Detection of articular knee cartilage defects using PD BLADE with fat saturation (FS), PD FS and T2 3D DESS with water excitation (WE)

From February 2010 to December 2012, thirty three consecutive patients with osteoarthritis (18 females, 15 males; mean age 56 years, range 37-71 years), who had been routinely scanned for knee examination using the image acquisition techniques described below, participated in the study. The presented knee examinations were performed on all the patients using a 1.5T scanner (Magneton Avanto, Siemens Healthcare Sector, Erlangen, Germany) and the Siemens four-channel matrix knee coil. Based on the results of the quantitative analysis, the ReCON of the Menisci/Cartilage Superficial, the Menisci/Cartilage Deep surface, the Fluid/Cartilage Superficial, the Fluid/Cartilage Deep surface, the Pathologies/Cartilage Superficial and the Pathologies/Cartilage Deep surface (Figure 1), in the PD BLADE FS COR sequences, were found to be superior to the PD FS COR, T2 3D DESS 1.5mm and T2 3D DESS 3mm sequences. The sequences T2 3D DESS 1.5mm and T2 3D DESS 3mm were significantly superior to the PD BLADE FS COR and PD FS COR sequences in the ReCON of Bone/Cartilage Superficial and Bone/Cartilage Deep surface (Figure 1). The sequence PD FS COR was significantly superior to the T2 3D DESS 1.5mm and T2 3D DESS 3mm sequences in the ReCON results between Menisci/Cartilage Superficial, Menisci/Cartilage Deep surface, Fluid/Cartilage Deep surface and Pathologies/Cartilage Deep surface. No significant difference was calculated in the ReCON results between Fluid/Cartilage Deep surface and Pathologies/Cartilage Deep surface.

Based on the results of the qualitative analysis, the contrast in the PD BLADE FS COR sequence between Menisci and Cartilage, Fluid and Cartilage, Pathologies and Cartilage, and in the Conspicuousness Superficial Cartilage was found to be superior to the other sequences (p<0.001). The sequences T2 3D DESS 1.5mm and T2 3D DESS 3mm were significantly superior to the PD BLADE FS COR and PD FS COR sequences in the contrast between Bone and Cartilage and in the Conspicuousness deep Surface Cartilage. The sequences T2 3D DESS 1.5mm and T2 3D DESS 3mm were significantly superior to the PD FS COR sequence regarding the results of the Pulsation Artifact, and Fluid and Cartilage. Also, in the PD BLADE FS COR sequence, the results of the Truncation Artifact, Pulsation Artifact, Edge Sharpness and Blurring Artifacts, were superior to the other sequences (p<0.001).

**Figure 1.** Coronal PD BLADE FS (upper left), Coronal PD FS (upper right), Coronal T2 3D DESS with 3mm slice thickness (lower left), Coronal T2 3D DESS with 1.5mm slice thickness (lower right). Measurements of signal intensity (SI) in those four images were performed in pathology (1), bone (2) and cartilage (3). The results of ReCon in the PD BLADE FS COR sequence between the Cartilage and Pathologies were very superior to those of the other sequences. The results of ReCon between Bone and Cartilage from the T2 3D DESS 1.5mm and 3mm sequences were superior to those of the PD BLADE FS COR and PD FS COR sequences.