ORIGINAL ARTICLE

Frequency of Intrusive Luxation in Potential Orthodontic Patients with Increased Over-Jet

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OBJECTIVE: To find out the frequency of intrusive luxation in potential orthodontic patients with increased over-jet.
METHODOLOGY: Total 50 orthodontic patients having permanent dentition with increased overjet was included in the study and were examined in OPD as per selection criteria. The patients were examined for the presence of intrusive luxation of upper front teeth as per defined criteria.
STUDY DESIGN: A Cross Sectional Study.
SETTING: Orthodontic Center of Rashid Latif Dental College, Lahore.
DURATION: January 2021 to June 2023
RESULTS: The results showed that frequency of traumatic upper maxillary incisors intrusive luxation was found to be 3%, out of which 80% were females and 20% were males.
CONCLUSION: There is increased frequency of traumatic upper maxillary incisors intrusive luxation in orthodontic patients having increased over-jet.
KEYWORDS: Intrusive luxation; Orthodontic repositioning, Re-eruption; Orthodontic extrusion.
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INTRODUCTION

Prevalence of intrusive luxation injuries is constant on an elevated scale and its variations mostly reflect the local differences.[1] Children are common victims of dental injuries and estimation suggests 25% of injuries are encountered in childhood.[2,3] Prevalence of intrusive luxation injuries is around 3%, and due to its significance in causing occlusal interferences and malocclusion this dental injury warrants immediate treatment.[5-8] Right now there is no consensus on management of intrusive luxation injuries for permanent teeth. Various treatment modalities include spontaneous re-eruption, orthodontic repositioning, surgical repositioning and somewhere periodontal crown lengthening.[9,10]

Mildly intruded tooth is allowed to re-erupt without any active treatment.[4] If no progress is noted within two or four weeks then there is an indication for orthodontic / surgical repositioning to prevent other complication such as ankylosis. If no progress is noted within two or four weeks and there is more than 7mm then there is an indication for orthodontic / surgical repositioning to prevent other complication such as ankylosis.[11-13] Severely displaced teeth which are embedded deep into bone are predisposed to ankylosis. Such teeth should be luxated to produce some mobility and partially repositioned to allow the placement of orthodontic appliance and access for the endodontic treatment.[12-15] Furthermore Shapira, Tronstad and others suggested gingivectomy to

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uncover the crown,[16,17] while on the other hand the gingivectomy procedure has its own limitations.[18] Consequently the endodontic access should not be delayed at the cost of waiting for passive re-eruption. Time-dependent predictable sequelae such as formation of abscess or inflammatory root resorption may possibly develop.[19,20]

The objective of this study was to find out the frequency of intrusive luxation in potential orthodontic patients with increased over-jet.

METHODOLOGY

The present study was conducted at orthodontic department of Rashid Latif Dental College, Lahore. The sample size was calculated and study was conducted after taking informed consent from the patients and institutional ethics approval. Estimated Sample size was 50 patients using 95% confidence level, 80 % power of test, with increased overjet (of at least 6 mm or more and up to 10mm).[19] According to the IADT the tooth completing following criteria was considered as intrusively luxated: the tooth has moved upward into the socket, resulting in a fracture to the alveolar bone. The tooth isn't loose, and it has the high-metallic sound when tapped as with the lateral luxation. Periapical radiograph show no periodontal ligament space, and the pulp test is negative.[9,10]

Total 50 orthodontic patients, irrespective of gender and age range of 12-16 years, having permanent dentition with increased overjet (of at least 6 mm or more and up to 10mm) was included in the study and were examined in OPD as per selection criteria. The patients were examined for the presence of intrusive luxation of upper front teeth as per defined criteria. (Figure 1)

Figure 1

Following patients were excluded from the study: the orthodontic patients in primary or mixed dentition, history of any other oro-facial trauma, history of orthodontic or any surgical treatment, history of dental extraction, cleft lip palate and other craniofacial anomalies. The data was collected and presented using descriptive statistics.

RESULTS

The results showed that frequency of traumatic upper maxillary incisors intrusive luxation was found to be 3% (Table 1), out of which 80% were females and 20% were males.

Table 1: Frequency of intrusive luxation (N=50)

Parameter	Frequency
Total Patients	50 (100 %)
Patients with traumatic intrusive luxation	3 (6 %)

DISCUSSION

Dentoalveolar trauma is common occurrences during childhood in 25% of children with more than 60% are reported to be luxation type of injuries.[1,2,3] Such injuries cause damage to the pulp and supporting tissue of the tooth.[21] The orthodontist must be well equipped to handle such type of dental injuries.[4] The objective of this study was to find out the frequency of intrusive luxation in potential orthodontic patients with increased over-jet.

Dental Intrusive Injuries usually occur between 7 to 14 years of age before the cessation of facial growth.[22] Therefore it is necessary to preserve the tooth and adjacent bone before the completion of facial growth. Therefore, permanent restorations are not suitable. The eventual aim and success of treatment in growing patients is preservation of the tooth along with bone for few years and not necessarily require its health and function for the entire life if not sustainable any longer.[23]

Luxation injuries are classified as concussion, subluxation, and extrusive, lateral and intrusive luxation.[24,25] Intrusive luxation in permanent dentition accounts to only 3% of all traumatic injuries.[4-6,24-25] This is in accordance with the results of present study which showed that frequency of traumatic upper maxillary incisors intrusive luxation was found to be 3%.

Dental intrusive injuries are referred to as apical displacement of the injured tooth into alveolus after the application of traumatic force.[4-6] Dental trauma involves teeth and other associated structures including pulp, periodontal ligament, alveolar bone, and gingiva. Healing subsequent to trauma is a complex process. Management of such injuries has been modified from rigid splints to flexible and short-term interventions for the period of 7 to 10 days now.[24-30] Extension of such techniques has been the use of

orthodontic traction rather the manual repositioning of teeth.[4] There is no consensus concerning management of DII in permanent teeth. Routine treatment modalities include spontaneous re-eruption, orthodontic repositioning, surgical repositioning and periodontal crown lengthening.[9,10] IADT guidelines recommend passive re-eruption of mild traumatically intruded tooth.[13] In case no movement observed after 2 to 4 weeks, repositioning the tooth orthodontically/surgically is indicated before the development of ankylosis. Almost identical guidelines are suggested by British Society of pediatric dentistry, allowing mildly intruded tooth (<3 mm) to re-erupt and review. In severe cases (>6 mm) surgical repositioning of tooth is better option. There are several limitations of this study such as small sample size and cross sectional nature; however, within these, it was found that there is increased frequency of traumatic upper maxillary incisors intrusive luxation in orthodontic patients having increased over-jet. Our suggestion is to conduct further large scale studies.

CONCLUSION

There is increased frequency of traumatic upper maxillary incisors intrusive luxation in orthodontic patients having increased over-jet.

CONFLICT OF INTEREST

None declared

REFERENCES

1. Glendor U. Epidemiology of traumatic dental injuries - a 12 year review of the literature. Dental Traumatology. 2008;24:603-11. *https://doi.org/10.1111/j.1600-9657.2008.00696.x*

2. Andreasen JO, Andreasen FM, Andreasen L. Textbook and Color Atlas of Traumatic Injuries to the Teeth.4th ed. Oxford, UK: Wiley-Blackwell; 2007.

3. Perez R, Berkowitz R, Mcllveen L, Forrester D. Dental trauma in children: a survey. Endod Dent Traumatol. 1991;7:212-13. *https://doi.org/10.1111/j.1600-9657.1991.tb00438.x*

4. Graber LW, Vanarsdall RL, Vig KWL, Huang GJ. Orthodontics: current principles and techniques. St. Louis, MO: Elsevier; 2017.

5. Andreasen JO. Etiology and pathogenesis of traumatic dental injuries. A clinical study of 1,298 cases. Scand J Dent Res 1970;78:329 42. *https://doi.org/10.1111/j.1600-0722.1970.tb02080.x*

6. Gupta M. Intrusive luxation in primary teeth - Review of literature and report of a case. The Saudi Dent J. 2011;23:167-76. *https://doi.org/10.1016/j.sdentj.2011.09.003*

7. Yamashita FC, Previdelli ITS, Pavan NNO, Endo MS. Retrospective study on sequelae in traumatized permanent teeth. European J Dent. 2017;11:275-80. *https://doi.org/10.4103/ejd.ejd_85_17*

8. Guan Y, Qin M. A retrospective study of pulp healing after luxation injuries. Zhonghua Kou Qiang Yi Xue Za Zhi. 2008;43:520-3.

9. Costa L, Ribeiro C, Cantanhede L, Júnior JS, Mendonça MD, Pereira A. Treatments for intrusive luxation in permanent teeth: a systematic review and meta-analysis. Int J Oral Maxillofac Surg. 2017;46:214-29. *https://doi.org/10.1016/j.ijom.2016.08.021*

10. Patil S, Panicker A, Hindlekar A, Srinidhi S, Dhumal A, Vhora K. Forced orthodontic extrusion for anterior traumatized teeth by a simplistic approach. J Dent Allied Sci. 2014;3:111. *https://doi.org/10.4103/2277-4696.159097*

11. Andreasen FM, Pedersen BV. Prognosis of luxated permanent teeth - the development of pulp necrosis. Endod Dent Traumatol 1985; 1:207-20. *https://doi.org/10.1111/j.1600-9657.1985.tb00583.x*

12. Andreasen JO. Luxation of permanent teeth due to trauma. A clinical and radiographic follow-up study of 189 injured teeth. Scand J Dent Res 1970;78:273-86.

13. Diangelis AJ, Andreasen JO, Ebeleseder KA, Kenny DJ, Trope M, Sigurdsson A, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. Dent Traumatol. 2012;28:2-12. *https://doi.org/10.1111/j.1600-9657.2011.01103.x*

14. Turley PK, Crawford LB, Carrington KW. Traumatically Intruded teeth. Angle Orthod.1987;57:234-244

15. Spalding PM, Fields Jr HW, Torney D, et al. The Changing role of endodontics and orthodontics in the management of traumatically intruded permanent incisors. Pediatr dent. 1985;7:104-110

16. Shapira J, Regev L, Liebfeld H. Re-eruption of completely intruded immature permanent incisors. Endod Dent Traumatol 1986; 2:113-6. *https://doi.org/10.1111/j.1600-9657.1986.tb00137.x*

17. Tronstad L, Trope M, Bank M, Barnett F. Surgical access for endodontic treatment of intruded teeth. Endod Dent Traumatol 1986; 2:75-8. *https://doi.org/10.1111/j.1600-9657.1986.tb00130.x*

18. Ganji KK, Patil VA, John J. A Comparative Evaluation for Biologic Width following Surgical Crown Lengthening Using Gingivectomy and Ostectomy Procedure. Int J Dent. 2012;2012:1-9. *https://doi.org/10.1155/2012/479241*

19. Güngör HC, Cengiz SB, Altay N. Immediate surgical repositioning following intrusive luxation: a case report and review of the literature. Dent Traumatol 2006; 22:340-4. *https://doi.org/10.1159/000094848*

20. Kenny DJ, Barrett EJ, Casas MJ. Avulsions and intrusions: the controversial displacement injuries. J Can Dent Assoc 2003; 69:308-13.

21. Altun C, Güven G, Cehreli ZC, Gurbuz T, Aydin C. Re-eruption of an Intruded Immature Permanent Incisor with Necrotic Pulp: A Case Report. J Can Dent Assoc. 2008; 74:545-549

22. Bastone EB, Freer TJ, McNamara JR. Epidemiology of dental trauma: a review of the literature. Aust Dent J 2000;45:2-9. *https://doi.org/10.1111/j.1834-7819.2000.tb00234.x*

23. Trope M. Avulsion of permanent teeth: theory to practice. Dent Traumatol. 2011;27:281-94.
https://doi.org/10.1111/j.1600-9657.2011.01003.x

24. Kahler B,Heithersay GS. An evidence-based appraisal of splinting luxated, avulsed and root-fracturesteeth. Dent Traumatol. 2008;24:2-10
https://doi.org/10.1111/j.1600-9657.2006.00480.x

25. Hinckfuss SE,Messer LB. Splinting duration and periodontal outcomes for replanted avulsed teeth: a systemic review. Dent Traumatol. 2009;25:150-157
https://doi.org/10.1111/j.1600-9657.2008.00761.x

26. Yu C, Abbott P. Responses of the pulp, periradicular and soft tissues following trauma to the permanent teeth. Aust Dent J. 2016;61:39-58.
https://doi.org/10.1111/adj.12397

27. Andreasen JO. Challenges in the clinical dental traumatology. Endod Dent Traumatol. 1985;1:45-55
https://doi.org/10.1111/j.1600-9657.1985.tb00560.x

28. Nasjleti CE, Castelli WA, Caffesse RG. The effects of different splinting times on replantation of teeth in monkeys. Oral Surg Oral Med Oral Pathol. 1982;53:557-566
https://doi.org/10.1016/0030-4220(82)90340-1

29. Andersson LM, Lindskog S, Blomlof L, et al. effect of masticatory stimulation of dentoalveolar ankylosis after experimental tooth replantation. Endod dent Tramatol. 1985;1:13-16
https://doi.org/10.1111/j.1600-9657.1985.tb00552.x

30. Wimalarathna AAK, Fonseka MN, Jayasuriya NS. Management of an intruded permanent central incisor with late presentation following trauma. J Interdisciplinary Dent. 2018;8:72.
https://doi.org/10.4103/jid.jid_39_16