

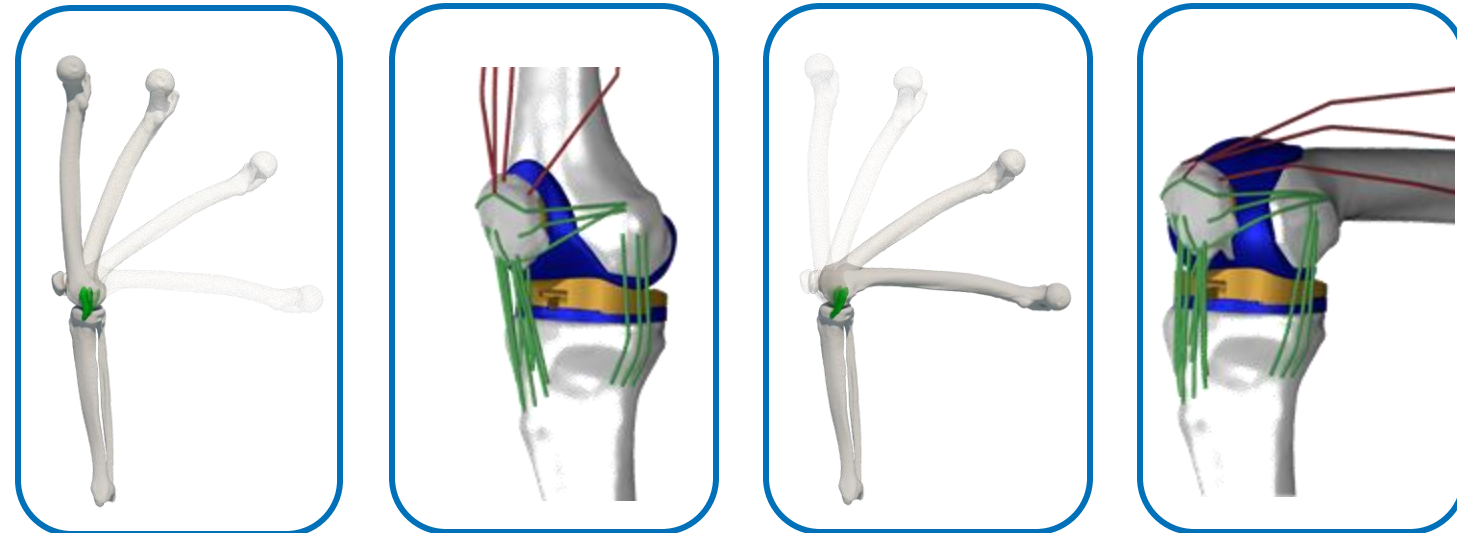
Revolutionizing knee replacement: Precision planning for orthopedic surgeons with ground breaking 4D Digital Twins

4D: 3D Modeling with **Dynamic** Motion of the Knee



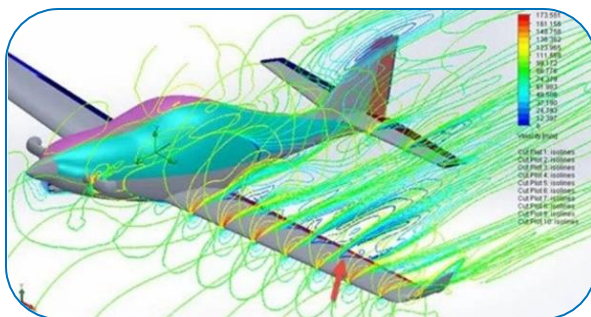
Mathieu RIMAUD, CEO

April 2025

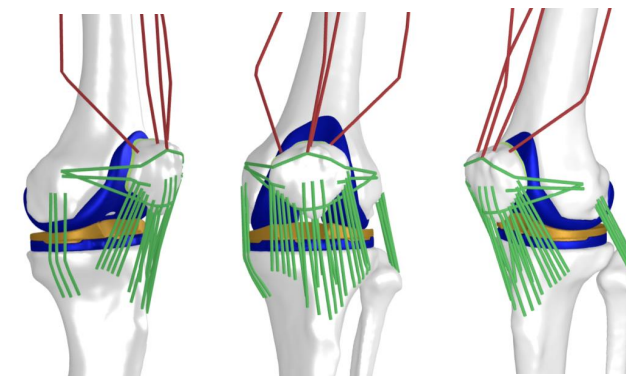


How can Computational Modeling and Biomechanical Simulation transform orthopedics: 2 parallel pathways to explore

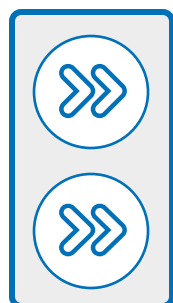
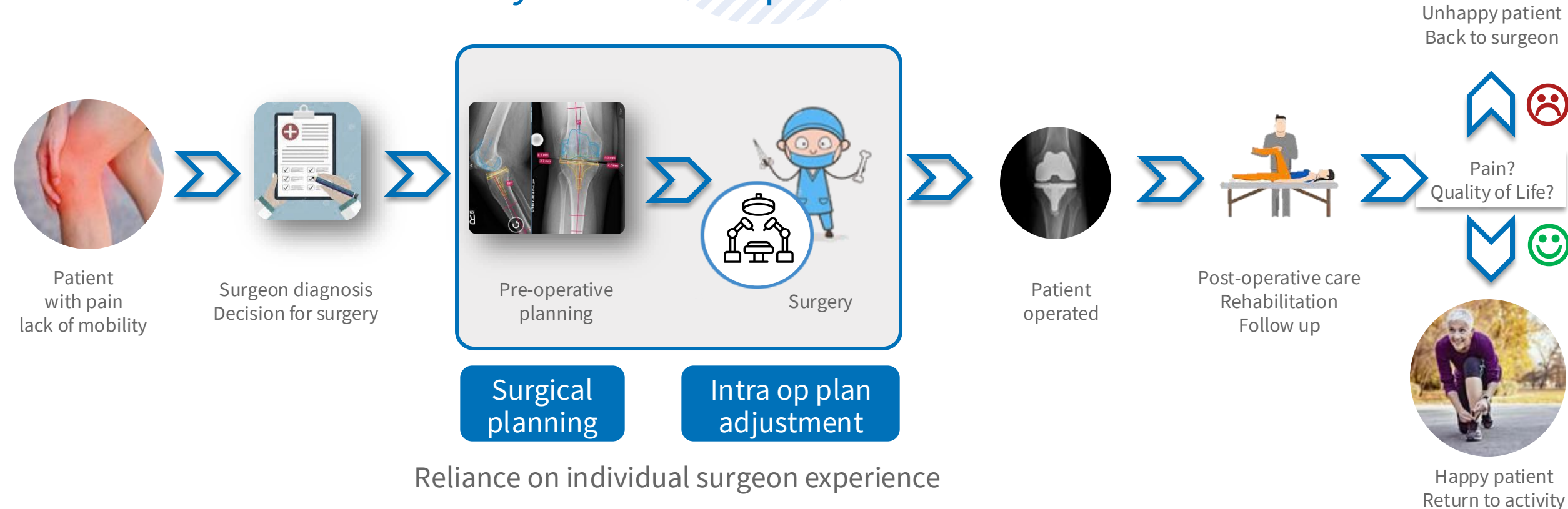
Facilitate design and approval of Medical Devices / Implants



Dynamic numerical simulation
using cohort of virtual patients



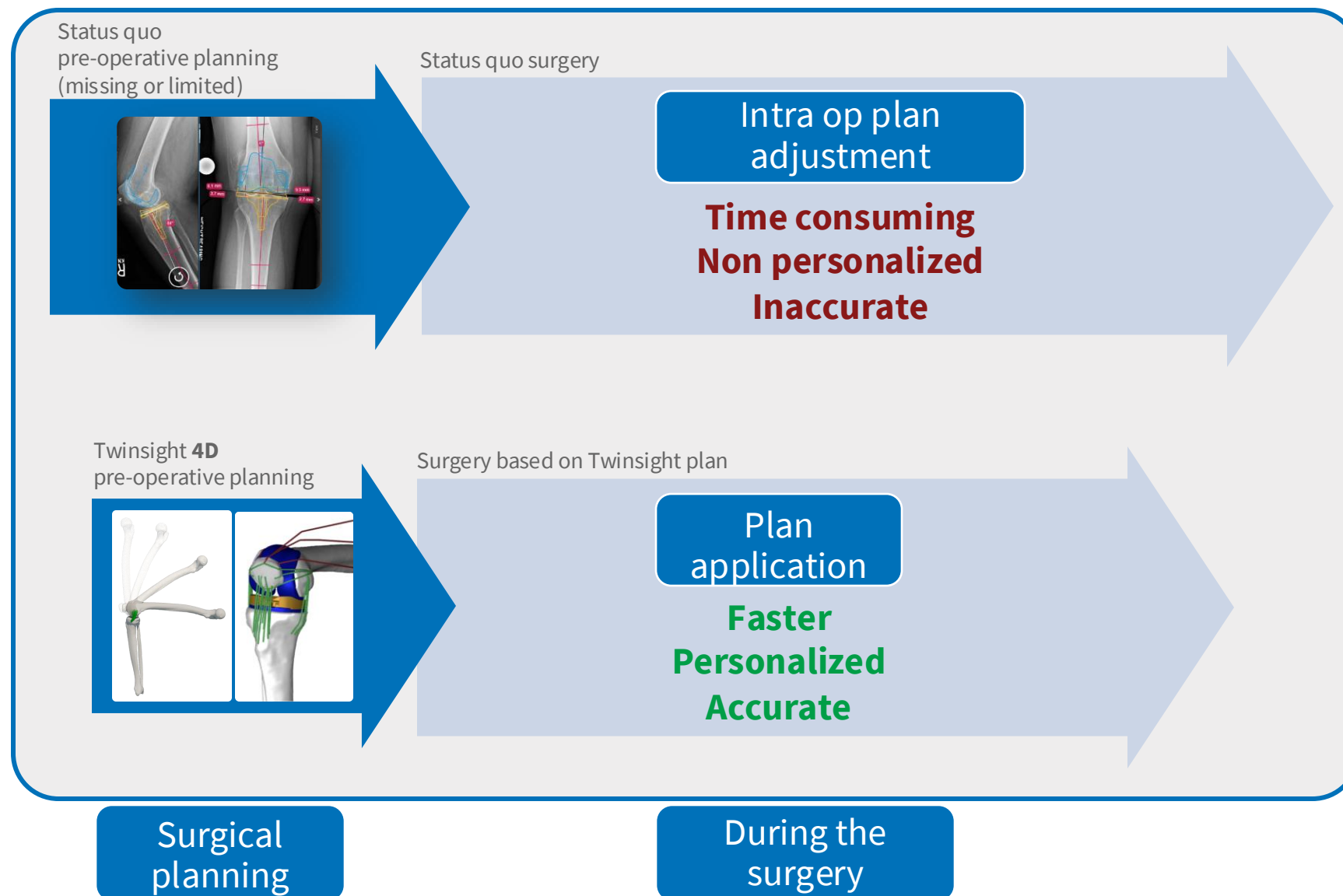
Current Patient Pathway for Knee Replacement



Insufficient planning: missing or limited

Intraoperative adjustments take time and cost money

Surgeon Pain Point: Better Planning to Improve Clinical Outcomes



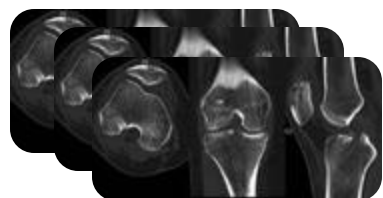
Unhappy patient



Happy patient

Twinsight's Solution: **SurgiTwin**

From CT to a tailored, dynamic digital twin of the knee



Pre-op imaging of the patient



Reference model



Implant database



Surgeon review of 4D Plan
Optional adjustments & Validation

AI powered

Simulation of knee motion

Automatic and 5 min. only

SaaS and intuitive

Step 1: SurgiTwin 3D → intuitive planning based on bony landmarks





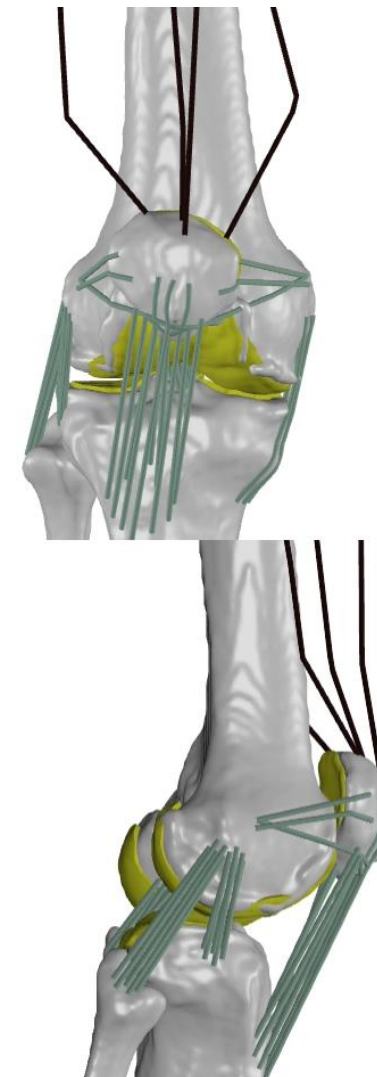
Enhance digital cohorts



2m05 Valgus



1m52 Varus

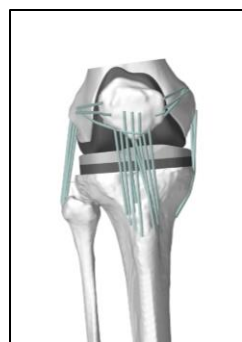
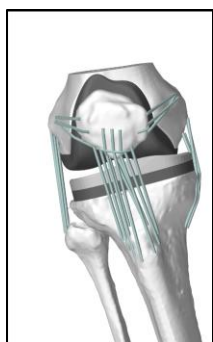


SurgiTwin 4D → features + research mode



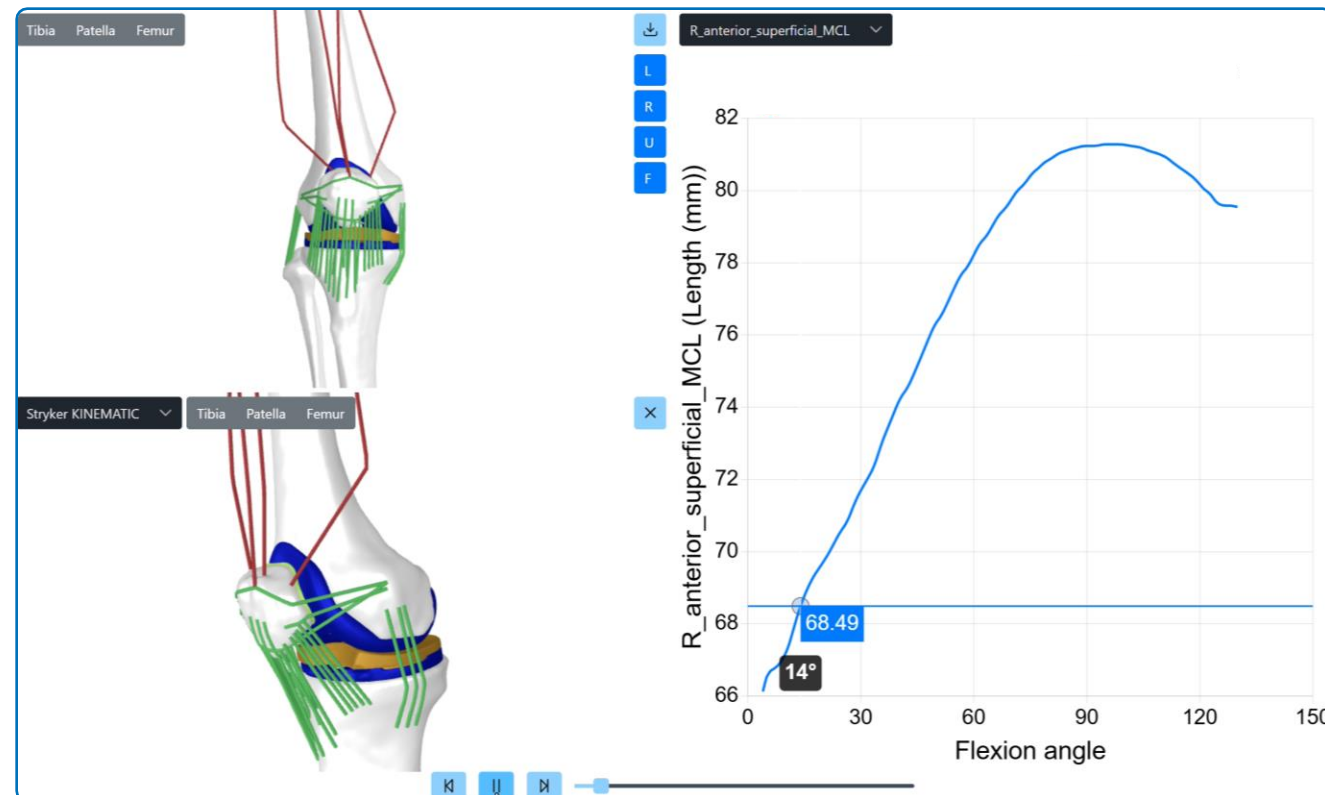
Assessment of ligament balancing across the range of knee flexion

Assessment of patella tracking across the range of knee flexion



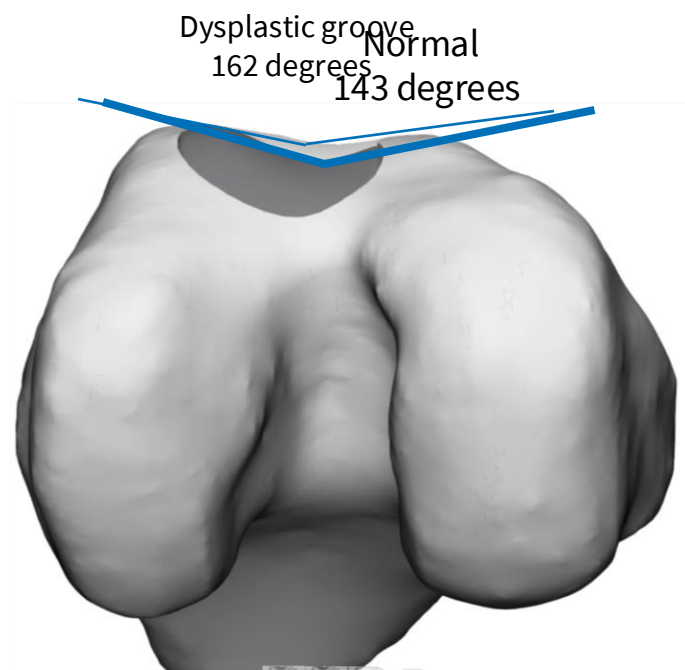
Varus/Valgus stress tests:

- Extension
- Flexion

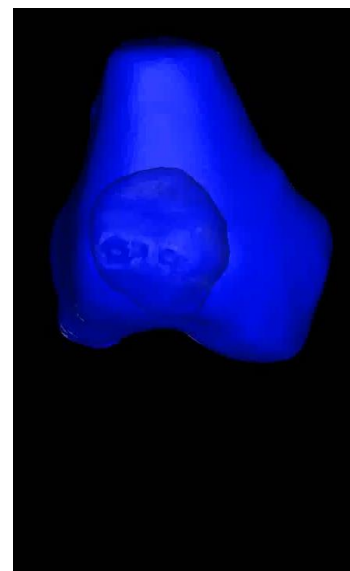


Use of the simulation results through curves of relative position of each bone (femur, tibia, patella): Translation, Rotation

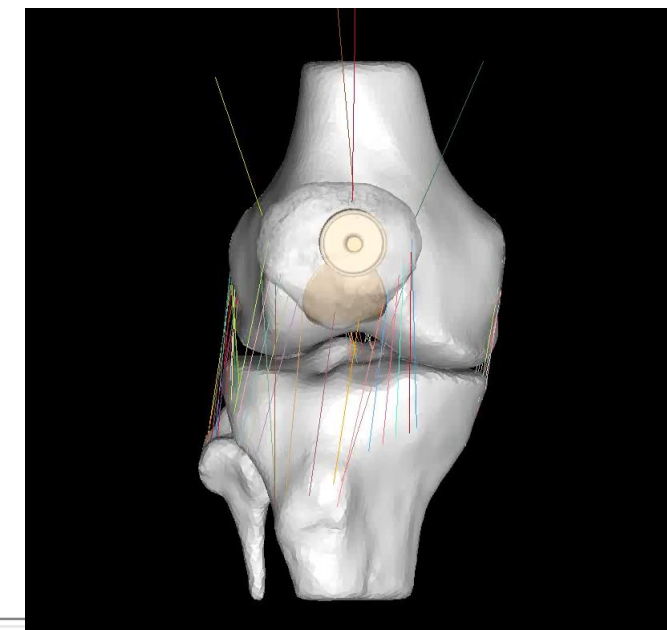
SurgiTwin 4D → features + research mode



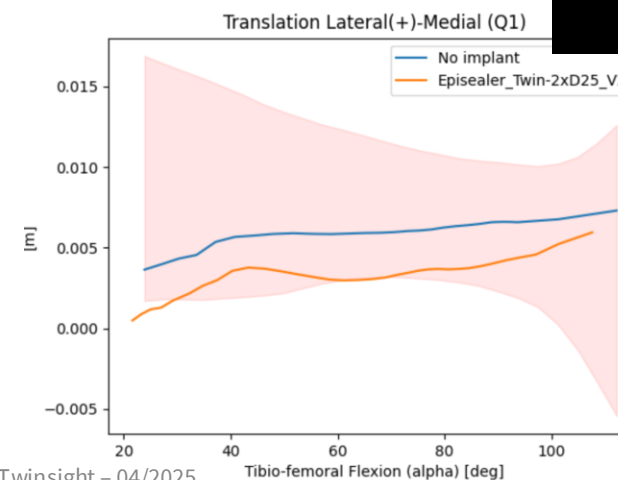
Contact map without implant



Kinematic with implant :
medial translation

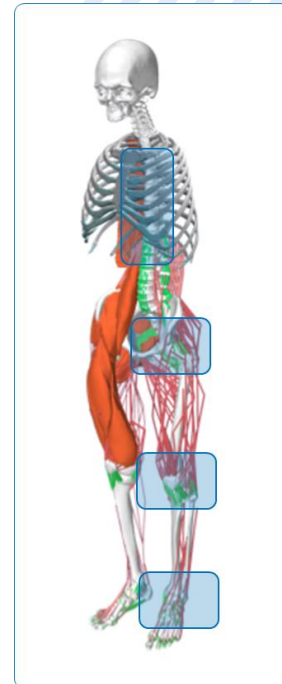
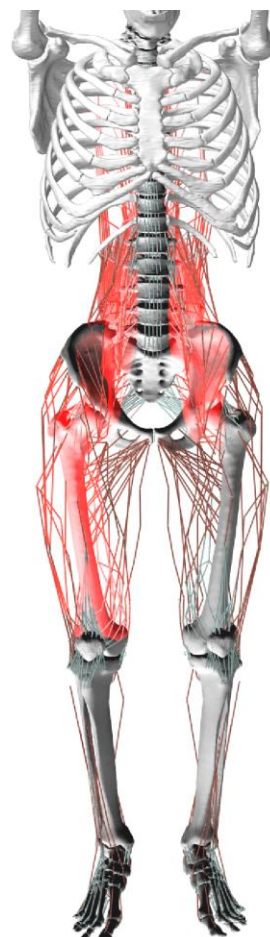


The trajectory of the patella over a extension-flexion cycle was modelled in this individual case using simulations



+ extension of SurgiTwin™ to:

- » **Foot & Ankle**
- » Spine
- » Sport medicine





Join us!

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Precision planning for orthopedic surgeons
with ground breaking 4D Digital Twins



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