



B.A.R.I.

**BORDEAUX ARTHROPLASTY
RESEARCH INSTITUTE**



Chirurgie articulaire et prothétique

CLINIQUE DU SPORT

BORDEAUX - MERIGNAC

Performing a 'Calipered KA TKA'

Charles Rivière

Toulouse 2023



**PRACTICAL COURSE
ORTHOPEDICS**



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ORTHOPEDICS**

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- Personalized Arthroplasty Society

SYSTEMATIC

PERSONALISED

Anatomical Alignment



JLO

Constitutional Alignment



HKA

KA (uKA, rKA, riKA/FA KA start)



Knee Anatomy

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Knee Surgery, Sports Traumatology, Arthroscopy
<https://doi.org/10.1007/s00167-022-07013-3>

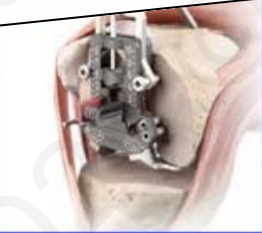
EDITORIAL

Anatomical versus mechanical joint reconstruction: time to pick your surgical philosophy!

Charles Rivière^{1,2,3,4} · Loïc Villet^{1,2,3} · Gabriel Bouchard Roby^{1,2,3}

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SYSTEMATIC

PERSONALISED

Anatomical Alignment

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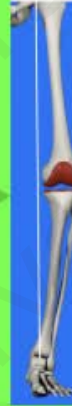
Constitutional Alignment

HKA



KA (uKA, rKA, riKA/FA_{KA start})

Knee Anatomy



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1970s

1980s

2010s

2020s

Mechanical Alignment

Measured resection



Gap balancing



FA_{MA start}



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SYSTEMATIC

PERSONALISED

Anatomical Alignment

JLO



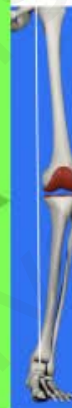
Constitutional Alignment

HKA



KA (uKA, rKA, riKA/FA_{KA start})

Knee Anatomy



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1970s

1980s

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2020s

Mechanical Alignment

Measured resection



Gap balancing



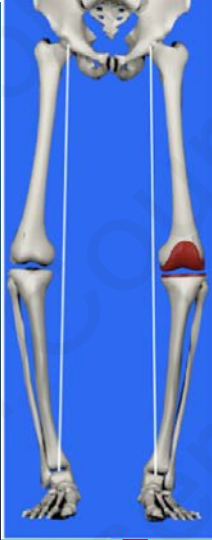
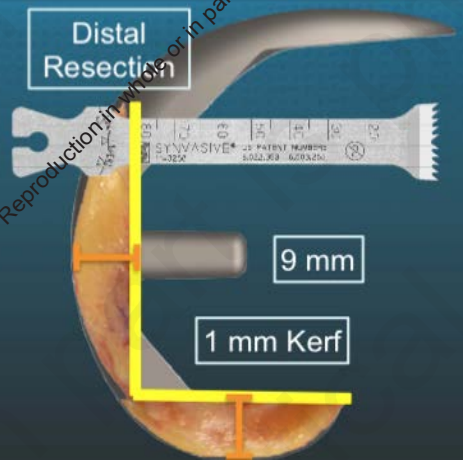
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PERSONALISED

True Knee Resurfacing



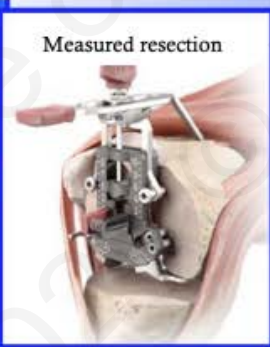
KA (uKA, rKA, riKA/FA KA start)
Knee Anatomy

1 Philosophy: Physiological TKA

Xs techniques: uKA, rKA, riKA/FA KA



Mechanical Alignment



FA_{MA} start

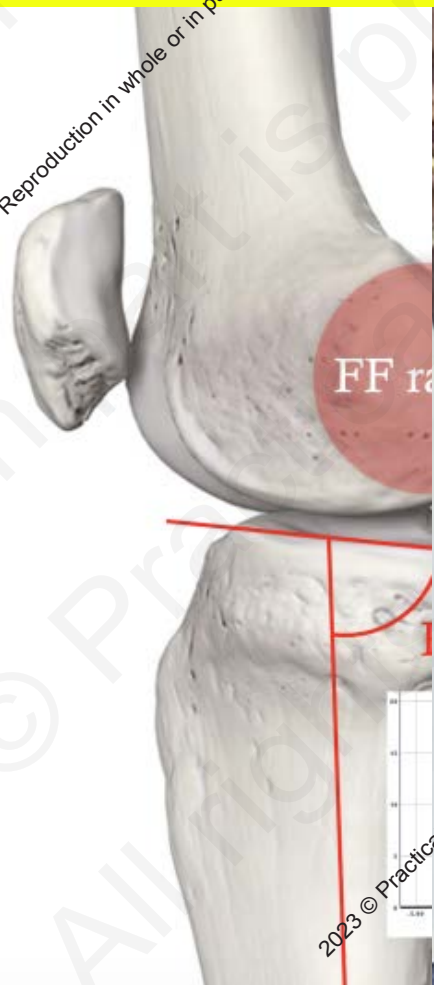
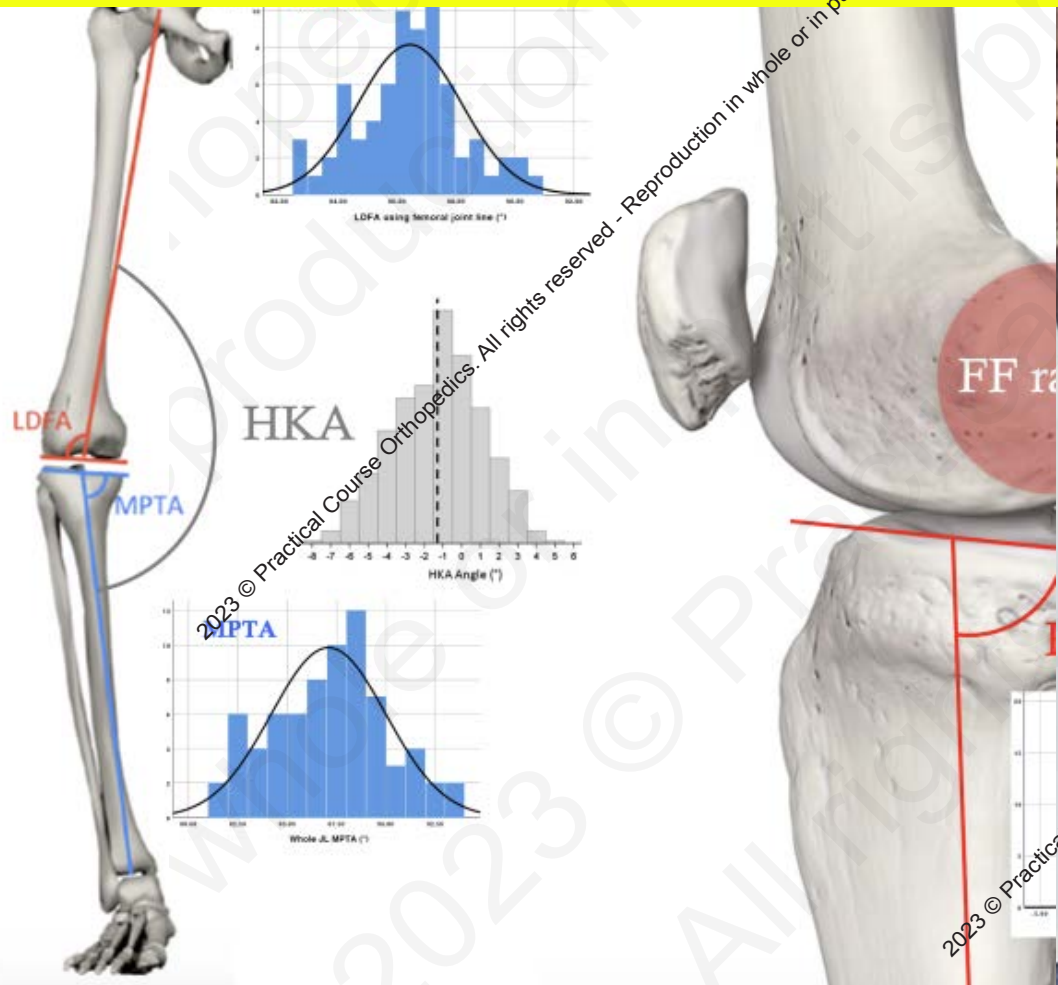


MECHANICAL

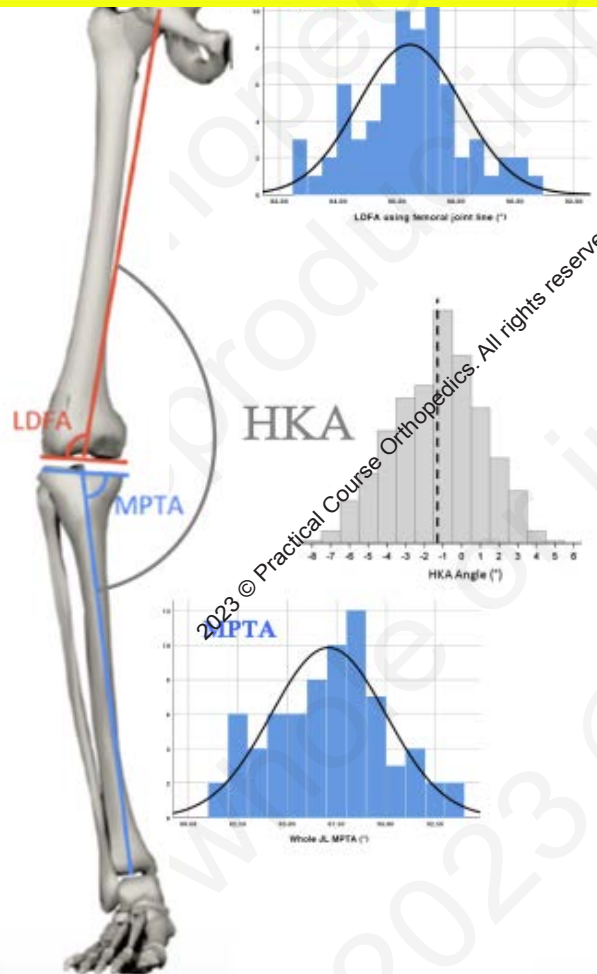
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We are **UNIQUE** from the **OUTSIDE**...and the **INSIDE**



We are **UNIQUE** from



Knee Surgery, Sports Traumatology, Arthroscopy
<https://doi.org/10.1007/s00167-019-05508-0>

KNEE



Phenotyping the knee in young non-osteoarthritic knees shows a wide distribution of femoral and tibial coronal alignment

Michael T. Hirschmann^{1,3} · Lukas B. Moser^{1,3} · Felix Amsler⁵ · Henrik Behrend⁴ · Vincent Leclercq⁶ · Silvan Hess^{1,2}



Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org



Evaluation of the 3-Dimensional, Weight-Bearing Orientation of the Normal Adult Knee

Denis Nam, MD ^a, Ritesh R. Shah, MD ^b, Ryan M. Tunley, MD ^a, Robert L. Barrack, MD ^a

The Chitranjan Ranawat Award

Is Neutral Mechanical Alignment Normal for All Patients?

The Concept of Constitutional Varus

Johan Bellemans MD, PhD, William Colyn MD, Hilde Vandenneucker MD, Jan Victor MD, PhD

SYSTEMATIC

PERSONALISED

Anatomical Alignment

JLO

Constitutional Alignment

HKA

KA (uKA, rKA, riKA/FA_{KA start})

Knee Anatomy

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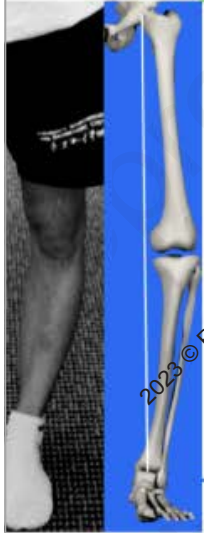
SYSTEMATIC ALTERATION of

- Knee Anatomy
- Knee Laxity
- Knee Kinematics

- Altered joint perception
- Residual symptoms
- Dissatisfied patients

FA_{MA start}

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SYSTEMATIC

PERSONALISED

Anatomical Alignment

Constitutional Alignment

JLO

HKA

KA (uKA, rKA, riKA/FA_{KA start})

Knee Anatomy

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2010s → 2020s

FA_{MA start}

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Anatomical Alignment

Frontal Joint Line Obliquity



Constitutional Alignment

Varus Limb Deformity



KA (uKA, rKA, riKA/FA_{KA start})

Knee Anatomy



= Personalised & Physiological TKA

1970's

1980's

2010's

2020's

Our Future!

Mechanical Alignment

Measured resection



Gap balancing



FA_{MA start}



ANATOMICAL

MECHANICAL

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= Personalised &
Physiological
TKA



Our Futur !

- 1- **More physiological** (~ native knee biomechanics)
- 2- **More reproducible**
 - Reliable landmarks (articular surfaces)
 - Caliper checks (sequential step process)
 - No ligament release (bony procedure)
- 3- **Feels better** (FJS)
- 4- **Low maintenance** (rare residual symptoms, rare complications)
- 4- **Good Longevity so far** (RSA, biomechanical, registry and clinical studies)
- 5- **For everyone** (rKA/FA (KA start) for extreme anatomy and/or lateral laxity and/or patella tracking)

KA (uKA, rKA, riKA/FA KA start)

Knee Anatomy

= Personalised & Physiological TKA



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Manual instrumentation

CAS/ROBOTICS

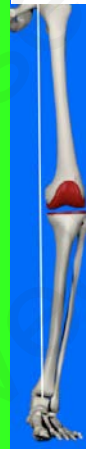
PSI



= Calipered KA Technique



= Personalised & Physiological TKA



Manual instrumentation



My CHOICE

Calipered KA-TKA

Calipered KA Technique



KA (uKA, rKA, riKA/FA KA start)

Knee Anatomy



= Personalised &
Physiological
TKA

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- 1. Measured resection (F or T first)
- 2. Posterior referencing
- 3. Pure bony procedure (collateral ligaments sparing)
- 4. Sequential step process (step → quality check → step → quality check → etc.)

Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

MEASURE AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Perform the femoral cuts and all femoral limitations

DISTAL CUT THEN OTHER CUTS WITH AIN T ANGULARLY. CONTROL THE QUALITY OF BONE RESECTIONS (CALIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER MAKING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, AND CUT THROUGH IN THIS ORDER

result if needed after quality control (caliper & angulation) of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RESECT THE TIBIA IF NEEDED

Size tibial component and make tibial fixation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

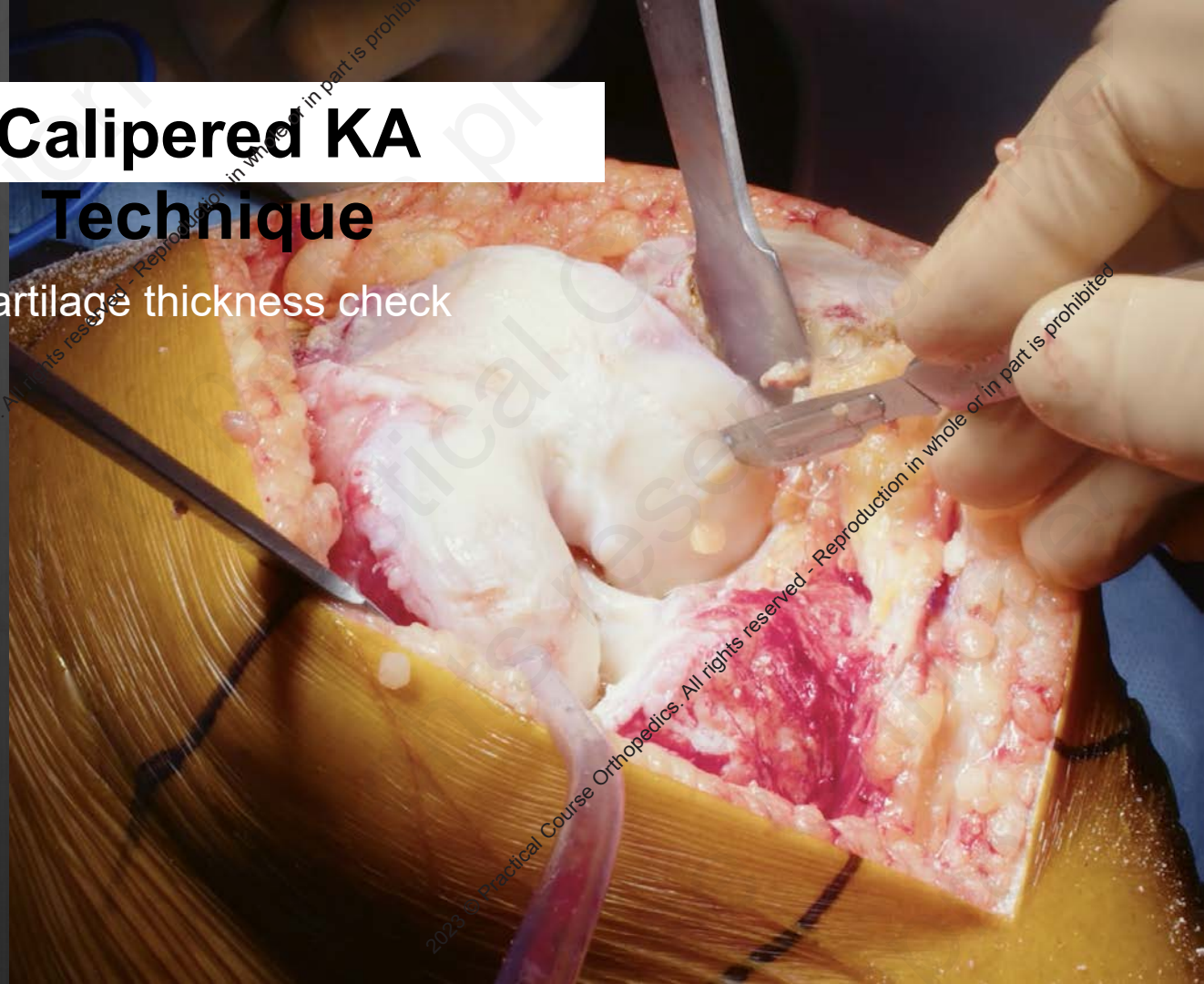
Final components implantation & closure

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Calipered KA-TKA

Calipered KA Technique

Cartilage thickness check



- Conventional medial para-patellar approach**
 - Estimate the physiological knee laxity and amount of bone loss
 - WALK AND VALGUS STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION
- Perform the femoral cuts and all femoral finitions**
 - DISTAL CUT THEN OTHER CUTS WITH AIN (ANALYZE) CONTROL THE QUALITY OF BONE RESCTIONS (CALLIPER)
- Achieve a good tibial exposure**
 - ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND THE LATERAL TIBIAL PLATEAUS
- Drill 2 holes along the lateral tibia plateau axis**
- Perform the tibial cut**
 - AFTER HAVING SET THE CUT BY ADJUSTING AXIAL, FRONTAL (VARUS-VALGUS), AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT RESPECTING THIS ORDER
 - result if needed after quality control (caliper & inspection) of the tibial cut
- Resect residual menisci and posterior condylar osteophytes**
- Assess extension and flexion gaps with spacer blocks**
 - RE-CUT THE TIBIA IF NEEDED
- Size tibial component and make tibial finition for the knee**
 - MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU
- Insert trial components**
 - ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING
- Perform kinematic patella resurfacing with trial components still in place**
 - DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES
- Final components implantation & closure**

Calipered KA-TKA

Calipered KA Technique

Estimate the physiological knee laxity and amount of bone loss **X** Conventional medial para-patellar approach

PERFORM AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Achieve a good tibial exposure

PERFORM THE FEMORAL CUTS AND ALL FEMORAL FINITIONS

DISTAL CUT THEN OTHER CUTS WITH AIN (ANALOGUE) CONTROL THE QUALITY OF BONE RESECTIONS (CALLIPER)

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT INSIDE IN THIS ORDER

result if needed after quality control (caliper & inspection) of the tibial cut

Reset residual menisci and posterior condylar osteophytes with spacer blocks

RESECT THE TIBIA IF NEEDED

Size tibial component and make tibial finition for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

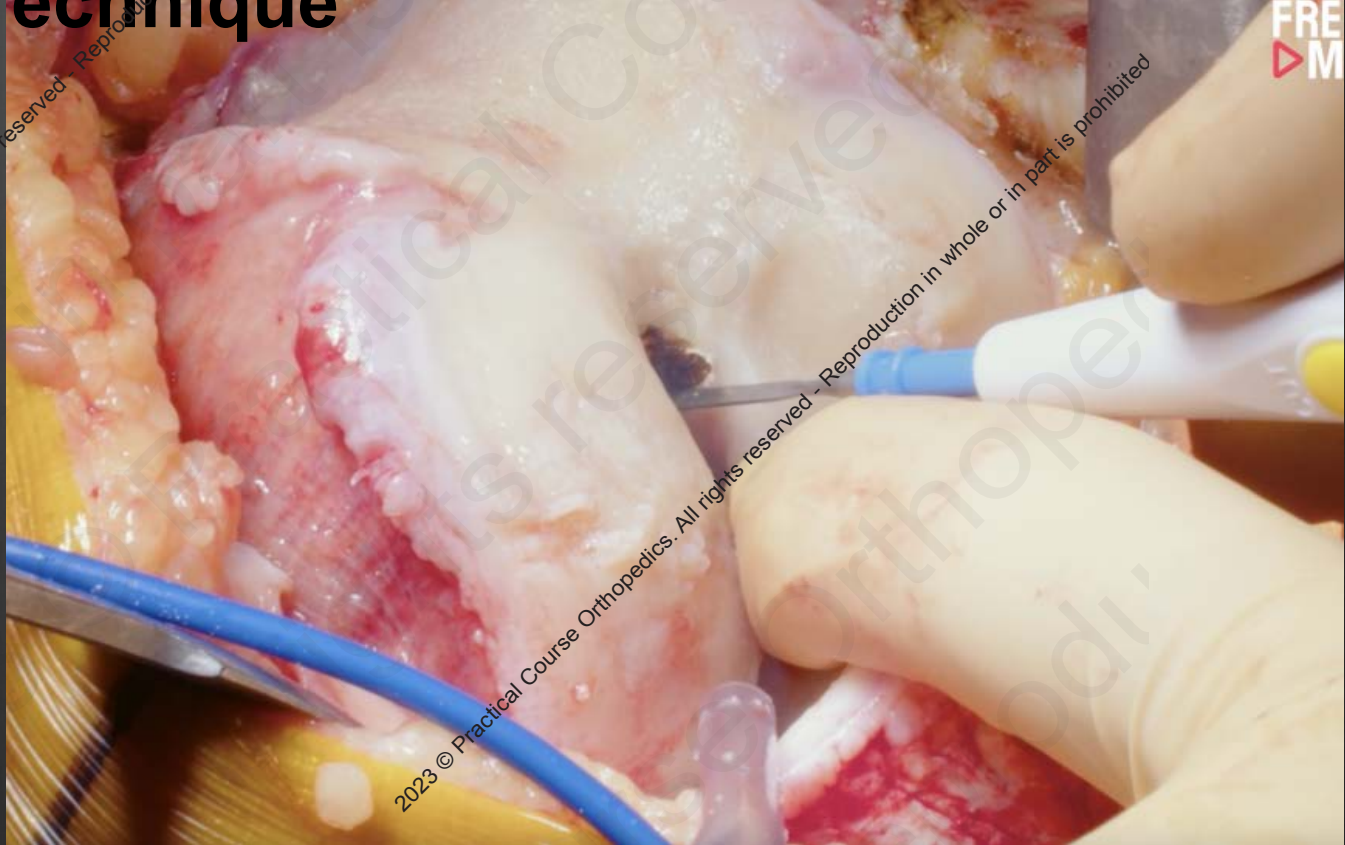
Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

Final components implantation & closure



Calipered KA-TKA

Calipered KA Technique

of S. M. Howell, MD - Lodi Memorial Hospital, Lodi, CA (USA)

Estimate the physiological knee laxity and amount of bone loss **X** Conventional medial para-patellar approach

Achieve a good tibial exposure

PERFORM THE FEMORAL CUTS AND ALL FEMORAL FIMITIONS

DISTAL CUT THEN OTHER CUTS WITH AN IT ANGLE AND CONTROL THE QUALITY OF BONE RESECTIONS (CALIPER)

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, AND CUT RESIDE IN THIS ORDER

RESULT IF NEEDED AFTER QUALITY CONTROL (CALIPER & INSPECTION) OF THE tibial cut

Assess extension and flexion gaps with spacer blocks

RESECT RESIDUAL MENISCI AND POSTERIOR CONDYLAR OSTEOPLASTY

Size tibial components and make tibial fixation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure



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Calipered KA-TKA

Calipered KA Technique

Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

MEASURE AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Perform the femoral cuts and all femoral finitions

DISTAL CUT THEN OTHER CUTS WITH AIN (ANCLAGE) CONTROL THE QUALITY OF BONE RESECTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND THE LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT THROUGH THE GUIDE

result if needed after quality control caliper & inspection of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Size tibial component and make tibial finition for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

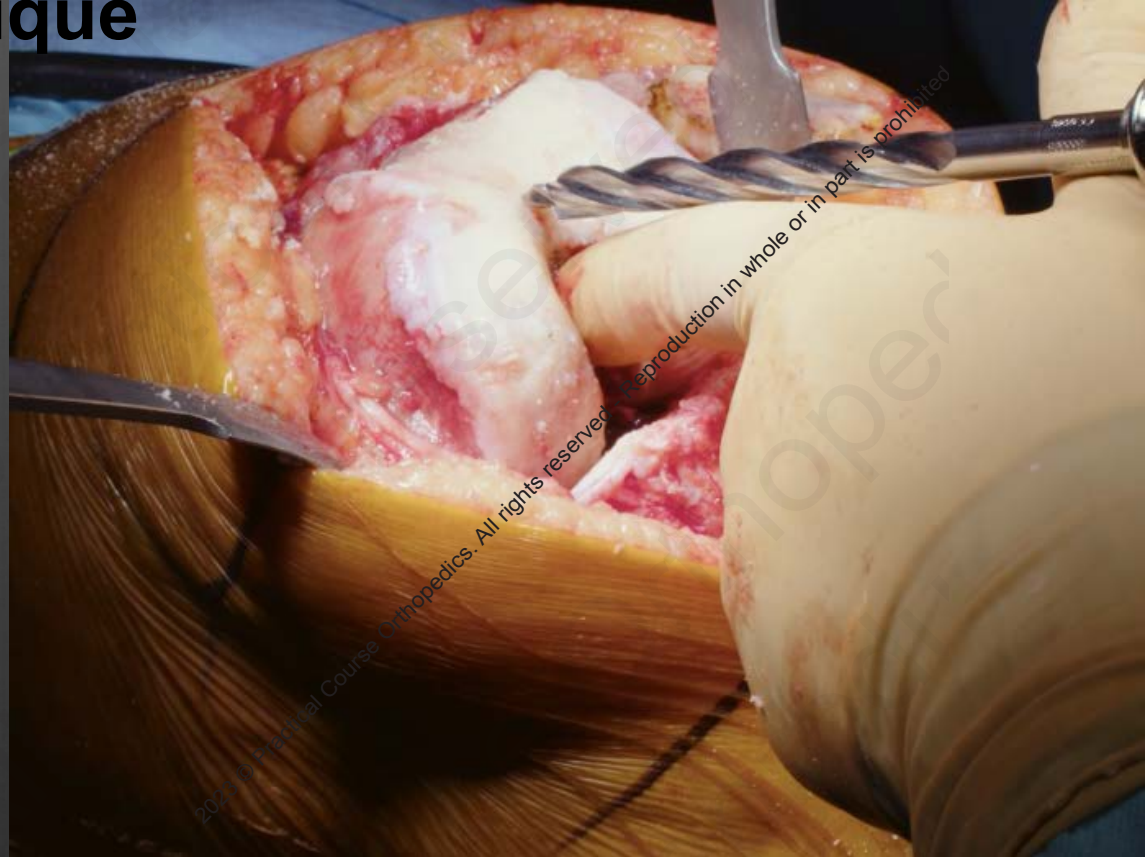
Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

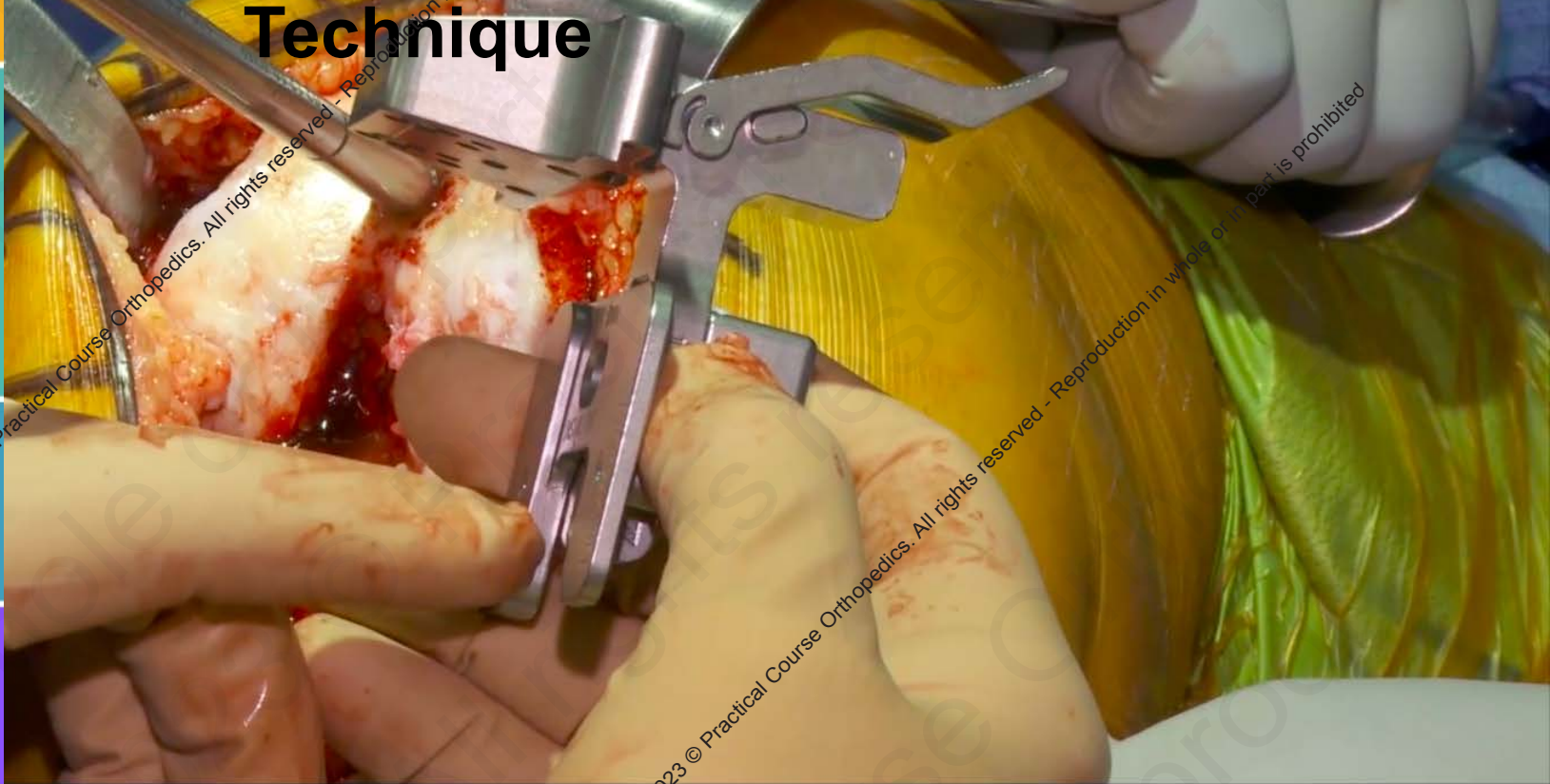
Final components implantation & closure



Calipered KA-TKA

Calipered KA Technique

of S. M. Howell, MD - Lodi Memorial Hospital, Lodi, CA (USA)



Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

MEASURE AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

X Perform the femoral cuts and all femoral limitations

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER MAKING THE CUT BY ADJUSTING ANIMAL, FRONTAL, CORRAL, VALGUS, AND SAGITTAL SLOPE/ROTATIONS, AND CUT INSIDE IN THIS ORDER

result if needed after quality control: caliper & inspection of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RE-CUT THE TIBIA IF NEEDED

Size tibial components and make tibial limitation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

Final components implantation & closure

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Calipered KA-TKA

Calipered KA Technique

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Estimate the physiological knee laxity and amount of bone loss

CONVENTIONAL MEDIAL PARATELLAR APPROACH

MEASURE AND VALIDATE STERILE TECHNIQUE THROUGHOUT THE KNEE RANGE OF MOTION

X Perform the femoral cuts and all femoral limitations

DISTAL CUT THEN OTHER CUTS WITH ONE T ANGLE. ALWAYS CONTROL THE QUALITY OF BONE RESTRICTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS), AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT INSIDE IN THIS ORDER

result if needed after quality control (caliper & inspection) of the tibial cut

Assess extension and flexion gaps with spacer blocks

RESCUT THE TIBIA IF NEEDED

Resect residual menisci and posterior condylar osteophytes

Size tibial component and make tibial limitation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

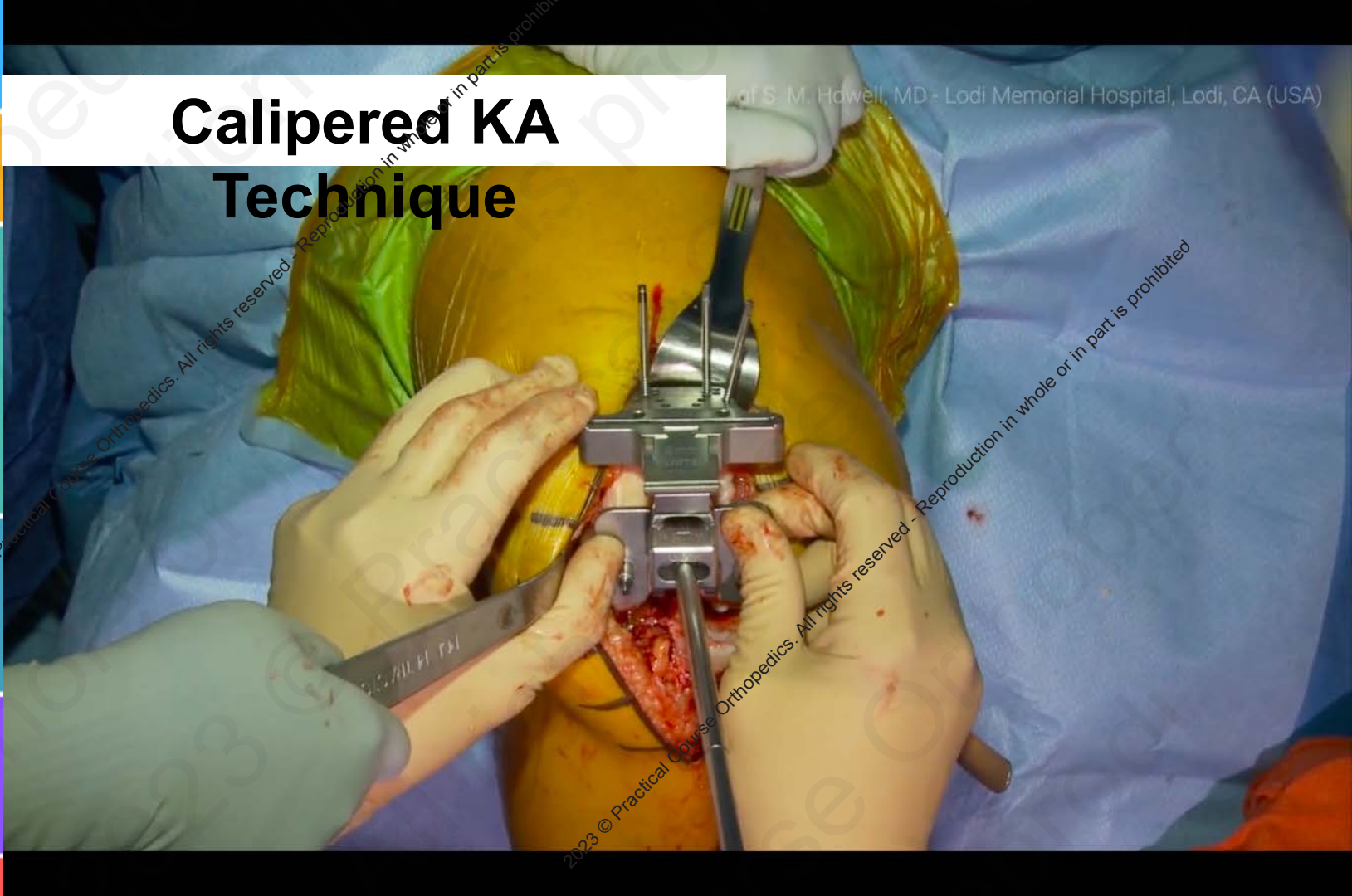
Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

Final components implantation & closure



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Calipered KA Technique

Distal condyle check

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Estimate the physiological knee laxity and amount of bone loss

WALK AND VALGUS STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Conventional medial para-patellar approach

X Perform the femoral cuts and all femoral limitations

DISTAL CUT THEN OTHER CUTS WITH AIN (ANALOGUE) CONTROL THE QUALITY OF BONE RESTRICTIONS (CALIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER MAKING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, AND CUT HORIZONAL TO THIS GRIDS

result if needed after quality control caliper & inspection of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Size tibial components and make tibial limitation for the heel

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Assess extension and flexion gaps with spacer blocks

RECUIT THE TIBIA IF NEEDED

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT, ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

Final components implantation & closure



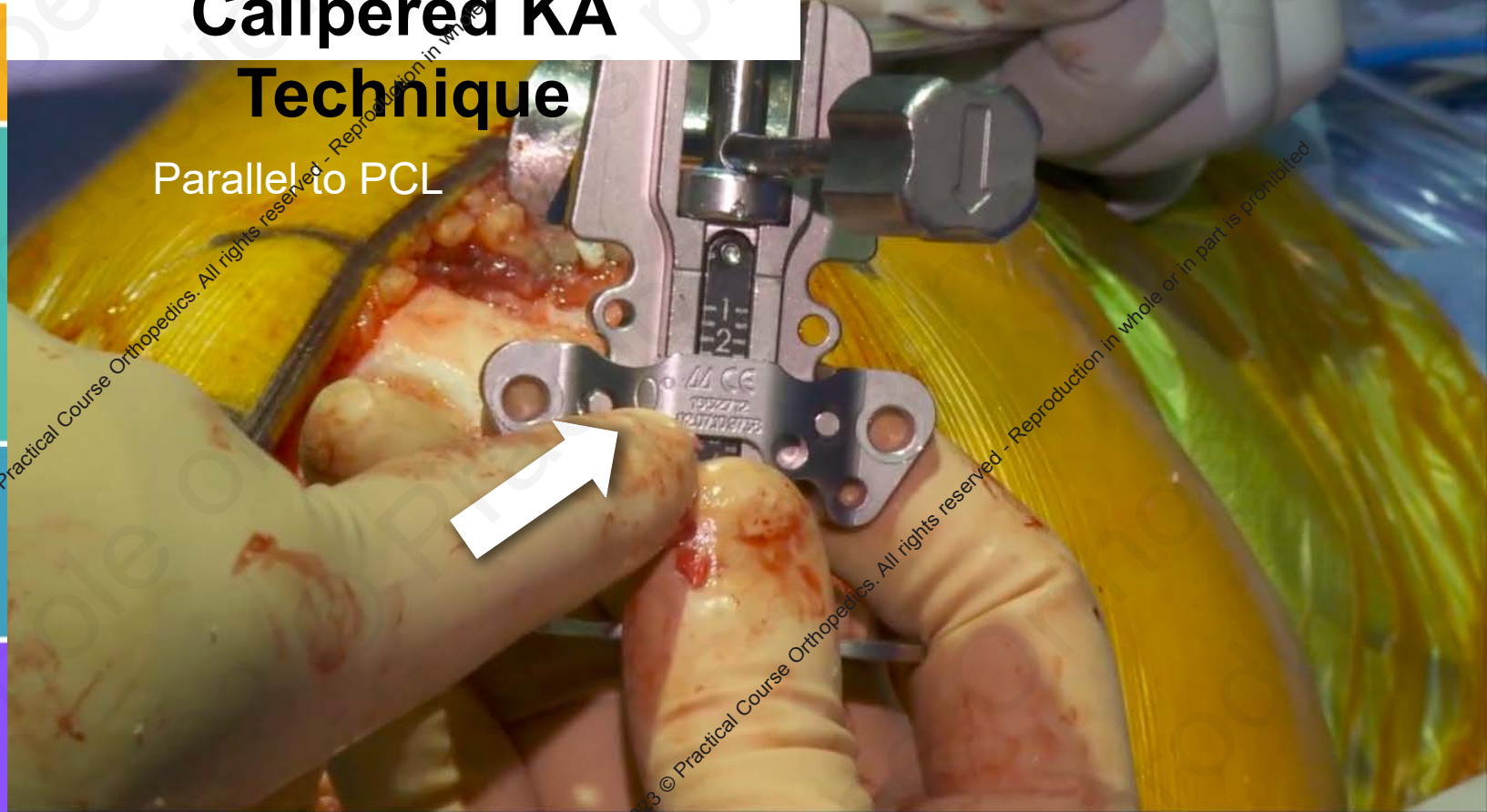
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Calipered KA-TKA

Calipered KA Technique

Parallel to PCL

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Estimate the physiological knee laxity and amount of bone loss

Conventional medial parapatellar approach

MEASURE AND VALIDATE STERILE TECHNIQUE THROUGHOUT THE KNEE RANGE OF MOTION

X Perform the femoral cuts and all femoral limitations

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL CORRECTIONS, VALGUS, AND SAGITTAL SLOPE/ROTATIONS, AND CUT TIBIAL IN THIS ORDER

result if needed after quality control (runner & impacters) of the tibial cut

Assess extension and flexion gaps with spacer blocks

RE-CUT THE TIBIA IF NEEDED

Resect residual menisci and posterior condylar osteophytes

Size tibial components and make tibial limitation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure

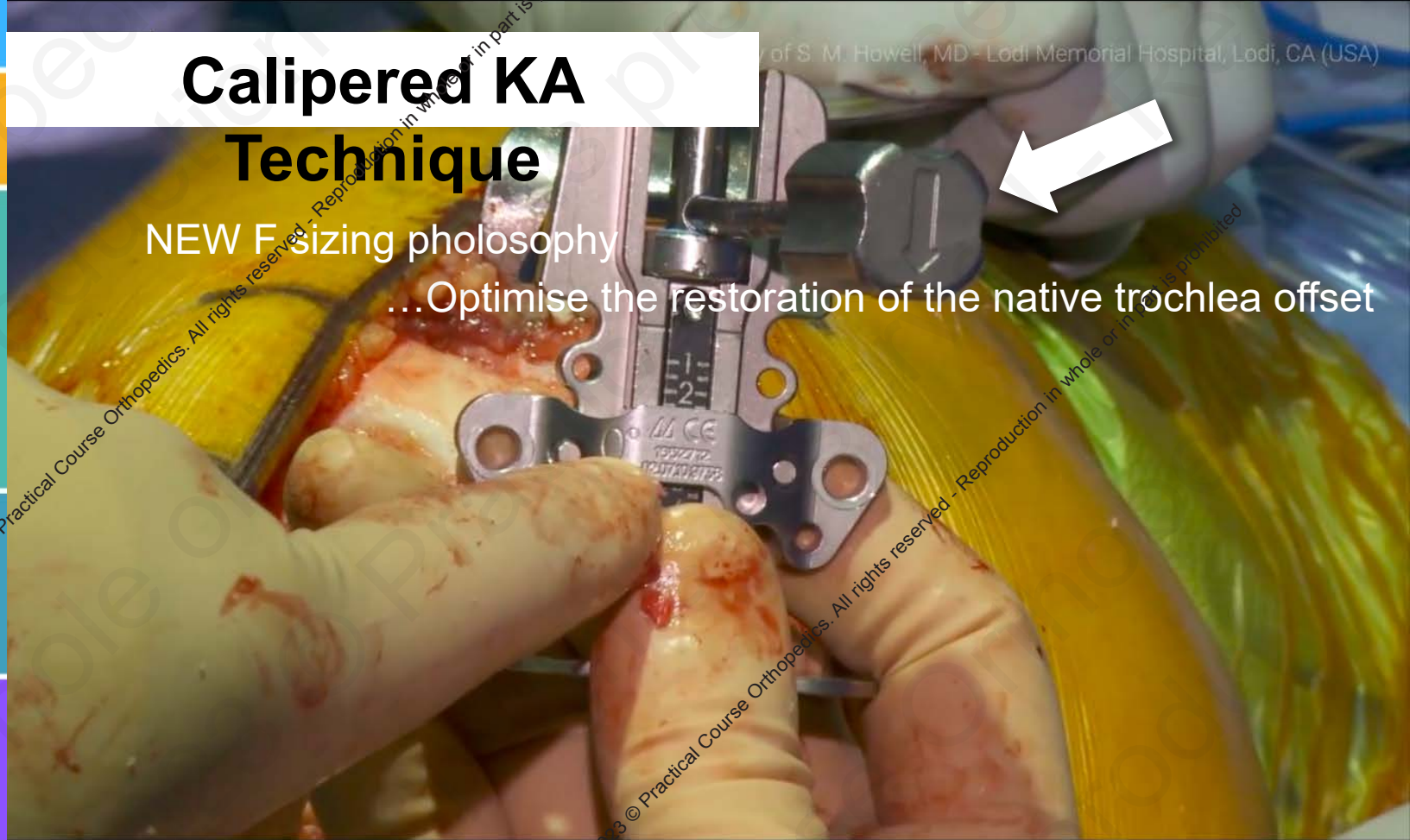
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Calipered KA-TKA

Calipered KA Technique

NEW F sizing philosophy

...Optimise the restoration of the native trochlea offset



of S. M. Howell, MD - Lodi Memorial Hospital, Lodi, CA (USA)

Estimate the physiological knee laxity and amount of bone loss

CONVENTIONAL MEDIAL PARAPATELLAR APPROACH

MEASURE AND VALIDATE STEREO TESTS THROUGHOUT THE KNEE RANGE OF MOTION

X Perform the femoral cuts and all femoral limitations

DISTAL CUT THEN OTHER CUTS WITH AIN (ANGLE) AND CONTROL THE QUALITY OF BONE RESTRICTIONS (CALIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL CORRECTION, VALGUS, AND SAGITTAL SLOPE/ROTATION, AND CUT TIBIAL IN THIS ORDER

result if needed after quality control (caliper & inspection) of the tibial cut

Assess extension and flexion gaps with spacer blocks

RE-CUT THE TIBIA IF NEEDED

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure

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Calipered KA Technique

NEW F sizing philosophy

...Optimise the restoration of the native trochlea offset



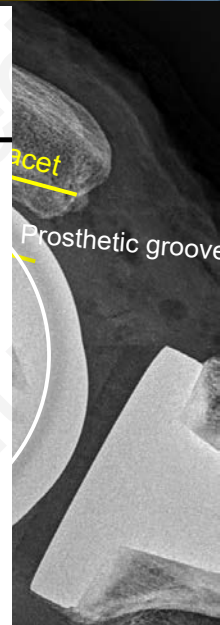
Knee Surgery, Sports Traumatology, Arthroscopy

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EDITORIAL

Anatomical restoration of the anterior femoral compartment when performing KATKA: the end of the flush anterior femoral cut dogma!

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Calipered KA-TKA

Calipered KA Technique

of S. M. Howell, MD - Lodi Memorial Hospital, Lodi, CA (USA)

Estimate the physiological knee laxity and amount of bone loss

MEASURE AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Conventional medial para-patellar approach

X Perform the femoral cuts and all femoral finitions

DISTAL CUT THEN OTHER CUTS WITH ONE T-ANGLE AND CONTROL THE QUALITY OF BONE RESECTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER MAKING THE CUT BY ADJUSTING ANIMAL, FRONTAL, CORONAL, VALGUS, AND SAGITTAL SLOPES, ROTATIONS, AND CUT HEIGHT, IN THIS ORDER

result if needed after quality control (caliper & angler) of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RE-CUT THE TIBIA IF NEEDED

Size tibial component and make tibial finition for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

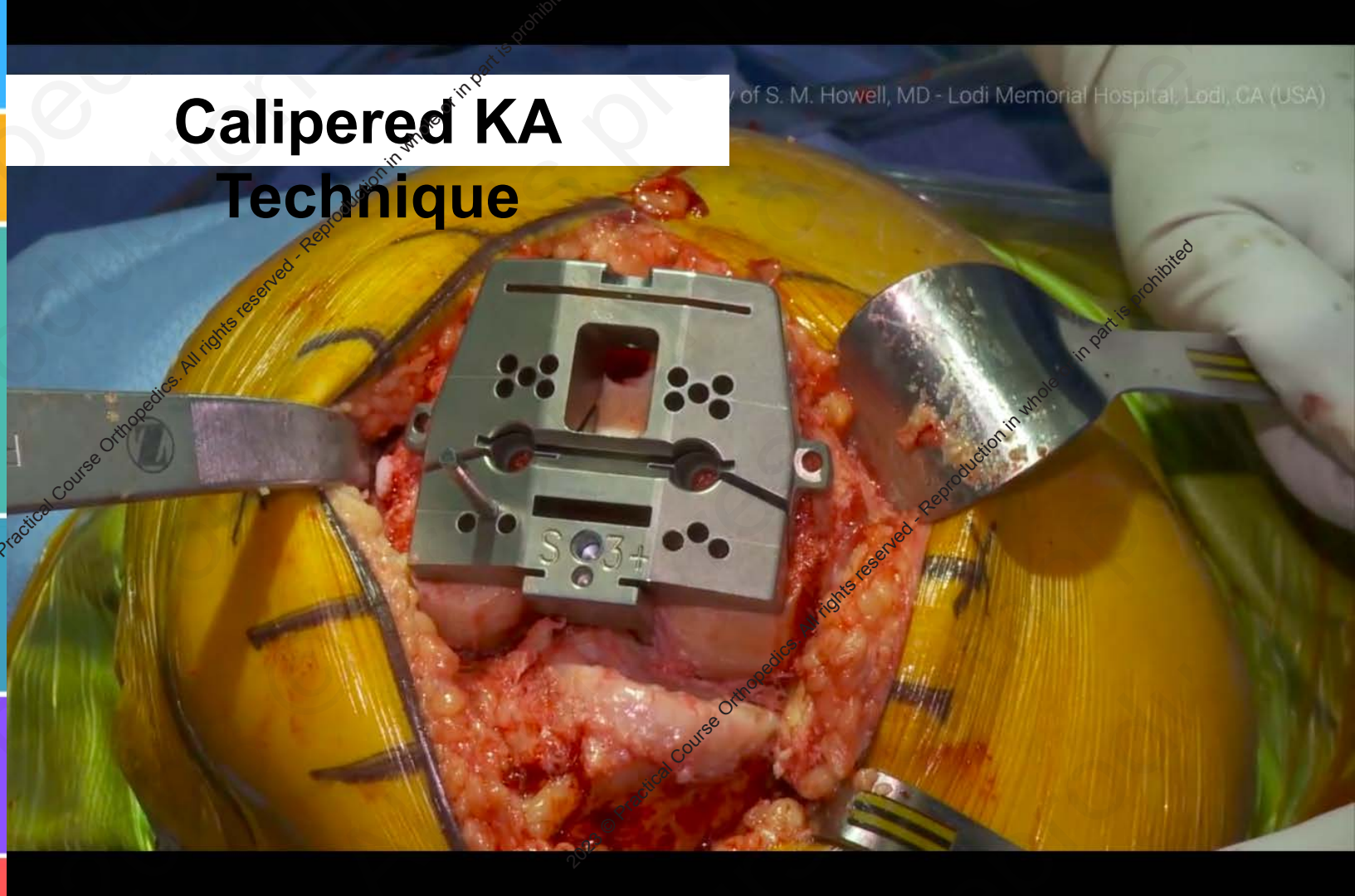
Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

Final components implantation & closure



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Posterior condyle check

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Estimate the physiological knee laxity and amount of bone loss

Conventional medial para-patellar approach

PERFORM AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Perform the femoral cuts and all femoral finitions

DISTAL CUT THEN OTHER CUTS WITH ONE T-ANCHOR. CONTROL THE QUALITY OF BONE RESECTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS), AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT INSIDE IN THIS ORDER

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RECUR THE TIBIA IF NEEDED

Size tibial component and make tibial finition for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

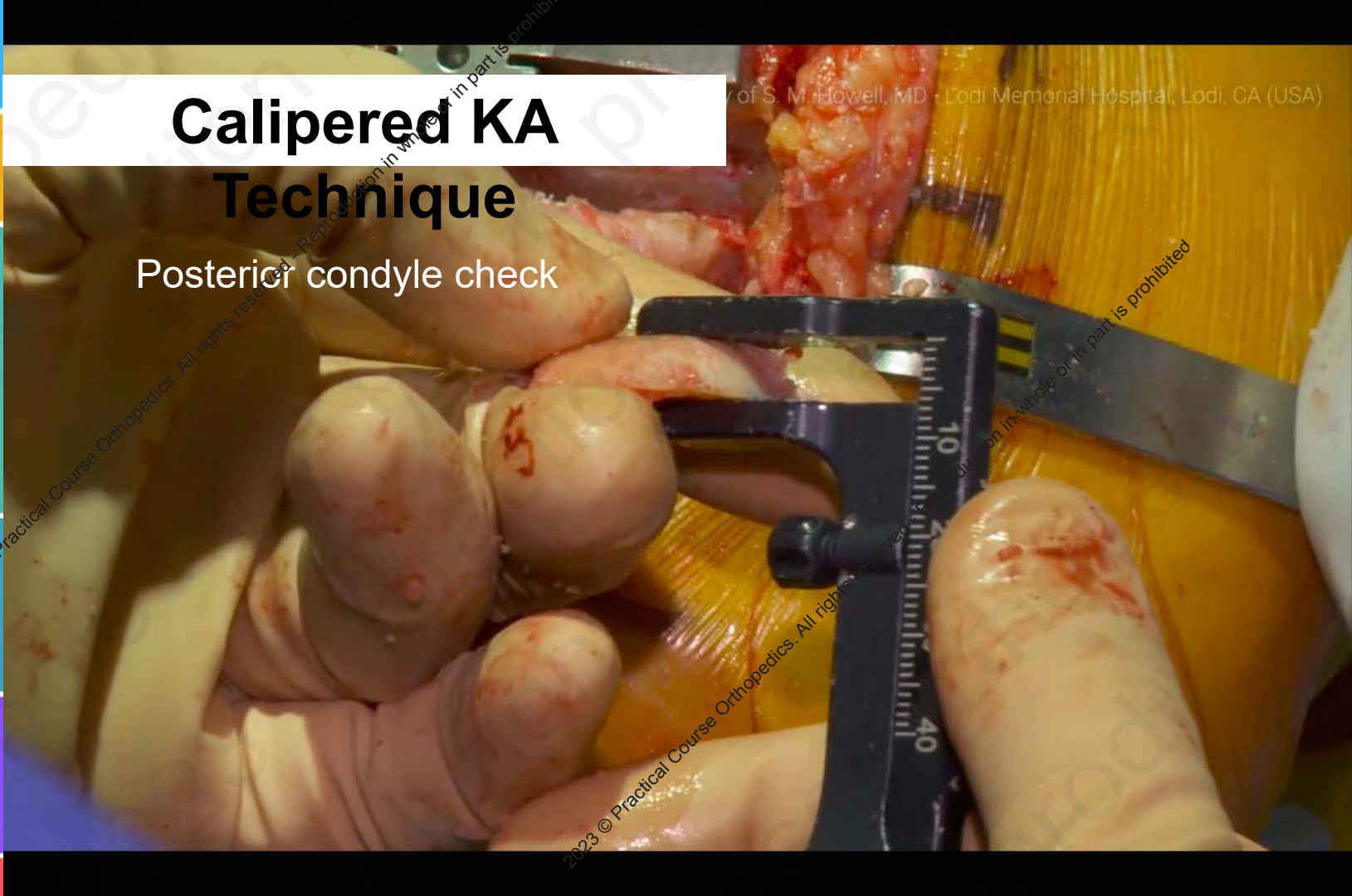
Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure

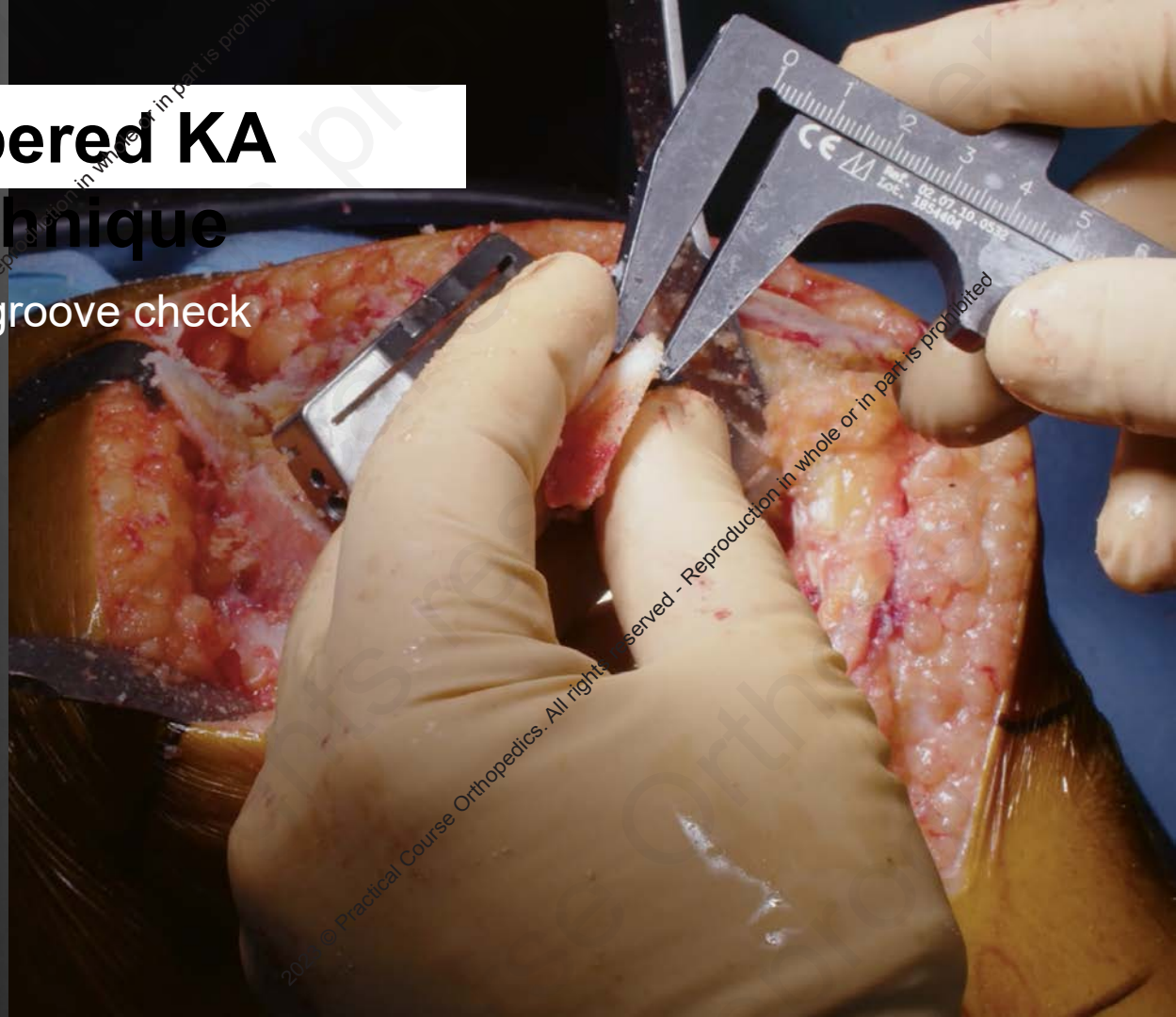


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Trochlea groove check



Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

MEASURE AND VALIDATE STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

X Perform the femoral cuts and all femoral finitions

DISTAL CUT THEN OTHER CUTS WITH AIN T ANGLE AND CONTROL THE QUALITY OF BONE RESECTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT THROUGH THE GUIDE

result if needed after quality control (caliper & inspection) of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RECUIT THE TIBIA IF NEEDED

Size tibial component and make tibial finition for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSES FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

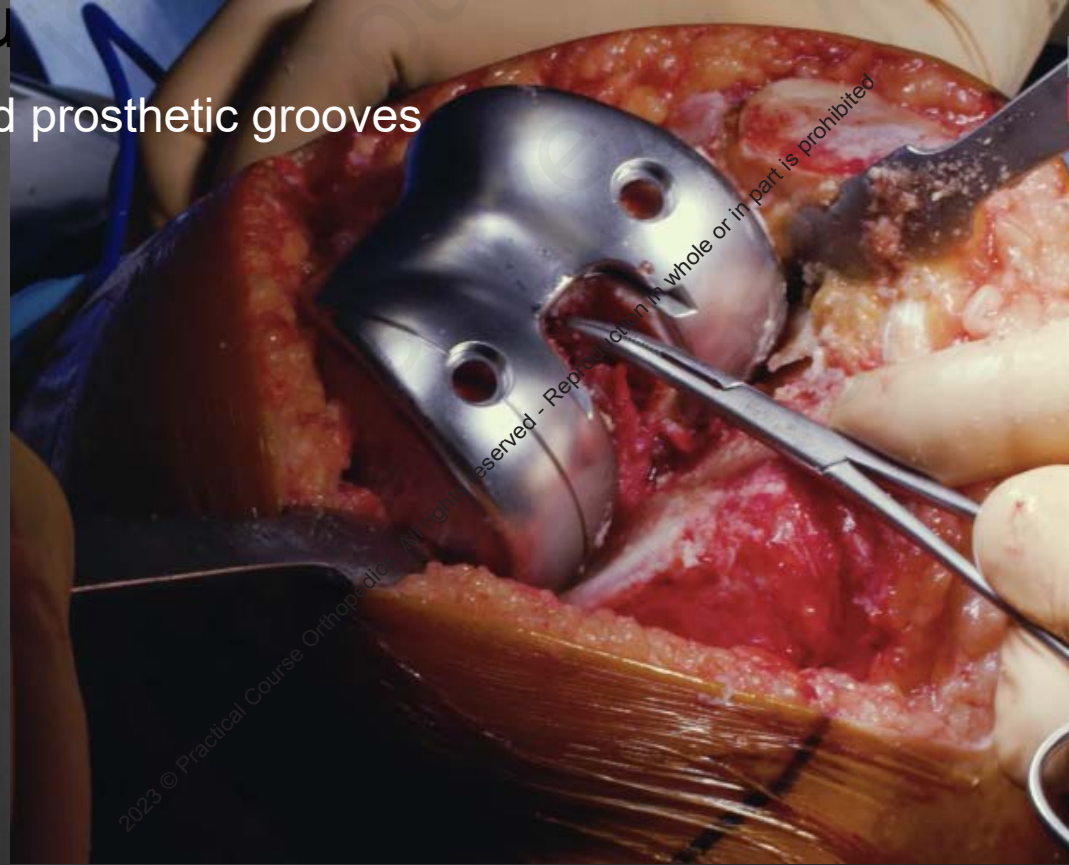
DRILL 2 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 2 HOLES

Final components implantation & closure

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Co-align native and prosthetic grooves



Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

WALK AND VALGUS STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Perform the femoral cuts and all femoral limitations

DISTAL CUT THEN OTHER CUTS WITH AIN (ANGLE) AND CONTROL THE QUALITY OF BONE RESTRICTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND THE LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING AXIAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLIGHT ROTATIONS) AND CUT INSIDE IN THIS ORDER

result if needed after quality control caliper & inspection of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RECUIT THE TIBIA IF NEEDED

Size tibial component and make tibial limitation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

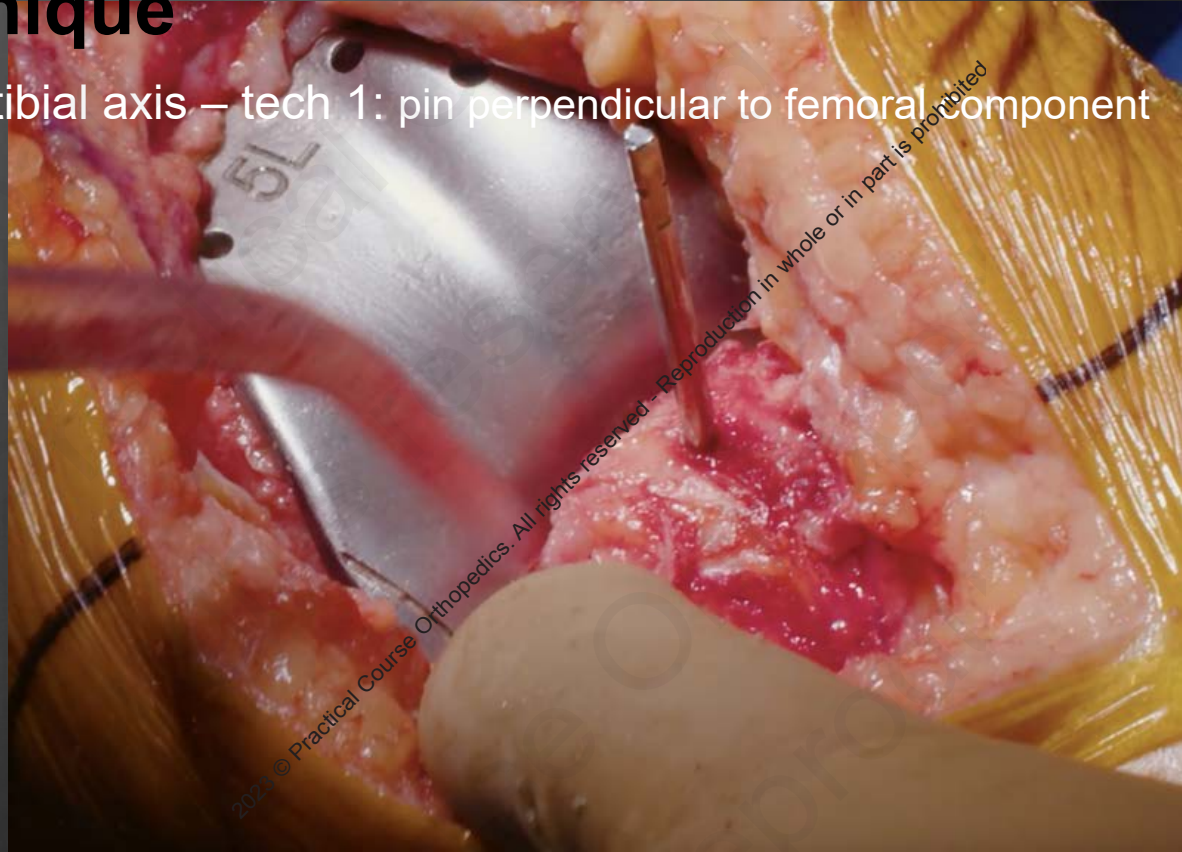
DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure

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Mark the AP tibial axis – tech 1: pin perpendicular to femoral component



Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

WEDGE AND VALGUS STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Perform the femoral cuts and all femoral finitions

DISTAL CUT THEN OTHER CUTS WITH 40° T ANGLE AND CONTROL THE QUALITY OF BONE RESECTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibial plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT INSIDE IN THIS ORDER

result if needed after quality control (caliper & inspection) of the tibial cut

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RECUIT THE TIBIA IF NEEDED

Size tibial component and make tibial finition for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSES FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

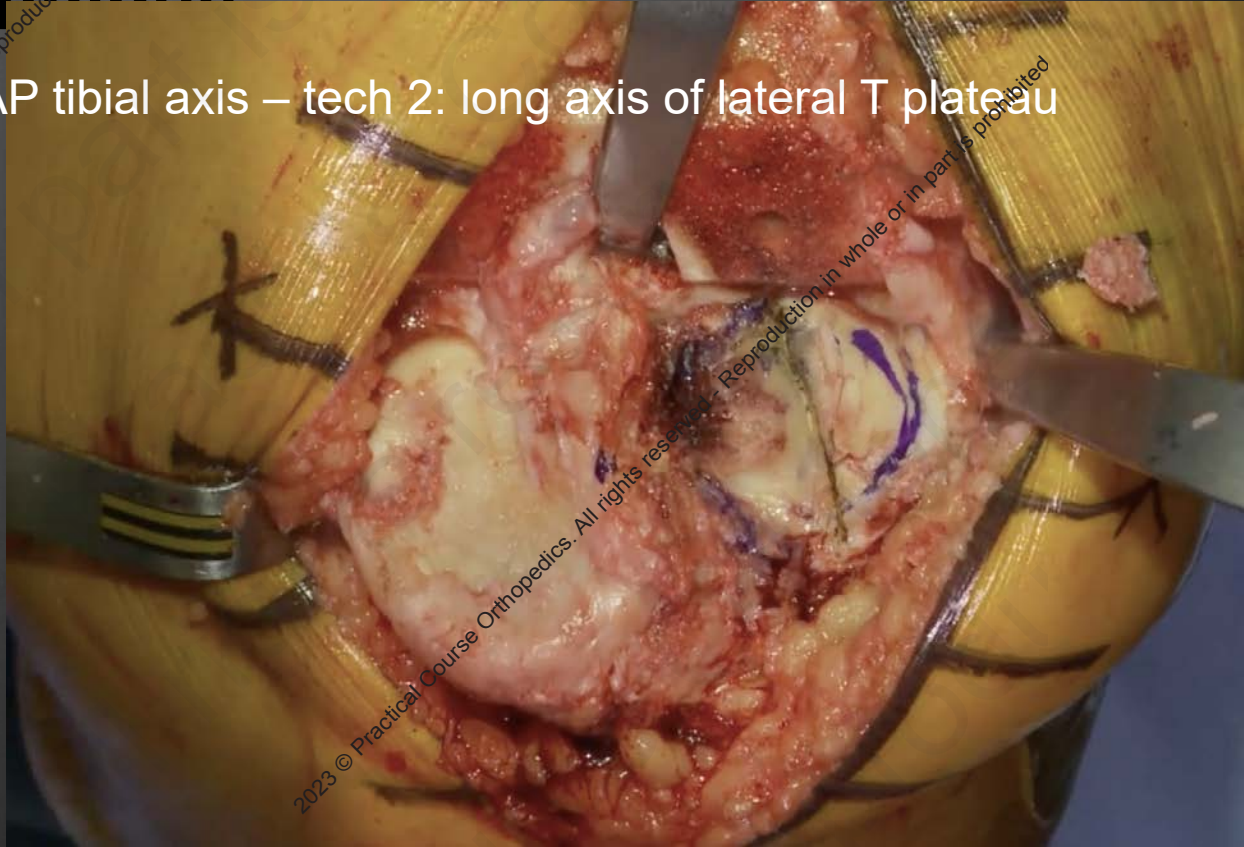
DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure

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Mark the AP tibial axis – tech 2: long axis of lateral T plateau



Conventional medial para-patellar approach

Estimate the physiological knee laxity and amount of bone loss

WEDGE AND VALGUS STRESS TESTS THROUGHOUT THE KNEE RANGE OF MOTION

Perform the femoral cuts and all femoral limitations

DISTAL CUT THEN OTHER CUTS WITH AIN (ANALOGUE) CONTROL THE QUALITY OF BONE RESTRICTIONS (CALLIPER)

Achieve a good tibial exposure

ANTERIOR TIBIA DISLOCATION TO EXPOSE THE MEDIAL AND LATERAL TIBIAL PLATEAUS

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

AFTER HAVING SET THE CUT BY ADJUSTING ANIMAL, FRONTAL (VARUS-VALGUS) AND SAGITTAL (SLOPE) ROTATIONS, MAKE CUT INSIDE IN THIS ORDER

Resect residual menisci and posterior condylar osteophytes

Assess extension and flexion gaps with spacer blocks

RECUIT THE TIBIA IF NEEDED

Size tibial components and make tibial limitation for the knee

MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

Insert trial components

ASSESS FEMOROTIBIAL BALANCE AND PATELLA TRACKING

Perform kinematic patella resurfacing with trial components still in place

DRILL 3 HOLES ALONG THE PATELLA CREST BEFORE PERFORMING THE PATELLA CUT. ALIGN THE PROSTHETIC CREST ON THE LINE JOINING THE 3 HOLES

Final components implantation & closure

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Estimate the physiological knee laxity and amount of bone loss

Conventional medial para-patellar approach

Perform the femoral cuts and all femoral finitions

Achieve a good tibial exposure

Drill 2 holes along the lateral tibia plateau axis

Perform the tibial cut

Resect residual menisci and posterior condylar osteophytes

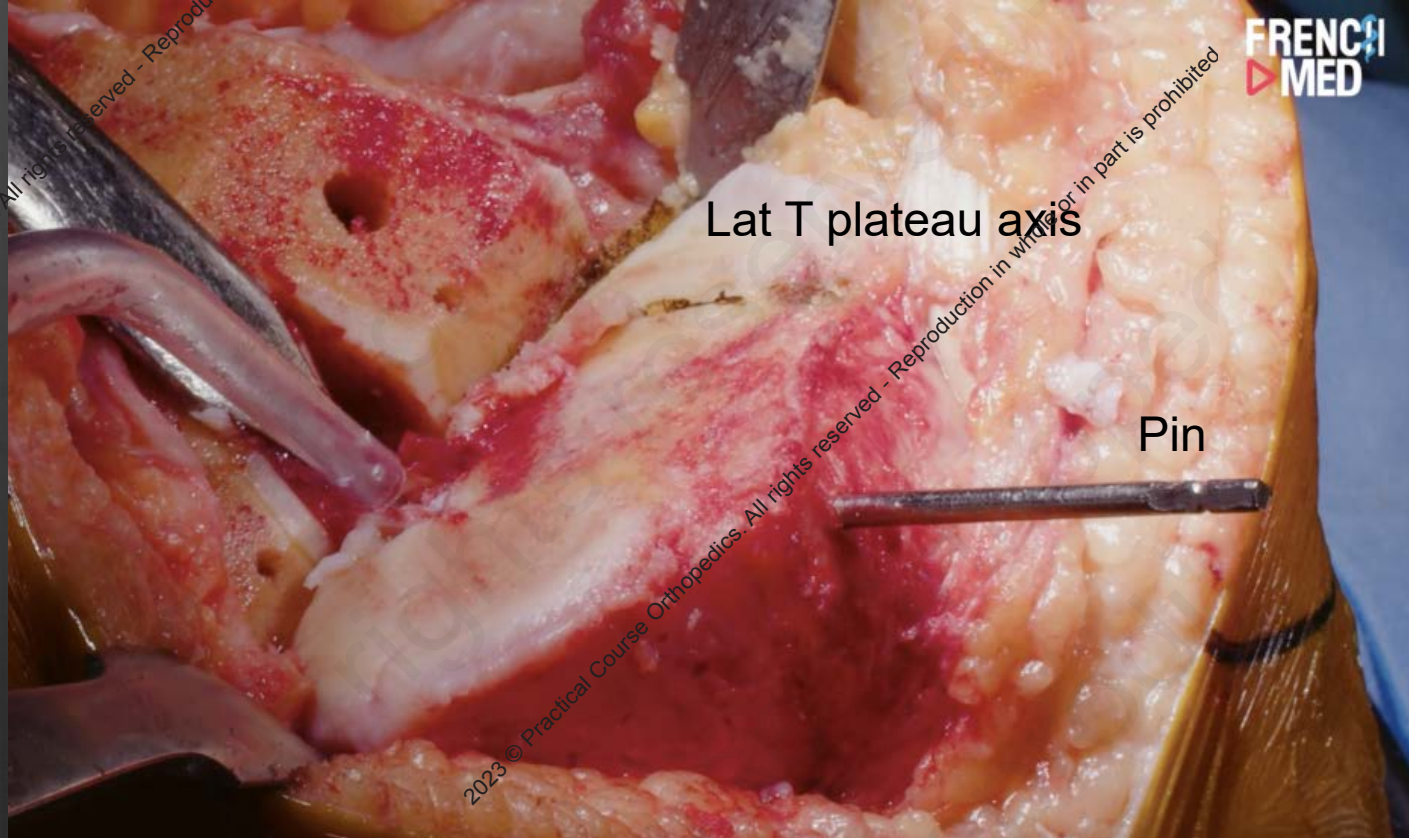
Assess extension and flexion gaps with spacer blocks

Size tibial components and make tibial finition for the knee

Insert trial components

Perform kinematic patella resurfacing with trial components still in place

Final components implantation & closure



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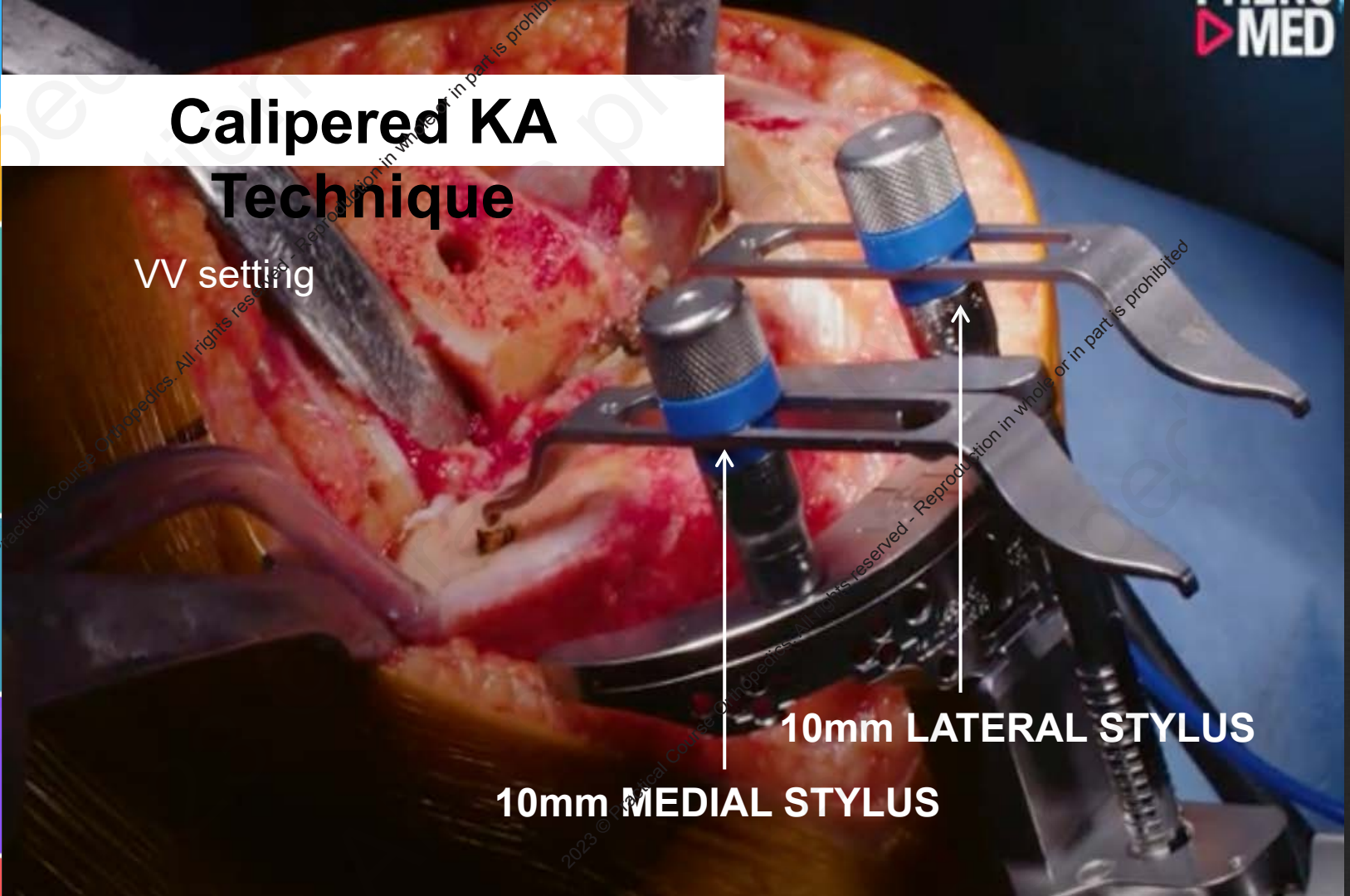
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VV setting

10mm LATERAL STYLUS

10mm MEDIAL STYLUS

- Conventional medial para-patellar approach**
 - Estimate the physiological knee laxity and amount of bone loss
 - Measure and validate styli depth throughout the knee range of motion
- Perform the femoral cuts and all femoral limitations**
 - Distal cut then other cuts with an 1° angle and control the quality of bone resections (CALLIPER)
- Achieve a good tibial exposure**
 - Anterior tibia dislocation to expose the medial and lateral tibial plateaus
- Drill 2 holes along the lateral tibia plateau axis**
- Perform the tibial cut**
 - After having set the cut by adjusting axial, frontal, coronal, valgus and sagittal slopes, rotations and cut height, in this order
 - result if needed after quality control (angle & depth) of the tibial cut
- Resect residual menisci and posterior condylar osteophytes**
- Assess extension and flexion gaps with spacer blocks**
 - Re-cut the tibia if needed
- Size tibial component and make tibial limitation for the knee**
 - Make sure the tibial rotation is parallel to the line joining the 2 holes made in the lateral plateau
- Insert trial components**
 - Assess femorotibial balance and patella tracking
- Perform kinematic patella resurfacing with trial components still in place**
 - Drill 2 holes along the patella crest before performing the patella cut, along the prosthetic crest on the line joining the 2 holes
- Final components implantation & closure**



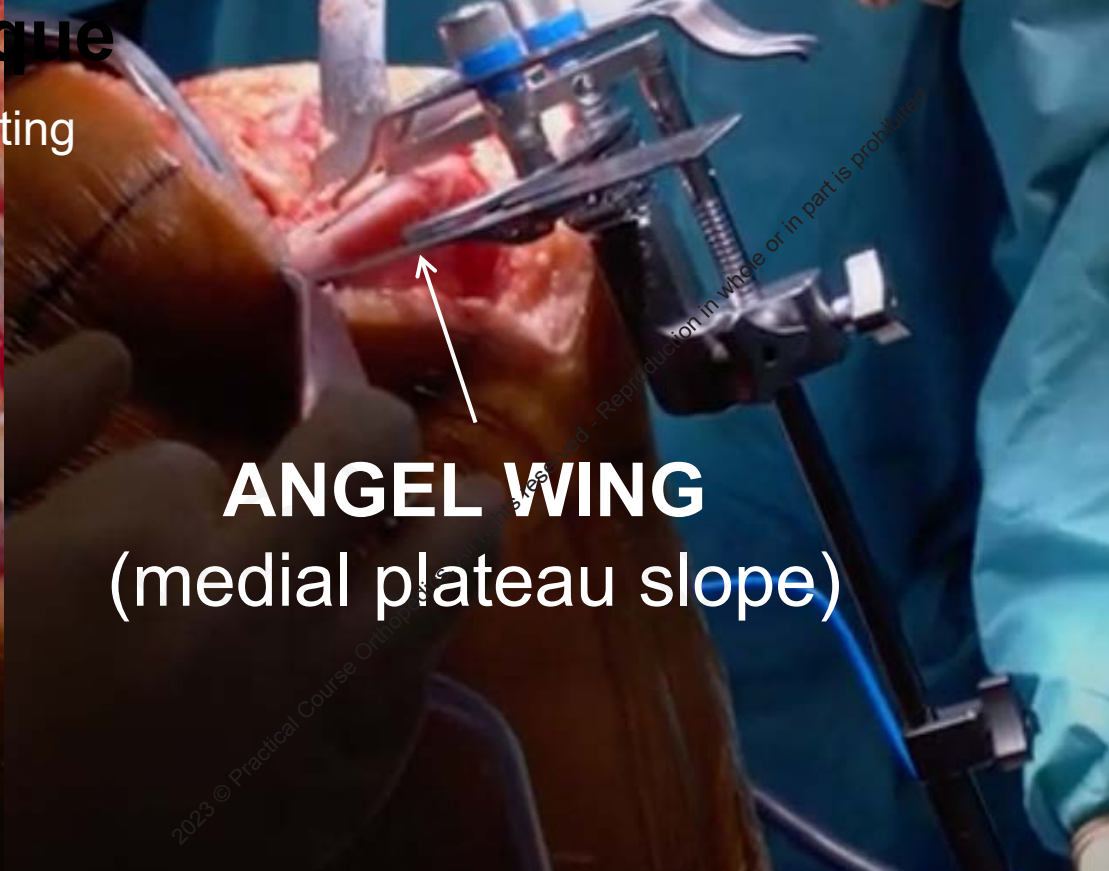
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Post T slope setting

ANGEL WING
(medial plateau slope)

Estimate the physiological knee laxity and amount of bone loss	Conventional medial para-patellar approach
Perform the femoral cuts and all femoral limitations	DRILL 2 HOLES ALONG THE MEDIAL TIBIAL PLATEAU TO INDICATE THE RANGE OF MOTION
Achieve a good tibial exposure	PERFORM THE FEMORAL CUTS WITH AN ANGLE AND CONTROL THE QUALITY OF BONE RESECTION (CALLIPER)
Perform the tibial cut	DISTAL CUT THEN OTHER CUTS WITH AN ANGLE AND CONTROL THE QUALITY OF BONE RESECTION (CALLIPER)
Assess extension and flexion gaps with spacer blocks	DRILL 2 HOLES ALONG THE LATERAL TIBIAL PLATEAU AXIS
Insert trial components	AFTER HAVING SET THE CUT BY ADJUSTING ANGLE, FRONTAL CURVATURE, VALGUS, AND SAGITTAL SLOPE, ROTATIONS, AND CUT HEIGHT, IN THIS ORDER
Perform kinematic patella resurfacing with trial components still in place	RESECT RESIDUAL MENISCI AND POSTERIOR CONDYLAR OSTEOPHYTES
Final components implantation & closure	MAKE SURE THE TIBIAL ROTATION IS PARALLEL TO THE LINE JOINING THE 2 HOLES MADE IN THE LATERAL PLATEAU

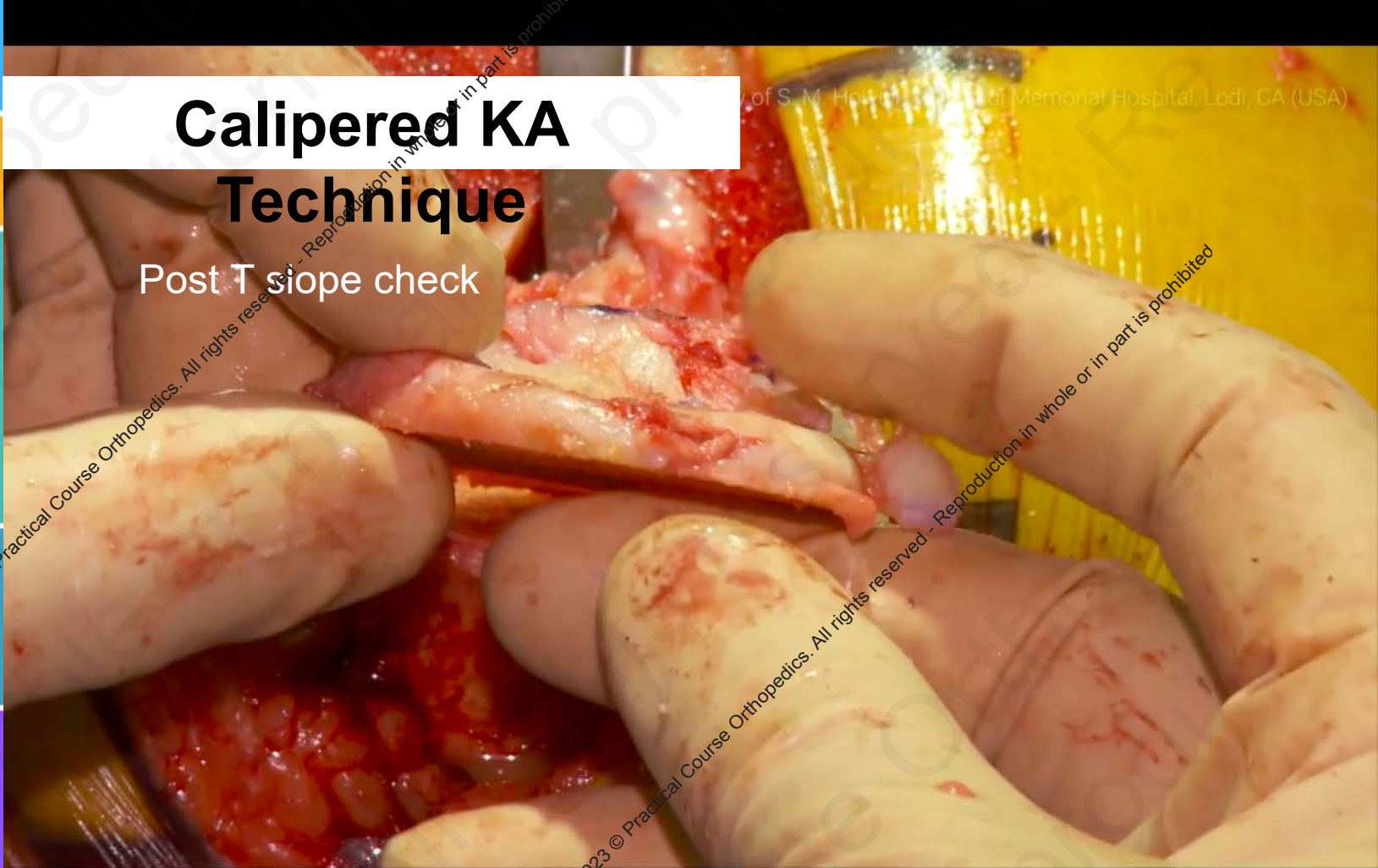


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Post T slope check

Estimate the physiological knee laxity and amount of bone loss	Conventional medial para-patellar approach
Achieve a good tibial exposure	Perform the femoral cuts and all femoral finitions
Perform the tibial cut	Drill 2 holes along the lateral tibia plateau axis
Assess extension and flexion gaps with spacer blocks	Resect residual menisci and posterior condylar osteophytes
Insert trial components	Size tibial component and make tibial finition for the heel
Final components implantation & closure	Perform kinematic patella resurfacing with trial components still in place



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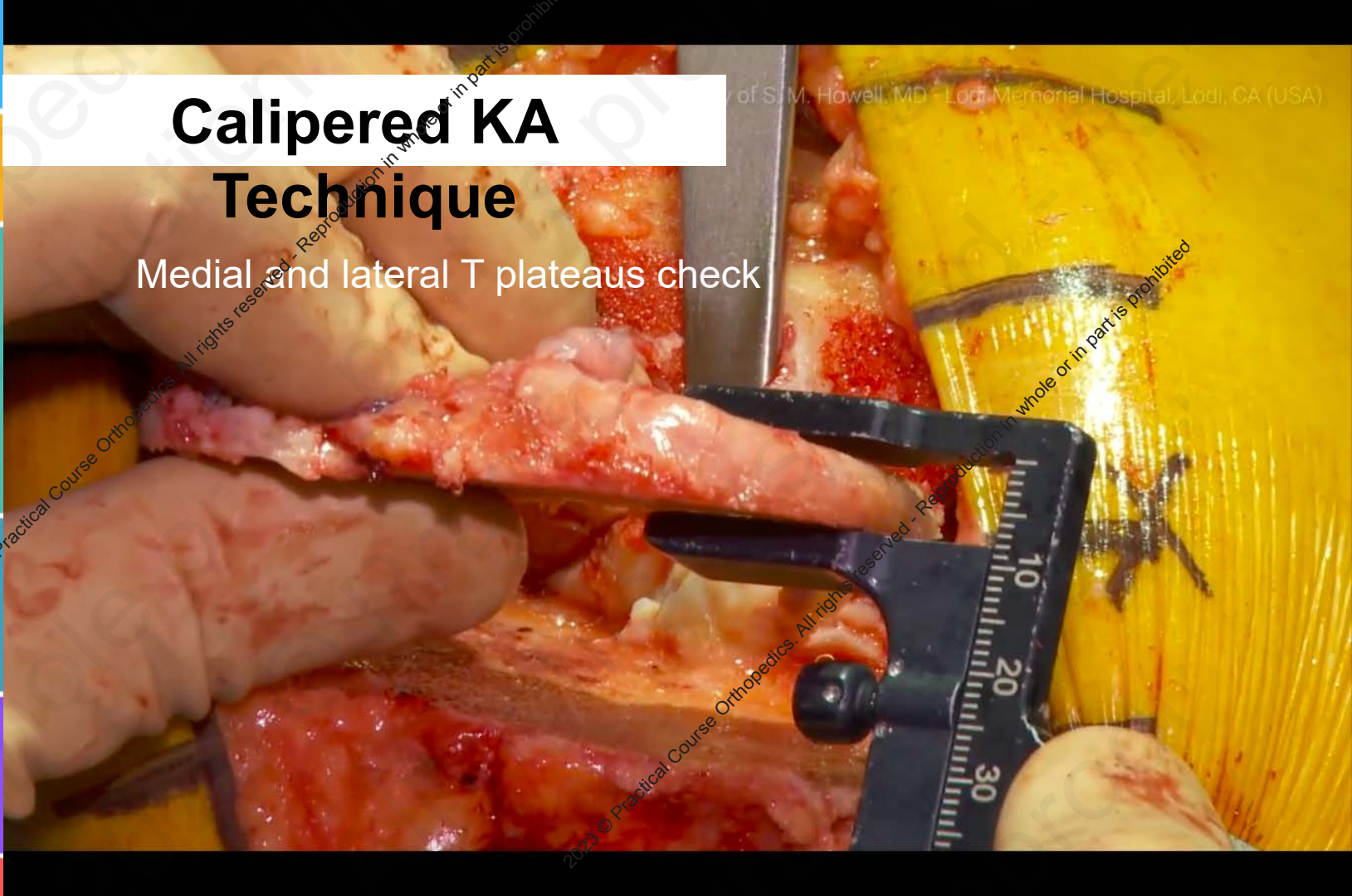
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Medial and lateral T plateaus check

Estimate the physiological knee laxity and amount of bone loss	Conventional medial para-patellar approach
Achieve a good tibial exposure	Perform the femoral cuts and all femoral limitations
Perform the tibial cut	Drill 2 holes along the lateral tibia plateau axis
Assess extension and flexion gaps with spacer blocks	Resect residual menisci and posterior condylar osteophytes
Insert trial components	Size tibial components and make tibial limitation for the knee
Final components implantation & closure	Perform kinematic patella resurfacing with trial components still in place



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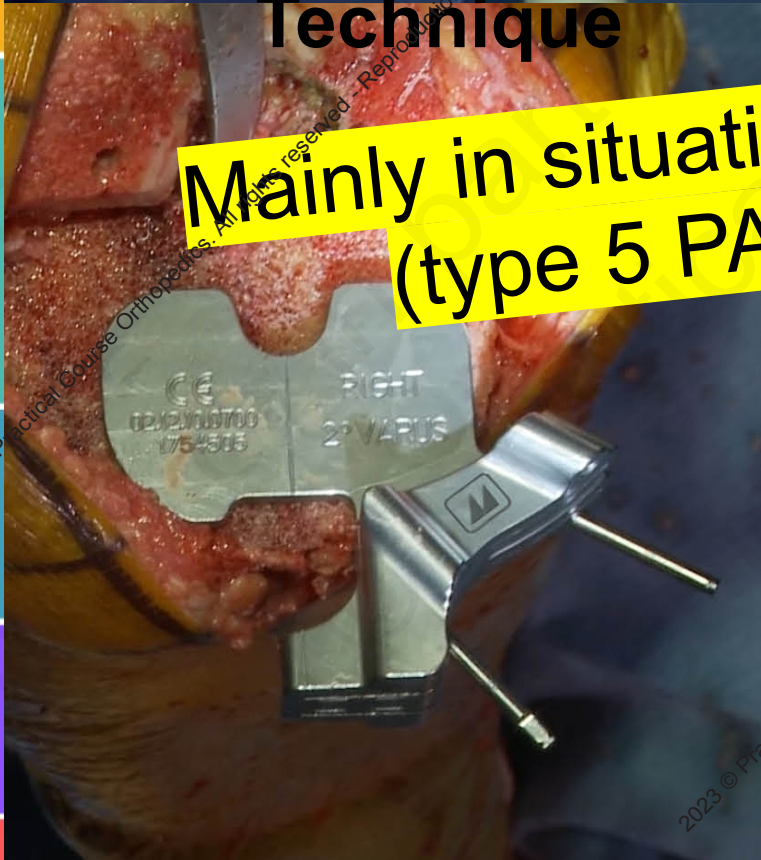
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Mainly in situation of tibial bone loss
(type 5 PAS classification)

- Conventional medial para-tibial approach
- Estimate the physiological knee laxity and amount of bone loss
- Perform the femoral cuts and all femoral finitions
- Achieve a good tibial exposure
- Drill 2 holes along the lateral tibia plateau axis
- Perform the tibial cut
- Resect residual menisci and posterior condylar osteophytes
- Size tibial component and make tibial finition for the knee
- Insert trial components
- Perform kinematic patella resurfacing with trial components still in place
- Final components implantation & closure

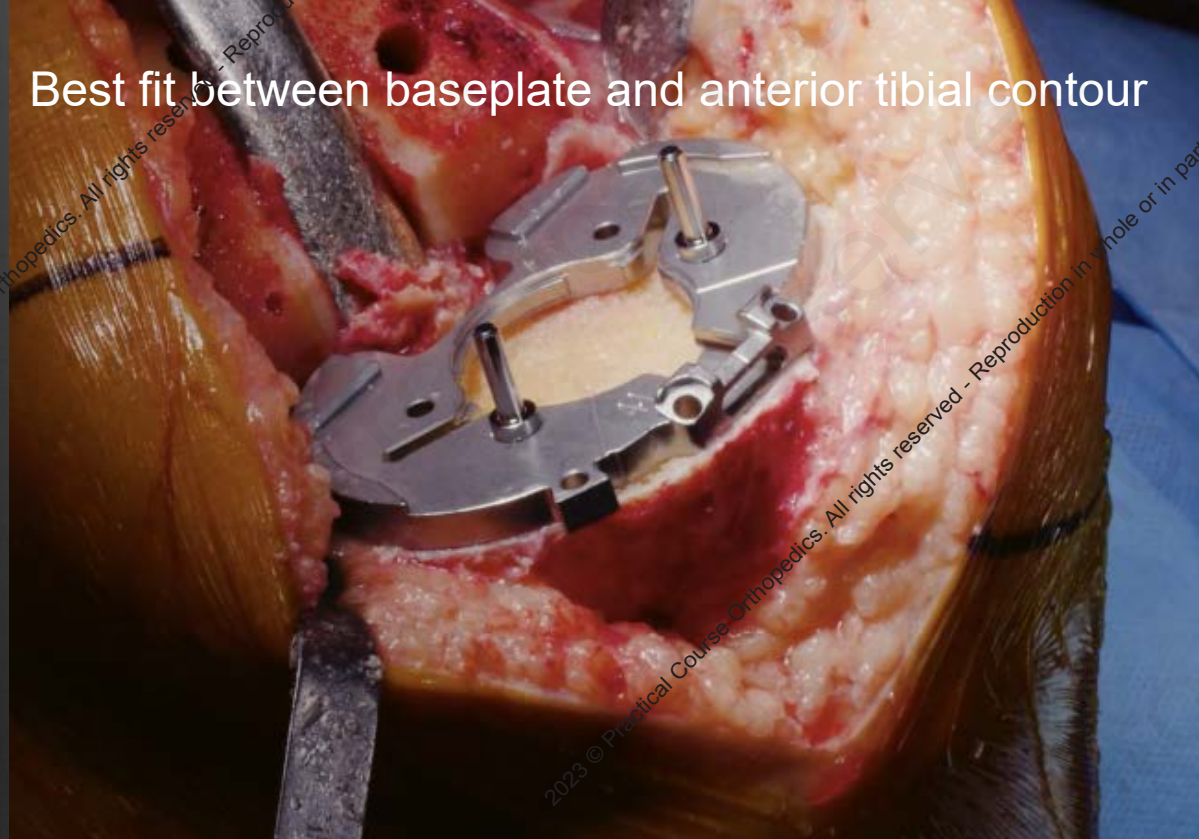


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Best fit between baseplate and anterior tibial contour



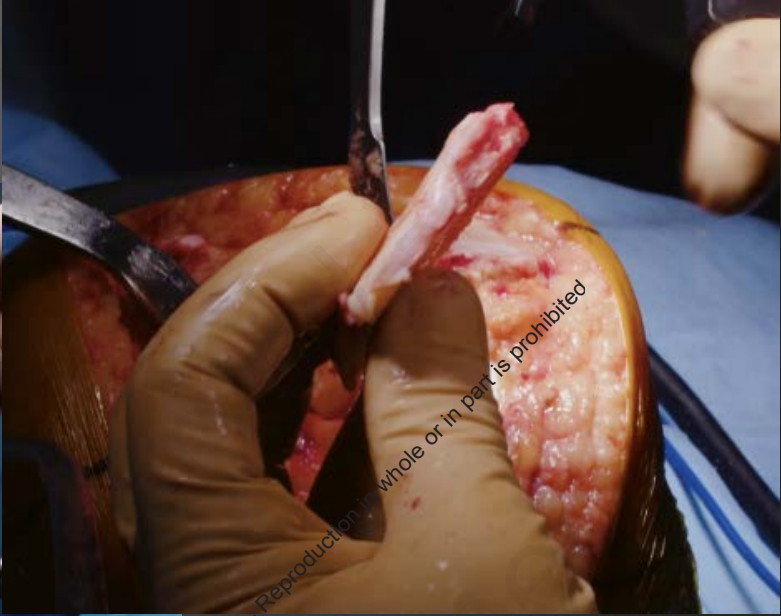
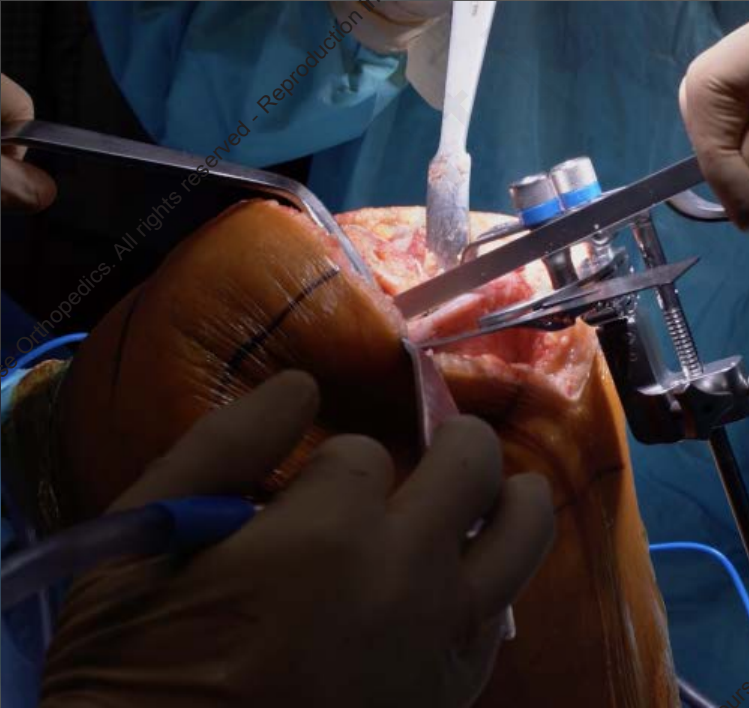
- Conventional medial para-patellar approach**
 - Estimate the physiological knee laxity and amount of bone loss
 - Measure and validate starting points throughout the knee range of motion
- Perform the femoral cuts and all femoral limitations**
 - Distal cut then other cuts with aim if ancillary, control the quality of bone resections (caliper)
- Achieve a good tibial exposure**
 - Anterior tibia dislocation to expose the medial and lateral tibial plateaus
- Perform the tibial cut**
 - After having set the cut by adjusting axial, frontal, varus-valgus and sagittal slope/rotations, and cut respect to this order
 - Result if needed after quality control (caliper & inspection) of the tibial cut
- Resect residual menisci and posterior condylar osteophytes**
 - Assess extension and flexion gaps with spacer blocks
 - Resect the tibia if needed
- Size tibial component and make tibial limitation for the knee**
 - Make sure the tibial rotation is parallel to the line joining the 2 holes made in the lateral plateau
- Insert trial components**
 - Assess femorotibial balance and patella tracking
- Perform kinematic patella resurfacing with trial components still in place**
 - Drill 2 holes along the patella crest before performing the patella cut, along the prosthetic crest on the line joining the 2 holes
- Final components implantation & closure**

Performing a 'Callipered r/ri-KA TKA'

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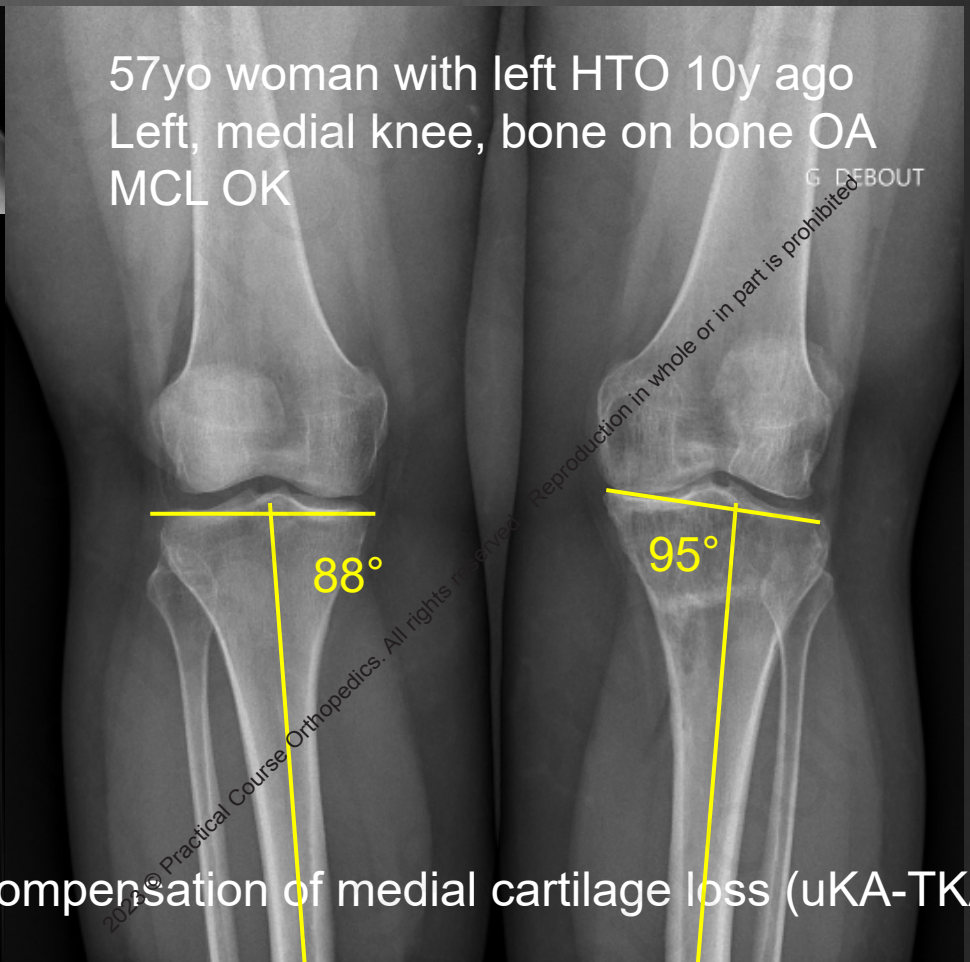
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ILLUSTRATION 1: **SAGITTAL PLANE**



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ILLUSTRATION 2: **FRONTAL PLANE**



10° fixed valgus after compensation of medial cartilage loss (uKA-TKA)

ILLUSTRATION 2: **FRONTAL PLANE**

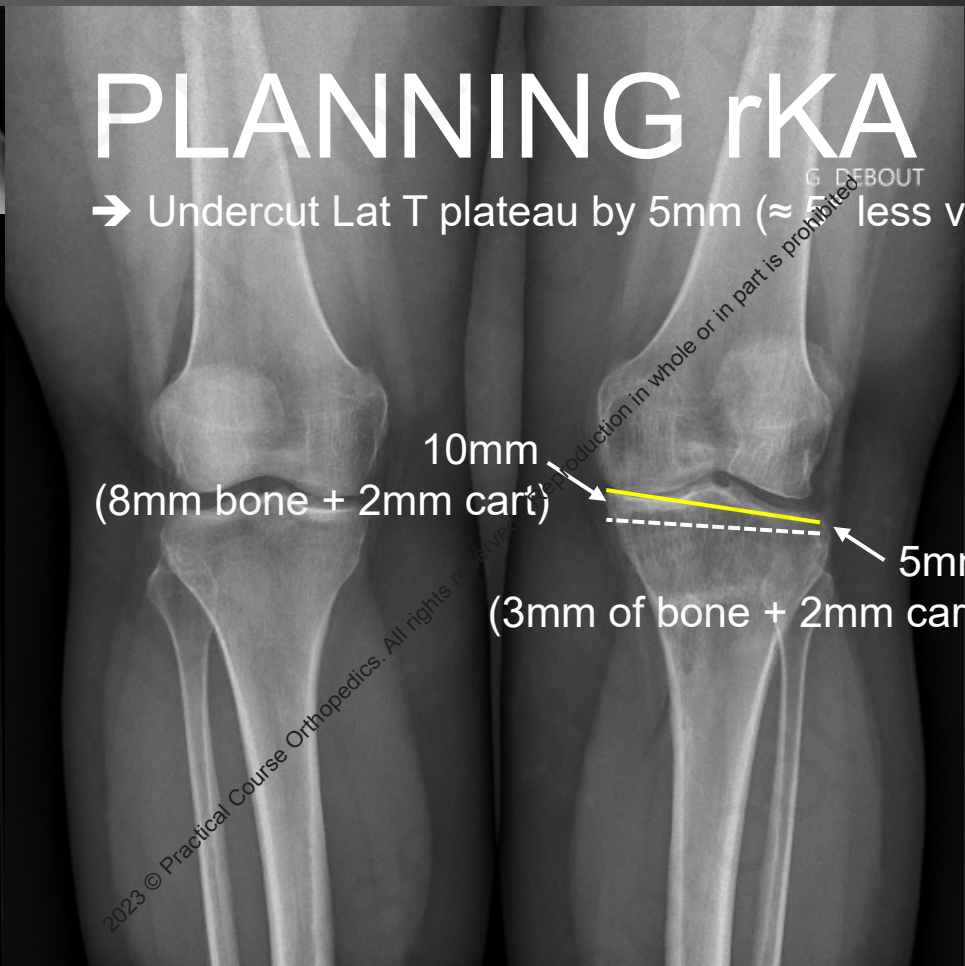


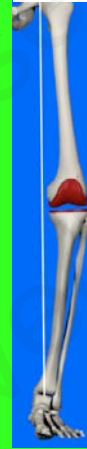
ILLUSTRATION 2: **FRONTAL PLANE**



Calipered KA Technique

- 🌀 **Measured resection** (F or T first)
- 🌀 **Posterior referencing**
- 🌀 **Pure bony procedure** (collateral ligaments sparing)
- 🌀 **Sequential step process** (step → quality check → next step → ...)
- 🌀 **Allows restrictions (r/ri [≈FA] KA)**
- 🌀 **Simple, Reliable and Cost-Friendly**
- 🌀 **NEW gold standard ?** 😊

KA (uKA, rKA, riKA/FA KA start)



= Physiological
TKA

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