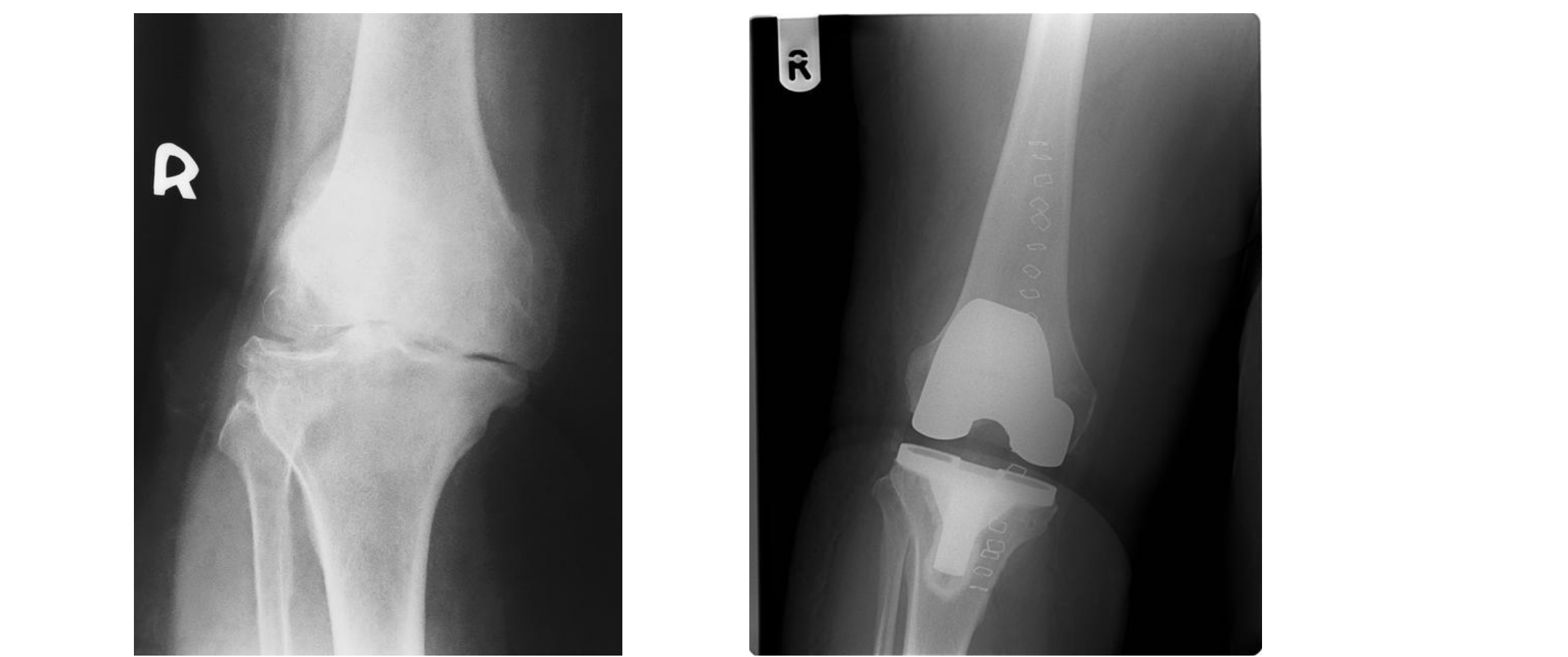
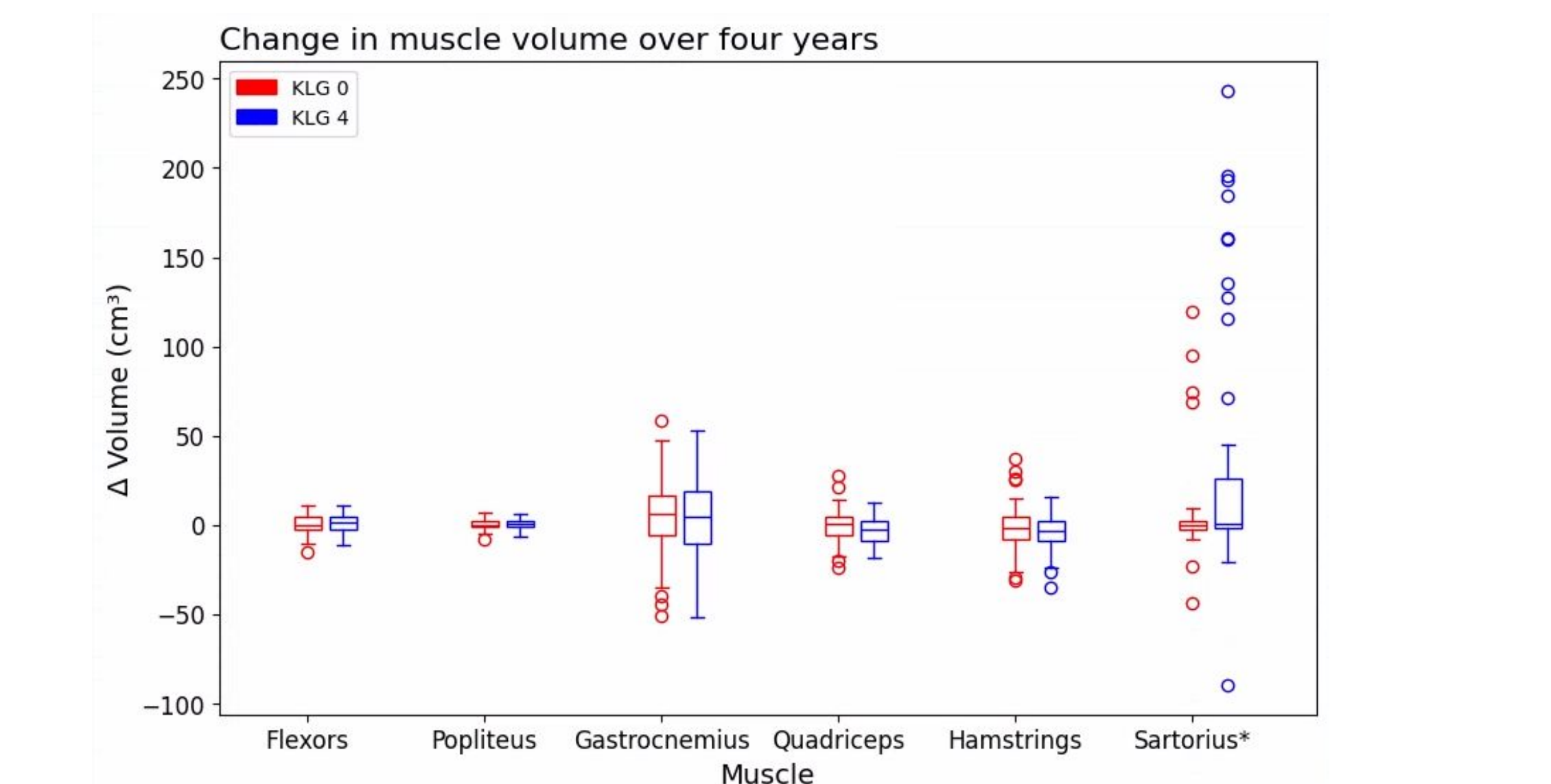


Using Deep Learning to Predict Knee Osteoarthritis

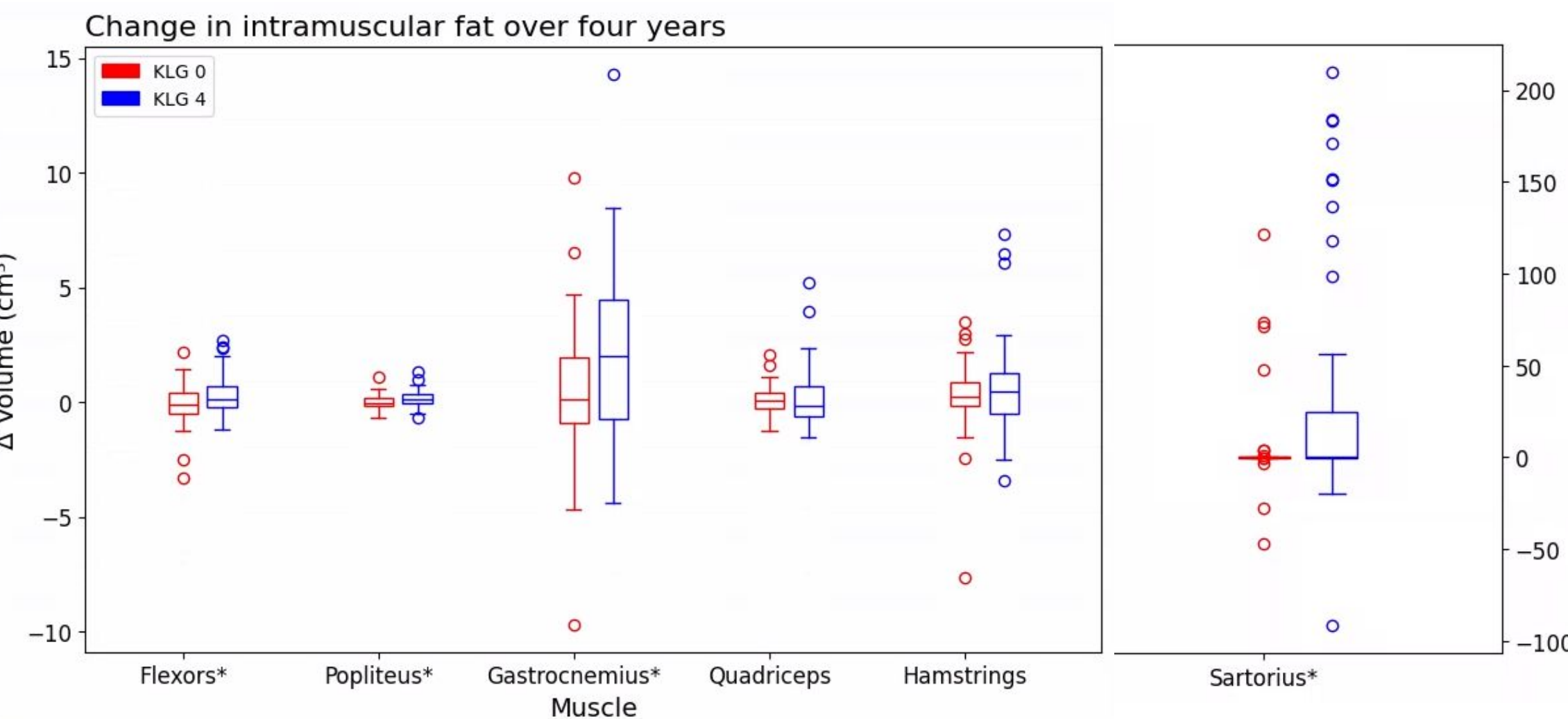
Osteoarthritis (OA) is a **degenerative joint disease** that burdens the patient with progressively decreasing function due to joint pain, instability, and stiffness. There is **no treatment to reverse** disease progression, placing emphasis and **early detection** and mitigation.



We use a **U-Net** 3D segmentation model to measure volumes of muscle and fat around the knee. We note an **increase in sartorius volume**.

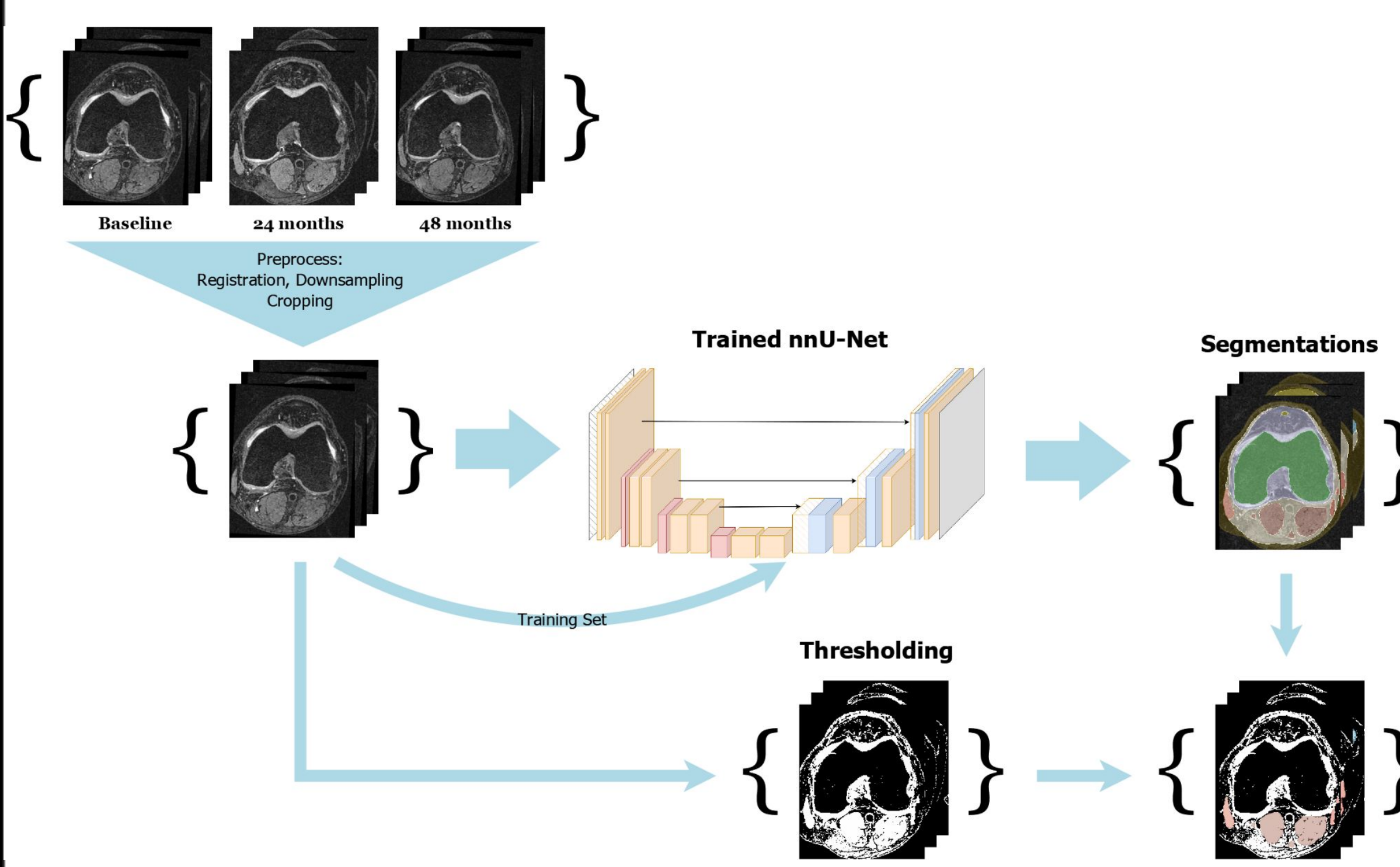
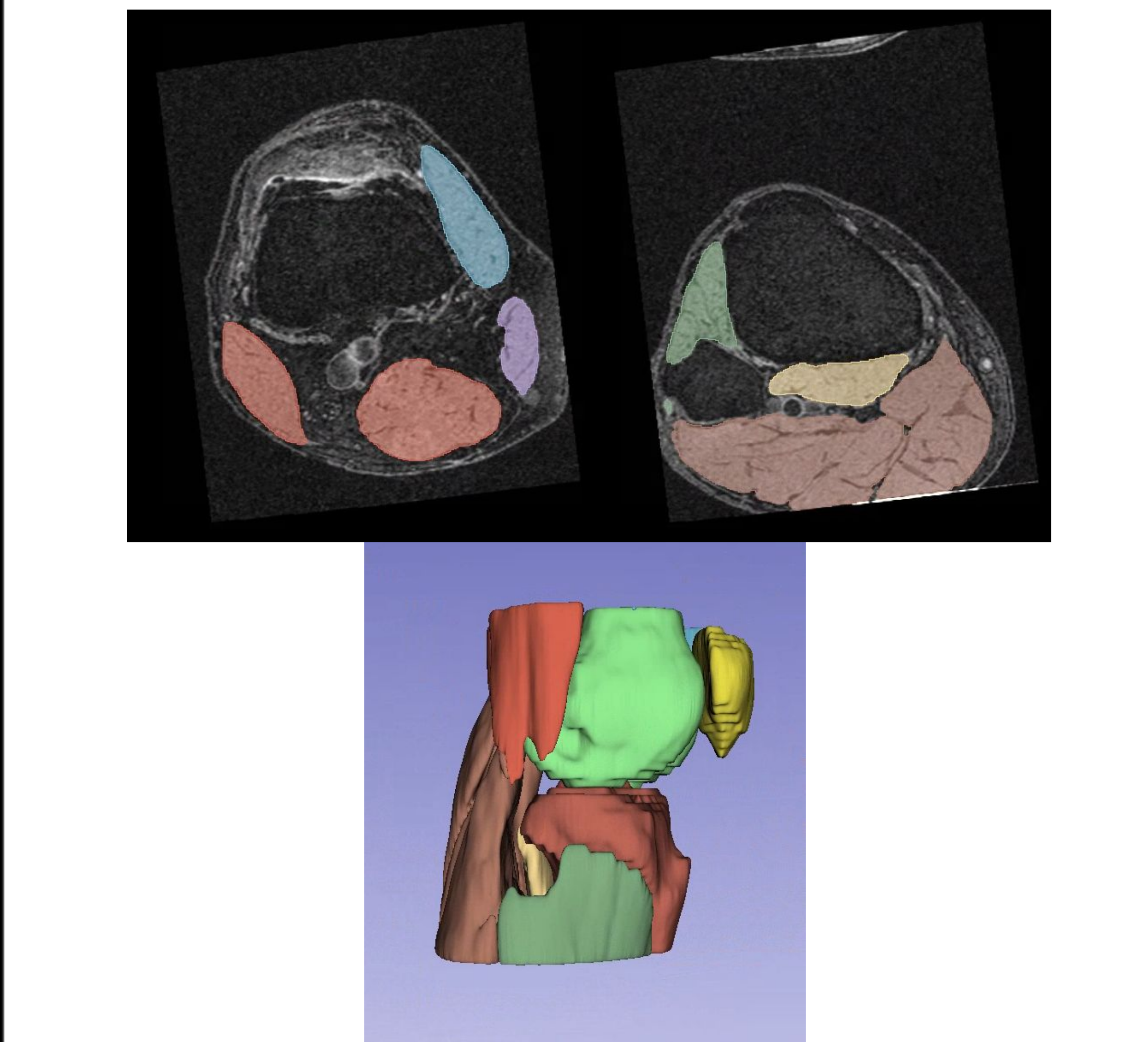
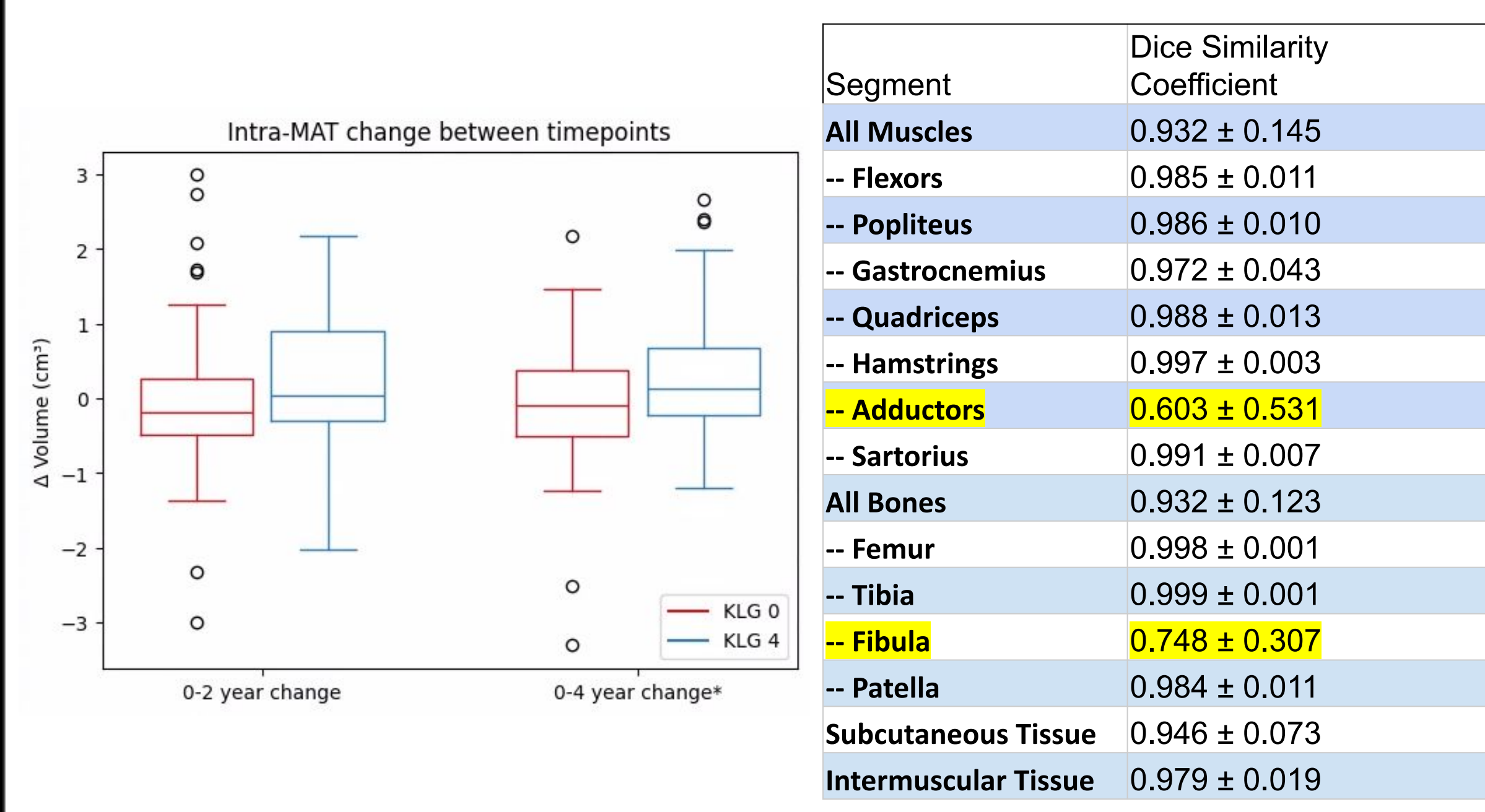


After validating model performance, we see muscles such as the foot/ankle flexors, popliteus, gastrocnemius, and sartorius muscles show **increased intramuscular fat**. This information can be used to guide physical therapy and reduce the disease burden.



Future Directions: Using the entirety of the NIH Osteoarthritis Initiative dataset, discover biomarkers of Knee OA and create a deliverable tool to aid physicians in early diagnosis.
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Deep learning models allow monitoring of fat infiltration into muscles near the knee, which can serve as a potent predictor of knee osteoarthritis onset and progression.



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