

## Evaluation Of Commonly Treated Mandibular Teeth With Preventive Resin Restoration In Children With Permanent Dentition

Research Article

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### Abstract

**Introduction:** Knowledge of oral health is often the first step in oral health education. In many developed countries, oral health among children and adolescents has improved in recent decades, especially in terms of dental caries. Prevention at the earliest stage has the best prognosis rather than allowing the disease to worsen and being managing the disease. Preventive Resin Restoration Is a conservative and a recent advancement in preventive dentistry.

**Aim:** to evaluate the commonly treated Mandibular teeth with Preventive Resin Restoration in the children with Permanent dentition among the patients visiting Saveetha Dental College and Hospital.

**Materials & Methods:** The study was performed as a retrospective study under a university setting in the outpatient department of Pediatric and Preventive Dentistry. Data was collected by reviewing patient records and analysed data of 500000 patients between June 2019- February 2021. The collected data was subjected to statistical analysis using the SPSS software by IBM of version 23.

**Results:** From the results of the present study, Preventive Resin Restorations were commonly performed in males (52%). Permanent Mandibular left and right first molars were the most commonly treated teeth with Preventive Resin Restoration (24.86% & 23.70% respectively). There was no significant difference in the number of male and female children being treated with preventive resin restoration (p-value=0.40).

**Conclusion:** From this study it can be concluded that the Permanent Mandibular molars are most prone to the risk of caries and being treated with Preventive Resin Restoration. There is no difference in treatment based on gender. Oral hygiene instructions should be instilled at an earlier age as soon as the tooth erupts for better caries-free maintenance.

**Keywords:** Preventive Resin Restoration; Caries; Permanent Dentition; Adolescents; Innovative Technique.

### Introduction

The oral cavity serves as the body's entry point. Knowledge of oral health is often the first step in oral health education. Individuals' oral health is critical for their overall health and well-being, which includes a variety of health promotion and disease prevention issues [1]. Health is described as a condition of full physical, mental, and social well-being, rather than the absence of disease or infirmity. Oral health has changed dramatically over the last decade. This change, however, has not been felt equally across the population, with the better off benefiting far more. Oral wellbe-

ing has always been inextricably linked to overall health. In many developed countries, oral health among children and adolescents has improved in recent decades, especially in terms of dental caries [2, 3]. Adjustments in dietary patterns, enhanced oral hygiene, adequate fluoride use, and other clinical practises, as well as the establishment of school-based preventive programmes, can be ascribed with this dramatic improvement in the trend [4].

Dental caries is defined as an irreversible microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth, which often leads to cavitation [5, 6]. Dental caries

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is a widely prevalent and major health problem in India, with an incidence rate of 60-80% among the children. Preventive Dentistry is the area of dentistry that focuses on those procedures and practices that prevent the beginning or progression of oral disease [7]. There are three levels of prevention in dentistry as Primary prevention corresponds to any measure taken prior to the onset of a preventable disease i.e., in the pre-pathogenic period. Primary prevention encompasses a sequence of measures including maintaining oral hygiene, avoiding sticky foods, and fluoride application. Secondary prevention refers to the preventive measures taken in the early period of pathogenesis and arresting the progression [8].

Tertiary prevention limits the extent of disabilities once a disease has caused any functional limitation. However, prevention at the earliest stage has the best prognosis Rather than allowing the disease to worsen and being managing the disease. Dental healthcare professionals and dental students must have sufficient expertise and a positive attitude in order to improve oral health in society. However, there is a difference in attitude when it comes to diagnosis and recovery planning. In addition to preventive dental treatment to avoid further complications [9].

Both children tend to benefit from early implementation of preventive dental care services and clinical care management. Preventive dental management includes usage of Preventive Sealants and Preventive Resin Restoration (PRR). Dental Sealants are a preventive measure for pit and fissure caries, which is widely seen in 80% of the children and adolescents. It is used effectively as part of a holistic approach to caries prevention on an individual basis or as a public health measure for at-risk populations. Dental Sealants penetrates into the deep pits and Fissures in the occlusal aspect of the tooth and acts as a barrier inhibiting the bacterial and nutrient intrusion, As a result, the disease progression is halted [10, 11].

Preventive Resin Restoration is a conservative and a recent advancement in preventive dentistry. PRR being a conservative approach it involves limited excavation of the carious tissue or sometimes no excavation of caries depending the size and extent of the lesion and restoring the site with the composite resin. It is mostly done in the occlusal surface of the Premolars and Molar of both Primary and Permanent dentition [12].

PRR is mostly indicated when the caries is limited to the occlusal pit and fissure where the lesion is small and discrete. In the teeth with deeper grooves in the pit and fissure, cleaning becomes difficult and it will be more prone to caries. PRR protects the tooth by sealing the deep grooves and creates a smooth surface which makes it self-cleansable. PRR acts as a Secondary method of prevention which halts the further progression of the disease at the incipient stage [13]. The design and approach towards PRR is pretty crucial and also requires critical elimination of moisture in the teeth to be treated. The steps involved in the application of PRR includes isolation of teeth to be treated, then preparation of a minimal exploratory cavity to remove the carious tissue without involving the healthy adjacent tooth. The prepared surface is etched with 37% o-phosphoric acid for 15-20 seconds and the bonding agent is applied and cured for 20 seconds, followed by restoring the cavity with filled resin and the adjacent unaffected pits and fissure is sealed using a Dental Pit & Fissure Sealant [14]. Our team has extensive knowledge and research experience that has translate into high quality publications [15-27, 28-34].

With this background the aim of the present study was to evaluate the commonly treated Mandibular teeth with Preventive Resin Restoration in the children with Permanent dentition among the patients visiting Saveetha Dental College and Hospital.

## Materials and Methods

This retrospective study was conducted in a university setting. The ethical clearance for the study was obtained from the Institutional Scientific Review Board (Saveetha Research Board). A total of 5,35,951 patient treatment records between June 2019 to February 2021 were assessed for the study. The data collection and analysis was done by two examiners. The advantages of the present study include, large availability data and similar ethnicity and the disadvantages of this particular study was mainly the geographical limitations and the isolated populations.

The inclusion criteria were children between the ages of 12-17 years, children who underwent PRR treatment in the permanent Mandibular teeth and complete records of the patient and treatment done in the case sheet with photographic evidence. Exclusion criteria for the study were patients above 17 years of age and below 12 years of age, incomplete case records and missing photographic proof of completed treatment. To avoid sampling bias, simple random sampling was done. Based on the inclusion and exclusion criteria, dental records of 173 children who had undergone PRR in the permanent Mandibular teeth were finalised for data analysis.

The extracted data was tabulated in a spreadsheet (Excel 2017: Microsoft Office) and analysed using SPSS Software by IBM Version 23.0 (SPSS, Inc., Chicago). Descriptive statistics and chi-square tests were performed with the level of significance at 5% ( $p < 0.05$ ).

## Results

In the present study frequency of patients treated PRR was 53.1% were males and 46.8% were females (Fig 1). Around, 53.1% were treated in left sided Mandibular teeth and 46.8% were treated in right sided Mandibular teeth were treated with PRR in the present study (Fig 2). The most commonly treated teeth with PRR in the present study was Permanent Left Mandibular First Molar in 24.8% of the children followed by 23.7% in Permanent Right Mandibular First Molar (Fig 3). Among the males 13.2% had PRR in Permanent Left Mandibular First Molar, whereas Females had 12.1% of them PRR in Permanent Right Mandibular First Molar (Fig 4). In both Male (27.1%) and Female (26.01%) children comparatively Mandibular Left sided Permanent teeth are more treated with PRR than the Mandibular Right sided Permanent teeth (Fig 5).

## Discussion

Preventive dental procedures, such as early and regular preventive treatment, fluoridation, and sealants, are cost efficient in terms of lowering disease burden and related costs. Prevention is the key to avoiding oral diseases and maintaining good oral health [33]. Dentists play a critical role in assisting their patients in reducing the burden of oral disease and achieving good oral health

Figure 1. The bar chart depicts the gender distribution of the children included in the present study. 53.1% were males represented in blue colour and 46.8% were females represented in Green colour.

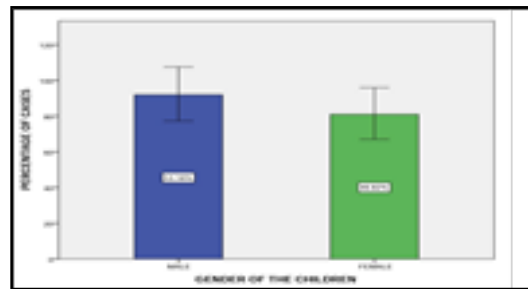


Figure 2. The Bar chart depicts the Site of commonly treated Permanent Mandibular teeth with Preventive Resin Restoration in the present study. 53.1% were treated in left sided Mandibular teeth represented in brown colour and 46.8% were treated in right sided Mandibular teeth represented in black colour.

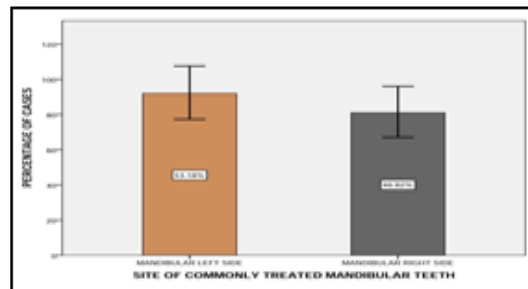


Figure 3. Bar chart depicts the commonly treated Permanent Mandibular teeth with Preventive Resin Restoration in the present study. 1.1% were treated with PRR in 34 represented by beige colour, 3.4% were treated with PRR in 35 represented by lavender colour, 24.8% were treated with PRR in 36 represented by yellow colour, 23.7% were treated with PRR in 37 represented by orange colour, 2.8% were treated with PRR in 44 represented by indigo colour, 2.8% were treated with PRR in 45 represented by red colour, 23.7% were treated with PRR in 46 represented by violet colour, 17.3% were treated with PRR in 47 represented by pink colour.

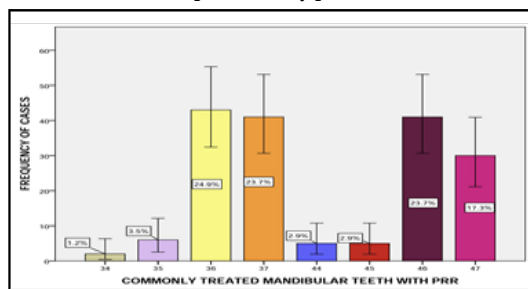


Figure 4. Bar chart represents the association between the commonly treated permanent mandibular teeth with PRR and Gender of the patient. The X-axis represents the commonly treated permanent mandibular teeth with PRR and Y-axis represents the Gender of the Patient. Blue colour represents the Males and Green colour Females. Among the Males, 36 was the most commonly treated permanent Mandibular tooth with PRR in 13.2% of the patients. Among the Females, 46 was the most commonly treated permanent Mandibular tooth with PRR in 12.14% of the patients. However this association was not statistically significant (chi-square value - 8.14 ~ p-value = 0.4 - hence not significant).

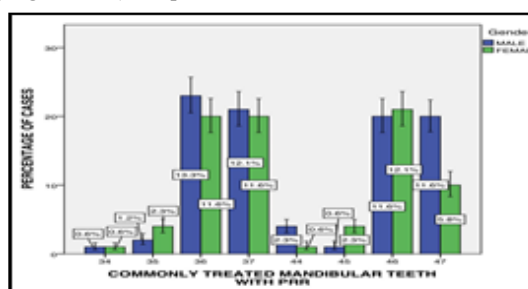
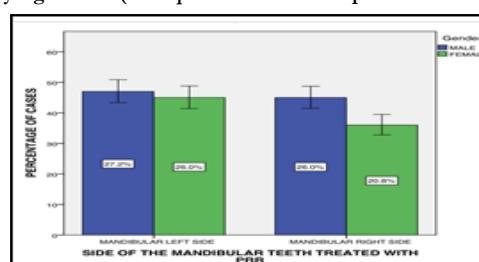


Figure 5. Bar chart represents the association between the side most commonly treated with PRR in permanent mandibular teeth and Gender of the patient treated with PRR. The X-axis represents the commonly treated permanent mandibular teeth with PRR and Y-axis represents the Gender of the Patient. Blue colour represents the Males and Green colour Females. Among the Males, 27.1% permanent Mandibular left sided teeth was the most commonly treated with PRR, and also in 26% females permanent Mandibular left sided teeth was the most commonly treated with PRR. However this association is not statistically significant (chi-square value - 4.45 ~ p-value = 0.4 - hence not significant).



behaviour. The attitude of dental practitioners toward preventive dentistry is a significant factor that may influence their decision to use preventive dental care and can potentially impair their ability to motivate patients to obtain preventive care steps. In recent times, The perception toward bettering oral health has changed among the parents. The priority on prevention has improved people's attitudes toward improving their oral health. Non-invasive approaches are favoured over invasive therapies in current practice [31, 32].

Preventive resin restoration is a conservative reply to 'extension for prevention' philosophy. Preventive resin restorations are now termed as "Conservative Adhesive Resin Restoration" (CARR) to imply that other adhesive materials could even be employed in these restorations. The term CARR was first described by Simonsen and Stallard in 1977 and refined in 1985. In the present study frequency of patients treated PRR was 53.1% were males and 46.8% were females. In concordant to the present study Pandiyan et al., also conclude that Males were comparatively more treated with PRR than Females. It might be attributed to the dietary life-style, oral hygiene maintenance which is more in females than in males [35].

Around, 53.1% were treated in left sided Mandibular teeth and 46.8% were treated in right sided Mandibular teeth were treated with PRR in the present study. Since Dental Caries is a Bilateral phenomenon it can occur in any surface of any tooth due to different etiological agents. In a study by Saravanan et al., it was seen that there was no significant association between the side of caries attack among males and females [25, 36]. The most commonly treated teeth with PRR in the present study was Permanent Left Mandibular First Molar in 24.8% of the children followed by 23.7% in Permanent Right Mandibular First Molar. In accordance with the present study, Wright et al., the Permanent Mandibular Molars were the most common teeth susceptible to dental caries and treated with Pit & Fissure sealant. This is most likely due to the topography and the narrow morphology of the fissure in the Mandibular molars pushing it at a high risk of developing caries [37].

Mandibular molar are the most common site of caries incidence in the present study, Among the males 13.2% had PRR in Permanent Left Mandibular First Molar, whereas Females had 12.1% of them PRR in Permanent Right Mandibular First Molar [38]. Depending on the Clinical scenario, the affected or the teeth which are at the risk of developing caries are managed accordingly. Rafatjou et al., reported a success rate of 53.6% in one year in the treated teeth PRR [39], while Walker et al., reported a success rate of 83% over 6.5 years in the pediatric patients treated with PRR [40]. In both Male (27.1%) and Female (26.01%) children comparatively Mandibular Left sided Permanent teeth are more treated with PRR than the Mandibular Right sided Permanent teeth. Poor placement techniques such as moisture contamination, improper sealing of all pits and fissures, inadequate etching, rinsing or drying, insufficient curing time which ultimately results in material wear and results in failure of PRR [41, 42].

The shortcomings of this study were that the treatment plan was not determined by a single operator, it is a Retrospective study, minimal external validity, that the rationale for material selection was not included and the success rate and longevity of PRR is not included. Additional research will be needed to evaluate the out-

come and effect of such interventions with a larger sample size, improved external validity.

## Conclusion

Within the limitations of the present study, Permanent Mandibular molars are most prone to the risk of caries and being treated with Preventive Resin Restoration. There is no difference in treatment based on gender and the Left Permanent Mandibular Molars are often treated with Preventive Resin Restoration. Oral hygiene instructions should be instilled at an earlier age as soon as the tooth erupts for better caries-free maintenance.

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