

# Unusual tissue damage in the forearm caused by glass: a case report

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## ABSTRACT

Penetrating injuries of the forearm are relatively frequently seen in hand surgeon's practice. They are typically caused by a knife or other sharp tool which drives deeply into the forearm muscles and frequently damages nerves or vessels. In this paper, we report a case of a young man with a forearm wound in which a piece of glass on the palmar side passed through the muscles and the interosseous membrane to the dorsal side and

caused extensor tendons injury. The glass object was seen in the X-ray. The wound was inspected in the operating theatre and injured tendons were repaired. The postoperative course was uneventful. This case shows that surgeon must be very cautious in assessing penetrating injuries due to the possibility of damage to structures localized beyond the entry wound.

**Keywords:** penetrating injury of the forearm; muscle injury; extensor tendons injury in the forearm.

## INTRODUCTION

Penetrating injuries of the forearm are relatively frequently seen in hand surgeon's practice. They are caused by a knife or other sharp tool which drives deeply into the forearm muscles and frequently damages nerves or vessels [1, 2, 3]. Injuries of these structures are usually seen on the ipsilateral side of the injury and not on the contralateral. For instance, if the wound is localized on the palmar side of the forearm, one can expect laceration of flexor muscles/tendons, median/ulnar nerves, or radial/ulnar arteries. Likewise, when the wound is localized on the dorsal side of the forearm, extensor muscles/tendons of radial nerve are at risk of damage. It is very uncommon that an entry wound on the palmar side penetrates the dorsum of the forearm (and vice versa) resulting in damage to structures occurring there. It is not a case in gunshot wounds, when the forearm is frequently pierced right through, resulting in tissue damage around the entry and exit wounds [4].

We present an unusual case of forearm wound in which a piece of glass on the palmar side passed through to the dorsal side and caused injury to extensor tendons.

## CASE REPORT

A 27-year-old man presented to the Emergency Department with an open wound on the palmar side of the right forearm, sustained several hours earlier. The patient reported that he had fallen on the glass object standing on the floor. On admission, the wound was not bleeding and the forearm was fitted with a dressing. Physical examination revealed normal hand vascularity, undisturbed sensation, and full flexion of all digits. There was a loss of extension of the middle and ring fingers, suggesting injury of the extensor tendons of these fingers. An X-ray showed the presence of a big piece of glass in the forearm (Fig. 1). The patient was admitted to the hand department and, as he was in

good shape, after short preparation he was given surgery. The operation was performed under brachial plexus block anaesthesia and with the tourniquet. The wound was localized approx. in the distal  $\frac{1}{3}$  part of the forearm, on the palmar side (Fig. 2). The skin on the dorsal side was intact. After the extension of the wound, the glass fragment was identified and retrieved from the muscles (Fig. 3). The wound was next carefully inspected, revealing injury to flexor muscles and intact median nerve and radial artery. The ulnar side of the forearm was not lacerated. Further exploration of the wound showed injury to the interosseous membrane, the structure spanned between the radial and ulnar bones, and deep penetration of the wound to the dorsal side of the forearm. In this situation, an additional incision was made on the dorsal side which revealed a laceration of the extensor tendons to the middle and ring fingers (Fig. 4). The tendons were repaired with the standard Kessler technique, followed by suturing of the flexor muscles, wounds closure and plaster splint on the forearm. The postoperative course was uneventful and the patient was released home in 2 days to out-patient care.

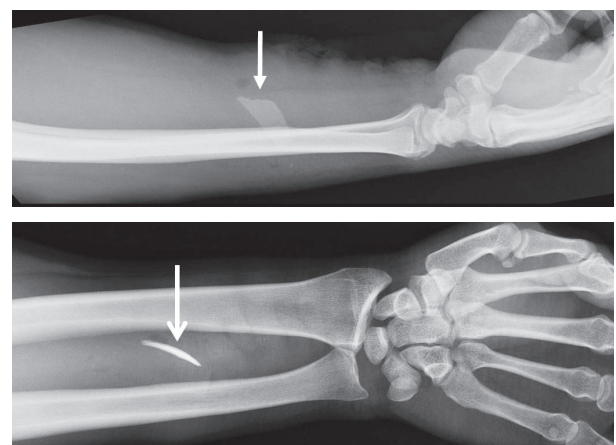


FIGURE 1. An X-ray of the forearm shows a big piece of glass



**FIGURE 2.** The wound in the forearm at the beginning of the operation



**FIGURE 3.** A glass retrieved from the forearm of the patient



**FIGURE 4.** Lacerated extensor tendons on the dorsal side of the forearm (marked with arrows)

## DISCUSSION

The presented case is interesting because of unusual injuries caused by a relatively big glass fragment driven deeply into the forearm muscles from the palmar side. At this localization of the wound, one would expect injuries to the flexor muscles or tendons, median or ulnar nerves, and radial or ulnar arteries. Surprisingly, the trajectory of penetration of the glass piece was very strange, because it passed through the flexor muscles

without damaging any vital structure, perforated the intraosseous membrane and cut 2 extensor tendons, without piercing skin on the dorsal side of the forearm. Such a wound trajectory and range of injuries can be considered strange and unusual. The authors failed to find any article in the literature presenting a similar case, and therefore decided to describe it and publish it.

The literature contains several articles about acute penetrating injuries of the forearm. Şirinoğlu et al. reported 5 cases of penetrating injuries of the forearm caused by blunt-edged objects as a corrugated iron fence, garden wires, iron stick, or iron safety fence. At the first sight, all these injuries presented horribly but intraoperatively no nervous or vascular injury was found. Most patients had a partial tear of the muscle bellies and extensor tendon lacerations, as it was a case in our case. All these injuries were primarily repaired [5].

Tuncali et al. reported the results of the study investigating deep-structure injuries of the upper limb through small penetrating wounds. A total of 226 patients were included in the study. The wounds were caused by glass (69%) and knives (31%). In 134 patients (59%) at least 1 deep structure was damaged: in 124 (55%) at least 1 tendon, in 25 (11%) at least 1 nerve, and in 20 patients (9%) at least 1 artery. Extensor tendons were more commonly injured – in 82 patients (61%). Combination injuries were found in 20 (9%) patients. The most encountered combination was the injury of all 3 structures: tendon, nerve, and artery. The authors conclude that small laceration injuries of the upper extremity have the potential to conceal an underlying deep injury [6].

Essomba et al. reported the case of a 23-year-old patient with a transfixing wound in the forearm due to a blow with an atypical kind of knife. Clinical and radiographic tests showed significant muscle and neurovascular lesions. Surgical removal of the knife and lesion repair were performed [7].

The presented case is interesting because of the unusual and strange range of injuries caused by a glass object penetrating the forearm. It shows that surgeon must be very cautious in assessing such wounds due to the possibility of damage to structures localized beyond the entry wound.

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