SPINAL FUSION AND SMOKING: IS PSEUDARTHROSIS THE CAUSE FOR POORER CLINICAL OUTCOME?

*Sandhu, H S; **Zdeblick, T; ***Foley, K T; *Khan, S; *Zheng, F
*Hospital for Special Surgery, Cornell University, New York, NY
**Division of Orthopaedic Surgery, University of Wisconsin, Madison, WI
***Department of Neurosurgery, University of Tennessee, Memphis, TN

Purpose:
Nicotine consumption by spinal fusion patients is associated with increased pseudarthrosis risk and poorer clinical outcome. This study examines the relationship between smoking and clinical outcome independent of fusion success.

Methods:
Patients with symptomatic lumbar disc disease were enrolled in prospective studies to examine the efficacy of rhBMP-2 on an absorbable collagen sponge (InFuse™, Medtronic) as a bone graft substitute for anterior lumbar interbody fusion (ALIF). All patients underwent single level ALIF with an LT-cage™ (Medtronic) containing either iliac crest autograft (control) or InFuse™. Clinical outcome data was collected preoperatively, and at 1½, 3, 6, 12, and 24 months following surgery. This included the Oswestry Disability Questionnaire, SF-36 back profile, and back pain questionnaires. Radiographic outcomes were assessed at 6, 12, and 24 months following surgery. Successful fusion required evidence of bridging trabecular bone on CT scans and radiographs, and the presence of < 5° of angular motion and < 3mm translation on flexion-extension radiographs, and no radiolucent lines covering more than 50% of the implant surface. Patients who had consumed nicotine by smoking within 6 months of surgery were identified as smokers. In order to exclude the effect of pseudarthrosis, we compared the outcome data between smokers and nonsmokers in the subgroup of patients who had achieved successful fusion.

Results:
At 24 months postoperative, a total of 303 patients had achieved successful fusion: 211 nonsmokers (93.3% fusion rate) and 92 smokers (88.3% fusion rate). The following graphs depict the clinical outcome in these patients.

Conclusion:
Independent of fusion outcome, there were differences in clinical outcome between smokers and non-smokers. Non-smoking patients with successful fusion had superior Oswestry scores (significant 6 and 12 months postoperative), superior SF-36 physical scores (sig. 12, 24 mos postop), superior SF-36 mental scores (sig. 6, 12 mos postop), and less back pain (sig. 6 mos postop) compared to smoking patients with successful fusion. The adverse effects of nicotine on osteogenesis and spinal fusion may not fully explain the poorer clinical outcome in patients who smoke.