



Association of Age and Gender of Patients with the Type of Tooth Resorption Treated - A Retrospective Analysis

Mulumoodi Rama Sowmya, Delphine Priscilla Antony S*, Adimulapu Hima Sandeep

Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai - 600077, Tamil Nadu, India

Article History:

Received on: 04 Sep 2020

Revised on: 04 Oct 2020

Accepted on: 10 Oct 2020

Keywords:

age,
external tooth
resorption,
frequency,
gender,
internal tooth resorption

ABSTRACT

The aim of the present study was to assess the association of age and gender of patients with the type of tooth resorption treated. The data was retrieved from the patient records and analyzed the data of tooth resorption treated patients between June 2019 to March 2020, after approval from the Institutional Review board of Saveetha Dental College. It is an institutional based retrospective study. The data was tabulated into excel sheets under the headings age, gender, type of tooth resorption treatment, tooth number. The data was analyzed by Chi-square test using SPSS software. The probability value obtained after performing Chi-square test was $P > 0.05$ indicating that there is a statistically insignificant difference between the age, gender, teeth of patients who have undergone treatment for tooth resorption. Within the limitations of the study, the frequency of internal tooth resorption cases was higher compared to external tooth resorption cases. Male population of the age group 20 to 25 years have most frequently undergone treatment for internal tooth resorption.



*Corresponding Author

Name: Delphine Priscilla Antony S

Phone: 9790856274

Email: delphine.sdc@saveetha.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL3.3479>

Production and Hosted by

IJRPS | <https://ijrps.com>

© 2020 | All rights reserved.

INTRODUCTION

Root tooth resorption is the loss of dental tissues as a result of clastic activities. It might occur as a pathologic or physiologic phenomenon. Physiologic phenomenon is seen in case of tooth eruption and shedding, whereas pathological tooth resorption is seen after trauma or infection. (Nasim and Nandakumar, 2018). Bone undergoes physiologic remodelling

continuously throughout life (Patel *et al.*, 2010). Root resorption of permanent teeth is not a natural process and is invariably inflammatory in nature. Thus root tooth resorption in permanent dentition is a pathologic event; if untreated might result in premature loss of affected teeth (Fernandes *et al.*, 2013a). Odontoclasts are responsible for tooth resorption. Root resorption might be broadly classified into external or internal tooth resorption based on the location of tooth resorption in relation to the root surface. Compared with external root resorption, internal tooth resorption is a rare occurrence relatively (Fernandes *et al.*, 2013b).

Internal root resorption has been described as intraradicular or apical, based on the location of the conditions. Intraradicular internal tooth resorption is an inflammatory condition that results in progressive destruction of intraradicular dentin & dentinal tubules along middle and apical third of the canal walls (Mittal *et al.*, 2014). The resorptive spaces might be filled by granulation tissue or cementum like mineralised tissues. The condition is

more frequently observed in males than female subjects (Nasim and Nandakumar, 2018). Compared with intraradicular internal tooth resorption, apical internal tooth resorption is common in teeth with periapical lesions (Fernandes et al., 2013a).

Two types of internal tooth resorption can occur. Internal inflammatory tooth resorption and root canal replacement tooth resorption. They are akin to intraradicular and apical tooth resorption (Ramanathan and Solete, 2015). In the inflammatory type of tooth resorption, the resorptive process of the intraradicular dentin progresses without adjunctive deposition of hard tissues adjacent to the resorptive sites (Gabor et al., 2012). This phenomenon is associated with the presence of granulation tissues in the resorbed area. In the replacement tooth resorption, the resorptive activity causes defects in dentin adjacent to the root canal with concomitant deposition of bone like tissue in the defective area (Haapasalo and Endal, 2006). It results in an irregular enlargement of the pulp space and the pulp chamber might be fully or partly obliterated.

In endodontics, external root tooth resorption occurs because of trauma mainly or contamination of root canal with bacteria that induce small root tooth resorption cavities called how ship's lacunae reaching the dentin. It is a process that starts from lesions of PDL/ cementum due to trauma tubules and root canal. It can be caused by sudden trauma or persistent orthodontic force (Solomon et al., 1989).

Andreasen & Hjorting Hansen have described three forms of external root tooth resorption. Surface, inflammatory & replacement. Surface tooth resorption has been observed in 90% of human teeth and is self limiting to the cementum zone. After the clastic cavity has cupped out cemental areas, new cementum and new PDL fibres repair these concavities and restore the root contour (Dental abstracts, 2006; Hegde and Hegde, 2013).

Inflammatory tooth resorption is generally related to the presence of bacteria. In severe cases, if surface root tooth resorption reaches the dentinal tubules, it allows for possible communication with pulp tissue and can result in inflammatory tooth resorption. Replacement tooth resorption can be seen in cases of severe trauma in which the PDL is disrupted or injured. In the replacement tooth resorption, bone can replace the root structure (Patel et al., 2018).

Depending on the extent of injury to the PDL, this replacement tooth resorption or ankylosis can resorb the entire root or damage can be mild, Can be transient and repair itself with cells from adjacent healthy periodontal ligament (Arora et al., 2015). Another type of tooth resorption, accord-

ing to the classification of Lindskog, a true combined lesion called external tooth resorption communicating with internal tooth resorption, is also a rare occurrence. Both the defects can occur concomitantly either with similar etiology or separate etiologies (Arora et al., 2015).

Few studies were done to know the prevalence of internal or external root tooth resorption. Shannon Patel et al, found that internal tooth resorption is quite rate compared to external tooth resorption (Patel et al., 2010). Cabrini et al concluded in his study that internal tooth resorption is difficult to identify initially with a two dimensional radiographic evidence without complementary three dimensional radiographic or histological support (Cabrini et al., 1957). Caliskan and Turkun examined the internal tooth resorption mostly occurring in anterior teeth. Yousuf et al, found in his study that external tooth resorption occurs more frequently than internal resorption. He also said that external tooth resorption occurs at multiple sites (Rafflenbeul and Bolender, 2020). The aim of the present study was to assess the association of age and gender of patients with the type of tooth resorption treated.

MATERIALS AND METHODS

The data was retrieved from the patient records of an institution. Data of patients treated for tooth resorption between June 2019 to March 2020 was analysed after approval from the Institutional Review board of Saveetha Dental College. It was an Institutional based retrospective study. Data was collected from patients who underwent treatment for tooth resorption.

The data was tabulated into excel sheets under the headings age, gender, type of tooth resorption treatment, tooth number. Data was collected from July 2019 to March 2020. Inclusion criteria-patients of age 18 to 60 years and maxillary and mandibular teeth treated by internal and external tooth resorption. Exclusion criteria- incompletely treated teeth.

The data includes all completed cases- maxillary and mandibular teeth, treated for tooth resorption, age and gender of patients who underwent tooth resorption which was collected in a chronological order from the database. The data collected was tabulated in an excel sheet. The data was analyzed by Chi-square test using SPSS software. The dependent variables are, type of treatment i.e., internal and external tooth resorption, age and gender. Independent variables include maxillary and mandibular teeth.

RESULTS AND DISCUSSION

In this study, we observed that there was a statistically insignificant difference between the age and gender of patients who underwent treatment for tooth resorption. The probability value obtained after performing Chi-square test was $P > 0.05$ indicating that there is a statistically insignificant difference between the age, gender, teeth of patients who have undergone treatment for tooth resorption. The frequency of age distribution of patients who underwent treatment for tooth resorption showed that wherein the age group of 20 to 25 years underwent more number of treatments (60%) for tooth resorption compared to the age group 26 to 30 years (40%). The frequency of gender distribution of patients who underwent treatment for tooth resorption showed that males (80%) underwent more number of treatments for tooth resorption compared to females. The frequency of distribution of teeth that are treated for tooth resorption shows that maxillary right central incisor (40%) was treated more for tooth resorption compared to maxillary left central incisor (20%) and mandibular molars (20%). The frequency of distribution of type of treatment showed that more number of internal tooth resorption cases (80%) have been performed than external tooth resorption (20%). Figure 1 bar graph shows the age distribution of patients treated for internal and external tooth resorption which denotes that the age group of 20 to 25 years underwent more number of treatments for internal tooth resorption followed by external tooth resorption. [$P > 0.05$; chi-square test]. Figure 2 bar graph shows the gender distribution of patients who underwent treatment for tooth resorption, which illustrates that males have undergone more internal tooth resorption treatments compared to females followed by external tooth resorption treatments. [insignificant difference [$P > 0.05$; chi-square test]. Figure 3 bar graph shows the distribution of maxillary and mandibular teeth treated for internal and external tooth resorption wherein it illustrates that maxillary right central incisor underwent more internal tooth resorption treatments compared to maxillary left central incisor, mandibular molars. [$P > 0.05$; chi-square test]

Figure 1 shows, the graph shows that more internal tooth resorption cases were treated in the age group of 20 to 25 and more external tooth resorption cases were treated in the age group of 20 to 25. However, the association between the age and type of tooth resorption treated, was insignificant; $p = 0.36$, chi-square value = 0.83 (P -value > 0.05 , Chi-square test).

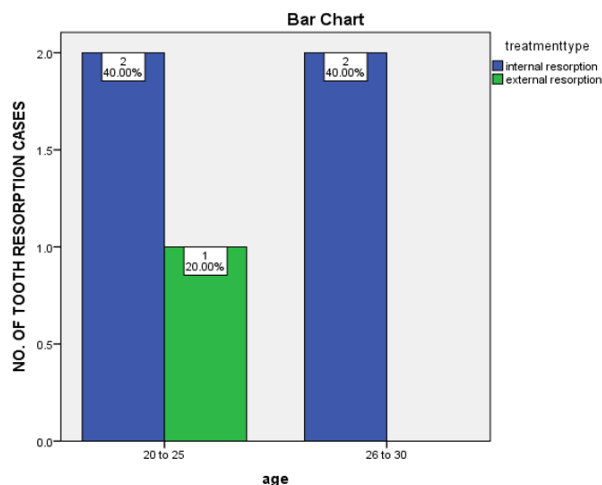


Figure 1: This graph represents the association between age of the patients and the type of tooth resorption treated, where blue colour denotes internal resorption and green colour denotes external resorption.

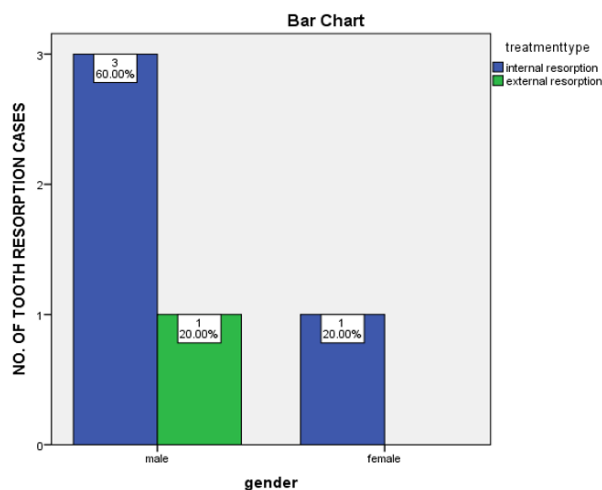


Figure 2: This graph represents the association between the gender of the patients and type of tooth resorption treated, where blue colour denotes internal resorption and green colour denotes external resorption.

Figure 2 shows, the graph shows that more number of male patients were treated for internal resorption, and only male patients underwent treatment for external resorption. There was no significant association between the gender and the type of tooth resorption treated; $p = 0.57$, chi-square value = 0.31 (P -value > 0.05 , insignificant association, Chi-square test).

Figure 3 shows the graph shows that more internal tooth resorption treatments were done in maxillary right central incisor followed by mandibular first and third molars and external tooth resorp-

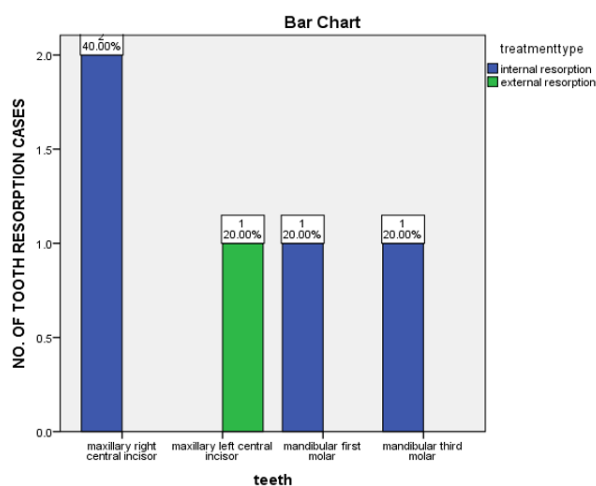


Figure 3: This graph represents the association between the teeth and type of tooth resorption treated, where blue colour denotes internal resorption and green colour denotes external resorption.

tion treatment was done in maxillary left central incisor. There was no significant association between the teeth and the type of tooth resorption treated; $p=0.17$, chi-square value=5.0 (P -value >0.05 , insignificant association, Chi-square test).

Chi-square statistical test is performed using SPSS software. Though the probability value obtained was insignificant ($P>0.05$), the frequency of internal tooth resorption cases were higher compared to external tooth resorption. Males of the age group 20 to 25 years have undergone more treatments for internal tooth resorption compared to external tooth resorption.

According to the Glossary of the American Association of Endodontics, tooth resorption is defined as a condition associated with either a physiologic or a pathologic process resulting in loss of dentin, cementum or bone. It can be physiologic during tooth eruption process or pathologic most commonly during the inflammatory process (Jose et al., 2020).

Tooth resorption can be classified as internal tooth resorption, external tooth resorption, external tooth resorption communicating with internal tooth resorption (Nasim et al., 2018; Kumar and Antony, 2018). However, it is found that the occurrence of internal tooth resorption is quite rare when compared to external tooth resorption. In a study conducted by Georgina et al, it is found that internal tooth resorption occurs mostly in the anterior teeth (Allen and Gutmann, 1977). In another study conducted by Gabor et al, he found that internal inflammatory root tooth resorption was preva-

lent among teeth with inflammation/pulpal necrosis (Gabor et al., 2012). James Lupi et al, in his study found out that 73% of the external replacement tooth resorption occurred after orthodontic treatment (Singh et al., 2014). External cervical tooth resorption is another form of tooth resorption that usually manifests in the cervical aspect of the teeth. According to Andreasen, it develops as a result of damage to or deficiency of PDL and subepithelial cementum. According to Heather say, orthodontic treatment, internal bleaching and few surgical procedures are predisposing factors to external cervical tooth resorption (Yildirim and Elbay, 2019). Mavridou et al, hence confirmed that external cervical tooth resorption is usually more prevalent compared to other forms of external root tooth resorption usually accounts for 57% (Ramesh et al., 2018; Teja and Ramesh, 2019).

The treatment protocol varies according to the type of tooth resorption (Rajendran et al., 2019). Once internal tooth resorption is detected, it presents with a unique difficulty to endodontists. This is due to the irregularly shaped internal tooth resorption defect which might hinder the mechanical instrumentation within the canal (Rajakeerthi and Nivedhitha, 2019). However, the initial treatment of choice for internal tooth resorption is conservative root canal procedure (Gabor et al., 2012). Access cavity preparation should be kept very minimal to prevent further weakening of the tooth structure by removing more tooth structure. This should be followed by thorough disinfection and placement of intracanal medicament between appointments to allow the lesion to heal followed by obturation (Yildirim and Elbay, 2019; Janani et al., 2020; Manohar and Sharma, 2018).

The treatment for external tooth resorption depends on the location of the defect. In case of external cervical tooth resorption, flap is raised followed by curettage and placement of barrier material and follow up (Nilsson et al., 2013). Whereas in case of external apical tooth resorption, chemomechanical debridement followed by copious irrigation with chlorhexidine irrigant and placement of calcium hydroxide intracanal medicament to allow it to heal followed by obturation (Noor, 2016; Ramamoorthi et al., 2015; Siddique et al., 2019). In case of external tooth resorption communicating with internal tooth resorption (true combined lesion), both the defects have to be treated separately (Ahangari et al., 2015). The internal tooth resorption should be treated by conventional root canal treatment by placing calcium hydroxide medicament and the external tooth resorption is treated by debridement

and placement of barrier material such as MTA for healing (Ravinthar and Jayalakshmi, 2018).

The aim of the present study is to assess the association of age and gender of patients who underwent treatment for tooth resorption. In this study, we have observed that there is a statistically significant difference in the age and gender of patients who underwent treatment for tooth resorption.

The data was analyzed by chi-square test between the variable age, gender, teeth and type of tooth resorption. In the frequency distribution of the age group of patients undergoing treatment for tooth resorption, it can be seen that the age group of 20-25 years underwent more number of treatments for tooth resorption. And also males have undergone more treatments for tooth resorption compared to females.

In the type of treatment performed it can be noted that internal tooth resorption cases have been recorded more than external tooth resorption. It can also be inferred that maxillary central incisor was treated for internal tooth resorption in excess compared to maxillary lateral incisor and mandibular molars. The result of our study shows that internal tooth resorption is more prevalent compared to external root tooth resorption.

The reason may be attributed to the more number of cases reporting to the hospital with severe pulpal inflammation and necrosis. The overall consensus does not support the previous literature where they said that external tooth resorption is more prevalent than internal tooth resorption. However, there are certain limitations of our study.

1. Very limited sample size
2. Preparation is confined to a single hospital
3. Subjective error/bias may be present.
4. Data collected is confined to one year only.

Hence in future multicentric study is advised and a larger group of population should be assessed.

CONCLUSION

Within the limitations of the study, the frequency of internal tooth resorption cases were higher compared to external tooth resorption cases. Male population of the age group 20 to 25 years have undergone more treatments for internal tooth resorption.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

Funding support

The authors declare that they have no funding support for this study.

REFERENCES

- Ahangari, Z., Nasser, M., Mahdian, M., Fedorowicz, Z., Marchesan, M. A. 2015. Interventions for the management of external root resorption. *Cochrane database of systematic reviews*.
- Allen, A. L., Gutmann, J. L. 1977. Internal root resorption after vital root resection. *Journal of Endodontics*, 3(11):438-440.
- Arora, S., Gill, G. S., Saluja, P., Setia, V. 2015. Management of a rare case of communicating internal-external inflammatory resorption. *Journal of Clinical and Diagnostic Research: JCDR*, 9(5):39-40.
- Cabrini, R. L., Maisto, O. A., Manfredi, E. E. 1957. Internal Resorption of dentine. *Oral Surgery, Oral Medicine. Oral Pathology*, 10(1):90-96.
- Dental abstracts 2006. A selection of world dental literature. 51:208-210. Multiple external root tooth resorption.
- Fernandes, M., de Ataide, I., Wagle, R. 2013a. Tooth resorption part I - pathogenesis and case series of internal resorption. *Journal of Conservative Dentistry*, 16(1):4.
- Fernandes, M., de Ataide, I., Wagle, R. 2013b. Tooth resorption part II - external resorption: Case series. *Journal of Conservative Dentistry*, 16(2):180.
- Gabor, C., Tam, E., Shen, Y., Haapasalo, M. 2012. Prevalence of Internal Inflammatory Root Resorption. *Journal of Endodontics*, 38(1):24-27.
- Haapasalo, M., Endal, U. 2006. Internal inflammatory root resorption: the unknown resorption of the tooth. *Endodontic Topics*, 14(1):60-79.
- Hegde, M. N., Hegde, N. 2013. Internal and External Root Resorption Management: A Report of Two Cases. *International Journal of Clinical Pediatric Dentistry*, 6(1):44-47.
- Janani, K., Palanivelu, A., Sandhya, R. 2020. Diagnostic accuracy of dental pulse oximeter with customized sensor holder, thermal test and electric pulp test for the evaluation of pulp vitality: an in vivo study. *Brazilian Dental Science*, 23(1):8.
- Jose, J., P., A., Subbaiyan, H. 2020. Different Treatment Modalities followed by Dental Practitioners for Ellis Class 2 Fracture – A Questionnaire-based Survey. *The Open Dentistry Journal*, 14(1):59-65.
- Kumar, D., Antony, S. D. P. 2018. Calcified Canal and Negotiation-A Review. *Research Journal of Phar-*

- macy and Technology*, 11(8):3727.
- Manohar, M., Sharma, S. 2018. A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists. *Indian Journal of Dental Research*, 29(6):716.
- Mittal, S., Mittal, S., Sharma, J., Kumar, T. 2014. "Internal root resorption: An endodontic challenge": A case series. *Journal of Conservative Dentistry*, 17(6):590.
- Nasim, I., Hussainy, S., Thomas, T., Ranjan, M. 2018. Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One-year follow-up. *Journal of Conservative Dentistry*, 21(5):510.
- Nasim, I., Nandakumar, M. 2018. Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis. *Journal of Conservative Dentistry*, 21(5):516.
- Nilsson, E., Bonte, E., Bayet, F., Lasfargues, J.-J. 2013. Management of Internal Root Resorption on Permanent Teeth. *International Journal of Dentistry*, 2013:1-7.
- Noor, S. 2016. Chlorhexidine: Its properties and effects. *Research Journal of Pharmacy and Technology*, 9(10):1755-1760.
- Patel, S., Foschi, F., Mannocci, F., Patel, K. 2018. External cervical resorption: a three-dimensional classification. *International Endodontic Journal*, 51(2):206-214.
- Patel, S., Ricucci, D., Durak, C., Tay, F. 2010. Internal Root Resorption: A Review. *Journal of Endodontics*, 36(7):1107-1121.
- Raffenbeul, F., Bolender, Y. 2020. Severity and prevalence of root resorption in maxillary canine impaction. *American Journal of Orthodontics and Dentofacial Orthopedics*, 158(1):8-9.
- Rajakeerthi, R., Nivedhitha, M. S. 2019. Natural Product as the Storage medium for an avulsed tooth – A Systematic Review. *Cumhuriyet Dental Journal*, 22(2):249-256.
- Rajendran, R., Kunjusankaran, R. N., Sandhya, R., Anilkumar, A., Santhosh, R., Patil, S. R. 2019. Comparative Evaluation of Remineralizing Potential of a Paste Containing Bioactive Glass and a Topical Cream Containing Casein Phosphopeptide-Amorphous Calcium Phosphate: An in Vitro Study. *Pesquisa Brasileira em Odontopediatria e Clínica Integrada*, 19:1-10.
- Ramamoorthi, S., Nivedhitha, M. S., Divyanand, M. J. 2015. Comparative evaluation of postoperative pain after using endodontic needle and EndoActivator during root canal irrigation: A randomised controlled trial. *Australian Endodontic Journal*, 41(2):78-87.
- Ramanathan, S., Solete, P. 2015. Cone-beam Computed Tomography Evaluation of Root Canal Preparation using Various Rotary Instruments: An in vitro Study. *The Journal of Contemporary Dental Practice*, 16(11):869-872.
- Ramesh, S., Teja, K. V., Priya, V. 2018. Regulation of matrix metalloproteinase-3 gene expression in inflammation: A molecular study. *Journal of Conservative Dentistry*, 21(6):592.
- Ravinthar, K., Jayalakshmi 2018. Recent Advancements in Laminates and Veneers in Dentistry. *Research Journal of Pharmacy and Technology*, 11(2):785-785.
- Siddique, R., Sureshababu, N. M., Somasundaram, J., Jacob, B., Selvam, D. 2019. Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi. *Journal of conservative dentistry*, 22(1):40-47.
- Singh, M., Singh, N., Dhiman, R., Kumar, D. 2014. External replacement resorption in an avulsed reimplanted permanent incisors. *Journal of the International Clinical Dental Research Organization*, 5(1):27.
- Solomon, C. S., Notaro, P. J., Kellert, M. 1989. External root resorption—fact or fancy. *Journal of Endodontics*, 15(5):219-223.
- Teja, K. V., Ramesh, S. 2019. Shape optimally and clean more. *Saudi Endodontic Journal*, 9(3):9-9.
- Yıldırım, S., Elbay, M. 2019. Multidisciplinary Treatment Approach for Perforated Internal Root Resorption: Three-Year Follow-Up. *Case reports in dentistry*.