

# Doron Sher

MBBS, MBiomedE, FRACS FAOrthA

## Knee Malalignment and Instability

160 Belmore Rd, Randwick  
47-49 Burwood Rd, Concord

[www.kneedoctor.com.au](http://www.kneedoctor.com.au)

[www.orthosports.com.au](http://www.orthosports.com.au)

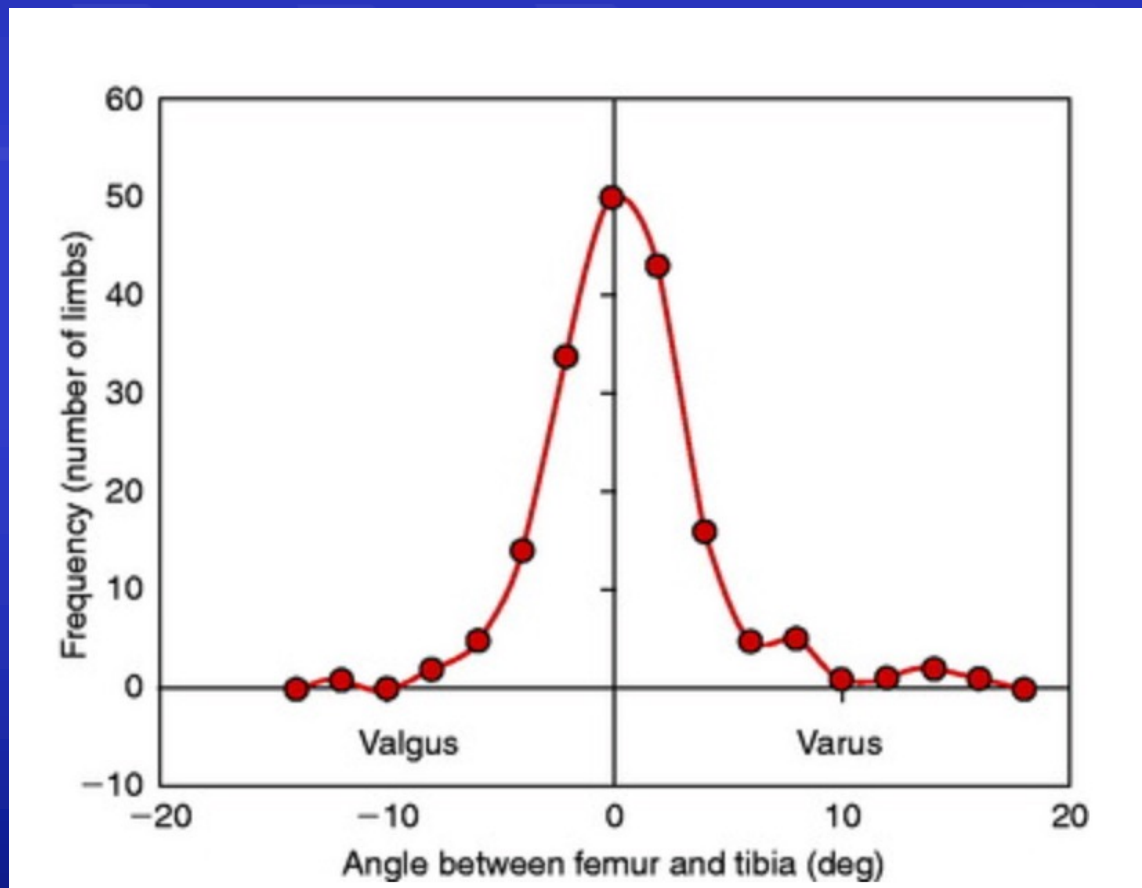


**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

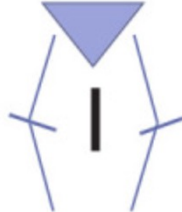
# Is Varus Normal



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

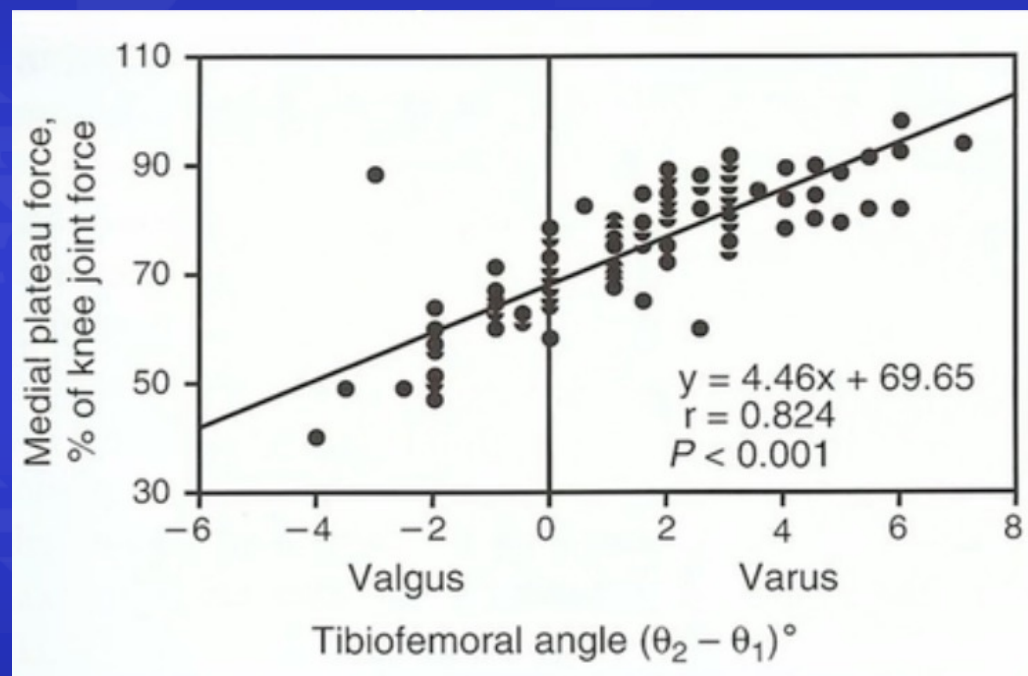
| Arithmetic HKA (MPTA - LDFA)        |               |                                                                                      |
|-------------------------------------|---------------|--------------------------------------------------------------------------------------|
|                                     |               | VARUS      NEUTRAL      VALGUS                                                       |
| Joint Line Oblliquity (MPTA + LDFA) | APEX DISTAL   |    |
|                                     | NEUTRAL       |   |
|                                     | APEX PROXIMAL |   |
|                                     | APEX DISTAL   |    |
|                                     | NEUTRAL       |   |
|                                     | APEX PROXIMAL |   |
|                                     | APEX DISTAL   |   |
|                                     | NEUTRAL       |  |
|                                     | APEX PROXIMAL |  |



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

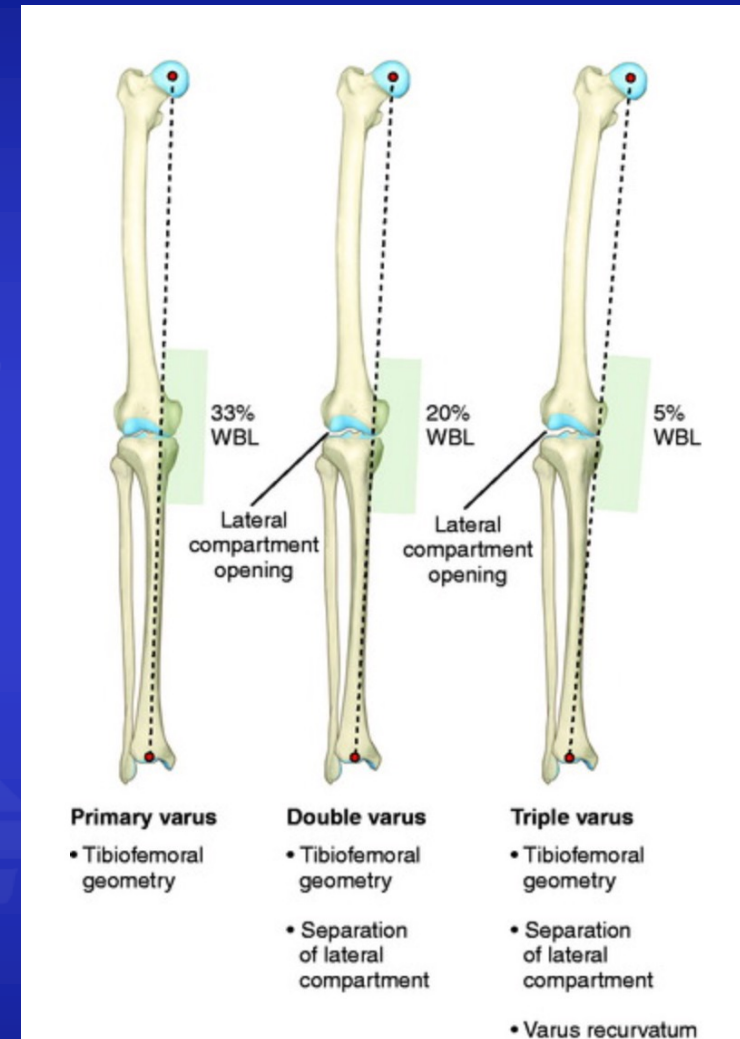
**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

Femoral  
Head  
Center

Anatomic Axis

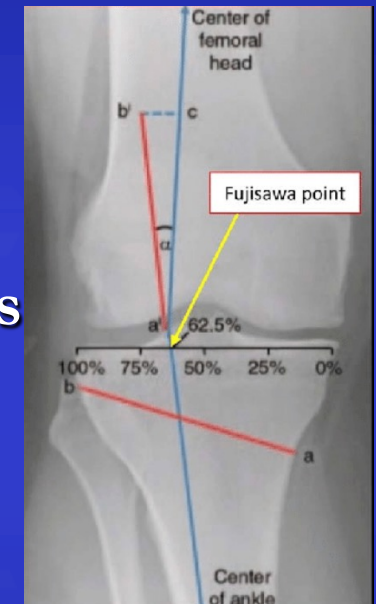
5° valgus

Knee  
Center

Tibio-Talar  
Center

Mechanical Axis

1.2° varus



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr Doron Sher  
Knee & Shoulder Surgery

# Varus Isn't Always Bad

- Pele
- Maradonna
- Neymar
- Robinho
- Beckham



ORTHOSPORTS  
ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr Doron Sher  
Knee & Shoulder Surgery



Today's talk does not include  
instability without malalignment



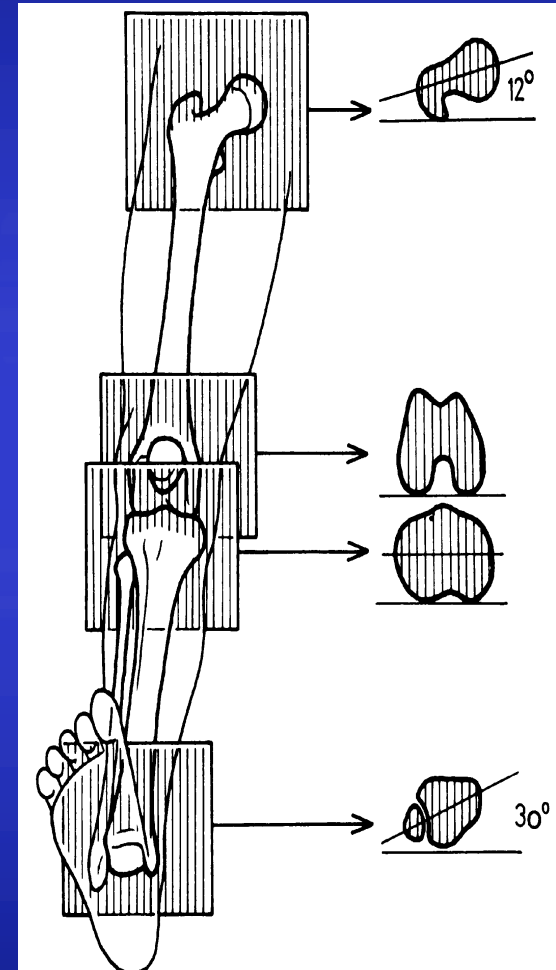
**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

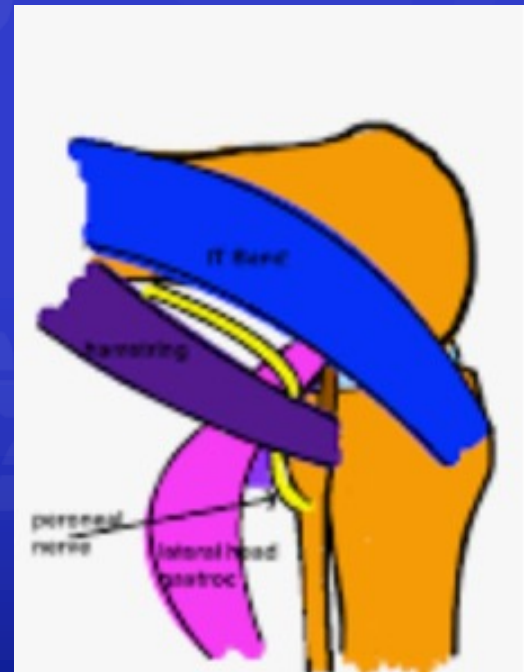
# Total varus angulation

- 1) Structural
- 2) Loss of the medial osteo-cartilaginous complex
- 3) Separation of the lateral joint



# Soft Tissues

Abnormally elongated restraints:



# Clinical Presentation

- Younger patient
- Varus, valgus, recurvatum  
+/- ligamentous injury
- Gait
  - varus
  - valgus
  - hyperextension thrust



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Clinical Exam

- Joint line tenderness
- Gait – look for thrust
- Stance – single, double limb alignment



ORTHOSPORTS  
ORTHOPAEDIC & SPORTS MEDICINE SERVICE

- Double, triple varus knee + ACL deficiency
- Stability tests

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

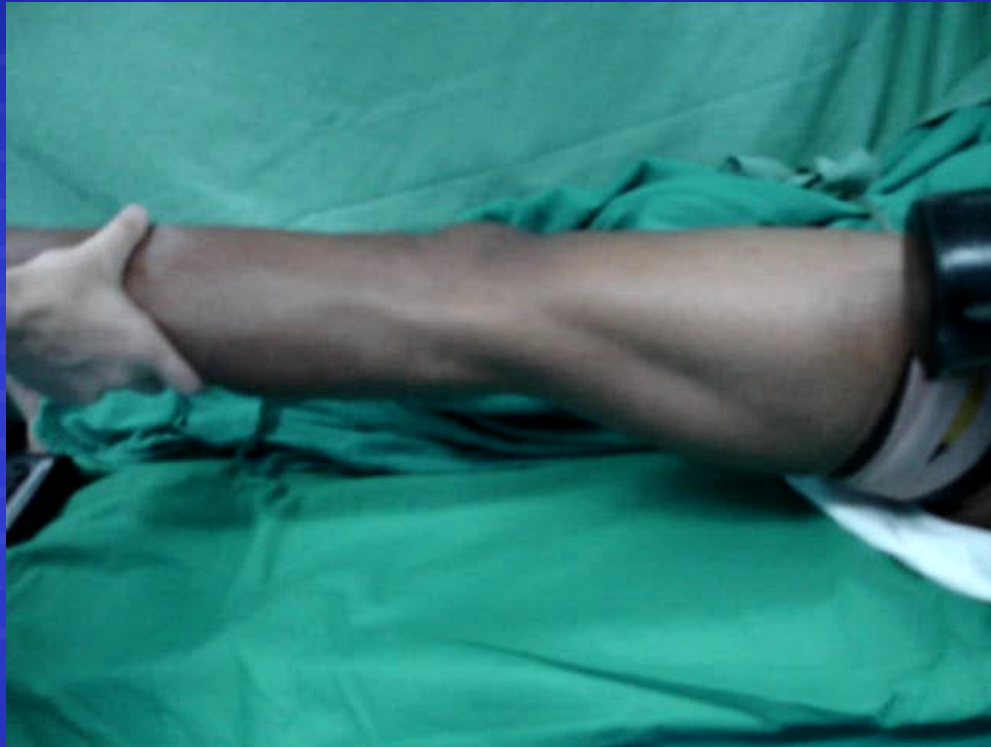
**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

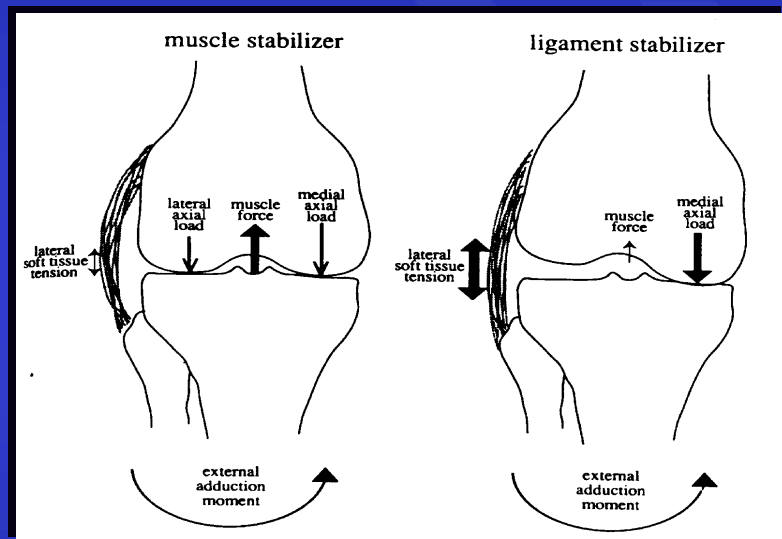
**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Gait Analysis

- Often back-knee gait with little or no observable quadriceps muscle contraction
- Knee hyperextension

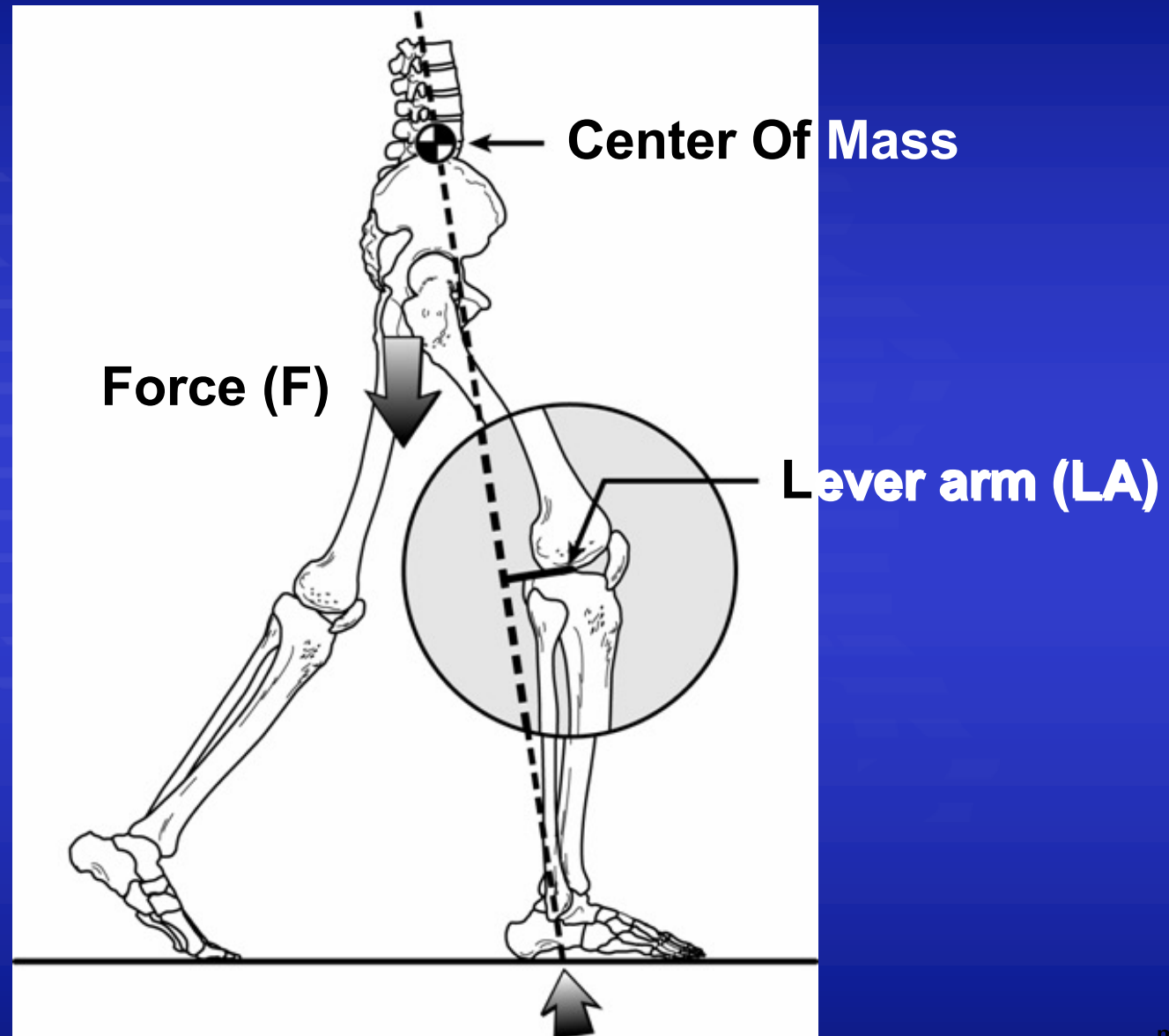


ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr. Dorian Sher  
Knee & Shoulder Surgery

# Demand Moment



**Ground Reaction Force**



**ORTHOSPORTS**

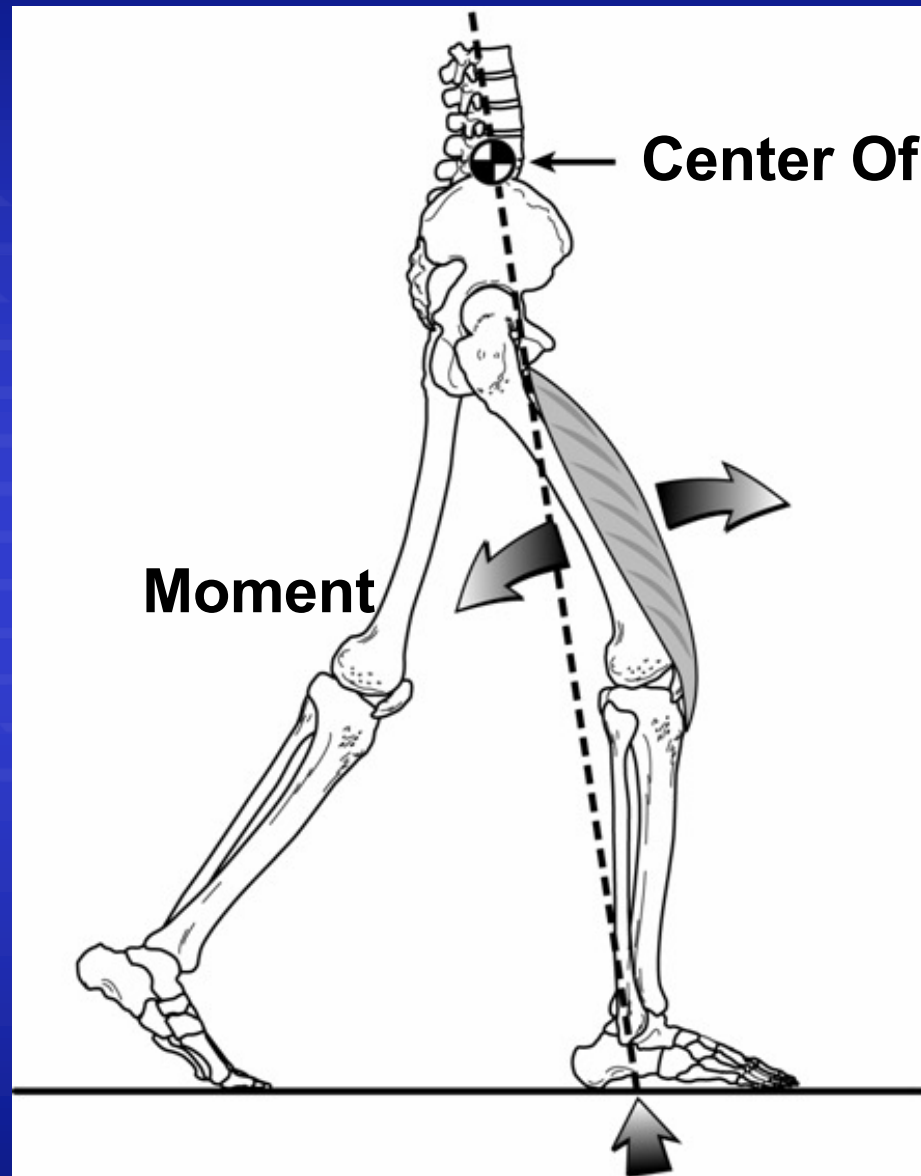
ORTHOPAEDIC & SPORTS MEDICINE SERVICE



**Dr Doron Sher**  
Knee & Shoulder Surgery

CP989962-2

# Muscle Response



Muscle  
contraction

Ground Reaction Force



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE



Dr Doron Sher

Knee & Shoulder Surgery

CP989962-1

# Preop Physio

They must be taught preoperatively to  
re-educate the quadriceps muscle



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Knee OSTEOTOMY: Indications

|              |              |              |                                            |
|--------------|--------------|--------------|--------------------------------------------|
| Malalignment | Malalignment | Malalignment | Malalignment                               |
| +            | +            | +            | +                                          |
| Arthrosis    | Instability  | Arthrosis    | Meniscal /<br>Cartilage<br>Transplantation |
|              |              | +            |                                            |
|              |              | Instability  |                                            |



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# ACL Insufficiency - Classification

- Primary varus → tibiofemoral geometry
- Double varus → tibiofemoral geometry + separation lateral compartment
- Triple varus → tibiofemoral geometry + separation lateral compartment + varus recurvatum

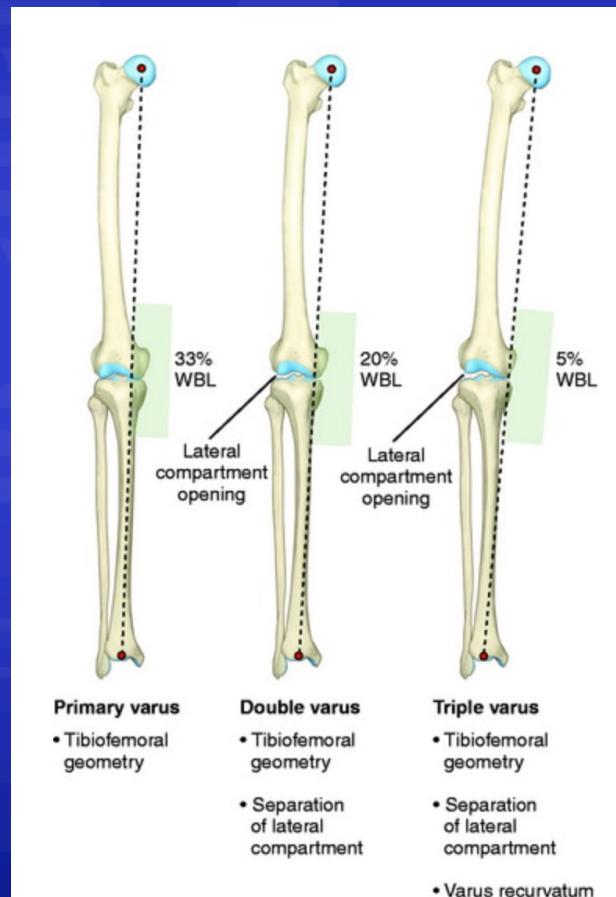


**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Primary Varus



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Double Varus

- More varus
- Separation laterally with standing, walking and running
- Increased tensile forces in the posterolateral soft tissues



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Triple Varus



ORTHOSPORTS  
ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# High Tibial Osteotomy - Goals

- Improvement of function
  - Functional stability
- Reduction of thrust / instability
- Reduction of compartment overload
- Pain reduction
- (Shift WB line prior to cartilage / meniscal saving procedures)

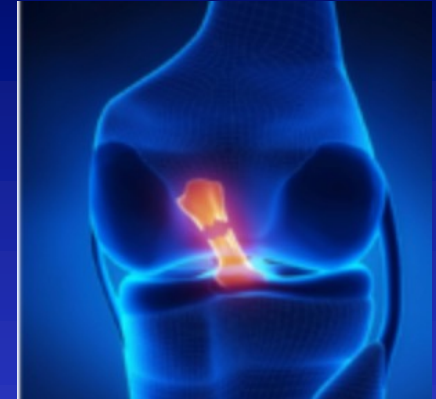


**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# *Indications ??*



- Medial compartment
  - arthrosis
  - arthrosis + varus alignment + varus thrust
  - PL instability + varus hyperextension thrust
- Cruciate deficiency + varus alignment  $\pm$  thrust
- Combined ligamentous laxity + varus, valgus or posterolateral thrust
- Meniscus / cartilage transplantation



# Two main groups of younger pts

- 1) Chronically ACL deficient
  - Prior medial meniscectomy
- 2) Varus malalignment
  - Abnormal bony geometry
  - Ligament deficiency
  - +/- meniscus / cartilage loss



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# High Tibial Osteotomy

## *Routine X-rays*

- Standing AP
- Standing notch
- Lateral
- Skyline



**ORTHOSPORTS**

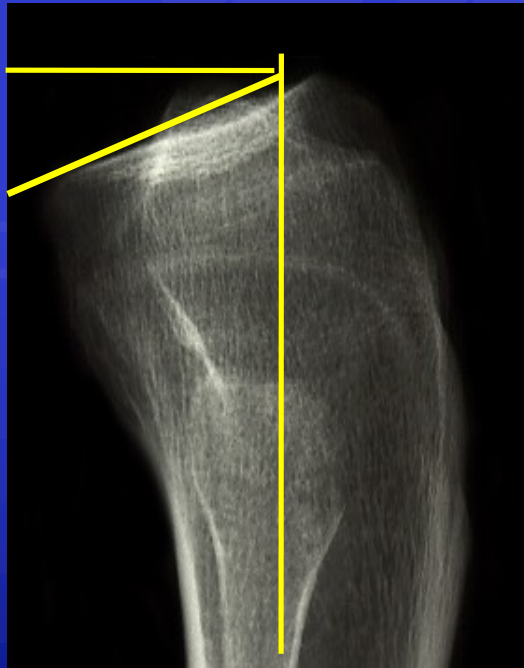
ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Knee & Shoulder Surgery

# High Tibial Osteotomy

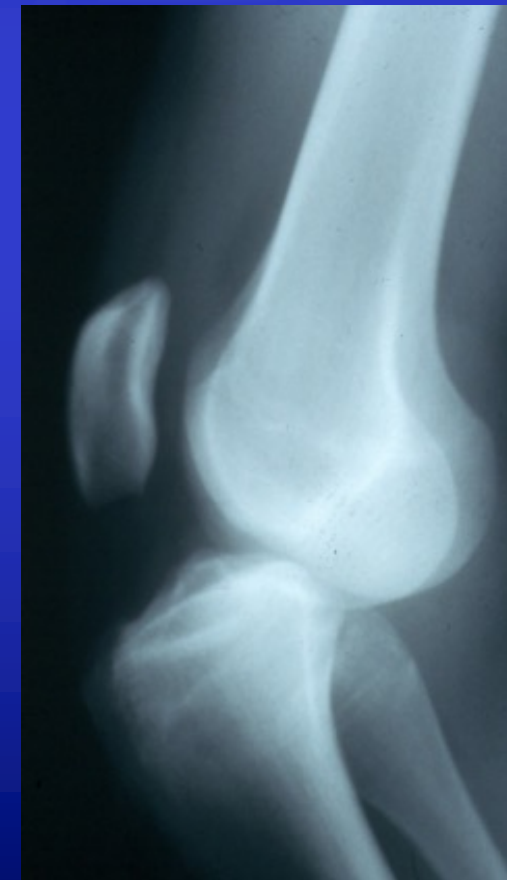
## *Pre-operative Planning*

- Lateral
- Single leg standing hip-to-ankle



# Investigations

- Xray
  - Dislocation
  - Intra articular fracture
  - Second fracture
  - Alignment
  - Other changes
- MRI still the gold standard



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Doron Sher  
er Surgery

# MRI



Sagittal



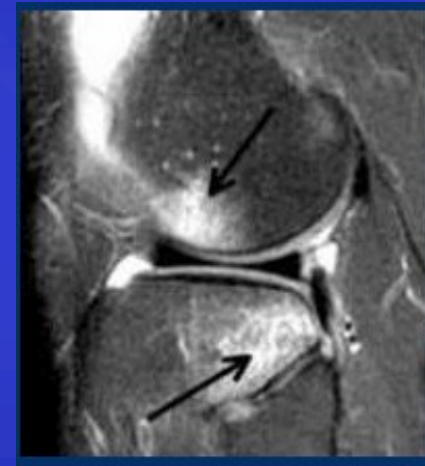
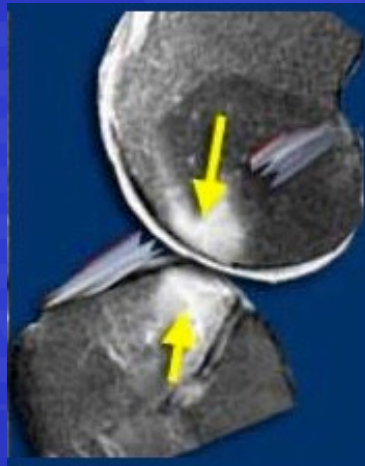
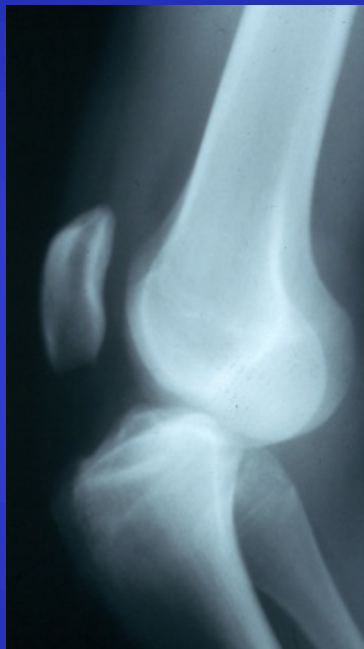
Coronal



ORTHOSPORTS  
ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr Doron Sher  
Knee & Shoulder Surgery

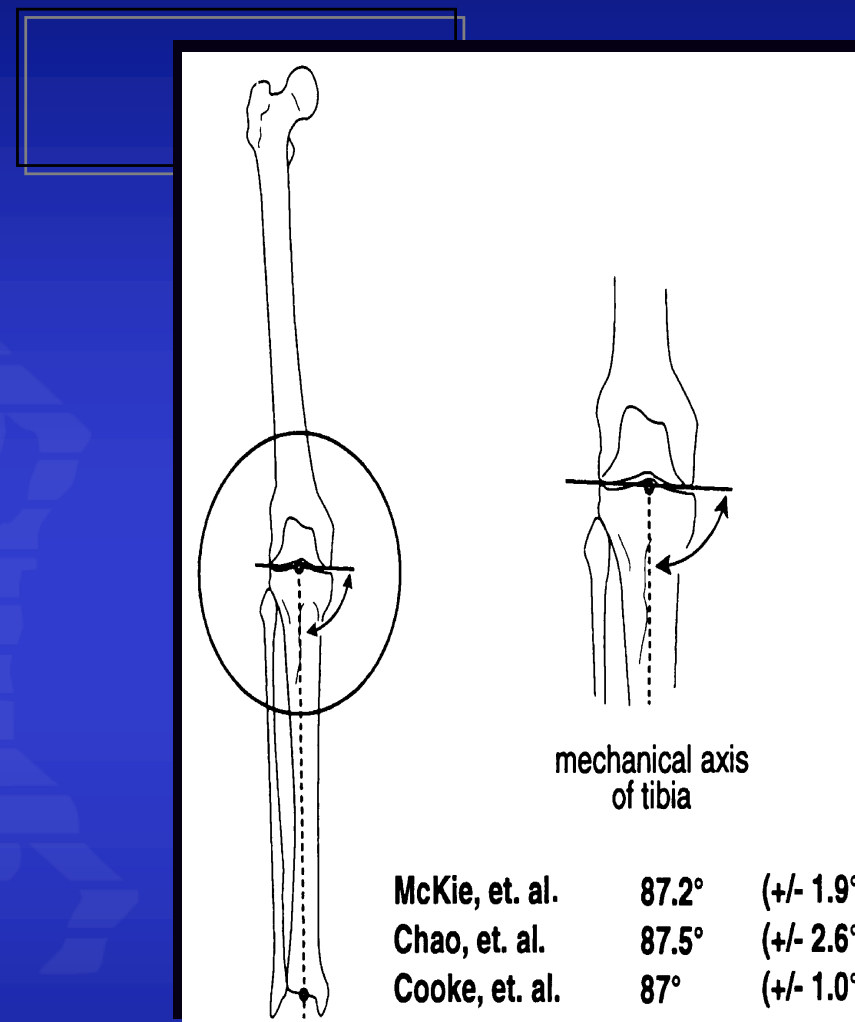
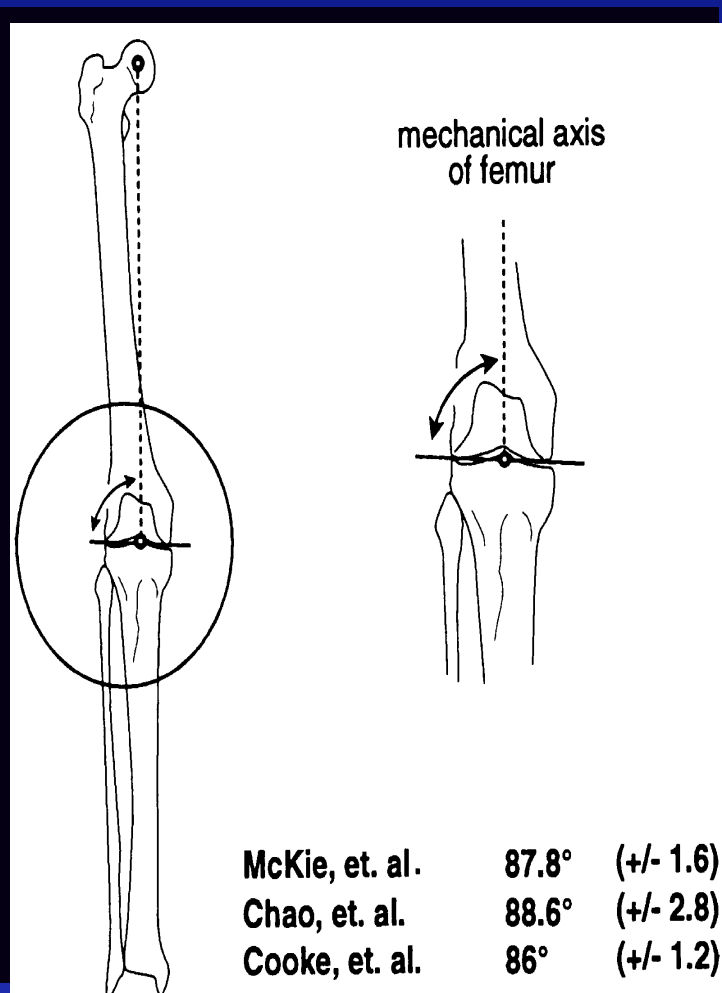
# Bone bruising from dislocation



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

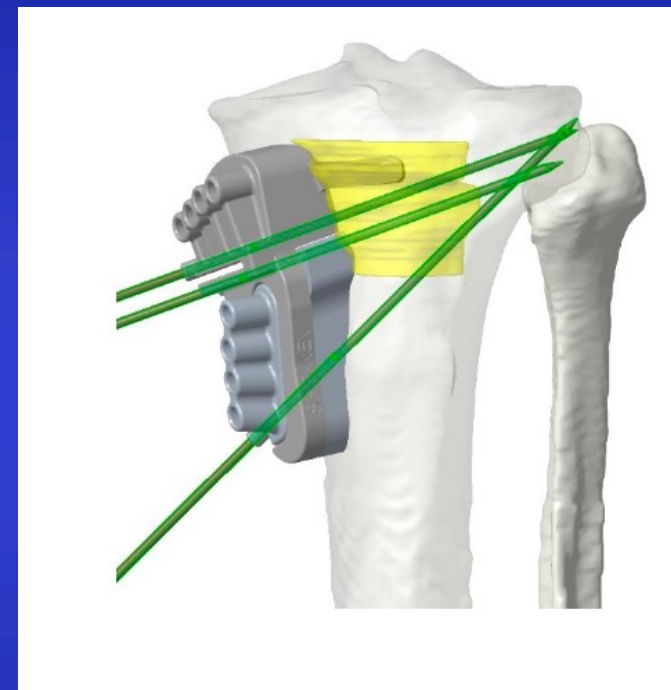
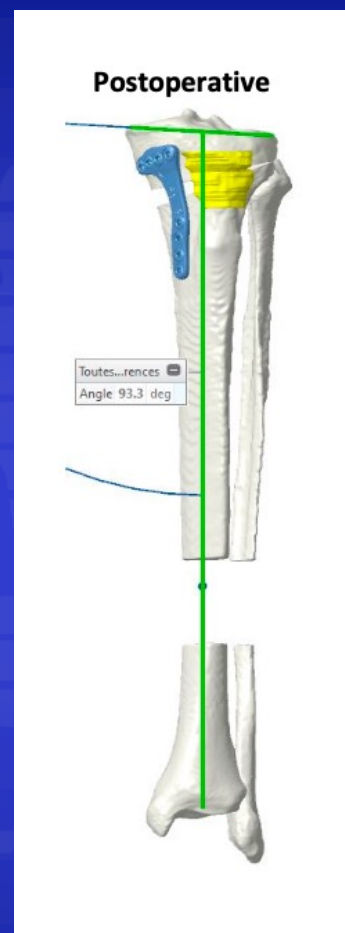
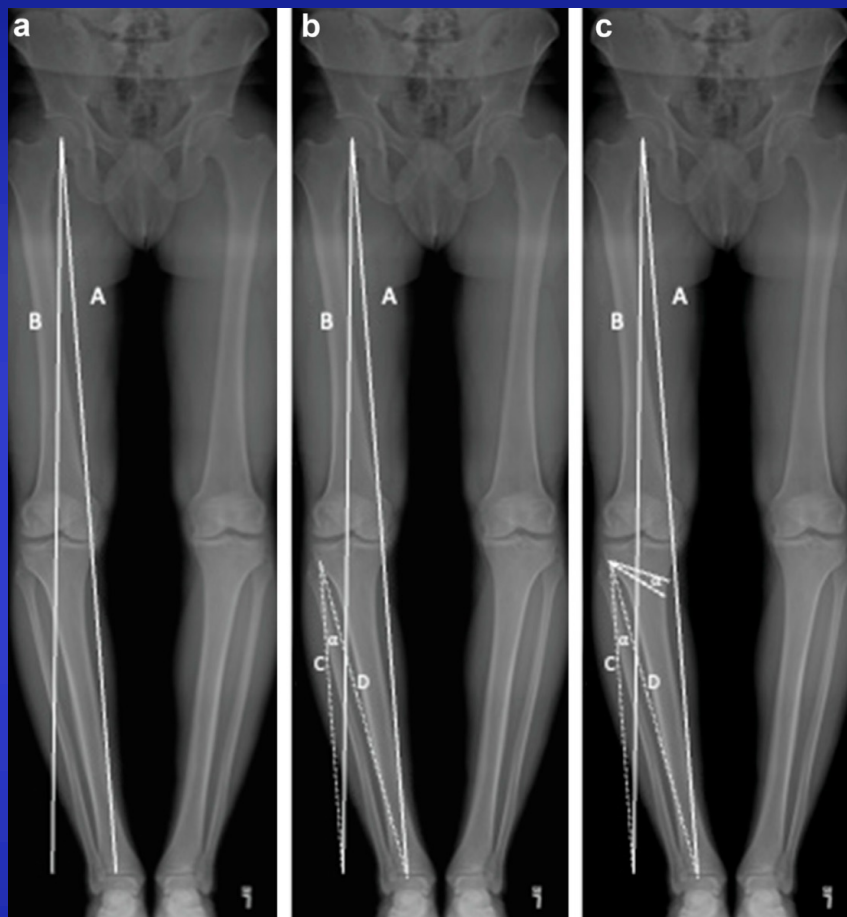
**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



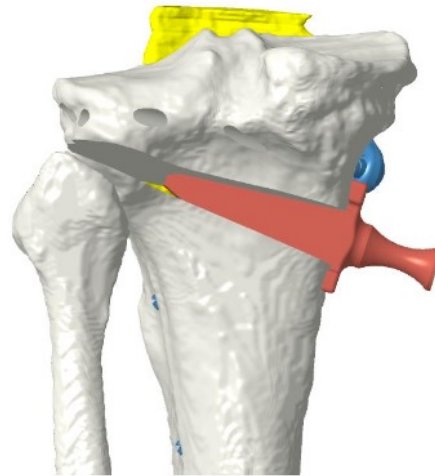
**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

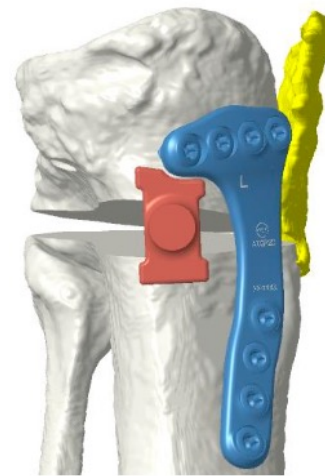
**Dr Doron Sher**  
**Knee & Shoulder Surgery**

## CUSTOM WEDGE

First view

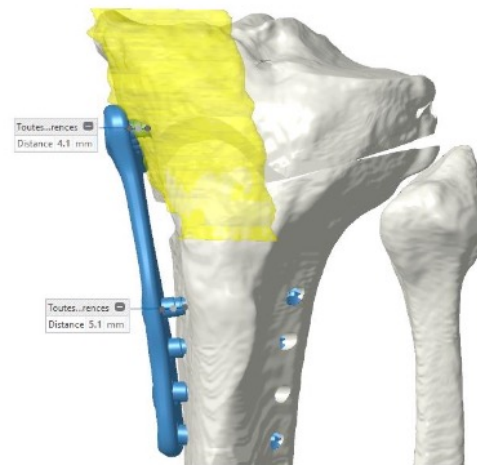


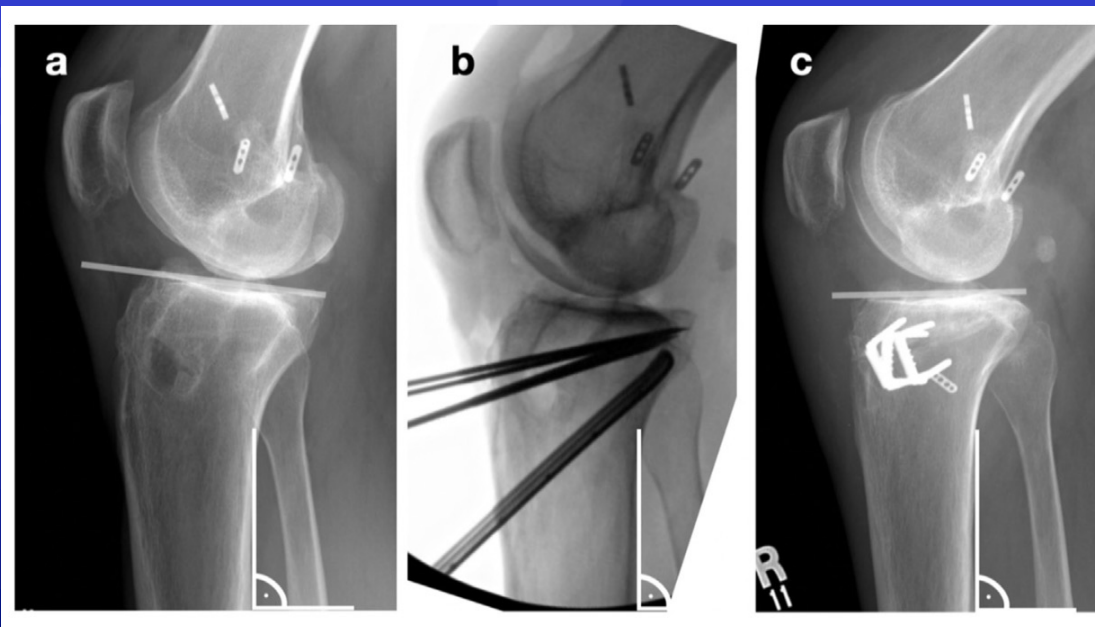
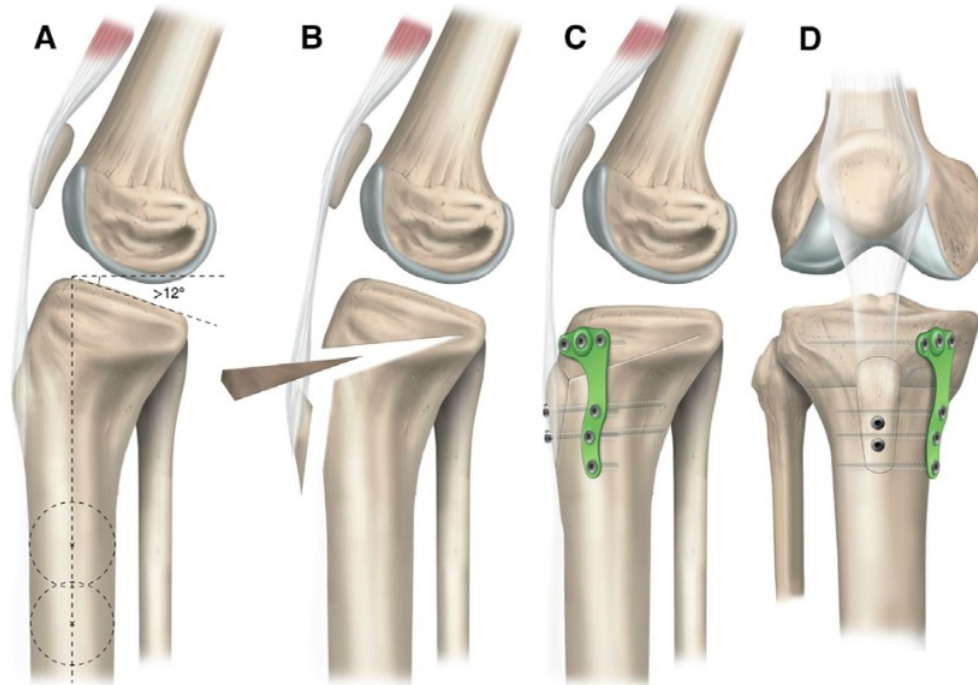
Second view



## GAP

**Beware of the GAP between the plate and the bone.**

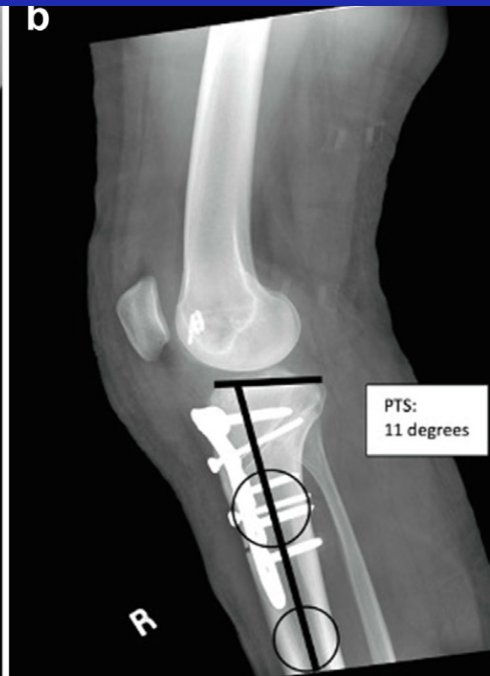
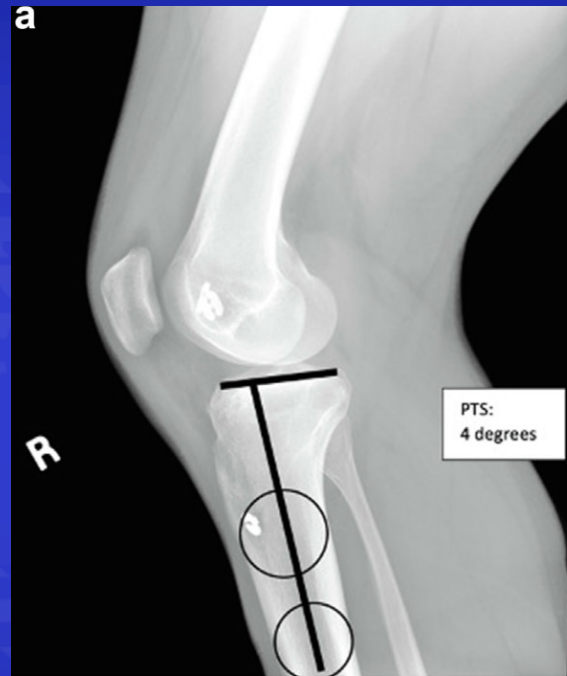
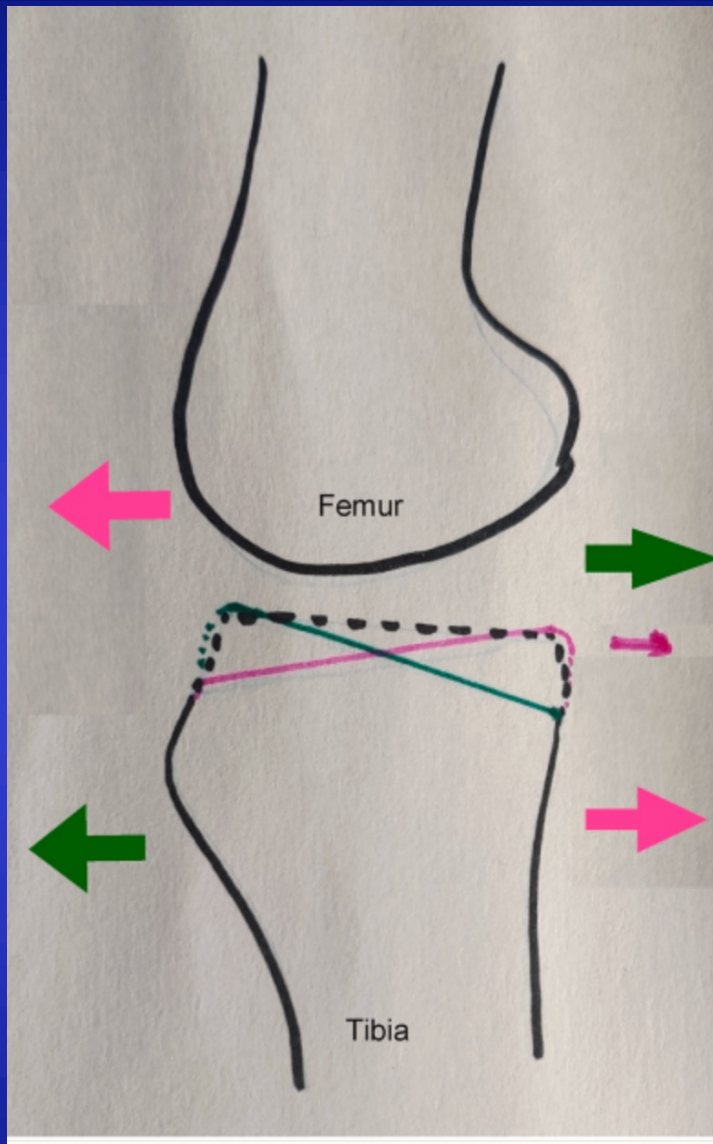




**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Knee Osteotomy

## *Post-Operative Management*

- Hinged brace
- Full range of motion
- Touch → protected weight-bearing
  - over 3 months





**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Conclusion

Instability with malalignment.....

- Difficult problem
- You need to look for it to see it
- Soft tissue procedures alone are unsatisfactory



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Doron Sher

MBBS, MBiomedE, FRACS FAOrthA

## Knee Malalignment and Instability

160 Belmore Rd, Randwick  
47-49 Burwood Rd, Concord

[www.kneedoctor.com.au](http://www.kneedoctor.com.au)

[www.orthosports.com.au](http://www.orthosports.com.au)



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**

# Thank you



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Doron Sher**  
**Knee & Shoulder Surgery**