DIFFICULT PRIMARY TKA: VALGUS KNEE

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EPIDEMIOLOGY

- MOST FREQUENT DEFORMITY IS FIXED-VARUS: 50 TO 55%
- FIXED-VALGUS RATE: 10 TO 15%

BOTH LESS FREQUENCY AND LACK OF CONSENSUS ABOUT CORRECTION TECNIQUES MAKES FIXED VALGUS DEFORMITY CHALLENGING.

GRIFFIN, SCUDERI, INSALL, 2005

PATHOPHYSIOLOGY

- NORMAL KNEE HAS A FEMOROTIBIAL ANGLE OF 6-7° VALGUS
- FIXED-VALGUS SHOWS AN ASYMMETRICAL DEFORMITY WITH:
  - DEFICIENCY OF LATERAL BONE AND CARTILAGE
  - LATERAL CONTRACTURE / MEDIAL STRETCHING
  - MAY OCCUR ASYMMETRICAL POSTEROLATERAL CONDYLE WEAR

WATANABE et al., 1993; WHITESIDE, 1993

IMPLANT SELECTION

- SEVERE DEFORMITY OFTEN SHOWS DISEASED AND CONTRACTED PCL
- RECOMMENDATION OF POSTERIOR STABILIZED (PS) PROSTHESIS DESIGN
- IN THE ELDERS and WHEN LIGAMENT STABILITY CANNOT BE ACHIEVED CCK or HINGED DESIGNES ARE PREFERRED
  - LOWER CHANCE OF PERONEAL N. PALSY AND FLEXION OR EXTENSION INSTABILITY

COLIZZA et al. 1995, BULLEK et al. 1996

APPROACH

- **MEDIAL PARAPATELLAR ARTHROTOMY IS, IN OUR EXPERIENCE, THE BEST CHOICE**
  - THE MEDIAL THIRD OF THE QUADRICEPS TENDON IS DIVIDED FROM THE LATERAL 2/3 LONGITUDINALLY
  - THE CAPSULE IS PEELED OFF THE MEDIAL THIRD OF THE PATELLA BY SUBPERIOSTIAL DISSECTION

INSALL, 1993

APPROACH

- **LATERAL PARAPATELLAR ARTHROTOMY CAN BE USED IN PREEXISTENT LATERAL INCISIONS**
  - **IN A VALGUS KNEE APPROACH CAN BE DIFFICULT, AND PATELLA MAY NOT BE EVERTED MEDIALLY**
  - **THIS APPROACH IS POTENTIALLY EXTENSIBLE, THEREFORE MAY BE POTENTIAL PATELLAR DEVASCULARIZATION**

APPROACH

- **LATERAL PARAPATELLAR ARTHROTOMY**

ADVANTAGES

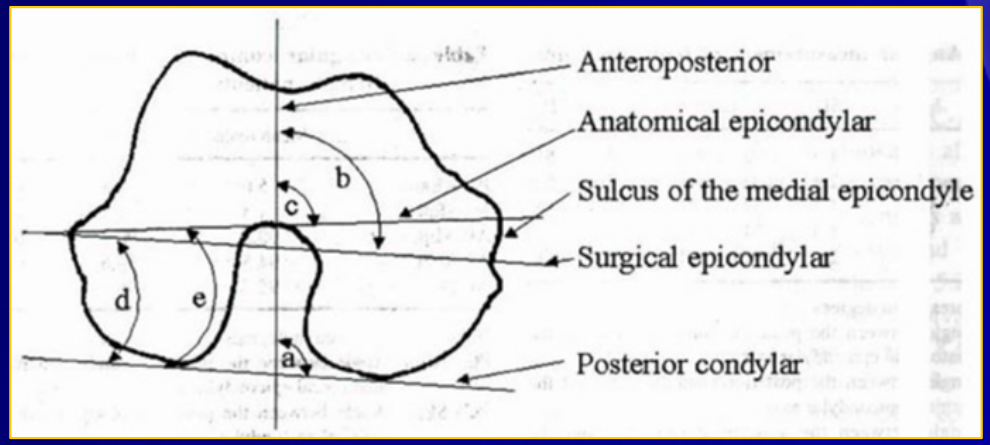
- PRESERVATION OF BLOOD SUPPLY
- EXTENSIVE LATERAL RELEASE, BIG EXPOSURE
- CORRECTION IN VALGUS DEFORMITY

DISADVANTAGES

- PERONEAL NERVE INJURY
- JOINT STABILITY
- PATELLA DEVASCULARIZATION AND FRACTURE

BONE CUTS

- ASYMMETRICAL POSTEROLATERAL CONDYLE WEAR IN VALGUS KNEE
- SURGICAL TRANSEPICONDILAR AXIS IS A BETTER REFERENCE, ESPECIALLY IN VALGUS KNEE



INSALL, 1993; BERGER et al., 1993

SOFT TISSUE RELEASES

MANY DIFFERENT PHYLOSOPHIES

TABLE 4.1. Sequences of release

Author	First step	Second step	Third step	Final steps
Insall[17,18]	Posterolateral corner	Iliotibial tract	LCL, LIS	CCK
Ranawat[21]	Iliotibial tract transverse (2.5 cm)	Popliteus, LCL	Posterior capsule	LIS, lateral head of gastrocnemius
Keblish[10]	Lateral approach	Iliotibial tract multiple puncture	Posterolateral corner	Gerdy's tubercle, tibial tubercle elevation
Buechel[13]	Lateral approach	Iliotibial tract	LCL, popliteus	Fibular head excision
Clayton[14]	LCL, popliteus, lateral capsule	Posterolateral capsule, lateral head gastrocnemius, LIS	Iliotibial tract	Biceps femoris tendon Z-lengthening
Whitesides[3]	Iliotibial tract	Popliteus	LCL	Lateral head of gastrocnemius
Krackow[20]	Iliotibial tract	Popliteus	Posterolateral capsule, popliteus	Biceps femoris tendon, lateral head of gastrocnemius, MCL advancement in Type II

LIS = Lateral intermuscular septum
LCL = Lateral collateral ligament
CCK = Constrained condylar knee

INSALL et al, 1979; RANAWAT et al, 1988; KEBLISH et al, 1991; BUECHEL et al, 1990; CLAYTON et al, 1986; WHITESIDES et al, 1993; KRACKOW et al, 1991

SOFT TISSUE RELEASES

OUR PHYLOSOPHY

- AIM: LIGAMENTOUS BALANCE WITH RECTANGULAR FLEXION AND EXTENSION GAPS WITH LATERAL SIDE STABILITY IN FLEXION

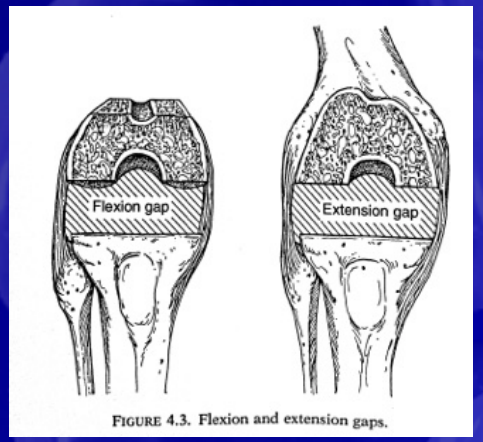


FIGURE 4.3. Flexion and extension gaps.

- RELEASE IS PERFORMED IN A STEP-BY-STEP CONTROLLED FASHION AND REASSESSED WITH LAMINAR SPREADERS AFTER EACH STEP

SOFT TISSUE RELEASES

OUR PHYLOSOPHY

- USUALLY WITH FIXED-VALGUS FURTHER "PIECRUSTING" RELEASE OF ILEOTIBIAL BAND, POSTERIOR CAPSULE AND LCL IS NECESSARY
- THE POPLITEUS TENDON and BICEPS FEMORIS TENDON SHOULD BE PRESERVED

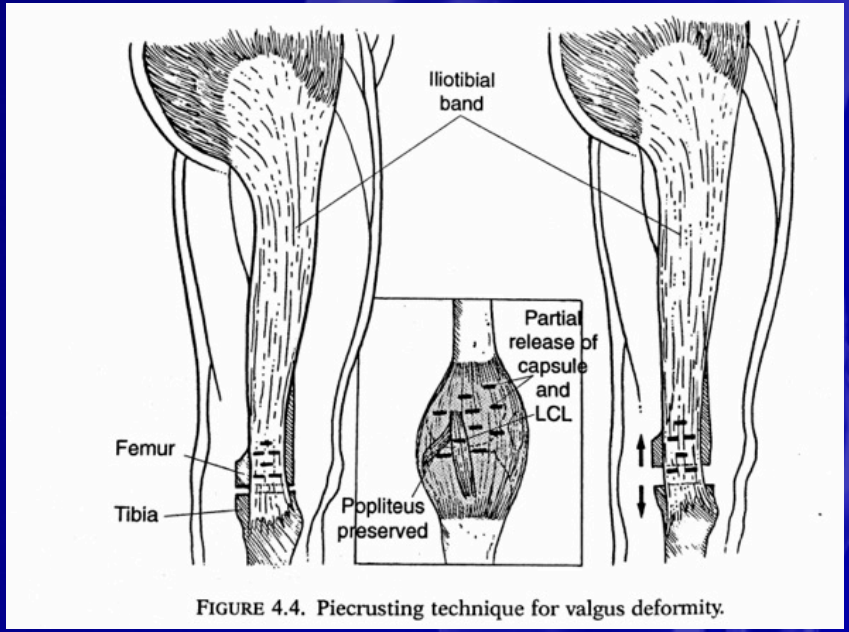


FIGURE 4.4. Piecrusting technique for valgus deformity.

SOFT TISSUE RELEASES

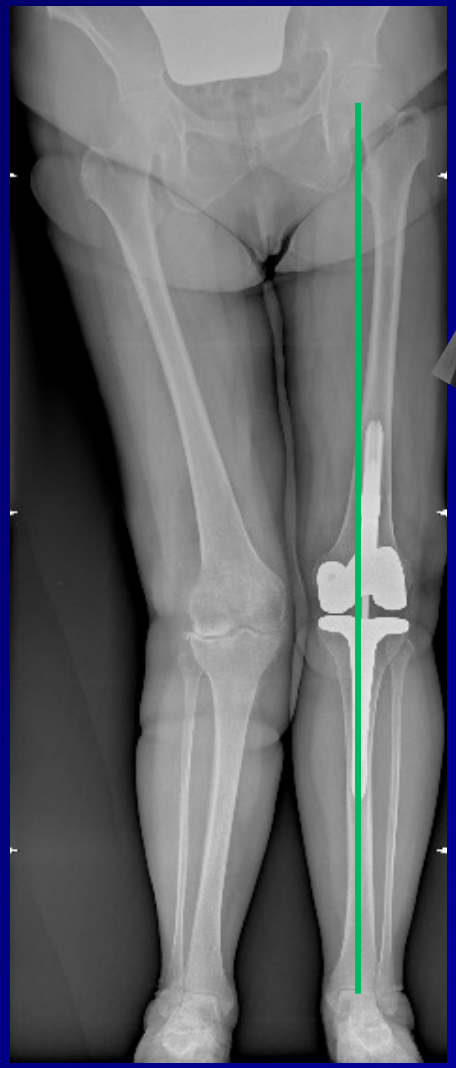
OUR PHYLOSOPHY

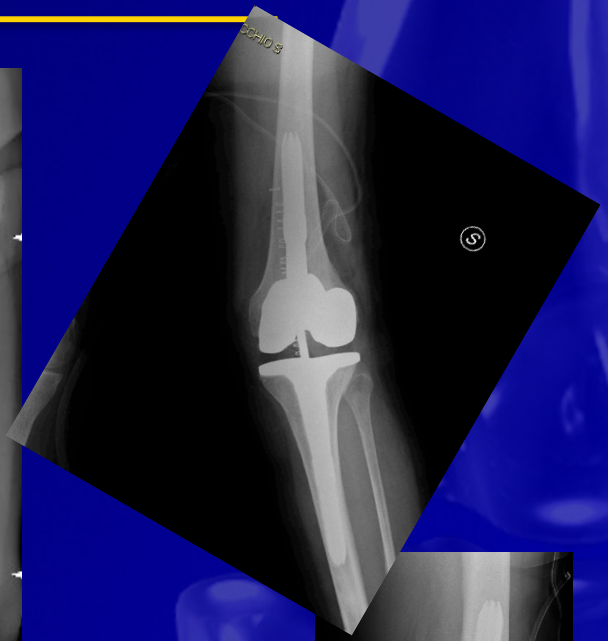
- **IF LIGAMENT STABILITY CANNOT BE ACHIEVED, SEMI-CONSTRAINED / CCK / HINGED IMPLANT WILL BE USED**

PS → SEMI-CONSTRAINED → ROTATING HINGE

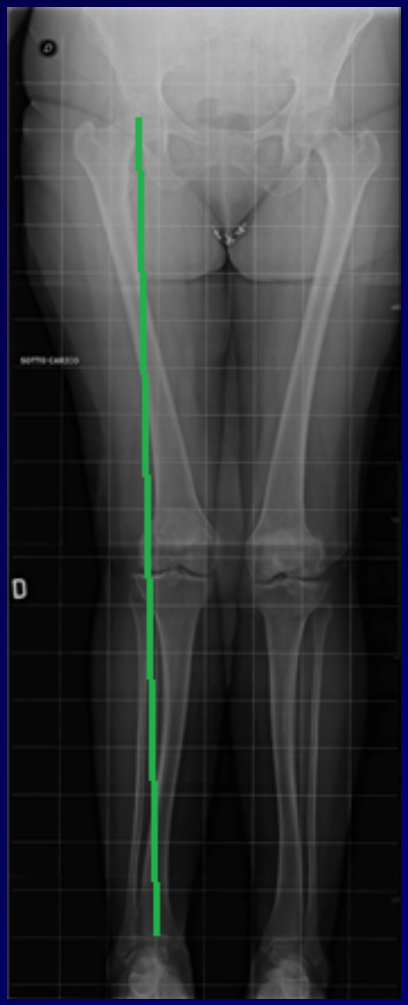
- **USE OFF-SET WHEN ABNORMAL TIBIAL AND/OR FEMORAL ROTATION**

SEMI-CONSTRAINED TKA

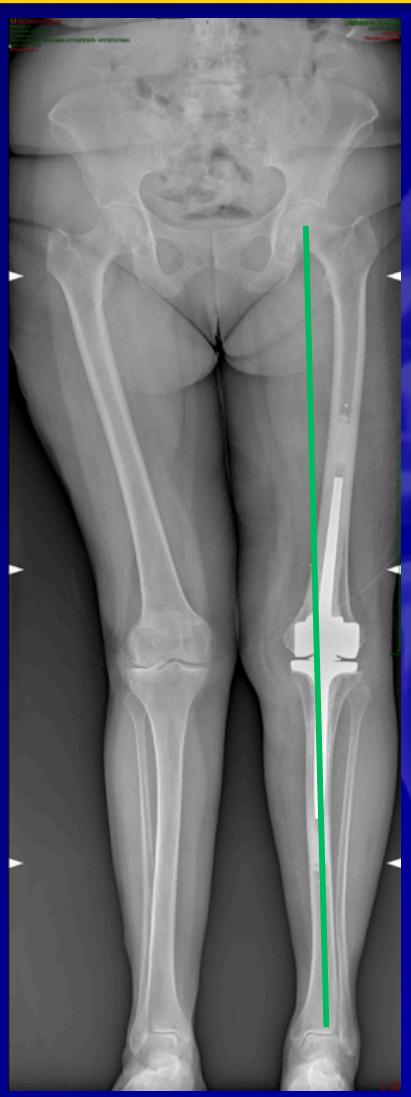




SEMI-CONSTRAINED WITH OFF-SET



ROTATING HINGE TKA

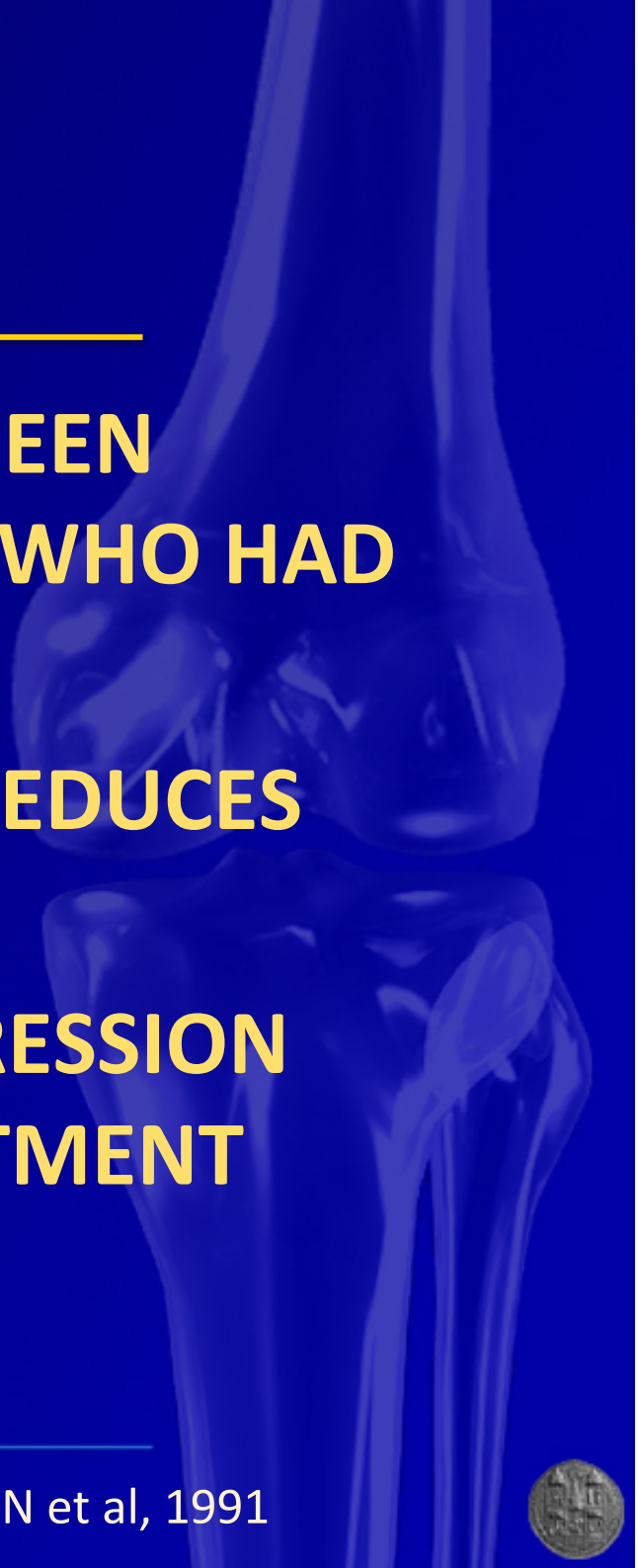


POST-OP MANAGEMENT

- LIGAMENT RELEASE DOES NOT MODIFY POST-OP MANAGEMENT
- CONTINOUS PASSIVE MOTION (CPM) MACHINE UNTIL 90° OF FLEXION
- PARTIAL WEIGHT BEARING BY SECOND DAY

COMPLICATIONS

- PERONEAL NERVE PALSY HAS BEEN REPORTED IN 3% OF PATIENTS WHO HAD TKA IN VALGUS KNEE
- EARLY CPM MACHINE USAGE REDUCES PALSY INCIDENCE
- SURGICAL NERVOUS DECOMPRESSION ONLY IF NONOPERATIVE TREATMENT FAILS



STERN et al, 1991

COMPLICATIONS

- SYMMETRIC EXTENSION INSTABILITY MAY OCCUR DUE TO DISTAL FEMUR OVERRESECTION
- ASYMMETRIC EXTENSION INSTABILITY IS OFTEN LINKED WITH INSUFFICIENT LIGAMENTS RELEASE

SCUDERI et al, 1995

COMPLICATIONS

- **PATELLAR MALTRACKING IS A COMMON ISSUE AMONG TKA IN VALGUS KNEE**
  - **PROPER ROTATIONAL ALIGNMENT**
  - **LATERAL RETINACULUM RELEASE**

  CAN HELP CORRECT TRACKING
- **IF PATELLA KEEPS TRACKING UNCORRECTLY AFTER LATERAL RELEASE REEVALUATE COMPONENTS ROTATIONAL POSITION!**

BULLEK et al, 1991

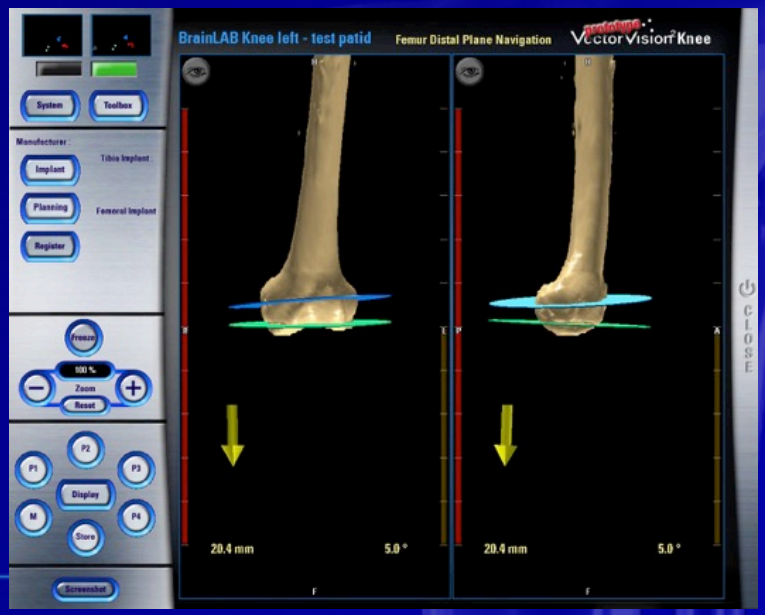
IMAGE GUIDED SURGERY

SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Istituto Ortopedico Rizzoli di Bologna
Istituto di Ricovero e Cura a Carattere Scientifico

IMAGE GUIDED SURGERY

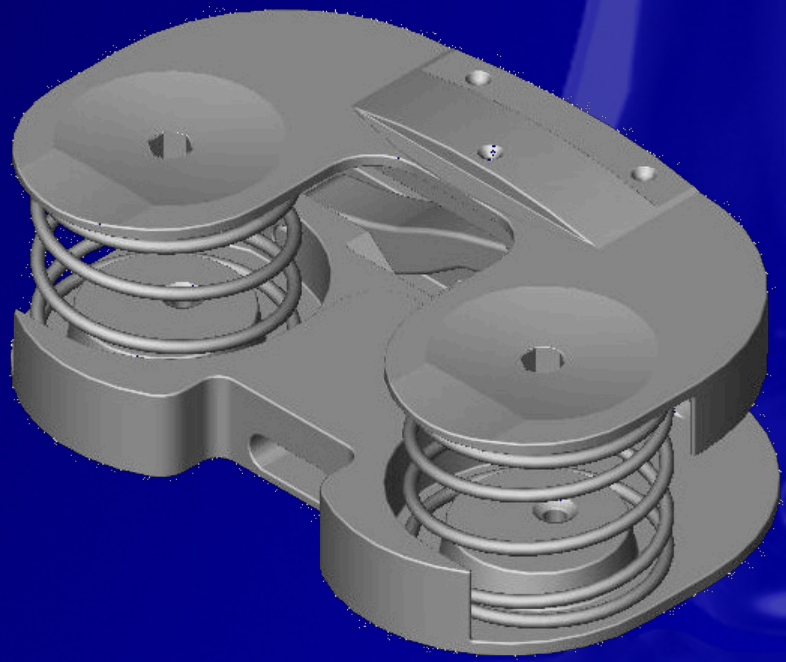
BETTER CONTROL

- ✓ AXES
- ✓ CUTTING PLANES
- ✓ PRECISION < 1MM
  < 2°



SENSOR TENSOR

2 PADS

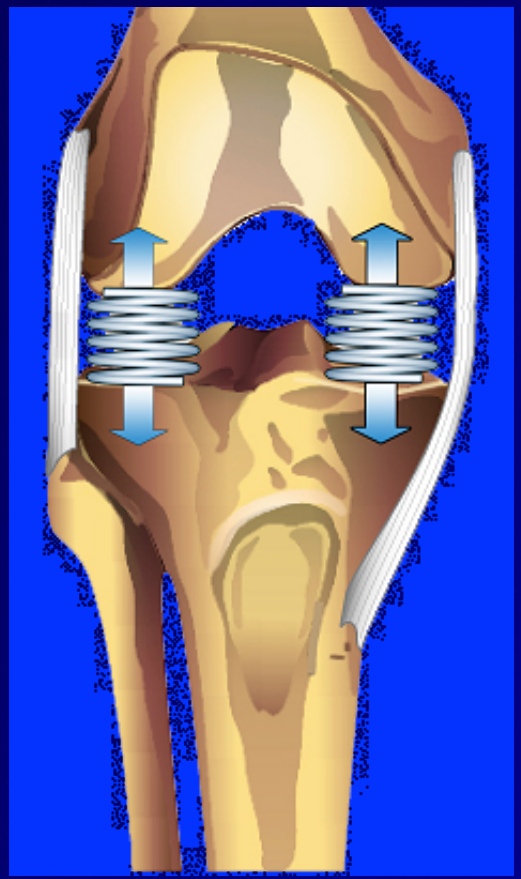


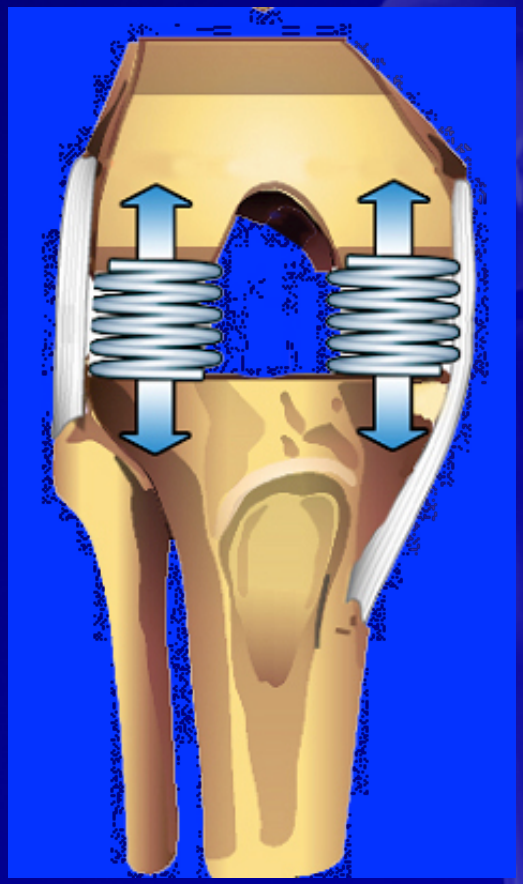
SEPARATED BY 2 SPRINGS

SENSOR TENSOR

TENSOR GOAL

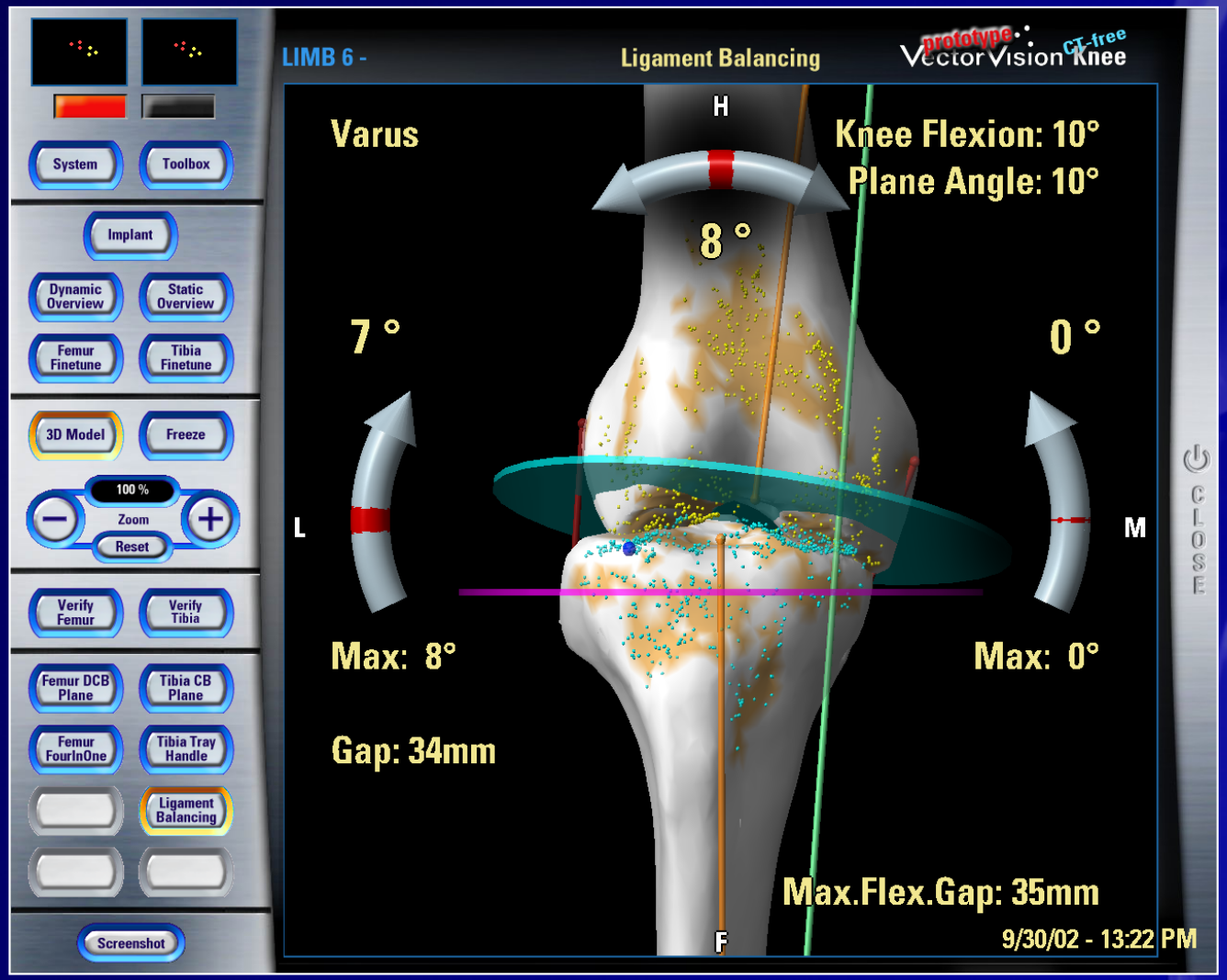
- ✓ **APPLY CONSTANT FORCES IN BOTH COMPARTMENTS**





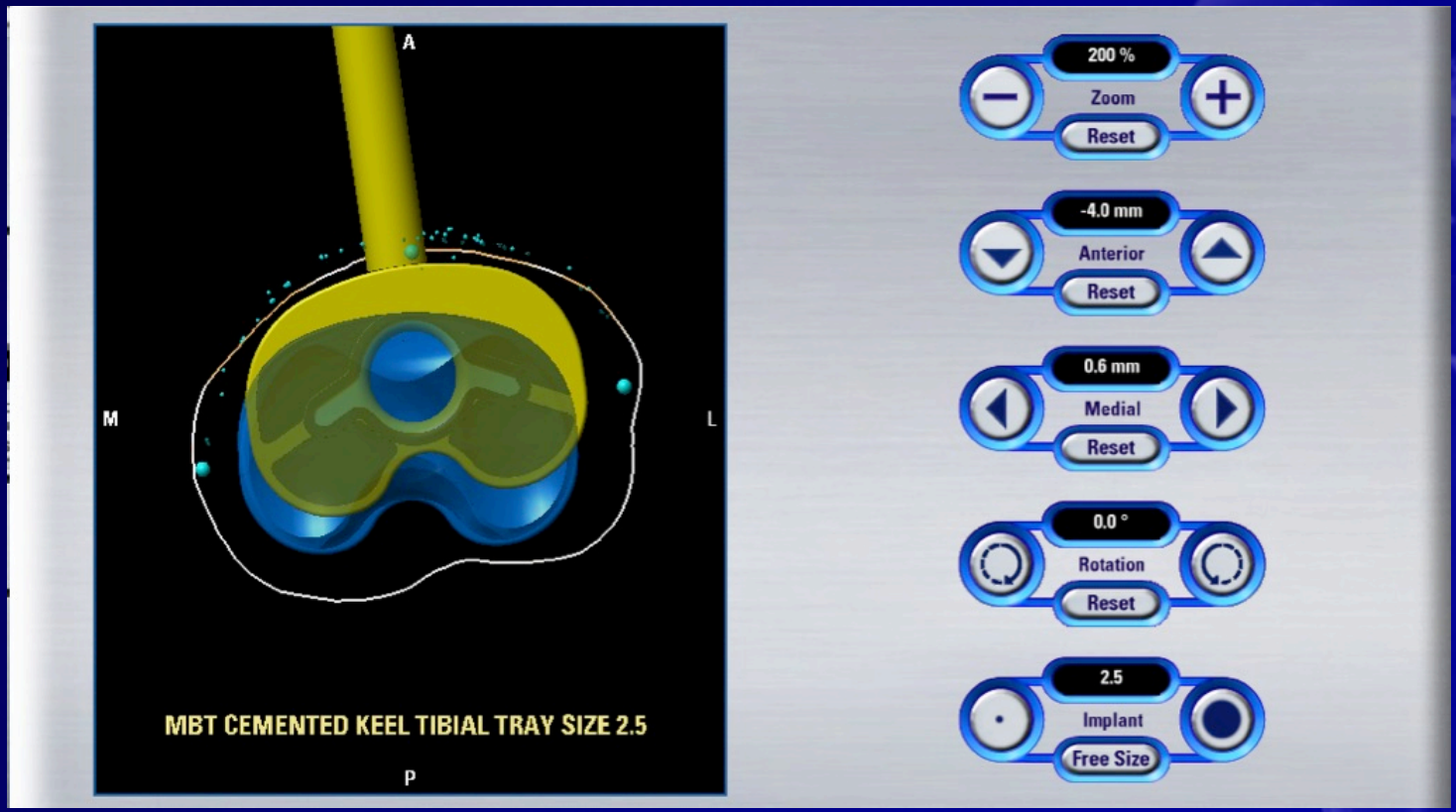
SENSOR TENSOR

MONITOR BALANCE DURING ROM



SENSOR TENSOR

ENSURING HIGH REPEATABILITY AND POSITIONING CONTROL



SENSOR TENSOR

TIBIAL CUT ESECUTION

↓

TEST TO CONTROL

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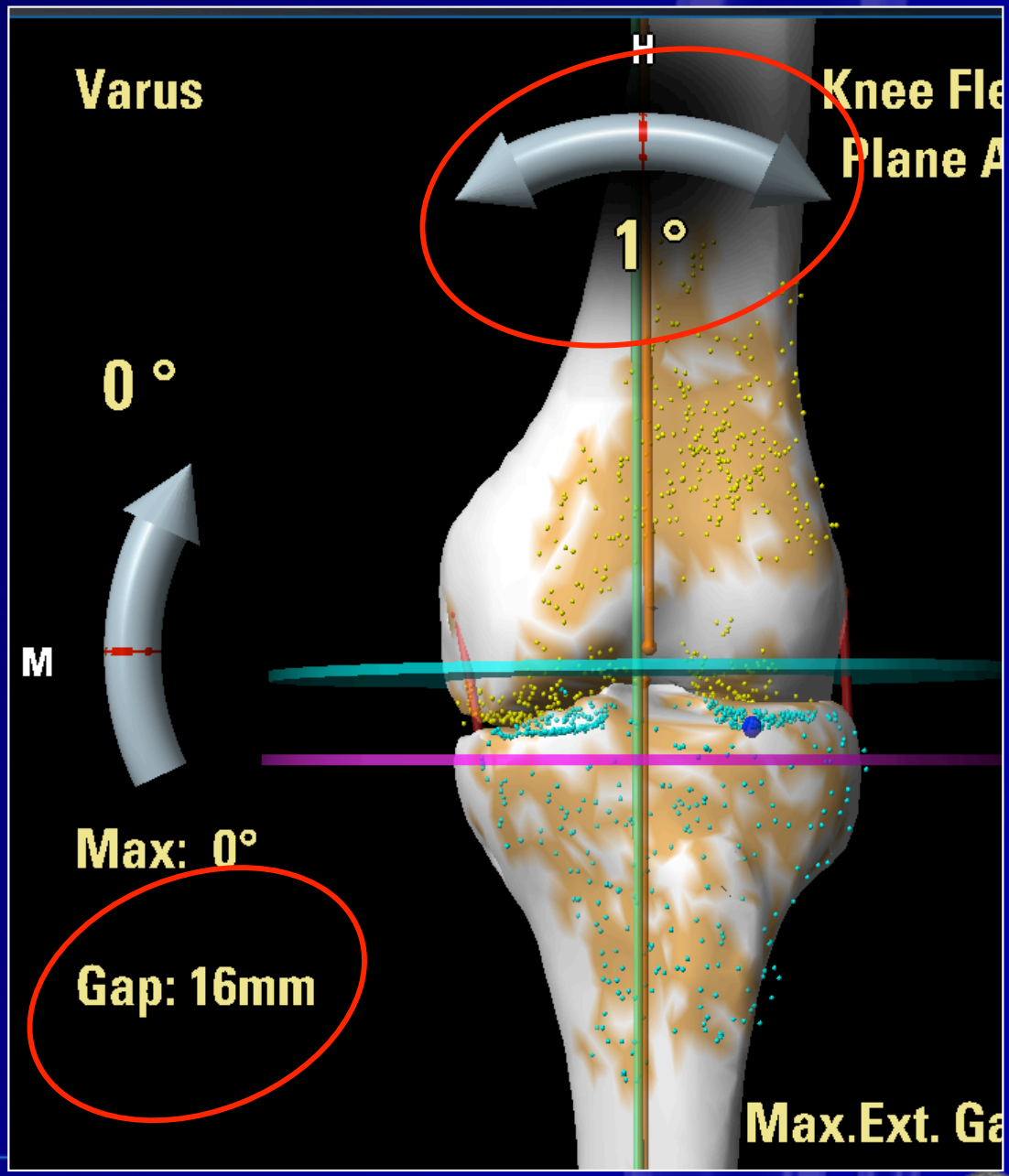
SPACE AND BALANCE AT THE SAME TIME



CONCLUSIONS

- WE BELIEVE A PS PROSTHESIS WILL PROVIDE MORE RELIABLE RESULTS IN VALGUS KNEE
- THE SURGICAL EPICONDYLAR AXIS PROVIDES A REPRODUCIBLE LANDMARK FOR APPROPRIATE ROTATIONAL ALIGNMENT OF THE FEMORAL COMPONENT
- MEDIAL CONDYLE AND TIBIAL PLATEAU SHOULD BE USED TO REFERENCE THE DISTAL FEMORAL AND PROXIMAL TIBIAL CUTS
- SEQUENTIAL RELEASES SHOULD BE REASSESED INTERMITTENTLY WITH LAMINAR SPREADERS OR A TENSOR
- CORRECTLY BALANCED, 90 TO 95% OF PATIENTS WITH VALGUS DEFORMITY REPORTEDLY HAVE GOOD OR EXCELLENT RESULTS
- COMPLICATIONS INCLUDE PERONEAL NERVE PALSY, INSTABILITY AND PATELLAR MALTRACKING

Thanks for your attention!

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