

QUANTIFICATION OF PELVIC ORGAN PROLAPSE IN SUPINE AND UPRIGHT POSITION USING MRI

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INTRODUCTION

Pelvic organ prolapse (POP), the descent of abdominal organs, is a common condition in women above 40 years

Symptoms can be relieved with surgery, but have a 30% anatomical recurrence rate¹. This might be because current diagnosis simulates the effect of gravity by straining

The purpose of this research is to investigate POP in upright position during rest

RESULTS

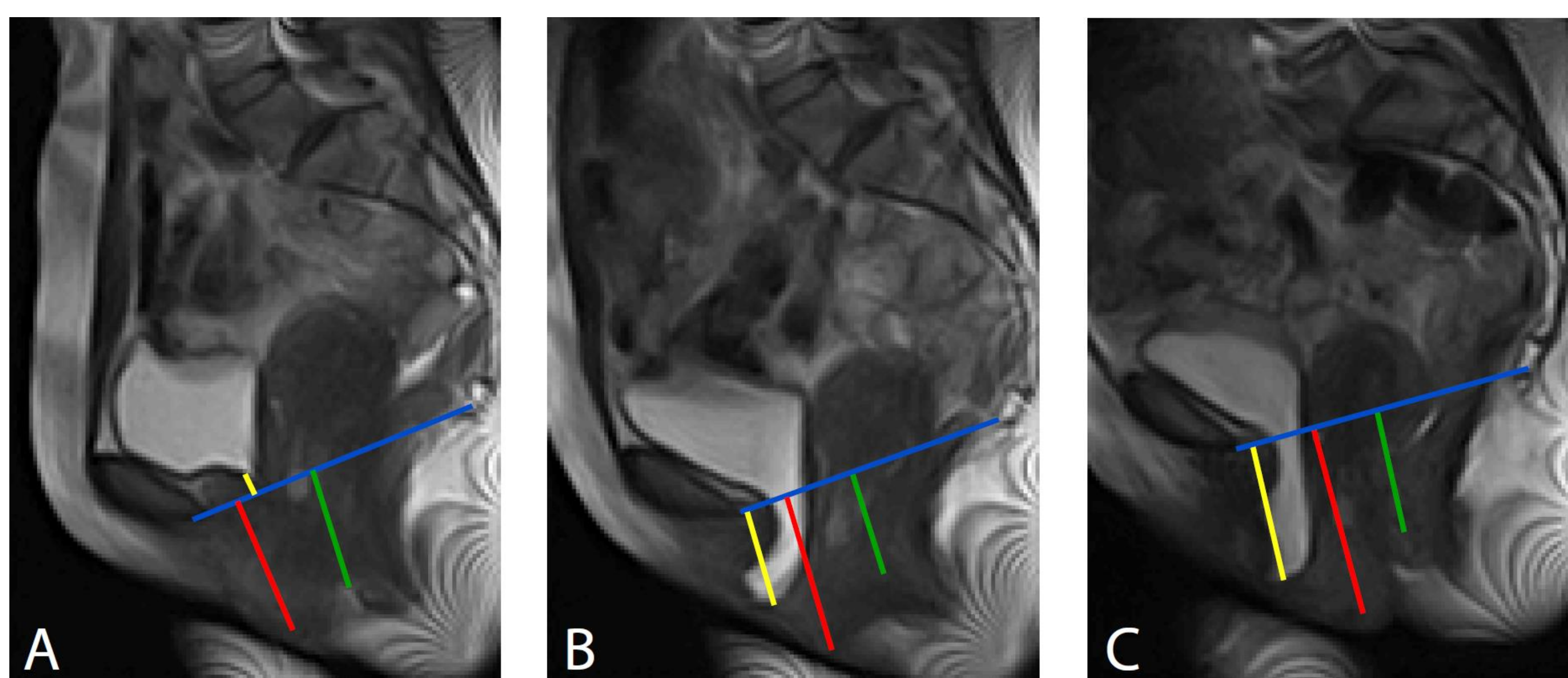


FIGURE 1 Midsagittal scans of the abdomen in supine rest (A), supine strain (B) and upright rest (C) position. All images show the manual determined pubococcygeal line (blue) and its distance to the bladder (yellow), cervix (red) and pouch of Douglas (green). A clear descent of the cervix and bladder neck can be observed when straining or scanning upright

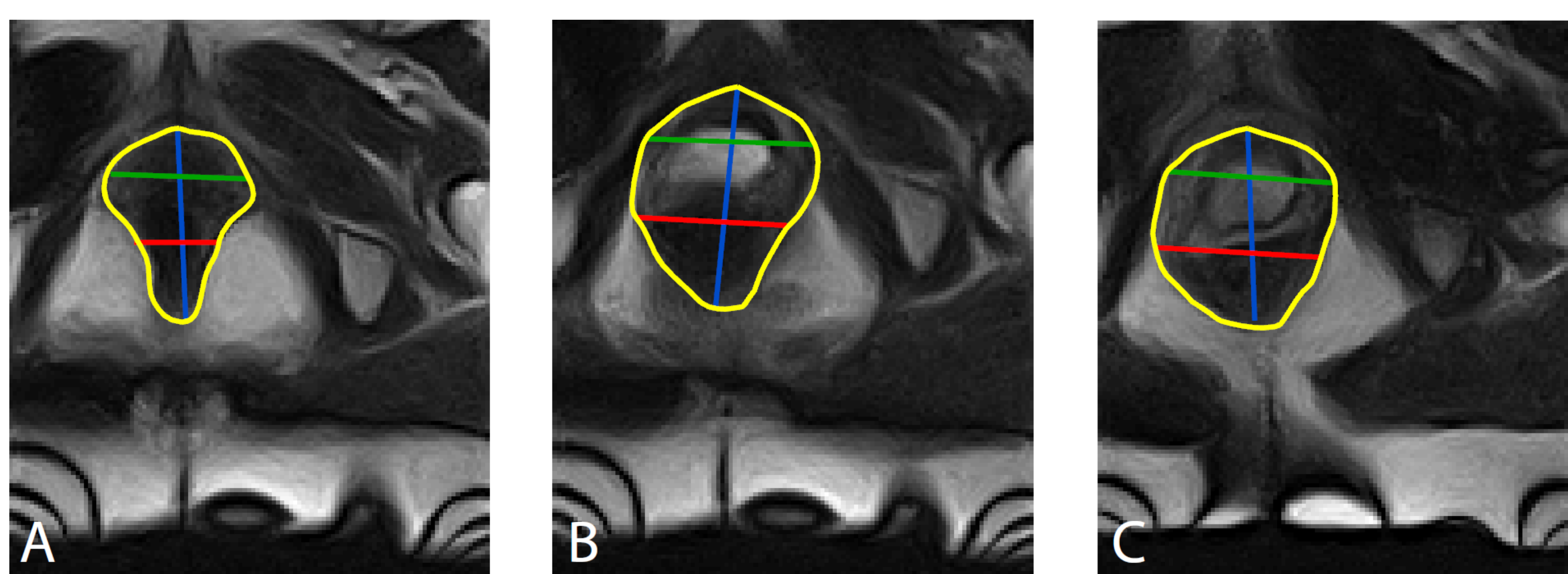


FIGURE 2 Transversal scans at the height of the pubococcygeal line made in supine rest (A), supine strain (B) and upright rest (C) position with manually determined diameters and area. The posterior levator hiatus (red) significantly increases when the subject is in upright position whereas the anterior levator hiatus (green) does not. The hiatal area is shown in yellow

DISCUSSION

One patient was excluded due to insufficient image quality, another patient no longer had a uterus

All investigated pelvic organs significantly descend when standing upright compared to the supine position, comparable to the straining situation (Figure 1 & 3)

The difference between posterior diameter (significant increase) and anterior diameter (no significant change) could be because the levator ani muscle is attached to the pubic bone on the anterior side, limiting movement (Figure 2 & 4)

Upright scanning in rest can be a valid replacement for supine straining imaging. This enables increasing acquisition time and therefore image quality

Estimating prolapse at rest might be more reproducible than during straining because the amount of straining maneuvers performed has been shown to affect the prolapse extent³

CONCLUSION

Scanning in upright position could give more insight into the true degree of prolapse, improving staging. The additional information can be used to better diagnose the site and extent of the POP and might even influence the choice of surgery type

REFERENCES

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- [2] Dietz, H, et al., *Ultrasound Obstet Gynecol* 2005; 25: 580-585
- [3] Tumbarello JA, et al., *Int Urogynecol J*. 2010. 21(10): 1247-1251

METHODS

15 patients (45-70 years) with \geq stage 2 prolapse who were eligible for surgery were scanned on a tilting 0.25T MRI scanner (G-Scan, Esaote SpA, Genoa, Italy)

2D bSSFP images were acquired in midsagittal and transverse plane: TR/TE: 3.5/7 ms, slice thickness: 15mm, FOV: 400x400 mm, FA: 70 or 90°, matrix: 256x256, total acq. time: 7 sec

The distances of pelvic organs to the pubococcygeal line (PCL) were measured to quantify the extent of prolapse. Levator hiatal dimensions were determined at a standardized level² and used as a measure for muscle function

All parameters were measured by a trained radiologist in supine and upright position during rest and straining. A Wilcoxon's rank sum test was performed to assess significance

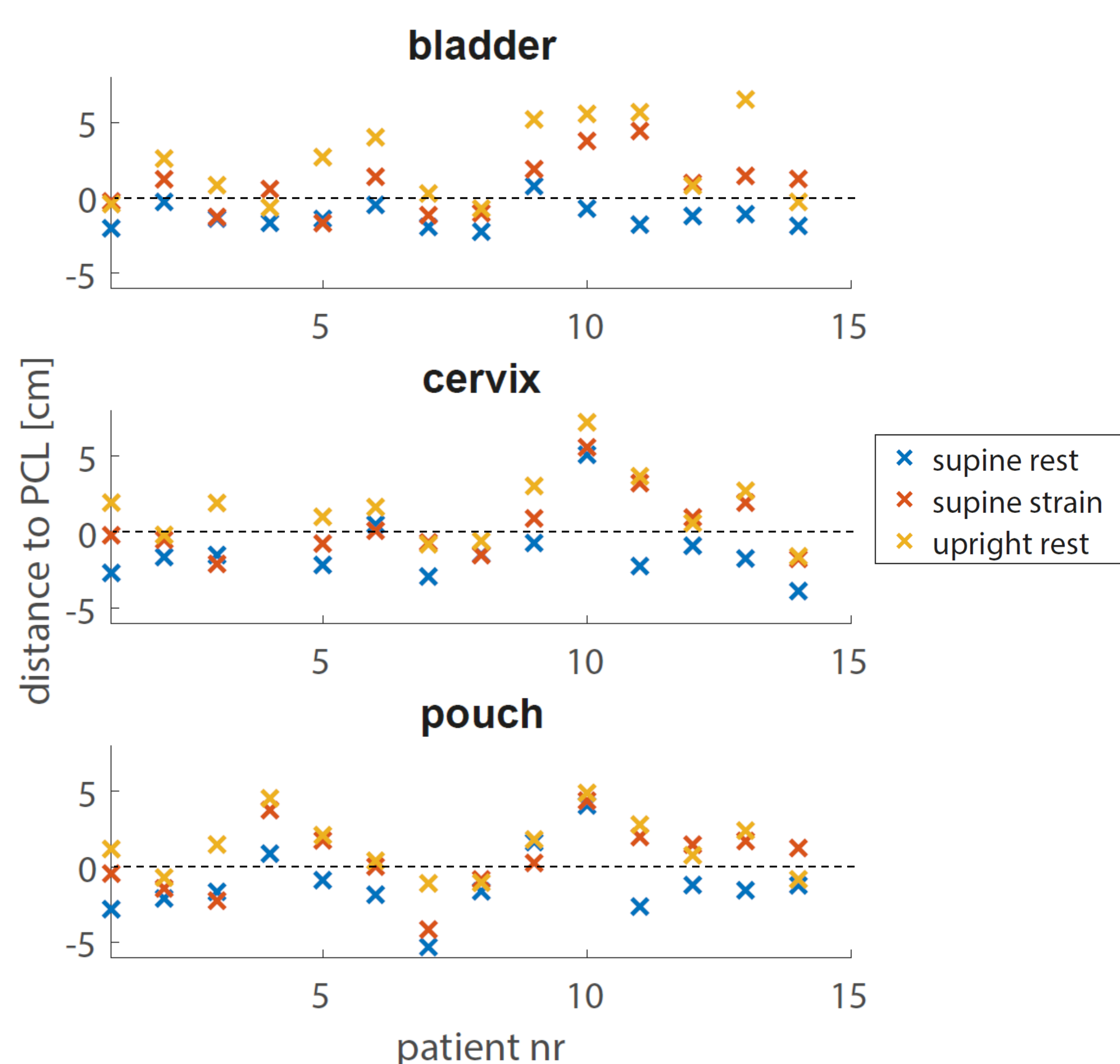


FIGURE 3 Measured pelvic organ distances of 15 patients to the pubococcygeal line (PCL). Negative distances define that the pelvic organs are positioned above the PCL. Nearly all patients show a larger extent of the prolapse in the upright and the straining situation

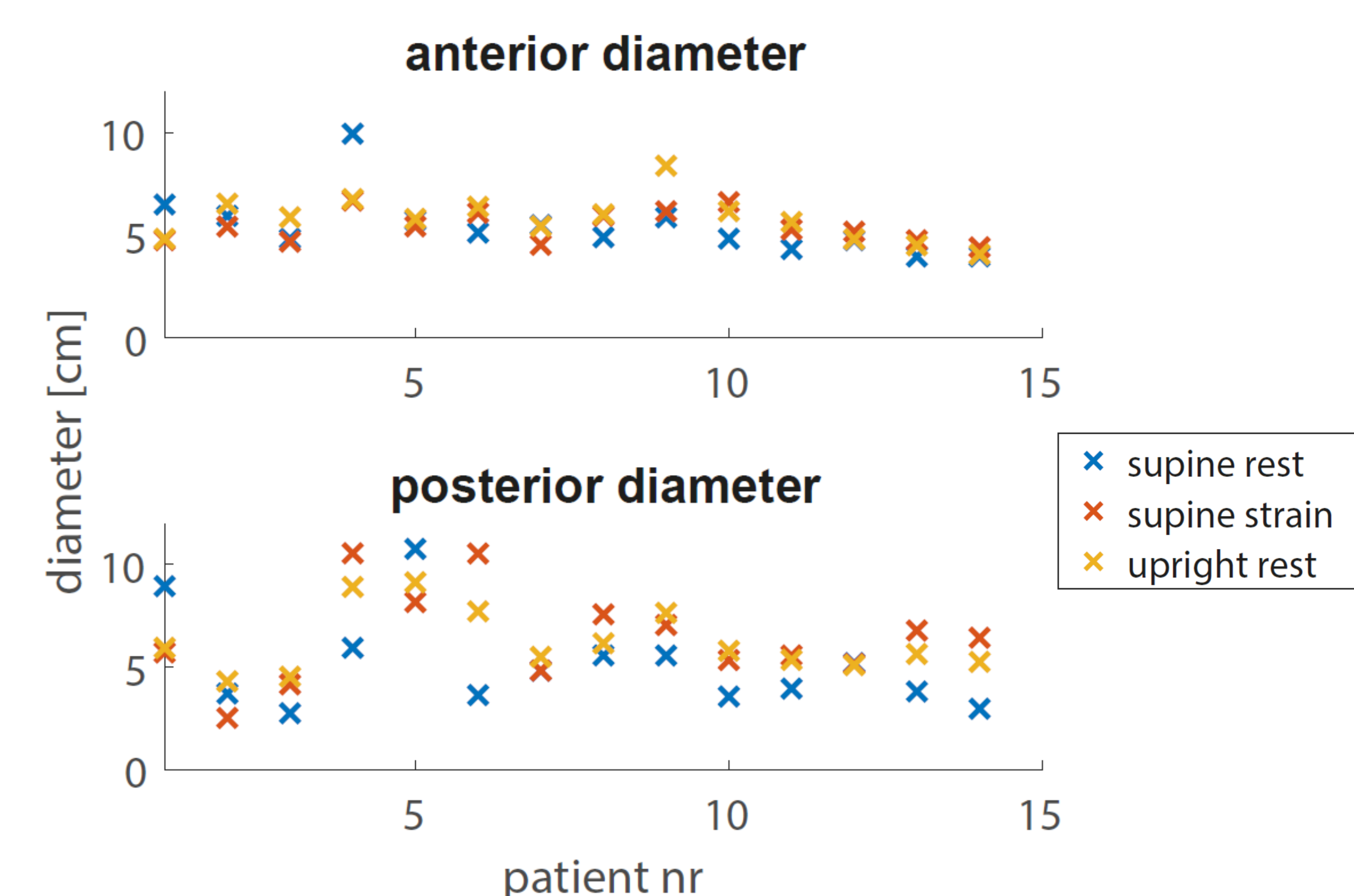


FIGURE 4 Measured diameters of the levator hiatus of 15 patients. Although the anterior diameter is not significantly altered, the posterior diameter is significantly increased in the upright and in the straining situation



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