



## **The Effect of Cigarette Smoking on the Therapeutic Success of Dental Implants**

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### **Dear Editor-in-Chief**

The success of the treatment of missing teeth with dental implants is the complete integration of an implant with the bone and the correct functioning of implant-based prosthetic restoration for many years. Factors that may affect therapeutic failure are the patient's age, general diseases including osteoporosis, diabetes, and hypertension, as well as dental and medical factors. The simultaneous presence of several factors is also significant. Tobacco smoking is one of the essential factors that may affect the success of implant treatment of missing teeth (1).

We evaluated the influence of cigarette smoking on the degree of bone loss and the success rate of the implantation. The study covered 101 patients (71 females and 30 males) that received dental implant treatment between 2009 and 2012. The group included 32 addicted cigarette smokers and 69 non-smokers. The mean age of women was 44.8 yr (21-67 ±13.5), whereas that of men was 44.3 yr (26-64 ±12.4). The extent of bone loss was estimated by comparing the post-implantation radiographs to the post-loading ones using a millimeter scale template. The therapy was entirely successful when bone loss was smaller than 25% and partially successful when bone loss was greater than 25%; the treatment

was considered a failure when implants were totally rejected.

The analysis of cigarette smoking on the level of peri-implant bone loss showed that in the group of smokers the bone loss median was 20% (10%-40% range), being significantly higher than the peri-implant bone loss median in non-smokers that reached 10% (10%-20% range) ( $Z=-2.03$ ,  $P=0.04$ ). The comparison of the number of smokers and non-smokers with absent, total or partial bone loss showed no statistically significant correlations between the studied variables ( $\chi^2=2.06$ ;  $P=0.35$ ). Implant treatment of missing teeth was entirely successful in 81 patients, which constitutes of 80.2% of the total number of treated patients, partial success was achieved in 6 patients (5.9%), and failure – in 14 patients (13.9%). Analyzing the influence of bone loss on the treatment success in all the patients, regardless of their smoking or non-smoking tobacco, a statistically significant correlation between the studied variables was found ( $\chi^2=91.9$ ;  $P<0.0005$ ). Despite partial bone loss (10%-25%) found in the significant majority of patients (over 90%), dental implants were osseointegrated and the implant treatment was entirely successful. The analysis of the correlation between cigarette smoking and implant therapy success did not

show the influence of smoking on the treatment success. The differences between the smoking group and the non-smoking one were not statistically significant ( $\text{Chi}^2=2.99$ ;  $P=0.2$ ).

The present study showed that although greater bone loss around dental implants ( $P=0.04$ ) was related to cigarette smoking, the latter did not exert a significant influence on the success of implant treatment ( $P=0.2$ ). Our results partially overlap with those obtained in active smokers (over 20 cigarettes/day), in comparison to non-smokers, the implant therapy failure index increases with an increase in the number of cigarettes smoked daily (2). Similarly, a significantly higher level of implant failures (23.08%) found in the group of cigarette-smoking patients in comparison to non-smokers (13.33%), while the total failure level was 7.72% (3). The correlation between implant therapy failures and smoking, the latter, however, was not the most important risk factor (4). A statistically significant correlation between smoking and early implant rejection was not observed and it was stated that the very fact of cigarette smoking cannot be considered as a risk factor in early implant failure (5). Contrary to this conclusion, (6) almost one out of three rejected implants occurred in smokers and one out of five patients with early implant failure smoked over 10 cigarettes daily, while only 12.3% patients with unsuccessful implant treatment were smokers.

Considering the fact that smoking cigarettes contributes to peri-implant bone loss, however, does not directly translate into implant therapy failure, it may assume that bone loss is associated with the process of osseointegration, while the therapeutic success is affected also by other factors. Tobacco smoking is not a contraindication for missing teeth treatment with dental implants, however, providing the smoker with detailed information on the addiction-related risk of im-

plant therapy failure is a rational consensus from the vantage point of both patient and dentist.

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