

# Nonsmokers: a prospective study

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In 2006, Rudolf bertagnoli and his team published a study investigating the effects of smoking on patients who have undergone Lumbar total disc arthroplasty. “ Smoking has always been considered to a negative predictor for fusion surgery.” (Bertagnoli. R, 2006)

Not many studies have been undertaken to observe effects of smoking on the procedure of Total arthroplasty and the recovery afterwards in smoking and non smoking patients. Some research suggests that smoking prevents or reduces the bones ability to grow into the prosthesis. Delay in recovery and decrease in over all success of the implantation procedure have also been blamed on smoking. (ProDisc Total Disc Replacement, 2008)

“ The aim of the study was to evaluate the changes in functional and disability outcomes within a period of two years minimum in smoking and nonsmoking patients who have undergone the artificial disc replacement therapy.” (Bertagnoli. R, 2006)

### **The Null hypothesis and the Alternate hypothesis proposed were as follows:**

1. Null Hypothesis: Smoking has no detrimental effect on success of artificial disc replacement (ADR);
2. Alternate Hypothesis: “ Smoking has a detrimental effect on the success of artificial disc replacement (ADR).” (Bertagnoli. R, 2006).

A cohort study was conducted with an initial sample of 110 patients between March 2000 and April 2002. The inclusion criteria for the sampling included, smokers and non smokers, age between 18-65 years, “ disabling low back pain and some radicular pain secondary to single-level lumbar spondylosis”

(Bertagnoli. R, 2006), patients undergoing minimum of 2 year follow up and assessment, and lastly failure of medical treatment. They excluded “ patients with spinal stenosis, osteoporosis, prior fusion surgery, chronic infections, metal allergies, facet arthrosis, inadequate vertebral endplate size, more than one level of spondylosis, neuromuscular disease, pregnancy, Workers' Compensation, spinal litigation, body mass index greater than 35, and/or any isthmic.” (Bertagnoli. R, 2006)

Patient's smoking status was recorded through questionnaires. Preoperative aspects of the lumbar anomaly were recorded radiographically. Outcome measurements were recorded at 3rd, 6th, 12th and the 24th month after undergoing the procedure. The procedure success and recovery progression was noted using the Visual Analog Score (VAS) and the Oswestry Disability Index (ODI). Questionnaires recording the back pain, pain drugs usage and patient satisfaction were also used. Preoperative and postoperative radiographical assessment of the back was also used to observe the recovery progression in both, the smoking and non smoking group of patients.

Dependent variables included Smoking and Non smoking group. Whereas the independent variables included VAS, ODI, patient satisfaction, leg pain, work rates (postoperative), and drugs used postoperatively.

Statistical analysis was done as it was found that even though there was significant changes between preoperative and postoperative variable like VAS, ODI, patient satisfaction, relief of leg pain work rate etc but no statistically significant differences were found between these outcomes of

smoking patients when compared with nonsmokers. Therefore, the study fails to reject the null hypothesis, which still stands, i. e. “ Smoking has no detrimental effect on success of artificial disc replacement (ADR).”

(Bertagnoli. R, 2006)

The research was conducted in a controlled manner excluded many bias. But further studies need to be conducted with larger sample sizes to further explore the role of smoking if any, in the success of disc replacement. Also there is need for exploring the link between blood levels of nicotine and success of procedure as well as the effects of smoking and indicators of bone adherence to the prosthesis needs to be further conducted.

Couple of questions that come to mind, if nicotine plays such great inhibiting effect on the bone and collagen growth as the study claims, then why wasn't the effect of smoking on growth factors and their monitoring not included in the study. Also, if as the researchers claim, that nicotine has an analgesic effect on patient, was it not included as a component in the study?

## References:

1. Bertagnoli. R., Yue. J. J., Kershaw. T, Shah. R, V., Pfeiffer. F, Fenk-Mayer, A, et al. (2006). Lumbar Total Disc Arthroplasty Utilizing the ProDisc Prosthesis in Smokers versus Nonsmokers: A Prospective Study with 2-Year Minimum Follow-up. *Spine*, 3, 992-997.
2. ProDisc Total Disc Replacement (2008). Spine Service- Sydney, Australia, retrieved on February 29th, 2008, from <http://www.spine-service.org/dr.html>