

# Radiological Changes in the Bone Fusion Site After Posterior Lumbar Interbody Fusion Using Carbon Cages Impacted With Laminar Bone Chips: Follow-Up Study Over More Than 4 Years

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## **Abstract In Brief Author Information**

**Study Design.** A retrospective clinical study with a follow-up of more than 4 years was conducted.

**Objectives.** To know the radiologic changes in the interbody bone fusion site in patients who had received posterior lumbar interbody fusion (PLIF) using carbon fiber cages.

**Summary of Background Data.** PLIF using cages is a popular surgical method for treating degenerative lumbar spinal diseases. However, there are few reports on the radiologic changes in the bone fusion site after this procedure.

**Method.** Forty-one patients were observed (male-to-female ratio 12:29; mean age 51 years; 1-level-to-2-level PLIF 37:4) for 56 months (range 48–78). Anteroposterior and lateral radiograph films were taken from all patients immediately after bone fusion, at 6 and 12 months after surgery, and at follow-up. The extent of the bone fusion was classified as: only inside the cage; around the cage; extending to the vertebral cortical margin; and overgrowth beyond the vertebral cortical margin. The extent of bone fusion was observed anterior and posterior to the cages.

**Results.** Of the 45 fusion levels examined in these 41 patients, successful bone fusion was observed in 40 levels of 36 patients (88%). All the successful fusions occurred inside and posterior to the cages. Of the 40 successful fusion levels at 6 and 12 months after surgery, 10% and 35% of the levels showed the fusion mass to be both inside and around the cages, while the remaining 90% and 65% of the levels showed the fusion mass only inside the cages, respectively. More than 4 years after surgery, 82% of the levels showed the fusion mass extending to the posterior cortical margin, and 2 levels (5%) with shallowly inserted cages showed bony overgrowth into the spinal canal.

**Conclusion.** All the intervertebral bone fusion after PLIF occurred inside the cages and in the posterior intervertebral space. We suggest the complete removal of disc material and deep insertion of the cages to create sufficient posterior intervertebral space for bone growth. PLIF using cages impacted with laminar bone chips is a useful method when considering the time required for surgery and the morbidity of the autograft donor sites.

The radiologic changes in the interbody bone fusion site after posterior lumbar interbody fusion using cages impregnated with laminar bone chips were followed-up for more than 4 years. Intervertebral bone fusion occurred in the posterior intervertebral space, which extended from the inside and around the cage. Posterior lumbar interbody fusion using cages impregnated with laminar bone chips is a useful method when considering the time required for surgery and the morbidity of the autograft donor sites.

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