Identification and Management of Pediatric Craniofacial Fractures Resulting from Dog Bites

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Introduction

Due to a young child’s short stature, proportionally large head, and lack of defensive strength, the incidence of facial dog bites varies inversely with age.¹ As much as 80% of pediatric dog bite injuries, an estimated 44,000 cases per year, occur on the head and neck. In children under the age of 7, these injuries represent a significant proportion of all maxillofacial traumas, nearing 30%.²,³ Soft-tissue injuries from a bite are generally classified into three major types: laceration, avulsion, and puncture. Although somewhat rare, the compressive force of dog bites can be sufficient to fracture bones, especially the thin facial bones of a child. Fractures involving the orbit, midface, and skull have been the most common injuries. Our goal is to classify fracture patterns associated with facial bites and to determine appropriate management based on analysis of patient outcomes.

Methods

A retrospective chart review was conducted for the study period 1/1/2010 to 6/1/2015 using ICD9 codes to include all patients with facial dog bites (Table 1). A review of the English literature for the past 20 years was also conducted. All manuscripts detailing location and management of fractures in pediatric patients are summarized in Table 2.

Results

Table 1: HMC Case Summary Table

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Bond</th>
<th>Associated Injury</th>
<th>Fracture</th>
<th>Articulate Imaging (P/A)</th>
<th>Surgical Management</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>F</td>
<td>Saltine</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>M</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>Untreated</td>
<td>Right mandible</td>
<td>Right maxillary fracture</td>
<td>CT</td>
<td>ORIF</td>
<td>None</td>
</tr>
</tbody>
</table>

Discussion

The facial fractures described in this study demonstrate unique patterns of injury, which relate to the mechanism of a dog bite. Skull fractures tend to be associated with relatively small scalp lacerations and are often missed on initial exam. Similarly, small puncture wounds over maxillary or frontal sinuses may easily disrupt bone. Nasal, orbital, and alveolar fractures tend to require additional procedures due to complications such as epistaxis and dental loss, respectively. Despite the etiology, authors favored traditional methods of surgical repair. Internal reduction and rigid fixation was preferred for displaced fractures by the majority of surgeons in cases summarized in Table 2, but removal is recommended at 3-6 months to avoid plate migration and growth restriction in children.⁴

Conclusions

• Dog-bite-related facial fractures occur in 1-6% of pediatric facial dog bites.
• CT imaging is recommended for children presenting with craniofacial dog bites.
• Management of these fractures typically requires washout in the OR with ORIF.
• Patients benefit from hospital admission for IV antibiotics and close follow up to monitor for long-term complications.
• Rigid metallic fixation is preferred, but removal is recommended at 3-6 months.

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References: