

# Do current cut-offs describe the same situation with respect to hypermobile urethra? retrospective pelvic floor ultrasound imaging study



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## HYPOTHESIS / AIM OF STUDY

Assessment of urethral mobility is not only an important element of standard urogynecological examination; it also a significant element in surgeons' decisions regarding the treatment of patients with stress urinary incontinence. It is generally assumed that increased mobility is a cause of stress urinary incontinence and that higher mobility is also associated with a greater likelihood that treatment will be successful. There is an arbitrarily defined cut-off for hypermobile urethra: descent of more than 15 mm during Valsalva manoeuvre or rotation of 30 degrees or more. We perform a retrospective analysis of mobility of the urethra as assessed during clinical examination by transperineal 4D ultrasound (US), featuring a detailed measurement of descent and rotation of the urethra and pelvic floor status, in patients before treatment of stress urinary incontinence

## STUDY DESIGN, METHODS

This is a retrospective analysis of urethral mobility of women diagnosed with urodynamic stress incontinence (USI) and treated with tension-free vaginal slings during the period 01/2009 - 10/2016. For each patient, urethral mobility data was available at the time of preoperative assessment, and we later measured parameters of bladder neck mobility by employing stored 4D US volumes. We measured the H-distance (i.e. the distance of the bladder neck (BN) from the horizontal line at the level of lower margin of the symphysis), and we compared these results at rest and at maximal Valsalva manoeuvre. Secondly, we measured the gama angle (the angle between a line connecting BN to lower margin of symphysis and axis of symphysis) at rest and during the maximal Valsalva manoeuvre. Mobility was always calculated as the difference between the position at rest and at Valsalva. We then correlated both measurements methods (H-distance and gama angle) Finally, we assessed avulsion of the levator ani muscle and correlated it with the mobility of the urethra.

## RESULTS:

427 patients were treated during the period, and 4D US volumes were available for analysis for 394 of these patients. The mean age of the group is 56.5 years (min 29 - max 87, SD 7.9), mean BMI 27.4 (min 18.3 - max 39.6, SD 7.9), mean parity 2.14.

Mean descent of the bladder neck was 11.8 mm (min -1; max 37; SD 6.9). Mean rotation of the bladder neck was 38.8 degree (min -5; max 118, SD 20.0). We calculated the correlation of mobility using both parameters: H-distance and gama angle (graph).

The data graph demonstrates a distinct correlation between both parameters. We found levator ani muscle avulsion in 71 patients (18.1%). There was a most significant difference in BN position at rest between patients with or without levator avulsion (Table), but with no difference in mobility of the urethra.

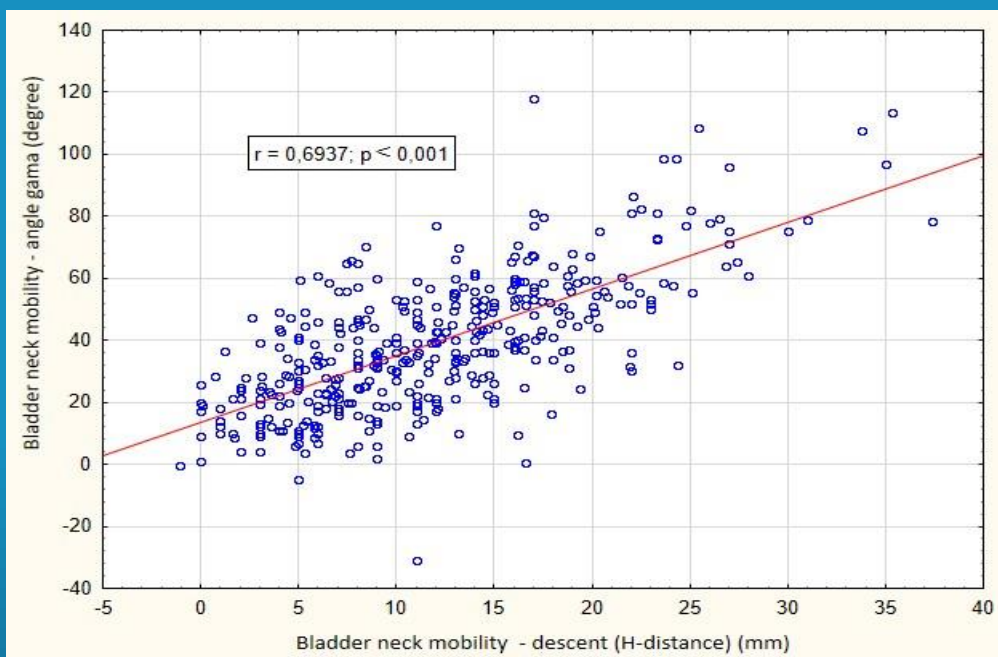


Table	no avulsion n=322	yes avulsion n=71	p	no avulsion SD	yes avulsion SD
BN - H - distance at rest (mm)	27.2	23.9	<0.001	4.9	7.1
BN - H - distance on Valsalva (mm)	15.2	13.1	0.08	7.8	9.2
Mobility H (mm)	11.9	10.8	0.20	6.8	7.1
BN - Gama angle at rest (degree)	75.2	84.1	<0.001	15.1	20.6
BN - Gama angle on Valsalva(degree)	114.3	121.3	0.04	23.9	25.1
Mobility Gama (degree)	39.1	37.2	0.48	21.5	20.7

## INTERPRETATION OF RESULTS

According to our data and relevant analysis the cut-off of 15 mm descent corresponds with 44 degree of rotation, while a cut-off of 30 degree corresponds with less than 10 mm descent. At this moment, we are unable to determine which cut-off is more relevant.

Secondly, the proportion of avulsion rate in patients with stress urinary incontinence corresponds with rather lower margin to general population rates. At the same time the avulsion of levator ani muscle has an effect on the position of the bladder neck at rest but does not influence the mobility of the urethra in patients with stress urinary incontinence that are without prolapse.

## CONCLUSION

It is evident that cut-offs for hypermobility of 15 mm descent and more than 30 degree rotation do not describe the same situation. In addition, the presence of levator ani muscle avulsion does not increase mobility of the urethra in patients with urinary stress incontinence.