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

I. 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 (Harsha et al., 2014). The maxillary canine is the second most commonly impacted teeth (Msagati, Simon and Owibingire, 2013). 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 (Power and Short, 1993).
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 (Goel et al., 2010) and it is a painful procedure (Kumar, 2017a). The diagnosis and treatment of the impacted tooth require careful evaluation of the orthodontist and the surgeon (Francisco and Cappellette Junior, 2012). Other alternative methods for treating impactions are surgical removal followed by orthodontic space closure/prosthetic replacement, autogenous transplantation, surgical exposure and accessory bonding for traction, ulectomy with or without osteotomy (Francisco and Cappellette Junior, 2012). Gingivectomy can also be done in case of labial impactions (Francisco and Cappellette Junior, 2012).

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 (Kinaia et al., 2016), (Msagati, Simon and Owibingire, 2013). 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 (Oginni et al., 2002), (Msagati, Simon and Owibingire, 2013).

Sometimes canines remain palatally impacted and sometimes it changes positions. There can be bilateral impactions too but palatal impactions are more common (Ling et al., 2007). Patterns of maxillofacial injuries reflect the trauma patterns within the community and the maxillofacial injury can cause tooth impaction (Abhinav et al., 2019). Dental students must be made aware of the surgical procedures (Sharma et al., 2017) and medicines used post surgery (Rao and Santhosh Kumar, 2018), (Jesudasan, Abdul Wahab and Muthu Sekhar, 2015), (Kumar, 2017b), (Christabel et al., 2016) to formulate a proper treatment plan and to treat the normal and medically compromised patients (Abhinav, Sweta and Ramesh, 2019), (Sharma et al., 2017). Previously our team has a rich experience in working on various research projects across multiple disciplines (Neelakantan et al., 2015; Ramamoorthy, Nivedhitha and Divyanand, 2015; Abdul Wahab et al., 2017; Eapen, Baig and Avinash, 2017; Manivannan et al., 2017; Patil et al., 2017; Ezhilarsan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; Ravindiran and Praveenkumar, 2018; Wahab et al., 2018; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Rajeshkumar et al., 2019; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020). 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.

II. 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.

III. 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 (Kumar and Rahman, 2017) and management (Kumar and Sneha, 2016) to be followed. Usually considered when all possibilities of natural eruption are not possible (Marimuthu et al., 2018), (Packiri, 2017). Buccal fat pad graft can give better results in extended nasolabial flap (Patil et al., 2017). Awareness should be
made on the various surgical procedures to formulate a proper treatment plan for impacted teeth (Patturaja and Pradeep, 2016). (Jain et al., 2019).

Impacted teeth occur when there is lack of space, early extractions, cyst formation or inadequate arch length (Manne et al., 2012), (Carvalho, de Carvalho and Luna, 2016), (Kinaia et al., 2016). 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 (Stlea et al., 2010). 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 (Aras et al., 2011). Impacted teeth are common in both genders but in some cases (especially impacted canine) it occurs mostly in females (Patil and Maheshwari, 2014), (Sachan and Chaturvedi, 2012).

Impactions of incisors and premolars are rare. Impacted incisors can occur due to dilacerations. Some studies dealt with impacted incisors (Agarwal et al., 2019), (Chaushu et al., 2003). 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 (Chaushu et al., 2003) 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 (Ezirganli et al., 2014).

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 (Haralur et al., 2017). The reason may be due to the lower transverse dimension of the upper arch in females (Francisco and Cappellette Junior, 2012) (Haralur et al., 2017).

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 (Fardi et al., 2011). 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 (Shastri et al., 2014). Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadosss, 2018; Ramesh et al., 2018; Ezhilarasam, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

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.

IV. 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.

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AUTHOR CONTRIBUTIONS

Chaitanya Shree.P: Literature search, data collection, analysis, manuscript writing.
The authors declare that there were nil conflicts of interest in the present study.

REFERENCES


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Figure 3: Bar chart representing frequency distribution of affected teeth.

Figure 4: Bar chart representing the association between age group and affected teeth.

Figure 5: Bar chart representing the association between gender and affected teeth.

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![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.](image-url)
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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%).
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.

**LEGENDS FOR TABLES AND GRAPHS**

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