# Secondary caries in fixed dental prostheses

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**Abstract:**

**Background**: This study was aimed to evaluate the risk of developing secondary caries among subjects with FDPs in relation to oral hygiene status. **Material and methods**: To gather information on the patients' FDP complications as well as oral hygiene status, clinical as well as radiographic examinations were carried out. Secondary caries was examined as the primary clinical parameter. The effects of complications like fractures, debonding, and the requirement for endodontic care were also examined. From the time of therapy through the period of follow-up, the interval survival rate as well as cumulative survival rate of FDPs had been examined. **Results**: A total of 100 participants had been assessed for this investigation. Patients made up 51% of women and 49% of men. A total of 200 FDPs, including 40 veneer restorations, 110 crowns, and 50 bridges, were assessed. Regarding the materials utilized, 130 prosthesis (65%) were manufactured of porcelain fused to metal (PFM), while 130 prostheses (35%) were created entirely of porcelain. There were 63 FDPs (31.5%) with secondary caries, 79 (39.5%) with fracture (or chipping), 19 (9.5%) with debonding, and 39 (19.5%) with the requirement for endodontic therapy.In total, 200 FDPs had these four problems. In this study, 36 of the 115 female patients who received FDPs (31.3%) had secondary caries.For the male patients, secondary caries was linked to 27 out of 85 prosthesis (31.7%). **Conclusion**: In patients with FDPs, good dental hygiene can significantly lower the likelihood of secondary caries. Among subjects having poor dental hygiene, secondary caries is a prevalent consequence.

**Keywords**: caries, FPD, oral hygiene

## Introduction:

Fixed partial dentures (FPDs) have been the treatment of choice for the replacement of missing teeth for some years. The dental literature has some 7000 articles on the topic of FPDs. However, only a few of them deal with patients' perceptions of clinical outcomes and level of satisfaction with FPD treatment. Edentulism and dental disease have been shown to affect patients adversely. Patients with the dental disease suffer from an altered self-image.[1] They may be expected by others to be socially less competent and have less intellectual achievement.[2] Dento-facial problems have known effects on patient's satisfaction with their dentition as they affect esthetics, performance, and function.[3,4,5]

Secondary (or recurrent) caries [6] has been defined as “lesions at the margins of existing restorations” [7] or “caries associated with restorations or sealants” (CARS). Secondary caries is a complex, multifactorial process, interweaving the various causes of “conventional” caries with the specific characteristics of the restoration and restorative material involved, i.e., secondary caries pathogenesis follows the same concept for any other caries lesions, involving demineralization and, in case of dentin secondary caries, enzymatic dissolution of the organic component, but is modified by the presence of a restoration or sealant margin.

Hence, this study was conducted to evaluate the risk of developing secondary caries among subjects with FDPs in relation to oral hygiene status.

## Material and methods:

Only those participants who were over 18 and able to give written informed consent were included in the trial. All subjects underwent clinical as well as radiographic tests in order to gather information about their FDP problems and level of oral hygiene. Secondary caries was the primary clinical parameter analysed. Analysis was also done on complications such fractures, debonding, and the requirement for endodontic therapy. The patients' oral hygiene status was evaluated using the Simplified Oral Hygiene Index (OHI-S). Based on the quantity of plaque as well as calculus adhered to the tooth surface, this index classifies the state of oral hygiene. To assist in finding trapped plaque on the tooth surface, a revealing solution was used. Based on the OHIS assessments, three oral hygiene status categories were identified: good, fair, and poor oral hygiene. Data was analysed using SPSS software.

## Results:

**Table 1: Gender-wise distribution of subjects**

| Gender | Number of subjects | Percentage |
|---|---|---|
| Males | 49 | 49% |
| Females | 51 | 51% |
| Total | 100 | 100% |

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## Discussion:

Secondary caries may be (1) causally associated with a defective restoration (mainly via gaps between the restoration and the tooth allowing acidic fluids or biofilm to enter the interface) or (2) causally associated with an intact restoration (e.g., via a lower buffering capacity of the restoration compared with the tooth hard tissue) or (3) not causally associated with the restoration at all, but mere primary caries adjacent to existing restorations (mainly when the caries process has not been sufficiently addressed on a patient level and the surface next to the restoration becomes carious as a result of this ongoing caries activity) [8,9,10].

Today, dental treatment through fixed dental prostheses (FDPs) helps millions of patients by controlling oral disease and restoring mouth function and aesthetics. Due to the time and costs associated with this type of treatment, patients expect to receive treatment that is successful, durable, and survives for a long period of time under normal conditions (Glantz et al., 2002).[11] Many reports have confirmed that FDPs have a long survival rate of up to 20 years (De Backer et al., 2006, 2008).[12] Failure of FDPs can be the result of various mechanical and biological complications (Sailer et al., 2006; Solá-Ruiz et al., 2022).[13], [14] Although there is no standardized definition of FDP failure, the need to replace an existing FDP or to extract a tooth may be seen as a clear indication of failed treatment (Heintze & Rousson, 2010; Scurria et al., 1998).[15], [16] For instance, a common failure seen with this type of treatment is when an abutment tooth needs to be

extracted due to biological complications or is associated with an irreparable problem (Guess et al., 2014).[17] Some published studies have not considered certain complications, such as chipping or cracks in a crown, as failures because they are repairable issues, particularly when the defects are small (Rinke et al., 2018). [18]

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The incidence of dental caries has been linked with poor oral hygiene, which may allow plaque to accumulate on tooth surfaces (Taraszkiewicz-Sulik et al., 2012).[19] With natural dentition, an intact tooth surface undergoes a self-cleaning process with the help of saliva that regulates pH and balances oral microflora (Mattos-Graner et al., 2014).[20] For patients with FDPs, this self-cleaning process can be limited due to various factors, such as the presence of a connector with a dental bridge or gaps at the tooth–restoration interface (Kois, 1996).[21]

In a study conducted by Pjetursson et al. [22], higher caries prevalence was reported on all-ceramic restorations in comparison to metal-ceramic FPDs. Loss of vitality was reported to be a possible cause due to an increased tooth reduction when preparing for an all-ceramic restoration.

## Conclusion:

In patients with FDPs, good dental hygiene can significantly lower the likelihood of secondary caries. Among subjects having poor dental hygiene, secondary caries is a prevalent consequence.

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