

# A Sixteen Year Boy with Maxillofacial Injury by Five-Pronged Spear Head Harpoon Hook Gun: Case Report

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Received 14 April 2019/Accepted 24 June 2019

## ABSTRACT

This report illustrates a rare maxillofacial injury by spear gun that can cause mortality and morbidity. It is important to know how to intervene such a patient. He was conscious and oriented when he admitted to the Emergency Department (ED), his respiration and circulation was stable. Five-pronged spear head was stuck into the left zygomatic-orbital, maxilla and nose regions. The head of the five-pronged spear gun was cut out by a hydraulic cutter and the harpoon hook was removed in operation room under general anesthesia (oral endotracheal intubation). The patient healed with no deficit and discharged three days after operation.

Spear head harpoon guns are very dangerous equipment that children can easily access. Management of cases can be different according to the different kinds of spear guns. This case demonstrates management to the spear head harpoon gun injuries in the Emergency Department (ED) and in the Operation Room (OR).

**Keywords-** Spear Head Gun; Harpoon; Maxillofacial; Children; Trauma; Emergency.

## INTRODUCTION

Spear gun is a weapon for underwater fishing and the damage caused by spear gun can be severe and can cause mortality and morbidity.<sup>1,2</sup> In literature, there are various type of injuries related with spear gun, such as maxillofacial, thoracoabdominal, craniofacial and cervical injury.<sup>1,3-5</sup> In these cases, the spear guns range number of prongs, or barb types. The injury of maxillofacial region by spear gun is a very rare condition.<sup>1</sup> Hydraulic cutter may be required for removing a spear gun in such cases.<sup>3</sup> Therefore, it is important to know the mechanisms Maxillofacial of injury and how to intervene to the patient, who is injured by spear gun. Here, we present a challenging Maxillofacial injury case, that required hydraulic cutter. We aim to define a proper approach and the tips of initial management, by reporting a boy, who was injured with a five-pronged spear head harpoon hook gun.

## CASE REPORT

A sixteen-year old boy was admitted to the emergency department (ED), because he was accidentally shot in the face with a five-pronged spear head harpoon hook gun from a distance of approximately one meter, while he and his brother were playing with it at home. On general assessment, he was conscious and his Glasgow Coma Score was 15; breathing uncomfortably and the circulation was stable. On physical examination, it was

noted that a five-pronged spear was stuck into the left zygomatic-orbital, maxilla and nose regions. The entrance sites of prongs were nose, maxilla and infraorbital area, respectively (Figure 1).



**Figure 1:** Lateral aspects of the patient in Emergency Department (ED).





**Figure 2** A and B: Anterior and lateral aspects of the patient in operation room.

The lower pronged of spear gun (5<sup>th</sup> harpoon) had entered into the nasal cavity and dentoalveolar area of maxilla, the two middle pronged of spear gun (4<sup>th</sup>, 3<sup>rd</sup> harpoons) had entered and exited into the infraorbital region, and the two upper pronged of spear gun (1<sup>st</sup>, 2<sup>nd</sup> harpoons) had run free outside of the soft tissue near the orbit and supraorbital area.

Despite this, the patient's airway was closed from the left side and was breathing uncomfortably, and his respiratory rate was 18/min, and auscultation of lungs were normal. Oxygen saturation (SpO<sub>2</sub>) was 98% in room air, his heart rate was 95 beats/min, and his blood pressure was 105/55 mmHg. Extra-ocular movements and visual acuity were not affected. The rest of physical examination findings were normal, he was in pain and non-steroidal anti-inflammatory drug was given for analgesia, and there is no facility to do any radiological type of examination before manipulation of pronged spear gun, therefore, the two middle harpoons caused only two cut wounds, but the lower harpoon was penetrated into the nasal cavity and the dentoalveolar area of maxilla. Neurological and vascular structures were intact. Ampicillin sulbactam at a dosage of 200 mg/kg/day, and tetanus toxoid immunization were administered prophylactically in the Emergency Department (ED). Dexamethasone at a dosage of 8 mg/day was administered to control post-operative morbidities and to provide comfort for the patient.

Brand name and the technical features of harpoon and its arrow were learned and researched before the operation to prevent secondary injuries while removing.

The pronged spear head harpoon gun was planned to remove in the Operation Room (OR), under general anesthesia conditions, (oral endotracheal intubation). The pronged spear head gun was cut out by a hydraulic cutter

in the Operation Room (OR), under general anesthesia (Figure 2 A, B).

The upper 1<sup>st</sup> and 2<sup>nd</sup> two harpoons, was removed without any soft tissue injuries, and the sharp mobile barb of the 3<sup>rd</sup> and 4<sup>th</sup> harpoons was covered by elastic tubes to prevent secondary injuries of the soft tissue and the skin was removed without any soft tissue injuries. The 5<sup>th</sup> harpoon was removed from nasal cavity and dentoalveolar part of the maxilla (Figure 3).



**Figure 3:** Photograph of the pronged spear head harpoon and its barb (arrow) after removal from the patient.

No bleeding sutured by vicryl 3/0 and skin sutured by proline 4/0.

The patient was extubated after the operation. The patient healed with no deficit and discharged three days after the operation (Figure 4 A, B).





**Figure 4** A, B: Postoperative anterior and lateral aspects of the patient in word.

## DISCUSSION

Spear gun is a weapon for underwater fishing. In literature, the terms such as spear gun, harpoon, fishing gun are used.<sup>1,6,7</sup> There are two most common types of spear guns: rubber powered and air powered (pneumatic). Our case was shot by a rubber powered spear gun, which consists of three main parts: a spear, rubber bands for loading and a trigger.<sup>1</sup>

Stretching of rubber band and attaching to notches in spear gun may be difficult for children, since they do not have enough strength to pull and fix those rubber bands, the risk of slipping off their hands and injuring the one across is higher. Therefore, children must be avoided from equipment like these. In our country, an authorization to have spear gun is mandatory, but children can get an authorized spear guns for their parents at home easier than firearms. Although they are both authorized, but firearms are kept away from children more cautiously.

Parents may neglect precautions to avoid an injury of spear guns like this, but the common point of all injured children in literature is that there is no parental supervision.<sup>1,4,8,9</sup> Our case was shot at home, while playing with his brother and there was no parental supervision. Most injuries by spear gun occur accidentally, but a few cases of suicide were published earlier.<sup>2</sup> Although, the injuries that caused by pronged spear head harpoon gun have high risk of mortality and morbidity, fortunately, our patient had no severe deficit compared with some cases published before,<sup>10,11</sup> and Maxillofacial injuries that caused by spear gun are very rare conditions, therefore, in literature, a few case reports were published in recent years.<sup>1,6,8</sup>

Probably, the reason of having no severe deficit in these cases was the absorption of the power of trauma by the dentoalveolar part of the maxilla and nasal cavity, besides, our case healed with no deficit probably because of the absorption of maxilla.

Our case had some difficulties unlike other cases in literature, therefore, the pronged spear head harpoon hook gun needed to be removed in the operation room (OR), under general anesthesia oral endotracheal intubation.

Whereas, in some cases, cutting the outer part of the object that penetrates to maxillofacial region can be necessary as in ours.<sup>8,10</sup> Thus this process has some risks for patients, because the vibrations of the cutter machine can increase parenchymal damage, so choosing the right cutter machine is important, therefore, we used a hydraulic cutter in our case because it causes less vibration.

The structure of harpoon was another consideration in our case. Generally, the arrow of spear guns has a barb to prevent the runaway of the catch and the barb can be mobile or immobile type,<sup>1</sup> and it is important to be aware of this to decrease the complications in surgery.<sup>10</sup> So we obtained information about the shape of the spear gun arrow before the manipulation, since the barb type in our case was mobile, and we closed the barb and covered it by an elastic tube to prevent the soft tissue and the skin from secondary damage.

In post-operative period, primary goals are controlling post-operative morbidities and to provide comfort of the patient. A type of antibiotics and timing is controversial, but most surgeons adopt the antibiotic therapy that should be initiated pre-operative period and continued for five days,<sup>8,12</sup> in addition to this, Dexamethasone is the preferred corticosteroid due to long acting effect,<sup>12</sup> therefore, we used Ampicillin sulbactam and Dexamethasone in our case.

## CONCLUSION

This type of facial injury is very rare and the management is highly individualized depending upon patient presentation, general condition of the patient, available resources and experience of operating team in management of such patients.

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