# KNOWLEDGE AWARENESS AND PERCEPTION OF PAIN MANAGEMENT POSTOPERATIVELY AFTER ROOT CANAL TREATMENT USING HAND AND ROTARY INSTRUMENTATION

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## Abstract

**Introduction:** Endodontic therapy or root canal therapy is the *sequence of treatment* for the pulp of a tooth, which results in the elimination of infection and the protection of the decontaminated tooth from future microbial invasion. Root canal therapy is one of the most common procedures. If the dental pulp or the periapical tissue becomes diseased or injured, endodontic treatment is required to save the tooth. During root canal preparation, there can be unpredictable inflammation to the periapex ensuing in postoperative pain. Postoperative pain can arise because of the extrusion of necrotic debris, dentinal chips, or pulpal remnants into the apical area throughout root canal procedures.
**Materials and Method:** This cross sectional survey was conducted during June to August 2021 including postgraduates students of Endodontic department of various colleges across the country. 100 participants had participated in this study. Ethical permission to carry out the study was obtained from Saveetha Institute Of medical and Technical Sciences, Scientific review board. Snowball sampling method was used to distribute the questionnaire among the participants. The questionnaire consisted of 11 questions which were designed in such a way to evaluate the awareness, knowledge and attitude on the post operative pain after root canal treatment between hand and rotary instruments. Out of 11 questionnaires in which 3 questions based on knowledge, 4 based on attitude, 4 questions based on practice were created. 100 responses were assessed and the output was represented in a bar chart for each and every question
**Results:** The result showed that 62% of the study population were aware that hand instrumentation can cause postoperative pain in root canal treatment. Pearson chi square test showed the p- value of 0.174 (>0.05) which is statistically insignificant.
**Conclusion:** Most endodontist postgraduates students are aware of the post operative pain after root canal therapy and they also show a responsible attitude towards these procedures. But there exists a group of students who are not aware of postoperative pain caused while using hand instrumentation over rotary instruments in root canal treatment .

**Keywords:** Post operative pain, Root canal treatment, Hand instruments, Rotary Instruments, Innovative technology.
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## Introduction

The primary goal of root canal procedure is to absolutely debride the inflamed, infected content material and offer a sterile area for obturation. During root canal preparation, there can be unpredictable inflammation to the periapex ensuing in postoperative pain . Postoperative pain can arise because of the extrusion of necrotic debris, dentinal chips, or pulpal remnants into the apical area throughout root canal procedures . The extruded material can result in an acute inflammatory response ensuing in growth of periapical tissue strain inflicting unendurable pain (Sargenti, 1978; Cohenca, 2014; . Whitworth, 2014; Basrani, 2015; Levy *et al.*, 2021).

Several studies have evaluated the effect of the canal preparation method used on the intensity and duration of postoperative pain in permanent teeth. The prevalence of pain in various reports is also variable, which is reflective of the variations in the study method, treatment procedure, case selection and experience of the operator . In contemporary endodontic practice, rotary instrumentation with Crown down technique is preferred over manual

instrumentation with Step back technique(El Sayed and Gaballah, 2021; Kumar *et al.*, 2021; Liang *et al.*, 2021; Moreira *et al.*, 2021; Solete and Ramesh, 2021; Uğur Aydin, Koşumcu and Meşeci, 2021).

Various root canal instrumentation techniques, such as manual, reciprocating, and rotary instrumentation, are used.Conventionally, root canals were instrumented using hand files followed by engine-driven rotary files . These rotary file systems have been proven to be better than manual preparation in respect to the quality of preparation and instrumentation time.

Post Endodontic pain is highly subjective and is influenced by several factors . Pain management before, during and after treatment should be an integral part of dental treatment. Because the measurement of subjective variables is such a huge challenge , different scales and methods have been used to assess postoperative pain.Our has extensive knowledge and research experience that has translated into high quality publications(Dinesh *et al.*, 2013; Krishnan and Lakshmi, 2013; Muthukrishnan and Warnakulasuriya, 2018; Sekar *et al.*, 2019; Gomathi *et al.*, 2020) (Sathivel *et al.*, 2008; Panda *et al.*, 2014; Govindaraju, Neelakantan and Gutmann, 2017; Johnson *et al.*, 2020; Saraswathi *et al.*, 2020). The aim of our study is to analyse the awareness, knowledge and practise on postoperative pain after root canal treatment. This survey is a step towards creating awareness about the post operative pain after root canal treatment using hand and rotary instrumentation(Turk and Melzack, 2011; de Freitas Portela *et al.*, 2021; Guimarães *et al.*, 2021; Han and Hou, 2021; KarataŞ *et al.*, 2021; Shubham *et al.*, 2021; Ye *et al.*, 2021).

## Materials and Methods

**Study Design**

A cross sectional study was conducted from April to July 2021 through an online survey among the endodontist postgraduates students.

**Ethical Approval**

Ethical permission and approval for the project was obtained from the institutional review board of Saveetha Institute Of Medical And Technical Sciences, Chennai, India on date ……./2021 [SDC/SIHEC/2020/DATA/0619-0320].

**Inclusion Criteria**

postgraduates students of endodontic departments of various colleges in India who were willing to participate were included.

**Exclusion Criteria**

Postgraduates students of endodontic departments of various colleges in India who were not willing to participate were excluded.

**Study Subjects**

This cross sectional study was done among the endodontist postgraduates students. The subjects were taken from both government, private clinic practitioners. A total of nearly 100 participants were requested to participate in the study. The sampling method performed here is Snowball sampling technique. The subjects' various specialisations were given importance to participate in the survey. The questionnaire had 11 items in it which was designed in such a way to evaluate the awareness and attitude of awareness on the post operative pain encountered while doing root canal using hand and rotary instruments. The subjects were requested to respond to each item in the specific format given at the end of each item. All the participants were allowed to choose one of the given three to four choices for each item in the questionnaire. Descriptive statistics were obtained and the collected data was analysed using SPSS software.

**Study Method**

Self administered questionnaire of 11 close-ended questions was prepared and it was distributed among the postgraduates students of Endodontic department through online survey forms “GOOGLE FORMS”. Demographic details were also included in the questionnaire.

**Data Quality Assurance**

The collected data were checked regularly for clarity, competence,consistency, accuracy and validity. The necessary correction was made on questionnaires that need correction accordingly and invalid questionnaires were removed before the actual data collection.

**Statistical analysis**

Data was analysed with the SPSS version (22.0). Descriptive statistics as number and percent were calculated to summarise qualitative data. Chi square test was used to analyze and compare the awareness of postoperative dental pain after root canal treatment . The confidence level was 95% and of statistical significance $P < 0.05$. Finally, the result was statistically represented using bar charts.

## Results and discussion

In this study, about 100 Postgraduate students of endodontic departments of various colleges across the country have participated in this study. Majority of the students belong to the 3rd year postgraduates dental students where they showed a positive attitude towards the study. This study represented a broad overview about the awareness and attitude of various postoperative pain after root canal treatment using hand and rotary instrumentation.In the present study, 38% of the postgraduates 2nd years preferred H file hand instrument for root canal procedures but 29% of the postgraduates 3rd years preferred reamers for root canal treatment (Table 2) (figure 1). 39% of the postgraduate 2nd year students believed that the use of Endo motor does not cause postoperative pain after the root canal treatment (Table 3)(figure 2). 55% of post graduates 2nd year students believed that usage of local anaesthesia relieves pain during second visit (Table 4)(figure 3). 41% of the postgraduates 2nd year students believed that pain will be present after root canal treatment (Table 5 )(figure 4).

The intensity of pain was scaled 1 to 10 in which 45% of the third years answered on a scale of '9', 39% of the 2nd years responded'8' and 16% of them responded for '6', in which p value= 0.001 which is statistically significant. A knowledge on postoperative pain using an endomotor was assessed in which 61% of the participants responded 'yes' and 39% responded 'no', in which p value= 0.001 which is statistically significant. The knowledge on the use of local anaesthesia was assessed in which 99 % responded 'yes' and 1% responded 'no', in which p value= 0.001 which is statistically significant. The knowledge on the usage of painkillers was assessed in which 54% responded paracetamol and 16% responded dolo 650, 1% responded amoxicillin, and 29% responded aspirin, in which p value= 0.001 which is statistically significant. The knowledge on the use of ice packs in relieving postoperative pain were assessed in which 68% responded 'yes' and 32% responded 'no' in which p value= 0.001 which is statistically significant. The long term result is determined by the success and failure of endodontic treatment and not the presence or absence of short-term post-operative pain. For a long term success root canal treatment with postoperative pain can be done whereas treatment without postoperative pain may result in failure. When dentists and patients consider one appointment treatment the postoperative pain is an important issue. The purpose of this study was to determine the post- operative incidence and severity of pain after a one- appointment treatment. Different criteria have been used in previous studies for the assessment of pain after endodontic therapy. Most studies have only addressed the incidence of interappointment emergencies or levels of post-operative pain. For example, the initial root canal treatment is significantly less than the incidence of pain for retreatment cases.The effect of the number of treatment visits on post-operative pain has not been well studied. In the endodontic community,one appointment for endodontic treatment of vital cases has been accepted.

Of non vital cases,one appointment treatment is practiced, but not accepted universally. Due to higher incidence and severity of postoperative pain in single visit treatment causes fear in some dentists. However, this fear is not supported by previous research or this study.when compared with teeth treated multiple visits to single visit treatment, single visit treatment shows no difference in treatment complications or success rate.Intracanal microbiota, the major source of endodontic problems, are eliminated or controlled by mechanical instrumentation, antimicrobial irrigants and isolation of any remaining microorganisms with an effective obturation.Historically, emphasising the advantage of interappointment dressings,several appointments to complete the treatment was the norm (Torabinejad and Walton, 2009; Fuks and Peretz, 2016; Olivi, De Moor and DiVito, 2016; Manakil, 2019; Li *et al.*, 2021; Streltzov *et al.*, 2021; Tavares *et al.*, 2021). In recent years however, the number of sessions have been reduced. A two-visit model using an interappointment dressing with calcium hydroxide was proposed as standard. Genet et al found a positive correlation of operative factors associated with pain after the first endodontic visit. Without extruding debris beyond the apical foramen the debris is removed from the canal there findings are accepted by our studies.

| Demographic variables | Categories | No. of respondents | Percentage % |
|---|---|---|---|
| **Gender** | Female<br>Male | 16<br>84 | 16<br>84 |
| **year of study** | 1 year Pg<br>2 year Pg<br>3 year pg | 16<br>55<br>29 | 16<br>55<br>29 |

**Table 1 :** Showing demographic data of participants with number of responses in percentage. Out of which females were 16% and 84% were male , the year of study 1st year were 16, 2nd year were 55% and 3rd year were 29%.

| **Qualification** | **What were the various hand instruments used in root canal treatment ?** | | | | **P value** |
|---|---|---|---|---|---|
| | H file | K file | Reamers | All of the above | |
| First Year PG | 0 | 16 | 0 | 0 | -0.001 |
| Second Year PG | 38 | 0 | 0 | 17 | |
| Third Year PG | 0 | 0 | 29 | 0 | |
| Total | 38 | 16 | 29 | 17 | |

Table 2 : Shows the distribution of responses of participants on the various hand instruments used in root canal treatment, showing statistically no significant difference between the variables.(p>0.001)

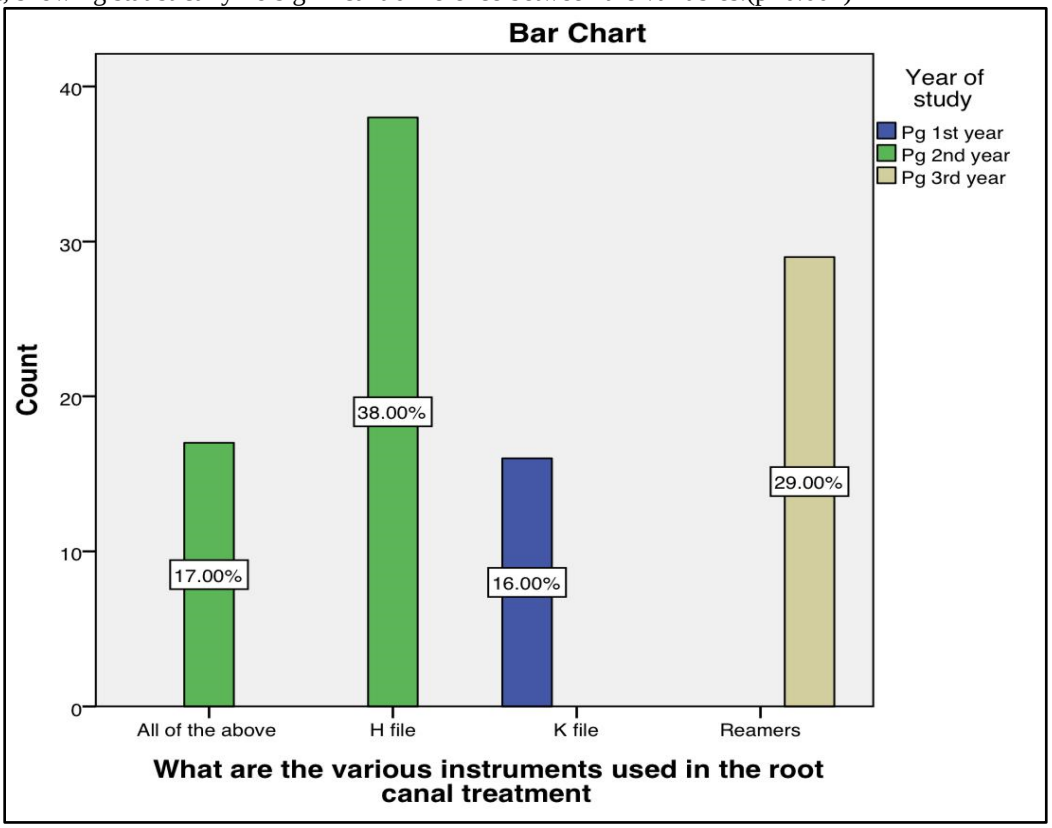


Figure 1: Bar graph depicts the association between year of study and the percentage of responses on usage of various instruments in root canal treatment. The X axis represents the year of study and the Y axis represents the percentage of responses. Blue colour represents postgraduates 1 st year, green colour represents postgraduates 2nd year and the sandal colour represents postgraduates 3rd year. 38% of the study population belonging to postgraduates 2nd year preferred h file in performing RCT. The difference was statistically analysed ( chi square test; p value -0.001 statistically significant).

| | **Are you aware about the root canal treatment** | |
|---|---|---|

| Qualification | Yes | No | P value |
|---|---|---|---|
| First Year PG | 16 | 0 | -0.001 |
| Second Year PG | 16 | 39 | |
| Third Year PG | 29 | 0 | |
| Total | 61 | 39 | |

Table 3 : Shows the distribution of responses of participants on the awareness about the root canal treatment , showing statistically no significant difference between the variables.(p>0.001)

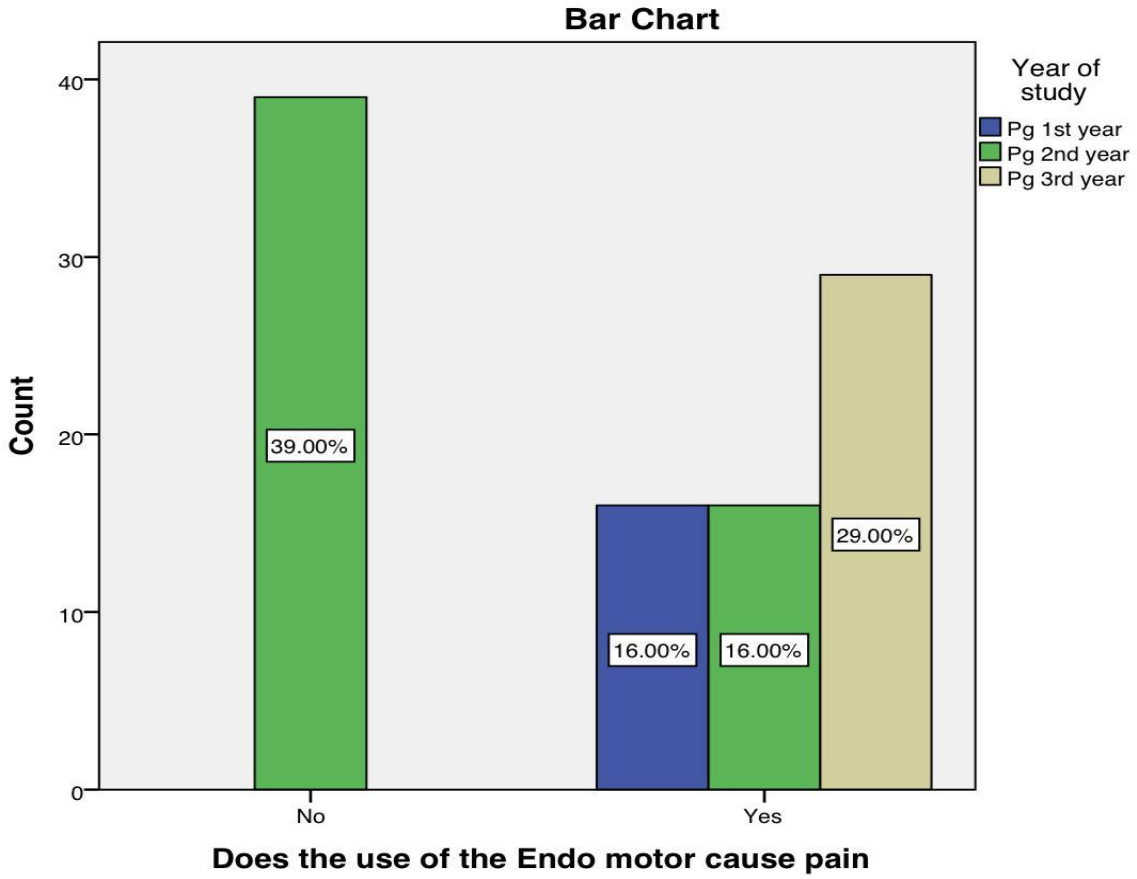


Figure 2: Bar graph depicts the association between year of study and the percentage of responses on awareness of root canal treatment. The X axis represents the year of study and the Y axis represents the percentage of responses. Blue colour represents postgraduates 1 st year, green colour represents postgraduates 2nd year and the sandal colour represents postgraduates 3rd year. 39% of postgraduate 2nd year students said that the use of endo motor does not cause postoperativepain after the root canal treatment. The difference was statistically analysed ( chi square test; p value -0.001 statistically significant).

| Qualification | Does the use of the local anaesthesia relieves in the second visit reduce pain during procedures | | P value |
|---|---|---|---|
| | Yes | No | |
| First Year PG | 16 | 1 | -0.001 |
| Second Year PG | 54 | 0 | |
| Third Year PG | 29 | 0 | |
| Total | 99 | 1 | |

Table 4 : Shows the distribution of responses of participants on the use of local anaesthesia as a pain relief measure, showing statistically no significant difference between the variables.(p>0.001)

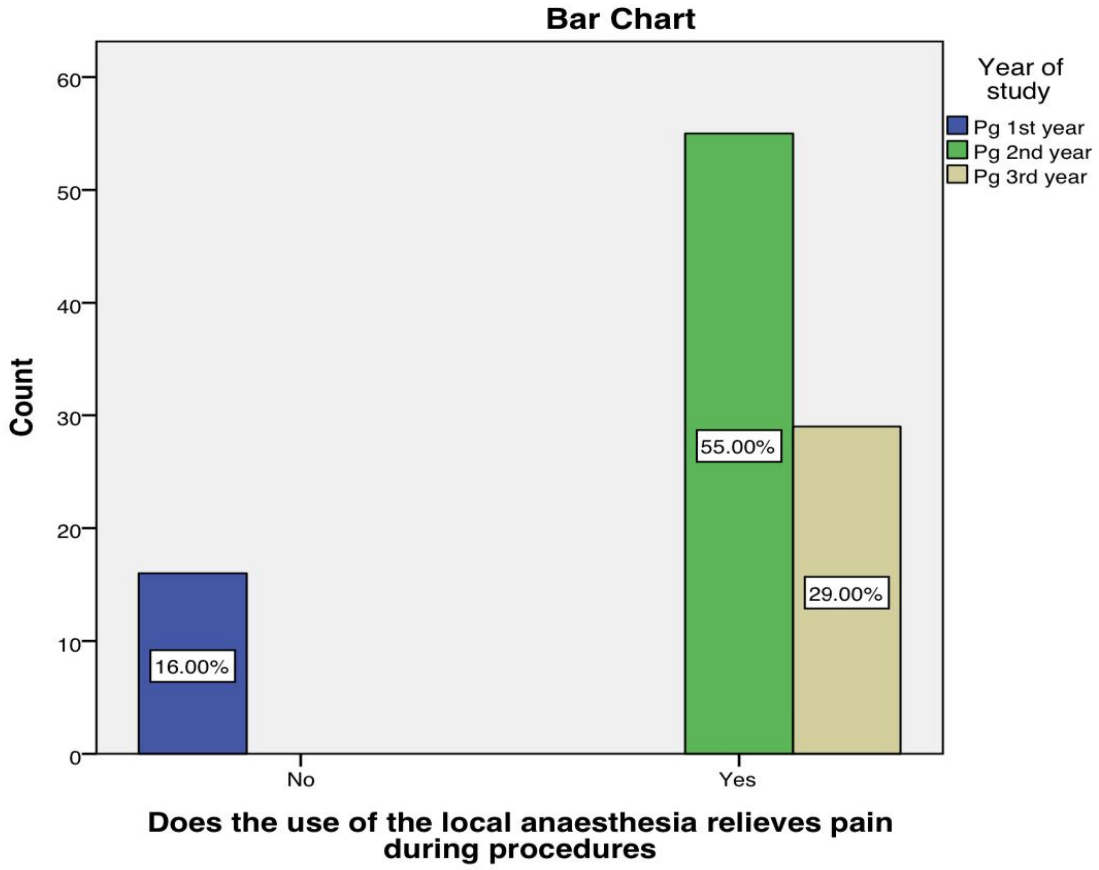


Figure 3: Bar graph depicts the association between year of study and the percentage of responses on usage of the local anaesthesia during RCT. The X axis represents the year of study and the Y axis represents the percentage of responses. Blue colour represents post graduates 1 st year, green colour represents postgraduates 2nd year and the sandal colour represents postgraduates 3rd year. 55% of post graduates 2nd year students believed that usage of local anaesthesia relieves pain during second visit. The difference was statistically analysed ( chi square test; p value -0.001 statistically significant).

| Qualification | What type of pain will be present after root canal treatment? | | P value |
|---|---|---|---|
| | Pricking pain | throbbing pain | |
| First Year PG | 0 | 16 | -0.001 |
| Second Year PG | 41 | 14 | |
| Third Year PG | 29 | 0 | |
| Total | 70 | 30 | |

Table 5 : Shows the distribution of responses of participants on the type of pain after root canal treatment, showing statistically no significant difference between the variables.(p>0.001)

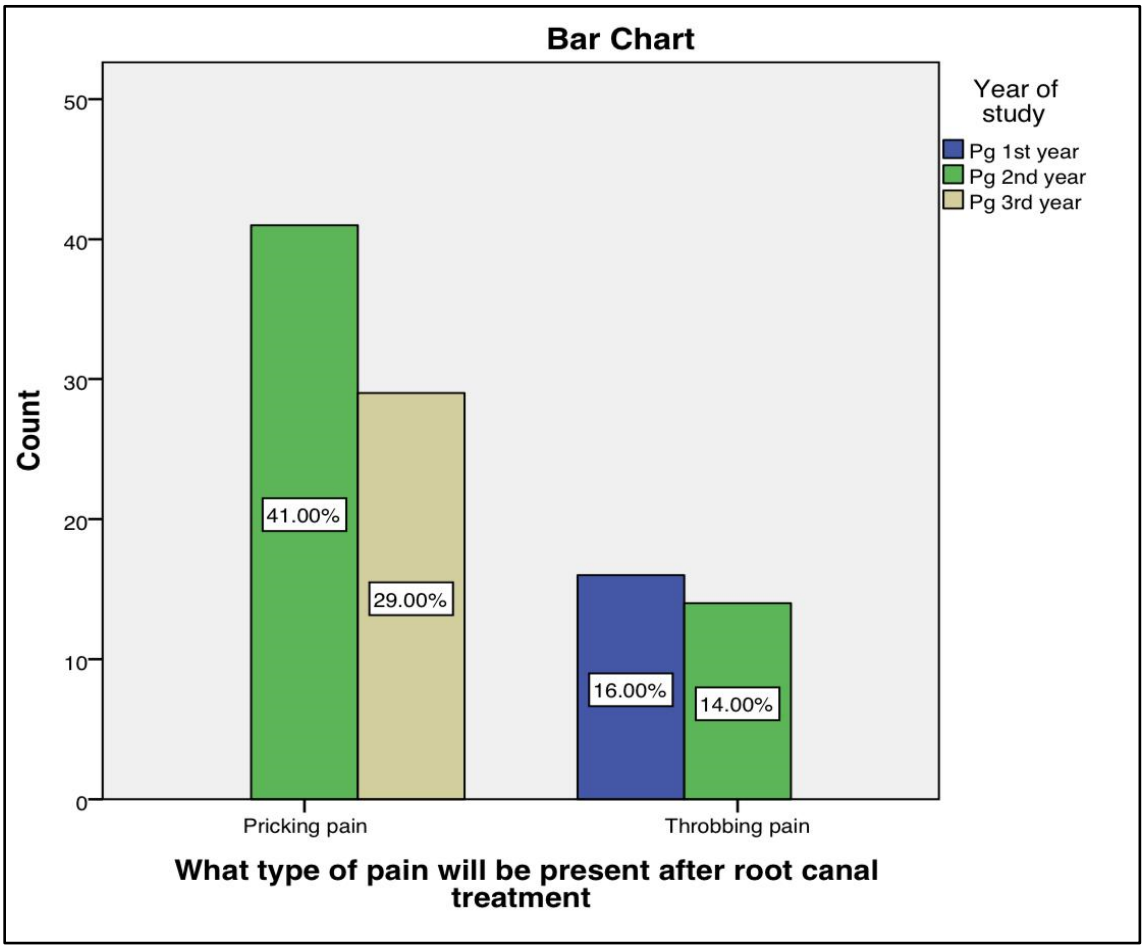


Figure 4: Bar graph depicts the association between year of study and the percentage of responses on type of pain felt after root canal treatment. The X axis represents the year of study and the Y axis represents the percentage of responses. Blue colour represents postgraduates 1 st year, green colour represents post graduates 2nd year and the sandal colour represents post graduates 3rd year. 41% of the post graduates 2nd year students believed that pain will be present after root canal treatment. The difference was statistically analysed ( chi square test; p value -0.001 statistically significant).

## Conclusion

Most of the postgraduate dental students were aware of the root canal treatment and it's techniques and showed a responsible attitude towards these procedures. But there exists a circle of students who are not aware of post operative pain after root canal treatment and it's procedures. Even the certain group of respondents lack knowledge on the various causes of post operative pain and it's management, so proper awareness should be created among postgraduates on the management of pain to provide in future.

**Funding Source:** Saveetha Institute of Medical and Technical Sciences and Royal hospital, Thanjavur,Tamilnadu
**Overall Consensus:** In agreement with findings of the study.
**Limitations:** This study was confined among a smaller number of population, the questions can be focused on the management of postoperative pain using hand instruments .
**Future Scope:** This study can be conducted in a larger number of populations.

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