

Abstract

Background: Athlete is a 20-year-old male heavyweight wrestler with no HX of back issues. Athlete's height was five feet eleven inches. Athlete weighed two hundred and sixty pounds. Athlete first noticed back pain during a Romanian deadlift exercise with 225 lbs. Athlete stated that he thought he "pulled his back" and continued to weightlift and participate in wrestling activities for the next six days. Seven days after the initial injury, the athlete decided to come to the athletic training room for treatment. When asked to rate the P! on a scale of ten, athlete claimed the P! to be a four while standing and a seven when performing lumbar extension. Observation revealed an excessive lumbar curvature. Palpation revealed point tenderness on both erector spinae muscle groups lateral to the lumbar spine, as well as point tenderness on the spinous processes of L2-L5. A step of deformity was noted at the L4 level. Palpation also revealed the L4 spinous process would depress if a vertical load was placed on the L4 spinous process, causing the athlete extreme pain. Range of motion testing revealed full active range of motion with flexion, producing little Pain. Testing of lateral flexion, trunk rotation, and extension all produced incomplete range of motion based on visual inspection. The athlete claimed extension created the most pain. Manual muscle testing was inconclusive due to patient apprehension and pain. Special testing revealed a (+) prone instability test for instability of the lumbar spine, a (-) Valsalva test, and a (-) stork stance test. Differential diagnosis: Spondylolisthesis, spondylolysis, facet joint impingement. Initial treatment: Athlete was given IFC electrical stimulation targeting A-beta nerve fibers. Athlete was also given a hot pack on top of the E-stim pads. After 20 minutes of pain treatment, the athlete began rudimentary core and back exercises. The athlete began with lying core contractions emphasizing activation of the transversus abdominus, then progressed to pelvic tilts hip bridges and cat-cows. The athlete has continued to participate in pain management and basic exercises throughout the past week. Uniqueness: Although a spondylolisthesis may be a prevalent pathology in older adults, a spondylolisthesis is a rare condition in healthy young adults, whether acute or chronic. Conclusions: The athlete was a male heavyweight wrestler who began to suffer back pain immediately after performing a deadlift exercise. The athlete's pain increased to debilitating levels before coming to receive treatment. Upon examination, the athlete demonstrated several qualities that were characteristic of a spondylolisthesis pathology. Palpation revealed the athlete demonstrated a step-off deformity of the L4 vertebrae, inferior translation of the vertebrae when force was applied. Range of motion revealed tremendous pain with trunk extension, and almost no pain with trunk flexion. Special testing revealed a positive posterior instability test.

Introduction

An isthmic spondylolisthesis is a clinical condition in which a vertebral segment fractures and separates from the pars interarticularis bilaterally, resulting in anterior slippage of a vertebral segment. A spondylolysis (which is defined as a stress fracture or a defect in the pars interarticularis may or may not precede a spondylolisthesis, as a spondylolysis is a fracture of the pars interarticularis (unilaterally or bilaterally) without anterior translation of the vertebrae. An isthmic spondylolisthesis is graded based on the amount of anterior translation, with more anterior translation yielding a higher score (Higgins, 2011). A spondylolisthesis may appear as a congenital condition, an acute condition, a degenerative condition, or a combination of several of these factors. The following case deals with what is believed to be an acute, low grade (grades I or II) isthmic spondylolisthesis in a 20-year-old male heavyweight wrestler. The athlete, unfortunately, never received imaging to confirm or deny any findings in the evaluation. This paper only addresses lower grade spondylolisthesis', as higher-grade spondylolisthesis' (grades III-V) tend to have poor conservative treatment outcomes. The rehabilitation protocol for lower grade spondylolisthesis' is also much more applicable to the typical athletic training setting (Stanitski, 2006).

Purpose

The purpose of this case report was to analyze the case of a 20 year old heavyweight collegiate wrestler who presented with indications of a spondylolisthesis, and was treated as such. This presentation focuses on the clinical presentation and demographical information of the athlete, and how they compare to research. An overview of this injury is presented in order to provide a better understanding regarding the clinical presentation and clinical diagnosis

Anatomy

The lumbar spine consists of vertebrae in the lower back, between the thoracic and sacral segments of the spine. The main component of each vertebral segment is the body of the vertebrae, which articulate superiorly and inferiorly with the bodies of adjacent vertebrae. These connections made superiorly and anteriorly are separated by the intervertebral discs, which serve as shock absorbers. The intervertebral discs effectively reduce the magnitude of compressive forces placed on the spinal column. Extending posteriorly from each body, are the pedicles, where they merge laterally into each transverse process. Just medial and superior to the transverse process the superior facet can be located. On the underside of the junction, the inferior facet may be located. The junction then gives way medially and posteriorly to the lamina, which converge to form the spinous process (Marieb & Hoehn, 2015).

Case Report

Patient The athlete in this case is 5'11 and weighs two hundred and sixty pounds.

Mathlete history and clinical examination

The athlete in this case is 5'11 and weighs two hundred and sixty pounds. Upon first meeting with the athlete, the athlete explained the he thought he pulled his back while performing a Romanian deadlift exercise with two hundred and twenty-five pounds 7 days ago. The athlete explains that he continued to wrestle and weightlift for the next week but decided to come to the training room because the pain had increased drastically. When asked to rate the pain, the athlete rated the pain as a 4 at rest, and a 7 when performing lumbar extension. Upon clarification that a 10 meant "worst pain possible", the athlete maintained his answer. Observation revealed an excessive lumbar curvature. Palpation revealed point tenderness on both erector spinae muscle groups lateral to the lumbar spine, as well as point tenderness on the spinous processes of L2-L5. A step off deformity was noted at the L4 level. the L4 spinous process would depress if a vertical load was placed on the L4 spinous process, causing the athlete extreme pain. Range of motion testing revealed full active range of motion with flexion, producing little Pain. Testing of lateral flexion, trunk rotation, and extension all produced incomplete range of motion based on visual inspection. The athlete claimed extension created the most pain. Manual muscle testing was inconclusive due to patient apprehension and pain. Special testing revealed a positive prone instability test for instability of the lumbar spine, a negative Valsalva test, and a negative stork stance test. As mentioned previously, the evaluation performed by the athletic training staff resulted in high suspicion of a spondylolisthesis. Unfortunately, since the athlete never received imaging, the diagnosis of a spondylolisthesis cannot be confirmed or denied.

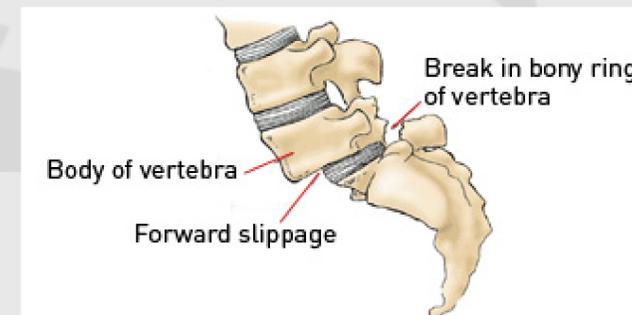
Prevalence

This case is unique, since a spondylolisthesis is a rare pathology amongst otherwise healthy collegiate athletes. A study performed by Kalichman and colleagues attempted to analyze the prevalence of spondylolisthesis among individuals aged forty to eighty who complained of lower back pain. Of the 188 participants, CT scans indicated that 21 of the individuals had a measurable spondylolisthesis, making the prevalence of spondylolisthesis roughly 11% in this group (Kalichman, Kim, Li, et al., 2009). Another study indicates that among 4243 "elite" athletes with back pain, radiographic imaging revealed only 280 of these athletes demonstrated a spondylolisthesis. This equates to roughly 15% of the athletes studied demonstrating the pathology (Rossi & Dragoni, 2001).

Clinical diagnostic characteristics

There are several evaluative findings that can increase the clinical predictive likelihood of a spondylolisthesis. A study published in 2009 analyzed certain characteristics of the evaluative process and attempted to determine which parts of the evaluation were highly indicative of a lumbar spondylolisthesis. The study found that among 100 subjects with a documented spondylolisthesis, 88 of the subjects demonstrated signs of anterior vertebral slippage upon palpation. This is compared to 30 subjects who do not have the pathology, in which anterior slippage is not demonstrated in any of the subjects without the pathology. Furthermore, 99% of the subjects with the pathology demonstrated core weakness and abdominal wall drooping, as 66% of the subjects without the pathology demonstrated core weakness and abdominal drooping. Furthermore, the double leg raise produced pain in 87% of the subjects who had the pathology, and 23% of the subjects who did not have the pathology (Kalpakcioglu, Altinbilek, & Senel, 2009).

To relate this information back to the case at hand, the case correlates with some of the demographical statistics, mechanism, and evaluation findings detailed above. For one, demographical findings have demonstrated that individuals with a higher body mass index were more likely to demonstrate a spondylolisthesis (He, Wang, Gong, et al., 2014). The wrestler is also an 18-year-old male, which correlates to the age of peak onset. The activities the wrestler performs also correlates to the reported mechanism of injury for a spondylolisthesis. In the sport of wrestling, competitors are often manipulated into positions of extension with some sort of rotational component, either passively or actively, again and again. Furthermore, the Romanian deadlifts the athlete was performing at the time of injury involved the lumbar spine actively moving into extension Lastly, the athlete demonstrated pain in extension and segmental anterior instability, both of which are highly indicative of a spondylolisthesis



Summary

To summarize, the evaluation performed on the athlete was highly indicative of a lumbar spondylolisthesis. Unfortunately, the athlete never received imaging, so the diagnosis cannot be confirmed or denied. This paper covered low grade isthmic spondylolisthesis' (grades I and II), because conservative treatment is highly successful and is much more applicable to rehabilitation in an athletic training facility. A lumbar spondylolisthesis is a rare pathology amongst otherwise healthy collegiate athletes. Research is yet to establish a finite cause of the pathology, but many researchers agree the mechanism is due to extension, or extension with some sort of trunk rotation. The pathology is also more likely to be demonstrated by individuals with certain characteristics, as individuals who are male and overweight are more likely to demonstrate a lumbar spondylolisthesis. A proper evaluation from the athletic training staff is key to eventually diagnose a spondylolisthesis, as there are many tests and palpatory findings that are highly indicative of the pathology. This includes slippage during palpation, the double leg raise, an inventory of core definition and a painful response to back extension.

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