Supplementary Material

The KIMRISS web interface is accessible free to registered users at [www.carearthritis.com](http://www.carearthritis.com). This site includes a customized HTML5 DICOM viewer which allows users to upload and score their own DICOM data sets, an introductory slide presentation explaining KIMRISS and demonstrating examples of proper use and pitfalls, and for training purposes, several fully scored sample cases prepared by two expert musculoskeletal radiologist readers. Readers can practice scoring these cases and instantly review their performance slice-by-slice compared to the expert readings.

*KIMRISS Overlay placement:*

The tibia is scored with the template positioned and locked once on the “central slice” where the ACL and PCL are seen to cross on a single image. If the knee is ACL or PCL deficient the central slice is placed where the intact ligament is best seen. Ten segments can be defined for each slice (5 immediately subarticular and 5 deeper). Using 3 mm MRI slice thickness, we have found in pilot work that knees are covered by 29 slices containing the tibia (10 medial, 10 lateral, and 9 central), resulting in a maximum score of 290 for the tibia (i.e., scoring range 0-290).

The femur is scored with the template positioned and locked three times: once outlining the femoral trochlea on the “central slice” (as chosen for the tibia) and once for each femoral condyle, outlining the respective condyle where the cross-sectional area appears largest. The web-based interface will automatically adjust the template position between “locked” positions to best match the femoral contour, using interpolation between the “lock” points. As for the tibia, 29 3-mm slices provide full coverage of the femur (10 slices for each condyle and 9 central
slices for the trochlea). Each slice contains 13 segments, resulting in a maximum score of 377 for the femur.

The patella is scored with the template positioned and locked once on the slice with the largest patellar cross-sectional area, and kept in that position to score all slices that contain the patella (maximum of 12 3-mm slices in pilot work). We define 8 segments per slice (4 immediately subarticular and 4 deeper), resulting in a maximum score of 96 for the patella.

Overall maximum score is 290 (tibia) + 377 (femur) + 96 (patella) = 763.

In the rare event that a BML is missed due to being outside the limit of the 29 femur/tibia slices and/or the 12 patellar slices, the template center can be adjusted to include the missed BML. This did not occur in any of the 80 subjects in this study. MRI slices less than 3 mm in thickness should be post-processed to 3 mm prior to scoring.

For ease of use, the KIMRISS BML score at a region is automatically recorded as 1 when a user simply clicks a mouse or touches a touch-screen within that region. Scores are automatically populated into a data table which is maintained in the computer memory cache and can be exported when the scan has been fully reviewed. An overall KIMRISS score can be calculated by summing each segment(s) containing a BML, for each bone (tibia, patella, femur), region (e.g., trochlea, medial condyle, lateral condyle), or subregions. This allows several permutations of region based analysis or calculation of a “total score” for each knee.