Behrend C, Prasarn M, et al. Smoking Cessation Related to Improved Patient-Reported Pain Scores Following Spinal Care. JBVJS Am 2012;94:2161-6.

Design: Prospective cohort study

Population/sample size/setting:

- 5333 patients (2925 women, 2404 men, mean age 52.4) seen for cervical or lumbar spine care at two academic hospital centers at the Universities of Florida and Texas
- A prospectively maintained database entered data on pain, function, secondary gain, BMI, and smoking status
    - Smoking status was categorized four ways: never smokers (n=2634), former smokers (n=1532), current smokers (n=914), and quitters (were smoking at time of entry but quit during treatment for spine condition, n= 253)
    - Secondary gain was defined as workers compensation claims, litigation, disability, or malpractice issues related to the spinal disorder
    - Pain scores were recorded in four ways: worst pain, least pain, weekly pain and current pain (presumably least and worst pain refer to the past seven days, which is a common way of reporting pain in longitudinal studies)
- It appears that any cervical or lumbar spine condition was eligible for entry into the study; the only exclusion criteria were a follow-up time of less than one month and having an incomplete smoking history in the database

Main outcome measures:

- The four smoking groups were compared with respect to pain scores at entry into care and at the time of the final follow-up visit
- The vast majority of the patients (86.5%) were diagnosed with degenerative disease of the lumbar or cervical spine
- Average follow-up time was 8 months
- Only a small minority (3.2%) had surgery; the other patients were treated with physical therapy, over-the-counter pain medicine, injections, home exercise, and a smoking cessation program
    - Smoking cessation program included counseling by the treating and primary care physician and referral to a smoking cessation hotline
- Simply stated, current smokers had higher pain scores at entry and at the time of final follow-up, and had less improvement in pain than nonsmokers

- A moderate clinically important difference was defined as an improvement in pain of at least 30% during treatment, and the percentage of patients with this improvement was calculated separately for the four smoking categories
    - For never smokers, this criterion was met by 31.2%
    - For former smokers, 29.1%
    - For current smokers, 16.6%
    - For smokers who quit during treatment, 32.0%
- For the Oswestry disability scores, never smokers had greater improvement (7.3 points) than current smokers (4.6 points)
- Secondary gain factors were predictive of more pain both at entry and at the end of follow-up

Authors' conclusions:

- Smokers reported more pain than nonsmokers
- Smoking cessation prior to treatment or during the course of care was related to a greater improvement in reported pain compared to current smoking
- Never smokers had greater improvement in Oswestry disability than current smokers
- Although only 22% of smokers quit smoking after entry into the study, up to 36% of smokers in other studies have been able to quit with an appropriately structured program and education
- There is a need for smoking cessation programs for patients with axial and radicular pain of spinal origin

Comments:

- Several outcomes are not clearly reported, making the interpretation of the study problematic
    - No data is presented on how many patients had injections, how many received prescription analgesics, how many participated in active physical therapy, and how many had lumbar vs. cervical spine pain
    - Some comparisons are made in terms of p values without clear presentation of effect sizes
    - At the end of the results section, the authors report that patients with secondary gain had significantly more pain on all scales and significantly less pain on the VAS weekly and worst pain scales; this appears to be a direct contradiction
    - Associations between secondary gain and smoking status are not reported
- One comparison which is probably satisfactory is the percentages of patients who had improvements of >30% in pain scores; the effect sizes were reported, and supported the hypothesis that the quitters fared better than the smokers who continued smoking

- The average age of the current smokers (45.2) was younger than the never smokers (51.5) and former smokers (59.3); this potential confounder would be expected favor the smokers, and this does help to support the hypothesis that smoking is a predictor of less improvement from treatment
- Although a multivariate analysis was done with the general linear model, the VAS pain scales for smoking status in Table I do not appear to have been adjusted for the variables which were in the general linear model
- The greater improvement of Oswestry scores for never smokers compared with current smokers also appears to be satisfactorily supported
- Due to a lack of reporting of which interventions were done for which patients, only a general statement can be made to the effect that smokers have less favorable responses to nonoperative care than nonsmokers or than smokers who quit smoking during treatment for spine pain

Assessment: adequate for some evidence that smokers respond less well to nonoperative spine care than nonsmokers, and that patients who quit smoking during treatment for spinal pain experience greater improvements than patients who continue smoking during treatment