Total Wrist Replacement

Registrar Teaching Day
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Total Wrist Arthroplasty

- Total/Partial resection carpus
- Removal articulating surface of radius + ulna
- Replacement with an articulating implant
History of Wrist Arthroplasty

- 1536 – Ambrose Pare – 1st joint excision for destructive infection (Elbow)
- 1773 – Orred 1st Wrist joint resection
- 19th Century – Resection arthroplasty was commonly performed, with encouragement of early mobilisation
- 1840 – John Murray Carnochan – used interpositional materials for the wrist joint
- 1894 – Pean – Platinum plate
- 1890 – 1st Total Wrist Replacement – Themistocles Gluck – Ivory ball and socket design
20th Century History

- Early 20th Century – Murray used fascia lata as an interpositional material
- Until 1960’s – Interpositional arthroplasty lost favour
- 1967 Paul Lipscomb, Swanson and Niebauer
  - Silicone interpositional spacer
- 1969 Metal Implants – Gschwind-Scheier-Bahler
Early Arthroplasty Design

• Ball and Socket joint
• Single centre of rotation
• 3 degrees of freedom
• Theoretically unconstrained

Results:
  – Soft tissue balancing,
  – Distal loosening,
  – high revision rates
Early Design Examples

- Meuli Prosthesis
- 1970’s
- Ball and Socket
- Non constrained
- Originally no axial offset
- Based around the centre of rotation being on the capito-lunate joint
Early Arthroplasty Example

- Volz – 1970
- 2 pronged distal
- Single proximal stem
Obr. 1a. TP zápěstí Medin
1b. TP zápěstí s rozloženými komponentami

Obr. 5. Rtg snímek 35letého pacienta s RA 7 měsíců po operaci
Current Designs

- Elliptical articulating surfaces
- Minimally constrained
  - Alnot (Guepar)
  - Menon (Universal)
  - Beckenbaugh (Biaxial)
Universal 2 Total Wrist Arthroplasty

- **Universal 2 Wrist Arthroplasty**
  - Indications Rheumatoid Arthritis
    - (USA are using this implant for Osteoarthritis)
  - It combines an intercarpal fusion with arthroplasty
    - Thus reducing the previous complications of instability and carpal component loosening
Indications

- Very Limited
- Patient Specific
- Specific NICE Guidelines to be followed

- For the treatment of destructive wrist arthrosis in:
  - Rheumatoid arthritis
    - Associated with PAIN
    - Where the retention of wrist motion to a certain degree will maintain patient independence, commonly where the other wrist joint has already been arthrodesed
    - Low demand patients
Goals of Wrist Arthroplasty

- PAIN Relief
- Maintain the wrist mobile to a functional degree
- Stable Wrist
- Reasonable durability
Surgical Technique

• Dorsal approach + Extensor tenosynovectomy
• Incise 3rd & 4th compartment
• Excise Lister’s tubercle
• Retract tendons (protect 1st compartment)
• Expose the DRUJ & radiocarpal joint to CMCJs
Surgical Technique

Minimal Bony Resection

Resect the lunate initially

Uncemented insertion of components
Post Operative Care

• 10-14 days in a below elbow plaster cast

• Splinting by Hand Therapists
  – Allowing early mobilisation
  – Protected for further 4-6 weeks
Complications

- Early
  - Infection
  - Median Nerve Compression
  - Dislocation

- Late
  - Loosening
  - Distal Radius Fracture
  - Metacarpal Fracture – following failure of carpal fusion
  - Attrition rupture of tendons
  - Polyethylene wear