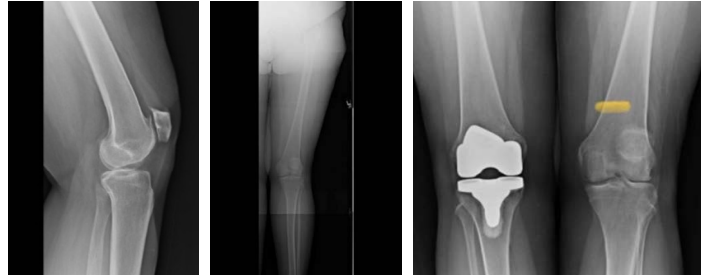


Mako Total Knee 2.0

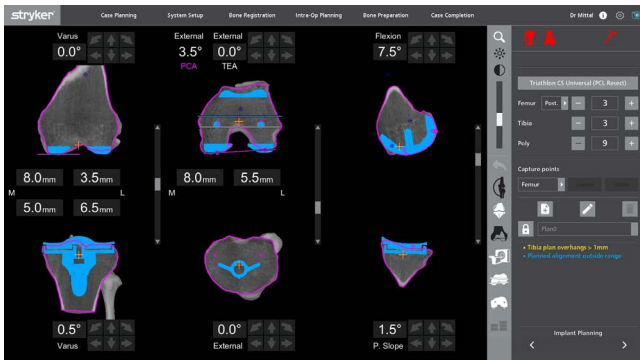
► Valgus case review with Yogesh Mittal, M.D.

Patient history / Pre-op x-rays

- 67-year-old female
- BMI 30
- Previous contralateral knee replacement



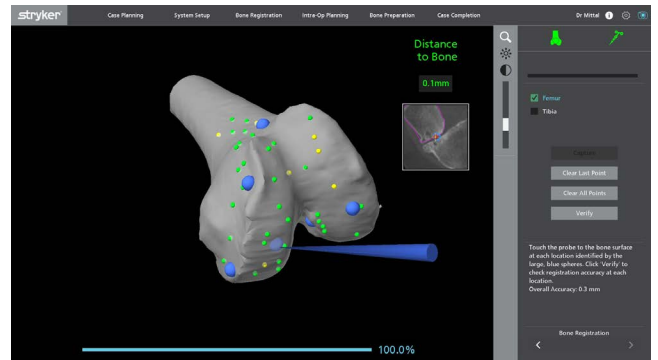
3D CT-based pre-planning



1

In CT view, the surgeon assesses implant sizing and initial implant positioning. Since this is a valgus knee, the surgeon sets the medial tibial resection to 5.0mm. The surgeon also adds 0.5° of varus into the tibia due to the initial valgus of the limb.

Bone registration



2

Once the surgeon is satisfied with their preoperative plan, they will move on to bone registration. Bone registration is completed, and the plan is verified within 0.5mm of the CT scan.

Native deformity



3

The surgeon holds the leg in extension to evaluate the limb's coronal and sagittal alignments. The software captures the native deformity, which shows a 7° flexion contracture and a 1.5° valgus deformity.

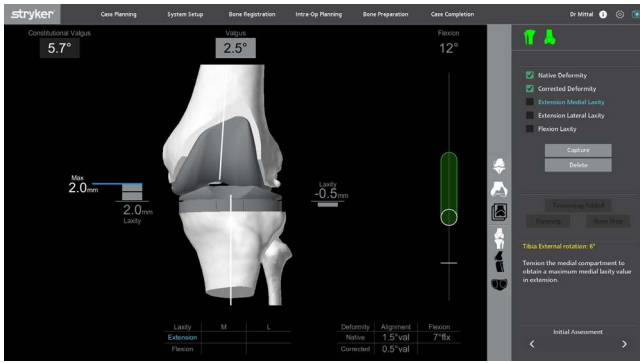
Corrected deformity



4

The surgeon then applies a corrective stress to the knee and captures the corrected deformity. This knee is correctable to 0.5° valgus.

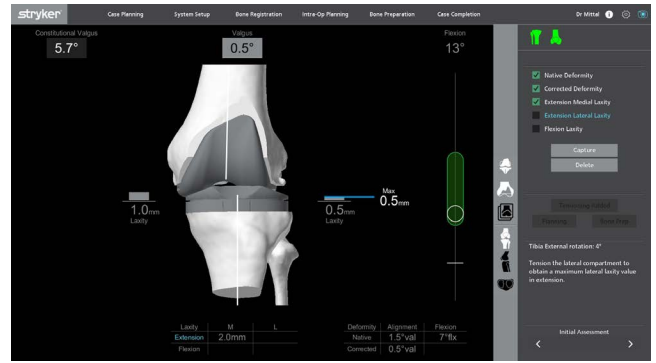
Extension medial assessment



5

The surgeon then applies a valgus stress to open up the medial compartment in extension. Using the audible and visible cues, from the software's digital tensioner, the maximum ligament laxity of 2.0mm is stored and captured in the laxity table. The green capturable range on the right side of the screen reinforces the need to relax the posterior capsule by 5° from the native sagittal deformity.

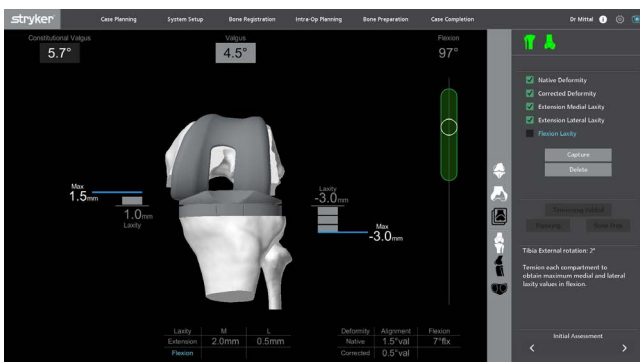
Extension lateral assessment



6

Similarly on the lateral side, the surgeon applies a varus stress to open up the lateral compartment and will capture the maximum laxity value which is 0.5mm.

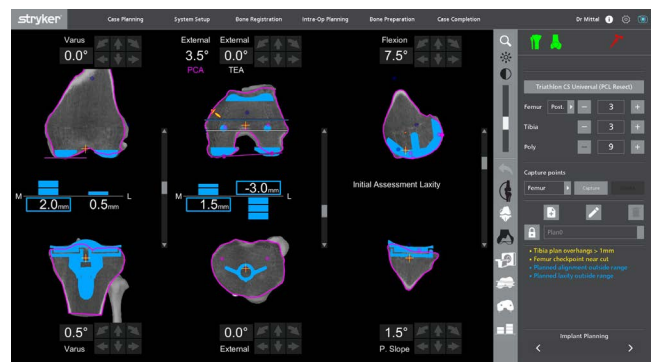
Flexion medial and lateral assessment



7

In flexion, the surgeon chooses to assess both the medial and lateral compartments together by applying tension to the joint, using the Mako spacer paddles. This results in asymmetric laxities: 1.5mm loose on the medial side and 3.0mm tight on the lateral side.

Intraoperative implant adjustments



8

Starting in extension, the medial laxity is 2.0mm loose and the lateral laxity is 0.5mm loose. The laxity values in extension and flexion are incorporated into the implant planning screen so the surgeon can make bony adjustments to balance the knee.



9

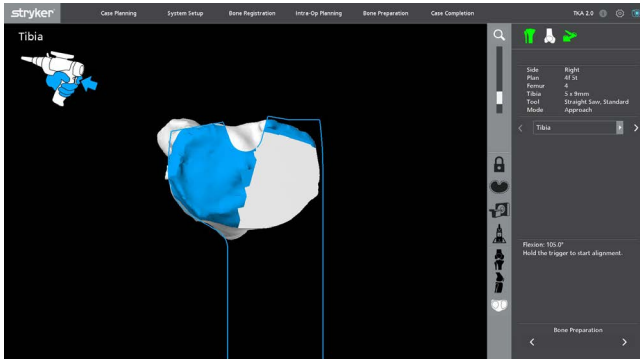
The surgeon anchors centrally and moves the tibia proximal by 0.5mm initially to tighten up the extension space.



10

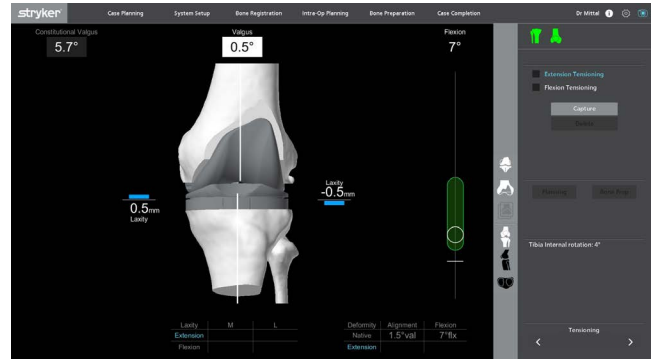
The surgeon can toggle to the actual bony resections from the laxity values to see that they are taking 0.5mm less bone on the tibia.

AccuStop™ Haptic Technology – Tibia resection



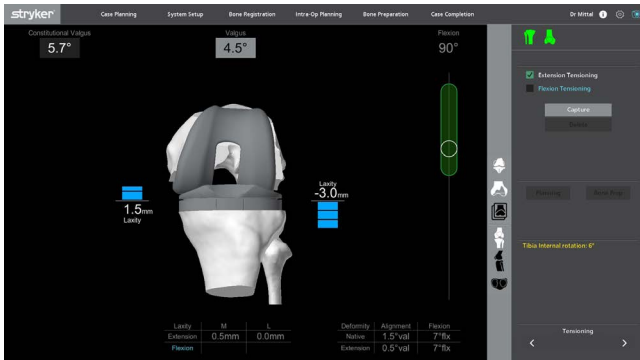
The surgeon executes a mid-resection technique. The tibia resection is made using the haptic technology, based on the implant plan in the previous step.

Tensioning in extension



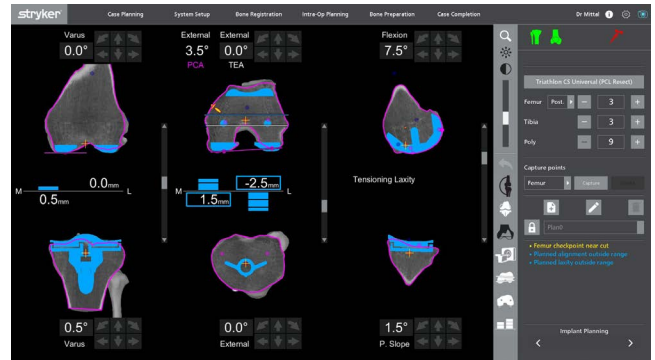
After the tibial resection, the ligaments are reassessed in extension by stressing the collaterals with lamina spreaders or a tensioner.

Tensioning in flexion

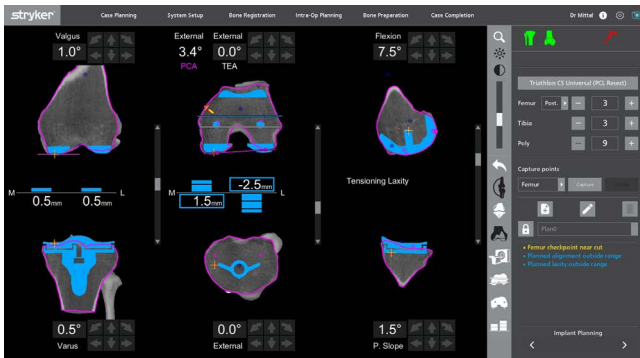


The ligaments are then stressed in flexion using the same methodology.

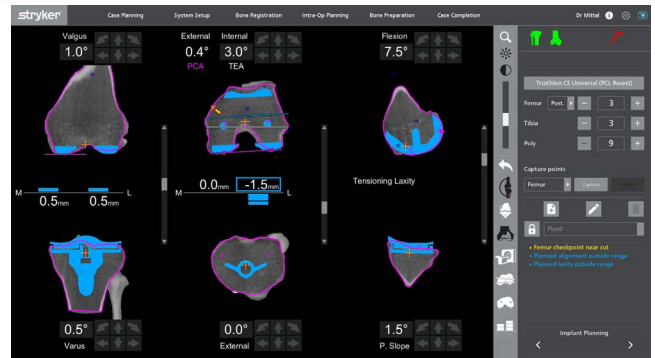
Intraoperative implant adjustments



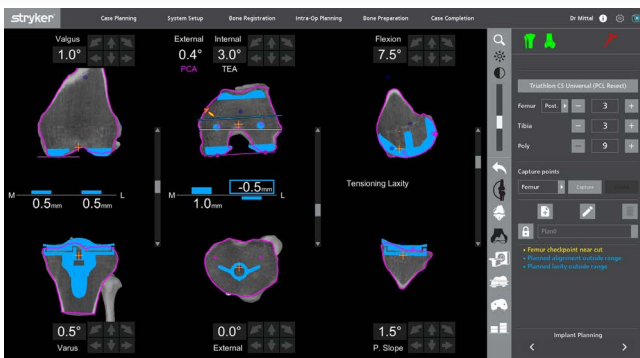
The new laxity values captured from the tensioning step are now incorporated into the implant planning screen, so the surgeon can make additional implant adjustments to balance the knee, before executing the remaining bone cuts.



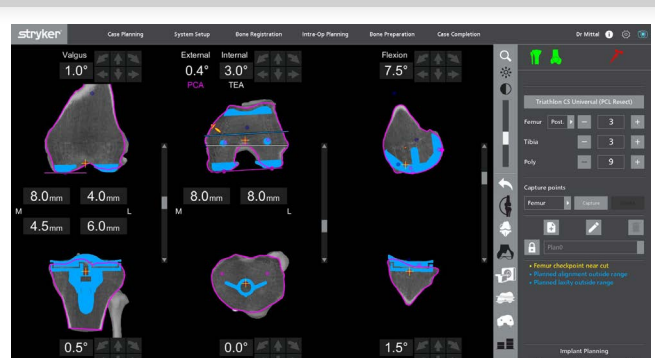
The surgeon adds 1.0° degree of valgus on the femur. Note that the anchor point is placed on the medial aspect of the femur so only the lateral compartment in extension is affected.



The surgeon adds 3.0° of internal rotation on the femur, anchoring centrally. The surgeon accepts 3.0° of internal rotation because the PCA is still externally rotated, and the conformity of the patellofemoral groove matches the anatomic position of the femur using the CT view.

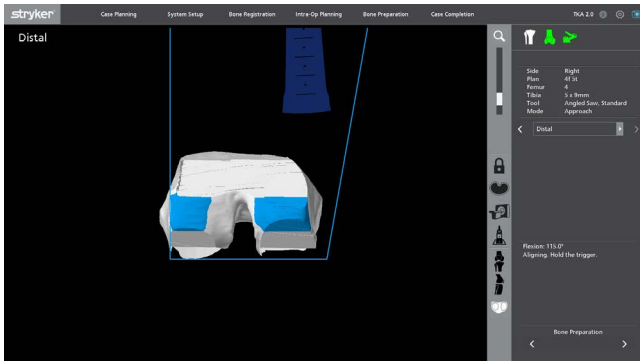


The surgeon moves the femur anteriorly 1.0mm. This is acceptable because the posterior condylar offset (PCO) is intact, which can be confirmed in the CT view. The PCO and functional position of the femur should always be assessed in the decision-making process, as not to decrease the offset and create flexion instability.



Once the surgeon reaches their final plan, they will assess the bone resection values and review the final plan: the planned alignment and laxity values in both extension and flexion; ensure the transverse view shows adequate rotation without overstuffing the PF joint and ensure the femur flexion is appropriate to avoid notching.

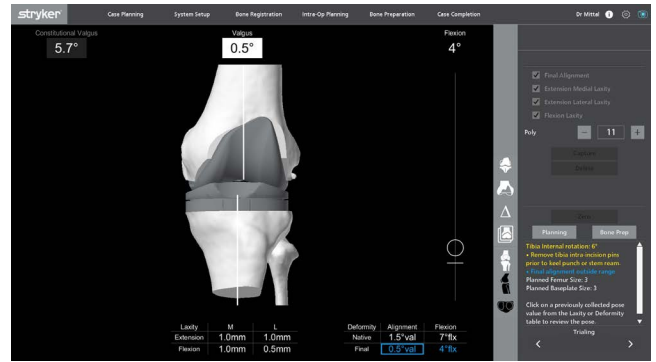
AccuStop™ Haptic Technology



19

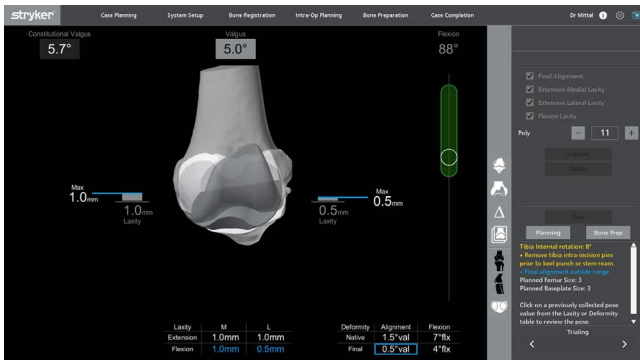
The surgeon completes the remaining bone resections using AccuStop™ haptic technology. The saw is constrained in the virtual boundary that is established by the surgeon's patient specific plan.

Trialing



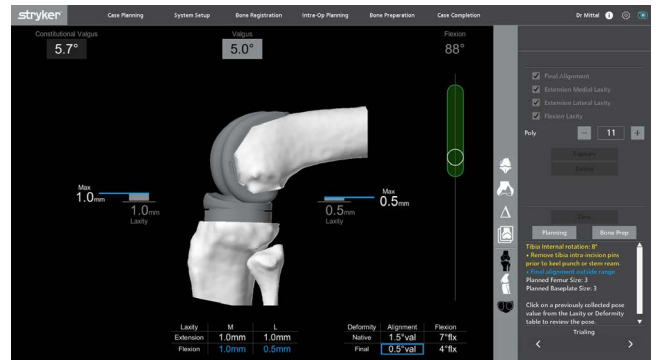
20

The trialing assessment demonstrates that the limb is capable of reaching 4° of extension, and the valgus deformity was corrected from 1.5° to 0.5°. The extension and flexion laxities are all balanced within 1.0mm, as planned.



21

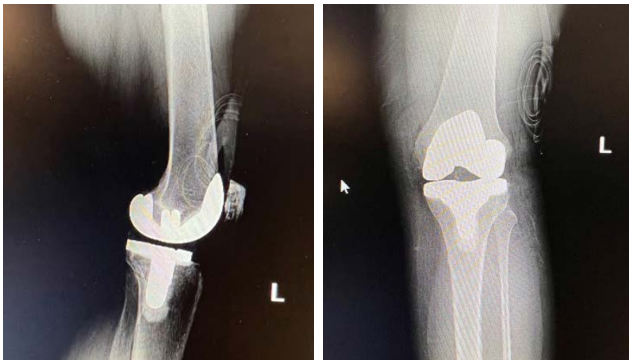
The surgeon uses the preset views to further confirm alignment and kinematic positions of the femur and tibia to ensure congruity.



22

In this view, the surgeon can stress the knee in an AP manner and visually see the anterior stability of the final result with trials in.

Post-op X-ray



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