

## Management of Bear Attack in Bhutan: A Maxillofacial Perspective

**Karan Padha<sup>1\*</sup> and Rigzin Phyelgye<sup>2</sup>**

<sup>1</sup>Oral & Maxillofacial Surgeon, 1202 Dental Unit, Bhutan

<sup>2</sup>Oral & Maxillofacial Surgeon, JDWNRH, Bhutan

**\*Corresponding Author:** Karan Padha, Oral and Maxillofacial Surgeon, Dental Unit, Government of India, India.

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**Karan Padha and Rigzin Phyelgye.**

### Abstract

Bear attacks in the Himalayan region often result in severe facial and head injuries. This case report presents a 41-year-old woman who sustained extensive facial fractures following a bear attack in Bhutan. Surgical management involved a "Top to Down, Outside to Inside" approach to repair the facial skeleton, addressing Le Fort III and I fractures, mandibular fractures, and soft tissue injuries. This case highlights the importance of timely and comprehensive management of bear attack injuries to achieve optimal functional and aesthetic outcomes.

**Keywords:** Bear Attack; Maxillofacial Reconstruction; Panfacial Trauma

### Introduction

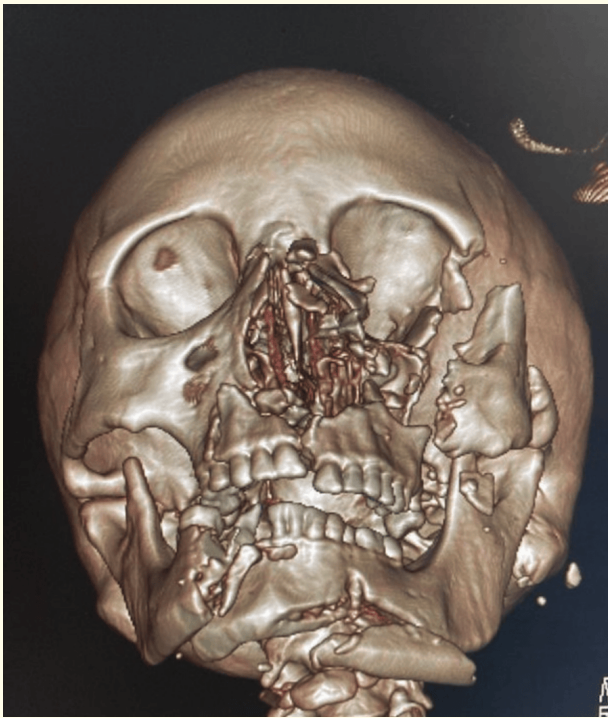
Bear attacks are commonly reported in the winter months along the Himalayan range in India, Nepal and Bhutan. Bear attack injuries commonly involve the face (80.57%) followed by head (54.67%) [1]. In this clinical report, a woman was attacked while working in the field in the wild and could be described as a defensive attack by the bear in its natural habitat [2]. In these cases, prime importance should be given to thorough irrigation of the wounds and debridement of the foreign contaminants as they can be embedded deep into the wounds during the attack [3,4]. We discuss a case of bear maul injury in Bhutan and its panfacial maxillofacial management.

### Case Report

A 41 year old woman from Trongsa, Bhutan suffered a bear attack in the wild and was immediately airlifted to Gelephu Central Regional Referral Hospital by the Bear Emergency Aeromedical Retrieval (BEAR) Team where she received primary management and was subsequently airlifted to JDWNRH, Thimphu (Figure 1). On radiographic examination, a Le Fort III fracture on the left side and a Le Fort I fracture on the right side with a left mandibular symphysis and right body fracture was detected (Figure 2).



**Figure 1:** The victim post bear attack.



**Figure 2:** Radiographic evaluation.



**Figure 3:** Exposure of the fractured segments.

The treatment plan was as follows: Maintenance of airway, breathing and circulation was done and bleeding was arrested. Tetanus prophylaxis and Rabies Vaccine were administered to the patient. Under General Anesthesia, repair of the facial skeleton was performed using a “Top to Down, Outside to Inside” approach. This approach was selected as the NOE complex was involved. Existing lacerations were used to expose the fracture segments (Figure 3). As the skullbase and frontal bone were intact, zygoma reduction was performed to maintain midfacial width and projection. Following correction of the sagittal zygoma rotation, NOE reduction and fixation was done. To get proper reduction, the plate is adapted anterior to the medial canthus tendon before fixing it to the frontal bone. The vertical buttress (nasomaxillary and zygomaticomaxillary) reduction and fixation was done. Maxillary palatal reduction was done using a plate at the anterior piriform aperture. Mandibular symphysis and body fracture reduction and fixation was done while correcting mandibular splaying (Figure 4). After establishing bony reduction and fixation, soft tissue reconstruction was performed and layer-wise closure was done using 4-0 vicryl and 6-0 prolene (Figure 5). Tazobactam 4.5 gm IV thrice daily, Amikacin 500 mg IV twice daily and Metronidazole 100 ml IV thrice daily was administered. Topical mupirocin was applied twice a day to treat secondary infections.



**Figure 4:** Fixation of the fractured segments.





**Figure 5:** Immediate postoperative photograph.

### Discussion

Bear attack injuries can be described as crushing or penetrating which can cause avulsion of tissues [5]. The victims suffer from psychological trauma as well as physical trauma in the form of disfigurement. The significant debilitation complicates the surgical management, and the dynamic nature of the face challenges the reconstruction. In accordance with similar studies, rabies and tetanus prophylaxis was given to the patient with broad spectrum antibiotics to combat the spectrum of pathogens [6,7]. In literature, bear attacks generally cause midface fractures with secondary debridement and revisions often needed due to high vascularity of the tissues [8,9].

As the bear attack injuries are not just restricted to face, a multidisciplinary approach is required for management. Physical and radiological examination with knowledge of the reconstruction of facial structures is critical for definitive management. Wound debridement is paramount to decrease the risk of infections as well as administration of rabies and tetanus immunizations. As prima-

ry debridement is not always enough, secondary revision surgery is generally needed establishing a need for regular follow up and maintaining quality of life for the patient. In this clinical report, we describe the step-by-step maxillofacial management of an extensive bear attack injury.

### Conclusion

Bear attacks in the Himalayan region pose significant health risks, particularly to individuals working in rural areas. This case report underscores the importance of timely and comprehensive maxillofacial intervention for victims of such attacks. The “Top to Down, Outside to Inside” surgical approach proved effective in the maxillofacial reconstruction and achieved optimal functional and aesthetic outcome.

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