

Fine-tuning sling tension post-operatively may have longterm benefits in preventing late-onset urinary retention- the Poiseuille effect

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Abstract: Post-operative adjustment after midurethral sling surgery using special methodology has immediate effects in improving cure rate, reducing post-operative urinary retention and may helping reduce obstruction due to sling fibrosis many years after the surgery.

Keywords: Midurethral sling; Post-operative adjustment; Fibrosis.

Dear Editors

I write to comment on what I consider is a major development in midurethral sling methodology. Shkapura et al.¹ successfully address a major problem with midurethral slings (MUS), too tight: post-operative urinary retention, too loose: incontinence. Using cough stress test and flow measurements, they confirmed continence restoration relied on a precise, non-obstructive tape length as per the prototype operations², figure 1. The tape works by reinforcing the pubourethral ligament (PUL) against which opposite striated muscle forces stretch, narrow and kink urethra to close it distally and at bladder neck², restoring continence and geometry³. Narrowing exponentially increases the resistance to flow inversely by the 4th power of the radius (Poiseuille's Law). If PUL (tape) is loose, muscles lose contractile force and cannot close urethra (stress incontinence); if too tight, sling obstructs urethra (retention)¹, both modes explainable by the "Poiseuille Effect", exponentially varying resistance to flow with only minor changes in diameter. The fine-tuning of Shkapura et al's methodology is unique in being able to make such minor changes post-operatively, with excellent results as regards relief of obstruction and higher cure rates¹.

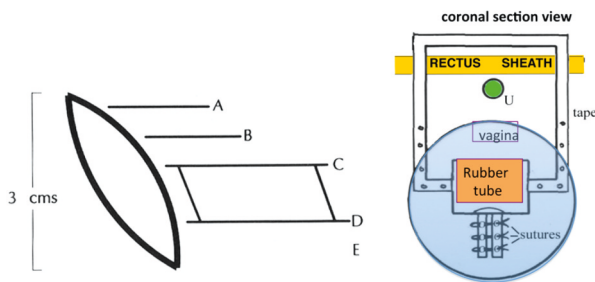


Figure 1. – Shkapura MUS. The mechanism of the midurethral sling is not obstructive. (Right) Coronal section immediately behind the pubic symphysis. The tape was configured around the rectus sheath into the vagina, through both ends of a rubber tube, exiting at its inferior end, both ends secured with interrupted sutures in holes set 0.5 cm apart, so the tape could be lowered sequentially if there was obstructed flow. (Left) symptoms experienced on lowering the tape: A, loss of sensation of bladder fullness; B loss of sensation to flow through the urethra; C-D slow stream, stopping starting, frequency nocturia, urgency (FNU); E normal flow, no FNU. Based on diagrams from the original 1990 publication of the Integral Theory (pp 53-59).

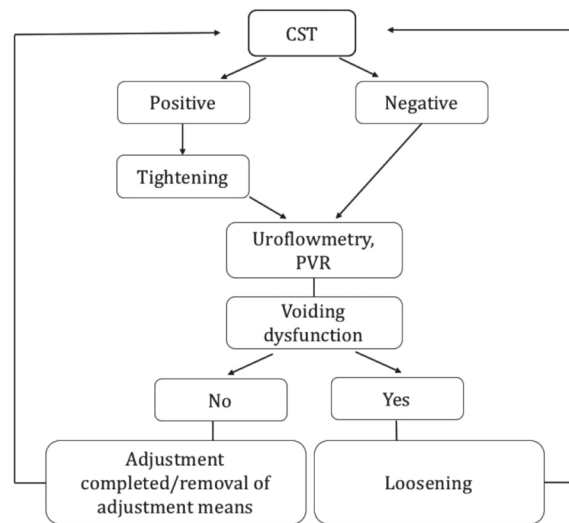


Figure 2. – Protocol for loosening or tightening sling.

The modus operandi of the MUS, musculo-elastic closure^{2,3}, is not just a theoretical issue. There are some who, with little scientific proof, promote physical obstruction* by the tape as the mechanism for continence restoration, which means post-MUS obstructive micturition would be considered a normal event. It is not. Tape related collagen shrinks with age. Urinary retention from MUS inserted 20 years earlier is being increasingly reported. Because the "Poiseuille Effect" exponentially magnifies such shrinkage, it would seem prudent for surgeons to perhaps be more proactive about tape loosening with persistent obstruction, as these are the very patients most likely to present years later with retention.

Though many "tips and tricks" help avoid tape obstruction, only Shkapura's method objectively addresses the Poiseuille Effect to predictably produce high cure rates. On this basis alone it is worth serious consideration.

* A simple clinical test can prove it is not tape obstruction which closes the urethra. Examine a USI patient with very full bladder (ready to micturate) in the semirecumbent position. Ask her to cough; press gently upwards on one side of urethra immediately behind the symphysis with curved hemostat until urine loss is controlled; then, with haemostat in place ask patient to pass urine by pushing down when she feels the urge; some succeed, proving that the mechanism for return to continence is musculoelastic as confirmed by dynamic video ultrasound³.

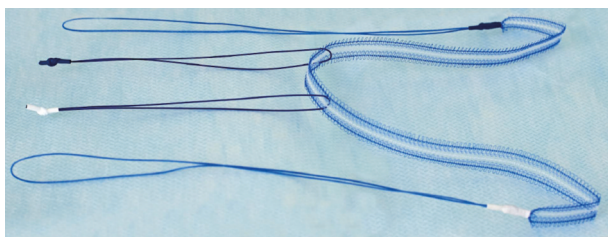


Figure 3. – How sling can be tightened or loosened.

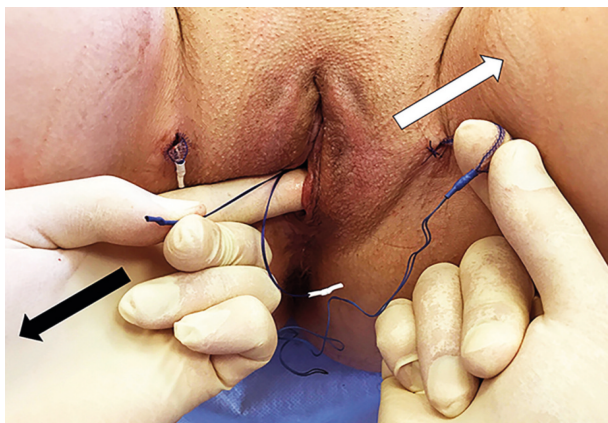


Figure 4. – Post-operative adjustment of sling.

REFERENCES

1. Shkapura D, Kubin N, Staroseletseva O, Shapalova E. Adjustable transobturator sling for the treatment of primary stress urinary incontinence. *International Urogynecology Journal* 2018; 29: 1341-1347.
2. Petros PE & Ulmsten U. An Integral Theory of female urinary incontinence. *Acta Obstetrica et Gynecologica Scandinavica* 1990; 69: Supp. 153: 1-79.
3. Petros PE, Von Konyk B. Anchoring the midurethra restores bladder neck anatomy and continence. *Lancet* 1999; 354: 9193-9198.

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Letter to the editor

Dear Editor,

The article ‘Influence of foot stool on defecation: a prospective study’ by Shota Takano, Midori Nakashima, Masahiro Tsuchino, Yuya Nakao and Atsushi Watanabe (*Pelvipiperineology* 2018; 37: 101-103) reports a well designed and conducted study. The conclusion is that a footstool aids defaecation by incorporating leaning forward and raising intra-rectal pressure. However, all of the measured mechanical parameters remained unchanged and non-significant suggesting the opposite. The authors should add why they

think in the absence of these changes that the abdominal pressure increases solely by leaning forward. This would promote further discussion and research into the role of intra-abdominal pressure in defaecation.

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The Author's reply

Dear Editor,

I would like to thank Dr. Darren Gold for his comment on our paper entitled, “Influence of foot stool on defecation: a prospective study” and I have provided an explanation related to his comment.

The pushing rectal pressure showed no significant difference between with and without a foot stool in both the upright sitting position and the upper body bent forward position. However, we found that in the upper body bent forward group, the difference of the rectal pressure between with and without a foot stool was larger than in the backward position group. Therefore, we think that the larger difference of the rectal pressure in the upper body bent forward position with

a foot stool facilitates better evacuation especially among elderly patients.

We sincerely appreciate Dr. Gold's comment and we will continue to study the relationship between continence function and defecatory posture.

Best regards,

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