

Duration of Mobility Reduction Followed by Management of Avulsed Tooth

Research Article

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Abstract

Traumatic dental injuries are often seen among injuries to the face. Many times teeth get knocked out during daily activities or sporting events especially in contact sports. In cases of avulsion, mechanical trauma to the periodontal ligament, dehydration and periodontal ligament cells viability particularly can complicate the prognosis. The aim of the study was to evaluate the duration of mobility reduction after the management of the avulsed tooth. In this study around 44 pedo patient's data was collected from patient's dental records who reported with avulsed teeth, between June 2019 to March 2020, Saveetha Dental College and Hospital, Chennai. The values obtained were tabulated and documented. The data were then entered into SPSS software for statistical analysis. Age groups were split into 0-6 years, 7-12 years and 13-18 years. Among the selected data, most commonly affected were males (80%) (around the age group 13-18 years). 50% of the study showed 13-18 years were most affected with avulsion, followed by 7-12 (43%). The most common time duration taken for reduction of mobility after management of the avulsed teeth was found to be more than 6 months (50%). The chi square test showed negative correlation between teeth no. and duration (P value >0.05). Avulsion is a rare condition/accident, mostly affecting children between 7-9 years of age. The clinician should choose evidence based treatment procedures which will reduce mobility in a short period and anti-resorptive therapy methods are essential for therapy of avulsed teeth to avoid growth retardation of alveolar ridge.

Keywords: Avulsion; Antiresorptive; Duration; Mobility; Reduction.

Introduction

Traumatic dental injuries are often seen among injuries to the face. The frequency of the reported incidence of tooth avulsion, which is known as complete displacement of the tooth from its socket, ranges from 1-16% of all traumatic injuries to permanent dentition [10]. Many of these teeth are knocked out during daily activities or sporting events especially in contact sports. In cases of avulsion, mechanical trauma to the periodontal ligament, dehydration and periodontal ligament cells viability particularly can complicate the prognosis [41].

The ideal treatment for an avulsed tooth is its immediate replantation into the socket, which significantly improves the prognosis. In 1706, Pierre Fauchard reported the case of avulsed teeth being

replanted [15]. Andreasen reported in a retrospective study that 90% of the avulsed teeth used to be successfully studied were replanted within the first 30 minutes of the accident in 1966 [2]. Since then the extension possibility of survival rate of replanted teeth has been widely investigated. Although the best therapy for avulsed teeth is their immediate replantation, many factors may affect this approach after trauma. The prognosis of the treatment as well as the survival of an avulsed teeth in the mouth depends on intrinsic and extrinsic factors, such as duration of the tooth's extra - alveolar period, its storage medium, replantation time, periodontal status and duration of splinting [10]. 60 minutes of extra oral dry time is considered to be critical. In order to protect periodontal ligament cells and provide optimum healing, immediate replantation is the most ideal treatment among other options. However, clinically it has been reported that the replanta-

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tion period was lasting 1-4 hours following the tooth storage in insufficiently wet/dry storage [31]. Dry storage of avulsed teeth leads to a death of periodontal ligament cells attached to the root maintaining periodontal ligament vitality is crucial for a good prognosis since the presence of the necrotic periodontal ligament remnants can cause the development of root resorption [41].

To achieve a more favourable prognosis after replantation, use of a suitable storage medium is a critical factor. The capacity of the storage medium is more important than the duration of the extra alveolar time [16]. The storage of periodontal ligament cells can be done in biocompatible medium, best solution called Hank's balanced solution (HBSS) in 1980 [9]. The storage medium containing saliva, water, ice, physiological saliva, viaspan(R), minimum essential medium (MEM), tropolis, green tea extract, red mulberry, egg white, coconut water, sports drinks and oral rehydration solutions [34]. Some liquids like soy milk, powdered milk, enfamil and contact lenses collusion can be used. However, when there is an interruption in blood supply to the periodontal ligament, all the metabolites (calcium, phosphate, potassium) and glucose that the cells require are needed. Studies have shown that the teeth that are protected in a physiological ideal media can be reimplanted within 15 minutes to one hour after the accident with good prognosis [4]. The final decision regarding patient care remains primarily in the hand of the treating dentist. For ethical reasons, it is important that the dentist provides the patient and guardian with pertinent information relating to treatment so also the patient and guardian has as much influence in the decisionmaking process as possible [20, 23]. This study evaluates the duration taken for the management of avulsed teeth of patients who reported to the saveetha dental college and hospital.

Previously our team has a rich experience in working on various research projects across multiple disciplines. (Jain, 2017 [19]); (Varghese, Ramesh and Veeraiyan, 2019 [44]); (Ashok and Ganapathy, 2019 [7]); (Padavala and Sukumaran, 2018 [22]); (Ke et al., 2019 [21]); (Ezhilarasan, 2018 [12]); (Krishnan et al., 2018 [22]); (Ezhilarasan, Sokal and Najimi, 2018 [14]); (Pandian, Krishnan and Kumar, 2018 [30]); (Ramamurthy and Mg, 2018 [36]); (Gupta, Ariga and Deogade, 2018 [17]); (Vikram et al., 2017 [47]); (Paramasivam, Vijayashree Priyadharsini and Raghunandhakumar,

2020 [32]); (Palati et al., 2020 [29]); (Samuel, Acharya and Rao, 2020 [40]). Now the growing trend in this area motivated us to pursue this project. The idea for this survey stemmed from the current interest in our community.

Materials and Methods

This study was approved by the research ethics committee of saveetha dental college. The data was collected from patients records between June 2019 and march 2020, in Saveetha Dental College And Hospital, Chennai. The dental records of 44 patients who reported to the clinic for management of Avulsed teeth were investigated by collecting the data and records were entered in the excel sheet. The male and female distribution among the study population was evaluated. The collection of data was divided on 4 parameters, the age of the patient, the gender of the patient, teeth number and duration of mobility management of avulsed tooth. After grouping the parameters, data copied to the software and statistical analysis was carried out. Statistical analysis was done using IBM SPSS software. The significance level was at <0.05. Descriptive analysis and chi-square tests were done. Graphs were tabulated.

Inclusion Criteria: Patients of age group 0-18 years only included, and both male and females with avulsion were included.

Exclusion Criteria: Other than avulsion cases, other injuries or dental trauma were excluded.

Results & Discussion

Avulsion was most commonly seen only in the maxillary and mandibular, central and lateral incisors. The most affected one is 11 where nineteen patients were reported with avulsion (43.2%), followed by 21 where thirteen cases were reported (29.5%), 31 & 12 where five cases each were reported with avulsion (11.4%), and 22 & 41 were one case was reported with avulsion (2.3%) (Figure 1). The incidence of duration was associated with the mobility reduction after the management of avulsed teeth. The most duration taken to reduce was more than 6 months where 22 cases showed mobility reduction after the management of

Figure 1: This graph shows distribution of the teeth no. of the patients with avulsed teeth that were included in the study. X axis shows the teeth no., Y axis shows the number of patients. From the graph it's evident that 11(orange colour) was most affected 43.2%, followed by 21(29.5%) which in maroon, 31(sea green) & 12(yellow) shows 11.4%, and 22(pink) & 41(grey) where only 2.3%. cases were reported with avulsion.

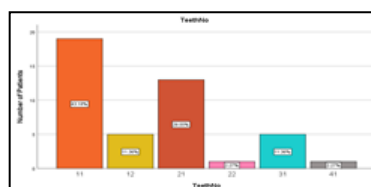


Figure 2: This graph shows the distribution of time taken for mobility reduction after management (Duration) of the patients who reported with avulsed teeth that were included in the study. X axis shows the duration, Y axis shows the number of patients. From the graph it's evident that more than 6 months(green bar) period was found to be (50%) followed by the 5-6 months (red bar) period where 15 patients showed mobility reduction after management of avulsion (34.1%) and in less than 5 months(blue bar) period 7 cases showed mobility reduction after management(15.9%)

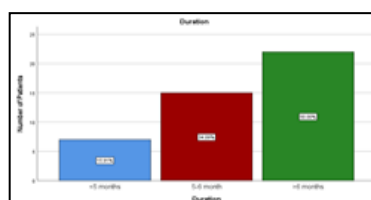


Figure 3: The graph shows association between the age and gender of the patients. X axis represents the age of the patient and y-axis represents the gender of the patients who reported with avulsed teeth. Chi-square test was done and the association was found to be statistically not significant. Chi square value- 2.71 p value - .257 ($p > 0.005$), statistically not significant. Hence from the figure we infer that the males in the age group between 7-12 years (36.36%) (Neon green) are most commonly affected than females. Whereas, Females were less affected in 0-6 years (2.27%) (Purple) age group.

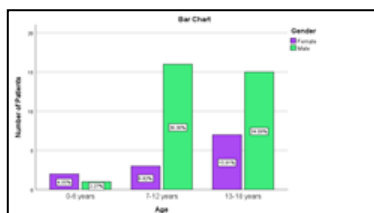
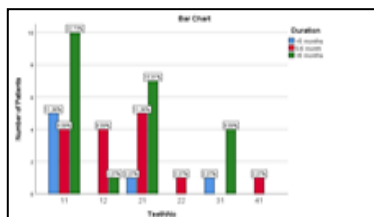


Figure 4: This graph shows the association between teeth no. and duration of the treatment with avulsed teeth. X axis represents the teeth no. and y-axis represents the number of patients who underwent avulsion treatment. Chi-square test was done and was found to be statistically insignificant. Chi square value - 14.24 p value - .162 ($p > 0.005$) statistically not significant. Hence from the figure we infer that the time duration taken for the mobility reduction management of avulsed teeth, is more than 6 months period for tooth no. 11(22.73%).



avulsion (50%), followed by 5-6 months period where 15 cases showed mobility reduction after management of avulsion (34.1%) and in less than 5 months period 7 cases showed mobility reduction after management (15.9%) (Figure 2). Among the 44 pedo patient's , in the age group 0-6 years , two female patients, one male were reported with avulsion, in the 7-12 years age group , four female patients, and fifteen male patients reported with avulsion. In the 13-18 years age group, six female patients, and sixteen male patients reported with avulsion (Figure 3). Each tooth had its own time period for mobility reduction after management of avulsion. In less than 5 months period five cases with avulsion in 11, one case with avulsion in 21 and one case with avulsion in 31 showed mobility reduction , whereas in 5-6 months period, four cases with avulsion in 11 & 12, five cases with avulsion in 21, one case with avulsion in 22 and 41 showed mobility reduction. In more than 6 months period, ten cases with avulsion in 11, one case with avulsion in 12, seven cases with avulsion in 21 and four cases with avulsion in 31 showed mobility reduction after the management(Figure 4). Correlations between the age and gender was determined which showed p value to be .257 which showed a negative correlation and correlation between the teeth number and duration was seen , p value was found to be .162 which also showed a negative correlation between the two parameters.

This study was done to evaluate the duration of mobility reduction followed by management of avulsed teeth. These study records were collected and tabulated. Around which 50% of them showed 13-18 years age group, followed by 7-12 years age group (43.2%). The avulsion was more common in male (72.7%) than in females (27.3%). The teeth number most commonly affected was 11(43.2%), followed by 21(29.5%)(Figure 1). It was found that the time duration taken for mobility reduction following the management of avulsed teeth was more than 6 months (50%), followed by a 5-6 months duration period(34.1%)(Figure 2). The P value for the correlations among the parameters done in this study was not statistically significant (Figure 3 and Figure 4).

The benefit of tooth replantation especially in growing children and adolescents is mainly the time gained to establish an optimal permanent treatment plan, preservation of the width of the alve-

olar bone contour and contributes to future prosthetic treatment planning. In the worst case scenario , even if the replanted tooth is extracted later, the improved alveolar development will provide better options in future prosthetic restoration [2]. Individuals suffering from craniofacial trauma involving tooth avulsion usually receive their first aid treatment in the hospital emergency service or general practitioner [5]. Therefore, in most situations, important factors for the success of replantation cannot be controlled. Studies have shown that this scenario can be improved significantly with educated campaigns on dento alveolar trauma and storage media directed to lay people [8]. As a treatment option, replantation restores occlusal function and esthetics shortly after injury. In cases of delayed replantation, increase survival rate of the avulsed tooth application [8]. A thorough understanding of the potential and function of many molecules in the medical science and new hopes for the patients can be seen. The long-term progression of root resorption of a tooth replanted within 15 min was very limited and thus such a tooth has a favourable long-term prognosis. Consequently, it is appropriate to recommend that avulsed teeth be immediately replanted. Although most avulsed teeth can be immediately replanted, prompt replantation is not always feasible. In seriously injured or unconscious patients there is a risk of aspiration if the tooth is replanted, and an extraoral storage medium should be recommended until replantation can be performed at the clinic. Furthermore, severely contaminated teeth, such as with soil, should be carefully rinsed before replantation. In some instances it is not possible to carefully rinse the tooth in places other than the clinic, and a storage medium is therefore mandatory during transport to the clinic. Experimental studies have shown that storing the tooth in milk [5, 27] or wrapping the tooth in plastic foil [1, 3] prevents the PDM cells from injury and prevents later root resorption. For shorter periods saliva is sufficient, but contains micro-organisms and has a low osmolality, which adversely affects the viability of the PDM cells [23, 8, 24, 25]. However, so far there have been clinical studies on artificial storage media. Consequently, future comparative clinical long-term studies of avulsed human teeth stored in artificial media before replantation are needed. Future development in tissue engineering might facilitate impaired periodontal ligament regeneration and provide a new perspective on the treatment of delayed replanted teeth [42].

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 [37]; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018 [46]; Ezhilarasan, Apoorva and Ashok Vardhan, 2019 [13]; Ramadurai et al., 2019 [35]; Sridharan et al., 2019 [43]; Vijayashree Priyadharsini, 2019 [45]; Chandrasekar et al., 2020 [11]; Mathew et al., 2020 [26]; R et al., 2020 [38]; Samuel, 2021 [39]). We hope this study adds to this rich legacy.

Conclusion

In this study, the time taken for reduction of mobility following the management was seen for more than 6 months (50%). The management of the avulsed teeth can be done easily so that early results can be obtained. Mostly follow up and home care contributes to better healing followed by dental trauma injuries. Avulsion to a rare accident, mostly affecting children between 7-9 years of age, within the limitation of this study it can be concluded that clinicians should choose evidence based treatment procedures which will reduce mobility in a short period and anti-retrospective therapy methods are essential for avulsed teeth to avoid growth retardation of alveolar ridge.

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