Surgical Considerations of the TMJ

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Surgical Options of the TMJ

- Arthroscopy
- Open Arthroplasty
  - Disk preservation
  - Diskectomy
Surgical Options of TMJ

• General Indications
  – Significant TMJ pain or dysfunction
  – Non-surgical therapy has failed
  – Radiographic evidence of disease

Failure to manage associated myofascial pain and dysfunction lowers the rate of surgical success.
Arthroscopic Arthroplasty

• Biopsy of suspected lesions or disease
• Confirmation of other diagnostic findings that may warrant surgical treatment
• Unexplained persistent joint pain that is non-responsive to medical treatment
Arthroscopic Arthroplasty

Indications

- Closed, locked articular disc
- Painful popping joint
- Adhesions
- Perforated disc
- Hypermobile joints
- Inflammatory joint disease
- Hypermobility
- Degenerative Joint Disease
- Traumatic Injuries
- Suspected Infection
Arthroscopic Arthroplasty

Equipment

- **Scope**
  - Video/monitoring equipment
  - Arthroscopic cannula, scissors, forceps, probes, shavers
  - Laser
Arthroscopic Arthroplasty

*Equipment*

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Equipment
Arthroscopic Arthroplasty

Arthroscopic Arthroplasty
Arthroscopic Arthroplasty
Open Arthroplasty
Dissection
Open Arthroplasty
Dissection
Open Arthroplasty

Disc Repositioning
Open Arthroplasty
*Disc Repositioning*

- Techniques
  - Partial-thickness plication, recontour posterior band, +/- eminence reduction
  - Full-thickness plication +/- Mitek anchor, recontour posterior band, +/- eminence reduction
Open Arthroplasty
Disc Repositioning

Displaced Disc

Repositioned Disc
Open Arthroplasty

*Diskectomy*

- Indications
  - Same as disc preservation, except disc cannot be preserved
    - Disc deformity
    - Disc perforation
  - Failed previous surgery
Open Arthroplasty

Diskectomy

• Post-Op Management
  – ROM exercises
  – NSAIDs
  – Reduce joint loading
    • Medications
    • Splint
    • Soft diet
Total TMJ Reconstruction

Alloplastic Joint Prosthesis

TMJ Concepts
Total TMJ Reconstruction
Alloplastic Joint Prosthesis

• Indications for TMJ Reconstruction
  – Degenerative joint disease
  – Ankylosis
  – Failed previous TMJ surgery
  – Loss of vertical ramus height resulting in malocclusion
TMJ Concepts
Patient-Fitted Prosthesis
TMJ Concepts
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Patient-Fitted Prosthesis
TMJ Concepts
Patient-Fitted Prosthesis
TMJ Concepts
Virtual Surgical Planning
Intraoral Scanning
TMJ Concepts
Virtual Surgical Planning
TMJ Concepts
Virtual Surgical Planning
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TMJ Concepts

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TMJ Concepts
Patient-Fitted Prosthesis
• Fossa Implant
  – Titanium backed with Ultra High Molecular Weight Polyethylene

• Condyle Implant
  – Titanium ramus
  – Chromium-Cobalt-Molybdenum condylar component
Total TMJ Reconstruction
Total TMJ Reconstruction
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Total TMJ Reconstruction
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On-Q Pain Pump
Total TMJ Reconstruction

On-Q Pain Pump

- 0.25% marcaine
- Volume = 270mL
- Rate = 2mL/hr
  - 5mg/hr x 24 hr = 120mg/day
- Maximum daily dose of 0.25% marcaine = 4mg/kg/day
  (60kg patient max dose = 240mg)
TJR Post-op
Total TMJ Reconstruction

Bony Ankylosis
Total TMJ Reconstruction

**Bony Ankylosis**

**Causes**

- Trauma, ie – intracapsular condylar fractures
- Multiple TMJ surgeries
- Infection, ie – otitis media/mastoiditis
- Systemic arthropathy, ie – RA, Ankylosing Spondylitis
- Neoplasia, ie - Osteochondroma
Total TMJ Reconstruction

Bony Ankylosis
Total TMJ Reconstruction

Bony Ankylosis
Total TMJ Reconstruction

Bony Ankylosis
Total TMJ Reconstruction

Intraoperative Navigation

Intraoperative Navigation

• Components
  – Localizer
  – Surgical Probe
  – CT Scan

• Optical-based design
  – Active System: Battery-powered LEDs on probe
  – Passive System: Reflectors on probe illuminated by infrared flashes

• Registration
  – Correlating anatomic references to digitized data
    • Invasive – fixed markers secured to patient
    • Noninvasive – LED mask or “surface matching”
Total TMJ Reconstruction

Intraoperative Navigation

Invasive Fiducial Markers
Total TMJ Reconstruction

Intraoperative Navigation

Surface Matching
Total TMJ Reconstruction

Intraoperative Navigation

- Accuracy 0.6-1.4mm
  (Standard Deviation 0.2mm)
Total TMJ Reconstruction

*Bony Ankylosis – Fat Graft*
Total TMJ Reconstruction

Pediatric Ankylosis

Causes

• Trauma, ie – intracapsular condylar fractures
• Previous surgeries
• Infection, ie – otitis media/mastoiditis
• Systemic arthropathy, ie – RA, Ankylosing Spondylitis

12yo Juvenile Idiopathic Arthritis
Pediatric Ankylosis
Pediatric Ankylosis
Interpositional Gap Arthroplasty
Interpositional Gap Arthroplasty

Establish Range of Motion
Interpositional Gap Arthroplasty

Rib Harvest
Interpositional Gap Arthroplasty

Rib Harvest
Interpositional Gap Arthroplasty

Rib Preparation
Interpositional Gap Arthroplasty

Rib Placement
Interpositional Gap Arthroplasty

Costochondral Graft
Pediatric Joint Replacement
Costochondral Graft
Pediatric Joint Replacement

Distraction Osteogenesis

Pediatric Joint Replacement

*Distraction Osteogenesis*

• **Latency**
  – 5-7 days
    • Proliferation of fibroblasts
    • Vascular development
    • Formation of a soft callus

• **Distraction**
  – Rate of 1mm/day
    • Usually divided 0.5mm twice daily or 0.25mm four times per day

• **Consolidation**
  – 6-8 weeks minimum
  – Hard callus formation
Pediatric Joint Replacement

Distraction Osteogenesis
Total TMJ Reconstruction
Total TMJ Reconstruction
Failed Previous Implant
Total TMJ Reconstruction

Failed Previous Implant

Proplast – Teflon Fossa Implant Displaced Into the Middle Cranial Fossa
Alloplastic Total Joint Replacement

Pre op
Alloplastic Total Joint Replacement

Custom total joints
Alloplastic Total Joint Replacement
Failed Previous Implant
Alloplastic Total Joint Replacement

intraop
Alloplastic Total Joint Replacement

*Intra op*
Alloplastic Total Joint Replacement

intraop
Alloplastic Total Joint Replacement

*Post op*
Alloplastic Total Joint Replacement

Post op
Alloplastic Total Joint Replacement

Malocclusion

- Acquired mandibular asymmetry
- Congenital/Developmental disorder
- Systemic inflammatory disorder

Simulated Virtual Surgical Plan

Simulated Surgical Procedure: RSSO and Left Condylectomy
Alloplastic Total Joint Replacement

**Congenital/Developmental disorder**

- Congenital or developmental disorders may result in asymmetric growth of the mandible and canting of the maxilla. If a condyle is severely dysfunctional the treatment plan may require a combination of orthognathic surgery and TJR.
Combined Orthognathic Surgery and Total Joint Reconstruction

- Surgical sequence
  - Condylectomy +/- Coronoidectomy
  - Sagittal split osteotomy
  - Maxillomandibular fixation
  - Fixation of sagittal split
  - Fixation of alloplastic joint prosthesis
  - Lefort osteotomy
Combined Orthognathic Surgery and Total Joint Reconstruction
Combined Orthognathic Surgery and Total Joint Reconstruction