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Review Article

### OVERVIEW OF BRIDGES, DENTURES AND IMPLANTS

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**Abstract:**

*Teeth loss is one of the most common health conditions affecting the populations worldwide, and one of the main conditions the dentists see in their clinics. It has negative consequences on patient's quality of life. It disturbs the ability to articulate, eat, and maintain oral health. For such negative aesthetic, social, and functional consequences, many dental prosthetics have been developed. The three main devices available for teeth replacement are dental bridges, dental implants, and dentures. The choice of which device should be tailored to each patient according to his preferences, health condition, and the advantages and disadvantages of each of these devices. Dental bridges are removable prosthetics used to fill the gap created by the missing teeth. The main disadvantages of bridges are being uncomfortable and that they put forces on abutment teeth compromising its health. The dentures are either complete or partial prosthesis used to replace all the missing teeth or a part of them. Though being simple in placement, they are uncomfortable, and they need frequent follow up visits for alignment and adjustment. Dental implants are the most recently used dental appliances for teeth restoration. They are comfortable, stable, need little maintenance, and put no force on adjacent teeth. However, they are expensive, and the surgical procedure carries potential risks and complications. This article aims to review and summarize the different types of dental devices used to replace teeth, and to address their advantages and disadvantages.*

**Keywords:** bridges, dental bridges, dentures, dental implants, implants.

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## INTRODUCTION:

Teeth loss is one of the most common health conditions affecting the populations worldwide, and one of the main conditions the dentists see in their clinics [1]. Teeth loss results in considerable negative aesthetic, social, and functional consequences [2]. Overall, the prevalence of teeth loss (both total and partial types) has decreased during the past few decades. Reports from the National Health and Nutrition Examination Survey showed that a marked reduction in prevalence reported from 1970 to 2004 [3]. It is estimated that 23.93% of adults between 65 and 75 years has no remaining teeth, and the number increases to 31.3% among those older than 75 years [3]. Females, smokers, blacks, and those with lower educational levels or lower incomes are more vulnerable to teeth loss [3,4]. Regarding adults, reports from the National Health and Nutrition Examination Survey stated that about 3.75% of adults between 20 to 64 years had total teeth loss [3]. A review of several longitudinal research studies conducted in 7 countries revealed that the annual incidence of teeth loss ranged from 1.3% to 13.7%, and an estimate of 3 to 38 subjects per 100 individuals in population lose one or more teeth per year [5,6].

Following teeth loss, many dental prosthetics have been developed to replace the lost teeth to enhance the function, the aesthetics, and the individuals' quality of life [2]. The three main devices available for teeth replacement are dental bridges, dental implants, and dentures [7-11]. The choice of which device should be tailored to each patient according to his preferences, health condition, and the advantages and disadvantages of each of these devices. This article aims to review and summarize the different types of dental devices used to replace teeth, and to address their advantages and disadvantages. The differences between the different types of dental restorative prosthetics are depicted in table 1.

## DENTAL BRIDGES:

### Construction and procedure:

Dental bridges are fixed and permanent dental prosthetic used for teeth restoration. As the name indicates, a dental bridge is designated to bridge the gap left by the lost tooth/teeth. It is made of at least two crowns on the periphery and a central false tooth (referred to as "pontic") [12]. The crowns are designed to anchor the dental bridge to the adjacent healthy teeth (also called the abutment teeth). The pontics are made of alloys, gold, porcelain, or any combination of these materials. The dental bridges may be three-unit dental bridges (composed of two crowns and one pontic), four-unit dental bridges

(composed of two crowns and two pontics, six-unit dental bridges (composed of two crowns and four pontics), and so on [13]. Though the vast majority of the dental bridges are fixed, removable dental bridges can be used. Removable bridges are made of metal clasps and an acrylic base, and they clip the abutment teeth on either side of the lost tooth [14].

Prior to dental bridge insertion, two adjacent healthy teeth should be assessed and prepared to be the abutment teeth. They are then reshaped and contoured for the crown to be mounted on top of them. This reshaping procedure is carried out via removing an adequate amount of teeth enamel under anaesthesia for these teeth to be fitted into the bridge crown. The impression of these reshaped abutment teeth is then moulded and sent to the dental lab to construct the dental bridge. Aesthetically, concerns should be taken to match the bridge colour with the patient's natural teeth. Some patients do not have adequately strong abutment teeth to support the dental bridge and, therefore, dental implants may be applied first to anchor the bridge. In some cases, a temporary dental bridge is needed for teeth protection before the permanent bridge is applied [15].

### TYPES:

Four types of dental bridges are available: the traditional bridges, cantilever bridges, and Maryland bonded bridges [16]. The traditional bridges are the most common type of dental bridges where crowns are created on both sides of the pontics on natural teeth or dental implants. They are made of porcelain attached to ceramics or metal [17]. The second most common type is the Maryland-bonded bridges (also referred to as resin-bonded dental bridge). They are composed of pontics and porcelain or metal wings on a single side of the dental bridge. The least used type of dental bridges is the cantilever bridge that is used when abutment teeth are only available on one side of the lost tooth/teeth. This type of bridges put excessive force on the remaining healthy teeth resulting into their damage [18-20]. The fourth and last type of dental bridges is the adhesive bridge. Adhesive bridges are made of pontics and metal wings that are fixed to the abutment teeth via strong adhesives. This type does not require teeth preparation or reshaping, and protect them from future damage.

### Advantages and disadvantages of dental bridges:

#### Advantages

Dental bridges have many advantages over the other types of dental restorative prosthetics. They are cheap, less painful, and less expensive than implants and dentures, and they do not require a complicated

or long procedure for their application. It often takes two or three visits for the patient to get his dental bridges applied via simple outpatient dental procedure. Unlike dental implants, bridges can be used for patients with mandibular pathology or significant damage to the jaw. Furthermore, dental bridges possess good stability once fixed. They provide comfort and allow effortless chewing of food. This is because the structure of the pontics and crowns distribute the chewing and the bite force evenly on the missing and the remaining teeth preventing further damage to the natural remaining teeth. Dental bridges are also small in size, of lightweight, and have a good longevity. Filling the gap created by the missing teeth help controlling the adjacent teeth movement and displacement [21-24].

#### **Disadvantages**

The main disadvantage of the dental procedure is related to the procedure of teeth preparation. The removal of the teeth enamel during the reshaping procedure results in loss of a considerable amount of healthy tooth tissue which results in teeth weakening and reduction of its longevity. Reducing the enamel might result in inflammation of the underlying nerves resulting in pain and sensitivity. Another disadvantage of dental bridge is that it depends mainly on the abutment teeth i.e. if the abutment teeth are affected, the stability of the dental bridge will be compromised [22-24].

#### **DENTURES:**

##### **Construction And Procedure**

Denture are the most traditional dental restorative prosthetic that has been used for more than 100 years<sup>25</sup>. They are removable devices composed of a set artificial tooth (false teeth) mounted on an acrylic base and held in place by a seal supported by the soft and hard tissue of the oral cavity. Dentures are made of plastic or metal frameworks upon which the artificial teeth are based. Though the conventional dentures are removable, some designs provide fixed prosthodontics via clasping or bonding to dental implants<sup>26-28</sup>.

##### **TYPES:**

There are two main types of dentures: complete and partial dentures. Complete dentures are used when all the natural teeth are lost, whereas partial dentures replace one or more of the missing teeth. The complete dentures are designated and fitted into the natural anatomy of the oral cavity. These dentures are categorized according to the teeth they are designed to replace into maxillary arch dentures and maxillary arch dentures. Complete dentures are either

conventional or immediate. The conventional complete teeth are placed after eight to twelve weeks after removal of the natural teeth to allow the gum tissue to heal. Immediate complete teeth, on the other side, can be placed immediately after removal of the primary teeth. Partial dentures, on the other hand, are designated to replace one or more missing teeth. They are attached to the adjacent natural teeth via clips [26,28].

#### **ADVANTAGES AND DISADVANTAGES OF DENTURES:**

Dentures are simple to place and do not require surgical intervention to be applied. However, they are uncomfortable for the vast majority of patients particularly at the beginning and they take time to get used to it. Also, frequent follow-up visits may be needed to ensure proper fitness and re-adjustment of the dentures. This is more evident with the immediate type of dentures because, after teeth loss, the jaw bone and gum soft tissue shrink over time, and the dentures will need to be realigned or replaced. Immediate dentures, hence, require more adjustment to fit properly than the conventional teeth. Regular follow up is basically essential for early diagnosis and proper management of potential diseases. One of the main advantages of the conventional dentures is that they can be placed only after eight to twelve weeks after teeth extraction and, thus, the patient will have to stay for a long period without teeth [29-31].

#### **DENTAL IMPLANTS:**

##### **Construction and procedure:**

Dental implants are long-standing, fixed, and durable dental appliances for teeth restoration. They are composed of an implant body, collar, connection, and abutment. The implant body is a metal portion that is inserted into the mandibular or maxillary bone. The external surface of this portion is designated to fuse with the bony surface of the mandible or the maxilla, this process is referred to as the osseointegration [32,33]. The implant collar is the superior portion of the implant body that passes through the gingiva, and it is designated to reduce bone loss. The connection is made to connect the implant body with the abutment. The abutment is the part of the implant that resembles the artificial teeth and is screwed around the external portion of the connection. The dental implant is often made of titanium. The procedure of its placement is conducted under local anaesthesia, and sedation may be needed for anxious patients. After initial placement of the dental implant, the bone and soft tissue grow around the implant making it more stable [34,35].

**Advantages and disadvantages of dental implants:**

Dental implants are the most common recently used dental prosthetics used during the past few decades. They prevent teeth displacement or malposition, and subsequently protect against temporomandibular diseases. One of the main advantages of dental implants is that, unlike dental bridges and dentures, they do not put strain on adjacent healthy teeth compromising their health. Additionally, they do not necessitate the presence of healthy adjacent teeth to be placed. Furthermore, they may be used as a support for dentures and dental bridges. The implants, unlike dentures, need little maintenance, and they can last for life if they can last for life if they were of high quality. The cleaning process is also simple, and the implants are stable, comfortable and look natural [34,36,37].

The main disadvantages of dental implants include the high cost, the need for surgery, and the relatively long time of the procedure. Also, they cannot be placed on diseased or injured gums or bones. The procedure of grafting dental implants is sometimes tedious and carries potential risks and complications. There is a risk for implant rejection and procedure failure [34,35,37].

**CONCLUSION:**

Various types of dental appliances are designated for teeth restoration. Dental bridges are removable prosthetics used to fill the gap created by the missing teeth. The main disadvantages of bridges are being uncomfortable and that they put forces on abutment teeth compromising its health. The dentures are either complete or partial prosthesis used to replace all the missing teeth or a part of them. Though being simple in placement, they are uncomfortable and they need frequent follow up visits for alignment and adjustment. Dental implants are the most recently used dental appliances for teeth restoration. They are comfortable, stable, need little maintenance, and put no force on adjacent teeth. However, they are expensive and the surgical procedure carries potential risks and complications.

## TABLES

**Table 1:** Comparison between dental bridges, dentures, and dental implants

	Dental Bridges	Dentures	Dental implants
<b>Construction</b>	Two or more bridges and central false teeth (pontics)	False teeth on a set of	
<b>Fixation</b>	Fixed/removable	Removable	Fixed
<b>Types</b>	According to crown number: <ul style="list-style-type: none"> <li>• Three-unit bridges</li> <li>• Four-unit bridges</li> <li>• Six-unit bridges</li> </ul> According to structure: <ul style="list-style-type: none"> <li>• Traditional bridges</li> <li>• Cantilever bridges</li> <li>• Maryland-bonded bridges</li> <li>• Adhesive bridges</li> </ul>	According to number of replaced teeth: <ul style="list-style-type: none"> <li>• Complete</li> <li>• Partial</li> </ul> According to site of teeth replaced: <ul style="list-style-type: none"> <li>• Maxillary</li> <li>• Mandibular</li> </ul>	---
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Cheap</li> <li>- Less painful</li> <li>- Less expensive</li> <li>- Simple short procedure</li> <li>- Even distribution of bite and chewing force</li> <li>- Comfortable</li> <li>- Small in size</li> <li>- Lightweight</li> <li>- Good longevity</li> <li>- Very stable</li> </ul>	<ul style="list-style-type: none"> <li>- Cheap</li> <li>- Simple procedure</li> <li>- Less expensive</li> </ul>	<ul style="list-style-type: none"> <li>- Comfortable</li> <li>- Longevity</li> <li>- Simple cleaning</li> <li>- Little maintenance is required</li> <li>- Stable</li> <li>- Do not compromise adjacent teeth</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>- Destruction of the abutment teeth.</li> <li>- Injury to underlying nerves</li> <li>- Stability depends on abutment teeth health.</li> </ul>	<ul style="list-style-type: none"> <li>- Uncomfortable</li> <li>- Need regular follow-up visits</li> <li>- Require many adjustments (especially immediate type)</li> <li>- Conventional type cannot be applied before 8-12 weeks after tooth extraction.</li> <li>- Potential gum and oral cavity diseases.</li> </ul>	<ul style="list-style-type: none"> <li>- Require surgical intervention</li> <li>- Expensive</li> <li>- Risk of implant failure or rejection.</li> </ul>

**REFERENCES:**

1. Fitzmaurice C, Allen C, Barber RM, et al. Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 32 cancer groups, 1990 to 2015: A Systematic Analysis for the Global Burden of Disease Study Global Burden. *JAMA Oncol.* 2017;3(4):524-548. doi:10.1001/jamaoncol.2016.5688
2. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst
3. EM, Creugers NHJ. Tooth loss and oral health-related quality of life: A systematic review and meta-analysis. *Health Qual Life Outcomes.* 2010;8. doi:10.1186/1477-7525-8-126
4. NIH. Tooth Loss in Seniors | National Institute of Dental and Craniofacial Research. <https://www.nidcr.nih.gov/research/data-statistics/tooth-loss/seniors>. Published 2016. Accessed December 19, 2018.
5. Burt BA, Morrison EC, Morrison EC, Beltran

- ED. Risk Factors for Tooth Loss Over a 28-year Period. *J Dent Res.* 1990;69(5):1126-1130. doi:10.1177/00220345900690050201
6. Haugejorden O, Klock KS, Trovik TA. Incidence and predictors of self-reported tooth loss in a representative sample of Norwegian adults. *Community Dent Oral Epidemiol.* 2003;31(4):261-268. doi:10.1034/j.1600-0528.2003.00004.x
  7. Silva-Junior MF, Batista MJ, De Sousa MDLR. Incidence of Tooth Loss in Adults: A 4-Year Population-Based Prospective Cohort Study. *Int J Dent.* 2017;2017. doi:10.1155/2017/6074703
  8. Sugerma PB, Barber MT. Patient selection for endosseous dental implants: oral and systemic considerations. *Int J Oral Maxillofac Implants.* 2002;17(2):191-201.
  9. Carlsson GE, Omar R. The future of complete dentures in oral rehabilitation. A critical review. *J Oral Rehabil.* 2010;37(2):143-156. doi:10.1111/j.1365-2842.2009.02039.x
  10. Turkyilmaz I, Company AM, McGlumphy EA. Should edentulous patients be constrained to removable complete dentures? the use of dental implants to improve the quality of life for edentulous patients. *Gerodontology.* 2010;27(1):3-10. doi:10.1111/j.1741-2358.2009.00294.x
  11. Durey KA, Nixon PJ, Robinson S, Chan MFWY. Resin bonded bridges: Techniques for success. *Br Dent J.* 2011;211(3):113-118. doi:10.1038/sj.bdj.2011.619
  12. Van Noort R. The future of dental devices is digital. *Dent Mater.* 2012;28(1):3-12. doi:10.1016/j.dental.2011.10.014
  13. Martínková N, Nová P, Sablina O V., Graphodatsky AS, Zima J. Karyotypic relationships of the Tatra vole (*Microtus tatricus*). *Folia Zool.* 2004;53(3):279-284. doi:10.1007/s13398-014-0173-7.2
  14. Santosa RE. Provisional restoration options in implant dentistry. *Aust Dent J.* 2007. doi:10.1111/j.1834-7819.2007.tb00494.x
  15. Removable dental bridge. November 1952. <https://patents.google.com/patent/US2826814A/en>. Accessed December 23, 2018.
  16. Dental bridge and method of dental bridge fabrication. March 1982. <https://patents.google.com/patent/US4457714A/en>. Accessed December 23, 2018.
  17. Ardila A. Orígenes del lenguaje: Un análisis desde la perspectiva de las afasias. *Rev Neurol.* 2006;43(11):690-698. doi:10.14219/jada.archive.2003.0196
  18. Campbell SC, Harper AL, Scott KH. The coping-retained bridge: a modified approach to conventional bridge design – review and case report. *Dent Update.* 2013;40(8):606-612. doi:10.12968/denu.2013.40.8.606
  19. Chan AWK, Barnes IE. A prospective study of cantilever resin-bonded bridges: An initial report. *Aust Dent J.* 2000;45(1):31-36. doi:10.1111/j.1834-7819.2000.tb00239.x
  20. Briggs P, Dunne S, Bishop K. The single unit, single retainer, cantilever resin-bonded bridge. *Br Dent J.* 1996;181(10):373-379. doi:10.1038/sj.bdj.4809263
  21. Gopakumar A, Boyle EL. “A bridge too far” - The negative impact of a bridge prosthesis on gingival health and its conservative management. *Br Dent J.* 2013;215(6):273-276. doi:10.1038/sj.bdj.2013.877
  22. Augthun M. Long-Term Results of Tooth-Implant-Supported Bridges. *IMPLANTOLOGIE.* 2008.
  23. Kissov HK, Todorova BP. Comparative evaluation of two commonly accepted tests for adjustment of fixed prosthetic constructions. *Folia Med.* 2001;43(1-2):73-75. [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list\\_uids=15354473](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15354473).
  24. Dudea D, Alb C, Culic B, Alb F. Performance of dental composites in restorative dentistry. In: *Handbook of Bioceramics and Biocomposites.* ; 2016:1075-1114. doi:10.1007/978-3-319-12460-5\_53
  25. Burke FT. Resin-Retained Bridges: Fibre-Reinforced versus Metal. *Dent Update.* 2008;35(8):521-526. doi:10.12968/denu.2008.35.8.521
  26. Al-Ansari A. Simplified complete dentures. *Evid Based Dent.* 2017;18(3):77-78. doi:10.1038/sj.ebd.6401255
  27. Ismail HY. Complete dentures. *J Prosthet Dent.* 1986;19(4):321-330. doi:10.1016/S0022-3913(13)00116-9
  28. Packer M. Removable partial dentures. *Br Dent J.* 2004;197(10):656-656. doi:10.1038/sj.bdj.4811837
  29. Giblin T. Fixed partial dentures. In: *Practical Procedures in Aesthetic Dentistry.* ; 2017:184-187. doi:10.1016/j.biocontrol.2018.09.011
  30. Pilathadka S, Vahalová D, Vosáhlo T. The Zirconia: a new dental ceramic material. An overview. *Prague Med Rep.* 2007.
  31. Ladha K, Verma M. Conventional and contemporary luting cements: An overview. *J Indian Prosthodont Soc.* 2010;10(2):79-88. doi:10.1007/s13191-010-0022-0

32. McCord JF, Grey NJA, Winstanley RB, Johnson A. A clinical overview of removable prostheses: 2. Impression making for partial dentures. *Dent Update*. 2002;29(9):422-427. doi:10.12968/denu.2002.29.9.422
33. Le Guéhennec L, Soueidan A, Layrolle P, Amouriq Y. Surface treatments of titanium dental implants for rapid osseointegration. *Dent Mater*. 2007;23(7):844-854. doi:10.1016/j.dental.2006.06.025
34. Jokstad A. *Osseointegration and Dental Implants*.; 2009. doi:10.1002/9780813804644
35. de Groot K. Dental implants. In: *Bioceramics Calcium Phosphate*. ; 2018:115-130. doi:10.1201/9781351070133
36. Pye AD, Lockhart DEA, Dawson MP, Murray CA, Smith AJ. A review of dental implants and infection. *J Hosp Infect*. 2009;72(2):104-110. doi:10.1016/j.jhin.2009.02.010
37. Jokstad A, Braegger U, Brunski JB, Carr AB, Naert I, Wennerberg A. Quality of dental implants\*. *Int Dent J*. 2003. doi:10.1111/j.1875-595X.2003.tb00918.x
38. Schwarz MS. Mechanical complications of dental implants. *Clin Oral Implants Res*. 2000;11 Suppl 1:156-158. doi:10.1034/j.1600-0501.2000.011S1156.x