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Buffing Up MR Images

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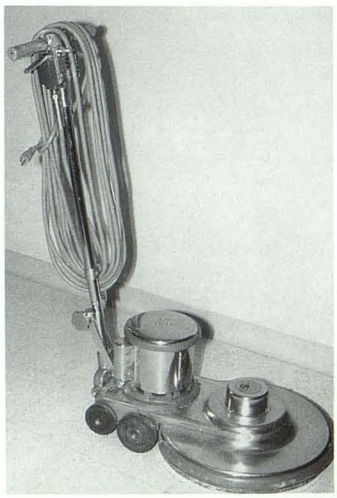
Summary: The authors describe an innovative approach to buffing up MR images.

Index terms: Magnetic resonance, instrumentation; Neuroradiology and neuroradiologists, bon bons

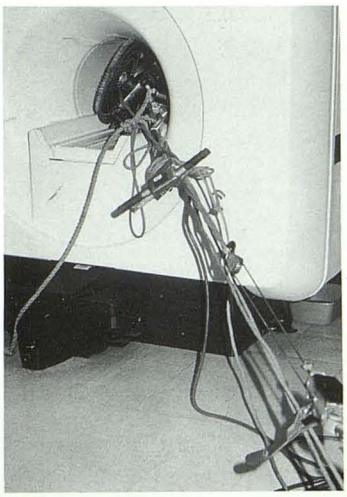
There are many ways to improve MR (magnetic resonance) image quality: optimizing magnetic field homogeneity and field strength, improving gradient and surface coil design, developing new pulse sequences and maximizing patient comfort to avoid patient motion are only a few (1, 2). A more novel approach is the subject of this report; to our knowledge, this technique has not been previously described in the medical literature.

Materials and Methods

A model SSS 1040 Ultra High Speed floor wax buffer (Fig. 1) has been used at our facility for several years to clean the floors of the MR and MEG (magnetic encephalography) building. The threshold of the scanning room housing a GE Signa 1.5 T (General Electric, Milwaukee, WI) is clearly indicated, with a warning of the potential danger of the high magnetic field strength. Maintenance personnel are routinely informed of the risk of crossing this threshold with ferromagnetic materials. This knowledge notwithstanding, on the eve of May 10, 1990, an experienced member of the maintenance team noticed a blemish on the floor that he described as a macular taint having serpiginous borders and lying in propinquity to the threshold of the room. Extirpation of the blemish was attempted.



1



2A

2B

Fig. 1. The model SSS 1040 Ultra High Speed floor wax buffer.
Fig. 2. *A* and *B*, Attempted extraction of the buffer from the magnet bore.

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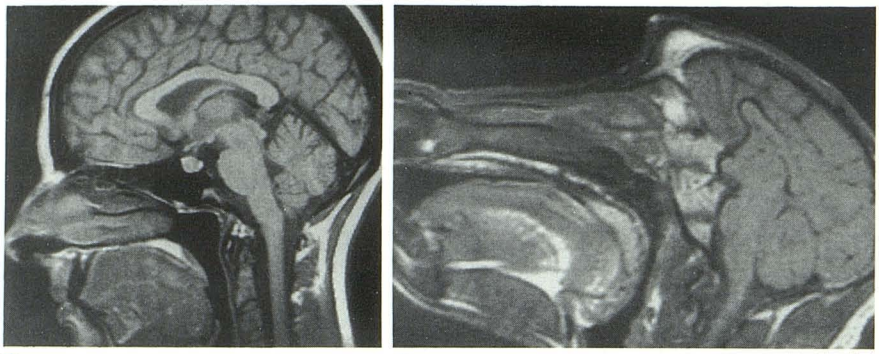
Fig. 3. Sagittal 500/30 (TR/TE) T1-weighted image of the head prior to the buffer upgrade.

Fig. 4. Sagittal 500/30 T1-weighted image of the head post-buffer upgrade. Note the improved visualization of the facial structures and of the anterior cerebral artery as compared to Figure 3.



3 4

Results

Upon crossing the threshold of the magnet room, the floor buffer was pulled from the grasp of the maintenance employee and propelled to a final resting place within the bore of the magnet. Attempts to extract the buffer from the magnet with a block and tackle were unsuccessful (Fig. 2). After incrementally ramping down the magnetic field strength by using the shim power supply, the floor buffer was successfully removed from the bore of the magnet.

Although minor albeit costly cosmetic repairs were necessitated by the aforementioned buffer upgrade, a significant improvement in image quality resulted. Standard T1-weighted sagittal images of the brain obtained prior to the buffer upgrade are illustrated in Figure 3. Routine post-upgrade images are illustrated in Figure 4.

Discussion

Buffed magnetic resonance (MR) represents another step in the continuing evolution of MR imaging. The resulting improvements in image quality and spatial resolution are substantial (Figs. 3 and 4). While there is mild spatial distortion associated with this upgrade, the authors feel that with 10 years of experience in interpreting MR images and a strong neuroradiology background, this shortcoming can be easily overcome.

It is important to emphasize that all patients must be removed from the scanner prior to installing the buffer, and that care should be taken not to stand between the floor buffer and the magnet while crossing the threshold of the scanning room. Failure to heed this caveat may be hazardous.

Once the buffer upgrade is installed, the improvement in image quality should be instantly apparent to referring physicians and result in an exponential increase in patient referrals. This will in turn yield an increased patient database available for clinical research projects, thus potentially enhancing the academic credentials of the neuroradiologists involved causing still more of an increase in patient referrals.

In summary, buffed MR represents yet another advance in MR imaging and is strongly recommended.

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