

Poster Abstracts

Imaging

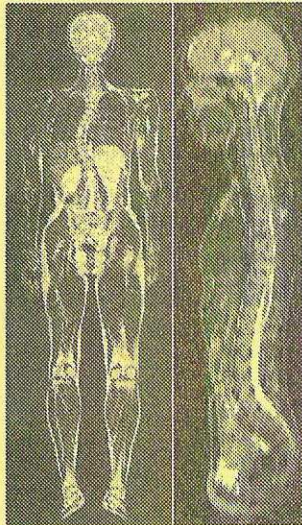
I-05

WHOLE BODY MRI: DIAGNOSTIC APPLICATIONS

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It is reported about diagnostic possibilities of whole body MRI. This method allows obtaining images of not only fragments of body as in ordinary MRI but whole human body from head to heels. It is useful for study of spine, blood vessels, metastases, etc. The method is realized by mechanical moving of patient through the scanning zone [1].



We realized this method on 0.5 T scanner Tomikon S50 ("Bruker") by installing an additional platform on the patient bed to increase its size. Step of removing was equal to the size of scanning zone for sagittal and coronal projections or to the thickness of slice package for axial ones. As this step was equal to 20 cm, a typical MRI required 8-10 stages. Typical scanning to obtain T1 or T2 weighted image (60x20 cm) took about 1.5-2 minutes for one stage. After "gluing" images together we obtained large MR images (60x180 cm) having 2 mm resolution with 1 cm slice thickness (see left figure).

We used MR images to reconstruct spine with S-scoliosis pathology (see emulation of warped sagittal slice on right figure).

Another application of whole body MRI is estimation of fat content in human body. We used well known software 3D-doctor™ for segmentation of fat zones and

calculation of their volume.

Whole body MRI gives additional useful diagnostic information and most likely may be realized on variety of commercial MR scanners.

References

[1] Lauenstein TC et al, Eur. Radiol., 2002, Aug;12(8):2091-9.

Imaging

I-06

MRI SCANNING CONTROLLED BY PATIENT

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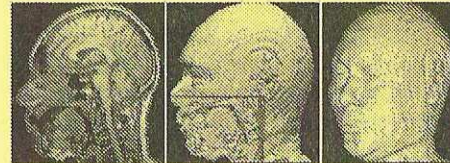
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It is reported about a new method of synchronization of MRI scanning in which starting, interruption and proceeding of scanning is controlled by the patient.

MRI scanning in some cases, for example, at abdomen research, demands interruption of scanning until the given phase of breath is reached [1]. Otherwise the MR image appears distorted. The simplest solution is breath hold, where scanning time is restricted by short values (<20-30 seconds). In this method the moment of breath hold is controlled by operator but it is not always convenient for patient.

Another way is the use of synchronization system which applies the threshold scheme operated by signals from a sensor - respiratory belt. The method greatly increases scanning time and work well only if traced process is periodic. However the patient does not always breathe in regular intervals, for example, because of cough.

In the synchronization system developed by us the patient can start and interrupt scanning independently by means of the push-button switch as an analog of sensor. Owing to it he can choose himself most convenient moments for breath holds, and synchronize scanning with these holds.



We used this method at whole body imaging and articulatory organs studies. In the latter case it was required to make scanning to the moments of pronouncing of vowel sounds [2]. Examples of MR images are given on figures.

The developed method is useful for long time scanning if patient has unstable condition (cough) or if nonstandard or non-periodical process (articulation) is investigated.

References

[1] Ehman R.L. et al. Am. J. Radiol., 1984, 143, 1175-1177.

[2] Anisimov N.V. et al. MEPhI -Sci. session, 2003, 25, 17-19 (in Russian).