

## Abstract 5

### 3D-Reconstruction of Fe<sub>3</sub>O<sub>4</sub>-Mesh-implants: inner pelvic mesh measurement techniques

**Autor(en):**

Frau PD Kerstin A. Brocker / Department of Obstetrics and Gynecology, University of Heidelberg, Germany

Frau Luyun Chen/ Biomedical Engineering Department, Pelvic Floor Research Group University of Michigan, USA

Frau Dr. Céline Alt / Department of Radiology, University of Düsseldorf, Germany

Herr Prof. Dr. Christof Sohn / Department of Obstetrics and Gynecology, University of Heidelberg, Germany

Herr Prof. Dr. John DeLancey / Obstetrics and Gynecology Department, Pelvic Floor Research Group University of Michigan, USA

**Einleitung:**

We aim to demonstrate the feasibility of reconstructing magnetic resonance (MR) visible mesh implants, and measure their postsurgical location and dimension relative to the bony pelvis and important anatomical structure.

**Material und Methodik:**

This is a proof of concept study from a prospective multi-center study evaluating women treated with anterior vaginal mesh-repair using a MR-visible Fe<sub>3</sub>O<sub>4</sub>-polypropylene implant (Seratom E PA MR, Serag Wiessner, Naila, Germany) for pelvic floor reconstruction. High resolution sagittal T2-weighted sequences, transverse T1-weighted (T1w) FLASH 2D and transverse T1w FLASH 3D sequences were performed on a 1,5 T scanner in this trial to evaluate Fe<sub>3</sub>O<sub>4</sub>-polypropylene mesh MR-visibility and overall postsurgical pelvic anatomy three months postsurgical. Full mesh course and important pelvic structures were reconstructed using the 3D Slicer® software program based on T1 and T2 MR-images. We first measured the implanted mesh dimension as the distance between anterior, mid and posterior arms. Then, we measured the implanted mesh location relative to the bony pelvis as their distance to pubic symphysis, and ischial spine. In addition, we measured the distance from posterior arms to the pudendal nerve/vessel bundles. Regarding all performed measurements, the original mesh dimension as constructed by the designers was taken into consideration.

**Ergebnisse:**

Five women with symptomatic POP-Q grade III cystoceles were successfully treated with a partially absorbable MR-visible anterior vaginal mesh with sacrospinale fixation showing no adverse event or recurrent cystocele in the 3 months follow-up examination. The course of mesh and its arms in the pelvis was visible on MR-images and reconstructable in all cases. In one case the middle arms had been detached from the implant by the surgeon, which was seen on MR-images and 3D-reconstruction. The mesh-dimension measurements were applicable and reproducible in all cases. In some cases, the distances between implanted anterior arm and mid arm were less than the designed distance and a double layering of the mesh was observable in the distal mesh part. There are variations in the implanted mesh location relative to the bony pelvis and pudendal nerve/vessel bundles.

**Schluss:**

The use of MR-visible Fe<sub>3</sub>O<sub>4</sub>-polypropylene meshes in combination with post-surgical 3D reconstruction of the mesh and important adjacent anatomic structures is feasible. Inner pelvic measurements are reproducible and suggest that this combined technique might be a useful tool to more precisely evaluate mesh location, possibly occurring complications and that it might be a valuable interactive feedback tool for surgeons and mesh design engineers.