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RESEARCH ARTICLE

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Evaluation of Pain in Relation to Root Canal Treated Tooth with Sealer Extrusion - A Retrospective Analysis

Keerthana Balaji[1], Raghu Sandhya[2*], Pradeep D[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, India
Email: 151501068.sdc@saveetha.com

[2]Reader, Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, India
Email: sandhya.sdc@saveetha.com

[3]Associate Professor, Department of Oral and Maxillofacial surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, India
Email: pradeep@saveetha.com

ABSTRACT

Sealer extrusion causes damages to the surrounding periradicular tissues and anatomical structures. Symptoms such as pain or swelling may be present causing discomfort to the patients. Sealer extrusion may also lead to failure of endodontic therapy.The purpose of this study was to evaluate the association of pain in root canal treated teeth with sealer extrusion. The study was designed to include all dental patients of the ages 20-61 years undergoing retreatment of root canal treatment (Re-RCT) for sealer extrusion. This study included 258 participants who required Re-RCT. The final data used for analysis were patients with sealer extrusion which was n=15. Age, gender and tooth involved was documented. Data was collected and tabulated in Excel. Data was analysed by descriptive statistics and chi square test using SPSS software. The total occurrence of pain in root canal treated tooth with sealer extrusion among the study population was found to be 66.6% (10/15). Higher incidence of pain was noted in lower posterior teeth 33.3% (5/15). In the present study, pain in the root canal treated tooth with sealer extrusion was recorded in 66.6% of the cases, with higher predilection in male population. Experience of pain was found to be higher in the age group 20-30 years. The pain was more often associated with lower posteriors.

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KEYWORDS

Root canal treatment, sealer extrusion, Pain, Lower posterior teeth

INTRODUCTION

Endodontic therapy is mainly carried out to clean the root canal system, reduce pain and remove infection from the tooth. Pain and swelling are the common indicators of an existing disease associated with an offending tooth. Endodontic treatment focuses on the reversal of the disease process [1,2]. Root canal treatment involves excavation of vital and necrotic pulp tissue followed by three-dimensional filling of root canal space with minimal postoperative discomfort. However, factors such as sealer extrusion, trauma to the periapical tissue leading to its inflammation might result in postoperative pain [3,4]. Ideally, the filling material should reach to the apex of the root without extending into periapical tissues or other neighbouring structures. Several studies have shown that the highest success rate of endodontic treatment was observed in cases with root canal fillings ending 0–2 mm short of the radiographic

*Contact: Raghu Sandhya, *Reader, Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, India*
sandhya.sdc@saveetha.com

apex, and underfillings or over fillings display significantly lower rates. However, over-instrumentation of a root canal with manual or rotary instruments leads to extrusion of sealers and irrigation solutions into the surrounding anatomical structures and periapical tissues [5,6]. Extruded sealer is either solubilised in the tissue fluids or gets phagocytosed. This depends on the physicochemical properties of the obturation material [7,8]. The most common complication seen incase of sealer extrusion is pain [9,10]. Swelling of the lip, dysesthesia , paraesthesia and hypoesthesia are the other clinical symptoms observed when the extruded sealer comes in contact with periapical tissues and nerve structures [11,12]. The possible factors that can cause tissue damage leading to the clinical symptoms include chemical factors because of the neurotoxic effects of the materials used in endodontic therapy, over instrumentation, pressure from the core filling material or sealer within the inferior alveolar canal and overheating of tissues during obturation [13–15]. The success of the root canal treatment depends on the complete removal of the necrotic pulp and obturation of the root canal system [16,17]. Pain after endodontic therapy is mainly due to the activation of local inflammatory factors in the periapical tissues. The apical limit of the obturation material influences the treatment outcome. It has been observed that successful results are obtained when the obturation material does not extend beyond the apical foramen [18–20]In addition to the apical limit of obturation, type of root canal sealer used in the endodontic treatment also plays a predominant role in the success of the treatment [21–23]The degree of tissue reaction is based on the type and amount of sealer used , the location of the extrusion, and the condition of the periodontal tissues [24–26]. Extrusion of sealer can cause problems that vary from mild inflammatory reactions to severe neurotoxic damage [27,28]. Previously our team had conducted numerous clinical trials and lab studies and in-vitro studies [29–44] over the past 5 years. We have shifted the focus to this retrospective analysis. The aim of this study was to evaluate pain in relation to root canal treated teeth with sealer extrusion.

MATERIALS AND METHODS

Study Setting

The study was conducted with the approval of the Institutional Ethics Committee [SDC/SIHEC/2020/DIASDATA/0619-0320]. The study consisted of one reviewer, one assessor and one guide .

Study Design

The study was designed to include all dental patients of the ages 20-61 years undergoing Retreatment RCTs for sealer extrusion.The patients who did not fall into this inclusion criteria were excluded.

Sampling Technique

The study was based on a non probability consecutive sampling method. To minimise sampling bias, all case sheets of patients who underwent Retreatment RCTs were reviewed and included.

Data Collection and Tabulation

Data Collection was done using the patient database with the timeframe work 01 June 2019 and 31 march 2020. About 258 case sheets were reviewed and those fitting under the inclusion criteria were included. Cross verification was done with the help of Photographs and radiographic evidence. To minimise sampling bias all data were included. The exclusion criteria was patients with systemic conditions. Data was downloaded from DIAS and imported to Excel, Tabulation was done. The values were tabulated and analysed.

Statistical Analysis

Descriptive statistics was performed using SPSS by IBM on the tabulated values. Chi-Square test was performed and the p value was determined to evaluate the significance of the variables it was used to evaluate the association between the age and gender with the type of treatment done in the third molar. The results were obtained in the form of graphs and tables.

RESULTS

This study included 258 participants who required retreatment RCTs. The final data used for analysis were patients with sealer extrusion which was 15. The total occurrence of pain in root canal tooth with sealer extrusion among the study subjects was found to be 66.6% (10/15) with higher predilection in males that is 46.67% (7/15) (Figure-1). Prevalence of pain was higher in the age group 20-30 years that is 70% (5/15) (Figure-2). Higher incidence of pain was noted in lower posterior teeth 33.3% (5/15) and incidence of pain was observed to be least in case of lower anterior teeth that is 6.6% (1/15) among different age groups as well as gender (Figure-3).

DISCUSSION

Risk of sealer extrusion can be influenced by several factors such as over-instrumentation, complexity of the anatomy of the root canal system, excessive amount of sealer, excessive compaction force, hydrostatic pressure, the use of lentulo spiral, immature canal apices or root resorption [45,46]. Most of the studies showed that sealer extrusion in

premolars and molars is mainly due to over instrumentation [47]. The results of the present study showed that the prevalence of pain was higher in lower posterior teeth. These findings were consistent with the results of the study conducted by Eyal Rosen et al, who stated that incidence of sealer extrusion was found to be higher in mandibular molars resulting in pain and paresthesia [48]. Shashirekha et al stated in their study that patients experienced high intensity pain due to the inflammatory response towards the filling materials [49]. Brodin P et al concluded in their study that chemical neurotoxic factors of the overfilling substance were more influential resulting in pain compared to mechanical factors [50]. The biocompatibility of the filling material is very important. They also state that biocompatibility stimulates the reorganisation of damaged apical tissue remaining in direct contact with the material [51]. Root canal sealers with antibacterial properties aid in periradicular tissue healing. Root canal sealers also have a tendency to deposit mineralised tissue in the apical foramen [52]. A proper flowability of the sealer fills all irregularities within the root canal but excess flowability leads to sealer extrusion. Bioceramic sealers have greater flowability than resin-based sealers [53]. Ardo Sabir et al stated in their study that overfilling was a local factor of endodontic treatment failure. Prognosis of the tooth depends on the amount/volume of the overfilling substance [54].

In contrast, Graunaite et al observed no pain or no reports of flare ups due to sealer extrusion [55]. Braúlio Fonseca et al reported that bioceramic sealers presented significantly more extrusion than resin based sealers and sealer extrusion was not associated with pain [56]. Microbial factors play a predominant role in the inflammation of periradicular tissue. Several literature reviews stated that sealer extrusion alone is an unlike factor in the failure of endodontic treatment [57]. Major factor responsible for root canal failure is probably not sealer extrusion, flare ups due to acute inflammation of periradicular tissues also contribute towards endodontic failure [58]. Regardless, all data points to the association of pain in root canal treated teeth having sealer extrusion. Foreign body reaction to the extruded root canal filling materials can maintain the disease and the symptoms. Sealers may cause an inflammatory reaction and pain when extruded beyond the apical limit of the root canal system.

CONCLUSION

In the present study, pain in the root canal treated tooth with sealer extrusion was recorded in 66.6% of the cases, with higher predilection in male population. Experience of pain was found to be higher in the age group 20-30 years. The pain was more often associated with lower posteriors. However, owing to small sample size in only a specific region, further multicentre studies are required to be conducted to analyse the association of pain in root canal treated teeth having sealer extrusion.

AUTHOR CONTRIBUTIONS

First author Keerthana Balaji performed data collection, analysis, interpretation and manuscript writing.

Second author Raghu Sandhya contributed to conception, study design, analysis, interpretation and critically revised the manuscript

Third author Pradeep D contributed to manuscript writing and supervision.

All the authors have discussed the results and contributed to the final manuscript.

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CONFLICT OF INTEREST

None

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ETHICAL CLEARANCE

Ethical clearance was obtained from “Saveetha Institute Human Ethical Committee” (Ethical Approval Number-SDC/SIHEC/2020/DIASDATA/0619-0320)

REFERENCES

1. Köseog˘lu BG, Tanrıkulu Ş, Sübay RK, Sencer S. Anesthesia following overfilling of a root canal sealer into the mandibular canal: A case report. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2006 Jun 1;101(6):803–6.
2. Ramamoorthi S, Nivedhitha MS, Divyanand MJ. Comparative evaluation of postoperative pain after using endodontic needle and EndoActivator during root canal irrigation: A randomised controlled trial. Aust Endod J. 2015 Aug;41(2):78–87.
3. Arias A, de la Macorra JC, Hidalgo JJ, Azabal M. Predictive models of pain following root canal treatment: a prospective clinical study. Int Endod J. 2013 Aug;46(8):784–93.
4. Rajakeerthi R, Ms N. Natural Product as the Storage medium for an avulsed tooth--A Systematic Review. Cumhuriyet Dental Journal. 2019;22(2):249–56.

5. Conrad SM. Neurosensory disturbances as a result of chemical injury to the inferior alveolar nerve. Oral Maxillofac Surg Clin North Am. 2001;13(2):255–64.
6. Ramanathan S, Solete P. Cone-beam Computed Tomography Evaluation of Root Canal Preparation using Various Rotary Instruments: An in vitro Study. J Contemp Dent Pract. 2015 Nov 1;16(11):869–72.
7. Ricucci D, Rôças IN, Alves FRF, Loghin S, Siqueira JF Jr. Apically Extruded Sealers: Fate and Influence on Treatment Outcome. J Endod. 2016 Feb;42(2):243–9.
8. Teja KV, Ramesh S, Priya V. Regulation of matrix metalloproteinase-3 gene expression in inflammation: A molecular study. J Conserv Dent. 2018 Nov;21(6):592–6.
9. Siqueira JF, Lopes HP. Treatment of endodontic infections. Quintessence London; 2011.
10. Hussainy SN, Nasim I, Thomas T, Ranjan M. Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One-year follow-up. J Conserv Dent. 2018 Sep;21(5):510–5.
11. Froes FGB, Miranda AMMA, Abad E da C, Riche FN, Pires FR. Non-surgical management of paraesthesia and pain associated with endodontic sealer extrusion into the mandibular canal. Aust Endod J. 2009 Dec;35(3):183–6.
12. Rajendran R, Kunjusankaran RN. Comparative Evaluation of Remineralizing Potential of a Paste Containing Bioactive Glass and a Topical Cream Containing Casein Phosphopeptide …. Pesqui Bras Odontopediatria Clin Integr [Internet]. 2019; Available from: http://www.scielo.br/scielo.php?pid=S1983-46322019000100364&script=sci_arttext
13. Tilotta-Yasukawa F, Millot S, El Haddioui A, Bravetti P, Gaudy J-F. Labiomandibular paresthesia caused by endodontic treatment: an anatomic and clinical study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006 Oct;102(4):e47–59.
14. Pogrel MA. Damage to the inferior alveolar nerve as the result of root canal therapy. J Am Dent Assoc. 2007 Jan;138(1):65–9.
15. Siddique R, Sureshbabu NM, Somasundaram J, Jacob B, Selvam D. Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi. J Conserv Dent. 2019 Jan;22(1):40–7.
16. Szep S, Grumann L, Ronge K, Schriever A, Schultze M, Heidemann D. In vitro cytotoxicity of medicated and nonmedicated gutta-percha points in cultures of gingival fibroblasts. J Endod. 2003 Jan;29(1):36–40.
17. Kumar D, Antony S. Calcified Canal and Negotiation-A Review. Research Journal of Pharmacy and Technology. 2018;11(8):3727–30.
18. Pitt Ford TR. Tissue reactions to two root canal sealers containing formaldehyde. Oral Surg Oral Med Oral Pathol. 1985 Dec;60(6):661–5.
19. Janani K, Palanivelu A, Sandhya R. 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. 2020 Jan 31;23(1):8.
20. Manohar MP, Sharma S. A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists. Indian J Dent Res. 2018 Nov 1;29(6):716.
21. Ricucci D, Langeland K. Apical limit of root canal instrumentation and obturation, part 2. A histological study. Int Endod J. 1998 Nov;31(6):394–409.
22. Ravinthar K, Others. Recent Advancements in Laminates and Veneers in Dentistry. Research Journal of Pharmacy and Technology. 2018;11(2):785–7.
23. Noor S, Others. Chlorhexidine: Its properties and effects. Research Journal of Pharmacy and Technology. 2016;9(10):1755–60.
24. Yamaguchi K, Matsunaga T, Hayashi Y. Gross extrusion of endodontic obturation materials into the maxillary sinus: a case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2007 Jul;104(1):131–4.
25. Jose J, Subbaiyan H. Different Treatment Modalities followed by Dental Practitioners for Ellis Class 2 Fracture–A Questionnaire-based Survey. Open Dent J [Internet]. 2020; Available from: https://opendentistryjournal.com/VOLUME/14/PAGE/59/FULLTEXT/
26. Teja KV, Ramesh S. Shape optimal and clean more. Saudi Endodontic Journal. 2019 Sep 1;9(3):235.
27. Ektefaie MR, David HT, Poh CF. Surgical resolution of chronic tissue irritation caused by extruded endodontic filling material. J Can Dent Assoc. 2005 Jul;71(7):487–90.
28. Nandakumar M, Nasim I. Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis. J Conserv Dent. 2018 Sep;21(5):516–20.
29. Robert R, Justin Raj C, Krishnan S, Jerome Das S. Growth, theoretical and optical studies on potassium dihydrogen phosphate (KDP)

single crystals by modified Sankaranarayanan–Ramasamy (mSR) method [Internet]. Vol. 405, Physica B: Condensed Matter. 2010. p. 20–4. Available from: http://dx.doi.org/10.1016/j.physb.2009.08.015

30. Sahu D, Kannan GM, Vijayaraghavan R. Size-dependent effect of zinc oxide on toxicity and inflammatory potential of human monocytes. J Toxicol Environ Health A. 2014;77(4):177–91.
31. Suresh P, Marimuthu K, Ranganathan S, Rajmohan T. Optimization of machining parameters in turning of Al-SiC-Gr hybrid metal matrix composites using grey-fuzzy algorithm [Internet]. Vol. 24, Transactions of Nonferrous Metals Society of China. 2014. p. 2805–14. Available from: http://dx.doi.org/10.1016/s1003-6326(14)63412-9
32. DeSouza SI, Rashmi MR, Vasanthi AP, Joseph SM, Rodrigues R. Mobile phones: the next step towards healthcare delivery in rural India? PLoS One. 2014 Aug 18;9(8):e104895.
33. Sekhar CH, Narayanan V, Baig MF. Role of antimicrobials in third molar surgery: prospective, double blind,randomized, placebo-controlled clinical study. Br J Oral Maxillofac Surg. 2001 Apr;39(2):134–7.
34. Chellaswamy C, Ramesh R. Parameter extraction of solar cell models based on adaptive differential evolution algorithm [Internet]. Vol. 97, Renewable Energy. 2016. p. 823–37. Available from: http://dx.doi.org/10.1016/j.renene.2016.06.024
35. Danda AK, Muthusekhar MR, Narayanan V, Baig MF, Siddareddi A. Open versus closed treatment of unilateral subcondylar and condylar neck fractures: a prospective, randomized clinical study. J Oral Maxillofac Surg. 2010 Jun;68(6):1238–41.
36. Samuel MS, Bhattacharya J, Raj S, Santhanam N, Singh H, Pradeep Singh ND. Efficient removal of Chromium(VI) from aqueous solution using chitosan grafted graphene oxide (CS-GO) nanocomposite. Int J Biol Macromol. 2019 Jan;121:285–92.
37. Lakshmanan A, Bhaskar RS, Thomas PC, Satheesh Kumar R, Siva Kumar V, Jose MT. A red phosphor for nUV LED based on (Y,Gd)BO3:Eu3 [Internet]. Vol. 64, Materials Letters. 2010. p. 1809–12. Available from: http://dx.doi.org/10.1016/j.matlet.2010.05.034
38. Venu H, Subramani L, Dhana Raju V. Emission reduction in a DI diesel engine using exhaust gas recirculation (EGR) of palm biodiesel blended with TiO2 nano additives [Internet]. Vol. 140, Renewable Energy. 2019. p. 245–63. Available from: http://dx.doi.org/10.1016/j.renene.2019.03.078
39. Manimaran G, Pradeep kumar M, Venkatasamy R. Influence of cryogenic cooling on surface grinding of stainless steel 316 [Internet]. Vol. 59, Cryogenics. 2014. p. 76–83. Available from: http://dx.doi.org/10.1016/j.cryogenics.2013.11.005
40. Neelakantan P, Varughese AA, Sharma S, Subbarao CV, Zehnder M, De-Deus G. Continuous chelation irrigation improves the adhesion of epoxy resin-based root canal sealer to root dentine. Int Endod J. 2012 Dec;45(12):1097–102.
41. Babu MN, Naresh Babu M, Muthukrishnan N. Investigation on Surface Roughness in Abrasive Water-Jet Machining by the Response Surface Method [Internet]. Vol. 29, Materials and Manufacturing Processes. 2014. p. 1422–8. Available from: http://dx.doi.org/10.1080/10426914.2014.952020
42. Panda S, Doraiswamy J, Malaiappan S, Varghese SS, Del Fabbro M. Additive effect of autologous platelet concentrates in treatment of intrabony defects: a systematic review and meta-analysis. J Investig Clin Dent. 2016 Feb;7(1):13–26.
43. Adalarasan R, Santhanakumar M, Rajmohan M. Optimization of laser cutting parameters for Al6061/SiCp/Al2O3 composite using grey based response surface methodology (GRSM) [Internet]. Vol. 73, Measurement. 2015. p. 596–606. Available from: http://dx.doi.org/10.1016/j.measurement.2015.06.003
44. Rajeshkumar S, Kumar SV, Ramaiah A, Agarwal H, Lakshmi T, Roopan SM. Biosynthesis of zinc oxide nanoparticles usingMangifera indica leaves and evaluation of their antioxidant and cytotoxic properties in lung cancer (A549) cells. Enzyme Microb Technol. 2018 Oct;117:91–5.
45. ElAyouti A, Weiger R, Löst C. Frequency of overinstrumentation with an acceptable radiographic working length. J Endod. 2001 Jan;27(1):49–52.
46. Khabbaz MG, Papadopoulos PD. Deposition of calcified tissue around an overextended gutta-percha cone: case report. Int Endod J. 1999 May 24;32(3):232–5.
47. Knowles KI, Jergenson MA, Howard JH. Paresthesia associated with endodontic treatment of mandibular premolars. J Endod. 2003 Nov;29(11):768–70.

48. Rosen E, Goldberger T, Taschieri S, Del Fabbro M, Corbella S, Tsesis I. The Prognosis of Altered Sensation after Extrusion of Root Canal Filling Materials: A Systematic Review of the Literature. J Endod. 2016 Jun;42(6):873–9.
49. Shashirekha G, Jena A, Pattanaik S, Rath J. Assessment of pain and dissolution of apically extruded sealers and their effect on the periradicular tissues. J Conserv Dent. 2018 Sep;21(5):546–50.
50. Brodin P. Neurotoxic and analgesic effects of root canal cements and pulp-protecting dental materials. Dent Traumatol. 1988;4(1):1–11.
51. Huang F-M, Tai K-W, Chou M-Y, Chang Y-C. Cytotoxicity of resin-, zinc oxide--eugenol-, and calcium hydroxide-based root canal sealers on human periodontal ligament cells and permanent V79 cells. Int Endod J. 2002;35(2):153–8.
52. Tanomaru Filho M, Leonardo MR, Silva LA, Utrilla LS. Effect of different root canal sealers on periapical repair of teeth with chronic periradicular periodontitis. Int Endod J. 1998 Mar;31(2):85–9.
53. Zhou H-M, Shen Y, Zheng W, Li L, Zheng Y-F, Haapasalo M. Physical properties of 5 root canal sealers. J Endod. 2013 Oct;39(10):1281–6.
54. Sabir A. Root canal overfilling as an influencing factor for the success of endodontic treatment. 2005 Dec 1;38(4):194–7.
55. Graunaite I, Skucaite N, Lodiene G, Agentiene I, Machiulskiene V. Effect of Resin-based and Bioceramic Root Canal Sealers on Postoperative Pain: A Split-mouth Randomized Controlled Trial. J Endod. 2018 May;44(5):689–93.
56. Fonseca B, Coelho MS, Bueno CE da S, Fontana CE, Martin ASD, Rocha DGP. Assessment of Extrusion and Postoperative Pain of a Bioceramic and Resin-Based Root Canal Sealer. Eur J Dent. 2019 Jul;13(3):343–8.
57. Lin LM, Skribner JE, Gaengler P. Factors associated with endodontic treatment failures. J Endod. 1992 Dec;18(12):625–7.
58. Dalopoulou A, Economides N, Evangelidis V. Extrusion of Root Canal Sealer in Periapical Tissues - Report of Two Cases with Different Treatment Management and Literature Review. Balkan Journal of Dental Medicine. 2017 Mar 1;21(1):12–8.

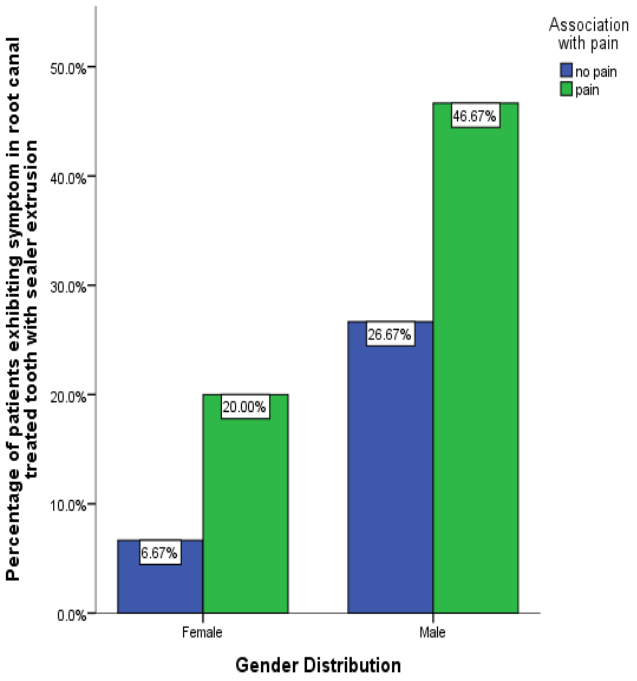

Figure 1: This graph represents the association between gender and presence (green bars)/ absence of pain (blue bars)in relation to root canal treated teeth with sealer extrusion. X-axis represents the gender; Y- axis represents the percentage of patients.More number of male patients experienced pain compared to female patients. However gender did not influence the presence and absence of pain (Chi-square test; p value=0.68, P>0.05, not significant)

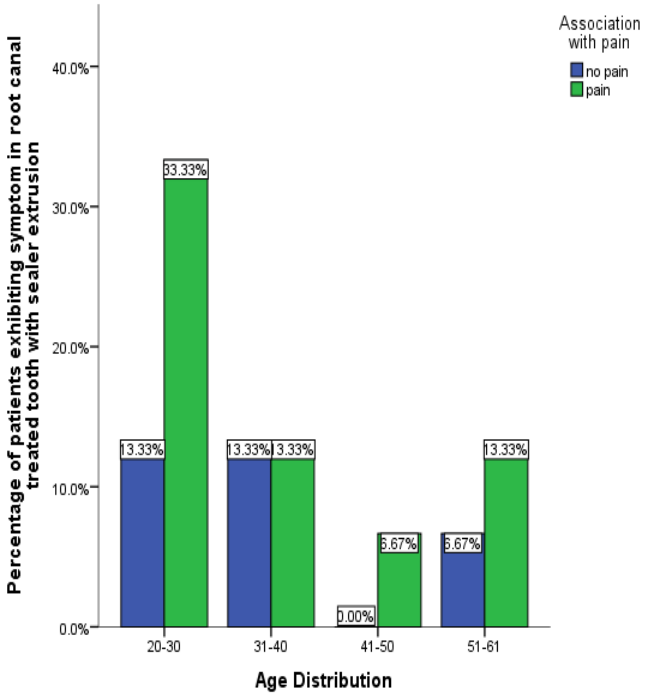

Figure 2: This graph represents the association between age and presence(green bars) / absence of pain(blue bars) in relation to root canal treated teeth with sealer extrusion. X-axis represents the age of the patient (in years); Y- axis represents the percentage of patients. More number of patients in the age group 20-30 years experienced pain compared to other age groups. However age did not influence the presence and absence of pain (Chi-square test; p value=0.78, P>0.05, not significant)

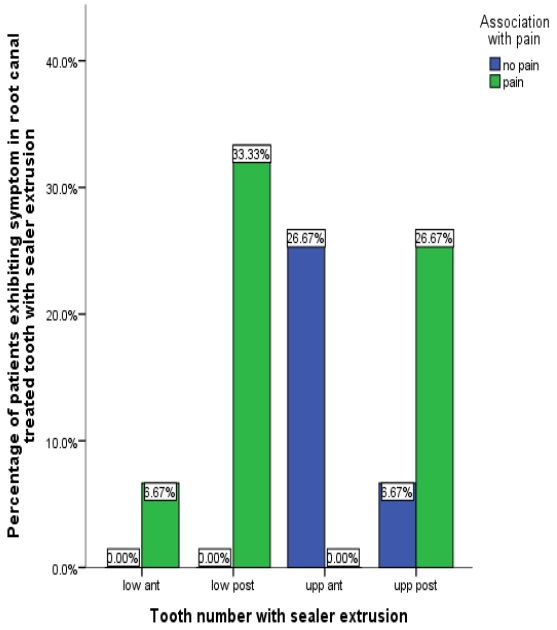

Figure 3: This graph represents the association between the tooth and presence(green bars)/ absence of pain(blue bars) in relation to root canal treated teeth with sealer extrusion. X-axis represents the root canal treated tooth with sealer extrusion; Y- axis represents the percentage of patients. Among the teeth associated with pain, the majority of them were lower posterior teeth. However tooth involved did not influence the presence and absence of pain (Chi-square test; p value=0.10, P>0.05, not significant)