Hand and Wrist

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President BSSH

www.handsurgery.co.uk
Dupuytren’s Disease
Flexor Tendon Repair
Scapholunate injuries
Wrist Arthritis
Distal Radius Fractures
Metacarpal Fractures
- Dupuytren’s Disease
- Flexor Tendon Repair
- Scapholunate injuries
- Wrist Arthritis
- Distal Radius Fractures
- Metacarpal Fractures
Heterogeneity of disease

Stumps  Twigs  Logs

Abstract
Dupuytren's disease is a heterogenous condition for which a palette of treatment options is required. Randomized control trial evidence is sparse; design challenges, such as validated outcome measures, blinding, equipoise, funding and assessment of recurrence, may limit further data accrual. Recurrence has different significance with different treatments and so rates are not directly comparable. The risk of any treatment is a function of both the chance of a complication and the clinical sequelae of that complication. The patient must be intimately involved in choosing treatment and is often trading rapid recovery for a higher chance of recurrence. Health economies are strained and as custodians of healthcare, surgeons should consider whether many patients even need treatment. To minimize the chance of complex, hazardous and expensive revision surgery, a low threshold for primary skin grafting should be applied, especially for those who are young, have dense disease or vulnerable zones.
Xiapex
Heterogeneity of disease

• Some cords are more suitable for surgery
  • diathesis
  • dense cords
  • skin involvement

• Some are more suitable for PNF
  • thin MCP cord
Developments in surgical technique

Invasive surgical procedures

- Open-heart surgery
- Hysterectomy
- Angioplasty
- Cholecystectomy
- Appendicectomy

All common until 1990s

Minimally Invasive Procedures

- EVAR
- Laparoscopy/Keyhole
- Lithotripsy

Mainly used after 2000
We should be thinking of offering more needles

Advise everybody that if you choose a needle instead of surgery, you are trading:

- Much quicker recovery
  - 3 days vs 6 weeks
- Much cheaper
- Much fewer serious complications
  - 2% vs 6%

Recurrence
Dupuytren’s Disease
Flexor Tendon Repair
Scapholunate injuries
Wrist Arthritis
Distal Radius Fractures
Metacarpal Fractures
Key points

- 4 or 6 strand suture
- Peripheral sutures optional
- Allow repair to be bulky not gappy
- Thorough pulley release
- Less wrist restriction in splint
- Early active motion
- Multi strand
  - 4 or 6
- 3-0 or 4-0
  - Non Dissolvable
  - Not fibre wire
Bunch up the repair

(a) A smooth repair without tension
(b) At the time of surgery

A slightly bulky repair with tension

During active digital motion after surgery

Gaps form easily when tendon moves

The repair site is flatter without gaps
Functionally relevant bowstringing does not occur if A4 or A2 released

Better to bowstring than to trigger
The Manchester short splint: A change to splinting practice in the rehabilitation of zone II flexor tendon repairs
Peck, Rowe, Duff, Ng, Hand Therapy 2014 19 47-53

- Allows wrist flexion and extension
- Tenodesis
- Early active movement
Dupuytren’s Disease
Flexor Tendon Repair
Scapholunate injuries
Wrist Arthritis
Distal Radius Fractures
Metacarpal Fractures
Kinematic problem with SL rupture

- loss of distal support of scaphoid
  - scaphoid falls into flexion
- loss of scapho-lunate apposition
  - bones separate
  - lunate tilts backwards (DISI)
Staging and Natural History
SLAC Wrist

Stage I
• Radial Styloid-scaphoid

Stage II
• Radioscaphoid joint

Stage III
• Capitate-lunate
Treatment

**Hand & Wrist**

Treatment of scapholunate ligament injury: current concepts

Jonny K. Andersson

Acute

**Mend within 2 to 3 weeks**

Chronic

**Consider reconstruction**
Acute repair
Chronic SL Dissociation

Leave alone?

• The natural history of SLAC 1 and SLAC 2 is often **benign**

• No consistent evidence that SLIL reconstruction delays or prevents progression of SLAC

• Any operation can make you worse

• 20% complication rate with surgery  Naqui et al 2018
  • Infection
  • Bone tunnel fracture
  • Wire penetration
The management of chronic non-arthritic scapholunate dissociation: a systematic review

Zafar Naqui¹, Wee Sim Khor¹, Anuj Mishra², Vivien Lees² and Lindsay Muir¹
<table>
<thead>
<tr>
<th>Technique</th>
<th>Author/year</th>
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<tbody>
<tr>
<td>STT arthrodesis</td>
<td>(Peterson and Lipscomb, 1967)</td>
</tr>
<tr>
<td>ECRB tenodesis through the scaphoid</td>
<td>(Palmer et al., 1978)</td>
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<tr>
<td>Scaphoid-lunate-capitate-triquetrum arthrodesis</td>
<td>(Uematsu, 1979)</td>
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<td>Limited triscaphoid intercarpal arthrodesis</td>
<td>(Watson, 1980)</td>
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<td>Extensor tenodesis (dorsal and palmar)</td>
<td>(Glickel and Millender, 1984)</td>
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<td>Scapholunate arthrodesis</td>
<td>(Hastings and Silver, 1984)</td>
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<td>Blatt capsulodesis</td>
<td>(Blatt, 1987)</td>
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<td>Palmar SLIL reconstruction with K-wire</td>
<td>(Conyers, 1990)</td>
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<td>Four-Bone ECRB weave</td>
<td>(Almquist et al., 1991)</td>
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<td>Scaphocapitate arthrodesis</td>
<td>(Pisano et al., 1991)</td>
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<td>Scaphocapitolunate arthrodesis</td>
<td>(Rotman et al., 1993)</td>
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<td>Brunelli FCR tenodesis</td>
<td>(Brunelli and Brunelli, 1995)</td>
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<td>Dorsal radioscapophoid capsulodes</td>
<td>(Wintman et al., 1995)</td>
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<td>RASL with Herbert screw</td>
<td>(Rosenwasser et al., 1997)</td>
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<td>Dorsal capsulodesis with suture anchors</td>
<td>(Uht et al., 1997)</td>
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<tr>
<td>Modified Brunelli FCR tenodesis</td>
<td>(Van Den Abbeele et al., 1998)</td>
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<tr>
<td>Bone-retinaculum-bone autograft [distal radius]</td>
<td>(Weiss, 1998)</td>
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<tr>
<td>Metacarpal-carpal bone-retinaculum-bone autograft</td>
<td>(Harvey and Hanel, 2002)</td>
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<tr>
<td>Mayo dorsal capsulodes</td>
<td>(Moran et al., 2005)</td>
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<tr>
<td>Arthroscopic debridement and pinning of joint</td>
<td>(Dartis et al., 2006)</td>
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<td>Three-ligament FCR tenodesi</td>
<td>(Garcia-Elias et al., 2006)</td>
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<tr>
<td>Arthroscopic RASL</td>
<td>(Aviles et al., 2007)</td>
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<tr>
<td>ECRB ligamentoplasty and dorsal capsulodes</td>
<td>(Papadogeorgou and Mathoulin, 2010)</td>
</tr>
<tr>
<td>Arthroscopic dorsal capsulodes</td>
<td>(Mathoulin et al., 2011)</td>
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<tr>
<td>Viegas dorsal capsulodes</td>
<td>(Camus and Van Overstraeten, 2013)</td>
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<tr>
<td>Transosseous ligament reconstruction with FCR</td>
<td>(Ross and Couzens, 2013)</td>
</tr>
<tr>
<td>Arthroscopic dorsal and volar ligament reconstruction</td>
<td>(Ho et al., 2015)</td>
</tr>
</tbody>
</table>
17 papers

- Pain
  - Pre-op 6
  - Post op 2.8

- Grip strength
  - +11% tenodesis
  - +31% capsulodesis

- Radioulnar arc
  - +19% capsulodesis
  - -11% tenodesis

- Radiological gap recurs
- Does not correlate with outcome
- Very short follow up
  - Only 4 papers > 4 years….
Scapho-lunate injuries

• Acute- fix

• Chronic
  • Asymptomatic
    • then probably leave alone
    • Natural history may well be benign
    • Surgery is unproven and may cause severe complications
  • Symptomatic
    • We do not know which op is best
    • Soft tissue procedures unpredictable
Dupuytren’s Disease
Flexor Tendon Repair
Scapholunate injuries
Wrist Arthritis
Distal Radius Fractures
Metacarpal Fractures
Wrist Arthritis

- Wrist replacement is “work in progress”
- Don’t forget neurectomy
- Use preserved cartilage
“A doctor has a duty to take reasonable care to ensure that the patient is aware of any material risk involved in any recommended treatment and of any reasonable alternative or variant treatments. “

“It requires that the test of materiality is whether in the circumstances of the particular case a reasonable person in the patient’s position would be likely to attach significance to it”
Complications Following Partial and Total Wrist Arthroplasty: A Single-Center Retrospective Review

Michael P. Gaspar, MD,∗† Jesse Lou, BA,∗ Patrick M. Kane, MD,∗† Sidney M. Jacoby, MD,∗† A. Lee Osterman, MD,∗† Randall W. Culp, MD∗†

Conclusions Although TWA and partial wrist arthroplasty are attractive treatment options for the painful arthritic wrist, there remains a noteworthy potential for complications requiring additional surgery. A detailed understanding of these risks is essential for surgeons so that patients may be counseled accordingly and that alternative treatment options may be considered. (J Hand Surg Am. 2016;41(1):47–53. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)

59% complication
39% revision
Follow Up 35 +/- 28 months

8 articles
405 implants, 7 types
FU 2.3 to 7 years
Motec best DASH
Maestro best ROM
Universal 2 highest survival
Biax 69% complication
Remotion lowest complication

The evidence does not support the widespread use of arthroplasty over arthrodesis
What journal would publish a THR or TKR paper with such short term results
Unless they are bad results

Which surgeon would use implants with such a complication and revision rate

- No NJR
- No Beyond Compliance
Motec (Gibbon)

- Uncemented ball and socket
- 110 wrists
  - 63 cases > 5 years follow up
  - 82% projected survivorship at 10 years
- ROM 125 degrees
  - total flexion extension radial tilt ulnar tilt
- PRWE 25

Complications
- 33% total
- 9% Revision for loosening
- 4% fusion for infection/malposition
Wrist Arthritis

- Wrist replacement is “work in progress”
- Don’t forget neurectomy
- Use preserved cartilage
Wrist Denervation

• Hilton 1862
  • The nerve crossing a joint innervates that joint

• Wilhelm 1959
  • Wrist joint denervation
  • 5 incisions

• Berger 1998
  • Single incision AIN and PIN
Partial Wrist Denervation: The Evidence Behind a Small Fix for Big Problems

Michael T. Milone, MD,* Christopher S. Klifto, MD,+ Louis W. Catalano III, MD*

JHS (2018) 43:272-77

• No evidence that proprioception is damaged
• No need for pre-op injections
• Results
  • Satisfaction 70-90%
  • Good/excellent 70-90%
  • Survival 68-85% @ 2.6 years
Wrist Arthritis

- Wrist replacement is “work in progress”
- Don’t forget neurectomy
- Preserve cartilage
Your own cartilage and subchondral bone is better than metal and plastic.
Review article

*The treatment of wrist arthritis.*
Bone Joint J 97-B : 1303-1308
Is there preserved cartilage?
If there is preserved cartilage
*use it*
PRC or 4CF

• Equal clinical outcomes
  • 60% ROM
  • 80% grip strength
  • 80% survivorship 10 years

• PRC
  • easier
  • safer
  • cheaper

SNAC and SLAC is the capitate-lunate involved?

- No
  - PRC
  - 4CF
- Yes
  - 4CF

☞ Do not do
  - Replacement
  - Total fusion
A comparison of dart thrower’s range of motion following radioscapholunate fusion, four-corner fusion and proximal row carpectomy

Philippa A. Rust¹, Larissa M. Manojlovich² and Robert Wallace³

<table>
<thead>
<tr>
<th>Group</th>
<th>Control</th>
<th>RSL</th>
<th>4CF</th>
<th>PRC</th>
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<tr>
<td>Radial extension</td>
<td>43 (SD 4)</td>
<td>32 (SD 4)</td>
<td>23 (SD 4)</td>
<td>45 (SD 5)</td>
</tr>
<tr>
<td></td>
<td>* p &lt; 0.01*</td>
<td>* p &lt; 0.001*</td>
<td>* p &lt; 0.05*</td>
<td>* p &lt; 0.001*</td>
</tr>
<tr>
<td>Ulnar flexion</td>
<td>36 (SD 3)</td>
<td>28 (SD 2)</td>
<td>32 (SD 3)</td>
<td>33 (SD 2)</td>
</tr>
<tr>
<td></td>
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<td>* p &lt; 0.05*</td>
</tr>
<tr>
<td>OTM arc</td>
<td>61 (SD 3)</td>
<td>50 (SD 2)</td>
<td>55 (SD 2)</td>
<td>70 (SD 2)</td>
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<tr>
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- Distal Radius Fractures
- Metacarpal Fractures
Temper your enthusiasm to fix everything

- Surgery is dangerous
- Anatomy *does not* correlate with outcome
  - In the older patient
  - Low functional demands
- Anatomy *might* correlate *somewhat* with outcome
  - In younger patients
  - High functional demands
The relationship between displacement and clinical outcome after distal radius (Colles’) fracture

V. Finsen
Faculty of Medicine, Norwegian University of Science and Technology, and Department of Orthopaedic Surgery, St.Olav’s University Hospital, Trondheim, Norway

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Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway

H. Russwurm
Department of Orthopaedic Surgery, St.Olav’s University Hospital, Trondheim, Norway
Anatomy *may* make a difference in younger people


Grewal and McDermid (2007) *The Risk of Adverse Outcomes in Extra-Articular Distal Radius Fractures Is Increased With Malalignment in Patients of All Ages but Mitigated in Older Patients* J Hand Surg 32(a) 962-970
Over 60 to 65 years

*No difference for surgery vs non-op*


Volar Plate Fixation Versus Plaster Immobilization in Acceptably Reduced Extra-Articular Distal Radial Fractures

A Multicenter Randomized Controlled Trial

Marjolein A.M. Mulders, MD, PhD, Monique M.I. Walenkamp, MD, PhD, Susan van Dieren, PhD, J. Carel Goslings, MD, PhD, and Niels W.L. Schep, MD, PhD; on behalf of the VIPER Trial Collaborators*

Background: There is no consensus as to whether displaced extra-articular distal radial fractures should be treated operatively or nonoperatively. We compared the outcomes of open reduction and volar plate fixation with closed reduction and plaster immobilization in adults with an acceptably reduced extra-articular distal radial fracture.

Methods: In this multicenter randomized controlled trial, patients 18 to 75 years old with an acceptably reduced extra-articular distal radial fracture were randomly assigned to open reduction and volar plate fixation or plaster immobilization. The primary outcome was function as measured with the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire after 12 months. Follow-up was conducted at 1, 3, and 6 weeks and at 3, 6, and 12 months. Analyses were performed according to the intention-to-treat principle.

Results: Ninety-two patients were randomized, 48 to open reduction and volar plate fixation and 44 to plaster immobilization; 1 patient in each group was excluded for withdrawing informed consent. At all follow-up time points, operatively treated patients had significantly better functional outcomes, as indicated by significantly lower DASH scores, than patients treated nonoperatively (all p values < 0.05). Twelve nonoperatively managed patients (28%) had fracture re-displacement within 6 weeks and underwent subsequent open reduction and internal fixation, and 8 patients (14%) had a symptomatic malunion treated with corrective osteotomy.

Conclusions: Patients with an acceptably reduced extra-articular distal radial fracture treated with open reduction and volar plate fixation have better functional outcomes after 12 months compared with nonoperatively managed patients. Additionally, 42% of nonoperatively managed patients had a subsequent surgical procedure. Open reduction and volar plate fixation should be considered for patients who experience this common injury.

Level of Evidence: Therapeutic Level I. See Instructions for Authors for a complete description of levels of evidence.

Risks of k wires

26-28% risk of complication!!


Complications following volar locking plate fixation for distal radial fractures: a systematic review

A. Bentohami¹, K. de Burlet¹, N. de Korte¹, M. P. J. van den Bekerom², J. C. Goslings³ and N. W. L. Schep³

Abstract
The purpose of this systematic review is to assess the prevalence of complications following volar locking plate fixation of distal radial fractures. A computer-based search was carried out using EMBASE and PUBMED/MEDLINE. Only prospective comparative and prospective cohort studies that presented data concerning complications after treatment of distal radial fractures with a volar locking plate in human adults with a minimal follow-up of 6 months were included. Two quality assessment tools were used to assess the methodological quality of the studies (level of evidence rating according to the Oxford Centre of Evidence Based Medicine and the modified version of the Cochrane Bone, Joint and Muscle Trauma Group’s former quality assessment tool).

Thirty three studies were eligible for final assessment. Most complications were problems with nerve and tendon function as well as complex regional pain syndrome. With an overall complication rate of 16.5%, most of which were ‘minor’ complications and low rates of nonunion and malunion, volar locking plate fixation can be considered a reasonably safe treatment option for patients with distal radial fractures.

complication rate 16%, 8% material
So, should we fix distal radius fractures?

- Earlier restoration of function
  - Avoid POP
  - Early movement
- Restoration of rotation
  - Dorsal angulation
- Improved strength
  - Midcarpal malalignment
- Ulno-carpal abutment
  - Positive ulnar variance

But to avoid OA
No evidence…….
How many of these.....
End up with these…?
Very unlikely!

- Haus BM, Jupiter JB 2009 Intra-articular fractures of the distal end of the radius in young adults: reexamined as evidence based and outcomes medicine JBJS(Am) 2009;91A:2984-91
- Warwick et al 1993 Function 10 years after Colles’ Fracture CORR 295:270-274
- Forward, Davis, Sithole 2008 Do young patient with malunited fractures of the distal radius inevitably develop symptomatic post-traumatic osteoarthritis? JBJS 90B:629-637
Why is the risk lower?

- Concave surfaces
  - tolerate incongruity
- Non-weight bearing
  - Less load
  - Less impact
- Discrepancy usual in the hand
  - OA vs Symptoms
    - Thumb base
    - Heberdon’s nodes
    - Radioscaphoid
Plates or wires?
Methods

- 461 patients
- Randomised
  - K wire vs VP
- Outcomes at 3, 1, 12 months
  - PRWE
  - QuickDASH
  - Pain
  - Complications

Outcome

- No difference

Criticisms

- 4600 eligible patients, 461 entered
- Excluded fractures which cannot be reduced closed!
- Skill of surgeon
  - 2/3 by non consultants
  - 13 % surgeons done less than 10 VPs
  - 13 % surgeons done less than 20 VPs
- Radiology better for VP
- DASH better (not MID)
Earlier return to function with VLP over K wire


• Function
  • Substantially improved function at 6 weeks
  • evaporated by 3 months
EDITORIAL

Cost-effectiveness studies
WHO IS THE KEY STAKEHOLDER?

Montgomery vs Lanarkshire
Health Board 2015 UKSC11

Clavicle
Scaphoid
Distal Radius
• Vitamin C
  • No evidence it prevents CRPS
• Radiological parameters
  • Insufficient evidence to correlate with patient rated outcome
• Immobilisation
  • In neutral not flexed
  • 4 weeks not 6
• Check Xrays
  • At 2 to 3 weeks
  • If unstable
  • If a change in position would prompt surgery
  • No need at time of POP removal
• Over 65 years
  • Evidence that surgery does not improve PROMs
• Which operation
  • ORIF not superior to K-wires at 1 year (level1+)
    • Only applies to reducible fractures
    • Function at 6 weeks
  • No need to fix the ulnar styloid
  • Use ORIF rather then ExFix (level 1++)
Fractures (non-complex): assessment and management

Surgery within

- 72 hours-intra-articular fractures
- 1 week extra-articular fractures
- 72 hours- re-displaced fractures

If surgery needed

- Offer k-wires
  - No intra-articular displacement
  - Closed reduction possible
- Offer ORIF
  If not
- Dupuytren’s Disease
- Flexor Tendon Repair
- Scapholunate injuries
- Wrist Arthritis
- Distal Radius Fractures
- Metacarpal Fractures
Non-operative

- Immediate mobilisation
  - No splint
- Manipulation does not work
  - JHS AM 2015:40:1582-85
Non-operative for 5th MC neck

- 78 patients
  - Plaster and follow up
    - RTW 5 weeks
  - Neighbour strap, info sheet and discharge
    - RTW 2.7 week
    - Higher satisfaction
    - Equivalent DASH

• **Patients**
  - Non randomised
  - 18 locking plates vs 20 IM wires

• **Outcomes**
  - Flexion 59% plate vs 98% wires
  - Extension 89% plate vs 99% wires
Intramedullary wires

- Recommended for neck fractures
- Percutaneous
- Stable
- Avoid impingement
  - Collateral ligaments
  - 1st and 4th Dorsal interosseous
WRIST & HAND

Single versus dual Kirschner wires for closed reduction and intramedullary nailing of displaced fractures of the fifth metacarpal neck (1-2 KiWi): a randomized controlled trial

- N=151
- No difference in QuickDASH
- Trend in single wire
  - Shortening
  - Rotation
Indications

Metacarpal neck

• index and middle
  ▪ 10-15
  ▪ Fixed CMCJ

• ring
  ▪ 30-40

• little
  ▪ 50-60
  ▪ Mobile CMCJ
  ▪ Hyperextensile MCPJ

Little finger

• Almost always leave alone
• If surgery: Intramedullary wires
• never transverse wires or plate
Dupuytren’s Disease
Flexor Tendon Repair
Scapholunate injuries
Wrist Arthritis
Distal Radius Fractures
Metacarpal Fractures
Oxford Specialist Handbook
HAND SURGERY
Second Edition

Edited by
David Warwick
Roderick Dunn

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• A greater focus on hand therapy and alternatives to hand surgery, reflecting the multidisciplinary nature of the field

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