

Conquering the Challenge: Bertolotti Syndrome and a Cyclist's Path to Recovery

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Abstract

The Bertolotti syndrome is a rarely recognized cause of low back pain, attributed to a congenital anomaly in the formation of the transverse processes of L5. This case report details the experience of a 22-year-old professional cyclist who transitioned from persistent low back pain to ultimately undergoing a successful surgical intervention for Type IIa Bertolotti syndrome. The initial conservative approaches, including exercise therapy and infiltrations, yielded temporary relief. Subsequent surgical intervention resulted in significant and sustained pain relief, enabling the cyclist to resume professional cycling. The Bertolotti syndrome, rarely acknowledged as a cause of low back pain, necessitates accurate identification for appropriate management. A step-up conservative therapy plan is strongly favoured before considering surgery. However, this case highlights successful surgical outcome in a professional athlete and underscores the importance of individualized management.

Keywords: Bertolotti syndrome • Orthopaedic surgery • Professional athlete

Introduction

Bertolotti syndrome is considered a rare manifestation of low back pain, attributed to a congenital variation involving a Lumbosacral Transitional Vertebrae (LSTV) [1]. This anomaly involves an enlargement of the transverse process of the lowest lumbar level, resulting in a pseudoarticulation or fusion with the sacrum [2-4]. The estimated prevalence of LSTV ranges from 4 to 36% [3]. Accurate diagnosis relies on radiographically confirmed LSTV as the underlying cause of low back pain [2,5]. The diverse nature of LSTV is classified according to the Castellvi classification, which categorizes four types based on the formation of pseudarthrosis at the transitional level, considered to be the primary cause of low back pain [6]. Clinical manifestations of Bertolotti syndrome vary and may include low back pain, hip pain, groin pain, sacroiliac joint discomfort, or radiating pain along the L5 distribution [4]. However, the anatomical finding associated with Bertolotti syndrome can also be noted in asymptomatic individuals as an incidental finding. The Castellvi Types I and II are highlighted as the most prevalent, with Type II exhibiting the highest reported prevalence of low back pain (73%) [2].

This case report presents a young Belgian professional cyclist experiencing low back pain attributed to a Bertolotti joint. To our knowledge, this is the first report of a successful surgical intervention in a professional athlete with Bertolotti syndrome. Initial management involved a stepwise conservative approach, ultimately leading to a surgical intervention. This case study addresses the feasibility of resuming professional cycling post-surgical treatment for Bertolotti-induced low back pain.

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Case Presentation

A 22-year-old male professional cyclist presented with persistent low back pain and reported subjective weakness in both lower limbs. His medical history included significant axial skeletal muscular trauma and left knee surgery due to pre-patellar friction.

The low back pain persisted for approximately two years despite prior therapeutic interventions, including exercise therapy and facet injections, which yielded no relief. The subjective limb weakness occurred during high-load exertions, notably during races or prolonged physical activity. The pain was predominant on the left side, not radiating to the legs. Physical examination revealed a slight swayback posture, mild pelvic anteversion, a paravertebral scar from the traumatic incident, and focal tenderness at the left mid-lumbar facet joints. Radicular tests were negative, and the pain limited end-range mobility of the lumbar spine, especially during retroflexion.

Further diagnostic evaluation included bone scintigraphy with SPECT and an MRI of the lumbar spine. Functional tests encompassing muscle strength measurements and Redcord tests [7] were conducted. The MRI revealed a Castellvi Type IIa lumbosacral transitional anomaly, with left partial hemisacralization of L5 and the sacrum. SPECT bone scintigraphy showed significant active inflammation in the left L5-S1 neoarticulation and minimal active inflammation in the bilateral sacroiliac joints. Additionally, grade 1 retrolisthesis of the L4 vertebral body relative to L5 was noted. Functional diagnostics consistently indicated triaxially impaired core stability (Figure 1).

Based on the additional technical assessments, the hypothesis was formulated that the LSTV was the probable source of the patient's low back pain, leading to a Bertolotti syndrome. The conservative step-up approach was continued with two radiographically guided infiltrations with methylprednisolone and lidocaine at the left L5-S1 neoarticulation, combined with core stability training. These provided temporary but insufficient pain relief. Meanwhile, the patient ceased competitive cycling due to the debilitating nature of the back pain. A third infiltration with a two-week non-steroidal anti-inflammatory drug regimen (piroxicam) yielded only temporary and partial relief. The discernible albeit partial improvement following the infiltrations yielded valuable diagnostic information, further supporting the notion that the LSTV was indeed the underlying cause of the low back pain [2].

After the failure of maximal conservative therapy, a surgical intervention was performed, involving posterior decompression and desarthrosis of the

left transverse process at L5 and the sacrum. Two weeks postoperatively, the patient experienced no pain and cycled for thirty minutes. After an intensive two-month rehabilitation, he returned to professional cycling without pain or requiring additional rehabilitation.

Subsequently, a new SPECT scan was performed four years postoperatively because of other emerging back and pelvic problems. These arose after repeated knee surgery. A comparative analysis with the preoperative condition showed no uptake at the left L5-S1 LSTV and confirmed the complete discontinuity of the LSTV at this level. Furthermore, functional tests using Redcord were repeated, revealing a triaxial improvement in patient's core stability. During the patient's reevaluation one years later, it was confirmed that he remained pain-free and participated actively in professional and competitive cycling (Figure 2).

Results and Discussion

The Bertolotti syndrome, which results from a congenital defect in the transverse processes of L5, remains a rarely recognized cause of low back pain. Four different types of LSTV exist, posing therapeutic challenges [5]. Initially, a step-wise conservative approach is recommended, involving activity modification, pharmacological interventions and physiotherapy [2,3]. Minimally invasive options, such as steroid infiltrations, are considered if conservative therapy fails. Effective pain relief from infiltrations serves as diagnostic indicator for a Bertolotti syndrome [2]. The majority of the patients can be treated conservatively, although surgical interventions are necessary in cases where conservative therapy fails [8].

Two major surgical techniques exist, including resection or fusion of the LSTV [3,4]. This choice remains debatable, but Jenkins III AL, et al. [4] recently released a stepwise operative approach tailored to different Castellvi types. They suggested a bilateral fusion for Type II Bertolotti.

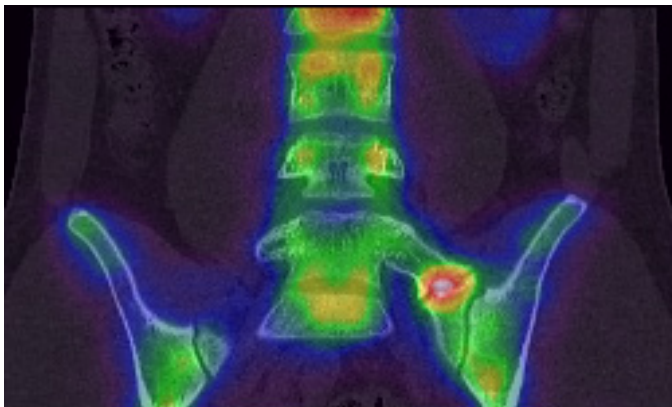


Figure 1. Preoperative: SPECT scan with increased captation at left L5-S1 LSTV.

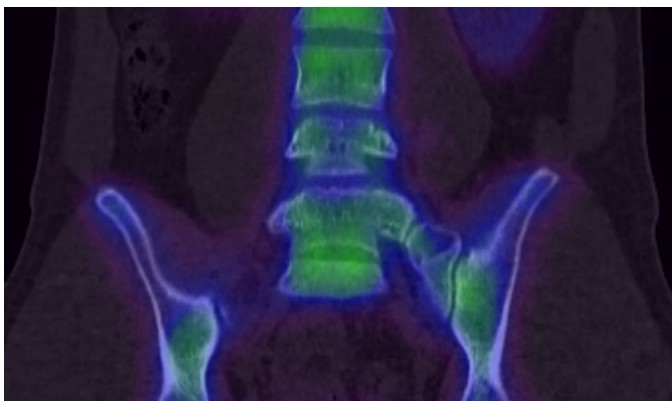


Figure 2. Four years postoperative: SPECT scan with absence of captation at left L5-S1 LSTV.

Crane J, et al. recommended resection for young patients without degenerative spine changes and bilateral fusion for those with underlying disc pathology [3].

This unique case illustrates the successful surgical treatment of a Bertolotti syndrome in a professional Belgian cyclist. The patient returned to professional cycling only two months postoperatively and remains pain-free four years post-surgery. The absence of uptake in the SPECT scan and improved core stability signify improvements compared to the preoperative state. Despite the rarity of Bertolotti syndrome, there is a crucial need for more precise identification and appropriate therapy, particularly in patients who present with degenerative spinal changes at a young age.

Conclusion

This case highlights successful surgical outcome in a professional athlete and underscores the importance of individualized management.

Acknowledgement

None.

Conflict of Interest

The authors report no conflicts of interest.

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