

Interdisciplinary management of orofacial lesions in early childhood: paediatric alert system at University of Verona



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Abstract

Orofacial trauma (OFT) occurs frequently in children and requires thorough evaluation not only by paediatric dentists but also by all specialists involved in emergency services, particularly in cases involving children under 3 years of age, given their inability to directly participate in clinical-anamnestic evaluations. Addressing early childhood orofacial trauma resulting from maltreatment, this study explores the key role played by various healthcare professionals, including paediatric dentists, general dentists, maxillofacial surgeons, dental hygienists, and paediatricians, in the optimal management of these cases. In the event of trauma due to suspected or confirmed mistreatment, it is essential that all healthcare workers involved have precise knowledge of the appropriate course of action from both a clinical and legal point of view, guaranteeing maximum protection for the young patient. This is particularly significant as cases of mistreatment with apparently minor consequences can degenerate into situations of irreparable severity. The latest guidelines from the International Association of Dental Traumatology (IADT) in 2020 continue to emphasise the potential correlation between OFT and cases of abuse or violence. Recent recommendations in the literature highlight the importance of facilitating mandatory reporting of incidents to relevant authorities and improving information sharing between dental healthcare professionals and child welfare services. A new flow diagram, called Paediatric Orofacial Trauma Alert (P.O.T.A.), has been proposed at the University of Verona. This tool is specifically designed to assist specialists dealing with early childhood orofacial trauma cases by assisting them in identifying potential cases of maltreatment. In this innovative approach, the collaborative efforts of general dentists, paediatric dentists, maxillofacial surgeons, dental hygienists and paediatricians play a vital role in cases of abuse. In addition to restoring the oral health of young patients, these professionals can activate a vast network of contacts, ensuring not only optimal oral health care but also providing comprehensive support to victims. The objective is to safeguard not only the physical but also the psychological well-being of these vulnerable subjects.

KEYWORDS child maltreatment, child abuse, unintentional injuries, dental trauma, dental neglect, oral lesions

Introduction

There are over 50 methods in the literature for classifying dental trauma, complicating the documentation and comparison of cases. Furthermore, in emergency services, only a part of the medical staff is adequately trained to manage dental trauma, with underestimation of the severity of the trauma and potential legal consequences and negative effects on the quality of life of patients and resulting in frequent delays in treatment [Tewari et al., 2023]. Greater awareness and preparation among healthcare workers are essential to effectively address these cases [Wolfer et al., 2022]. Within the International Classification of Diseases (ICD), only in 2022 was a new coding system for dental trauma officially accepted, establishing an independent section labelled "traumatic dental lesions." [Petti et al., 2022]. The classification utilized to delineate various types of dental trauma is based on the system developed by Andreasen over 50 years ago [Andreasen, 1970], which is still endorsed in the most recent International Association of Dental Traumatology (IADT) guidelines from 2020 [Levin et al., 2020]. The recent addition of dental trauma coding in the ICD since 2022 is set to improve how healthcare professionals, including those with less experience, handle such cases. This update aims to encourage better care practices and standardize scientific studies on dental trauma, marking a positive step towards a more consistent and comprehensive approach in healthcare. Distinguishing accidental traumatic episodes from episodes of parental abuse or neglect is difficult, despite them being widely described in the literature for a long time [Tate, 1971]. The 2020 overview of the United Nations report reveals alarming statistics: one billion children, or one in two globally, experience violence every year. Furthermore, 40.150 children die every year due to violence and three out of four children between the ages of 2 and 4 suffer violent punishment from their caregivers and, one in four children under the age of 5

lives with a mother who has experienced intimate partner violence. In particular, according to the dossier "Keeping the promise: ending violence against children by 2030", children with disabilities are four times more likely to suffer violence [World Health Organization, 2020]. In April 2021, in Italy there were 401.766 children and adolescents in the care of social services, of which 77.493 were reported victims of abuse. The study, which involved 2.1 million minors, identified neglect of care (40.7%) and witnessed violence (32.4%) as the predominant forms of maltreatment. Furthermore, 45 out of 1.000 resident children were in the care of social services. Out of 1.000 children entrusted to social services, 193 were present due to maltreatment. In the general population, 9 out of 1.000 resident children are victims of maltreatment. Hospitals and paediatricians made up only 5% of those reporting maltreatment, underscoring the need for training to identify and address maltreatment. This information derives from the Second National Survey on child and adolescent maltreatment in Italy, conducted by Terre des Hommes and Cismai for the Guarantor for Childhood and Adolescence between July 2019 and March 2020, using data from 2018 [Guarantor Authority for Children and Adolescents, 2021]. In 2022, it is estimated that approximately 680,000 children in America experienced abuse [Cuartas et al., 2022]. Already in 1987, Pless and Russell published an article in which they analysed, using a checklist, cases of suspected abuse in the paediatric emergency room of the Montreal Children's Hospital [Pless et al., 1987]. People who are victims of abuse span all age groups, but Infants and preschool-age individuals, particularly boys, are the most vulnerable. The perpetrators of the crime, in 90% of cases, are identified as parents or guardians [Zimmermann et al. 2006].

Dental neglect, neglect and abuse

According to the World Health Organization (WHO), the abuse or maltreatment of minors encompasses any form of physical and/or emotional maltreatment, sexual abuse, negligence or neglect, commercial exploitation, or any other form of mistreatment or exploitation. This includes actions that result in actual or potential harm to the health, survival, development, or dignity of the minor within the context of a relationship characterized by responsibility, trust, or power. According to the definition provided by the American Association of Pediatric Dentistry [2023], dental neglect is characterized as the deliberate failure of a parent or guardian to seek and follow through with treatment essential for maintaining an adequate level of oral health, crucial for proper function and the prevention of pain and infection [American Academy of Pediatric Dentistry, 2023]. Consequently, dental neglect could be recognized as a form of parental abuse against the child. Various forms of abuse exist, and some are challenging to identify. As outlined by the U.S. Children's Bureau, these can be categorized into physical abuse, sexual abuse, emotional abuse, and neglect [Child Welfare Information Gateway, 2023]. The 2014 study "Usefulness of a Child Abuse Screening Guideline in an Urban Pediatric Emergency Department" by Higginbotham et al. [2014], suggests that 1.3% to 15% of paediatric trauma cases attended to the emergency room can be attributed to abuse, as previously described by Schmitt and Kempe in 1975 [Schmitt et al., 1975]. The oral cavity plays a crucial role in functionality and communication, especially in the first years of life. An in-depth article by Ridsdale et al. [2023] highlights the

importance of a multidisciplinary approach, involving both paediatric and dental perspectives, to thoroughly examine the oral cavity of paediatric patients. This approach is essential to identify potential signs of abuse [Ridsdale et al. 2023]. Early multiple dental caries can serve as a clear indicator of parental neglect, as highlighted in various studies [Harris, 2018; Seow, 2012; Hooley et al., 2012; Karst et al., 2022]. If left untreated, they can lead to pulpitis, apical periodontitis or tooth abscesses, causing pain, swelling and sometimes fever. Given the range of risk factors that contribute to the development of carious lesions, parental influence appears to be one of the most significant aspects during childhood [Hooley et al. 2012; Cantile et al., 2023]. When a child presents to the dentist with multiple early cavities, it may be indicative of a family in need of assistance. In such situations, in addition to addressing dental problems, close collaboration with social workers is recommended to prevent potentially more serious problems in the future [Karst et al., 2022]. The appearance of intra- or perioral lesions may be an indicator of possible abuse. Indeed, even if in the early years of life, accidental injuries are relatively common in paediatric patients who may frequently visit the emergency room [Jessee, 1995; Alhaddad et al., 2019], recurrent episodes of accidental trauma may be suggestive of parental neglect and lack of supervision. Intraoral injuries, in particular, account for approximately 2-7% of all injuries seen in physically abused children [Cavalcanti et al., 2010; Dorfman et al., 2018]. It is important to note that this figure may be an underestimate because minor intraoral injuries tend to heal rapidly, often remaining hidden or not seeking emergency treatment. Furthermore, these injuries may not leave visible scars or marks after some time. In case of abuse, characteristic lesions of the soft tissues of the mouth may include erosions, petechiae, lacerations, swelling or burns and the lips, in particular, are the most affected area. Laceration of the upper labial frenulum as a pathognomonic sign of possible abuse is still a topic of discussion. However, in a child already weaned and subsequently fed with cutlery, laceration of the upper labial frenulum could suggest an attempt to forcefully insert cutlery during a meal which the child resists, triggering violent and offensive behaviour on the part of the parent or caregiver [Mele et al., 2023]. Therefore, in the case of such an injury without a reasonable correlation between the episode described, the place and the extent of the trauma, the suspicion of abuse would be legitimate. The tongue may exhibit indications of abuse, including lacerations, burns, or bites arising from the forced closure of the jaw. Abuse tends to predominantly affect the upper incisors, potentially leading to fractures or dislocations. Distinguishing these cases from accidental trauma poses a considerable challenge. Consequently, healthcare professionals should attentively listen to the account of events and, whenever feasible, conduct separate interviews with the individuals involved to aid in making an accurate diagnosis.

The role of dentist and of others specialists

The role of dentists in managing trauma, particularly in cases of abuse, is crucial, as they are often the initial healthcare professionals to respond [Montecchi et al., 2009; Bucchi et al., 2021]. Paediatric dentists, maxillofacial surgeons, dental hygienists, and paediatricians may also come across cases of abuse, playing a significant role in promptly identifying, intervening, and preventing abuse. This contributes to the

overall promotion of the health and safety of individuals under their care. Surprisingly, studies have shown that approximately 87% of surveyed dentists had never conducted screenings for domestic violence, and 18% had not explored this possibility, even when patients exhibited visible signs of head and neck trauma [Love et al., 2001]. Several reasons contribute to the low reporting of signs of violence by dentists. These include the presence of the partner or children in the waiting room (77%), insufficient information (68%), concern about offending the patient (66%), or the discomfort of the operator in addressing certain topics [Love et al., 2001]. A recent study reveals that only 8% of the 28% of dentists who observed signs of violence in children reported it to the authorities. Dentists typically reached out to social and psychological services (21%), lawyers (10%), the police (9%), and occasionally the district attorney and children's hospital (4%) [Rodrigues et al., 2016; Kaihara et al., 2022]. Interestingly, students who have undergone short courses on the topic exhibit increased sensitivity to health-related violence. This suggests that a robust university education can substantially diminish the barriers mentioned above [Buchanan et al., 2021]. In his study on trauma, Raja introduced a trauma assessment framework known as the "Pyramid of Trauma-Informed Care" [Raja et al. 2014; Raja et al., 2015]. This comprehensive approach comprises multiple stages, enabling clinicians to address patients more effectively with suspected trauma. It emphasizes empathy and discourages a one-size-fits-all approach that could potentially lead to misunderstandings. It is recommended that multidisciplinary centres, such as polyclinics or hospitals, be utilized to ensure patients receive comprehensive expertise and follow-up care [Nikolic et al., 2018]. In cases of dental trauma without signs of abuse or mistreatment, international guidelines for the prevention and clinical management of dental trauma in children underline that the dentist should offer adequate assistance in terms of diagnosis and treatment and issue appropriate certification. However, when abuse is suspected, the guidelines recommend adhering to local protocols. This highlights the importance of dentists also being fully aware of their legal obligations regarding trauma and abuse and respecting the specific legal and procedural frameworks in their local jurisdiction [Day et al., 2020]. All healthcare workers, including dentists, are required by law to certify suspected abuses in the exercise of their professional functions and sanctions are foreseen for anyone who commits false or inaccurate certifications. This certification also constitutes an ethical obligation for doctors and dentists based on their Code of Ethics.

The certificate must be drawn up at the same time as the visit, accurately reporting the patient's medical history, diagnosis, therapy and prognosis and must contain information on diagnostic tests (such as x-rays, photographs or plaster models), on the therapeutic plan and on follow-up investigations. In order to proceed with the therapeutic action, it is necessary to obtain a clear vision of the intrusive trauma; for this purpose, photogrammetry seems to be a good and accessible method [Zotti et al., 2022]. It must also indicate whether existing assessments, including future treatment costs, warrant further examination by the forensic department. In summary, the dentist who documents traumatic injuries should use suitable means (files, x-rays, photographs, etc.) to provide essential clinical evidence for the medical examiner and for judicial purposes, both criminal and compensatory. For the initial examination of a child who has sustained orofacial trauma, the schedule outlined in Table 1 is suggested.

Name		
Birthday		
Date of the 1st visit		
Signs of neurological impairment	Yes	No
Dyscoagulopathies	Yes	No
Referral paediatrician		
Photos	Yes	
Rx	Yes	
Diagnosis based on Andreasen's classification		
When (date and time reported of the trauma)		
How (mode referred)		
Where (possible risk of bacterial contamination)		
Cause / Effect Compatibility	Yes	Doubtful
Bleeding that requires suturing	Yes	No
Treatment carried out		
Oral hygiene instructions and dietary advice		
Next recall		
Costs for future treatments		

TABLE 1 Dental trauma report

Dental Injuries as a Sign of Child Abuse

When there is suspicion of trauma resulting from abuse or mistreatment, initiating data collection is crucial during the initial phase to investigate and clarify suspicions regarding the origin of the trauma, such as abuse or mistreatment. The 2020/24 IADT guidelines, specifically in paragraph 1.7 titled "Intentional (non-accidental) injury," recommend an immediate referral for a comprehensive physical examination when abuse is suspected. Adherence to local protocols is also advised. While evidence-based assessment protocols exist for nonaccidental paediatric trauma, there is a lack of studies assessing compliance. [Esquivel et al., 2020; Fisher-Owens et al., 2017] A recent systematic review has underscored various shortcomings in the methodological quality of existing trauma guidelines. For future guidelines, improvements in areas such as "development rigour", "stakeholder involvement," and "applicability" are suggested to address these existing limitations [Saikia et al., 2023].

Considering the potential for abuse or mistreatment is a crucial step, particularly in the 0-3 age group, which represents the highest risk category and necessitates enhanced protection measures.

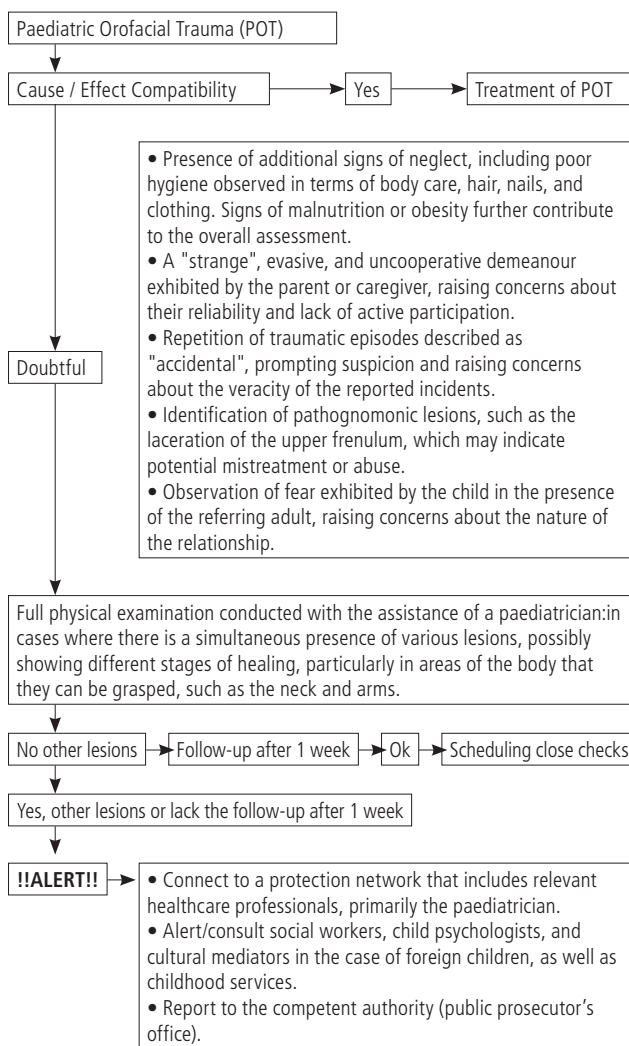
As illustrated in Table 2, a significant portion of early childhood orofacial trauma can be preventable. These preventive measures aim to reduce the occurrence of orofacial trauma in early childhood and create a safer environment for children. In cases of orofacial trauma, healthcare providers should remain vigilant for signs of nonaccidental trauma. Key indicators that may raise suspicion are summarized in Table 3 [Zerman, 2021]. Remaining attentive to these indicators can aid in the early identification and intervention in cases of potential nonaccidental trauma. It is essential to carefully evaluate temporomandibular joint (TMJ) trauma, as it can sometimes be a consequence of violence or abuse, as well as root fractures of both deciduous incisors in a child under three years of age [Spinaz et al., 2022].

Supervise the learning phases of the journey.
Protect easily accessible areas such as stairs, windows, and doors/windows to prevent falls using safety measures like gates, guards, chains, and other appropriate safety devices.
Avoid allowing free climbing due to the risk of falling from a height.
Discourage running in areas with obstacles that could cause trips or collisions, especially on slippery or wet surfaces (e.g., bathroom floor, poolside).
Discourage the independent use of dangerous play equipment such as slides and swings.
Discourage engaging in complex motor activities that are not suited to the psycho-physical development and emotional level of the child.
Avoid using a walker without adult supervision
Avoid allowing pushes from behind and throwing blunt objects between peers.
Discourage free contact with dangerous animals to minimize the risk of bites.
Implement protective measures to prevent falls from elevated surfaces such as beds, tables, changing tables, prams, strollers, and bicycle seats.
Management of higher-risk conditions: Address and supervise conditions that pose a higher risk, including: protruding teeth (consider discontinuation of use if caused by bottles and pacifiers), overweight and obesity (which can lead to poorer motor control and reduced responsiveness), and particular attention to children with disabilities.

TAB. 2 Prevention of Deciduous Dental Trauma

No clear cause-effect relationship and multiple or unexplained injuries.
Presence of multiple lesions at different stages of healing without a clear or plausible explanation, especially in body parts that can be grasped, such as the neck and arms.
Trauma not in line with the child's abilities or developmental milestones.
Unexplained delay in seeking medical attention for observed injuries.
Conflicting explanations or inconsistencies or changes in the caregiver's explanations regarding the cause of the injuries.
Orofacial trauma, particularly injuries to the face or head, should be of increasing concern.
Presence of bite marks that may indicate intentional harm.
Lesions or bruises in children who are not yet able to walk or move independently.
Presence of other signs of neglect, such as poor hygiene of the body, hair, nails, clothing, indicating malnutrition or obesity.
Observable behavioural or social indicators that may suggest mistreatment.
Observing a "strange", elusive, and less reliable or participatory attitude on the part of the parent or caregiver.
Repeated traumatic episodes consistently labeled as "accidental."
Pathognomonic lesions, such as a laceration of the upper labial frenulum [Maguire et al., 2007].

TAB. 3 Indicators for Suspecting Non-accidental Trauma



TAB. 4 Paediatric Oro Facial Trauma Alert (P.O.F.T.A) Flow Chart

Paediatric Orofacial Trauma Alert (P.O.T.A.) at the Pediatric Dental Clinic of the University of Verona: Guidelines for Addressing Suspected Mistreatment

In situations where there is certainty or strong suspicion of abuse, it becomes imperative and mandatory to report to the relevant authorities, recognizing the role of healthcare workers as public officials dedicated to safeguarding the well-being of minors. It is not uncommon for these children to be taken to clinics or private practices in an attempt to avoid reporting.

For those involved in handling these cases, establishing a connection with a protective network is essential. This network should include relevant healthcare professionals, particularly the family paediatrician. The family paediatrician, often acquainted with the family unit since the child's birth, can play a significant role in the proper management of suspected cases of abuse or mistreatment. Additionally, the involvement of health professionals present in the child's home or childcare settings can provide valuable information for ensuring the

optimal protection of the child. The roles of a child psychologist or cultural mediator, particularly in cases involving foreign children, can be pivotal. Childhood Services, especially for children attending nursery or preschool, can play a crucial role in understanding and highlighting potentially critical elements from their perspective. Collaborative efforts from these professionals contribute to a comprehensive approach for the child's well-being and safety. Particular attention should be devoted to safeguarding the "suspected" parent to prevent the unintentional creation of unfounded accusations, which might escalate into media scandals, as regrettably occurs on occasion. Implementing regular follow-up checks every few days after the initial visit, in coordination with the treating paediatrician who can conduct a comprehensive medical examination, serves as a protective measure for the minor in cases identified as being at risk. The protocol employed at the Pediatric Dental Clinic of the University of Verona, named Paediatric Orofacial Trauma Alert (P.O.T.A.), is outlined in Table 4.

Conclusion

Multiple early cavities in deciduous incisors caused by negligence not only compromise the integrity of the teeth but also render them more susceptible to fractures in the event of accidental trauma. Consequently, dental trauma in children may indicate two potential forms of abuse: physical abuse and negligent abuse. To enhance the screening for orofacial trauma and potential incidents of abuse, dental trauma questionnaires should be made available in hospital emergency services and private clinics. This approach ensures more accurate epidemiological data and the identification of individuals at risk of abuse. Implementing a stable and regular monitoring system strengthens prevention, protection, and care policies for child victims of abuse. Such measures can address territorial disparities, which continue to pose a significant obstacle to the full enjoyment of the rights of minors residing in so-called civilized countries. It is essential to provide comprehensive training to students in degree courses related to dentistry, medicine, dental hygiene, and maxillofacial surgery to enable them to recognize and effectively manage orofacial trauma resulting from mistreatment or abuse. The concept of care encompasses various aspects of an individual's well-being, and a doctor's responsibility is multifaceted, involving various perspectives. Therefore, it is crucial that doctors receive support and guidance in dealing with these complex responsibilities during their training. Reducing the incidence of dental trauma and its complications requires increased awareness and continuous training of all professionals involved in the multidisciplinary management of trauma. These professionals must operate in compliance with the psycho-physical well-being of the minor. Numerous current studies and reliable guidelines acknowledge the challenges in clinical management, especially in early childhood dental traumatology. Children under three years old can be challenging to treat due to difficulties in achieving effective cooperation. However, addressing their needs is crucial due to the long-term consequences, which worsen without an adequate approach. This phase is particularly important for identifying trauma resulting from abuse or violence. The Paediatric Orofacial Trauma Alert (P.O.T.A.) from the Pediatric Dental Clinic at the University of Verona advocates a comprehensive approach when there is suspicion of mistreatment or abuse.

In summary:

- Collection of detailed clinical documentation: This includes photographs and x-rays from the initial visit and subsequent actions.
- Mandatory reporting: Suspected or probable cases of abuse must be reported to the relevant authority and child protection agencies following local protocols.
- Interdisciplinary collaboration: Work closely with specialists such as paediatricians, maxillofacial surgeons, and social workers for comprehensive management.
- Support for the minor and the family: Provide consultancy and potential intervention by social services.
- Establish a follow-up care plan: This includes monitoring the healing process to ensure the child's well-being.
- Knowledge and compliance with legal and ethical obligations: Adhere to patient confidentiality and reporting requirements.

The Paediatric Orofacial Trauma Alert aims to facilitate a coordinated and timely response to suspected cases of mistreatment and abuse, prioritizing the well-being and safety of the child.

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