

EFFECT OF SMOKING AND ALCOHOL ON THE OUTCOME OF IMPLANT TREATMENT

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ABSTRACT

Smoking and Consumption of alcohol are one of the most common lifestyle choices that have been linked to a number of systemic and oral health effects. Smoking affects a person's overall health as well as their dental health. The results of practically all therapeutic treatments carried out in the oral cavity are adversely affected by tobacco use. Smoking has a negative impact on maintaining oral hygiene surrounding implants and the risk of peri-implantitis, and smokers have a significantly greater failure rate for implant osseointegration. It has been established that drinking alcohol significantly increases the risk of osteoporosis and bone loss. Numerous studies have shown that long-term alcohol misuse can cause osteopenia and a higher risk of fractures. Recent research indicates that alcohol consumption reduces new bone production with a far smaller impact on bone resorption, resulting in a negative bone balance and gradual bone loss, even though the precise mechanism is yet unknown. Alcohol use can have a major clinical impact on the management of overall dental implant health, affecting the effectiveness of treatment, and the long-term survival rates of implants. The present article reviews the influence of smoking and alcohol on dental implants and their failure rates.

KEYWORDS: Alcohol, smoking, implants, peri implantitis, bone loss.

INTRODUCTION

Numerous prosthetic rehabilitation techniques can be carried out using dental implants. However, it's crucial to remember that smoking and alcohol consumption raises the risk of peri-implant illness. An implant-fixed prosthesis can have a higher quality of life and a longer survival rate as long as the patient stops smoking and alcohol and maintains good oral hygiene.^[1] Due to increased plaque formation, a higher prevalence of gingivitis and periodontitis, a faster rate of tooth loss, and increased alveolar ridge resorption, smoking and alcohol has been shown to have detrimental effects on the oral cavity. Additionally, smoking and alcohol has been linked to worse healing following mucogingival surgery, which has been linked to the increased incidence of refractory periodontitis.^[2] Findings indicated that, in comparison to placement in non-smokers, implant placement in smokers and alcohol affected marginal bone loss (MBL) and implant failure rates.^[4] Following dental implant placement, patients often suffer from postoperative complications, the most prevalent of which are peri-implantitis and related conditions that impact the oral tissues. Postoperative problems are common among patients who have had dental implants placed. According to one school of thinking, there are numerous factors that contribute to the development of peri-implantitis, some

of which are systemic and others of a local origin. Several factors can contribute to the development of this ailment, such as tobacco use, diabetes, and poor oral hygiene, among others. The present review aimed to measure the levels of alcohol consumption and smoking among patients had an impact on the prevalence of peri-implantitis among patients. Furthermore, the current study sought to ascertain whether or not patients' levels of alcohol consumption and alcohol had an impact on the severity of their peri-implantitis.^[12]



Fig 1: commercially available dental implants.

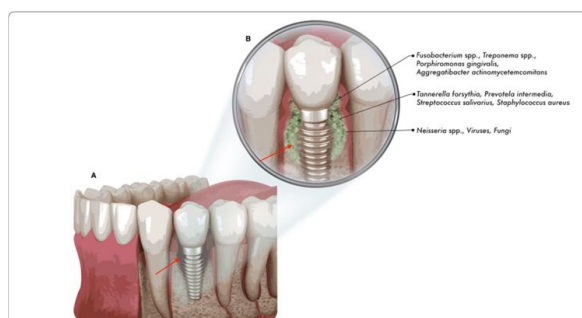


Fig 2: Classification of the peri-implant biofilm in health and disease and the type of microbiota associated with each condition.

Smoking and the Periodontal Microbiome

Smoking either directly or indirectly impacts the human microbiota through oxygen deprivation, immunosuppressive processes, or biofilm development. Numerous compounds included in tobacco smoke increase the adhesion of bacteria to a substrate, hence promoting the production of biofilms. It has been shown that smokers' subgingival microbial communities are less diversified than those of nonsmokers, with notable variations in the number and prevalence of bacteria linked to disease and those that are healthy. In both marginal and subgingival oral biofilms, smoke exposure creates anaerobic conditions that promote the early acquisition and very unstable initial colonization of facultative anaerobic periodontopathogens. In individuals with periodontitis, smokers have been observed to have greater detection rates of *Tannerella forsythia*, *P. gingivalis*, and *Prevotella intermedia* than nonsmokers. *Fusobacterium nucleatum* has been reported to be more prevalent in smokers than in nonsmokers, which is one of the main factors contributing to a subgingival bacterial community shift brought on by smoking. It has also been demonstrated that smokers with periodontitis have a healthy core microbiome that is dominated by anaerobic bacteria. It has been proposed that smoking may alter the oral microbiome's fundamental metabolic processes, which could lead to differences in the microbiome's overall makeup between smokers and nonsmokers. This includes the loss of bacterial species involved in the metabolism of xenobiotics, energy, and carbohydrates. There is proof that exposure to cigarette smoke extract (CSE) controls both the virulence and DNA repair genes of *P. gingivalis*. It has been demonstrated that treating dendritic cells (DCs) with nicotine and *P. gingivalis* lipopolysaccharide (LPS) alters the immunopathogenesis of periodontal disorders, including the modulation of LPS-stimulated DC immunoregulatory functions. It has been proposed that smoking may alter the oral microbiome's fundamental metabolic processes, which could lead to differences in the microbiome's overall makeup between smokers and nonsmokers. This includes the loss of bacterial species involved in the metabolism of xenobiotics, energy, and carbohydrates. There is proof that exposure to cigarette smoke extract controls both the virulence and DNA repair genes of *P. gingivalis*. It has been demonstrated that treating dendritic cells with

nicotine and *P. gingivalis* lipopolysaccharide alters the immunopathogenesis of periodontal disorders, including the modulation of LPS-stimulated DC immunoregulatory functions(1).

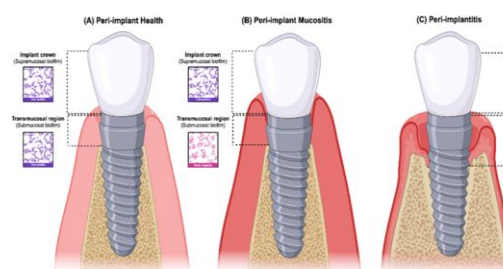


Fig 3: Peri-implantitis causing bone loss, exposition of dental implant, and biofilm formation.

Smoking and Dental Implants

Shenava et al. concluded that smoking was not forbidden but that patients should be informed of its negative effects because smokers had a greater implant failure rate (63% to 66%) than nonsmokers (36% to 37%). Similar findings were obtained by Takamiya et al. in their systematic study. When Bain and Moy looked at the connection between smoking and implant success, they discovered that smokers had an implant failure rate of 11.28% as opposed to 4.76% for nonsmokers.(1)

According to Shenava et al. patients who had smoked for more than ten years had a 30.95% implant survival rate, while those who had smoked for less than ten years had a 69.05% survival rate. Additionally, they discovered that cigarette smokers who used more than 20 packets annually had a higher rate of implant failure than those who consumed fewer than 20 packets annually; however, this difference was not statistically significant. According to a study by Twito and Sade smokers experienced a greater implant failure rate (5.6%) than nonsmokers (3.5%).(1)

A number of elements must come together for an implant to be successful, including a decent prosthesis and regular maintenance, as well as a competent operation. Endosseous dental implants in individuals who are partially or totally edentulous have a consistently high success rate, according to clinical investigations. Although they happen infrequently, failures tend to concentrate among people who have risk characteristics. Anything that raises the likelihood of failure is considered a risk factor. Implant characteristics (e.g., dimensions, coating, and loading), implant location, clinician experience, and patient-related factors (e.g., overall patient health status, smoking habits, quantity and quality of bone, and oral hygiene maintenance) make up the majority of reported predictors for implant success and failure. (3). Smoking has a more noticeable impact on implant survival and success in regions with low-quality trabecular bone. Compared to mandibular implants, maxillary implants fail more frequently in smokers. Maxillary bone is most likely of inferior quality

and, as a result, more vulnerable to the harmful effects of smoking. According to certain research, vasoconstriction brought on by nicotine's local absorption into the bloodstream is a major contributing factor to implant failure. Because the tongue covers the posterior jaw, it is shielded from the local effects of tobacco smoke, which may account for smokers' decreased failure rates in this location.^[3]

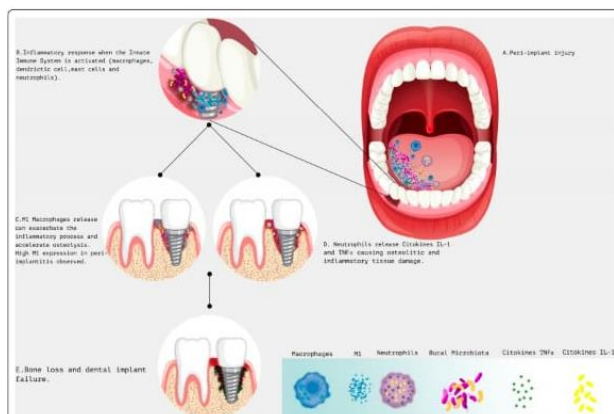


Fig 4: Peri-implantitis is a multifactorial condition affecting soft tissue and bone around the implant and is resulting from an imbalanced interaction between the pathogen and the host immune response.

POST OPERATIVE RISKS

Cigarette smoking contributes to numerous oral health problems, including black hairy tongue, leukoplakia, and oral squamous cell carcinoma. Moreover, smoking negatively impacts dental implant rehabilitation, resulting in increased implant failure rates, marginal bone loss, and postoperative wound complications.

Alcohol Consumption and Oral Health

Alcohol use has been linked to a number of issues affecting oral health, such as cancer of the mouth and periodontal disorders. Long-term alcohol use can affect the composition of the oral microbiota, weaken the host's immune system, and delay the healing of wounds, all of which raise a person's chance of developing oral illnesses. When it comes to periodontal health, drinking alcohol has been associated with a higher chance of developing periodontitis, which is characterized by inflammation and the breakdown of the tissues that support teeth. Alcohol misuse has been shown to worsen gingival wound healing, increase periodontal inflammation, and weaken the host's defenses against periodontal infections, all of which can accelerate the development of periodontal disorders. Alcohol's effects on periodontal health are well established, but little is known about how it affects the tissues around implants. However, new research indicates that alcohol use may have an impact on peri-implant health and play a role in the emergence of peri-implant problems, such as peri-implantitis. To better understand the mechanisms behind alcohol-induced peri-implant problems and create focused therapies to reduce the incidence of peri-implantitis in alcohol-consuming patients, more study is

required. In general, drinking alcohol can harm your teeth and raise your chance of developing periodontal disorders. To better understand how alcohol affects implant therapy outcomes and to create specialized strategies for managing peri-implant problems in alcohol-consuming individuals, more research is necessary to fully grasp the association between alcohol use and peri-implant health.^[12]

Mechanisms Underlying Alcohol-Induced Peri-implant Complications

- Impaired Wound Healing
- Dysregulated Inflammatory Response
- Altered Host-Microbial Interactions

Clinical Implications of Alcohol Consumption in Peri-implantitis

- Increased Risk of Peri-implant Complications
- Poorer Treatment Outcomes
- Delayed Healing and Tissue Regeneration
- Compromised Host Defense Mechanisms

Risks and complications associated with dental implant failure

- Smoking
- Alcohol
- Age factor
- Oral hygiene and maintenance
- Bruxism
- Loss of implant/graft material into the maxillary sinus
- Bisphosphonate-related osteoradionecrosis
- Injury to adjacent tooth
- Peri-implantitis
- Hyperglycemia
- Immune deficiency
- Bleeding disorders
- Osteoporotic patients
- Corticosteroid therapy^[7]

DISCUSSION

Exposure to cigarette smoke and alcoholism disrupts bone health by modifying matrix composition and impairing mineralization, resulting in fragile bones. Smoking and alcoholism also decreases trabecular thickness and mineralization rates. Furthermore, smokers and alcoholic display increased levels of free radicals and oxidative stress markers, which may indirectly activate bone resorption by affecting osteoclast function. This study categorized daily smokers as those consuming one or more cigarettes and alcoholic. Implant failure necessitating removal was the primary outcome. Research indicated cigarette smoke and alcoholic disrupts bone healing by reducing angiogenic markers. Smokers and alcoholic generally display poorer peri-implant outcomes, including higher bleeding indices, deeper pockets, and increased inflammation.

CONCLUSION

Tobacco use compromises the success of various oral therapeutic procedures. Smoking and alcohol significantly increases implant osseointegration failure rates and hinders oral hygiene maintenance around implants, elevating peri-implantitis risk. To enhance implant survival in smoker and alcoholics, addressing smoking and alcoholism habits is crucial.

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