International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 02, 2020
ISSN: 1475-7192

INCIDENCE OF SURGICALLY ASSISTED ORTHODONTIC TOOTH ERUPTION-A RETROSPECTIVE INSTITUTIONAL STUDY

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Abstract

Introduction*: The most commonly impacted teeth are molar and maxillary canine impactions. Surgically assisted orthodontic eruption is the surgical uncovering of the crown which aids in tooth eruption and it is the commonly employed method for tooth eruption. The present study aims at assessing the incidence of surgically assisted orthodontic tooth eruption at Saveetha Dental College.*

Materials and methods*: The present study is a retrospective based analysis conducted in a hospital setting. Patient records were collected by a complete analysis of data of 86000 patients between March 2019 to March 2020. The required data were extracted from the patient's records. 19 case sheets were collected. The data collected are stored in excel and transferred to SPSS for analysis by T-test. Chi-Square test was done to associate age and gender with the affected teeth group. Results obtained in the form of bar graphs.*

Results*: 19 patients who underwent surgical-orthodontic eruption were used for this study. In the present study, we observed that 11 to 15 years (42.1%) patients are more prone to impaction and the most commonly affected gender is females (73.7%). The commonly affected teeth in the present study were 13-23 (57.9%) especially canines. Associating the age group with affected teeth group, p-value was analysed and it is found to be statistically significant ($p<0.05$). Associating the gender with affected teeth group, p-value was analysed and it is found to be statistically not significant ($p>0.05$).*

Conclusion*: In the present study, we observed that patients between 11-15 years were more commonly affected by impacted teeth and underwent orthodontic-surgical eruption. Females are more commonly affected than males.*

Keywords: *Canine, Impaction, Orthodontic, Surgically assisted*

Introduction

An impacted tooth is when the tooth is not completely erupted or partially erupted. The most common impactions seen in oral cavities are third molar impactions, maxillary canines impactions. Third molars are the most common teeth that are impacted among all molars [1]. The maxillary canine is the second most commonly impacted teeth [2]. If the canine impaction is detected at an earlier age, the extraction of deciduous canine is recommended in the age group of 10-13 year patients. It improves the possibility of eruption [3].

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The impactions can be treated by the surgically assisted eruption. It is the surgical uncovering of the crown. Surgically assisted orthodontic treatment is required when a definite diagnosis of the impaction has been made and when all possibilities of its natural eruption have been exhausted [4] and it is a painful procedure [5]. The diagnosis and treatment of the impacted tooth require careful evaluation of the orthodontist and the surgeon [6]. Other alternative methods for treating impactions are surgical removal followed by orthodontic space closure/prosthodontic replacement, autogenous transplantation, surgical exposure and accessory bonding for traction, ulectomy with or without osteotomy [6]. Gingivectomy can also be done in case of labial impactions [6].

The reasons why tooth impactions occur are due to impaction within jaw bone, inadequate arch length, lack of space for tooth eruption. First, the most common tooth to get impacted is mandibular third molars. Impactions can occur if there is retained deciduous tooth [7], [2]. Multiple impactions are associated with syndromes like cleidocranial dysostosis, Gardner's Syndrome, Gorlin-Sedano Syndrome and Yunis Varon Syndrome. Some studies show that there is periodontal problem in the tooth adjacent to the impacted tooth and some studies showed that there are infections like pulpitis, pericoronitis reported in patients with impactions [8], [2].

Sometimes canines remain palatally impacted and sometimes it changes positions. There can be bilateral impactions too but palatal impactions are more common [9]. Patterns of maxillofacial injuries reflect the trauma patterns within the community and the maxillofacial injury can cause tooth impaction [10]. Dental students must be made aware of the surgical procedures [11] and medicines used post surgery [12], [13], [14], [15] to formulate a proper treatment plan and to treat the normal and medically compromised patients [16], [11]. In the present study we assessed the incidence of surgically assisted orthodontic tooth eruption at an institution,which has been taken as a study centre.

MATERIALS AND METHODS

Patient records were collected by complete analysis of data of 86000 patients between March 2019 to March 2020. The required data (patients who underwent surgically assisted orthodontic tooth eruption) were extracted from the patient's records. 19 case sheets were collected and reviewed. The data collected were stored in excel and transferred to SPSS for analysis by T-test.

The independent analysis is the patient's demographic details. The dependent analysis is surgical treatment undergone. The data was analysed and tabulated.

RESULTS AND DISCUSSION

19 patients were used for this study. They were segregated as per their age and gender. Commonly affected age group is 11-15 years (42.11%). Least commonly affected age limit is 26-30 years (5.26%) [Figure 1]. Females are most commonly affected (73.68%) than males (26.32%) [Figure 2]. In the present study the most commonly affected teeth were from 13-23 (57.89%) and the least commonly affected teeth were from 34-38 (10.53%), 44-48 (10.53%) and upper arch (5.26%) [Figure 3]. One sample T-test was done and the p-value appears to be statistically significant ($p<0.05$) [Table 1]. Correlating with age and gender, we found that the association of affected teeth group with age was found to be statistically significant ($p<0.05$) [Figure 4] whereas the association of affected teeth group with gender was found to be statistically not significant ($p>0.05$) [Figure 5].

Surgical assisted orthodontic tooth eruption aids in proper eruption of tooth and a standard protocol for the procedure [17] and management [18] to be followed. Usually considered when all possibilities of natural eruption are not possible [19], [20]. Buccal fat pad graft can give better results in extended nasolabial flap [21]. Awareness should be made on the various surgical procedures to formulate a proper treatment plan for impacted teeth [22],[23].

Impacted teeth occur when there is lack of space, early extractions, cyst formation or inadequate arch length [24], [25], [7]. A study was conducted by Carmen Stelea et al and they reported that 27 patients presented with impacted canines and underwent surgically assisted orthodontic eruption. They reported that maxillary canines were more commonly impacted than mandibular canines, similar to the present study. The affected patients were between 18-25 years, which is contrary to the present study [26]. Similar study was conducted by Mutan-Hamdi Aras et al on evaluation of surgical orthodontic treatments and they reported that from overall patients, 21 patients (65.6%) between 12-24 years were treated with surgical orthodontic eruption of canines with females

being more common than males, similar to the present study [27]. Impacted teeth are common in both genders but in some cases (especially impacted canine) it occurs mostly in females [28], [29].

	Test value=0				95% confidence interval of the difference	
	t	**df**	**Sig.(2-tailed)**	**Mean difference**	**Lower**	**Upper**
Age	6.692	18	0.000	2.474	1.70	3.25
Gender	16.734	18	0.000	1.737	1.52	1.95
Teeth Number	8.293	18	0.000	3.368	2.52	4.22

Table 1: Table representing the one sample T test. Mean difference, t value, df and p value were calculated for age, gender and teeth number. t value for age is 6.692; gender is 16.734; teeth number is 8.293. df for age, gender, teeth number were found to be 18. p value obtained is 0.000 for age, gender and teeth number and it is found to be statistically significant ($p<0.05$).

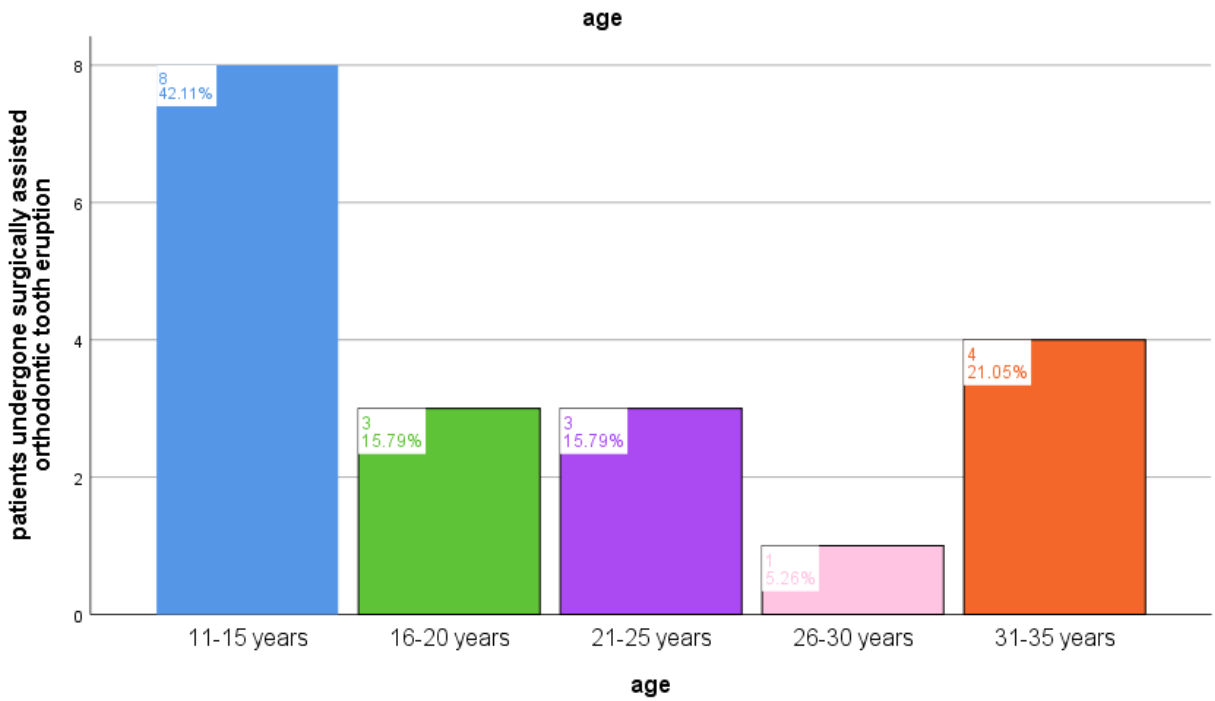

Figure 1: Bar chart representing the frequency distribution of affected age groups. X axis represents age and Y axis represents the number of patients undergone surgically assisted orthodontic tooth eruption. Blue denotes the patients between 11-15 years (42.11%), green denotes the patients between 16-20 years (15.79%), purple denotes patients between 21-25 years (15.79%), pink denotes patients between 26-30 years (5.26%), orange denotes patients between 31-35 years (21.05%). Patients between the age group 11-15 years (42.11%) were more commonly affected with impaction followed by 31-35 years (21.05), 16-20 years (15.79%), 21-25 years (15.79%) and 26-30 years (5.26%) and had undergone surgically assisted orthodontic tooth eruption.

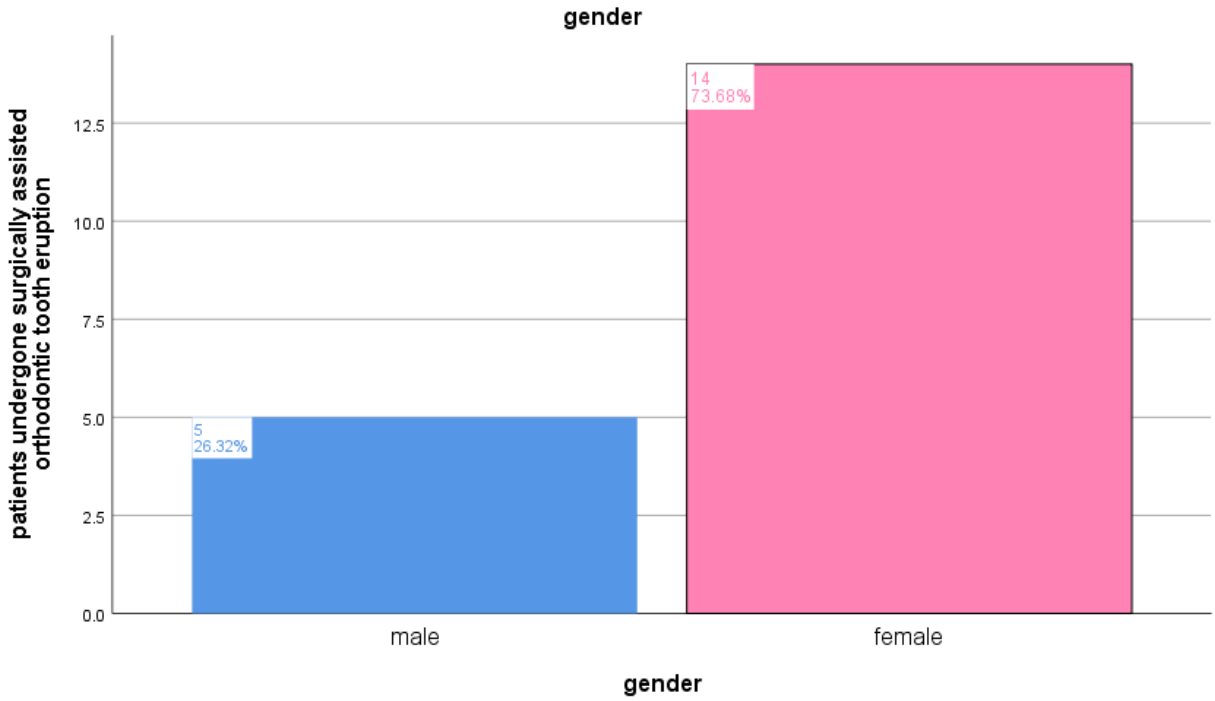

Figure 2: Bar chart showing frequency distribution of gender. X axis represents gender and the Y axis represents the number of patients undergone surgically assisted orthodontic tooth eruption. Blue denotes males (26.32%) and pink denotes females (73.68%). Female patients (73.68%) were more commonly affected with impaction than males (26.32%).

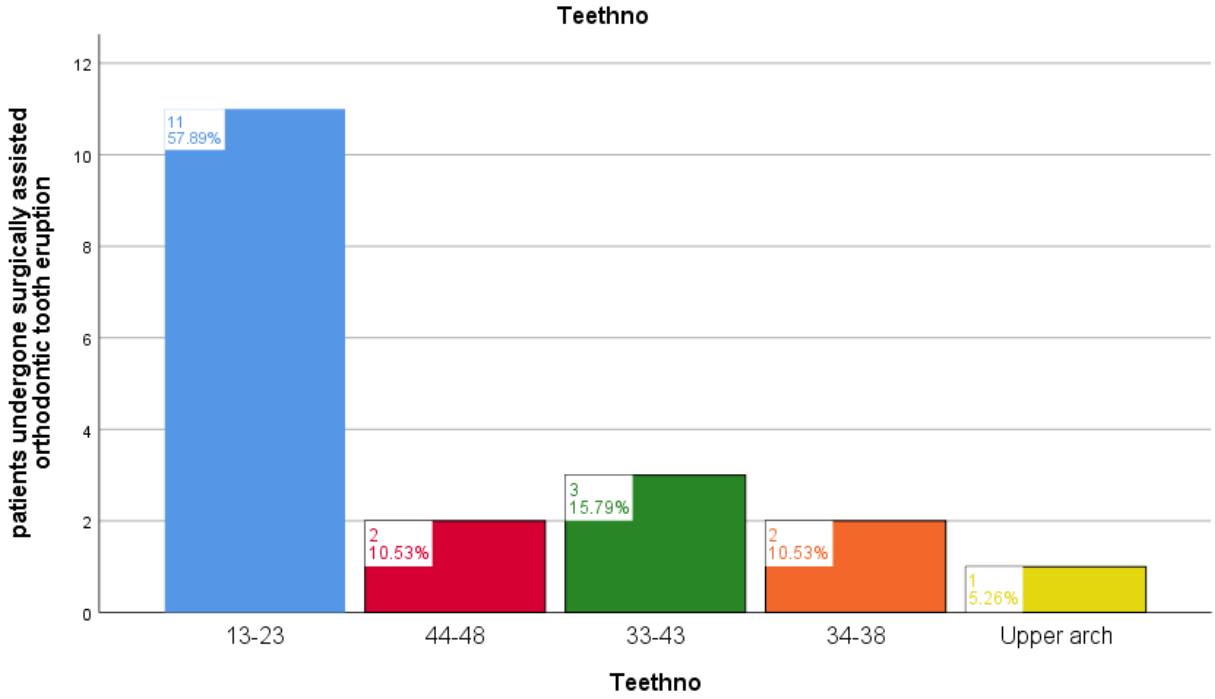

Figure 3: Bar chart representing frequency distribution of affected teeth. X axis represents teeth number and Y axis represents the number of patients undergone surgically assisted orthodontic tooth eruption. Maxillary anterior teeth (13-23) are the most common teeth group affected with impaction (57.89%) followed by 33-43 (15.79%), 44-48 (10.53%), 34-38 (10.53%) and upper arch (5.26%).

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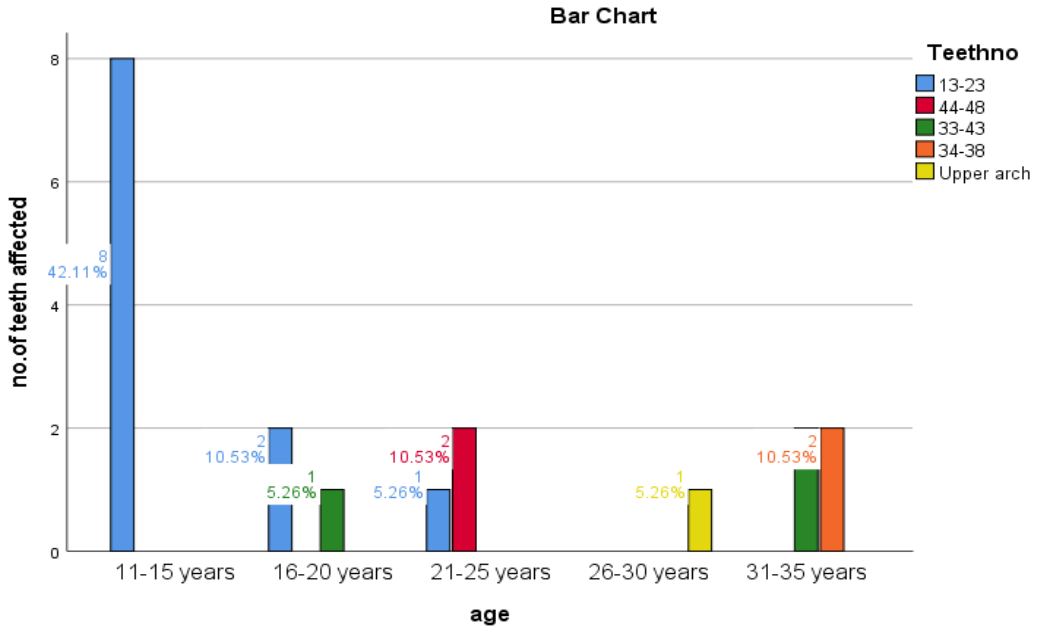

Figure 4: Bar chart representing the association between age group and affected teeth. X axis represents age group and Y axis represents the number of patients with the affected teeth which undergone surgically assisted orthodontic tooth eruption. Blue denotes teeth group 13-23, red denotes 44-48, green denotes 33-43, orange denotes 34-38, yellow denotes Upper arch. Majority of the patients between the age group of 11-15 years had commonly undergone surgically assisted orthodontic eruption and maxillary anterior teeth (13-23) were the most commonly affected teeth (42.11%). Least commonly affected age group was 26-30 years and the upper arch is affected (5.26%). Chi square test was done and the association between age group and affected teeth group was found to be statistically significant. p value obtained is 0.000 which is statistically significant ($p<0.05$).

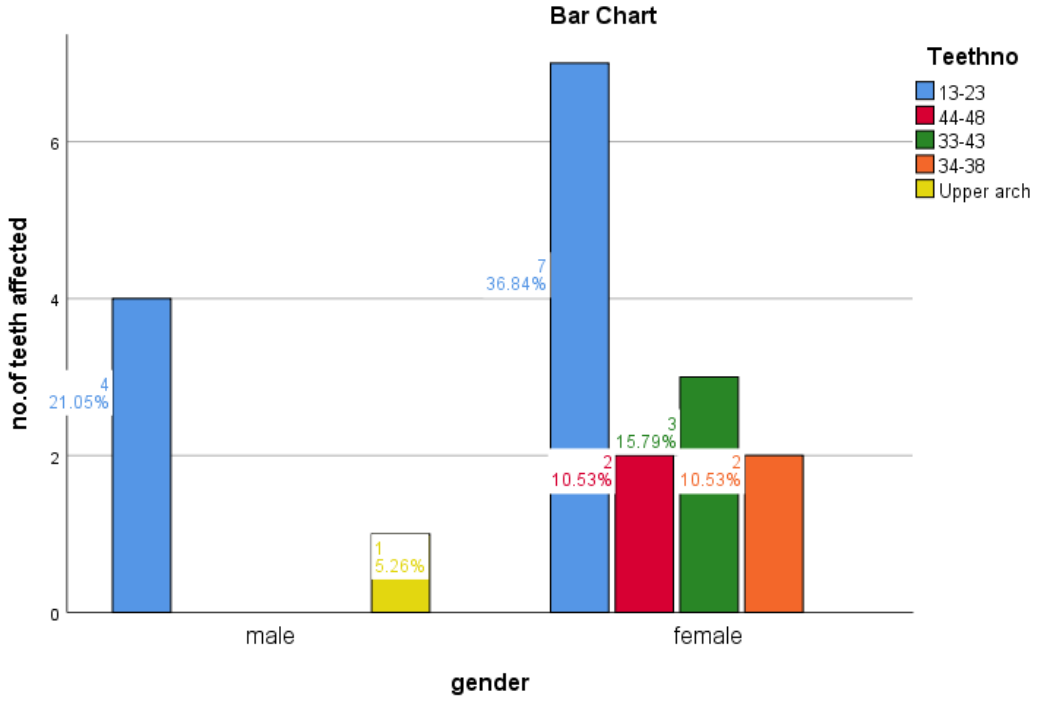

Figure 5: Bar chart representing the association between gender and affected teeth. X axis represents gender and Y axis represents the number of patients with affected teeth which undergone surgically assisted orthodontic

tooth eruption. Blue denotes teeth group 13-23, red denotes 44-48, green denotes 33-43, orange denotes 34-38, yellow denotes Upper arch. Majority of the female patients underwent surgically assisted orthodontic eruption and maxillary anterior teeth (13-23) were the most commonly affected teeth in females (36.84%). 5.26% male patients underwent surgically assisted orthodontic eruption in the upper arch. Chi square test was done and the association between gender and affected teeth group was found to be statistically not significant. p value obtained is 0.209 which is statistically not significant ($p>0.05$). Though it is statistically not significant, maxillary anterior teeth were found to be the most commonly affected teeth group especially in females and underwent surgically assisted orthodontic tooth eruption for the same.

Impactions of incisors and premolars are rare. Impacted incisors can occur due to dilacerations. Some studies dealt with impacted incisors [30], [31]. S. Chaushu et al conducted a study where they assessed periodontal status of surgically treated incisors and found that from overall patients, 12 patients (37.5%) underwent surgical-orthodontic eruption for impacted incisors, contrary to the present study [31] and reported that some patients got affected by periodontal diseases post treatment. Seref Ezirganli et al conducted a study to assess prevalence of impacted premolars where they found that from overall patients, 101 patients (0.98%) had impacted premolars, contrary to the present study [32].

In the current study it has been found that maxillary anterior teeth (13-23) are commonly being surgically exposed and guided to the occlusal plane using orthodontics. A study was conducted by Satheesh B Haralur where they checked the incidence of impacted canine and found that females were more commonly affected, similar to the present study [33]. The reason may be due to the lower transverse dimension of the upper arch in females [6] [33].

A radiographic study was conducted by Fardi A et al. and they reported the incidence of impacted canine, similar to the present study. There was no statistical significance between genders, contrary to the present study [34]. Dipti Shastri et al. conducted a case report on an 18 year old female where her maxillary left permanent canine was unerupted. Surgical exposure and orthodontic guidance of eruption is considered in this case, similar to the present study and reported a good outcome [35,36].

In the present study we observed that maxillary canines are the most common surgically assisted orthodontically erupted teeth, associated with age ranging from 11 years to 15 years respectively. A multicentric study in near future should be carried out to generalise the outcome of this study.

CONCLUSION

From this minimally sampled retrospective study we observed that maxillary anterior teeth (13-23) were been commonly exposed surgically and guided to the occlusal plane orthodontically. The future scope of the present study includes a larger sampled population and a randomised control trial to implicate the results of this study in the field of oral and maxillofacial surgery.

ACKNOWLEDGEMENT

The authors would like to sincerely acknowledge the faculty of Medical record department and Information technology department of SIMATS for their selfless help in collecting datas and sorting out datas pertinent to this study

AUTHOR CONTRIBUTIONS

Chaitanya Shree.P: Literature search, data collection, analysis, manuscript writing.

Dr.M.Sivakumar: Study design, data verification, manuscript drafting.

Dr.Subhashree.R: Manuscript alignment and formatting, data verification.

CONFLICT OF INTEREST

The authors declare that there were no conflicts of interest in the present study.

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