

## Study on the Prevalence of Eruption Status of Third Molars in South Indian Population

Swarna Meenakshi Sivaramakrishnan\* and Pratibha Ramani

Saveetha Dental College and Hospitals, Chennai

### Abstract

**Context:** To date, there are very few studies regarding the eruption status of third molars in South Indian population. This study aims to analyse the eruption status of third molars and also the reasons behind their impactions.

**Aim:** To study the prevalence of eruption status of third molars in South Indian population.

**Materials and methods:** Status of third molars was evaluated radio graphically for 150 subjects (75 males and 75 females) and the impaction status, eruption status and congenital absence of third molars were recorded.

**Statistical analysis used:** The results were analysed using chi-square test.

**Results:** Out of the expected number of molars in 150 patients i.e. 600, only 317 molars (52.8%) were completely erupted and 250(41.6%) failed to erupt completely and were impacted and 33(5.5%) molars were congenitally absent.

**Conclusion:** Third molar impactions have a mandibular predisposition. Third molar impaction showed a predilection towards females than males. Agenesis of third molars was more common in females than in males and was more common on the right side. The most common pattern of impaction was Mesioangular followed by vertical which is more common on the left side, horizontal which is common on the right side. The most commonly impacted teeth were 18 and 48.

**Keywords:** Eruption; Impaction; Agenesis; Evolution; Anchorage; Third molar

### Introduction

It is a universally known fact that nature tries to eliminate anything that is not in use. Likewise with the advent of civilisation, the use of soft and refined diet has completely eliminated the need for a large and strong jaw for mastication. Hence, with evolution, human jaws have shrunk from its large ape size to a smaller one and thus, there is no space in our mouths in order to accommodate all 32 teeth [1]. Therefore, the last teeth that develop i.e. third molars are most often impacted. An impacted tooth is a tooth that is prevented from erupting into its rightful position in the oral cavity because of malposition, lack of space, or other impediments [2]. Peterson [3] characterised impacted teeth as those teeth that fail to erupt into the dental arch within the expected time of eruption. Later in 2004 Farman [4] stated that impacted teeth are those teeth that are prevented from eruption due to a physical barrier within the path of eruption. Generally, third molars erupt between the ages of 18 and 21 years [5,6] and their eruption time varies with races [5-8]. For instance, mandibular third molars may erupt at 14 years of age in Nigerians [7] and may erupt even at an age of 26 years in European population [8]. The third molars in males erupt 3-6 months ahead of that of females [7]. Third molar eruption is a very important clinical issue because retention of this tooth might be beneficial for orthodontic anchorage, prosthetic abutment or transplantation [9].

The objective of this study was to evaluate the eruption status of third molars and the type of impaction in south Indian population within the age group of 18-26 years.

### Materials and Methods

The population studied consisted of a total of 150 patients (75 males, 75 females) who visited saveetha dental college and hospital, belonging to south India within the age of 18- 26 years. Orthopantomograms (OPG) were taken for these patients and radio graphically evaluated.

They were evaluated by manual tracing.

The radiographs were analysed and interpreted for the following:

- Impacted maxillary and mandibular third molars
- Agenesis of maxillary and mandibular third molars
- Gender of the patient
- Angulation of the impacted teeth ( type/pattern of impaction)

The inclusion criteria were as follows:

- OPGs of patients aged 18-26 years
- OPGs of patients who had no history of extraction/exfoliation
- OPGs of patients who are non syndromic
- OPGs of Patients who are systemically healthy
- OPGs of patients who had no history of trauma
- OPGs of patients who are not under orthodontic treatment

The type of impaction was determined by observing the inclination of the third molar to the long axis of the second molar (winter's

**\*Corresponding author:** Swarna Meenakshi Sivaramakrishnan, IV Year BDS Student, Saveetha Dental College and Hospitals, Chennai, India, Tel: 91-805-618-952; E-mail: [swarna.meenakshi@gmail.com](mailto:swarna.meenakshi@gmail.com)

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classification) [10,11]. The third molars that had reached the occlusal plane in relation to the occlusal surface of the second molar were considered to have erupted normally into its position. The results were analysed by chi-square test.

## Results

The study population consisted of 150 patients whose age ranged from 18- 26 years. There were 75 males and 75 females.

- Out of the expected number of molars in 150 patients i.e. 600, only 317 molars (52.8%) were completely erupted and 250 (41.6%) failed to erupt completely and were impacted and 33 (5.5%) molars were congenitally absent.
- Among the 317 erupted third molars, 172 molars (54.2%) were erupted in the upper jaw and 145 molars were in the lower jaw (45.7%).
- The overall prevalence of impacted upper and lower third molar was 250 (41.6%).

- The arch wise distribution of third molar impaction in this study showed greater predilection towards mandible 130 (52%) than the maxilla 120 (48%) (Figure 1 and Table 1) ( $p$  value < 0.001 which is statistically significant).
- Gender wise distribution of impaction showed a predilection towards females 148 (59.2%) than males 102 (40.8%) (Figure 2).

- Agenesis of third molars was more common in females 18 (3%) than in males 15 (2.5%) and was more common on the right side (Figure 3).
- The most commonly impacted teeth were 18 and 48 (Figure 4 and Table 2) ( $p$  value < 0.001 which is statistically significant).
- The most common pattern of impaction was Mesio-angular 103 (41.2%) followed by vertical which is more common on the left side, horizontal which is common on the right side (Figure 5 and Table 3) ( $p$  value < 0.01 which is statistically significant).

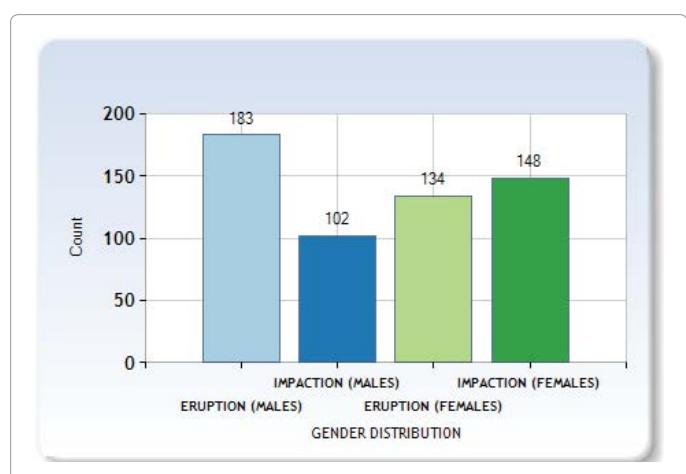
## Discussion

To date, there are very few studies regarding the eruption status of third molars in South Indian population within the 18-26 age group.

Status	Male (75)		Female (75)		Total
	Maxillary	Mandibular	Maxillary	Mandibular	
Erupted	103	83	69	62	317 (52.8%)
Impacted	56	59	64	71	250 (41.6%)
Congenital Absence	6	9	7	11	33 (5.5%)
					Females:148 (59.2%) Males: 102 (40.8%)
					33 (5.5%) Females:18 (3%) Males: 15 (2.5%)

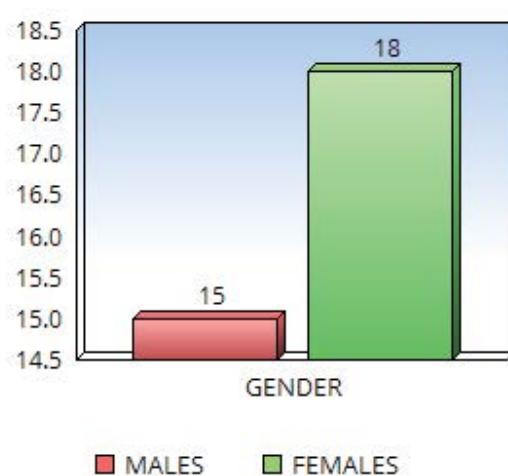
The results are significant with a  $p$ -value <0.001.

**Table 1:** Eruption status.

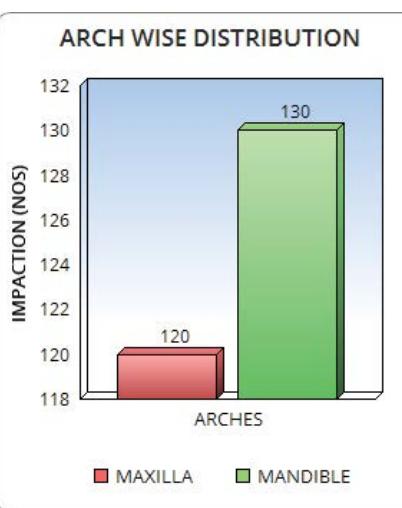


**Figure 2:** Gender distribution.

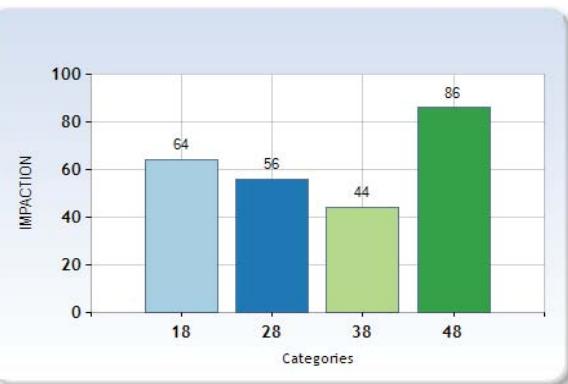
## AGENESIS



**Figure 3:** Agenesis.



**Figure 1:** Arch wise distribution.

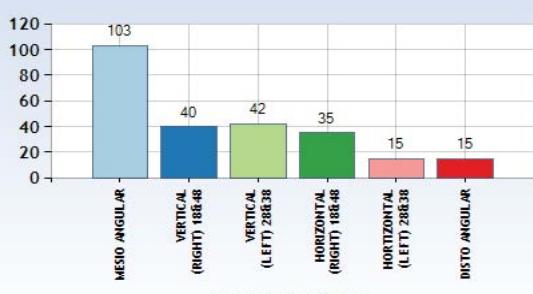


**Figure 4:** Categories.

	18	28	38	48	
	Frequency	Frequency	Frequency	Frequency	Total
Erupted	81	91	78	67	317 (52.8%)
Impacted	64	56	44	86	250 (41.6%)
Absent	7	6	8	12	33 (5.5%)

The results are significant with a p value <0.001

**Table 2:** Distribution of erupted, impacted and congenitally missing third molars.



**Figure 5:** Pattern of impaction.

This study aimed to analyse the eruption status of third molars and also the reasons behind their impactions. Third molars are most often congenitally missing. Even if present, they may follow an abortive path of eruption and become impacted as a result of spacial insufficiency in the area of eruption [12]. Third molars account for 98% of all impacted teeth. The aetiology behind agenesis of one or more molars is unknown, but several mechanisms have been suggested like a physical disruption of dental lamina in the developmental stage, limitation of space, an inherent defect of dental lamina and failure of induction of the underlying mesenchyme. These changes are under the influence of genetic and environmental factors [13]. The clinical significance of impacted 3rd molars are mainly a crowded dentition, pericoronitis, pressure resorption of roots of adjacent 2<sup>nd</sup> molars, dental caries

	18		28		38		48	
	Males	Females	Males	Females	Males	Females	Males	Females
Mesio angular	9	14	8	12	13	15	14	18
Vertical	8	9	8	10	10	14	7	16
Horizontal	3	4	1	2	3	9	11	17
Disto angular	1	3	1	1	1	2	2	4

The results are significant with a p value <0.01

**Table 3:** Pattern of impaction.

involving both 2<sup>nd</sup> and 3<sup>rd</sup> molars. The arch wise distribution of third molar impaction in this study showed greater predisposition towards mandible 130 (52%) than the maxilla 120 (48%) which was also in accordance with other studies by Quek et al., Kanneppady et al., and Syed et al. [10,11,14]. Venu Gopal conducted a comparative study on impacted third molars in the South Indian population which showed greater predisposition towards the mandible, which also supported our findings [15] study by Pushparaja et al. [9] also showed similar findings. Hashemipour study on Iranian population also showed a mandibular arch predilection [16]. In the present study, mesioangular impaction (41.2%) was by far the most common and the least was distoangular pattern of impaction (6%). A Study conducted in Singapore Chinese population showed similar findings [10]. Hashemipour study on Iranian population showed the most leading pattern of impaction in the mandible was mesioangular which was followed by horizontal, vertical and distoangular impaction [16]. These findings were in consonance with the results of the present study. In this study, gender wise distribution of impaction showed a predilection towards females 148 (59.2%) than males 102 (40.8%) which was in consonance with the study on third molars done by Pushparaja et al. [9] whereas in contradiction to the result in a study done by Ramamurthy, et al. [17]. Agenesis of third molars was more common in females 18 (3%) than in males 15 (2.5%) and was more common on the right side and these findings are in accordance with that of the study done by Hellman [18] and also radiographic study in south India done by Ramamurthy et al. [17]. The most commonly impacted teeth were 18 and 48. The rate of third molar impactions are increasing at an alarming rate with the progress of evolution. In the course of evolution, the tooth bud of the third molar might become completely absent due to lack of space because of decrease in jaw size and loss of inter proximal attrition, tooth loss due to use of refined soft diet.

## Conclusion

From the present study it can be concluded that

- Third molar impactions have a mandibular predisposition.
- Third molar impaction showed a predilection towards females than males.
- Agenesis of third molars was more common in females than in males and was more common on the right side.
- The most common pattern of impaction was Mesio-angular followed by vertical which is more common on the left side, horizontal which is common on the right side.
- The most commonly impacted teeth were 18 and 48.

Further study is needed for exact prediction, evaluation and also for early surgical intervention in order to avoid the complications that they cause.

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