



Lower leg's deformities Assessment / analysis and planification

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< Deformity >

= a change from the normal size or shape of an anatomic structure due to mechanical forces that distort an otherwise normal structure

The state of being misshapen

- Default of alignment of a bone/limb axis
- Default of orientation of a joint line
- Limb length discrepancy
- Congenital VS acquired
- Simple VS complex
- Associated medical conditions



Historical teaching

For genu varum do a high osteotomy

For genu valgum do a distal femoral osteotomy

Modern teaching

Genu varum HTO?

Genu valgum DFO?

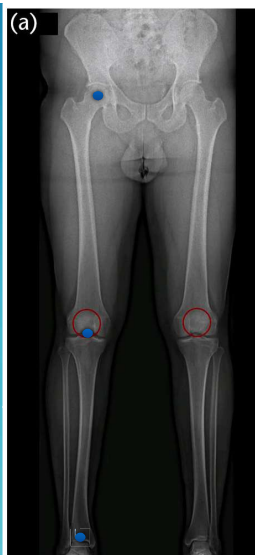
What's NORMAL ??!

A

B

POINTS.

- Apex of femoral notch
- Midpoint of femoral condyles
- Center of tibial epiphysis
- Midpoint of soft tissue outline
- Midpoint of tibial plateau
- Center of femur
- Center of tibia



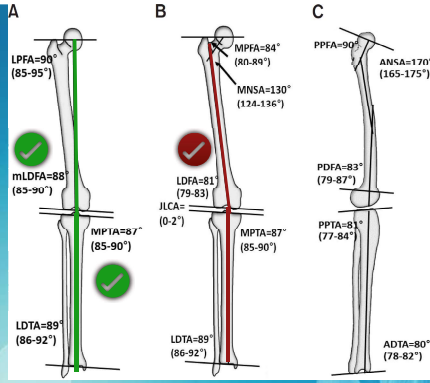
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LINES

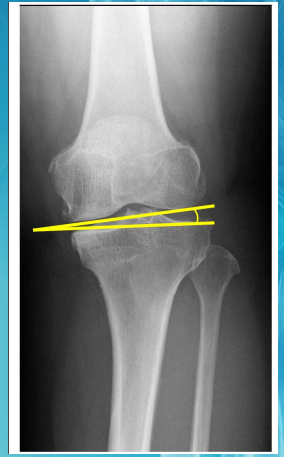
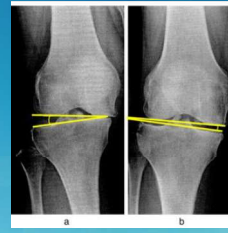
LINES

LINES

2 lines = 1 angle JOA Nomenclature



- Measurement position
- (m)MPFA = mechanical Medial Proximal Tibial Angle for FEMUR
- Proximal (P) or distal (D)
- mLDFA = mechanical Lateral Distal Femoral Angle for TIBIA
- A = anatomic
- LDFA = anatomic Lateral Distal Femoral Angle



Joint Line Convergence Angle

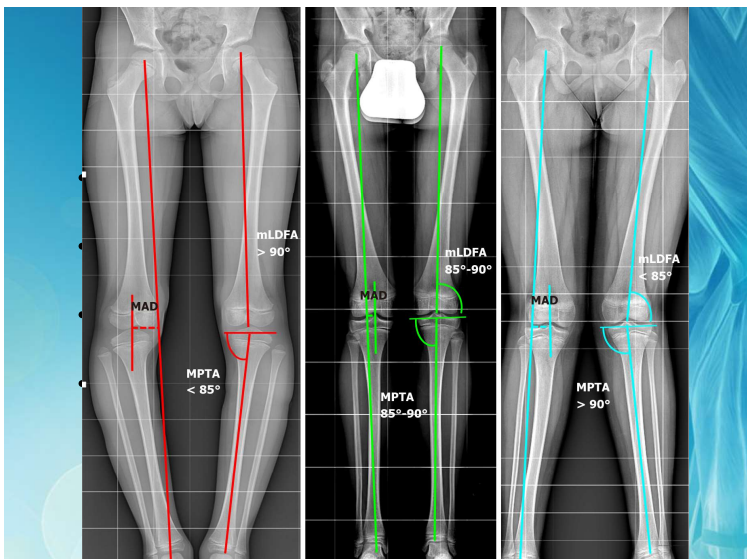
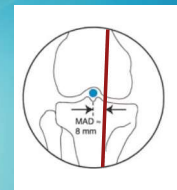
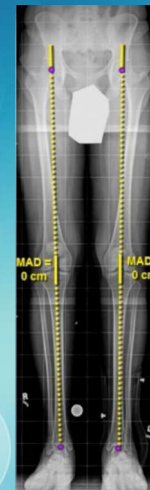
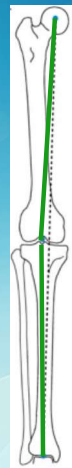
JLCA 0-2°

What's the best axis?

- Anatomic axis
- Mechanical axis
- CASE DEPENDENT

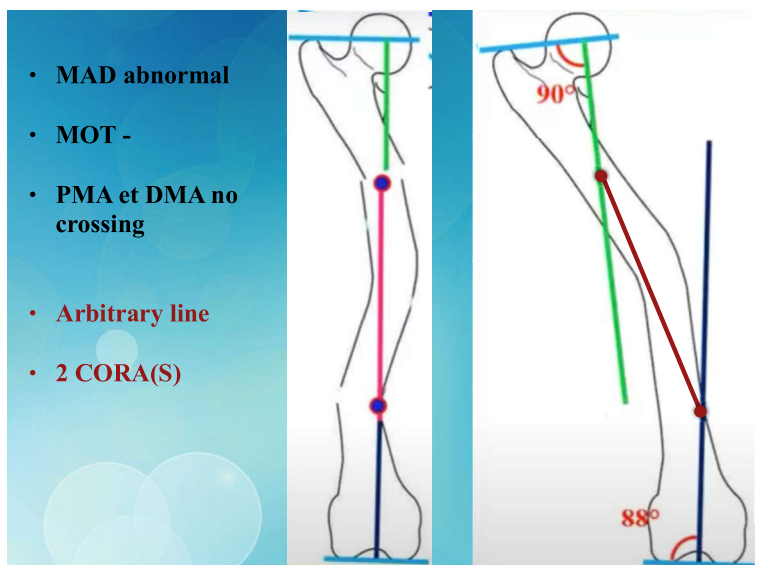
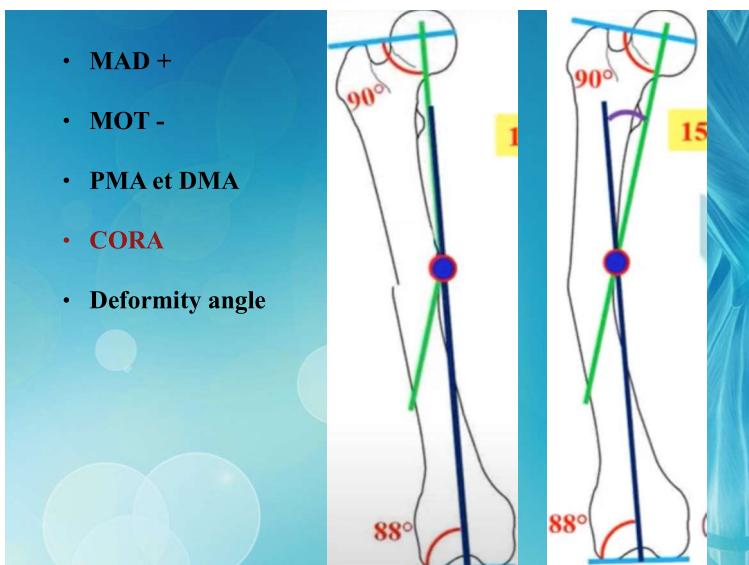
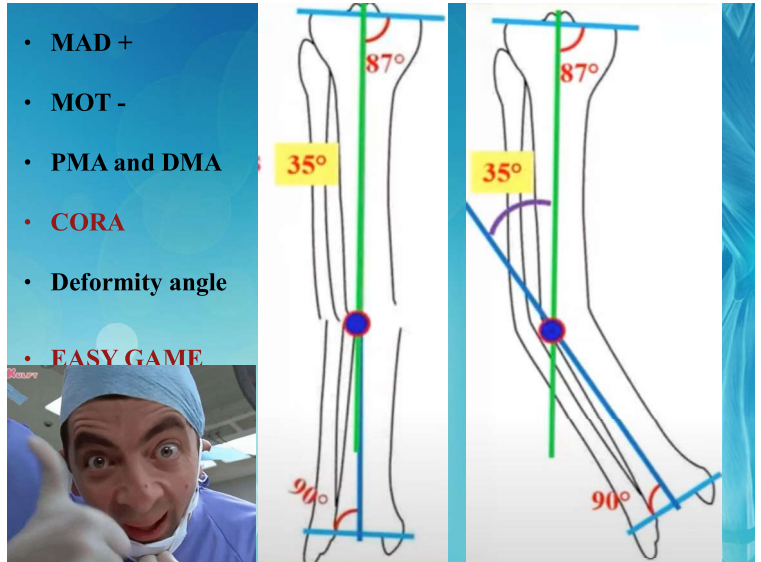
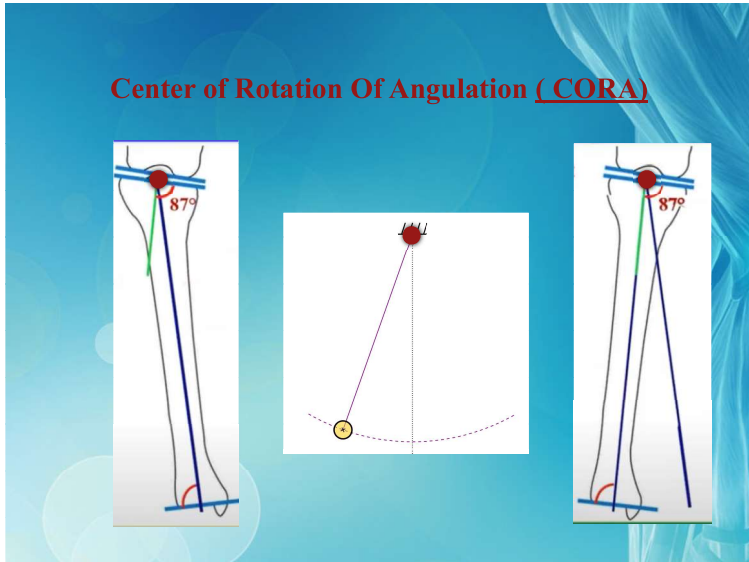
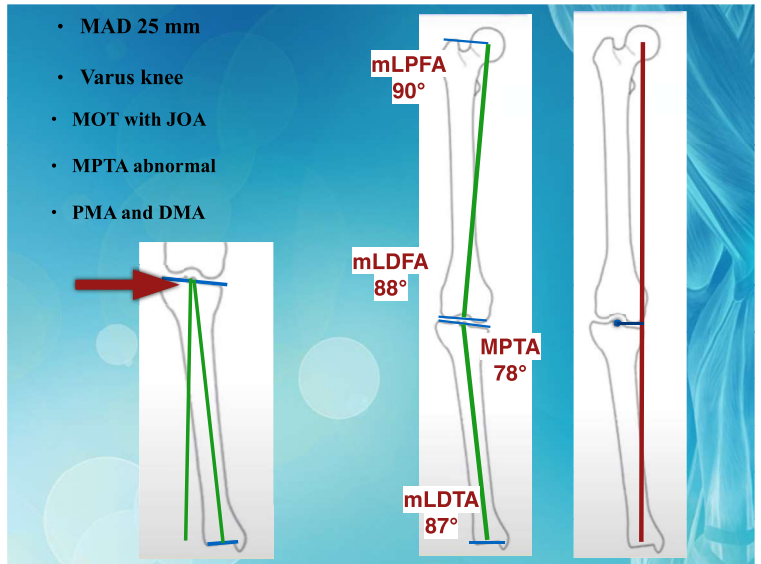
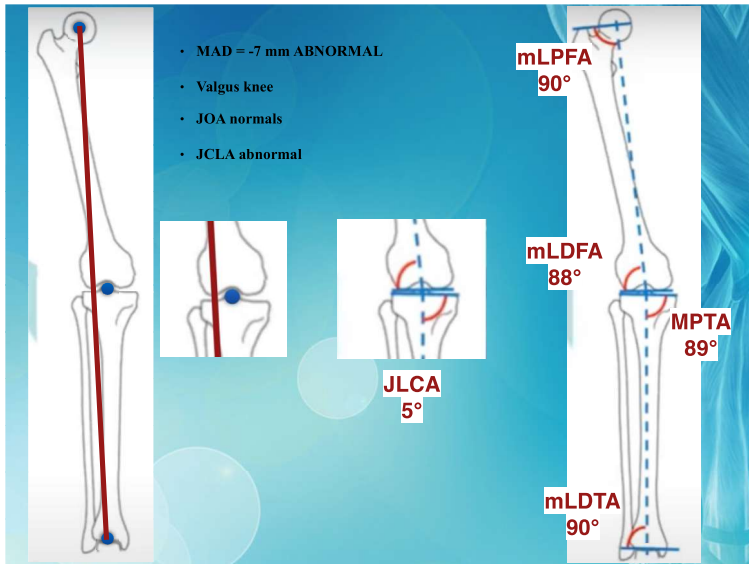


HKA / Mechanical Axis of the lower leg



Second step: MOT

- Measure **JOA**
- Compare the JOA with the nomenclature
- Create **PMA** and **DMA**
- Finding the site of **DEFORMITY**



- Transverse BISECTOR LINE - (TBL)
- Infinity of ACAs - CORA(s)
- ACA Apex of Correction of Angulation (Angulation Correction Axis)

CORA/ACA / Osteotomy

- CORA - defined by deformity CAN NOT be changed
- ACA (correction's CORA) - HAVE to be chosen
- Osteotomy - HAVE to be chosen
- ACA may or may not be at CORA
- Osteotomy may or may not be at ACA

- 1st : ACA and osteotomy at CORA
- 2nd : ACA at CORA , osteotomy NOT at CORA
- 3rd : ACA and osteotomy NOT at CORA

	Rule 1	Rule 2	Rule 3
Correct at CORA	Y	Y	* N
Osteotomy at CORA	Y	N	N

- 1st Osteotomy rule
- 2nd Osteotomy rule
- 3rd Osteotomy rule

How MUCH to correct....?

Femoral Deformity Planning: Intentional Placement of the Apex of Deformity

HSS

$$\alpha = \arccos\left(\frac{l^2 + m^2 - d^2}{2lm}\right)$$

- 4° Valgus M 50 L 50
- 6° Valgus M 40 L 60
- 15-7° Valgus
- Angle of correction
- 3° = 14°
- VALGUS

MEDIAL - LATERAL ARTICULAR LINE

LATERAL 75% MEDIAL 50%

100% 0% 100% 0% 62.5%

(a) (b) (c)

CENTER OF THE HIP JOINT

FUJISAWA POINT

CORA HINGE POINT

CENTER OF THE ANKLE JOINT

2/3 loss of medial cartilage = Fujisawa MAD

	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
M	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	16
SS	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	18
60°	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
70°	5	6	7	8	10	11	12	13	14	15	16	17	18	19	21	22
80°	6	7	8	10	11	13	14	15	17	18	19	21	22	24	24	25

