DISTRIBUTION AND FREQUENCY OF DENTOALVEOLAR FRACTURE OF ANTERIOR TEETH AND ITS MANAGEMENT IN PAEDIATRIC PATIENTS

(*DISTRIBUSI DAN FREKUENSI FRAKTUR DENTOALVEOLAR GIGI ANTERIOR DAN PENANGANANNYA PADA PASIEN PEDIATRIK)*

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ABSTRACT

Dentoalveolar fractures are the most common types of orofacial fractures. Differences influence variations in prevalence across regions in fracture classification systems, demographic factors, and the behaviors that lead to trauma. This study aimed to determine the distribution and frequency of anterior dentoalveolar fractures based on age, gender, cause of fracture, classification of fracture, and its management. At Dental and Oral Hospital Faculty of Dentistry, Universitas Indonesia, from October 2019 to October 2024. A retrospective descriptive approach took secondary data from paediatric patients at the Dental and Oral Hospital, Faculty of Dentistry, University of Indonesia, from October 2019 to October 2024. In a study of 113 fracture cases, 68.1% were dentoalveolar fractures, with 29.2% meeting inclusion criteria involving 48 teeth. The highest incidence occurred in the 10–18-year age group (45.5%), predominantly

in males (57.6%). Falls were the leading cause (66.7%), and uncomplicated crown fractures were most common (45.8%). Primary tooth fractures (Class IX) were the most frequently found (39.6%) and most commonly occurred in the upper first incisors (75%). Composite restorations were the most common treatment (39.6%). This study demonstrates that dentoalveolar fractures in paediatric patients predominantly affect male adolescents, with falls being the leading cause, and permanent teeth, especially the maxillary central incisors, being the most impacted. Composite restoration is the most commonly performed treatment method.

Keywords: anterior teeth; dentoalveolar fracture; management fracture

ABSTRAK

Fraktur dentoalveolar adalah jenis fraktur orofacial yang paling umum. Variasi prevalensi antar wilayah dipengaruhi oleh perbedaan sistem klasifikasi patah tulang, faktor demografis, dan perilaku yang menyebabkan trauma. Penelitian ini bertujuan untuk mengetahui distribusi dan frekuensi fraktur dentoalveolar anterior berdasarkan usia, jenis kelamin, penyebab fraktur, klasifikasi fraktur, dan pengelolaannya. di Rumah Sakit Gigi dan Mulut Fakultas Kedokteran Gigi Universitas Indonesia dari Oktober 2019 hingga Oktober 2024. Pendekatan deskriptif retrospektif dilakukan dengan mengambil data sekunder dari pasien anak di Rumah Sakit Gigi dan Mulut Fakultas Kedokteran Gigi Universitas Indonesia periode Oktober 2019 hingga Oktober 2024. Dalam sebuah penelitian terhadap 113 kasus patah tulang, 68,1% adalah fraktur dentoalveolar, dengan 29,2% memenuhi kriteria inklusi, melibatkan 48 gigi. Insiden tertinggi terjadi pada kelompok usia 10-18 tahun (45,5%), terutama pada pria (57,6%). Jatuh adalah penyebab utama (66,7%), dan patah tulang mahkota yang tidak rumit paling sering terjadi (45,8%). Fraktur gigi primer (Kelas IX) adalah yang paling sering ditemukan (39,6%) dan paling sering terjadi di gigi seri pertama atas (75%). Restorasi komposit adalah pengobatan

yang paling umum (39,6%). Studi ini menunjukkan bahwa fraktur dentoalveolar pada pasien anak sebagian besar mempengaruhi remaja pria, dengan jatuh menjadi penyebab utama, dan gigi permanen, terutama gigi seri pusat rahang atas, menjadi yang paling terpengaruh, sedangkan restorasi komposit adalah metode pengobatan yang paling umum dilakukan.

***Kata kunci**: fraktur dentoalveolar; gigi anterior; manajemen fraktur*

INTRODUCTION

Traumatic dental injuries (TDI) or dentoalveolar fractures are the most common orofacial injuries.[1] According to the International Association of Dental Traumatology (IADT), the estimated prevalence of TDI is 22.7%.[2] However, these figures vary due to differences in classification systems, geographical and socioeconomic factors, and behavioral aspects. For instance, the prevalence of dentoalveolar fractures in Brazil is reported to be 16.5%, whereas in Indonesia, it is lower at 11.4%.[3] Such fractures frequently occur in school settings, where children are more prone to accidents like falls or collisions, contributing to the high incidence of dentoalveolar fractures in Indonesia.[4]

Dentoalveolar fractures refer to fractures of the bone surrounding the teeth without involving the basal bone of the maxilla or mandible.[5] They can disrupt the continuity of the tooth's hard tissues and the alveolar structure, potentially affecting the periodontal tissues and alveolar bone.[6] Clinical signs include tooth mobility, lacerations on the lips and gingiva, tenderness, jaw swelling, and wounds and hematomas on the gingiva.[7] Data from the Indonesian Basic Health Research indicate an increase in trauma cases from 56,818 in 2004 to 72,281 in 2005. Fractures can be classified into soft tissue, hard tissue, and periodontal injuries, depending on their location. Crown fractures are the most common type, whereas tooth avulsion, though rare, is among the most severe.[8]

Dentoalveolar fractures can occur in all age groups but are more frequently seen in children and adolescents. According to the IADT, children aged 8–12 years, particularly at age 9, have the highest risk of dental trauma.[2] A study in a school in DKI Jakarta found the highest frequency of dental trauma (47.37%) at age 9 years,

followed by 24.56% at age 10 years, and the lowest (7.02%) at age 11 years.[7] Another study in Chile reported the highest frequency of dentoalveolar fractures (66.6%) in the 7–12-year age group.[5] Additionally, boys are more likely to sustain these injuries than girls, with a ratio of 1.5:1 to 2.5:1. This difference may be due to boys engaging in more physical activities such as sports and active play. In contrast, girls tend to be more cautious.

The prognosis of dentoalveolar fractures is significantly influenced by immediate care at the accident site and the time elapsed after the injury.[9]According to IADT guidelines, repositioning, and mobilization are generally the preferred treatments for severe dentoalveolar fractures such as tooth avulsion**.** However, immediate treatment is not always feasible, as emergency management is crucial in determining the prognosis. Repositioning is not recommended when the patient is uncooperative, has severe cognitive impairment requiring sedation, or has a serious heart condition that requires individualized management.[2] Several factors can affect the success rate of dentoalveolar fracture treatment, including storage medium, contamination, and cementum manipulation. Additionally, the duration that an avulsed tooth remains outside its socket, known as dry time, also influences the treatment choice.[10]

Data on the distribution, frequency, and treatment patterns of dentoalveolar fractures—particularly anterior tooth avulsions in children in Indonesia—remain limited. With the increasing number of cases and a lack of recent studies, further research is needed to understand the distribution and management of anterior tooth avulsion cases. Therefore, this study aims to analyze the distribution, frequency, and treatment patterns of anterior tooth avulsion cases at the Dental and Oral Hospital, Faculty of Dentistry, Universitas Indonesia (RSKGM FKG UI) from October 2019 to October 2024.

METHOD

This research is a descriptive study with a retrospective design. It was conducted using secondary data obtained from the medical records of paediatric patients aged 1–18 years in the Department of Emergency, Oral Surgery, and Paediatric at the Dental and Oral Hospital Faculty of Dentistry, Universitas Indonesia (RSKGM FKG UI), the period from October 2019 to October 2024. These records included patient identities, details of anterior dentoalveolar fractures, and their treatments. The inclusion criteria were medical records of paediatric patients aged

1–18 with complete patient information and a clinical diagnosis of anterior dentoalveolar fractures and their treatments. Data obtained in this study will be processed using Microsoft Excel, and univariate analysis will be performed using SPSS 23.0. The results will be presented in tables and diagrams describing the distribution and frequency of patients with dentoalveolar fractures and their treatments.

RESULT

One hundred thirteen fracture cases were identified at RSKGM FKG UI, comprising 77 dentoalveolar fractures (68.1%) and 36 maxillofacial fractures (31.9%). Of the 77 dentoalveolar fractures, 33 anterior dentoalveolar fractures met the inclusion criteria for this study. From October 2019 to October 2024, 48 anterior teeth were recorded as having dentoalveolar fractures that met the criteria in 33 medical records. Thus, 48 anterior teeth with dentoalveolar fractures fulfilling the criteria were found in 33 patient records.

The distribution and frequency of anterior dentoalveolar fractures in paediatric patients at RSKGM FKG UI from October 2019 to October 2024 were analyzed based on age groups, as classified by the Kementerian Kesehatan Republik Indonesia.[11] The distribution was as follows: Infants and Toddlers (1–4 years) accounted for 27.3%, Children (5–9 years) also accounted for 27.3%, and Adolescents (10–18 years) accounted for 45.5%. Out of 33 patients, the Adolescent age group (10–18 years) had the highest frequency compared to the other two age groups.

The distribution and frequency of anterior dentoalveolar fractures in paediatric patients at RSKGM FKG UI from October 2019 to October 2024 based on gender were as follows: males accounted for 57.6%, and females for 42.4%. According to the data, male patients represented more cases, with 19 children (57.6% of the total), and female patients numbered 14 children, representing 42.4%.

Based on the cause of the fracture, the distribution and frequency of anterior dentoalveolar fractures are shown in Table 1 below.

Table 1. Distribution and frequency of dentoalveolar fractures in paediatric patients based on the cause of fracture

Cause of Fracture	Frequency	Percentage
Falls	22	66.7%
Accident	3	9.1%
Biting hard objects	5	15.1%
Hit hard objects	3	9.1%
Total	**33**	**100.0%**

Table 1 shows that, based on the cause of fracture, the distribution, and frequency of anterior dentoalveolar

fractures, most cases in 22 children (66.7%) were caused by falls, which occurred in various locations such as playgrounds, swimming pools, and sports fields.

Based on the fracture type, the distribution, and frequency of anterior dentoalveolar fractures in paediatric patients are shown in Table 2 below.

Table 2. Distribution and frequency of anterior dentoalveolar fractures in pediatric patients based on type of fracture

Type of Fracture	Frequency	Percentage
Tooth avulsion	13	27.1%
Complicated crown fracture	3	6.3%
Uncomplicated crown fracture	22	45.8%
Complicated crown-root fracture	2	4.2%
Alveolar process fracture	3	6.3%
Extrusive luxation	1	2.1%
Intrusive luxation	3	6.3%
Subluxation	1	2.1%
Total	**48**	**100.0%**

Table 2 shows uncomplicated crown fractures are the most frequent type, totaling 22 cases (45.8%), followed by tooth avulsion with 13 cases (27.1%). Extrusive luxation and subluxation were each recorded in only 1 case (2.1%). This data indicates that most cases involve uncomplicated crown fractures, followed by tooth avulsion cases.

Based on Ellis and Davey's classification, the distribution and frequency of anterior dentoalveolar fractures are shown in Table 3 below.

Table 3. Distribution and frequency of anterior dentoalveolar fractures in paediatric patients based on Ellis and Davey's classification

Ellis and Davey's Classification	Frequency	Percentage
Class I	7	14,6%
Class II	9	18.8%
Class III	3	6.3%
Class IV	2	4.2%
Class V	6	12.5%
Class VI	0	0%
Class VII	1	2.1%
Class VIII	0	0%
Class IX	20	41.7%
Total	**48**	**100.0%**

Table 3 shows that the distribution and frequency of anterior dentoalveolar fractures based on the Ellis and Davey fracture classification total of 48 fractured teeth, Class IX fractures were the most common, with 20 cases (41.7%), followed by class II 9 cases (18.8%) and class I with 7 cases (14.6%). Class VII fractures were recorded in only 1 case (2.1%), while Class VI and VIII fractures were not found in this dataset. This distribution indicates that Class IX fractures dominate the cases among paediatric patients in this study.

Table 4 below shows the distribution and frequency of dentoalveolar fractures based on the type of fractured anterior tooth.

Table 4. Distribution and frequency of anterior dentoalveolar fractures in

paediatric patients based on anterior tooth type

Anterior Tooth Type	Frequency	Percentage
Maxillary Central Incisor	36	75%
Mandibular Central Incisor	5	10.4%
Maxillary Lateral Incisor	4	8.3%
Mandibular Lateral Incisor	2	4.2%
Mandibular Canine	1	2.1%
Total	**48**	**100.0%**

Table 4 shows the distribution and frequency of anterior dentoalveolar fractures based on the anterior tooth type. The right maxillary central incisor had the highest cases (36 or 75%), while the left mandibular canine had the fewest (1 case or 2.1% of the total 48 cases).

Table 5. Distribution and frequency of anterior dentoalveolar fractures in paediatric patients based on type of treatment

Treatment Type	Frequency	Percentage
Debridement	5	10.4%
Tooth extraction	7	14.6%
Glass Ionomer Cement (GIC)	5	10.4%
Pulpectomy	2	4.2%
Replantation, fixation, and immobilization with composite wire splint	6	12.5%
Repositioning, fixation, and immobilization with composite wire splint	4	8.3%
Composite restoration	19	39.6%
Total	**48**	**100%**

Table 5 shows the distribution and frequency of anterior dentoalveolar fractures based on treatment type. Composite restoration recorded the highest number of cases, with 19 cases (39.6%), followed by tooth extraction with 7 cases (14.6%), and replantation, fixation, and immobilization with composite wire splint in 6 cases (12.5%). Meanwhile, pulpectomy had the fewest cases, with only 2 cases (4.2%). This data indicates that composite restoration is the most commonly performed treatment compared to other types of treatment.

DISCUSSION

Medical record data at RSKGM FKG UI documented 113 fracture cases, of which 77 (68.1%) were dentoalveolar fractures. This figure is much higher than the 11.4% prevalence reported by Wardhana et al. (2017), likely because the data were obtained from a specialized hospital focused on the head and neck region.[12] Of those 77 cases, 33 (29.2%) involved anterior dentoalveolar fractures that met the study's inclusion criteria, aligning with the 4%–35% prevalence reported in Asia.

The incidence of dentoalveolar fractures increases with age, with the highest number found in the adolescent

group (10–18 years, 45.5%), compared to infants/toddlers (1–4 years) and children (5–9 years). Statistical analysis showed that the mean age of patients was 8.42 years, with a median of 9 years and an age range of 1–17 years. This finding is consistent with Gordy (2004), who reported that fractures more frequently occur in children aged 6–15, correlating with more complex physical activities such as sports or minor daily accidents.[14] Gender is also a factor influencing dentoalveolar fractures: of the 33 children with anterior dentoalveolar fractures, 19 (57.6%) were male and 14 (42.4%) were female, with a male-to-female prevalence ratio of nearly 1.5:1. This aligns with Altun et al., who found ratios ranging from 1.5:1 to 2.5:1. The difference may be due to boys engaging more often in physical activities such as sports, fights, and accidents, while girls tend to be more cautious.[15]

Dentoalveolar fractures typically result from trauma affecting the tooth structure and supporting tissues. The degree of tissue damage depends on factors such as impact force, shape of the impacting object, direction of impact, and the response of surrounding tissues.[16] In this study, falls were the leading cause, with 22 cases (66.7%), consistent with Eyuboglu et al. (2009), who reported 74.2% of fractures caused by falls.[17] The locations included playgrounds, swimming pools, and sports fields. The second most common cause was biting hard objects (15.2%), such as hard foods or toys. Other causes, including accidents and collisions with hard objects, each accounted for 9.1% (3 cases), aligning with previous studies reporting traffic accidents (7.8%) and physical violence (6.6%). [15]

Dentoalveolar fractures encompass a range of types, including uncomplicated crown fractures, complicated crown fractures, crown-root fractures, alveolar process fractures, and various luxation injuries (intrusive, extrusive, lateral, subluxation).[18] In this study, uncomplicated crown fractures were most prevalent (22 cases, 45.8%), followed by tooth avulsion (13 cases, 27.1%). These findings are also consistent with the study by Robertson et al., which found that crown fracture is the most common type of dentoalveolar fracture (65% of all cases), followed by tooth luxation (8-20%). A study in São Paulo also yielded similar results, showing that avulsion (20.4%) and crown fractures (19.7%) are the most frequently occurring dentoalveolar fractures. Crown fractures, whether complex or not, involving enamel or both enamel and dentin, are the most commonly reported types of dentoalveolar fractures.[19]

In identifying dentoalveolar

fractures, three central classification systems are commonly used: Ellis and Davey's (1960), WHO (1978), and Andreasen's (2007). The Ellis classification is preferred here because it focuses on anterior tooth trauma without involving alveolar socket or jaw fractures.[20] Of the 48 fractured teeth, the most common type was Class IX (primary tooth fractures) with 20 cases (41.7%), followed by Class II (enamel-dentin fractures) with 9 cases (18.8%). It aligns with Khandelwal et al. (2018), who identified Class IX as the most frequent. The primary tooth fractures in this study included uncomplicated crown fractures, tooth avulsion, and luxation.[17] An Indian study also supports that enamel fractures are the most common, followed by enamel-dentin fractures (Class II).[13]

As a result of the study, 48 anterior teeth that experienced dentoalveolar fractures permanent teeth were more commonly affected (28 cases, 58.3%) compared to primary teeth (20 cases, 41.7%). This finding aligns with Altay et al., who reported that 21.6% of 332 fractured teeth were primary, while 78.4% were permanent. However, it differs from Andreasen's study in a Danish population, where 30% of injuries occurred in primary teeth and 22% in permanent teeth.[2]. After evaluating which teeth were most frequently fractured, the right maxillary central incisor (Insisif 1 RA) was most commonly affected, with 36 cases (75%). This result corroborates earlier studies, such as Pradeep (2007), who reported that 83.2% of fractures involved the maxillary central incisor, and Lembacher et al., who recorded 63.5% trauma to the upper central incisors.[15] The susceptibility of the maxillary central incisor, particularly in Class II malocclusion, is due to its protruded and exposed position. The protrusion characteristic of Class II Division 1 malocclusion increases the risk of trauma, unlike the lower incisors, which are better protected by the lower lip and the upper central incisors.[13] Conversely, the left maxillary central incisor sustained only five fracture cases (10.4%).

Managing dentoalveolar fractures requires an approach tailored to tooth type, developmental stage, injury location, bone support, and periodontal health.[21] In this study, composite restorations were the most common treatment, with 19 cases (39.6%). It aligns with Francisco et al., who noted that composite restorations, including acid-etch procedures, were the most frequent treatment (26%), while other treatments were less common. Composite restorations are often the first choice for uncomplicated crown fractures of anterior permanent teeth due to their high success rate, immediate aesthetic results, and restoration of function

in a visit with a favorable prognosis.[21] Tooth extraction was the second most common treatment (14.6%), followed by replantation and immobilization using a composite wire splint for more severe fractures (12.5%). Glass Ionomer Cement (GIC) restorations and debridement each accounted for 10.4%, while pulpectomy was the least common (4.2%), typically indicated in severe crown loss or delayed treatment.[22]

CONCLUSION

This study demonstrates that dentoalveolar fractures in paediatric patients predominantly affect male adolescents, with falls being the leading cause and permanent teeth, especially the maxillary central incisors, being the most impacted. Composite restoration is the most commonly performed treatment method.

CONFLICT OF INTEREST

There is no conflict of interest in the writing of this article.

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REFERENCES

1. Salarić I, Tikvica Medojević D, Baždarić K, Kern J, Miličević A, Đanić P, et al. Primary School Teachers' Knowledge on Tooth Avulsion. Acta Stomatol Croat [Internet]. 2021 Mar 15;55(1):28–36. Available from: https://hrcak.srce.hr/file/369345.
2. Fouad AF, Abbott P V., Tsilingaridis G, Cohenca N, Lauridsen E, Bourguignon C, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. Dental Traumatology [Internet]. 2020 Aug 13;36(4):331–42. Available from: https://onlinelibrary.wiley.com/doi/10.1111/edt.12573
3. Francisco SS, Filho FJ, Pinheiro ET, Murrer RD, de Jesus Soares A. Prevalence of traumatic dental injuries and associated factors among Brazilian schoolchildren. Oral Health Prev Dent. 2015;11(1):31–8.
4. Mayasari Y, Setia Wibowo RD. Teachers' Knowledge About Dental Trauma and its Management in Primary Schools in Jakarta, Indonesia. Journal Research of Social, Science, Economics, and Management. 2022;1(8):1061–71.
5. Shetye OA. Dentoalveolar Injuries and Wiring Techniques. In: Oral and Maxillofacial Surgery for the Clinician.

Singapore: Springer Nature Singapore; 2021. p. 1013–37.
6. W F, E S. Management of dentoalveolar fracture by using rigid wire and composite splint: A case report. Intisari Sains Medis. 2018 Jun 5;9(2).
7. Nur Cahyo DS, Widyastuti MG, Rahajoe PS. Pengelolaan Fraktur Dentoalveolar pada Anak-Anak dengan Cap Splint Akrilik. Majalah Kedokteran Gigi Indonesia. 2015 Dec 1;20(2):216.
8. Elleray E, Brizuela M PT. Trauma to the Primary Dentition [Internet]. StatPearls Publishing; 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK580475/
9. Khan MH, Singh G, Charul K, Ezhilarasi S. Management of Dentoalveolar Fracture of Anterior Maxilla Following Traumatic Intrusion of Permanent Maxillary Anterior Teeth: A Review and Case Report. The Traumaxilla. 2020 Dec 13;2(1–3):28–31.
10. Al A, Ali B, Rcs MFD, Fahad I, Qooz A, Ireland MFDRCS, et al. Tooth Avulsion : Etiology and Management. 2020;42(3):206–8.
11. Kementerian Kesehatan RI. Kategori Usia [Internet]. Kemkes.go.id. [cited 2024 Nov 11]. Available from: https://ayosehat.kemkes.go.id/kategori-usia
12. Wardhana A, Basuki A, Prameswara ADH, Rizkita DN, Andarie AA, Canintika AF. The epidemiology of burns in Indonesia's national referral burn center from 2013 to 2015. Burns Open. 2017 Oct;1(2):67–73.
13. Ain TS, Lingesha RT, Sultan S, Tangade P, Ravishankar Telgi C, Tirth A, et al. Prevalence of Traumatic Dental Injuries to Anterior Teeth of 12-Year-Old School Children in Kashmir, India. Arch Trauma Res. 2016 Jan 23;5(1).
14. Gordy FM, Eklund NP, DeBall S. Oral trauma in an urban emergency department. J Dent Child (Chic). 2024;71(1):14–6.
15. Lembacher S, Schneider S, Lettner S, Bekes K. Prevalence and patterns of traumatic dental injuries in primary teeth: a 3-year retrospective overview study in Vienna. Clin Oral Investig [Internet]. 2022 Feb 6;26(2):2085–93. Available from: https://link.springer.com/10.1007/s00784-021-04190-2
16. Abdalla Eltahir M, Fath Elrahman Ibrahim R, Alharbi H. Perspective Chapter: Teeth Avulsion. In IntechOpen; 2023. Available from: https://www.intechopen.com/chapters/82767
17. Khandelwal V, Nayak UA, Nayak PA, Ninawe N. Prevalence of traumatic

injuries to the anterior teeth among 3–17-year-old school children of Indore and correlating it with Kuppuswamy SES, occlusal relationship and ascertaining percentage of those seeking the treatment. Int J Adolesc Med Health. 2018 Oct 1;33(1).

18. Balaji S, Balaji P. Textbook of oral & maxillofacial surgery. 3rd ed. New Delhi, India: ELSEVIER Saunders; 2018.
19. Serra-Pastor B, Penarrocha-Diago M, Penarrocha-Diago M, Agustin-Panadero R. Treatment and restoration of adult dentoalveolar trauma: A clinical case report. J Clin Exp Dent. 2016
20. Petti S, Andreasen JO, Glendor U, Andersson L. NA0D– The new Traumatic Dental Injury classification of the World Health Organization. Dental Traumatology. 2022 Jun 28;38(3):170–4.
21. Burman S, Lal B, Alagarsamy R, Kumar J, Ankush A, Rai AJ, et al. Evidence-based management of isolated dentoalveolar fractures: a systematic review. J Korean Assoc Oral Maxillofac Surg. 2024 Jun 30;50(3):123–33.
22. Mousavi E, Khoshdel M, Sharifiyan H. Management of Severe Dento-Alveolar Traumatic Injuries in a 9-Year old Boy: A Case Report. Journal of Dentistry Indonesia. 2021 Dec 30;28(3).