

Lumbar pseudarthrosis

Instrumented spinal fusion continues to exhibit high failure rates in patients undergoing multilevel [lumbar fusion](#) or pseudarthrosis revision; with Grade II or higher [spondylolisthesis](#); or in those possessing risk factors such as [obesity](#), [tobacco](#) use, or metabolic disorders.

Lumbar [pseudarthrosis](#) is one of the most common complications encountered in lumbar spine [reconstructive surgery](#).

Failed solid [bony fusion](#), or pseudarthrosis, is a well-known complication of [lumbar spinal fusion](#). Recent advances in radiographic technology, biologics, instrumentation, surgical technique, and understanding of the local biology have all aided in the prevention and treatment of pseudarthrosis.

A [systematic literature review](#) was conducted using the MEDLINE and Embase databases in order to search for the current radiographic diagnosis and surgical treatment methods published in the literature (1985 to present). Inclusion criteria included: 1) published in English; 2) level of evidence I-III; 3) diagnosis of degenerative lumbar spine conditions and/or history of lumbar spine fusion surgery; and 4) comparative studies of 2 different surgical techniques or comparative studies of imaging modality versus surgical exploration.

Seven studies met the inclusion criteria for current radiographic imaging used to diagnose lumbar pseudarthrosis.

Plain radiographs and thin-cut CT scans were the most common method for radiographic diagnosis. PET has been shown to be a valid imaging modality for monitoring in vivo active bone formation. Eight studies compared the surgical techniques for managing and preventing failed lumbar fusion. The success rates for the treatment of pseudarthrosis are enhanced with the use of rigid instrumentation.

Spinal fusion rates have improved secondary to advances in biologics, instrumentation, surgical techniques, and understanding of local biology. Treatment of lumbar pseudarthrosis includes a variety of surgical options such as replacing loose instrumentation, use of more potent biologics, and interbody fusion techniques. Prevention and recognition are important tenets in the algorithm for the management of spinal pseudarthrosis ¹⁾.

Classification

[Lumbar symptomatic pseudarthrosis](#).

Risk factors

The rate of [pseudarthrosis](#) increases based on several parameters.

These include the number of levels fused, the type of fusion, and medical risk factors for pseudarthrosis.

There is a strong positive correlation between clinical success and radiologically proven fusion.

In addition to the risks inherent in reconstruction and fusion, a variety of risks are within the surgeon's control. These include the choice of graft material, preparation of the host graft surface, graft placement environment, and construct design.

Management of lumbar pseudarthrosis begins with avoidance. If a pseudarthrosis does occur, careful analysis should be given to its cause before considering revision. In revision surgery the surgeon may fix any technical errors of the first procedure, place new, better graft material in the best possible biological environment for fusion, and correct the biomechanical environment to yield the best chance for success.

A surgeon needs to follow the golden rule of surgical revision: if the first procedure does not succeed, do something different with the next ²⁾.

Smoking

The most common (and modifiable) patient-related behavior that affects the rate of fusion is smoking. Smoking can lead to a 33% decrease in the rate of fusion. This is due to vasoconstriction and the restriction of essential small-vessel growth into the fusion site. Strategies to avoid pseudarthrosis begin with elimination of smoking prior to the original procedure. Some surgeons will refuse to perform elective surgery in patients who smoke. Although this is a sound strategy by which to avoid the potential of pseudarthrosis, it may be unrealistic for people in extreme pain or with instability. These patients will find it more difficult to stop smoking than those less severely afflicted because of the added pain-induced stress. It is recommended that smoking cessation classes be offered. While some surgeons will perform surgery if the patient states that he/she has quit, others require testing for a negative blood nicotine level to ensure smoking cessation. Although both are reasonable, neither guarantees the patient's behavior after surgery. Additionally, if someone already suffers from a symptomatic pseudarthrosis, it may not be possible to manage behavior prior to surgery.

Treatment

[Lumbar pseudarthrosis treatment.](#)

Case series

The aim of a study was to determine if patients with [lumbar intervertebral disc disease](#) who achieve radiographic fusion after single-level [lumbar interbody fusion](#) have better clinical outcomes than patients with radiographic [pseudarthrosis](#) at 12 and 24 months postoperative.

Individual patient-level data of 4 [randomized controlled trials](#) (RCTs) were obtained from the [Yale University Open Data Access](#) Project project and analyzed. Clinical [outcomes](#) ([Oswestry Disability Index](#) [ODI]; Numeric Rating Scales [NRSs] for back and leg pain) were compared between patients with radiographically confirmed fusion and those with radiographic nonunion 1 and 2 years postoperative. The results of each study were first analyzed separately, and then were pooled by [metaanalysis](#). The GRADE approach was applied to evaluate the level of evidence.

A total of 496 patients with clinical and radiographic data at 1- and 2-year follow-ups were identified.

Of these, 5.5% (95% confidence interval: 3.7; 8.3) had radiographic nonunion which did not require reoperation. Patients with fusion had better improvements in ODI ($P < 0.001$) and NRS back pain scores ($P < 0.001$). The overall percentage of fused patients with ODI and NRS back pain scores that exceeded the criteria for minimal clinically important differences was also significantly higher than that of patients with nonunion (ODI, odds ratio [OR]=2.7, $P = 0.019$; NRS back pain, OR=3.5, $P = 0.033$). The predictive values of fusion for clinical outcomes, however, were poor, with low specificity and low negative predictive values.

The presence of radiographic fusion is clinically significant, as patients with fusion had better clinical outcomes at 1 and 2 years postoperative than those with nonunion; however, patient-centered clinical outcomes should also be taken into consideration as independent, complimentary variables when assessing treatment success ³⁾.

1)

Chun DS, Baker KC, Hsu WK. Lumbar pseudarthrosis: a review of current diagnosis and treatment. *Neurosurg Focus*. 2015 Oct;39(4):E10. doi: 10.3171/2015.7.FOCUS15292. PubMed PMID: 26424334.

2)

http://www.medscape.com/viewarticle/462180_3

3)

Noshchenko A, Lindley EM, Burger EL, Cain CM, Patel VV. What Is the Clinical Relevance of Radiographic Nonunion After Single-Level Lumbar Interbody Arthrodesis in Degenerative Disc Disease?: A Meta-Analysis of the YODA Project Database. *Spine (Phila Pa 1976)*. 2016 Jan;41(1):9-17. doi: 10.1097/BRS.0000000000001113. PubMed PMID: 26274529.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=lumbar_pseudarthrosis

Last update: **2024/06/07 02:54**

