

OCCURRENCE RATE OF DIFFERENT KINDS OF PERFORATION IN ANTERIOR TEETH.

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ABSTRACT

Aim; Perforations are a connection, from the tooth structure to its surrounding structures (periodontium), which may be created during or after a root canal treatment (iatrogenic) while attempting entry into the root canal system or as a factor of a biological process, where-in, there is a formation of a pathological connection, due to extensive caries, external/internal-resorption etc. Therefore, the aim of this study is to determine the prevalence of root canal treatment attending private dental colleges in Chennai.

Materials and methods: Case sheet of all the patients reporting to the OPD of Saveetha Dental College with root canal treatment. The study was conducted between June 2020-March 2021. This university setting study a sample of 97 patients. Data tabulated with parameters of age, gender and site of perforation Microsoft excel 2016 (Microsoft Office 10) was used to collect data and later was imported to SPSS software for statistical analysis.

Results: The prevalence of RCT treated tooth was found to be more in males (58.7%) than females (41.3%). Among the age groups of 17-25 years, 26-34 years, 35-42 years, 43-52 years and 53-67 years, it was more prevalent in 35-42 years age group (27.7%). Among the site of perforation (Anterior/Posterior) posterior site is more common. Types of perforation Root perforation, furcal perforation, crown perforation most common was crown perforation (53.2%). The correlation between gender and decayed surfaces was found to be insignificant with $p > 0.05$.

Conclusion: Within the limits of the study, the age group of (35-43) years and male patients had a higher prevalence of root canal treatment than females. However, no significant statistics were found for the prevalence of gender and root canal treatment $p > 0.05$ (chi-square test).

Keywords: Perforation, Root canal. MTA, Pulp chamber

INTRODUCTION

Perforations are a connection, from the tooth structure to its surrounding structures(periodontium), which may be created during or after a root canal treatment while attempting entry into the root canal system or as a factor of a biological process, where-in, there is a formation of a pathological connection, due to extensive caries, external/internal-resorption etc(1)(2). It can also occur due to lack of knowledge of the dental anatomy from the part of the dentist,or due to calcifications in pulp chambers, misidentification of the root-canal, incorrect arch inclination like rotation or tipping, posts, crowns or use of inappropriate instruments(3).

The various factors affecting the successful management of the same are the location, size, time of repair, periodontal status of the tooth, access to repair, and the biocompatibility of the perforation repair material. There are various methods of diagnosing a perforation, in endodontic practice(4). It is usually centered around symptoms and Radiographic evaluations. The patient may experience a variety of symptoms ranging from sensitivity to pain, and bleeding on introducing the instrument into the canal. Various methods of assessing and evaluating a perforation include direct visual evaluation, Paper points for bleeding, Electronic apex locators, symptomatic findings, DOMs(Dental Operating Microscopes), CBCT (Cone Beam Computed Tomography), Radiographs, Dental loupes for magnification(5).

The various methods that can be employed by the practitioner to minimize the incidence of perforations are, the use of NiTi files(6). Anticurvature filing, using the various diagnostic techniques mentioned above during the treatment to intervene and avoid any perforations at all, and also the use of non-end cutting burs(7). The various types of iatrogenic perforations that can occur during root-canal treatments can occur during the access cavity preparation (gouging-cervical perforations), and during negotiation of the root canal for biomechanical preparation (zipping, strip perforation, canal transportation) or even during post-space preparation(8). These will ultimately lead to the failure of the root canal treatment(9).

A small sized perforation, in the root, apical to the crestal bone and epithelial attachment, that is sealed immediately has a better prognosis(10). The various materials that can be used in the repair of the perforation are MTA, Calcium hydroxide, Calcium silicates, dentin chips, GIC and less commonly, or rather historically, silver amalgam, cavit, Indium foil, Aluminium foil, Zinc-Oxide Eugenol, Plaster of Paris(11). These materials aid in sealing off the connection and promote osteogenesis and cementogenesis(12,13). Used of calcium hydroxide for dental pulp treatment. This material has been studied for many years, and has several potentials, among which favoring the healing process of the pulp and periapical tissues(14). Calcium hydroxide has an antibacterial effect on the cytoplasmic membrane.

Mineral Trioxide Aggregate (MTA) was introduced in endodontics in 1990 as a new material with the ability to seal communication between the tooth and the external surfaces. The main components of the chemical composition of MTA, include tricalcium silicate, tricalcium aluminate, tricalcium oxide and silicate oxide(15). MTA is a calcium silicate cement introduced

in endodontics in the 1990s. New materials with similar composition to MTA, but distinct properties, have been introduced into the market on account of properties that facilitate handling and manipulation. New cements such as bioceramics are composed mainly of dicalcium silicate and tricalcium silicate. In the event of a perforation, during treatment, the patient should be informed of the same, the risks and prognosis be explained and the subsequent procedures are to be explained(16).In the event of not detecting the perforation or not addressing the perforation, it leads to an inflammatory response of the periodontium which may or may not be due to bacterial contamination, and may lead to destruction of periodontal tissue and alveolar bone, pocket formation, fistula formation, proliferation of tissue leading to granuloma formation, and ultimately the loss of the tooth(17).

Our team has extensive knowledge and research experience that has translated into high quality publications(18–27),(12,28–30),(14,31–34)(35). Therefore the aim of my study is to create the knowledge of occurrence of rate of different kinds of perforation in anterior teeth.

MATERIAL AND METHODS

This record based, descriptive study was conducted among patients reporting to the OP of Saveetha Dental College. Case sheets of all the Patients of OP Department of Saveetha dental college were reviewed for a period of ten months [JUNE 2020 and MARCH 2021]. Sample of 93 patients regarding root canal treatment were taken.

Prior to the start of the study,ethical approval was obtained from Scientific Review Board,Saveetha Dental College,SIMATS University.Data consisting of age,gender and decayed tooth was retrieved from the records of patients who visited dental college from june 2020-march 2021.

The age was grouped into (17-25 years),(26-34 years).(35-42 years),(43-52 years),(53-67 years).The gender include male and female.Site of perforation-Root perforation,furcal perforation,crown perforation.Data was recorded and tabulated in ms excel.Then the tabulated data expressed by means of frequency and percentage. Chi-square test was employed to find the association between age and anterior/posterior teeth, Gender and anterior/posterior teeth with level of Statistical significance at $p < 0.05$.

RESULT

The final database consisted of 97 patients of Indian origin in which about 58.70% male patients and 41.30%female patients were included(figure-4).Among the various age groups included for this study, the age group which had a higher prevalence for decayed surfaces was the 35-42 years age group that is about 24 patients (27.17%) following which was 43-52 years age group with 22 patients (26.09%) and above 55 years around (19.57%) patients had root perforation (figure 3)Males were predominantly distributed than females in the present study.It was evident from the results that Crown perforation (53.26%) had the highest prevalence for perforation

site followed by Furcal perforation(35.87%). About 21.74 patients had anterior tooth and 78.26% patients had posterior site tooth as root canal perforation. (figure 1). The association between gender and site of perforation anterior and posterior of the study population was found to be statistically insignificant with $p>0.05$. (figure 6) (chi square test).

DISCUSSION

The data for this retrospective study was based on residents of Chennai seeking treatment at Saveetha Dental College, Chennai. Currently there are no existing studies investigating the correlation of age with sites for perforation(Anterior/Posterior). Since all the data was included without a sorting process, no bias was expected in the selection of patients. The current study is done to compare the age associated with the site of perforation(Anterior/Posterior).

In the current study,the age group which had a higher prevalence for decayed surfaces was the 35-42 years age group (27.17%) followed by the 43-52 years age group (26.09%). In a study done by Torabinejab et al 2014, stated that young adults had more caries prevalence than older adults which leads to root canal treatments(36). In another study by Estreala et al 2014, it was noted that the highest prevalence of dental caries was found to be in the 35-45 years age group(37).

According to the current study, as the age increases, the prevalence of caries decreases and this is in concordance with many pieces of literature. (38,39) This holds true as with age the incidence of decayed teeth increases. The present study does not observe any significant sex differences in the prevalence of decayed surfaces. In the current study, there were more male participants than female participants. (58.7%) and (41.3%) respectively. However, in a study by Mamai E et al, stated that caries risk in both males and females was the same. (38)Currently, the caries experience between the study seemed to reduce during the past few years.In this we get a crown perforation more prevalent in compared to furcal perforation and root perforation. Studies done by Saed et al 2016 state that the crown perforation was more common(40).

Females generally pose a more positive behavior than males concerning the brushing frequency. Females usually care more about their body and appearance and therefore they might be more concerned about adopting behaviors and habits which promote their dental health.It is also seen that females have better dental knowledge and better oral hygiene than men.(41,42).Dentists must take care of anatomy and proper knowledge of root, they also have a proper idea how to manage the perforation.The majority of the study participants were males. This might bias the study results, as the sample taken is not representative of the population. Also, this study has geographic limitations and the additive flaws of the DMFS index lowers the credibility and increases the potential for human error while recording scores.Thus the interpretation of results of the study must be done keeping the above limitation in mind.

CONCLUSION

Within the limit of the study, root furcation was most common among 43-52 years old on posterior site study participants and crown perforation was more prevalent as compared to furcal perforation and root perforation. With relation to gender, male study participants had a higher prevalence of decayed teeth than female study participants with leads to root canal treatments. However, no statistically significant association was found for the prevalence of decayed teeth and gender.

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CONFLICT OF INTEREST

None declared.

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REFERENCES

- Bryan EB, Woollard G, Mitchell WC. Nonsurgical repair of furcal perforations: a literature review. *Gen Dent*. 1999 May;47(3):274–8; quiz 279–80.
- 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 [Internet]. Vol. 11, *Applied Sciences*. 2021. p. 4984. Available from: <http://dx.doi.org/10.3390/app11114984>
- Muthukrishnan L. Imminent antimicrobial bioink deploying cellulose, alginate, EPS and synthetic polymers for 3D bioprinting of tissue constructs [Internet]. Vol. 260, *Carbohydrate Polymers*. 2021. p. 117774. Available from: <http://dx.doi.org/10.1016/j.carbpol.2021.117774>
- Website [Internet]. Available from: 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>
- 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.
- Narendran K, Jayalakshmi S, Ms N, Sarvanan A, Amirtha GS, Sukumar E. Synthesis, Characterization, Free Radical Scavenging and Cytotoxic Activities of Phenylvilangin, a

- Substituted Dimer of Embelin [Internet]. Vol. 82, Indian Journal of Pharmaceutical Sciences. 2020. Available from: <http://dx.doi.org/10.36468/pharmaceutical-sciences.720>
- 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* [Internet]. 2020 Apr 1 [cited 2021 Aug 24];18(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/32618460/>
 - Teja KV, Ramesh S. Is a filled lateral canal – A sign of superiority? [Internet]. Vol. 15, Journal of Dental Sciences. 2020. p. 562–3. Available from: <http://dx.doi.org/10.1016/j.jds.2020.02.009>
 - Maheswari TNU, Nivedhitha MS, Ramani P. Expression profile of salivary micro RNA-21 and 31 in oral potentially malignant disorders [Internet]. Vol. 34, Brazilian Oral Research. 2020. Available from: <http://dx.doi.org/10.1590/1807-3107bor-2020.vol34.0002>
 - 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 [Internet]. Vol. 18, International Journal of Environmental Research and Public Health. 2021. p. 7162. 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 [Internet]. Vol. 14, Materials. 2021. p. 3159. 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 [Internet]. Vol. 885, European Journal of Pharmacology. 2020. p. 173507. Available from: <http://dx.doi.org/10.1016/j.ejphar.2020.173507>
 - Gudipani 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.
 - Kanniah P, Radhamani J, Chelliah P, Muthusamy N, Balasingh EJJ, Thangapandi JR, et al. Green Synthesis of Multifaceted Silver Nanoparticles Using the Flower Extract of *Aerva lanata* and Evaluation of Its Biological and Environmental Applications [Internet]. Vol. 5, ChemistrySelect. 2020. p. 2322–31. Available from: <http://dx.doi.org/10.1002/slct.201903228>
 - Romera A, Peredpaya S, Shparyk Y, Bondarenko I, Bariani GM, 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 [Internet]. Vol. 3, The Lancet Gastroenterology & Hepatology. 2018. p. 845–55. Available from: [http://dx.doi.org/10.1016/s2468-1253\(18\)30269-3](http://dx.doi.org/10.1016/s2468-1253(18)30269-3)

- Muthukrishnan L. Nanotechnology for cleaner leather production: a review [Internet]. Vol. 19, Environmental Chemistry Letters. 2021. p. 2527–49. Available from: <http://dx.doi.org/10.1007/s10311-020-01172-w>
- 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 Mimulus 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>
- 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.
 - Chaturvedula BB, Muthukrishnan A, Bhuvanaraghan 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.
 - Torabinejad M. *Mineral Trioxide Aggregate: Properties and Clinical Applications.* John Wiley & Sons; 2014. 360 p.
 - Estrela C, Holland R, Estrela CR de A, Alencar AHG, Sousa-Neto MD, Pécora JD. Characterization of successful root canal treatment. *Braz Dent J.* 2014 Jan;25(1):3–11.
 - Mamai-Homata E, Topitsoglou V, Oulis C, Margaritis V, Polychronopoulou A. Risk indicators of coronal and root caries in Greek middle aged adults and senior citizens. *BMC Public Health.* 2012 Jun 26;12:484.
 - Doifode VV, Ambadekar NN, Lanewar AG. Assessment of oral health status and its association with some epidemiological factors in population of Nagpur, India. *Indian J Med Sci.* 2000 Jul;54(7):261–9.
 - Saed SM, Ashley MP, Darcey J. Root perforations: aetiology, management strategies and outcomes. *The hole truth.* *Br Dent J.* 2016 Feb 26;220(4):171–80.
 - Kateeb E. Gender-specific oral health attitudes and behaviour among dental students in Palestine. *East Mediterr Health J.* 2010 Mar;16(3):329–33.
 - Locker D, Miller Y. Subjectively reported oral health status in an adult population. *Community Dent Oral Epidemiol.* 1994 Dec;22(6):425–30.

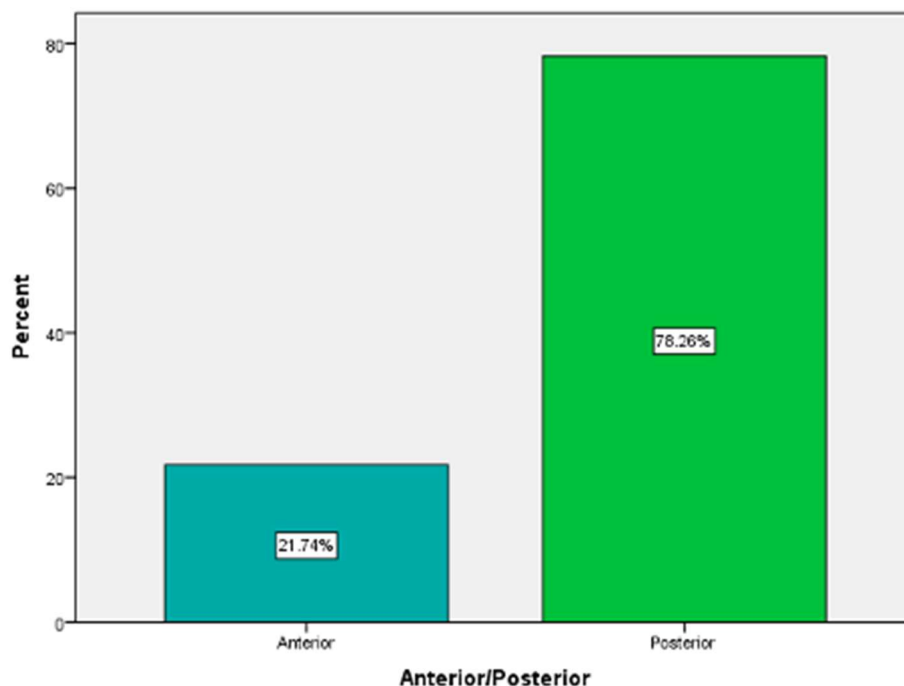


Figure 1- This graph represents the distribution of study subjects based on age group.X axis represents site of oral cavity where tooth affected, Anterior and Posterior. y axis represents the frequency of participants.Posterior site were found be more (78.28%) followed Anterior site(21.74%).

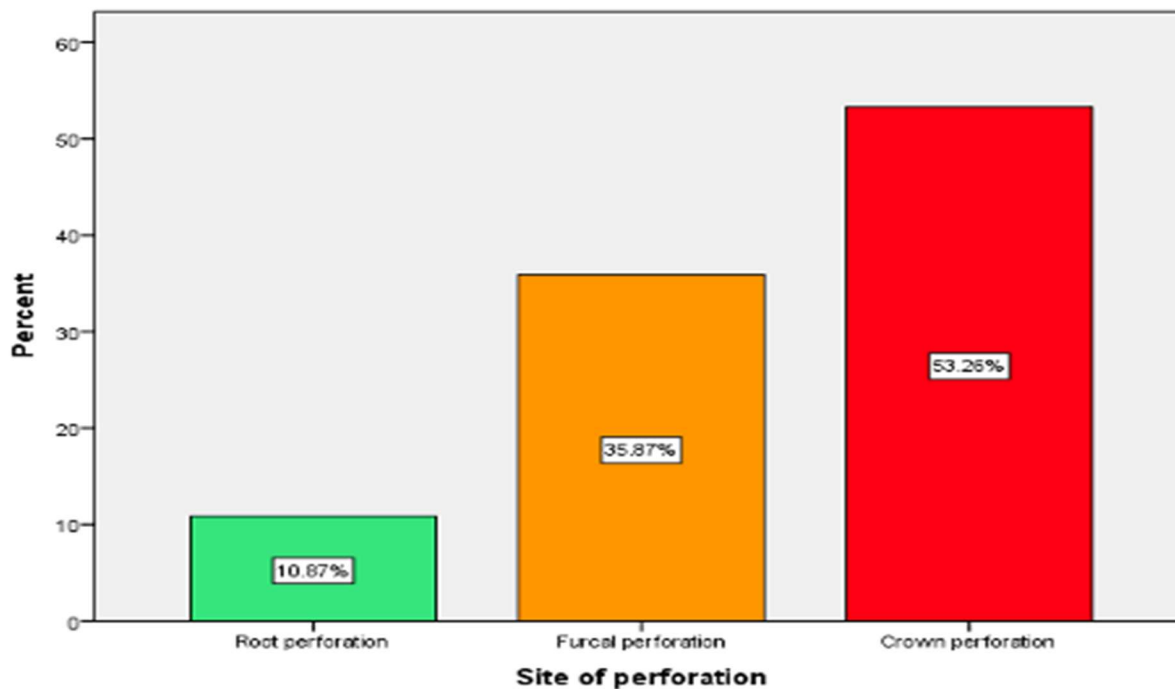


Figure 2- This graph represents the distribution of study subjects based on age group.X axis represents the site of perforation Root perforation, Furcal perforation, Crown perforation y axis

represents the frequency of participants. Crown perforation were found be more (53.26%) followed by Furcal perforation(35.87%)

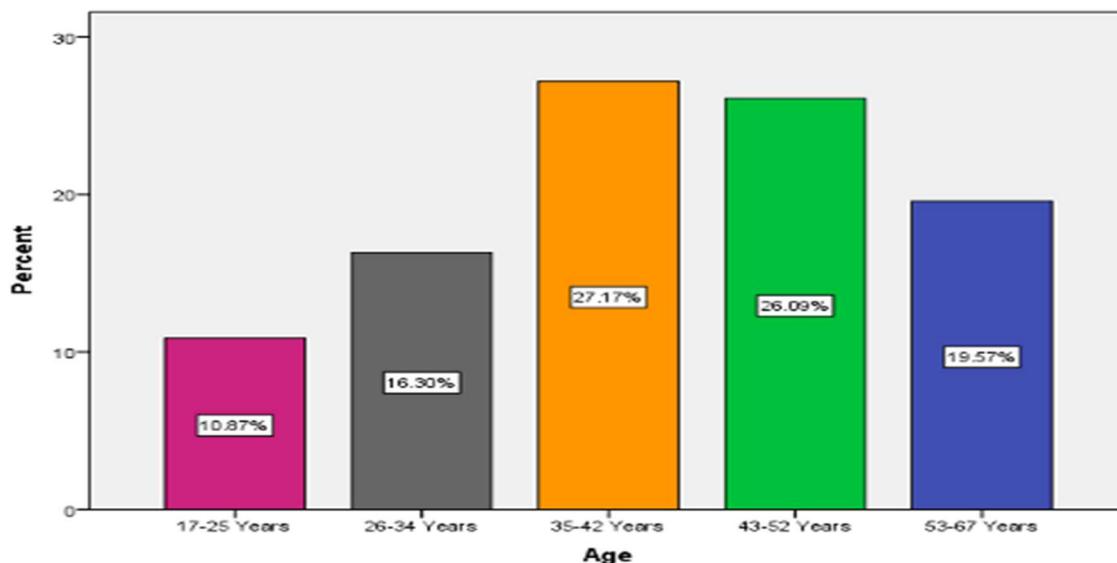


Figure 3- This graph represents the distribution of study subjects based on age group. X axis represents the age range (17-25 year),(26-34 year),(35-42 year),(43-52 year),(53-67 year) y axis represents the frequency of participants. Age range from 35-42 years were found be more (27.17%) followed by age range 43-52 years.(26.09%)

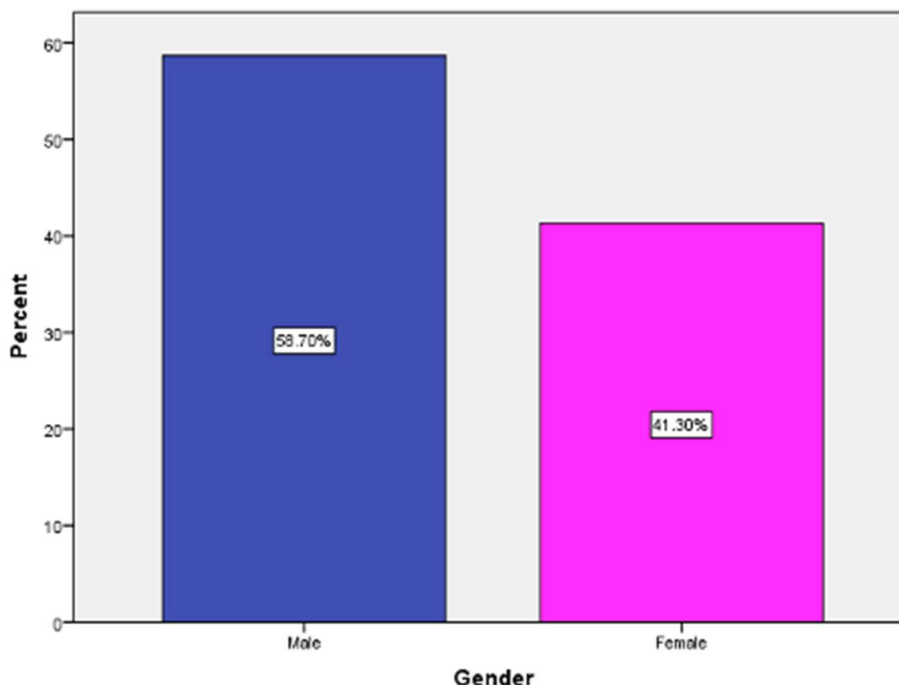


Figure 4:The graph represents the distribution of study subjects based on gender. X axis represents the gender y axis represents the frequency of study subjects. Out of 93 study subjects, were male (58.70%)and (41.30%) were female

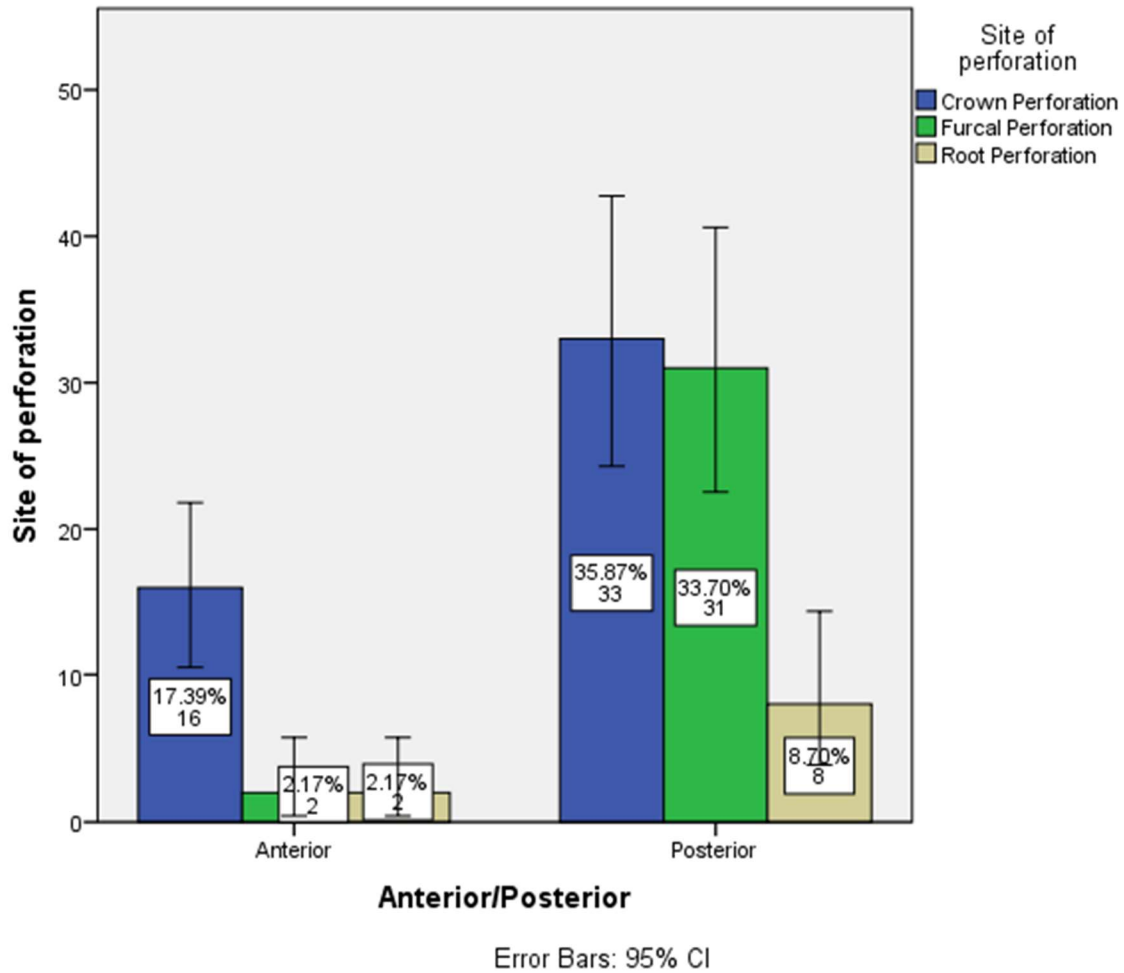


Figure 5-Bar graph represents the association between Anterior/Posterior and Site of perforation. X axis represents Anterior/Posterior and Y axis represents the site of perforation, where blue colour denotes the root perforation, green colour denotes furcal perforation and pink colour denotes the crown perforation. The association between anterior/posterior and site of perforation was analyzed using Chi square test and was found to be statistically significant [Chi- square value= 22.301; (p value<0.001)]. Hence proving furcal perforation and crown perforation were more prevalent in the posterior teeth.

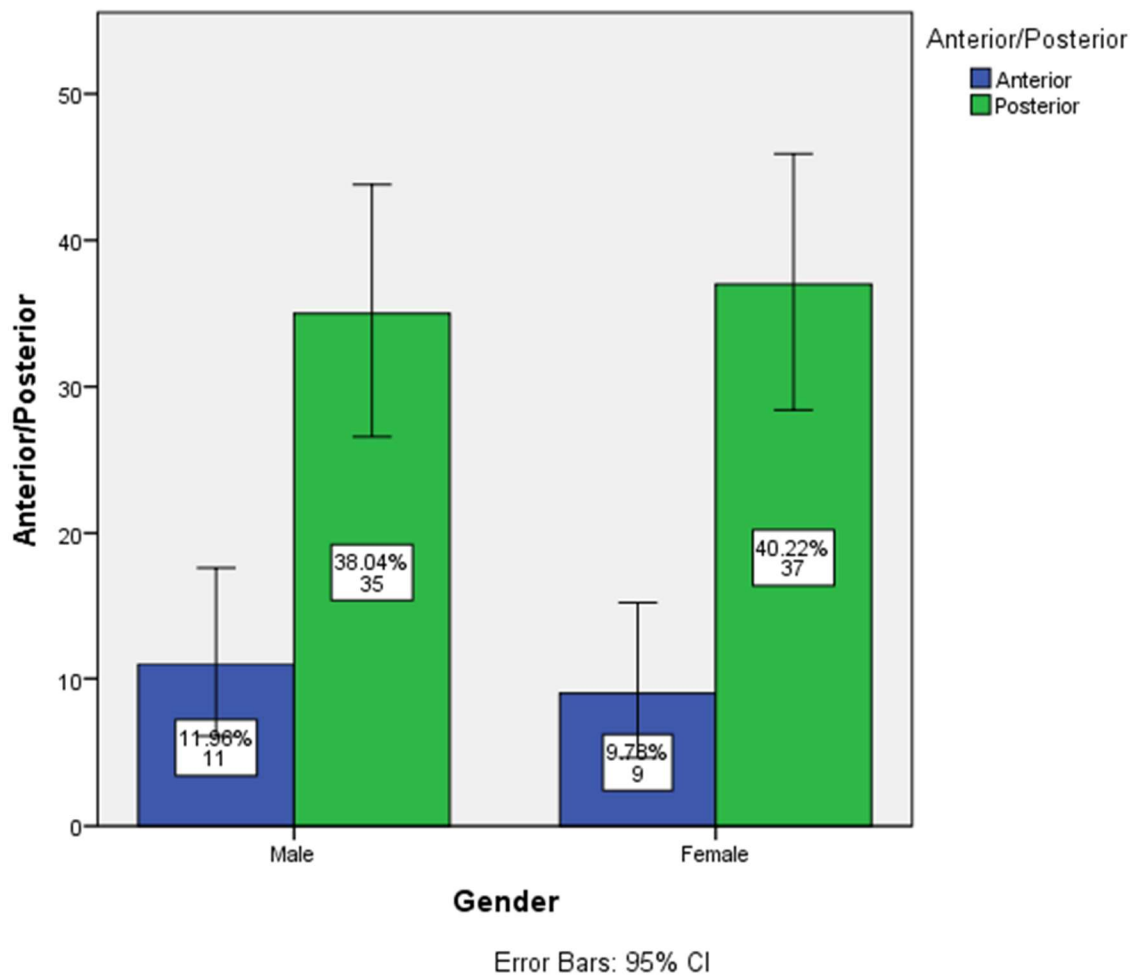


Figure 6-Bar graph represents the association between Gender and Anterior/Posterior teeth. X axis represents Gender and Y axis represents Anterior/Posterior Teeth, where blue colour denotes the anterior teeth, green colour denotes Posterior teeth. The association between gender and anterior/posterior teeth was analyzed using Chi square test and was found to be statistically significant [Chi- square value= 22.301; (p value<0.001)]. Hence proving the posterior teeth were more prevalent in male.

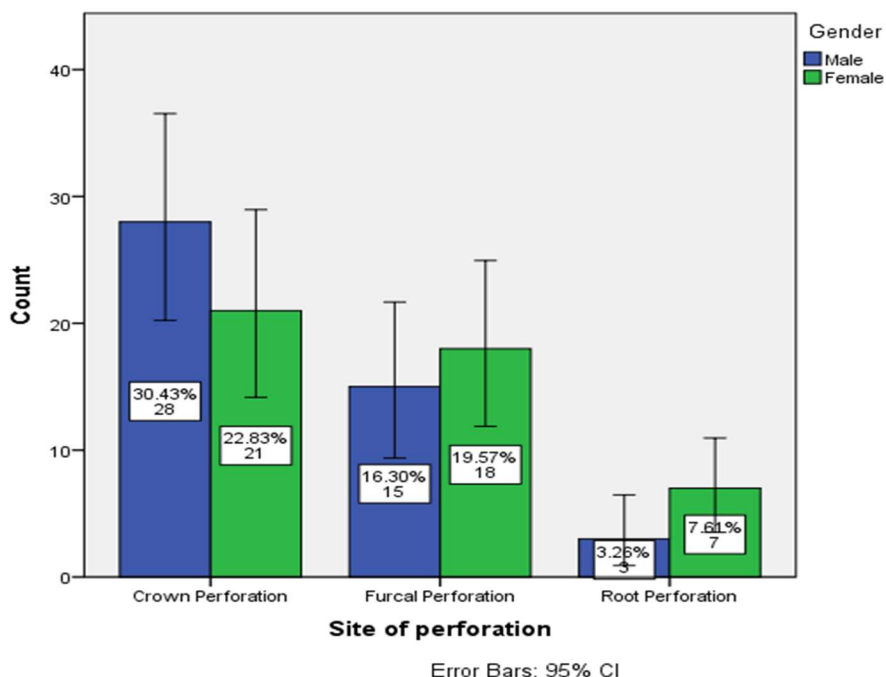


Figure 7-Bar graph represents the association between Site of perforation and Gender teeth. X axis represents Site of perforation and Y axis represents gender, where blue colour denotes the male, green colour denotes female. The association between gender and site of perforation was analyzed using Chi square test and was found to be statistically significant [Chi- square value= 22.301; (p value<0.001)]. Hence proving the male with crown perforation is more prevalent.