



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 11, Issue, 07, pp.5268-5271, July, 2019

DOI: <https://doi.org/10.24941/ijcr.35873.07.2019>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

RESEARCH ARTICLE

THE PREVALENCE OF DENTAL ANOMALIES IN THE VIDARBHA REGION OF MAHARASHTRA: A CROSS SECTIONAL STUDY

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ARTICLE INFO

Article History:

Received 22nd April, 2019

Received in revised form

19th May, 2019

Accepted 27th June, 2019

Published online 25th July, 2019

Key Words:

Dental anomalies,
Vidharbianpopulation,
Prevalence,
Orthopantomogram,
Malocclusion.

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ABSTRACT

Introduction: Dental anomalies in tooth number, shape, size and position usually result in problems in maxillary and mandibular arch length and occlusion, which may greatly influence orthodontic treatment planning. Digital radiography (Panoramic radiography) is most accurate for diagnostic purposes as it allows complete visualization of maxillary and mandibular teeth. **Aim:** The aim of the present study was to determine the prevalence of dental anomalies, that could be the cause of malocclusion in the Vidarbhan population. **Materials and Methods:** The present cross-sectional study was carried out in department of Oral Medicine and Radiology of Swargiya Dadasaheb Kalmegh Smruti Dental college and Hospital Nagpur, Maharashtra and approval was obtained from the institutional ethics committee. A total of 1000 panoramic radiographs were scanned for evaluation of dental anomalies. Dental records and orthopantomograms (OPGs) were reviewed for the following dental anomalies: congenitally missing teeth (agenesis), supernumerary teeth, impaction, ectopic eruption, transposition, germination, fusion, dilacerations, taurodontism, dens in dente (Dens Evaginatus) and any other unusual condition. **Results:** Out of 1000 patients examined between the age group of 12 to 36 years of age 313 patients had dental anomaly. The most common dental anomaly found was impacted teeth (23.1%) followed by Dilaceration (3.6%), Congenitally missing (1.7%), Odontome (1%), Distomolar (0.2%), Talons cusp (0.2%), Partial anodontia (0.2%), Amelogenesis imperfecta (0.2%), Supernumerary teeth (0.2%), Mesiodens (0.2%), Taurodontism (0.4%), Dens invaginatus (0.1%), Dentinogenesis imperfecta (0.1%), Dilated odontoma (0.1%). In the present study 687 patients among 1000 patients did not show any dental anomaly. **Conclusion:** The prevalence of dental anomalies in Vidharbian population was found to be 31.1%.

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Citation: Rakhi Chandak, Rucha Pandharipande, Ramhari Sathawane, Ashish Lanjekar, Romita Gaikwad and Runal Bansod, 2019. "The prevalence of dental anomalies in the vidarbha region of Maharashtra: A cross sectional study", *International Journal of Current Research*, 11, (07), 5268-5271.

INTRODUCTION

Dental anomalies in tooth number, shape, and position usually result in problems in maxillary and mandibular arch length and occlusion, which may greatly influence orthodontic treatment planning. They may include variations in the number, size, morphology, or eruptive pattern of teeth (Afify and Zawawi, 2012). There are wide range of abnormalities among different populations of the country. These anomalies may be congenital or acquired due to genetic or environmental factors (White, 2009). Congenital abnormalities are typically genetically inherited anomalies and developmental anomalies occur during the formation of teeth. In contrast, acquired abnormalities result from changes to teeth after normal formation.¹In other aspects abnormalities of teeth may be part of systemic or syndromes disorders (White, 2009). There are several studies which reports the frequencies of various dental anomalies in different populations, but the results are conflicting. This may be due to racial differences, variable sampling techniques, and different diagnostic criteria. Congenitally missing teeth constitute the most common developmental anomaly of the

human dentition, occurring in approximately 25% of the population, and the wisdom tooth represents the most affected tooth (20.7%) (Garib et al., 2009). Excluding third molars, the prevalence of tooth agenesis is approximately 4.3 to 7.8%, and the mandibular second premolars are the most commonly missing teeth, followed by the maxillary lateral incisors and maxillary second premolars (Polder et al., 2004; Ericson and Kurol, 2000; Peck et al., 1994). The unilateral occurrence is predominant, except in the case of maxillary lateral incisor agenesis, where bilateral agenesis is more common. Panoramic radiography is used for diagnostic goals such as third molar location, intraosseous lesions and developmental anomalies.⁷It seems that digital radiography is most accurate for diagnostic purposes (Afify and Zawawi, 2012). Many researchers investigated the prevalence of various dental anomalies but very few have evaluated through panoramic radiography and have related it to orthodontic treatment. Therefore, the aim of this study is to investigate the prevalence of dental anomalies that could be a cause of malocclusion in the Vidarbhan region of Maharashtra.

MATERIAL AND METHODS

The present cross-sectional study was carried out in department of Oral Medicine and Radiology of Swargiya Dadasaheb Kalmegh Smruti Dental college and hospital Nagpur, Maharashtra and approval was obtained from the institutional ethics committee. A total of 1000 panoramic radiographs were scanned for evaluation of dental anomalies. Patients between the age groups of 12 to 36 years were included in the study and patients who exhibited one or more of the following: any disease, trauma, or fracture of the jaws that may affect the normal growth of permanent dentition were excluded from the study.

Methodology

All panoramic radiographs are taken with the Orthophos XG X-ray system, version 2.53 Sirona, Germany. Digital orthopantomograms (OPGs) of patients will be examined in a standard manner under good lighting conditions, standardized screen brightness and resolution. Dental records and orthopantomograms (OPGs) to be reviewed for the following dental anomalies: impaction, dilacerations, congenitally missing teeth (agenesis), supernumerary teeth, Talons cusp, Taurodontism, ectopic eruption, dens in dente (Dens Evaginatus), transposition, germination, fusion, anodontia, amelogenesis/dentinogenesis imperfecta and any other unusual condition.

Criteria for selection of teeth

- The number anomaly such as supernumerary teeth, mesiodens, congenitally missing teeth and partial anodontia were evaluated by counting each tooth on panoramic radiograph.
- Positional anomalies such as impacted teeth, ectopic eruption and rotation was evaluated as tooth rotation was considered subjectively as any evident (at least 20°) mesiolingual or distolingual intra-alveolar displacement of tooth around its longitudinal axis.
- Shape anomalies such as Taurodontism was evaluated based on the criteria given by Shiffman and Chanannel in which a tooth is considered a taurodont if the distance from the lowest point of the roof of the pulp chamber (A) to the highest point of the floor (B) divided by the distance from A to the root apex is equal to or greater than 0.2, and when the distance from B to the CEJ is greater than 2.5 mm.
- Other structural anomalies such as amelogenesis, dentinogenesis imperfecta were noted after clinical correlation.

RESULTS

Out of 1000 patients examined between the age group of 12 to 36 years of age 313 patients had dental anomaly. Therefore, prevalence of dental anomalies in Vidharbian population was found to be 31.3%. Out of the total 1000 patients examined 497 patients were male and 503 patients were females. Among 497 male patients 157 patient had dental anomaly and among 503 female patients 156 female had dental anomalies. In the present study the most common dental anomaly was found to be impacted teeth. Out of 1000 patients 231 patients had impacted teeth with a prevalence of 23.1%.



Fig 1: Horizontal impaction with mandibular second molars



Fig 2: Dilaceration with mandibular 3rd molars



Fig 3. Amelogenesis imperfecta with dilated odontoma with mandibular second molars

Among the impacted teeth the prevalence of horizontal impaction of third molars was found to be most common among all impactions. There was no case of distoangular impaction reported among 1000 patients. Third molar tooth was the most commonly impacted while 2 cases of canine impaction and 2 cases of incisor impaction were reported in the present study. Dilaceration of molar and premolars was the second most common anomaly noted in the present study. 36 patients in the present study showed dilaceration therefore prevalence of dilaceration was found to be 3.6%. During the examination of panoramic radiograph, we also noticed a rare case of amelogenesis imperfecta with dilated odontoma in mandibular right and left second molar. The prevalence of dilated odontoma in general population is 0.25%. In the present study 687 patients among 1000 patients did not show any dental anomaly. The prevalence of dental anomalies in Vidharbian population is shown in Table 1.

Table 1.

| S. No | Dental anomaly | Male | Female | Total |
|-------|--------------------------------------|-------------|-------------|-------|
| 1. | Horizontal impaction (third molar) | 48 (45.2%) | 60 (56.6%) | 108 |
| 2. | Mesioangular impaction (third molar) | 47 (62.6%) | 28 (37.3%) | 75 |
| 3. | Vertical impaction (third molar) | 23 (52.2%) | 21 (47.72%) | 44 |
| | Vertical impaction (canine) | 2 (100%) | 0 (0%) | 2 |
| | Vertical impaction (incisor) | 2 (100%) | 0 (0%) | 2 |
| 4. | Distoangular impaction | 0 (0%) | 0 (0%) | 0 |
| 5. | Dilaceration(third molar) | 14 (43.75%) | 18 (56.25%) | 32 |
| | Dilaceration(premolar) | 0 (0%) | 4 (100%) | 4 |
| 6. | Distomolar | 2 (100%) | 0 (0%) | 2 |
| 7. | Odontome | 4 (40%) | 6 (60%) | 10 |
| 8. | Dilated odontoma | 1 (100%) | 0 (0%) | 1 |
| 9. | Congenitally missing | 9 (52.94%) | 8 (47.05%) | 17 |
| 10. | Supernumerary teeth | 0 (0%) | 2 (100%) | 2 |
| 11. | Talons cusp | 0 (0%) | 2 (100%) | 2 |
| 12. | Mesiodens | 2 (100%) | 0 (0%) | 2 |
| 13. | Taurodontism | 1 (25%) | 3 (75%) | 4 |
| 14. | Dens invaginatus | 1 (100%) | 0 (0%) | 1 |
| 15. | Partial anadontia | 0 (0%) | 2 (100%) | 2 |
| 16. | Amelogenesis imperfecta | 1 (50%) | 1 (50%) | 2 |
| 17. | Dentinogenesis imperfecta | 0 (0%) | 1 (100%) | 1 |
| 18. | No anomaly | 337 | 350 | 687 |

DISCUSSION

Dental anomalies in tooth, shape and number should be carefully investigated as these anomalies can complicate orthodontic treatment. Thus it is important for diagnosis and treatment planning of the patient. Many epidemiological surveys have been done in the recent past in different parts of the world to determine the prevalence of dental anomalies. The present study was carried out with an aim to investigate the prevalence of dental anomalies that could be a cause of malocclusion in the Vidarbhan region of Maharashtra. The prevalence of dental anomalies in Vidharbian population is found to be 31.3%. In a radiographic study conducted in Iran by Ardakani, Sheikhha and Ahmadi (2007) the prevalence of dental anomalies was found to be 40.8% which was in accordance with the present study. While in another radiographic study conducted by Goncalves Filho *et al.*, (2014) in Para, Brazil the prevalence of dental anomalies was found to be 56.9% which was much higher as compared to present study. Similarly, in a study conducted by Ahmed Khalid (2012) among the patients of western region of Saudi Arabia the prevalence was found to be 45.1%. In India very few studies were carried out to evaluate the prevalence of dental anomalies through radiographic survey. In a conducted by Gupta *et al.*, (2011) where the prevalence of dental anomalies was found to be 31.26% which was in accordance with the present study. Similarly, in a study conducted in North Karnataka by Ramdurg *et al.* (2017) the prevalence of dental anomalies was found to be 23.74%. While in a clinical study conducted by Anitha *et al.* (2018) the prevalence of dental anomalies was found to be 2.52%. In the present study impaction of teeth was the most common dental anomaly noted with a prevalence of 23.1%. This was found in accordance with the study conducted by Ahmed and Khalid (2012) where prevalence of impaction was 21.2% (186 patients) and prevalence of third molar impaction was the highest (15.9%) compared to upper canine (3.3%), lower premolar (0.6%), and others 1.4%. (upper second premolar and lower second premolar). While in a study conducted in south Indian population by Chandrika *et al.*, (2018) it was found that, among all the anomalies examined missing 3rd molars was the most common which accounted for 16% of the total population. In present study dilaceration of roots was second most common developmental anomaly with a prevalence of

3.6%. This was also in accordance with study conducted by Chandrika *et al.*, (2018) where the prevalence was found to be 3%. Also in a study by Vibhute *et al.* prevalence of dilacerated roots is found to be 4.1% among in western Maharashtra population. The presence of congenitally missing teeth in the present study was found to be 1.7%. The most common teeth affected was mandibular 3rd molar. Polder *et al.* (2004) carried out a meta-analysis on caucasian populations in North America, Australia and Europe to determine prevalence of dental agenesis of permanent teeth. It was found that mandibular second premolar was the most affected tooth, followed by the maxillary lateral incisor and the maxillary second premolar. The others dental anomalies noted were Odontome (1%), Distomolar (0.2%), Talons cusp (0.2%), Partial anadontia (0.2%), Amelogenesis imperfecta (0.2%) Supernumerary teeth (0.2%), Mesiodens (0.2%), Taurodontism (0.4%), Dens invaginatus (0.1%), Dentinogenesis imperfecta (0.1%). In our present we also noted a rare case of dilated odontoma in mandibular molars bilaterally in a case of amelogenesis imperfecta.

Conclusion

In the present study prevalence of dental anomalies in Vidharbian population was found to be 31.3%. The most common dental anomaly found was impacted teeth followed by dilaceration of teeth. There was no significant distribution of dental anomalies among both the sexes.

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