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Frequency of Injury to Front Teeth in Class II Skeletal and Dental Malocclusion

Research Article

Keerthana Baskar[1], Dr. Aravind Kumar Subramaniam[2*], Dr. Sreedevi Dharman[3]

[1] Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences(SIMATS), Saveetha University, Chennai 600077, Tamil Nadu, India.
[2] Professor and Head, Department of Orthodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamil Nadu, India.
[3] Reader, Department of Oral medicine and Radiology, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamil Nadu, India.

Abstract

Many researchers have examined the prevalence of dental injuries in children and adolescents. This study was carried out to evaluate the frequency of traumatic injury in class II division 1 malocclusion patients and gender variation of the fracture. Data of 384 class II malocclusion patients was collected. Statistical analysis was done using SPSS version 19 .P value was set at 0.05. 38% of the patients had Ellis class III fracture followed closely by Ellis class II fractures (36%) in patients with class II malocclusion. Males were commonly affected than females. Ellis class III fracture (45.4%) was most prevalent among females and Ellis class II fracture (39.2%) in males. P value was >0.05 and hence the results were statistically not significant. Within the limits of the study, it was found that fracture of the anterior teeth was more in males than females. Ellis class II was the most common type of fracture that was observed among males and Ellis class III fracture was prevalent among females.

Keywords: Fracture; Gender; Malocclusion; Prevalence; Trauma.

Introduction

Fracture in class II malocclusion is due to the incisor proclination, maxillary prominence, class II division 1 and incompetent lip can be the possible risk factors. An increased risk of incisor trauma is present in children with an overjet that is greater than 6 mm [10, 28].

Oral facial trauma usually can result in a wide spectrum of dental injuries that ranges from enamel crown fractures with good prognosis and complex injuries with reduced long-term prognosis [24].

The prevalence of incisor injury has been reported to range from 6% to 34% [5]. [2] Falls, collisions, Sporting activities, road traffic accidents are the most common cause for dental injuries [6, 3]. Variables such as age, sex, social economic status and behavioural problems also influence the frequency of traumatic injury.

Studies have shown that patients aged 8 to 11 years had the highest prevalence of dental trauma [6, 3]. Studies have shown a positive correlation between the frequency of incisor trauma and its sequelae [9].

The efficacy of intervention to traumatic injury is closely related to the time of treatment and peak occurrence of incisor trauma. The benefits of early orthodontic treatment will be inefficient if dental trauma occurs before the start of the treatment. Trauma to the front teeth can affect the aesthetic appearance of the patient and cause significant distress to the patient.

Various clinical trials, in-vitro studies and reviews have been conducted by our team. [(Ramesh Kumar et al., 2011 [37]; Felicita, Chandrasekar and Shanthasundari, 2012 [17]; Dinesh et al., 2013 [11]; Jain, Kumar and Manjula, 2014 [20]; Kamisetty et al., 2015 [22]; Krishnan, Pandian and Kumar S, 2015 [26]; Rubika, Felicita and Sivambiga, 2015 [39]; Viswanath et al., 2015 [50]; Sivamurthy and Sundari, 2016 [44]; Felicita, 2017a, 2017b [15, 16]; Samantha,

***Corresponding Author**:
Dr. Aravind Kumar Subramaniam,
Professor and Head, Department of Orthodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, 162, PH Road Chennai 600077, Tamil Nadu, India.
Tel: 9841299939
E-mail: aravindkumar@saveetha.com

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2017 [40]; Vikram et al., 2017 [49]; Pandian, Krishnan and Kumar, 2018 [31])]. Now, we are focusing on epidemiological studies.

Previously our team has a rich experience in working on various research projects across multiple disciplines. (Jain, 2017 [19]); (Varghese, Ramesh and Veeraiyan, 2019 [46]); (Ashok and Ganapathy, 2019 [1]); (Padavala and Sukumaran, 2018 [29]); (Ke et al., 2019 [23]); (Ezhilarasan, 2018 [12]); (Krishnan et al., 2018 [25]); (Ezhilarasan, Sokal and Najimi, 2018 [14]); (Pandian, Krishnan and Kumar, 2018 [31]); (Ramamurthy and Mg, 2018 [35]); (Gupta, Ariga and Deogade, 2018 [18]); (Vikram et al., 2017 [49]); (Paramasivam, Vijayashree Priyadharsini and Raghunandhakumar, 2020 [32]); (Palati et al., 2020 [30]); (Samuel, Acharya and Rao, 2020 [42]). Now the growing trend in this area motivated us to pursue this project.

The purpose of this study was to describe the prevalence, extent and severity of incisor trauma in class II skeletal and dental malocclusion patients.

Materials and Methods

The study was conducted in a hospital set up in Saveetha dental College, Chennai. The ethical approval was given by the institutional research board. Data was obtained from the Dental Information Archiving System of Saveetha Dental College. The population type was all patients with class II malocclusion. Sampling was done from June 2019-April 2020. The number of case sheets that were reviewed was 384. Out of 384 patients, only 51 patients had anterior fracture. Cross verification of the data was done with the photographs that were embedded. To minimize sampling bias, convenience sampling was done. An inclusion criterion was patients with injury to front teeth with class II malocclusion. .Patients who had injury of the incisor due to other reasons were not included in this study.

The data was obtained from the Dental Information Archiving System. The data was tabulated and analysed in Excel. The data was imported to SPSS version 19 and chi squared test was done. The dependent variable for the study is fracture of anterior teeth and independent variable is age and gender. Type of analysis done was correlation and association.

Results & Discussion

There were 384 patients with class II malocclusion. Out of these 384 patients, 50 patients had anterior fracture, out of which 28 were found to be males and 22 were females. It was found that patients with Ellis class III fractures were found to be more which was closely followed by patients with Ellis class II factors, the percentage affected being 38% and 36% respectively. Patients with class I fracture were found to be 26%. (Figure 1).

Association of gender with the type of fracture was studied in the present study. Among females, Ellis class III was found in the majority of patients (45.4%), followed by Ellis class II (31.8%) and Eliis class I (22.7%). While in males, Ellis class II was more common (39.2%), followed by Ellis class II (32.1%) and Ellis class I fracture (28.5%). (Figure 2).

Figure 1: The above depicted bar graph shows frequency distribution of type of fracture among patients with class II malocclusion. The X-axis denotes occurrence of fracture of anterior teeth (Ellis class I, II, III) and Y-axis denotes number of patients with class II malocclusion. Ellis class III fracture was most prevalent (38%) in class II malocclusion patients and Ellis class I was the least prevalent (26%).

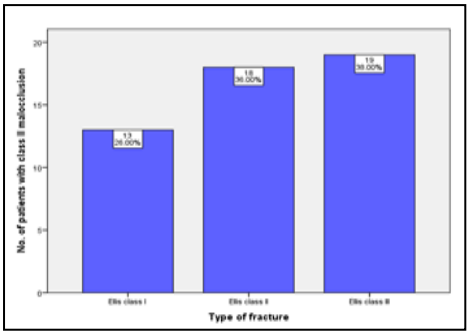
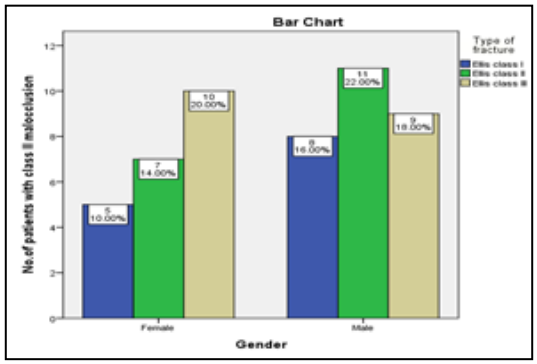


Figure 2: The above depicted graph shows association between gender and type of fracture in class II malocclusion patients. The X-axis denotes gender and Y-axis denotes number of patients with class II div 1 malocclusion and anterior fracture. Highest prevalence of Ellis class III (brown) was seen in females and Ellis class II (green) was most common among males in class II malocclusion patients. Chi-Square test was done and the association between gender and type of fracture in class II malocclusion patients was found to be statistically not significant since Pearson's chi square value : 0.927, DF: 2, p value: 0.629 (>0.05).



The P value of this study was > 0.05, hence the study was insignificant.

In the present study, it was found that patients with Ellis class III fracture, that is fracture involving the pulp, found to be in the majority (38%). In a study done by Koruluk et al, It was found that fractures involving enamel only were found majorly (69.8%) [24]. The age group variation of this study was found to be 10 years-56 years. The mean age was found to be 26.72 years.

In a study done by Chen et al, it was found that boys had increased incisor trauma compared to girls [9]. Similar results were obtained in a study by Kaste et al. [24].

In most of the studies, it was found that trauma to the maxillary central incisor was the most common, followed by lateral incisor [2, 51]. Most of the studies associated with trauma are carried out in the pre-adolescent and adolescent age groups.

In the present study, among females, Ellis class III (45.4%) was experienced by most of the patients. While in male patients, Ellis class II (39.2%) was the most common. No study has been done on this association.

According to Jarvinen et al [(Järvinen, 1979)] 21, the range of injuries increased in relation to larger overjet (> 6mm). The patients between 8– 11 years of age were more prone to traumatic injuries to anterior teeth according to previous studies [7, 43].

As the data was inadequate a lot of information was missing like overjet, lip coverage of the patient was not assessed. The limitation of the study includes, type of tooth fracture was not studied. The study was done on a much smaller sample size, as it was a university based study.

Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018 [33]; Ramesh et al., 2018 [36]; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018 [48]; Ezhilarasan, Apoorva and Ashok Vardhan, 2019 [13]; Ramadurai et al., 2019 [34]; Sridharan et al., 2019 [45]; Vijayashree Priyadharsini, 2019 [47]; Chandrasekar et al., 2020 [8]; Mathew et al., 2020 [27]; R et al., 2020 [38]; Samuel, 2021 [41]). We hope this study adds to this rich legacy.

Conclusion

Within the limitations of the study, it was found that fracture of the anterior teeth was more in males than females in patients with class II malocclusion. Ellis class II was the most common type of fracture observed among males and Ellis class III fracture was prevalent among females. Thus, from the present study it has been inferred that proclination of anterior teeth leads to accidental trauma. Hence, early intervention and correction of proclination by fixed orthodontic appliances prevents not only trauma but also enhances the aesthetics and function.

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