

## Management of Upper Limb Monomelic Polytrauma with Neurovascular Problems

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**ABSTRACT:** Nine patients with monomelic polytrauma of the upper extremity with distal vascular deficit were treated by radical debridement. Immediate skeletal stabilisation, revascularisation and soft tissue cover. Early free flaps were not possible because of multiple level crush injury. Five patients had abdominal flaps to cover the ulnar plates at the exposed ulnar fracture levels. All limbs survived and fractures went on to union at an average of ten weeks. Five patients required removal of ulnar implants after bony union due to infection and one patient needed tendon transfer for extensor loss. With a minimum one year follow up seven patients had returned to normal activity. The severity of muscle avulsion and the extent of nerve damage were found to influence the result more than the extent of skeletal damage or the level of vascular injury.

### Introduction

Multiple fractures with extensive soft tissue injury and associated distal vascular deficit (monomelic polytrauma) is an uncommon injury in the upper extremity. Primary radical debridement, immediate skeletal stabilisation, revascularisation and early soft tissue cover have now become the accepted norm for the management of high energy trauma to the extremities<sup>1</sup>. This paper discusses our experience in managing nine patients with this complex surgical problem.

### Materials and Methods

Nine patients, seven of whom had sustained industrial accidents and two with road traffic accidents were treated in our hospital between June 1991 and June 1994. All patients had multiple level fractures, extensive circumferential degloving of the forearm with distal vascular deficit due to avulsion of major vessels. Avulsion of forearm muscles from their origin was very common. The extent of injury and various procedures adopted for each patient are given in Table 1. All patients reached our hospital within three hours of the injury. The following protocol was followed in their management.

The general condition of the patient assessed, resuscitated and was taken to the operating room with 45 minutes of their arrival at the hospital. Surgery was done under brachial block. Assessment of the injury and radical debridement were done under tourniquet. All fractures inclusive of closed one were fixed internally. Dynamic compression plates were used for forearm bones. Humeral fractures had short plates in addition to external fixators.

Eight patients had long segment avulsion of both forearm vessels and the remaining one patient had brachial artery injury. In the forearm, distal portion of one vessel was used as a graft to bridge the long segment avulsion in the other after examining the quality of the graft under the microscope. Vein grafts were used in one forearm where the arterial segment could not be salvaged and in the case of brachial artery avulsion. Average time from injury to clamp release after vascular anastomosis was five hours.

After revascularisation, reassessment for evidence of non-viable tissue was done. Non-vascularised muscle groups were again excised. In the patient (case 5) where there was a complete extensor compartmental loss in the forearm, the distal tendons in the region of the wrist were tagged and buried under available soft tissues. Six months