

# Prevalence of Dental Caries in permanent Mandibular First Molars in Adult Patients Visiting OPD of Department of Conservative Dentistry & Endodontics (18 to 44 years) a Cross Sectional Study

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**Abstract:** Dental caries is a widespread global oral disease and a significant economic problem in developed countries, which has a direct impact on the quality of life. The mandibular first molar is the first tooth to erupt and has the longest exposure to the oral cavity and is very important with regard to bearing all the masticatory load and in maintaining a functionally desirable occlusion. Dental caries can ultimately lead to the extraction of first mandibular molars if not treated early. Therefore this study was undertaken to determine the prevalence of caries in 1<sup>st</sup> permanent mandibular molars, in terms of the proportion of persons affected. The patients visiting the OPD were randomly selected using simple random sampling method with a sample size of 994. Case history was taken and Caries were clinically diagnosed in mandibular first molars. Out of the 994 patients examined, 81.58% of patients showed presence of caries in permanent mandibular first molars in the age group of 18-45 years the study showed that there is a very high prevalence and susceptibility of dental caries in permanent mandibular first molars.

**Keywords:** Prevalence, dental caries, mandibular molars, adult patients, susceptibility

## 1. Introduction

Oral health is an integral component of general health and is essential for well-being. There is evidence to prove the interrelationship between oral and general health(1). Dental caries is a widespread global health problem and has a direct impact on the quality of life. Dental caries remains a significant economic problem in developed countries and has been a major public health challenge.

Miller in the late 19<sup>th</sup> century proposed the chemoparasitic theory which describes decay as the dissolution of the inorganic salts of the tooth by acids produced by oral bacteria. These bacteria accumulate on the retentive sites of the teeth in aggregations known as dental plaque and fermented dietary carbohydrates in situ to the acid pH required for the solubilization of the hydroxyapatite crystals found in the enamel(2). Malnutrition during teeth development may exacerbate periodontal and oral infectious diseases. Prevalence of dental caries is a term used to express the frequency of clinical dental caries in existence at a particular point of time(3). Several epidemiological studies on the prevalence of dental caries have been carried out in different population groups. However very little has been done to find the incidence in the individual teeth which would help in planning preventive measures especially prior to the susceptible period (4). The permanent mandibular 1<sup>st</sup> molar is the 1<sup>st</sup> tooth to erupt and has the longest exposure in the oral cavity. This tooth is very important with regards to bearing all the masticatory load and in maintaining a functionally desirable occlusion(5). Therefore this study was

carried out to determine the prevalence of dental caries in the permanent mandibular 1<sup>st</sup> molars so that oral health programs can be planned and implemented to target those patients that are at greater risk of dental caries.

## 2. Aim

To study the prevalence of Dental Caries in permanent mandibular 1<sup>st</sup> molars in patients visiting Department of Conservative Dentistry & Endodontics at VSPMsDCRC, Nagpur.

## 3. Objectives

The present study was carried out to estimate the prevalence of dental caries in the permanent mandibular 1<sup>st</sup> molars in adult patients who attend the OPD and are treated at the Conservative Dentistry Department of VSPMsDCRC, Nagpur.

## 4. Materials and Methods

First of all approval was taken from the Institutional Ethics Committee. Case history proforma was formulated which was duly validated. The sample size was 1005, all these cases were selected from the patients attending the OPD at Department of Conservative Dentistry and Endodontics at VSPMsDCRC Nagpur. The sample size was calculated using software EPI info 7,  
Population of Dighod hills =14,000  
Confidence Interval = 99.9%

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99.9% CI = Sample size is 1005.  
 But there were 5 dropouts from the study so it was 1000.

The inclusion and exclusion criteria for the patients selection were,

#### Inclusion Criteria

- 1) Patients visiting Conservative OPD at VSPM DCRC.
- 2) Co-operative patients after taking their consent.
- 3) Patients with both genders are taken for the study

#### Exclusion Criteria

##### Non co-operative patients

The 1000 cases comprised of 484 female patients and 516 male patients and 5 patients refusing to participate in the study. The mean age of the patients is 31.5 years with a standard deviation of 13.3 years. Individuals were randomly selected using simple random sampling. After thorough cleaning of teeth Caries were clinically diagnosed by visual and tactile inspection under dry conditions using proper light with the patient seated comfortably on the dental chair (6). All exposed and accessible surfaces were examined for dental caries. The instruments used were sterilized after every single use (7). Patients case history was recorded and Intra oral examination was performed by the author only, to reduce inter examiner error.

## 5. Results

1. A total of 1000 cases were examined at the OPD of VSPMsDCRC, Nagpur which included 484 female patients and 516 male patients.

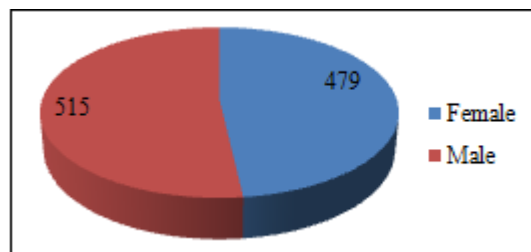
**Table 1:** Prevalence of caries, gender wise in different age groups:

Sr no	Age Group (years)	Gender		Total
		Male	Female	
1	18 to 26	142	144	286 (39.4%)
2	27 to 35	120	119	239 (32.9%)
3	36 to 44	106	94	200 (27.5%)
	Total	368	357	725

In the above table it can be seen that out of 725 patients having caries 286 (39.4%) patients are in the age group 18 to 26 years which corresponds with the findings of Abdul et al (8), followed by 239 patients in age group 27 to 35 years. (32.9%)

More no of carious lesion are found in the young adults age group patients.

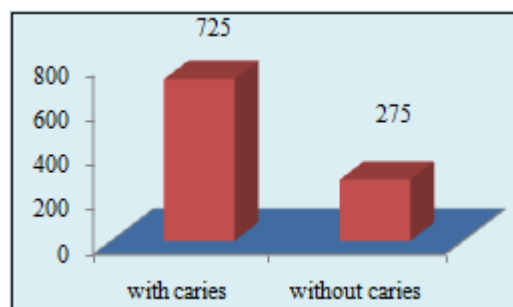
## II. Gender wise distribution of patients



Females- 48.8%    Males-51.8%

This shows that there is a very slight male predilection for caries.

## Prevalence of caries in 36,46.



Out of the 1000 patients examined it was observed that 725 patients showed presence of caries in 36, 46 with the implication that 72.5% of patients showed presence of caries in permanent mandibular 1<sup>st</sup> molars, which is a significantly high number.

## 6. Discussion

The reason for studying prevalence of caries in mandibular 1<sup>st</sup> molars in this study was that this tooth is most susceptible to caries in the pits and fissures. Mandibular 1<sup>st</sup> molar are the 1<sup>st</sup> teeth to erupt, as early as six years of age and hence have a longer exposure to the oral cavity. The molar has deep developmental grooves which are more numerous and exaggerated and hence are more likely to develop caries (9). It was found that susceptibility to caries is low during the first post eruptive year, but rises rapidly to the maximum rate approximately two to three years post eruption (10). The mandibular 1<sup>st</sup> molars have control over the teeth erupting later behind and in front of them. They have the maximum root surface area and are considered to be the best source of anchorage for moving the tooth, they support the main masticatory duty and influence the vertical distance of upper and lower jaws, the occlusal height and esthetic proportions (11). This particular tooth is very important with regards to bearing all the masticatory loads required for proper digestion of food and also helps in achieving a functionally desirable occlusion. Dental caries can ultimately lead to the extraction of the 1<sup>st</sup> permanent molars if not treated early. If this tooth is lost in early age then it can result in malpositioning of the other teeth, midline shifts and even skeletal symmetry. Missing third molars are a very common anomaly either because of impaction followed by extraction of the tooth or agenesis i.e. missing congenitally (12). This enhances the need for keeping mandibular molars safe. Thus the mandibular molars have a high strategic value and its loss due to caries can result in a functional and esthetic imbalance affecting the overall physical and psychological development of the individual.

Oral health is a human right and an integral part of general health and the oral cavity plays a central role for intake of basic nutrition and protection against microbial infections. Worldwide 60-90% of school children and nearly 100% of adults have dental cavities often leading to pain and discomfort (13). During 1940, caries prevalence in India was 50.5%, while during 1960-70, it was reported to be around

50–68 % (14). According to Binod Kumar Patra *et al*, in Delhi the prevalence of caries is reported to be 84.9% and the prevalence of dental caries in the age group of 35-44 years to be 82.4%(15) which is lower than that reported in the WHO Oral Health Country Profile (94%)(14). In a study conducted by Doifode *et al* (16). in Nagpur (48.6%) in the same age-group and by Chakraborty *et al* (17). in Siliguri (57.03%) in the age-group of 35-40 years and 63.4% in Chennai in a study conducted by Shubha *et al*(18).

Kalaskar *et al* conducted studies in Vidarbha region which showed prevalence ranging from 40% to 50%(19). Caries commences most often at enamel surface in the pits and fissures of the crown, beneath the contact areas of proximal surfaces of teeth and in the cervical third of the crown between the gingival margins and the point of maximum convexity of the crown. This is because it is in these areas that bacteria in form of dental plaque adhere to the teeth and are relatively protected from becoming scrapped off. Caries development in healthy individuals is usually slow compared with the rate in compromised patients(20). A polarization is occurring worldwide, where the prevalence of caries is declining in developed countries, is increasing in less developed countries and is epidemic in countries with emerging economics(20). Living in urban areas has implications for lifestyle, including dietary pattern and has been shown to be associated with an increased prevalence of dental caries (21).

The purpose of this study was to determine the prevalence of caries in the mandibular 1<sup>st</sup> permanent molars in adult patients. The most important finding was the marked difference in caries incidence in the 1<sup>st</sup> permanent mandibular molars which was greatest in comparison with the other teeth. The prevalence was found to be as high as 72.5%. and these results were found to be consistent with those of Demirci *et al*, who stated that mandibular 1<sup>st</sup> molars (65.77%) exhibited statistically higher caries prevalence than their maxillary counterparts(10).

## 7. Conclusion

Prevalence of any disease is a very helpful tool to assess the actual status of the disease among the population and for designing the preventive measures against it. This study on prevalence of caries in the mandibular 1<sup>st</sup> molars can be useful to design preventive measures against dental caries as most of the patients are unaware that these are the 1<sup>st</sup> permanent teeth to erupt in the oral cavity. Present study shows that there is a high incidence of caries in mandibular first molars, which is to be treated as priority of oral health services. This study also showed that the prevalence is more in young adults who could be the target group for preventive services and also there is a slight predilection in males as compared to the female patients. Patient's awareness about the importance of these permanent molars need to be improved as these teeth erupt as early as 6 years of age in the oral cavity. There is a need to organize large national surveys among young adults so as to determine the disease pattern and establish the relevant treatment needs. Dental caries can be effectively controlled and prevented by a combination of community, professional and individual

actions. There is a need to provide accessible and affordable oral health services to the patients.

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