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Review

An Overview of Pediatric Dental Emergencies

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Abstract

Pediatric dental emergencies encompass a wide range of acute oral health issues in children that require immediate attention. These emergencies can result in pain, functional impairment, and long-term dental problems if not addressed promptly. They account for a significant portion of children's first dental visits. Life-threatening dental emergencies in children include situations where a child's life or health is at immediate risk. These can involve airway compromise due to severe facial swelling, cavernous sinus abscess, periorbital inflammation, high fever, uncontrolled bleeding, dislodgment of intraoral appliances, or avulsed permanent teeth in children with underlying medical conditions. Immediate intervention is crucial in these cases to prevent life-threatening complications. Urgent dental emergencies, while not immediately life-threatening, require prompt attention to alleviate pain, prevent complications, and restore oral health. These include severe toothaches, dental infections, dental abscesses, and orthodontic emergencies like broken braces or protruding wires. Soft tissue injuries, foreign body impaction, and traumatic dental injuries like dental fractures, avulsion, tooth intrusions, extrusions, and dental luxations also fall under this category. Timely treatment is essential to prevent further complications and ensure the best possible outcome for affected teeth and tissues. Traumatic dental injuries can vary in severity, from minor enamel cracks to complete avulsions, and may require treatments like dental bonding, veneers, crowns, or reimplantation of avulsed teeth. Fractures of supporting bones or jaws may accompany these injuries, necessitating immobilization or surgical intervention. Mouthguards are recommended for individuals engaging in activities with a risk of dental trauma to reduce the likelihood of injuries.

Keywords: *Pediatric dentistry, medical emergencies, trauma, hemorrhage, dental abscess, orthodontic emergencies*

Introduction

Pediatric dental emergencies encompass a range of acute dental issues that require immediate attention and intervention in the pediatric population. A dental emergency, to borrow the terminology of the emergency medicine practice, is any unanticipated change in a child's oral health status, which oftentimes frequently interferes with daily physiologic or behavioral function and necessitates immediate care (1). These emergencies may lead to pain, discomfort, functional impairment, and long-term dental sequelae if not managed promptly and appropriately. It has been reported that emergencies account for 25.7% of children's first dental visits (2).

The treatment of patients whose oral health issues are interfering with their life or the function of their organs can be categorized as emergency visits. Patients in need of urgent dental care typically have acute infections of the soft tissues and teeth, uncontrollable bleeding in the mouth, dental trauma, or rapidly growing facial swelling. They also typically have severe dental and facial pain that cannot be relieved with over-the-counter medications (3). Research indicates that dental decay is the primary cause of emergency room visits. With long-term advantages for the child, the recommendation that a child's first dental visit should take place during the child's first year of life has had a major impact on the prevention of dental disease (4). The dental team faces numerous obstacles when providing children with urgent and emergency dental care. When a child has an infection or a dental emergency, it can be very challenging to control their behavior, particularly if it is combined with an underlying medical condition. The signs and symptoms that have been described can make emergency visits uncomfortable for both the patient and the professionals. When working with children, it is critical that the dentist be sufficiently knowledgeable to act quickly and alleviate pain and discomfort.

In this academic paper, we discuss the various types of pediatric dental emergencies. Furthermore, we emphasize the crucial role of preventive measures in reducing the incidence of these emergencies.

Methodology

This study is based on a comprehensive literature search conducted on November 6, 2023, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed pediatric dental emergencies. There were no restrictions on date, language, participant age, or type of publication.

Discussion

Pediatric dental emergencies can be classified into life-threatening and urgent care cases based on their severity and urgency of treatment. These classifications help dental professionals and healthcare providers prioritize and manage cases effectively.

Life-threatening dental emergencies in pediatric patients encompass a range of critical situations where a child's life or health is in immediate jeopardy due to severe dental or oral conditions (5). These emergencies demand swift and urgent attention to avert potentially fatal outcomes. One such dire circumstance involves the peril of airway compromise resulting from severe facial swelling. Typically caused by conditions like infected dental abscess and cellulitis cases including Ludwig’s angina, this swelling can exert pressure on the airway, obstructing the child's ability to breathe **(Figure 1)**. This poses a grave risk, as it can rapidly progress to respiratory distress or even complete airway blockage, necessitating immediate intervention (6). Another life-threatening scenario is the looming threat of a cavernous sinus abscess (7). Although rare, it represents a grave complication of untreated dental infections. Such infections can advance to the cavernous sinus within the skull, perilously close to vital structures like the brain. Symptoms may include severe headache, fever, altered consciousness, and eye-related issues.

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Urgent treatment is imperative to forestall further complications, including the onset of sepsis.

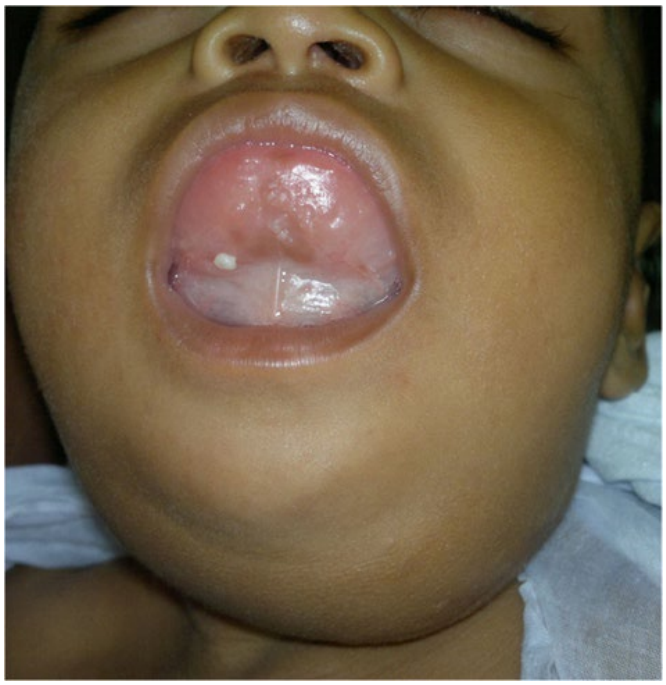

Figure 1: Ludwig's angina in a 3-year-old boy with Staphylococcus aureus and Bacteroides infection (8)

Periorbital inflammation, characterized by swelling and inflammation around the eye, is another condition that, when severe, can lead to the compression of the optic nerve or optic tracts, critical for vision (9). Failure to promptly address this situation can result in vision loss due to pressure necrosis of these crucial optic structures. Additionally, when a child presents with a fever surpassing 39°C (102°F), it can signify a severe infection, possibly originating from an oral or dental abscess that has spread systemically (10). Such a scenario increases the child's susceptibility to sepsis, a life-threatening condition where the body's response to infection becomes detrimental. Urgent medical attention is necessary to manage the infection and control the fever. Uncontrolled hemorrhage from the mouth due to trauma or dental procedures is another alarming situation (11). Excessive bleeding can lead to substantial blood loss, placing the child at risk of hypovolemic shock, a perilous state where the body lacks adequate blood volume for proper functioning. Halting the bleeding and providing appropriate care is of utmost importance. Moreover, the dislodgment of an intraoral appliance, such as a dental crown or orthodontic device, can obstruct the child's airway, causing breathing difficulties (12). Immediate intervention is indispensable to remove the obstruction and ensure unimpeded airflow. Lastly, when a permanent tooth is avulsed (completely displaced) in a child with an acute medical condition, such as a bleeding disorder or immunodeficiency, it becomes a life-threatening situation (13). Urgent dental and medical care is essential to address both the dental injury and the underlying medical condition. In all these life-threatening dental emergencies, time is of the essence. Swift assessment, stabilization, and intervention are imperative to secure the child's safety and thwart further complications.

Urgent dental emergencies in pediatric patients encompass a category of dental conditions that require prompt attention and intervention to alleviate pain, prevent complications, and restore oral health. While these emergencies may not pose an immediate threat to a child's life, they can significantly impact their well-being if left unaddressed. Here, we delve into various urgent dental emergencies commonly encountered in pediatric dentistry. Severe toothaches and dental infections are a type of urgent concern. They can cause excruciating pain and discomfort in children, often stemming from untreated dental caries that have progressed to affect the dental pulp. Urgent dental treatment, such as root canal therapy or tooth extraction, may be necessary to alleviate pain and address the underlying infection. Dental abscesses are localized pockets of pus that form within the oral tissues, typically in response to a dental infection (14). They can cause swelling, pain, and sometimes a fever. Immediate attention is crucial to drain the abscess, provide antibiotics if necessary, and address the source of the infection, which may involve root canal treatment or extraction. Orthodontic emergencies may also arise in children undergoing orthodontic treatment with appliances (15). Orthodontic emergencies pertain to situations where patients with orthodontic appliances, such as braces or aligners, experience issues that require prompt attention from an orthodontic specialist. These emergencies are distinct from life-threatening

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and urgent dental emergencies but are nonetheless significant in ensuring the success of orthodontic treatment and the patient's comfort. One common orthodontic emergency involves broken braces or brackets. The brackets attached to the teeth can become loose or detached due to various reasons, including trauma, chewing on hard or sticky foods, or accidental contact (16). When this occurs, it can lead to discomfort and irritation of the cheeks, lips, or tongue and may affect the progress of orthodontic treatment. Patients with broken braces should contact their orthodontist promptly to schedule a repair appointment. In some cases, orthodontic wax can be used temporarily to alleviate any irritation. Protruding or poking wires are another issue that orthodontic patients may face. The archwires used in braces can sometimes shift or extend beyond the last bracket, irritating the soft tissues of the mouth (17). Patients can attempt to gently push the wire back into place using a clean and disinfected instrument, such as a pencil eraser or cotton swab. If this does not resolve the issue or if the wire continues to cause discomfort, it is advisable to contact the orthodontist for guidance and adjustments. Orthodontic emergencies can also involve lost or broken orthodontic appliances, such as retainers, headgear, or rubber bands (18). These appliances play a crucial role in maintaining the progress of orthodontic treatment. When they are damaged or lost, it is essential to consult with the orthodontist to replace or repair them promptly. Failure to address these issues can result in treatment setbacks or compromised results. Discomfort or soreness is a common experience during orthodontic treatment, especially after adjustments or when new appliances are placed. While this discomfort is not typically an emergency, patients can use over-the-counter pain relievers as directed by their orthodontist and follow any recommended care instructions to manage the soreness effectively. Overall, orthodontic emergencies revolve around issues related to orthodontic appliances and their proper functioning. While these situations are not life-threatening, they can impact the comfort of the patient and the progress of orthodontic treatment. Soft tissue injuries, such as lacerations to the lips, cheeks, or tongue, can result from accidents or trauma (19). These injuries may require sutures or other interventions to promote proper healing and prevent infection. Foreign body impaction is another potential issue in children (20). Swift removal of the foreign body by a dental professional is essential to prevent further complications **(Figure 2)**.

Figure 2: Reimplantation of an avulsed permanent lateral incisor. (21)

Traumatic dental injuries encompass a range of injuries that occur to the teeth and surrounding oral structures due to external forces or accidents (22). According to previous literature, trauma incidence peaks twice, once in the first 3 years of life and again between the ages of 6 and 12 (23-25). These injuries can be painful and often require prompt dental attention to prevent further complications and ensure the best possible outcome for the affected teeth and tissues. One common type of traumatic dental injury is dental fractures (26). These fractures can vary in severity, from minor enamel cracks to more extensive fractures that involve the dentin or pulp of the tooth (27). Enamel fractures may cause cosmetic concerns, but they are not typically painful. However, fractures that extend deeper into the tooth can result in sensitivity to temperature changes and, in some cases, severe pain. Treatment options for dental fractures may include dental bonding, dental veneers, or dental crowns, depending on the extent of the damage.

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Avulsion, or the complete displacement of a tooth from its socket, is another traumatic dental injury that requires immediate attention. The incidence of avulsion injuries is rare in children, making up only 0.3−0.5% of all dental injuries (28). This often occurs because of accidents or sports injuries. In cases of tooth avulsion, it is crucial to handle the tooth carefully by the crown and not the root. If possible, reimplantation should be attempted wherein the tooth is gently repositioned in its socket and held in place until a dentist can provide further treatment (29). The faster the tooth is reinserted, the better the chances of saving it. If reinsertion is not possible, the tooth should be placed in a container of milk or a specialized, commercially available tooth preservation solution and taken to a dentist as soon as possible.

Tooth intrusions and extrusions are injuries where the tooth is pushed into the socket (30) or partially forced out of the socket (extrusion) (31). These injuries often result in misalignment of the affected tooth and require immediate dental evaluation. In some cases, a dentist may need to reposition the tooth and stabilize it using orthodontic wires or splints to allow for proper healing. In cases of dental luxation, the tooth remains in the socket but is displaced from its normal position. This can lead to discomfort, difficulty in biting, and potential damage to the surrounding tissues. Dental luxation requires a dental assessment, and treatment may involve repositioning the tooth and providing appropriate stabilization (22). Fractures of the supporting bone or jaw may occur alongside dental injuries. These fractures can affect the stability of the teeth and the overall function of the oral cavity. Treatment often involves immobilization of the fractured bone or surgical intervention, depending on the severity and location of the fracture (32) (Figure 3).

Traumatic dental injuries can vary widely in their nature and severity, making it essential for individuals who experience such injuries to seek prompt dental care. Timely assessment and treatment by a dentist or oral surgeon can help preserve the affected teeth, alleviate pain, and prevent long-term complications. Additionally, individuals participating in sports or activities with a risk of dental trauma should consider wearing mouthguards to reduce the likelihood of injuries.

Figure 3: Mandibular fracture in a 2-year-old girl showing abnormal alignment of the anterior lower teeth and hematoma of the vestibule sulcus (33)

Conclusion

Pediatric dental emergencies encompass a spectrum of conditions that demand timely and appropriate intervention to ensure the well-being of young patients. These emergencies range from life-threatening situations that require immediate attention, such as airway compromise and severe infections, to urgent concerns like dental trauma and orthodontic issues. Orthodontic emergencies involve issues with appliances like braces, while traumatic dental injuries can result from external forces and require prompt dental care. Regardless of the category, early assessment and treatment by dental professionals are crucial to alleviate pain, prevent complications, and promote oral health in pediatric patients.

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Conflict of interest

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Ethical consideration

Non applicable.

Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection, and final writing of the manuscript.

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