Sarcouncil journal of Medical sciences

ISSN(Online): 2945-3526

Volume- 01| Issue- 09| 2022

Review Article

Received: 13-10-2022 | Accepted: 24-10-2022 | Published: 01-11-2022

Retention Means of Prosthetic Parts in Implant Dentistry (Comparative and Analytic Study)

Dr. Ahmed Khamis Mohammed[1], Dr. Samara Salman Soud[2], and Abbas Abdul Wahhab Jumaah[3]

[1]M.B.Ch.B. \ F.I.C.M.S. \ (Anesthesiologist), Ministry of Higher Education and Scientific Research, Al-Iraqia University, Medical College, Pharmacology Department, Baghdad, Iraq

[2]Higher Diploma of Prosthodontics, Iraqi Ministry of Health, AL-Karkh Health Directorate, Al-Dawoody Special Centre for Prosthetic and Orthodontics, Baghdad, Iraq

[3]Department of Applied Embryology, High Institute for Infertility Diagnosis and Assisted Reproductive Technologies, Nahrain University, Kadhimiya, Baghdad, Iraq

Abstract: This paper aims to review the factors affecting the selection and prognosis of the screw- and cement-retained implant-supported prosthesis. The different characteristics of the screw- and cement-retained implant restorations and how they may influence the esthetics, irretrievability, retention, passivity, occlusion, accessibility, cost, and provisional restorations. Problems and complications frequently encountered are discussed. The bone-implant interface appears able to survive with some degree of offset loading; however, there appears to be an increase in the incidence of prosthetic complications such as screw loosening and breakage. As such, prudent control of offset loading is suggested through prosthetic design. The ability to generate vertical or axial loading may be compromised when the choice is made to use screw-retained implant restorations. Cement-retained implant prostheses are able to vertically load the prosthetic head of the implant. The use of misaligned implants is sometimes unavoidable; it should be minimized as non-axial forces on implants and abutments are more likely to cause complications and failures. The average rate of complications was 37,5% for cemented-retained restorations and 30% for screw-retained restorations. The complications more common in the cemented-retained restoration were the presence of mucositis (14,87%), while in the screw-retained restorations was the loosening screw (20%). Student t-test and Log-Rank test found significant differences (p=0,001) between the screw loosening and the presence of mucositis. The cemented-retained restorations show a lower incidence of screw loosening than screw-retained restorations.

Keywords: Prosthetic, Implant, cement, esthetics, screw, restorations.

INTRODUCTION

The history of the evolution of dental implants is a rich and fascinating travelogue through time. Since the beginning of mankind, humans have used dental implants in one form or another to replace missing teeth.

Long-term success is the prime goal for any restoration in prosthetic treatment, and so is it with implant dentistry. Several factors concerning the materials used, as well as techniques followed in the clinical practice, influence the relative outcome of the final prosthesis. One of such concerns is the connection between the prosthesis and the implant. The attachment of the restoration to an implant can be accomplished through screw retention, cementation, or a combination of both.

Screw-retained prostheses have a well-documented history of successful application in completely edentulous patients because of its ease of retrievability, reduced biological complications such as bone loss, and peri-implant diseases, ease of hygiene maintenance, repairs, and provision for future surgical interventions if required. However, technical complications, such as screw loosening and breakage, and the porcelain veneer fracture due to offset loads transmitted at the implant-prosthesis connection, require very precise surgical techniques to avoid these issues. There has been a rapid switch in trends of retention systems from screw-retained to cement-retained implant restorations, which provide optimal occlusal design, superior esthetics, passively fitting restorations, and axial stress distribution to the prosthetic components and bone-implant interface, with high degree of retrievability using soft access cements based on clinical judgment.

There are various factors that regulate the decision in the selection of the attachment mechanism in implant dentistry. These include retention, retrievability, passivity, occlusion, and axial loading, occlusal material fracture, esthetics and hygiene, abutment-crown crevice, ease, and cost of fabrication. [Shetty, S. *et al*., 2014]

Treatment modalities for the replacement of missing teeth have truly evolved from ancient transplants to modern-day implants, the third dentition. Implants have revolutionized dental practice and have helped overcome many of the limitations encountered with conventional fixed or removable prostheses and is considered as an aesthetic, functional restoration with long-term predictability. [Adell, R. *et al*., 1981; Agar, J.R. *et al*., 1997; Brennan, M. *et al*., 2010]

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

***Corresponding Author:** Dr. Ahmed Khamis Mohammed

DOI-https://doi.org/10.5281/zenodo.7271886

Abutment-borne prosthesis could be cement retained similar to conventional crown and bridge prosthesis or screw-retained. However, there is significant controversy regarding cement-retained versus screw-retained prostheses. Thus, there are three primary methods for attaching the final prosthesis to the endosseous implant include:

Screwing the restoration to the implant directly.

Screwing an abutment into the implant and attaching the restoration to the abutment with either additional screws or cement.

Cementing the abutment directly into the implant before attaching the crown. [Lewis, LIamas, and Avera, 1992].

Cement Retained Prosthesis

Many current implant systems have abutments onto which superstructures can be cemented. In cemented implant prosthesis, the metal-ceramic fixed partial denture is luted onto a transmucosal abutment, which is connected to the implant. Cemented prostheses may be selected in all-traditional porcelain fused-to-metal applications ranging from single-tooth replacement to full-arch restoration.

Cement-retained prostheses have become, in many cases, the restoration of choice for the treatment of implant patients. This evolution started after a modification of the UCLA abutment, which led to a new philosophy in restorative solutions, i.e., the fabrication of customized abutments to overcome esthetic and angulation problems, which implant manufacturers had not foreseen [Buser, D. *et al*., 2012].

These restorations permit the development of desired occlusal interdigitation, improved esthetics, and correct loading characteristics. The abutment preparation design and cementation technique mimics conventional fixed prosthodontic procedures for natural teeth. Moreover, the cement space that exists between the crown and abutment can help compensate for minor discrepancies in the fit of the prosthesis [Buser, D. *et al*., 2004; Chen, S.T. *et al*., 2009; Doerr, J, 2002].

The type of cement used is also an important consideration because it affects the retention characteristics of the restoration. It may be desirable to use a type of cement that allows the restoration to be retrieved so that a superstructure can temporarily be cemented to evaluate the loading of the implant, occlusion, and tissue response.

The important factor in retention is the type of cement. A wide variety of cement exists with varying degrees of strength. For cement-retained implant restorations, the choice of cement is one of the most important factors controlling the amount of retention attained [Grunder, U. *et al*., 2005; Hebel, K.S. *et al*., 1997].

Since there is no risk of decay for the abutments, provisional cement can also be used for the cementation of implant restorations, as they are much weaker than the definitive cement and permit the retrievability of the restorations. Either Temp-Bond cement or a mixture of Temp-Bond cement and petroleum jelly (reduced strength) can be used to cement implant-supported prosthesis [Linkevicius, T. *et al*., 2013; Linkevicius, T. *et al*., 2011].

A study analyzed the optimal properties of provisional luting cement and the surface treatment of abutments in a single implant abutment system and found that tensile bond strength increased by surface treatment with aluminum oxide. Tensile bond strength of provisional luting cement in no surface treatment decreased with the sequence of TempBond NE, TempBond, Cavitec, TempBond with vaseline, and no cement. [Lee, H.Y. *et al*., 2002] Another study examined the retentive force of crowns retained on implant abutments with different temporary cements and found that the mechanical properties of the temporary cement, particularly their compressive strength, affected the retention of crowns cemented on implant abutments [Nagasawa, Y. *et al*., 2005]

A Comparison between Cement- and Screw-Retained Prosthetics

Both cement- and screw-retained prostheses have been validated in clinical studies, and each type of restoration has particular advantages and disadvantages (Fig. 1). Historically, screw-retained prostheses were widely used as restorations could be retrieved for evaluation of the underlying implants and repair of any possible complications. Cemented restorations are now widely used as more esthetic restorations can be created.

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

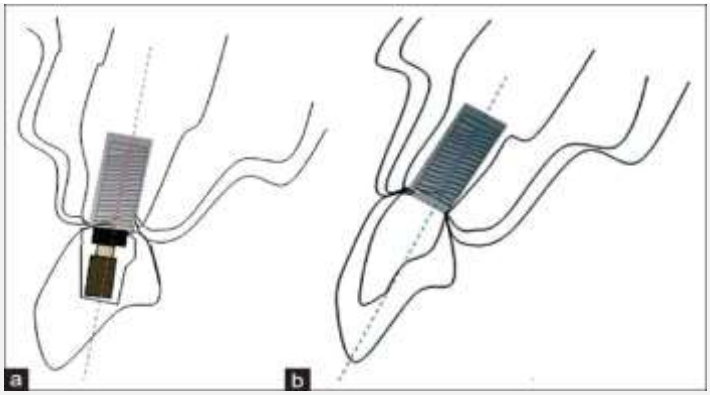

Figure 1: (a) Screw-retained restorations (b) Cement-retained restorations [Shetty, Garg, and Shenoy (2014)]

Occlusal and Loading Concepts Related to Design

The selection of screw retention or cement retention as an attachment mechanism impacts on the occlusion of the restoration. Implants ideally placed under the central fossa or stamp cusps of posterior teeth represent the best opportunity to generate axial loading. Clinical experience suggests that this goal is often not attained, and thus, offset loading occurs. Screws or screw holes in the occlusal surfaces of teeth disrupt the occlusal surfaces. The area where the screw hole exists may be a critical area when one attempts to generate an optimal occlusion.

With cement-retained implant restorations, all of the anatomic surfaces of all of the teeth are present to develop protrusive and lateral protrusive relationships. Screw-retained implant prostheses may lack the proper anatomy on the cuspids and central incisors for the smooth transition into protrusive and lateral protrusive movements, and thus, anterior guidance may be compromised.

Many factors interact in a complex manner to produce a load at the bone-implant interface. Offset loading is one factor that can be controlled with prosthetic design. The bone-implant interface appears able to survive with some degree of offset loading; however, there appears to be an increase in the incidence of prosthetic complications such as screw loosening and breakage. As such, prudent control of offset loading is suggested through prosthetic design. The ability to generate vertical or axial loading may be compromised when the choice is made to use screw-retained implant restorations. Cement-retained implant prostheses are able to vertically load the prosthetic head of the implant.

Features of Cement- and Screw-Retained Restorations

One of the keys to successful long-term implant restorations is the stability of the implant/abutment connection.

The type of finish on screws can have a significant effect on the tension induced by a given torque. Implant manufacturers have altered the material in the screws as well as the surface of abutment screws in an effort to prevent or minimize screw loosening. Martin and colleagues, (2001) [Martin, W.C. *et al*., 2001] tested the rotational angles in implant/abutment connections with various abutment screws and preloads. They found that the abutment screws with enhanced surfaces reduced the coefficient of friction and produced greater rotational angles and preload values than screws made from conventional gold and titanium alloys.

The Abutment According to the Material, As Well

Titanium abutments – Titanium abutments may be covered with a gold-colored titanium nitride coating that improves esthetics [Sadeq, A. *et al*., 2003]. The gold color is less likely than a titanium-colored abutment to cast a gray shadow at the gingival margin. The abutment is normally machined with a 6° taper and has a pre-chamfered margin. It is available straight or pre-angled to correct for misalignment of the implant. The abutment has a flat side to prevent rotation of the final restoration.

Ceramic abutments – Ceramic abutments may be made of zirconia or alumina (aluminium oxide) [Lesmes and Lasterl, 2011]. The ceramic allows for light reflection in a similar way to natural teeth and leads to less darkening of thin gingival tissue than is the case with metal. The ceramic abutment may be preferred if a translucent material is used

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

for the definitive prosthesis [Christensen, G.J, 2008]

Zirconia abutment has a machined titanium interface that fits onto the implant. The margins of the abutment can be prepared to follow the uneven contours of the gingival tissue.

The hardness of the material can make these abutments difficult to prepare intraorally. The implant position should be as close to ideal as the abutment cannot accommodate changes in angulation (Fig. 2).

The fabrication of cement-retained restorations is easier than that of screw-retained restorations because conventional laboratory and clinical prosthodontic techniques are used for making cemented restorations. [Wilson Jr, T.G. *et al*., 2009] The screw-retained restorations are usually more expensive because of the extra components needed, such as plastic sleeves, laboratory fixation screws, and the fixation screws themselves. [Avivi-Arber, and Zarb, 1996]. Nevertheless, the increased cost of the screw-retained restoration that allows for predictable retrievability must be compared to the potential costs of damaging the cemented restoration if a biologic or technical complication occurs. [Gervais, M.J. *et al*., 2007]

When the implant is placed in the ideal position, predictable esthetics can be achieved with either screw- or cement-retained restorations. One of the debates regarding using screw-retained restorations is the screw access channel that may be placed in an esthetic area; when there is difficulty in placing the implant in an ideal position for any anatomic limitation, the pre-angled or custom abutments can be used so that the screw access channel is relocated away from the esthetic area. The use of an opaquer in combination with a resilient composite offered a significant esthetic improvement of implant restoration (Shadid, R. *et al*., 2012).

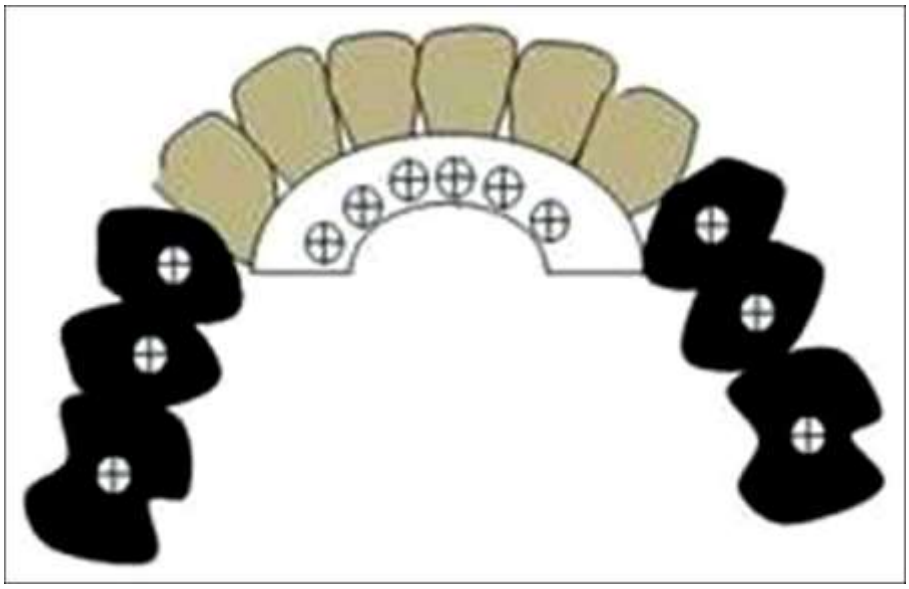

Figure 3: Compromised esthetics in screw-retained prosthesis due to facial porcelain ridge lap [Shetty, Garg, and Shenoy, 2014]

The security of retention is considered one of the most important factors affecting implant prostheses longevity ;There are several factors that

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

affect the retention of cement-retained restorations, such as taper of the abutment, surface area and height, surface roughness, and type of cement, Felton [Chee, W. *et al*., 1999], Taper greatly affects the amount of retention in cement-retained restorations [Jorgensen, 1955] machined abutments have mostly 6o of taper depending on the concept of ideal tapering proposed by Jorgensen for natural teeth. [Gilboe, D.B. *et al*., 1974] Regarding surface area and height, the subgingival placement of the implants provides longer implant abutment walls and usually more surface area than prepared natural teeth.

The minimum abutment height to use cement-retained restorations with predictable retention was documented to be 5 mm. [Kaufman, E.G. *et al*., 1961] Therefore, when the interocclusal space is as little as 4 mm, screw-retained restorations may be used since these restorations can be attached directly to implants without an intermediate abutment .Increased surface roughness will offer increased mechanical retention for cement, and so roughening the implant abutments using diamond burs or grit blasting will provide higher retention. However, because of the ideal 6^{o} taper and long surface provided by implant abutments, there will usually be no need for roughening the abutment surface to increase retention. Cement selection is one of the most important factors controlling the amount of retention attained for cement-retained restorations.

The cement used with implant restorations can be either permanent or provisional, and it is the clinician's decision to choose a certain type of cement based on the clinical situation. [Hebel, K.S. *et al*., 1997]

Mansour, *et al*., (2002); Simon, (2003); Sadan, *et al*., (2004). The concept of using provisional cementation is considered to achieve restoration retrievability without endangering the implant restoration components when loose restoration or abutment screw loosening occurs. [Breeding, *et al.*, 1992]. With regard to screw-retained restorations, retention is obtained by a fastening screw. The loss of retention in screw-retained restorations is demonstrating itself as screw loosening. [McGlumphy, Mendel, and Holloway, 1998]. Factors including insufficient clamping force, screw settling, biomechanical overload, off-axis centric forces (forces that are not directed along the long axis of the implant), implant components and prosthesis misfit, differences in screw material and design, and finally, hex height and implant diameter will affect the amount of retention of screw-retained restorations. [Hebel and Gajjar, 1997; McGlumphy, Mendel, and Holloway, 1998; Haack, *et al*., 1995].

The screw loosening is a major problem with screw-retained restorations. [Jemt, Linden, and Lekholm 1992; Jemt, *et al*., 1991; Laney, *et al*., 1994; Carlson, and Carlsson, 1994]. The incidence of screw loosening was 65% for single tooth implant restorations in one study [Jemt, Linden, and Lekholm, 1992]. In contrast, the incidence of unretained cemented implant restorations was reported to be less than 5% in other studies. [Singer, and Serfaty, 1996; Mish, 1995]. However, the improvements in implant systems, including the advent of internal implant-abutment connections, enhancement of torque drivers, and screw materials and design, led to a reduction in the incidence of screw loosening. [Avivi-Arber, and Zarb, (1996); Jemt, *et al*., (1991); Laney, *et al*., (1994); Ekfeldt, Carlsson, and Borjesson, (1994); Goodacre, Kan, Rungcharassaeng, (1999)].

The main advantage of screw-retained restorations is the predictable retrievability that can be achieved without damaging the restoration or fixture. Therefore, the prosthodontic components can be adjusted, the screws can be refastened, and the fractured components can be repaired [Chiche and Pinault, 1991] with less time and at a lower cost than would be the case with cement-retained restorations. [Michalakis, Hirayama, & Garefis, (2003); Uludag, Celik, (2006); Guichet, *et al*., (2000)].

Several suggestions and techniques have been introduced to facilitate the removal of cement-retained restorations. One of the techniques described is the incorporation of the screw into the cemented restoration to be used later to lift the restoration off the abutment if activated. Compared with conventional screw retention, this technique improves esthetics and occlusion since the access hole can be placed in the most ideal position without regard to the implant position.

Some Situations Prefer One Method of Retention over the Other

It was stated that the selection of an implant system is the first step in determining the feasibility of either a cement or screw retention for the prosthesis. The current implant systems that employ a conical interface between the implant and the abutment or other internally designed

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

connection features have reduced the incidence of screw loosening and other problems associated with traditional hex-top systems. Therefore, it is believed that it is easier and simpler to utilize the traditional cementation methods with these current systems for retaining definitive prostheses. However, there are some situations where it is better or more suitable to use one method of retention rather than another. These situations are summarized in Table 1.

Table 1: Situations that prefer screw retention and those that prefer cement retention [Shadid and Sadaqa, 2012]

Situations That Prefer Screw Retention	Situations That Prefer Cement Retention
Large, Full-arch implant reconstructions are preferred to be screw-retained because complications in these long-span prostheses are more common than those of short-span ones. Cantilevered prostheses are preferred to be screw-retained because some maintenance of restorative structures or implants would probably be needed during the lifetime of such prostheses. With patients who are at a high risk of developing gingival recession, screw-retained restorations are preferred. This is to allow for their uncomplicated removal and then for the modification of the restorations according to the new situation. With patients who are expected to lose more teeth in the future, screw-retained restorations are preferred. This is to allow for easy removal of the restorations, thereby modifying the restorations. In situations where minimal interocclusal space exists, it may not be possible to achieve adequate retention for cement-retained restorations because these restorations require a vertical component of at least 5 mm to provide retention and resistance form. However, as little as 4 mm of interocclusal space is sufficient to use screw-retained restorations. Additionally, screw-retained restorations can be attached directly to implants without an intermediate abutment, therapy reducing the interocclusal space needed for these restorations. In situations in which removal of excess cement is difficult or impossible (e.g., If the final restorative margin will be greater than 3 mm subgingivally, the use of screw-retained restoration is indicated). An alternative to screw-retained restoration in this situation would be to fabricate a custom abutment for cement retention with a restorative margin following the outline of the gingival contours. Cases in which technical or biologic complications are anticipated, screw-retained restorations are preferred to allow for easy removal of the restorations and therapy managing the problems.	Single-unit and short-span implant restorations, assuming that implant table size, implant numbers, and abutment screw torque can be optimized, are preferred to be cement-retained. The only reason for using screw retention in such cases would be if the implant's long axis were too palatal in the anterior region. Cases involving narrow-diameter crowns in which the screw may compromise the crown's integrity are preferred to be cement-retained. Situations in which the occlusal surface will be compromised with regard to esthetics or occlusal stability due to the presence of a restorative material sealing the screw access are preferred to be cement-retained. In situations of restoring malaligned implants, if the divergence of the implant axis and the retaining screw of the angled abutment, which is to receive the restoration, is less than 17^{o}, conventional screw retention of the restoration using premachined abutment is not possible.

CONCLUSION

Retention system that is more functional and stable in the successful management of future failures and complications should be selected based on individual patient situation.

Both screw- and cement-retained have their advantages and disadvantages.

Increased implant predictability, patient demand for high esthetic outcomes, and lower cost

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

recommend the use of cement-retained restorations for implant-supported single crowns.

Due to increased technical and prosthetic complications associated with a screw-retained prosthesis, cement-retained restorations are preferred in patients with parafunctional habits.

For multiple-unit implant-supported restorations and in patients with limited interarch space, screw-retained restorations are more acceptable.

REFERENCES

1. Shetty, S., Garg, A. and Shenoy, K.K. "Principles of screw-retained and cement-retained fixed implant prosthesis: A critical review." *Journal of Interdisciplinary Dentistry* 4.3 (2014): 123-129.
2. Adell, R., Lekholm, U., Rockler, B. and Branemark, P.I. "A 15-year study of osseointegrated implants in the treatment of the edentulous jaw." *International journal of oral surgery* 10.6 (1981): 387-416.
3. Agar, J.R., Cameron, S.M., Hughbanks, J.C. and Parker, M.H. "Cement removal from restorations luted to titanium abutments with simulated subgingival margins." *The Journal of prosthetic dentistry* 78.1 (1997): 43-47.
4. Brennan, M., Houston, F., O'Sullivan, M. and O'Connell, B. "Patient satisfaction and oral health-related quality of life outcomes of implant overdentures and fixed complete dentures." *International Journal of Oral & Maxillofacial Implants* 25.4 (2010): 791–800
5. Buser, D., Janner, S.F., Wittneben, J.G., Brägger, U., Ramseier, C.A. and Salvi, G.E. "10-year survival and success rates of 511 titanium implants with a sandblasted and acid-etched surface: a retrospective study in 303 partially edentulous patients." *Clinical implant dentistry and related research* 14.6 (2012): 839-851.
6. Buser, D., Martin, W. and Belser, U.C. "Optimizing esthetics for implant restorations in the anterior maxilla: anatomic and surgical considerations." *International Journal of Oral & Maxillofacial Implants* 19.7 (2004): 43–61.
7. Chen, S.T. and Buser, D. "Clinical and esthetic outcomes of implants placed in postextraction sites." *International journal of oral & maxillofacial implants* 24 (2009): 186–217.
8. Doerr, J. "Simplified technique for retrieving cemented implant restorations." *J Prosthet Dent* 88 (2002): 352–353.
9. Grunder, U., Gracis, S. and Capelli, M. "Influence of the 3-D bone-to-implant relationship on esthetics." *International Journal of Periodontics & Restorative Dentistry* 25.2 (2005): 113–119.
10. Hebel, K.S. and Gajjar, R.C. "Cement-retained versus screw-retained implant restorations: achieving optimal occlusion and esthetics in implant dentistry." *The Journal of prosthetic dentistry* 77.1 (1997): 28-35.
11. Linkevicius, T., Puisys, A., Vindasiute, E., Linkeviciene, L. and Apse, P. "Does residual cement around implant-supported restorations cause peri-implant disease? A retrospective case analysis." *Clinical oral implants research* 24.11 (2013): 1179-1184.
12. Linkevicius, T., Vindasiute, E., Puisys, A. and Peciuliene, V. "The influence of margin location on the amount of undetected cement excess after delivery of cement-retained implant restorations." *Clinical oral implants research* 22.12 (2011): 1379-1384.
13. Lee, H.Y. and Lee, H.S. "In vitro study of the tensile bond strength of cement-retained single implant prosthesis by the various provisional luting cements and the surface treatment of abutments." *The Journal of Korean Academy of Prosthodontics* 40.3 (2002): 296-305.
14. Nagasawa, Y., Nakajima, H., Hasegawa, Y., Yamaga, T., Hibino, Y. and Meikai. "Retention of Crowns Cemented on Implant Abutments with Temporary Cements." University School of Dentistry, Saitama, Japan, *JDR* 84 Special Issue A, abst. #532 (2005).
15. Martin, W.C., Woody, R.D., Miller, B.H. and Miller, A.W. "Implant abutment screw rotations and preloads for four different screw materials and surfaces." *The Journal of prosthetic dentistry* 86.1 (2001): 24-32.
16. Sadeq, A., Cai, Z., Woody, R.D. and Miller, A.W. "Effects of interfacial variables on ceramic adherence to cast and machined commercially pure titanium." *The Journal of prosthetic dentistry* 90.1 (2003): 10-17.
17. Christensen, G.J. "Selecting the best abutment for a single implant." *J Am Dent Assoc*. 139.4 (2008): 484-487.
18. Wilson Jr, T.G. "The positive relationship between excess cement and peri-implant disease: a prospective clinical endoscopic study." *Journal of periodontology* 80.9 (2009): 1388-1392.
19. Gervais, M.J. and Wilson, P.R. "A rationale for retrievability of fixed, implant-supported prostheses: a complication-based analysis." *Int J Prosthodont*. 20(2007): 13–24.

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

20. Shadid, R. and Sadaqa, N. "A comparison between screw-and cement-retained implant prostheses. A literature review." *Journal of Oral Implantology* 38.3 (2012): 298-307.
21. Chee, W., Felton, D.A., Johnson, P.F. and Sullivan, D.Y. "Cemented versus screw-retained implant prostheses: which is better?." *Int J Oral Maxillofac Implant* 14 (1999): 137–141.
22. Gilboe, D.B. and Teteruck, W.R. "Fundamentals of extracoronal tooth preparation. Part I. Retention and resistance form." *Journal of Prosthetic Dentistry* 32.6 (1974): 651-656.
23. Kaufman, E.G., Coelho, A.B. and Colin, L. "Factors influencing the retention of cemented gold castings." *The Journal of Prosthetic Dentistry* 11.3 (1961): 487-502.
24. Hebel, K.S. and Gajjar, R.C. "Cement-retained versus screw-retained implant restorations: achieving optimal occlusion and esthetics in implant dentistry." *The Journal of prosthetic dentistry* 77.1 (1997): 28-35.

Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:
Mohammed, A.K., Soud, S.S. and Jumaah, A.A.W. "Retention Means of Prosthetic Parts in Implant Dentistry (Comparative and Analytic Study)." *Sarcouncil journal of Medical sciences* 1.9 (2022): pp 1-8.

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher