Knee - Osteotomies

60% of the load of the body weight passes through the medial compartment of the knee
Loads up to 4 times body weight are produced on climbing stairs
Osteotomy redistributes the force

Valgus osteotomy most commonly performed (varus knee) and is indicated in patients that have uni compartmental disease, are less than 60 - 70 years old, are of optimal weight, have an active occupation or lifestyle which they want to maintain and have a good range of motion

NB: ROM is not likely to improve with an osteotomy

INDICATIONS

1. Age: physiologic age < 60 yrs in an athlete, laborer, or anyone who needs to knee down such as for gardening (TKR will generally not allow the patient to kneel)
2. Weight: > 80 kg are at increased risk for component failure;
3. Angular Deformity:
    1. < 15 deg of fixed varus deformity (often patients will have varus laxity)
    2. < 15 degrees flexion contracture
    3. > 90 degrees flexion
4. Radiologically intact lateral (or medial) and patellofemoral compartments

CONTRAINDICATIONS:

1. Tibial Subluxation > 1 cm
2. RA & inflammatory arthritis
3. ACL tear
4. osteochondral injuries with involvement of more than 1/3 the condylar surface or OCD lesion of more than 5 mm deep

CLINICAL

- Observe patient walk (look for varus thrust)
- Stability
- Q Angle
- Compensatory arc of motion - to correct a valgus knee deformity - for a 20-degree varus osteotomy, 20 deg of abduction at the hip is required so pt does not end up with an adduction deformity
- Examine the foot and ankle to rule out fixed varus deformities which may worsen medial compartment loading
- Leg length discrepancy Coventry closing wedge osteotomy might be indicated, where as, if the arthritic side is shorter (than the other leg), then consider opening wedge osteotomy

INVESTIGATIONS

Radiology

- Standing long-leg film with patellae facing forward (rather than the patient's feet)
  - Mechanical axis = centre of femoral head - medial tibial spine - centre of ankle joint
  - Weight-bearing axis = centre of femoral head - centre of ankle joint
  - Anatomical axis = line along axis of the femur to the intercondylar notch and the line formed by the interspinous region to the centre of the ankle
- Supine films

Arthroscopy

METHODS

Medial Compartment Disease

∴ we are lateralizing the mechanical axis

- High Tibial Osteotomy (HTO) above the tibial tubercle
- Lateral closing wedge & fibular shortening [Technique, Wheeless]
- Overcorrection of the mechanical axis by 3 degrees is ideal
- Complications:
  1. Undercorrection - most common
  2. Overcorrection
  3. Penetration of the articular surface

4. AVN of tibial plateau
5. Patella baja
6. Peroneal nerve injury
7. Anterior compartment syndrome
8. TKR may be more difficult

Lateral Compartment Disease

- < 12 degrees valgus = Varus tibial osteotomy
- > 12 degrees = Medial closing wedge osteotomy of distal femur (supracondylar)

RESULTS

- Satisfactory results obtained in as many as 70% at 10 years have been reported (study of 51 knees JBJS, 1988) with 30% fair or poor
- Best results are obtained if slight over correction achieved that is 2 - 3o beyond the normal 7o of valgus
- Results relate to the preoperative knee scores and the degree of correction / over-correction of the mechanical axis
- Odenbring et al 1990
  - 75% of patients under the age of 50 w/ early medial DJD had at good result at 11 years post surgery
- Billings et al (JBJS 1999)
  - 64 valgus producing high tibial osteotomies were performed using a calibrated cutting guide w/ plate fixation
  - 43 out of 64 knees had a good to excellent clinical result w/ an average knee score of 94 points at an average of 8.5 years follow up
  - using total knee arthroplasty as an end point, there was 85 % survival at 5 yrs and 53 % at 10 years
  - no patient had patella baja postoperatively (the authors fell that early ROM w/ CPM prevented baja)
  - average initial postoperative correction (and standard deviation) for all knees was to 9.2 ± 3.69 degrees of valgus
  - 5 knees were corrected to less than 5 deg of valgus
  - 3 of them were treated with a subsequent arthroplasty (at twenty-four, sixty-five, and sixty-six months)

- 13 knees had lost more than 2 deg of correction at the time of the latest follow-up
- average initial postoperative correction for these knees was to 9.4 ± 4.12 deg (range, 4 to 17 degrees) of valgus
- of knees that lost more than 2 degrees of correction, four subsequently had a total knee arthroplasty.