

SURGICAL APPROACHES FOR KNEE ARTHROPLASTY

Back To Basics – The Lower Extremity
Orthopaedica Belgica Instructional Course
Saturday 19th November 2022
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CHC - UGEGE

1

- ▶ Various surgical approaches to the knee joint and its surrounding structures
- ▶ Designed to allow the best access to an area of pathology whilst safeguarding important surrounding structures
- ▶ The medial parapatellar arthrotomy, or anteromedial approach, has been the most used and has been regarded as the standard approach for exposure of the knee joint

SURGICAL APPROACHES FOR KNEE ARTHROPLASTY


2

- ▶ Medial parapatellar arthrotomy
 - ▶ First described in 1879 by von Langenbeck
- ▶ Subvastus
 - ▶ Hofmann reported on the quadriceps preserving subvastus approach in 1991
- ▶ Midvastus
 - ▶ Described by Engh in 1997, it's a good compromise between preserving quadriceps function and good surgical exposure
- ▶ Lateral parapatellar approach

SURGICAL APPROACHES FOR KNEE ARTHROPLASTY

3

- ▶ Skin Incision
 - ▶ most commonly used skin incision for primary TKA is an anterior midline incision
 - ▶ done with the knee in flexion to allow the subcutaneous tissue to fall medially and laterally, which improves exposure
 - ▶ beginning 6cm proximal to superior pole of the patella, extending over patella midpoint, and ending at the medial border of tibial tuberosity or approximately 4 cm distal to the inferior pole of the patella
 - ▶ The extent of the skin incision is dictated by the requirements of the surgery



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4

- ▶ Skin Incision
 - ▶ some surgeons prefer to vary the incision with a more medial way, arguing that incision is less likely to scar and contract



SURGICAL APPROACHES FOR KNEE ARTHROPLASTY

5

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SURGICAL APPROACHES FOR KNEE ARTHROPLASTY

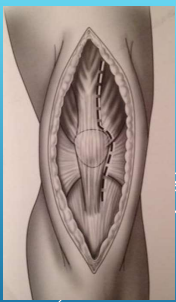
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- ▶ Skin Incision
 - ▶ If a preexisting anterior scar on the knee is in a usable position, it should be incorporated in the skin incision
 - ▶ Parallel longitudinal incisions are problematic, so maximizing the skin bridge of 5-6 cm is recommended
 - ▶ If multiple previous incisions are present, the most lateral usable incision should be selected, because blood supply to the skin of the anterior knee tends to come predominantly from the medial side



SURGICAL APPROACHES FOR KNEE ARTHROPLASTY


7



MEDIAL PATELLAR APPROACH

8

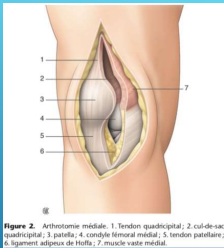
- ▶ Historical approach
- ▶ Has been the standard
- ▶ Follow the medial border of the quadriceps tendon



MEDIAL PARAPATELLAR APPROACH

9

- ▶ Along the length of the quadriceps tendon, leave a 3- to 4-mm cuff of tendon on the vastus medialis for later closure
- ▶ Incision is continued around the medial side of the patella, extending to the antero-medial surface of the tibia along the medial border of the patellar tendon

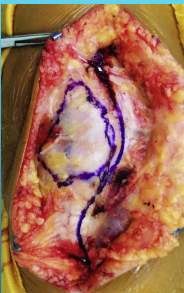


MEDIAL PARAPATELLAR APPROACH

Figure 2. Arthrotomie médiale. 1. Tendon quadriceps; 2. cul-de-sac quadriceps; 3. patella; 4. condyle fémoral médial; 5. tendon patellaire; 6. ligament adipeux de Hoffa; 7. muscle vaste médial.


10

- ▶ Advantages
 - ▶ Allows excellent exposures
 - ▶ Easy to safely execute
- ▶ Drawbacks
 - ▶ Disruption of the quadriceps mechanism at the junction of vastus medialis and the quadriceps tendon, destabilizing the patella
 - ▶ Superior lateral genicular artery is at risk during lateral retinacular release, as may be the last remaining blood supply after medial parapatellar approach



MEDIAL PARAPATELLAR APPROACH

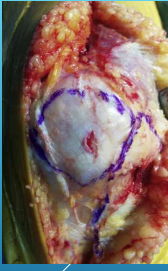
11



SUBVASTUS APPROACH

12

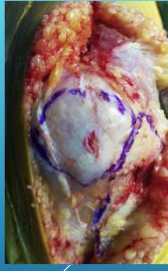
- ▶ More "anatomical" approach
- ▶ Popularized by Hofman in 1991
- ▶ The ideal patient for this approach is a thin patient with mobile soft tissue
- ▶ Previous scars, obesity, undergoing revision TKRs, and severe deformities are relative contraindications for this approach.



SUBVASTUS APPROACH

13


- ▶ The vastus medialis inserts into the superior medial corner of the patella
- ▶ The fascia along the inferior border of the vastus medialis is incised from the patella down to the medial intermuscular septum
- ▶ The arthrotomy continues distally along the medial margin of the patella
- ▶ The medial retinaculum is incised along the medial border of the patellar tendon and down onto the tibia



SUBVASTUS APPROACH

14

- ▶ Advantages
- ▶ Preservation of the patellar vascularization
- ▶ Preservation of the extensor mechanism
- ▶ Faster recovery of mobility and strength
- ▶ Better patellar tracking



SUBVASTUS APPROACH

15

- ▶ Drawbacks
- ▶ Increased difficulty with exposure
- ▶ Greater difficulty everting the patella
- ▶ → think about the "ideal patient"
 - ▶ Previous surgeries
 - ▶ TKP revision
 - ▶ Patella boga
 - ▶ Obesity ...

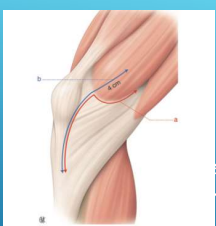



Figure 6. Variation de l'abord medial. a. Voie subvastus; b. voie mid-vastus.

SUBVASTUS APPROACH


16



MIDVASTUS APPROACH

17


- ▶ Difficulties with exposure using the subvastus approach → develop a compromise
- ▶ Muscle splitting approach first described by Engh in 1997
- ▶ Vastus medialis is split full thickness, parallel to its muscle fibers
- ▶ The quadriceps tendon is not incised.



MIDVASTUS APPROACH

18


- ▶ The incision is extended to the superior medial corner of the patella
- ▶ Distally, continued along the medial patella and patellar tendon to the level of the tibial tubercle or as dictated by the requirement of the surgery.
- ▶ As in the subvastus approach, the capsule of the suprapatellar pouch is divided so that the patella can be everted and dislocated laterally.



MIDVASTUS APPROACH

19

- ▶ Functional outcomes have not been proven to be superior in the long term
- ▶ Advantages :
 - ▶ Respect of the extensor mechanism and the patellar vascularization
 - ▶ Easier to evert the patella with the midvastus approach than with the subvastus approach
 - ▶ This approach splits the muscle well away from its neurovascular supply.



MIDVASTUS APPROACH

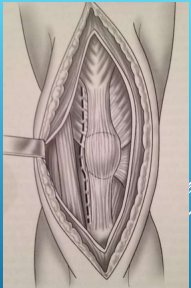
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- ▶ Same relative contraindications than Subvastus
- ▶ → think about the "ideal patient"
 - ▶ Previous surgeries
 - ▶ TKP revision
 - ▶ Patella baja



MIDVASTUS APPROACH


21



LATERAL APPROACH

22


- ▶ First published in 1982, and further developed by Kebabian in 1991
- ▶ Access to the joint from the lateral side of the patellar tendon
- ▶ Used principally for TKA in valgus knees where use of the standard medial parapatellar approach can exacerbate patellar maltracking



LATERAL APPROACH

23

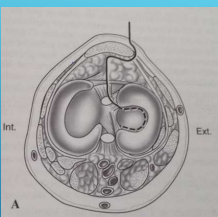
- ▶ Lateral parapatellar retinacular incision extends from the lateral border of the quadriceps tendon, over the lateral margin of the patella
- ▶ Continues distally into the anterior compartment fascia



LATERAL APPROACH

24

- ▶ The infrapatellar fat pad is used for later closure of the lateral retinacular defect
- ▶ This approach may be considered in TKA for fixed valgus deformities, isolated or combined with flexion contracture



LATERAL APPROACH

25

- ▶ Revision TKA
- ▶ Bony or fibrous ankylosis
- ▶ Trauma
- ▶ Infection

DIFFICULT EXPOSURES


26

- ▶ A standard medial parapatellar approach is used in most revisions
- ▶ During eversion of the patella and flexion of the knee, the tibial insertion of the patellar tendon should be directly observed
- ▶ If the medial fibers of the insertion begin to peel away from the tibial tubercle, tension should be released, and a more extensive, quadriceps-relaxing exposure should be considered.

DIFFICULT EXPOSURES

27


- ▶ Quadriceps plasties
 - ▶ Used to avoid Tibial tubercle osteotomy



DIFFICULT EXPOSURES

28


- ▶ Quadriceps plasties
- ▶ Y-plasty « Coonse-Adams »
 - ▶ standard medial parapatellar retinacular incision with an additional limb extending as an inverted V across the quadriceps tendon through the lateral patellar retinaculum
 - ▶ useful in obtaining flexion in knees with quadriceps contractures from long-standing lack of flexion



DIFFICULT EXPOSURES

29

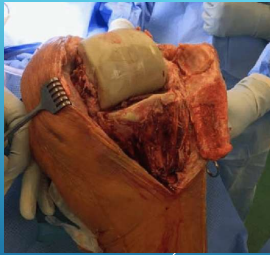
- ▶ Quadriceps plasties
- ▶ Rectus Snip « Insall »
 - ▶ Modification of the quadriceps turndown procedure
 - ▶ The proximal extent of a medial parapatellar arthrotomy is extended laterally across the quadriceps tendon



DIFFICULT EXPOSURES

30

- ▶ Tibial tubercle osteotomy
- ▶ elevation of an 6-8cm segment of the bone that includes the tibial tubercle
- ▶ The tubercle can be advanced proximally for patella baja or if the joint line is elevated significantly



DIFFICULT EXPOSURES

31

- ▶ With careful planning and arthrotomy selection, the anterior aspect of the joint can be adequately exposed for knee arthroplasties in different clinical scenarios
- ▶ The choice of surgical approach for knee arthroplasties should be dictated by
 - ▶ the presenting clinical scenario
 - ▶ the training and experience of the surgeon

SURGICAL APPROACHES FOR KNEE ARTHROPLASTY

32

THANK YOU FOR YOUR ATTENTION

33