

University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Stiff DRUJ & Wrist

Prof David Warwick

11th Southampton Hand Course
for Therapists and Surgeons
September 2016



www.handsurgery.co.uk

UNIVERSITY OF Southampton School of Medicine University Hospital Southampton NHS Foundation Trust

University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Summary

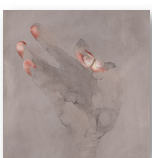
- DRUJ
- Wrist



University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Main Messages

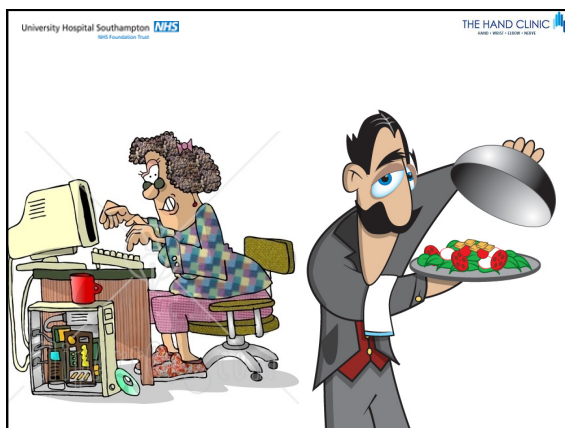
- DRUJ**
 - Lost rotation is disabling
 - Correct bone causes
 - Release soft tissue
- Wrist**
 - a stiff wrist does not always need treatment
 - select procedure precisely according to the affected joint
 - Wrist replacements are experimental
 - Own cartilage better than plastic and metal



University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Summary

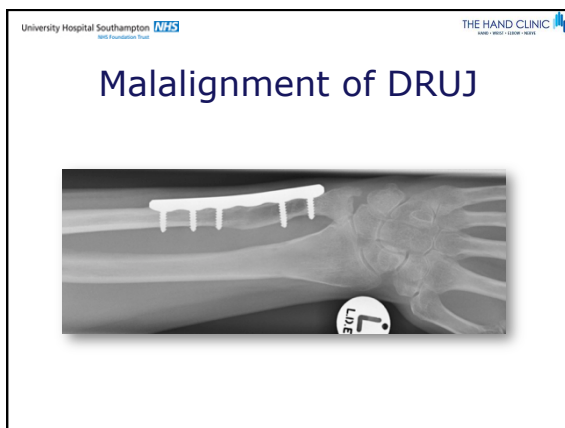
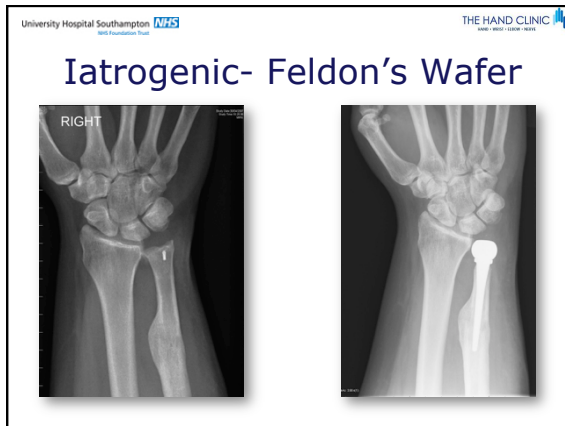
- DRUJ
- Wrist

University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Why does the DRUJ get painful or stiff?

- Incongruity**
 - Distal Radius malunion
 - Ulnar neck malunion
 - Instability of DRUJ
 - Intra-articular fracture
 - Ulnar head
 - Sigmoid notch
 - Synostosis
- Rheumatoid and similar**
 - Primary OA
 - rare
 - Post-infective OA
 - Capsular contracture



- University Hospital Southampton NHS Foundation Trust THE HAND CLINIC
- ### DRUJ Pathology
- #### Symptoms
- Stiffness on rotation
 - Pain on rotation
 - Pain and weakness on grip
 - Clunking (if unstable)
 - Tendon Rupture
 - Vaughan Jackson Syndrome

University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Vaughan Jackson

- OA DRUJ
- Tendon rupture
 - EDM
 - EDC


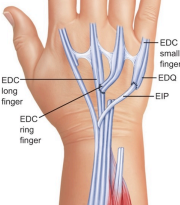

- University Hospital Southampton NHS Foundation Trust THE HAND CLINIC
- ### Treatment
- Stiff and painful wrist
- Non-operative
 - Adapt, cope, accept
 - Hand Therapy
 - splint, movements
 - Painkillers
 - Cortisone injection
 - Surgery
-

University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Treatment

Vaughan Jackson

- Excise ulnar head
 - ? Darrachs
 - ? Replace head
- Reconstruct tendons
 - Tendon transfer
 - Tendon Graft




EDC small finger
EDC long finger
EDC ring finger
EIP

University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Surgery


- Correct bone malalignment
- Correct incongruity
- Release contracture



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

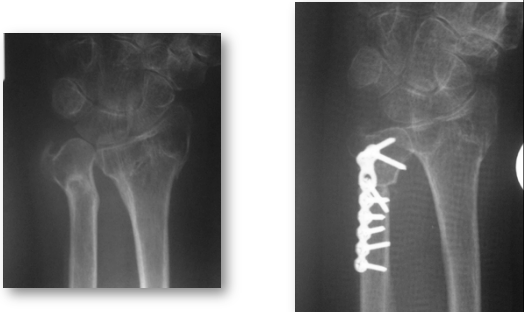
Surgery

- Correct bone malalignment
- Correct incongruity
- Release contracture



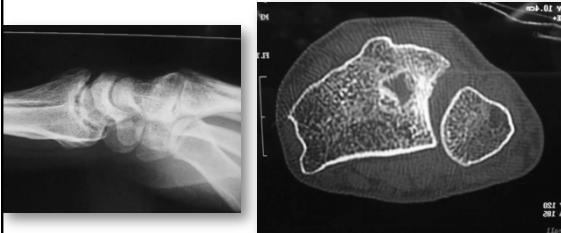
University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Ulnar Head malunion



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Distal Radius Malunion




University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Surgery


- Correct bone malalignment
- Correct incongruity
- Release contracture



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Philosophy


- Ulnar head deletion first
 - Replacement if it fails
- Primary ulnar head replacement
 - Remove if it fails



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

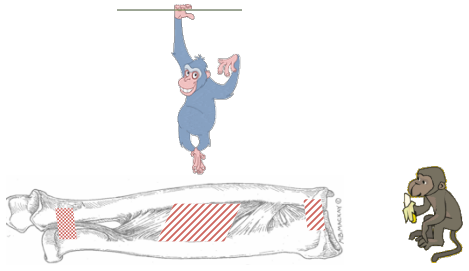
Ulna Head Deletion

- Various procedures
 - Darrach's
 - Bower's
 - Watson's
 - Baldwin's
 - Sauve-Kapandji




University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

The radius hangs from the ulna



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC

Injury to one part disrupts another part



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC



decapitation is not nice



University Hospital Southampton **NHS** Foundation Trust THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Darrach's

- Particularly poor results in trauma, OA and younger patients
 - Field J et al. JBJS Br 75:53-57 1993.
Poor results of Darrach's procedure after wrist injuries
 - Bieber EJ et al. J Hand Surg(Am) 1988 13:193-200
Failed distal ulna resections
 - Bell MJ et al JBJS 67B: 126-129 1985
Ulnar impingement syndrome
 - Fraser KE et al et al JHS 24B: 667-690 1999
Comparative results of resection of the distal ulna in rheumatoid a post-traumatic conditions

University Hospital Southampton **NHS** Foundation Trust THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Ulnar head replacement

University Hospital Southampton **NHS** Foundation Trust THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

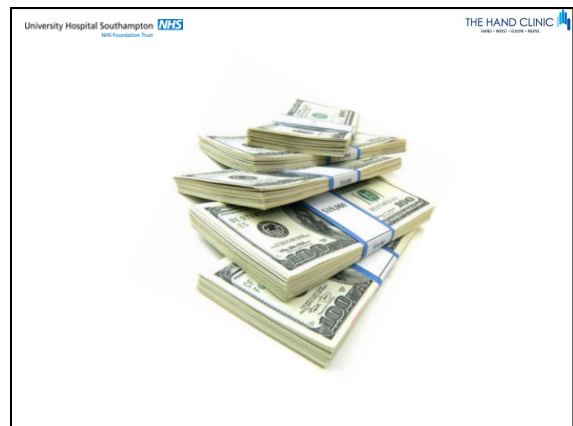
Silicone Ulnar head

Withdrawn 1993

University Hospital Southampton **NHS** Foundation Trust THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Anatomical Designs

- Restore normal forearm kinematics
 - Gordon et al 2003 J Hand Surg (Br);28:551-8
 - Berger and Cooney 2005 Hand Clinic;21:603-20
 - Masaoka et al 2002 JHS(Am) 27A:845-853



RCS
ADVANCING SURGICAL STANDARDS

ORIGINAL RESEARCH

Ann R Coll Surg Engl 2013; 95: [pages]
doi:10.1308/003588413X13629960048235

Ulnar head replacement: indications and early to mid-term results

D Warwick¹, G Shyamalan², E Balabanidou²

¹University Hospital Southampton NHS Foundation Trust, UK
²Princess Alexandra Hospital NHS Trust, UK

ABSTRACT

INTRODUCTION: The aim of this study was to explore the indications and show the early to mid-term results of ulnar head replacement for the treatment of pathological conditions of the distal radioulnar joint.

METHODS: Our study group comprised 52 patients with a mean age of 64 years who had 56 ulnar head replacements. Seven were implanted to salvage an unstable deltoid procedure; the rest were for primary treatment of osteoarthritis, rheumatoid arthritis and trauma. Concomitant procedures along with the ulnar head replacement included wrist arthrodesis, joint replacement and tendon transfers.


RESULTS: The follow-up duration ranged from 1 year to 11 years (mean: 60 months, median: 60 months). In almost all of the patients, pain improved with a median visual analogue scale score of 2 (mean: 2.2, range: 0-8) and a median DASH (Disabilities of the Arm, Shoulder and Hand) score of 12.5 (mean: 17.9, range: 0-56). Of the 52 patients, 47 reported they would have the same procedure again.

CONCLUSIONS: Ulnar head replacement appears to be a reliable and effective procedure solving several pathological problems of the distal radioulnar joint. We present a large patient group with a short to medium-term follow-up duration.

University Hospital Southampton **NHS** THE HAND CLINIC

Results are good and durable

Results Herbert Head



Van Schoonhoven et al 2000 J Hand Surg (Am) 25:438-46
Salvage of failed resection arthroplasties of the distal radioulnar joint using a new ulnar head prosthesis

- N=23
- Average FU 27 months
- 1 removal- low grade infection
- 22 Stable and pain much improved

Results

Cefalo et al JHS (Br) 2005, 30B S1:66-67 (Abstract)

- N=42
- Indications
 - 3 failed resection
 - 39 primary disease
- Follow-up 46 months
 - Pain, grip, rotation all improved
 - 1 unstable

Mayo- Avanta

Willis AA, Berger RA, Cooney WP 3rd (2007) Arthroplasty of the distal radioulnar joint using a new ulnar head endoprosthesis (preliminary report) Hand Surg (Am) 2007:177-89

- N=19, FU 2 years
- OA or convergence instability
- 50% decrease pain score
- 3X improvement function score
- Grip increased 16%

ORIGINAL RESEARCH

Ulnar head replacement: indications and early to mid-term results

D Warwick G Shyamalan E Balabanidou
University Hospital Southampton NHS Foundation Trust, UK
Princess Alexandra Hospital NHS Trust, UK


THE HAND CLINIC

PROMS

Patient related outcome measures


- Outcomes**
 - Pain 2.2 (0 to 8)
 - DASH 18 (0 to 56)
- “Would you have the procedure again?”**

47	yes
2	No

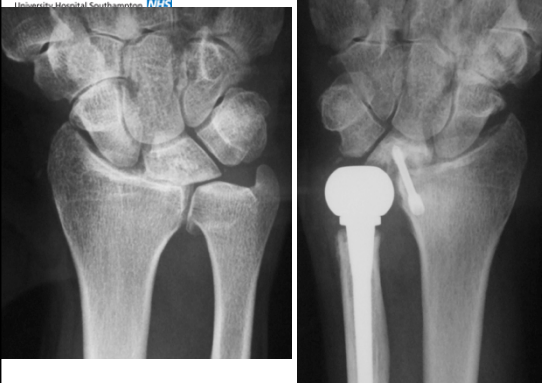


University Hospital Southampton **NHS** THE HAND CLINIC

Ulnar Head malunion



University Hospital Southampton **NHS**



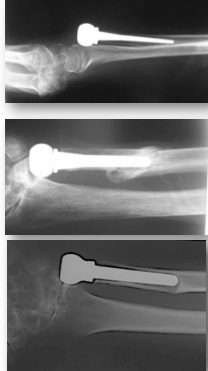
University Hospital Southampton **NHS** THE HAND CLINIC



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Complications

- **Complications**
 - delayed tendon rupture
 - tendon transfers
 - infected loosening
 - two stage revision
 - aseptic loosening
 - impaction grafting
 - one peri-prosthetic fracture
 - non-surgically
 - Painless instability
 - non-surgically



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Later erosion

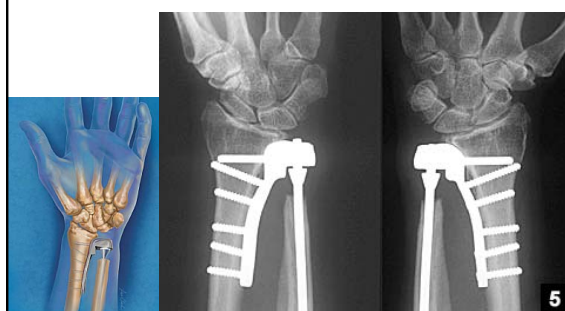
- 5 cases
- 0 patient had symptomatic erosion of the sigmoid notch



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Total DRUJ replacement

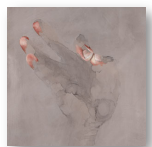
Scheker



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

Surgery

- Correct bone malalignment
- Correct incongruity
- Release contracture



University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

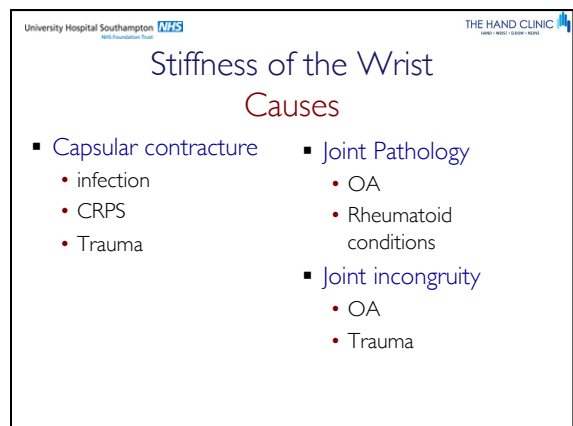
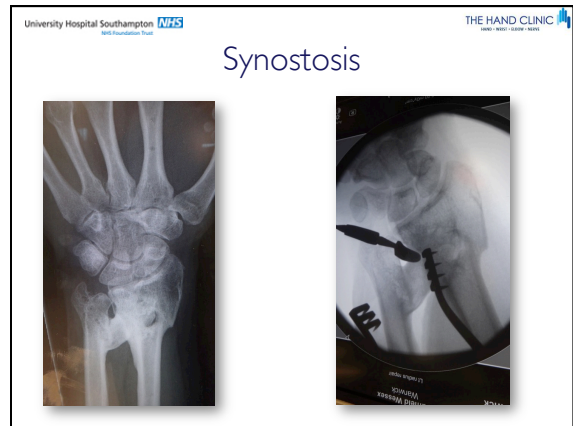
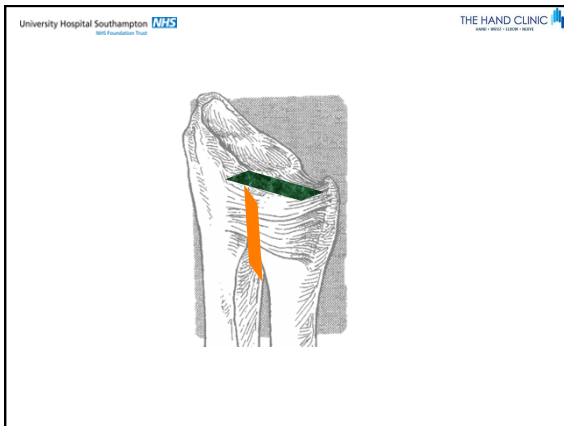
Capsular contracture

- Anterior capsule contracts
 - Loss of supination

University Hospital Southampton **NHS** FOUNDATION TRUST THE HAND CLINIC
HAND • WRIST • ELBOW • NECK

DRUJ Capsulectomy

- Kleinman WB, Graham T.(1998) The distal radioulnar joint capsule: clinical anatomy and role in posttraumatic limitation of forearm J Hand Surg; 23(A): 588-998
- Dissected 8 cadavers
 - DRUJ capsule is a distinct entity
- 9 Patients
 - DRUJ capsulectomy improves rotation



University Hospital Southampton **NHS** THE HAND CLINIC

Management Questions to consider

- is there pain or not?
- How much movement is needed
- What is the pathology

University Hospital Southampton **NHS** THE HAND CLINIC

Wrist Function

- Good wrist function needs
 - Miminal pain
 - Some movement
- Flexion
 - Personal care
 - Intricate work
- Extension
 - Power grip
 - Opening



University Hospital Southampton **NHS** THE HAND CLINIC

Wrist function

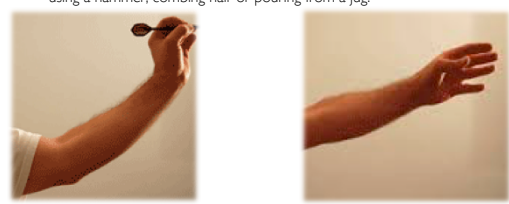
- Range required
 - Literature varies
- Useful range
 - 20 degrees flexion
 - 30 degrees extension

Palmer AK, Werner FW, Murphy D, Glisson R. 1995
 Functional wrist motion: a biomechanical study.
J Hand Surg 1995;10A:39-46.

University Hospital Southampton **NHS** THE HAND CLINIC

Dart Thrower's Motion (DTM)

- oblique plane of movement
 - radial deviation with extension to ulnar deviation with flexion.
 - using a hammer, combing hair or pouring from a jug.



Palmer AK (1985) Functional wrist motion: a biomechanical study. *J Hand Surg Am*;10:39-46.
 Moritomo H, et al. (2007) IFSSH committee report of wrist biomechanics committee: biomechanics of the so-called dart-throwing motion of the wrist. *J Hand Surg Am*;32:1447-1453.
 Brigstocke GH, et al (2014). In-vivo confirmation of the use of the dart thrower's motion during activities of daily living. *J Hand Surg Eur*. 39:373-378.

University Hospital Southampton **NHS** THE HAND CLINIC

So
 stiff wrists do not always need treatment

Only if there is

- Pain
- Functional impairment

The Bone & Joint Journal
 Formerly known as JBJS (Br)

SPECIALTY UPDATE
The treatment of arthritis of the wrist

J. S. Logan,
 D. Warwick

From: University Hospital Southampton, Southampton, United Kingdom

Arthritis of the wrist is a painful disabling condition that has various causes and presentations. The traditional treatment has been a total wrist fusion at a price of the elimination of movement. However, forms of treatment which allow the preservation of movement are now preferred. Modern arthroplasties of the wrist are still not sufficiently robust to meet the demands of many patients, nor do they restore normal kinematics of the wrist. A preferable compromise may be selective excision and partial fusion of the wrist using knowledge of the aetiology and pattern of degenerative change to identify which joints can be sacrificed and which can be preserved. This article provides an overview of the treatment options available for patients with arthritis of the wrist and an algorithm for selecting an appropriate surgical strategy.

Cite this article: *Bone Joint J* 2015;97-B:1303-8.

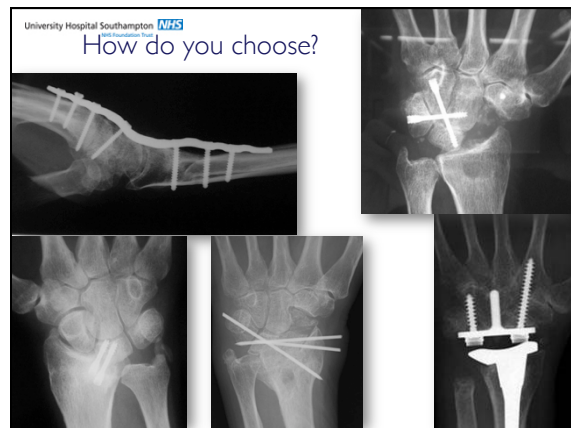


Motion preserving operations

- Radial styloidectomy
- Neurectomy
- Scaphoid excision with 4 corner fusion
- Capitate lunate fusion
- Proximal row carpectomy
- Radio-lunate fusion
- Radio-scapho-lunate fusion
- Wrist replacement

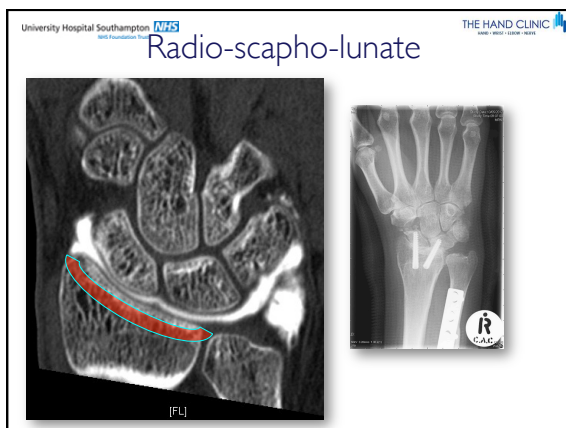
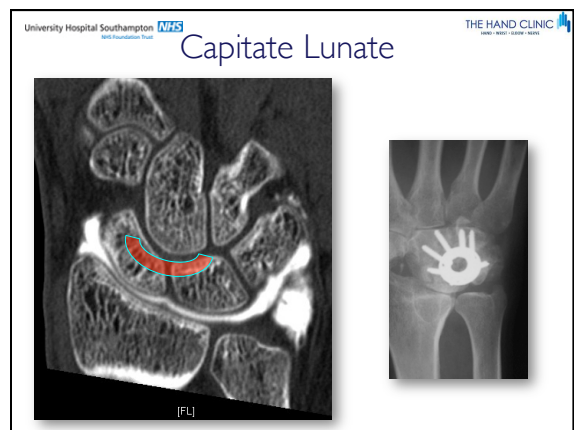
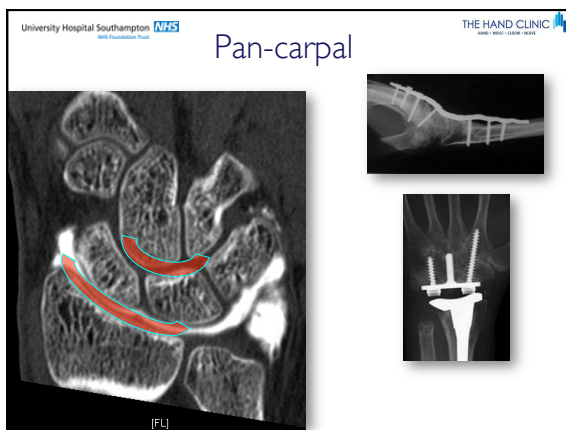
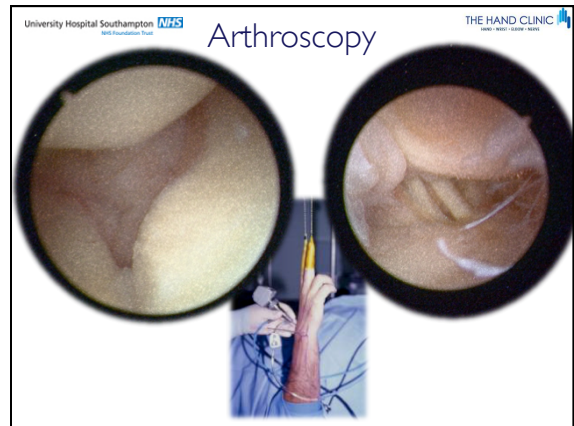
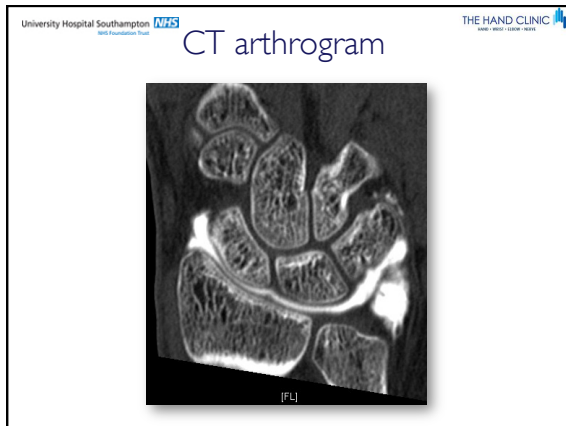
	Flex	Ext	UD	RD	DTM	Ref
Normal	75	70	35	20	Y	Field,[[22]] Ryu,[[4]] Hayden[[23]]
Functional	5	30	15	10	Y	Lautenbach,[[24]] Palmer[[3]]
TWA	29	81	22	6	N	Weiss,[[25]] Boeckstyns[[12]]
RSL	45	78	61	27	Y	Bain[[31]]
4CF	45	31	21	14	N	{Vanhove:2008iv}
PRC	39	40	21	15	Y	{Vanhove:2008iv}

• TWA total wrist arthroplasty; RSL radio-scapho-lunate-fusion with distal scaphoid and triquetrum excision, 4CF, scaphoid excision and four corner fusion; PRC, proximal row carpectomy; UD, ulnar deviation; RD, radial deviation; DTM, dart throwers' movement; Flex, flexion; Ext, extension




- Plain xray
- CT arthrogram
- Wrist arthroscopy






University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

SNAC and SLAC is the capitate-lunate involved?




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

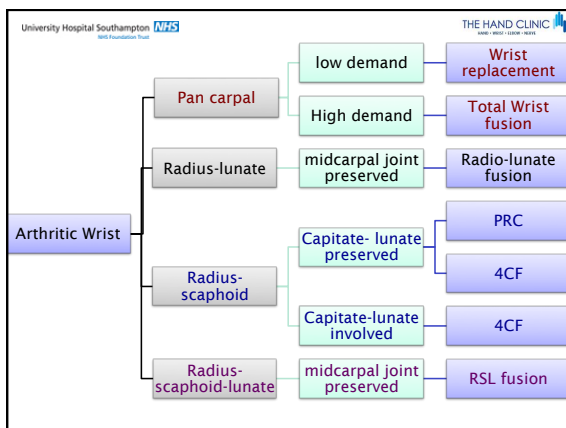


University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

PRC vs 4CF



- Equal clinical outcomes
- PRC
 - easier
 - safer
 - cheaper

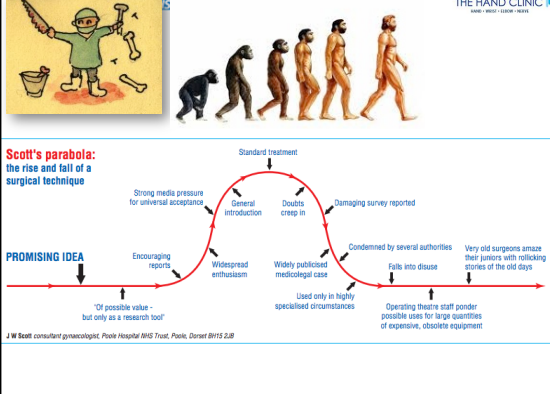


University Hospital Southampton NHS Foundation Trust THE HAND CLINIC

Wrist replacements are experimental

- Good for pain
- Movement is no better than before surgery
- They are bound to fail one day
- Revision is not easy

University Hospital Southampton NHS Foundation Trust THE HAND CLINIC



Scott's parabola: the rise and fall of a surgical technique

PROMISING IDEA → Encouraging reports → Widespread enthusiasm → Widely publicised medicolegal case → Used only in highly specialised circumstances → Falls into disuse → Very old surgeons amaze their juniors with rollicking stories of the old days

Standard treatment

Strong media pressure for universal acceptance → General introduction → Ductile creep in → Damaging survey reported → Condemned by several authorities → Operating theatre staff ponder possible uses for large quantities of expensive, obsolete equipment

"Of possible value - but only as a research tool"

J W Beatt consultant gynaecologist, Poole Hospital NHS Trust, Poole, Dorset BH15 2JB

Systematic review of TWA

Cavaliere CM and Chung KC. A systematic review of TWA compared with total wrist arthrodesis for rheumatoid arthritis. *Plast Reconstr Surg* 2008; 122(8):3-825

- 91% no or mild pain
- Flexion 17-44 degrees
- Extension 10-40 degrees
- 0-100% complications
- 91% satisfied

NB Short follow up
Rheumatoid
low demand
other pathology?

Norwegian Registry


rubinag et al 2011 Results of 189 wrist replacements. A report from the Norwegian Arthroplasty Register. *Acta Orthop* 2011;82(4):405-9

Patients and procedures

- 1994-2009
- 189 primary wrist replacements
- Bax, Elos, Gibbon

Survival


- 5-year 78% (95% CI: 70-85)
- 10-year 71% (CI: 59-80)



Universal 2 in RhA

Ward C, Saji T, Adams B (2011) Five to ten year outcomes of the Universal total wrist arthroplasty in patients with rheumatoid arthritis. *J Bone Joint Surg Am* 18(5):414-6

- N=19 RhA patients
- Mean 7.3 years (range 3.0 to 10.8 years)
- Outcomes
 - DASH 62 points preop, 40 points at latest follow-up
 - mean improvement in the total flexion-extension arc of 14°
 - 9 (53%) revised (loose carpal component)
 - 1 wrist arthrodesis for instability
 - 2 further loose carpal component subsidence
- Survivorship
 - 5 years 73%
 - 7 years 60%



Yeoh D, Tourret L (2015) Total wrist arthroplasty: A systematic review of the evidence from the last five years. J Hand Surg Eur 40:458-468

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

The evidence does not support the widespread use of arthroplasty instead of arthrodesis

PROMS and Complications Universal 2™ Wrist Replacement

Stephen Ali¹ David Warwick²

¹Wrist Team Medical Consultant, University of Southampton, Southampton, ²Consultant Hand Surgeon, University Hospital, Southampton

BSSH Harrogate April 2013

Southampton THE HAND CLINIC

Universal 2

Ferrera A, Litch A, Che Ngait (2013) Universal wrist wrist arthroplasty system. Follow up study J Hand Surg Am. 36:567-73.

- N=21, 2001 to 2007.
- 14 RA
- 2 Trauma, 1 OA, 1 contracture
- 5.5 years (range, 3-8 years)
- PRWE 24 (SD 21)
- 20 satisfied or very satisfied
- 2 early and 3 late complications
- wound hematomas, superficial wound infection
- some distal radius around the screw inserted into the medullary canal of the index metacarpal, but not in the trapezoid bone
- 1 slight loosening of the distal component with subsidence on the ulnar side of the carpus
- no abrasions or vascular lesions of the extensor tendons

Motec

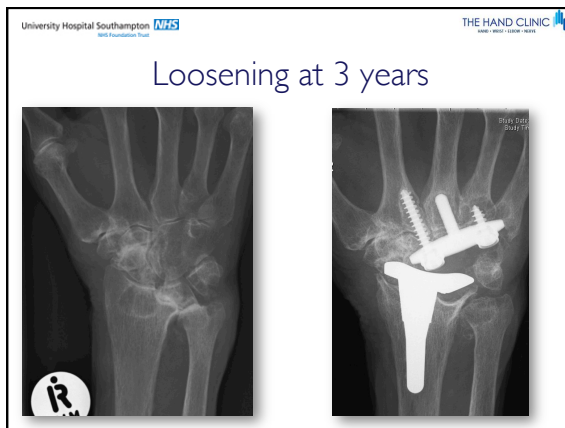
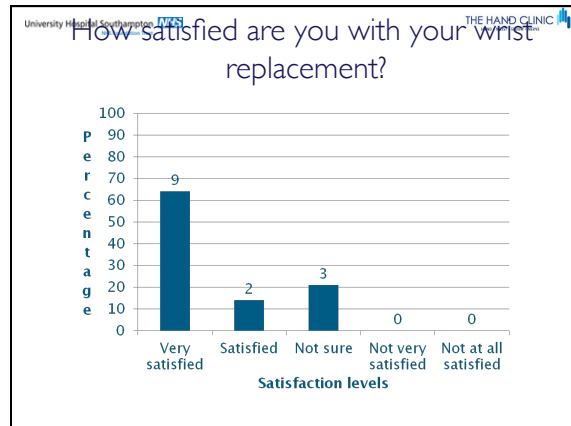
Wagstad et al. Promising one to six year results with the Motec wrist arthroplasty in patients with post-traumatic OA J Bone J Surg [Aug 2012] 94B: 1340-5

- N=16
- SNAC, SLAC, OA
- All would choose arthroplasty again
- FU 1.1 to 6.1 years
- Complications
 - 2 needed later
 - 1 needed 1 year
 - 4 needed revision of impinging bone

Maestro

Nydyck et al JHS(Am) 2012 N=23


- FU 4-55 months
- Complications
 - 4 Wrist contracture
 - Deep infection
 - Instability
 - Synovitis
- Pain improved 8 to 2.2
- DASH improved in 7/23 patients



My Philosophy

Own cartilage and subchondral bone must be better than metal and plastic

avoid wrist replacement if you can do a partial wrist fusion or PRC

- ### Main Messages
- DRUJ**
 - Lost rotation is disabling
 - Correct bone causes
 - Release soft tissue
 - Wrist**
 - a stiff wrist does not always need treatment
 - select procedure precisely according to the affected joint
 - Wrist replacements are experimental
 - Own cartilage better than plastic and metal
- 

Stiff DRUJ & Wrist

Prof David Warwick

11th Southampton Hand Course for Therapists and Surgeons

September 2016

www.handsurgery.co.uk



University of Southampton School of Medicine | University Hospital Southampton NHS Foundation Trust