

Results of 15-Year Clinical Study of Reaction Bonded Silicon Nitride Intervertebral Spacers

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During 1986 to 1988, 30 patients with long-term spinal degeneration problems underwent anterior interbody fusion of the lower spine (L3/4, L4/5, L5/S1) using reaction bonded silicon nitride intervertebral spacers. The patients consisted of 16 males and 14 females of ages ranging from 25 to 64 years. Patient reviews were undertaken after 1, 5, and 10 years. A control population of 10 underwent the same procedure using autologous bone.

The only post-operation issue consisted of slippage of the implant in 2 patients and dislodgement in 1 patient. No rectification was performed on the former 2 patients. The implant was removed from the latter patient and posterior fusion was performed.

The 1-year review of 25 patients involved pain assessment only, which consisted of a subjective ranking from 0 (no pain) to 10 (worst pain imaginable). Of these, 14 patients reported substantial pain reduction, 7 reported more modest pain reduction, and 4 reported no change. No patient reported an increase in pain.

The 5-year review of 22 patients showed further slippage in only 1 patient, subsidence in 2 cases, indication of reaction with the implant in 2 cases, and loosening in 1 case. Interbody bone fusion was observed in every case except 1, which was uncertain. Subjective pain assessments on a scale of 0 to 10 indicated pain decrease in all cases but 3, with 2 patients perceiving no change and 1 reporting an increase in pain. There were no significant differences in patient satisfaction or rates of union between the autologous bone grafts and ceramic implants, but there was a significant reduction in interspace collapse with the silicon nitride implants. Overall satisfaction was very high, with 15 happy, 4 uncertain, and 3 unhappy patients.

The 10-year review of 16 patients showed no slippage, subsidence, or reaction. Interbody bone fusion was maintained in all cases. Pain perception remained approximately constant compared to the 5-year review, with 1 patient reporting a significant increase and 2 cases reporting significant decreases. Overall patient satisfaction decreased somewhat compared to the 5-year review, with 9 happy, 3 uncertain, and 4 unhappy patients. However, progressive degeneration was observed in 9 of 13 cases assessed. Further, degeneration was observed at levels adjacent to L4/5 in 13 of 16 cases assessed. Although the reason for these degenerations cannot be demonstrated, it is likely to be the result of stress shielding due to elastic modulus mismatch.