Managing the Stiff Elbow

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Managing the Stiff Elbow

Goal

Scientific basis of clinical practice

Improves patient care/outcomes

Disclosure

Potential conflicts

- Zimmer – royalties, consultant
- Stryker – royalties
- Don Joy – royalties – relevant
- Tenex – Medical director; Interim CEO

OUTLINE

- Etiology
- Pathophysiology
- Intervention
  - Avoidance
  - Active treatment
- Outcomes
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**PATHOPHYSIOLOGY**
- Anatomy
- Biology

**Managing the Stiff Elbow**

- Post traumatic
- Primary arthritis

**Pathophysiology of the Stiff Elbow**

**Anatomy**
- Highly congruent / constrained
  
  **Implication:** Sensitive to intra-articular adhesions

**Articular**
- Mal-alignment – limits flexion
  - P/S intact

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Pathophysiology of the Stiff Elbow

Constraints
- Capsule
- Lateral collateral
- Medial collateral

Individual variation
- Ectopic ossification
  Least understood

Soft tissue
- Capsule – scanning EM

Individual variation
- ‘Malignant arthrofibrosis’
### Managing the Stiff Elbow

**INTERVENTION**

- Avoidance
- Active treatment

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**INTERVENTION**

- Avoidance – Trauma
  - Rigid fixation
  - Early motion
- If this fails, then what?

First question – what’s needed?

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**INTERVENTION**

- What’s needed
  - 30 – 130 (120)

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**INTERVENTION**

<table>
<thead>
<tr>
<th>Contracture</th>
<th>Reach</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>98</td>
</tr>
<tr>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>90</td>
<td>0</td>
</tr>
</tbody>
</table>

Why is 30 deg critical angle? AND

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- NOTHING, shoulder, compensates for deficient elbow motion!!

Surgical Intervention

- Extrinsic
- Intrinsic

**Dominant Variable**

Dictates success of surgery and PT!!!
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Surgical Intervention

- COLUMN PROCEDURE
- Indication:
  Extrinsic contracture
  Normal joint

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Surgical Intervention

- Anatomy
  Anterior - ECRL, Brachioradialis
  Posterior - Triceps

Managing the Stiff Elbow
Surgical Intervention

<table>
<thead>
<tr>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column procedure</td>
</tr>
<tr>
<td>Extrinsic</td>
</tr>
<tr>
<td>- High grade contracture</td>
</tr>
<tr>
<td>- Extensive osteophytes</td>
</tr>
<tr>
<td>- Normal/adequate joint</td>
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Managing the Stiff Elbow Surgical Intervention

**Principle - Loose 20 deg post op**

So get it out straight

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Managing the Stiff Elbow Surgical Intervention

**OUTCOMES**

**COLUMN PROCEDURE**

**MAYO EXPERIENCE**

- Period: 1989 - 1994
- Procedures: 38

Mansat, Morrey, JBJS - 1998

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Managing the Stiff Elbow Surgical Intervention

**OUTCOMES**

- Literature: Arthroscopy
  - Early (1990) – case reports ‘can be done’
  - Later (1998) – series ‘as effective’
  - Current (2004) – as effective safe

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Managing the Stiff Elbow Surgical Intervention

**OUTCOMES**

**Results**

- Flexion/Extension Arc
  - Pre: 50 deg
  - Post: 94 deg
  - Arc: 25 - 120 deg
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Rehabilitation

- **Principles same before as after surgery**
- Primary problem is almost always scar tissue
- The healing response is inflammatory
- Aggressive stretching promotes more scarring!!
- Can't rehabilitate a bad joint surface
  Aggressive movement incites inflammation

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**CONCEPT**

<table>
<thead>
<tr>
<th>Static-Adjustable Splints</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRESS RELAXATION</strong></td>
</tr>
<tr>
<td><strong>Tissue Tension</strong></td>
</tr>
<tr>
<td>50 deg</td>
</tr>
<tr>
<td>40 deg</td>
</tr>
<tr>
<td>Constant angle</td>
</tr>
</tbody>
</table>

**Time**

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**DYNAMIC SPLINTS**

- Constant load

**Tissue Tension**

- 50 deg
- 40 deg
- 30 deg

**Time**

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**Examination under anesthesia**

**Technique**

- General anesthesia
- Post op note, xray - reviewed, available
- Inject cortisone + marcaine with epi
- Gentle torque
  - Alternate flexion/extension
  - Gentle
  - Note smoothness of flexion arc
- Splint in direction most needed
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Outcome

- Period 1999 -2006
- Patients 51
- ROM – mean increase 42 deg
- Complications - 0

Elbow Stiffness

- The solution: Genetic  
  - Better understand the basis of disease
  - Individual variation

Elbow Stiffness

Managing the Stiff Elbow

SUMMARY

- Understanding is limited
  - Marked individual variation
  - Best to avoid
  - Rx Options emerging
  - Intervention function:
    - Pathology
    - Expertise
    - Expectations
    - Post operative Rx ?
Thank You