

## A ROLE OF THE PELVIC FLOOR AND PROSTATE IN MALE VOIDING: A MAGNETIC RESONANCE IMAGING STUDY

### Introduction

Bladder neck and urethral motions are particularly important before the transition from urine storage to voiding. For smooth initiation of voiding, synchronization between the pelvic floor muscles and the bladder and urethra is essential, and if this synchronization is disrupted, various types of voiding dysfunction can occur. The real time MRI (rtMRI) is useful for dynamic imaging of intrapelvic soft tissue movement. In this study, rtMRI was used to analyze differences in pelvic floor muscle movement and prostate during voiding between patients with normal voiding and those with voiding dysfunction.

### Design

This study included 3 young male patients in the normal voiding group and 11 male patients in the voiding dysfunction group. Real rtMRI imaging from urine storage to voiding in the sagittal and coronal planes was performed with patients in the lateral position. With rtMRI during voiding, puborectalis muscle, pubococcygeus muscle, and anterior fibromuscular stroma (AFMS) distance were measured, and urine stream was analyzed. Statistical analysis was performed to compare pelvic floor muscles movement.

### Results

Prostate position descended with rotation at initiation of voiding. rtMRI has also shown deformation and motion of the bladder neck and urethra due to contraction of the AFMS and pelvic floor muscles during voiding. The deformation of the morphology of the bladder neck and urethra due to contraction of the AFMS and pelvic floor muscles favors the spiral urine stream during voiding. This deformation decreases the flow pressure. AFMS contraction at initiation of voiding was significantly greater in the normal group ( $P < 0.05$ ). Striated urethral sphincter contraction (%) at initiation of voiding tended to decrease with older age ( $P = 0.05$ ).

### Conclusion

The present results indicate that strong contractions of the pelvic floor muscles and the AFMS are important for normal male micturition, since the bladder neck and urethra are deformed to a shape with no stress that allows for smooth urine streaming.

### References

1. Hocaoglu Y, Herrmann K, Walther S et al. Contraction of the anterior prostate is required for the initiation of micturition. *BJU Int.* 2013; 111: 1117-23.
2. Ukimura O, Inui E, Ochiai A, Watanabe M and Watanabe H. Transrectal ultrasonic monitoring of the prostate at voiding with reference to AFMS. *Neurourol Urodyn.* 1998; 17: 377-9.
3. Nishio K, Soh S, Syukuya T, Sato R, Sadaoka Y, Iwahata T, Suzuki K, Ashizawa Y, Kobori Y and Okada H. Role of male pelvic floor muscles and anterior fibromuscular stroma in males on  $\alpha(1)$ -blocker treatment: a magnetic resonance imaging study. *Int J Urol.* 2014; 21: 724-7.

### Disclosures

**Funding:** None **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Koshigaya25010 **Helsinki:** Yes **Informed Consent:** Yes