

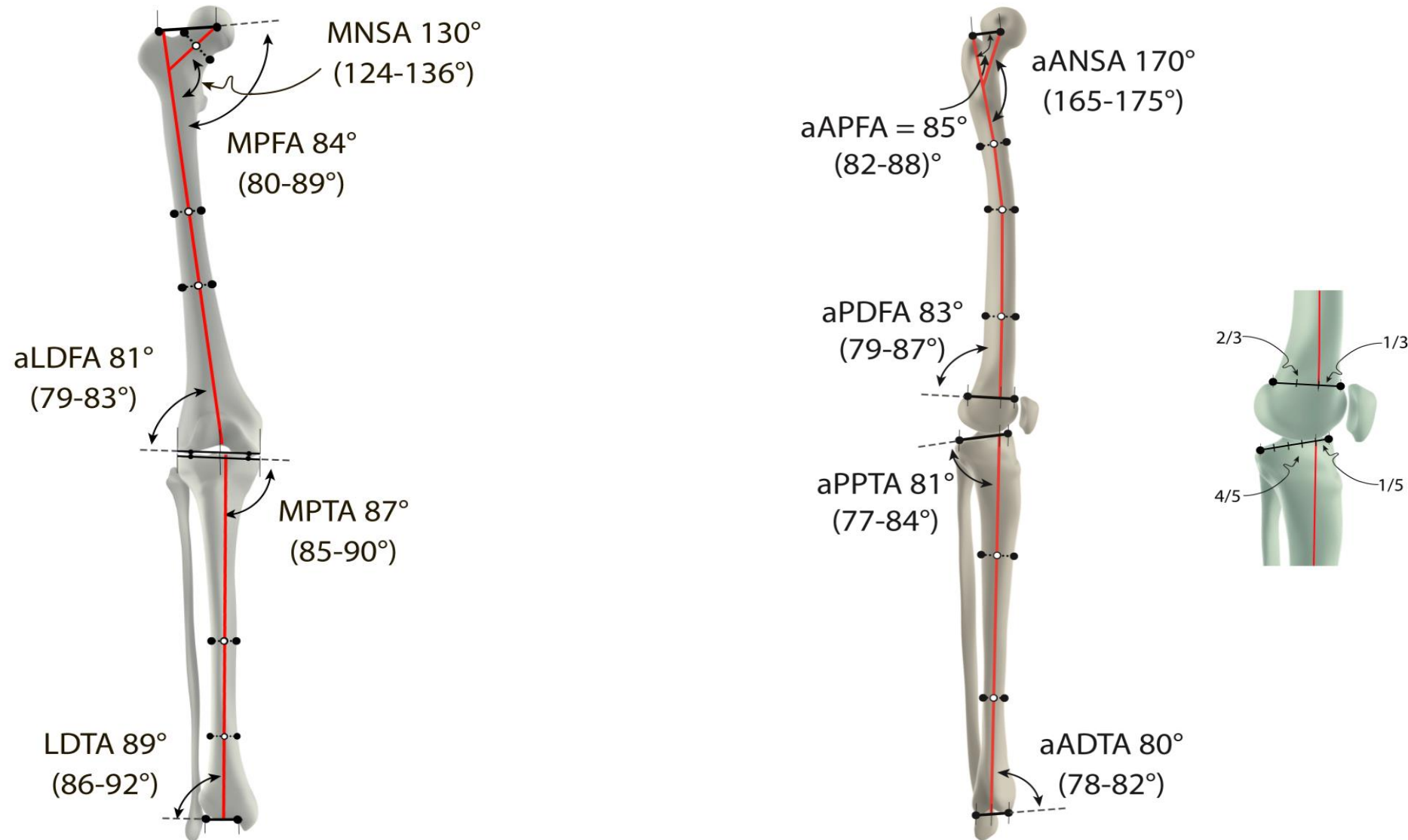
Reference Lines and Angles (RLAs)



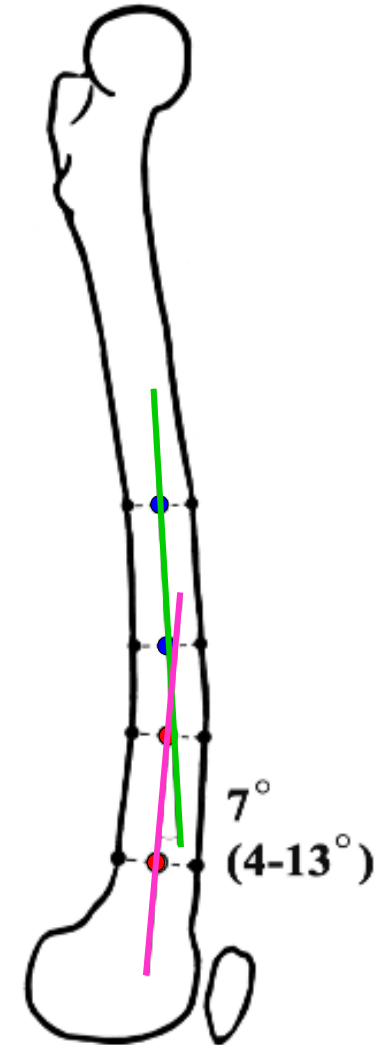
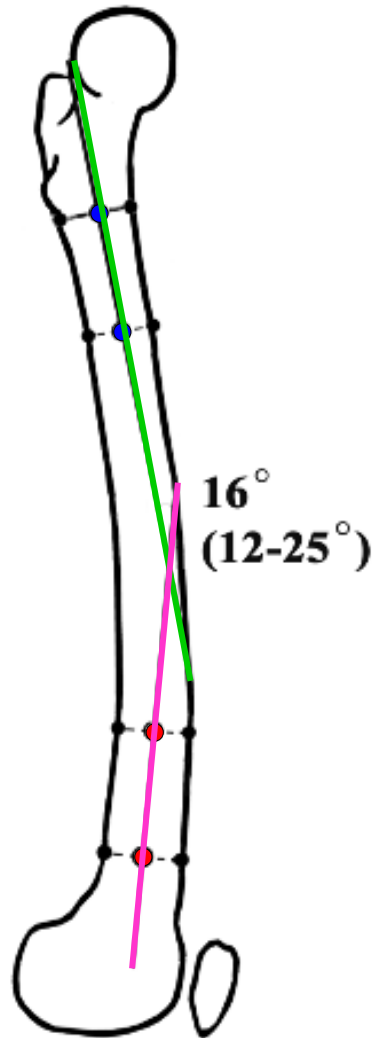
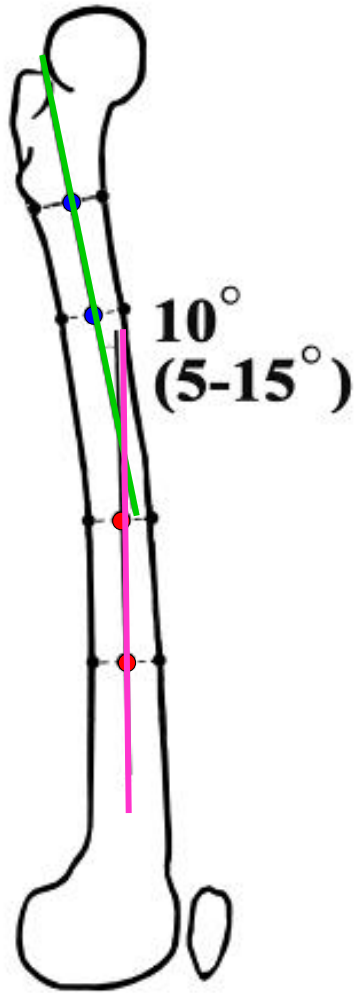
<http://rniito.org>

St.Petersburg, 2022

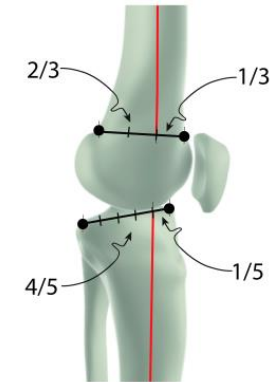
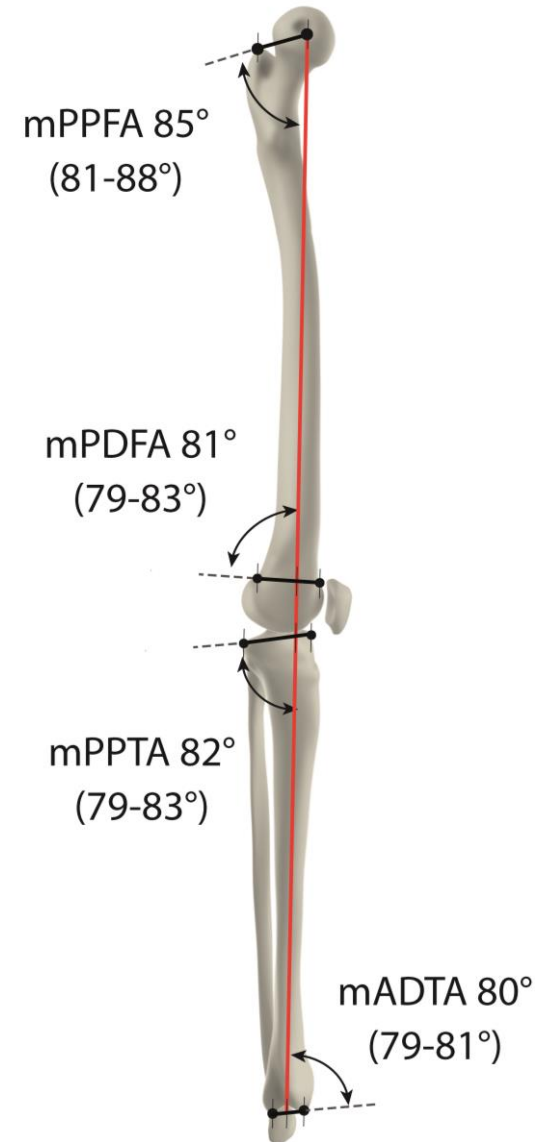
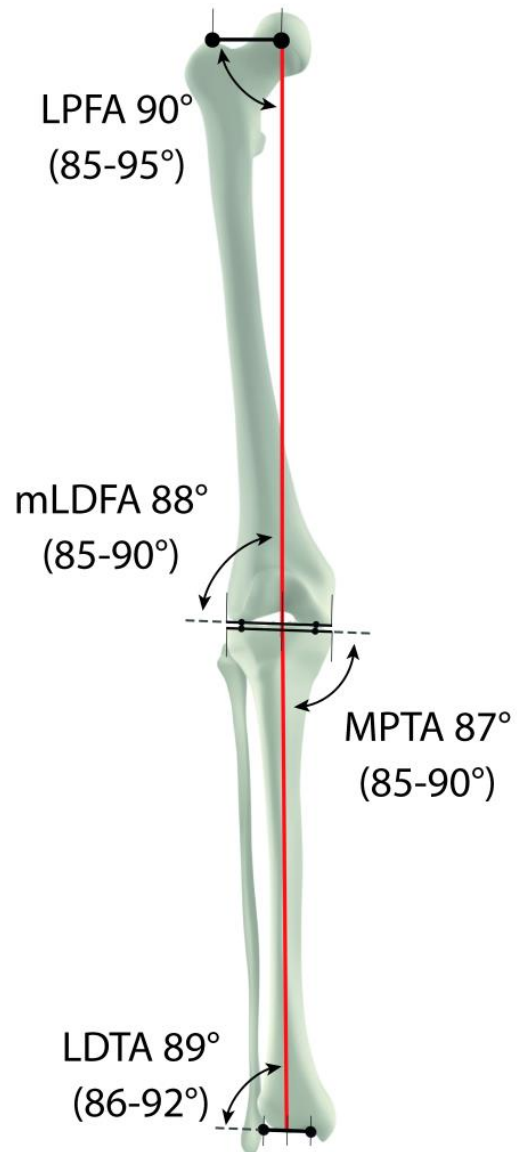
Reference Angles Nomenclature: anatomic



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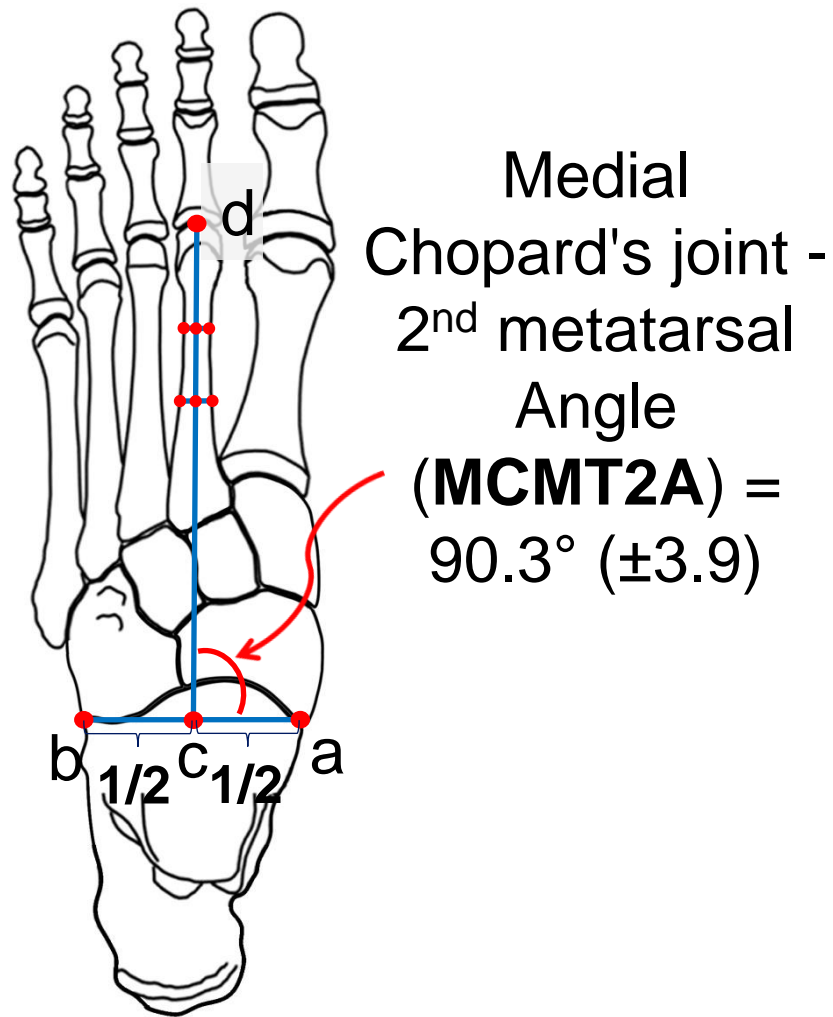
Reference Angles Nomenclature: mechanical



Reference Angles Nomenclature

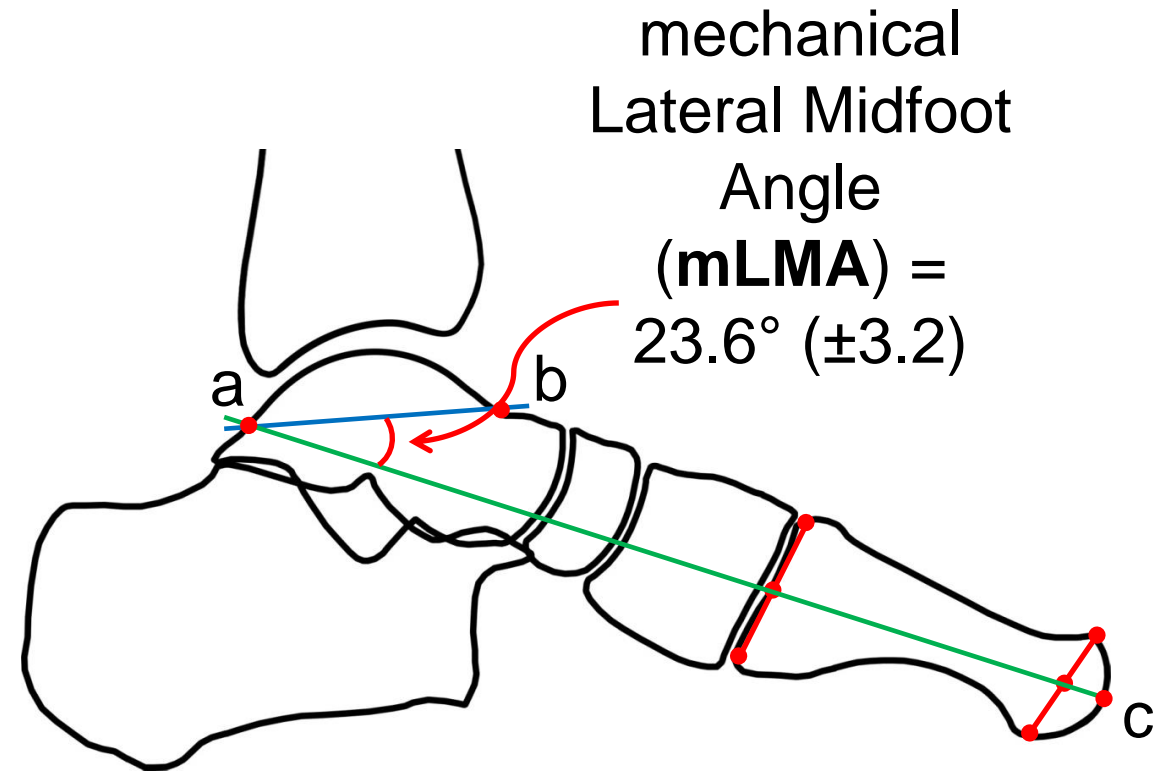
abbreviation	complete title	average normal value and range
MAD	mechanical axis deviation	0 (3 lat. - 8 med.) mm
Mechanical angles of femur		
LPFA	lateral proximal femoral angle	90° (85-95°)
mLDFA	mechanical lateral distal femoral angle	88° (85-90°)
mPPFA	mechanical posterior proximal femoral angle	85° (81-88°)
mPDFA	mechanical posterior distal femoral angle	81° (79-83°)
Mechanical angles of tibia		
mMPTA	mechanical medial proximal tibial angle	87° (85-90°)
mLDTA	mechanical lateral distal tibial angle	89° (86-92°)
mPPTA	mechanical posterior proximal tibial angle	82° (79-83°)
mADTA	mechanical anterior distal tibial angle	80° (79-81°)
Anatomic angles of femur		
MPFA	medial proximal femoral angle	84° (80-89°)
MNSA	medial neck shaft angle	130° (124-136°)
aLDFA	anatomic lateral distal femoral	81° (79-83°)
aAPFA	anatomic anterior proximal femoral angle	85° (82-88°)
ANSA	anterior neck shaft angle	170° (165-175°)
aPDFA	anatomic posterior distal femoral angle	83° (79-87°)
Anatomic angles of tibia		
aMPTA	anatomic medial proximal tibial angle	87° (85-90°)
aLDTA	anatomic lateral distal tibial angle	89° (86-92°)
aPPTA	anatomic posterior proximal tibial angle	81° (77-84°)
aADTA	anatomic anterior distal tibial angle	80° (78-82°)
Addition angles		
JLCA	joint line convergence angle	0-2°
AMA	anatomic-mechanical angle	7° (5-9°)
mTFA	Mechanical tibiofemoral angle	0-1.3° varus
aTFA	Anatomic tibiofemoral angle	6-7° varus

Midfoot RLAs



$$k = cd / ab = 2.43 (\pm 0.23)$$

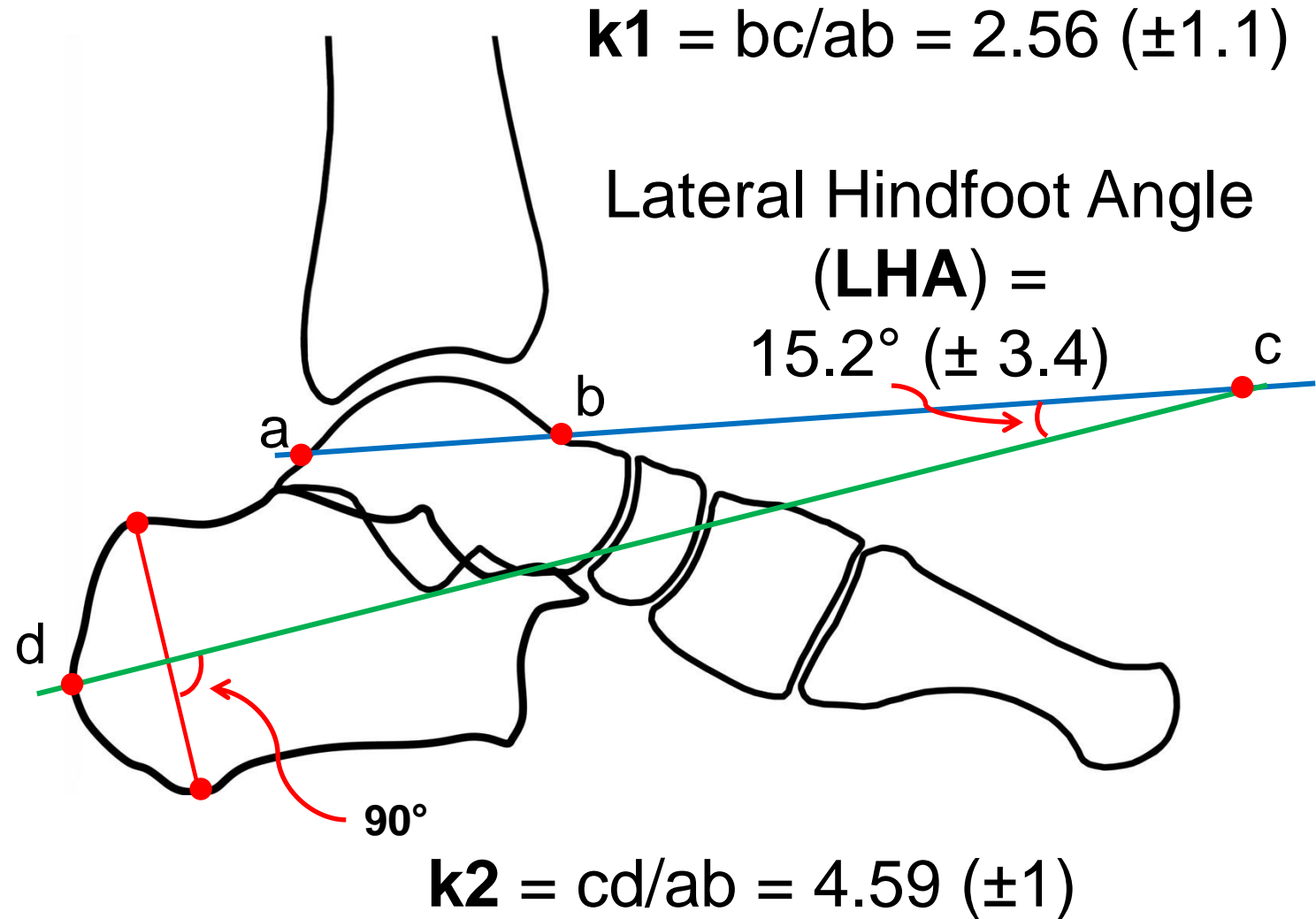
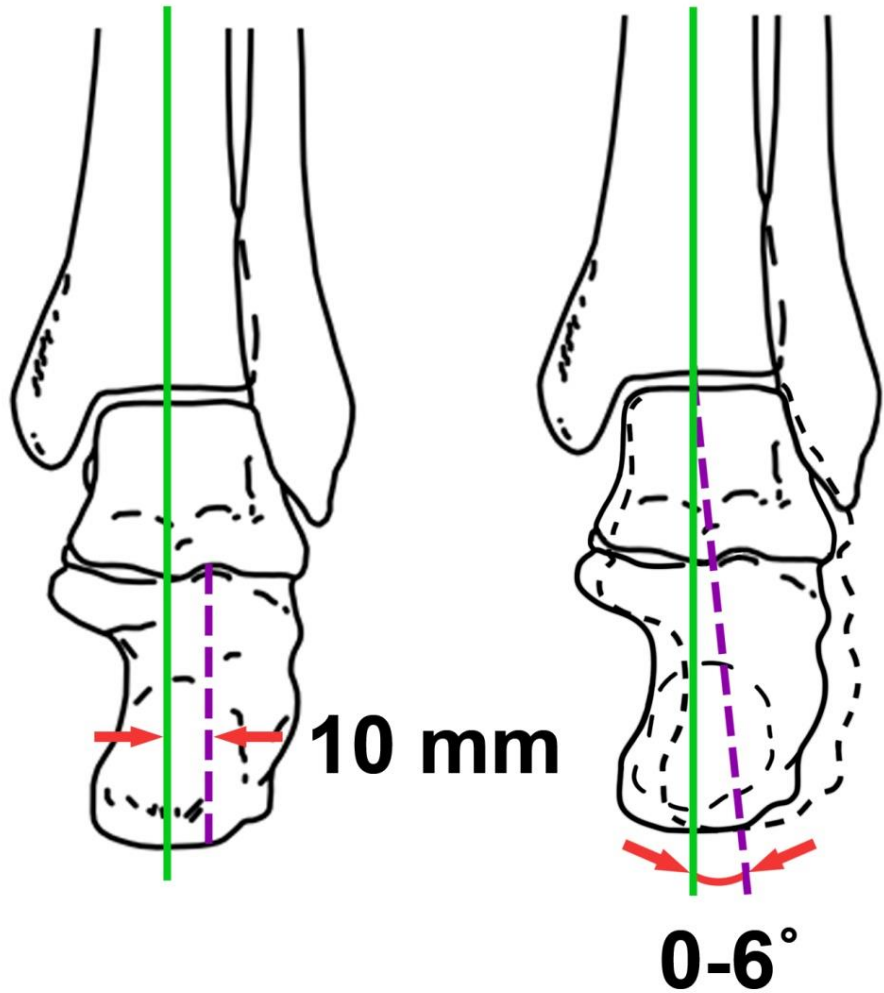
i.e. $cd = ab \times 2.43$



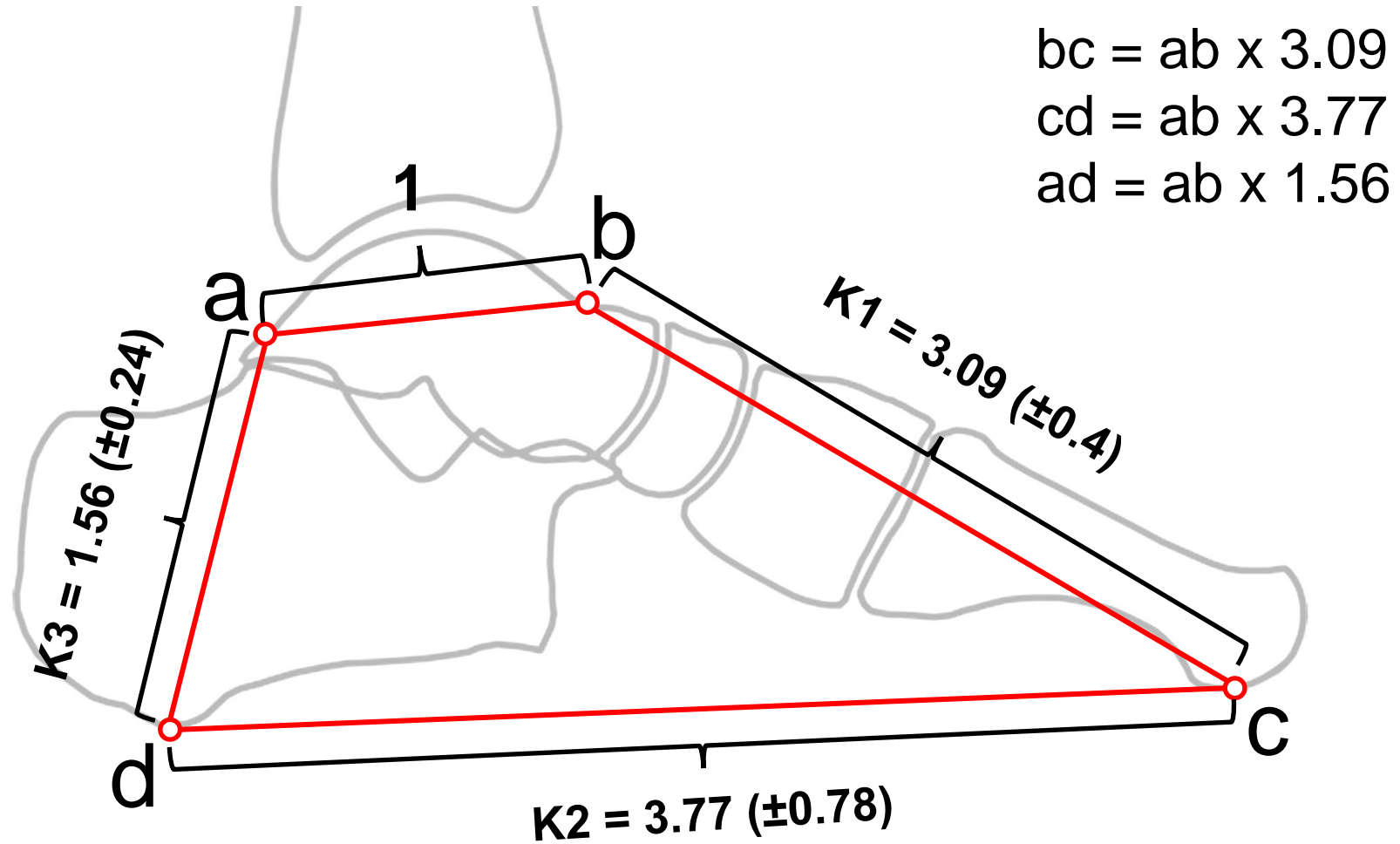
$$k_1 = ac / ab = 0.7 (\pm 0.3), \text{ i.e. } ac = ab \times 0.7$$

$$k_2 = cd / ab = 3.6 (\pm 0.2), \text{ i.e. } cd = ab \times 3.6$$

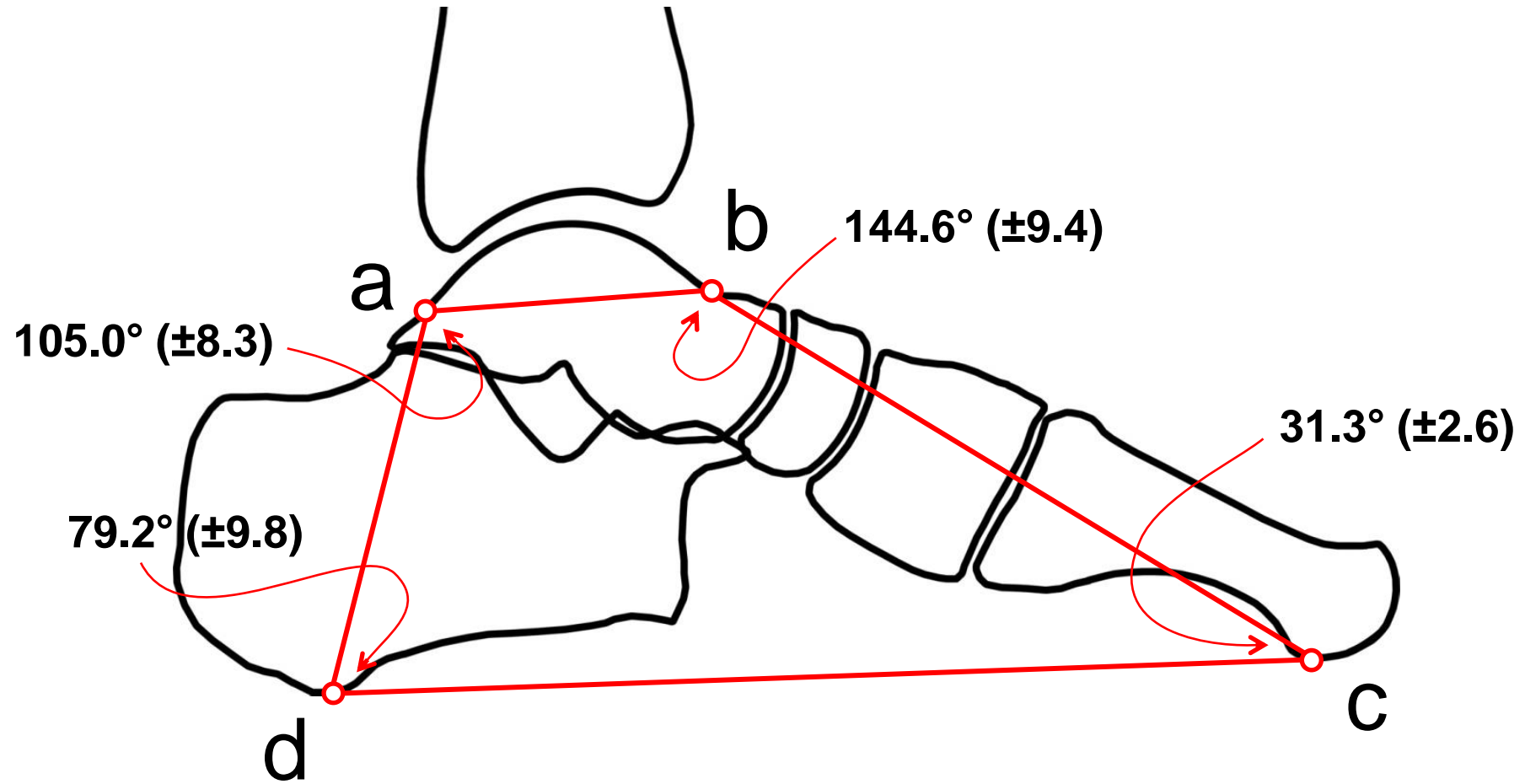
Hindfoot RLAs



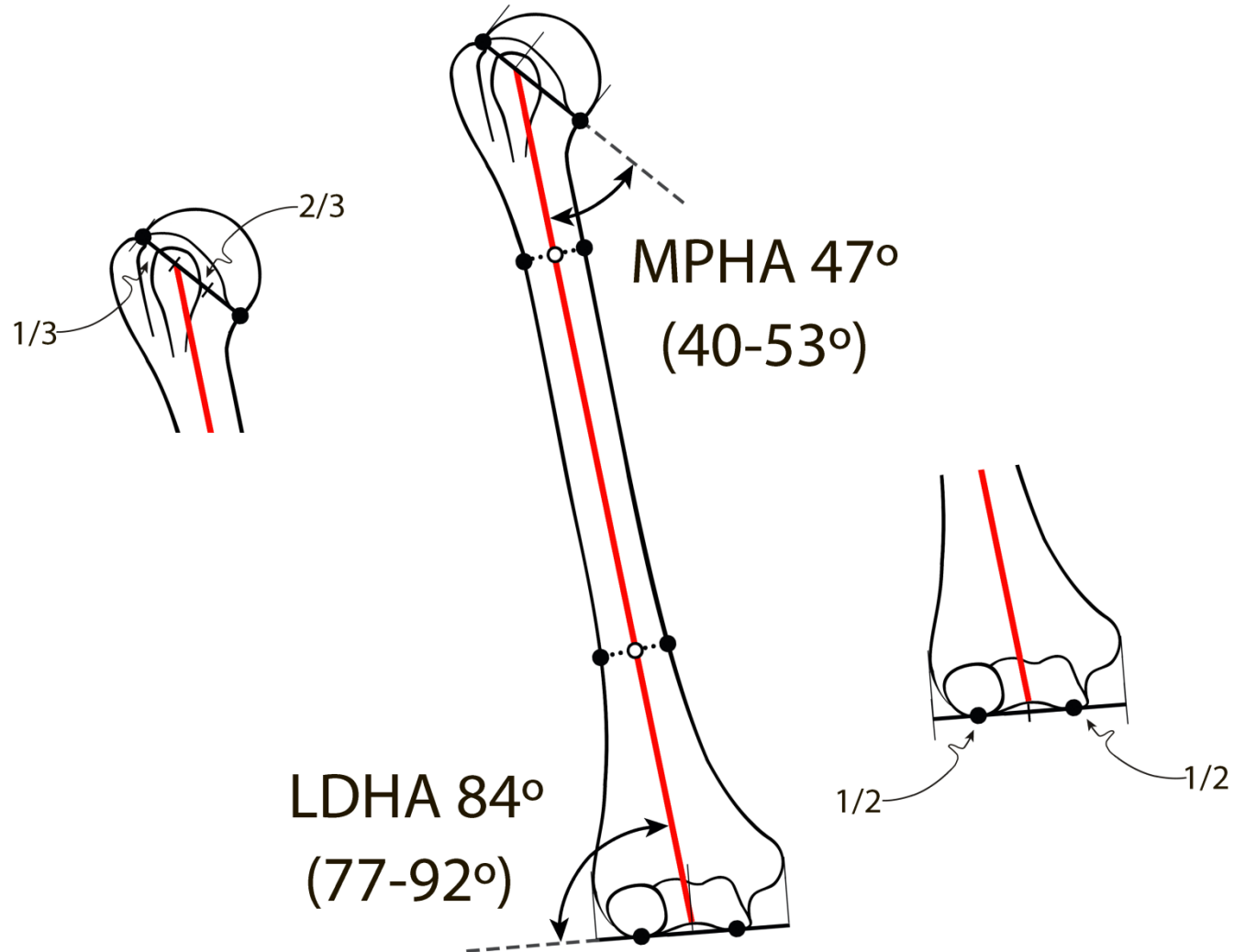
Foot Quadrilateral



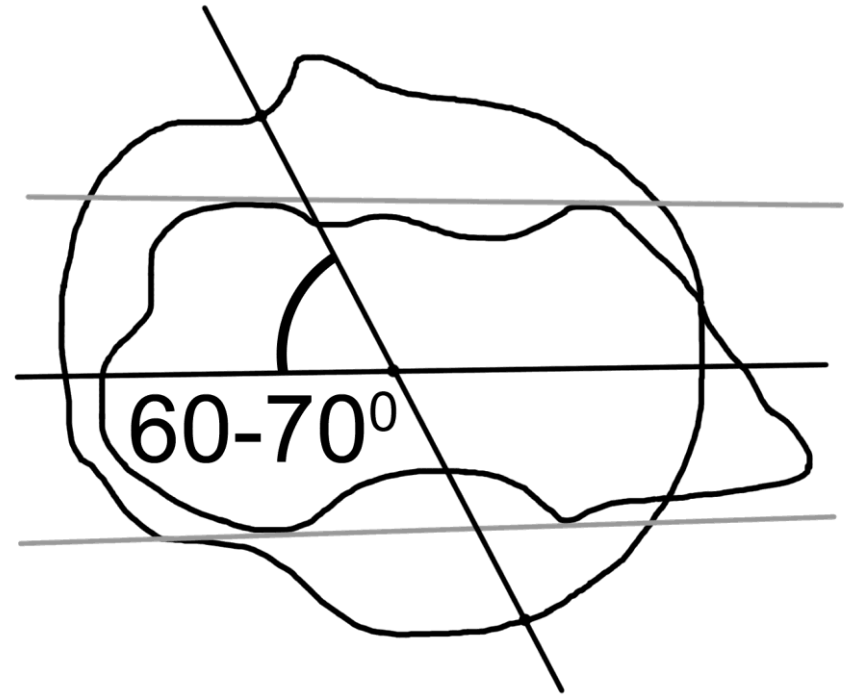
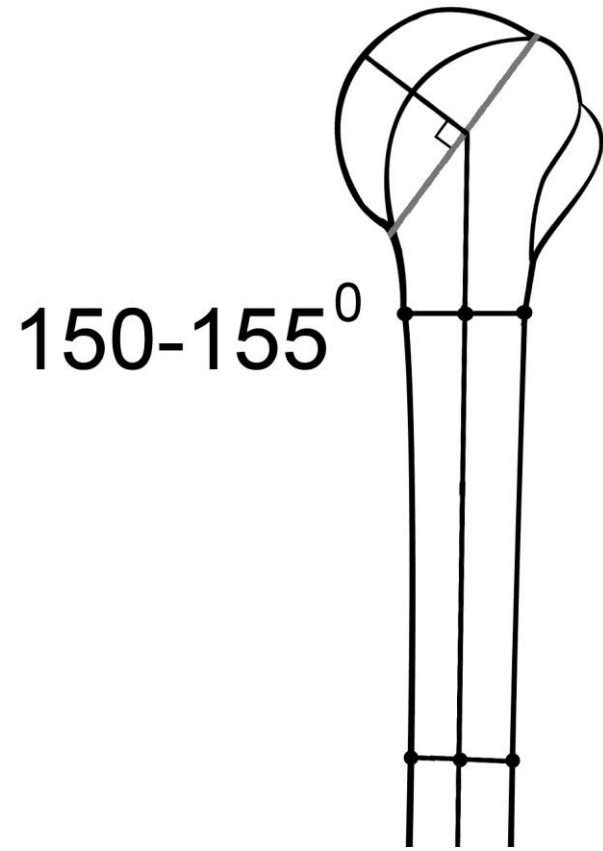
Foot Quadrilateral



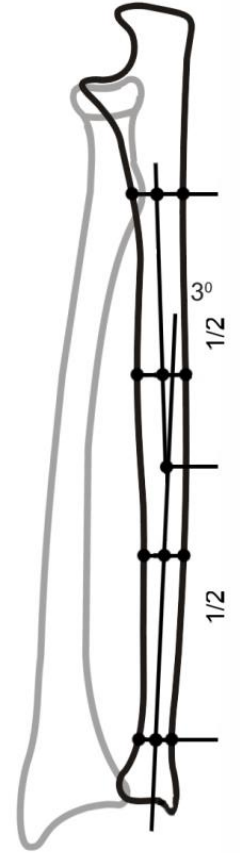
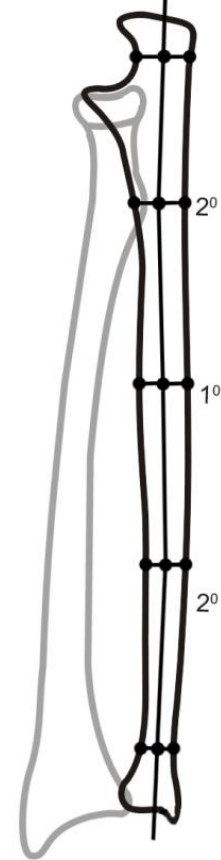
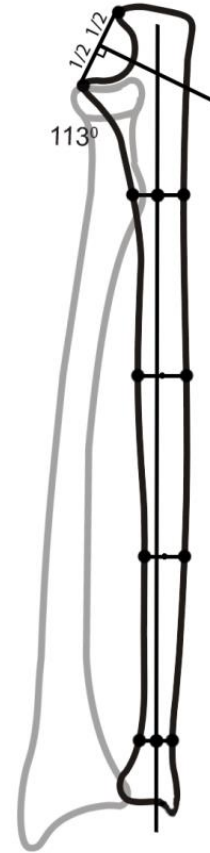
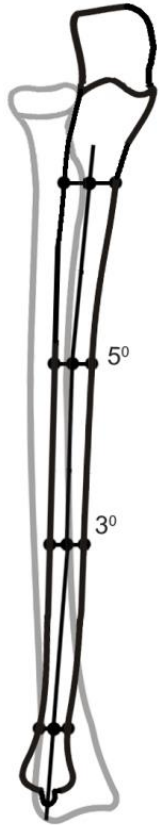
Humerus RLAs: AP



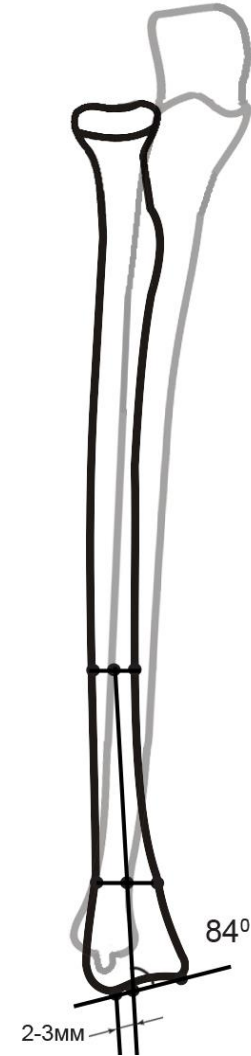
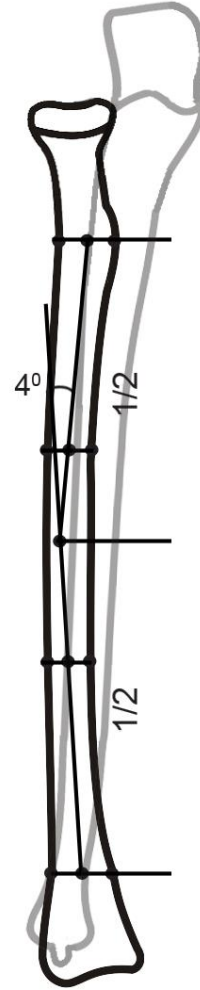
Humerus RLAs: Lat, torsion



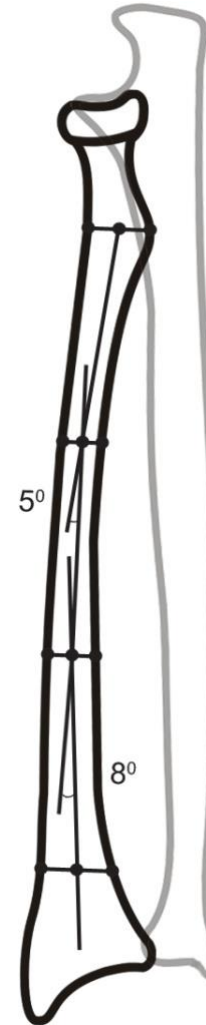
Ulna RLAs



Radius RLAs: AP



Radius RLAs: Lat



Distal radius

