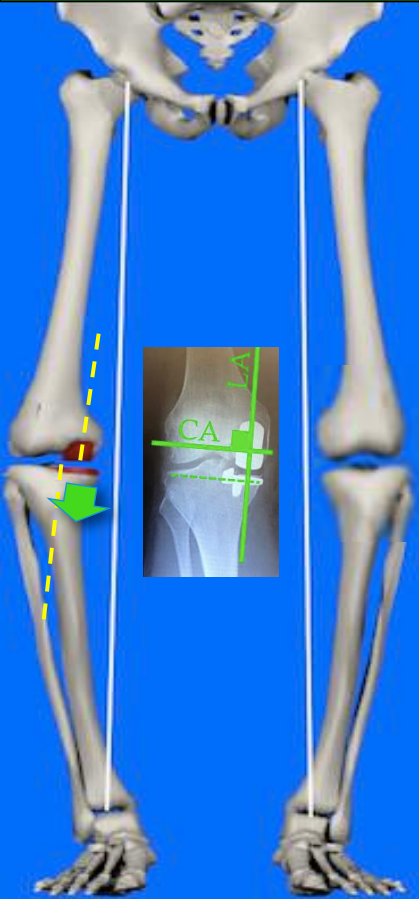


KA UKA



Kinematic Alignment Technique For UKA

Charles C.J Rivière

ISTA 2019 – Keynote

MSK LAB

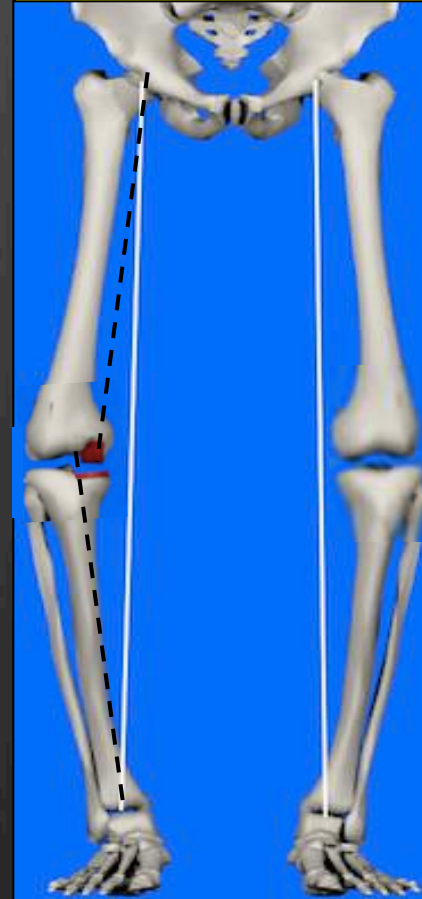
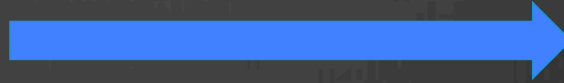


**Imperial College
London**

What have we done so far?

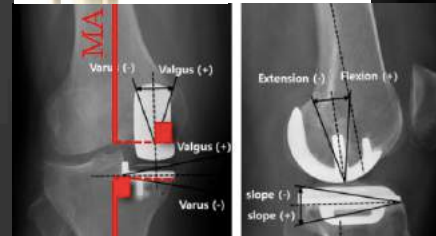
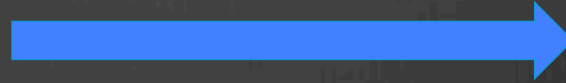
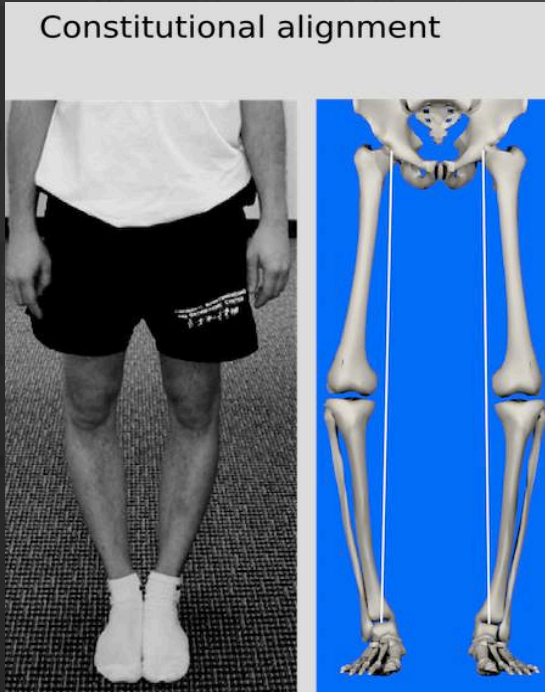
⦿ Systematic approach

Constitutional alignment



What have we done so far?

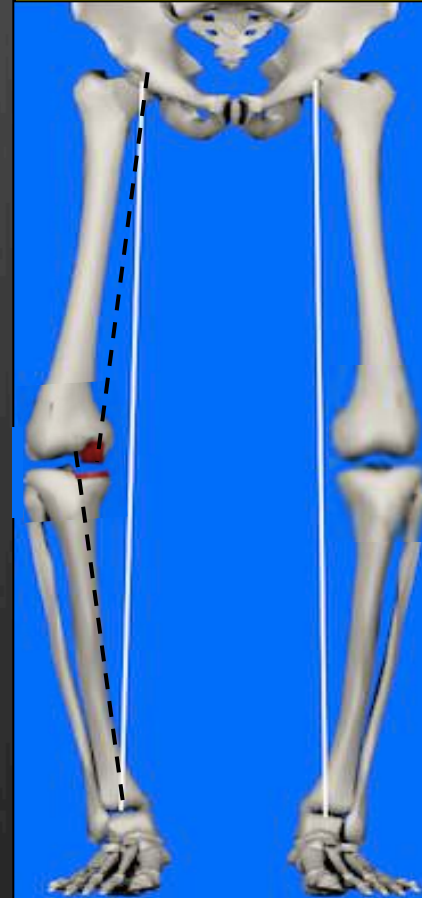
- Systematic approach



What have we done so far?

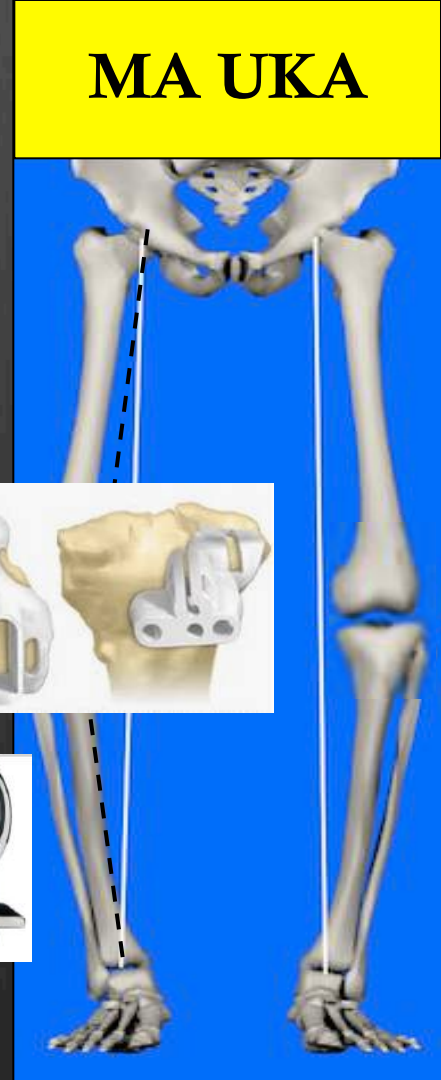
- Systematic approach
- Residual complications!

- Proximal tibia pain (1 to 10%)
- Medial tibia plateau fracture
- Edge loading related (PE wear/dislocation)



What have we done so far?

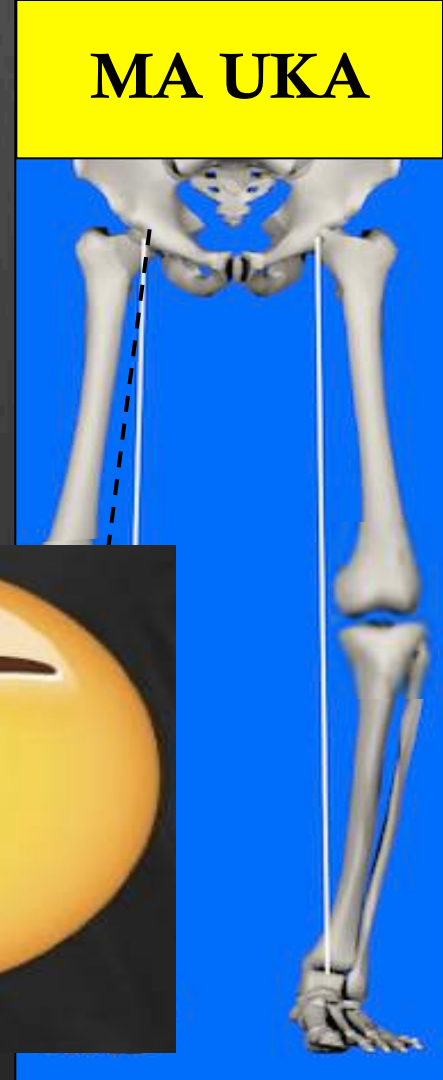
- Systematic approach
- Residual complications!
 - ~~Lack of precision?~~
 - ~~Poor implant design?~~



What have we done so far?

- Systematic approach
- Residual complications!
 - ~~Lack of precision?~~
 - ~~Poor implant design?~~

...Intrinsical limitation ?



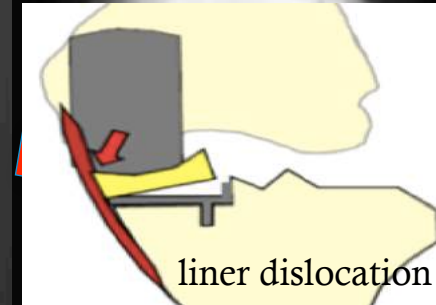
...Intrinsical limitation ?

→ No respect of medial compartment' anatomy & biomechanics



...Intrinsic limitation ?

→ No respect of medial compartment' anatomy & biomechanics

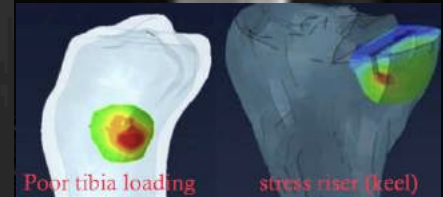


...Intrinsical limitation ?

→ No respect of medial compartment' anatomy & biomechanics



edge loading



Poor tibia loading

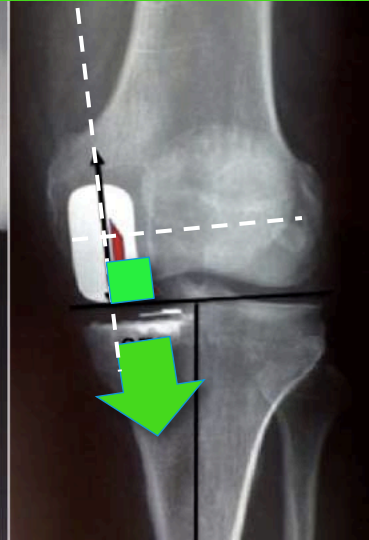
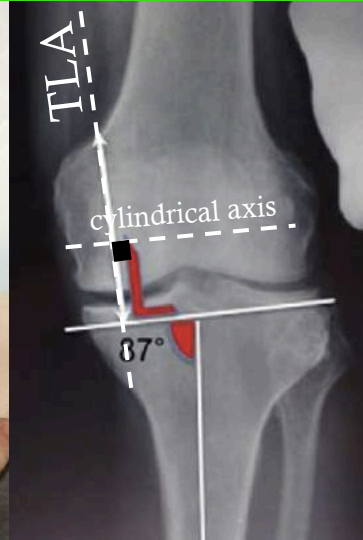
stress riser (keel)

Alternative Alignment Technique

Kinematic Alignment technique for UKA



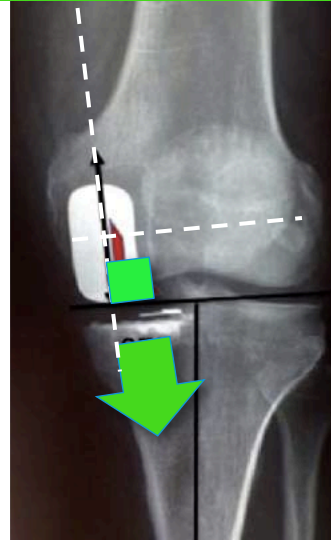
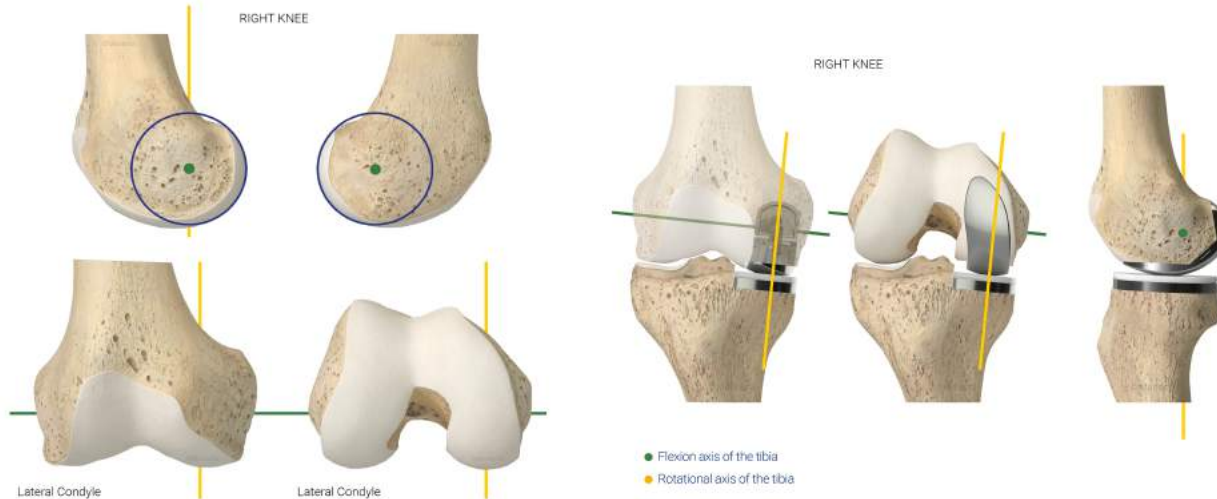
Philippe
Cartier



Alternative Alignment Technique

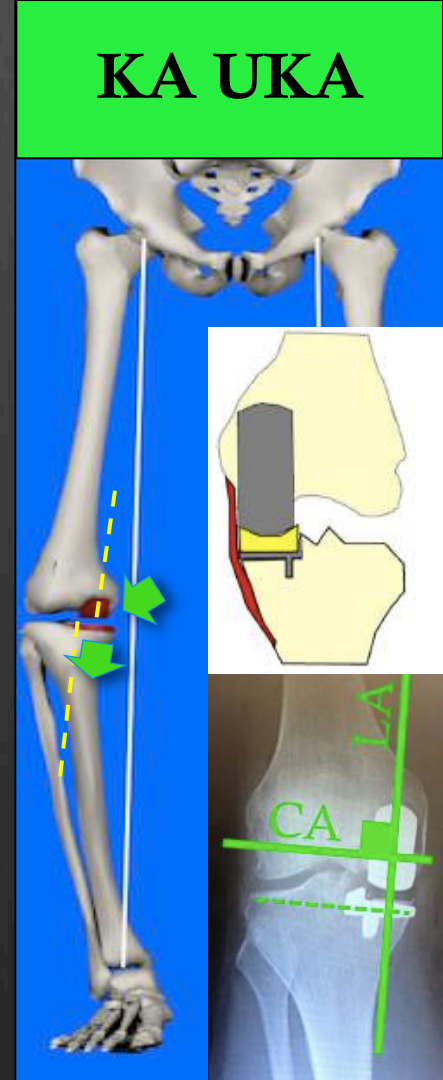
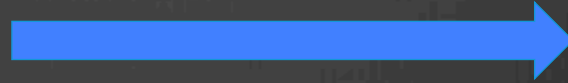
successfully performed with **few fixed bearing UKA designs**
...for few decades!

Kinematic Alignment technique for UKA



Alternative Alignment Technique

⦿ Personalised approach

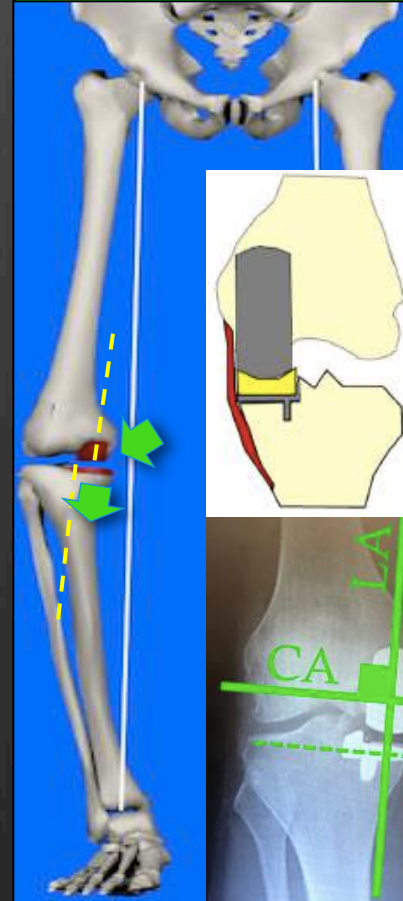


Alternative Alignment Technique

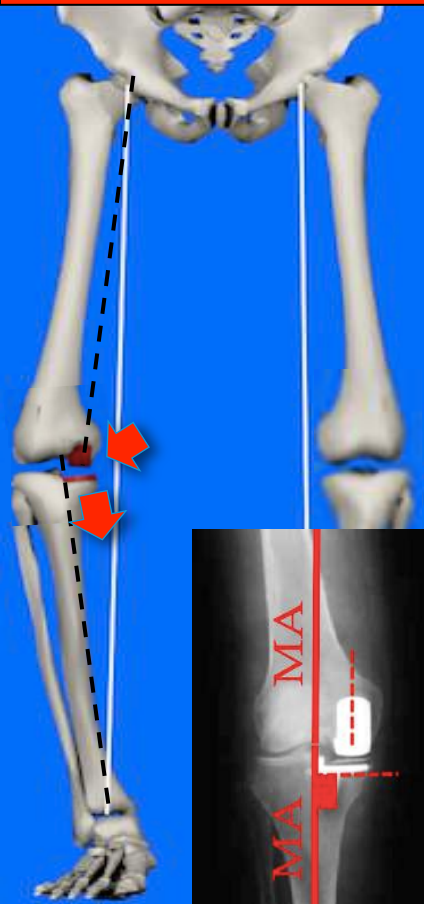
⦿ Personalised approach

Potential benefits:

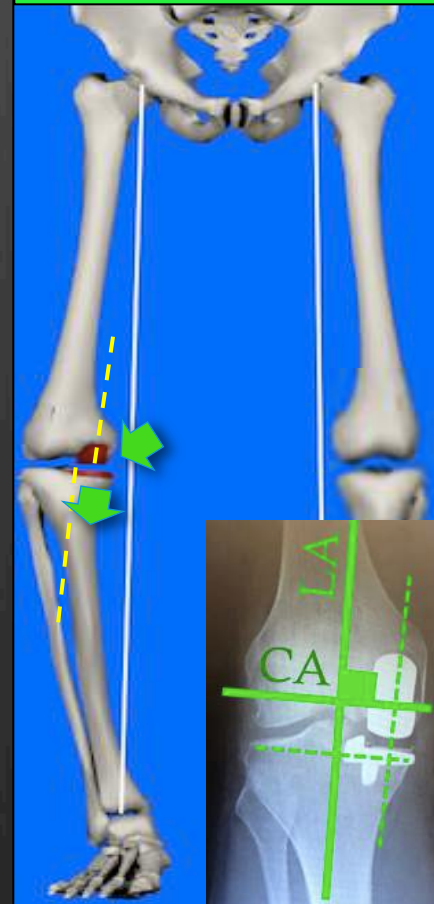
1. Physiological **bone loading**
2. Physiological **soft-tissue balance** (personalized T slope)
3. Excellent **components interact**^o (less PE wear/dislocation)
4. **Bone preserving** (tibia)
5. Better fit of components to supportive bone



MA UKA



KA UKA



| | MA technique "systematic approach" | KA technique "patient specific approach" |
|-----------------|---|--|
| F flexion | similar | |
| T rotation | similar | |
| F distal cut | perpendicular to femoral mechanical axis (MR tech) or parallel to MA tibial cut (GP tech) | ≠ parallel to KA tibial cut (parallel to cylindrical axis and parallel to medial condylar wall) |
| F posterior cut | parallel to MA tibial cut | ≠ parallel to KA tibial cut (parallel to cylindrical axis and perpendicular condylar flexion facet axis) |
| T frontal cut | perpendicular mechanical axis of tibia | ≠ parallel to cylindrical axis (=perpendicular condylar flexion facet axis) |
| T slope | 2 to 7° posterior slope | ≠ slope of medial plateau |

MA UKA



KA UKA



**Alters
physiological
Biomechanics**

**Keeps
physiological
Biomechanics**



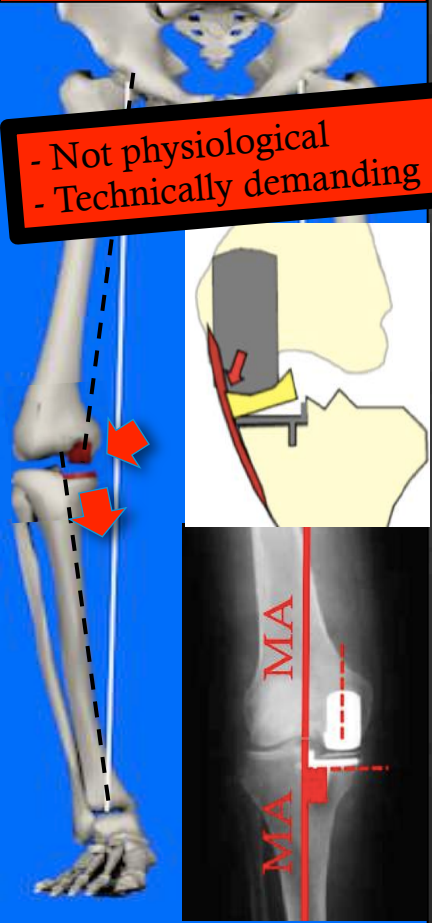
MA



KA

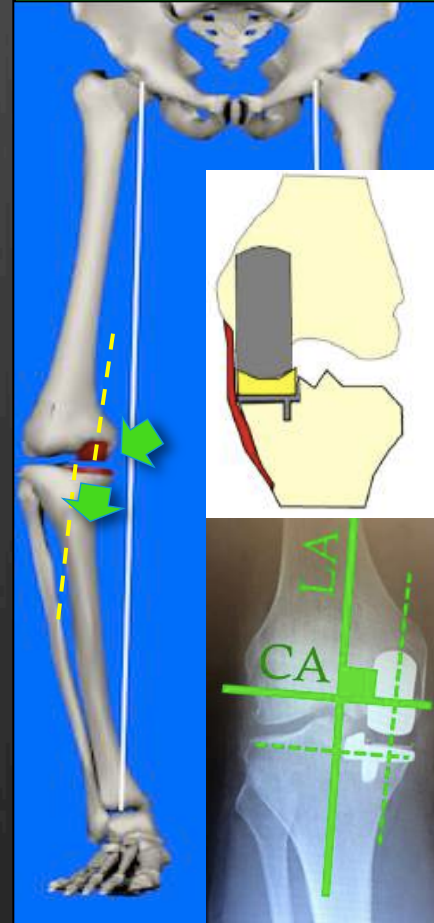
MA UKA

- Not physiological
- Technically demanding

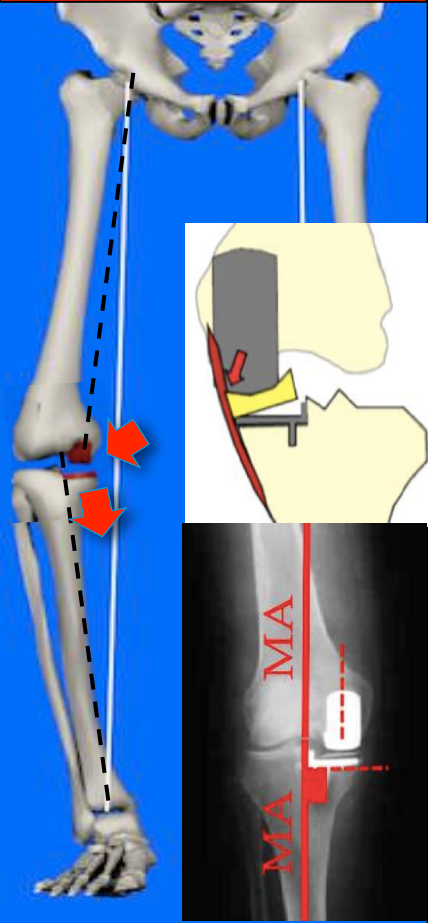


1. No respect of **medial compartment' anatomy & biomechanics**
2. **Technically demanding** (balance gaps, achieve good components interaction)

KA UKA

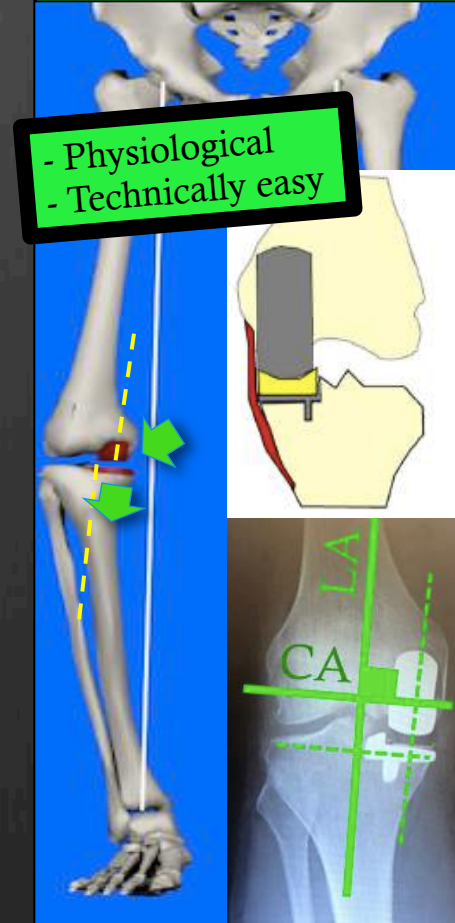


MA UKA



1. Respect of **medial compartment**' anatomy & biomechanics
2. **Technical ease** (balance gaps, achieve good components interaction)

KA UKA

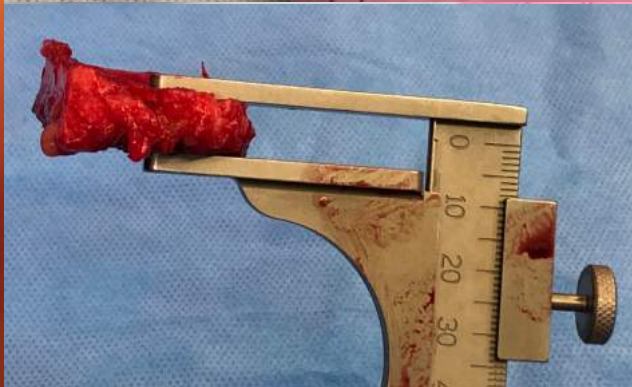


How to perform KA-UKA?

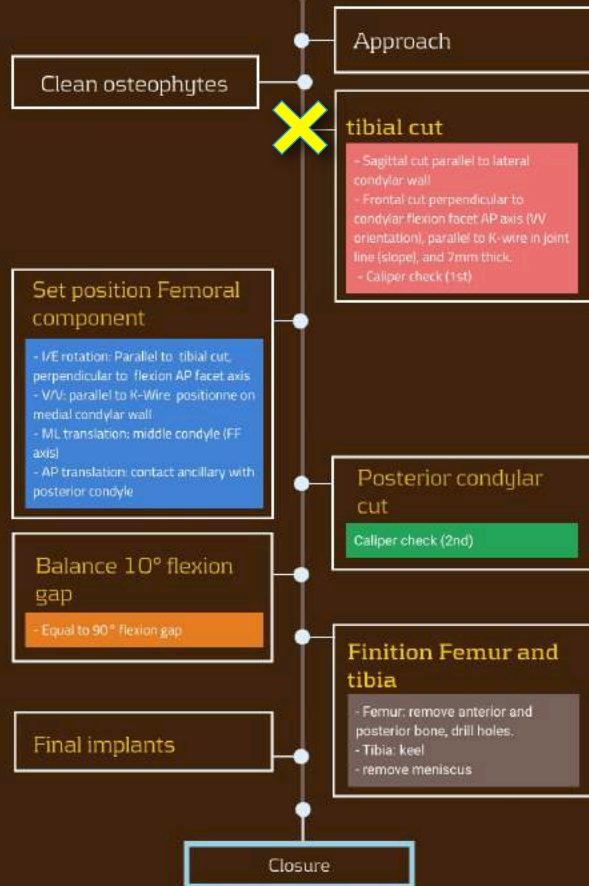
Surgical Technique KA-UKA Oxford®



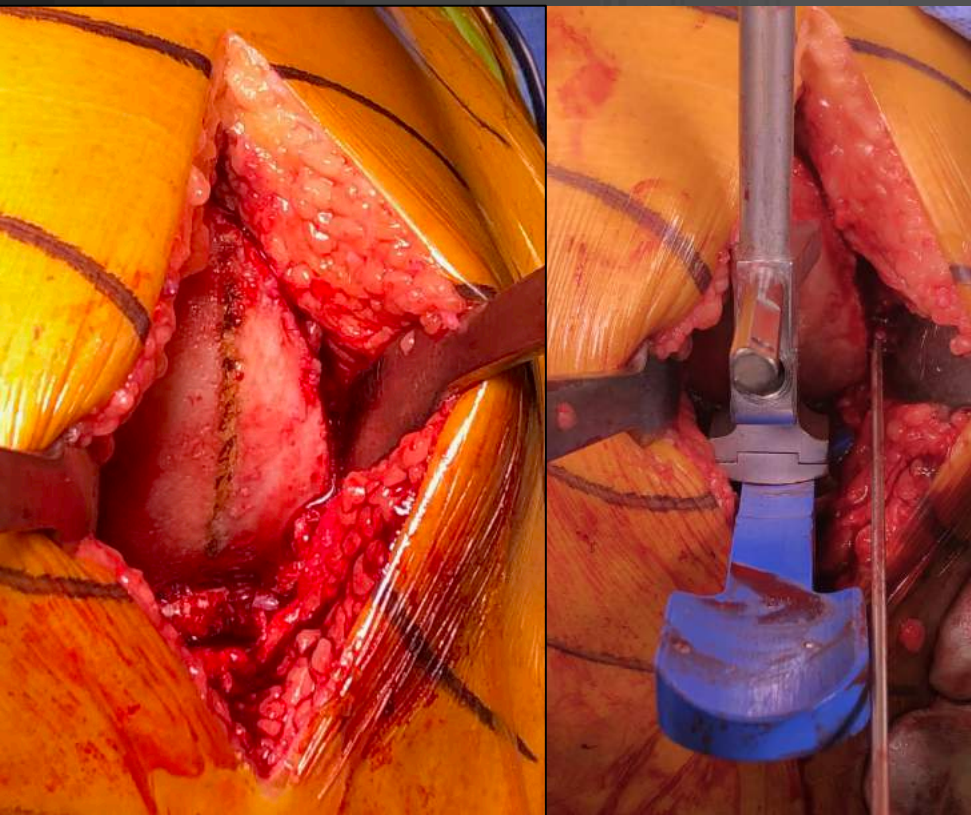
How to perform KA-UKA?



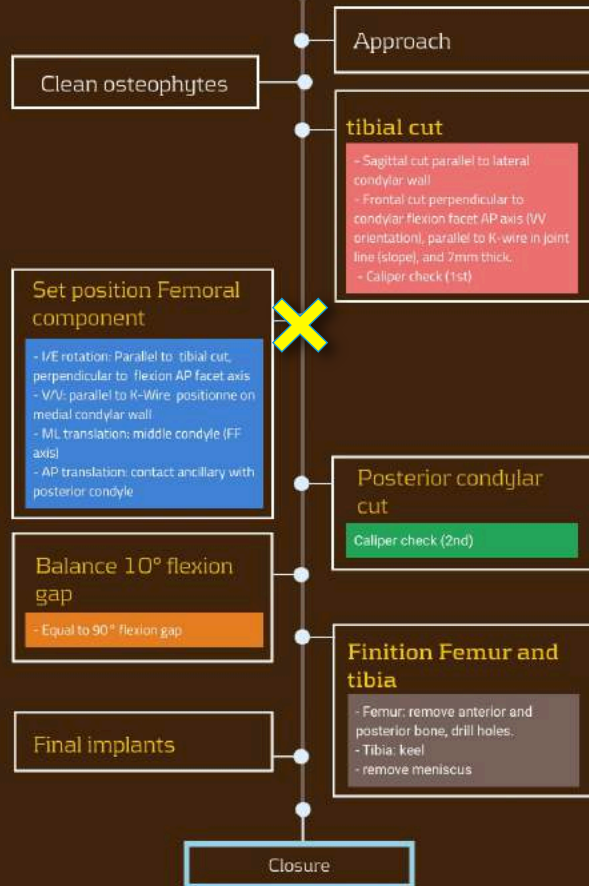
Surgical Technique KA-UKA Oxford®



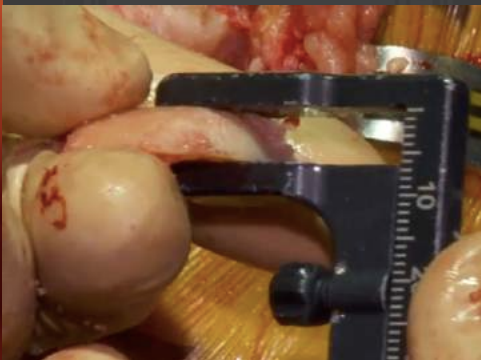
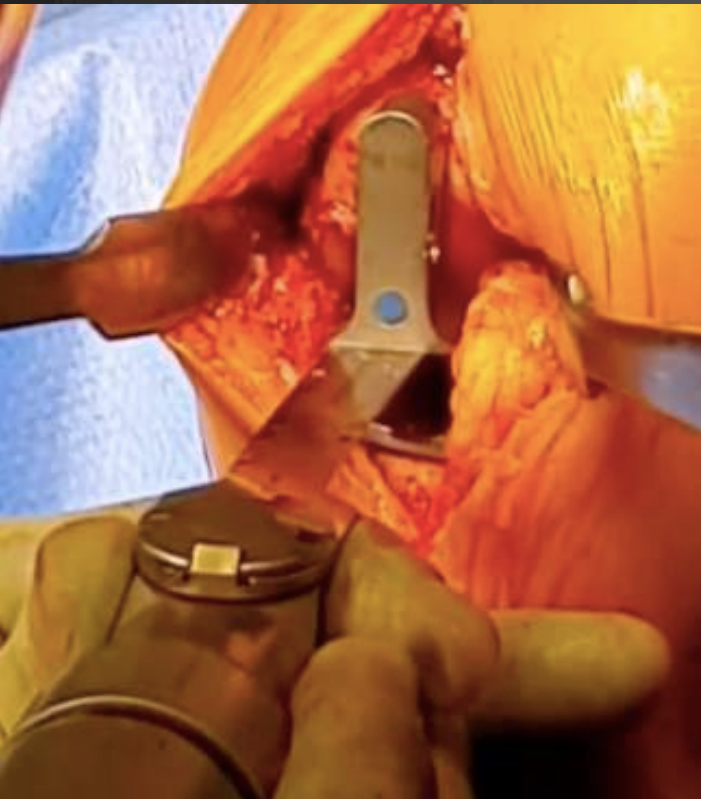
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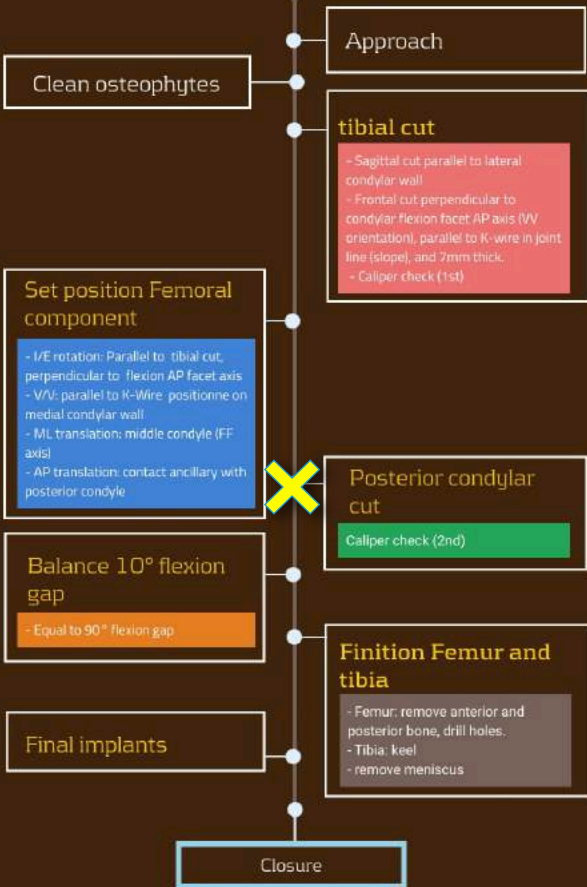
Surgical Technique KA-UKA Oxford®



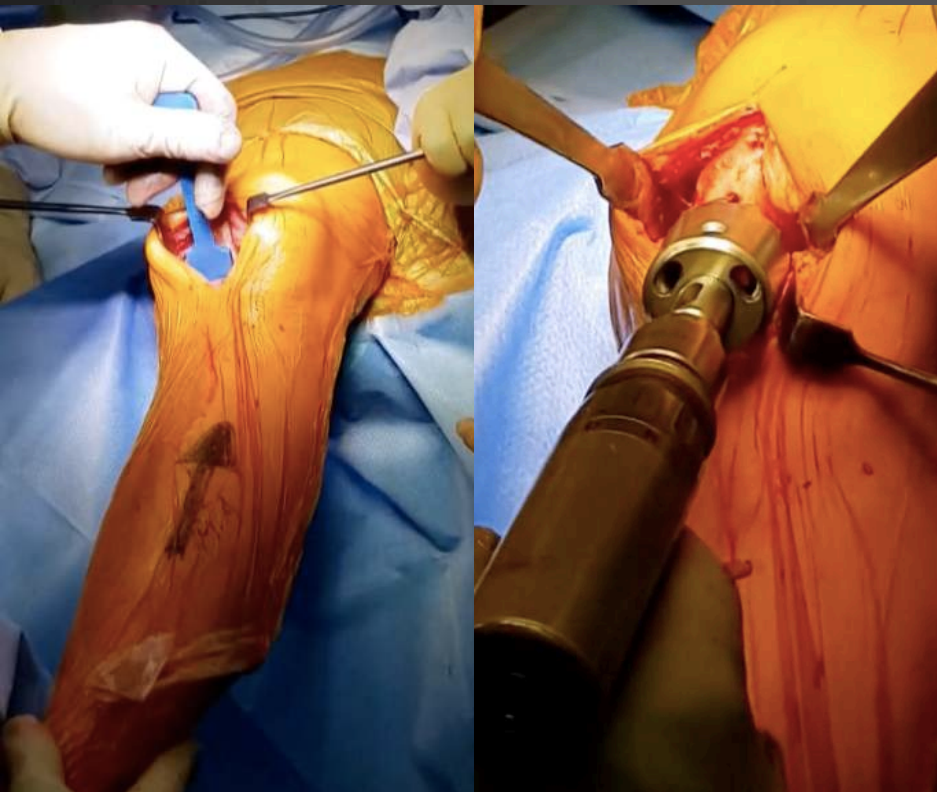
How to perform KA-UKA?



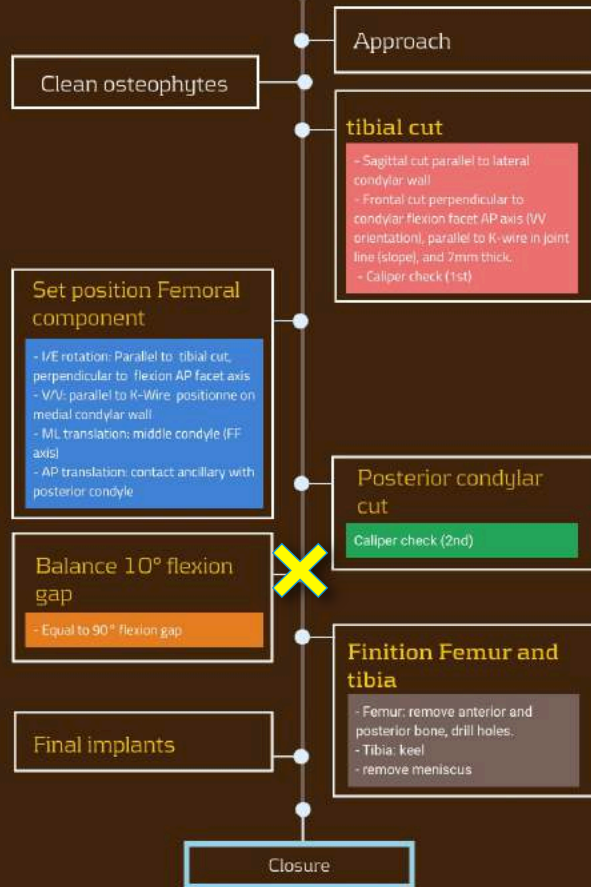
Surgical Technique KA-UKA Oxford®



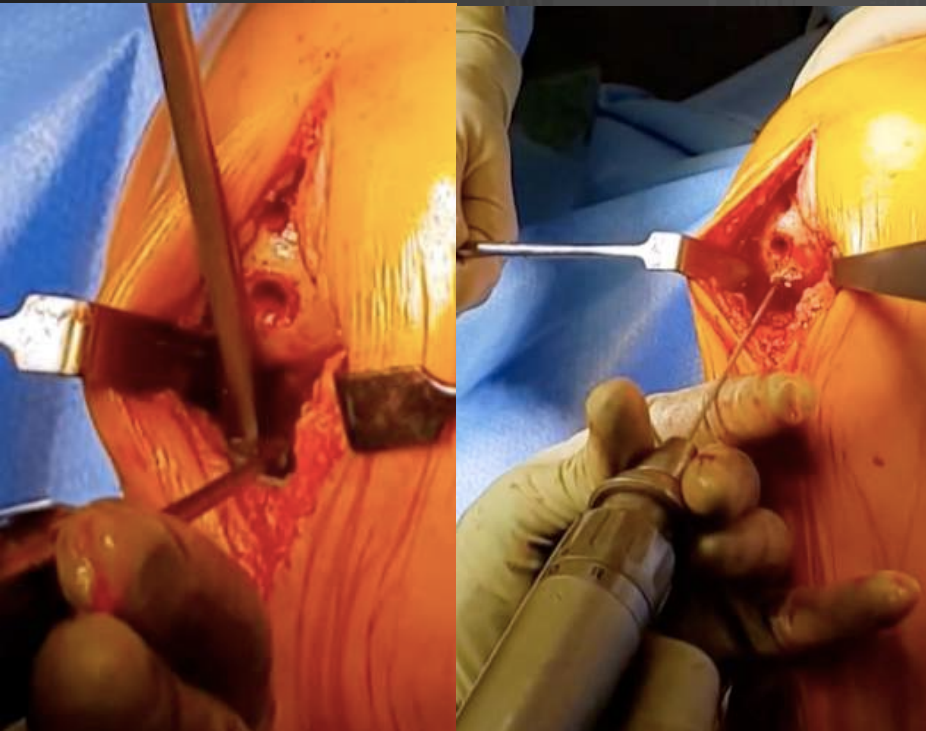
How to perform KA-UKA?



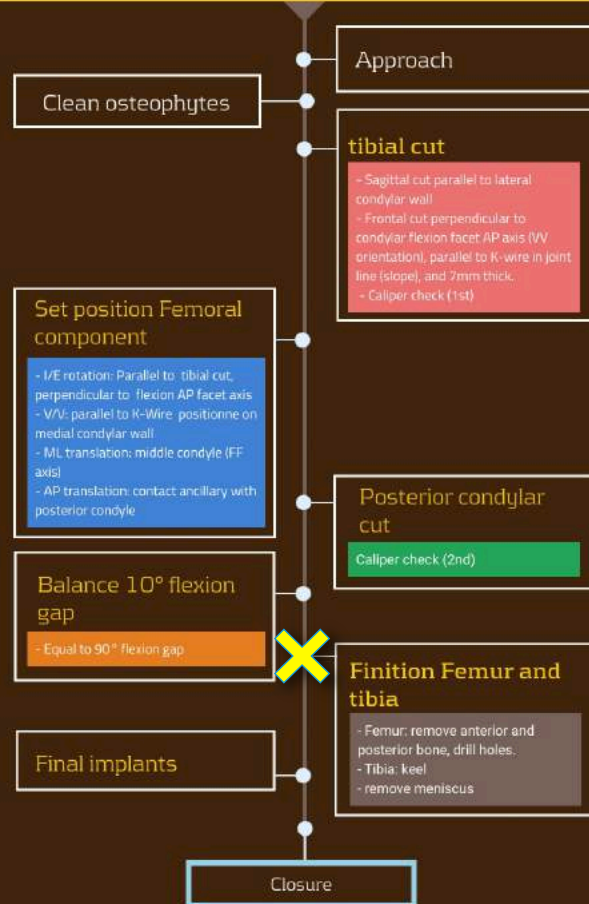
Surgical Technique KA-UKA Oxford®



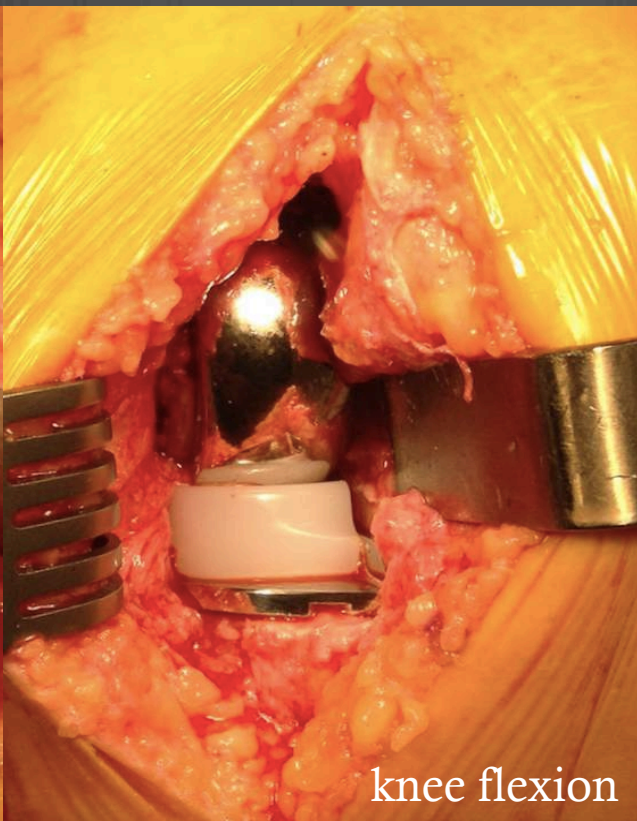
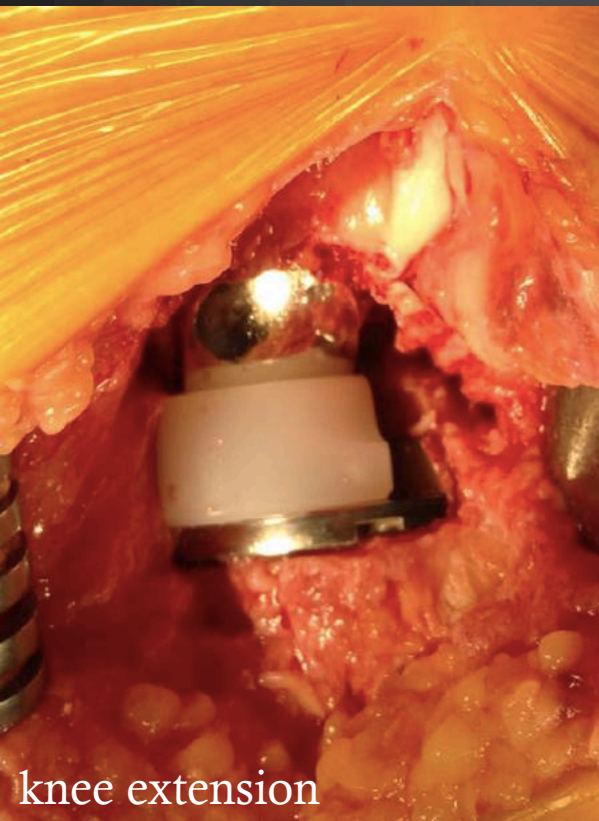
How to perform KA-UKA?



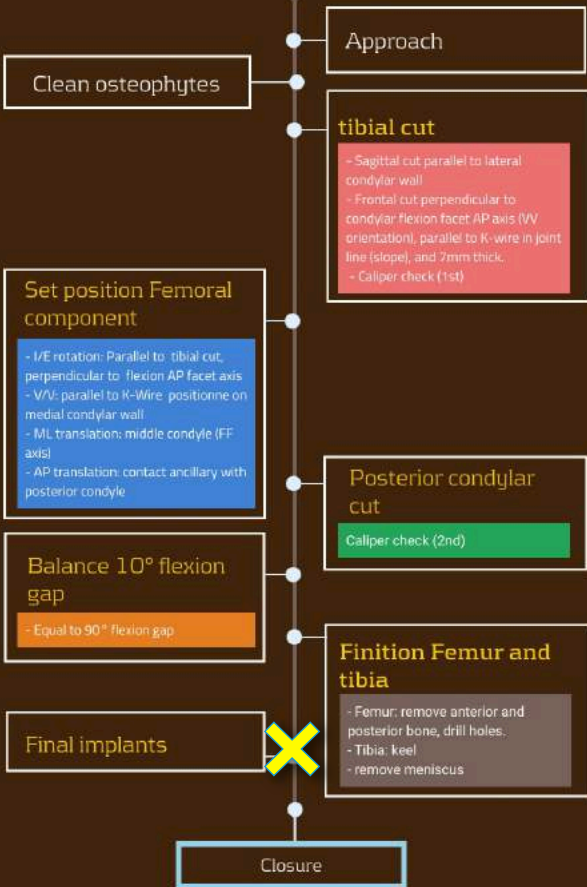
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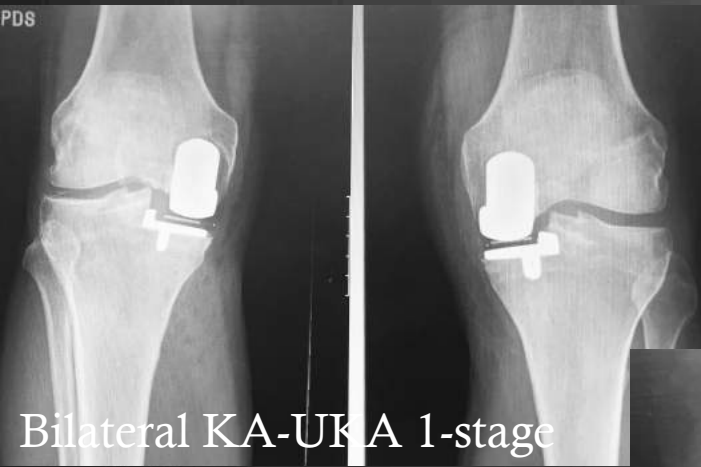
How to perform KA-UKA?



Surgical Technique KA-UKA Oxford®



How to perform KA-UKA?



Bilateral KA-UKA 1-stage



Surgical Technique KA-UKA Oxford®



➤ Evidence



Original article

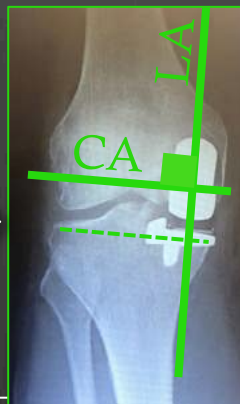
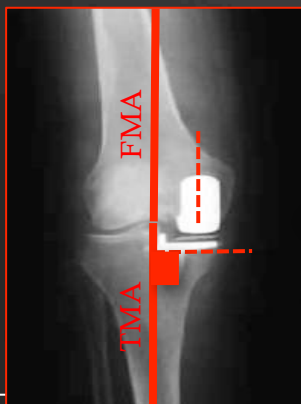
Kinematic alignment technique for medial OXFORD UKA: An in-silico study

Charles Rivière^{a,*}, Ciara Harman^b, Anthony Leong^c, Justin Cobb^c, Cedric Maillot^a

^a The MSK Lab-Imperial college London, South West London Elective Orthopaedic Centre, London, United Kingdom

^b South West London Elective Orthopaedic Centre, Dorking road, KT18 7EG Epsom, United Kingdom

^c The MSK Lab-Imperial college London, Charing Cross Campus, Laboratory Block, W6 8RP London, United Kingdom



Conventional Versus Kinematic Aligned Oxford™ UKA

Evidence



Original article

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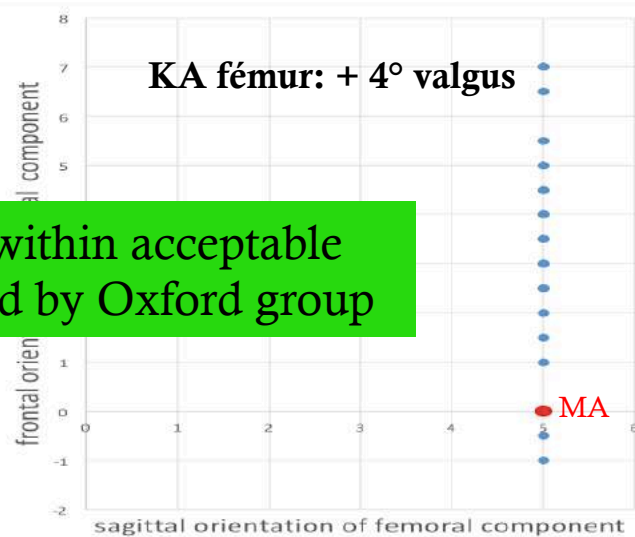
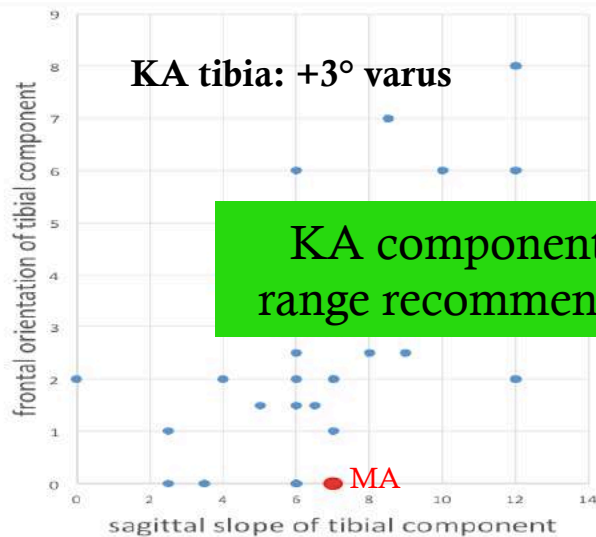
^b South West London Elective Orthopaedic Centre, Dorking road, KT18 7EG Epsom, United Kingdom

^c The MSK Lab-Imperial college London, Charing Cross Campus, Laboratory Block, W6 8RP London, United Kingdom



- KA positioning
- MA positioning

systematic (MA) vs Personalised (KA)



KA components within acceptable range recommended by Oxford group

➤ Evidence



Original article

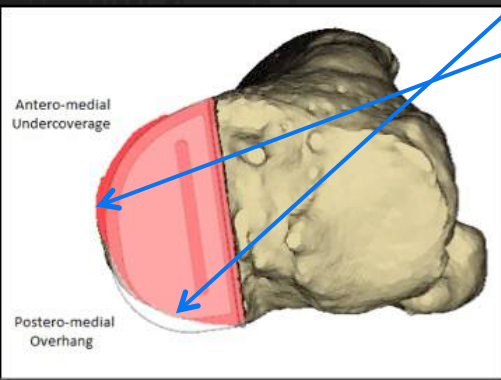
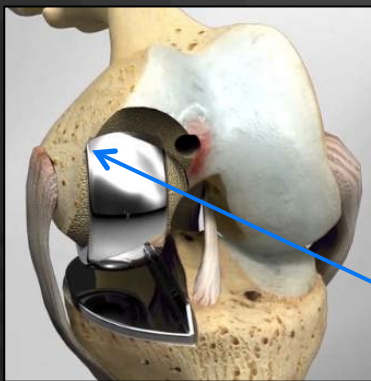
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| | | MA simulation | KA simulation | p |
|---|---------------|---------------|---------------|---------------|
| femoral antero-medial overhang | | 10 | 2 | 0.005* |
| tibial postero-medial overhang | | 2 | 2 | 1 |
| tibial undercover | 1/3 posterior | 0 | 0 | 0.083 |
| | 1/3 medium | 3 | 0 | |
| | 1/3 anterior | 0 | 0 | |
| borderline anatomical components fit | | 15 | 4 | 0.009* |
| | | 38% | 10% | |

➤ Evidence



Original article

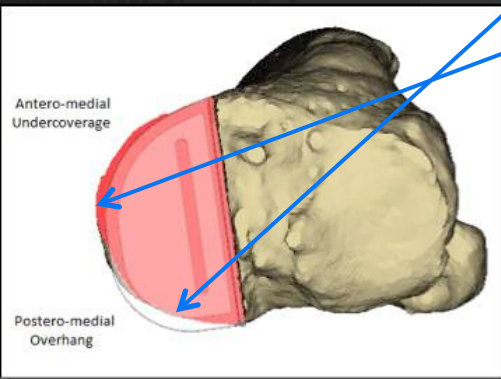
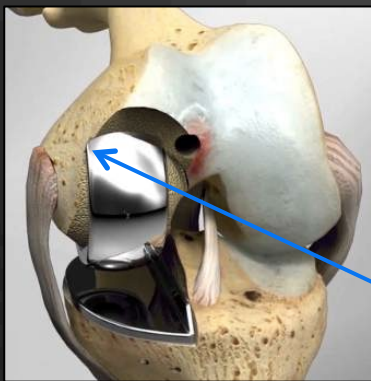
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| MA simulation | KA simulation | p |
|---------------|---------------|---|
|---------------|---------------|---|

KA UKA:

➔ Higher bone coverage

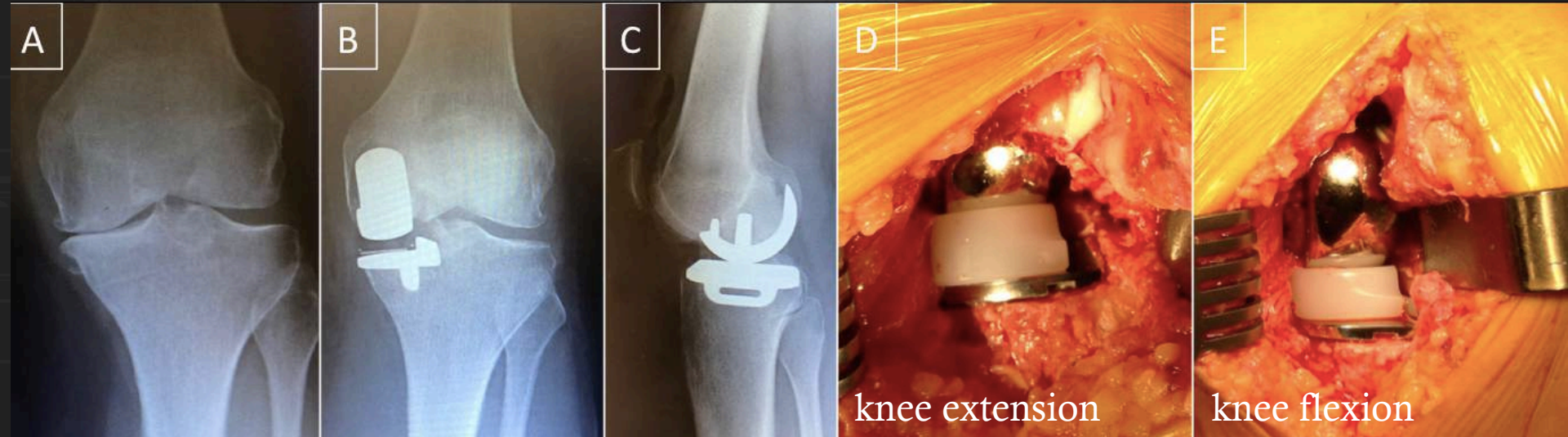
➔ Less component overhang

38%

10%

My Experience

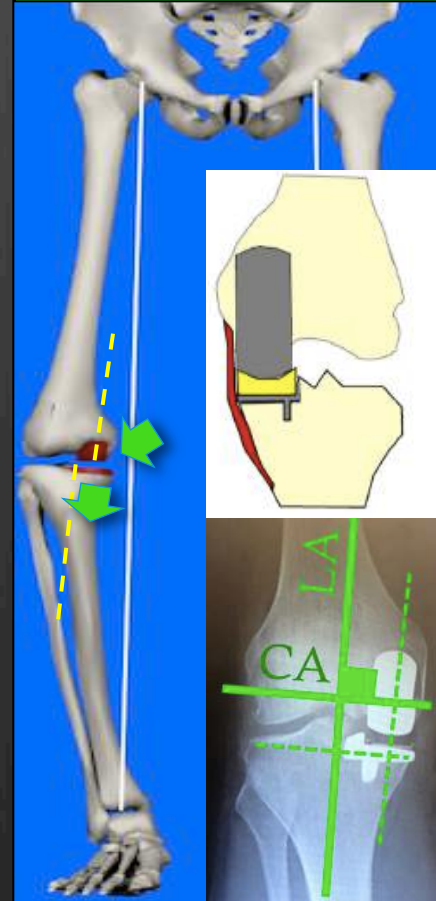
- ≈ 50 KA UKAs OXFORD over last 18 months
- On-going study



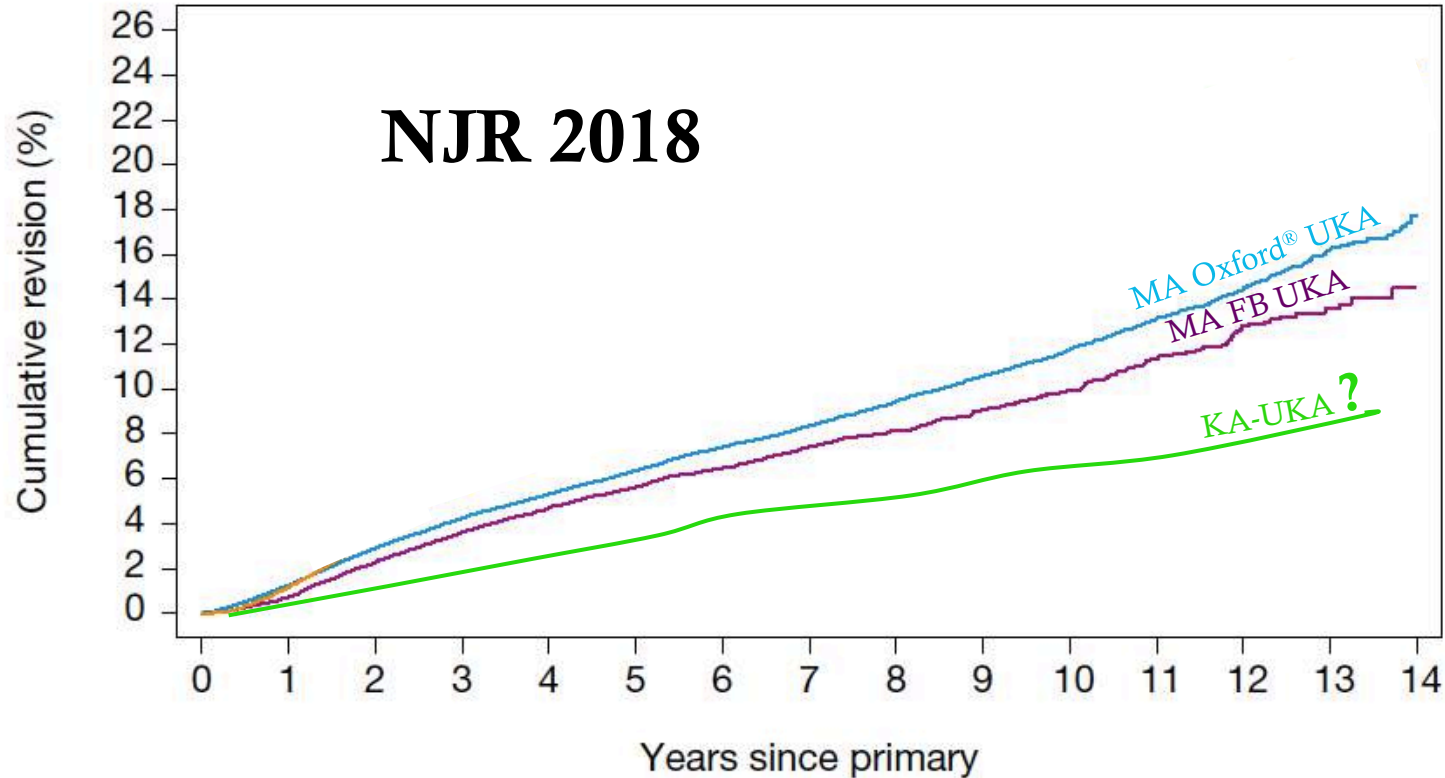
TAKE HOME MESSAGE

1. Physiological bone loading
2. Physiological soft-tissue balance (personalized slope)
3. Excellent components interact^o (less wear/ dislocation)
4. Bone preserving (tibia side)
5. Better fit of components to supportive bone

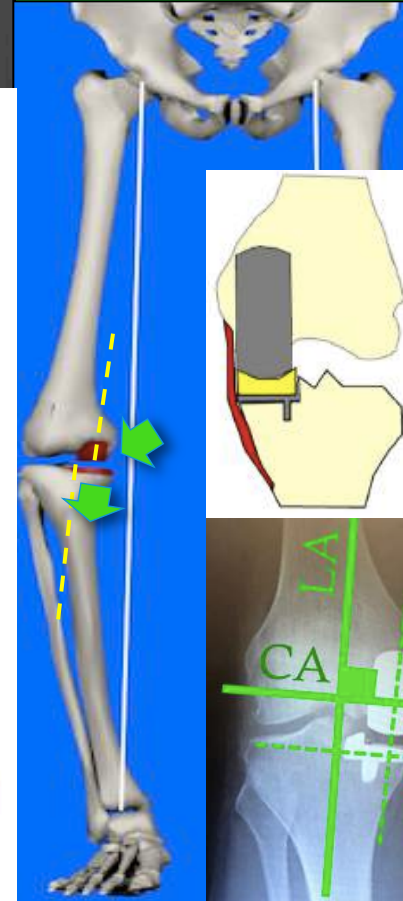
...KA-UKA is likely an improvement and could be clinically advantageous...Evidence awaited!



TAKE HOME MESSAGE



KA UKA



Thank You
For Listening

Personalized Hip and Knee Joint Replacement

Charles Rivière
Pascal-André Vendittoli
Editors

 Springer

EXTRAS ONLINE

Thank You
For Listening



**KEEP
CALM
AND
SWITCH
TO KA**

Thank You
For Listening

