

# International Journal of Research in Health and Allied Sciences

Journal home page: [www.ijrhas.com](http://www.ijrhas.com)

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

## Original Research

### Investigation of Correlation between Conventional Radiographic Assessment and Actual Root Canal Configuration Present In Mandibular Third Molars in Punjab – A Stereomicroscopic Study

Nishant Sharma<sup>1</sup>, Sambhav Jain<sup>2</sup>, Shabnam<sup>3</sup>

<sup>1</sup>(M.D.S. Conservative Dentistry & Endodontics) Private Clinical Practitioner, Patiala, Punjab;

<sup>2</sup>(B.D.S.) Private Clinical Practitioner, Patiala, Punjab;

<sup>3</sup>(M.D.S. Orthodontics and Dentofacial Orthopaedics), Senior Lecturer: Baba Jaswant Singh Dental college hospital & Research Institute, Ludhiana, Punjab, India

#### ABSTRACT

**Aim:-** The aim of this study was to analyze the pattern of mandible fracture in the region of lower Himalayas of state of Himachal Pradesh based on the mechanism of injury. **Material & Method:-**The records of the patients treated for their mandibular fracture were reviewed between time periods from August 2017 to December 2018. Age, Gender, Etiology, Anatomical site of mandible, multiple fractures within the mandible and Method of treatment were recorded and assessed. **Result:** Maximum incidence of fractures was observed among the individuals in 3rd decade (29.55%) followed by 4th decades (27.28%) of life. Male to female ratio was 10:1 suggestive of male predominance. Road traffic accidents (RTAs) were observed to be the predominant etiological factor responsible accounting for 40.90% of the total injuries followed by fall (39.77%) which is almost equal to RTAs, interpersonal violence (11.37%), sports injury (3.4%), animal injury (2.28%). Condyle exhibited the highest incidence (33.8%) amongst the anatomic sites, followed by parasymphysis (22.55%), angle (17.29%), body (13.55%), symphysis (7.52%), Dentoalveolar (3.75%), coronoid (1.5%) and ramus (0.76%). Single fracture site was noted in 56.82% cases followed by two anatomical sites in 35.23% then three anatomical sites in 7.95% cases. Fracture mandible mainly treated with open reduction and internal fixation in 73.87% of cases. **Conclusion:** High incidence of mandible was observed with male predominance in 3<sup>rd</sup> decade of life, RTAs and fall being the chief cause and the condyle was the most commonly involved site. Mandible can fracture at single, double or multiple sites. Mandible fracture can be treated mainly by open reduction with internal fixation with miniplates.

**Key words:** Mandibular fractures, Lower Himalayas region, road traffic accident, open reduction internal fixation

Received: 22 July, 2019

Revised: 19 September, 2019

Accepted: 20 September, 2019

**Corresponding Author:** Dr Nishant Sharma, (M.D.S. Conservative Dentistry & Endodontics) Private Clinical Practitioner, Patiala, Punjab; India

**This article may be cited as:** Sharma N, Jain S, Shabnam. Investigation of Correlation between Conventional Radiographic Assessment and Actual Root Canal Configuration Present In Mandibular Third Molars in Punjab – A Stereomicroscopic Study. Int J Res Health Allied Sci 2019;5(5):155-158.

## INTRODUCTION

Mandibular third molar is important for maintaining the alveolar arch and serves as a strategic abutment in cases of loss of the mandibular first and second molars so it is essential to understand its morphology for good endodontic treatment. The anatomy of third molars has been described as unpredictable. There are different radiological methods to evaluate the root canal morphologies, such as conventional radiography, Computed Tomography and CBCT. However, conventional radiography is the most commonly used method because of its availability, low dosage and being inexpensive and easy to perform. Clearing technique is considered as a gold standard technique for studying root canal morphology as the canal configuration can be better detected when compared to conventional radiography. Cone-beam computed tomography (CBCT) and Conventional CT are non-destructive, feasible, highly accurate techniques which are widely accepted for the evaluation of root canal morphology. They provides a three-dimensional reconstruction of the root canal system, low radiation dose and decrease in imaging errors such as artifacts.

## AIMS AND OBJECTIVES

The aim of this study was to investigate the correlation between conventional radiographic assessment of root canal configuration with actual root canal configuration present in mandibular third molars in Punjab.

## MATERIAL AND METHODS

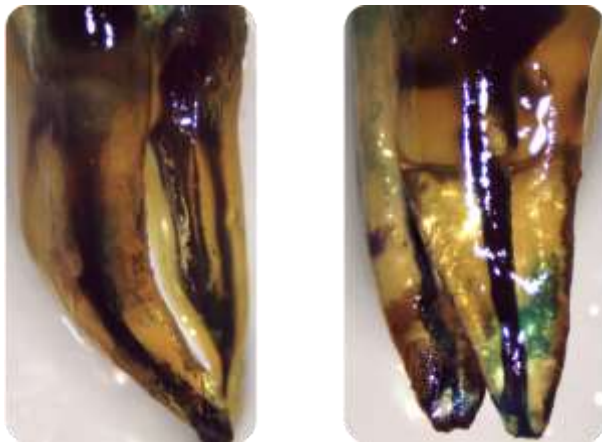
Sixty permanent mandibular third molar teeth indicated for extraction were collected. Inclusion criteria included teeth extracted due to caries, periodontal disease, periapical disease and exclusion criteria included teeth with fractures, impacted teeth and root canal treated teeth. Radiographs before extraction of teeth included in the study were preserved for later comparison. Extracted teeth were cleaned of all debris and attached tissue and were preserved in 10 % formalin solution. All the caries were removed and access cavities were prepared using round diamond bur in a high speed Air Rotor Handpiece with air water spray. The location of apical foramina were established by passing a size 10 K-file into the canal until it passes the root apex to maintain the patency. Then teeth were placed in 5% of sodium hypochlorite solution for 24 hours. Following the placement in Sodium hypochlorite solution, teeth were washed with running water for 2 hours, and then placed in 5% of Nitric Acid solution for 72 hours. Teeth were then washed with running water for 30 minutes and placed in ascending grades of Isopropyl alcohol 70%, 90% and 100% successively for 12 hours each, for a total duration of 36 hours for dehydration. Teeth

were made transparent by placing in Methyl Salicylate solution. Once the samples were completely cleared Methylene blue die was injected into the pulp chamber with a 26 gauge needle attached to syringe. The die was drawn through the canal system by applying negative pressure to the apical end of the tooth with the use of a central suction system. All stained and cleared samples were carefully examined under Stereomicroscope and the number and type of the canals inside each root was recorded according to Weine's classification. The radiographic assessment were then compared with the actual three dimensional root canal configuration present.





**Radiographic Anatomy**

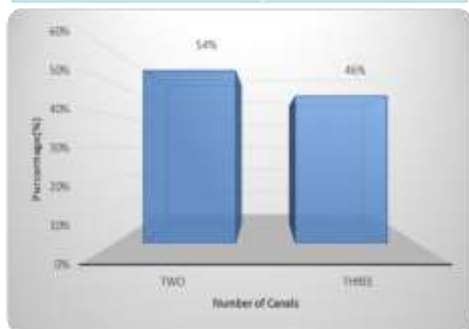


**Actual Anatomy after Clearing Technique**

**OBSERVATIONS AND RESULTS**

**DISTRIBUTION ACCORDING TO NUMBER OF CANALS**

| No. of canals                      | No. of samples | Percentage(%) |
|------------------------------------|----------------|---------------|
| <b>Two</b> (1 Mesial & 1 Distal)   | 27             | 54.0          |
| <b>Three</b> (2 Mesial & 1 Distal) | 23             | 46.0          |
| <b>Total</b>                       | 50             | 100.0         |



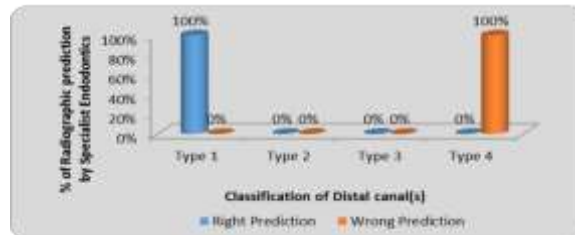
**Correlation of Weine's Classification of Mesial canal(s) and Radiographic prediction by Specialist Endodontists**

| Weine's Classification of Mesial canal(s) | Radiographic prediction by Specialist Endodontists |                  | Total    | x2-value         |
|---|--|------------------|----------|------------------|
|   | Right Prediction                                   | Wrong Prediction |          |                  |
| Type 1                                    | 19(38%)  | 2(4%)            | 21(42%)  | 3.13, p=0.37, NS |
| Type 2                                    | 5(10%)   | 8(16%)           | 13(26%)  |                  |
| Type 3                                    | 2(4%)  | 8(16%)           | 10(20%)  |                  |
| Type 4                                    | 0(0%)  | 6(12%)           | 6(12%)   |                  |
| <b>Total</b>                              | 26(52%)  | 22(48%)          | 50(100%) |                  |

**Correlation of Weine's Classification of Distal canal(s) and Radiographic prediction by Specialist Endodontists**

| Weine's Classification of Distal canal(s) | Radiographic prediction by Specialist Endodontists |                  | Total    | x2-value         |
|---|--|------------------|----------|------------------|
|   | Right Prediction                                   | Wrong Prediction |          |                  |
| Type 1                                    | 33(100%)   | 0(0%)            | 33(66%)  | 1.46, p=0.48, NS |
| Type 2                                    | 0(0%)  | 0(0%)            | 0(0%)    |                  |
| Type 3                                    | 0(0%)  | 0(0%)            | 0(0%)    |                  |
| Type 4                                    | 0(0%)  | 17(100%)         | 17(34%)  |                  |
| <b>Total</b>                              | 33(66%)  | 17(34%)          | 50(100%) |                  |

**GRAPHICAL PRESENTATION**



The software used in the analysis were SPSS 17.0 and Graph Pad Prism 5.0 version.

The statistical test used for the analysis of the result is Chi square Test.

## DISCUSSION

Many techniques have been used to investigate the internal anatomy of the teeth including root sectioning, canal staining and clearing, review of clinical records, and radiographic techniques such as conventional radiographs, computed tomography (CT), and CBCT. Conventional radiograph is the most common method used to assess the configuration of root canal systems during root canal treatments (Pineda et al. 1972), hence conventional radiography is used in present study. The tooth staining and clearing technique was used in the current study because it allows three dimensional evaluation of the root canal. The vacuum-assisted ink injection allowed diffusion of ink throughout the root canal system including canal complexities such fine semicalcified canals or at least stain their orifices, helping to detect them. In the present study the most common anatomical pattern of mandibular third molars found was two canals (54%). Alavi et al reported 68% mandibular third molars have two canals in Thai population. Kuzekanani et al. (2012) reported that mandibular third molars in Iranian population having two canals (73%) as most common pattern. Weine et al. 1969 concluded that the common canal anatomy present in molars are Type 1 (48.5%), Type 2 (37.5%), Type 3 (14%) and Type 4 (8.5%). According to the present study in mesial canals most common root canal anatomy found was Type 1 (42%), Type 2 (26%), Type 3 (20%) and Type 4 (12%) and in distal canals most common root canal anatomy present was Type 1 (66%), Type 4 (34%). Salwa et al. 2015 found that the most common root canal anatomy of mandibular third molars are Type 1 (66.7%), Type 2 (21%), Type 3 (3.5%) and Type 4 (3.5%). Omer et al in their comparative study between clearing technique and radiographic technique in the study of root canal anatomy of maxillary molars concluded that conventional radiographs are of limited value in predicting the root canal anatomy. Deepalaxmi M reported that well angulated periapical films with cone-directed straight-on, mesio-oblique and disto-oblique reveals and clarifies the three dimensional canal morphology in mandibular molars. The clearing technique was considered the best available method for the morphological study of the root canal system and its variations (Vertucci 1984). The main limitation of this technique is that it is destructive, produces irreversible changes in the tooth structure and creates artefacts. (Vertucci 2005, de Pablo et al. 2010). Cone beam computed tomography and Conventional CT are non destructive in vivo methods which provides accuracy, high-resolution, and can be used for detailed quantitative and qualitative measurements of root canal anatomy. CBCT has been widely accepted in endodontics because it has major advantage over

conventional CT i.e. reduction in radiation exposure, very simple to use and are approximately the same size of the panoramic radiographic machines (Abella et al. 2011). Neelakantan et al. 2010 concluded that CBCT and CT were as accurate as the tooth clearing technique in identifying root canal systems. Kim Y 2014 concluded that the clearing technique as gold standard for studying root canal morphology ex vivo, however complex root canal systems cannot be fully revealed by this technique alone. Hence, 3D image reconstruction techniques in CBCT provides a more accurate method for studying in-depth morphology of complex root canal systems.

## CONCLUSION

1. In the present study the most common anatomical pattern of mandibular third molars found in Punjab was two canals (54%).
2. The most common root canal anatomy according to Weine's classification in mesial canals is found to be Type 1 (42%) and in distal canals is found to be Type 1 (66%).
3. Weine's Type 1 canal configuration can be easily predicted using conventional radiography in mandibular third molars.
4. Well angulated IOPA's are required for the detection of Type 2 / Type 3 canal configuration in mandibular molars.
5. While Type 4 cannot be viewed using conventional radiography.
6. Cone beam computed tomography (CBCT) is required for the detection of Type 4 anatomy in mandibular third molars.

## REFERENCES

1. Alavi AM, Opananon A, Ng YL, Gulabivala K. Root and canal morphology of Thai maxillary molars. *Int Endod J* 2002;35(5):478-85.
2. Kuzekanani M, Jahangir H, Hossein N. Root and Canal Morphology of Mandibular Third Molars in an Iranian Population. *JODDD* 2012;6(3):85-89.
3. Ng YL, Aung TH, Alavi A, Gulabivala K. Root and canal morphology of Burmese maxillary molars. *Int Endod J* 2001;34(8):620-30.
4. Omer E, Al Shababi RM, Jennings M, Glennon J, Claffey NM. A comparison between clearing and radiographic techniques in the study of root canal anatomy of maxillary first and second molars. *Int Endod J* 2004;37:29-36.
5. Salwa Z, Sameena T, Sumit S, Kumar RV, Iswarya TH: A stereomicroscopic in vitro study to investigate the root canal morphology of mandibular third molars using clearing technique. *J Res Dent* 2015;vol.3(1):567-575.
6. Sidow SJ, West LA. Root canal morphology of human maxillary and mandibular third molars. *J Endod* 2000;26:67538.
7. Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol* 1984;58:589-99.
8. Weine FS, Healey HJ, Gerstein H, Evanson L. Canal configuration in the mesiobuccal root of the maxillary first molar and its endodontic significance. *Oral Surg Oral Med Oral Pathol* 1969;28:419-25