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**Ultrasound guided infiltration of the piriformis muscle and
verification of the injectate using magnetic resonance imaging**

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Since 1947 the “piriformis-syndrome” (PS) is described and controversially discussed in the literature. The most commonly mentioned symptoms found in the literature are buttock pain, external tenderness over the sciatic notch, increasing pain during prolonged sitting, and more severe pain by increasing tension of the piriformis muscle (PM).

The different options to treat PS include injection techniques. In our study we developed an ultrasound guided injection technique that was verified by magnet resonance imaging (MRI).

To our best knowledge we were the first to validate ultrasound guided infiltration of PM with MRI. We calculated the distance from the liquid depot to the nerve and the size of the depot based on the MR-imaging as well as on the taken US pictures.

Nevertheless, just as described by other physicians, employing the ultrasound-guided technique, it was challenging to precisely identify the correct structure of the piriformis muscle in the ultrasound image, which lead to apparently false injections in some of the cases.

Although the puncture site was chosen with care, we could not avoid that one (8%) injection was misplaced within the gluteal muscle, whereas two injections were slightly misplaced with a fraction within the lower border of the gluteal muscle. One of these injections was more difficult because the PM was bi-parted. However, of these gluteal injected test persons had no sensomotorical deficits.

Two other test persons had short-term slight paraesthesia and motorical weaknesses for about an hour although the correct muscle (PM) was infiltrated.

Nevertheless, the impaired subject only experienced slight motor deficits; were able to walk home without further support.

The mean size of the liquid depot was 4.8 cm³ (SEM 0.5) in MRI and 1.7 cm³ (SEM 0.6) in US calculations while the mean distance between the sciatic nerve and the depot was 5.6 mm (SEM 1.2) in MRI and 16.4 mm (SEM 4.7) in US calculations. We assume that these results differ because of US calculations based on only one alignment and the fact that the MRI sequences were finished about 20 minutes after US pictures were taken. The liquid might have spread in between within the muscle structures and so the calculated volume had to be bigger.

Due to the fact that twelve healthy human males were included into our study, it might be difficult to guess the accuracy of PM infiltrations among PS patients. It might be more difficult to identify the PM structure in US in patients where structures already have altered due to the pathological processes.

Further research will be needed to precisely select the appropriate patients and to further increase the accuracy of this technique. However, the influence of such an easily accessible, easy to perform, cheap and safe technique as ultrasound-guided infiltration, will surely increase.