Prevention and Treatment of Elbow Stiffness

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Elbow Stiffness

- Highly constrained joint
- Predisposed to stiffness
- Prevention is best treatment
- 3 articulations
  - Ulnar Collateral
  - Radial collateral
  - Annular ligament

Dr. Roy Meals M.D.
Elbow Stiffness

- Position hand in space
- Functional arc of motion
  - 30-130 f/e
  - 50/50 p/s
- May need more pronation with more keyboarding.
Risk Factors

- Fractures (20%)
- Dislocations (3%)
- Crush and Burns (related to severity)
- Head injury (5-10%)
  - 80% if HI and Elbow injury
- 2-incision biceps repair
- Elbow Arthroscopy
- Multiple surgeries 7-14 days after injury
- RA; OA; Congenital; Infection
ELBOW

Risk factors for development of heterotopic ossification of the elbow after fracture fixation

Geoffrey D. Abrams, MD*, Michael J. Bellino, MD, Emilie V. Cheung, MD

Department of Orthopedic Surgery, Stanford University, Stanford, CA, USA

- 159 patients
- Fu 185 days
- 86% with HO at two weeks had HO at final fu
- All pt with secondary resection had HO at 2 weeks
- 25% required resection
- Anterior HO was common, Correlated with resection of HO
Morrey Classification

- Intrinsic causes
  - Joint erosion
  - Joint incongruity
  - Loose bodies
  - Intra-articular adhesions
- Extrinsic causes
  - HO
  - Capsular contracture
  - Ligaments, Muscle
- Combination
Evaluation

- Complete H&P
  - Ulnar nerve function pre-op
  - End points of motion
  - Pain during motion (articular incongruity)
  - Pain at Rest (low grade infection)
  - Pain at ends of motion arc (HO or capsule)
- CT scans can be helpful for pre-op planning
  - Loose bodies, osteophytes, HO
  - MRI is usually not helpful
Prevention

- Prevention is best treatment
  - Aspiration, splinting in extension
- CPM
- Radiation
- NSAIDS
Non-operative Treatment

- Static Progressive Splinting
  - Change in length
- Dynamic Splinting
  - Constant tension
A Prospective Randomized Controlled Trial of Dynamic Versus Static Progressive Elbow Splinting for Posttraumatic Elbow Stiffness

Anneluuk L.C. Lindenhovius, MD, PhD, Job N. Doornberg, MD, PhD, Kim M. Brouwer, MSc, Jesse B. Jupiter, MD, Chaitanya S. Mudgal, MD, and David Ring, MD, PhD

Investigation performed at the Orthopaedic Hand and Upper Extremity Service, Department of Orthopaedic Surgery, Massachusetts General Hospital, Boston, Massachusetts

- 36 Patients
- Prospective
- Randomized Trail
- No difference
- 100 deg Arc
Radiotherapy for prevention of heterotopic ossification of the elbow: a systematic review of the literature

Avraam Ploumis, MD, PhD, Lazaros Belbasis, SMS, Evangelia Ntzani, MD, PhD, Periklis Tsekeris, MD, PhD, Theodoros Xenakis, MD, PhD

• 27 studies identified
• 1 Randomized Trail
• 25 Case series
• Average use 7 Gy
• Overall the evidence is week
Radiation Therapy for Heterotopic Ossification Prophylaxis Acutely After Elbow Trauma
A Prospective Randomized Study

By Nady Hamid, MD, Nomaan Ashraf, MD, Michael J. Bosse, MD, Patrick M. Connor, MD, James F. Kellam, MD, Stephen H. Sims, MD, Douglass E. Stull, MD, Kyle J. Jeray, MD, Robert A. Hymes, MD, and Timothy J. Lowe, PhD

Investigation performed at Carolinas Medical Center, Charlotte, North Carolina

• Randomized at 3 medical centers
• 7 Gy
• 38% non-union in study group
• 4% in Control
• No difference in HO
• Terminated the study early
17 patients

Treated in first two weeks improved motion

116 arc flexion < two weeks

91 arc flexion > two weeks
Surgical Treatment

- Failed non op treatment
- Non functional range of motion (30-130 arc)
- Bony block
- Pain relief
Surgical Release

- Articular Surface
- Fracture Reduction and Stability
- N/V Exam
- Soft tissue envelope
- Pre-operative motion under anesthesia
Surgical Release

• All receive regional block with catheter (3 days to 2 weeks)

• Post-operative authorization with therapy

• Oral Analgesic +/- NSAIDS
• 32 patients

• 16 with CPM within 24 hours

• All post traumatic elbows

• CPM 38 to 96 degrees

• NO-CPM 42 to 101 degrees
Surgical Treatment

- Open release
  - Lateral Approach
  - Medial Approach
  - Anterior
  - Posterior
- Arthroscopic
- Combination
Lack Flexion
- >100 degrees
  - pMCL + pCAP
- <100 degrees
  - pMCL + pCAP + CBTR/T

Lack Extension
- >100 degrees
  - Scope Column MOTT
  - pMCL + pCAP + CBTR/T + CBTR/T if CBTS
- <100 degrees
  - pMCL + pCAP + CBTR/T

Lack Flexion & Extension
- >100 degrees
  - Scope Column MOTT
- <100 degrees
  - pMCL + pCAP + CBTR/T

Heterotopic Ossification
- Column or MOTT or both
  - +/- CBTR/T
  - +/- pMCL
  - +/- Anterior approach
Lack of Flexion

- Posterior Band of MCL
- Ulnar nerve function
- Consider Ulnar nerve transposition
- Open vs Arthroscopic
- Two approaches
  - FCU splitting
  - Hotchkiss
  - Over-the-Top

Cleveland Clinic, 2009
• Release Posterior MCL

• Consider open release due to risk of ulnar nerve injury

• Can also release anterior and posterior Capsule
Lack of Extension

- Lateral Column procedure
- Good for exposure of anterior capsule, Coronoid osteophytes
- Also can access posterior capsule, Olecranon osteophytes
- Lateral UCL is preserved
The Column Procedure: A Limited Lateral Approach for Extrinsic Contracture of the Elbow

BY PIERRE MANSAT, M.D.†, AND B. F. MORREY, M.D.‡, ROCHESTER, MINNESOTA

Investigation performed at the Mayo Clinic, Rochester
Arthroscopy

- Best for limited contractors
- No Heterotypic bone present
- Need experienced surgeon
- Limited capsule volume visualization is difficult
- P MCL most use limited Open Approach
Complications of Elbow Arthroscopy

By Edward W. Kelly, MD, Bernard F. Morrey, MD, and Shawn W. O'Driscoll, PhD, MD

Investigation performed at the Mayo Clinic and Mayo Foundation, Rochester, Minnesota

473 arthroscopy
12 nerve palsies
Complication rates decreased over time

Arthroscopic treatment for limitation of motion of the elbow: the learning curve

Sung-Jae Kim · Hong-Kyo Moon · Yong-Min Chun · Ji-Hoon Chang

Improved operative times
After 15 procedures
Ulnar Nerve Bony Tunnel
Post Release of Ulnar nerve
Most Exciting moment of the day
3 months post op
4 WEEKS POST OP...
Closed Manipulation
The outcome of examination (manipulation) under anesthesia on the stiff elbow after surgical contracture release

Arash Araghi, DO\textsuperscript{a}, Andrea Celli, MD\textsuperscript{b}, Robert Adams, PA\textsuperscript{c}, Bernard Morrey, MD\textsuperscript{c,*}

- 51/200 MUA
- 40 days post op
- Improved Arc 33 to 73 deg
- Used in selected cases
14/52 (27%) had manipulation

5/52 (10%) required second procedure

Risk of fracture and possible need for open release

Use caution
Early “Simple” Release of Posttraumatic Elbow Contracture Associated With Heterotopic Ossification

Randall W. Viola, MD, Douglas P. Hanel, MD, Seattle, WA

- 15 elbows with early HO excision
  - 5 day indocin
- 23 week delay
- 43 to 120 flex-ext
- 79 to 152 pro-sup
Elbow Capsulectomy for Posttraumatic Elbow Stiffness

David Ring, MD, Lauren Adey, MD, David Zurakowski, PhD, Jesse B. Jupiter, MD

From the Department of Orthopaedic Surgery, Massachusetts General Hospital and Harvard Medical School, Boston, MA.

- 46 patients
- 48 mos f/u
- 53 degree improvement
- 29% second procedure
- 103 degree ROM
Fused Elbow
13 patients in 22 years
54 yo mean age
37-118 arc of motion
50% re-operation rate
24% infection rate
24% MUA
HO prophylaxis was not successful
USE Caution
Treatment of heterotopic ossification of the elbow following burn injury: Recommendations for surgical excision and perioperative prophylaxis using radiation therapy

Christopher Maender, MD, Deenesh Sahajpal, MD, Thomas W. Wright, MD

- 13 month f/u
- 2 patients required repeat surgery
  - Recurrent HO (1); Manipulation (1)
  - Flexion/Extension 139°
  - Pronation/Supination 119°
THANK YOU!