

# ASSOCIATION OF AGE AND GENDER DISTRIBUTION IN PATIENT HAVING CLASS III/ CLASS IV CARIES RESULTING IN ROOT CANAL TREATMENT IN UPPER AND LOWER ANTERIORS

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## Abstract:

Aim of the study was to assess the association of age and gender distribution in patients having class III/ class IV caries resulting in root canal treatment in upper and lower Anteriors. This is a retrospective clinical study carried between the month of June 2019 to March 2020. Data of patients with diagnosis of class III/ class IV caries and prognosis to RCT were collected. Thus a sample size of 56 was obtained and tabulated in excel. Excel tabulated data is transferred to SPSS software for analysis. Based on software analysis and chi square test results were tabulated. We got a result that male patients aged between the age group of 61-70 years are most affected by class III/ class IV caries resulting in root canal treatment. Maxillary right permanent central incisor [11] is the most common tooth to be affected anteriors in upper arch and mandibular left permanent canine is most commonly affected anteriors in lower arch. Within the limitations of this study, we observed that male patients showed higher incidence of class III, class IV caries resulting in root canal treatment compared to female patients. Class III and class IV caries are observed to be more prevalent in the age group 61-70 years. Thus early diagnosis and conservative treatment of class III and class IV caries can prevent teeth from progressing to RCT.

**Key Words:** Anteriors, Class III , Class IV , Dental caries, RCT.

## INTRODUCTION:

Dental caries is one of the most important chronic diseases of oral cavity which is prevalent worldwide (Petersen, 2009). Considering dental caries each and every dentists must be able to reasonably assess the following presence and severity of all carious lesions; tooth surface cavitation status; caries risk; and outcome probabilities for treatment regimens (Vanobbergen *et al.*, 2001). It has been well established that information regarding a subject's caries pattern may provide insight on the etiology of the disease (Hujoele *et al.*, 1994). Susceptibilities to dental caries in an individual tooth depends on Individual tooth surfaces with the pit and fissure (occlusal) surfaces the most susceptible, and the smooth (labial and lingual) surfaces the least susceptible (Chestnutt *et al.*, 1996). Caries susceptibility varies from one tooth to another even though they are present adjacent to each other (Edward, 1997; Mejàre, Källest 1 and Stenlund, 1999; Dirks, 2009). The caries susceptibility of a tooth surface also varies over time. Different age groups and populations exhibit distinct caries prevalence rates, observations of which could provide a useful descriptive measure of caries susceptibility in tooth surfaces (Hannigan *et al.*, 2000) To make diagnosis of dental caries in a simple way several authors suggested classifications for dental caries.

Dr.G.V.Black developed a system to categorize carious lesions based on the type of tooth affected (anterior or posterior tooth) and the location of the lesion (e.g. lingual, buccal, occlusal, etc.).

Class I: Dental Caries involving pits and fissures on the occlusal surfaces of molars and premolars; facial and lingual surfaces of molars; lingual surfaces of maxillary incisors.

Class II: Dental Caries on proximal surfaces of premolars and molars

Class III: Dental Caries on proximal surfaces of incisors and canines that do not involve the incisal angle.

Class IV: Dental caries on proximal surfaces of incisors or canines that involve the incisal angle.

Class V: Dental caries on the cervical third of the facial or lingual surfaces of any tooth.

Class VI: Dental caries on incisal edges of anterior teeth and cusp tips of posterior teeth.

Dental caries can progress deep and have more chance to affect pulp where teeth must be treated with root canal treatment. Class III and class IV carries more chances to progress into root canal treatment (Ismail *et al.*, 2013; Ramamoorthi, Nivedhitha and Divyanand, 2015; Guzmán-Armstrong *et al.*, 2019). Class III, class IV caries progress to RCT can be tested using pulp vitality tests (Ramesh, Teja and Priya, 2018) and can be confirmed using radiographic investigation (Ramanathan and Solete, 2015; Janani, Palanivelu and Sandhya, 2020). It is easy to carry out RCT procedures in anterior tooth (Kumar and Delphine Priscilla Antony, 2018; Nasim and Nandakumar, 2018; Jose, P. and Subbaiyan, 2020). Success of root canal treatment depends on canal irrigation, cleaning and shaping and canal medicaments (Noor, S Syed Shihaab and Pradeep, 2016; '1. Optimal contact pressure and optimal punch shape', 2017; Manohar and Sharma, 2018; Ravinthar and Jayalakshmi, 2018; Rajendran *et al.*, 2019; R, Rajakeerthi and Ms, 2019; Siddique *et al.*, 2019). Proper coronal seal of access opening followed by full veneer crown placement over RCT treated tooth is necessary (Hussain *et al.*, 2018). The aim of the study was to assess the association of age and gender distribution in patients having class III/ class IV caries resulting in root canal treatment in upper and lower anteriors.

## MATERIALS AND METHODS:

Retrospective clinical study carried under controlled environment where dental students evaluate patients and diagnose patients having class III and class IV caries progress to RCT upper and lower anteriors in the South Indian population. For this study we got approval from the Institutional Ethical Review Board. Number of people involved in carrying out this research were a main data collector and analyser. For sampling data of all patients with diagnosis of class III/ class IV caries and progressing to RCT between the month of June 2019 to March 2020 were collected from records. Collected case sheets were reviewed including patients with class III and class IV caries and patients with decay close to pulp or involving pulp. Patients with Ellis fracture, periodontally compromised cases were excluded. In order to minimise the occurrence errors, verified case sheets were once again cross verified by another examiner. Finally we got a sample size around 56.

After verification data were entered and tabulated in excel under column of age, gender, patient with class III /class IV caries progressing to RCT, upper and lower anterior tooth number. Gender column includes male/female, age was categorised into 8 different groups like 0-10years; 11-20years; 21-30years; 31-40years; 41-50years; 51-60years; 61-70years; 71-80years. In order to minimise the occurrence of error in individual tooth identification FDI notation is used for individual tooth identification. Based on the FDI notation tooth number included in our study are 11, 12, 13, 21, 22, 23, 31, 32, 33, 41, 42, 43. Excel tabulated data is transferred to SPSS software for statistical analysis. age and gender were listed as independent variables and patients with class III/ class IV caries progressing to RCT upper and lower anterior tooth number were listed as dependent variables. Finally chi square test was carried out. Then results were tabulated.

## RESULT AND DISCUSSION:

The present study was aimed to find association of age and gender distribution in patients having class III/ class IV caries resulting in root canal treatment in upper and lower anteriors. In this study 56 teeth with class III /class IV progressing to RCT in 56 patients were analysed and recorded. The distribution of caries teeth according to age (and tooth number) is shown in Figure 1. Where 29 patient(51.8%) aged between 61-70 years; 15 patient (26.8%) were aged between 71-80 years; 4 patients(7.1%) aged between 21-30 years; 3 patients(5.4%) aged between 31-40 years; 2 patient 3.6%) aged between 11-20 years, was between age groups of 0-10, 41-50 and 51-60 years constitute of 1 patient (1.8%) in each. According to PonnuduraiArangannal,et al 1.4% sample population were affected with caries are <10years of age.(Arangannal, 2016)It has also been reported that dental caries on a population basis is the predominant cause of tooth loss, even up to the age of 60 (Manji, Baelum and Fejerskov, 1988; Luan *et al.*, 1989; Fejerskov, 1995; Pitts, 1997; Diehnelt and AsumanKiyak, 2001)improper oral hygiene, improper diet,habits, nutrition, salivary hypofunction can be taken as reason for high incidence in old age.

The distribution of caries teeth according to gender is shown in Figure 2. Where 31 patients (55.4%) were males and 25 patients (44.6%) were females.PonnuduraiArangannal,et al. showed that males had dental caries about 50.3% and females 49.7%(Arangannal, 2016). According to Ismail AI, et al showed males had higher incidence than females (Ismail *et al.*, 2013) because the type of diet, nutrition, habits , flow rate of saliva main reason for male predilection. Our study shows around 83.9% class III and 16.1% class IV results in RCT. Previous study PonnuduraiArangannal, et al says class III has more chance to damage pulp than class IV(Ismail et al., 2013; Arangannal, 2016).

The distribution of caries teeth according to tooth number is shown in Figure 3. Where 12 patients (21.4%) had class III class IV caries in tooth number 11 followed by tooth number 21 where 10 patients (17.9%) had class III class IV caries. Figure 4 shows distribution of class III / class IV caries in individual teeth where around 47 teeth (83.9%) had class III caries and 9 teeth(16.1%) had class IV caries. Chi square test was carried between age and gender(Table 1); age and tooth number(Table 1); age and class III/class IV (Table 1); gender and tooth number (Table 1) (gender and class III/class IV) showed p-value>0.005 which is statistically not significant. Figure 5 shows frequency distribution of prevalence of class III/ class IV prognoses to RCT based on gender where 24 males and 23 females had class III ; 7 males and 2 females had class IV caries. Figure 6 shows Frequency distribution of prevalence of class III/ class IV progress to RCT based on anterior tooth which got affected. Figure 6 shows frequency distribution of prevalence of class III/ class IV progressing to RCT based on tooth number where 11 is most affected followed by tooth number 21, 12, 22,etc. Most prevalent tooth indicated with class III/ class IV progressing to RCT (Figure3) is maxillary right permanent central incisor [11] in maxillary arch and mandibular left permanent canine [33] in mandibular arch. Caries distribution was higher in the maxillary jaw than in the mandibular jaw (Luan *et al.*, 2000; Demirci, Tuncer and Yucekur, 2010). According to Macek MD, et al more caries were observed on proximal surfaces of central and lateral incisors of maxillary arch (Maceket *al.*, 2003). Furthermore, approximal surfaces of incisors, canines show higher caries rates than other sites in anteriors in both men and women (Lin *et al.*, 2001; Antuneset *al.*, 2003).

Our study had few limitations such as its a single centered study, subjects were not available for direct examination and we relied on photographs and case sheets of patients. Sample size of only 56 can be

expanded. Not much quantitative data. Surface involved in caries tooth is not considered due to less number of samples. In future this study can be done for longer durations in a larger population in a multi centered approach.

#### **CONCLUSION:**

Within the limitations of this study, we observed that male patients showed higher incidence of class III , class IV caries resulting in root canal treatment compared to female patients. Class III and class IV caries were observed to be more prevalent in the age group 61-70 years. Maxillary central incisors were more prone for class III and class IV caries than lateral incisors and canine. Mandibular central incisors were least likely to experience class III/class IV caries. Prevalence of class III and class IV caries was comparatively more in maxillary arch than mandibular arch. Thus early diagnosis and conservative treatment of class III and class IV caries can prevent teeth from progressing to RCT.

#### **AUTHOR'S CONTRIBUTIONS:**

Author 1 (Santhanam.P), carried out the retrospective study by collecting data and drafted the manuscript after performing necessary statistical analysis. Author 2 (Dr. Subash Sharma) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3 (Dr. Raghu Sandhya) has participated in the study design and has coordinated in developing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

**CONFLICT OF INTEREST :** nil

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## Tables and Graphs:

Table 1 - Chi square test

Parameter	p Values	Significance	Inference
Age vs Gender of patients	0.009	>0.05	Not Significant
Age vs Tooth Number in FDI notation	1.000	>0.05 (significant)	Not Significant

Tooth Number vs Class III/ Class IV Caries	0.000	<0.05	Significant
Age vs Class III/ Class IV Caries.	0.892	>0.05	Not Significant
Sex vs Tooth Number in FDI notation	0.457	>0.05	Not Significant
Sex and Class III/ Class IV caries.	0.140	>0.05	Not Significant

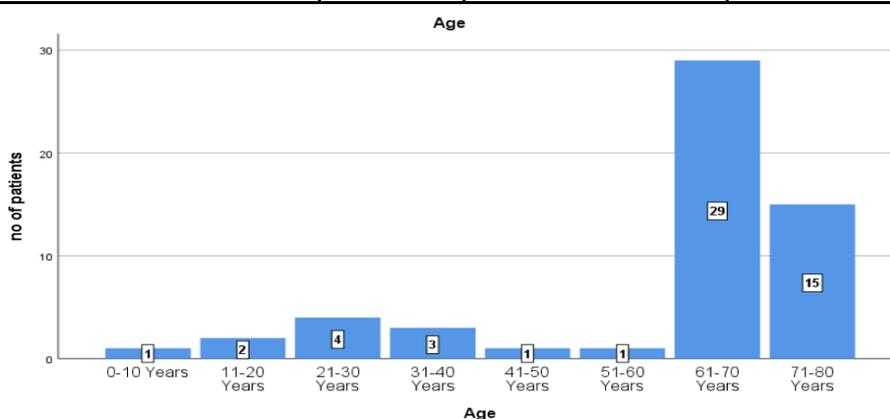


Figure 1: Bar graph representing frequency distribution of age of the patients. X-axis represents age and Y-axis represents the number of patients. Graph shows that most of the patient who had class III/class IV caries progress to RCT were aged between 61-70 years (29); followed by 71-80 years (15); 21-30 years (4); 31-40 years (3); 41-50 years(1); 51-60 years (1); 0-10 years (1). On analysis most of the patients with class III and class IV caries were aged between 61-70 years.

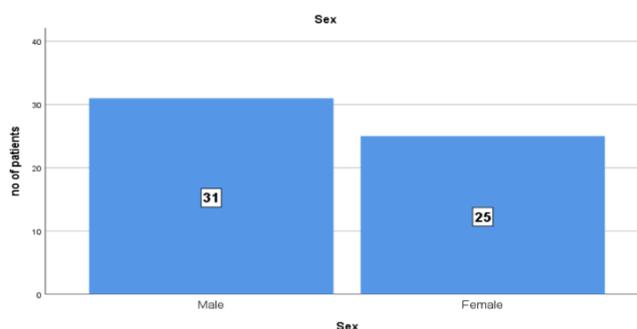


Figure 2: Bar graph representing frequency distribution patients gender. X-axis represents gender and Y-axis represents the number of patients. Graph shows that most of the patients who had class III/ class IV caries progressed to RCT were males (31) followed by females (25).

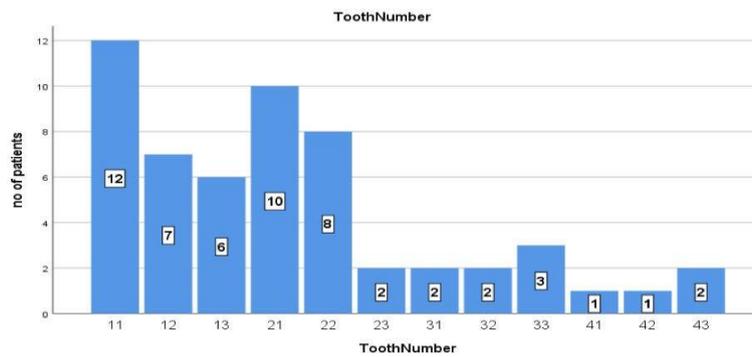


Figure 3: Bar graph representing frequency distribution of individual tooth number in FDI notation which had class III/class IV caries. X-axis represents tooth number in FDI notation and Y-axis represents the number of patients. Graph shows that most of the patients individual tooth with class III/class IV caries was tooth number 11(12 individual tooth ); followed by 21(10 individual tooth); 22(8 individual tooth ); 12(7 individual tooth); 13(6 individual tooth); 33(6 individual tooth); 23(3 individual tooth) ; 31(3 individual tooth); 32(3 individual tooth); 43(2 individual tooth);41(1 individual tooth ); 42(1 individual tooth). On analysis most of the patients whose individual tooth which had class III/class IV is Maxillary right permanent central incisor (11).

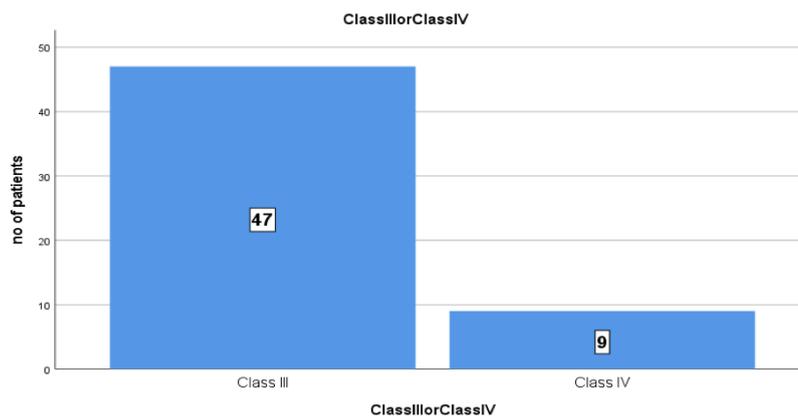


Figure 4: Bar graph representing frequency distribution of patients' gender. X-axis represents class III/class IV caries and Y-axis represents the number of patients. Graph shows that most of the patients had class III (47) progress to RCT followed by class IV (9) . On analysis most of the patients had class III caries than class IV caries which progress to RCT .

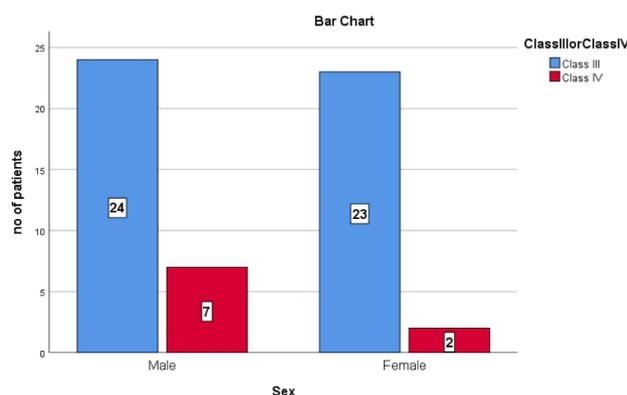


Figure 5: Association Bar graph representing association between gender and class III /class IV caries progress to RCT. X-axis represents gender (blue colour - male, red colour- female) and Y-axis represents the number of participants. Graph shows that most of the males had class III caries which progress to RCT(24) followed by class IV which progress to RCT(7); similarly females class III caries which progress to RCT(23) followed by classIV which progress to RCT(2). Pearson Chi square value- 0.140, p value>0.05, which is statistically not significant. The association analysis denotes classIII and class IV caries which progress to RCT is prevalent in males.

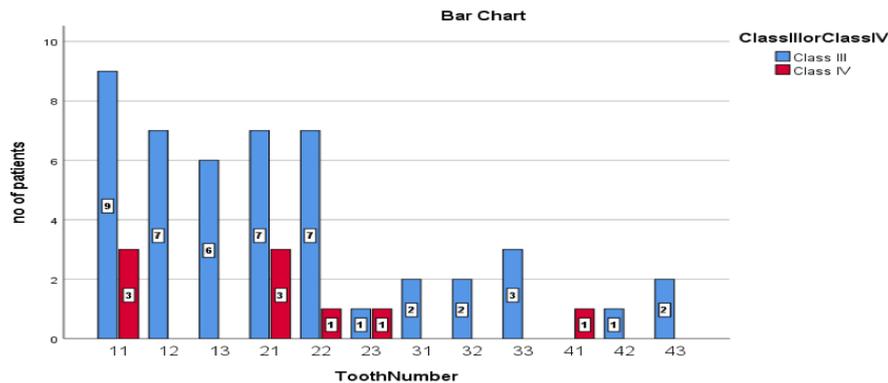


Figure 6 :Association Bar graph representing association between individual tooth number in FDI notation and class III /class IV caries progress to RCT. X-axis represents class III /class IV caries progress to RCT (blue colour - classIII, red colour- classIV) and Y-axis represents the number of individual teeth. Graph shows most of the class III caries which progress to RCT is prevalent in tooth number 11 (9) followed by 12(7); 21(7); 22(7); 13(6); 33(3); 31(2); 32(2); 43(2); 42(1). Most of the class IV caries which progress to RCT are prevalent in tooth number 11 (3) and 21(3) followed by 22(1);23(1); 41(1). Pearson Chi square value- 0.000, p value<0.05, which is statistically significant. The association analysis denotes Maxillary right permanent central incisor tooth number 11 was found to have classIII and class IV caries which progresses to RCT