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TKA after tibial osteotomy
How I do



5th Advanced course on knee surgery
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TKA after HTO. Outcomes

Reported to be poorer for patients with previous HTO compared with similar patients w/o prior osteotomy

- decreased postoperative ROM
- poor clinical outcome due to *patella infera*
- poor wound healing
- deep infection in some patients due to difficulty in exposure and poor lateral skin flap vascularity

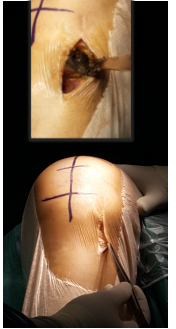
Technical Problems of TKA after HTO

- Difficult Exposure
- Bone Defects / Deformities
- Difficult Ligament Balance
- Prolonged Operative Time



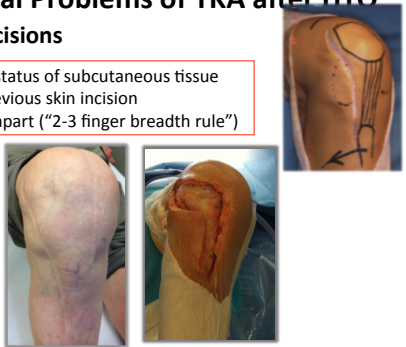
Technical Problems of TKA after HTO

- Difficult Exposure
 - **Prior incisions**
 - It is usually safe to ignore small medial or lateral parapatellar / transversal incisions
 - Risk of skin necrosis
 - in case of parallel incisions
 - avoid acute angles




Technical Problems of TKA after HTO

- **Prior incisions**
 - Consider the status of subcutaneous tissue
 - Re-use big previous skin incision
 - New incision apart ("2-3 finger breadth rule")



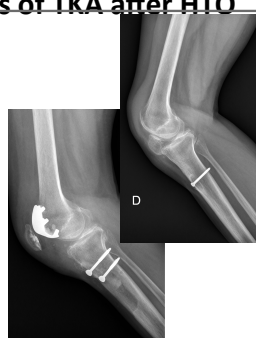
Technical Problems of TKA after HTO

- Difficult Exposure
 - **Patella Baja / Fixed**
 - is characterized by lowering of the patella relative to its normal position
 - Difficulties in eversion
 - Insufficient / inadequate exposure



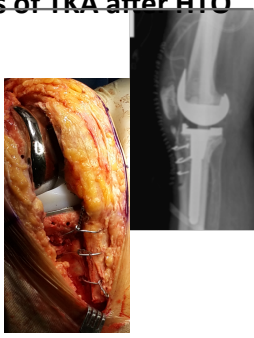
Technical Problems of TKA after HTO

- **Patella Baja / Fixed**
 - Recurrent patellar dislocation
 - Ext Mechanism realignment + ATT distalization
- Tibial Tuberosity Slide or Transfer to a cephalad position




Technical Problems of TKA after HTO

- **Patella Baja / Fixed**
 - Osteotomy of the Tibial Tuberosity
 - may be difficult due the proximity to a cemented tibial component



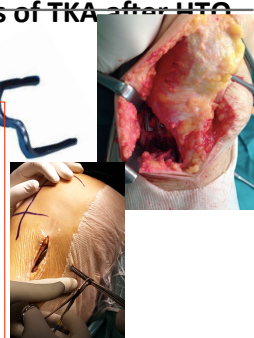
Technical Problems of TKA after HTO

- **Difficult Exposure**
- **Hardware removal**
 - Several different devices
 - Enlarge approaches
 - Time consuming



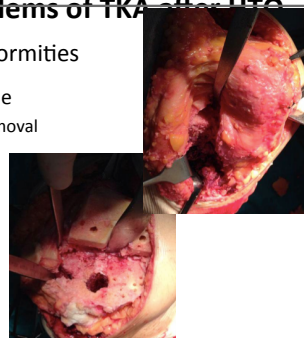
Technical Problems of TKA after HTO

- **Hardware removal**
 - Technical precautions**
 - Be prepared
 - be aware of some innocent hardware devices (staples)
 - Consider secondary small incisions
 - Stage surgery if high risk of infection
 - previous infection, poor skin, associated pathology



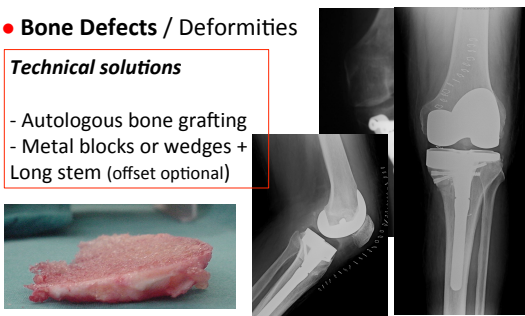
Technical Problems of TKA after HTO

- **Bone Defects / Deformities**
 - Poor quality of bone
 - After hardware removal




Technical Problems of TKA after HTO

- **Bone Defects / Deformities**
 - Technical solutions**
 - Autologous bone grafting
 - Metal blocks or wedges + Long stem (offset optional)



Technical Problems of TKA after HTO

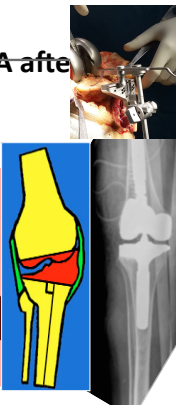
- **Bone Defects / Deformities**
 - **Proximal tibial distortion**
 - Minor / Major deformities TP (varus/valgus/ TP lateralization)
 - Tilt of tibial plateau (increased/inverted slope)
 - Alterations of the medullary canal



Technical Problems of TKA after HTO

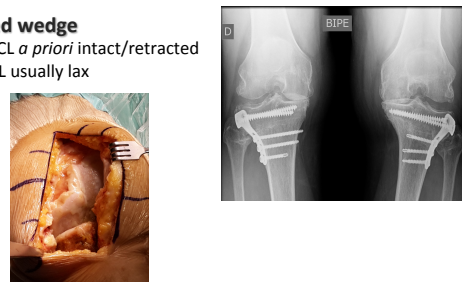
- **Proximal tibial distortion**

The tibial cut should be referenced off the the most preserved compartment, which may leave a defect on the contralateral side of the tibia that requires bone grafting and/ or metal block.




Technical Problems of TKA after HTO

- **Difficult Ligament Balance**
 - **Closed wedge**
 - MCL *a priori* intact/retracted
 - LCL usually lax



Technical Problems of TKA after HTO

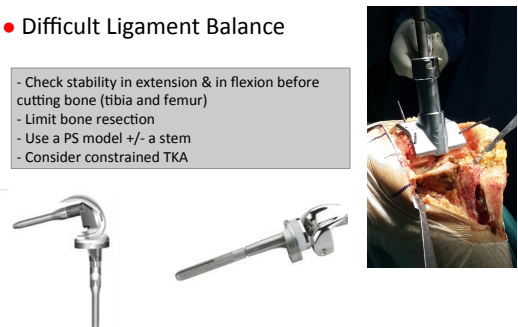
- **Difficult Ligament Balance**
 - **Open wedge**
 - MCL can be weak (most anterior fibers)
 - Potential medial laxity (particularly in flexion)
 - A few problems in our experience



Technical Problems of TKA after HTO

- **Difficult Ligament Balance**

- Check stability in extension & in flexion before cutting bone (tibia and femur)
- Limit bone resection
- Use a PS model +/- a stem
- Consider constrained TKA



Technical Problems of TKA after HTO

- **Prolonged Operative Time**

- 50 consecutive TKA post HTO compared to 50 age matched primary TKA
- **Results**
 - Interval from HTO to TKA avg → 7.3yrs (2-12)
 - TKA avg → **23 minutes longer** surgery $p < .05$
 - Higher patellar subluxation in HTO group $p < .05$
 - No difference in Revision Rate, KSS or HSS scores at avg F/U of 6.2 yrs

Quite optimistic

Haddad J Arthroplasty 2000

Technical Problems of TKA after HTO
Case 1

- Minor deformities**
 - Slight varus + inverted tibial slope
 - Minimal distortion in the proximal tibia morphology

Technical Problems of TKA after HTO
Case 1

- Technical Tips**
 - Asymmetric tibial cut (restitute orthogonal JL)
 - Carefully centered tibial tray

Technical Problems of TKA after HTO
Case 2

- Minor deformities**
 - Slight varus + inverted tibial slope
 - Patella baja
 - Minimal distortion in the proximal tibia morphology

Technical Problems of TKA after HTO
Case 2

- Technical Tips**
 - Whiteside approach / ATT transfer
 - Asymmetric tibial cut (restitute orthogonal JL)
 - Carefully centred tibial tray (PS model)

Technical Problems of TKA after HTO
Case 3

- Minor deformities**
 - Slight valgus + increased tibial slop
 - Non-union osteotomy site
 - No distortion in proximal tibial morphology

Technical Problems of TKA after HTO
Case 3

- Technical Tips**
 - Asymmetric cut on tibia (restitute orthogonal JL)
 - Centered Long stem without offset

Technical Problems of TKA after HTO

Case 4

- Major deformities**
 - Valgus + lateralization of tibial plateau
- Technical Tips**
 - Asymmetric cut on tibia (restitute orthogonal JL)
 - Tibial tray with an offset long tibial stem

Technical Problems of TKA after HTO

Case 5

- Major deformities**
 - Lateralization of TP
 - Inverted slope
 - Patella infera and fixed

Technical Problems of TKA after HTO

Case 5

- Technical Tips**
 - Independent approach for hardware removal (avoiding further dissection)
 - Asymmetric cut on tibia
 - Positioning of the tibial tray with an offset tibial stem (2 plains)
 - TT cephalad transfer

TKA after HTO. Results

Authors	Year	No. of TKA	Follow-up	Results/primary TKA
Bae et al. (15)	2009	16	Not mentioned	No difference ★
Kazakos et al. (34)	2008	38	4.5 years	No difference ★
Van Raaij et al. (37)	2007	12	3.7 years	Technically more demanding, but clinical outcome identical ★
Haslam et al. (39)	2007	51	12.6 years	No significant difference but reduced ROM and more revisions ★
Parvizi et al. (45)	2004	166	15.1 years	Factors of bad prognosis: weight, age, gender, and limb malalignment ★
Iodrytal and Pink (42)	2003	50	5.4 years	Similar outcomes, increased risk of Patella infera ★
Madan et al. (43)	2003	29	7.5 years	Technically more demanding, results inferior than after primary TKA
Karabatos et al. (48)	2002	20	5 years	Poorer functional results (but no statistical significance)
Noda et al. (41)	2000	28	25 months	Poorer results
Mehring et al. (34)	2000	95	8.6 years	No difference ★
Hodgson and Bentley (44)	2000	50	5 years	Overall outcome remains good to excellent ★
Gill et al. (46)	1995	30	3.8 years	Results of TKA after failed HTO > than after failed UKA
Mont et al. (27)	1994	73	73 months	Risk factors of bad results: (1) workmen's compensation patient, (2) history of RSD after HTO, (3) early onset (less than one year) or no period of relief of pain after HTO, (4) multiple surgeries before HTO, and (5) an occupation as a laborer
Neyret et al. (22)	1992	38	3 years	Poorer results for walking distance and flexion angle
Amendola et al. (28)	1989	41	37 months	Global outcome identical but decreased ROM ★
Staheli et al. (31)	1987	35	29 months	No difference ★

Summary

- APPROACH**
Incision and skin flaps / Removal of hardware / Patela Baja
- BONE CUTS**
Decreased bone STOCK / Offset tibial shaft medially / Anterior tibial slope
- SOFT TISSUE BALANCING**
Release to achieve correct alignment / Restore tibial slope

Take Home Message

- Never easy surgery
- Careful surgical plan
 - Hardware removal
 - TKA model (metal blocks and offset stems)
 - Extra-time (Tourniquet time)

