

INTRODUCTION: The progression of osteoarthritis can be monitored by measuring the minimum joint space width (JSW) between the edge of the femoral condyle and the tibial plateau on radiographs of the knee. This is generally performed by a trained radiologist using a graduated magnifying lens and is prone to the subjectivity and variation associated with observer measurement. We have developed software which performs this measurement automatically on digitized radiographs.

METHODS: 190 radiographs of the knee (95 duplicate acquisitions) were digitized with a 100 μ pixel size by a Lumisys Lumiscan laser digitizer and cropped so that the digital images were free of non-anatomical structures. The software first determined the edge of the femoral condyle on 400 μ subsampled images. Contours marking the location of the tibial plateau in the medial compartment were found on 100 μ images using the femoral edge as a starting point. The results were compared to contours drawn by a trained radiologist and the duplicate acquisitions were used to measure the reproducibility of the minimum JSW measurement.

RESULTS: Over 93% of the cases demonstrated excellent agreement with the hand-drawn data. Using the duplicate acquisitions, the minimum JSW reproducibility was measured to be better than 0.2 mm. (or CV < 3%).

CONCLUSION: We have developed automated software which accurately measures the minimum JSW in knee radiographs and requires no user interaction for the vast majority of cases. This improves measurement objectivity and reduces the time necessary for radiographic evaluation.