Implant Arthroplasty of the Lateral Column of the Midfoot

I. Background - Biomechanics
   A. Gait
      1. Push-off requires rigid lever arm
      2. From foot-flat to toe-off the foot resupinates to become rigidus
   B. Joint motion
      1. Lateral column > medial > middle
      2. Lateral column has significant sagittal and horizontal planes of motion → Compensatory
      3. An "essential" joint (Hansen)

II. Lateral column arthritis
   A. Presentation
      1. Pain motion of lateral joints, tenderness/swelling over 4/5 TMT joints
      2. Seldom isolated unless traumatic etiology
         a. Often seen with diffuse midfoot disease, e.g. pseudogout
         b. May be result of overload created by collapsed/abduction deformity of medial column degeneration
   B. Diagnostic studies
      1. Radiographs - assess midfoot in general
         a. AP/lateral standing, oblique
         b. Assess for subluxation, osteophytes, joint space narrowing
         c. Assess for medial column collapse (lateral talo-1st MT angle, height of medial cuneiform off floor)
         d. AP standing ankle if associated hindfoot mal-alignment
      2. Bone scan
         a. Helpful in diagnosing subtle cases or post-traumatics with anatomic reduction
         b. Beware . . . increased uptake may occur in joints that are not symptomatic
      3. CT
         a. Like bone scan can be helpful in subtle cases but can be over-read
      4. Differential injections
         a. Fluoroscopic-assisted injection of anesthetic + cortisone, arthrogram confirmation
         b. Diagnostic and therapeutic benefits - assists in preoperative decision making
   C. Operative treatment – lateral column joints
      1. Goals
         a. Achieve a painless, stable and plantigrade foot
         b. Maintain compensatory motion of lateral column
      2. Indications
         a. Pain
         b. Deformity
         c. Failure of conservative treatment
         d. Temporary improvement with differential injection
3. Contraindications
   a. PVD
   b. Poor skin condition/vasculitis
   c. Infection
   d. Acute Charcot - controversial but best to avoid acute inflammatory state
   e. No pain relief with differential injection
4. Surgical decision making
   a. Despite radiographic changes lateral joints are rarely symptomatic
   b. Lateral pain may improve if abduction deformity/overload corrected by realignment arthrodesis of the medial column joints
   c. Avoid arthrodesis of the compensatory lateral column
      1. Makes for a stiffer foot – gait disturbance
      2. High rate of nonunion and hardware fatigue
   d. If persistently symptomatic and temporary relief with differential injection, consider interposition arthroplasty of the lateral column as an option to fusion
5. Technique for symptomatic lateral column
   a. “Anchovy” arthroplasty
      1. Popliteal or ankle block anesthesia feasible (if isolated procedure)
      2. Dorsolateral incision, avoid sural nerve
      3. Debride 5th (4th) TMT joints
         a. Create a dowel effect while maintaining ligament support
         b. Use fluoroscopy to centralize and confirm correct location
      4. Harvest peroneal tertius
         a. From insertion at 5th metatarsal to ankle level – tendon stripper useful
         b. Long toe extensor tendons (3rd/4th) used if p. tertius not present
      5. Insert into joint defect(s) as an anchovy
   6. Percutaneous K-wire (0.062) fixation - remove prior to WB at 6-8 weeks
b Preferred option of ceramic sphere insertion (*Orthosphere* - *Wright Medical*)
1. Approach and preparation same as for anchovy
2. Ceramic implant in multiple sizes
3. Originally used for thumb CMC arthritis
4. Set comes with dowels/sizers
5. Eliminates need for tendon/pin
6. Stable implants allow for weightbearing and motion at 2 weeks (assuming isolated procedure)
7. Technique tip: if medial column fusion is also being performed, prepare fusion segments but do not complete fixation until Orthosphere(s) placed
8. Surgical technique in Shawen/Anderson FAI 2007

c. Complications
1. Neuritis/neuroma - sural
2. Wound healing problems/infection
3. Dislocation/subsidence of implants
   a. No events to date

e. Results – Lateral column fusion/arthroplasty
1. Berlet et al, FAI
   a. Lateral column arthroplasty useful in preserving lateral motion
   b. Relieves pain localized to those joints
   c. Limited benefits to those undergoing extensive midfoot fusions
2. Schon et al, FAI
   a. Successful lateral column fusion in 26/28; most neuropathic – 6 as isolated procedures in normosensate patients
   b. 9 broken screws; concern for lateral foot stiffness and prominence
   c. Overall, 75% improved in pain and function
3. Shawen et al, AOFAS Summer meeting ’04/FAI, ’07
   a. Three year follow-up of 20 patients
   b. Good pain relief in >90% of patients
   c. No reported failures of the implant – one subsidence

Bibliography
B. Berlet GC, Anderson RB, Davis WH: Tendon arthroplasty for basal 4th and 5th metatarsal arthritis. *Foot Ankle* 23: 440-446, 200