

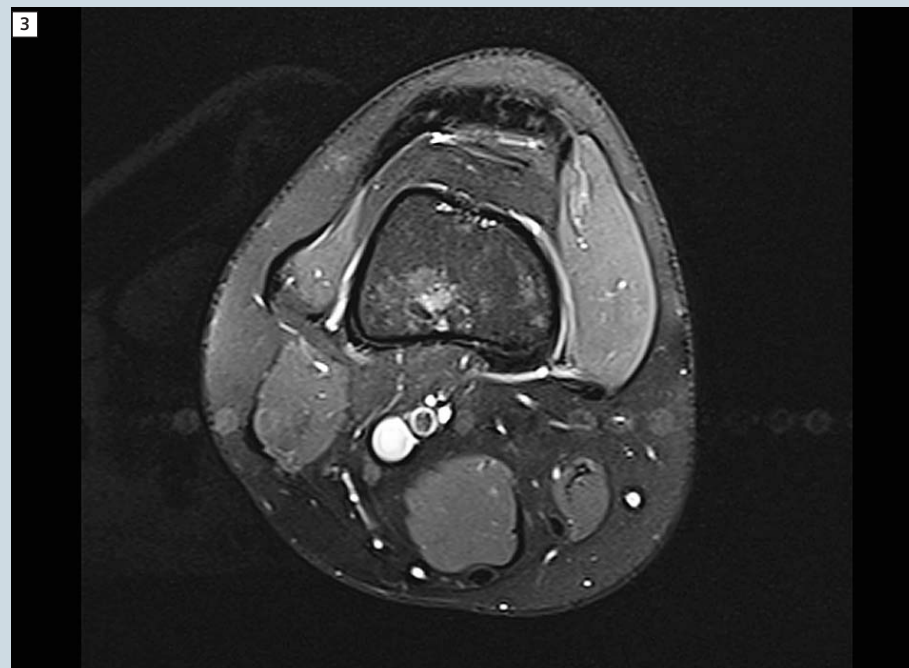
Knee Imaging with 4-Channel Flex Coils. The Influence of Patient Positioning and Coil Selection on Image Quality

Birgit Hasselberg; Marion Hellinger

Siemens Healthcare, Erlangen, Germany



2 Patient positioned for an examination of the right knee. Both knees are positioned in one plane.



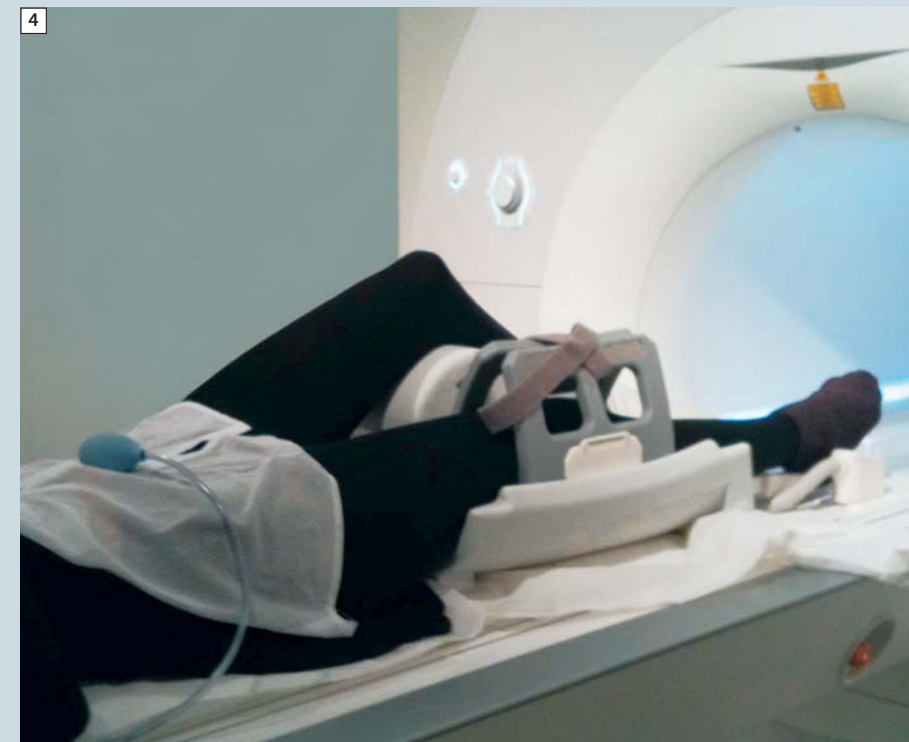
3 Using the Siemens protocol from clinical library arthrography Pd_tse_fs_tra_320, due to incorrect patient positioning, infolding effects of the not examined left knee are visible.

Wrong

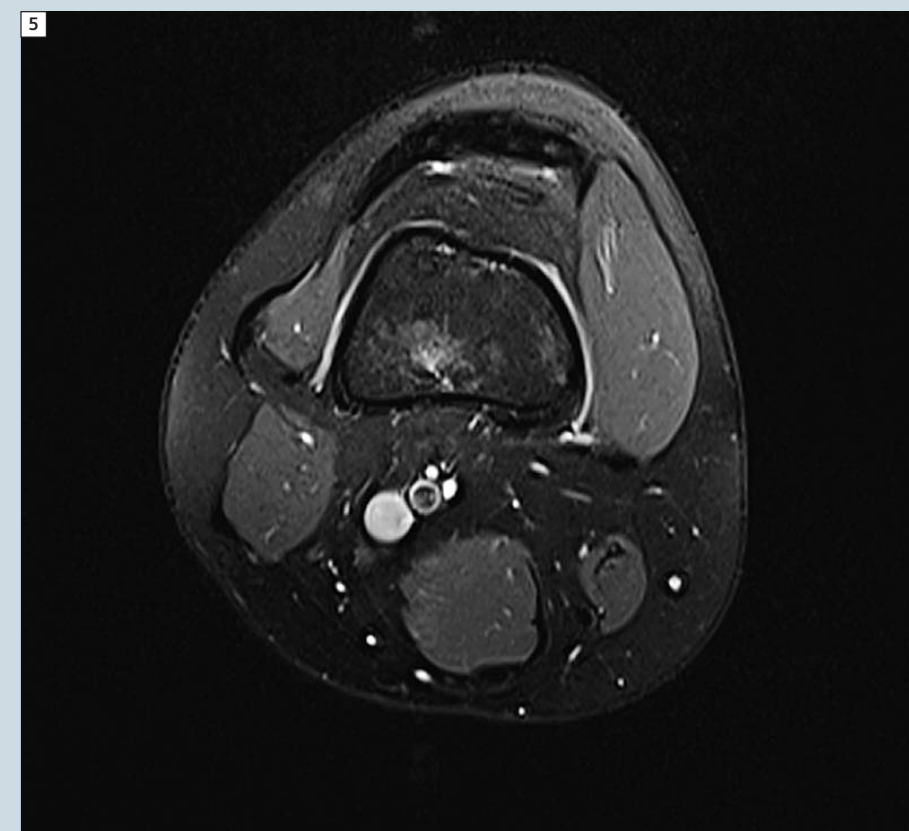
Correct patient positioning and the selection of the right coil have a huge influence on image quality as the following examples clearly show.

The patient is positioned supine on the table in feet-first orientation. In the first case, the patient lies straight on the table; both knees are positioned in one plane.

The resulting transversal clinical image shows aliasing effects from the left knee (which is not being examined) in the left-right phase-encoding direction.



4 Patient correctly positioned for knee exam. The knee not being examined is positioned on a cushion.



5 Again using the Siemens protocol from the clinical library arthrography Pd_tse_fs_tra_320. No infoldings due to correct patient positioning.

Right

Done right, the patient is again positioned supine on the table in feet first orientation. However, in this case the left knee is raised by a cushion in order to avoid the aliasing effect. The knee which is not examined is positioned higher than the examined knee. The resulting transversal image shows no aliasing effects.



Wrong

Besides correct patient positioning, the size of the knee in combination with the chosen coil has an effect on the image quality. The so-called “coil filling-factor” is demonstrated below. When you choose a coil which is too large for the examined body part, you get less overall signal which results in a minor image quality.

In the first case, the large 4-channel flex coil is used for the examination of a small knee. The resulting sagittal series shows minor image quality: apart from minor signal-to-noise ratio, this also results in inhomogeneous signal distribution as well as fat suppression.

6 A small knee positioned in a large 4-channel flex coil.



7 T1_tse_fs_sag_256 of a small knee in a large 4-channel flex coil, resulting in minor image quality.



Right

In the second case, the small 4-channel flex coil is used for the examination of a small knee. At the popliteal fossa we left the coil open. The resulting sagittal image shows a good SNR with an adequate image quality.

8 A small knee positioned correctly in a small 4-channel flex coil.



9 T1_tse_fs_sag_256 of a small knee examined with a small 4-channel flex coil, resulting in good SNR, good image quality. Compared to figure 7 there is good contrast and homogenous fat saturation in the bone.

1



1 4-Channel Flex coil large and small

Finally, remember to position the patient in the isocenter of the magnet. The flexibility of the large and small 4-channel flex coils gives perfect support in optimal left-right positioning. As shown above, the 4-channel flex coils come in 2 sizes and are part of the standard system configuration. They provide superior signal-to-noise-ratio (SNR) and can be used for the examination of various body parts. The wrap

around coil is made of soft and flexible material. Due to its 4-channel design it is iPAT-compatible. The coil can easily be combined with other coils such as Spine 32 and Body 18.

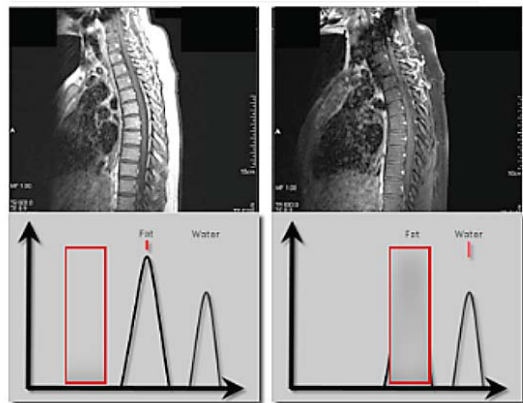
In summary, we can state that in knee examinations correct patient positioning and the selection of the right coil have a huge influence on the resulting clinical images.

Contact

Marion Hellinger
Siemens Healthcare
H IM MR PLM AW T Workflow
Allee am Roethelheimpark 2
D-91052 Erlangen
Germany
marion.hellinger@siemens.com

SIEMENS

Fat Saturation Process



As seen in the previous scenario, if the system chooses the fat peak as the center frequency and the user selects fat saturation, the system will apply the saturation pulse to the left of the center frequency. As demonstrated here, nothing will be saturated.

After adapting the adjustments, the center frequency will now be moved to its correct position and the fat saturation pulse will provide the proper suppression.

→ Get free-of-charge application training at www.siemens.com/magnetom-world

In this 8 min online training on fat saturation you will learn

- how to identify the fat and water peaks
- to calculate fat and water separation
- to perform the optimal fat saturation process

→ Visit us at www.usa.siemens.com/fatsat-video