Evaluation, Rehabilitation and Operation in male urinary incontinence

W5, 29 August 2011 09:00 - 12:00

Start	End	Topic	Speakers
09:00	09:10	How to evaluate the male incontinent patient	• Ajay Singla
09:10	09:30	Role of the continence advisor; nursing and physical aspects of male incontinent treatment - expert opinion and evidence based medicin	• Frankie Bates
09:30	09:50	Is AUS 800 is the gold standard?	• Chris Gonzalez
09:50	10:10	Why consider using other techniques ? -SLINGS	• Wilhelm Hubner
10:10	10:20	Traditional slings and Urethral Constrictor	• Ajay Singla
10:20	10:30	Adjustable balloons (ProACT)	• Ervin Kocjancic
10:30	11:00	Break	None
11:00	11:30	Round table with case discussion	All
11:30	11:55	Questions	All
11:55	12:00	Take home message and concluion	• Ervin Kocjancic

Aims of course/workshop

Urinary incontinence post radical prostatectomy has a negative impact on the Quality of Life and the treatment is a challenge. The aim of the workshop is to achieve the knowledge on evaluation, different procedures, managing difficult cases, the complications of the most commonly performed procedures for male incontinence and fix failures through an active learning process. At the end of the session the participants will be able to recognize the most commonly performed procedures for male incontinence surgery, understand and recognize the possible complications and consider alternative options in unusual, complicated male incontinent patients.

Educational Objectives

Urinary incontinence post radical prostatectomy has a negative impact on the Quality of Life. The treatment of urinary incontinence in men is a challenge. With the increase of diagnosis and surgical treatments of prostatic cancer, the number of patients with urinary incontinence will increase. Various treatments have been introduced for the treatment of post-prostatectomy incontinence, such as, physiotherapy, sling, urethral constrictor, ProACT, and artificial sphincter. The purpose of this workshop is to discuss the evaluation and management of patients with urinary incontinence, how to treat complications and fix failures Case discussions will give practical views of the problems. We will discuss the evaluation recommendation. The results and advantages of each surgical technique will be discussed. Q&A and cases are provided during the workshop.

CONTINENCE FACTS

The Canadian Continence Foundation

URINARY INCONTINENCE? BIOFEEDBACK MAY HELP!

Claudia Brown, Physiotherapist, B.Sc. P.T.

The pelvic floor muscles line the undersurface of the pelvis, and include the muscles of the urinary and anal sphincters. A good pelvic floor contraction supports and controls the bladder and helps the sphincters to close. It has been proven that pelvic floor muscle exercises can help patients who suffer from some types of urinary incontinence. Typically, this type of exercise has been called the Kegel exercise, and it requires repeated contractions of the pelvic floor muscles. This is to train them to work when necessary, by preventing urine from exiting the bladder at inopportune times.

BUT wait, what if you're not sure how to do the pelvic floor exercises?

Unlike the biceps muscle, the pelvic floor muscle is not easily seen, nor is its contraction as obvious as a biceps curl! For these reasons, BIOFEEDBACK can be particularly helpful in pelvic floor muscle training. Biofeedback therapy enables you to visualise the muscle activity on a monitor, and it immediately shows you what happens when you make the effort to contract. It makes it much easier for you to learn the exercises and you can be more confident in your training when you know that you are exercising properly.

Biofeedback therapy is available in some hospital settings and in some private clinics. It is usually given by a physiotherapist, and in some cases it is given by a doctor, nurse, or technician. The patient lies comfortably on a treatment table, with his/her head slightly raised on a pillow so that he/she may see the biofeedback monitor. For female patients, an electrode is gently inserted into the vagina, and for male patients an electrode is gently inserted into the anus. Sometimes, surface electrodes may be used instead, and these are placed on the skin in the perineal area. All of these electrodes are able to read the activity of the pelvic floor muscles, as the muscles span the area from the pubic bone in front to the coccyx in the back (See Fig. 1). Other electrodes may also be placed on the skin over the abdominal muscles, to monitor the activity of these important muscles as well.

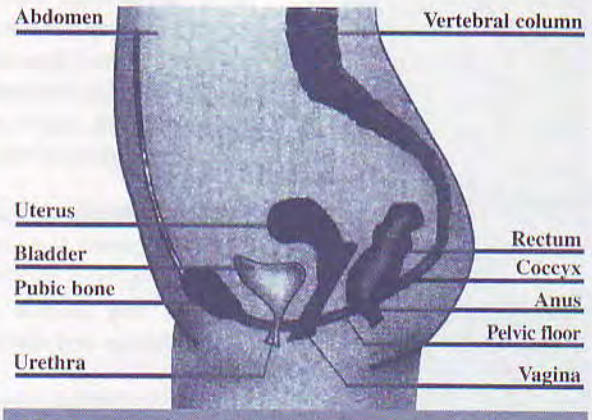


Figure 1 - Sideview of female pelvis

The patient will first see a line, which represents the activity within the muscle while she is at rest. As she tries to contract the pelvic floor muscle, this line should move upwards, and the line should come back down as she relaxes the muscle. As she contracts and relaxes, she is practicing the activity, and she is also subconsciously memorizing the activity so that she can eventually exercise easily without the machine. The therapist will instruct the patient on different ways to contract the muscle, in order to train different muscle groups and different muscle fiber types. For example, she can practice maximum strength by contracting strongly for short periods of time. Or, she can practice endurance by contracting moderately for long periods of time, or practice contraction speed by doing several quick successive contractions. All of these appear differently on the monitor, so the patient can visualise her muscle activity with different exercises, and can understand the concepts of training more easily. Fig. 2

(please turn over)

URINARY INCONTINENCE? BIOFEEDBACK MAY HELP! con't

Claudia Brown, Physiotherapist, B.Sc. P.T.

The Canadian Continence Foundation

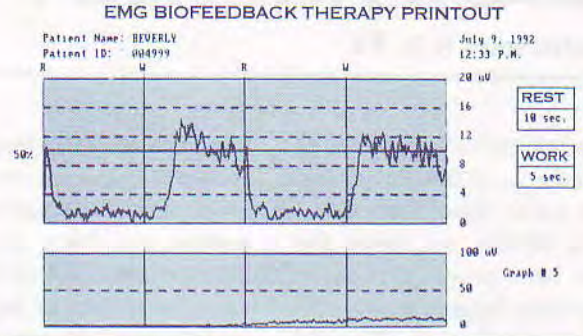


Figure 2

If the patient lives far from a treatment centre, or if she simply prefers to work on her own, she may use a home biofeedback unit. The home units may be purchased or rented, and usually have graphics that are less sophisticated than those at the treatment centres. There is no pain involved with biofeedback therapy, as the biofeedback unit is only monitoring and displaying the muscle activity as the patient exercises.

When biofeedback therapy is given in a specialized treatment centre, it is always given in conjunction with other therapies to control urinary incontinence. These therapies may include counselling, exercise therapy, manual therapy and electrical stimulation therapy.

With continence counselling, the patient is given detailed information about how the bladder works and what can be done for bladder control. Bladder irritants such as coffee and chocolate are discouraged, and tips on avoiding urinary infections and skin breakdown are given. The patient may learn to work with a urinary diary, which helps her to track her progress and work towards a normal urinary frequency. (Normally, one should empty the bladder 5 – 8 times per day.)

Exercise therapy involves varied training of the pelvic floor muscles and the abdominal muscles, both groups playing important roles in bladder control. Patients are given a home program, which is essential to the success of treatment. It is usually recommended to start with three sets of 10 sustained contractions (5-10 seconds each) per day and to gradually increase the frequency and duration of the contractions. Patients then learn to identify their problem positions and activities, and to contract the pelvic floor muscles at the appropriate moment in order to avoid incontinent episodes. For example, if a patient suffers urinary loss every time she coughs, she must learn to contract the muscles prior to the cough and to keep them contracted until the cough is over. The goal is so that the patient will eventually contract the pelvic floor automatically, when necessary.

Manual therapies are usually performed by a physiotherapist. The therapist will use massage, stretch and resistance techniques to improve the performance of the muscle.

For electrical stimulation therapy, a pain-free electric current is applied to the muscle, causing the muscle to contract. This gives a boost to the muscle and allows the patient to experience the sensation of a contraction, helping her to learn to imitate that contraction on her own.

In summary, biofeedback therapy is an interesting and effective way to learn to do pelvic floor exercises. Its success has been proven, on its own and in conjunction with other continence therapies. Depending upon the nature of the incontinence problem, some patients may do better than others with pelvic floor muscle training. We suggest you discuss your problem with your doctor to see if you are a good candidate for this type of therapy.

The Canadian Continence Foundation

For more information about incontinence contact

The Canadian Continence Foundation

P.O. Box 30, Victoria Branch, Westmount, Quebec H3Z 2V4

Tel. (514) 488-8379 • Fax (514) 488-1379 • General Information 1-800-265-9575

www.continence-fdn.ca

This publication was made possible with an educational grant from Medtronic Canada.

Post orpeative adjustable procedures for male stress urinary incontinence

Ervin Kocjancic

Department of Urology

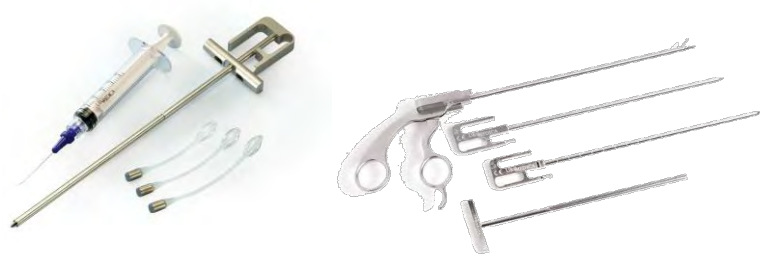
University of Illinois at Chicago

Chicago, IL.

INTRODUCTION:

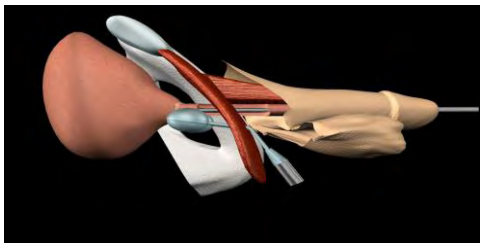
The incidence of urinary Incontinence after prostate surgery is a grossly under reported problem, with a significant variation between reports. Many men do not seek medical treatment, partially due to the relatively ineffective treatment options available. The Artificial Urinary Sphincter (American Medical Systems) is considered the gold standard of surgical intervention however its global adoption is limited somewhat by the cost, the invasiveness of the technique, and therefore the skill of the surgeon to perform the procedure and manage the complications, as well as the need for patient participation in its management.

ProACT (Adjustable Balloons)



The ProACT device, developed by Uromedica Inc for the treatment of male stress urinary incontinence is a minimally invasive treatment for this condition, with the unique feature that it is post operatively adjustable if required. It consists of two silicone elastomer balloons placed paraurethrally at the bladder neck in post radical prostatectomy patients or at the level of the membranous urethra in patients who have residual prostatic tissue following benign surgery. Each balloon is attached via a conduit to a titanium port buried in the anterior lateral aspect of the scrotum. Post operative adjustment of the balloon is facilitated by percutaneous injection of the port, a minimum of 4 weeks post operatively, with a 4 week interval between further adjustments. The implant is available in 12 and 14cm length and each balloon can be inflated up to 8cc over time if necessary. The ProACT device can be simply inserted using general, spinal or local anaesthesia as required.

The procedure was performed using similar technique to that reported by Huebner et al. With the patient in lithotomy position, the bladder is emptied and filled with 100 cc of contrast solution. The filling cystoscope is retained to maintain horizontal positioning of the urethra. Two small perineal stab incisions are made on each side of the urethra, to allow passage of the balloons via designated blunt and sharp trocars and outer cannula. The trocar is designed to perforate the pelvic floor and is gently rotated to advance it towards the bladder neck or membranous urethra as appropriate. Image intensification is used to identify the position of the trocar in relation to the urethra and final position. Once in position, the trocar is removed and a tissue expanding device (TED) inserted through the U shaped channel of the cannula. This device dilates only the area where the balloon will be inflated. The choice of device length is generally made based on the patient anatomical configuration. Prior to insertion, the device is primed to remove all air and is soaked briefly in antibiotic solution. The trocar is removed and the balloon inserted with the assistance of a push wire. Once in position, the balloon is inflated using an isotonic contrast and water mixture using a dedicated non coring 23G needle and syringe. The process is repeated on the contralateral side. A urethrogram should be performed to verify position and a 12 Fr Foley catheter inserted overnight. A superficial pocket is created in the sub dartos fascia of the anterior lateral aspect of the scrotum taking care to ensure that the ports are well separated and able to be accessed easily during post operative adjustments.



Results from different published series:

Author	# pts	% post RP	Avg f/u months	Avg # adjust	% pats impr.	0-1 pds /day %	Pre-op pds/d	Last f/u pds/p	Explan-ted %
Hűbner/ Schlarp	117	88	13	3	90	67	6	1	27
Gilling	33	81	24	3.3			2.8	0.7	9

Trigo-Rocha	23	100	22.4	4.6		65	4.6	1.8	17
Hűbner/ Schlarp	50	100	20	4	82	60	5	1.8	24
Crivellaro	44	100	19		84	68	5.1	2.5	14
Lebret	56	98	6		89	71	4.6	1.8	33.9
Kocjancic	64	100	12	3	80	68	5.2	1.5	17
Martens	29	100	41	3.7	56	31	4.8	3.1	44.8
Luyckx	60	93	8.9	2.7	85	64	2.5	1.2	20
Hidalgo	69	87	22	2-3	84	70			9
Gregori	62	100	25	3.6	92		3.7		4

Reference:

1. Adjustable continence therapy (ProACT): evolution of the surgical technique and comparison of the original 50 patients with the most recent 50 patients at a single centre. Hübner WA, Schlarp OM. Eur Urol. 2007 Sep;52(3):680-6. Epub 2006 Nov 3.
2. Spiral multidetector computerized tomography evaluation of Adjustable continence therapy implants. Giammò A, Bodo G, Castellano S, Borrè A, Carone R. J Urol. 2010 May;183(5):1921-6. Epub 2010 Mar 29.
3. Transrectal ultrasound-guided implantation of Adjustable Continence Therapy (ProACT): surgical technique and clinical results after a mean follow-up of 2 years. Gregori A, Romanò AL, Scieri F, Pietrantuono F, Incarbone GP, Salvaggio A, Granata A, Gaboardi F. Eur Urol. 2010 Mar;57(3):430-6. Epub 2009 Nov 21.
4. Adjustable continence therapy (ProACT) and bone anchored male sling: Comparison of two new treatments of post prostatectomy incontinence. Crivellaro S, Singla A, Aggarwal N, Frea B, Kocjancic E. Int J Urol. 2008 Oct;15(10):910-4. Epub 2008 Aug 28.
5. An adjustable male sling for treating urinary incontinence after prostatectomy: a phase III multicentre trial. Romano SV, Metrebian SE, Vaz F, Muller V, D'Ancona CA, Costa DE Souza EA, Nakamura F. BJU Int. 2006 Mar;97(3):533-9.

6. Adjustable bulbourethral male sling: experience after 101 cases of moderate-to-severe male stress urinary incontinence. Hübner WA, Gallistl H, Rutkowski M, Huber ER. BJU Int. 2011 Mar;107(5):777-82. doi: 10.1111/j.1464-410X.2010.09619.x. Epub 2010 Oct 21.
7. Adjustable suburethral sling (male remeex system) in the treatment of male stress urinary incontinence: a multicentric European study. Sousa-Escandón A, Cabrera J, Mantovani F, Moretti M, Ioanidis E, Kondelidis N, Neymeyer J, Noguera R. Eur Urol. 2007 Nov;52(5):1473-9. Epub 2007 Jun 4.
8. A New Device for the Treatment of Post-Prostatectomy Incontinence: Adjustable Perineal Male Sling Inci K et al, J Urol. 2008 Feb; 179(2):605-9

ADJUSTABLE SYSTEMS FOR MALE INCONTINENCE

W.Hübner
Korneuburg/Austria

Surgical therapy of male incontinence follows different strategies compared to female incontinence. The vast majorityof cases will need therapy for incontinence that was caused by surgical procedures, mainly radical prostatectomies. Due to that etiology clinical findings are also different than in the female. Most patients will be able to interrupt their stream even if they leak heavely. Additionally you will find the leakage to increase in the afternoon in the most cases. This is the clinical impact of an impaired striated muscle function (innervated by the pudendal nerve). However, the striated muscle is not capable of a long term contraction, which finally results in the clinical sign of incontinence due to fatigue.

It is well understood, that during radical prostatectomy the structures compromised usually include the autonomous innervation of the smooth muscle of the sphincter system. Therefore our goal must be to support this smooth muscle function.

Adjustable male slings (Argus, Remeex, Atoms)

Adjustable male slings are supposed to reestablish the baseline continence provided by the smooth musce system. It is the goal to support this function by a minimal increase of the urethral resistance (10-15cmH20). Adjustable male slings (Argus, Reemex) support the bulbar urethra thereby also using the bulbar venous tissue as a continence factor. Both systems (Argus, Reemex) are placed under the bulbar urethra and passed through the retropubic space up to the suprapubic region, where it is fixed. The argus-sling may as well be fixed using a transobturator approach. Anytime after placement of the sling the tension under the urethra maybe adjusted.

Surgical technique
For the **„ Argus-classic“** implantation a 10 cm longitudinale perineal incision is carried out after placement of a foley catheter. The subcutaneous tissue ist divided and the bulbo-spongiosus muscle is prepared. With the intact muscle covering the bulbar urethra the crura are freed on both sides of the bulbo-cavernosus muscle to show a triangular space between crus and muscle. Now a horizontal incision is made just above the symphysis and the rectus fascia is freed bilaterally approximately 3 cm off the midline. The implantation needle is placed in the triangle between crus and bulbo-spongiosus muscle, protecting the urethra with the tip of an index finger. The needle ist passed through the pelvic floor and in direct and gentle contact with the pubic bone and finally brought up to the suprapubic incision. The sling is then attached to the needle and finally pulled up to the suprapubic region. This procedures ist done bilaterally.

For the **Argus „T“** a helical needle is used, which is introduced in an outside-in fashion in the typical transobturator manner. The washers used fort he transobturator route are smaller, the excess ends of the columns are brought up to the suprabubic region subcutaneously.

Intraoperative adjustment
For the argus male sling we recommend intraoperative adjustment using a retrograde LPP. Therefore a rigid cystoscope with obturator or a foley catheter is placed in the mid urethra.

An infusion bottle is connected to the cystoscope/catheter. The assistant is asked to slowly move the infusion bottle downward from a level of 50cm until the infusion-flow stops. The upper fluid-level in the infusion bottle is measured against the level of the symphysis with a meterstick, it represents the retrograde leak point pressure (RLPP). This RLPP is taken before placement of the sling (usually 15 – 25 cmH2O) and after placement of the sling. The sling should be adjusted to a RLPP of 25-35cmH20 depending on the preoperative degree of incontinence, thus obtaining an increase of about 10cm which represents the support of the smooth muscle sphincter (baseline continenc). The sling is then fixed with the provided washers.

The **Reemex** system works in a slightely different way. The suture, that has been brought up to the suprapubic incision will be connected to a so called „varitensor". The varitensor consists of a mechanic system involving a cable winch, that can be adjusted using a little screw driver. This screw driver is left in place at the time of surgery sticking out of the wound. On day 1 after the operation the patient will be asked to void and cough. The sling ist adjusted using the screw driver until the patient bcomes dry, but still is able to void. Then the screw driver is removed and the wound is definitively closed.

Assessment
Sousa et al reported of 51 Remeex patients with the follow up of 32 month. 48 % were found to be dry, 26 % improved, 16 % not improved. Explantation had to be carried out in 6 % of cases.

Viktor Romano and co-workers published 48 patients using the Argus system with a follow up of up to 18 months and found 73 % to be dry, 10 % improved, 17% showed no improvement. In 10 % the sling had to be removed. The first serious of argus T was presented at the EAU meeting in Stockholm 2009 with similar results, however so far only with short follow up.

In our own series including 101 *patients with moderate to severe incontinence* between prostatectomy and Argus® sling placement, 74,3% had undergone a variety of procedures for SUI or bladder neck pathologies thereby representing a negative selection. 22 patients had undergone secondary irradiation therapy following surgery . All patients were evaluated pre and postoperatively with a 20 min pad tests, I-QoL questionnaires, cystoscopy and uroflowmetry.The mean follow up was 2, 1 years (0, 1-4, 5).

Adjustment was done in 39 cases (38.6 at an average of 104.3 days (14-910 days) after the initial implantation. The sling had to be removed in 16/101 patients (15.8%) at an average of 371.1 days (range 20-1260) after surgery due to urethral erosion or infection. However 6 out of those 16 patients were within the first 22 patients representing the learning curve. 13 of these patients received later successful treatment (7 with an AUS, 5 with re-implantation of the sling). After a median follow up of 2.2 years, 80/101 (79.2%) patients were considered as dry (pad test 0-1g, 70/101: 0g, 10/101:1g). The I-QoL improved from an average of 28.8 (range 14.5 – 61.8) to a mean of 63.2 (range 16.4-115) postoperatively. Both the 20 minute pad weight tests and I-QoL responses improved significantly compared to presentation at baseline ($p<0.001$).

EBRT subgroup:
Patients in this subgroup where incontinent after RPE (n=20) or TURP (n=2) and only 2 of them had implanted another device before implantation of the Argus® sling (1 Pro ACT®, 1 Invance®). Median FU in this group was 1,5 years (mean: 1,8 years). Of these 22 patients

who had received their irradiation therapy prior to implantation of the sling, only 2 erosions and 1 infection emerged. In two cases the sling had to be explanted and this occurred 22 or 430 days after implantation of the Argus sling. The remaining 20 irradiated patients all were dry at their last follow-up contact (dry rate 13%).

Index (standard) patients
As our cohort included a high number of pre-operated and / or irradiated patients which were implanted different other devices to treat the SUI prior to Argus® placement, we evaluated a subgroup of "index patients" (n=32), defined as I. >1y year FU, II. no EBRT, III. no previous surgery for SUI except UTI and IV. SUI only after RPE (n=25) or TURP (n=7).The median FU in this subgroup was 2.3 years (mean 2.3). The 20 min pad test decreased from preoperative mean 31.5g (range: 5-117) to postoperative mean 0.9g (range: 0-10). 87,5% in this subgroup were considered as "dry" at the time of the last follow up. Within this group only 2 urethral erosions and 3 infections occurred. In 4 of these cases (12.5%) the sling had to be explanted. The I-QoL within this subgroup could be raised to a mean of 58.3 from a preoperative mean of 29.7 points.
In our series success the dry rates showed no correlation between preoperative pad rate or irradiation therapy, the dry rates were similar after short and intermediate follow up.

New developments
Lately the **„Atoms"** Sling was introduced. It consists of a silicone pad mounted with an adjustable balloon type reservoire, which is implanted via a perineal transobturator approach. The principle is similar to the other adjustable slings, adjustment is easily provided perctaneously through a subcutaneous port in the lower abdomen without the need for any incision. However, so far publications are missing, presentations at international meetings reported short term results similar to Argus and Remeex.

In conclusion it can be stated, that with ajustable slings the dry-rate remains stable over a longer follow up, about 10 - 15% of implants will have to be removed. The number of intermediate results is small.
The postoperative adjustability allows reaction on dynamic changes in the postoperative course, both on possibly changing livestyle of the patient or changing urodynamic parameters.

Adjustable artificial urinary sphincters (Flowsecure, Zephyr)

The **Flowsecure system** basically paralells the wellknown AMS 800 artficial sphincter (to be presented seperately). However, the Flowsecure comes with two additional features: a accessory „stressballoon" placed intraabdominally which is connected to the system between the cuff and the pump, as well as an adjustable pump allowing to change the volume (thereby the pressure) of the system any time postoperatively. The stress balloon directly transmits any *pressure changes* within the abdomen to the cuff, thereby allowing to adjust the *baseline* pressure in the system to lower values. The idea was to reduce the incidence of subcuff atrophy. This innovative approach desibned by Prof. Michael Craggs significantly added to our understanding and knowledge about artificial sphincters.
In spite of these interesting features representing reasonable ideas, after years of development the system itself did not make it to widespread use, mainly due to technical difficulties. Publications in peer reviewed journals are not available.

The french **Zephyr Z375** Sphincter has recently granted CE mark and is available on the Eropean market. Developed by Dr Christophe Llorens it comes in one part consisting of two

components, a unisize cuff moulded in curve which is adjustable from 3,75 to 5 cm and a pressure regulating pump including one hydraulic and a second compensation circuit. This pump allows adjustment after implantation.
In a first series 36 ots were operated with two thirds of them leaking more than four pads per day. After two years FU 82% were socially dry, 6% improved and 12% failed due to infection. More experience will have to be accumulated to assess ist position in the armamentarium of male incontinence therapy.

Trigo Rocha F et al : Urology. 2008
O'Connor RC et al:. Urology. 2007
Hussain M et al: J Urol. 2005
Hübner W et al:: BJU Int 2005
Trigo-Rocha F et al: Urology. 2006
Gilling PJ et al: BJU Int. 2008
Kocjancic E et al: J Endourol. 2008
Romano SV et al: BJU Int. 2006
Trigo-Rocha F et al: Urology. 2006
Kocjancic E et al: J Endourol. 2008
Romano SV et al: BJU Int. 2006
Sousa-Escandón A et al: J Endourol. 2004
Sousa-Escandón A et al: Eur Urol. 2007
Hübner W et al:: BJU Int 2010 (in press)

CONTINENCE *FACTS*

PELVIC MUSCLE EXERCISES · *KEGEL EXERCISES* · FOR URINARY INCONTINENCE

Introduction

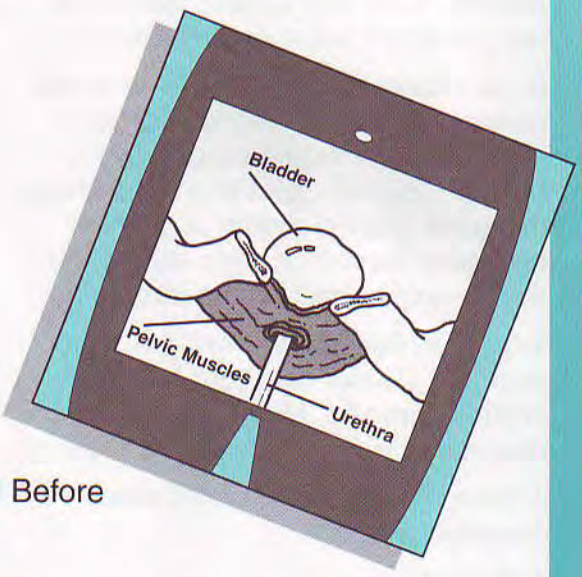
Pelvic muscle exercises are a therapy used for treating incontinence in both women and men of all ages. They do not involve surgery or medication, and pose little risk for side effects. Similar to any other exercises, they are a series of repeated contractions of one set of muscles - the pelvic muscles. The exercises are commonly called Kegel exercises, named after Dr. Kegel, who developed them over 40 years ago. Your healthcare professional may have recommended Kegel exercises for you. The following information may be helpful as you begin to do the exercises.

How Pelvic Muscle Exercises may Help

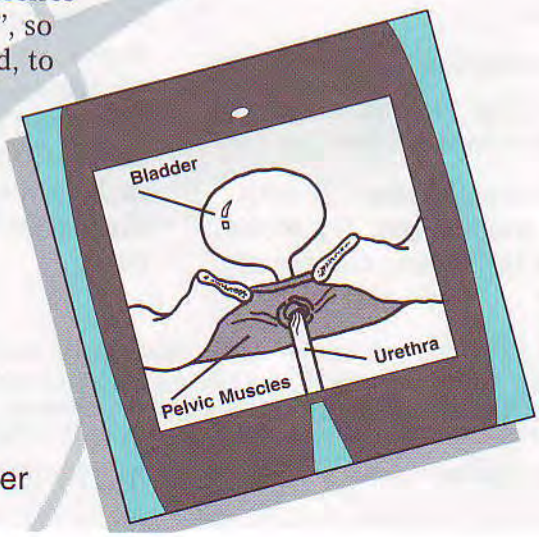
The pelvic muscles support the bladder like a hammock. We can tighten, and relax these muscles. When tightened or contracted, the urethra, the tube which passes urine from the bladder to outside the body, is squeezed so that urine is held in. If the muscles are strong, urine will not leak. But if the muscles are weak, they cannot close off the urethra, and urine may leak. Pelvic muscle exercises help to strengthen the "hammock", so that the urethra can be kept closed, to keep urine in.

Consult a Healthcare Professional

Incontinence can almost always be cured, treated or managed successfully. Pelvic muscle exercises are only one method for retraining the muscles. Consult a healthcare professional who is interested and experienced in the area of incontinence. If you have any questions or concerns about these exercises ask your healthcare professional for help.



Before



After

How to do Pelvic Muscle Exercises

Teach yourself to relax and focus on the pelvic muscle exercises. This will become easier with practice.

1. Stand, sit or lie down with your knees slightly apart (about 25 cm or 10 in apart). **Relax.**

2. Find your pelvic muscle. Imagine that you are trying to hold back urine, or a bowel movement. Squeeze the muscles you would use to do that.

- Women

To check that you are tightening the correct muscles, you can insert your finger into the vagina and tighten the muscle. You should feel a tightening around the finger.

- Men

To check that you are tightening the correct muscles, when you tighten, you should see your penis twitch and contract in.

In both cases, you should feel the rectal muscle (the one you use to hold back bowel movements and passing gas) tighten. You can check this by touching the opening at the rectum as you are tightening the muscle - you should feel the opening contract at the same time.

3. Tighten the muscles for 5 to 10 seconds. Do **not** hold your breath - breathe normally. Do **not** tighten your stomach or buttocks - keep them relaxed.

4. Now relax the muscles for about 10 seconds.

5. Repeat.

Your Schedule

- Repeat the contractions 12 to 20 times.
- Do the set of 12 to 20 contractions and relaxations three to five times per day.
- Schedule the times you exercise with activities that you do every day, so that you remember to do them consistently.

Tips

- Do them properly - check often to be sure that you are using the correct muscles.
- Do them regularly - at least three times per day.
- Do them when you need them most - learn to do them just before sneezing, coughing, or straining.
- Keep on doing them - Do not become discouraged. You should start to see results after a few weeks. However, like any muscle of the body, the pelvic muscles will only stay strong as long as you exercise them. Once you have reached your goal, continue your exercises at least every other day.

Some Other Techniques which may be Presented to You

If you find it difficult to identify the correct muscles to exercise, your healthcare professional can help. Your healthcare professional may recommend the use of biofeedback equipment to help you identify and exercise your pelvic muscles. Biofeedback allows you to see the effects of your muscle contractions on a monitor, so that you can more easily know if you are contracting the right muscles.

For women, there are devices called vaginal cones, which can be inserted into the vagina, again to help identify and strengthen the pelvic muscles. Once a cone is inserted, you would try to hold it in, by contracting the pelvic muscle for a short period of time, before removing the cone.

For more information about incontinence contact
The Canadian Continence Foundation
P.O. Box 30, Victoria Branch, Westmount, Québec, H3Z 2V4
Tel: (514) 488-8379 • Fax: (514) 488-1379 • General Information 1 800 265-9575

This information sheet has been made possible with an educational grant from Purdue Pharma.

Ajay Singla, MD

Evaluation of male incontinence, male slings and Urethra; constrictor

INTRODUCTION

Incontinence following prostatectomy is a devastating complication associated with significant alteration in quality of life. The incidence of urinary incontinence after radical retropubic prostatectomy ranges from 2.5% to 87%,[1] and tends to be lower in more recent series at 2% to 10%.[2] Incontinence has also been reported in 1% of patients undergoing surgical treatment for benign prostatic hyperplasia.[1] Approximately 10% of patients seek treatment for incontinence after radical prostatectomy.[3] **Overall symptomatic post-prostatectomy incontinence after radical retropubic prostatectomy likely occurs in 2% to 15% of patients and less than 5% will require surgical treatment.**[4] Occasionally incontinence can also occur after other forms of treatment for prostate cancer including cryotherapy, brachytherapy and even internal urethrotomy for anastomotic strictures. The risk is greater following transurethral prostatectomy performed after radiation or brachytherapy. Although the incidence of post-prostatectomy incontinence has decreased with better understanding of the neurovascular bundles and modification of the operative technique, it continues to be one of the most feared complications of surgery. A reason for the wide range in incidence rates is the use of different definitions of continence and methods of assessment.

PATIENT EVALUATION

The evaluation of patients with PPI should begin with a comprehensive history which should include the onset, duration, description of the type and severity of incontinence, and precipitating events. It is important to quantify the severity of leakage based on the number of pads used or pad weight. It is important to assess how the incontinence affects daily activities and whether it is bothersome. A history of adjuvant radiation increases the probability that detrusor overactivity or poor compliance may exist. A voiding diary can be helpful to get the exact quantification of the fluid intake and functional bladder capacity.

Physical examination. Physical examination is performed with emphasis on the neurological evaluation assessing the S2-S4 spinal segments including anal sphincter tone, perineal sensation in S2-S4 segments and bulbocavernosus reflex. The abdominal examination is performed to detect a distended bladder with overflow incontinence.

Urodynamic evaluation. The main role of urodynamics is to differentiate the various causes of PPI and especially to rule out poor bladder compliance, high pressure detrusor overactivity during filling and any bladder obstruction during the pressure flow study. Urodynamic bladder capacity is also assessed as most patients with severe incontinence have low functional capacity because of poor storage. Patients with poor compliance are especially at higher risk for complications after artificial urinary sphincter implantation and should be treated with anticholinergics before anti-incontinence procedures.

The role of ALPP to predict the degree of urinary incontinence is unclear and studies have failed to show any correlation of ALPP with severity of sphincter damage. Walker et al prospectively evaluated 14 patients complaining of post-prostatectomy incontinence and found no correlation between ALPP pressure and severity of incontinence.[5]

Cystoscopy. Patients with obstructive symptoms should be evaluated with office cystoscopy before any surgical treatment to rule out anasto-

ABBREVIATIONS: ALPP (abdominal leak point pressure), AUS (artificial urinary sphincter), BAMS (bone anchored male sling), PPI (post-prostatectomy incontinence), ProACT (prostate adjustable continence therapy)

motic strictures. Endoscopic evidence of urethral coaptation may indicate degree of sphincter insufficiency.

MANAGEMENT

Spontaneous improvement of urinary incontinence may take up to 12 months and, therefore, it has been recommended that surgical intervention be postponed in men with PPI for at least a year.[1] While pelvic floor exercise training and therapy before radical prostatectomy aid in earlier achievement of urinary incontinence, the value of the various approaches to conservative management of post-prostatectomy incontinence generally remains uncertain.[6] The AUS has been the gold standard for stress urinary incontinence treatment after prostatectomy since introduced more than 3 decades ago. In recent years various novel surgical treatments have been introduced as an alternative to AUS. Anti-incontinence procedures can be classified into non-adjustable male slings (bulbourethral sling, bone anchored male sling and transobturator male sling), and adjustable male slings (Reemex and Argus) and adjustable balloon devices (ProACT).

Non-adjustable male slings. Urethral compression provided by a sling is not a new concept. A variety of urethral compression procedures have been applied in an attempt to control urinary incontinence over the years. Most notable were the Kaufman procedures which included a crural crossover (Kaufman 1)[7] which was then modified to use a synthetic mesh tape that brings the crura together in the midline (Kaufman 2).[8] A silicone gel device is attached to the corpora cavernosa which compresses the ventral urethra. A new insurgence of various sling procedures has occurred in the last decade.

Bulbourethral Sling (fig. 1): Based on the Kaufman principles, Schaeffer et al introduced a bulbourethral sling procedure in 1998, which **uses a series of 3 tetra-fluoroethylene bolsters placed beneath the bulbar urethra through a perineal incision.**[9] These individual bolsters are attached to non-absorbable sutures. A counter suprapubic incision is made and all sutures are then transferred suprapubically using a Stamey needle lateral to the urethra and bladder neck. Suture ends are tied over the rectus fascia and the bulbar urethra is compressed. Resting urethral pressures and abdominal leak point pressures are measured intraoperatively with a goal to obtain pressure greater than 150 cm H_2O. The sling increases resistance to abdominal pressure excursions without affecting resting urethral pressure or causing obstructive voiding.

Clemens et al reported on the results of this technique in 64 men with severe post-prostatectomy incontinence.[10] At a mean follow-up of 18 months 56% of patients were dry and 8% were significantly improved. However, despite the excellent results, sling revision was required in 21% of patients and bolster removal was necessary secondary to infection in 6%. **Moreover, 52% of patients had perineal numbness or pain, with 26% rating this problem as moderate or severe.** This discomfort is most likely due to the high pressure entrapment

of pudendal nerve branches during blind suprapubic suture or passage. In a questionnaire based study Stern et al reported long-term results of the bulbourethral sling in 71 patients.[11] At a mean followup of 4 years (range 0.27 to 6.55) 68% of patients required 2 or fewer pads a day, and only 36% were completely dry requiring no pads. The sling was removed in 7 cases.

Bone Anchored Male Sling (InVance™, American Medical Systems, Minnetonka, Minnesota) (**fig. 2**): The first series of the bone anchored perineal male sling was presented by Jacoby in 1999,[12] with later reports by others.[13-16] The use of bone anchors obviates the need for blind transfer of sutures suprapubically to achieve bulbo-urethral compression and eliminates any abdominal incision.

A total of 6, 5 mm titanium screws are drilled into the anteromedial aspects of each descending pubic ramus using the InVance bone drill (American Medical Systems). These screws are preloaded with a pair of No. 1 polypropylene sutures. The proximal or topmost bone screws are placed just beneath the junction of the descending ramus and pubic symphysis, and the remaining sutures are placed a centimeter apart on each side. A 4 × 7 cm polypropylene mesh alone or in combination with dermis as a composite graft is used as sling material. Urethral dissection is not performed. The sutures are transferred through 1 side of the graft. After 1 side of the sling is anchored to the pubic ramus, sling tension is adjusted either by retrograde urethral pressure or by simple cough method when the patient is under spinal anesthesia and awake. The sling is then tied down to the opposite pubic ramus with adequate tension.

Unlike the artificial urinary sphincter that compresses the urethra circumferentially, thereby interfering with venous blood flow, and predisposing to urethral atrophy and even erosion, the male sling compresses only the ventral aspect of the bulbar urethra leaving the dorsal and lateral blood flow intact. Moreover, tissue including the bulbospongiosus muscle is left intact over the urethra serving as a cushion between the urethra and the sling, and further minimizing the risk of erosion.

Unlike the AUS, the perineal male sling has the advantage of allowing spontaneous physiological voiding without manipulation.

Optimal cure rates have been reported with the bone anchored perineal sling and generally range from 39% to 90% depending on the method of evaluation and definition of success.[13-20] Comiter recently reported intermediate term results at a median follow-up of 48 months (range 24 to 60).[17] Mean pad usage decreased from 4.6 _ 2.1 to 1.0 _ 1.7 pads a day ($p < 0.01$). Overall 65% of the patients were considered cured of leakage and 15% were significantly improved. Similar results have been obtained at our institution with a patient satisfaction rate of 70% and success rate of 74% at a mean follow-up of 24 months.[18]

In contrast, Castle et al did not observe good results in 42 patients at a mean follow-up of 18 months.[19] Of their patients only 39% achieved socially acceptable continence, none with severe incontinence was cured and only 15.8% were rendered pad-free. In a recent retrospective study of 40 patients with a mean follow-up of 3 years 55% were cured, 12.5% improved significantly and the procedure failed in the remaining 32.5%.[20] The authors found a significant association between preoperative radiation therapy and treatment failure, the incidence of perineal pain was 73% and the sling infection rate was 15%.

As more experience is gained with this procedure, the importance of patient and material selection is emphasized as this greatly impacts outcome. In a study of 46 men with a mean follow-up of 18 months the procedure was successful in 76%, resulted in improvement in 35% and failed in 24% due to absorbable graft material.[16] The success rates were significantly greater in patients receiving synthetic mesh either alone or as composite graft compared with the use of absorbable material

alone (75% and 97% vs 0%, respectively, p <0.05). Patients with mild to moderate incontinence (fewer than 5 pads a day) had a significant better outcome than those with severe incontinence (5 or more pads daily). Sling failure correlated well with the type of material and severity of incontinence. **Since the introduction of this procedure, it is now established that it is suited for patients with mild to moderate incontinence only.**

More recently, Fischer et al reported the predictors of BAMS using 24-hour pad weight and Patient Global Impression of Improvement.[21] Of 62 patients with a mean follow-up of 15 months the overall success rate was 58%. The only preoperative factor predictive of success was the 24-hour pad weight. The authors suggested that an individual had a 71% chance of success if preoperative pad weight was less than 423 gm. In our study the male sling (37 patients) was more effective than the collagen implant (34) for the treatment of mild to moderate incontinence (76% vs 30%, respectively, p <0.05).[22] Mean number of collagen injections was 2.1 (range 1 to 5) and mean amount of collagen injected was 8.8 cc (2 to 34).

In another study the bone anchored male sling provided efficacy for mild to moderate incontinence comparable to that of the AUS at a mean follow-up of 22 months (90% vs 80%, respectively).[23] However, the AUS was superior to the sling in patients with severe incontinence (72% vs 58%, respectively). In another retrospective study dry rates were 68% for men receiving prostate adjustable continence therapy and 64% for those treated with BAMS at a mean follow-up of 18 months and 36 months, respectively.[24] Results were better for moderate to severe incontinence in the ProACT group. Partial compression on the ventral aspect of the urethra by a male sling is adequate for patients with mild to moderate incontinence as they have adequate sphincter function. However, patients with severe incontinence have severe damage to the sphincter mechanism, which requires circumferential compression by an artificial urinary sphincter (**fig. 3**).

Placement of a male sling does not preclude AUS implantation at a later date. Of 18 patients in whom the male sling procedure failed a mean of 13 months later 11 underwent AUS placement.[25] No complications were encountered during urethral dissection. The dry rate was 72.7% and incontinence improved in 9.1% at a mean follow-up after salvage AUS placement of 14.2 months (range 6 to 20). Patient satisfaction after AUS placement was 74.5%. The authors concluded that AUS placement after a failed bone anchored male sling is technically feasible and does not affect the short-term efficacy of the artificial sphincter. These results were comparable to those after naïve AUS placement.

With regard to other outcomes, the infection and erosion rate for perineal sling is low (2.1%), and the need for revision caused by bone anchor dislodgement is 4.2%.[17] Transient urinary retention was seen in 2% of cases. Prolonged perineal pain or discomfort occurred in 15% of patients which usually resolved within 3 to 6 months.

NEW DEVELOPMENTS

Virtue sling (Coloplast Corp., Minneapolis, Minnesota). This new device is a modified sling with 4 arms. Two lateral arms are placed via the transobturator approach from outside in using a curved needle. The other 2 arms are passed superiorly in the prepubic space. The polypropylene mesh is placed under the bulbar urethra and put on tension by pulling all 4 arms. Clinical trials are being conducted at various centers in the United States and Canada. The sling is approved by Food and Drug Administration.

Stem cell therapy. Much interest has been generated in tissue engineering for stress incontinence. The first results of autologous myoblast and fibroblast injections in 63 patients with post-prostatectomy incontinence were published by Mitterberger et al in 2008.[37] The authors reported a continence rate of 65% and improvement rate of 27%.

Other groups were not able to confirm these data. The entire treatment involves a complicated and time-consuming process.

SUMMARY

In the last decade a number of slings and other devices have been introduced in the United States and other countries. Early results appear to be encouraging. In the short term these novel procedures appear to be safe and effective but most of the data available in the literature are limited due to the way they are collected or interpreted, particularly with regard to how success is defined. All available data on the male sling suggest that patient selection is the most important determinant of surgical success. Although long-term data on all types of male slings are lacking, short and intermediate term results indicate that these novel slings provide satisfactory results for the treatment of mild to moderate incontinence. However, no substantive level 1 or 2 studies are available, and so recommendations are based on level 3 or 4 evidence-based studies. Moreover, these reports only provide grade B recommendations. Based on the available evidence and personal experience, these newer procedures can be used for patients with mild to moderate stress urinary incontinence, patients with poor dexterity or patients who wish to avoid manipulating a device. An algorithm for the management of PPI is shown in **figure 4**.

REFERENCES

1. Haab F, Yamaguchi R and Leach G: Postprostatectomy incontinence. Urol Clin North Am 1996; **23:** 447.
2. Majoros A, Bach D, Keszthelyi A et al: Urinary incontinence and voiding dysfunction after radical retropubic prostatectomy (prospective urodynamic study). Neurourol Urodyn 2006; **25:** 2.
3. Stanford JL, Feng Z, Hamilton AS et al: Urinary and sexual function after radical prostatectomy for clinically localized prostate cancer: the Prostate Cancer Outcomes Study. JAMA 2000; **283:** 354.
4. Peyromaure M, Ravery V and Boccon-Gibod L: The management of stress urinary incontinence after radical prostatectomy. BJU Int 2002; **90:** 155.
5. Walker C, Masson D, Joseph A et al: Does the leak point pressure predict the severity of urinary incontinence in the male patient? J Urol, suppl., 1995; **153:** 277A, abstract 194.
6. Parekh AR, Feng MI, Kirages D et al: The role of pelvic floor exercises on post-prostatectomy incontinence. J Urol 2003; **170:** 130.
7. Kaufman JJ: Surgical treatment of post-prostatectomy incontinence: use of the penile crura to compress the bulbous urethra. J Urol 1972; **107:** 293.
8. Kaufman JJ: Treatment of post-prostatectomy urinary incontinence using a silicone gel prosthesis. Br J Urol 1973; **45:** 646.
9. Schaeffer AJ, Clemens JQ, FerrariMet al: The male bulbourethral sling procedure for post-radical prostatectomy incontinence. J Urol 1998; **159:** 1510.
10. Clemens JQ, Bushman W and Schaeffer AJ: Questionnaire based results of the bulbourethral sling procedure. J Urol 1999; **162:** 1972.
11. Stern JA, Clemens JQ, Tiplitsky SI et al: Long-term results of the bulbourethral sling procedure. J Urol 2005; **173:** 1654.
12. Jacoby K: Bone anchored sling for the treatment of postprostatectomy incontinence. Presented at International Continence Society meeting, Denver, Colorado, August, 1999.
13. Franco N and Baum N: Suburethral sling for male urinary incontinence. Infect Urol 2001; **14:** 10.
14. Madjar S, Jacoby K, Giberti C et al: Bone anchored sling for the

treatment of post-prostatectomy incontinence. J Urol 2001; **165:** 72.
15. Comiter CV: The male sling for stress urinary incontinence: a prospective study. J Urol 2002; **167:** 597.
16. Onur R, Rajpurkar A and Singla A: New perineal bone-anchored male sling: lessons learned. Urology 2004; **64:** 58.
17. Comiter CV: The male perineal sling: intermediate-term results. Neurourol Urodyn 2005; **24:** 648.
18. Rajpurkar A, Onur R and Singla A: Patient satisfaction and clinical efficacy of the new perineal bone-anchored male sling. Eur Urol 2005; **47:** 237.
19. Castle EP, Andrews PE, Itano N et al: The male sling for postprostatectomy incontinence: mean followup of 18 months. J Urol 2005; **173:** 1657.
20. Giberti C, Gallo F, Schnone M et al: The bone anchor sub urethral synthetic sling for iatrogenic male incontinence: critical evaluation at a mean 3-year followup. J Urol 2009; **181:** 2204.
21. Fischer MC, Huckabay C and Nitti VW: The male perineal sling: assessment and prediction of outcome. J Urol 2007; **177:** 1414.
22. Onur R and Singla A: Comparison of bone-anchored male sling and collagen implant for the treatment of male incontinence. Int J Urol 2006; **13:** 1207.
23. Samli M, Singla A and Aggarwal N: Artificial urinary sphincter vs. bone anchored male sling for post-radical prostatectomy urinary incontinence. Eur Urol, suppl., 2005; **4:** 143.
24. Crivellaro S, Singla A, Aggarwal N et al: Adjustable continence therapy (ProACT) and bone anchored male sling: comparison of two new treatments of post prostatectomy incontinence. Int J Urol 2008; **15:** 910.
25. Fisher MB, Aggarwal N, Vuruskan H et al: Efficacy of artificial urinary sphincter implantation after failed bone-anchored male sling for postprostatectomy incontinence. Urology 2007; **70:** 942.
26. Mitterberger M, Marksteiner R, Margreiter E et al: Myoblast and fibroblast therapy for post-prostatectomy urinary incontinence: 1-year followup of 63 patients. J Urol 2008; **179:** 226.

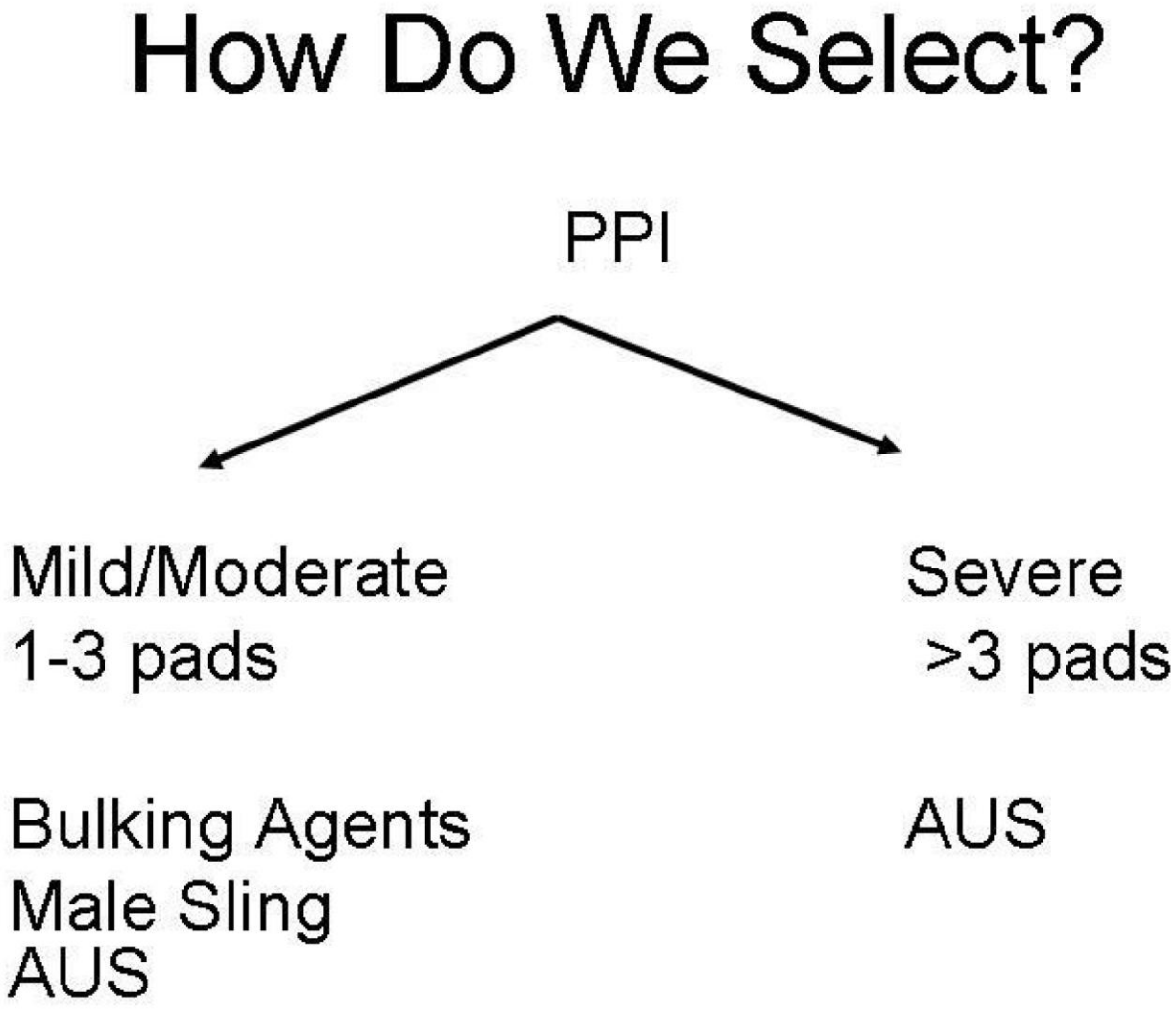

How Do We Select?
PPI
Mild/Moderate
1-3 pads
Severe
>3 pads
Bulking Agents
Male Sling
AUS
AUS

FIG. 4

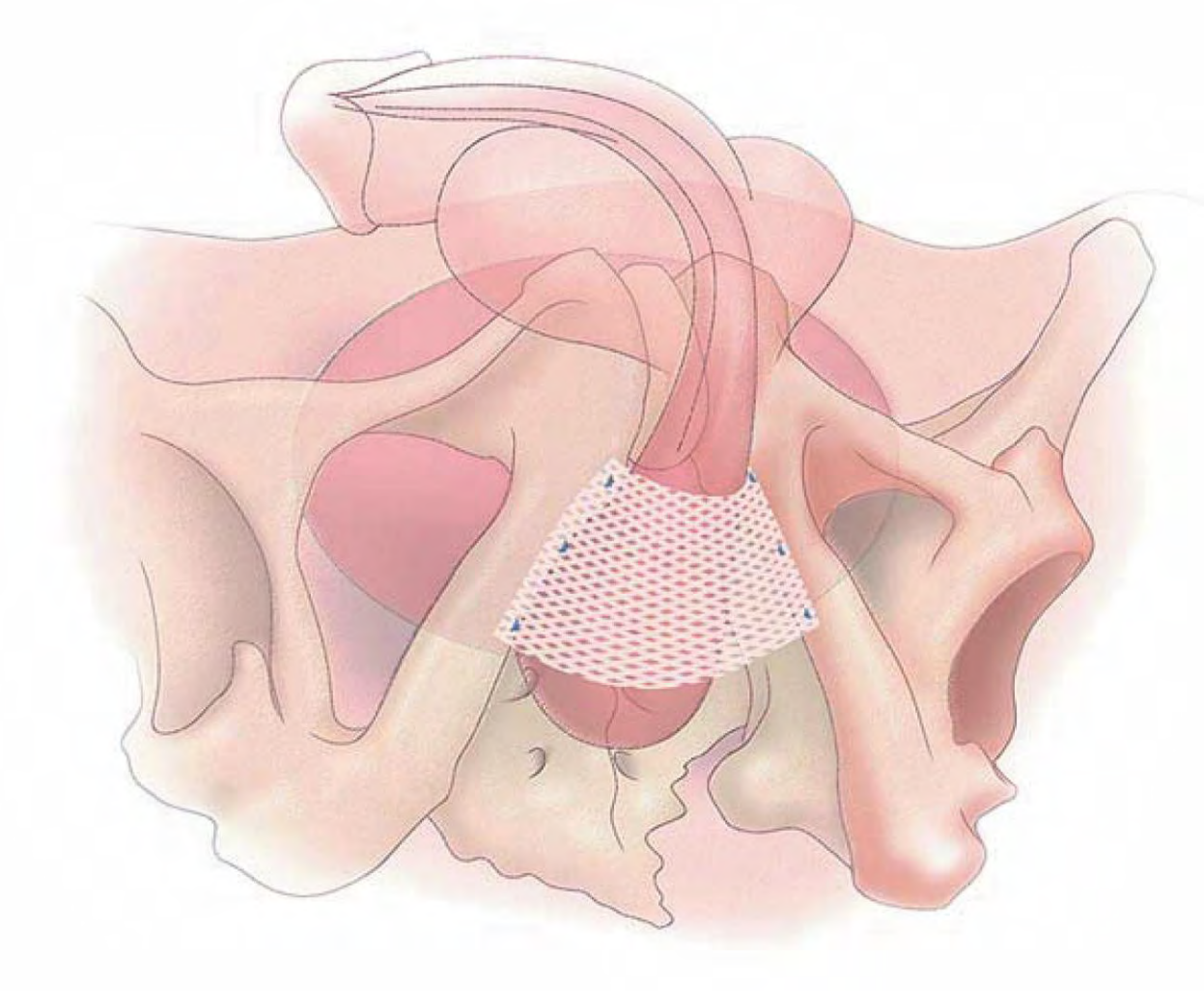


FIG. 2

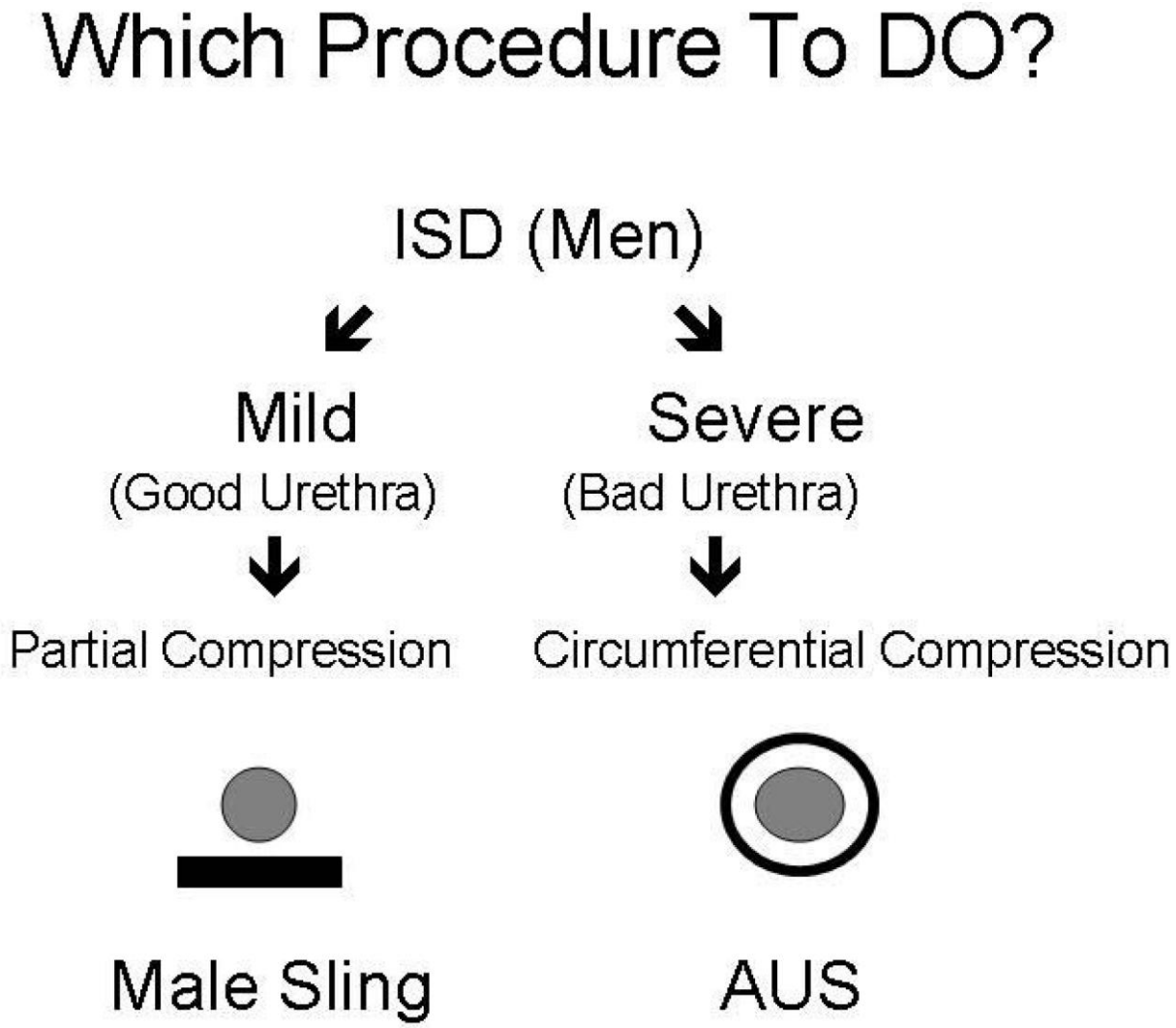

Which Procedure To DO?
ISD (Men)
Mild
(Good Urethra)
Severe
(Bad Urethra)
Partial Compression
Circumferential Compression
Male Sling
AUS

FIG. 3

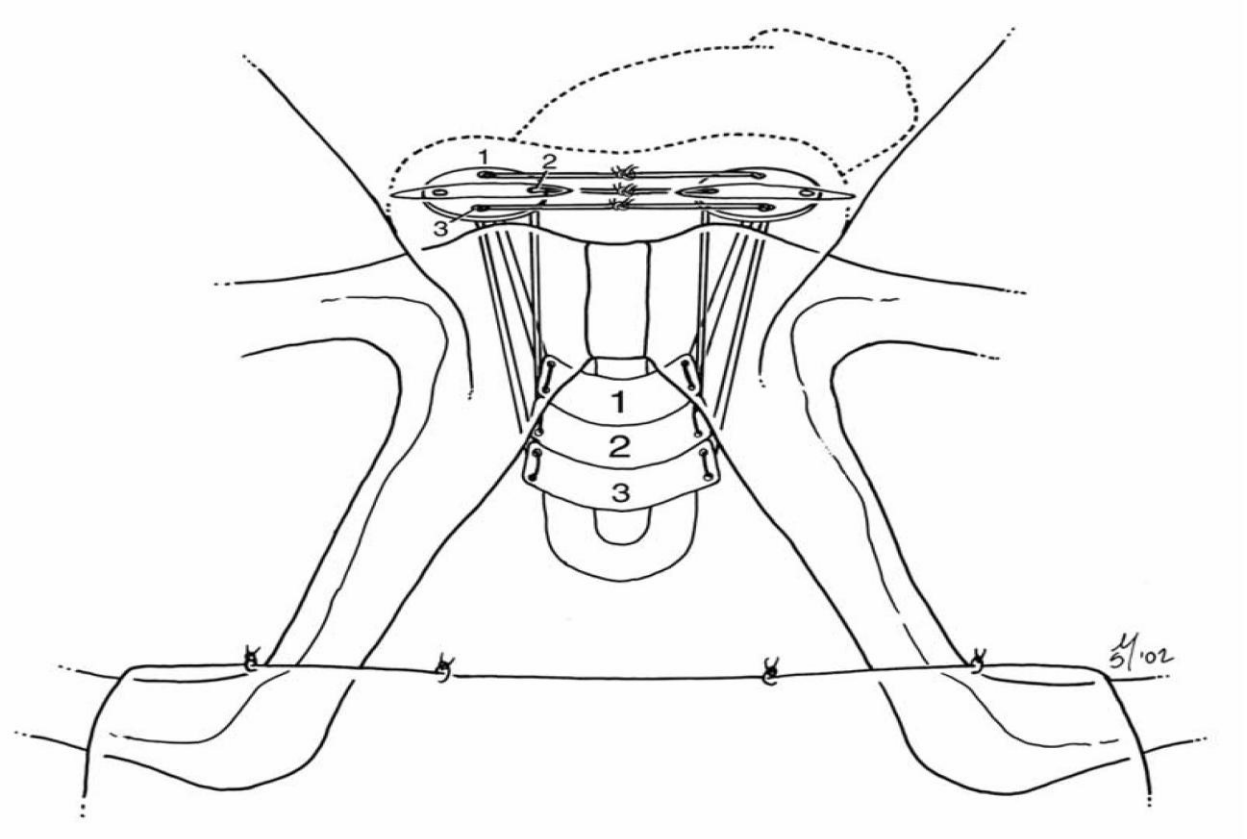


FIG. 1

Male Incontinence, Conservative Treatments:
Frankie Bates RN, NCA

The prevalence of incontinence in men of all ages is certainly lower than that for women. Large studies have indicated that there is a 3% to 11% overall prevalence rate of incontinence in the male population with urge incontinence being the prominent symptom reported in 40% to 80% of patients. (Nitti,VW, Rev Urol. 2001; 3 (Suppl 1): S2–S6).

A Canadian Urinary Bladder survey demonstrated 16% of men and 33 % of women over the age of 40 have symptoms of urinary incontinence but only 26% have discussed it with their family Doctor (The Canadian Continence Foundation)

According to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), male incontinence affects approximately 17 % of men over the age of 60. (Male Incontinence Overview 1998 – 2010 Health Communities.com.inc)

It is important to remember, although men tend to experience incontinence less often than women, in both sexes it can occur from neurologic injury, congenital defects, stroke, MS, Parkinsons, spinal cord injuries and physical problems associated with ageing.

A search of the literature falls short when dealing with incontinence in men and more predominantly when searching for conservative treatments. (Medline, Pubmed, Cochrane review) Most studies revolve around male incontinence associated with BPH or post radical prostatectomy. Hans et al found that OAB was primarily undiagnosed in almost 50 % of all patients treated for LUTS) (Hans et al Urol. Int. 2011)

Treatment options range from conservative and behavioral management, medications and surgery. In all cases the least invasive should be the first choice of options for the patient. This presentation will focus on conservative TX, including pelvic floor rehabilitation, behavioral interventions and life style changes, Biofeedback and Stimulation Therapy and Transcutaneous Electric Nerve Stimulation (TENS) or Percutaneous Tibial Nerve Stimulation (PTNS).

Pelvic Floor Exercises (PFE) were first introduced by Dr Arnold Kegel in the 1950's and unfortunately remain much underutilized to the present day. However, evidence shows that PFE's started early in rehab pre/ post radical prostatectomy (RP) can demonstrate a decline in SUI and bladder problems (Dorey 2001).
PFE's before and after RP and Transurethral Resection of Prostate (TURP) are advocated to minimize or reverse incontinence in the first few weeks after surgery (Porru D Campus G et al) (Tbraek S, Klarskok P et al 2007)

PFE should preferably be taught pre operatively. This will aid in isolation of the pelvic floor musculature, improve endurance and strength, as well as isolating the slow and fast twitch muscle fibers. It is suggested that PFE's be deferred from day of surgery to day of catheter removal to reduce resistance and pressure around the bladder neck, membranous urethra and anastamosis.

Maintaining an adequate exercise program is crucial to benefit. The literature varies substantially in exercise routines and unfortunately the evidence is poor in giving clear instruction in the number of PFE's recommended or required to build up muscle bulk. Generally anything from 45 to 100 exercises can be cited as a home program, varying profoundly from center to center. Typically working up to a 10 second hold and resting 10 seconds is a good maintenance contraction. Our center recommends three sets of ten exercises twice daily.

The emphasis is on appropriate use (AU) of the pelvic floor during stress maneuvers that cause leaking. The patient is taught to contract their pelvic floor prior to activities that cause them to leak (moving from a sitting to standing position, bending over, coughing sneezing or any activity that causes increase in abdominal pressure. These are often referred to as the "Knack" in Europe. (Miller et al 1996)
Over exercising is not encouraged as it can cause fatigue of the pelvic floor musculature to the point of exhaustion. This can actually increase UI especially in the evening hours as the patient tires.

In patients' that have impaired sensation or difficulty isolating the PF muscles, Biofeedback and Electrical Stimulation can be beneficial. (Harpel C Gillizlezer R et al)
Caution should be used in ensuring that new post op patients are cancer free (from pathology reports) before conducting stimulation therapy as the risk always exists that as the blood supply is improved to the area with the E stim , so too can the rate of cancer cell reoccurrence increase.
Six to twelve weekly sessions are typically recommended with the emphasis being on the home program intervention between treatments. Depending on patient compliance, the treatment time varies considerably from patient to patient. Expert opinion continues to be divided on the use of E stim.

With Percutaneous Tibial Nerve Stimulation, (PTNS) neuromodulation occurs through projections from post tibial nerve to sacral nerve plexus at the S2 – S4 junction. This treatment can be performed via a fine needle inserted percutaneously near the ankle. Alternatively Tanscutaneous Electric Nerve Stimulation (TENS) can be used via surface electrodes. Treatments last 30 minutes and typically range from eight to twelve weekly sessions.

Life style changes such as increasing fluid intake, lowering caffeine intake and switching to decaffeinated products, avoidance of carbonated beverages and alcohol have been beneficial to irritative voiding symptoms. (Bryant et al 2002) (Dalosso et al 2004) The amount, type and spacing of fluids will affect the ability of the bladder to handle containment of fluids (i.e. refraining from "bolus drinking")

Frequency / volume charts can establish baseline bladder capacity (BC) as well as intake consumption and types of fluid consumed and can be an extremely effective assessment tool. (Abrams, Klevmark 1996)

Bladder retraining to increase BC and assist with urge suppression techniques are an important part of treatment for symptoms of urgency, frequency and UI. (Dorey 2006) This helps to reduce voiding frequency by resisting the sensation of the first urge to void and prolonging the interval gradually between voids using various techniques. PFE's can be taught for SUI as well as urge suppression, especially when utilizing the fast twitch muscle fibres of the pelvic floor. Distraction techniques can also be beneficial especially for "Key in the door syndrome". Several studies have demonstrated the efficacy of bladder training. (Fantyl JA Wyman JF et al 1991. Columbo M, Zanetta G et al 1990)

Obesity and smoking have both been linked to bladder irritability and detrusor overactivity. (Dalosso et al 2004 Haidinger et al 2000) Weight loss studies have shown significant improvement in UI following bariatric surgery and with as little as 5% weight reduction in more traditional weight loss programs.

All these behavioral interventions are safe and reversible but do require active participation of a motivated patient and the time and expertise of a knowledgeable clinician (Goodes, Burgio K et al 2010)