

DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

AMERICAN SHOULDER AND ELBOW SURGEONS
ORTHOPAEDIC TRAUMA ASSOCIATION

SPECIALTY DAY
SAN DIEGO, MARCH 2017

Graham JW King MD, MSc, FRCS



Western



I (and/or my co-authors) have something to disclose.

Detailed disclosure information is available via:

"My Academy" app;



Printed Final Program; or

AAOS Orthopaedic Disclosure Program on the AAOS website at
<http://www.aaos.org/disclosure>

DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

- Get adequate imaging – understand what you are getting into!

63 YO WOMAN



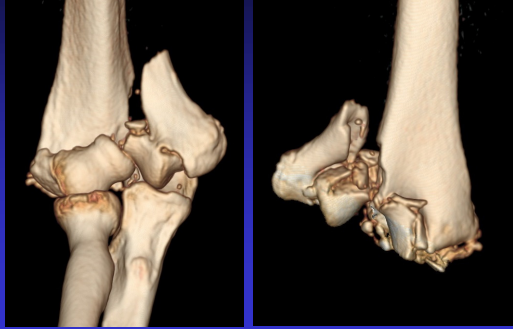
CT – FIXABLE OSTEOTOMY NOT NEEDED



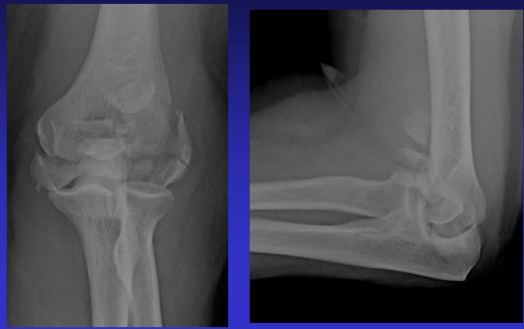
64 YO WOMAN FALL OF LADDER



CT – FIXABLE OSTEOTOMY NEEDED



74 YO WOMAN TRIPPED ON RUG



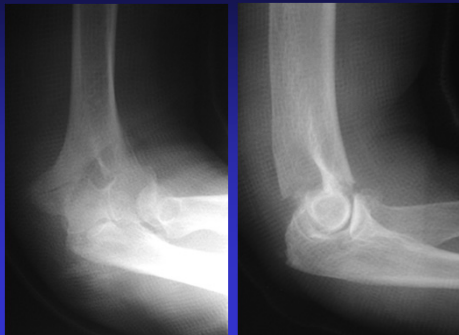
CT – NOT FIXABLE BAIL TO ARTHROPLASTY



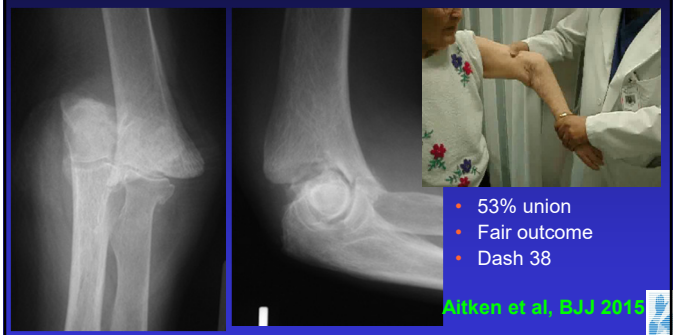
DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

- Get adequate imaging – understand what you are getting into!
- Consider non-operative treatment in select patients

90 Y/O WOMAN Hx CVA, COPD, DEMENTIA

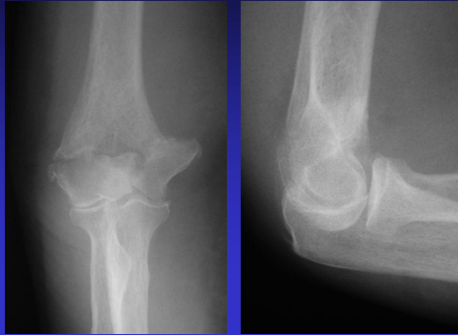


COLLAR & CUFF - NONUNION



- 53% union
- Fair outcome
- Dash 38

92 Y/O WOMAN Hx CVA, MI, COUMADIN



CASTED 8 WEEKS - HEALED



UNION ABOUT 80% WITH CAST

- Union more likely if column contact – Desloges (81%)
- Similar to report by Robinson - (83%)



Desloges et al, JSES 2015
Robinson et al, J Orthop Trauma. 2003

OUTCOMES SIMILAR IN ELDERLY REGARDLESS OF TREATMENT

Measures	TEA	ORIF	NON-OP
Mean flexion arc	101	100	107
Extension	25	20	22
Flexion	126	120	128
MEPS	90	88	90

- Data from Systematic review and Meta-analysis
 - Twenty-seven studies with 563 patients, > 60 years old
 - mean follow-up after TEA was 46 months
 - Mean follow-up after ORIF was 43 months

Desloges et al, JSES 2015
Githens et al, J Ortho Trauma 2013

COMPLICATIONS LESS WITH NONOPERATIVE TREATMENT

- Non-operative:
 - One patient cast pressure sore
 - One patient had a TEA for poor outcome
 - No ulnar neuropathy or infection
- Operative:



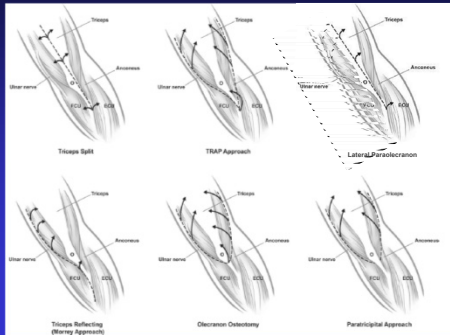
Complications	TEA	ORIF
Patients experiencing at least 1 complication	33.3% (CI 21.6-44.9%)	32.6% (CI 21.8-43.5%)
Total complications	37.6% (102)	34.2% (100)
Major	11% (30)	13.7% (40)
Minor	26.6% (72)	20.6% (60)

Desloges et al, JSES 2015 Githens et al. J Orthop Trauma. 2013

DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

- Get adequate imaging – understand what you are getting into!
- Consider non-operative treatment in select patients
- Correct surgical approach to address pathology

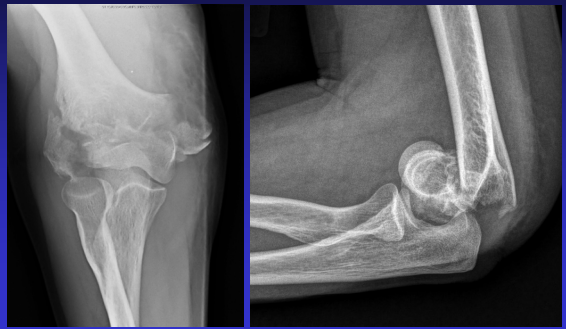
SURGICAL APPROACH KEY



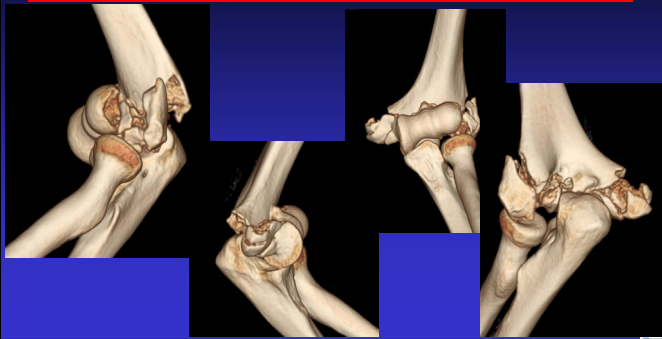
Naith et al.
JBJS 2011

Studer et al
JHS 2015

63 YO WOMAN



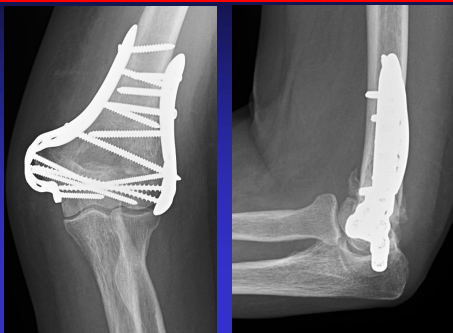
CT



PARATRICIPITAL APPROACH TYPE A AND SIMPLE TYPE C1



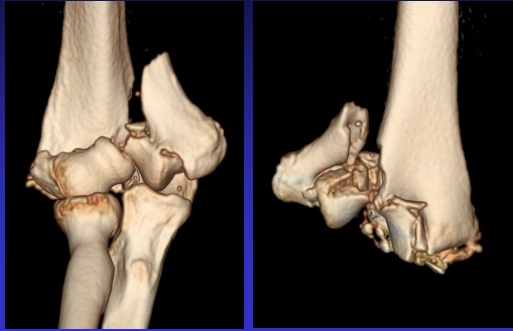
PARALLEL PLATES GOOD FUNCTIONAL OUTCOME



64 YO WOMAN FALL OF LADDER



CT



OLECRANON OSTEOTOMY COMMUNATED TYPE C

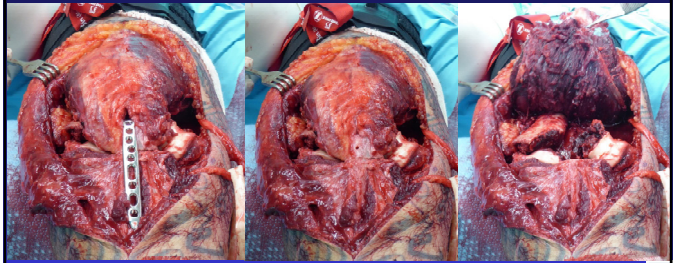
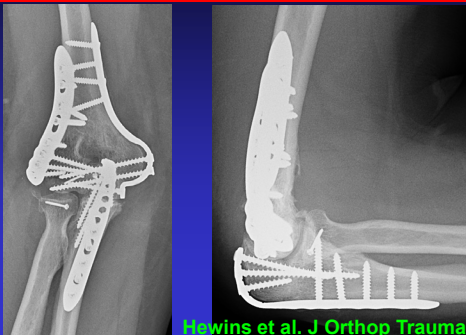


PLATE FIXATION OF OSTEOTOMY PREFERRED

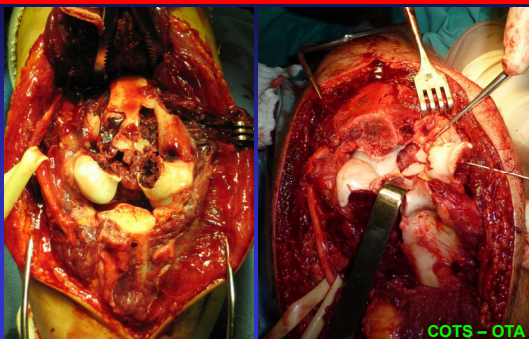


Hewins et al. J Orthop Trauma 2007

DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

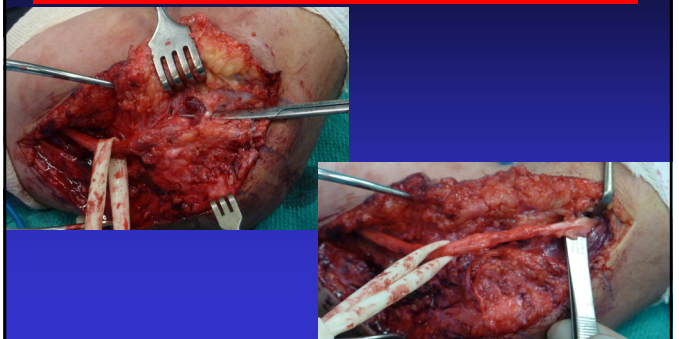
- Get adequate imaging – understand what you are getting into!
- Consider non-operative treatment in select patients
- Correct surgical approach to address pathology
- Transpose ulnar nerve

ULNAR NERVE - NO DIFFERENCE IN OUTCOME TRANSPOSITION OR IN-SITU RELEASE?



COTS - OTA 2016

NERVE SCARRING TO PLATE PROBLEMATIC WITH REVISION SURGERY – I MOVE IT!



DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

- Get adequate imaging – understand what you are getting into!
- Consider non-operative treatment in select patients
- Correct surgical approach to address pathology
- Transpose ulnar nerve
- Flexible approach to ORIF – ensure adequate fixation

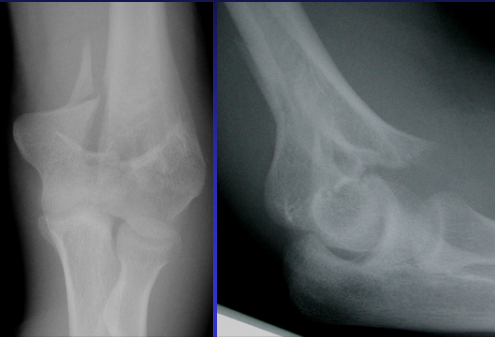


PRINCIPLES OF ORIF

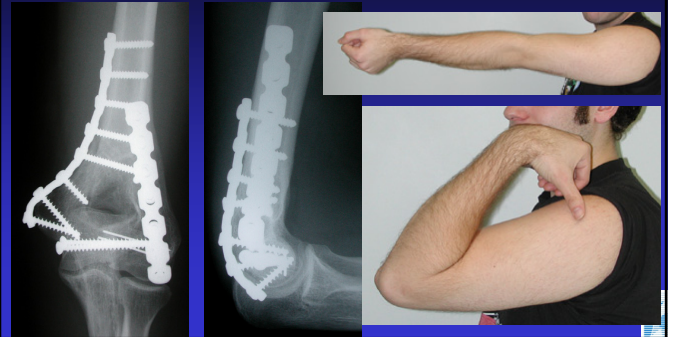
- Restore articular congruity
- Maximize fixation in distal fragments
 - At least three screws medially and laterally
 - Screws as long as possible
- Compress supracondylar component of fracture
- Robust plates if shaft extension



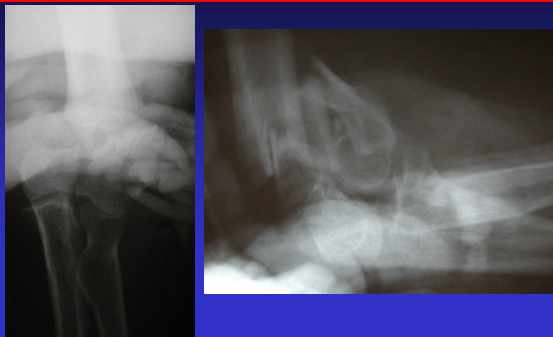
21 YO SNOWBOARDING



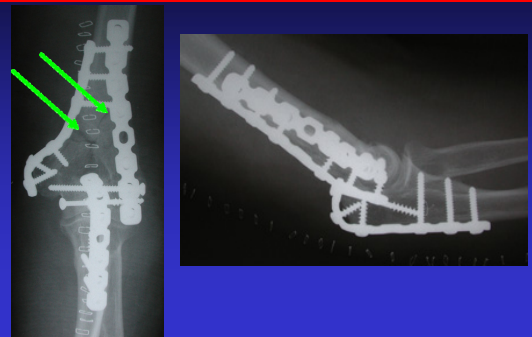
SPECIAL PLATES NOT NEEDED FOR SIMPLE FRACTURES WITH GOOD BONE



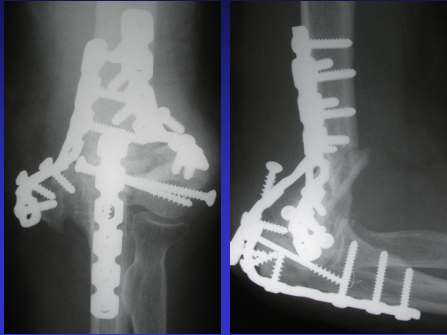
77 Y/O WOMAN



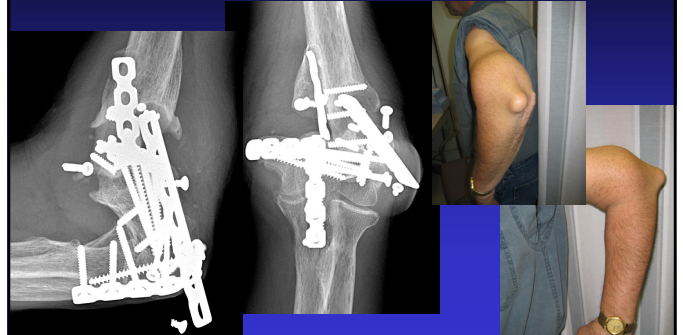
POST-OP ORIF PROXIMAL SUPRACONDYLAR



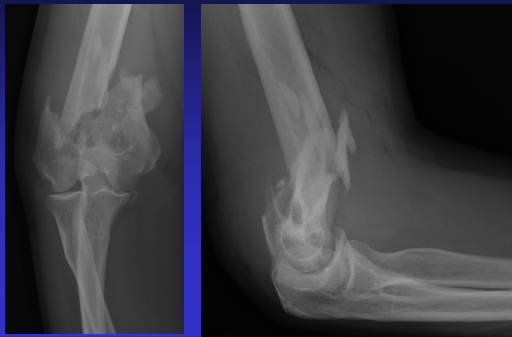
PLATES TOO WEAK – NEED THICKER PLATES FOR # ABOVE OLEC FOSSA



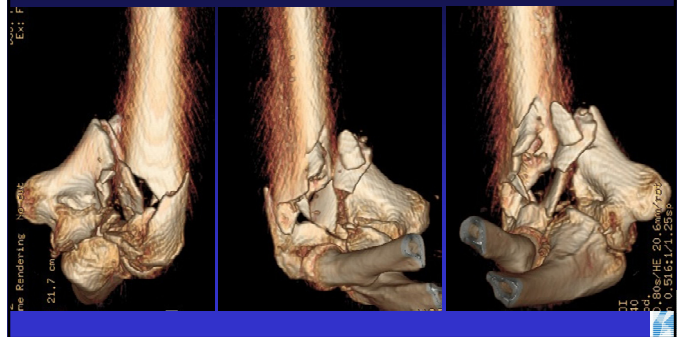
60 YEAR OLD MAN NOT MUCH DONE RIGHT!



75 YEAR OLD FARMER FALL OFF TRACTOR – OPEN #



HUMERUS SMASHED BUT HE'S A FARMER – AVOID TEA!



**PRECONTOURED PLATES SPEED SURGERY
SMALL PLATE HOLDS REDUCTION
ADD MORE PLATES IF NEEDED ? LOCKING ?**

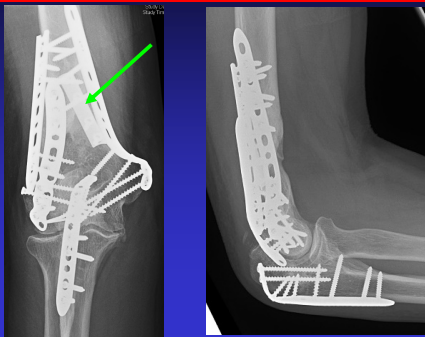


PLATE POSITION

- Parallel plates
 - Osteoporosis
 - Risk radial nerve and LCL injury
 - Lateral plate bothersome

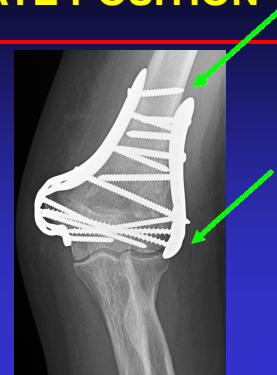


PLATE POSITION

- Parallel plates
 - Older patient
 - Risk radial nerve and LCL injury
 - Lateral plate bothersome
- Orthogonal plates
 - Younger patient
 - Coronal shear component



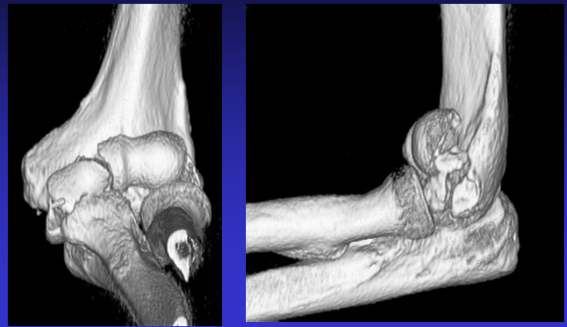
DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

- Get adequate imaging – understand what you are getting into!
- Consider non-operative treatment in select patients
- Correct surgical approach to address pathology
- Transpose ulnar nerve
- Flexible approach to ORIF – ensure adequate fixation
- Consider arthroplasty in older lower demand patients

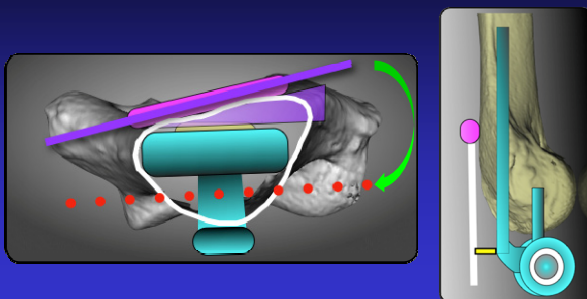
82 YO WOMAN CAPITELLUM-TROCHLEA



CT

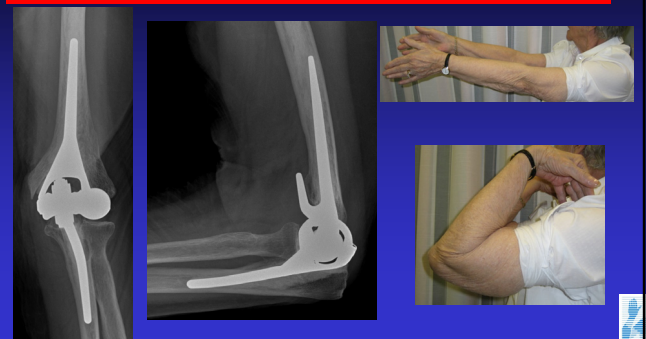


14 °INTERNAL ROTATION HC RELATIVE TO POSTERIOR FLAT SPOT



Sabo et al. JBJS 2012

FOUR YEARS POST LINKED TEA



TEA FOR DISTAL HUMERUS FRACTURES

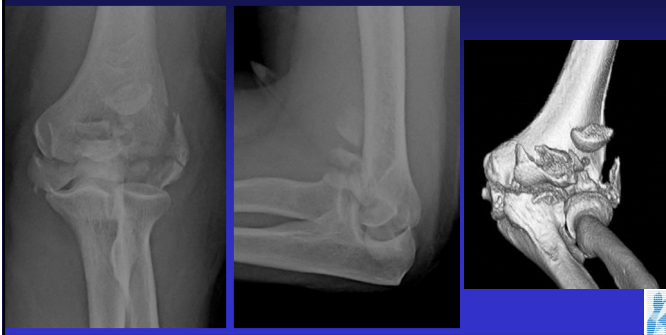
- More rapid return of function than ORIF
- Short-term outcome better than ORIF in elderly
- Complications less common but more severe than ORIF
- Loosening and wear concern at longer follow-up

Kaminen and Money, JBJS 2004; Lee et al, J Trauma 2006; Egol et al, Am J Orthop, 2011; Burkhart et al, Orthop Traumatol, 2010; Ali et al, JSES, 2010; Mansat et al, OTSR, 2013; Oberl et al, OTSR, 2013; Antuna et al, Acta Orthop Belg, 2012; McKee et al, JSES 2009

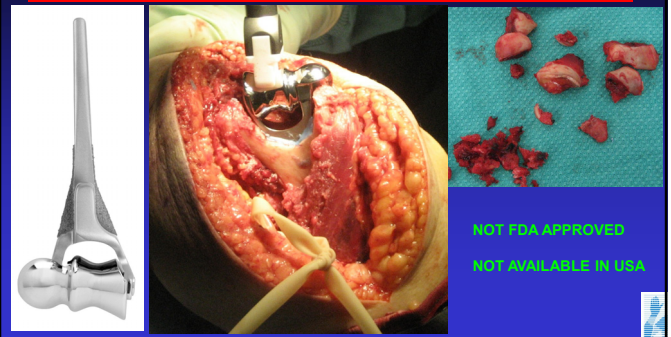
TEA FOR FRACTURE PEARLS

- Good patient selection
- Discard fractured condyles
- Efficient surgery to reduce infection
- 'Gentle' surgery to avoid fractures
- Immobilize elbow until skin heals

74 YO ACTIVE WOMAN TOO YOUNG FOR TEA?

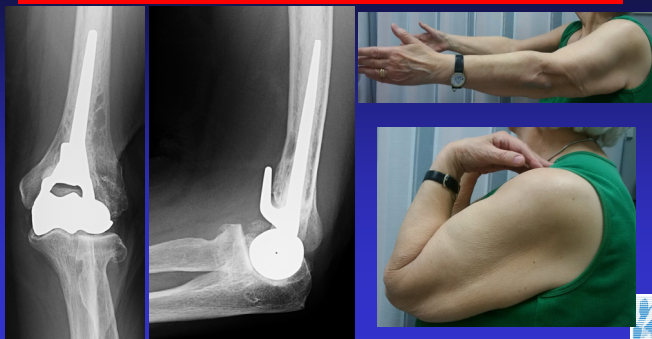


PARATRICIPITAL APPROACH HEMIARTHROPLASTY & LCL REPAIR



NOT FDA APPROVED
NOT AVAILABLE IN USA

TEN YEARS POSTOP NO PAIN MILD SUBSIDENCE & OA



HEMIARTHROPLASTY FOR DISTAL HUMERUS FRACTURES

- Insertion of humeral component straight forward
- Must reconstruct columns and/or collateral ligaments
- Elbow stability concern at short-term follow-up
- Ulnar wear concern at longer follow-up

Schulze et al, JSES 2017; Phadnis et al, ShEib 2016; Desai et al, JSES 2016; Nestorson et al, BJJ, 2016; Holzman et al, JSES 2014; Smith et al, JSES, 2013; Burkhart et al, J Trauma, 2011; Street et al, JBJS, 1974

DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

- Get adequate imaging – understand what you are getting into!
- Consider non-operative treatment in select patients
- Correct surgical approach to address pathology
- Transpose ulnar nerve
- Flexible approach to ORIF – ensure adequate fixation
- Consider arthroplasty in older lower demand patients



DISTAL HUMERUS FRACTURES WHAT I HAVE LEARNED

AMERICAN SHOULDER AND ELBOW SURGEONS
ORTHOPAEDIC TRAUMA ASSOCIATION

SPECIALTY DAY
SAN DIEGO, MARCH 2017

Graham JW King MD, MSc, FRCS



Western 

