type of setting you may be experiencing there is always the possibility for injuries. As an athletic training student, working with men's soccer has been quite an experience especially with the variety of injuries that has happened over the last two months. For this research paper, my case is on a twenty-two-year-old mid-fielder from France who transferred to Florida Gulf Coast University with some injury history due to soccer. For this athlete, he has a femoroacetabular impingement (FAI) on his right hip and has lumbar levoscoliosis where the curve is shifted to his left side. What treatments did he undergo in France? What kind of treatments is his doing now? And what surgical interventions will he need for his FAI in the future?

## Purpose

The purpose of this case report was to introduce a 22 year-old Division NCAA soccer athlete who received a femoroacetabular impingement and levoscoliosis overtime. Even though he experienced both of these injuries, he vetoed surgical procedures to avoid an even lengthier recovery process. An overview of this unique injury is presented to obtain additional information and a better understanding regarding FAI and levoscoliosis, from onset to return to play of a Division NCAA soccer player.

## Anatomy

Understanding the anatomy in relation to femoroacetabular impingement of the hip and levoscoliosis of the lumbar spine is essential in understanding the injury and radiographic findings. The hip serves as the base of support when it comes to lower extremity and trunk movements. It is a stable joint and requires little to no movement. The hips are the basis of where all power and force come from and is intertwined with the lumbar spine, known as the lumbo-pelvic complex. As any other structure in the human body, the hip has its fair share of injuries when it comes to muscular, ligamentous, and bony structures. The lumbar spine is in constant stress when it comes to the axial load that we present whether it is sitting, standing, laying down. Being in these positions for a repetitive or long period of time can cause damage. One thing to always take into consideration when evaluating a hip and/or lower back injury is that you want to assess both of them together due to their correlation with one another. With hip anatomy abnormalities or abnormal hip motion, it has been studied and stated that it can cause "lumbopelvic rhythm that predisposes patients to unnatural patterns of loading of the lumbar spine"

## Case Report

**Patient:** This Division NCAA soccer player is a 22 year-old athlete that received a FAI and levoscoliosis during practice. This patient presented with FAI first before his levoscoliosis injury. The following information will explain the mechanism of injury, clinical assessments, radiographic findings, diagnosis, treatments and return to play to provide additional information to this athlete's unique injury. **Mechanism of Injury:** Almost any patient whose sports require forceful body rotation can develop FAI. Only that person is among the 10 to 20 percent of people in which the conditions exists. Repetitive compressive forces from an abnormally shaped femoral head (cam lesion) or acetabulum (pincer lesion) or both. As for the case of the player, he had a mild levoscoliosis. The most common signs or symptoms presented can be leg length discrepancy, uneven posture and the feeling of pain and discomfort on lower back area and or down their legs (Axtell, 2017). The factors of this can commence from neurological problems, degenerative issues, poor posture and even at birth (Te, 2018).

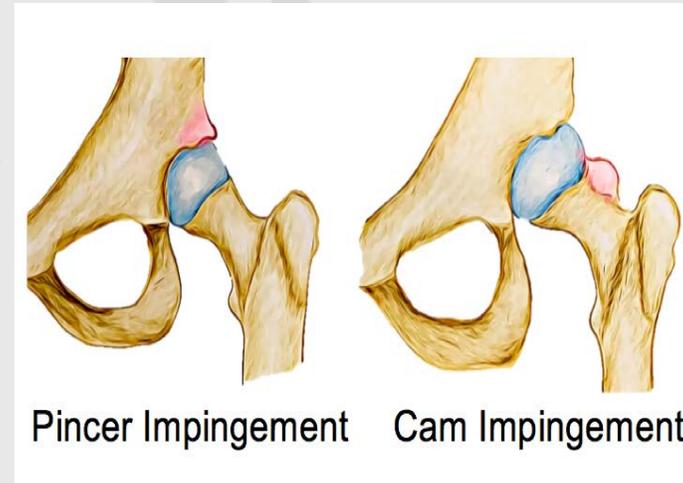
During practice the midfielder was dribbling the ball, where he then sustained a knee to his back. As he was hit, the athlete's spine was forcefully extended. This forceful extension resulted in the anterior translation of the lumbar spine causing discomfort and resulted in the findings of levoscoliosis.

**Clinical Examination:** The athlete walked off the field after the hit. A sideline assessment was performed. Upon arrival to the athlete, he had an antalgic gait and was holding his back. The assessment revealed pain on lumbar spine at L2-L4 region. No obvious deformity or signs of trauma was present. Athlete also stated that he did not recall hearing or feeling a "pop." Upon further evaluation off the field by the athletic trainer, the athlete was tender to palpation over L2-L4 as well as pain along the erector spinae. The athlete presented with full AROM with flexion, side bending and rotation, extension was limited and with P!

During the clinical special testing for this injury, the athlete tested positive when performing the straight leg raise test, stork stand test,, and quadrant extension test due to pain in extension. Having the athlete perform the straight leg raise and stork stand it mimics the mechanism of injury. This performed test was positive due to pain and the inability to perform fully. Quadrant extension test was performed while the patient is standing while the examiner stabilizes and applies over pressure to rule out herniation and or facet joint dysfunction. This movement translated spine anteriorly promoting compressive forces onto the lumbar spine and resulted in a positive sign because of pain due to the mechanism of injury. All other special tests such as fabers, slump, obers, Thomas reported negative and served as tests to rule out other pathologies such as SI joint dysfunction, sciatic nerve root impingement, and tight anterior and posterior hip/thigh musculature.

**Radiographic Findings:** The team physician within the athletic training room performed initial x-rays. These x-rays were taken to show bone deformities appearing in his lumbar spine. The results of the x-ray found the athlete received a levoscoliosis injury on his lumbar region. In a sagittal view the curve of the lumbar spine appears to the left but, in a posterior view the lumbar spine appears with no curve.

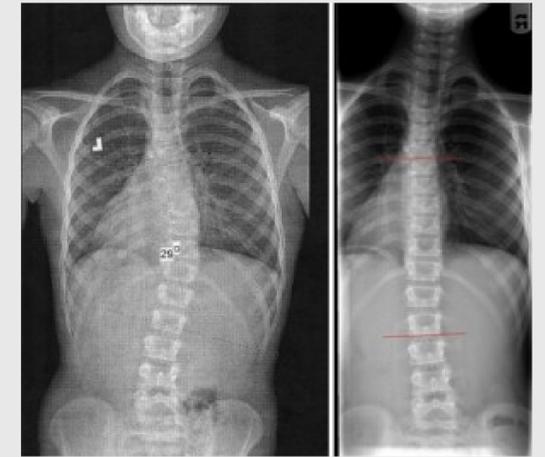
**Clinical Examination:** During physical examination, tenderness during palpation was inspected. Pain was diffuse, and located at the L2-L4 region. Clinical tests used to evaluate lumbar spine injuries included slump test, fabers, Thomas, obers, quadrant extension test, straight leg raise and stork stand test. None of these tests were accurately diagnostic, but the reliability was found to be high towards the conclusion of our original diagnosis of a spondylolysis injury. The results of the x-ray however, confirmed that the athlete suffered a lumbar levoscoliosis. Levoscoliosis can present from mild to severe conditions. With this case he presented with a mild case containing pain and some tight erector spinae on his left side. With the athlete already presenting with FAI, the choice of surgical procedure was given to the athlete. The athlete resorted to non-surgical rehabilitation, and began treatment immediately.



Pincer Impingement Cam Impingement

## Rehabilitation and Results

Following the decision of vetoing surgical repair of femoroacetabular lesion, conservative treatment is usually recommended for athletes with femoroacetabular injuries. With this patient, the sports medicine staff devised a rehabilitation protocol in which the athlete was to follow for the remaining of the season to establish also he levoscoliosis injury. The protocol was designed with four phases with particular criteria's for the athlete to progress to the next phase. Phase I criteria consisted of diminishing pain and inflammation, restoring range of motion, maintaining muscular strength and flexibility of involved and uninvolved muscle groups. In order to reduce inflammation, besides the use of modalities and treatment, the team physician prescribed anti-inflammatory for the athlete until inflammation decreased. In order for the athlete to progress to phase II, minimal pain, range of motion limitations, and normal gait must be normalized. Phase II goals were to restore pain-free range of motion, progress to stabilizing and strengthening exercises with normal gait, and progressively increase muscle strength and endurance. Criteria to progress to phase III was minimal pain during phase II, full pain free range of motion, and normalized full weight bearing gait and minimal pain during biking and progressing to jogging.. The athlete was able to complete both phases within 14 days in order to progress to phase III with no setbacks. Phase III goals consisted of restoring the muscular and cardiovascular endurance, and optimized neuromuscular control. Before phase VI was progressed, minimal pain and normalized running gait at sub max speeds was reached. Once phase VI was reached, the return to functional levels in sport specific drills was applicable under the completion of all phases of the rehabilitation protocol. Unfortunately, the athlete experienced a setback during a scrimmage. He was forced to return to phase III in which he returned to full participation following the final completion of phase VI. To which then the athlete completed maintenance work to keep with the stability and strengthening of the lumbo-pelvic complex.



## Discussion and Summary

FAI is very common in young athletes resulting in the altered change of the femoral head and/or acetabulum. They are classified into three different types of lesions. The different types that FAI can present are Cam or pincer lesion or the combination of both. Levoscoliosis is a type of scoliosis located in the lumbar spine where the curvature is presented on their left side in a sagittal view, but as you move to the posterior view, the lumbar spine is considered vertical with no curvature. These injuries can occur in all sports that produce collision and high velocity forces. The severity and mechanism is important to consider when individualized treatment plans and injury preventions are established. The mechanism of injury may be created in a different manner, but similarly consists Repetitive compressive. Physical examinations that include proper palpitations, special tests, and clinical findings are imperative in a correct diagnosis. Once a diagnosis is hypothesized, radiographic findings maybe necessary for some patients depending on severity and confidence of the diagnosed injury. Conservative treatment is followed and created with a rehabilitation protocol from the sports medicine staff.

This twenty-two-year-old senior mid-fielder has had some significant injuries in the past that contributed to his cam lesion FAI and his levoscoliosis in his lumbar region. The root of the cause is still inconclusive, but due to his tight hip musculature and previous sports hernia, that could have contributed to his FAI. Due to the compensatory patterns of his pelvis structures and limited range of motion, it could have possibly gone up the kinetic chain to his lumbar region presenting with discomfort, pain, and also limited range of motion in which created his levoscoliosis. Conservative treatment has continued throughout this evaluation and further research has been established for surgical intervention for the near future.

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