SEYBOLD Report
ISSN: 1533 - 9211
https://seyboldreport.net/

ASSOCIATION OF AGE AND GENDER WITH RCT IN RADIX ENTOMOLARIS.

Akshaya. K[1], S. Delphine Priscilla Antony [2]

[2]Saveetha Dental college & Hospitals, Saveetha Institute of Medical and technical Science, Saveetha University, Chennai E-mail ID - 151701075.sdc@saveetha.com
Contact number: +91 8939037205

[2]Reader, Department of Conservative dentistry and Endodontics, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and technical Science, Saveetha University, Chennai. E-mail ID - delphine.sdc@saveetha.com Contact number: +91 9790856274

ABSTRACT:

Background: Mandibular molars can have a supplementary root located lingually called the radix entomolaris or buccally, the radix paramolaris. If present, a complete awareness and understanding of this infrequent root and its canal morphology can contribute to the successful outcome of the endodontic treatment.

Aim: The aim of this study is to analyse the association between age and gender with the prevalence of RCT in radix entomolaris.

Materials and Methods: All the cases reported for RCT of mandibular molars between the month of June 2019 to March 2021 were considered for this study. Data of patients who underwent RCT in radix entomolaris were retrieved and reviewed. The age and gender associated with the prevalence of endodontic therapy done in radix entomolaris were analyzed, tabulated and were subjected to statistical analysis using chi square test in SPSS version 23.0. by IBM.

Results: From the statistical analysis, it can be documented that the prevalence of RCT in radix was 0.8%, commonly done in patients of age 15 to 30 years (69.2%), usually encountered in females (57.6%) and commonly seen in mandibular first molars (96%).

Conclusion: Radix entomolaris had female predilection, predominantly between the age group of 15 to 30 years, primarily reported in mandibular first molars.

Keywords: Endodontic therapy;Anatomical variant; Additional root; Radix entomolaris.

INTRODUCTION:

The prime objective of endodontic therapy is complete cleaning and shaping of the root canal system followed by 3-dimensional obturation. One of the frequent causes of failure of nonsurgical endodontic treatment is the inability to spot and negotiate additional root canals.(1) The mandibular first molar, the earliest permanent posterior tooth to erupt, is taken into account to be the foremost frequently involved tooth in endodontic procedures. It displays considerable anatomic variation and abnormalities regarding the number of roots and root canals. Clinicians should possess sound knowledge of aberrant morphology and must meticulously perform a preoperative radiographic examination before initiation of endodontic therapy so as to avoid incomplete obturation.(2) Radiographic identification of additional roots present on mandibular molars is important in order that all root canals are identified and instrumented during

endodontic treatment, since overlooked canals which haven't undergone chemomechanical preparation will contribute to early failure of endodontic therapy.(3) Use of cone beam volumetric tomography is often highly informative when anomalies in root morphology are identified on periapical radiographs. In the absence of such imaging, tube shifting with additional views taken from a more mesial or distal angle of 20–30 degrees (Parallax technique) can help delineate the morphology consistent with Buccal Object Rule. (4,5)

Mandibular molars with a supplementary third root located disto-lingually was first reported by Carabelli in 1844 and was termed "radix entomolaris". Rarely, a third root could also be found on the mesiobuccal side and is named "radix paramolaris." RE are often found on the mandibular molars, occurring least frequently on the second molar. Studies have shown that these supernumerary roots are often separated from other roots or are partially fused to other roots.(6) It is typically smaller than the mesial and disto-buccal roots and is typically curved, requiring special attention when endodontic intervention is considered. The coronal part of RE is totally or partially fixed to the distal root and its dimension can vary from short conical to a root of normal length.(7) Carlsen and Alexandersen described 4 differing types of RE,(8) whereas DeMoor et al., suggested a classification with 3 different types of RE: type I refers to a straight root, type II refers to an initially curved entrance that continues as a straight root, and sort III refers to an initial curve within the coronal third of the basis canal and a second curve beginning within the middle and continuing to the apical third.(9)

The etiology behind the formation of RE is unclear. In dysmorphic, supernumerary roots, its formation is usually associated with external factors during odontogenesis or due to penetrance of an atavistic gene or polygenic system.(10) In eumorphic roots, racial and genetic factors influence the more profound expression of a specific gene that leads to the more pronounced phenotypic manifestation.(5,11) Curzon suggested that the "3-rooted molar" trait, features a high degree of genetic penetrance, as its dominance was an highly prevalent trait in both pure Eskimo and Eskimo/Caucasian mixes.(12) Many anatomical studies have reported an association between the presence of a separate RE in the first mandibular molar and certain ethnic groups. In populations with Mongoloid traits, like Chinese, Eskimos and American-Indians, it occurs with a frequency of 5 to quite 30%.(13,14) In the African population, a maximum frequency of three was found whereas in Europeans the incidence was even less.(15) Schäfer et al using full-mouth periapical radiographs, investigated the incidence of radix entomolaris in the German population and concluded its overall incidence to be 1.35%. In the Indian population, Garg et al. reported 5.97% of occurrence of RE in mandibular first molars.(16) An equivalent method was employed by Karale et al. who reported a better incidence (6.67%) of RE.(17)

Our team has extensive knowledge and research experience that has translate into high quality publications(18–27),(28–31),(32–36) (37)

Knowledge of occurrence, location, and incidence of any tooth anatomical variation is vital because it features a significant role in clinical dentistry. This study will evaluate the association of age and gender with the incidence of root canal treatment done in radix entomolaris.

MATERIALS AND METHODS

Study setting and design

A retrospective study was conducted to analyse the association between age and gender with the prevalence RCT in radix entomolaris in patients visiting a private dental college. The study was conducted using case reports of patients visiting the author's University hospital.

Sample selection and criteria

This retrospective study was employed by reviewing all the records of patients who visited the University hospital from March 2020 to March 2021. A total of 26 records with signed informed consent were sorted. Efforts were made that all the retrieved case records had all the information needed for the study with no duplicates with the help of an external reviewer.

Ethical approval:

Prior permission to utilize the data was obtained from the University and ethical board number for the current study was obtained from the university.

Data collection:

Data on age, gender, teeth associated with RCT on radix was collected and tabulated in Microsoft Excel and imported to SPSS statistical analysis of version 23.0. The age of the patients in the case records was categorized for the convenience of statistical analysis such as 15 to 30 years and 31 to 45 years and 46 to 60 years.

Statistical analysis:

The collected data was analysed using Statistical Package for Social Sciences (SPSS) version 23.0. Descriptive statistics were used to analyse the association between age and gender with the prevalence RCT in radix entomolaris. A statistical significance p value <0.05 was considered.

RESULTS AND DISCUSSIONS:

In this study, of the total (3401) root canal treatments done in mandibular molars from March 2019 to March 2021, only 26 cases reposted were radix which points to about 0.8% prevalence of RCT done in radix entomolaris. On comparing the age group with the distribution of RCT done in radix, it can be seen that 69.2% of the patients were in the age range of 15 to 30 years, 23% of them were between 31 to 45 years and only 7.6% of them were between 46 to 60 years with a p value of less than 0.05 showing statistical significance (Figure 1 and 2). With regard to the prevalence of gender with radix entomolaris, in this study, female patients showed higher prevalence of RCT done in radix entomolaris (57.6%) when compared to male patients (42.3%).

Yet, this association shows no significance, giving a p value of greater than 0.05 (Figure 3 and 4). With regard to the prevalence of radix entomolaris in mandibular molars, it was equally seen on either side with lower left mandibular first molar showing slightly higher prevalence (50%) with a p value of 0.006 showing statistical significance (Figure 5).

The aim of the current study is to analyse the association of age and gender with root canal therapy done in radix entomolaris. This study will give an overall idea of the prevalence of anatomical variations such as radix among different age groups and genders, so as to help clinicians to have a keen understanding of the anatomical variation and to evaluate the same and plan the treatment accordingly.

From the current data and statistical analysis, it can be documented that the prevalence of RCT in radix entomolaris was 0.8%. This result was almost similar to the study conducted by Tratman et al., in 1938 who analysed the prevalence of radix among the Indian population and concluded the prevalence to be 0.2%.(38) In a similar study conducted by Chandra et al, in 2011 the prevalence of radix entomolaris in mandibular first molar was found to be 18.6%.(39) Yet, in another study conducted by Bharti et al in 2011 the prevalence of radix entomolaris among the Indian population was observed to be 2.19%. The overall prevalence of radix entomolaris was concluded to be between 5.8 to 43.6%. (40)

On associating the distribution of age with the prevalence of RCT in radix entomolaris, 69.2% of the patients were in the age range of 15 to 30 years. This shows the higher incidence of caries in adolescents requiring endodontic therapy. This was similar to the results conducted in 2019, which concluded the maximal prevalence of dental caries among the age group of 15 to 30 years (45.4%). The reasons for higher prevalence of dental caries among adolescents were attributed to increased consumption of sugary beverages and foods, low home water fluoridation, lower parental education.(41)

With regard to the prevalence of RCT in radix entomolaris according to gender, it was highly seen in female patients (57.6%) when compared to male patients (42.3%). RCT in radix doesn't have a significant association with the gender of the patients ($p<0.05$). Mukhaimer et al., in 2014 stated that the prevalence of radix has no significant Correlation with gender.(14) However Chandra et al, found higher prevalence of radix among male patients when compared to female patients.(2)

Prevalence of radix entomolaris was higher seen on mandibular first molar when compared to second and third molars, with mandibular left first molar showing higher prevalence (50%). Mandibular first molars seem to be the most frequent teeth in need of root canal treatment as they are the first permanent teeth to erupt. Nonetheless, anatomical variations of the root canal system in molars are not appreciated by a great number of general practitioners.(42) The presence of a third root (RE) may complicate the endodontic treatment and may lead to failure

as a result of canal missing. During root canal treatment in mandibular first molars, clinicians should be aware of this morphological abnormality.

Limitations of this study include Geographic limitation as predominantly South Indian population were only considered, and was a Unicentric study with few Incomplete and unclear data. The Future scope of this study will yield a better and more accurate result when Different ethnic populations are considered.

With the current study as a platform, the association of age and gender with the prevalence of radix entomolaris can be evaluated to enable dentists to gain a thorough knowledge on prevalent groups and will also aid in improving general public oral health.

CONCLUSION:

Within the limitations of the present study, Radix entomolaris was had female predilection, predominantly between the age group of 15 to 30 years, primarily reported in mandibular first molars. Thus, as a clinician, it is important to evaluate the morphological variations using radiographs to have a successful endodontic therapy with a better prognosis.

ACKNOWLEDGEMENT:

The authors would like to acknowledge the help and support rendered by, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai.

FUNDING:

The present study is funded by

- Saveetha Institute of Medical and Technical Sciences
- Saveetha Dental College and Hospitals
- Saveetha University
- Akshaya Associates Private Limited, Chennai.

CONFLICT OF INTEREST:

The authors declare no potential conflict of interest.

REFERENCES:

- Vertucci FJ, Haddix JE. Tooth Morphology and Access Cavity Preparation [Internet]. Cohen's Pathways of the Pulp. 2011. p. 136–222. Available from: http://dx.doi.org/10.1016/b978-0-323-06489-7.00007-2
- Chandra SS, Chandra S, Shankar P, Indira R. Prevalence of radix entomolaris in mandibular permanent first molars: a study in a South Indian population [Internet]. Vol. 112, Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2011. p.

e77–82. Available from: http://dx.doi.org/10.1016/j.tripleo.2011.02.016

- Weine FS. Endodontic Therapy. 1976. 496 p.
- Niemiec BA. Radiographic Interpretation for Endodontic Disease [Internet]. Practical Veterinary Dental Radiography. 2017. p. 143–55. Available from: http://dx.doi.org/10.1201/b20288-11
- Wang Q, Yu G, Zhou X-D, Peters OA, Zheng Q-H, Huang D-M. Evaluation of X-Ray Projection Angulation for Successful Radix Entomolaris Diagnosis in Mandibular First Molars In Vitro [Internet]. Vol. 37, Journal of Endodontics. 2011. p. 1063–8. Available from: http://dx.doi.org/10.1016/j.joen.2011.05.017
- von Lunkaszprie GC. Systematisches Handbuch der Zahnheilkunde. 1831. 176 p.
- Calberson FL, De Moor RJ, Deroose CA. The Radix Entomolaris and Paramolaris: Clinical Approach in Endodontics [Internet]. Vol. 33, Journal of Endodontics. 2007. p. 58–63. Available from: http://dx.doi.org/10.1016/j.joen.2006.05.007
- Carlsen O, Alexandersen V. Radix entomolaris: identification and morphology [Internet]. Vol. 98, European Journal of Oral Sciences. 1990. p. 363–73. Available from: http://dx.doi.org/10.1111/j.1600-0722.1990.tb00986.x
- De Moor RJG, Deroose CAJG, Calberson FLG. The radix entomolaris in mandibular first molars: an endodontic challenge. Int Endod J. 2004 Nov;37(11):789–99.
- Reichart PA, Metah D. Three-rooted permanent mandibular first molars in the Thai. Community Dent Oral Epidemiol. 1981 Aug;9(4):191–2.
- Kuzekanani M, Walsh LJ, Haghani J, Kermani AZ. Radix Entomolaris in the Mandibular Molar Teeth of an Iranian Population [Internet]. Vol. 2017, International Journal of Dentistry. 2017. p. 1–4. Available from: http://dx.doi.org/10.1155/2017/9364963
- Curzon ME. Miscegenation and the prevalence of three-rooted mandibular first molars in the Baffin Eskimo. Community Dent Oral Epidemiol. 1974;2(3):130–1.
- Sperber, Sperber, Moreau. Study of the number of roots and canals in Senegalese first permanent mandibular molars [Internet]. Vol. 31, International Endodontic Journal. 1998. p. 117–22. Available from: http://dx.doi.org/10.1046/j.1365-2591.1998.00126.x
- Mukhaimer R, Azizi Z. Incidence of Radix Entomolaris in Mandibular First Molars in Palestinian Population: A Clinical Investigation. Int Sch Res Notices. 2014 Nov 24;2014:405601.
- Ahmed HA, Abu-bakr NH, Yahia NA, Ibrahim YE. Root and canal morphology of permanent mandibular molars in a Sudanese population [Internet]. Vol. 40, International Endodontic Journal. 2007. p. 766–71. Available from: http://dx.doi.org/10.1111/j.1365-2591.2007.01283.x
- Schäfer E, Breuer D, Janzen S. The Prevalence of Three-rooted Mandibular Permanent First Molars in a German Population [Internet]. Vol. 35, Journal of Endodontics. 2009. p. 202–5. Available from: http://dx.doi.org/10.1016/j.joen.2008.11.010
- Garg AK, Tewari RK, Kumar A, Hashmi SH, Agrawal N, Mishra SK. Prevalence of Three-rooted Mandibular Permanent First Molars among the Indian Population [Internet]. Vol. 36, Journal of Endodontics. 2010. p. 1302–6. Available from:

http://dx.doi.org/10.1016/j.joen.2010.04.019

- Muthukrishnan L. Imminent antimicrobial bioink deploying cellulose, alginate, EPS and synthetic polymers for 3D bioprinting of tissue constructs. Carbohydr Polym. 2021 May 15;260:117774.
- PradeepKumar AR, Shemesh H, Nivedhitha MS, Hashir MMJ, Arockiam S, Uma Maheswari TN, et al. Diagnosis of Vertical Root Fractures by Cone-beam Computed Tomography in Root-filled Teeth with Confirmation by Direct Visualization: A Systematic Review and Meta-Analysis. J Endod. 2021 Aug;47(8):1198–214.
- Chakraborty T, Jamal RF, Battineni G, Teja KV, Marto CM, Spagnuolo G. A Review of Prolonged Post-COVID-19 Symptoms and Their Implications on Dental Management. Int J Environ Res Public Health [Internet]. 2021 May 12;18(10). Available from: http://dx.doi.org/10.3390/ijerph18105131
- Muthukrishnan L. Nanotechnology for cleaner leather production: a review. Environ Chem Lett. 2021 Jun 1;19(3):2527–49.
- Teja KV, Ramesh S. Is a filled lateral canal - A sign of superiority? J Dent Sci. 2020 Dec;15(4):562–3.
- Narendran K, Jayalakshmi, Ms N, Sarvanan A, Ganesan S A, Sukumar E. Synthesis, characterization, free radical scavenging and cytotoxic activities of phenylvilangin, a substituted dimer of embelin. ijps [Internet]. 2020;82(5). Available from: https://www.ijpsonline.com/articles/synthesis-characterization-free-radical-scavenging-and-cytotoxic-activities-of-phenylvilangin-a-substituted-dimer-of-embelin-4041.html
- Reddy P, Krithikadatta J, Srinivasan V, Raghu S, Velumurugan N. Dental Caries Profile and Associated Risk Factors Among Adolescent School Children in an Urban South-Indian City. Oral Health Prev Dent. 2020 Apr 1;18(1):379–86.
- Sawant K, Pawar AM, Banga KS, Machado R, Karobari MI, Marya A, et al. Dentinal Microcracks after Root Canal Instrumentation Using Instruments Manufactured with Different NiTi Alloys and the SAF System: A Systematic Review. NATO Adv Sci Inst Ser E Appl Sci. 2021 May 28;11(11):4984.
- Bhavikatti SK, Karobari MI, Zainuddin SLA, Marya A, Nadaf SJ, Sawant VJ, et al. Investigating the Antioxidant and Cytocompatibility of Mimusops elengi Linn Extract over Human Gingival Fibroblast Cells. Int J Environ Res Public Health [Internet]. 2021 Jul 4;18(13). Available from: http://dx.doi.org/10.3390/ijerph18137162
- Karobari MI, Basheer SN, Sayed FR, Shaikh S, Agwan MAS, Marya A, et al. An In Vitro Stereomicroscopic Evaluation of Bioactivity between Neo MTA Plus, Pro Root MTA, BIODENTINE & Glass Ionomer Cement Using Dye Penetration Method. Materials [Internet]. 2021 Jun 8;14(12). Available from: http://dx.doi.org/10.3390/ma14123159
- Rohit Singh T, Ezhilarasan D. Ethanolic Extract of Lagerstroemia Speciosa (L.) Pers., Induces Apoptosis and Cell Cycle Arrest in HepG2 Cells. Nutr Cancer. 2020;72(1):146–56.
- Ezhilarasan D. MicroRNA interplay between hepatic stellate cell quiescence and activation. Eur J Pharmacol. 2020 Oct 15;885:173507.

- Romera A, Peredpaya S, Shparyk Y, Bondarenko I, Mendonça Bariani G, Abdalla KC, et al. Bevacizumab biosimilar BEVZ92 versus reference bevacizumab in combination with FOLFOX or FOLFIRI as first-line treatment for metastatic colorectal cancer: a multicentre, open-label, randomised controlled trial. Lancet Gastroenterol Hepatol. 2018 Dec;3(12):845–55.
- Raj R K, D E, S R. β-Sitosterol-assisted silver nanoparticles activates Nrf2 and triggers mitochondrial apoptosis via oxidative stress in human hepatocellular cancer cell line. J Biomed Mater Res A. 2020 Sep;108(9):1899–908.
- Vijayashree Priyadharsini J. In silico validation of the non-antibiotic drugs acetaminophen and ibuprofen as antibacterial agents against red complex pathogens. J Periodontol. 2019 Dec;90(12):1441–8.
- Priyadharsini JV, Vijayashree Priyadharsini J, Smiline Girija AS, Paramasivam A. In silico analysis of virulence genes in an emerging dental pathogen A. baumannii and related species [Internet]. Vol. 94, Archives of Oral Biology. 2018. p. 93–8. Available from: http://dx.doi.org/10.1016/j.archoralbio.2018.07.001
- Uma Maheswari TN, Nivedhitha MS, Ramani P. Expression profile of salivary micro RNA-21 and 31 in oral potentially malignant disorders. Braz Oral Res. 2020 Feb 10;34:e002.
- Gudipaneni RK, Alam MK, Patil SR, Karobari MI. Measurement of the Maximum Occlusal Bite Force and its Relation to the Caries Spectrum of First Permanent Molars in Early Permanent Dentition. J Clin Pediatr Dent. 2020 Dec 1;44(6):423–8.
- Chaturvedula BB, Muthukrishnan A, Bhuvaraghan A, Sandler J, Thiruvenkatachari B. Dens invaginatus: a review and orthodontic implications. Br Dent J. 2021 Mar;230(6):345–50.
- Kanniah P, Radhamani J, Chelliah P, Muthusamy N, Joshua Jebasingh Sathiya Balasingh E, Reeta Thangapandi J, et al. Green synthesis of multifaceted silver nanoparticles using the flower extract of Aerva lanata and evaluation of its biological and environmental applications. ChemistrySelect. 2020 Feb 21;5(7):2322–31.
- Duhan J, Gupta A, Wadhwa J. Prevalence of three rooted permanent mandibular first molars in Haryana (North Indian) population [Internet]. Vol. 8, Contemporary Clinical Dentistry. 2017. p. 38. Available from: http://dx.doi.org/10.4103/ccd.ccd_699_16
- van den Bosch A, Dubois E. New Developments in Down Syndrome Research. Nova Biomedical; 2012. 316 p.
- Bharti R, Chandra A, Tikku A, Arya D. Prevalence of Taurodont molars in a North Indian population [Internet]. Vol. 6, Indian Journal of Dentistry. 2015. p. 27. Available from: http://dx.doi.org/10.4103/0975-962x.151700
- Quantitative and Qualitative Analysis of Dental Caries among Different Age Groups of Patients in a Private Dental College Hospital, Chennai, India [Internet]. Indian Journal of Forensic Medicine & Toxicology. 2020. Available from: http://dx.doi.org/10.37506/ijfmt.v14i4.12463
- Hommez GMG, Braem M, De Moor RJG. Root canal treatment performed by Flemish dentists. Part 1. Cleaning and shaping [Internet]. Vol. 36, International Endodontic Journal. 2003. p. 166–73. Available from: http://dx.doi.org/10.1046/j.1365-2591.2003.00633.x

Tables/ Figures:

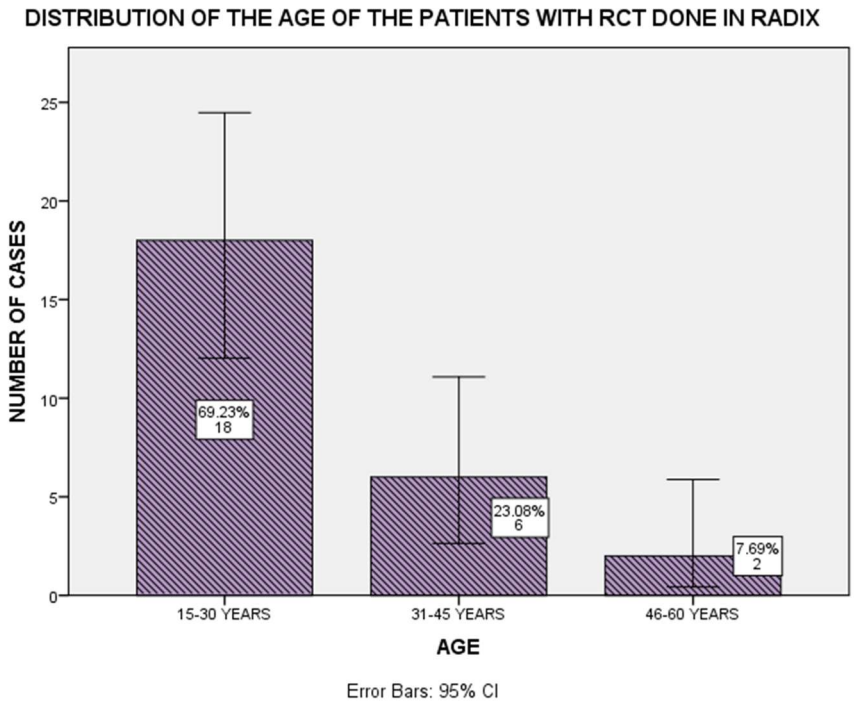

Figure 1: Bar graph showing the Prevalence of RCT in radix based on age. Age groups are represented in purple. The X axis shows prevalence among different age groups and the Y axis scale shows the percentage. From the graph it is evident that RCT in radix entomolaris was highly done among the patients of the age group 15 to 30 years. This finding is statistically significant. (Pearson Chi-SquareValue:2.556 ;p=0.000- statistically significant).

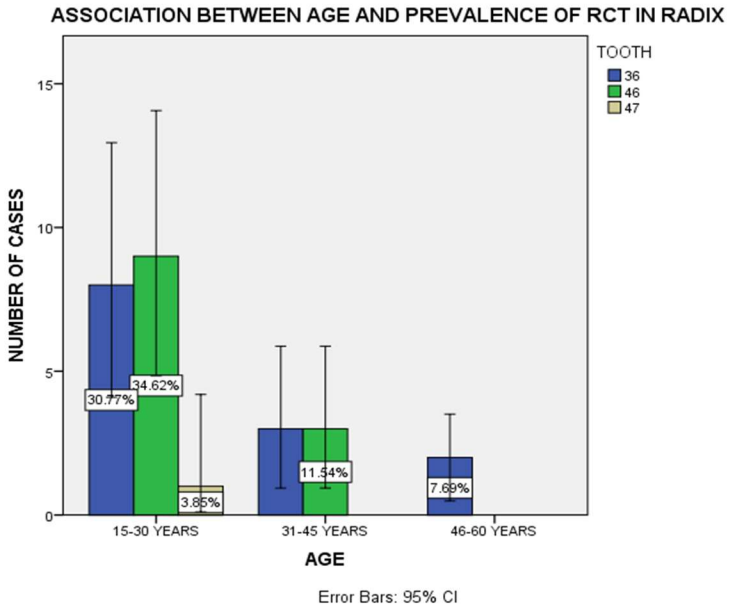

Figure 2: Bar graph showing the association between age of the patients and radix tooth having RCT done. 36 is represented in blue, 46 in green and 47 in cream colour. The X axis shows prevalence among different age groups and the Y axis scale shows the number of cases. From the graph it is evident that in the age range of 15 to 30 years RCT in radix was commonly prevalent in 46, among the age range of 31 to 45 years it was equally seen in both 36 and 46, among the patients of age 46 to 60 years it was seen only in 36. This finding is statistically not significant. (Pearson Chi-SquareValue:2.5 ;p=0.63- statistically not significant).

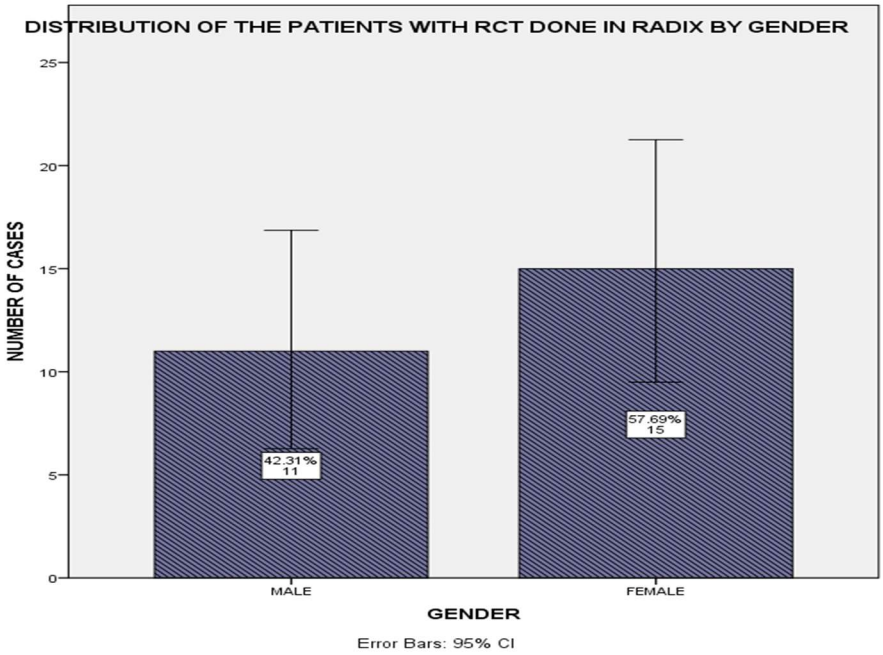

Figure 3: Bar graph showing the Prevalence of RCT in radix based on gender. Genders are represented in blue. The X axis shows prevalence among different genders and Y axis scale shows the percentage. From the graph it is evident that RCT in radix entomolaris was highly done among the female patients. This finding is not statistically significant. (Pearson Chi-SquareValue:3.46 ;p=0.43 statistically not significant).

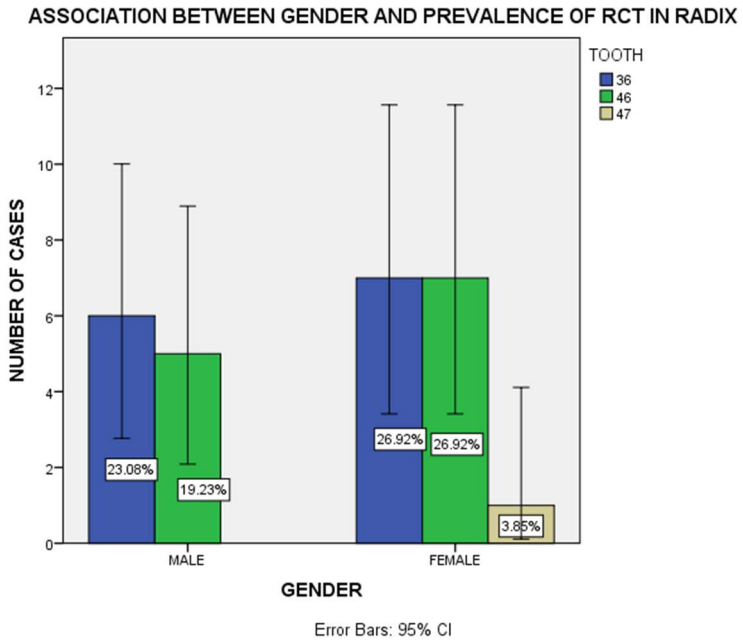

Figure 4: Bar graph showing the association between gender of the patients and radix tooth having RCT done. 36 is represented in blue, 46 in green and 47 in cream colour. The X axis shows prevalence among different genders and the Y axis scale shows the number of cases. From the graph it is evident that in males RCT in radix was commonly prevalent in 46, among females it was equally seen in both 36 and 46. This finding is statistically not significant. (Pearson Chi-SquareValue:0.8 ;p=0.66- statistically not significant).

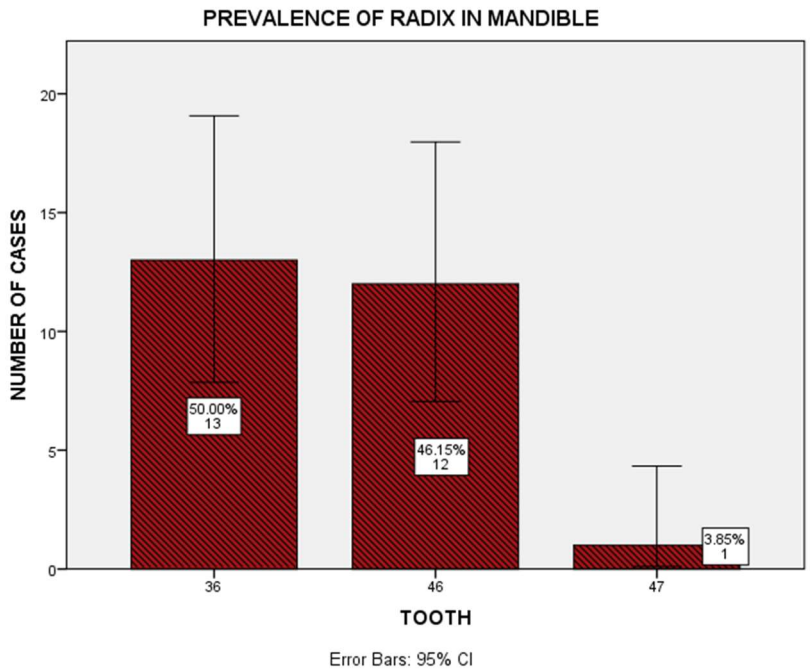

Figure 5: Bar graph showing the Prevalence of RCT in radix based on mandibular molars. Teeth undergone RCT are represented in red . The X axis shows prevalence among different teeth and the Y axis scale shows the percentage. From the graph it is evident that RCT in radix entomolaris was highly prevalent in mandibular first molars. This finding is statistically significant. (p=0.006- statistically significant).