



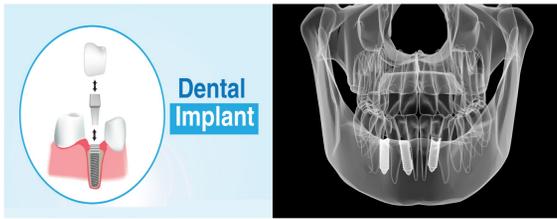
Implant-to-Natural Tooth Comprehensive Review

Dr. Alla Bizanti, Dr. Yasmeen Abugharbiyeh
Columbia University of Dental Medicine



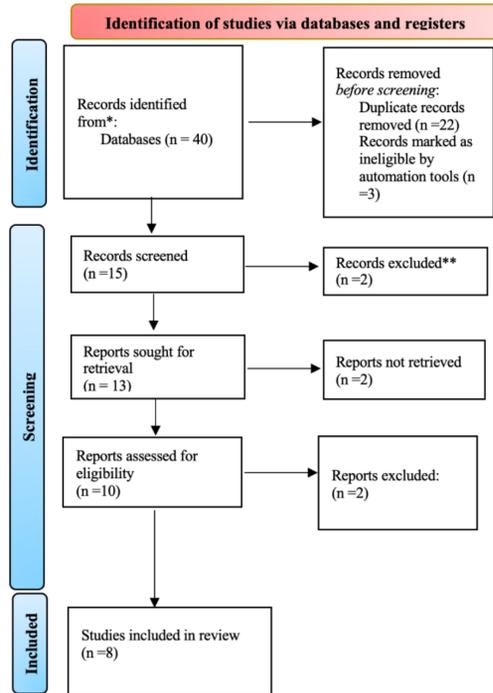
INTRODUCTION

Dental implants have become an increasingly popular and dependable treatment options for people with partial tooth loss. The benefits of tooth implant supported prosthesis include splinting a natural tooth to an implant, increased mechanoreception, and a more support for the total load on the dentition. Connecting teeth with implants also gives the restorative dentist more ways to treat patient, lowers the cost of replacing teeth, and gets rid of the need for the cantilevers. There are different types of dental implants that can have different biologic and technical complications and long-term survival rates of tooth-implant supported fixed partial dentures. A comprehensive review that addresses the available techniques, material, types, and complication regarding implant-to-natural-tooth supported fixed restorations is still lacking. Therefore, this study aims to present a comprehensive review of the basics of dental implants, types, complications, stress analysis and the long-term survival rate of tooth-implant with different connectors.

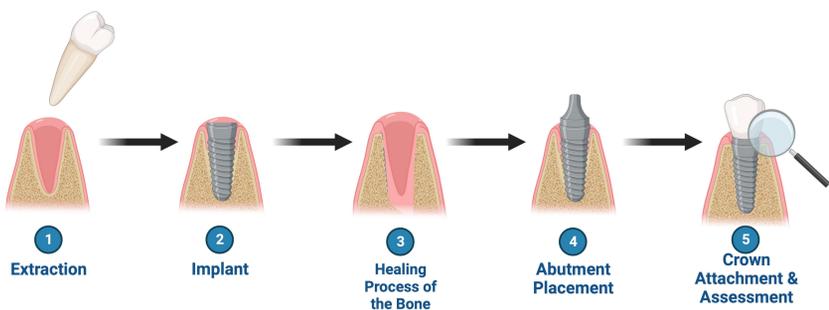


METHODS

For this systematic review, PubMed, Google Scholars, and Scopus databases were searched following the PRISMA guidelines using related keywords. Altogether 8 studies were included using certain criterial and quality assessment in accordance to the Newcastle-Ottawa Scale (Wells et al., 2000) to evaluate the research quality. The articles were then exported to a bibliographic databases for future screening processes.

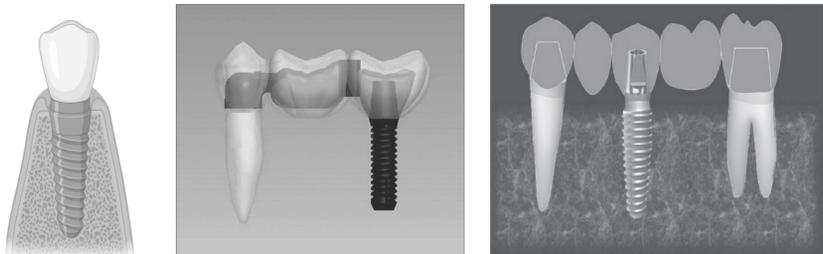


Dental Implant Procedure



Types of Implant-Tooth Connection

- **Rigid connection:** The tooth is permanently attached to the implant by use of a fixed dental prosthesis.
- **Non-rigid connection:** The tooth is attached non-rigidly to the implant using precision attachments, non-precision attachments, and telescopic restorations. It functions as a stress reliever.
- **Resilient connection:** It consists of a flexible component that mimics the periodontal ligament. It functions as a stress absorber.

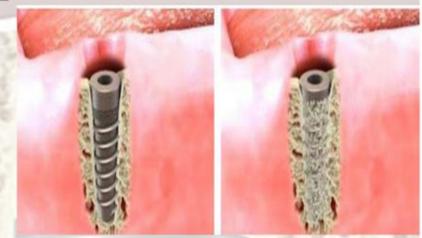


Advantages of Tooth-Implant Supported FPD

- Increased tactile perception
- Greater chewing comfort and efficiency
- Avoidance of vital structures
- Reduced cost
- Reduced need for advanced graft Improved patient acceptance

Series of events leading to OSSEOINTEGRATION

- Phase 1: Hemostasis**
From trauma to the degranulation of platelets (minutes to hours)
- Phase 2: Inflammatory phase**
From degranulation of platelets to attachment of fibroblasts (after 10 minutes to a few days)
- Phase 3: Proliferative**
From attachment of fibroblasts to formation of woven bone (few days to a few weeks)
- Phase 4: Remodeling**
Removal of woven bone and formation of lamellar bone (few days to a few years)



Factors Affecting Osseo-integration

- Implant material biocompatibility
- Implant design.
- Implant surface characteristics
- Surgical technique
- Status of the host bed
- Loading conditions

Implant Design Characteristics

3-D Structure Of The Implant

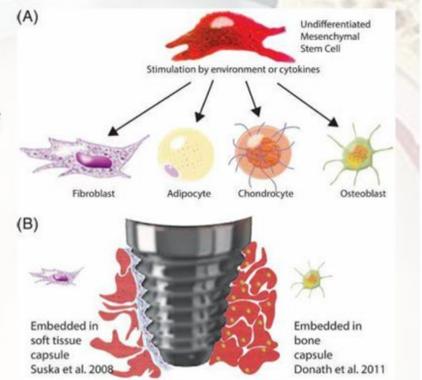
Bone resorption has been associated with the use of press fit or cylindrical implants primarily due to micromovements that occur during their use.

Threaded Implants

This implant provides immediate fixation and dissipation of stresses to resist functional forces. Threads improve the primary implant stability. - Avoids micro movement of the implants till osseointegration is achieved.

Surface Topography: Degree of roughness of the surface

Increased surface roughness, Increase surface area of the implant adjacent to bone, also Improve cell attachment to the implant surface and Increase biomechanical interactions of the implant with bone.



RESULTS

A total of 8 relevant articles were selected for inclusion in the topic of tooth-implant fixed partial dentures. There are advantages including: increase tactile perception, reduction of cost, improvement in patient acceptance. Risks include biomechanical complication, infection, loss of natural tooth. Understanding the best implant option and potential complication facilitate the selection of customizable treatment with long lasting results.

CONCLUSION

The increase in demand of dental implants in the last few decads in partially edentulous individuals requires a detailed investigation to ensure the optimal results. Here, we provided a comperhensive overview of the dental implant procedure approach, type of implant-tooth connection, material of implant, and potential complications. Further studies is recommended to develop a multidimensional assessment tool that addresses the difficulties faced by each patient case and plan an individualized treatment to acheive the best results.

References:

- Chee, W.W., Cho, G.C. 1997. A rationale for not connecting implants to natural teeth. J Prosthodont 6, 7-10.
- Davis, S.M., Plonka, A.B., Wang, H.L. 2014. Risks and benefits of connecting an implant and natural tooth. Implant Dent 23, 253-257.
- Gross, M., Laufer, B.Z. 1997. Splinting osseointegrated implants and natural teeth in rehabilitation of partially edentulous patients. Part I: laboratory and clinical studies. J Oral Rehabil 24, 863-870.
- Liaw, K., Delfini, R.H., Abrahams, J.J. 2015. Dental Implant Complications. Semin Ultrasound CT MR 36, 427-433.
- Nickenig, H.J., Schäfer, C., Spiekermann, H. 2006. Survival and complication rates of combined tooth-implant-supported fixed partial dentures. Clin Oral Implants Res 17, 506-511.
- Nickenig, H.J., Spiekermann, H., Wichmann, M., Andreas, S.K., Eitner, S. 2008. Survival and complication rates of combined tooth-implant-supported fixed and removable partial dentures. Int J Prosthodont 21, 131-137.
- Pesun, I.J. 1997. Intrusion of teeth in the combination implant-to-natural-tooth fixed partial denture: a review of the theories. J Prosthodont 6, 268-277.
- Ting, M., Faulkner, R.J., Donatelli, D.P., Suzuki, J.B. 2019. Tooth-to-Implant-Supported Fixed Partial Denture: A Comprehensive Overview of Systematic Reviews. Implant Dent 28, 490-499.