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- 'docendo ac discendo' - 'by teaching and learning'

In this issue:

Foreword

Welcome to the latest edition of the International Journal of Clinical Skills (IJOCS), Volume 7, Issue 2, March 2013.

The majority of medical students will enter their first surgical session not having had contact with immediate pre- or post-operative patients, never having set foot in an operating theatre before and with an overwhelming fear of fainting, or doing something inexcusable. A study conducted in Leeds, England, describes the planning, implementation and reflection of pilot sessions which utilise innovative resources and subject specific material. Use this pilot study to help implement perioperative education for your students, thus reducing risks and ultimately improving patient outcomes.

Exposure to real patients with real problems is highly valued by medical students. With medical student numbers increasing globally and opportunities to access real patients in healthcare facilities declining, alternative arrangements have to be made to provide students with a 'real' patient experience, including the use of 'patient volunteers'. However, little is known in relation to patients' experiences of being examined by medial students for purely teaching purposes. An Australian research group present an interesting study which discusses patients' attitudes and experiences. Are volunteer patients a viable alternative to utilising patients in healthcare settings? Find out what the evidence shows.

The dynamic hip screw (DHS) is the most commonly used implant for hip fracture. One of its postoperative complications is infection, which can be associated with a high degree of morbidity and occasionally mortality. Our colleagues at the Trauma and Orthopaedic Department, Glan Clwyd Hospital, Wales, suggest a technical method for the management of deep-seated infection following DHS fixation. This novel technique has the potential to help manage early deep-seated would infection, without compromising stability of the fracture fixation or needing to perform excision arthroplasty. Utilise this technical tip to improve the quality of patient care and reduce morbidity.

Metacarpal fractures are very common with frequent presentation to Accident and Emergency Departments. However, caution is required when assessing such injuries. This interesting paper illustrates how healthy individuals can simulate a rotational deformity in the little or ring fingers of a 'normal' hand and therefore the importance of accurate clinical examination.

As always, your feedback is invaluable for the continued development of the International Journal of Clinical Skills – the only peer reviewed international journal devoted to clinical skills (e-mail: feedback@ijocs.org).

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International Journal of Clinical Skills

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Clinical examination of metacarpal rotation: proceed with caution

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Abstract

Metacarpal fractures are very common and present frequently to both Emergency Departments and Fracture Clinics. Often junior doctors and specialist nurse practitioners assess these injuries and have been taught to examine for rotational deformity, due to the fact that this is an indication for surgery.

This study shows how 15 healthy individuals from the orthopaedic department at a UK district general hospital can simulate a rotational deformity in the little or ring fingers of a 'normal' hand. The mean angulation of the little finger was 20.5 degrees and of the ring finger 15.9 degrees.

This study emphasises that caution is required when assessing such injuries, so as not to lead to patient anxiety.

Introduction

Following changes to medical training within the UK in recent years, it has been noted within the orthopaedic department at our district general hospital that junior doctors knowledge in basic orthopaedics is limited, whether it be in the direct setting of orthopaedics or within the Accident and Emergency Department (A+E). Orthopaedic exposure as a medical student can be restricted and many junior doctors will only have read about how to perform hand examinations. The altered training patterns and working time directives of junior doctors have further highlighted this lack of knowledge.

Metacarpal fractures are one of the common injuries to present to Fracture Clinic following attendance to A+E. It has been cited that the incidence is 2.5% in 10 – 29 year olds [1]. The fractures are most usually sustained in patients that have punched objects with a closed fist, fallen, and after transport accidents [1, 2]. It is crucial that a full assessment of the patient is undertaken and a decision made for conservative or operative management.

Indications for surgery generally include unstable fractures and those with rotational deformity [2]. Our Orthopaedic Department believes that although obvious rotational malalignment should be corrected, the health professional needs to keep in mind a few fundamental principles when examining such patients so as not to be caught out, especially in the early years of training. What may appear as rotational deformity to the untrained eye may not be due to the fracture pattern and actually be due to swelling after injury, or the simple active (and passive) movement that can occur at the metacarpal and phalanx, as this study aims to highlight.

Objective

The hypothesis was tested that one does not need to have a fractured metacarpal to simulate a rotational deformity.

Methods

15 healthy doctors within the Orthopaedic Department at St Richards Hospital, Chichester, UK, were examined and photographed for the purpose of this study, none of whom had a history of injury to the hand in question.

The hand was first clinically assessed and then the fingers actively flexed to observe the normal cascade. In flexion the distance between the midpoints of the ring and little fingernails was measured. Photographs were then taken in this position. Each subject was then asked to actively simulate rotational malalignment in either their ring or little fingers by simply flexing the finger in question slower that the others causing overlap. Further photographs were taken and the distance between the midpoints of the fingernails measured.

The photographs were printed out and lines drawn down the mid-shaft of the distal phalanx of the middle, ring and little fingers. For each subject, 'normal' angles of finger cascade towards the scaphoid were determined by where the lines intersected.

The same lines were drawn down the fingers in the simulated rotation scenario and the difference in the angles between the middle and ring finger, and those of the ring finger and little finger, calculated.

Correspondence with the Royal West Sussex Trust's Research and Ethics Committee deemed that the project was for developing a teaching aid and therefore did not need formal ethical approval.

Results

All 15 individuals were able to simulate a rotational deformity commonly looked for in fracture of the metacarpal of the ring and little fingers, whilst flexing their fingers down towards their palm (Table 1). The mean overlap of the little and ring fingertips was 0.4 cm. The amount of simulated angulation between the middle and ring fingers was 15.9 degrees (range: 9 – 28, median 16). The mean amount of simulated angulation between the little and ring fingers was 20.5 degrees (range: 14 – 30, median 19).

Table 1: Table of measured rotation (ring and little fingers)

	Angle				True difference in rotation	
Subject Number	Little to ring finger (degrees)	Ring to middle finger (degrees)	Little to ring finger with rotation (degrees)	Ring to middle finger with rotation (degrees)	Little finger (degrees)	Ring finger (degrees)
1	3	2	17	11	14	9
2	4	3	34	12	30	9
3	4	3	19	29	15	26
4	4	2	22	18	18	16
5	5	4	19	21	14	17
6	6	4	34	20	28	16
7	4	3	31	14	27	11
8	5	3	27	21	22	28
9	3	2	18	15	15	13
10	2	1	17	13	15	12
11	4	3	23	19	19	16
12	4	2	20	21	16	19
13	5	4	32	24	27	20
14	3	2	24	18	21	16
15	4	3	30	13	26	10
Mean	4	2.73	24.46	17.93	20.46	15.86
Median	4	3	23	18	19	16

Discussion

This observational study aims to highlight to medical students and junior doctors both the importance and pitfalls of examining the hand for rotational malalignment after injury. Many junior doctors find themselves treating these fractures in Accident and Emergency Departments and Fracture Clinics having had little or no previous exposure to such cases.

To examine such an injury one is taught to examine the hand with the fingers extended and to look at the alignment of the nail plate. The fingers are then examined in flexion as each finger tip should individually and in combination strike the palm in the direction of the scaphoid [3, 4]. If the finger in question shows rotational malalignment one needs to decide whether operative correction is necessary. Even 10 degrees of malrotation at the metacarpal can cause up to 2 cm of overlap at the finger tip and consequently there can be significant disability [5].

Rotational deformity is highly unlikely after a single metacarpal fracture due to the strong interosseous ligaments at the bases of the metacarpals and the deep transverse (palmar and dorsal) intermetacarpal ligaments distally that serve to maintain the transverse arches of the hand [6]. Should there be multiple metacarpal fractures and associated soft tissue injury the likelihood of rotational deformity is thereby understandably higher.

All 15 subjects examined in this study were able to simulate a deformity that many inexperienced doctors may construe as an indication for operative intervention, should this have been in addition to a fractured metacarpal on radiograph (Figures 1 and 2). This, under certain circumstances and in times when senior advice is not immediately available, could lead to patient anxiety over treatment if called back for review at a later date for discussion as to whether surgery is necessary. Upon referral to fracture clinic such patients may require appropriate counselling to manage both their injury and expectations.

Figure 1: Photograph showing simulated rotational deformity in the little finger

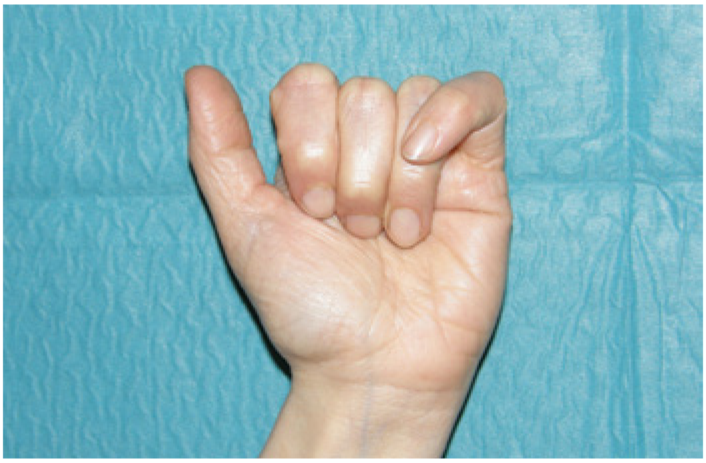

Figure 2: Photograph showing simulated rotational deformity in the ring finger

The deformities in this observational study are caused by flexing the affected finger down slower than the others in the cascade, which is an often seen clinical finding if there is pain inhibition secondary to injury. Passive internal rotation of the little finger can occur at the carpometacarpal joint and the metacarpophalangeal joints [7, 8]. Smith et al [7] have also shown how this affect is produced by the injection of normal saline in the intermetacarpal space to simulate swelling that is sustained after injury. They found that this increased the intermetacarpal distance and intermetacarpal angles giving the appearance of rotational deformity with no underlying fracture. One can extrapolate how exaggerated the finding would be with both swelling and pain inhibition present after an otherwise undisplaced or minimally displaced fracture. It is noted, however, that neither simulated swelling nor active movement causes fingernail orientation to change.

The observations in this study could be better assessed by a larger sample size of different aged patients and with radiological markers as used in other studies. Furthermore, with ethical approval, fracture clinic patients with metacarpal fractures could also be examined and results compared.

Conclusion

Metacarpal fractures are common and it is important that health professionals remain aware to look for rotational deformity, so as not to overlook an injury that could lead to significant patient morbidity and disability. If the finger is rotated in such a way that it is divergent from the other fingers or scaphoid, the need for operative stabilisation is clear. In more subtle cases where a rotational or angular deformity exaggerates the 'normal' plane of movement, the decision can be much harder and a senior clinical opinion should be sought.

As evidenced by photographs taken in this study, an element of rotation can be actively achieved by how the subject positions their fingers into flexion (Figures 1 and 2). Should this complicate an examination, explanation to the patient in regards to clinical assessment is paramount. If necessary, the examination should be repeated after adequate analgesia to aid in diagnosis.

Declarations

The author has no financial or other interests to declare in relation to this paper.

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References

1. de Jonge J J, Kingma J, van der Lei B, Klasen H J. (1994). Fractures of the metacarpals. A retrospective analysis of incidence and aetiology and a review of the English-language literature. Injury. **25**(6):365-369.
2. Soong M, Got C, Katarincic J. (2010). Ring and little finger metacarpal fractures: mechanisms, locations, and radiographic parameters. Journal of Hand Surgery. **35**(8):1256-1259.
3. McRae R. (2002). Practical fracture treatment. 4th Edition. Edinburgh, Churchhill Livingstone.
4. Royle S G. (1990). Rotational deformity following metacarpal fracture. Journal of Hand Surgery (Edinburgh, Scotland). **15**(1):124-125.
5. Bucholz R W, Court-Brown C, Heckman J, Tornetta P (Editors). (2010). Rockwood and Green's Fractures in Adults. 7th Edition. London, Lippincott Williams and Wilkins.
6. Dzwierzynski W W, Matloub H S, Yan J G, Deng S, Sanger J R, Yousif N J. (1997). Anatomy of the intermetacarpal ligaments of the carpometacarpal joints of the fingers. Journal of Hand Surgery (American). **22**(5):931-934.
7. Smith N C, Moncrieff N J, Hartnell N, Ashwell J. (2003). Pseudorotation of the little finger metacarpal. Journal of Hand Surgery (Edinburgh, Scotland). **28**(5):395-398.
8. Stern P. (1999). Fractures of the metacarpals and phalanges. In Green D P, Hotchkiss R N, Pederson W C (Editors), Green's operative hand surgery, pages 763-764. Volume 2. 4th Edition. Edinburgh, Churchill Livingstone.