CASE REPORT

Unusual limb injury associated with sport parachuting

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The case is reported of an open injury of the right arm sustained during a parachute jump. The fracture was managed in the usual way with wound debridement, wound irrigation, skeletal stabilisation, and reconstruction of the soft tissues. Good shoulder and elbow function were achieved. The combined effort of an orthopaedic trauma surgeon and plastic surgeon is essential to improve outcomes in such cases.

Sport parachuting is a recreational sporting activity which has increased in popularity since the inauguration of the first World Parachuting Championship in Yugoslavia five decades ago.¹ Despite being categorised as a dangerous sport, it is estimated that more than half a million people world wide participate. Most injuries from parachute jumping occur during landing,¹ and the ankle is the most common site of injury.² We present a case of unusual limb injury and mechanism associated with parachuting. To our knowledge no other such case has been described.

CASE REPORT

A 52 year old woman presented to the accident and emergency department with an open injury of the right arm. She was an experienced parachutist whose parachute had opened prematurely during a descent. As the canopy opened her right arm became entangled in the ropes and was subjected to a tremendous shearing force. This resulted in an open injury. Despite this, she managed to make a safe landing with no additional injuries.

On admission she was noted to have a deformity and grade 3B compound injury of the right arm. Radiographs confirmed a comminuted fracture of the middle and distal third of the right humerus (fig 1). There was no evidence of distal neurovascular deficit.

The patient was taken to theatre within six hours. The wound was debrided and irrigated. Definitive internal fixation was postponed because of heavy contamination. A second debridement was required after 48 hours, and definitive internal fixation was performed using a plate. There was a 6 cm × 3 cm × 2 cm soft tissue defect anteriorly just proximal to the transverse elbow crease, with the subcutaneous fascia and brachialis muscle completely divided. The bony injury was a comminuted fracture of the middle to distal third of the humerus shaft with a large medial butterfly fragment with extensive stripping of the periosteum. The radial nerve was severely bruised but in continuity.

The surgical approach was anterior as there was a pre-existing wound anteriorly with bone exposed. The three main fragments were reduced anatomically with lag screws, and a small fragment dynamic compression plate DCP was applied. The radial nerve was protected under vision. The soft tissue defect was closed primarily. Radiographs obtained after surgery showed a satisfactory fixation. The limb was rested in an above elbow plaster with the elbow in 90° flexion.

The immediate postoperative period was uneventful. Radiographs taken at three months showed an aseptic non-union at

Figure 1 Radiographs of the right arm at presentation showing a comminuted fracture of the middle and distal third of the humerus. (A) Anteroposterior and (B) lateral views.

the fracture site (fig 2). This was due to extensive periosteal stripping from the injury. It was managed by autologous bone grafting from the left iliac crest. At the six month follow up, there was radiological union (fig 3) with good shoulder and elbow function. The patient managed to return to parachuting.

DISCUSSION

In 1919, Leslie Irvin made the first ever free fall parachute jump near Dayton, Ohio.³ He used a hand operated chute, a

Figure 2 Radiographs at three month follow up showing non-union of the fracture. Anteroposterior (A) and lateral (B) views.

design that revolutionised parachuting and gave birth to a new sport. However, parachute jumping was not recognised as a sport until 1951 when the first World Championship was

Figure 3 Radiographs at six month follow up showing union of the fracture. Anteroposterior (A) and lateral (B) views.

held in Bled, Yugoslavia.^{1,3} Fifty years on, sport parachuting forms the largest internationally represented aeronautical sport.

Despite strict and extensive precautions, parachuting is by its nature a dangerous sport, with considerable injuries and

death rate.⁴⁻⁶ Several studies^{1-3,7} have identified the injury producing factors. Recommendations for and modifications of training programmes have been proposed to minimise parachuting injuries. There is evidence¹⁻⁷ to suggest that new parachute designs are safer, especially for novices.

Most parachuting injuries are sustained during landing² and not surprisingly to the weight bearing parts of the body. Our case is unique because the injury was sustained as the result of sudden unexpected opening of the parachute. The patient's right arm was entangled in the suspension lines thereby receiving a violent force. She was fortunate that she was able to execute the emergency reserve parachute and land safely on the drop zone.

As for any open fracture, the treatment protocol was wound debridement, skeletal stabilisation, copious irrigation, and delayed primary closure.^{8,9}

Recreational sport parachuting will continue to flourish. Knowledge of the phases of the parachute jump and the techniques of landing are necessary to minimise risk of injury. This potentially life threatening injury was not related to the landing but was due to equipment failure.

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Take home message

The goals in the treatment of open fractures are to prevent infection, achieve bone union, avoid malunion, and restore the limb and patient to full function as early as possible.

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