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Local Complications Of Dental Implant Treatment.

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ABSTRACT

Many factors can be connected to unsuccessful implant treatment. Factors can be divided in two categories - local and systemic. From previous data it is known that local factors such as periodontal disease, insufficient oral hygiene and smoking have the biggest influence at unsuccessful implant treatment. Furthermore, some implant factors such as diameter, length and type of implant might affect the success of this treatment. Furthermore, place of implant insertion in the bone and consequential load can influence the success of implant treatment. Therefore, the aim of this study was to review existing literature regarding local complications in dental implant treatment. Pubmed was searched and 51 articles have been found. We might conclude that periodontal disease, insufficient oral hygiene, smoking and hyposalivation have significant influence at unsuccessful implant treatment. Furthermore, diameter, length and type of implant surface might affect the success of this treatment. Implant insertion in the posterior parts of the bone and especially in maxilla when compared to the mandible might also result in the worse outcome. Low density bone may contribute to failed osseo integration which results in implant failure. Last but not least, occlusal overload also influences the success of implant treatment causing peri-implant marginal bone loss.

Keywords: local complications, dental implants, unsuccessful implant treatment, bone loss.

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INTRODUCTION

Many local and systemic factors are known and which contribute to the success of dental implant treatment. Local factors which influence dental implant outcome are: smoking, previous data upon periodontal disease, inadequate oral hygiene, diameter, length and type of implant, placement of implants in upper/lower jaw and various parts of the jaws and prosthetic superstructure.

Smoking and anamnestic data about former periodontal disease were closely connected to peri-implantitis, quote Carcuac and Jansson[1]. Past data about periodontal disease is connected to short implant life, quote Roccuzzo et al.[2]. Alissa and Oliver[3] found close connection between implant treatment failure and smoking and alcohol consumption. Lindhe and Meyle[4] have concluded that risk factors for successful implant treatment are poor oral hygiene, an amnestic data about past periodontal disease and smoking. Their findings were endorsed by findings of Heitz-Mayfield [5], Ferreira et al.[6] and Renvert et al.[7], that showed connection between poor oral hygiene, anamnestic data about past periodontal disease and smoking as most significant risk factors for peri-implantitis.

Roccuzzo et al.[2] who considered that periodontal treatment after the implant placement are the most important factor in the success of implant treatment. Serino and Strom[8] concluded that the local factors such as poor oral hygiene around implant placement were associated with the occurrence of peri-implantitis. Huang R et al.[9] also stated poor local implant sanitation as a highest risk factor connected to marginal bone loss. Cho-Yan Lee et al.[10] found that in people who had previously suffered from periodontal disease, the occurrence of peri-implantitis was more associated with inadequate maintenance of oral hygiene in relation to previous data upon periodontitis.

MATERIALS AND METHODS

Pubmed was searched in order to find out publications upon local complications of dental implant treatment and 51 articles were retrieved.

Previous data on periodontal disease

De AraújoNobre et al.[11] reported that previous periodontal disease was significantly associated with loss of bone around the implant on a sample of 1530 respondents. This finding was confirmed by Renvert et al.[7] on a sample of 172 patients who were treated for peri-implantitis, as well as Lindhe and Myele[4]. European Society for Periodontology suggested that previous data on periodontitis significantly affect the outcome of implant treatment. A cross-sectional study on 916 implants reported that previous data on periodontal disease had an increased risk of 2.2 times for peri-implantitis [12]. Contrary to these findings, de Souza et al.[13] did not establish a connection between former data about periodontal disease and implant treatment failure.

Maintenance of oral hygiene

Lindheand Myele[4], and the European Society of Periodontology reported that the lack of maintenance of proper oral hygiene significantly influences the outcome of the implant treatment. Assistance in maintaining the proper oral hygiene (antiseptic mouthwashes) must be taken into account. The most frequently used oral antiseptic are chlorhexidine, however chloramine, triclosan and essential oils are also used to reduce bacterial adhesion and biofilm formation. Verardi et al.[14] demonstrated no difference among these three oral antiseptics. Chlorhexidine did not outbid essential oils and chloramine which showed decrease in bacterial counts compared to the control group (saline solution treatment).

Smoking

Lindheand Myele[4] demonstrated how smoking has a significant impact on the outcome of dental implants. De AraújoNobre et al.[11] found a strong correlation between smoking and bone loss around the implants in 1530 respondents. In another study by Alsaadi et al.[15]significant association between smoking and the failure of the implant has been established. Mundt et al.[16] stated that the relative risk of implant failure is parallel to the duration of smoking. Haas et al.[17] concluded that smoking adversely affects osseo

integration of implants and leads to the occurrence of peri-implantitis. Retrospective study based on 2.670 patients who received 10.096 implants revealed how smoking and antidepressants were significant factors influencing early dental implant failures.

The lack of connection between smoking and unsuccessful implant treatment was noted by Carr[18], Zupnik et al.[19], Alsaadi et al.[20] and de Souza et al.[13], Olson et al.[21].

However, in another research Alsaadi at al.[15] established that smoking is closely connected to unsuccessful implant treatment, a finding which was endorsed by Renvert et al.[7], van Steenberghe et al.[22], Ferreira et al.[6] and Morales - Vadillo et al.[23].

Hyposalivation

Xerostomia, dry mouth, is an accompanying symptom of many diseases. It is most common in people taking certain medications such as antihypertensive drugs, psychotropic drugs, antihistamines, diuretics and many others. Chrcanovic et al.[24] studied survival of dental implants placed in sites of previously failed implants and possible factors that might influence the outcome of the replaced implants. They found significantly higher failure rate of the replaced implants in patients taking antidepressants, which are known to cause decreased salivary flow rate. To date, there are no controlled clinical studies on this subject.

Implant jaw location – maxilla or mandible, anterior or posterior location of the implant in the jaw

Carr[18] have proved how late complications related to implant failure were significantly associated with implant jaw location. Implant treatment failure was frequently established in maxilla, especially in posterior location of the jaw than in the anterior region of the jaw. Alsaadiet al.[15] confirmed this finding and found that implant failure was more common in implants that are placed close to the natural teeth. Morales-Vadillo et al.[23] made a retrospective study on 1,169 implants in 154 patients and found that the implant jaw location was a risk factor for the implant failure. Based on a review of the literature, Martin et al.[25] have shown how dental implant which is placed within 3 mm of the adjacent teeth has increased risk of normal functioning of the proximal bone. Further, Monje et al.[26]reported on the data of the three experienced clinicians' survey, that implants placed closer to buccal mucosa, minimal or lack of the keratinized mucosa and thin-tissue biotype might increase a risk for developing peri-implant disease. Kinsell and Liss[27] concluded that the implant jaw placement to the second premolars were associated with fewer complications compared to places in the area of premolars and molars.

Bone quality and quantity

He et al.[28] evaluated the influence of local bone density on implant cumulative survival rates and risk factors associated with implant failure at sites with different bone density. Out of total number of 2,684 inserted implants, 45 were lost. Their results showed that failed osseo integration and occlusal overloading were the main reasons for implant failure. Thus, smoking, advanced age (> 50 years), non-threaded implants and immediate loading were risk factors for implants placed in the bone with low density. Based on studies of 3937 patients (12.465 implants), Goiato et al.[29] reported a success of the treatment regarding bone density: type I, 97.6%; type II, 96.2%; type III, 96.5%; and type IV, 88.8%.

Type, diameter, length and surface roughness of the implant

Carr[18]indicated that the late implant failure was associated with the diameter of the implants but not with the length of the implants. The same authors[18] claimed how implant treatment failure was more often established with implant diameter of 5.00 mm compared to those with a diameter of 4.00 mm or 4,75mm. Alsaadi et al.[15] confirmed that the implant diameter was in relation to the late failure of implants. Another study of Alsaadi et al.[20] showed that implant length and diameter were significantly associated with implant failure. Renvert et al.[30] have not established the differences with respect to the implant surface (TioBlast AstraTech ™ and machine-etched Brane mark Nobel Biocare®) and the appearance of peri-implantitis. Goiato et al.[29] indicated how the durability of implants with treated surfaces which are placed in the low density bone was higher (97.1%), relative to the surface of the implant which was mechanically treated (91.6%).Quirynen et al.[31] through the literature search indicated that the rough surface implants were more

susceptible to the subsequent loss of the implant and / or loss of marginal bone in patients with periodontal disease compared to the implants with a minimum roughness of the surface. Walivaara et al.[32]showed that the hydrophilicity of the smooth titanium surface is in correlation to the fibrin adsorption, but this correlation did not exist in a rough surface of titanium. It has been shown that titanium implants with a rough surface have significantly higher strength of binding than those with smoother surfaces. Rougher surfaces have wider use in oral implantology. Olson et al.[33] found that the implant length was significantly associated with failure of the implants in 89 patients. Zupnik et al.[19] have not shown differences with regard to the implants failure and the type of implant. Failure associated with implant treatment was more common in those who have shorter implants. Pennarrocha[34] did not establish a correlation between implant diameter and failure of implant treatment. Kinsell and Liss[27] demonstrated that the increased frequency of implant failure was associated with shorter implants, increased implant diameter and implant surface treatment. Study of Alsaadi et al.[15] has shown that implant failure was associated with shorter implants and those with broader diameter.

Type of the prosthetic superstructure

De Souza et al.[13] showed on 722 implants placed in the 193 patients, that the greater bone loss around the implant was associated with prosthetic devices older than 4 years, and that the fixed partial dentures and total fixed prosthesis supported by implants had a higher rate of bone loss around implants to which they were attached. Passoni et al.[35] studied the relationship between number of implants in the fixed prostheses and the prevalence of peri-implantitis. Results of their study showed that more than 5 implants in total fixed rehabilitations seems to increase bone loss and the prevalence of implants affected with peri-implantitis.

However, in the published literature so far there are data showing that the clinical success of the implant and implant longevity are achieved by controlled biomechanical occlusion. It seems logical that occlusal overload certainly has an impact on the implant treatment failure, among other factors. Chambrone et al.[36] claimed that there was no association between occlusal overload disorders and tissue around the implant if plaque was not present. If plaque was present, occlusal overload has played a crucial role in the loss of tissue around the implant. In contrast to Chambrone et al.[36], Miyata et al.[37] claimed that bone resorption around the implant can be caused by excessive occlusal trauma even if there is no inflammation of the tissue around implants. However, Fu et al.[38] reported that the occlusal overload is the primary cause of biomechanical complications related to the implant treatment. According to long-term retrospective study with 18 years follow-up, bruxism and subsequent load risk are the most dangerous risk factors which should be included in the absolute contraindications for implant treatment [39]. Maximo et al.[40] found significant correlation between peri-implantitis and the duration of the implant loading. Nagasawa et al.[41]reported disturbances in the regeneration of bone around the implant due to excessive occlusal loading. Among others Hsu et al.[42] determined that occlusal loading, which results in the marginal bone loss, veneers and porcelain fracture, or the retention part of the denture base or denture base that is supported by the dental implants, weakening or breakage of the abutment bolt are the primary causative factor in the development of implant complications. Gotfredsen et al.[43]reported that lateral implant loading can lead to loss of contact between the implant and the epithelium, which causes implant failure. Contrary to that, Engel et al.[44] concluded that the setup of the implant does not lead to increased bone loss. In accordance with this, Berglundh et al.[45] and Kozlovsky et al.[46] concluded that normal functional loading does not lead to loss of the marginal bone. Retrospective long-term analysis of bone level changes after reconstruction with autologous bone grafts, demonstrated that implants placed in augmented bone show similar bone level changes compared to those inserted in non-augmented bone[47].

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