



ASSOCIATION BETWEEN PERI-IMPLANT DISEASES AND CEMENT-RETAINED PROSTHESIS: A REVIEW

PERİ-İMLANT HASTALIKLAR İLE SİMANTE PROTEZLER ARASINDAKİ İLİŞKİ: DERLEME

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ABSTRACT

Dental implants are used treatment of partial and total edentulousness. Although implants have long-term success, some problems such as peri-implant diseases can occur around the peri-implant tissues. Peri-implant diseases can be considered to result in loss of peri-implant bone and osseointegration that affects the long-term success of dental implants.

Cement-retained restorations are preferred by clinicians because their cementation is like traditional crown cementation. However, cement-retained implant restorations can be associated with peri-implant diseases because of the risk of residual cement. Residual cement in peri-implant mucosa causes bleeding on probing and suppuration, and inflammation can progress to the bone then the peri-implant bone loss can occur.

In this review the role of cemented implant restorations in the formation of peri-implant diseases were evaluated and it is tried to explain the impact of residual cement.

Key Words: cement, peri-implant diseases, cement-retained prosthesis

ÖZET

Dental implantlar parsiyel ve total dişsizliklerin tedavisinde kullanılmaktadır. İmplantlar uzun dönem başarıya sahip olmalarına rağmen, peri-implant hastalıklar gibi bazı problemler gözlemlenebilir. Peri-implant hastalıklarda kemik ile osseointegrasyon kaybı gözlenir ve bu durum implantların uzun dönem başarısını etkilemektedir.

Simante edilen implant restorasyonlar, simantasyon prosedürlerinin geleneksel kronlara benzemesinden dolayı klinisyenler tarafından tercih edilmektedir. Bununla birlikte simante edilen implant restorasyonlar, artık simandan dolayı peri-implant hastalıklara neden olabilmektedir. Artık siman, sondalamada kanama ile süpürasyona neden olabilmekte ve enflamasyonun ilerlemesiyle kemik kaybı meydana gelebilmektedir.

Bu derlemede simante implant restorasyonların peri-implant hastalıklarının oluşmasındaki rolü değerlendirilmiş ve artık simanın etkileri anlatılmaya çalışılmıştır.

Anahtar Kelimeler: siman, peri implant hastalıklar, simante protezler

Association Between Peri-implant Diseases and Cement-Retained Prosthesis: A Review

Dental implants are widely used as an acceptable and predictable treatment options of partial and total edentulous patients.¹ Although implants have long-term success, have late biological complications like peri-implant diseases. Peri-implant diseases are inflammatory reactions in peri-implant tissues and categorized in two forms; peri-implant mucositis and peri-implantitis.^{2,3}

The main predisposing factor in peri-implant diseases is bacterial colonization.⁴ Plaque formation around implants and host response to biofilm formation includes a series of inflammatory reactions. Initially, inflammation is localized to peri-implant mucosa but inflammatory reaction can progress and result in the loss of implant supporting bone.^{2,5-7}

Peri-implant Mucositis

Peri-implant mucositis is similar to gingivitis and presents inflammation around peri-implant soft tissue

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without loss of supporting bone.⁸ Bleeding on probing (BOP), redness, swelling and increased probing depths (4-5 mm) can occur in peri-implant mucositis.^{5,9} The prevalence of peri-implant mucositis has been reported in the range of 8 to 44%.¹⁰

Peri-implant mucositis is treated by non-surgical mechanical therapy using carbon fibre to minimize damage to implant surface. Chlorhexidine irrigation routinely used as a adjunctive therapy in treatment of peri-implant mucositis.¹¹⁻¹⁴

Peri-implantitis

Peri-implantitis includes soft tissue inflammation and loss of supporting bone, like periodontitis.⁸ Findings from animals and human cross-sectional studies have found that bacterial species associated with periodontitis and peri-implantitis are similar, mainly gram negative aerobes.^{15,16} BOP, deep probing depths (> 5 mm), suppuration can also occur in peri-implantitis. The frequency of peri-implantitis has been reported in the range of 1 to 19%.¹⁷

Similar to treatment of peri-implant mucositis, non-surgical treatment of peri-implantitis involves the mechanical debridement of plaque from the surface of implant.¹⁸ There is data that non-surgical treatment fails to eliminate bacterial load and little benefit can be expected in.¹⁹ Surgical treatment (access flap, removal of granulation tissue, implant surface decontamination) was shown to give a better outcome.²⁰ Local or systemic antibiotics may reduce BOP and probing depths when used in conjunction with surgical treatment.²¹⁻²⁴

A number of risk factors have been identified that may lead to the establishment and progression of peri-implant mucositis and peri-implantitis like previous periodontal disease, smoking, poor oral hygiene, genetic factors, poorly controlled diabetes, occlusal overload and residual cement from cement retained restorations.²⁵

Cement-Retained Prosthesis

Dental implants have grown in popularity, so have the incidence of cemented implant restorations. Clinicians prefer cement-retained prosthesis because of their passive fit, easy control of occlusion, more aesthetic and cementation procedure is similar to tooth.²⁶ This is an error, because teeth and implants have very different requirements from each others.

In teeth, supracrestal connective tissue attach to the tooth perpendicularly, resulting in a strong attachment to the tooth. In contrast, the connective tissue attachment in dental implants has fewer fiber bundles and their orientation tends to run parallel to the implant surface, resulting in less protection overall from invading pathogens.²⁷ Incomplete removal of cement from peri-implant tissues leaves a nidus of inflammation that can lead to peri-implant disease. The thin junctional epithelium around a dental implant is not a good barrier. As a result, the flow of cement is not restricted and easily migrates apically.

American Academy of Periodontology reported that residual cement is a risk factor for peri-implant diseases (peri-implant mucositis and peri-implantitis).²⁸ The effect of residual cement in peri-implant disease can be compared with that dental calculus in periodontal disease. Dental calculus is a predisposing factor due to additional retention of bacteria and mechanical irritation of periodontal tissues. Cement's rough surface is a good place for bacterial accumulation and biofilm can form on the excess cement.²⁹

Wilson³⁰ reported that residual cement is one of the predisposing factor for peri-implantitis. In this study, excess cement was associated with signs of peri-implant disease in the majority (81%) of the cases. Clinical and endoscopic signs of peri-implant disease were absent in 74% of the test implants after the removal of excess cement. Korsch et al.³¹ identified residual cement in 59.5% of implants. BOP was found at 80% of implants with residual cement and suppuration at 21.3% of the implants. After removal of excess cement 76.9% reduction in BOP was found.

Cement-retained prosthesis is associated with peri-implant disease than screw-retained prosthesis. Weber³² reported that plaque index and BOP is higher in cement-retained prosthesis than screw-retained ones. Complete removal of excess cement around the implant tissues is unpredictable and the residual cement causes inflammation, bleeding and suppuration. Linkevicius et al.³³ showed that bonding with cement of implant-supported prostheses resulted in excess cement in peri-implant tissues.

Peri-implant soft tissue response is more positive to screw-retained prostheses than cement-retained prostheses.³² However, some studies showed inflammation in screw-retained prostheses because of



microgap between restoration and abutment interface.^{34,35} Piattelli et al.³⁶ suggested that they showed inflammation around the cement-retained peri-implant tissues because of microgap, compared with cement retained restoration they found no signs of inflammation. Nissan et al.³⁷ also reported that cement-retained implant restorations had lower bleeding index and peri-implant bone loss.

Clinicians like to place the margins of their restorations greater than 2-mm subgingival for esthetic reasons. Linkevicius et al and Agar et al reported that removing excess cement around implant restorations with subgingival margins, especially when the margins are greater than 1.5 mm is impossible. Cement can removed when margins were placed 1-mm supragingival or at the gingival margin.^{33,38}

Reducing the amount of used cement can be recommended to minimize the risk of excess cement. The deep subgingival restorations should be avoid because removal of excess cement from this area is very difficult.³³ Different techniques reported to locate and remove the excess cement such as flap debridement and dental endoscope.^{30,39} High-viscosity cement can prefer to low-viscosity cement because low ones assumed to spread more easily to peri-implant tissues. Chee et al.⁴⁰ reported that the least excess cement was present when a cementation device was used. In this study he found no correlation between used cement and excess cement. He also found highest excess cement when cement applied to all axial walls of crown. Using cementation device reduces excess cement significantly. Radiography after cementation can help for better diagnosis of residual cement. Composition of used cement is important to detect the residual cement in radiography. Radiopacity is related with third power of the atomic number of the absorber elements⁴¹ For this reason zinc found cements like zinc phosphote and zinc oxide is detectable in radiography, but acrylic urethane cements are not detectable. However, the location of cement make the radiographic detection of excess cement difficult. Wadhvani⁴² reported that a follow-up radiograph wouldn't have product any result of methacrylate residual cement. In addition residual cement can be seen only in the interproximal gap of cement. In the facial and buccal sides a reliable diagnosis is imposible because of superposition of implants.

CONCLUSION

Healthy periodontal tissues are essential for the stability of dentition, likewise healthy peri-implant tissues are essential for stability of dental implant. Biofilm formation plays an important role in initiation and progression of peri-implant diseases. Dental calculus is a predisposing factor due to additional retantion of bacteria and mechanical irritation of periodontal tissues. The effect of residual cement in peri-implant diseases can be compared with dental calculus in periodontal diseases. Cement roughness and surface topography supply a good environment for bacterial accumulation. For this reason, detection and removal of residual cement from peri-implant area is helpful in preventing inflammation and peri-implant diseases.

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