Prevalence Of Mandibular Third Molar Pericoronitis Among Smokers And Evaluation Of Its Treatment Outcomes - A Retrospective Study

Pooja Umaiyal M, Jaiganesh Ramamurthy*

Department of Periodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

ABSTRACT

Pericoronitis is an infectious disease affecting the operculum overlying a semi-erupted or erupting tooth. Pericoronitis occurs mainly or particularly on the lower third molars. It is painfully debilitating at times and it’s a common periodontal emergency found for many diseases, with tobacco being the major modifiable risk factor. It has a negative impact over oral health and oral hygiene. The aim of this study is to analyse the prevalence of pericoronitis among smokers. Patients included in this retrospective study were those with a diagnosis of pericoronitis from July 2019 till March 2020. Socio-demographic and clinical data of all the 109 patients collected such as age, gender, tooth or teeth affected by pericoronitis and treatment undergone were retrieved from the recorded details of the patients. This data was tabulated in Excel and then imported to SPSS software for statistical analysis. During the study period, 109 patients presented with pericoronitis. The peak age for the prevalence of pericoronitis was 20-25 years accounting for 75.2% of the patients. The prevalence of lower left third molar (54.1%) being affected with pericoronitis was higher than the lower right third molar being affected (45.9%). Extraction (95.4%) was the frequently performed treatment for pericoronitis. Pericoronitis occurs more often in 20-25 years of age patients who are smokers. While the lower left third molar being the most common tooth involved in pericoronitis and extraction of the affected teeth was the treatment of choice among the majority of the population.

*Corresponding Author
Name: Jaiganesh Ramamurthy
Phone: 98404 43463
Email: jaiganeshr@saveetha.com

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INTRODUCTION

Pericoronitis is an inflammation of the operculum that is soft tissue covering the crown of an unerupted tooth or partially erupted tooth and it is also called as operculitis (McNutt et al., 2008). An operculum is a clinical term for the soft tissue covering a partially erupted tooth. A developed operculum surrounding the teeth tends to accumulate more bacterial plaque retention in between and when it’s affected by the masticatory trauma caused by the opposing tooth, the condition sets to be aggravated.

Symptoms of pericoronitis may range from mild discomfort to a very painful state which includes pain, swelling, and difficulty in swallowing, enlargement of the affected lymph nodes, fever, malaise, bad odour or altered taste. It can be associated with purulent exudates of the operculum which can be tested by digital pressure in that region, feeling nausea and lack of appetite (Yurtutan et al., 2020). The clinical category of the disease is closely related to
the frequency and intensity of these symptoms. The sequelae of such an infection are well recognised, as it may spread anteriorly or posteriorly along the fascial planes to involve the vestibular, buccal, submasticeteric, submental, submandibular and pterygoid spaces (Andrews, 1967). This can lead to cellulitis, extraoral sinus formation and Ludwig’s angina, which are of considerable clinical importance. Acute pericoronitis, sub-acute pericoronitis and chronic pericoronitis are three categories of clinically and diagnostically recognised pericoronitis. Acute pericoronitis is characterized by decreased mouth opening and very severe symptomatology, almost the same pattern with reduced intensity and with normal mouth opening is seen in sub-acute pericoronitis (Kumar, 2017). Chronic pericoronitis refers to a patient describing a short duration low-grade pain without characteristic symptomatology (Marchiani, 2012; Moloney and Stassen, 2008).

Pericoronitis could be a leading cause for extraction of permanent third molars and one of the conditions could include the precautionary extraction of impacted third molars (Chestnutt et al., 2000; Da et al., 2013). The infection is multimicrobial, predominantly caused strictly by beta-lactamase-producing anaerobic microorganisms (Gutiérrez-Pérez, 2004). The prevalence of third molar related pericoronitis is the lowest. The most prevalent type is chronic pericoronitis affecting the lower right second permanent molar. The peak age of occurrence of pericoronitis varied from 21 to 25 years of age constituting 55.2% of the patients. The soft tissues adjacent to vertically inclined partially erupted mandibular third molars are more fre-
For many diseases, smoking is considered an established risk factor (Haber et al., 1993). The newest plaque of the twentieth century is tobacco with it expanding exponentially with its usage or utilisation. One hundred eighty-two million smokers abide in India among the humongous population of 930 million worldwide tobacco users. By 2020 World Health Organization appraisal evaluated that tobacco-related demise may surpass 1.5 million every year or 13% of all passing in India (Vellappally et al., 2008). The use of tobacco around the world has been a major modifiable risk factor for health. Nicotine dependence includes both mental and physical dependence (Ramesh et al., 2017, 2016b). There are numerous unfriendly consequences for oral and dental being on smoking cigarettes (Souza and Markou, 2011). Oral malignant growth, periodontal illness, delayed healing of the extraction socket, the main source of tooth loss, discoloured teeth and tongue, awful breath, decreased feeling of taste and smell are among the impacts (Khalid et al., 2017; Vellappally et al., 2008).

Smoking exerts a strong, chronic and dose-dependent suppressive effect on gingival bleeding on probing (Ramesh et al., 2016a). When compared to the non-smokers, bleeding on probing was less evident in smokers which indicates its effect on gingival blood vessels. The exact mechanisms by which smoking suppresses gingival bleeding is not understood yet (Dietrich et al., 2004). Based on various study reports it is understood that smokers may present with a lower level of gingival inflammation, it has been accepted for the fact that the gingival blood flow in smokers is lesser than in non-smoking individuals. Smoking is thought to affect the periodontal tissues mainly by the vascular and immunological response of the body as it would also induce a decreased local host response. Previously our team had conducted numerous clinical trials (Ravi et al., 2017), in-vitro studies involving periodontal disease pathogenesis (Priyanka et al., 2017; Varghese et al., 2015), comparative studies (Ramesh and Mg, 2016b; Kavarthapu and Thamaraiselvan, 2018), Evaluation studies (Khalid et al., 2017; Thamaraiselvan et al., 2015), case reports (Panda et al., 2014; Ramesh et al., 2017, 2019), systematic reviews (Avinash et al., 2017; Mootha et al., 2016) reviews (Khalid et al., 2016; Ramesh et al., 2016b) and literature reviews (Ramesh et al., 2016b) over the past many years. Now we are focusing on epidemiological studies related to periodontal disease. Thus the aim of this present study is to assess the prevalence of pericoronitis among smokers.

Materials and Methods

A retrospective study was conducted in a University setting at Saveetha Dental College and Hospitals. The advantage of conducting this study in a University setting was the ease of Data Collection containing similar ethnicity with the involvement of both the genders. The unavailability of location-specific data was the disadvantage of this study. Ethical approval for conducting the study was obtained from the Institutional Scientific Review Board, Saveetha Dental College and Hospitals.

Data collected for this study was from the patients who had visited the institutional dental hospital for treatment between June 2019 and March 2020. A total of 109 patients’ details who were diagnosed with pericoronitis or had undergone extraction of third molar or operculectomy due to pericoronitis were collected. Sampling bias for the study was minimised by including all the required data. Data was collected from the patient records maintained by the hospital and was then tabulated in excel and then imported into SPSS software. Incomplete data was verified with the concerned department or patient or excluded from the study.

The collected data included age, gender, tooth involved and treatment is done. A statistical test was done using a chi-square test with the software SPSS by IBM. Independent variables included age and gender of the participants, whereas the depen-
dent variables included the smokers, gingival index, plaque index of the patients. All of these were analysed using correlation and association.

RESULTS AND DISCUSSION

A total of 109 patients who ranged from 17-25 years of age with pericoronitis were examined, among which 6.4% were smokers and the rest were non-smokers (Graph 1). Prevalence of pericoronitis was more evident among thenon-smoking patients compared to smoking patients.

High prevalence of pericoronitis was seen among the age group of 20-25 years, with 75.2% (Graph 2). Higher prevalence of pericoronitis was seen among the age group of 20-25 years (75.23%) and The lower left third molar (54.1%) was the most common site for pericoronitis to occur with extraction (52.29%) being the predominant type of treatment done, followed by the lower right third molar (45.9%) also with extraction (43.12%) being the most predominant type of treatment done and laser operculectomy (0.92%) being the least type of treatment done among the study population. (Graph 3). Extraction as a treatment for the pericoronitis is highly prevalent with 95.4% when compared to other treatments for pericoronitis like surgical operculectomy and laser operculectomy with 3.7% and 0.09% prevalence respectively with a statistically insignificant p-value of >0.05 (Graph 4). However, based on the presence or absence of smoking habit extraction was highly predominant among non-smokers and smokers with 88.9% and 6.4% respectively. It is statistically significant with p-value <0.05 (Graph 5).

Over the past 15 years, the correlation between smoking and periodontal diseases has been studied extensively and both cross-sectional and longitudinal studies provide strong epidemiologic evidence of a positive association between smoking. Clinical and radiographic signs of periodontitis also show an increased risk of periodontitis in smokers (Darby, 1983; Haber, 1994; Preber and Bergström, 1990). Even when the levels of plaque accumulation and gingival inflammation were not significantly different between smokers and nonsmokers, smokers exhibited an increase in prevalence as well as the severity of the destructive disease. The relationship between smoking and periodontitis appears to be dose-dependent.

Smoking habit causes changes in the gingival epithelium and gingival connective tissue. Smokers develop narrowing of blood vessels around the range of ≤ 0.5μ in diameter and decrease in inflammatory cell infiltration like neutrophils than non-smokers do. The epithelial changes are so significant that it mimics early phases of dysplastic changes may be a common finding in smokers but not in nonsmokers. A study showed that there was a decrease in the density of blood vessels and due to that, reduced inflammatory cell infiltrations were also detected in smokers (Sreedevi et al., 2012). Various study results showed that the consequences of smoking on vascular endothelium are caused by hazardous nicotine compounds. Nicotine causes stimulation of the production of amines like adrenaline and noradrenaline, which causes vasoconstriction and in turn leads to the decrease in the nature of bleeding and exudates production (Sreedevi et al., 2012). Gradual reduction in capillary diameter and decreased density of blood vessels in the gingival connective tissues of smokers is the causative factor for the reduction of gingival index. Inflammatory responses also decreased for smokers. This causes a reduction of inflammation and bleeding. Hence these inflammatory signs are markedly decreased in smokers. This finding is usually compared with gingival health status and makes the clinician believe that it’s healthy (Lie et al., 1998; Preber and Bergström, 1985). Hence, smokers are more prone to develop pericoronitis, but the smoking frequency is not proportionately associated with the disease.

In this study, the population contains only males, females were purposely excluded from the study for the main purpose that it would be difficult to recruit females who admit that they smoke. Since patients with any known systemic problems were not included, it was considered reasonable that comparisons made between the smokers and non-smokers were accurately reflected on the influence of smoking on pericoronitis. This was contradicted by Ayanbadejo et al., who reported having 59.5% of females with pericoronitis and 40.5% of males (Ayanbadejo and Umesi-Koleoso, 2008). This can be attributed to the fact that unlike western society in which habits like smoking or drinking have almost been identically distributed among males and females.

The present study reported the highest prevalence of pericoronitis among the age group of 20-25 years with 75.2% which was in accordance with the study by Ayanbadejo et al. (Ayanbadejo and Umesi-Koleoso, 2008), reporting the peak period being 19-23 years. Kalsaron et al. (Katsarou et al., 2019, showed the peak period as between 20-25 years with 72.41% and Trvelan Trventanov et al. (Tsvetanov, 2018), with a report showing 55.2% of the prevalence of pericoronitis occurring at the age group of 21-25 years. The reason for this
age dependence is because there is increased exposure to smoking to an individual after the age of 19 years caused by various factors like personality factors (openness, conscientiousness, extraversion, and neuroticism), cognitive factors (sense of self-efficacy and coherence), peer pressure, coping resources (friends and family social support) and demographic factors (gender and ethnicity).

In the current study, the lower left third molar was the most prevalent site of pericoronitis (54.1%) followed by the lower right third molar. This was supported by studies reported by Ayabadejo et al. (Ayanbadejo and Umesi-Koleoso, 2008), who similarly reported 45.3% of lower left molars to be predominant that 37% of lower right molars with a bilateral concurrent pericoronitis was noted in 17.7% of patients. A reason suggested by Sangal (Sangal, 1984) for this difference was that most of the impacted teeth remain unattended to in their patients, which may lead to occasional attacks of pericoronitis and may thus occur on both sides of jaw concurrently.

Opectulectomy is a procedure involving minor surgery where the affected soft tissue/the flap of gum over the molars, is cut away, preventing further build-up of debris and plaque and subsequent inflammation. The inflamed/infected, painful operculum are often removed by operculectomy which is the surgical excision or ablation of the operculum. It can be performed through various types of techniques: scalpel, CO₂ laser, caustic agents, electrosurgery, cautery, radiofrequency surgery, or hot-tip diode surgery. In our present study extraction of the tooth involved has been predominant with 95.4% followed by surgical operculectomy and laser operculectomy.

The limitation of the study conducted includes the reduction or availability of the data, the unequal distribution of the cases and the unavailability of location-specific datas. Hence, the results of this study must be interpreted within the limitations of this study and further cohort studies must be done, including larger data size. Such a study should also include the other associated parameters like angulation of impacted, bilateral pericoronitis, etc.

CONCLUSIONS

Pericoronitis is commonly seen periodontal problem which could be attributed to multiple factors. Within the limits of this study, the prevalence of pericoronitis occurring in patients who are smokers is more in the age group of 20-25 years. Hence smoking habit has a role in triggering the severity of the disease. With the lower left third molar being the most common tooth involved in pericoronitis, care needs to be given in early diagnosis of the condition and if diagnosed later, the only extraction of the affected teeth was the treatment of choice.

Authors Contributions

Conceptualisation: Pooja Umaiyal and Jaiganesh Ramamurthy; Methodology: Pooja Umaiyal and Jaiganesh Ramamurthy; Validation: Pooja Umaiyal and Jaiganesh Ramamurthy; formal analysis: Pooja Umaiyal and Jaiganesh Ramamurthy; writing-original draft preparation: Pooja Umaiyal; writing-review, editing and visualisation: Jaiganesh Ramamurthy.

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Conflict Of Interest

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

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