

# New 5-Grade Scale for Anterior Fusion Estimation: Validation for Infectious Spondylitis

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## Introduction

Fusion status assessed using plain radiograph or CTs, according to the 4-grade scale published by Bridwell et al (1995). Unfortunately, this method is based on the measuring of bone density and bone sclerosis and it's not completely definite for dynamic analysis, especially for early post-op period.

## Methods

5-grade scale based on the quantities evaluation characterized by implant's position between vertebral bodies and descriptive characteristic of the zone between transplant(implant) and implant site. 1 grade – dislocation of the transplant (implant): one or both ends are dislocated from the vertebral end plate(s); 2 grade – transplant (implant) is located between vertebral bodies, the size between blocked vertebra and end of transplant  $\geq 3$  mm; 3 grade – transplant (implant) is located between vertebral bodies, the size between blocked vertebra and end of transplant  $1 \leq \dots \leq 3$  mm; 4 grade – the diastasis between vertebra and transplant (implant) is not visualized; non-clear bone structure of fusion zone; with local sclerosis (similar to the grade 2 according Bridwell's scale); 5 grade – structural bone block with a clear bone trabeculars between transplant (implant) and contacted vertebral body (similar to the grade 1 according Bridwell's scale).

## Results

109 patients aged from 21 till 76 years (average - 59,2 years) were included into prospective CT-study 3, 6, 12 months post-op. All patients were consequently operated between 2010 – 2013 in one clinic. Indications for surgery was chronic spinal infections (TB or osteomyelitis) with un-effective previous course of conservative treatment. According to the variant of anterior fusion patients were divided into 2 groups: group 1 ( $n=40$ ) - autologous bone graft; group 2 ( $n=69$ ) – autologous bone graft inserted into the titanium mesh cage. Fusion was estimated separately for cranial and caudal contact zone. Statistically confirmed differences between compared groups in fusion status in early post-op (3 and 6 month) evaluation. The results were more differential in compare with Bridwell's scale. The differences completely disappeared till 12 month after surgery.

## Conclusions

New 5-grade scale for anterior fusion estimation doesn't depend on the technical characteristic of CT-images; it is more objective for estimation of early results of spinal reconstruction. The proposed method could be more informative for comparative studies of the different spine pathologies.