

## Case Report

# A review of three cases of mobile blast: The new culprit of hand injury

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## ABSTRACT

Although blast injuries are common with war; cooking gas; firecracker, mobile phone blast cases are increasing in number in last couple of years. We present 3 cases of mobile blast in 3 children causing injury to dominant hand in them.

## KEY WORDS

Amputation; mobile blast; hand injury

## INTRODUCTION

‘Mobile blast’ or ‘Bombile’ is the word you can hear everywhere in India from home to office, vegetable market to the shopping complex and school to universities. Reports are coming from many places of mobile phones suddenly exploding in the hand or in the pocket or after receiving a call, causing disastrous consequences on the patient, family members and society both physically and psychologically. We report three cases of mobile blast injuries to hand in three different children.

## CASE REPORTS

### Case report 1

A 10-year-old boy was brought by his parents with a history of mobile phone blast while he was playing game on the phone for half an hour and the phone was getting

charged. His father had bought this mobile 6 months back from the local market, costing about Rs. 1000; however, he is not aware of manufacturer of mobile phone or its battery. The patient sustained multiple injuries over chest, abdomen, face and right hand. The patient was referred to us 10 h after the incident. He was immediately taken to the operating room where all the wounds were thoroughly debrided. Abrasions over face, chest and abdomen were cleaned, and lacerated wounds over face and chest were sutured.

The right hand was grossly mutilated with amputation of the index, middle and ring fingers from metacarpophalangeal (MCP) joint and little finger through proximal interphalangeal (PIP) joint. The right thumb carpometacarpal (CMC) joint was dislocated with soft-tissue loss over the dorsum of hand and palm.

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The wound was thoroughly debrided and amputations were revised. The raw area over palm was primarily closed. K-wire fixation of 1<sup>st</sup> CMC joint was done. The raw area over the dorsum of hand with exposed 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> metacarpal heads was covered with right reverse radial forearm flap. Partial flap necrosis was seen which was debrided and later covered with split-thickness skin graft. The patient was then rehabilitated with intensive physiotherapy [Tables 1-3 and Figure 1].

### Case report 2

A 12-year-old boy was brought by his parents 3 days after mobile blast injury when he was playing with battery of the phone which was defective. Parents are unaware of the type and make of battery. Battery suddenly exploded when it was in the right hand of the patient. The patient sustained mutilating injury to right hand with amputation of thumb through IP joint, index finger through MCP joint and middle finger through PIP joint with soft-tissue loss over dorsum and palmar aspect of hand and fingers.

As the wound was grossly infected, serial debridement was done followed by which raw area over amputation stump, dorsum and palmar aspect of hand with exposed tendons was covered with right-sided superiorly based abdominal flap. Flap division and inset was done at 21 days [Tables 1-3 and Figure 2].

### Case report 3

A 12-year-old boy was brought by his parents with a history of the mobile blast while it was getting charged.

The patient was playing in the vicinity of the mobile phone. In this case also, parents are unaware of type and make of mobile or battery as they had bought it from local market 1 year back. The boy was brought 2 days after the incident. He sustained multiple injuries over face, chest and over right thumb. The patient lost vision in his right eye due to retinal injury. The wounds over the chest and right thumb (volar aspect) were serially debrided and later skin grafted [Tables 1-3 and Figure 3].

## DISCUSSION

The studies on blast injuries to hand have been reported describing their aetiology, pattern, pathomechanism,



**Figure 1:** A 10-year-old boy with right-hand mobile blast injury; pre- and post-operative photos

**Table 1: Age distribution, sex distribution, involved hand, mode of injury, time of presentation**

Patient number	Age (years)	Sex	Dominant hand	Injured hand	Mode of mobile blast	Time for presentation
1	10	Male	Right	Right	While playing game on mobile	10 h
2	12	Male	Right	Right	While playing with battery	2 days
3	12	Male	Right	Right	While playing around mobile which was getting charged	3 days

**Table 2: Type of injury, associated injury, reconstruction and operative procedure**

Patient number	Type of injury to hand	Associated injuries	Reconstruction	Operative procedure
1	Severe	Abrasions and lacerated wounds over face, chest and abdomen	Primary	Revision amputation + joint fixation + reverse radial flap
2	Severe	None	Secondary	Debridement + abdominal flap
3	Mild	Abrasion over face, chest with loss of vision in the right eye	Secondary	Split-thickness skin graft

**Table 3: Complications, secondary procedures, hospital stay and degree of impairment**

Patient number	Complication	Secondary procedure	Hospital stay (days)	Impairment
1	Partial flap necrosis	Debridement of partially necrosed flap with split-thickness skin graft	30	Significant
2	-	Waiting for flap defatting, 1 <sup>st</sup> web space deepening	45	Significant
3	Loss of vision in the right eye	None	20	None



**Figure 2:** A 12-year-old boy with right-hand battery blast; pre- and post-operative photos

etc. from time to time.<sup>[1-4]</sup> However, the cases of mobile phones causing blast injury involving hand have never been reported till date. Only one case of mobile blast injury causing gastric perforation has been reported till now.<sup>[5]</sup>

In our study, all three patients were boys in the age group of 10–12 years. The dominant hand, i.e. the right hand was involved in all three boys. This is due to the tendency of human beings to hold the mobile phones in their dominant hand.

Only one patient had mild injury, i.e. only soft-tissue involvement, while other two had a severe injury to hand.<sup>[1]</sup> We found a common pattern of hyperextension, thumb and fingers hyperabduction, IP and MCP hyperextension and dorsal dislocation. The impact of a forceful blast and hyperextension of the digits cause a disruption of the volar plates and disinsertion of the intrinsic muscles. Similar findings were observed in the study of blast injury to hand conducted by Hazani *et al.* and Adhikari *et al.*<sup>[1,2]</sup>

The hand comprises four discrete units of which the thumb is the most mobile owing solely to the mobility of the CMC joint which is bisaddle in nature.<sup>[6,7]</sup> The index finger is the next most mobile unit attached to the fixed unit of the hand comprised the central metacarpals. The rest of the fingers and the metacarpals take part in power grip of the hand.<sup>[8]</sup>

To grip the mobile phone in the hand, the primary action is provided by the thumb and the index finger while long finger stabilises the grip and ulnar fingers playing



**Figure 3:** A 12-year-old boy with shrapnel injury over trunk

a supporting role. Therefore, when the battery of the phone blasts, the brunt of the damage is born by the thenar eminence and 1<sup>st</sup> web space. Next in the row is loose fitting bisaddle joint of the thumb causing a dorsal dislocation of the CMC joint. The fingers and the mid palm are next to be affected. The IP joints have fixed volar plates and are, therefore, unyielding and usually disrupt from the injury leading to amputations of these fingers.<sup>[7-9]</sup>

Tissue losses were replaced with either skin graft or flap coverage. Adhikari *et al.* showed similar management protocol.<sup>[1]</sup> Groin flap was most favoured in their series. Other flaps such as reverse radial artery forearm flap and posterior interosseous artery forearm flap were done too.<sup>[9,10]</sup> Hazani *et al.* restored the hand functions with toe transplantation. The rectus abdominis and lateral arm flap were the workhorse for the 1<sup>st</sup> web space creation.<sup>[2]</sup>

All patients underwent rehabilitation with rigorous physiotherapy. However, long-term effect of mobile blast injuries remains to be seen.

## CONCLUSION

In the modern era of technology, the mobile blast is emerging as a new mode of hand injury. It represents a wide spectrum of wound ranging from a simple laceration to amputation leading to catastrophic physical trauma and complications. Hence, prevention is always better by observing mobile safety guidelines. The key to the management of blast injuries of the hand is attention towards early debridement and wound coverage with post-operative physiotherapy.

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### Conflicts of interest

There are no conflicts of interest.

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