

# The distribution of individual tooth impaction in general dental patients of Northern India

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**Objective:-** To investigate the distribution of individual tooth impaction in general dental patients of Northern India. **Setting:-** Centre for Dental Education and Research, All India Institute of Medical Sciences, New Delhi. **Design:-** Hospital based crosssectional study. **Methods:-** General dental patients were examined clinically and impacted teeth were diagnosed from radiographs. The distribution of impacted teeth (excluding third molars) with respect to the arch, side and gender were recorded. The results were analyzed with respect to the prevalence of individual tooth impaction. The distribution of teeth impaction was evaluated by using the Chi-square test. A p-value of <0.05 was considered as statistically significant. **Results:-** Of 27,529 general dental patients examined, 134 (0.49%) had at least one-impacted tooth and a total of 220 impacted teeth were recorded. The most frequently impacted teeth were maxillary canines (52.27%) and the least frequently impacted teeth were maxillary first and second molars (0%). **Conclusions:-** The prevalence of teeth impaction in the North Indian dental patients was less when compared with the other populations. The most frequently impacted teeth were maxillary canines and the least frequently impacted teeth were maxillary first and second molars.

*Key words: Dental, impaction, patients, prevalence, tooth.*

## Introduction

Teeth impaction is a common problem in dental patients. (Aitasalo *et al.*, 1972; Ahlqwist and Grondahl, 1991; Brown *et al.*, 1982). There are also considerable variations in the prevalence and distribution of impacted teeth in different regions of the jaw. (Aitasalo *et al.*, 1972; Ahlqwist and Grondahl, 1991; Brown *et al.*, 1982). There are many studies in the literature mentioning the prevalence and pattern of tooth impaction in the various populations (Chu *et al.*, 2003). However, there is no single study in the literature describing the prevalence and pattern of individual tooth impaction in general dental patients. Thus, the present study was conducted to determine the distribution of individual tooth impaction in North Indian dental patients.

## Subjects and Methods

This study included 27,529 North Indian dental patients, who presented to the Center for Dental Education and Research, All India Institute of Medical Sciences, New Delhi, during the period of March 2005 and February 2006. Intraoral examination of all the patients was performed and patients who had at least one impacted permanent tooth were included in a separate group i.e. impacted teeth group. Patients having exclusively one or more impacted third molars and impacted teeth associated with any syndrome were excluded from the sample. Patients of all ages were included in the study.

Diagnosis of an impacted tooth was made from a full clinical examination and panoramic radiographs. A tooth was considered as impacted when it was obstructed on its path of eruption by an adjacent tooth, bone or soft tissue. Following initial diagnosis of the patients having an impacted tooth, occlusal radiographs and intra-oral periapical radiographs with “buccal object rule” for the diagnosis of nature of tooth impaction were taken. All the patients included in the study were examined using a standard proforma, which included name, age and gender of the patient, arch involved, FDI tooth number, type of tooth impaction and any associated local pathology.

Descriptive analysis was carried out for individual tooth impaction in respect to their distribution in the arch and side and also gender. Chi-square test was used to determine if any significant difference existed in the distributions of impacted tooth. A p-value of < 0.05 was considered significant.

## Results

Of 27,529 general dental patients, 16,231 (58.95%) were males and 11,298 (41.05%) were females. Among all patients examined, 134 (0.49%) had at least one-impacted tooth. Among 134 impaction patients, 58 (43.28%) were males and 76 (56.72%) were females. These 134 patients aged 9-45 years, had a total of 220 (excluding third molars) impacted teeth; 43 patients had more than one impacted tooth (maximum seven teeth). The most frequently impacted teeth were maxillary canines (52.27%)

and the least frequently impacted teeth were maxillary first and second molars (0%) (Table 1).

The prevalence of maxillary canine impaction was 0.33% in the general dental patients. The frequency of impaction was significantly higher in females (0.345%) than males (0.3095) ( $p<0.001$ ). Also the frequency of impaction on the right side was significantly higher than on the left side ( $p<0.05$ ). The prevalence of maxillary canine impaction on the palatal side (72.17%) was significantly higher ( $p<0.001$ ) than that on the buccal side (27.83%). The prevalence of mandibular canine impaction was 0.11%; the right side was significantly more than the left side ( $p<0.05$ ). Canine impaction was higher in the maxilla than in the mandible ( $p<0.001$ )

The prevalence of the maxillary and mandibular central incisor impaction was 0.06% and 0.01% respectively. The prevalence of maxillary central incisor impaction was significantly higher than the maxillary lateral incisor impaction ( $p<0.01$ ), whilst in the mandible the prevalences were similar.

The prevalence of maxillary and mandibular first premolar impaction was 0.01% and 0.03% respectively, whereas the prevalence of maxillary second premolar impaction was significantly less than the mandibular second premolar impaction ( $p<0.05$ ).

First and second molars were the least commonly impacted teeth amongst the study population. The prevalence of mandibular molars impaction (0.003%) was more than the maxillary molar impaction.

### Discussion

The prevalence of impacted teeth in the North Indian general dental patients was 0.49% which is lower than figures from other studies (Aitasalo *et al.*, 1972; Ahlqwist and Grondahl, 1991; Brown *et al.*, 1982; Alattar *et al.*, 1980). Previous studies have also reported that maxillary canines were the most frequently impacted teeth (excluding third molars) (Aitasalo *et al.*, 1972; Brown *et al.*, 1982). The most frequently impacted tooth in the descending order were the mandibular first molars, maxillary canines, mandibular and maxillary second premolars and maxillary central incisors (Moyers,1963),

Among all the impacted teeth in the maxillary and mandibular arch, maxillary canines are the second most commonly impacted teeth after the third molars (Ericson and Kurol, 1986; Aydin *et al.*, 2004). Literature suggested the prevalence of maxillary canine impaction between 0.8% and 5.43% in various populations. (Ericson and Kurol, 1986; Aydin *et al.*, 2004) However in the present study the prevalence of maxillary canine impaction was low and this could be due to the large age range of the sample subjects. It was reported that in 85% of cases canines were impacted palatal to the dental arch and only in 15% of cases buccal to the arch. (Ericson and Kurol, 1987) Johnston (1969) noted the palatal canine impaction and buccal canine impaction ratio of about 2:1. In our study, the frequency of maxillary canine impaction on the palatal side of the arch was 2.59 times more than buccal side. We observed that, the mandibular canines were second most commonly impacted teeth after maxillary canines and these were the most commonly impacted teeth in the mandibular arch. However literature revealed

**Table 1.** Distribution of patients and total impacted teeth (n=220) according to arch, gender and side of involvement.

Tooth	Cases	Teeth		Gender Distribution				Right Side		Left Side		Bilateral	
		No.	%	Male Cases No.	Male Teeth %	Female Cases No.	Female Teeth %	Cases No.	Teeth %	Cases No.	Teeth %	Cases No.	Teeth %
Maxillary Central Incisor	16	16	7.27	9	9	7	7	7	7	9	9	0	0
Mandibular Central Incisor	2	4	1.81	2	4	0	0	0	0	0	0	2	4
Maxillary Lateral Incisor	6	6	2.73	3	3	3	3	3	3	3	3	0	0
Mandibular Lateral Incisor	2	4	1.81	1	2	2	2	0	0	0	0	2	4
Maxillary Canine	91	115	52.27	35	38	56	77	42	42	25	25	24	48
Mandibular Canine	29	36	16.36	17	19	12	17	14	14	8	8	7	14
Maxillary First Premolar	2	3	1.36	0	0	2	3	1	1	0	0	1	2
Mandibular First Premolar	8	10	4.54	2	2	6	8	3	3	3	3	2	4
Maxillary Second Premolar	7	8	3.63	5	5	2	3	6	6	0	0	1	2
Mandibular Second Premolar	12	15	6.81	6	7	6	8	5	5	4	4	3	6
Maxillary First Molar	0	0	0.00	0	0	0	0	0	0	0	0	0	0
Mandibular First Molar	1	2	0.90	1	2	0	0	0	0	0	0	1	2
Maxillary Second Molar	0	0	0.00	0	0	0	0	0	0	0	0	0	0
Mandibular Second Molar	1	1	0.45	0	0	1	1	1	1	0	0	0	0

that the second most commonly impacted teeth after third molars were second premolars followed by second molars in the mandibular arch. (Kokich and Mathews, 1993) The frequency of canine impaction in the mandible was almost three times less than the maxilla. However, Rohrer (1929) reported that the mandibular canine impaction was 20 times less frequent than the maxillary canine impaction. Our study revealed equal distribution of mandibular canine impaction among males and females but the frequency was approximately two times higher on the right side of the mandible and 38.89% of the total impacted mandibular canines were involved bilaterally.

The prevalence of central incisor impaction was six times more in maxilla than in mandible. We found mandibular central incisor impaction only in male patients and always with bilateral involvement. The prevalence of maxillary lateral incisor impaction was approximately three times less than that of maxillary central incisor impaction. The prevalence of mandibular lateral incisor impaction was half of that of maxillary lateral incisor impaction. However, the impaction of the mandibular central and lateral incisor impaction was equal in the general dental patients.

The prevalence of first premolar impaction in the mandible was three times more than that in the maxilla and was four times more in females, but was equally distributed on either sides of the jaw. The prevalence of maxillary second premolar impaction was three times more than that of maxillary first premolar impaction. In the mandibular arch, the second premolars were the second most commonly impacted teeth after third molars (Kokich and Mathews, 1993) and also approximately 24% of the all-dental impactions were mandibular second premolars (Collet, 2000). However in our study, second premolars were the second most commonly impacted teeth after canines. The combined prevalence of maxillary premolars was 0.03% in the general dental patients and the combined prevalence of mandibular premolars impaction was 0.07%. Previously it was reported that the prevalence of impacted premolars vary according to the age and the overall prevalence in adults was 0.5% with the range of 0.1% to 0.3% for maxillary premolars and 0.2% to 0.3% for mandibular premolars. (Andreasen, 1997) Thus our study suggested that the prevalence of premolar impaction in North Indian dental patients was less as compared to the other populations.

Our study also revealed that first and second molars were the least commonly impacted teeth in the mandibular arch. Previous study reported that excluding third molars, second molars were the second most commonly impacted teeth after second premolars (Kokich and Mathews, 1993). Proff *et al.* (2006) reported that first and second molars were rarely affected by eruption disorders with a prevalence of 0.01%-0.08%.

### Conclusions

The following conclusions were drawn from this present study-

- The prevalence of impacted teeth in the North Indian general dental patients was 0.49% and was more in female patients.
- The most frequently impacted teeth (excluding third molars) in both maxilla and mandible were the canines.

- The least frequently impacted teeth were maxillary first and second molars.
- The prevalence of teeth impaction (excluding third molars) in the maxilla was 1.5 times more than the mandible.
- The frequency of teeth impaction on the right side of the jaws was 1.5 times more than the left side, and the bilateral involvement of the teeth impaction was approximately 25% of the total impacted teeth.

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