

Missed injuries in the acutely traumatised hand

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SUMMARY

A prospective study of 500 consecutive patients referred from accident and emergency departments in Northern Ireland with acute hand injuries was performed to assess the incidence of missed injuries. An injury was 'missed' if a patient was receiving inappropriate treatment or returned due to persistent symptoms despite being examined, treated and discharged. There were 16 (3.2%) missed injuries. Seven involved tendon only, four were isolated nerve injuries and four were mixed tendon and nerve injuries. The remaining case was a ruptured ulnar collateral ligament of the thumb metacarpophalangeal joint. Thirteen injuries were open, with a glass laceration being the most common mechanism of injury. The time to detection of a missed injury was on average 11 days (range 1-62 days). Missed hand injuries in Northern Ireland are uncommon but do occur. A thorough clinical examination and accurate injury documentation remain fundamental in their prevention.

INTRODUCTION

Acute hand injuries account for 6.6% of all new attendances at Accident and Emergency Departments in Northern Ireland.¹ It is recognised that despite best efforts, hand injuries may be missed.^{2,3,4,5} Missed hand injuries may lead to a prolonged period of disability, further surgical intervention and a sub-optimal outcome.

The purpose of this study was to assess the incidence of missed injuries being referred to the Regional Plastic Surgical Unit and to identify any common contributing factors.

PATIENTS AND METHODS

A prospective study of 500 consecutive patients with acute hand injuries referred to the Regional Plastic Surgical Unit in Northern Ireland, was performed over a six month period. The Unit accepts all hand and wrist injuries, except for bony and/or ligamentous injuries to the carpus and distal forearm.

On admission, patients were assessed and the following data recorded; age, gender, hand dominance, the injured hand(s), whether the injury was open or closed, the diagnosis and if the injury was missed. The introduction of a hand injury

chart (Figure) provided an objective method of recording a patient's injuries.

An injury was defined as 'missed' if a patient was receiving inappropriate treatment or returned to the Accident and Emergency department due to persistent symptoms despite being examined, treated and discharged.

The Accident and Emergency records of patients with missed injuries were subsequently retrieved. From these notes we recorded; the date of injury, the grade of the initial examining medical officer, the mechanism of injury, the clinical diagnosis and any documented difficulties in patient assessment.

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FIGURE NORTHERN IRELAND PLASTIC AND MAXILLOFACIAL SERVICE HAND INJURY CHART

Name:

Occupation:

Date of birth:

Hand Dominance: Right / Left / Neither

M / F:

Injured hand: Right / Left / Both
(If both - complete separate chart for each hand)

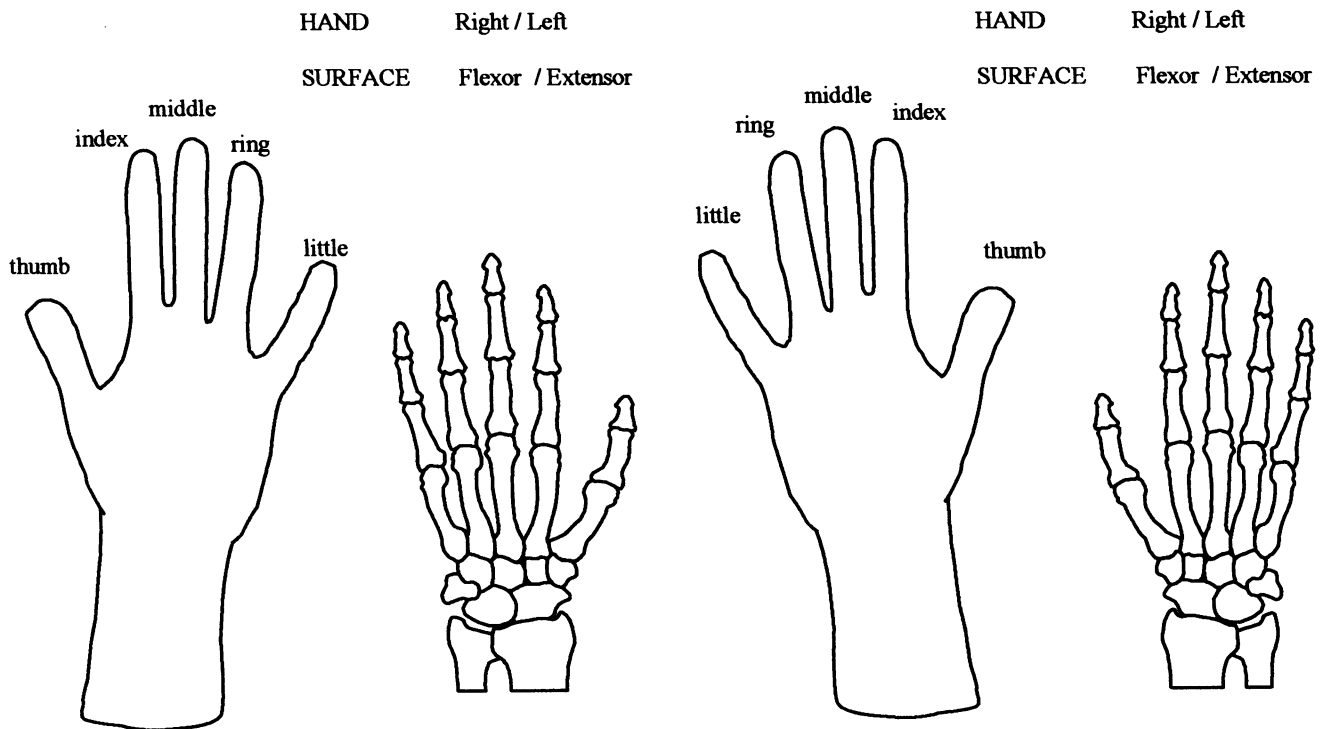
HISTORY:

Date/ Time/ Place of injury:

Mechanism of injury:

EXAMINATION:

Indicate on diagrams; lacerations, skin loss, burns, infection, amputations, sensory loss, bone injuries, retained foreign body.



Tendon injury:
(circle those divided)

Nerve injury:
(circle those divided)

Ligament injury:
(especially thumb)

Circulation:

Thumb	APL/EPB	FPL	EPL
Index	FDS	FDP	EDC/EI
Middle	FDS	FDP	EDC
Ring	FDS	FDP	EDC
Little	FDS	FDP	EDC/EDM

median	
ulnar	
radial	
digital	common
	radial / ulnar

radial collateral
ulnar collateral

Normal yes/no
Details

X-RAY: (hand +/- amputated part)

Yes / No

PHOTOGRAPH:

Yes / No

DIAGNOSIS:

EXAMINED BY:

(Print Name and Grade)

RESULTS

There were 16 (3.2%) missed injuries in the 500 consecutive patient referrals. The average age of patients was 29 years (range 19-53 years) with a male to female ratio of 3:1. In seven cases the dominant hand was involved.

Thirteen injuries were open. Of these, five involved tendon only, four were isolated nerve injuries and four were combined tendon and nerve injuries. Three injuries were closed. There were two isolated tendon injuries and one ruptured ulnar collateral ligament of the thumb metacarpophalangeal joint (Table I). In all of the patients with a missed injury, it was a Senior

House Officer who performed the initial assessment.

A glass laceration was the most common mechanism of injury, accounting for 6 cases (Table II). Difficulty in performing a clinical examination was recorded in one patient who was uncooperative due to alcohol intoxication. The average delay to detecting a missed injury was 11 days (range 1-62 days).

DISCUSSION

This study confirms that missed hand injuries do occur, but it is reassuring to note that they represent only a small percentage (3.2%) of the total referrals. Our findings suggest that missed injuries are more common in patients with hand or wrist trauma caused by glass and in patients examined by junior medical staff.

A previous study by Hill *et al*¹ described the characteristics, causes and disposal, of all isolated injuries to the hand and wrist in Accident and Emergency Departments in Northern Ireland. Using this data we can estimate that over 7,000 hand injuries will have passed through feeder departments over the six month period in which this study was performed. Patterns of disposal after initial attendance, also show that 87.3% of lacerations to the hand and wrist, including tendon and nerve injuries, will have been referred to our service.

The extent of underlying damage is often underestimated with glass lacerations. Blunt objects may cause little damage to deep structures, whereas thin slivers of glass which produce an unimpressive skin wound commonly divide tendons and major nerves.⁶ Although they account for only 5.1% of hand injuries in Northern Ireland¹ glass was involved in almost 40% of the missed injuries we detected.

It is well recognised that peripheral nerve injuries can be difficult to assess in the immediate post injury period. Some patients often appear to have function in a nerve which is subsequently shown to be divided. Lynch and Quinlan⁷ confirmed that a nerve impulse can jump a transection gap for up to 72 hours, until Wallerian degeneration occurs. This has clear implications for early nerve assessment by Casualty Officers. If a divided nerve remains in anatomical contact it may continue to transmit impulses and early assessment is therefore incomplete. If immediate exploration is not being carried out, patients with

TABLE I

Missed hand injuries in 500 patient referrals

	<i>Missed injury</i>	<i>No. patients</i>
Open		
<i>Tendon only</i>	Extensor digitorum	2
	Flexor digitorum profundus	3
<i>Nerve only</i>	Median nerve	2
	Ulnar digital nerve	1
	Radial digital nerve	1
<i>Combined</i>	Median nerve and flexor digitorum superficialis	1
	Ulnar nerve and flexor carpi ulnaris	1
	Flexor digitorum profundus and radial digital nerve	1
	Radial digital nerve and extensor digitorum	1
Closed		
	Flexor digitorum profundus	2
	Ulnar collateral ligament thumb metacarpophalangeal joint	1
	Total	16

TABLE II

Mechanism of missed injuries

	<i>Mechanism of injury</i>	<i>No. patients</i>
Open	Glass	6
	Knife	4
	Metal	1
	Fall	1
	Crush	1
Closed	Assault	1
	Sports injury	2

suspected nerve injuries should be reassessed approximately 72 hours later. At this stage Wallerian degeneration will have removed the possibility of jump transmission and the correct diagnosis can be established.

Failure to perform a comprehensive clinical examination is the most likely reason that missed hand injuries occur. This is often due to inexperience on the part of the junior doctor, compounded by a lack of knowledge of the complex anatomical and functional features of the hand. Consulting a more senior member of the team or referral to a hand injury review clinic are important options that should be available. Finlayson *et al*³ highlighted the benefits of a next day review clinic for patients attending casualty with acute hand or wrist injuries. Detection of unsuspected significant injuries, avoiding inappropriate treatment and teaching junior medical staff are clear advantages of this clinical setting.

Examination of the hand requires patient co-operation. Injuries can be missed when trying to assess patients who are uncooperative due to alcohol intoxication or drug abuse. The patient's response to the clinical examination may also be confused by emotional distress or the presence of pain. It is therefore important either to reassess the patient when they are more co-operative or ensure that they are reviewed the following day.

No previous study has attempted to quantify the problem of missed hand injuries or identify contributing factors. It is hoped that our findings, with an emphasis on a thorough history, clinical examination and accurate injury documentation using a hand injury chart, will help to reduce their occurrence.

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