

Clinical Evaluation Associated with Bleeding on Probing of Soft Tissue Around Dental Implants Restored with Cement Retained and Screw Retained Prosthesis: A Systematic Review

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Abstract

Aim: Dental implant is becoming common option for replacement of lost teeth, there are various reasons for implant failure one of them is peri-implantitis. This systematic review compares clinical evaluation associated with bleeding on probing of soft tissue around dental implants restored with cement-retained and screw-retained restorations. **Objectives:** To evaluate bleeding on probing of soft tissue around screw-retained prosthesis on implant. To evaluate bleeding on probing of soft tissue around cement-retained prosthesis on implant. To compare bleeding on probing of soft tissue around screw-retained and cement-retained prosthesis on implant. **Data Source:** Electronic search of PubMed, Google Scholar, EMBASE, Institutional Library and manual search of various journals. **Study Eligibility Criteria:** **Inclusion criteria:** All the randomized control trails evaluating bleeding on probing of soft tissue around screw and cement-retained prosthesis. All the case reports evaluating bleeding on probing of soft tissue around screw and cement-retained prosthesis. All the case series evaluating bleeding on probing of soft tissue around screw- and cement-retained prosthesis. All the studies comparing bleeding on probing of soft tissue around screw-retained and cement-retained prosthesis on implant. All the studies conducted between 2000 and May 2018. **Exclusion criteria:** All the studies conducted in vitro. All the narrative reviews. All the letters to editor. All the articles published in other languages. **Intervention:** Cement-retained restorations. **Results:** A total number of 367 articles were identified through the electronic search. Only 5 articles were included on the basis of inclusion and exclusion criteria. All the 5 articles were reviewed by the two authors for their study characteristic. All the articles indicated that there was no evidence of different behavior of the peri-implant marginal bone and of the peri-implant soft tissue with screw- and cement-retained prosthesis. **Limitations:** Total number of articles screened for full text are limited in number i.e., only 5 articles are screened in this systematic review. **Conclusion:** There was no evidence that one method of retention of the implant supported prosthesis i.e. Screw- and cement-retained prosthesis was biologically superior to the other during the time period for the respective study. The choice of cement-retained versus screw-retained implant restoration is based on their specific indications for the clinical situation.

Keywords: Cement-retained prosthesis; Screw retained prosthesis; Bleeding on probing.



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Introduction

Prosthetic reconstruction of endosseous implants can involve screw-retained or cement-retained restorations or both. The choice of cementation versus screw retention seems to be based on mainly the clinician's preference.^{1,2} The long-term criteria for successful dental implants have been previously based on osseointegration status, measured by parameters such as mobility, suppuration and peri-implant bone loss.

Screw retention was developed in response to the need for prosthesis retrievability, which can be obtained with attachment. This innovation helped in the early development of implant dentistry, when removal of the prosthesis was often required for repair or replacement.³ Currently, many implant systems used abutments retained by screws and the prosthesis can be cemented on these abutments using techniques that mimic the procedures used to prepare conventional fixed prostheses on natural teeth.⁴ Ideally, implant-supported prostheses should mimic a natural tooth⁵; therefore, the quality of the peri-implant soft tissues plays a decisive role.⁶

The main advantage of screw-retained restoration is retrievability, which is useful in conditions such as screw loosening or fracture, hygiene or modification of prosthesis. Pitfalls of screw-retained prosthesis are lack of versatility in design and suffer from inherent complications such as screw loosening and fracture. The advantages of cement-retained restoration are good esthetics, simplicity of technique and more passive fit compared to screw-retained restorations. The main drawbacks of cement-retained restoration is in difficulty of retrievability when subsequent prosthetic and peri-implant tissue management is necessary.

Peri-implant soft tissue is the tissue around implant. It has an important role in esthetic of the implant supported prosthesis.

Peri-implantitis is defined as an inflammatory disease that affects the soft tissues around a dental implant and results in the loss of bone supporting the implant. It usually causes no pain but exhibits bleeding when the dentist lightly probes between the mucosa around the implant. If not treated properly, or in time, it can lead to loss of the implant and the restorations that the implant supports.

There are a number of factors that hasten the loss of bone around implants with peri-implantitis including smoking, damage to the tissue caused by improper cleaning, overloading biting forces on an implant crown that is "too high" and even

materials like cement that get under the crown when the restorations is cemented on the implant.

Hence, researchers started to investigate on the health of peri-implant soft tissues and on the stability of implant-supported prosthesis. This systematic review compares clinical evaluation associated with bleeding on probing of soft tissue around dental implants restored with cement-retained and screw-retained prosthesis.

Materials and Methods

Eligibility Criteria

Inclusion criteria

1. All the randomized control trails evaluating bleeding on probing of soft tissue around cement- and screw-retained prosthesis
2. All the case reports evaluating bleeding on probing of soft tissue around cement- and screw-retained prosthesis
3. All the case series evaluating bleeding on probing of soft tissue around cement- and screw-retained prosthesis
4. All the studies comparing bleeding on probing of soft tissue around screw-retained and cement-retained prosthesis on implant
5. All the studies conducted between 2000 and May 2018

Exclusion criteria

1. All the studies conducted in vitro.
2. All the narrative reviews.
3. All the letters to editor.
4. All the articles published in other languages.

PICO

P (Population) - Dental implants placed in human

I (Intervention) - Cement retained restorations

C (Comparison) - Screw retained restorations

O (Outcome) - Bleeding on probing around the soft tissue

Information Sources

Literature search strategy was developed using keywords related to Cement-retained, Screw-

retained, Type of restorations, Bleeding on probing, Clinical evaluation of soft tissue.

Data was searched from PubMed and Google scholar from January 1st 2000 to May 31st 2018. Cross references were checked from relevant articles. Hand searching was done for the articles when the full text of the articles was not available through electronic databases.

Search

The comprehensive data search was done on PubMed and Google scholar. While carrying out the search filters were put for the dates of publication from January 1st 2000 to May 31st 2018. Language restriction was put to English articles only. No filters for full text and for study design were kept. The keywords for search were decided by the review of literature.

Table 1: Two Search Strategies Formed Using Keywords

Search Strategy	Articles in hits	Selected articles
Cement retained and screw retained and Bleeding on probing	140	3
Cemen retained and screw retained or type of restoration and bleeding on probing	37	3
Cement retained and screw retained and Bleeding on probing or clinical evaluation of soft tissue	118	3
Cement retained and screw retained or type of restoration and bleeding on probing or clinical evaluation of soft tissue	72	1

Google search was carried out for the articles not published on PubMed. Searching on Google yielded 10 articles which were found to be relevant according to the eligibility criteria.

Search Engines

Pub Med, Google Scholar, EMBASE, Institutional Library.

Data Collection Process

A standardized data extraction form was prepared in Microsoft Excel with the help of an expert. Initially 3-4 entries were made in the Excel and it was reviewed by an expert. Any disagreement between the authors was resolved by discussion. The following criteria were predetermined for

extracting the data:

1. The major interest was to obtain the baseline and post-treatment values for different parameters of bleeding on probing around soft tissue of restored dental implants.
2. Follow-up period from 6 months onwards was considered.

Data Items

1. *Study ID:* Number given to the study for identification.
2. *Author's name:* Name of the author
3. *Year of publication:* Year in which the study was published.
4. *Duration:* For how much duration the study was conducted
5. *Intervention and comparison baseline scores:* Baseline values for different parameters (bleeding on probing) before the procedure
6. *Post-intervention and comparison scores:* Values of different parameters post-procedure.
7. *Remarks:* Results of the individual study.

Results

This depicts the process of selecting the articles and excluding them at each step. 357 Records were identified through the data search using search strategy in PubMed. Through Google scholar 10 articles were selected based on titles. Total articles number arrived to be 367. Second step was screening through the titles and after screening 357 articles were excluded because they were not related to the objectives of the systematic review. 10 articles which remained were screened for duplicates manually. Out of 10 articles, five articles were found to be duplicates and hence remaining 5 articles were screened through abstracts as a next step. Finally, 5 articles were screened for full text. At the end 5 studies remained which underwent qualitative synthesis. 5 articles included in data extraction sheet in excel (Fig. 1).

Discussion

Restoration of dental implants can be done with screw retained and cement-retained prosthesis which present some advantages and disadvantages. Alterations in the peri-implant tissue are observed after the placement of the prosthetic crown, which

may compromise the esthetics of the prosthesis and lead to compromised clinical result and patient dissatisfaction.⁷ Complications related to peri-implant tissues are frequently associated

with inadequate adaptation of components, screw loosening, and malpositioned implants and excess cement during cementation of the prosthesis. Concerning the use of cement in cement-retained

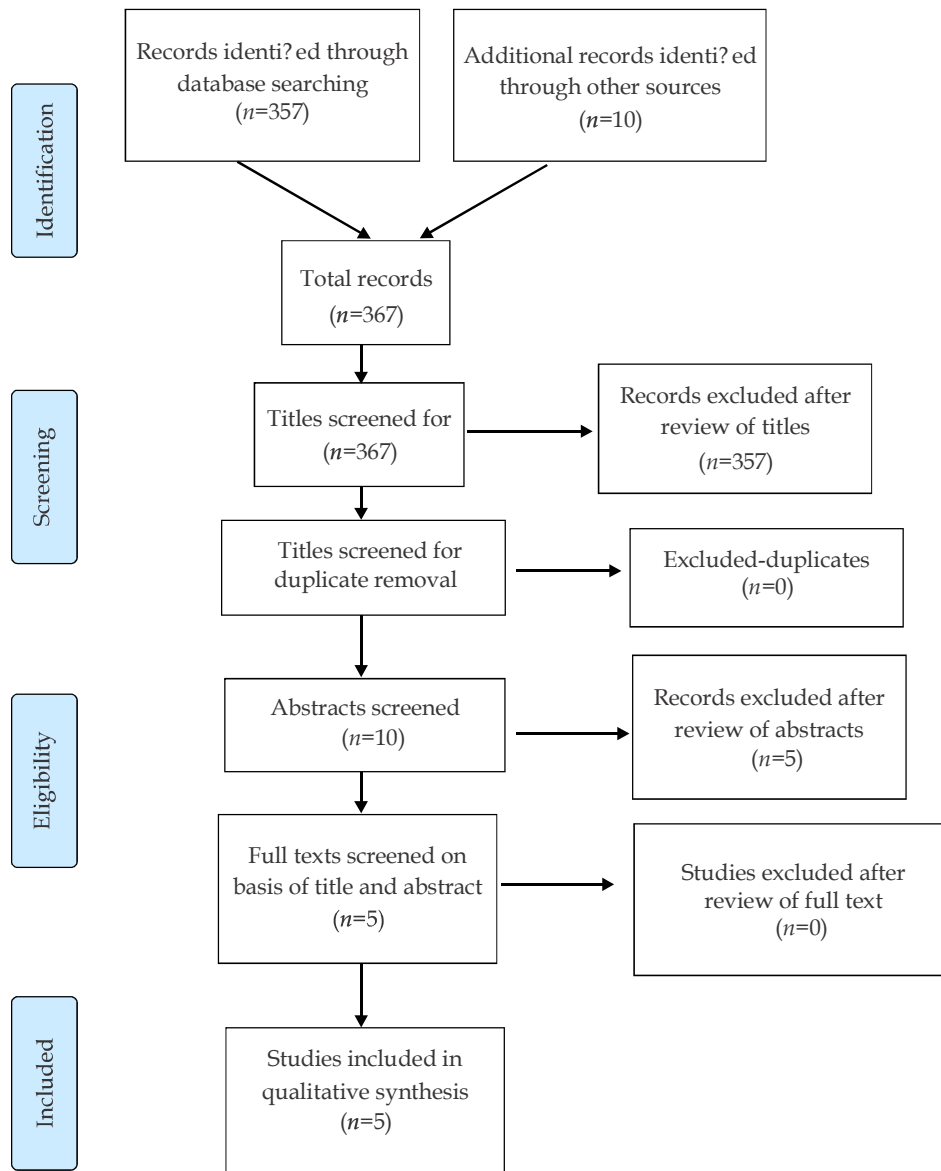


Fig. 1: Consort Flow Diagram

prosthesis, the technique has the inconvenience of allowing the overflow of cement residues, and thus, causes peri-implant inflammation associated with swelling, pain, increased depth, bleeding, or exudation on depth, which can lead to peri-implant bone loss. Hence, biomechanical and esthetic factors, as well as clinical experience, should be considered when deciding which type of prosthetic connection should be used.⁸ This systematic review

compares clinical evaluation associated with bleeding on probing of soft tissue around dental implants restored with cement-retained and screw-retained prosthesis.

Conclusion

There was no evidence that one method of retention of the implant supported prosthesis, i.e., Screw

and Cement-retained prosthesis was biologically superior to the other during the time period for the respective study. The choice of cement-retained versus screw-retained implant restoration is based on their specific indications for the clinical situation.

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