Instrumented lumbar fusion

Pedicle screws are the most ubiquitous method of treating spinal pathologies requiring lumbar spinal fusion.

If a solid fusion is not obtained, but the hardware is intact and there is still good stability to the spine, the patient may still have good pain relief with the surgery. This finding made some authors believe that achieving spinal stability alone is more important than obtaining a solid fusion.

The evolution of spinal instrumentation systems started during the late 1950s with the Harrington rod and hook system. By today's standards, the Harrington system was very basic although considered a major advance at that time. In the 1980's, a new standard was established for treating spinal deformity three-dimensionally using the Cotrel-Dubousset (CD) Instrumentation system. The CD Instrumentation system considered the coronal, sagittal and axial planes of the spine during surgical procedures to reconstruct the spine. Significant advancements in spinal technology and surgical techniques continued through the 1990's.

To enhance spinal stabilization and fusion, make the construct resistant to or stiffer for axial stress loading, lateral bending, and torsional stresses, cross-links and connectors were designed and included in a rod-screw construct.

Case series

A total of 48 patients who underwent instrumented lumbar fusion at L4-5 and had minimal ASD preoperatively were evaluated. The patients were divided into 2 groups at follow-up according to the development of ASD defined by radiologic criteria. Through review of their medical records and the radiologic files, the following variables were evaluated in the 2 groups: basic demographic data, body weight, body height, body mass index, bone mineral density, types of surgical approaches, preoperative and postoperative segmental and lumbar lordosis, and clinical outcomes.

ASD was found in 30 (62.5%) patients. The variables that showed statistical intergroup differences were the mean age at surgery, the mean difference in the degree of preoperative from postoperative lumbar lordosis, and the proportion of patients who underwent anterior lumbar interbody fusion. However, there were no statistically significant intergroup differences in the Japanese Orthopedic Association score at 1-year postoperatively or at the final follow-up, or in the recovery rate, success rate, and complication rate.

Radiographic ASD is relatively common long-term finding associated with instrumented lumbar fusion. However, radiographic evidence of ASD does not necessarily correlate with a poor outcome. Our results suggest that advanced age, anterior lumbar interbody fusion, and the restoration of the preoperative standing lumbar lordosis may have a protective effect against the development of ASD [1].

1)

Min JH, Jang JS, Jung Bj, Lee HY, Choi WC, Shim CS, Choi G, Lee SH. The clinical characteristics and risk factors for the adjacent segment degeneration in instrumented lumbar fusion. J Spinal Disord Tech. 2008 Jul;21(5):305-9. doi: 10.1097/BSD.0b013e318142b960. PubMed PMID: 18600137.