

# Intro to Total Knee Arthroplasty w/ Dr. Harb

Find Dr. Harb on Instagram [@thebonesurgeon](#)

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## History

- Consider: pre-op dx, age, sex. Knee-levels of activity, functional limitations, mechanical sx, previous tx. Smoking, alcohol consumption, medications, mental status. Tx any active infections, assess patients overall VTE risk, hx of DVT or PE (optimize perioperative management). Eval SH.
- Dementia, diabetes, BMI>40 + renal and cerebrovascular diseases= all independent predictors for in-hospital mortality and post-op complications s/p primary TKA
- Patients w/ NM disorders like parkinsons, high risk of instability following TKA- may benefit from specific implant options- varus-valgus constrained TKA< hinged knee components)-6 reference

## Physical Exam

- PE: gait, knee alignment, thrust/hyperextension during walking (ligamentous instability)-may do constrained design. In-toeing/out-toeing gait may indicate pre-existing rotational deformities. Hindfoot inspection. Note surgical scars. Pre-OP ROM is most important predictor of post-op motion
- ligamentous exam. NV exam. SKin discoloration, atrophic nails, absent hair, asymmetric / absent pulses. ABI
- PE: check ipsilateral hip + ankle

## Radiography/Pre op Templating

- AP, lateral, skyline view, full length AP
- Radiographic assessment
  - Limb mechanical axis - should bisect center of knee
  - tibiofemoral angle- lines down anatomic axis of femur and tibia. angle is around 7deg +/-1
- Femoral resection angle

- difference between mechanical axis of femur and anatomic axis. Typically between 5-7 degrees of valgus. Can vary between 3-11.
- Tibial bone cut
  - perpendicular to mechanical axis of tibia
  - Amount of resection based on combined thickness of tibial component + thinnest available polyethylene component thickness for implant system.. typically 10mm
    - put cut on unaffected side of plateau
- On AP wt bearing
  - detect medial/lateral osteophytes. On lateral- post osteophytes and measure tibial slope and patellar height
  - sunrise- measure patellar shift and title to eval extent of erosion of PF joint
- Component sizing
  - most commonly by A-P dimensions
- Patellar tilt
  - angle btwn horizontal axis of patella + anterior intercondylar line (+ when patella tilted laterally)
- Patellar shift
  - lateral displacement of median ridge of patella from intercondylar sulcus of femur

#### Surgical principles of Prim TKA

- restoration of neutral mechanical alignment, preservation of joint line, restoration of coronal and sagittal balance, maintenance of patellar tracking, restoration of posterior tibial slope
- Restoring Neutral mechanical alignment
  - mechanical axis passes through center of knee joint OR anatomic axis in 7 +/-1deg valgus
  - improves implant survival. even loads
  - femoral and tibial cuts made perpendicular to mechanical axis
- Preservation of joint line
  - achieved if bone cuts are accurate that amount of bone eroded pre-op and amount resected at TKA matches thickness of prosthesis.
  - proximal elevation of joint line- pseudopatella baja- high contact forces at PF joint +extensor mechanism dysfxn

- shifting it distally- patella subluxation + retropatellar pain
- Restoring coronal/sagittal balance
  - **Balancing**
  
- Maintenance of patella tracking
  - increasing Q angle can produce laterally directed muscle vector that lead to PF instability
  - IR and medialization of fem or tibia component + fem component positioned in >7 valgus can inc Q angle= WHICH IS BAD
  - so we want to- ER the tibial and femoral components, and medialize the patellar component

#### Complex TKA's

Severe coronal deformities + ligamentous instability

- Remove osteophytes, sequential soft- tissue balancing, adjust bone cuts if necessary
- Varus/valgus constrained knee implant may be useful in ppl with severe valgus and MCL deficiency
  - concern that TKA w/ constrain implant will transfer stresses to implant bone interface- results in premature loosening. but survivorship is ok
- some use a PS knee implant w/ MCL advancement, repair, or recon
  - some say it has adverse influence on ligaments isometry

Tanzer, M., & Makhdoum, A. M. (2016). Preoperative planning in primary total knee arthroplasty. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*, 24(4), 220-230.