International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

The Hidden Cause of a Non-Healing Forehead Wound: Significance of Meticulous Debridement and Examination in Pediatric Trauma - A Case Report

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Abstract: ***Background**: Pediatric facial trauma frequently presents with soft-tissue injuries that require prompt evaluation and management to prevent complications. Inadequate wound exploration and premature closure may result in retained foreign bodies, infection, delayed healing, and the need for secondary surgical intervention. This report highlights the importance of meticulous wound assessment and debridement in pediatric facial injuries. **Case Presentation**: A 7-year-old male child presented with pain, swelling, and purulent discharge from a previously sutured wound in the left supraorbital region following trauma from a cricket bat while playing. Initial management at a private healthcare facility involved primary wound closure. However, progressive swelling and signs of infection developed over the following days. Clinical examination revealed a sutured lacerated wound with marked tenderness, edema, and pus discharge. Computed tomography demonstrated a left supraorbital rim fracture with associated soft-tissue involvement. Surgical exploration under general anesthesia revealed copious purulent discharge and a retained wooden fragment from the cricket bat embedded within the wound. Thorough debridement and irrigation were performed, followed by anatomical reduction and fixation of the supraorbital rim fracture using a 2-hole gap titanium miniplate. The wound was subsequently closed in layers. **Results**: Postoperative recovery was uneventful, with complete resolution of infection, satisfactory wound healing, and restoration of facial contour. No functional or esthetic complications were observed during follow-up. **Conclusion**: This case underscores the critical role of careful primary wound assessment, adequate exploration, and meticulous debridement in pediatric facial trauma. Retained organic foreign bodies should be suspected in cases of delayed wound healing or persistent infection following trauma. Early recognition and appropriate surgical management are essential to prevent avoidable complications and achieve favorable outcomes.*

Keywords: Pediatric facial trauma; Supraorbital rim fracture; Retained foreign body; Wooden foreign body; Wound debridement; Facial laceration; Infection; Cricket bat injury.

1. Introduction

Pediatric facial trauma constitutes a significant component of childhood injuries and presents unique diagnostic and therapeutic challenges owing to the ongoing growth and development of the craniofacial skeleton. Although facial fractures are less common in children than in adults, soft-tissue injuries such as lacerations, abrasions, and contusions are frequently encountered and may result in considerable functional, esthetic, and psychological morbidity if inadequately managed. The pattern of injury varies with age, with falls, road traffic accidents, sports-related trauma, and interpersonal violence being the most common etiological factors.[1–3]

The anatomical characteristics of children, including increased skeletal elasticity, a relatively larger cranial-to-facial ratio, and the presence of developing dentition, influence both the incidence and presentation of facial injuries. These factors necessitate a treatment approach that not only addresses the immediate injury but also preserves future facial growth and development.[4,5]

Successful management of pediatric facial trauma extends beyond fracture stabilization and includes meticulous care of associated soft-tissue wounds. Wound debridement is a critical step in treatment, involving the removal of devitalized tissue, contaminants, and foreign material to establish a healthy wound bed. Adequate debridement reduces bacterial burden, minimizes the risk of infection, facilitates tissue regeneration, and enhances the likelihood of favorable functional and cosmetic outcomes.[6]

In children, the importance of proper wound debridement is amplified because residual contamination or poorly managed soft-tissue injuries can lead to hypertrophic scarring, facial asymmetry, contracture formation, and long-term psychosocial consequences. Early intervention with thorough wound assessment, irrigation, and conservative yet effective debridement can significantly improve healing while minimizing complications and the need for secondary corrective procedures.[3, 5,7]

Therefore, meticulous wound management remains a cornerstone in the treatment of pediatric facial trauma, playing a vital role in preventing infection, optimizing

esthetic outcomes, and preserving normal craniofacial growth and function.[7]

2. Case Report

A 7-year-old male child presented to the Department of Oral and Maxillofacial Surgery with a history of facial trauma sustained while playing cricket in his residential area. According to the patient's attendants, he was accidentally struck over the left periorbital region by a cricket bat, resulting in a lacerated wound and facial swelling**. (FIG 1)**

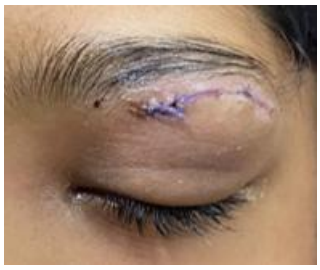

Figure 1: Pre OP Infected Wound

Immediately following the injury, the child was taken to a nearby private hospital, where primary wound management and suturing of the laceration were performed. However, a few days later, the patient developed progressive swelling in the left supraorbital region associated with pain and purulent discharge from the wound site. Consequently, the child was brought to our institution for further evaluation and management.

Clinical examination revealed a previously sutured lacerated wound over the left supraorbital region with marked swelling, severe tenderness on palpation, and purulent discharge from the wound margins. Ophthalmologic evaluation demonstrated no visual disturbances, and extraocular movements were within normal limits.

Computed tomography (CT) of the facial bones revealed a fracture of the left supraorbital rim (**FIG 2)** with associated soft-tissue edema. Based on the clinical and radiographic findings, a diagnosis of an infected supraorbital wound with an underlying left supraorbital rim fracture was established. The patient was planned for wound exploration, debridement, and fracture management under general anesthesia.

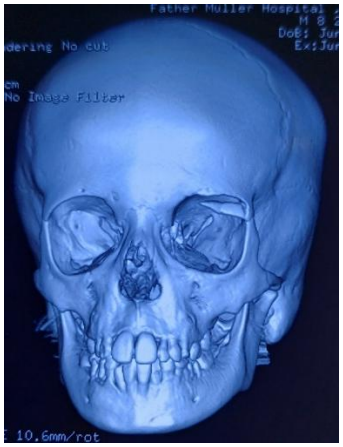

Figure 2: PRE OP CT CUT

Intraoperatively, upon removal of the previous sutures and exploration of the wound, a significant amount of purulent discharge was encountered. Further exploration revealed a retained wooden fragment (FIG 3), presumed to be a piece of the cricket bat, embedded within the wound. The foreign body was carefully retrieved, and thorough debridement of all infected and devitalized tissues was performed. Copious irrigation with normal saline and betadine was carried out to ensure adequate wound cleansing.

Figure 3: Foreign Body Retrieved From Cut Lacerated Wound

Figure 4: Intra OP Fixation

Following complete debridement, the fractured left supraorbital rim was exposed and reduced anatomically. Rigid fixation was achieved using a 2-hole gap titanium miniplate **(FIG 4)** with appropriate screws. After confirming fracture stability and achieving satisfactory wound bed preparation, layered closure of the surgical site was performed **(FIG 5).** The postoperative period was uneventful, and the patient was managed with intravenous antibiotics, analgesics, and regular follow-up. Subsequent reviews demonstrated satisfactory wound healing with resolution of infection and good facial contour restoration**. (FIG 6 & 7)**

Figure 5: Intra OP Closure

Figure 6: 1 Week Post OP

Figure 7: Post OP Xray

3. Discussion

Pediatric facial trauma represents a unique subset of maxillofacial injuries owing to the distinct anatomical and physiological characteristics of the growing craniofacial skeleton. Although sports-related injuries account for a considerable proportion of facial trauma in children, prompt diagnosis and appropriate management generally result in favorable outcomes.[1–4] However, failure to identify associated injuries or retained foreign bodies during the initial assessment can lead to significant morbidity despite the seemingly minor nature of the trauma.

The present case describes a 7-year-old child who sustained a supraorbital injury from a cricket bat while playing. Following primary wound closure at a peripheral healthcare facility, the patient subsequently developed progressive swelling, pain, and purulent discharge. Surgical exploration ultimately revealed a retained wooden fragment embedded within the wound, which served as the source of persistent infection. This case highlights the importance of thorough wound evaluation prior to definitive closure, particularly in injuries caused by wooden objects or other materials prone to fragmentation.

The management of pediatric facial injuries extends beyond simple wound closure and requires careful inspection for contamination, foreign bodies, and underlying skeletal injuries. Rogan and Fang emphasized that successful treatment of pediatric facial trauma depends on a comprehensive clinical examination and early identification of associated complications.[1] Similarly, Ryan et al. reported that seemingly uncomplicated facial lacerations may conceal underlying fractures or retained foreign material, necessitating a high index of suspicion during initial assessment.[2]

Foreign bodies composed of organic materials such as wood present a particular diagnostic challenge. Unlike metallic objects, wooden fragments may not be visible clinically as well as radiographically and can occasionally be overlooked during initial treatment. If left untreated, these materials act as a nidus for bacterial colonization, resulting in persistent infection, abscess formation, wound breakdown, delayed healing, and potential spread to adjacent anatomical structures.[3] In the present case, the retained wooden fragment resulted in suppuration and local infection, requiring secondary surgical intervention under general anesthesia.

The cornerstone of managing contaminated facial wounds is meticulous wound debridement. Adequate irrigation and removal of all devitalized tissue and foreign material reduce microbial load, improve tissue vascularity, and create an optimal environment for healing. Andrew et al. emphasized that early and thorough debridement significantly decreases the incidence of wound infection and unfavorable scar formation in pediatric patients.[4] Braun et al. further noted that preservation of healthy tissue while eliminating contaminants is critical for maintaining both facial aesthetics and future craniofacial growth.[5]

This case also underscores the potential consequences of seemingly minor omissions during primary care. Premature wound closure without adequate exploration may entrap contaminants and foreign bodies within the soft tissues, predisposing the patient to infection and delayed diagnosis. Such complications may necessitate additional surgical procedures, prolonged antibiotic therapy, increased healthcare costs, and psychological distress for both the child and caregivers.[5,6] The progression from a simple laceration to an infected wound requiring operative intervention in the present case exemplifies how a small oversight during initial management can result in significant clinical consequences.

The identification of an associated supraorbital rim fracture further reinforces the importance of comprehensive radiological assessment in pediatric facial trauma. While many facial fractures in children can be managed conservatively, displaced fractures or those encountered during surgical exploration may require stabilization to restore anatomy and prevent long-term functional or aesthetic deformity.[6] In the present case, fracture reduction and fixation using a 2-hole gap titanium miniplate provided stable osteosynthesis and facilitated uneventful healing.

Birgfeld and Heike emphasized that the primary goals in pediatric facial trauma management include infection prevention, restoration of function, preservation of facial growth, and achievement of acceptable cosmetic outcomes.[7] The favorable postoperative recovery observed in our patient can be attributed to timely surgical exploration, complete removal of the retained wooden foreign body, meticulous debridement, appropriate fracture fixation, and postoperative antimicrobial therapy.

This case highlights the critical importance of thorough primary wound assessment in pediatric facial trauma. Careful exploration, adequate irrigation, and meticulous debridement prior to wound closure are essential to prevent avoidable complications. Clinicians should maintain a high degree of suspicion for retained foreign bodies in injuries caused by wooden objects, especially when delayed swelling, pain, or purulent discharge develops after primary treatment. Early recognition and intervention remain key factors in achieving successful functional and aesthetic outcomes in pediatric patients.

4. Conclusion

This case highlights the importance of meticulous primary assessment and wound management in pediatric facial trauma. Failure to identify a retained foreign body during initial treatment resulted in infection and the need for secondary surgical intervention. Thorough wound exploration, adequate debridement, and appropriate radiological evaluation are essential to prevent complications and ensure favorable functional and aesthetic outcomes in growing children.

Statements & Declarations

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

The authors have no relevant financial or non-financial interests to disclose.

The authors affirm that human research participants provided informed consent for publication of the images in Figure(s) 1, 2, 3, 4, 5, 6, 7

All authors contributed to the study conception and design. Material preparation, data collection and the surgery were performed by [DR JAMEMA JAMAL], [DR SHREYAS J SORAKE]]. The first draft of the manuscript was written by [DR JAMEMA JAMAL] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

References

[1] **Rogan DT, Fang A. Pediatric Facial Trauma.** In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. Link: https://www.ncbi.nlm.nih.gov/books/NBK558932/

[2] **Ryan ML, Thorson CM, Otero CA, Vu T, Proctor KG, Doraiswamy VA, et al. Pediatric facial trauma: A review of the literature and guidelines for assessment and management.** *J Craniofac Surg.* 2011;22(4):1183–1189. PubMed: https://pubmed.ncbi.nlm.nih.gov/21772188/ DOI: https://doi.org/10.1097/SCS.0b013e31821c9368

[3] **Singh G, Mohammad S, Pal US, Hariram, Malkunje LR, Singh N. Pediatric facial injuries: Its management.** *Natl J Maxillofac Surg.* 2011;2(2):156–162. PubMed Central (Full Text): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3304182/ DOI: https://doi.org/10.4103/0975-5950.94472

[4] **Andrew TW, Morbia R, Lorenz HP. Pediatric Facial Trauma.** *Clin Plast Surg.* 2019;46(2):239–247. PubMed: https://pubmed.ncbi.nlm.nih.gov/30851748/ DOI: https://doi.org/10.1016/j.cps.2018.11.010

[5] **Braun TL, Xue AS, Maricevich RS. Differences in the Management of Pediatric Facial Trauma.** *Semin Plast Surg.* 2017;31(2):118–122. PubMed Central (Full Text): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5423802/ DOI: https://doi.org/10.1055/s-0037-1601377

[6] **Cole P, Kaufman Y, Hollier LH Jr. Managing the Pediatric Facial Fracture.** *Craniomaxillofac Trauma Reconstr.* 2009;2(2):77–83. PubMed Central (Full Text): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3052668/ DOI: https://doi.org/10.1055/s-0029-1215878

[7] **Birgfeld CB, Heike CL. Pediatric Facial Fractures.** *Semin Plast Surg.* 2021;35(4):245–252. PubMed Central (Full Text): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8604621/ DOI: https://doi.org/10.1055/s-0041-1732465