

Transobturator Tape for Sling Procedures

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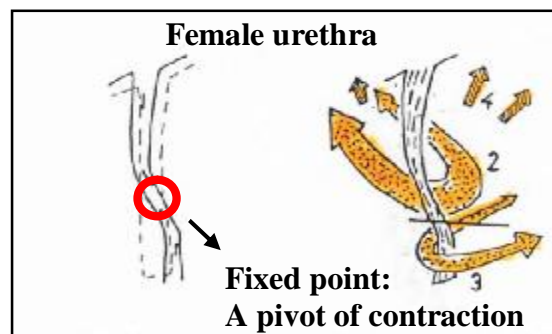
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Retropubic tension-free sub-urethral vaginal tapes have revolutionized the treatment of female stress urinary incontinence (SUI)^{1,2}. While these tapes have proved their long term efficacy³, their insertion *via* an ascending or descending retropubic route has been associated with a number of intra- or post-operative complications, resulting from the penetration of the tape (or supporting needle) in the bladder, urethra, bowel, or neurovascular structures⁴. In 2001, an outside-in transobturator approach has been proposed for the placement of mid-urethral tapes, with the aim of sparing the pelvic space⁵. It consists in the insertion of a tape through the obturator foramens from the thighs towards underneath the urethra. Several outside-in transobturator slings composed of various material are now commercially available.

Long term results of transobturator mid-urethral slings for treating SUI are currently lacking as minimal follow-up intervals have generally not exceeded one year. A recently published study comparing retropubic versus transobturator approaches has suggested that these techniques may generate similar short term post-operative continence rates⁶. At the physiopathologic level, high continence rates obtained with retropubic and transobturator tapes may share a common denominator, which is the restoration of a fixed bearing point located at the junction between the mid and distal urethra. Our



previous works have indeed identified a fixed point, which is a genuine pivot of rotation, from which two urethral segments – inferior and superior - can be distinguished⁷. During interruption of micturition, the superior segment of the urethra is pulled forward while the inferior shorter segment is attracted backward. These urethral movements around this pivot point play an important role in the mechanism of continence⁷. Anatomically, this fixed point corresponds to the median perineal aponeurosis^{7,8} and we have proposed that mid-urethral

slings may restore this aponeurotic structure under-developed in women⁸ and possibly altered by pregnancy/delivery⁹.

Initial clinical data^{5,10,11} as well as anatomic studies^{12,13} have suggested that, as compared with retropubic techniques, the outside-in transobturator approach may be associated with reduced complication rates. Yet, results from cadaver dissections¹³ and clinical studies^{11,14-19} have shown that bladder, urethra, and vagina injuries can occur with the outside-in technique. Noteworthy, bladder perforations have been observed despite the recommended use of a large lateral para-urethral dissection to allow the introduction of a finger, employed to guide the tunneler^{5,13}. Therefore, systematic intra-operative cystoscopy may be needed when performing an outside-in procedure, in particular for avoiding unrecognized bladder or urethra perforations^{17,18,20}.

In order to minimize the incidence of such complications and to insure the reproducible placement of the tape, we have developed a new surgical approach, the transobturator inside-out tension-free urethral suspension (TVT-O), which uses specific surgical instruments and in which a tape is passed from underneath the urethra, through the obturator foramina, towards the thigh folds, without entering the pelvic region at any time during the procedure^{9,21}. The TVT-O device and operative procedure have been detailed elsewhere⁹. The surgical device includes a pair of

helical passers assembled with polyethylene tubes bound to a polypropylene (Gynecare®) mesh, and one guide. This inside-out technique permits to reproducibly insert the tape after a minimal dissection, with the theoretical benefit of reducing the risk of vaginal erosion, tape infection and

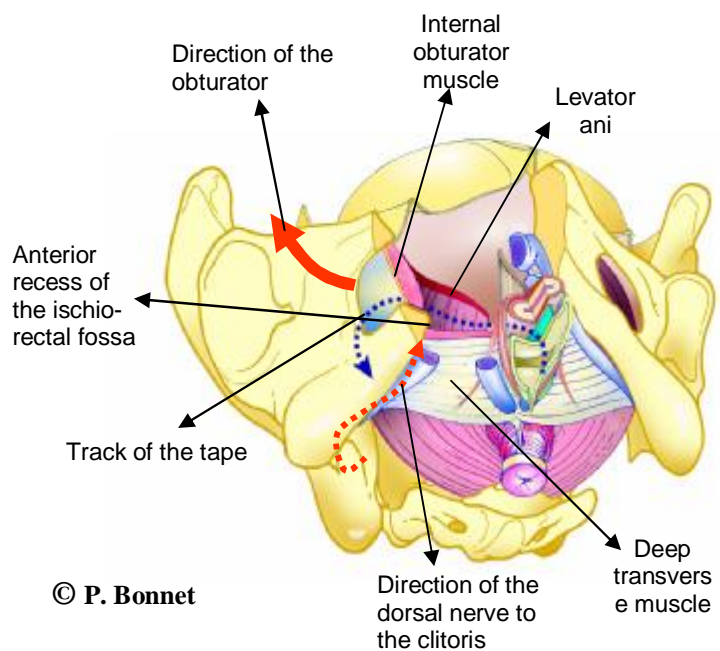


displacement, and urethral denervation. In this respect, the guide plays an important safety role since it virtually acts as a ‘shoe-horn’ by ensuring the device is accurately passed

through the obturator membrane and preventing entry into the pelvic space. No finger guidance is required.

In order to determine the exact anatomical track of the tape and its relationships with neighboring neurovascular structures and organs, we and others have performed cadaver dissections after TVT-O insertion according to the standard operative protocol^{21,22}. These anatomic works have demonstrated that the tape is inserted according to the following consistent path: penetration from the sub-urethral space (junction between mid and distal urethra) into a region limited medial and cranial by the levator ani muscle, caudal by the perineal membrane, and lateral by the internal obturator muscle. This region corresponds to the anterior recess of the ischio-rectal fossa. Then the tape perforates the obturator membrane and muscles and exits at the skin

level after passing through the adductor muscles and sub-cutaneous tissues. This study has demonstrated that the tape courses away from (i) the dorsal nerve to the clitoris (a terminal branch of the pudendal nerve), which is located much more superficially, below the median perineal



aponeurosis, (ii) the obturator nerve and vessels, and (iii) the femoral neuro-vascular bundle. Noteworthy, the anterior branch of the obturator artery is ‘protected’ from the passage of the tape by the bony rim of the inferior pubic ramus²¹⁻²³. The TVT-O tape is inserted into a rigorously perineal space, without traversing the levator ani muscle or its tendinous arch, making cystoscopy unnecessary, when properly performing the surgical procedure.

Most importantly, these anatomical findings are corroborated by our clinical experience of TVT-O. Since March 2002, a total of 455 consecutive patients have been operated on using the TVT-O procedure in our unit. All patients had clinically demonstrated stress urinary incontinence with a positive pre-operative stress test. The procedure was carried out independently of the patient's size and weight, in all case subjects. Each of the 910 needles was passed through the obturator foramens and exited at the skin level exactly where it had been marked and incised. Mean operative time for the procedure was 13 minutes. No bladder or urethra injury, no neurological complication, no obturator hematoma, and no significant bleeding (>200 cc) occurred peri-operatively. We and others are conducting clinical studies to assess efficacy and post-operative complication rates of TVT-O^{9,24-26}. Currently, our short term results indicate that around 90% of the patients are cured from their SUI after a 6-month follow-up²⁴. The incidence of post-operative retention and *de novo* urge symptoms appear reduced, as compared with TVT²⁴.

In conclusion, the TVT-O technique is a simple, quick, and safe transobturator technique with tailored instrumentation. It allows the accurate and reproducible passage of the tape with minimal dissection avoiding the pelvis. Longer follow-up times and results from randomized trials are warranted to determine the long term efficacy and safety of transobturator tapes.

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