



# **Semi-automated Segmentation Pipeline for Analysis of Knee Joint Kinematics**

A comparison with manual based segmentation

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- Knee osteoarthritis (OA) affects 10% men and 13% of women aged 60 and older (Zhang et al., 2010)
- Altered tibiofemoral kinematics in OA patients can potentially accelerate disease progression (Farrokhi et al., 2014)
- Even in ACL-deficient knees without instability symptoms, knee kinematics are altered (Yang et al., 2018)
- Understanding tibiofemoral kinematics is key to assessing knee joint function



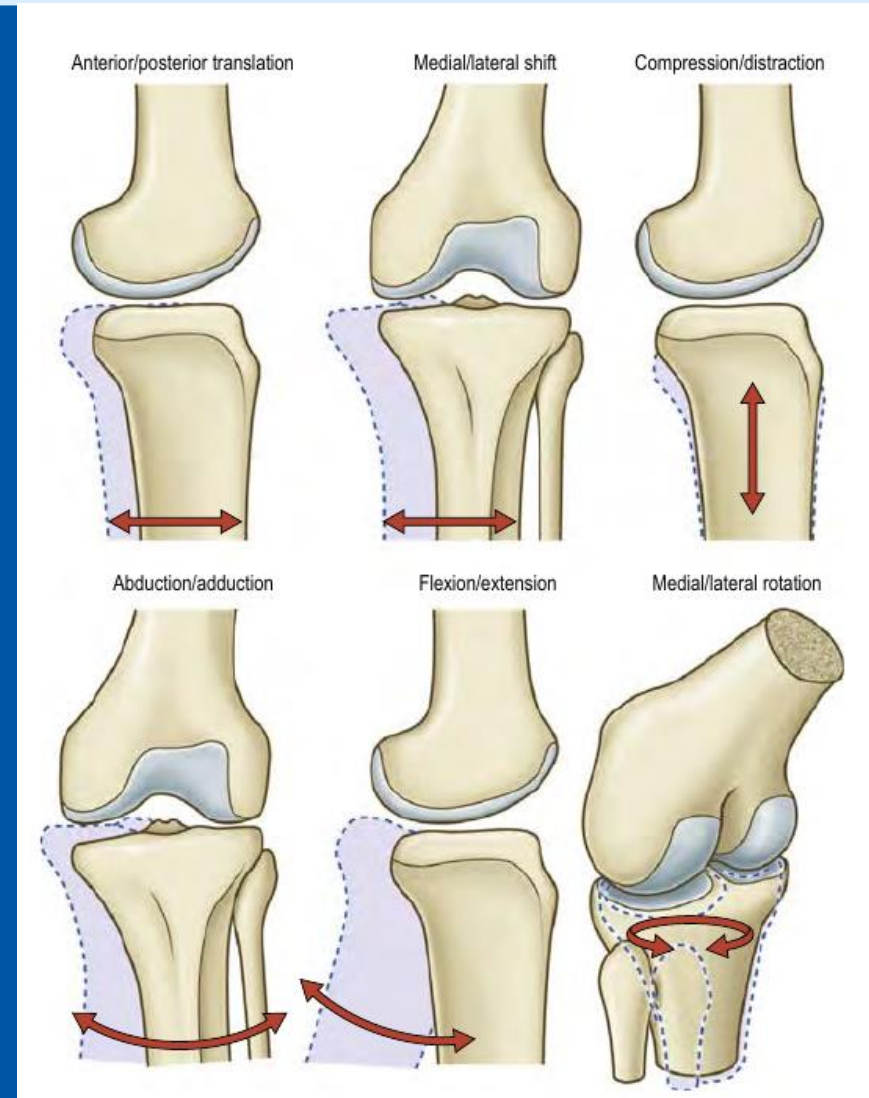
## Six Degrees of freedom

### 3 Rotations

- Flexion-Extension:  $\sim 160^\circ$
- Medial-Lateral:  $25\text{-}30^\circ$
- Abduction-Adduction:  $\sim 5^\circ$

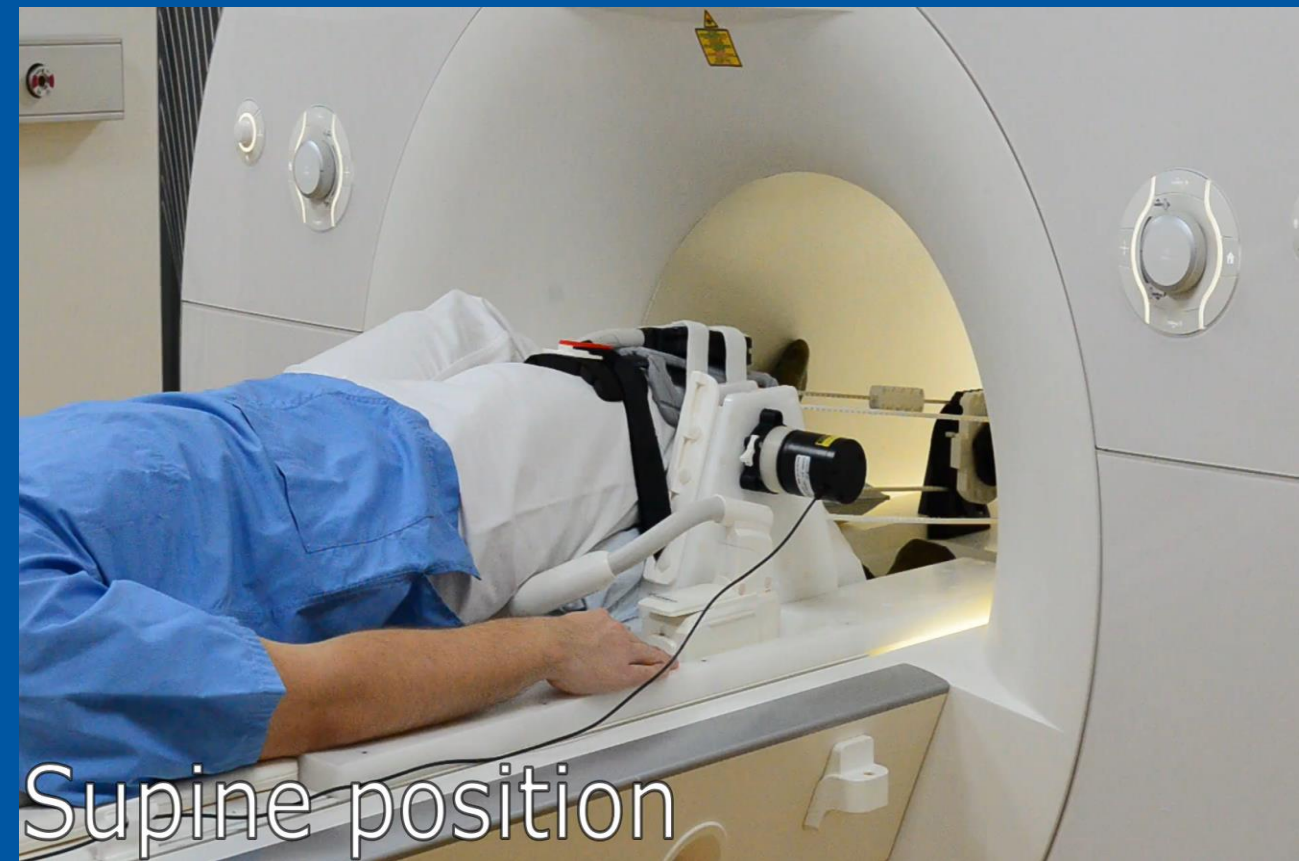
### 3 Translations

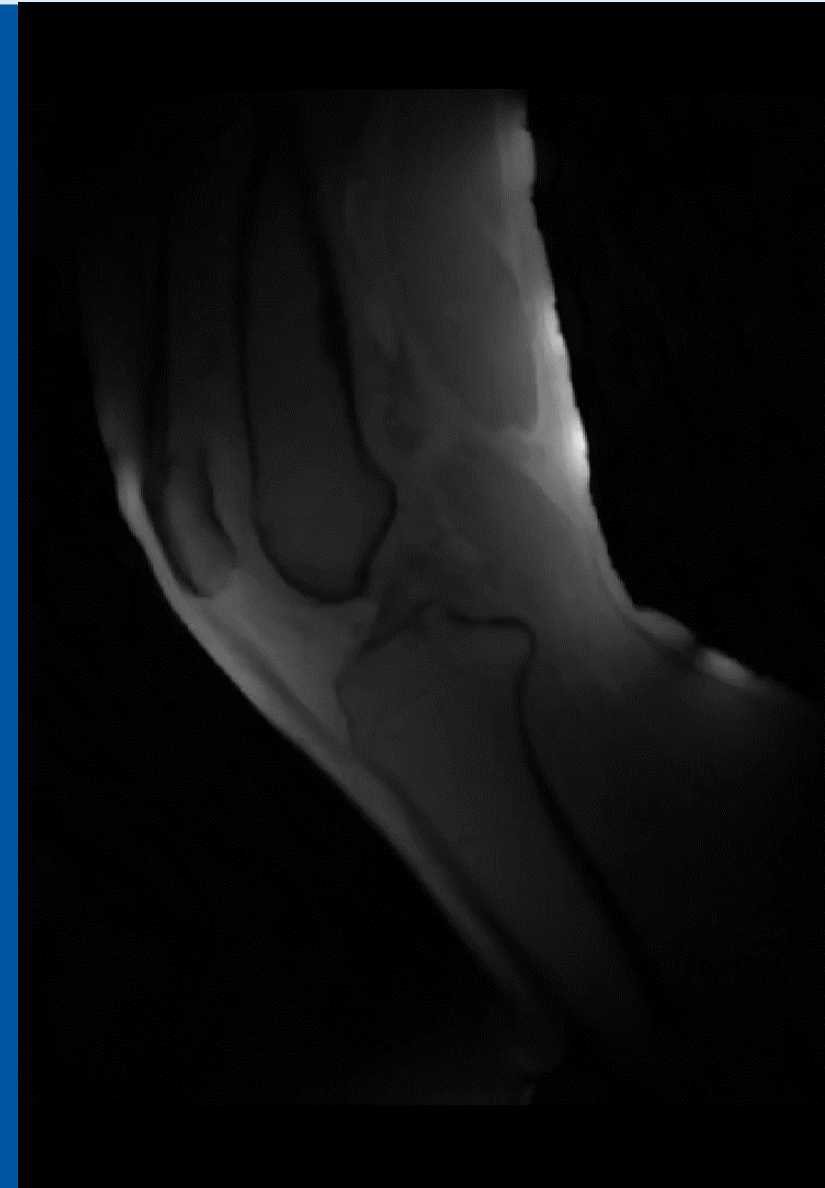
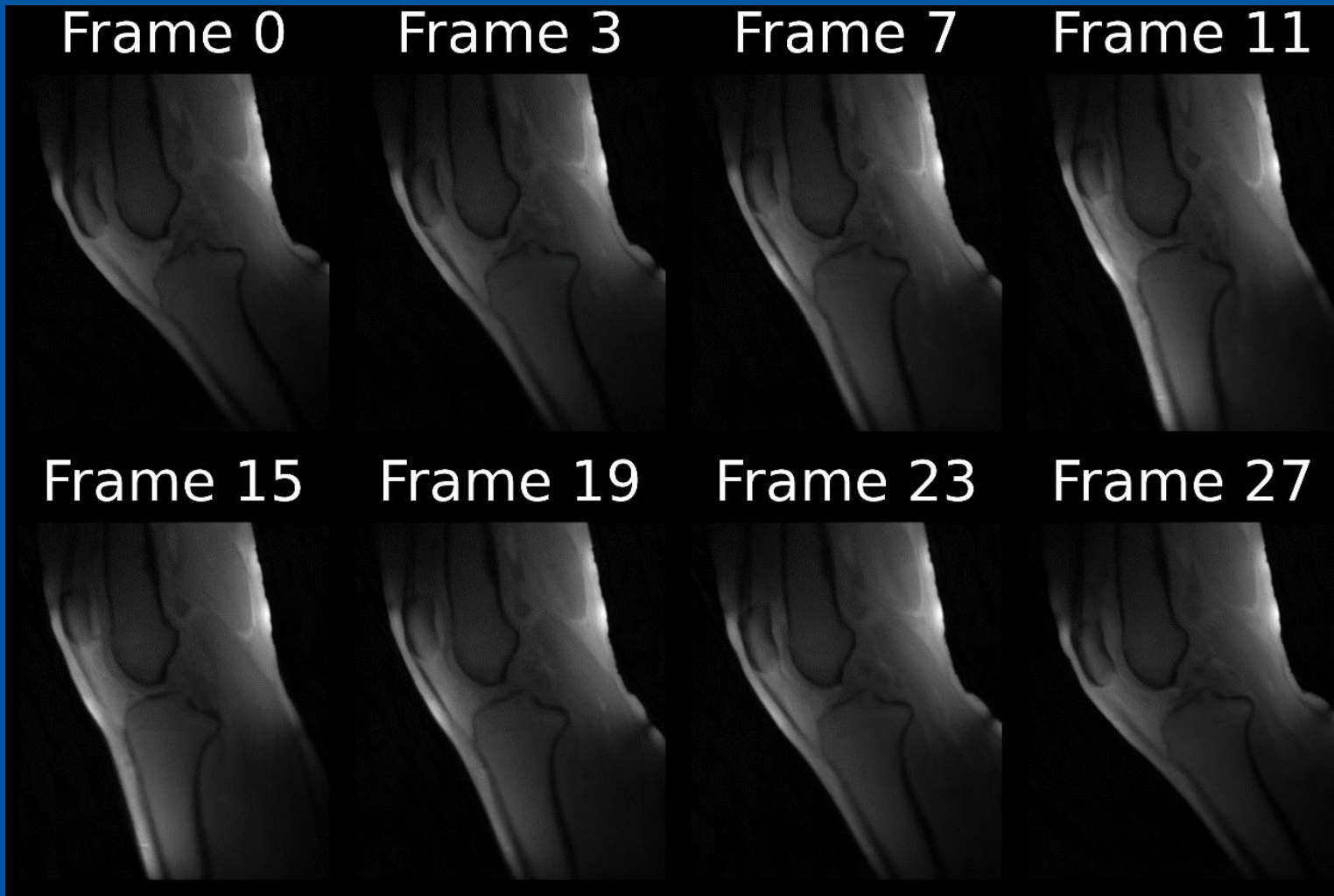
- Anterior-Posterior: 5-10 mm
- Medial-Lateral: 1-2 mm
- Compression-Distraction: 2-5 mm

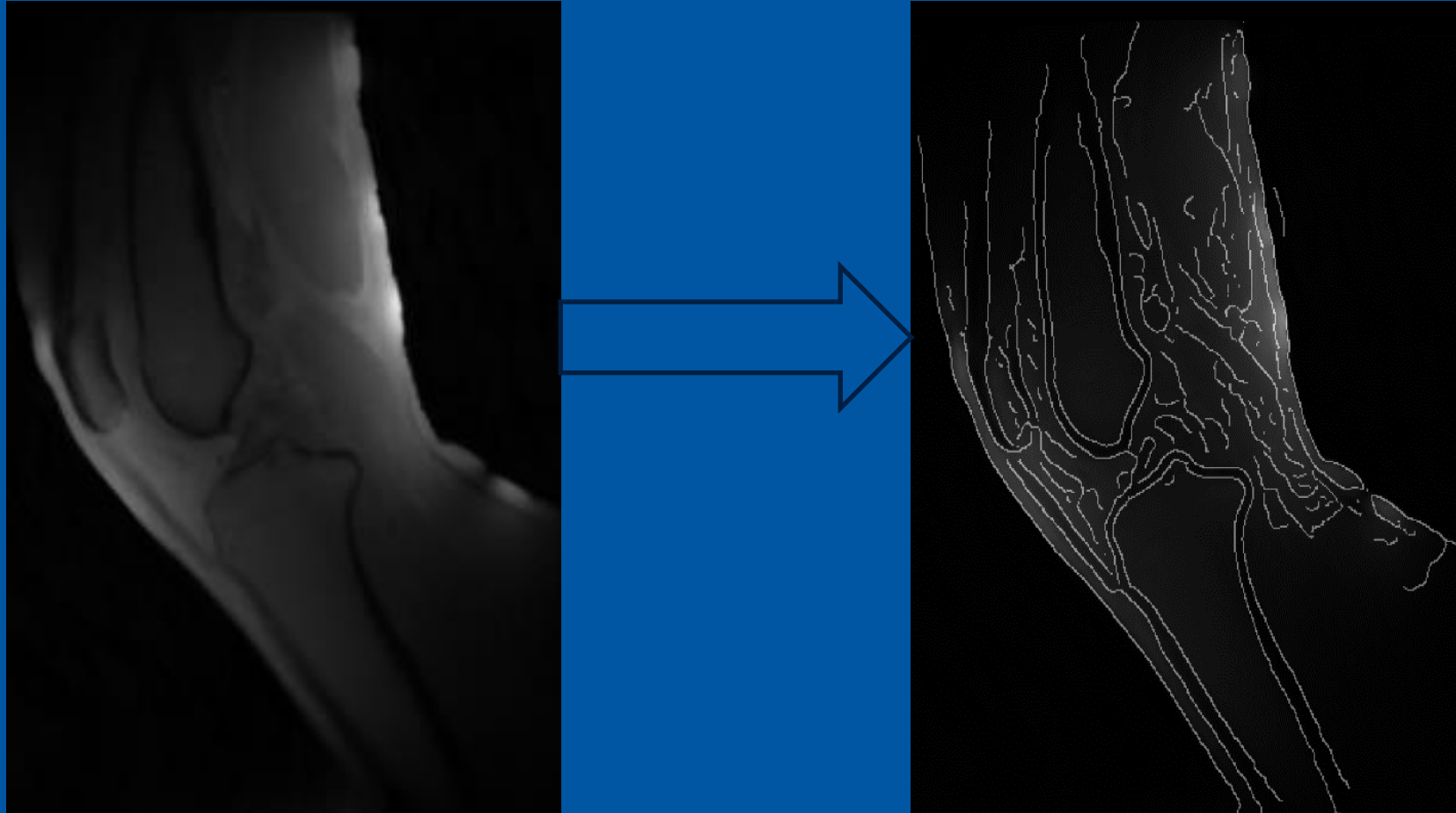


(Credit: Gray's Anatomy 42<sup>nd</sup> ed.)

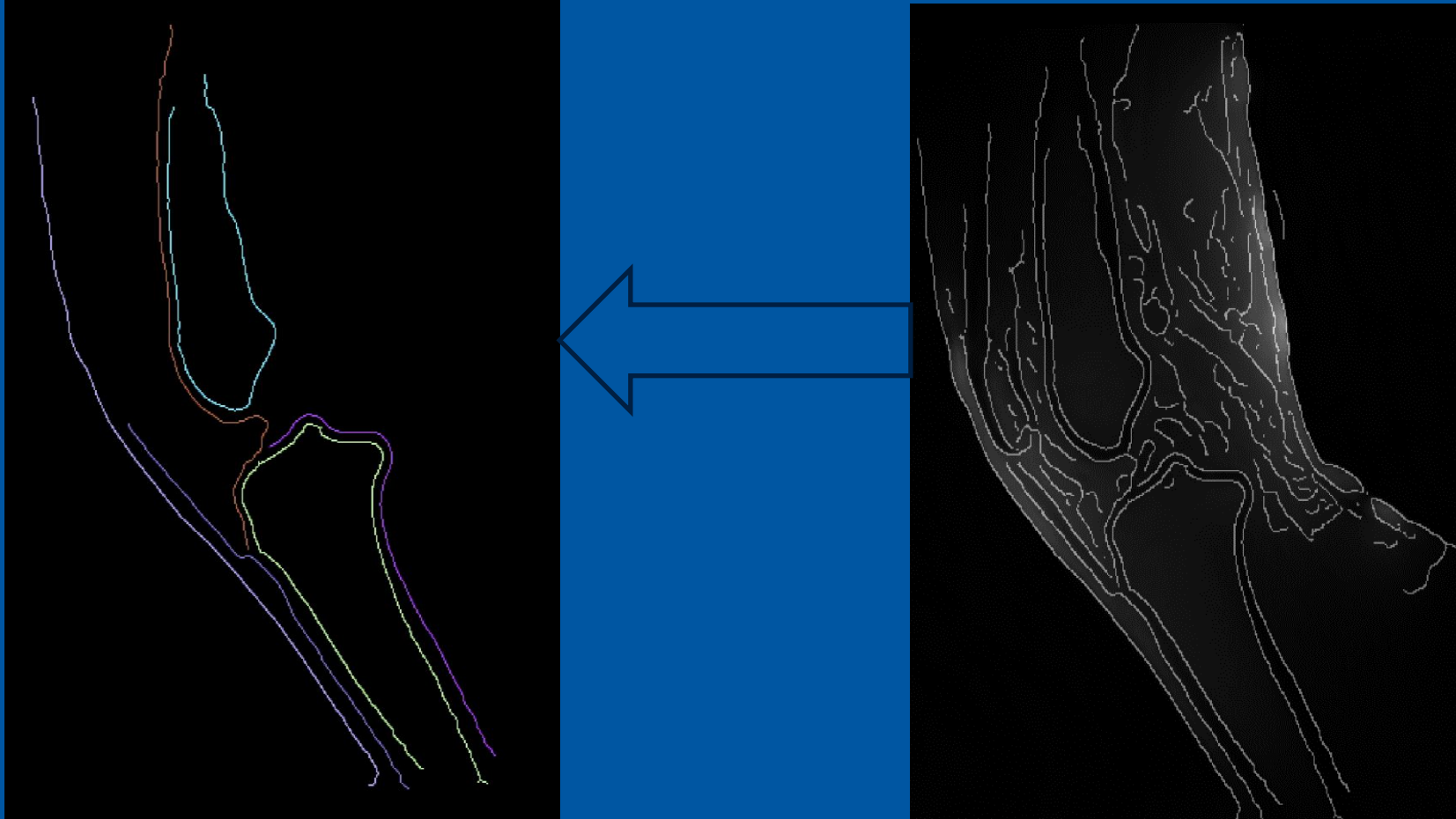


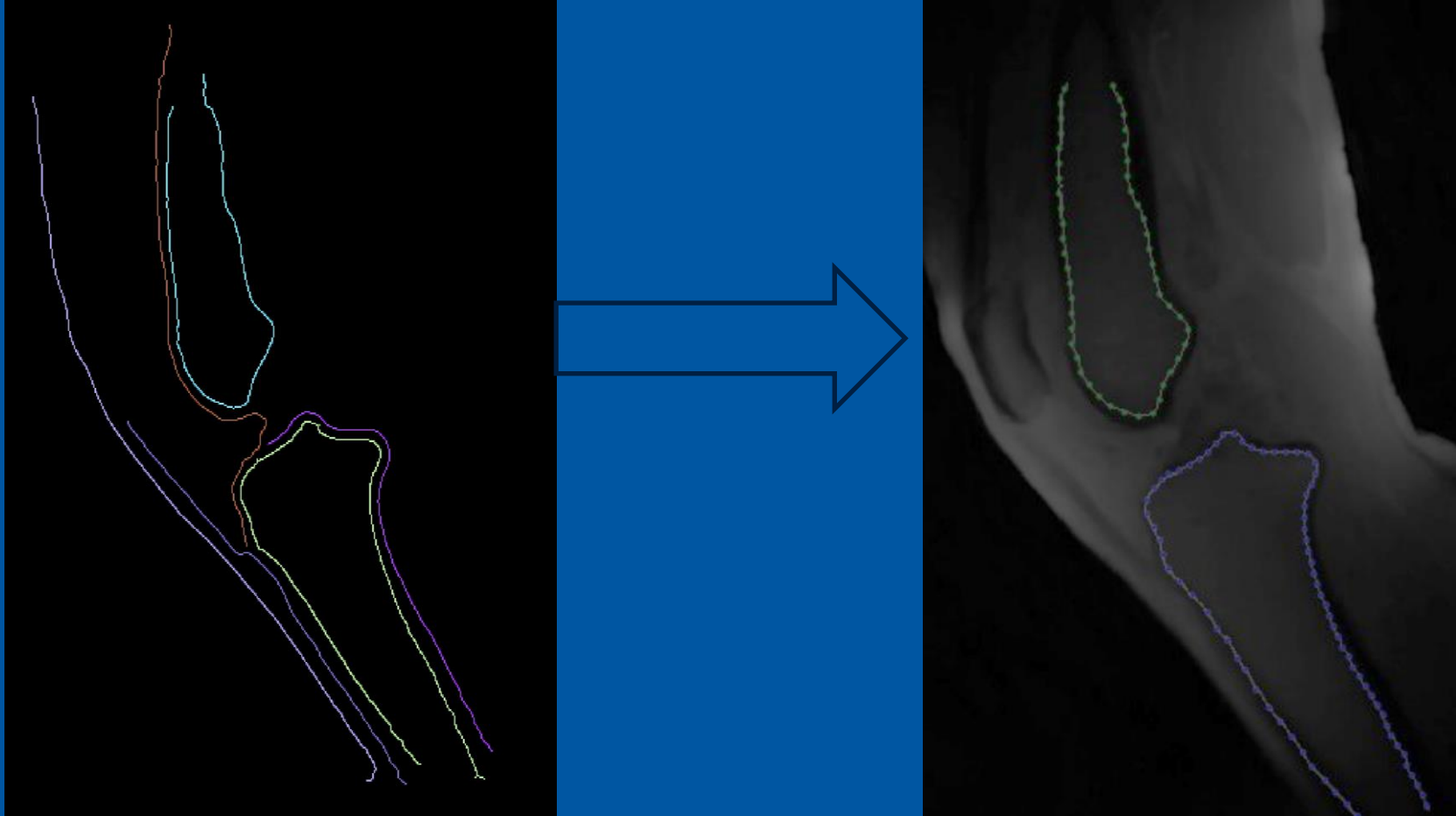




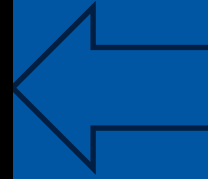
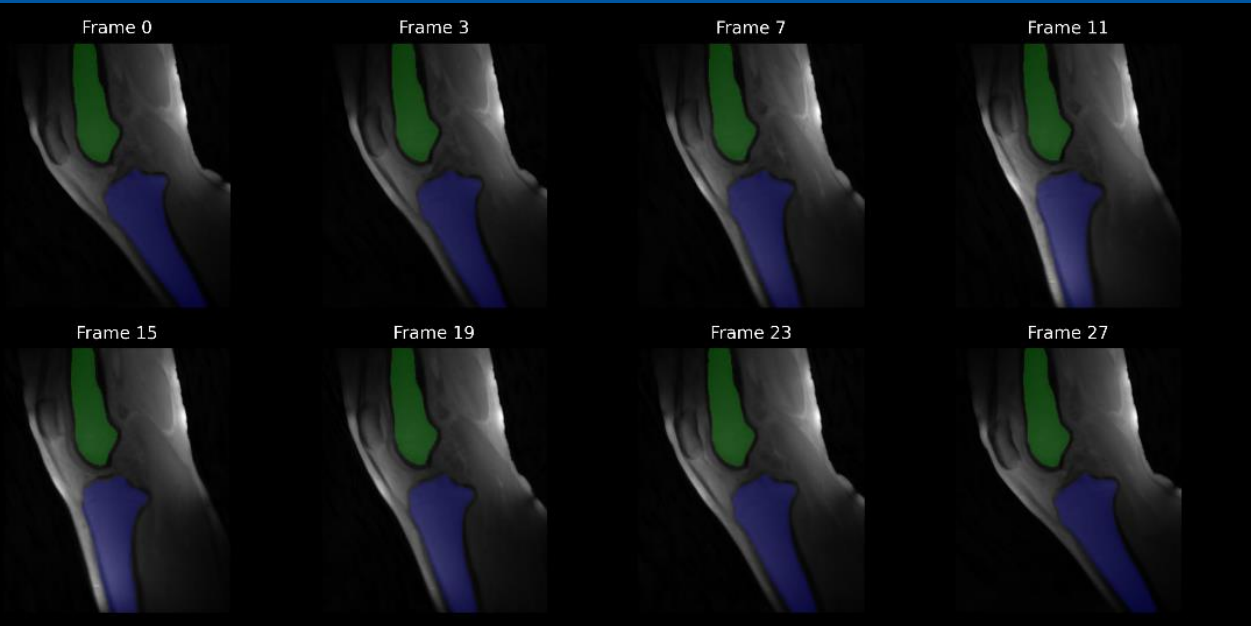


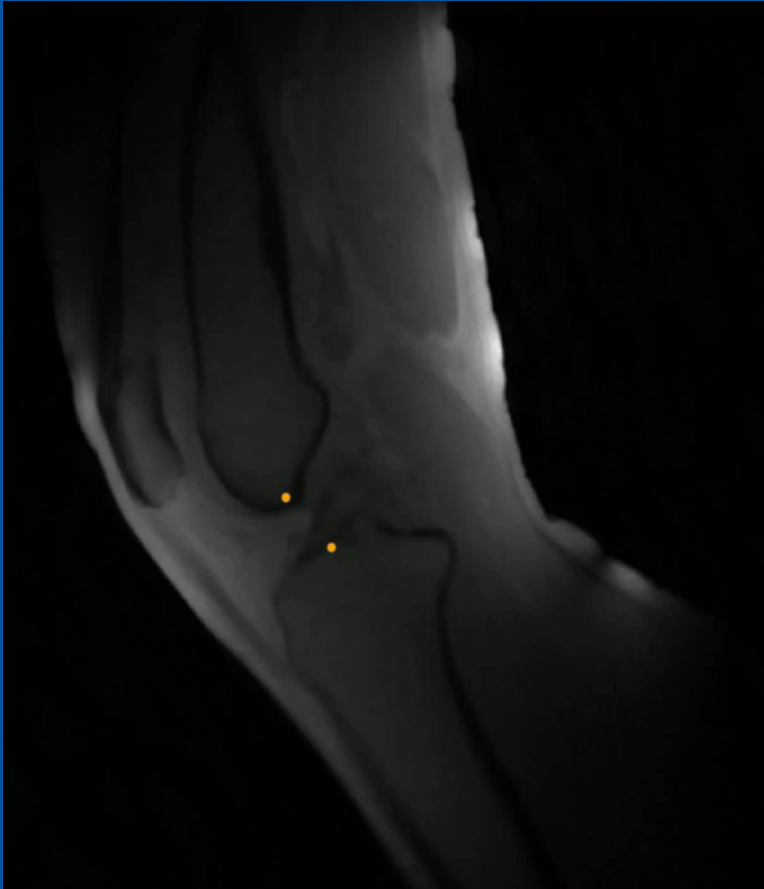


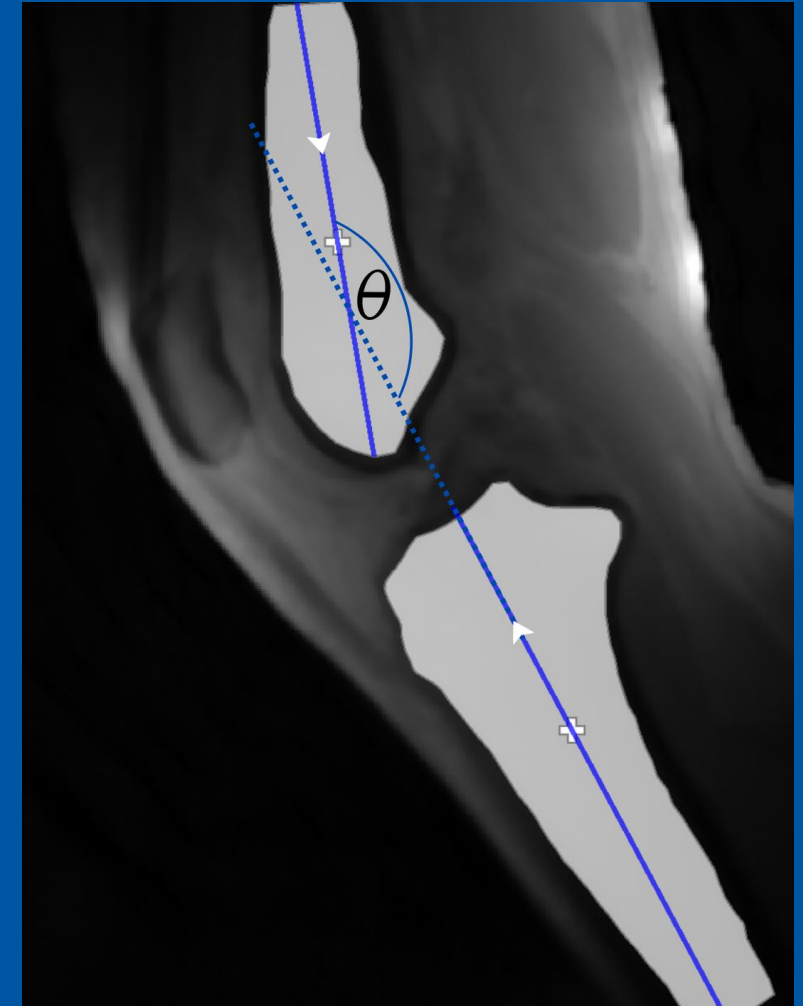


















Thank you for your attention!





