

# Suburethral sling: a new technique for treatment of female genuine urinary stress incontinence

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## Objective

The aim of the study was to produce and evaluate a new technique using a small-fashioned prolene tape to treat female genuine stress incontinence.

## Patients and methods

A total of 120 ( $n = 120$ ) female patients with genuine stress urinary incontinence were subjected to history taking, physical examination, and other investigations and were then operated upon at El-Galaa Teaching Hospital and Cairo University Hospital using a small-fashioned prolene tape of 5 × 1 cm applied below the midurethra and sutured to the tissues just over the inferior pubic rami on either sides of the urethra. The patients were followed up every month for 1 year for complications, complaints, cure, and satisfaction.

## Results

All patients showed marked improvement during the follow-up period for up to 12 months postoperatively. There were no intraoperative or postoperative complications. The operative time was about 15 min, the duration of hospital stay was about 6 h, and the cost involved was very low.

## Conclusion

Suburethral sling is a simple and easy technique that can be easily learned and applied.

## Keywords:

female stress incontinence, follow-up, urethral sling

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## Introduction

Stress urinary incontinence (SUI) is defined as involuntary loss of urine per urethra with a sudden increase in intra-abdominal pressure [1]. It can be defined as the loss of small amounts of urine during coughing, laughing, sneezing, exercising, or other movements that increase intra-abdominal pressure and thus increase pressure on the bladder. The urethra is supported by fascia of the pelvic floor. If this support is insufficient, the urethra can move downward at times of increased abdominal pressure, allowing urine to pass [2].

Some sources distinguish between urethral hypermobility and intrinsic sphincter deficiency [1]. In women, physical changes resulting from pregnancy, childbirth, and menopause often contribute to stress incontinence. Stress incontinence can worsen during the week before the menstrual period. At that time, lowered estrogen levels may lead to lower muscular pressure around the urethra, increasing the chances of leakage. The incidence of stress incontinence increases after menopause also because of lowered estrogen levels. In women athletes, effort incontinence occurs in all high-level sports involving abrupt repeated increases in intra-abdominal pressure that may exceed the perineal floor resistance [2].

The procedure of choice for SUI in women is what is called a sling procedure. A sling implant usually consists of a synthetic mesh material in the shape of a narrow ribbon, or sometimes a biomaterial (bovine or porcine) or the patient's own tissue, that is placed under the urethra through one vaginal incision and two small abdominal incisions. The aim is to replace the deficient pelvic floor muscles and provide a backboard of support under the urethra. The transvaginal mesh has recently come under scrutiny, as patients allege long-term harm and suffering as a result of the implanted mesh [2].

The tension-free transvaginal (TVT) sling procedure treats urinary stress incontinence by positioning a polypropylene mesh tape underneath the urethra [3]. Complications such as bladder perforation can occur in the retropubic space if the procedure is not performed correctly. However, recent advancements have established the minimally invasive TVT sling procedure as a common treatment strategy for SUI [4].

The transobturator tape (TOT or Monarc) sling procedure aims to eliminate SUI by providing support under the urethra. The minimally invasive procedure eliminates retropubic needle passage and involves inserting a mesh tape under the urethra through three small incisions in the groin area [5].

The needleless sling is a single incision transobturator tape. It is implanted through one unique incision. The needleless sling has ~136% more surface area than the mini-sling, which may better support the pelvic floor and urethra; further, no sharp instruments are required to implant the sling besides the scalpel used to make the incision, which may enhance patient comfort.

The readjustable sling consists of a standard synthetic mesh sling combined with sutures that attach to an implantable tensioning device that resides permanently under the skin in the abdominal wall. Once implanted, this readjustable mechanical external (REMEEEX) device can be reaccessed under local anesthesia to fine-tune the sling should incontinence reappear months or years after the initial surgery.

The mini-sling procedure was introduced in the USA in late 2006 by Gynecare/Johnson and Johnson under the name of TVT-SECUR. The AMS has released a similar version called MiniArc. The TVT-SECUR was designed to overcome two of the perioperative complications reported with the use of the TVT-Obturator: thigh pain and bladder outlet obstruction. The TVT-SECUR was designed to minimize the operative procedure as much as possible to reduce those undesired complications [6]. This new device is composed of an 8-cm-long laser cut polypropylene mesh and is introduced into the internal obturator muscle (Hammock position) by a metallic inserter, while no exit skin cuts are needed. The MiniArc is also quite simple and again eliminates the need for skin incisions other than the vaginal incision [7]. The reported short-term cure rates of mini-slings range from 67 to 90%.

Recently, new techniques based on a new theory of urethral closure mechanisms in female patients (the integral theory) were introduced. In this paper, we present a new approach depending on that theory.

## Patients and methods

This study was carried out at Cairo University Hospital and El-Galaa Teaching Hospital in Cairo where 120 female patients with SUI were operated upon. The study protocol included the following: history taking and general examination; gynecological examination; complete urine analysis; and a stress test (cough provocation) in the lying and standing positions with a bladder volume of ~300 ml.

Urodynamic investigations were conducted, including urocystometry and urethral profilometry in the sitting and/or semilithotomy positions. Women with detrusor instability were excluded as were those with intrinsic urethral sphincter deficiency. During follow-up visits, the stress test (provocative test) was repeated.

## Technique

### Anesthesia

Local anesthesia using xylocaine–adrenaline 2% was used for 70 patients. The area anesthetized was a quadrangular area 3.5 cm in length at the anterior vaginal wall starting

0.5 cm below the external urethral meatus. Sedation was used for all patients.

### Incision

A longitudinal midline incision at the anterior vaginal wall was made starting 1.5 cm below the external urethral meatus extending 1.5 cm.

### Dissection

Lateral dissection was performed on both sides until the lateral vaginal wall bilaterally. A prolene mesh was fashioned as a strip measuring 1 × 5 cm and placed under the midurethra. We used a prolene mesh with the following properties: 100% polypropylene, monofilamentous, macroporous of 50–250- $\mu$ m size, low elasticity, and flexible with no shape memory. Using a mosquito clamp we pushed one end of the tape toward the lateral vaginal wall where a small incision was made and the tape was grasped to appear from the incision. The procedure was repeated for the other side. The two ends of the tape were pulled out gently ensuring no tilt or rolling of the tape under the urethra by placing a scissor between the tape and the urethra and ensuring no tension to the urethra. Adjustment was made to allow only a few drops of urine to pass through the urethra. Closure of the vaginal mucosa was done using (000) absorbable sutures. The patient was discharged after 2 h.

## Results

Eighty-five patients were followed up for 16 months and 22 patients for 12 months by administering a urogenital distress inventory short form (UDI-6) and incontinence impact questionnaire short form (IIQ-7). The remaining 13 cases were followed up for 3 months only, and were dropped from the analysis. All patients showed marked improvement or almost complete cure (symptomatic and negative stress test). Operative time ranged between 10 and 20 min. The 20-min duration was recorded in the early cases; the procedure was more rapidly completed in later cases. All cases had unrecorded intraoperative bleeding.

As there is no retropubic penetration during the procedure, there was no bladder injury or retropubic hematoma formation and no need for cystoscopic examination.

## Discussion

Although SUI classification is potentially relevant to treatment selection, evidence on its influence on management outcome is limited. Generating a high-quality evidence base for treatment selection on these criteria is problematic, particularly because of the range of confounding factors. In practice, the modern practitioner relies on various tools to form an opinion on some key aspects, using the findings to derive a treatment strategy. Accordingly, there remains a need to confirm how a classification of SUI translates into treatment selection and better outcomes [8].

The sling procedure is the gold standard for SUI treatment. It is highly effective but not free from complications. The

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### UROGENITAL DISTRESS INVENTORY SHORT FORM (UDI-6)

Please answer each question by checking the best response. While answering these questions, please consider your symptoms over the last 3 months. We realize that you may not be having problems in some of these areas, but please fill out this form as completely as possible.

Do you experience, and if so, how much are you bothered by...	Not at all	Slightly	Moderately	Greatly
Frequent urination	0	1	2	3
Leakage related to feeling of urgency	0	1	2	3
Leakage related to physical activity, coughing, or sneezing	0	1	2	3
Small amounts of leakage (drops)	0	1	2	3
Difficulty emptying bladder	0	1	2	3
Pain or discomfort in lower abdominal or genital area	0	1	2	3

### INCONTINENCE IMPACT QUESTIONNAIRE-SHORT FORM (IIQ-7)

Some people find that accidental urine loss may affect their activities, relationships, and feelings. The questions below refer to areas in your life that may have been influenced or changed by your problem. For each question, circle the response that best describes how much your activities, relationships, and feelings are being affected by urine leakage.

Has urine leakage affected your...	Not at all	Slightly	Moderately	Greatly
1. Ability to do household chores (cooking, housecleaning, laundry)?	0	1	2	3
2. Physical recreation such as walking, swimming, or other exercise?	0	1	2	3
3. Entertainment activities (movies, concerts, etc.)?	0	1	2	3
4. Ability to travel by car or bus more than 30 minutes from home?	0	1	2	3
5. Participation in social activities outside your home?	0	1	2	3
6. Emotional health (nervousness, depression, etc.)?	0	1	2	3
7. Feeling frustrated?	0	1	2	3

Items 1 and 2 = physical activity; Items 3 and 4 = travel  
Item 5 = social/relationships; Items 6 and 7 = emotional health

**Scoring:** Item responses are assigned values of 0 for "not at all," 1 for "slightly," 2 for "moderately," and 3 for "greatly." The average score of items responded to is calculated. The average, which ranges from 0 to 3, is multiplied by 33 1/3 to put scores on a scale of 0 to 100.

**Reference:** Uebersax, J.S., Wyman, J.F., Shumaker, S.A., McClish, D.K., Fantl, J.A., & the Continence Program for Women Research Group. (1995). Short forms to assess life quality and symptom distress for urinary incontinence in women: the Incontinence Impact Questionnaire and the Urogenital Distress Inventory. *Neurology and Urodynamics*, 14(2), 131-139.

most common adverse outcomes from the surgery involving implant insertion are the following: overactive bladder occurring *de novo* after the surgery, voiding dysfunctions, urine retention, and unsatisfactory treatment outcome. The most important question that arises after 20 years of performing the sling procedure is how to manage the complications and what can be offered to patients with complications [9].

The 'integral theory' is a new concept for urethral closure, according to which the female urethra is closed at its midportion and not at the bladder neck [1,2]. Lack of support of the midurethra from the pubourethral ligaments, from the suburethral anterior vaginal wall, and impairment of the function and insertion of the pubococcygeal muscles predispose to stress incontinence [2,1]. On the basis of this theory, in this study a new technique is introduced, in which the same principle of midurethral support is used (applying a small piece of prolene mesh).

The procedure can be performed in patients who had undergone previous vaginal surgery. It involves a shorter operative time (10–20 min with a 15-min median time) and significantly shorter duration of hospital stay (2 h).

Thus, we can conclude that this new technique (or modification) has the advantages of the midurethral support procedure, such as ease of execution, need for only local anesthesia, and high success rate, besides additional advantages unique to this new technique, such as minimal complications, very low cost, shorter duration of hospital stay, and ease of learning and reproducing.

There are some limitations in our study; the most important is the lack of a control group or comparative arm with other procedures. Although this new technique seems to be ideal, it should be compared with other techniques in randomized controlled trials.

## Conclusion

The new technique using a midurethral sling is easy and simple, involves a very short operative time, and is almost free of intraoperative and postoperative complications. It is highly effective in controlling genuine stress incontinence but we prefer to conduct randomized control trials to compare it with older techniques.

## Acknowledgements

### Conflicts of interest

None declared.

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