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Dietary Acidity, Orofacial Trauma, and Care-Seeking Patterns among Children in Mixed Dentition: Evidence from Urban Pakistan

Dr. Iram Nasir
Adjunct Faculty, New York University College of Dentistry, Chief Resident, Georgia School of Orthodontics, USA Email: iramnasir27@gmail.com

Dr. Muhammad Nadeem
Clinical director, Dental360, Group USA
Ex Professor, Head of the Department of Periodontology and Public Health, Liaquat College of Medical and Dentistry, Karachi, Pakistan
Email: drmhnadeem@dental360grp.com

Dr. Maryum Saroosh
Ex. Lecturer, Department of Physiology, Sir Syed College of Medical Sciences for Girls, Karachi, Pakistan Email: maryumnaim@gmail.com

Author Details

Corresponding E-mail & Author*:

Dr. Iram Nasir
Adjunct Faculty, New York University College of Dentistry, Chief Resident, Georgia School of Orthodontics, USA Email: iramnasir27@gmail.com

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Abstract

Background
Changes in dietary practices, increased exposure to acidic beverages, and active lifestyles have contributed to emerging oral health challenges among children. Dental erosion and orofacial trauma are particularly relevant during the mixed dentition period, yet evidence regarding their combined determinants and care-seeking behavior in Pakistani children remains limited.

Objectives
To evaluate dietary, behavioral, and occlusal determinants of dental erosion and traumatic dental injuries (TDIs) and to assess post-injury dental care utilization among school-aged children.

Methods
A school-based cross-sectional study was carried out among 400 children aged 6–12 years. Clinical assessment of tooth surface loss and dental trauma was performed using standardized diagnostic criteria. Parents completed a structured questionnaire capturing dietary exposure to acidic foods, oral hygiene behaviors, physical activity patterns, and treatment-seeking history. Multivariate regression analysis was applied to identify independent predictors.

Results
Dental erosion was detected in 31.5% of participants, while 23.0% exhibited evidence of TDIs. Regular intake of packaged fruit juices and carbonated beverages significantly increased the likelihood of erosion ($p < 0.01$). TDIs were more common in males, children involved in organized sports, and those with protrusive incisors ($p < 0.05$). Only 41.3% of injured children received professional dental treatment.

Conclusions
Dental erosion and TDIs represent interconnected oral health challenges among Pakistani school children. Preventive dietary counseling, early orthodontic screening, and school-based injury prevention strategies are urgently required to reduce disease burden and improve timely care utilization.

Introduction

Oral health during childhood plays a critical role in physical development, psychosocial well-being, and long-term quality of life (1). Despite its importance, pediatric oral health remains underprioritized in many low- and middle-income countries, including Pakistan, where access to preventive dental services is limited and utilization is largely symptom-driven (2). Among the various oral conditions affecting children, dental erosion and traumatic dental injuries (TDIs) have gained increasing attention due to their rising prevalence and long-term consequences (3).

Dental erosion refers to the progressive loss of hard dental tissues caused by chemical processes unrelated to bacterial activity (4). The condition is strongly associated with frequent exposure to dietary acids, particularly carbonated beverages, citrus-based drinks, and processed foods increasingly consumed by children (5,6). If left unaddressed, erosion may lead to dentinal hypersensitivity, altered occlusion, and compromised esthetics, often requiring complex restorative care (7).

Traumatic dental injuries, on the other hand, are sudden events resulting from falls, sports participation, or road traffic incidents and commonly occur during the mixed dentition phase (8,9). The presence of erupting permanent incisors, developing motor coordination, and increased outdoor activity place children at heightened risk (10). Previous studies have identified male gender, increased overjet, and lack of protective measures as key contributors to TDIs (3,11).

Although several Pakistani studies have examined dental erosion and TDIs independently (4,5,8), limited research has explored their shared risk environment and subsequent care-seeking behavior. In addition to dietary and behavioral factors, psychosocial and environmental determinants have increasingly been recognized as contributors to pediatric oral health outcomes. Children attending urban schools are often exposed to aggressive marketing of acidic beverages, limited supervision during recreational activities, and inadequate enforcement of safety measures such as protective gear during sports. These contextual influences may simultaneously increase the risk of both tooth surface loss and dental trauma. Evidence suggests that school environment, peer influence, and parental supervision collectively shape children's oral health behaviors and injury risk, emphasizing the importance of community- and school-level interventions alongside individual preventive strategies (12,13). Therefore, this study aimed to assess dietary, behavioral, and anatomical predictors of dental erosion and TDIs and to examine patterns of dental care utilization following trauma among school-going children.

METHODOLOGY

This cross-sectional study was conducted among children aged 6–12 years enrolled in public and private schools in an urban district of Pakistan. A sample size of 400 was calculated based on an anticipated prevalence of 30%, a confidence level of 95%, and a precision of 5%, with an added margin to compensate for non-response.A multistage sampling technique was employed. Initially, eight schools were randomly selected, followed by systematic selection of eligible children from class registers. Inclusion criteria comprised children in the mixed dentition phase whose parents provided informed consent. Children with developmental enamel defects, chronic systemic illness, or ongoing orthodontic treatment were excluded. Hence, clinical examinations

were performed using sterile instruments under natural light. Dental erosion was assessed using a modified tooth surface loss index, while TDIs were recorded according to World Health Organization guidelines (3,4). A pre-tested questionnaire was administered to parents to collect information on dietary acid exposure, oral hygiene practices, physical activity, occlusal characteristics, and post-trauma care. Examiner calibration yielded a kappa score of 0.84, indicating high reliability. Data were analyzed using SPSS version 25. Descriptive statistics were generated, followed by chi-square tests and multivariate logistic regression. A p-value < 0.05 was considered statistically significant.

RESULTS

Among the 400 participants, the mean age was 9.1 ± 1.8 years, with males constituting 53.5% of the sample.

Table 1: Prevalence of Oral Conditions

Condition	Frequency	Percentage (%)
Dental erosion	126	31.5
Traumatic dental injuries	92	23.0
Both conditions	48	12.0

Children consuming acidic beverages four or more times per week showed a significantly higher prevalence of dental erosion ($p < 0.001$). TDIs were significantly associated with male gender, participation in contact sports, and increased overjet.

Table 2: Independent Predictors of Dental Erosion

Predictor	Adjusted OR	95% CI	p-value
Carbonated drinks	2.46	1.51–3.99	0.001
Packaged fruit juices	1.89	1.14–3.14	0.014
Irregular brushing	1.72	1.03–2.87	0.038

Table 3: Care-Seeking after Dental Trauma

Care Pattern	n	%
Immediate dental visit	38	41.3
Delayed consultation	21	22.8
No treatment sought	33	35.9

DISCUSSION

This study highlights the considerable burden of dental erosion and TDIs among Pakistani school children and underscores the role of shared behavioral and anatomical risk factors. The observed prevalence of dental erosion (31.5%) aligns with earlier national studies reporting similar rates among school-aged children (4,5,7,8). The strong association between acidic beverage consumption and erosion reflects changing dietary trends in urban Pakistan (6,10). Traumatic dental injuries affected nearly one-quarter of participants, consistent with global and regional estimates (3,8,11). Male predominance and sports-related injuries mirror findings from previous Pakistani and international studies (9,10,12,13,17). Increased overjet emerged as a significant predictor, reinforcing the preventive potential of early orthodontic screening (18).

Another important finding was the low rate of professional care utilization following dental trauma. More than one-third of injured children received no treatment, reflecting barriers such as limited awareness, accessibility issues, and perceived lack of urgency (19). Delayed or absent management may result in pulp complications, esthetic

concerns, and long-term psychological impact (11,12). An important but often overlooked dimension highlighted by this study is the role of health system responsiveness and parental perception in determining post-injury outcomes. Even when dental trauma is recognized, delayed or absent care is frequently influenced by the belief that primary or newly erupted permanent teeth do not require urgent treatment. Previous research has shown that lack of structured school referral systems and insufficient counseling by primary healthcare providers significantly reduce timely dental attendance following trauma. Strengthening referral linkages between schools and dental facilities, as well as incorporating oral injury first-aid education for teachers and parents, could substantially improve trauma-related outcomes in children (13,14,16). Collectively, these findings emphasize the need for integrated school-based oral health programs that address dietary counseling, trauma prevention, and early referral pathways. Strengthening parental education and embedding oral health within primary healthcare services may substantially reduce disease burden (14,16).

Evidence from Pakistani studies further indicates that parental and patient-level oral health knowledge plays a decisive role in preventive practices and timely utilization of dental services. Previous research has demonstrated that inadequate awareness regarding oral diseases, perceived low importance of preventive dental visits, and fear or misconceptions about dental treatment significantly reduce care-seeking behavior, even when services are available (20,21). Studies conducted in dental teaching hospitals in Karachi have similarly reported suboptimal oral health knowledge and poor preventive practices among patients, despite direct exposure to dental professionals (22). These findings suggest that limited awareness is not confined to underserved communities alone but persists across different care settings. In the context of dental erosion and traumatic dental injuries, insufficient understanding of disease progression and long-term consequences may lead caregivers to underestimate the urgency of early intervention. Strengthening community-based education, chairside counseling, and school-linked awareness initiatives may therefore play a critical role in improving preventive behaviors and post-injury dental attendance among children.

CONCLUSION

Dental erosion and traumatic dental injuries are prevalent and interrelated oral health problems among children in the mixed dentition phase in Pakistan. High consumption of acidic beverages, inadequate oral hygiene, male gender, sports participation, and increased overjet significantly contribute to disease risk. Despite this, post-trauma dental care utilization remains suboptimal. Comprehensive preventive strategies incorporating dietary modification, early orthodontic assessment, and school-based injury prevention are essential to safeguard pediatric oral health.

REFERENCES

Thomson WM, Broder HL. Oral–health–related quality of life in children and adolescents. Pediatric Clinics. 2018 Oct 1;65(5):1073-84. http://doi:10.1016/j.pcl.2018.05.015. PMID: 30213350.

Nadeem M, Huda SS. Evaluation of dental health education and dental status among dental students at Liaquat College of Medicine and Dentistry. International Journal of dental clinics. 2011 Jul 1;3(3):11-4.

Petti S, Glendor U, Andersson L. World traumatic dental injury prevalence and incidence, a meta-analysis—One billion living people have had traumatic dental injuries. Dental traumatology. 2018 Apr;34(2):71-86. http://doi:10.1111/edt.12389. PMID: 29455471.

Najmi N, Bugti AA, Nadeem M, Hannan H, Tanwir F, Shafiq F. Prevalence and predictors of dental erosion in school children of Karachi Pakistan. International Journal of Dental Clinics. 2013 Sep 1;5(3).

Naheed Najmi NN, Bugti AA, Muhammad Nadeem MN, Hafsah Hannan HH, Farzeen Tanwir FT, Faiza Shafiq FS. Prevalence and predictors of dental erosion in school children of Karachi Pakistan.

Shakoor A, Shahid J, Jalal M, Nisar Z, Usama M. Dental Problems Present among Healthcare Professionals in Pakistan due to the Consumption of Carbonated Drinks. Life and Science. 2024 Aug 15;5(3):08

Najmi N, Nadeem M, Ayub T, Maqsood T. Prevalence of dental erosion in Pakistani children: a cross-sectional study. **JMMC.** 2014;8(2):49–53. http://doi.org/10.62118/jmmc.v8i2.32

Dhaliwal G, Ouanounou A. Tooth surface loss: causes, management, and prevention. Quintessence International. 2024 Jun 1;55(6). http://doi:10.3290/j.qi.b5223649. PMID: 38634628.

Najmi N, Nadeem M, Ayub T. Dental injuries and Trauma in Mixed Dentition of Pakistani School Children: A Cross Sectional Study. InMedical Forum Monthly 2017 (Vol. 28, No. 12).

Madhwani SS, Nadeem M, Najmi N, Qureshi NR, Datoo F. Traumatic dental injuries in mixed dentition of school going children in Karachi, Pakistan. International Journal of Dental Clinics. 2014 Jul 1;6(3).

Patidar D, Sogi S, Patidar DC, Malhotra A. Traumatic dental injuries in pediatric patients: a retrospective analysis. International journal of clinical pediatric dentistry. 2021 Jul;14(4):506. http://doi:10.5005/jp-journals-10005-2004. PMID: 34824505; PMCID: PMC8585915.

Glendor UL. Epidemiology of traumatic dental injuries–a 12-year review of the literature. Dental traumatology. 2008 Dec;24(6):603-11. http://doi:10.1111/j.1600-9657.2008.00696.x. PMID: 19021651.

Ahmed I, Hashmi S, Tanwir F, Ahmed S, Nadeem M. INJURY PATTERN, OUTCOMES AND MANAGEMENT OF LIVER TRAUMA. International Journal of Dental Clinics. 2014 Apr 1;6(2).

Kayıllıoğlu Zencircioğlu Ö, Eden E, Öcek ZA. Access to health care after dental trauma in children: A quantitative and qualitative evaluation. Dental Traumatology. 2019 Jun;35(3):163-70. http://doi:10.1111/edt.12467. Epub 2019 Mar 18. PMID: 30758139.

Najmi N, Nadeem M, Ayub T. Orthodontic treatment and periodontal health status in Pakistani orthodontic patients. InMedical Forum Monthly 2017 (Vol. 28, No. 10).

World Health Organization. Oral health surveys: basic methods. World Health Organization; 2013.

Andersson L. Epidemiology of traumatic dental injuries. Journal of endodontics. 2013 Mar 1;39(3):S2-5. http://doi:10.1016/j.joen.2012.11.021. PMID: 23439040.

Boorum MK, Andreasen JO. Sequelae of trauma to primary maxillary incisors. I. Complications in the primary dentition. Dental Traumatology. 1998 Feb;14(1):31-44. http://doi:10.1111/j.1600-9657.1998.tb00806.x. PMID: 9643176.

Glendor U. Has the education of professional caregivers and lay people in dental trauma care failed?. Dental Traumatology. 2009 Feb;25(1):12-8. http://doi:10.1111/j.1600-9657.2008.00707.x. PMID: 19208006.

Nadeem M, Khan S, Ahmed F, Ahmed S. Oral health awareness, behavior and attitude of Pakistani population towards dental treatment. International Journal of Dental Clinics. 2012 Oct 1;4(4):6-10.

Muhammad Nadeem MN, Khan S, Farah Ahmed FA, Sajeel Ahmed SA. Oral health awareness, behavior and attitude of Pakistani population towards dental treatment.

Nadeem M, Najmi N, Raja IM. Oral Health Knowledge, Awareness and Practice Among Patients in Dental College/Hospital, Karachi. InMedical Forum Monthly 2017 (Vol. 28, No. 10).