Penetrating Facial Trauma in Children due to a Fishing Spear or Screwdriver

Serdar Altun1, Ahmet Çetinbaş2, M. Ihsan Okur1, Ali Bal1, Aysun Yıldız Altun3
1Department of Plastic, Reconstructive and Aesthetic Surgery, Fırat University School of Medicine, Elazığ, Turkey
2Clinic of Plastic Surgery, Kilis State Hospital, Kilis, Turkey
3Department of Anesthesiology and Reanimation, Fırat University School of Medicine, Elazığ, Turkey

Dear Editor,

Penetrating craniofacial traumas are rarely seen in childhood, but can lead to serious morbidities or mortality associated with the injuries of vital neurovascular structures. Penetrating craniofacial injuries in childhood are most commonly caused by knives and guns, or fragments of glass and metal. Penetrating injuries from screwdrivers and spear guns are rare among children and very few cases have been reported. We would like to share our two cases presenting with penetrating facial injuries from a screwdriver and a spear gun respectively.

Our first case is a two-year-old boy who fell onto a screwdriver while playing. The screwdriver entered through the right nasolabial region penetrated the front wall of the maxillary sinus and progressed obliquely towards the orbital base. The patient’s parents brought him to the ER without removing the screwdriver. His initial examination did not reveal any loci of bleeding, or oedema or hematoma in the oral region that would cause breathing difficulties. His eyes and eye movement were normal. Maxillofacial CT showed a foreign object that had reached into the right maxillary through the anterior wall of the maxillary sinus. The orbital base and the posterior wall of the maxilla were intact. The patient was urgently taken to surgery. The foreign object did not prevent using a mask over the nose and mouth for initiating general anesthesia, and no difficulties were encountered during ventilation. Movement of the screwdriver was prevented during mask application and endotracheal intubation. The screwdriver was easily pulled out and removed without requiring an additional incision. There was no bleeding, the maxilla wall was not reconstructed. The cutaneous incision was closed using 6-0 propylene suture. There were no findings of bleeding or infection during postoperative follow-up. (Figure 1).

Our second case is a 14-year old girl who was shot in the right nasolabial region with the spear gun that she triggered by mistake while she was playing in her fisherman father’s boat. The patient’s parents brought her to the ER without removing the spear head. Her initial examination did not reveal any loci of bleeding, or oedema or hematoma in the oral and intraoral region that would cause breathing difficulties. Maxillofacial CT showed that the spearhead entered through the nasolabial region and by an oblique and lateral progress reached between the mandibular ramus medial and the pterygoidal muscle lateral. No findings of trauma were identified in the bones. The patient was urgently taken to surgery. The foreign object did not prevent using a mask over the nose and mouth for initiating general anesthesia, and no difficulties were encountered during ventilation. Movement of the spearhead was prevented during mask application and endotracheal intubation. The hooked head of the spear gun lay under the skin, so a 1-cm incision was made over its point of penetration and the spearhead was removed, hence were any possible damages avoided. The cutaneous incision was closed using 5-0 propylene suture (Figure 2). There were no findings of bleeding or infection during the postoperative follow-up.

Children, by nature, are curious, and act without calculating the risk of danger, and therefore are often exposed to trauma. In most of the cases these traumas are caused by toy cars, toy fingernails, hooks, nails and ribbon balls. A total of 220,050 traumatic injuries from toys have been reported in one year, of which about 50% are

Figure 1. a-e. (a) The tip of the screwdriver is seen to have entered through the right nasolabial region and progressed obliquely to the superior. The screwdriver was immobilized with the help of gauze. (b) In 3D CT imaging the screwdriver is seen to have perforated the anterior wall of the maxilla without impacting the orbital base. (c) Sagittal CT imaging shows that the tip of the screwdriver did not penetrate the maxilla posterior or the orbit. (d) At anesthetic phase the mask fit well on the face and no issues were encountered during ventilation. (d) No bleeding was observed following the removal of the screwdriver and the wound site was primarily reconstructed.
indicated to be in the head and face region. Most of these are obtuse trauma events and constitute 80-90% of the injuries. While penetrating traumas constitute 10-20% of injuries, not many articles are available in the literature on facial injuries from screwdrivers or spear guns in children. The extent of the injuries caused by penetrating traumas can vary depending on the kinetic energy of the penetrating object. Spear guns function by two mechanisms: Compressed air or a rubber band for catapulting the spear forward. These two types of static energy are transmitted to the gun for instant acceleration. Since they are made to be used underwater, they use high energy to overcome the resistance of the water, and therefore can lead to severe injuries in the absence of aquatic resistance. Spearhead injuries have favorable prognosis in the absence of brain stem or vein injuries. Since injuries from sharp tools, such as the screwdriver, use lower mechanical force on a smaller area, they make a lower impact and thereby cause less trauma to the surrounding tissue. Unlike injuries from firearms, injuries from spear guns or screwdrivers are not accompanied by coagulation necrosis. The multitude and complexity of the head and neck region, however, can lead to mortality and morbidities. In both of our cases, no damage to the surrounding tissues occurred except for minor skin cuts.

Airway management should be evaluated in penetrating craniofacial injury cases, and possibility of a decline in airway safety caused by soft tissue oedema and bleeding should be considered even in patients with a patent airway. Patients should be checked for any vein injuries, oropharyngeal bleeding, their mental state should be monitored, and hemodynamic stability should be ensured. Gussack and Jurkovich have divided the human face into three regions for the assessment of the patient and the treatment options: supraorbital region, midface region, and the lower face region. The central nervous system and the frontal sinuses should be evaluated in penetrating supraorbital injuries. Detailed eye examination should be performed in cases, such as our first case, which the injuries of the midface also involve the infraorbital region. Cerebrospinal fluid leakage, presence of septal and dental injuries should be investigated in nasal examination. The larger veins of the neck, cervical vertebrae, and the oropharynx should be carefully examined in cases, such as our second case, which include injuries to the lower face. In all penetrating midface injuries, eyes, head base, and paranasal sinuses should be assessed using CT imaging. Therefore, the foreign object which has caused the injury should remain in situ during the first evaluation in the ER to be able to assess the anatomic layers it has impacted.

The role of angiography in assessing the presence of a vascular pathology in penetrating head and neck injuries is still a matter of discussion, but an angiography or a CT angiography should nevertheless be used when larger vein injuries are suspected.

Open, relatively clean and fresh traumatic injuries that occurred in less than four hours present a 20% infection risk, while penetrating injuries older than four hours present a 40% infection risk. Cefazolin is the antibiotic prophylaxis that should be considered in head and neck surgeries that involve the oral and pharyngeal mucosa and in traumatic wounds.

Tetanus vaccination should be administered to patients who were vaccinated with less than three doses. Both tetanus vaccination and tetanus immunoglobulin should be administered in contaminated wounds. Patients who have got three or more doses of vaccination, tetanus vaccination should be administered if the injury has occurred ten years after the last vaccination in clean wounds or if five years after the last vaccination in contaminated wounds. Antibiotherapy and tetanus prophylaxis should be initiated in the presence of the above findings.

Our two rare penetrating injury cases were the result of the encounter of two unattended minors with inappropriately dangerous material which they found intriguing. CT imaging was found sufficient for assessing both of our cases. Fortunately, neither of the patients demonstrated larger vein or nerve injuries. Antibiotic prophylaxis was initiated. No infection or bleeding was identified during follow-up and both patients had fully recovered by the time of discharge.

Informed Consent: Written informed consent was obtained from the parents of the patients who participated in this study.

Peer-review: Externally peer-reviewed.


Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES


4. Kazez A. Trauma in children. Turk Arch Ped 2010; 45: 12-6. [CrossRef]


Correspondence Author: Serdar Altun, MD
E-mail: serdaralt@gmail.com
Received: 02.01.2016 Accepted: 04.01.2016

Content of this journal is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.