



SCREW VS. CEMENT RETAINED PROSTHESES: A LITERATURE REVIEW

Dental Science

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ABSTRACT

Dental implant survival has been dependent on skills, materials, techniques and appropriate case selection. Implant failure still occur in dentistry, either mechanical or biological or both. Screw and cement are used to secure the prosthesis. Choice of retention varies in the literature surrounding controversies to it. This review article helps to survey the various benefits and drawbacks of screw retained and cement retained, clinical significance, esthetics, retrievability, long term effect surrounding the method for retention of prosthesis. This might help the clinician in optimizing their treatment protocol for the long-term success of implant.

KEYWORDS

Screw Retained; Cement Retained.

INTRODUCTION:

A prosthesis can be retained to implant fixture by screw or cement.¹ It has been noted that the choice is generally a clinician dependent rather than governed by scientific evidence.² The present literature, has extensive data available for each type of method of retention, advantages and disadvantages of techniques.³ Many authors have suggested that cement-retained prostheses have better esthetics, passivity in fit and controlling the occlusion is simpler.^{4,9} However, the chances of leaving an excess of cement in the peri-implant area is of significant concern.^{5,9} On the other hand, many reports state that due to their retrievability, maintenance of hygiene is easier.^{5,7} Screw loosening is most often found to be a major problem for the clinician.^{3,10} The purpose of this article is to help the clinician modify their treatment approach accordingly.

PROVISIONALIZATION AND ESTHETICS:

Esthetics zone is particularly challenging in implant dentistry. It is very difficult in attaining soft tissue profile and ideal contact as that of a previous natural tooth. In order to obtain a predictable outcome, it is necessary to consider the treatment planning process which includes the surgical risk factor and end prosthetic result.¹¹

It is necessary to give a provisional restoration so that it would be easier to obtain a good emergence profile and peri-implant soft tissue growth is adequately achieved, which will be in harmonious relation with neighboring soft and hard tissue.

Clinical Significance-

The provisional restoration is of particular importance when it comes to an implant placed at the bone crest level. There is a considerable advantage to this in which the dentist can individualize the emergence profile, crown margin and, mucosal zenith.

Screw retention is preferred in such cases as it is easy to remove as compared to cement in which care should be taken for the removal of excess cement which could lead to peri-implantitis.^{12,13} This is of particular importance in the anterior region where soft tissue inflammation could be unaesthetic.¹⁴

ACCESS OPENINGS-

Screw retained prostheses have access openings which, could compromise aesthetics in the anterior region. This would require placing the implant palatally than the ideal facial position. Due to the

presence of any anatomical landmark if it is not possible to place an implant in an ideal position use of custom made or preangled abutments can be done to relocate the access away from aesthetic area.¹²

Clinical significance-

Screw retained prostheses require the use of facial porcelain ridge lap because of placement of implant palatally. This makes maintenance of hygiene in cervical sulcus extremely difficult. This is not an issue with cement-retained prostheses in which implant can be placed in an ideal position and, better emergence profile can be obtained.⁷

OCCLUSION

Cement retained prostheses have a definite advantage in which stable and ideal occlusal contact can be easily obtained.^{7,15,16} In some cases, the use of larger diameter implants leads to a large access opening which, could occupy up to 50% of the occlusal table. This leads to occlusal instability and in protrusive and lateral excursive movements. Restorative material used to cover such type of openings often wear under occlusal load.¹⁷ Also, the load applied on the implant by the restorative material will be in a lateral direction and not directed axially leading to failure. The use of restorative material is justified if its sole aim is to provide occlusion and, no lateral forces act on it.

Clinical Significance:

Occlusal stability can be achieved by both cement and screw-retained prostheses. Screw retained prostheses can also make good occlusal contact despite the screw access channel, provided little or no force is exerted on the access filling rather than the crown portion itself.

INTEROCCLUSAL SPACE AND RETENTION

The retention of cement-retained prostheses is affected by many factors such as taper of the abutment, surface area and height, surface roughness, and type of cement.¹⁸⁻²³ The implant- abutment should be of sufficient height to acquire adequate retention for cement-retained prostheses.¹² In cases, where the interocclusal space is less than 4 mm then a screw retained prosthesis should be considered to achieve the required retention, this will in turn help to avoid any preprosthetic surgery to increase the restorative space.¹³

Cement selection is a crucial factor in cement retained prostheses. The cement is generally selected based on the type of prostheses given provisional or permanent.^{24,25,26} The luting agents should be strong

enough to prevent dislodgment of prosthesis and also weak enough to help easy retrieval of prosthesis without causing any complication. Behr et al. in his study, noted that zinc phosphate would leave some powdery remnants that were still present after excess cement removal. The easiest to remove was zinc oxide-eugenol cement and, it would have the cleanest surface.²⁷ TempBond is a eugenol free cement and has a characteristic to dissolve upon contact with fluid which leads to fewer complications.²⁸

Duralon, a type of polycarboxylate cement contains fluoride which is known to cause etching of titanium when used in the acidic environment causes corrosion on the implant surface. Hence, polycarboxylate cement is not advised for luting to implants.^{29,30}

Clinical Significance:

Cement retained prostheses are contraindicated in malaligned or limited interocclusal space; a screw-retained prosthesis should be considered. If lithium disilicate crowns are to be luted, then the use of permanent resin cement should be considered. Otherwise, TempBond is the choice for easier retrievability of the prosthesis.

RESIDUAL EXCESS CEMENT

Residual excess cement plays an essential role in peri-implant inflammation, according to the American Academy of Periodontology. Korsch et al. in his study, found that larger diameter implants had excess residual cement. This may be because most of larger diameter implants were used in the posterior region and the inability to access it to maintain hygiene.³¹ Excess cement in the peri-implant tissue will act as calculus and thus will make the implant surface rough and help adherence of bacteria.³²

Clinical Significance:

Residual cement is bound to cause peri-implant inflammation either in a short period or a long period of time. Removal of the abutment is the only method to successfully remove the cement use of titanium scalers for a non-surgical debridement and should be left to heal for 3-4 weeks before considering a surgical approach.

BIOLOGIC COMPLICATIONS

Implant biology is entirely different than that of a natural tooth. Supracrestal collagen fibers are generally responsible for holding the soft tissue around the tooth which, insert into the cementum.³³ The arrangement of these collagen fibers is such that it compartmentalizes the infection in a particular area and prevents its spread.³⁴ The implant does not have such arrangement of fibers instead a sling of circumferential fibers surround it, and hence the chances of spreading of infection increase any diseases entering will affect the entire implant.²⁹

Clinical Significance:

Residual cement is bound to cause peri-implant inflammation either in a short period or a long period of time. Removal of the abutment is the only method to successfully remove the cement use of titanium scalers for a non-surgical debridement and should be left to heal for 3-4 weeks before considering a surgical approach.

TECHNICAL COMPLICATIONS ASSOCIATED WITH SCREW RETENTION:

The implant screw is under constant stress, and hence more technical complications occur. Many authors report screw loosening and fracture to be a common consequence.^{34,10} Sailer et al. in his study over a period of 5 years, reported screw loosening to be more common in screw-retained prostheses while fracture was more often in cement-retained prostheses.³⁵ Assenza et al. reported that the old screw must be replaced with a new screw, rather than retightening of the old one because this may cause fatigue fracture since there is a chance of deformation of the screw due to previous load.³⁶

Clinical Significance:

Although screw loosening and screw fracture are most commonly seen technical complications, many current literatures show no difference between either mode of retention. A new screw must be placed rather than the retightening of old one.

RETRIEVABILITY AND LONG-TERM COMPLICATION

Screw retained prosthesis has a major advantage, since any biologic or technical complication occurs it might be necessary for oral hygiene maintenance, necessary restoration servicing it easier to retrieve as

compared to cement-retained.⁴ In the case of partial edentulousness, if the adjacent teeth have a poor prognosis and the future possibility of extraction should be kept in mind. In such times, if there rises a situation that the use of the previous implant is to be made then the use of screw-retained prosthesis is much better because of a more successful chance of retrievability than cement-retained.¹²

Clinical Significance:

Screw retained prostheses will help in easier management of complications should any arise.

Conclusion

There are innate advantages and disadvantages to both screw retained and cement retained prostheses the literature has shown that neither can be used for every clinical scenario, it is up to the clinician to make the most by the evidence-based in literature. The major factors to be considered are retrievability, biologic, mechanical, long term planning and use of different abutment in cases of angled implant placement for the use of either screw or cement retained implant prostheses.

SCREW VERSUS CEMENT RETAINED PROSTHESES:

	Cement retained	Screw retained
1.Retrievability		+
2.Passive casting	+	
3.Axial load	+	+
4.Esthetics/hygiene (emergence profile in anterior)	+	
5.Reduced occlusal material fracture	+	
6.Access	+	
7.Decreased fatigue/ fracture of Components	+	
8.Progressive loading	+	
9.Abutment microgap sealed	+	
10.Cost and time, components decreased	+	
11.Low profile retention		+
12.Limited interarch space		+
13.No cement in sulcus		+

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