

# Retroperitoneal vs. Transobturator Midurethral Slings

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# TVT vs TOT Slings in Women with Marginal or Low Urethral Closure Pressure

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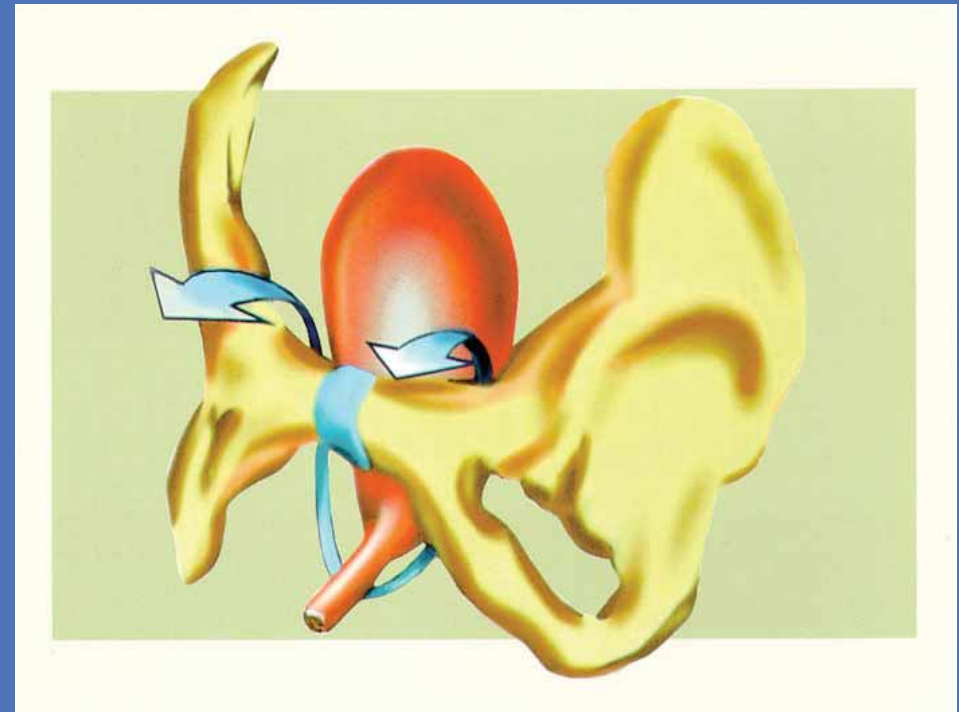
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# Minimally Invasive Procedures

- Reduce surgical time
- Reduce length of hospitalization
- Reduce complication rates/risks
- Allow quicker return to normal, daily activities
- Lower costs

# Tension-Free Vaginal Tape

- Introduced by Ulmsten in 1995
- Revolutionary change in sling procedure
- Safe, effective, and economical



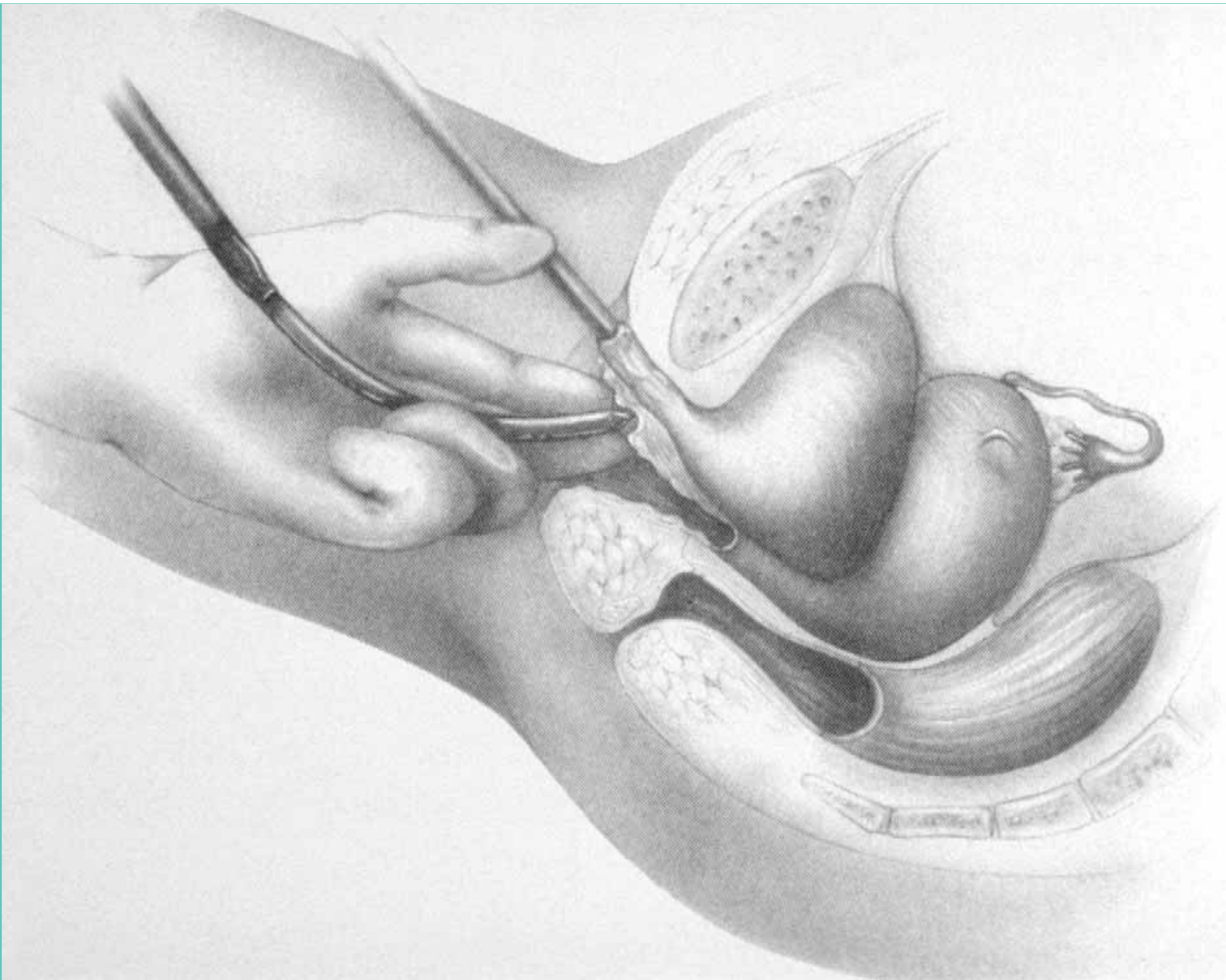
# Evolution of the TVT Procedure

- Based on integral theory set forth by Petros and Ulmsten\*
- Proposes that control of urethral closure is mainly the interplay of 3 structures
  - Pubourethral ligaments
  - Suburethral vaginal hammock
  - Pubococcygeus muscle

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\* An integral theory of female urinary incontinence.  
Experimental and clinical consideration.  
*Acta Obstet Gynecol Scand* 1990:69 (Suppl 153).





# Advantages of TVT

- May be performed under local anesthesia
- Short operative time
- Outpatient procedure
- Tape is loosely placed, minimizing anatomical distortion
  - Decreased incidence in post-op voiding dysfunction
  - Decreased incidence in post-op enterocele and rectocele

# Long-term Results of TVT

## 90 Consecutive Patients at 5 Years

- 72/75 Evaluated
- Cure 84.7%
- 10.6% Significantly Improved
- 4 (4.7%) Failed
- 25/90 Pre-op Urgency
  - 56% Resolved Urgency

Nilsson CG, Ulmsten U. Int J Urogynae 2001;S2: S5-S8.

# Prospective RCT: Burch vs. TVT

- 344 patients randomized from 14 centers in U.K.
- No significant differences in cure rates after 6 months:  
TVT – 66%                      Burch – 57%
- Bladder injury more common with TVT
- Longer voiding and recovery times with Burch

# Prospective RCT of Burch vs. TVT: 5 Yr F/U

- 344 women from 14 centers in U.K.
- 5 Yr. F/U: N= 79 (Burch) & 98 (TVT)
- One-Hour Pad Test Negative: 90% vs 81%
- No Leakage Reported: 46% vs. 39%
- Later Prolapse Surgery: 7.5% vs. 1.8%
- Mesh Erosions in 6 (Bladder, Vagina, Abd)

# TVT with Intrinsic Sphincteric Deficiency

SUI and "ISD" (N=49)

- 74% Cured
- 14% Failed
- Hypermobility in 41 Women
- 8 Patients without Urethral Hypermobility Failed

Rezapour M, Falconer C, Ulmsten U. Int J Urogynae 2001; S2: S12-14.

# TVT with Intrinsic Sphincteric Deficiency

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- 8 Patients with Immobile Urethra Failed

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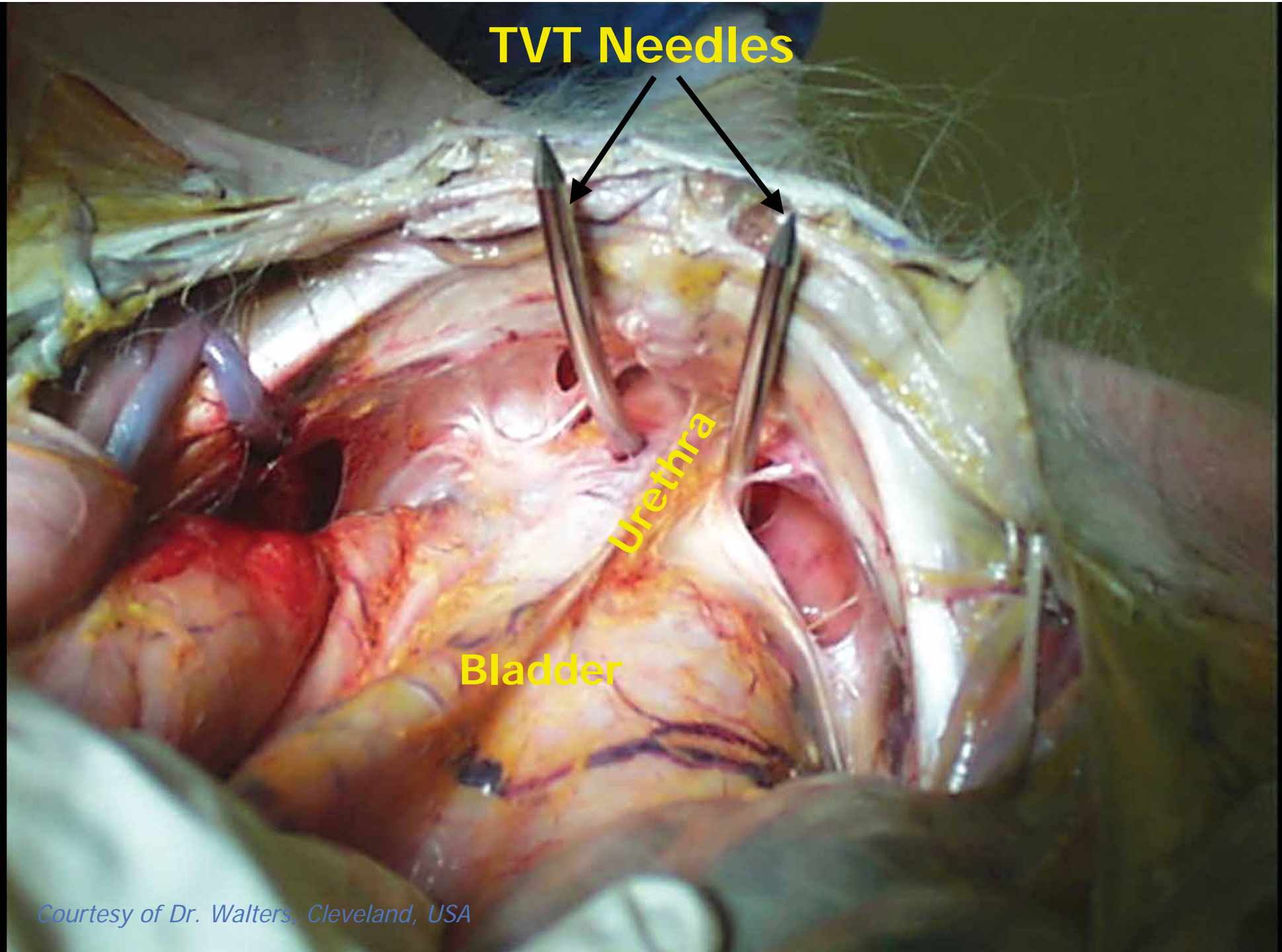
**TVT Needles**



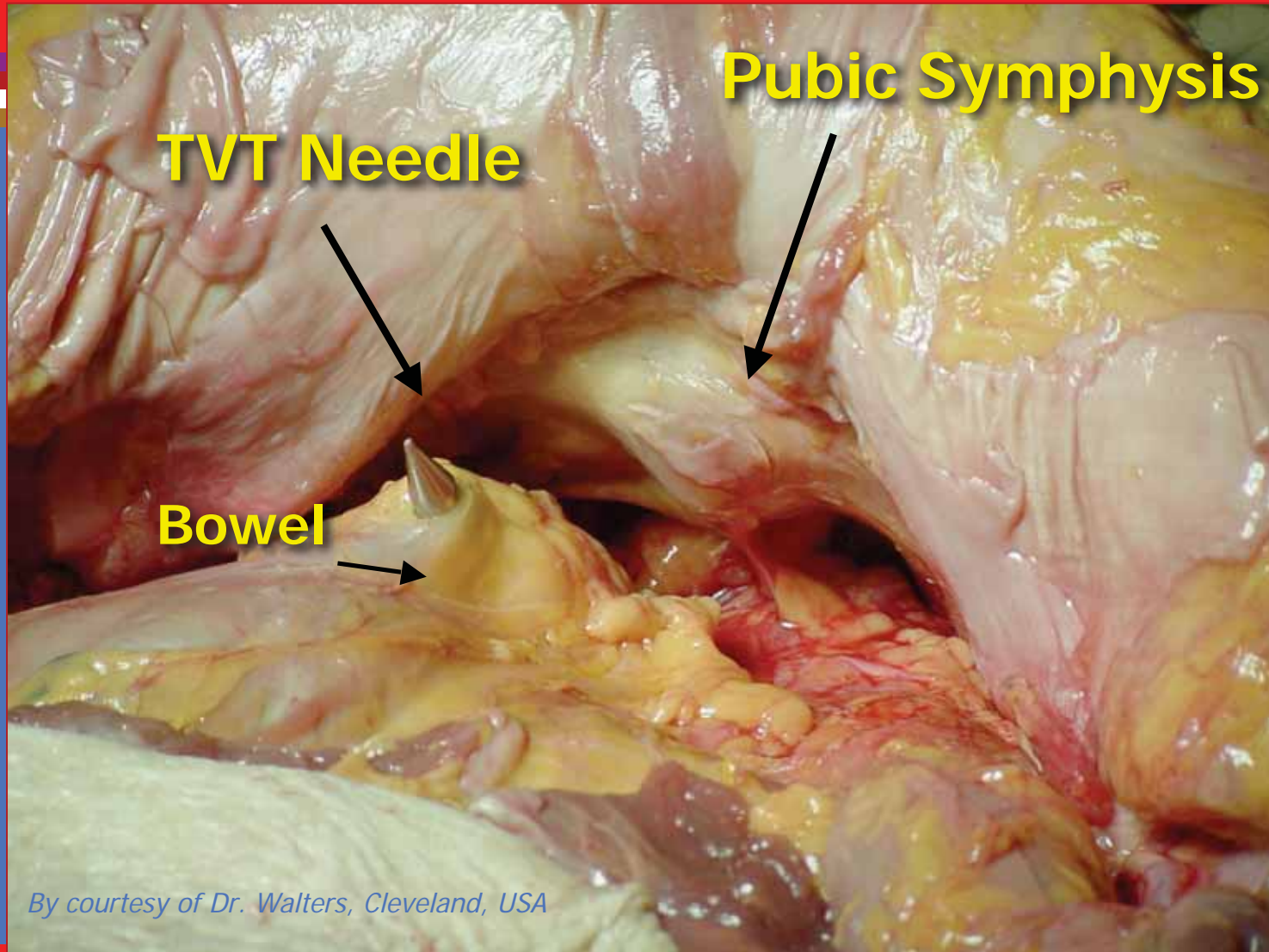
**Urethra**

**Bladder**

*Courtesy of Dr. Walters, Cleveland, USA*

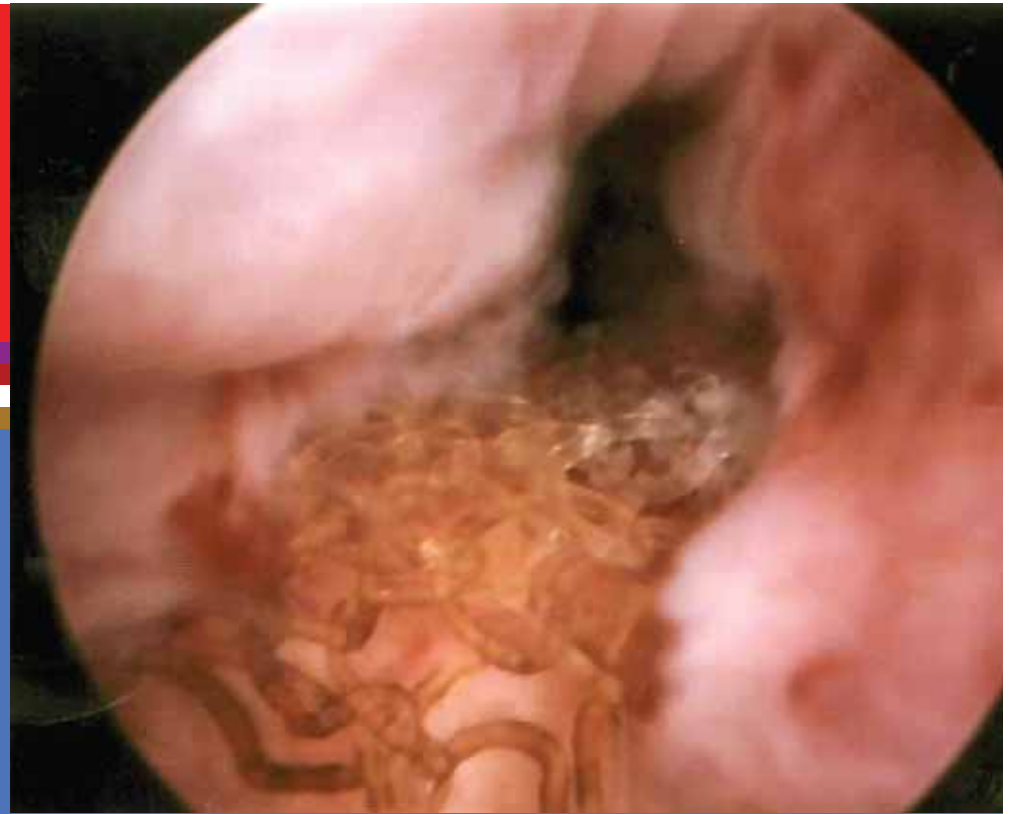


# Perforations



*By courtesy of Dr. Walters, Cleveland, USA*

# Urethral Erosion



# TVT: Long Term Results

	N.	%
Voiding dysfunction	109	7.5
Urinary retention	34	2.3
Urinary Infections	59	4.1
Urethral erosions	56	3.8
Blood loss > 200 ml	27	1.9
Obturator hematoma	27	1.9
Wound infection	12	0.8
vaginal defect healing	10	0.7
Vascular injuries	1	0.1
Obturator nerve lesions	1	0.1
Vaginal hematoma	1	0.1

# Mid-Urethral Slings

## *Complications*

### Bleeding complications with the TVT operation

Bleeding problems 151 of 5578 (2.7%) National Austrian Registry

- Increased intraoperative bleeding: 106 (1.9 %)
- Reoperation: 45 (0.8%)
- Increased intraoperative bleeding : conservatively (95%)
- Reoperations (45) : 34 laparotomies
  - 4 transvaginal evacuations
  - 3 revisions from a suprapubic catheter
  - 2 revisions of the vaginal incision

- Bleeding was: Arterial 12%  
Venous 88%

*Kolle D et al Am J Obstet Gynecol 2005 Dec; 193(6): 2045-9*

# TVT Complications in 1455 Patients in 38 Hospitals in Finland in 1999

Bladder perforation	3.8%
Minor voiding difficulties	7.6%
Retention	2.3%
Retropubic hematoma	1.9%
Major vessel injury	0.07%
Need for post-op laparotomy for a complication	0.3%

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**Kuuva and Nilsson, 2002**

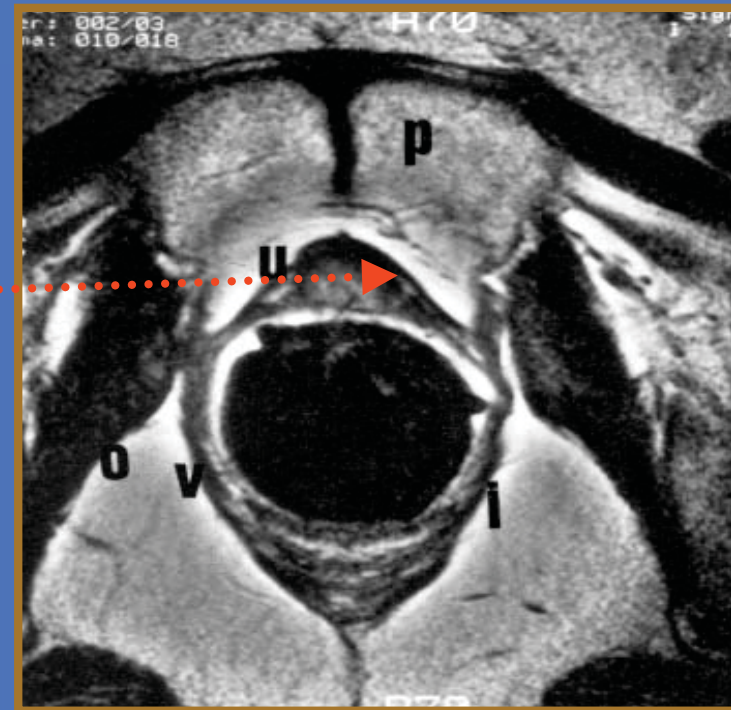
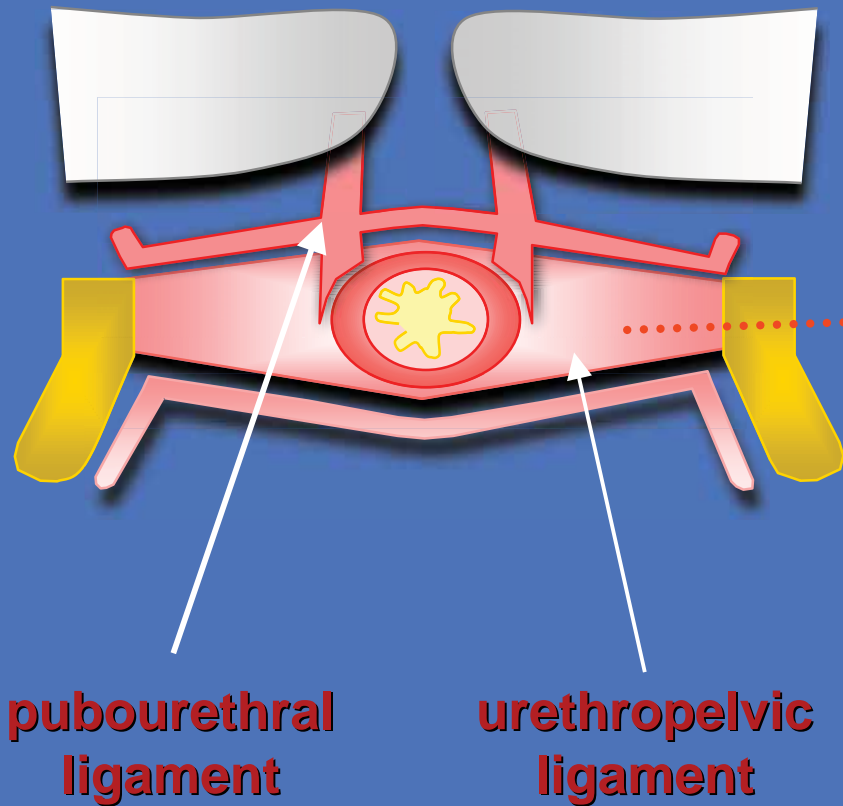
# Reasons to Consider a Transobturator Approach

- **Avoids space of Retzius**
- **No visceral trauma**
- **Potential for less irritative voiding**
- **Potential for reduced urinary retention**
- **Cystoscopy at physician discretion**

# Reasons to Consider a Transobturator Approach

- **Short operative time ( 10 to 15 min.)**
- **Easy to perform and to teach**
- **Less post-op pain**
- **Outpatient procedure**
- **Avoid vascular injury**

# Rationale for a Transobturator Approach



# Transobturator Tape Procedure

- Delorme, E, et. al: Euro Urol (2004)
  - Developed to avoid TVT complications
  - 32/150 pts with 17 month F/U
  - Mean age 64 yrs.
  - 90.6% Cured
  - O.R. time = 15 minutes
  - AEs: 1 retention x 4wks, 5 transient BOO
  - 6% De Novo UUI.
  - Avoids bladder, bowel, vascular injuries

# Transobturator vs. TVT Midurethral Slings

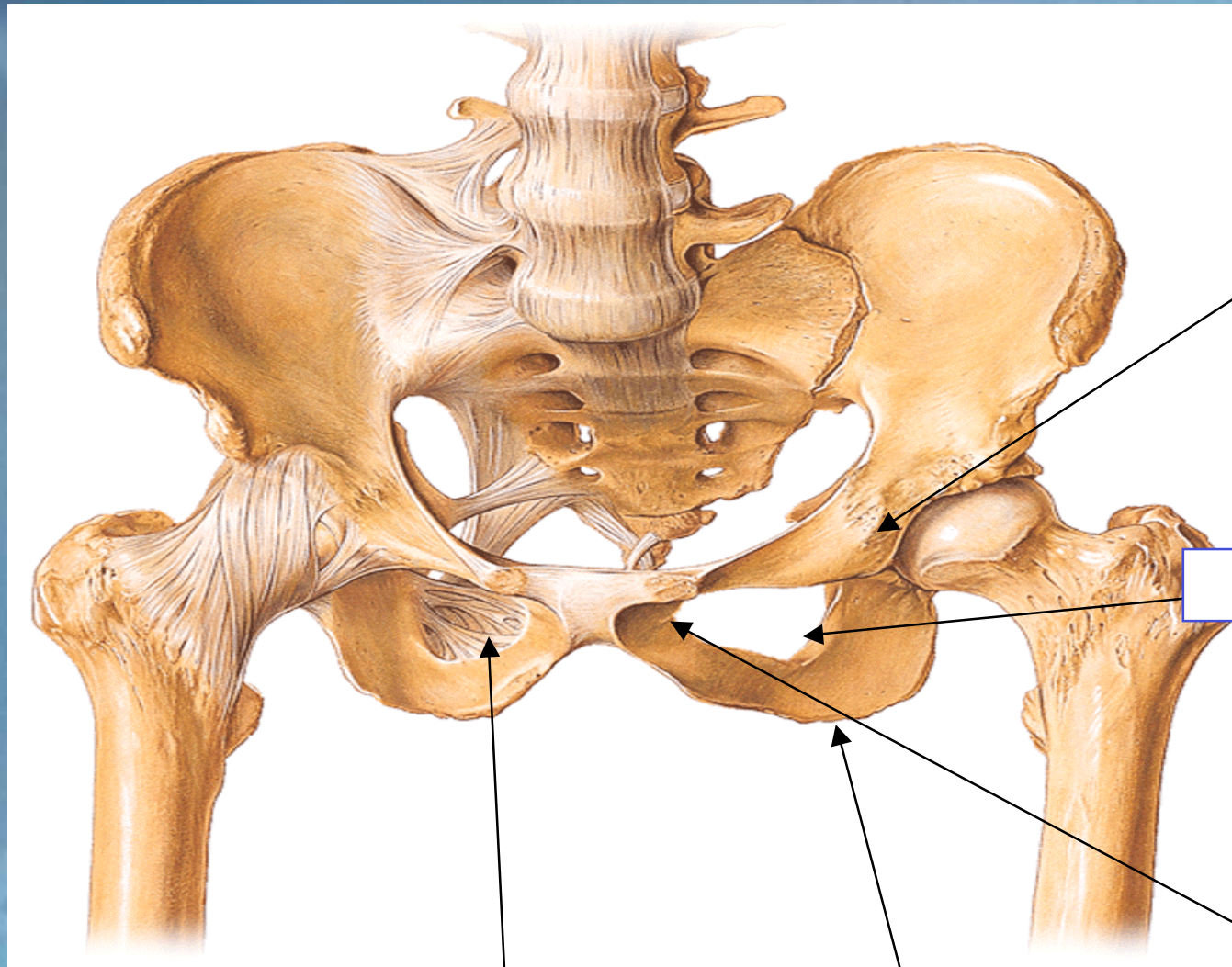
- Prospective RCT: TOT(N=30) vs. TVT(N=31)
- 1 yr. Cure Rates: 90% vs. 84%
- Post-op Retention: 13% vs. 26%
- Operative Time: 15 m vs. 27 m\*
- Complications: No erosions

\*p<0.001

# TVT vs TOT: Retrospective Cohort Analysis

- 198 Women
- TVT (n=91) or TOT (n=107)
- No significant difference for SUI cure rate  
*97% TVT vs 90% TOT (p = 0.118)*
- Similar subjective cure rates  
*87% vs 89%*
- Significant PVR in the TVT cohort  
*29% vs 14% - (p= 0.05)*

*Sand P K, Int Urogyn J August 2005*



**Pubic bone**

**Obturator Foramen**

**Pubic symphysis**

**Obturator membrane**

**Ischial bone**

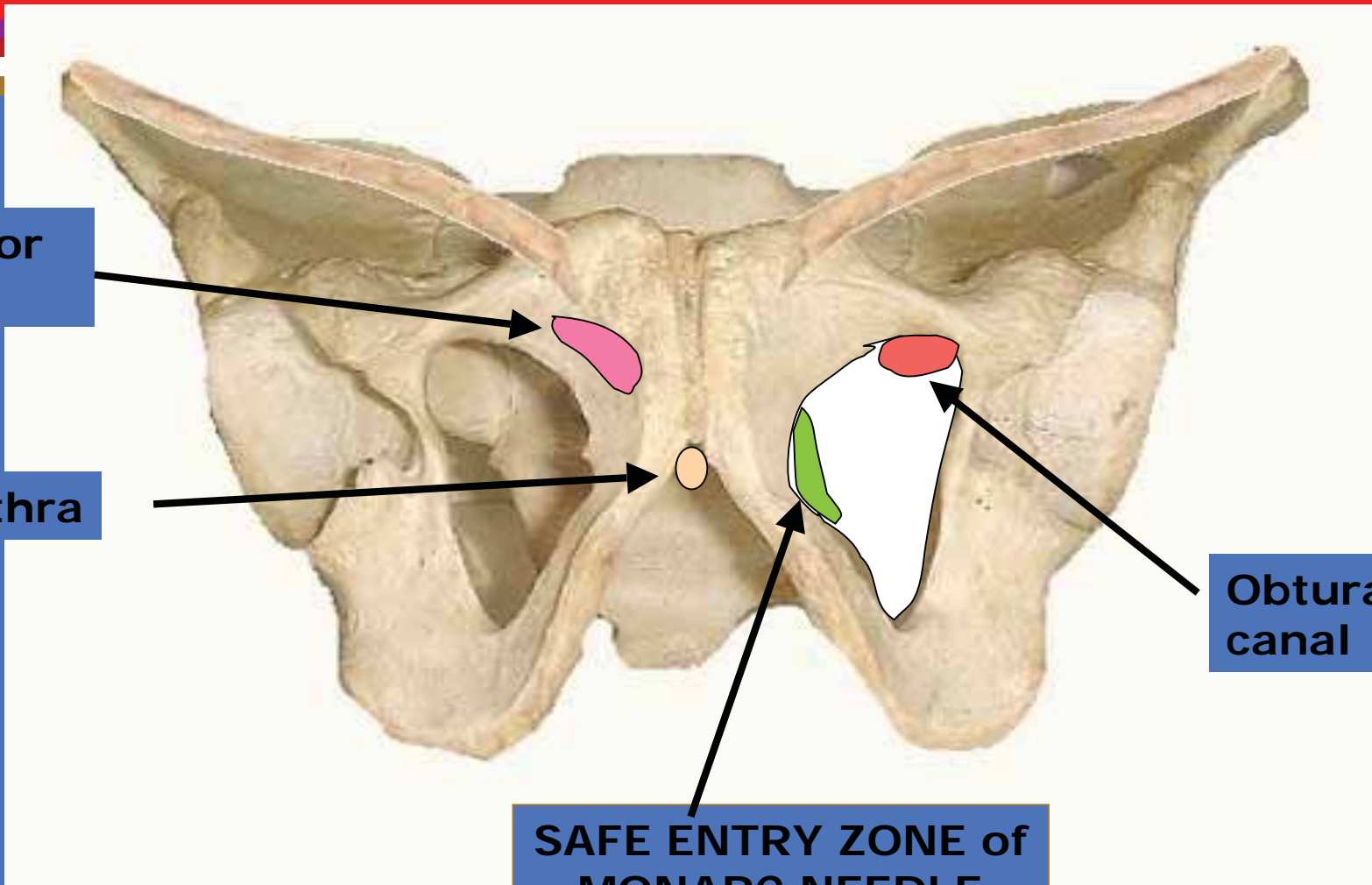
# Landmarks for Transobturator Slings

Adductor longus

Urethra

Obturator canal

SAFE ENTRY ZONE of MONARC NEEDLE





1-2 cm.







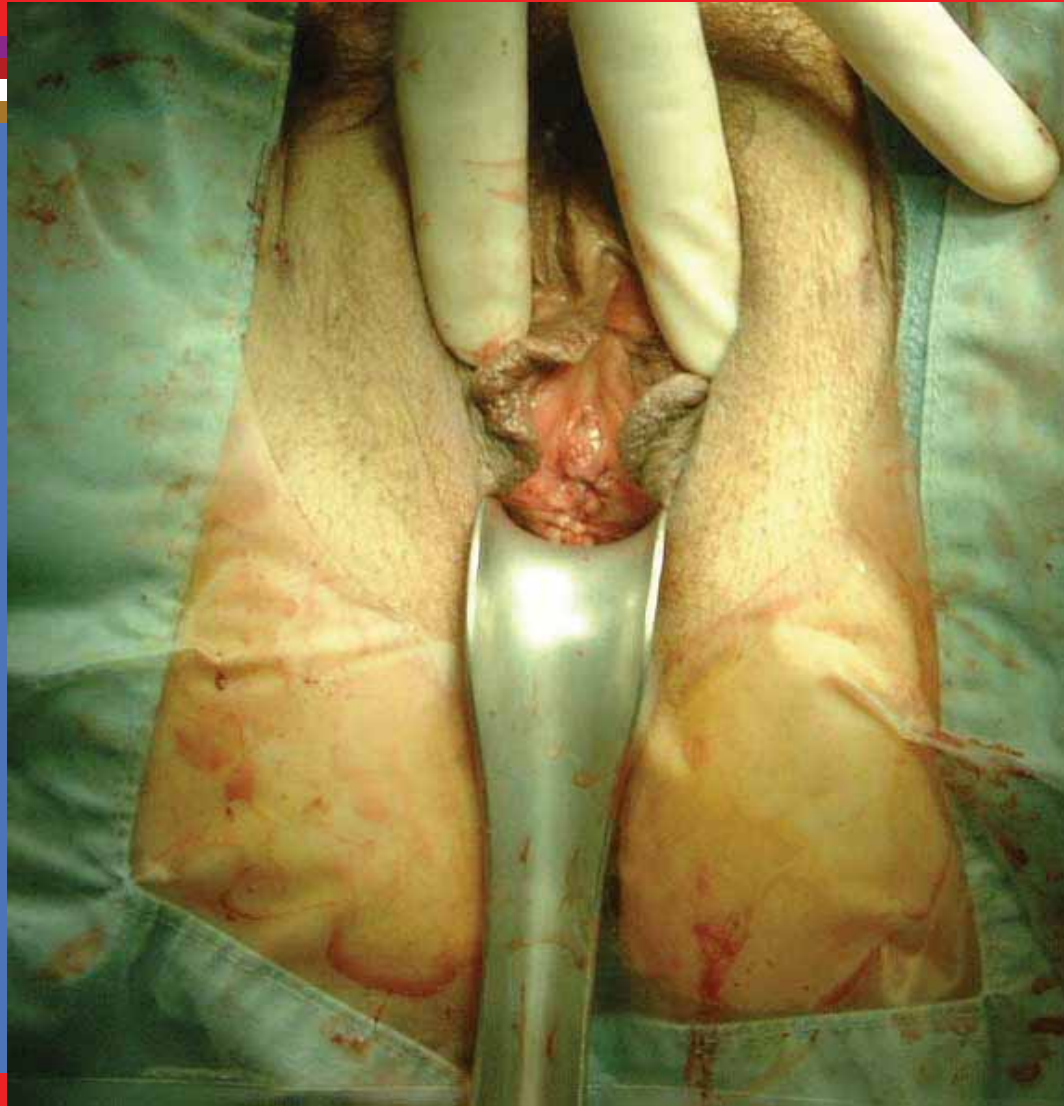




# Adjusting the tape



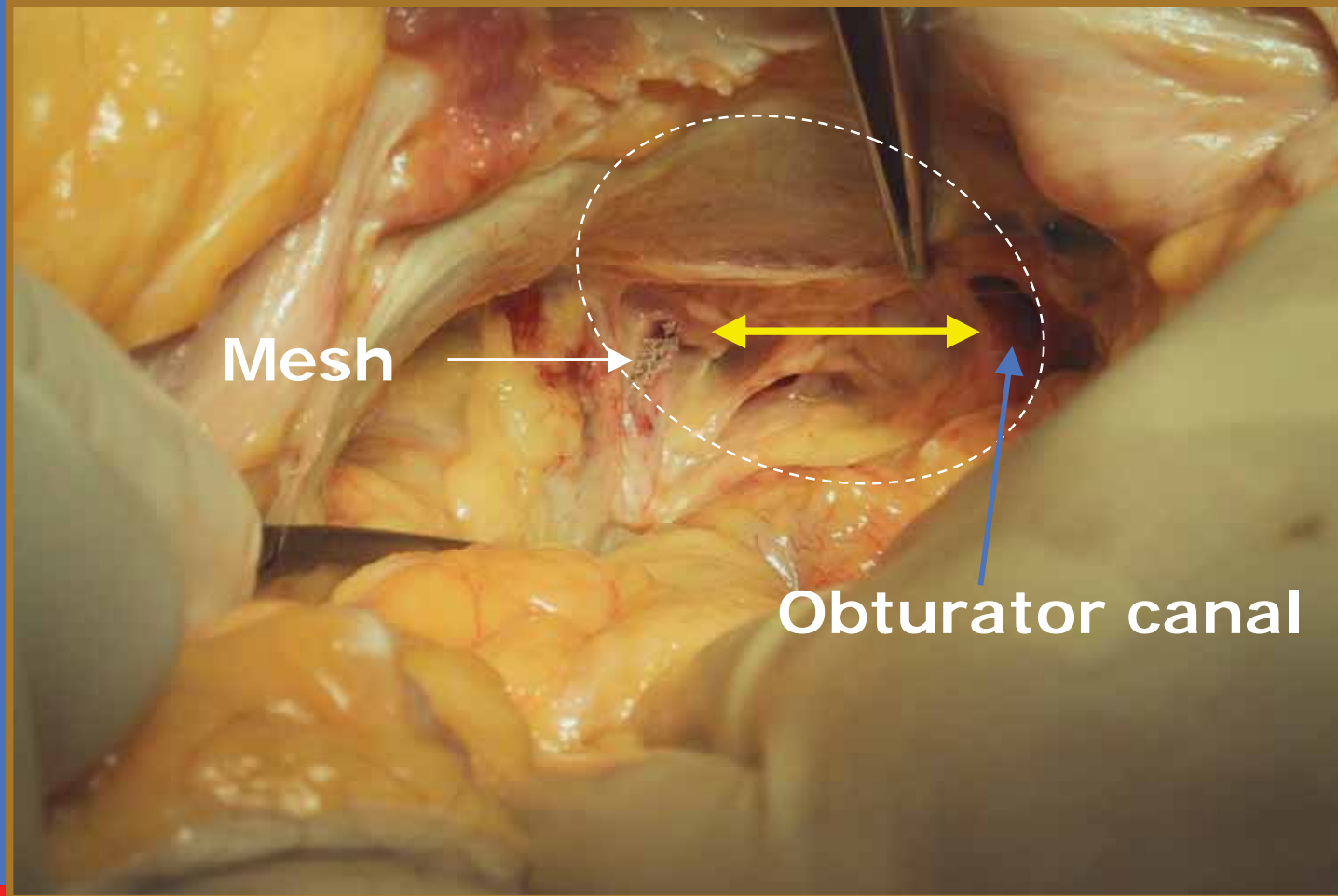
# Closing the incision

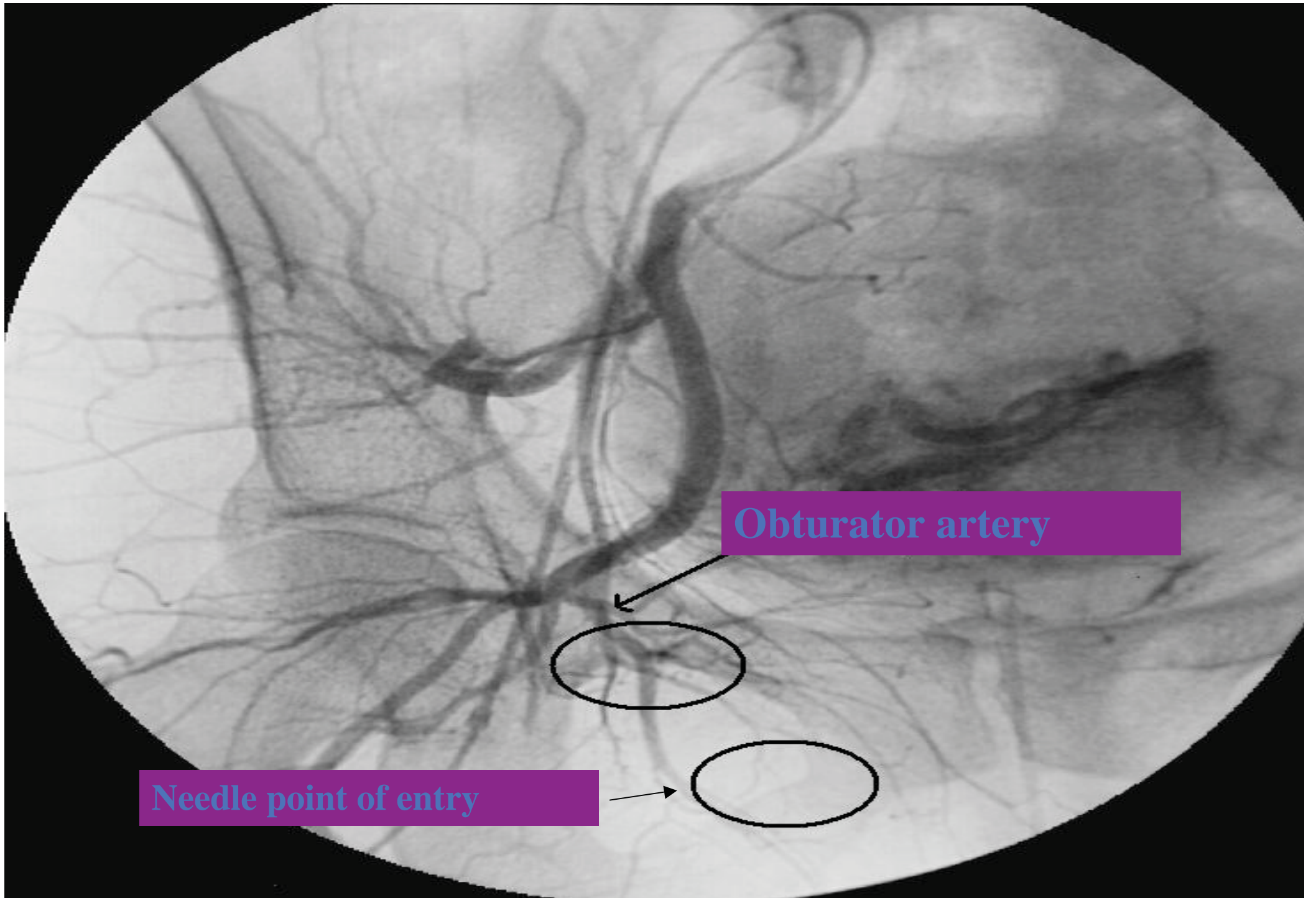


# Monarc Video



# Relative Position of Mesh and Obturator Canal





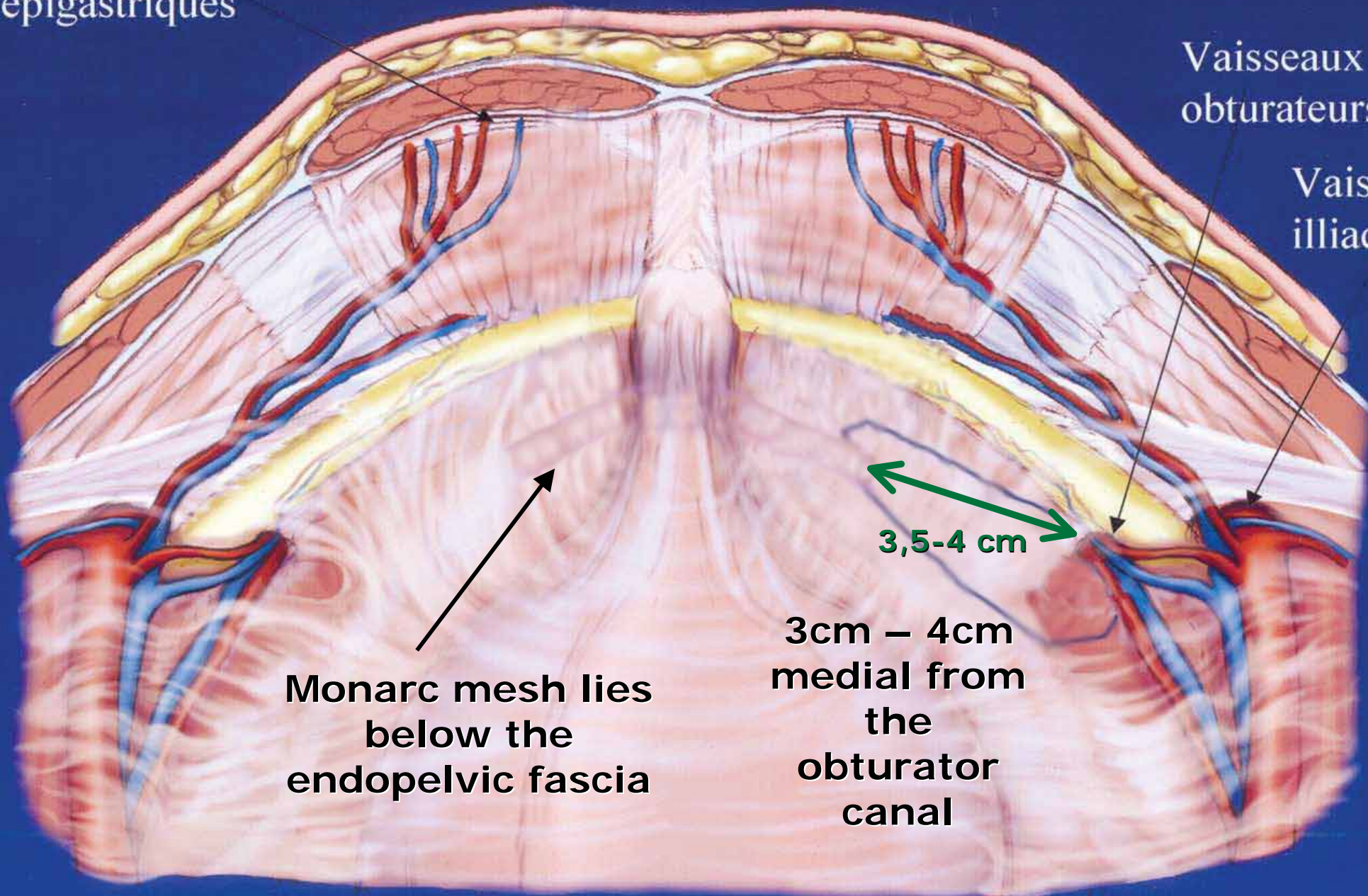
Obturator artery

Needle point of entry

Vaisseaux  
épigastriques

Vaisseaux  
obturateurs

Vaisseaux  
iliaques



Monarc mesh lies  
below the  
endopelvic fascia

3,5-4 cm  
3cm - 4cm  
medial from  
the  
obturator  
canal

# Cadaveric dissection summary

Structure	Mean Distance from midpoint Ischiopubic Ramus(cm)	S.D.*
Adductor longus muscle	5.0	1.0 (3 - 6.5)
Gracilis muscle	2.3	0.9 (1 - 3)
Obturator canal	4.8	0.4 (4.2 - 5.5)
Posterior Obturator nerve	4.9	0.9 (3.4 - 6.5)
Anterior Obturator nerve	4.8	1.0 (3 - 6.5)
Medial branch obturator vessel	3.1	0.9 (2.3 - 4.8)
Lateral branch obturator vessel	4.3	0.6 (3 - 5.3)

# Transobturator Devices

- **Obtryx - BSC**      **Woven Knit**
- **ARIS- Mentor**      **Non-Woven**
- **TVT-O - J & J**      **Woven Knit**
- **Monarc - AMS**      **Woven Knit**
- **Uretex-TO- Bard**      **Woven Knit**

# Midurethral Slings: Effect on SUI

Procedure	Resolved SUI	Resolved USI	PVR <sup>1</sup> >50 mL
TVT N= 62	87%	97%	29%
MONARC N=69	89%	90%	14%

<sup>1</sup>p= 0.05

Evanston Continence Center

# Midurethral Slings: Effect on OAB

Procedure	Resolved UUI <sup>1</sup>	Resolved DO	DeNovo UI <sup>2</sup>	De Novo DO
TVT N= 91	48%	42%	27%	33%
SPARC N= 52	44%	32%	19%	22%
MONARC N= 107	68%	46%	0%	25%

<sup>1</sup>p= 0.08

<sup>2</sup>p= 0.01

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# Prevalence of ISD

- 10 - 15 % of Incontinent Women

# TOT Outcomes in ISD Patients

Pre-op	Post-op (6wks)			Post-op (Last)			Bulking
	SUI	OAB	ESST+	SUI	OAB	ESST+	
ISD (n=31)	11 (35.5%)	7 (22.6%)	5 (16.1%)	<b>12 (38.7%)</b>	5 (16.1%)	5 (16.1%)	8 (25.8%)
SUI (n=39)	2 (5.0%)	5 (12.8%)	0	<b>2 (5.0%)</b>	4 (10.3%)	0	0
p-Value	0.0017	0.2819	0.0327	<b>0.0005</b>	0.7113	0.0327	0.0028



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# TOT vs TVT Results

Borderline LPU Objective Failures (CP < 43 cm H20)

TOT

TVT

**RR: 5.9 (1.0-33.9); NNTH 8 (4-83)**





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# Results

**Borderline LPU Post-op Subjective SUI (CP < 43 cm H<sub>2</sub>O)**

TOT TVT  
RR 1.7 (0.6-5.0); NNTH 11

# Mid-Urethral Slings

## *Effect of ISD*

### Early outcomes of mid-urethral slings for female SUI stratified by Valsalva leak Point Pressure

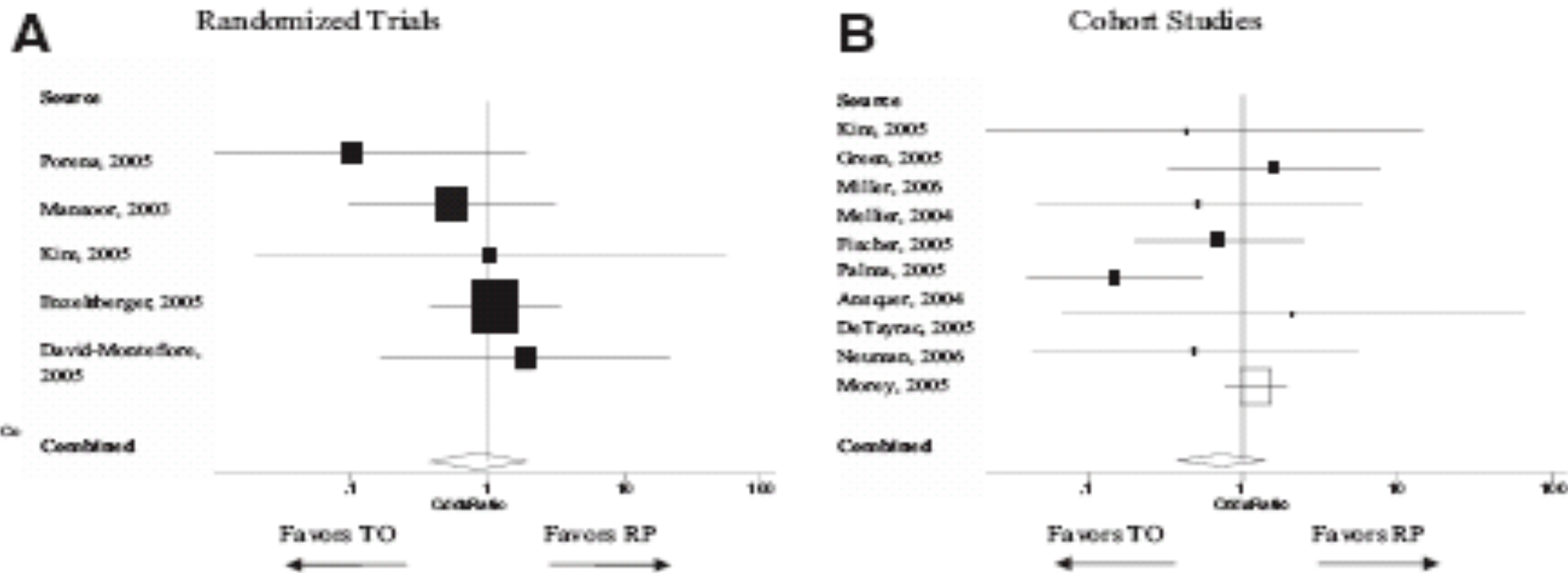
Overall Cure 65% With TVT-O (N=43):

- VLPP > 60 cm H<sup>2</sup>O
  - 77% Cure Rate
- VLPP < 60 cm H<sup>2</sup>O
  - 25% Cure Rate

**Low VLPP is an Indication for Retropubic MUS**

*O'Connor et al Neurourol Urodyn 2006 Apr;25(7):685-8*

# Risk of Subjective Failure After Transobturator vs. Retropubic Midurethral Slings



TO, transobturator approach; RP, retropubic approach.

# **Risk of Complications After Transobturator vs. Retropubic Midurethral Slings**

From: Sung VW, Schleinitz MD, Rardin CR, et al. *Am J Obstet Gynecol* 2007; 197:3-11

# **Risk of de Novo Irritative Voiding Symptoms After Transobturator vs. Retropubic Midurethral Slings**

From: Sung VW, Schleinitz MD, Rardin CR, et al. Am J Obstet Gynecol 2007; 197:3-11

# Mid-Urethral Slings

## Are there any factors predicting failure or complications rates of TOT surgery for SUI ?

- Age > 55ys.
  - SUI grade > 2
- stastistically associated with a decrease of surgical success

*Deutsch V et al Gynecol Obstet Fertil 2006 Dec; 34(12):1118-25*

## Identification of risk factors for voiding dysfunction following TVT placement

- Age
  - preoperative maximal peak flow rate < 15 ml/sec
- stastistically associated with a decrease of surgical success

*Salin A et al Eur Urol 2007 Mar; 51(3):782-7*

# Mid-Urethral Slings

## TVT: Analysis of Risk Factors for Failures

Retrospective Analysis (N=301)

Mean F/U: 32 months

Among presumed risk factors for failures only :

- Urethral Hypomobility
- Recurrent SUI

Significantly associated with failure of the TVT procedure

Cure rate dropped from 89 % to 70 %.

*Meschia et al Int Urogynecol J Pelvic Floor Dysfunct 2007 Apr;18(4):419-22*

# Mid-Urethral Slings

## TOT and Retropubic Tape procedures in SUI: a systematic review and meta analysis of effectiveness and complications

RCTs of TVT vs TVT-O or TOT (1997-2006)

- 5 RCTs : TVT-O vs TVT
- 6 RCTs : TOT vs TVT
- Subjective cure: TVT-O & TOT at 12 mos no better than TVT

Evidence for short-term superiority of TOT is limited. Bladder injuries and voiding dysfunction are lower, but the risk of vaginal erosion and groin pain is higher with TVT-O/TOT

# 3rd ICI 2005 Recommendations

- More than 220 published reports on the TVT.
- Level 1-2: 2-year F-U data from 3 RCT's similar cure to open colposuspension
- Level 1-2: Comparisons to TOT and Pubovaginal slings in prospective RCT's showed similar cure rates

# 3rd ICI 2005 Recommendations

## Confounding Variables

- Level 3 evidence: Older women respond to continence surgery as well as younger women.
- Level 3 evidence: Association of age with poorer outcomes has to do with other factors, such as urethral pressure.
- Level 4 evidence: Medical comorbidity impacts surgical outcomes (e.g. cadaveric fascial sling procedure).

# 3rd ICI 2005 Recommendations

## Confounding variables

- Conflicting evidence on the impact of obesity on the outcomes of SUI surgery.
- Grade B evidence: TVT can offer for recurrent SUI with similar cure rate to the first time surgery.
- Level 3 evidence: women with OAB are more likely to have less favourable outcome for surgery, but Level 1 trials are required to confirm this observation.

# What I Do & Why

## Transobturator Midurethral Sling

- Closure Pressure > 42 cm H<sub>2</sub>O
- Mixed Incontinence (DO)
- Underactive Detrusor

# Conclusions

- Transobturator Slings are Safe
- Voiding Dysfunction less likely
- Efficacy Similar to previous slings
- Simplicity very attractive feature
- Transobturator Slings appear to improve OAB Outcomes

# Surgical Rx of GSI Philosophy

**“A surgeon has got to know his  
limitations.”**

**Modified from “Dirty Harry”  
Clint Eastwood**