

Due to the large differences in magnetic properties between metal and human tissues, metallic implants or fragments within the body cause severe distortions (metal artifacts) in magnetic resonance (MR) images. In our patient population, these artifacts make it very difficult to adequately assess recurrent tumor, fracture, or infection in the region of an implant. Metal fragments from brain surgery and dental appliances (especially braces) cause severe artifacts in images of the brain, face, sinuses and neck. Reducing the extent and intensity of these image artifacts requires an understanding of the induced magnetic field and its effects on the image. One such correction method involves the addition of a magnetic field gradient in the slice selection direction during the signal readout period. This technique, first suggested by Cho et al.¹, effectively moves the artifact out of the image by projecting the image plane through a user specified angle. Information from the area surrounding the implant, previously hidden by artifacts, can now be obtained. We have modified the technique to compensate for a slice position-dependent shift in the read-out direction. Results of other artifact reduction methods that will be presented include maximizing the bandwidth in both the read and slice selection directions. The application of these techniques to clinical cases will also be presented, thus testing their viability practically as well as scientifically.

1. Cho ZH, Kim DJ, Kim YK. Total Inhomogeneity Correction Including Chemical Shifts and Susceptibility by New Angle Tilting. Med. Phys. 1988; 15:7-11.