

FEASIBILITY STUDY: DIAGNOSTIC VALUE OF 3T MRI IN EXAMINATING THE LEVATOR ANI MUSCLE AND ITS SUPPORTING STRUCTURES

Hypothesis / aims of study

Being the subject of many studies, the female pelvic floor and its pathologies remain not fully understood. An important part of the female pelvic floor is represented by the levator ani muscle which provides both stability and functionality. According to current literature, levator ani muscle defects are associated with pelvic floor dysfunctions.^[1]

As the levator ani muscle undergoes enormous strain during vaginal childbirth, this process portrays a major risk factor of such defects.^[2]

The aim of this feasibility study is to show the visibility of the levator ani muscle in 3T MRI in high quality, to differentiate structural defects within and surrounding the levator ani muscle and to compare imaging results to clinical outcome.

Study design, materials and methods

In this prospective feasibility study, primiparous women were examined within one week after giving vaginal childbirth. As a reference group, nulliparous women were examined.

Primiparous women were interviewed regarding maternal information (e.g. postpartal stress urinary incontinence), data of the newborn (e.g. birth weight) and about the birth process (e.g. performed vacuum extraction). In the primiparous group either a gestational week $\geq 35+0$ and a birth weight ≥ 2500 gram or a gestational week $\geq 36+0$ were required. Exclusion criteria were metal implants or claustrophobia. Additional exclusion criteria for the reference group were a body mass index $> 30 \text{ kg/m}^2$, pregnancy, pelvic floor dysfunctions and former pelvic floor surgery.

The examination was performed in the lithotomy position, using a 3T MRI scanner (TIM Trio, Siemens, Erlangen).

Results

Between October 2011 and January 2013, 25 primipara (mean age 31 years, 6 months) and 25 nullipara (mean age 26 years, 7 months) were examined. In all 25 participants of the reference group the levator ani muscle proved to be visible and intact. In comparison to 1.5T MRI-scans from different studies, a high picture quality could be seen. Within the group of primiparous women complex structural defects could be detected and differentiated, such as edemas or avulsion. Besides the levator ani muscle other tissues, bones and different muscles showed defects.

Regarding the anamnesis, the youngest patient (age 21 years) in the group of primipara suffered from short-termed stress urinary incontinence while the MRI-scans did not show any major defects.

Two women suffered from bilateral levator ani muscle avulsion while not showing any clinical symptoms, as well as other women with major defects in the MRI-scans.

Interpretation of results

Injuries of the levator ani muscle and its supporting structures after vaginal childbirth represent a much discussed issue in medical literature.^[3] As a non-invasive method, 3T MRI provides the possibility of a high resolution and easily reproducible imaging method, wherein structural defects can be differentiated from normal tissue.

A correlation between stress urinary incontinence and imaging results was not visible in this feasibility study, possibly due to the small cohort and the short postpartal evaluation time.

Concluding message

3T MRI is a promising imaging tool for diagnosing levator ani muscle defects. Larger cohorts and a longer postpartal evaluation time might make symptom correlation possible.

References

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3. Lien KC, Mooney B, DeLancey JO, Ashton-Miller JA: Levator ani muscle stretch induced by simulated vaginal birth. *Obstetrics and gynecology* 2004, 103(1):31-40.

Disclosures

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