

CENTER FOR RECONSTRUCTIVE URETHRAL SURGERY



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Summer Meeting of The Norwegian Association of Urology



Bergen - Norway

May 31 – June 2, 2012

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Reconstructive Surgery
in
Urethral Stricture

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ACTA CHIRURGICA SCANDINAVICA

SUPPLEMENTUM 176

FROM THE DEPARTMENT OF SURGERY (HEAD: PROFESSOR J. HELLSTRÖM),
KAROLINSKA SJUKHUSET AND THE DEPARTMENT OF HISTOLOGY (HEAD:
PROFESSOR G. HÄGGQVIST) KAROLINSKA INSTITUTET, STOCKHOLM, SWEDEN.

RECONSTRUCTION
OF THE MALE URETHRA IN STRICTURES

Application of the Buried Intact

Epithelium Technic

By

BENGT JOHANSON

STOCKHOLM 1953

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Based-evidence Medicine

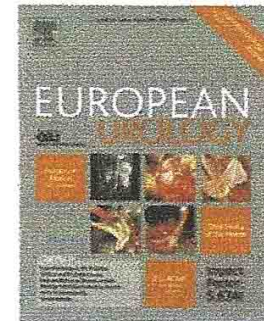
Metanalysis review

Guidelines

Consensus Conferences



available at www.sciencedirect.com
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Editorial

Can Reconstructive Urethral Surgery Proceed Without Randomised Controlled Trials?

Guido Barbagli^a, Massimo Lazzeri^{b,*}

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^b Department of Urology, Santa Chiara Hospital (GIOMI group), Florence, Italy

What has history taught us? The history of urethral reconstruction is based on observational studies that appear today to be disarming in their apparent ease. In 1968, Orandi introduced the concept of penile skin flap urethroplasty, publishing a paper consisting merely of two pages and two black and white figures and that lacked any outcome assessment [10]. Oral mucosa has become the most popular substitute material in the treatment of urethral strictures, as it is readily available and easily harvested from the cheek, lip, or tongue, allowing for a concealed donor site scar and low oral morbidity [11–14]. Unfortunately, all the papers that have contributed to the widespread use of the oral mucosa graft are retrospective, not prospective, and they are not RCTs.

Urethral surgery for stricture repair is performed on a small sample size and, for this reason, the focus tends to be on the comparison of different techniques in homogeneous groups rather than prospective, randomised design studies. What does homogenous mean? It means that a technique used for *penile urethra repair cannot be compared* with a technique used for *bulbar urethra repair*.

Eur Urol, 2008, 54: 709-711

Urological literature on urethral stricture

Few prospective, randomized studies

No homogeous series of patients

Small sample size – no statistical significance

No reliable data from developing countries

**Personal opinion of high-volume surgeon from
high-volume Center for Urethral Surgery**

Data published in peer review scientific Journals

**Data fully available and updated in our website
every year**



The Team



Salvatore Sansalone

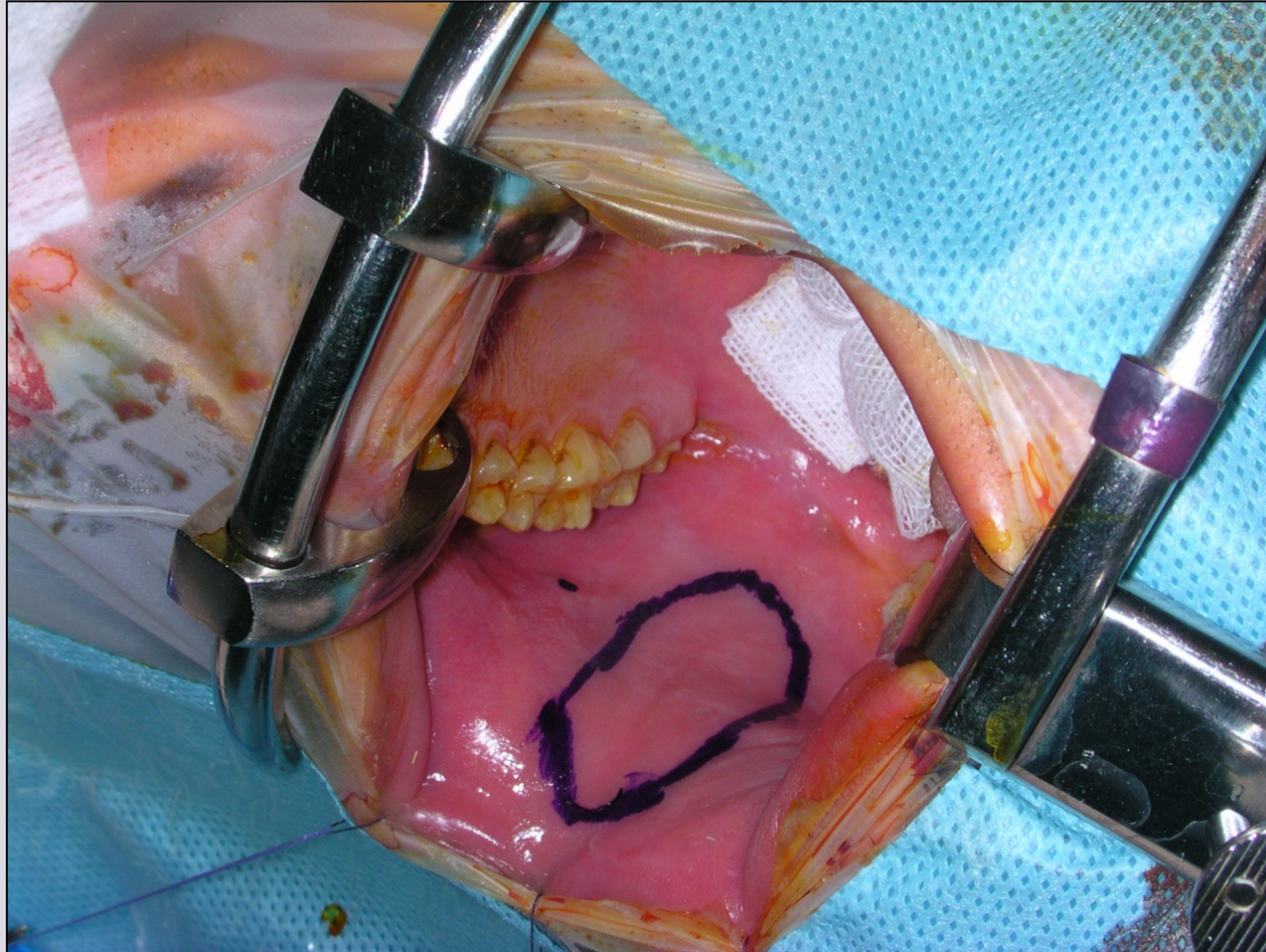


Sofia Balò



Giuseppe Romano

Oral mucosa



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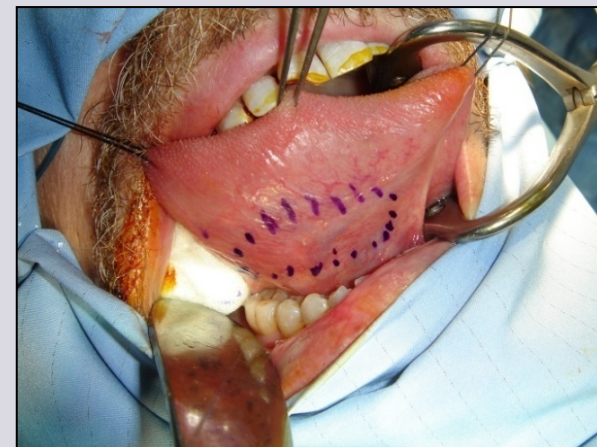
Oral mucosa: harvesting sites



cheek



lip



tongue

NO

Harvesting site from the lip: visible to the naked eye



Negative aesthetic consequences

Unsatisfactory post-operative patient acceptance

Oral mucosa: surgical technique

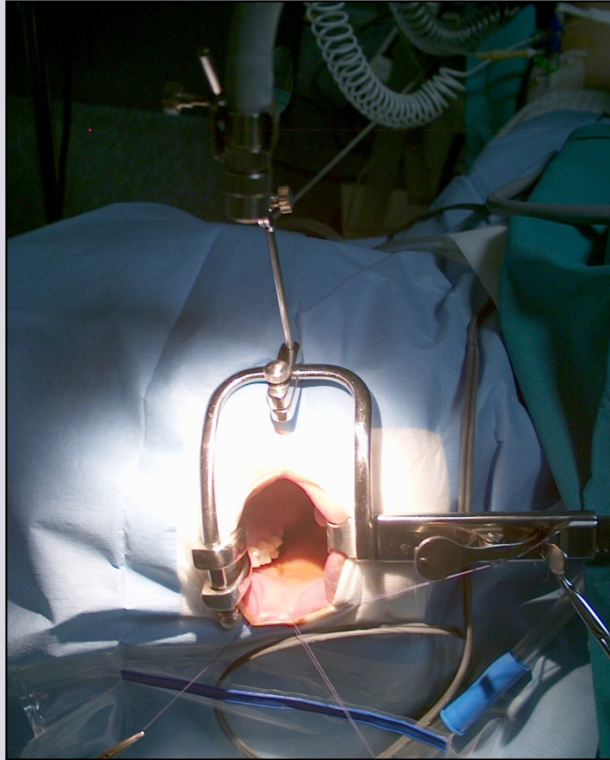


Two surgical teams work simultaneously

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Oral mucosa: surgical technique



**Appropriate
mouth retractor**



**Only one assistant is
needed to harvest the
oral graft**

Advantages of the double team

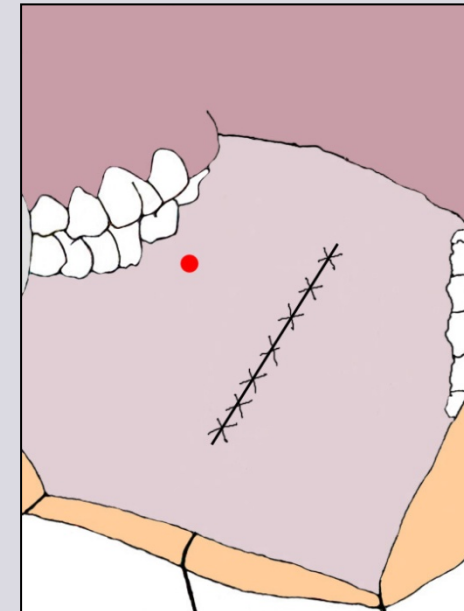
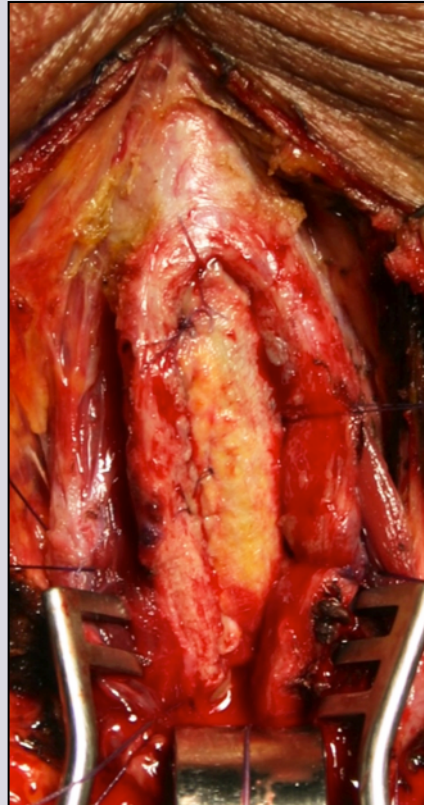
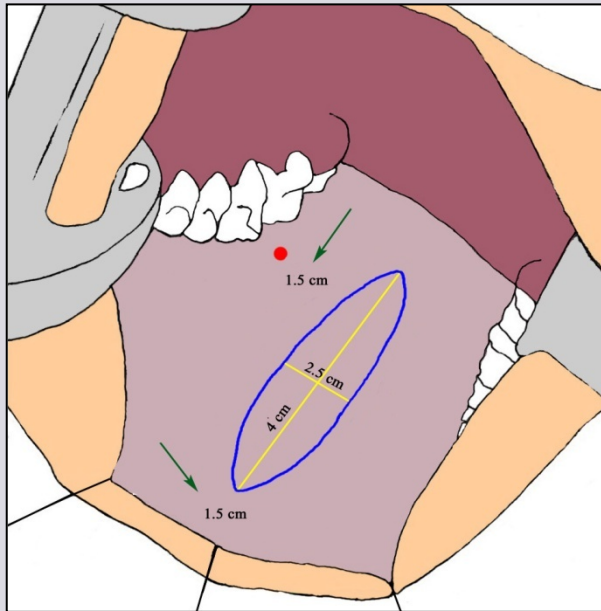
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graph TD; A[Advantages of the double team] --- B[decrease of surgical time to ~ one hour]; A --- C[decrease of contamination in surgery]; A --- D[provides training opportunity for a young assistant interested in learning urethral surgery]
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**decrease of
surgical time
to ~ one hour**

**decrease of
contamination in
surgery**

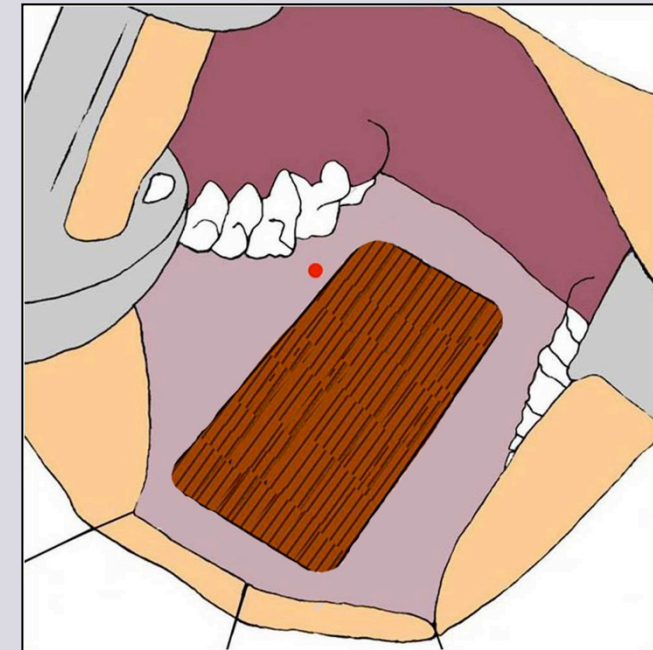
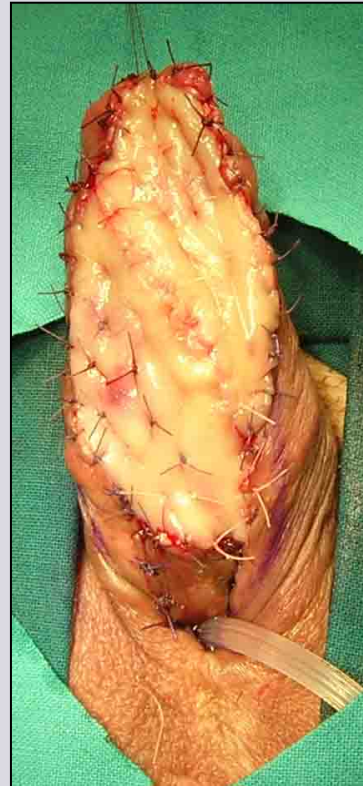
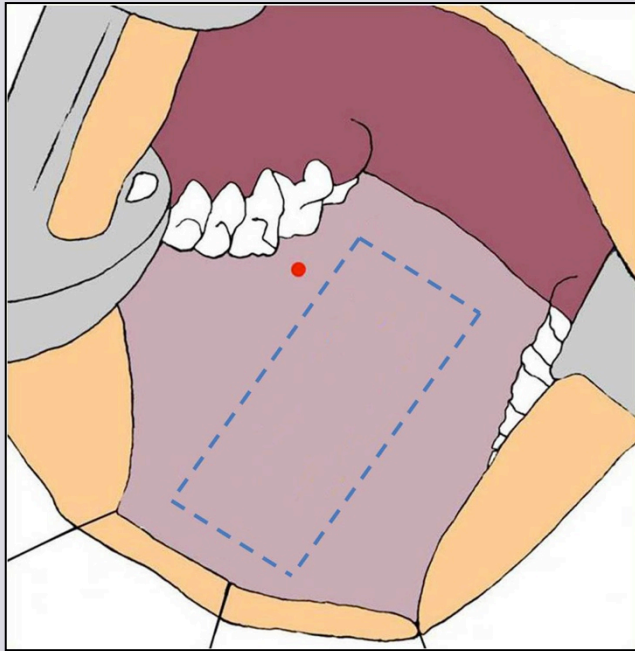
**provides training
opportunity for a young
assistant interested in
learning urethral surgery**

Oral mucosa: surgical technique



One-stage techniques: ovoidal graft shape

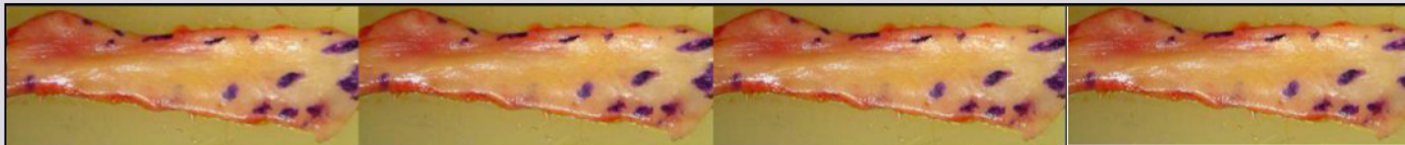
Oral mucosa: surgical technique



Staged techniques: rectangular graft shape

Oral mucosal grafts

right cheek	5 x 2.5 cm
left cheek	5 x 2.5 cm
tongue	4 x 2.5 cm
	4 x 2.5 cm

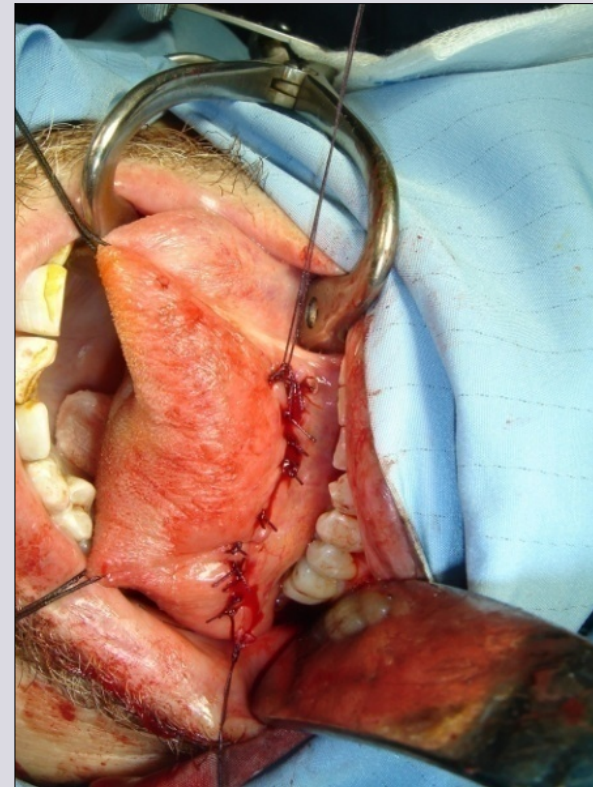


18 cm x 2.5 cm

**The oral mucosa is the
best material for
urethral
reconstruction**



Harvesting site



Oral mucosa → **concealed**

Harvesting site



Skin → **visible to the naked eye**

aesthetic consequences → **psychological sequelae**

Oral mucosa: biological characteristics

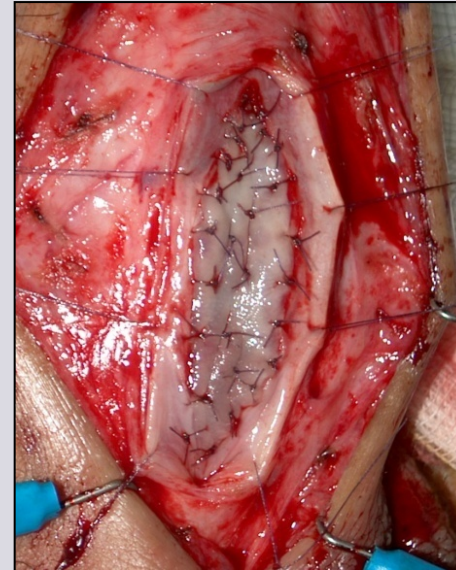
Easy to adapt for any type of urethroplasty



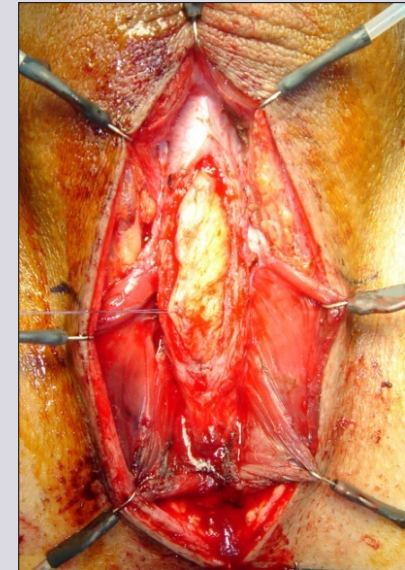
One-stage



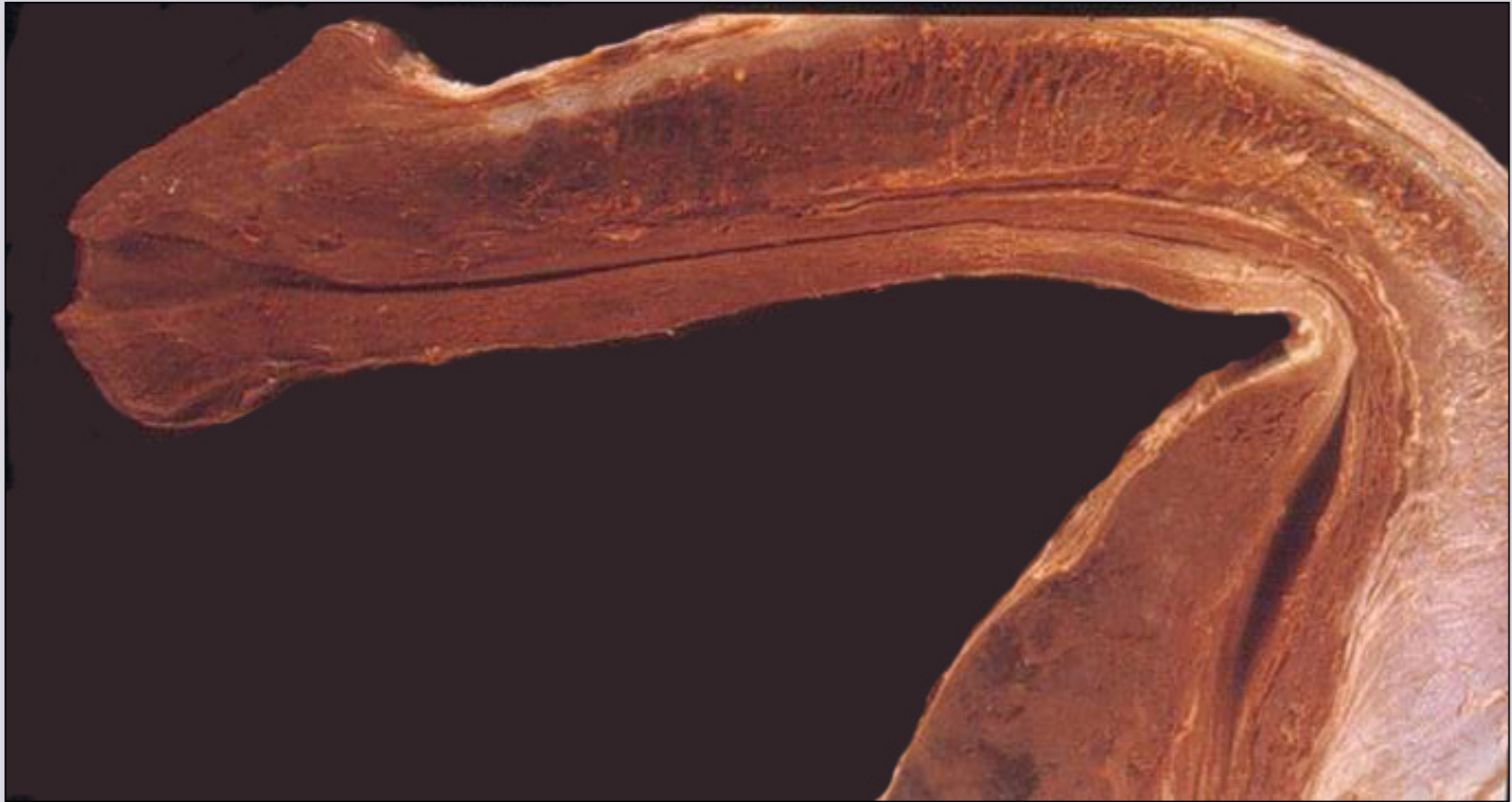
Two-stage



Inlay



Onlay



Penile urethroplasty

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One-stage penile urethroplasty



Minimally invasive technique using oral graft

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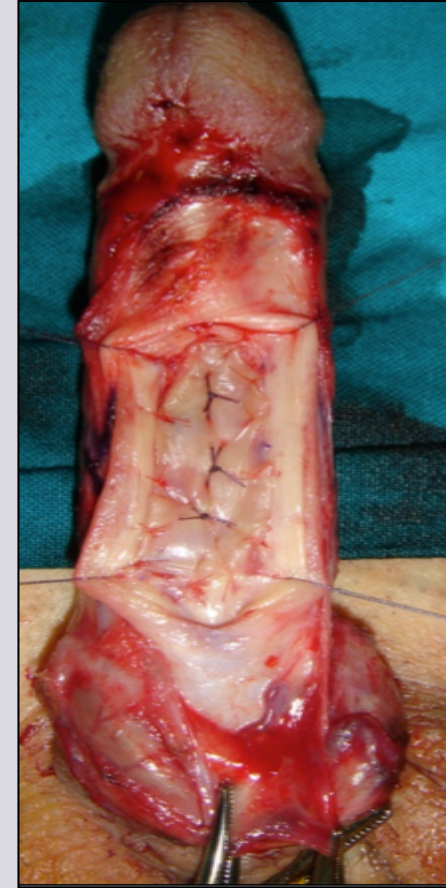
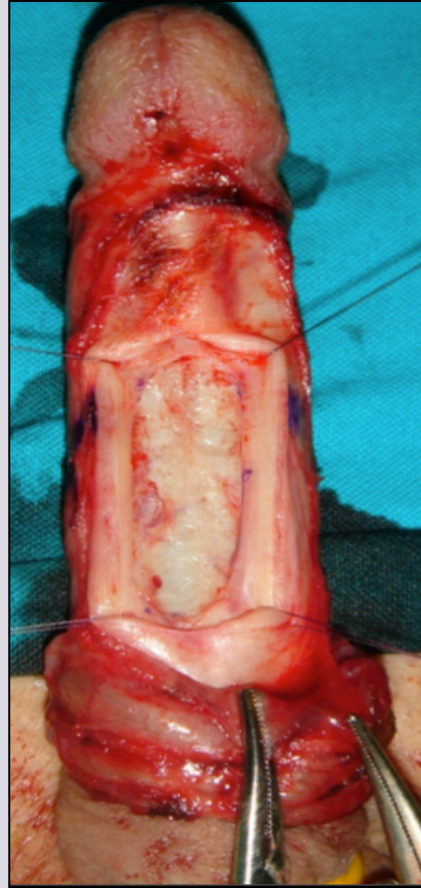
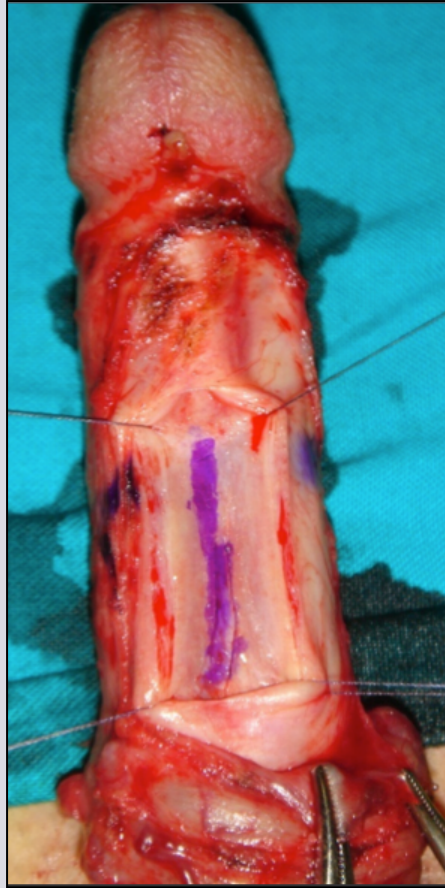
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Penile urethroplasty



One-stage technique

Penile urethroplasty



One-stage technique

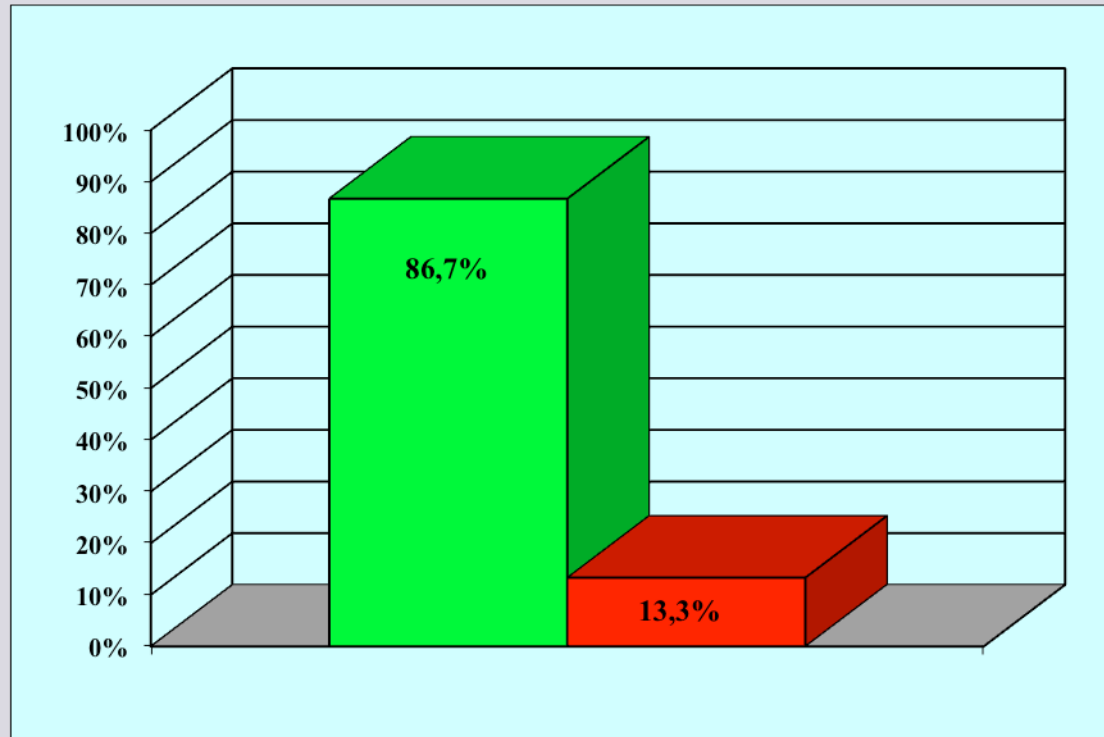
Penile urethroplasty



One-stage technique

**30
patients**

**oral
graft**

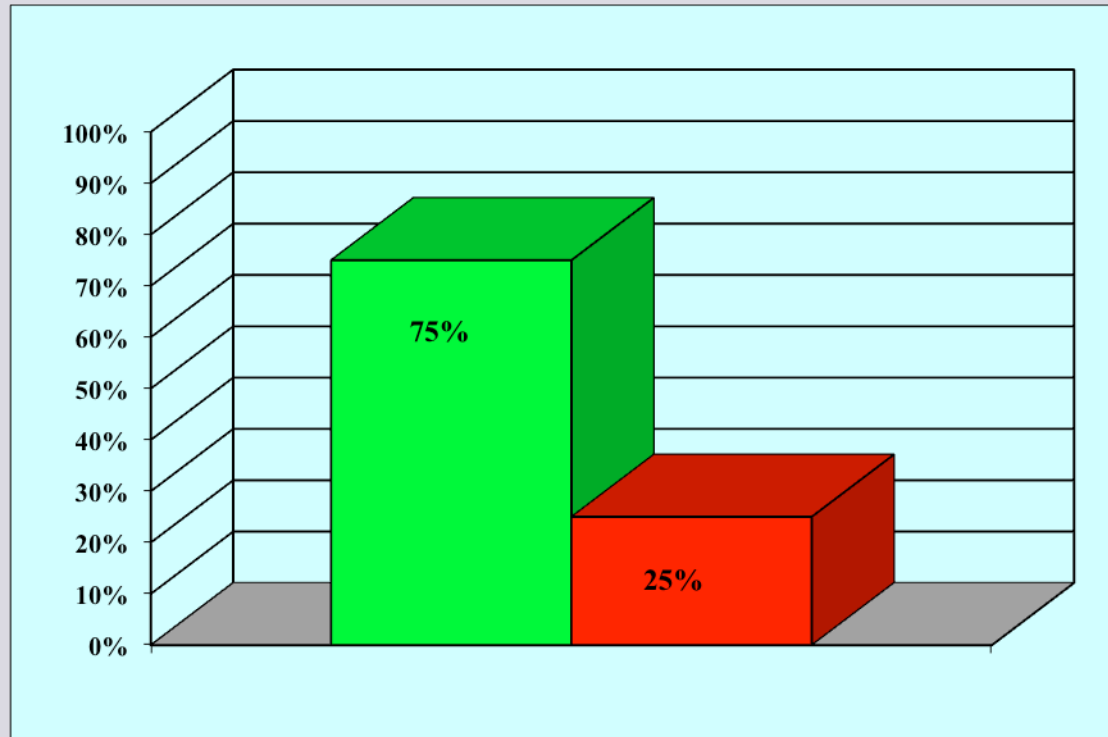


■ success	26 (86.7%)
■ failure	4 (13.3%)

	minimum	maximum	mean
Follow-up (months)	6	129	73
Age (years)	27	78	51

December 31, 2011

**32
patients**



**skin
graft**

■ success	24 (75%)
■ failure	8 (25%)

	minimum	maximum	mean
Follow-up (months)	8	185	76
Age (years)	15	75	44

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Two-stage penile urethroplasty



Minimally invasive technique using oral graft



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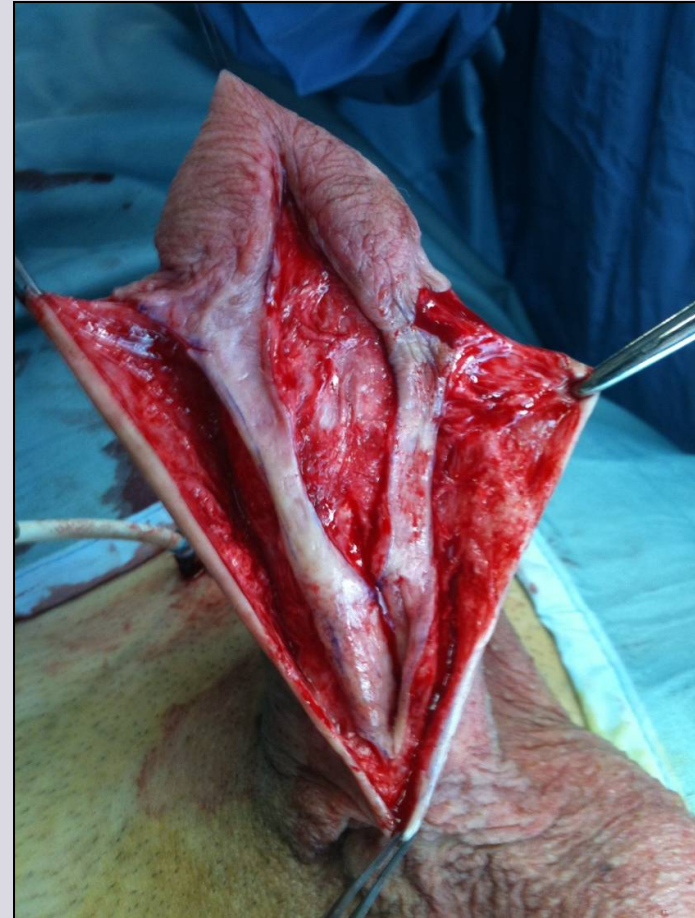
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Penile urethroplasty



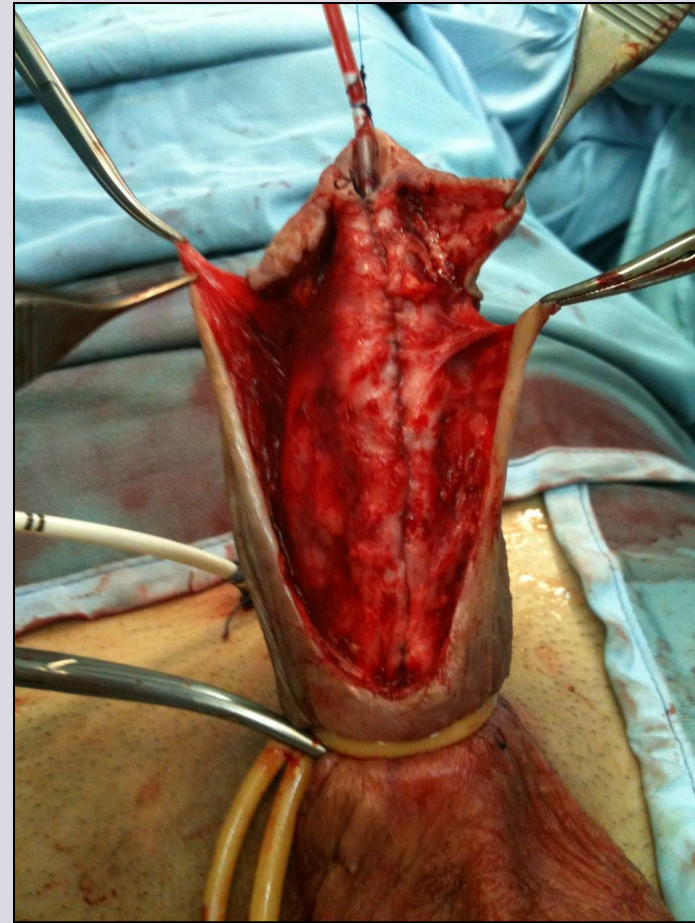
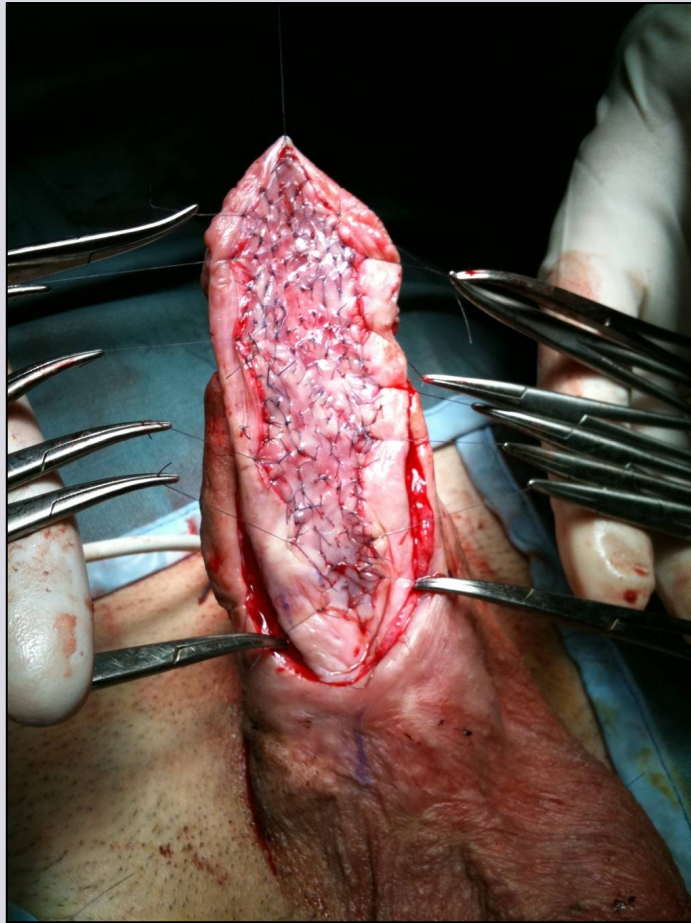
Staged urethroplasty (first stage - Johanson)

Penile urethroplasty



Staged urethroplasty (second stage)

Penile urethroplasty



Staged urethroplasty (second stage)

Penile urethroplasty



Staged urethroplasty (second stage)

Penile urethroplasty



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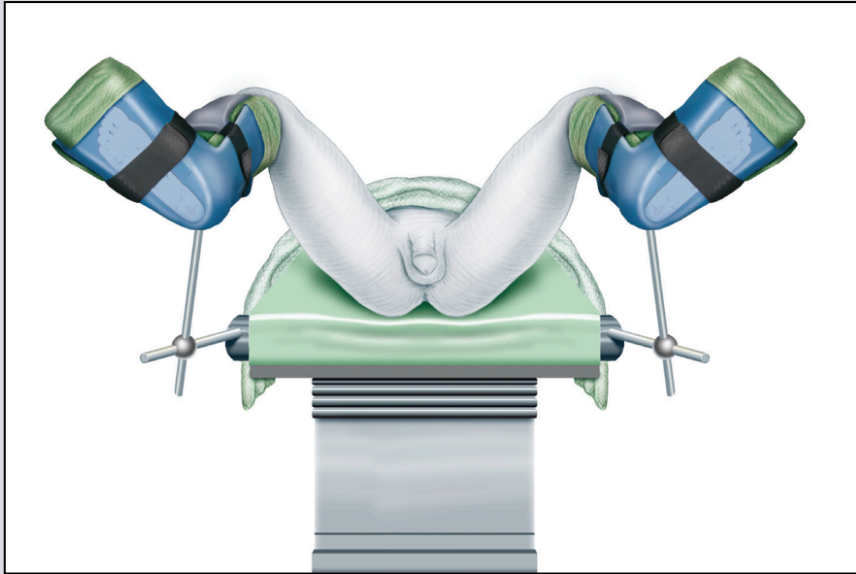


Bulbar urethoplasty

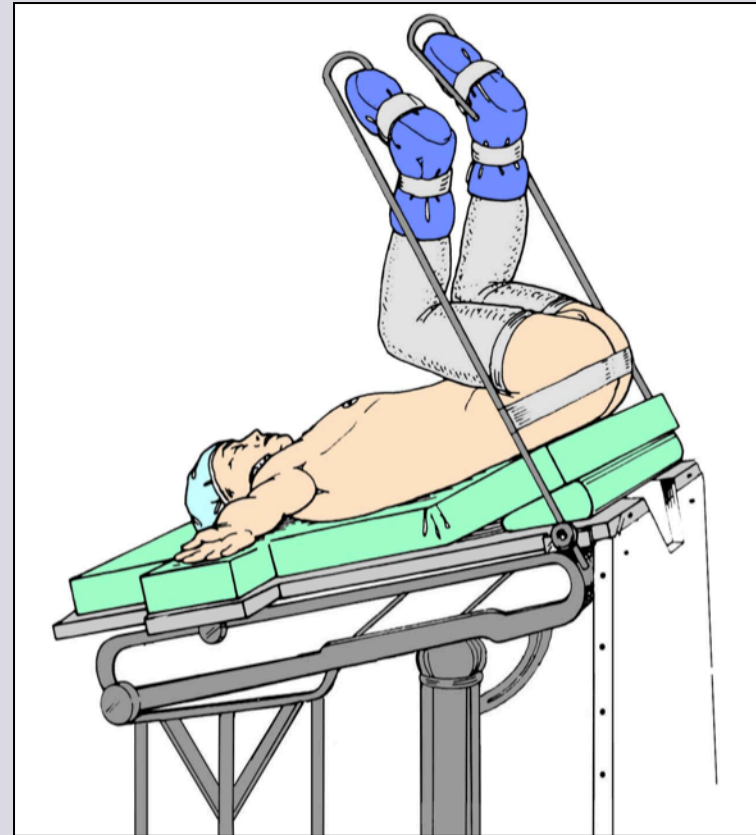
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Bulbar urethroplasty



Simple lithotomy position



NO

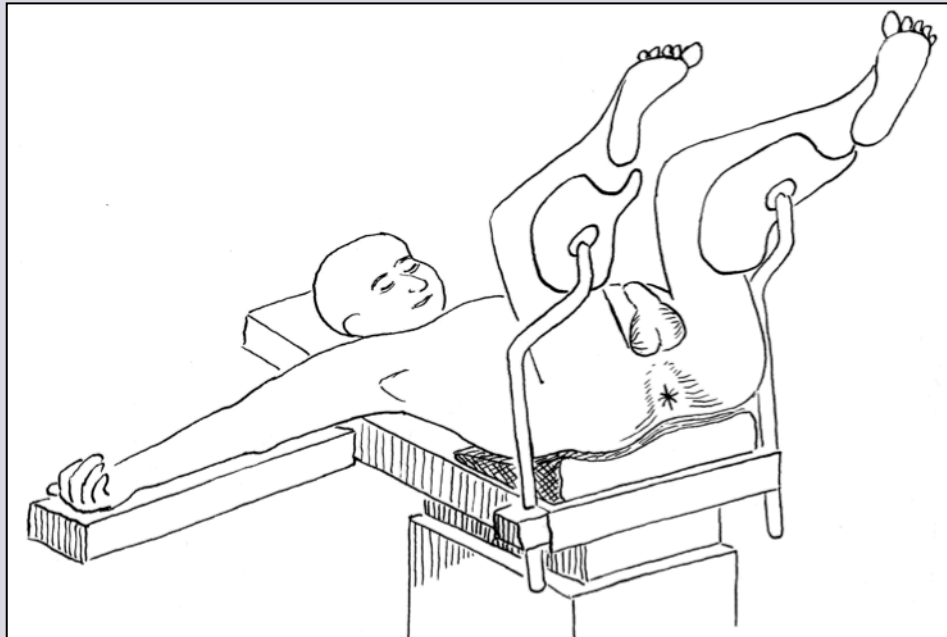
Bulbar urethroplasty



Allen stirrups with sequential inflatable compression sleeves

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Bulbar urethroplasty

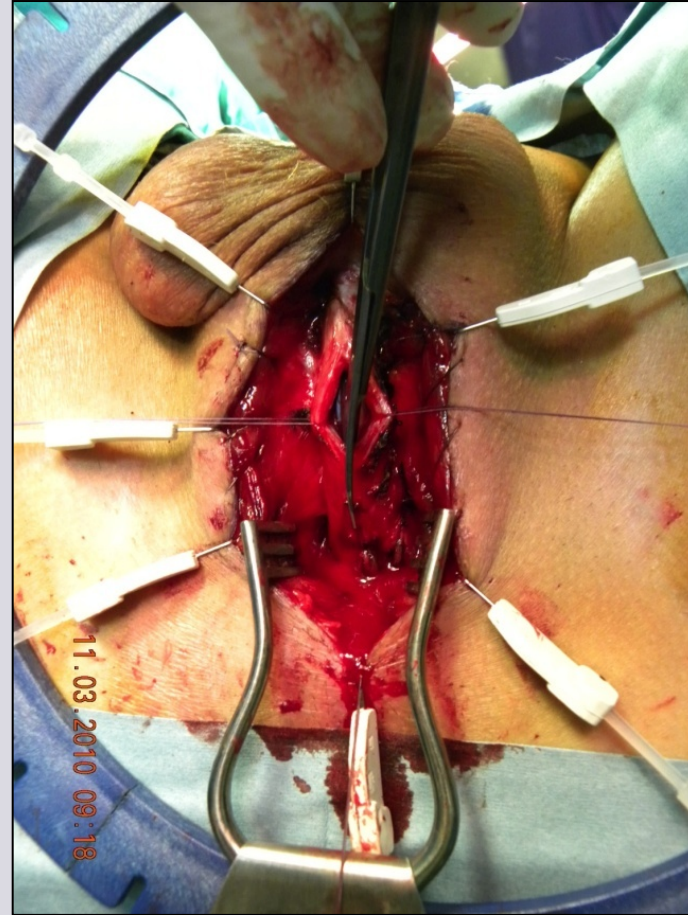
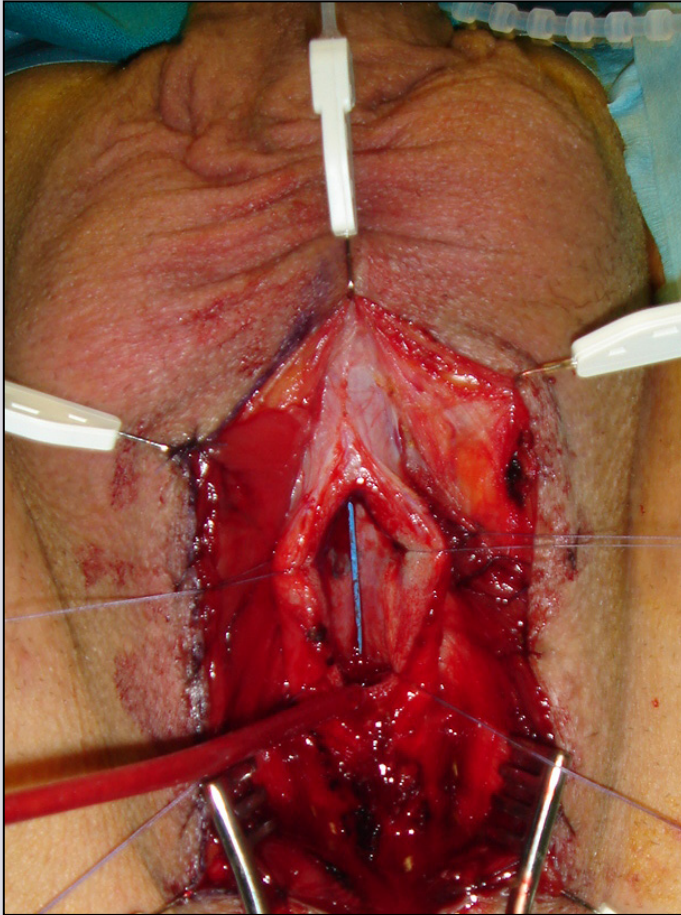


**Pre-operative
urethroscopy**



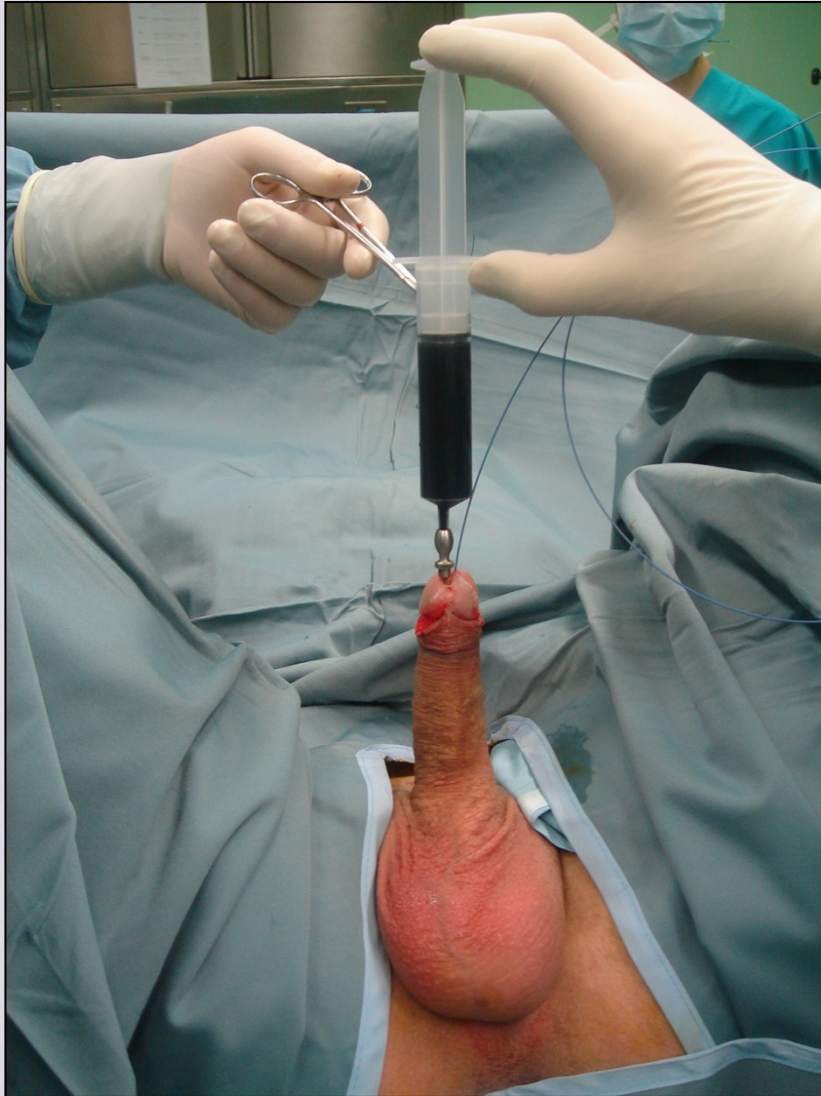
Insert Sensor guide wire

Bulbar urethroplasty



Insert Sensor guide wire

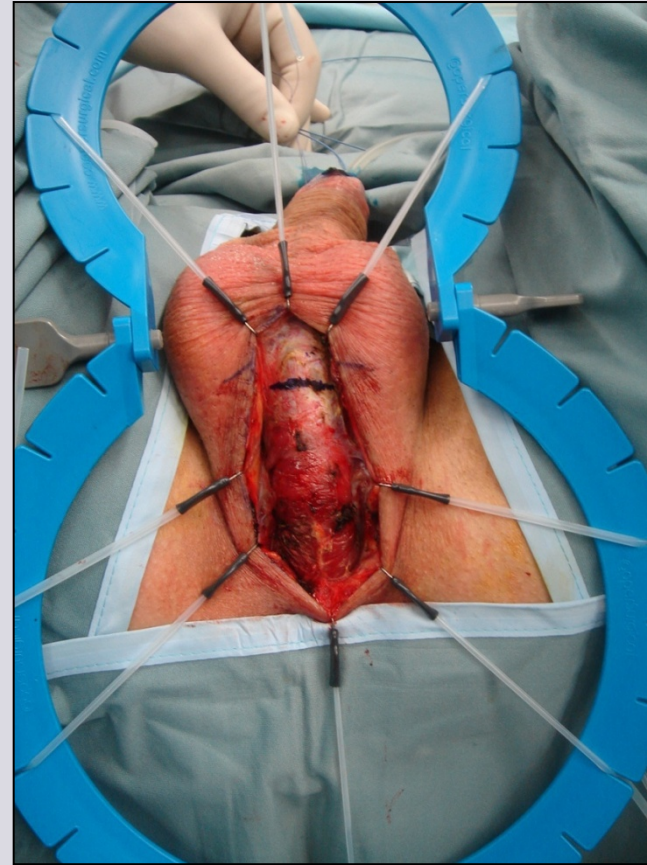
Bulbar urethroplasty



**Inject methylene blue
inside the urethra**

(G. Webster)

Bulbar urethroplasty



Calibrate the distal urethra and identify the distal stop

Bulbar urethroplasty



**Transect or not transect
the urethra?**

Ventral or dorsal graft?

Stricture etiology

Trauma

End-to-end anastomosis
Augmented anastomotic repair

Instrumentation

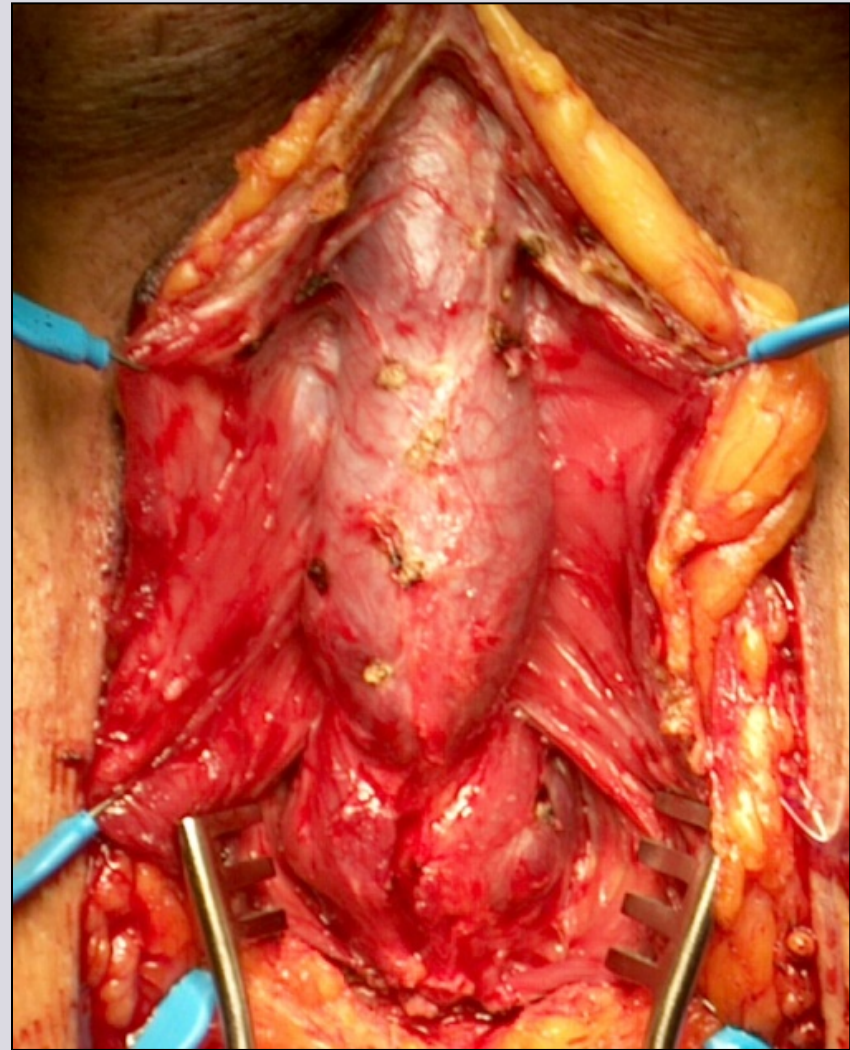
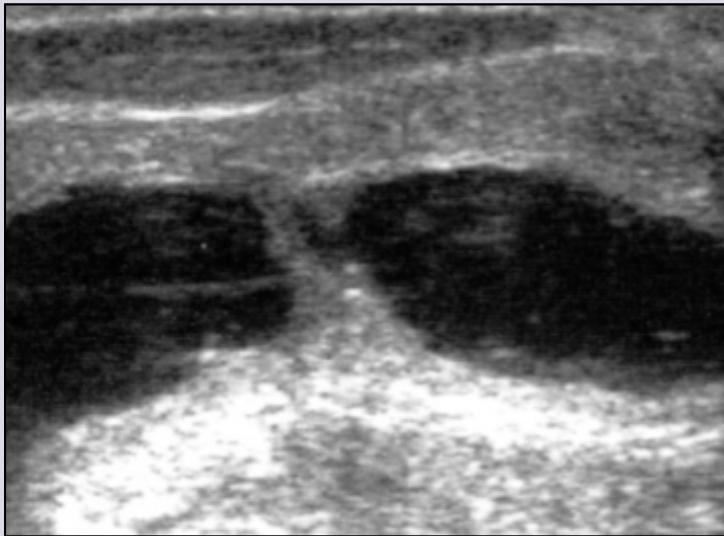
Catheter

Infection

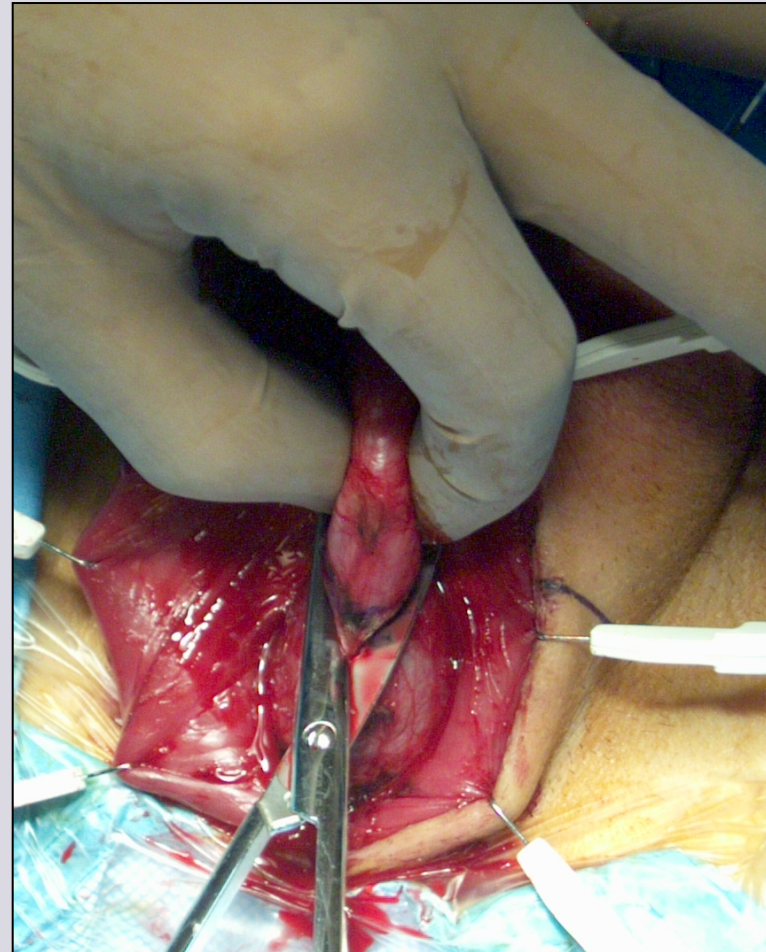
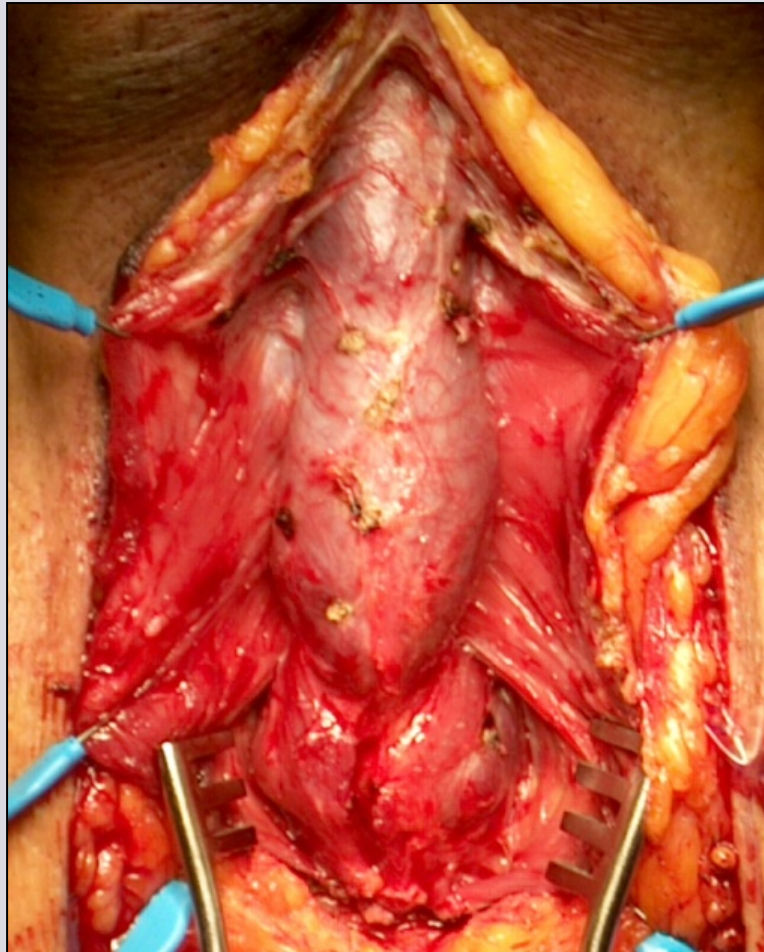
Other

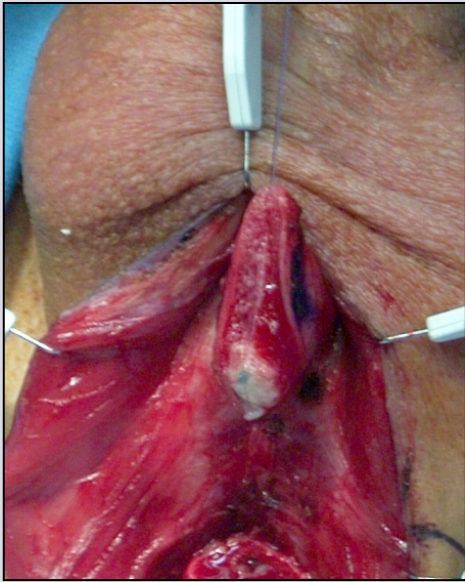
Oral mucosa onlay

1 - 2 cm **traumatic** bulbar urethral stricture

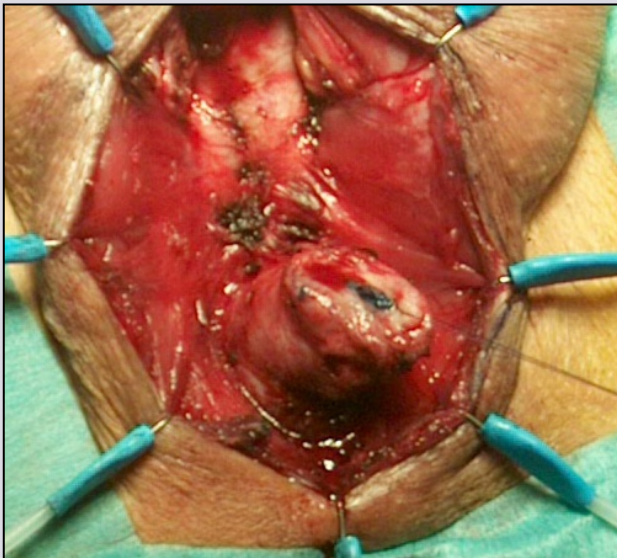
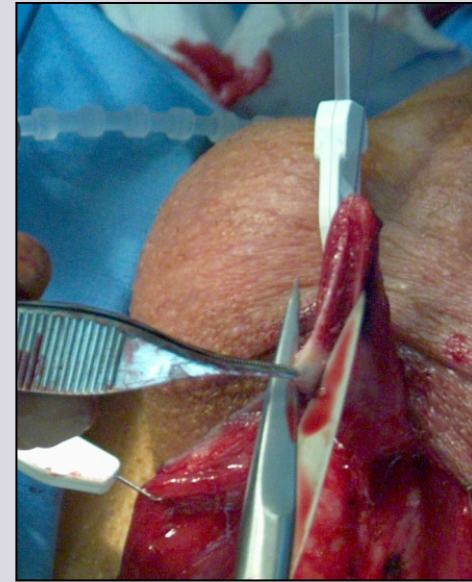


End-to-end anastomosis



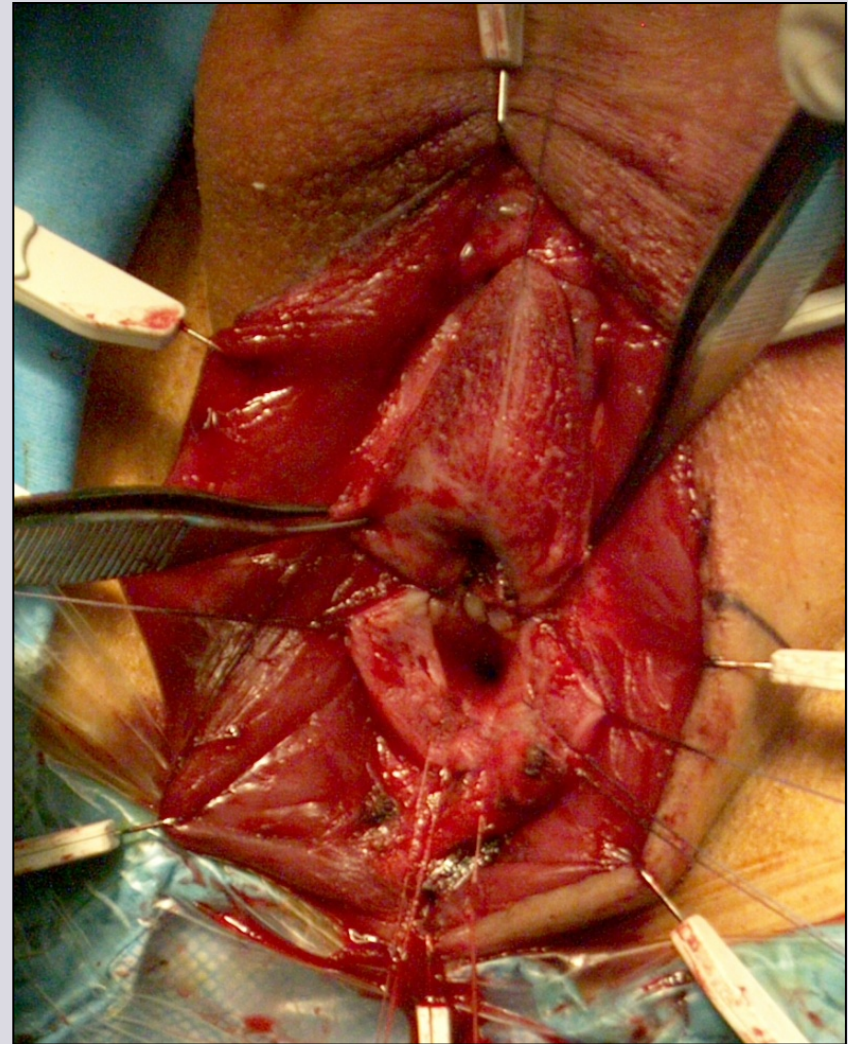
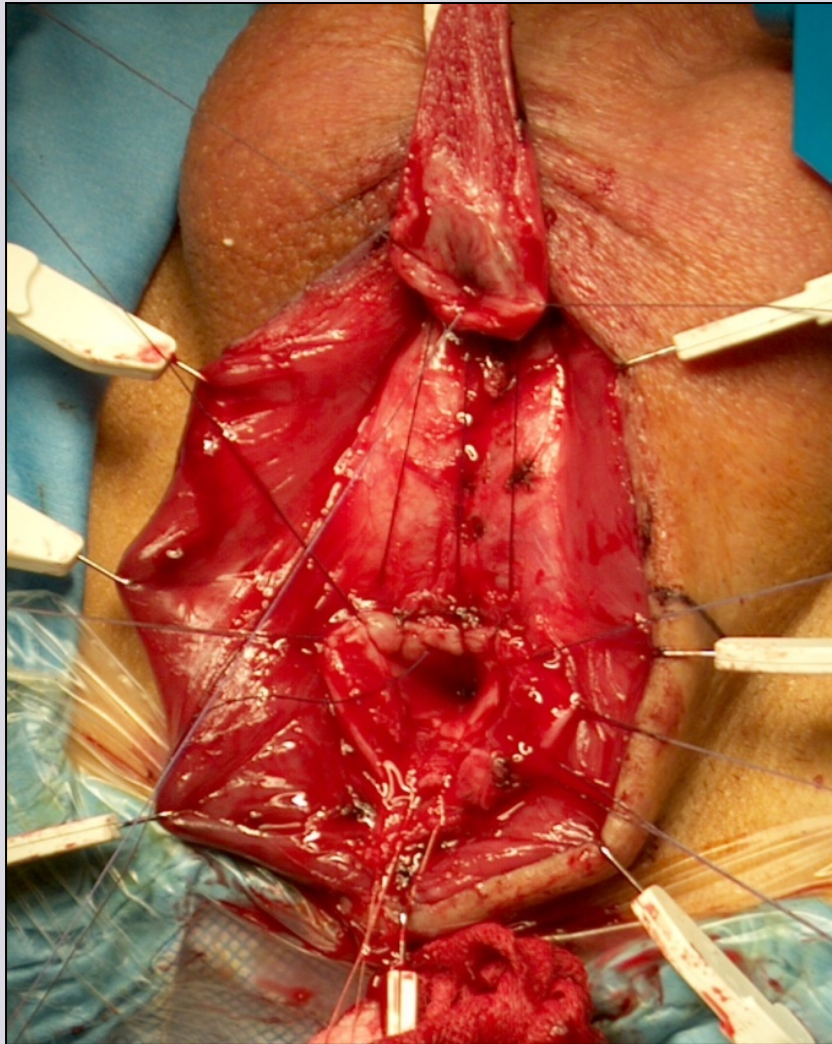


distal end



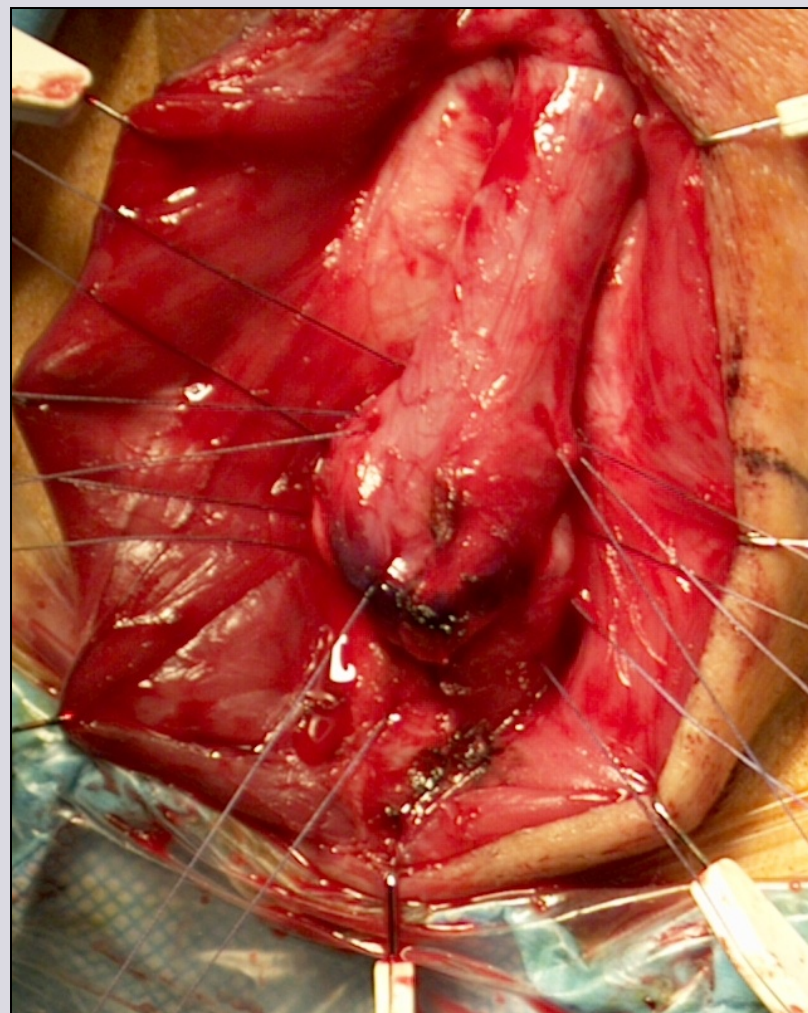
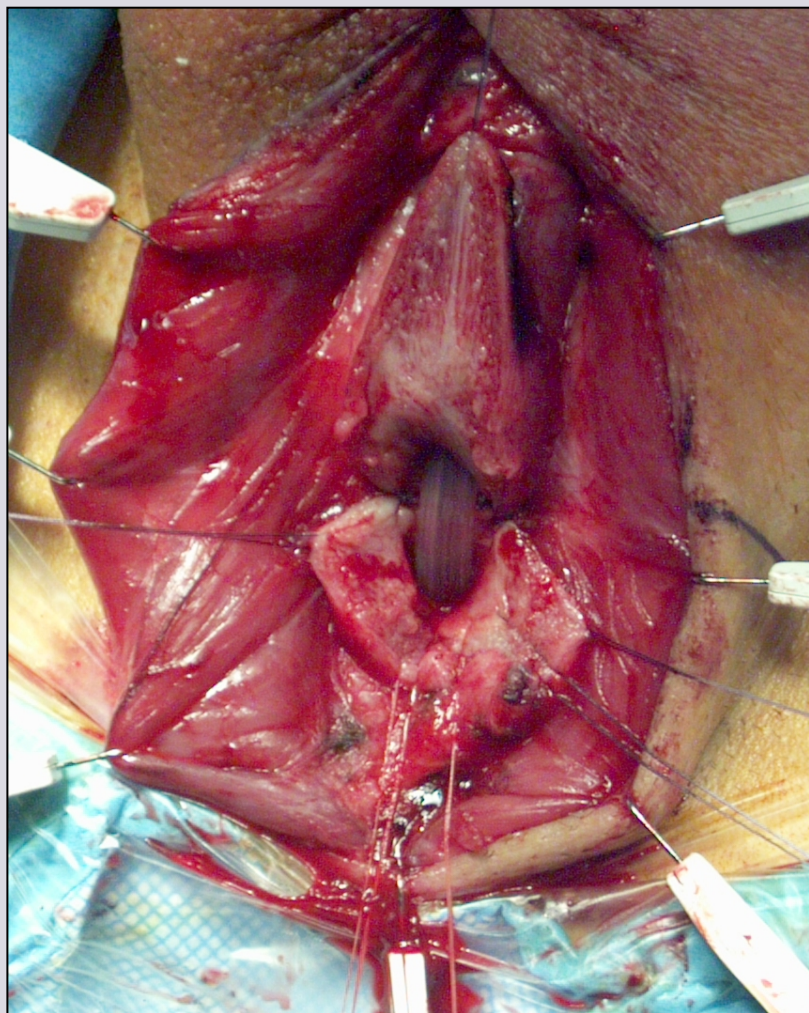
proximal end





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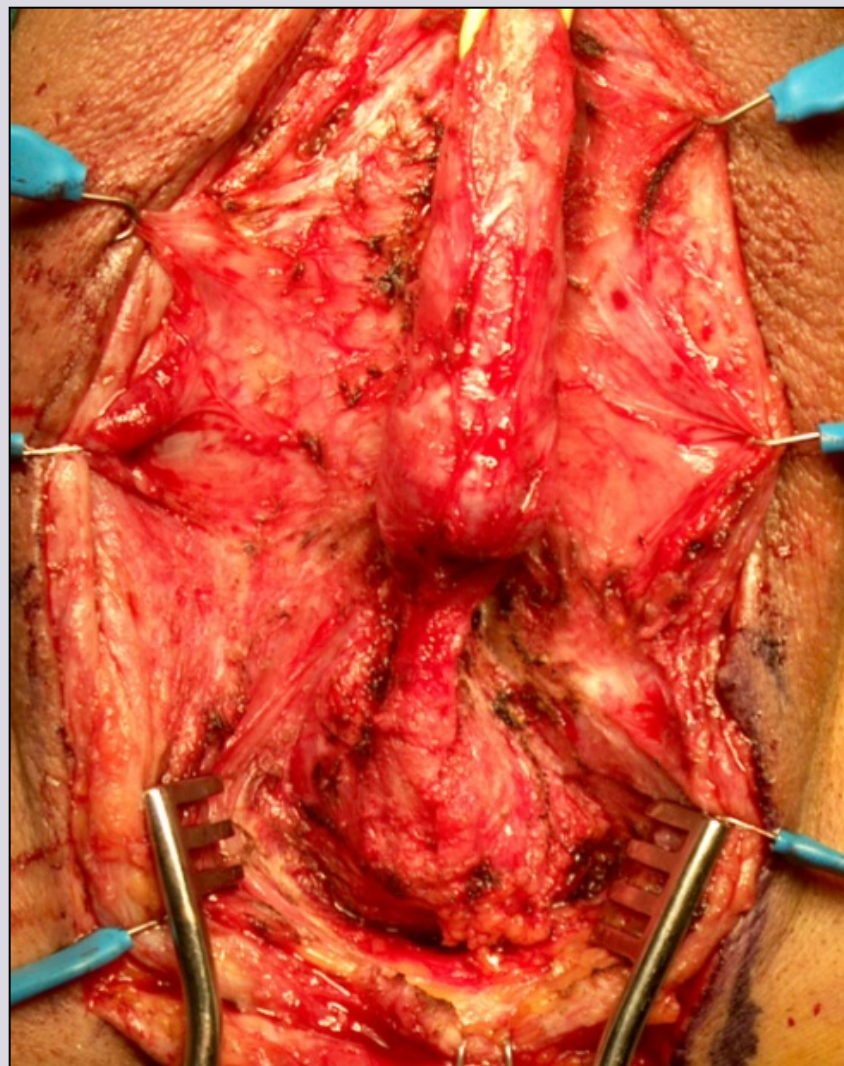
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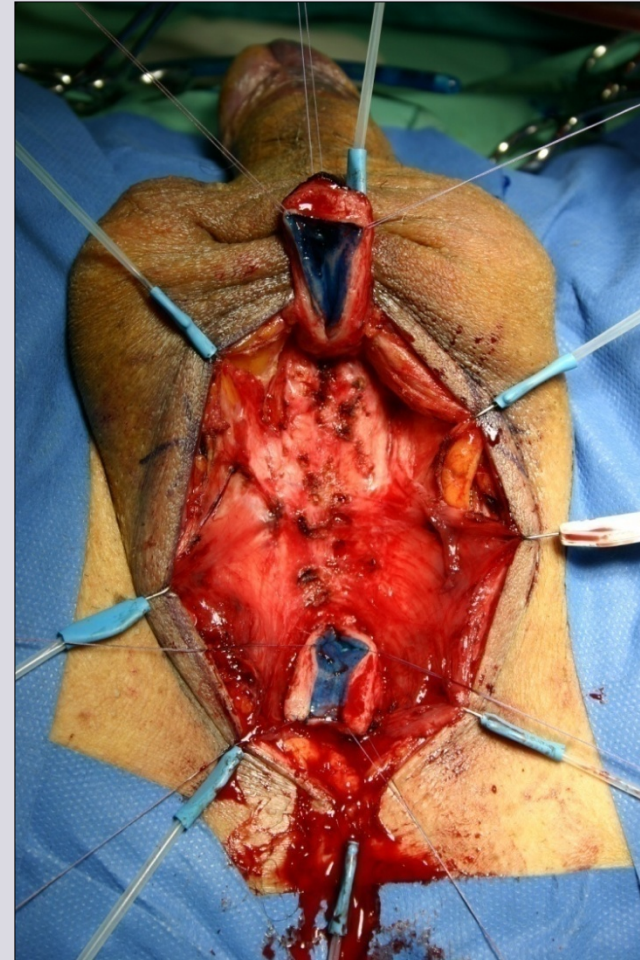
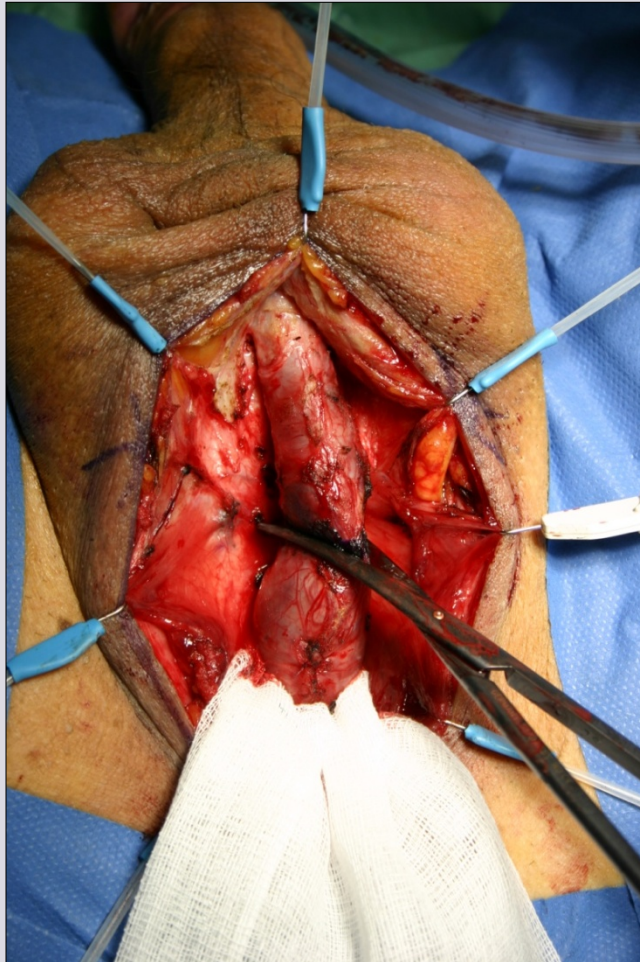
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2 - 4 cm traumatic bulbar urethral stricture



Augmented anastomotic repair



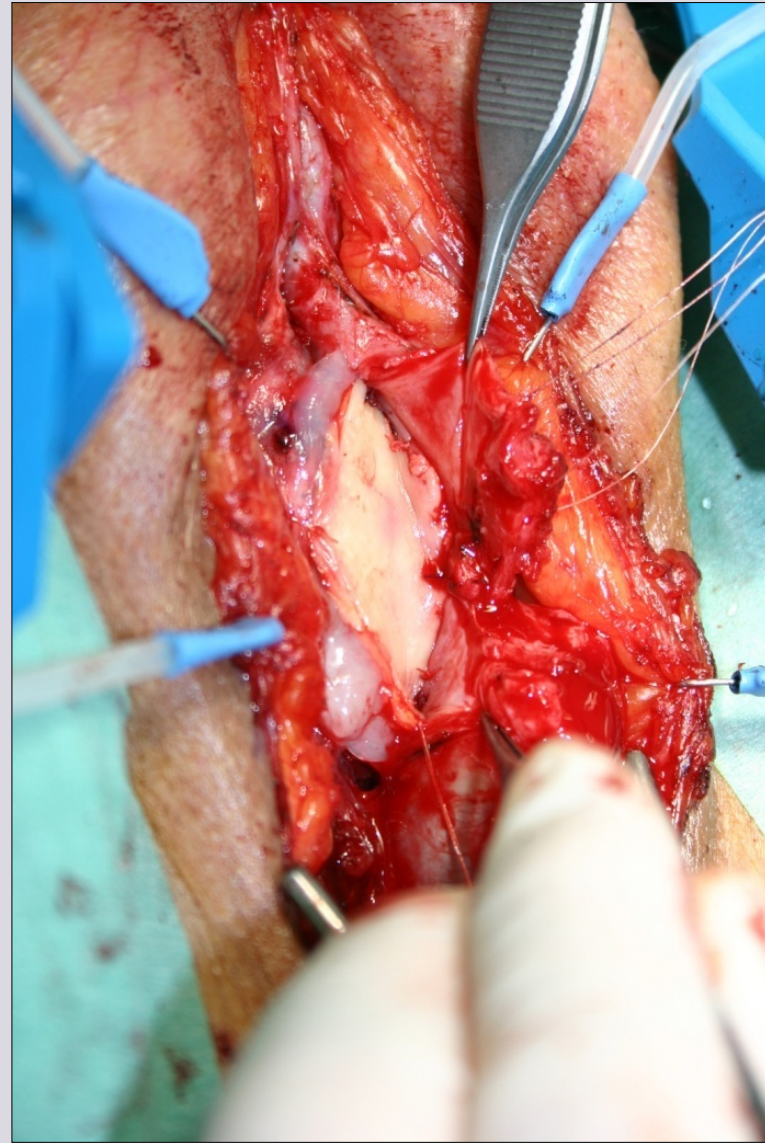
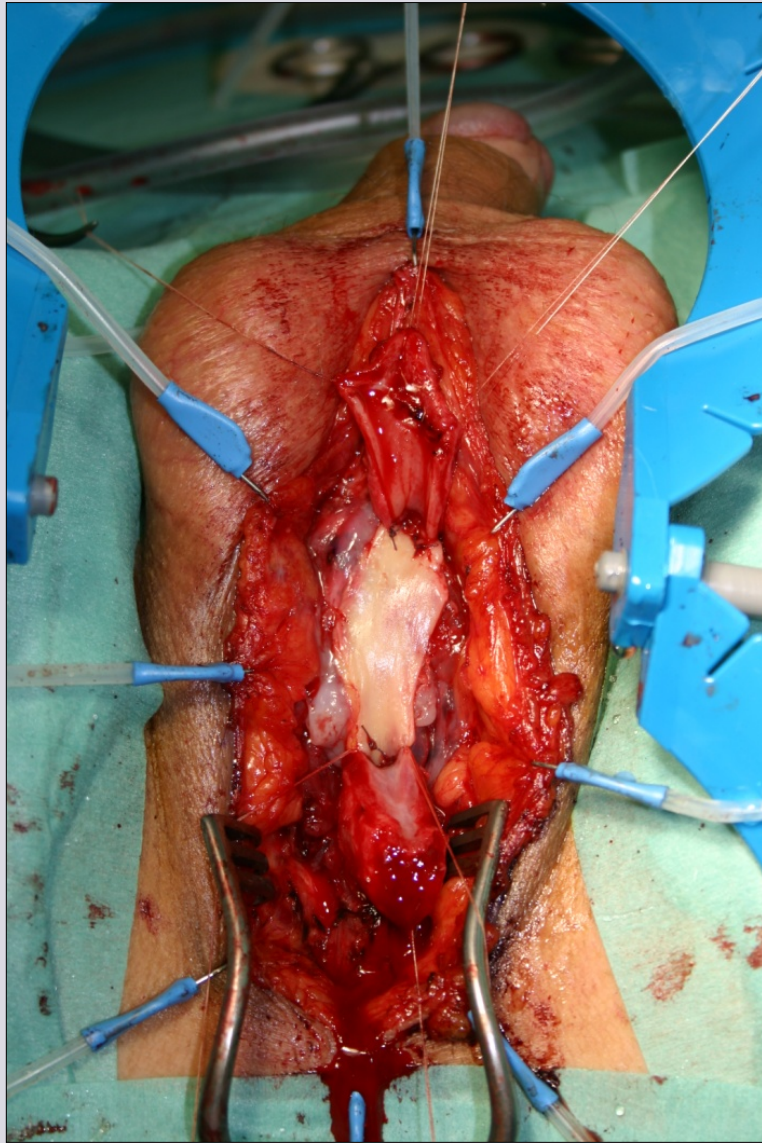
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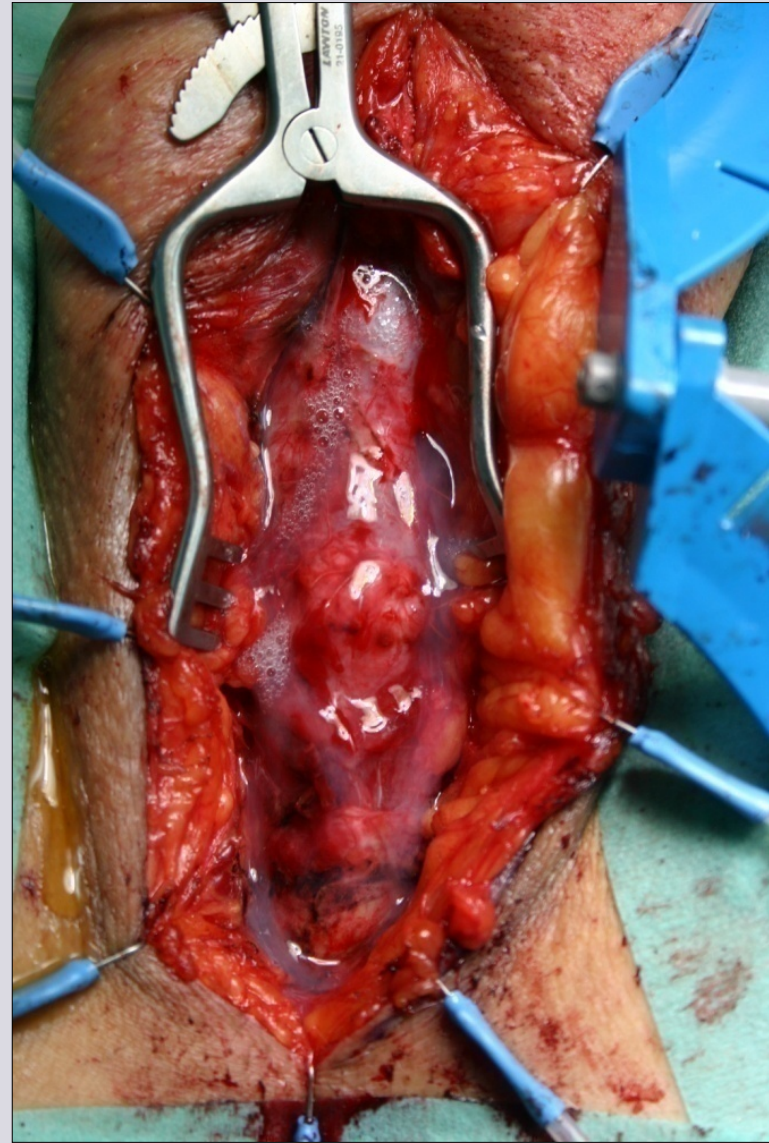
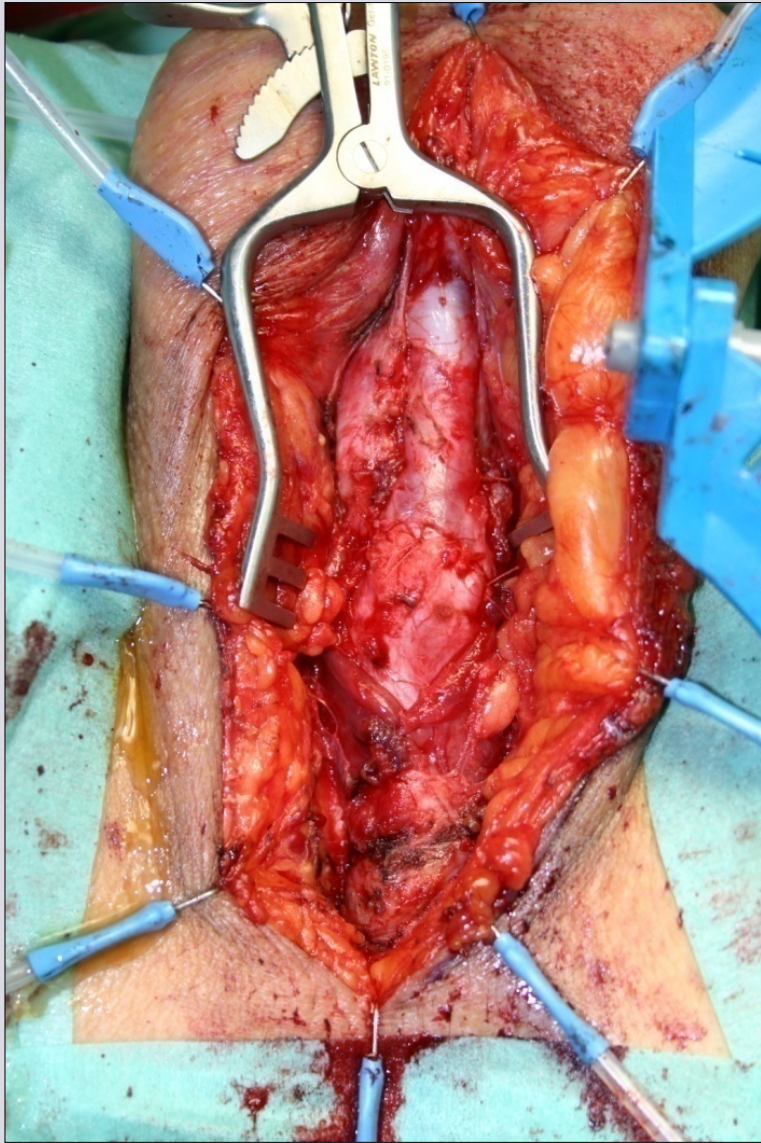
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Stricture etiology

Trauma

End-to-end anastomosis
Augmented anastomotic repair

Instrumentation

Catheter

Infection

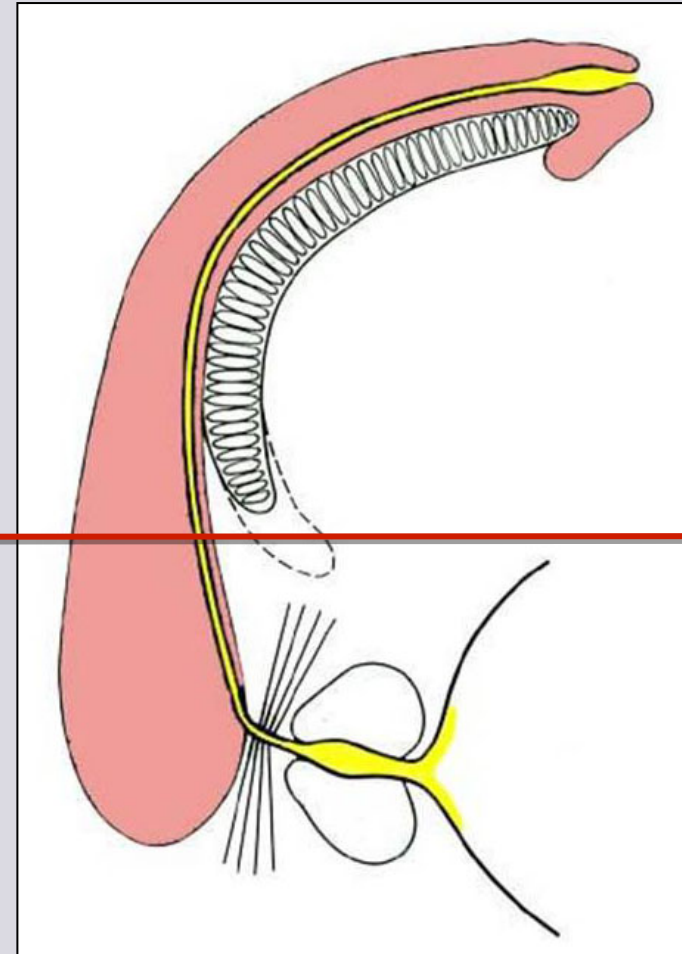
Other

Oral mucosa onlay

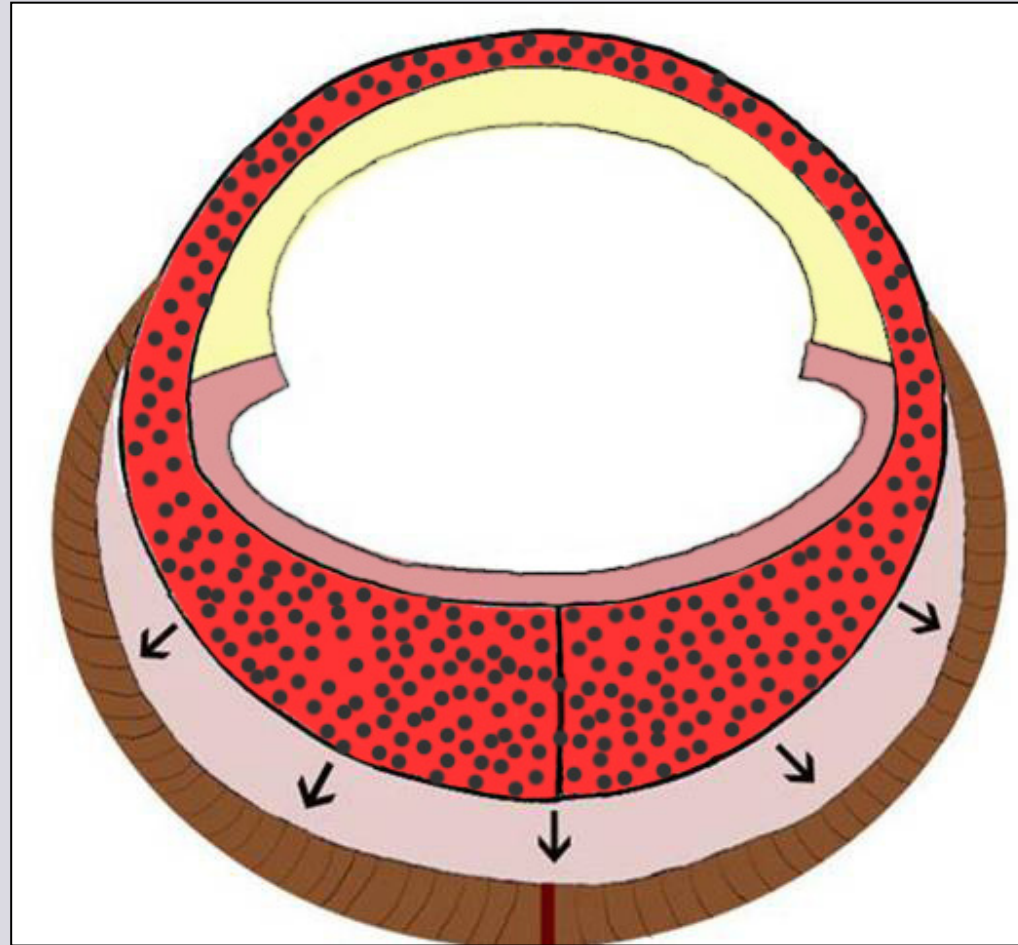
Ventral or dorsal graft?



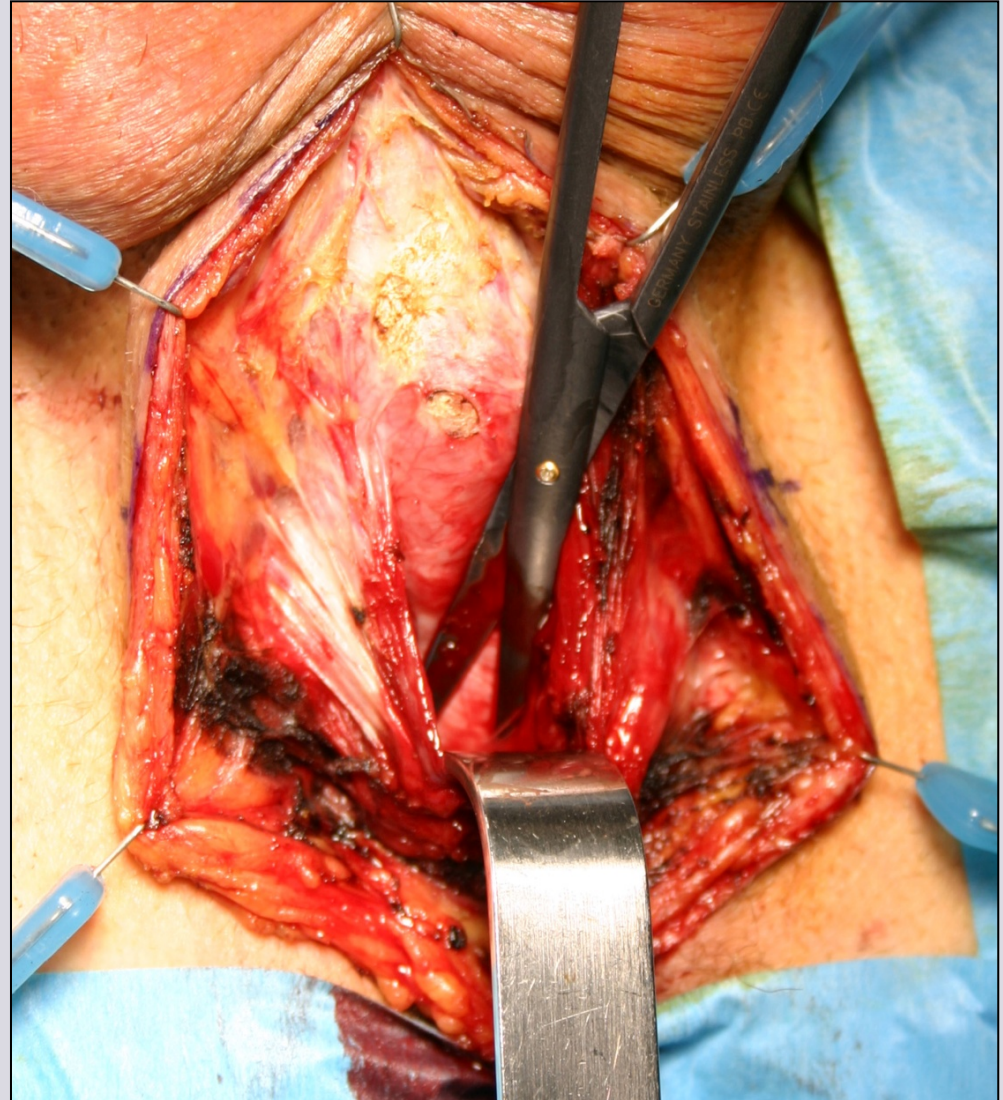
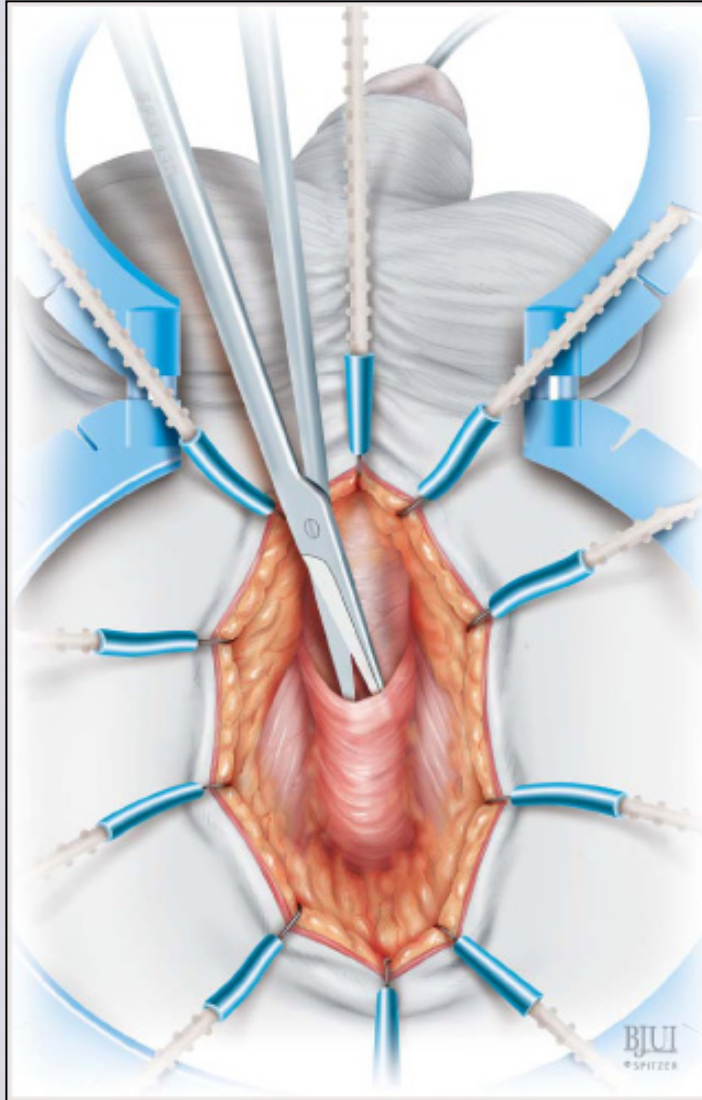
Distal
Dorsal onlay



Proximal
Ventral onlay

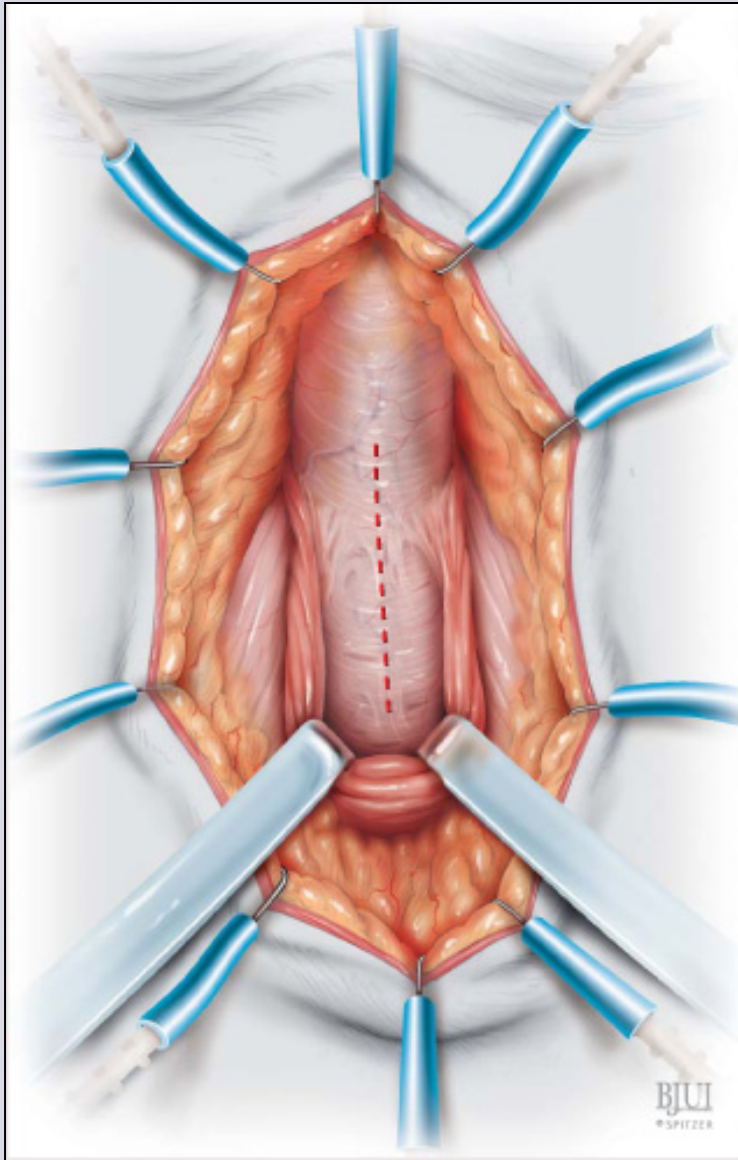


Muscle and nerve-sparing **ventral onlay graft
bulbar urethroplasty**



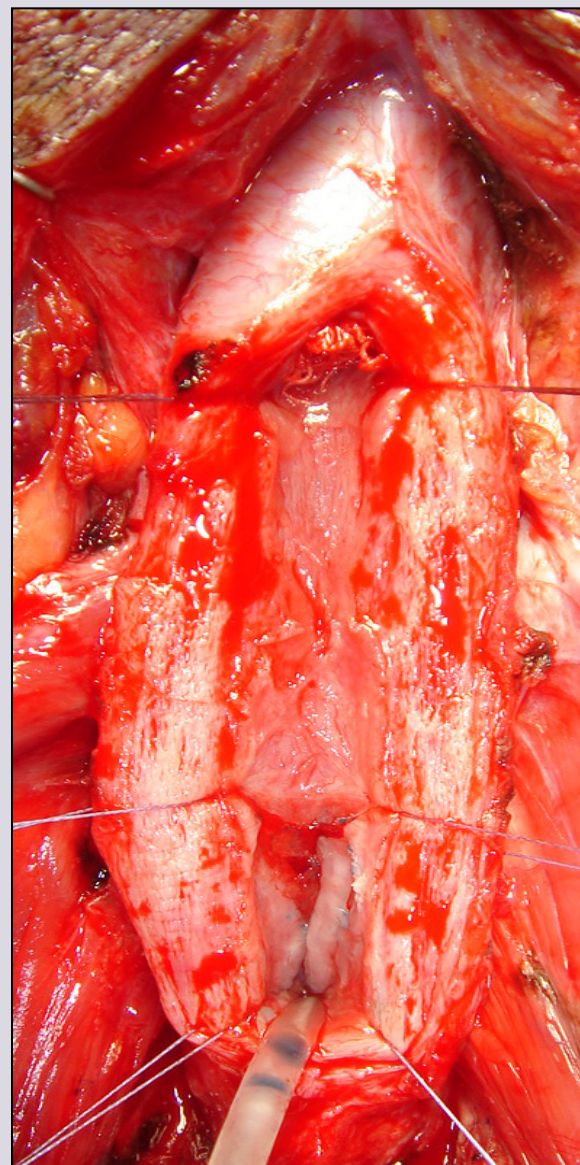
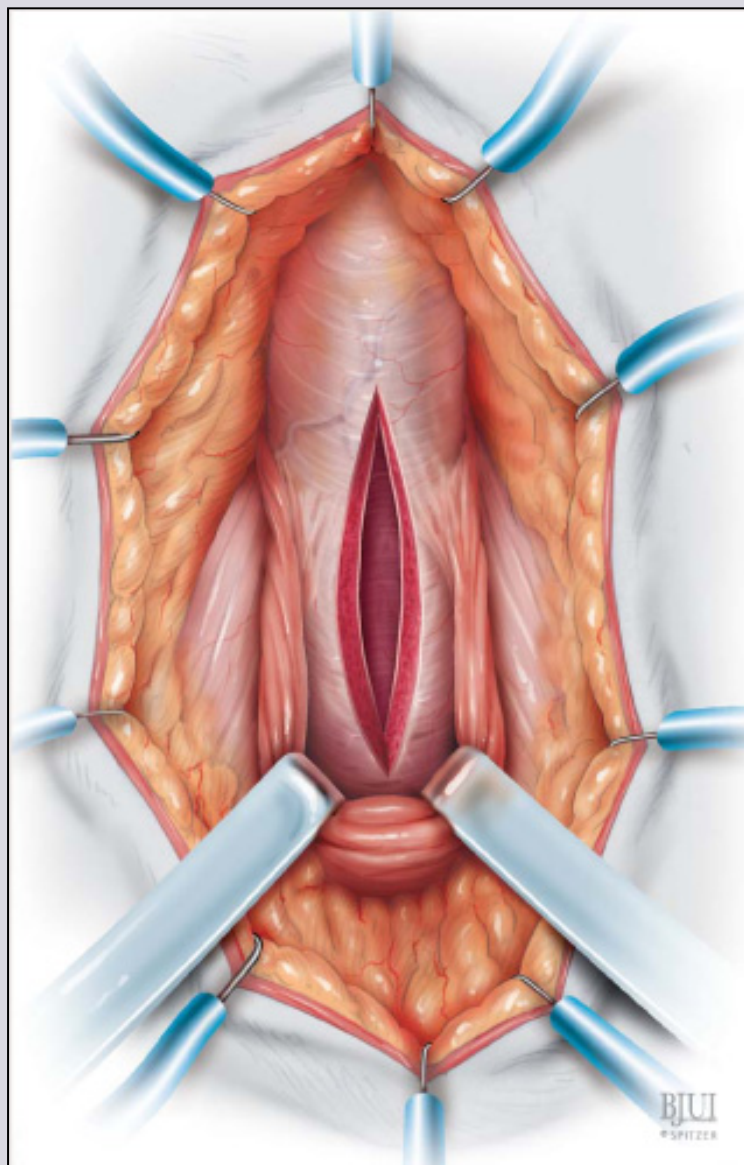
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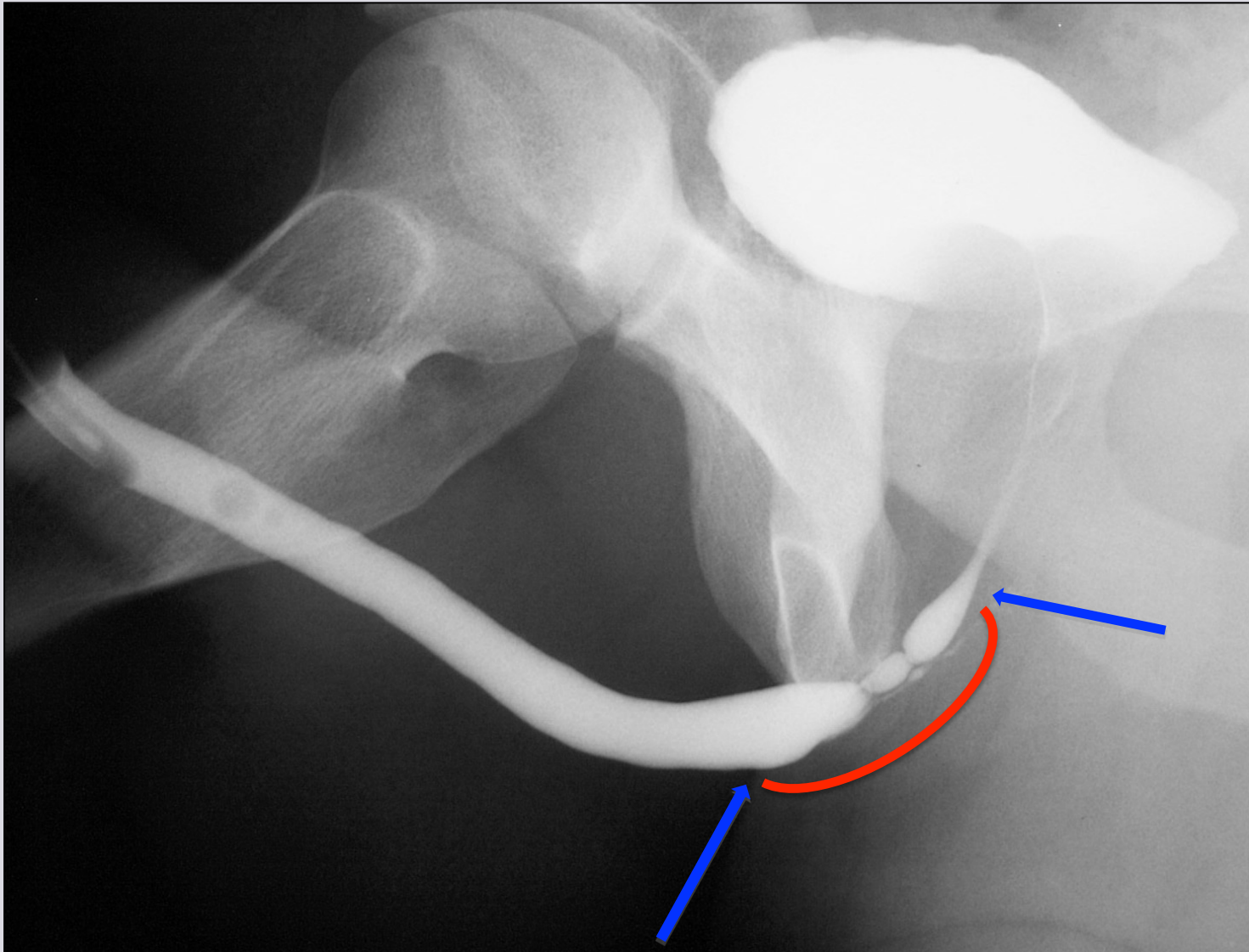
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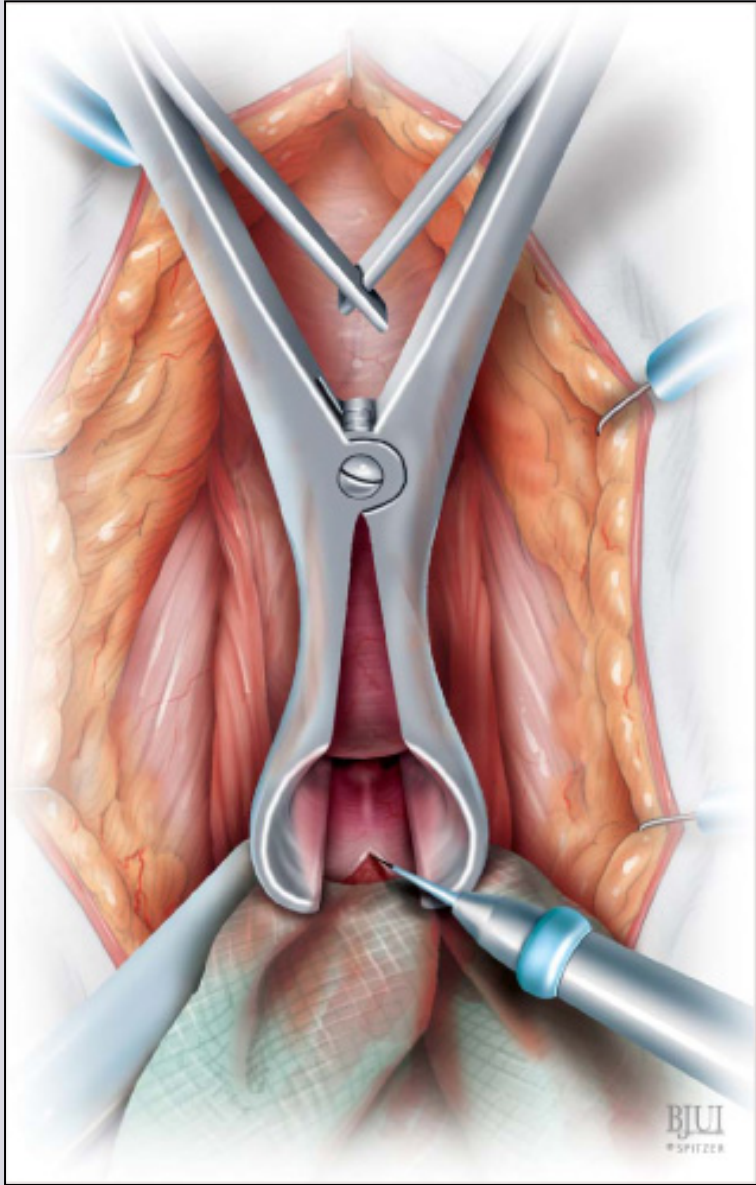
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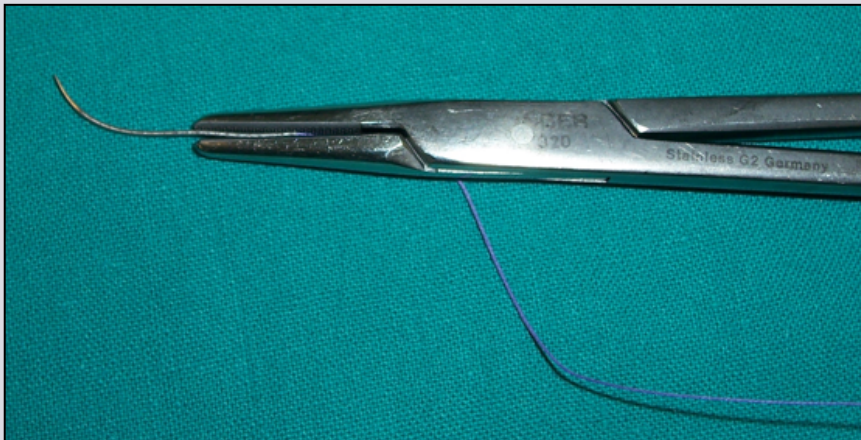
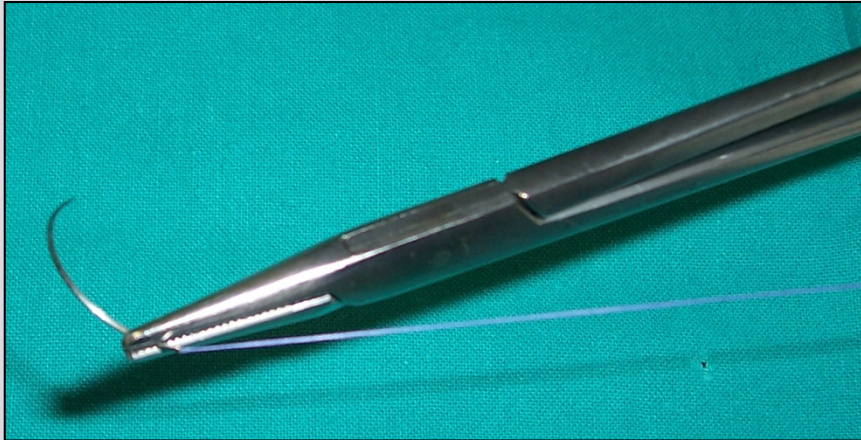
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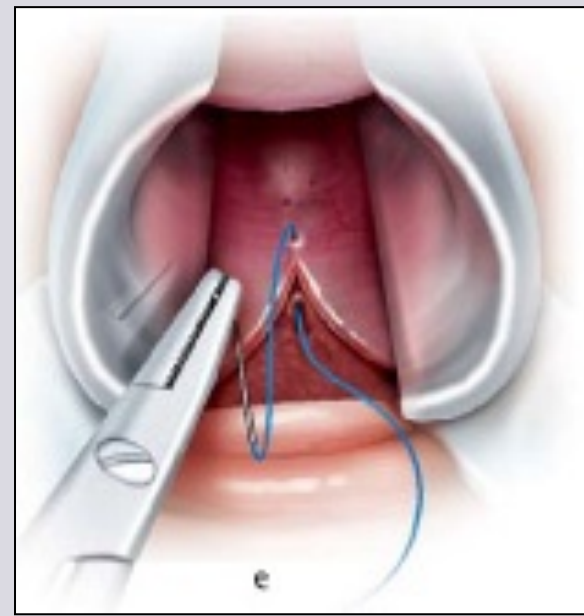
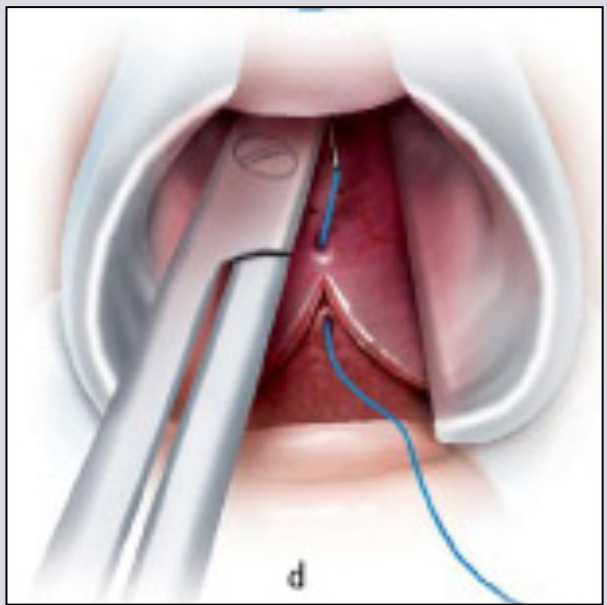
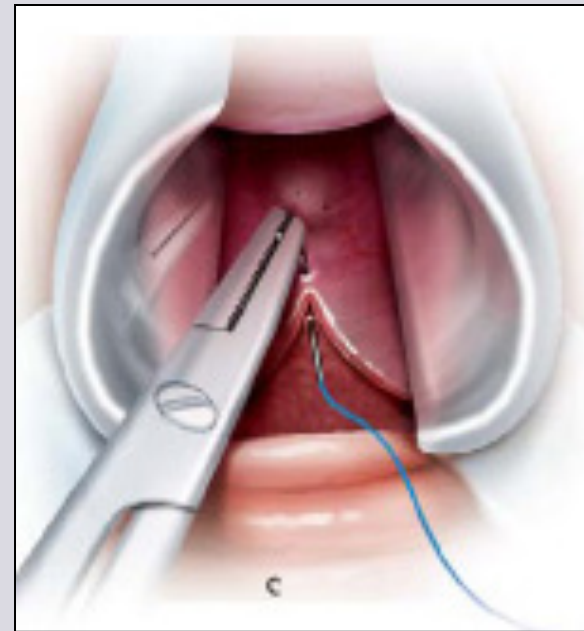
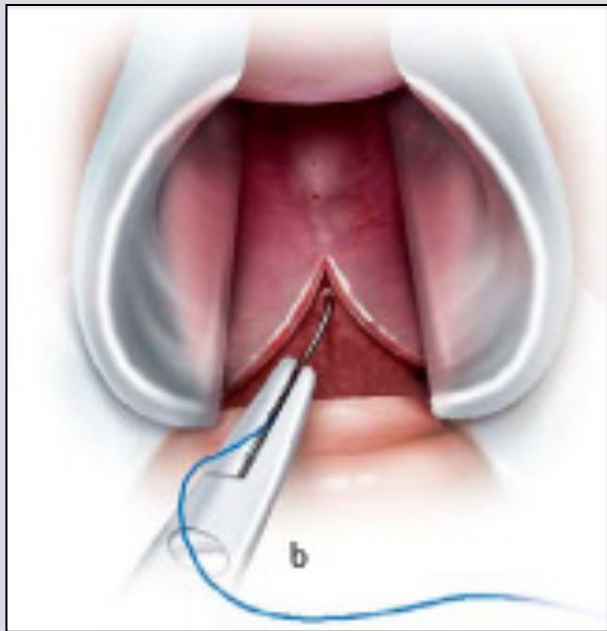
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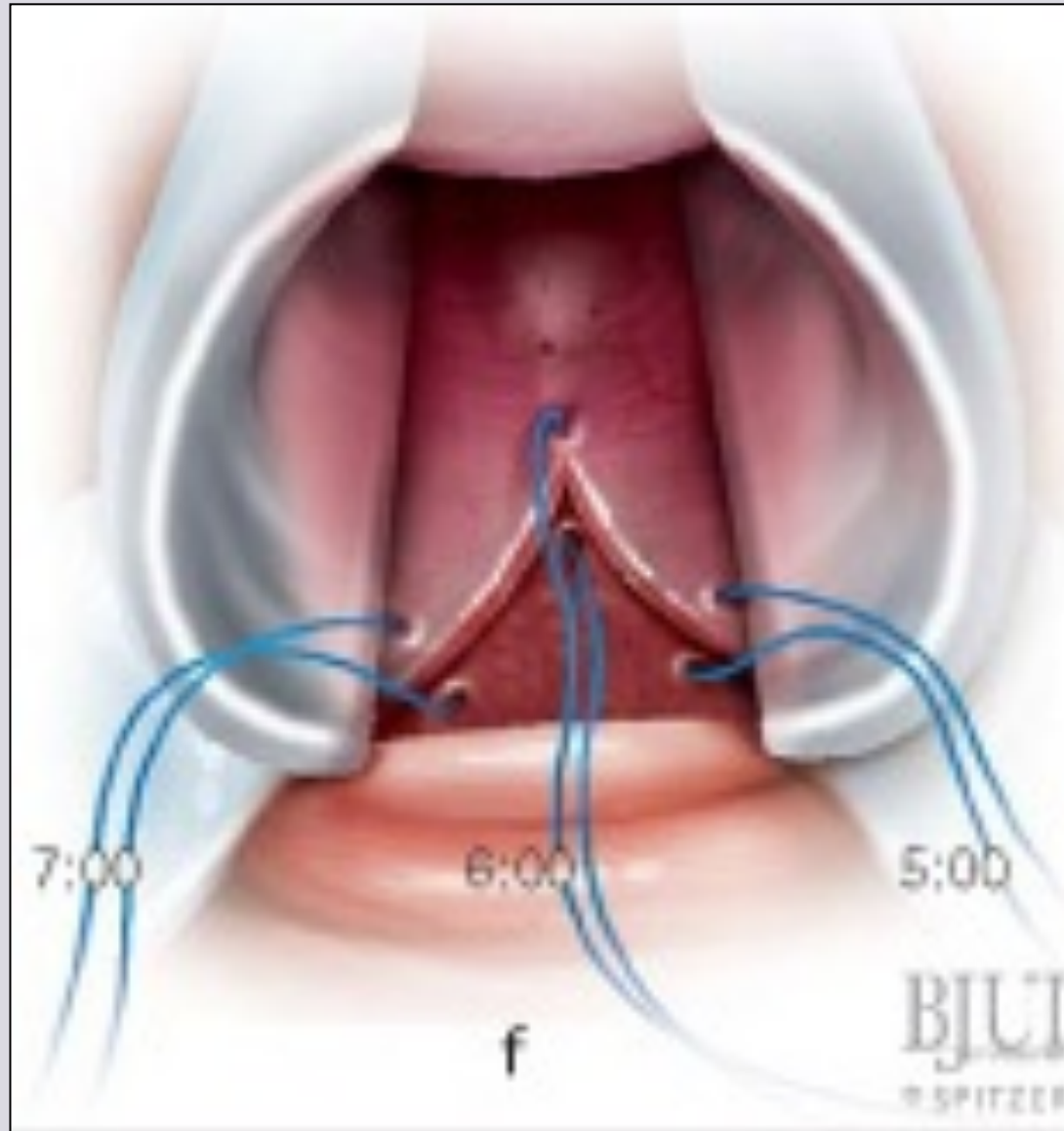
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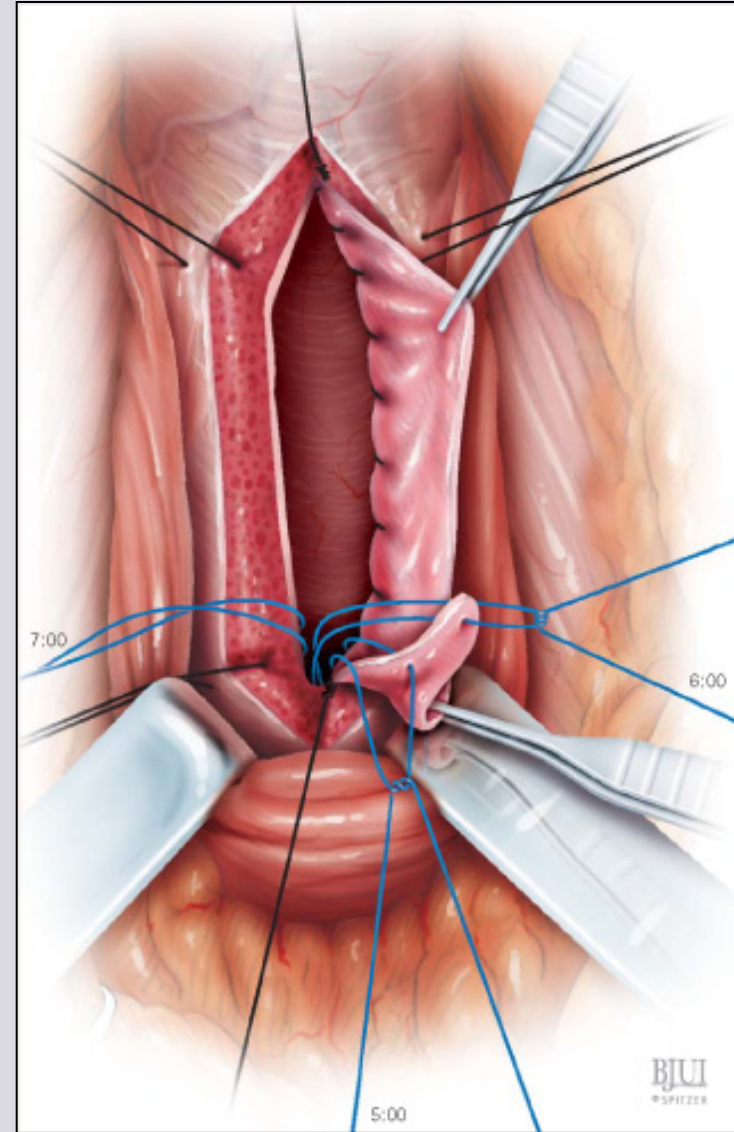
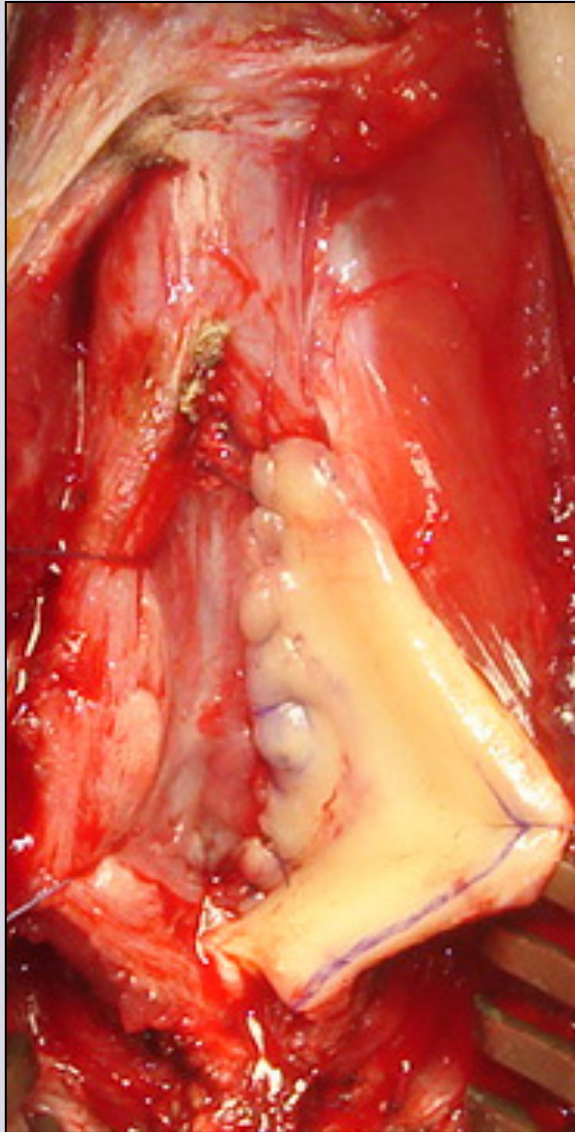
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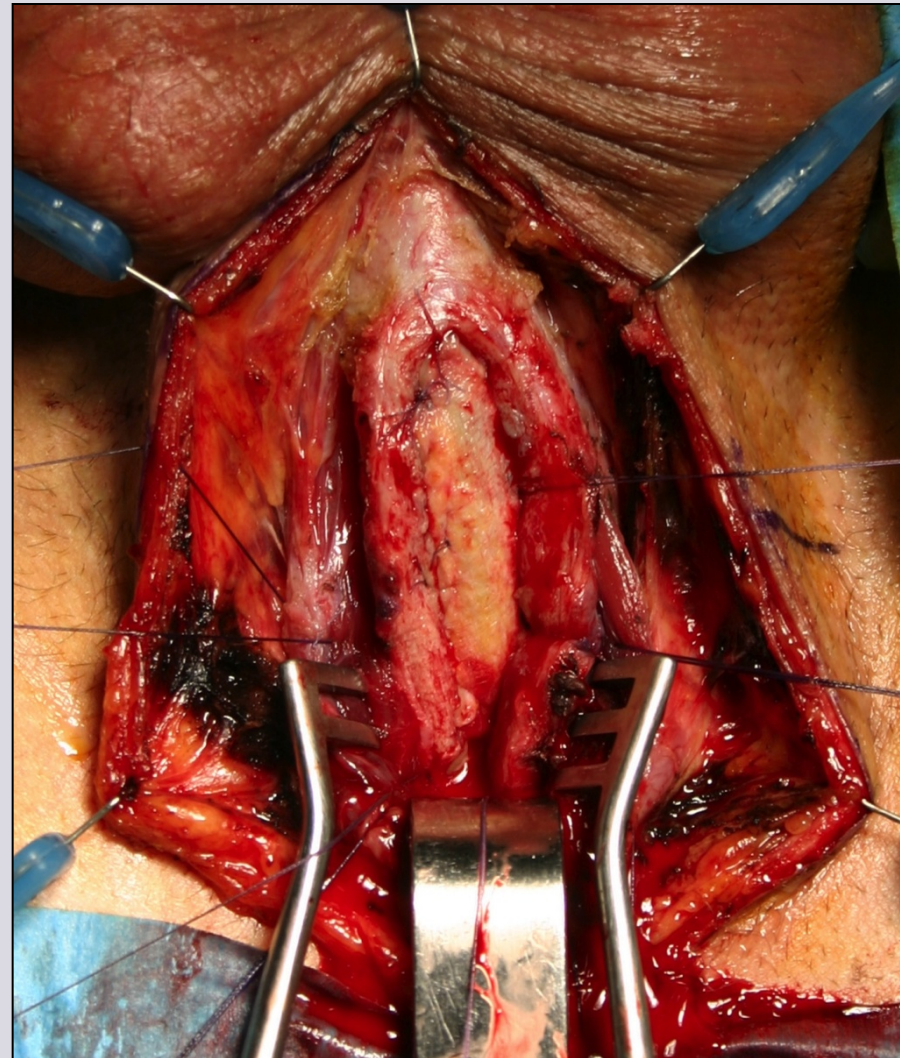
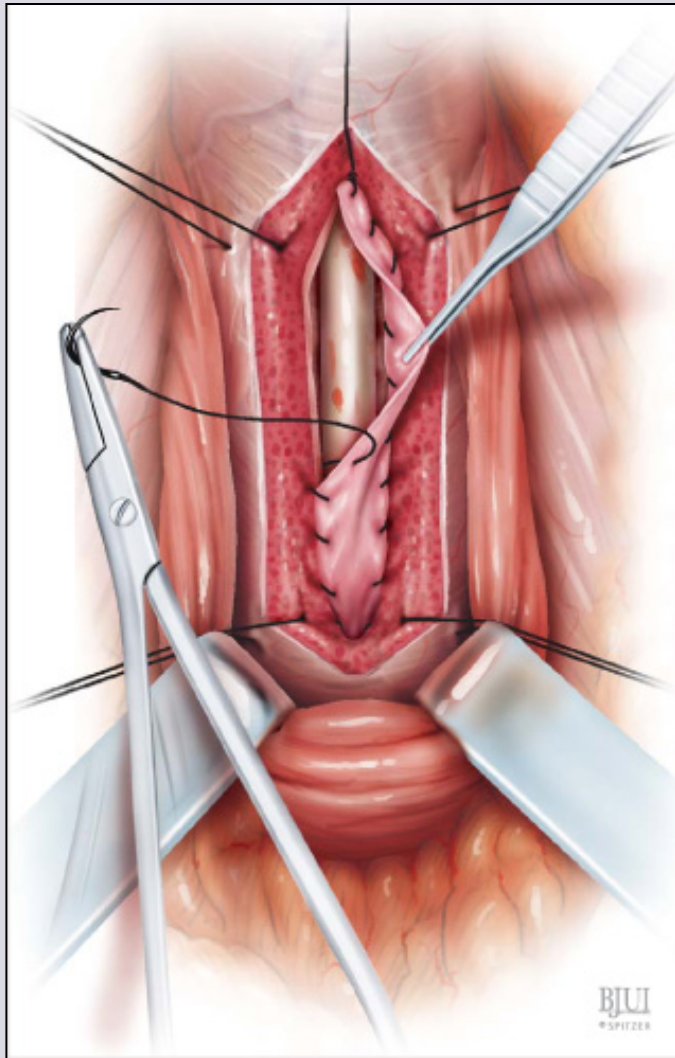
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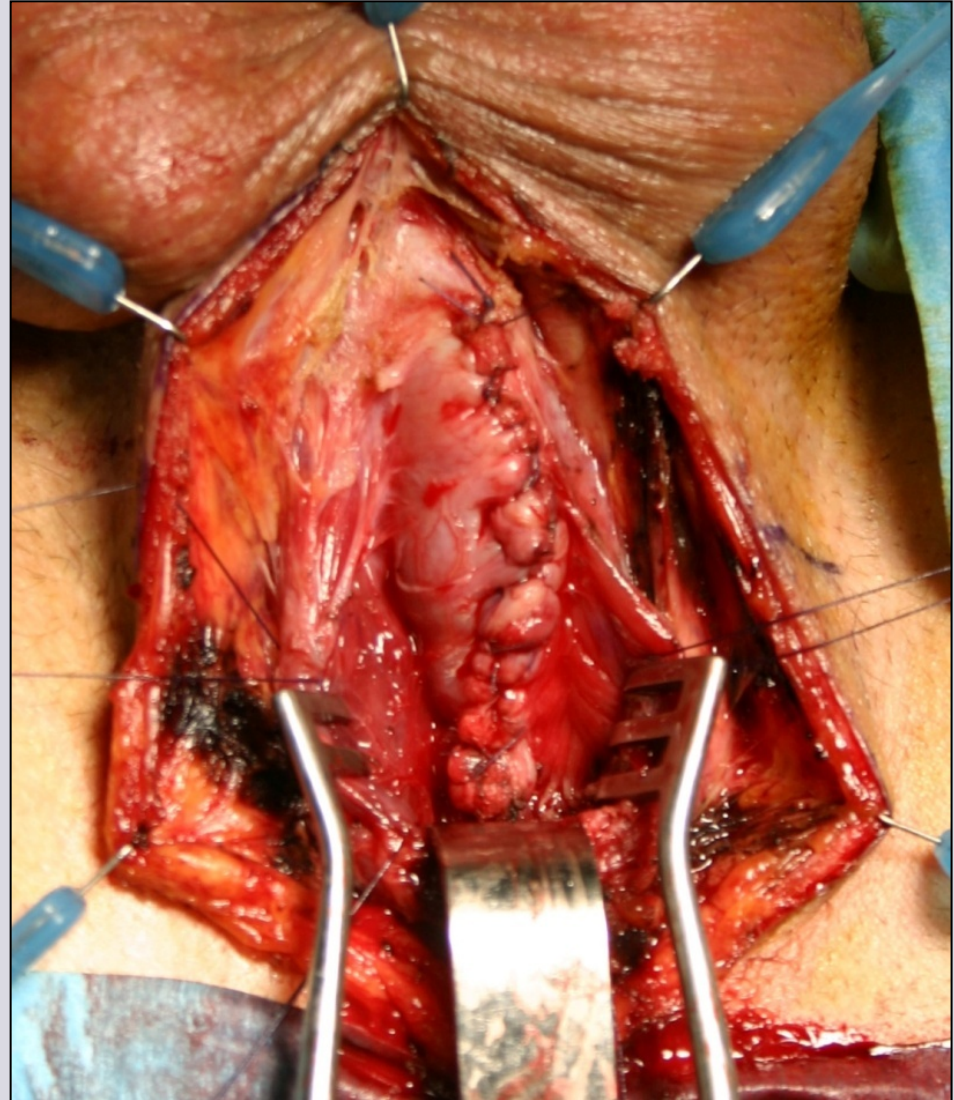
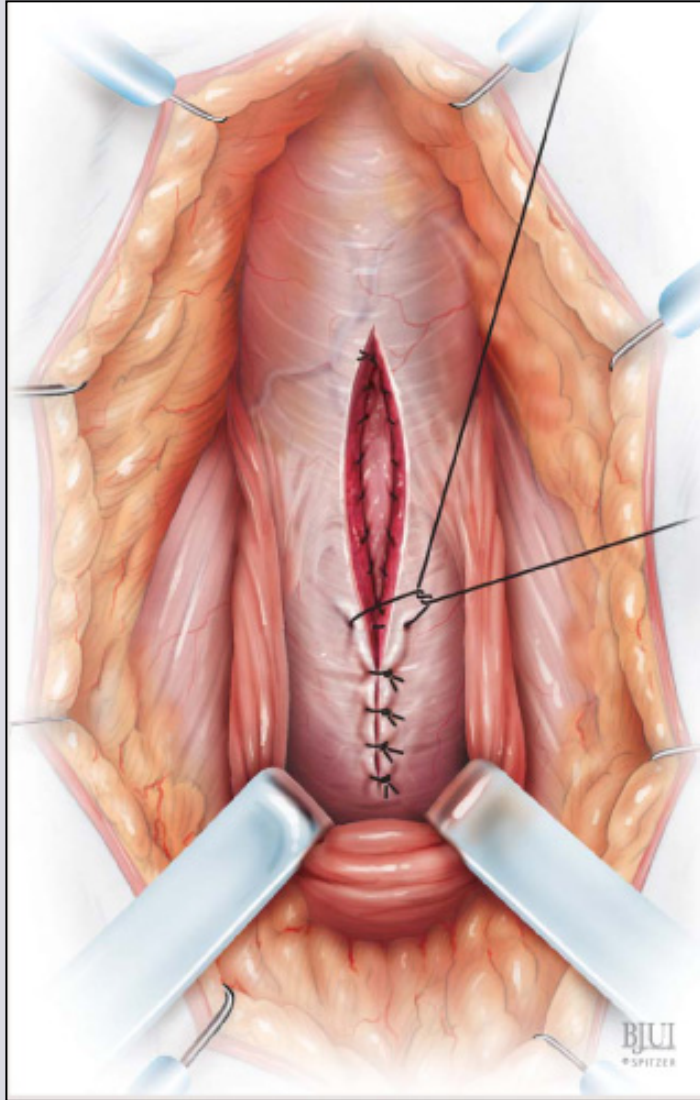
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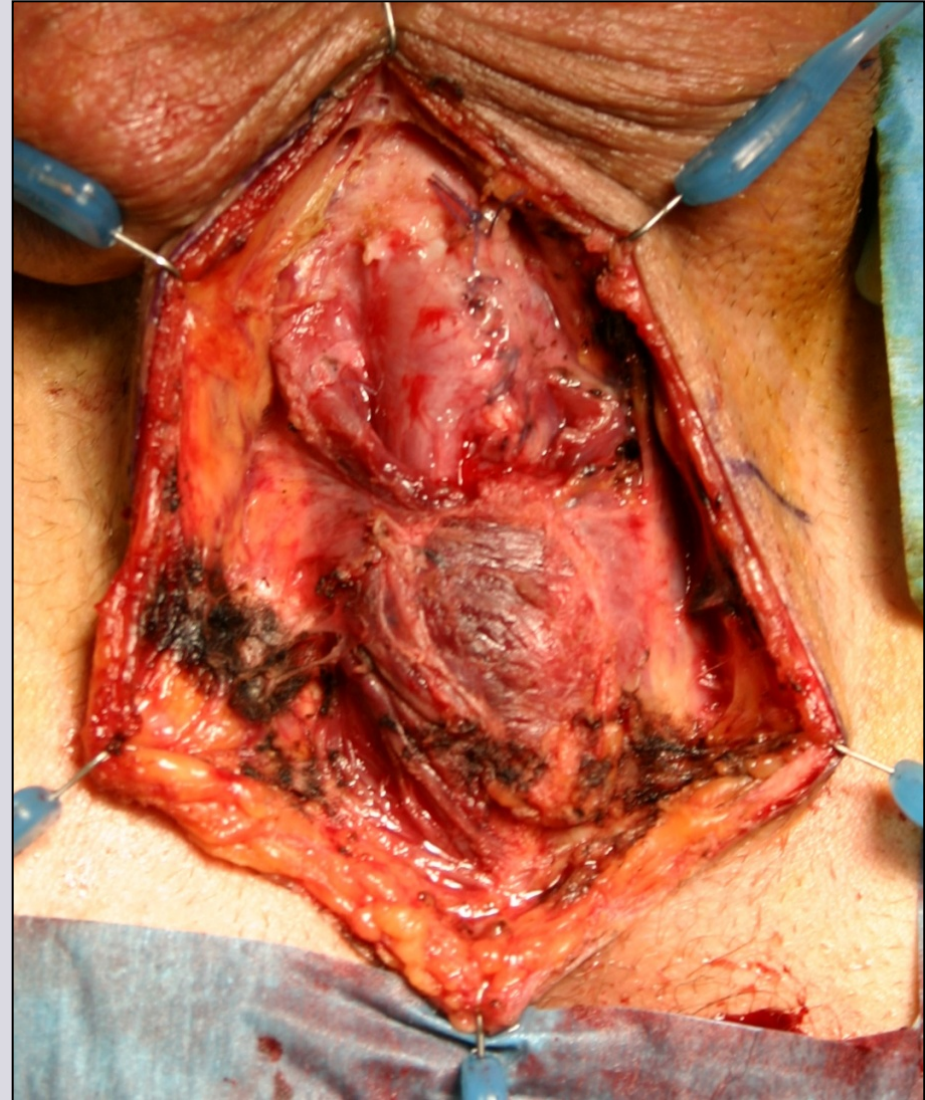
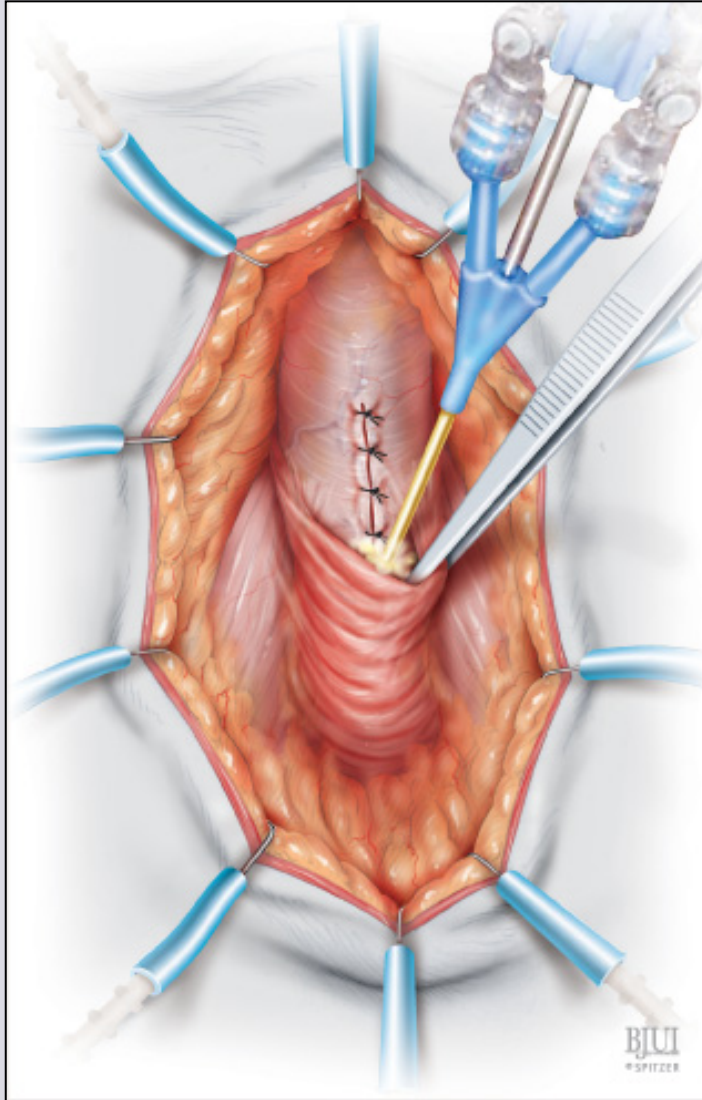
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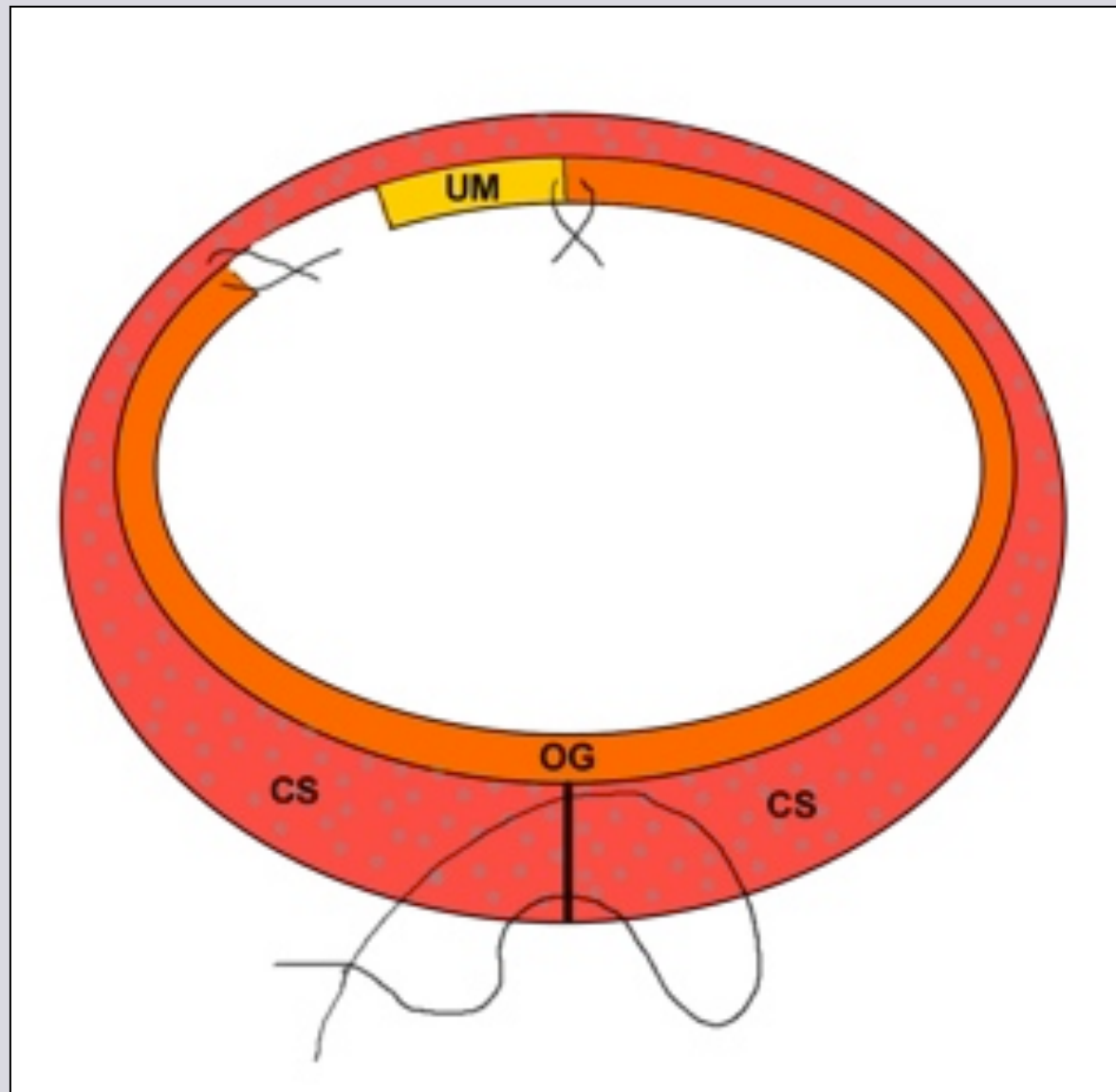
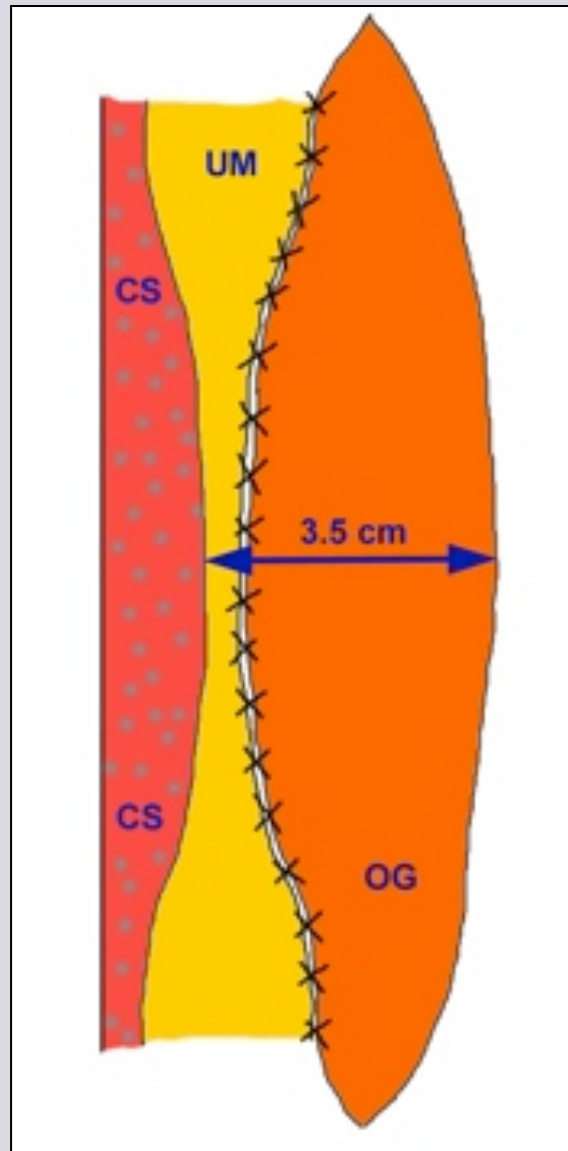
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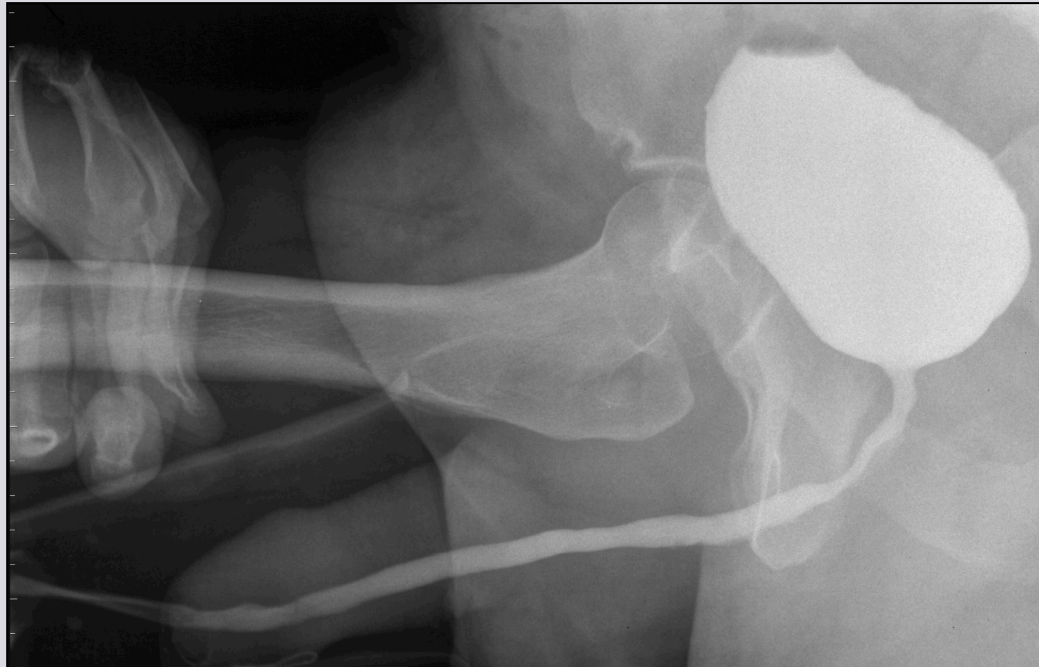
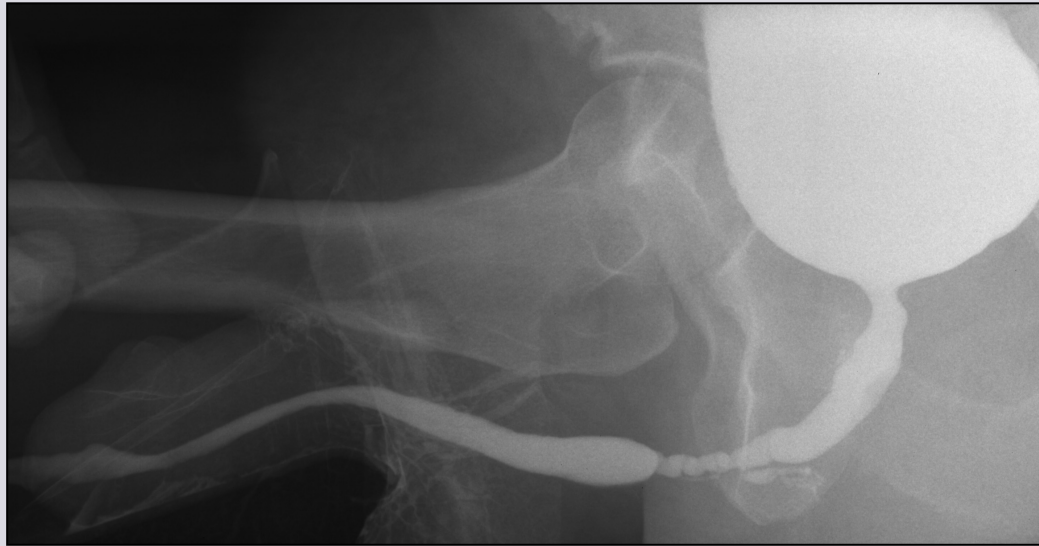


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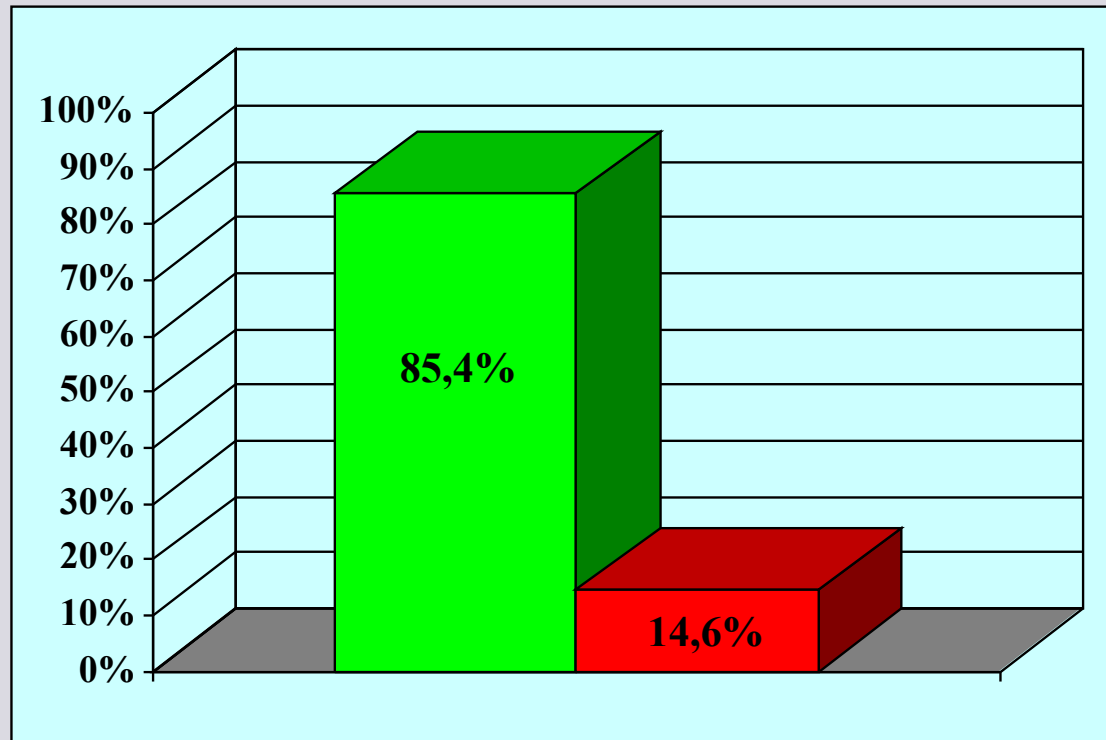


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**247
patients**

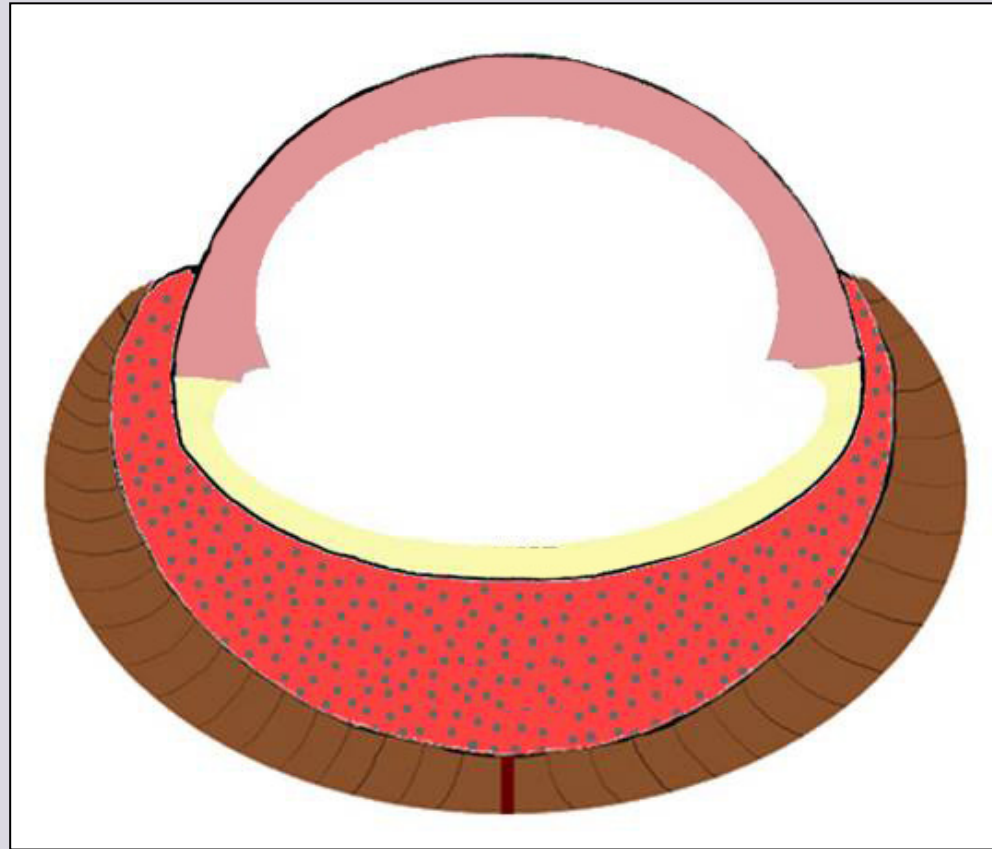


**oral
graft**

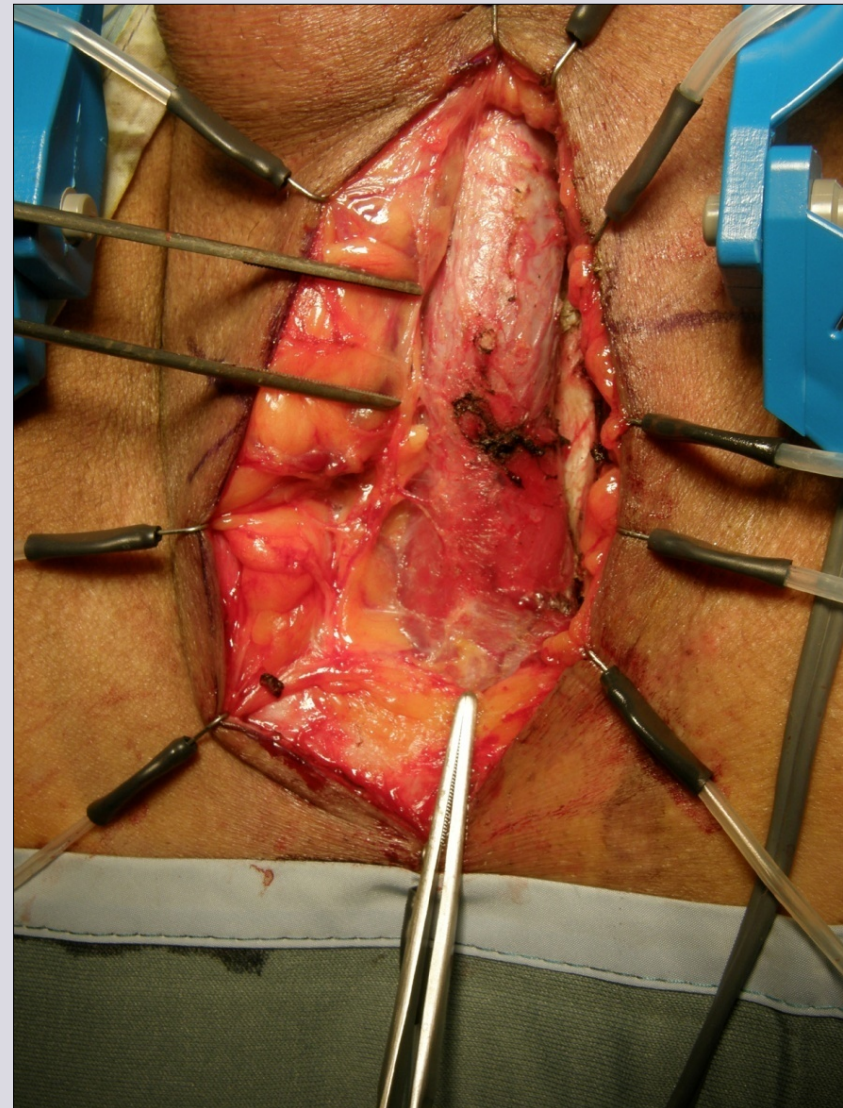
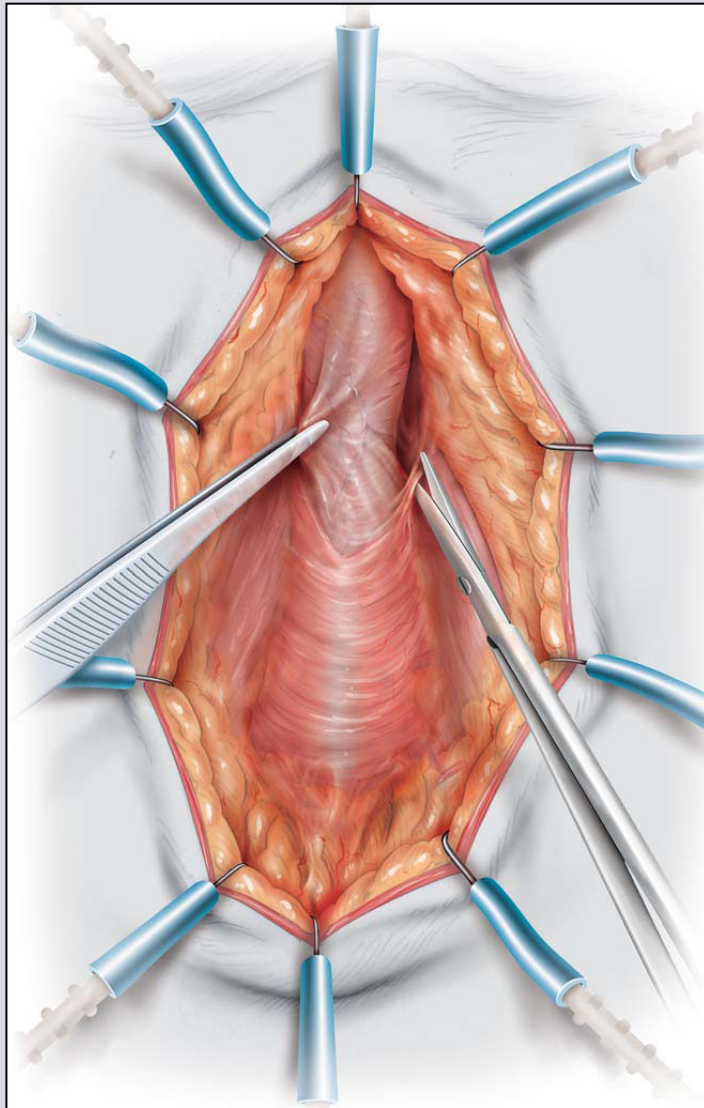
■ success	211 (85.4%)
■ failure	36 (14.6%)

	minimum	maximum	mean
Follow-up (months)	6	139	55
Age (years)	14	77	39

December 31, 2011

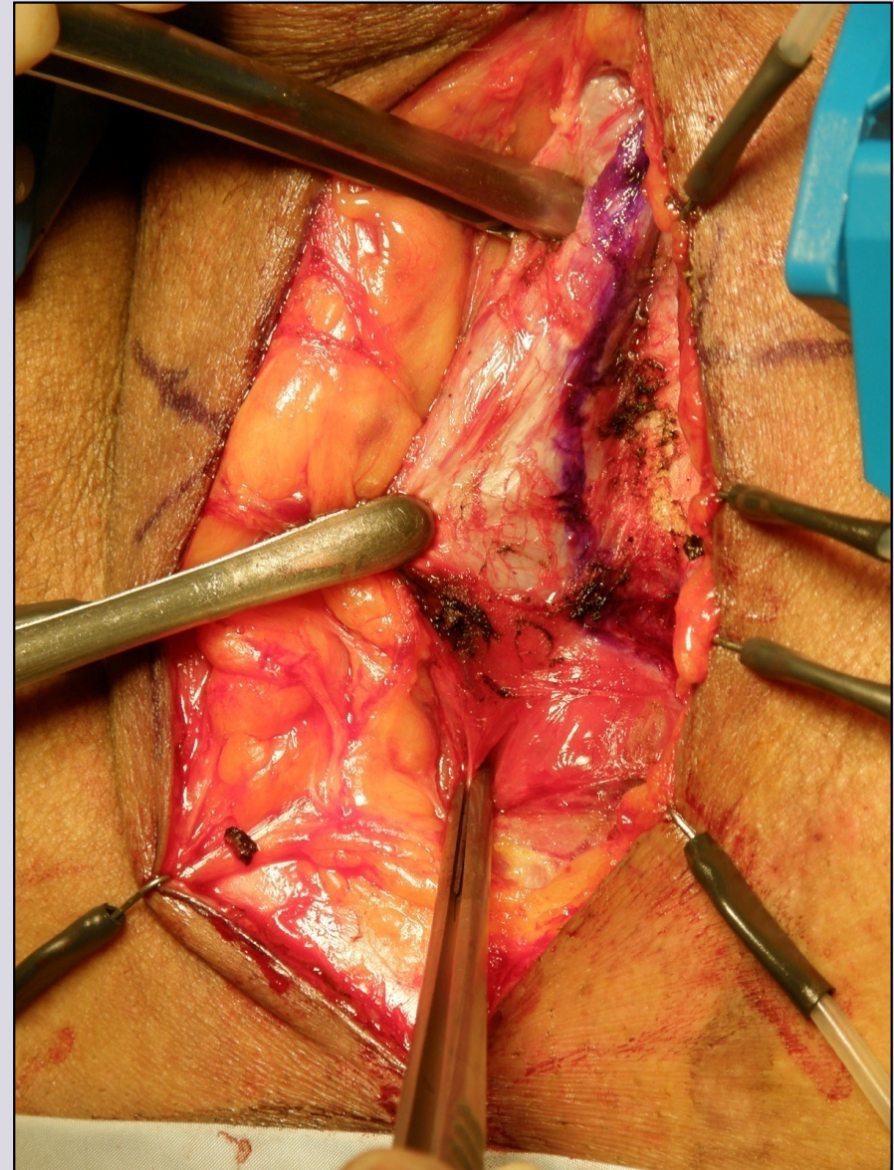
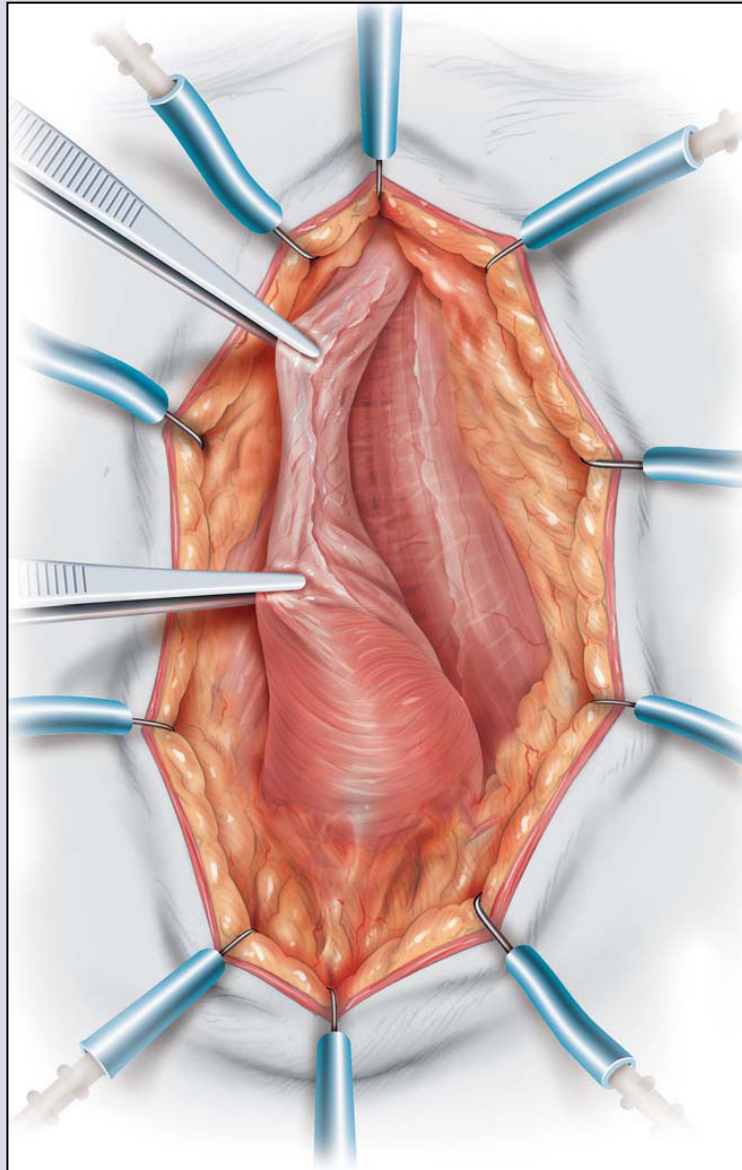


**Muscle and nerve-sparing dorsal onlay graft
bulbar urethroplasty**



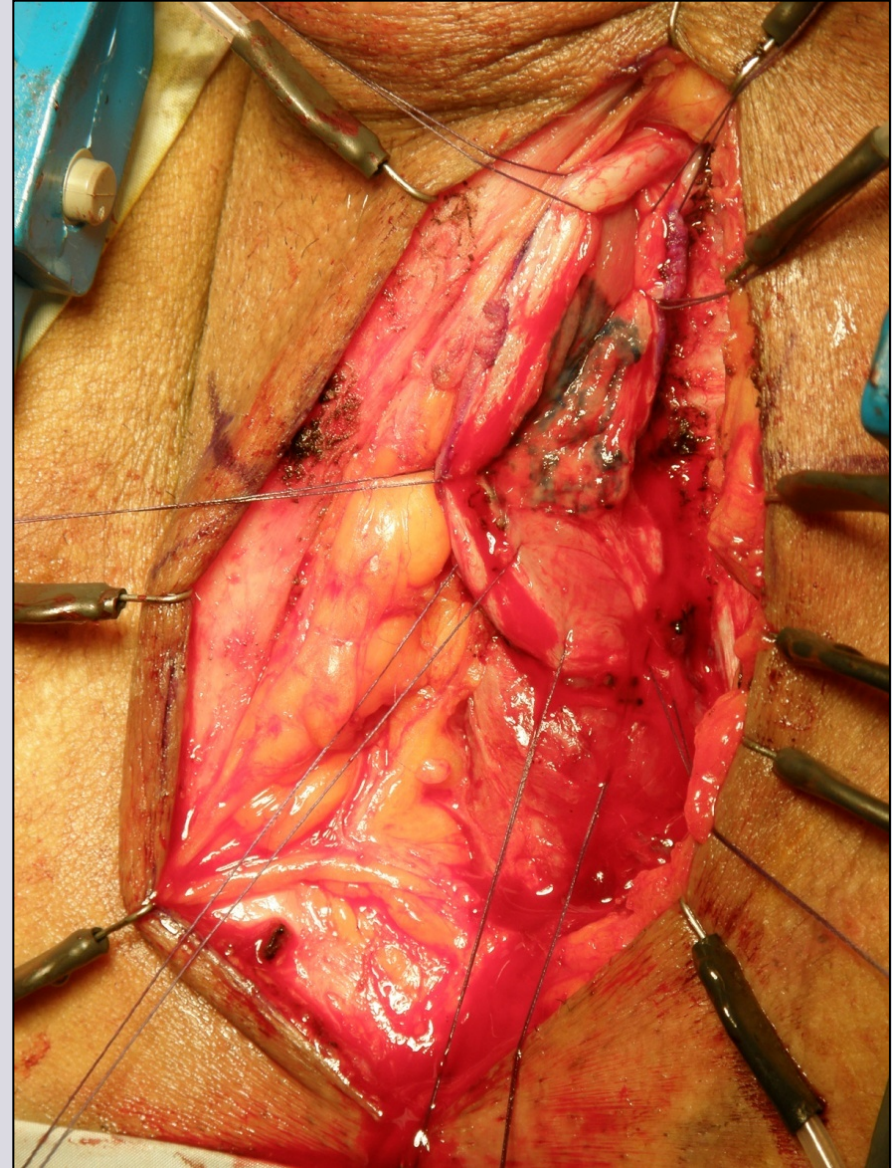
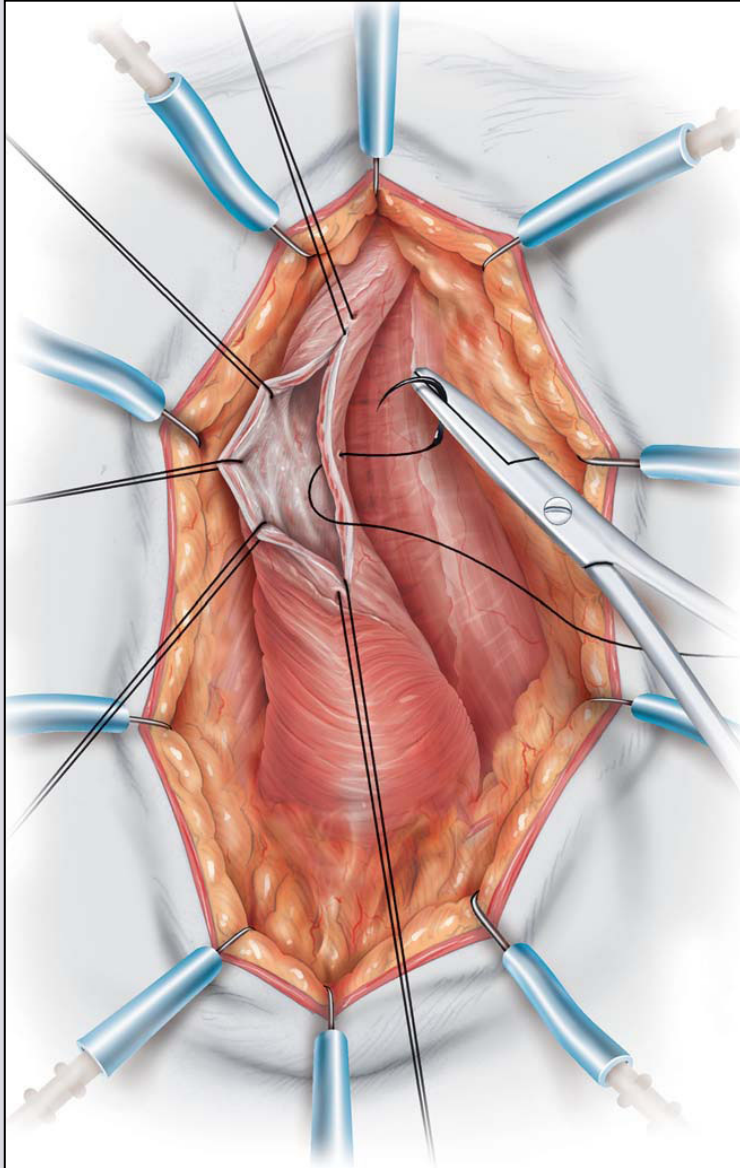
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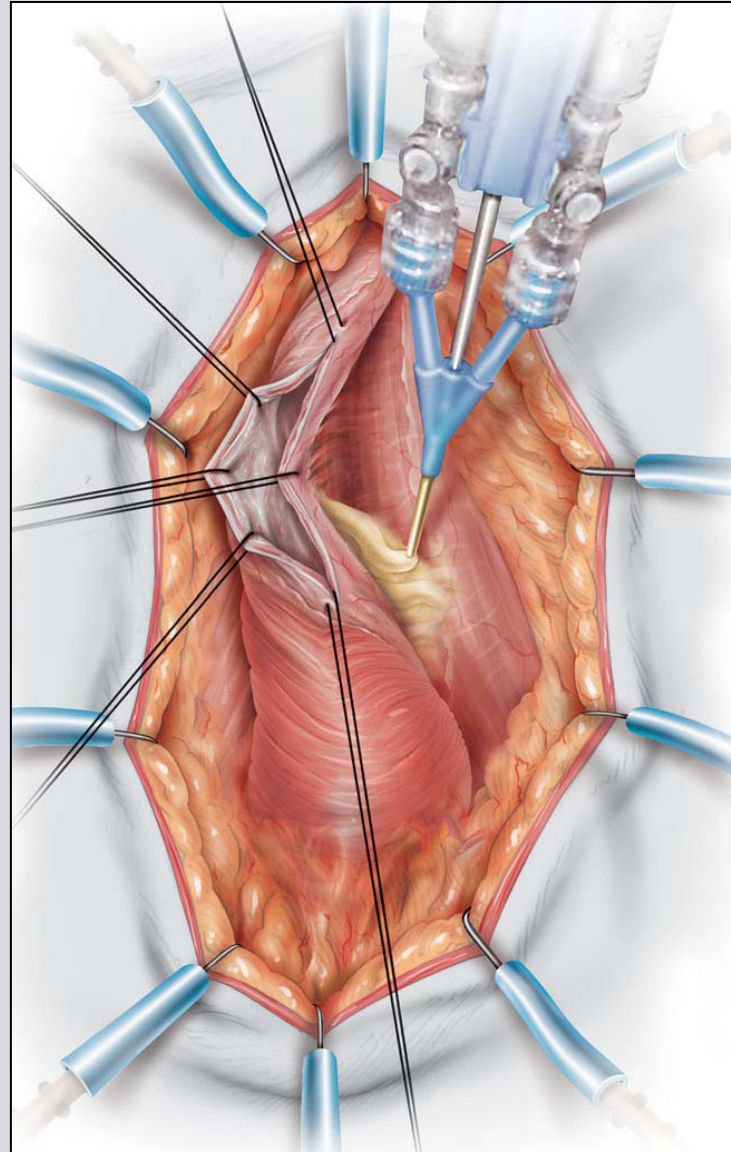
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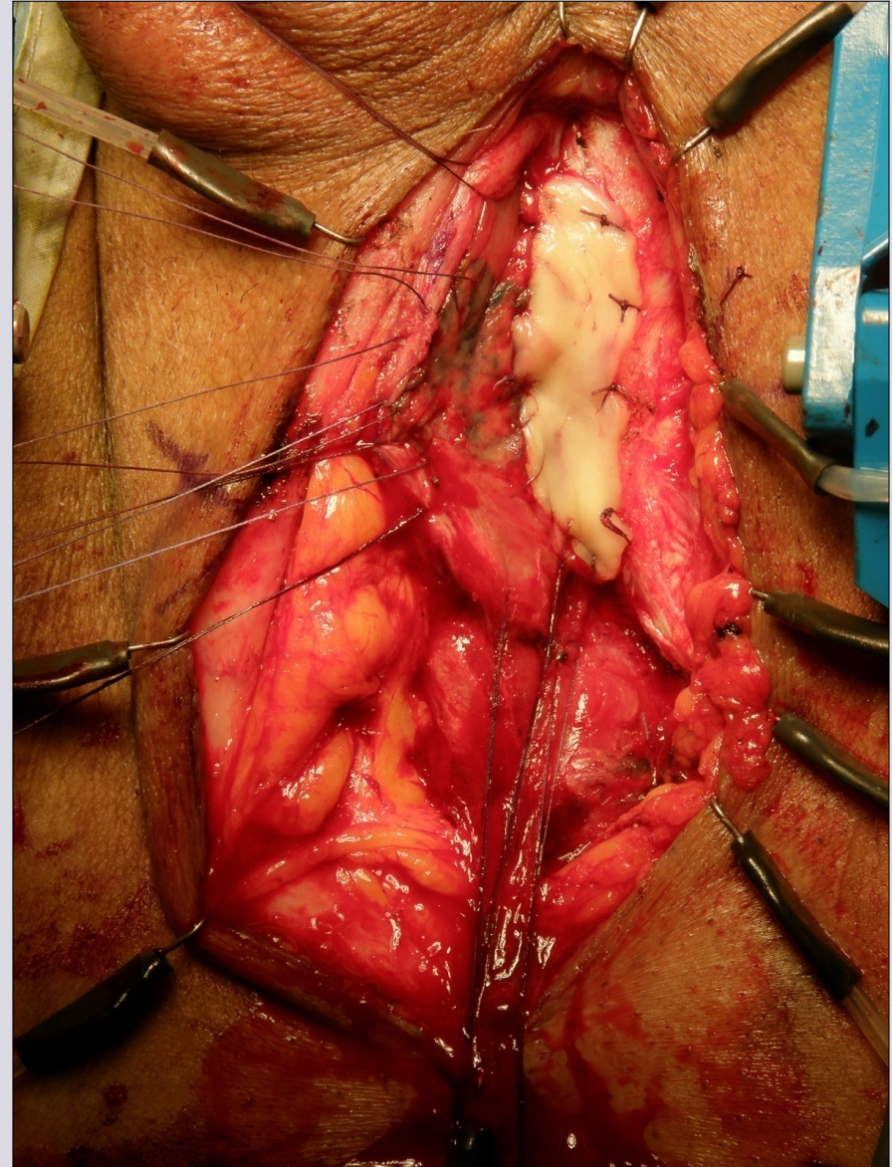
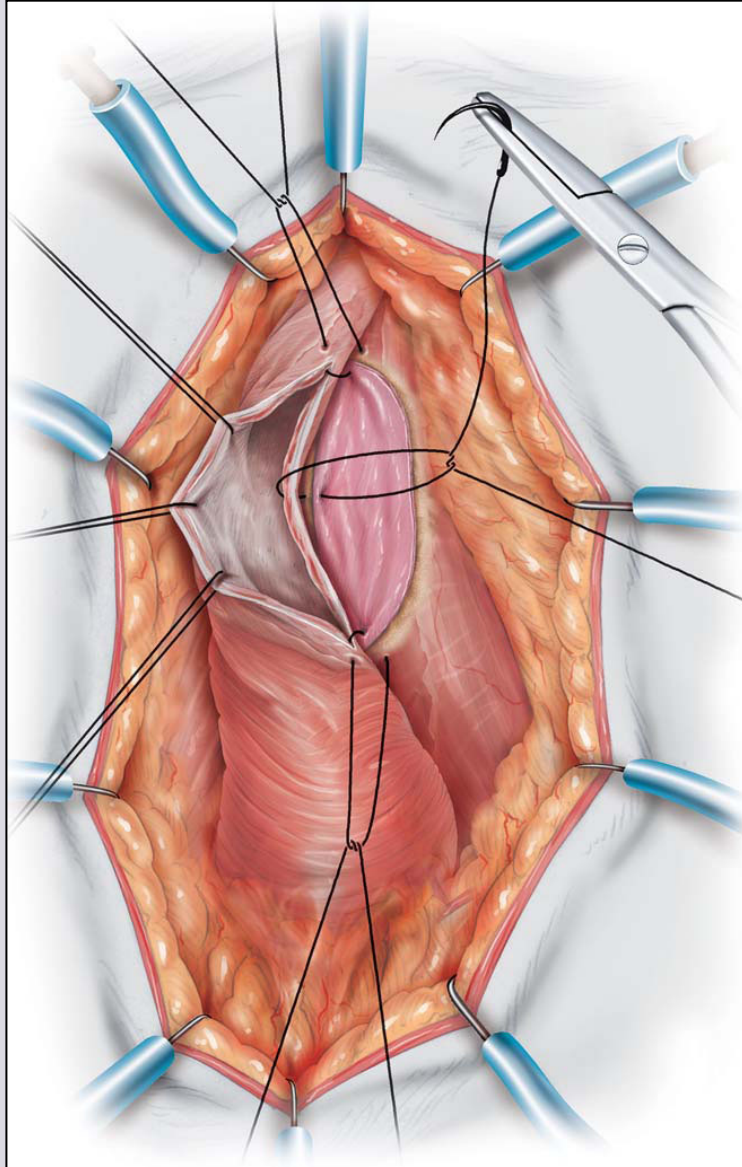
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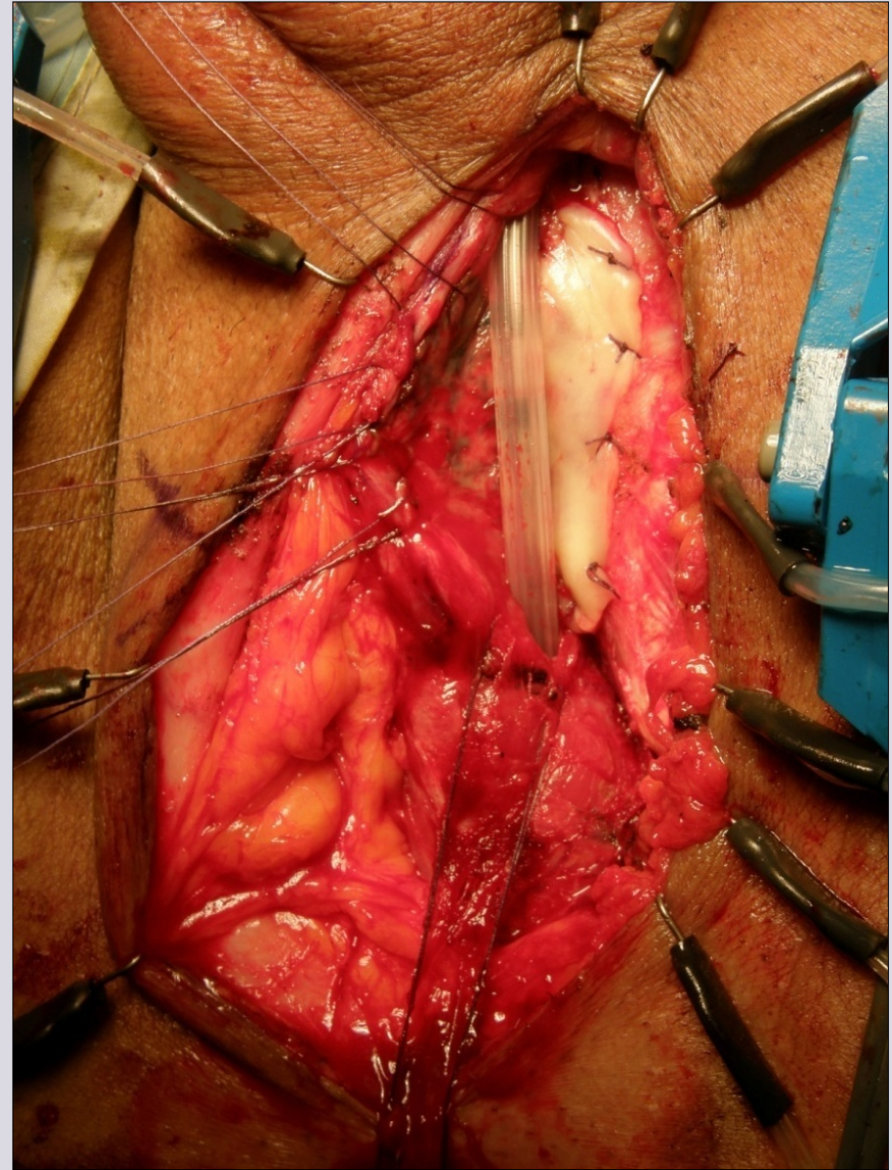
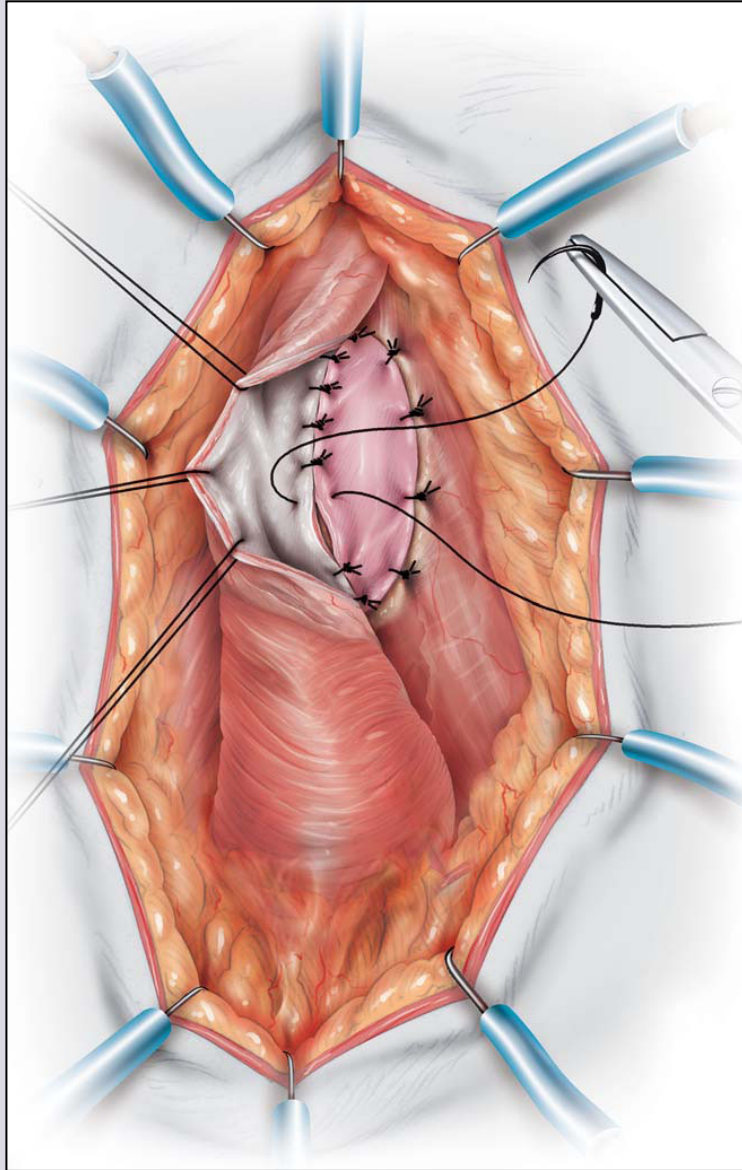
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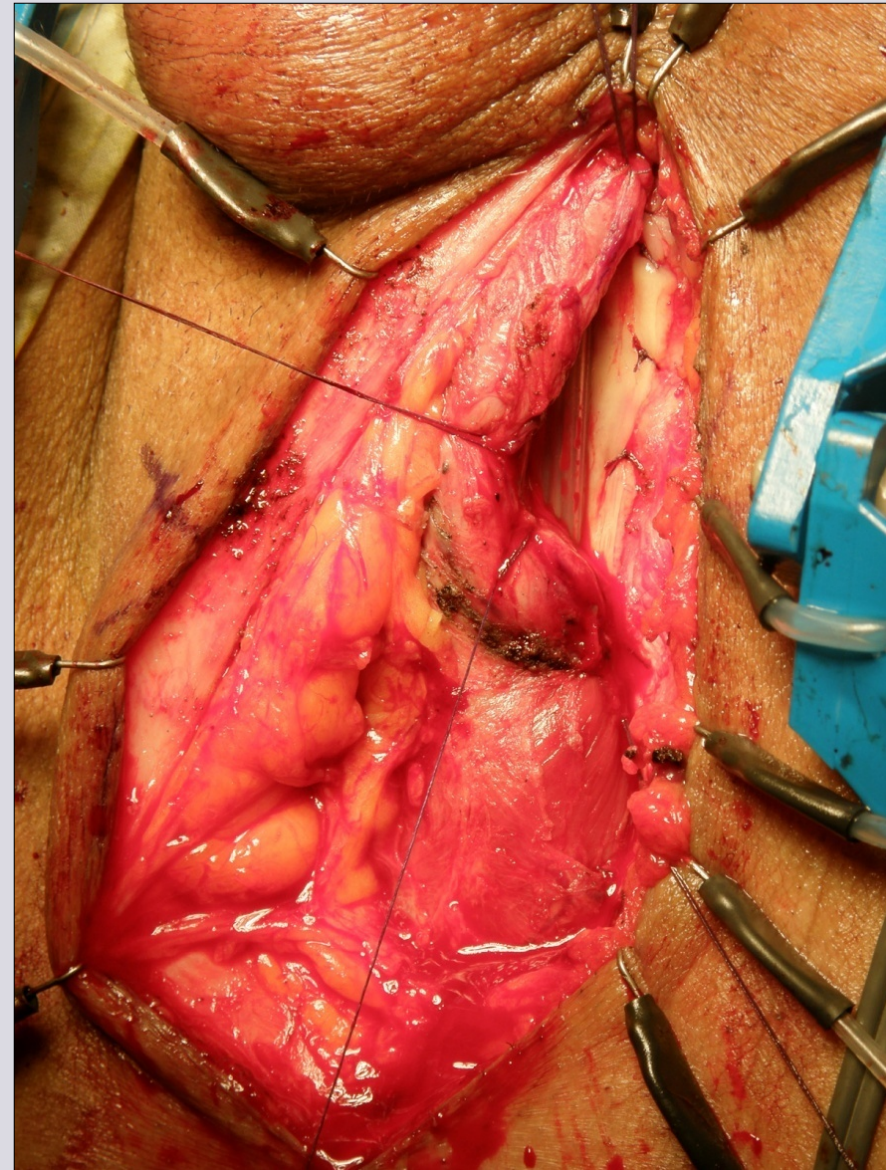
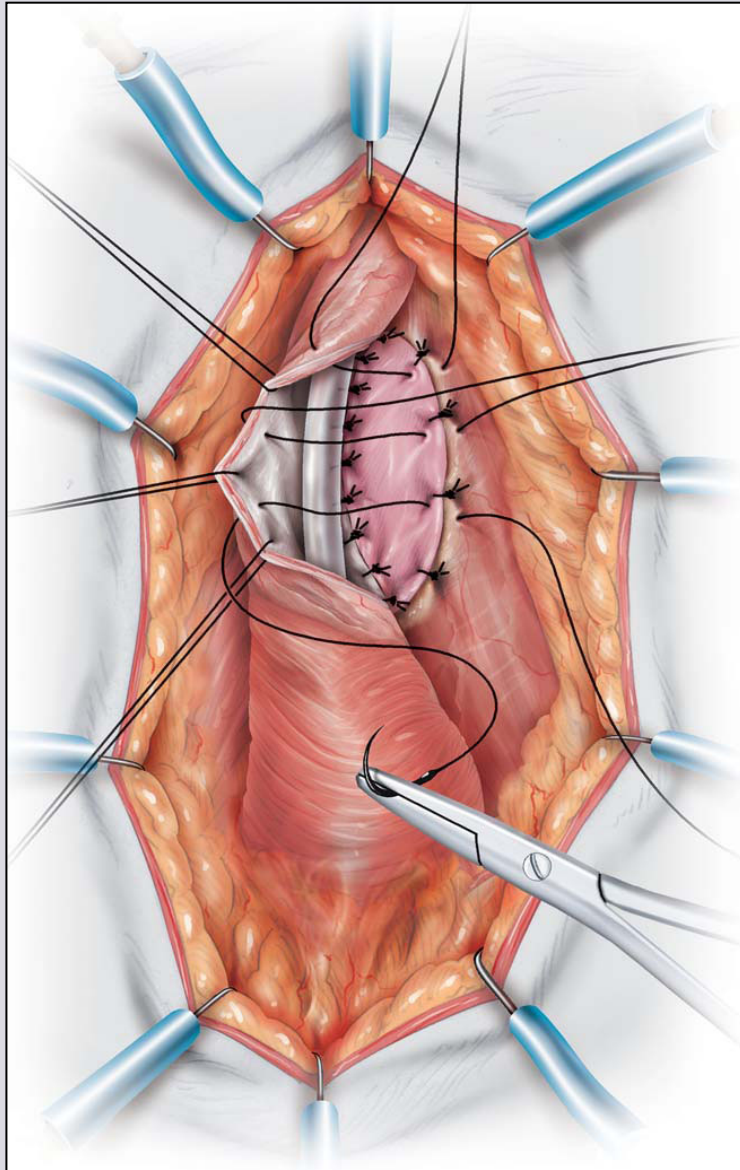
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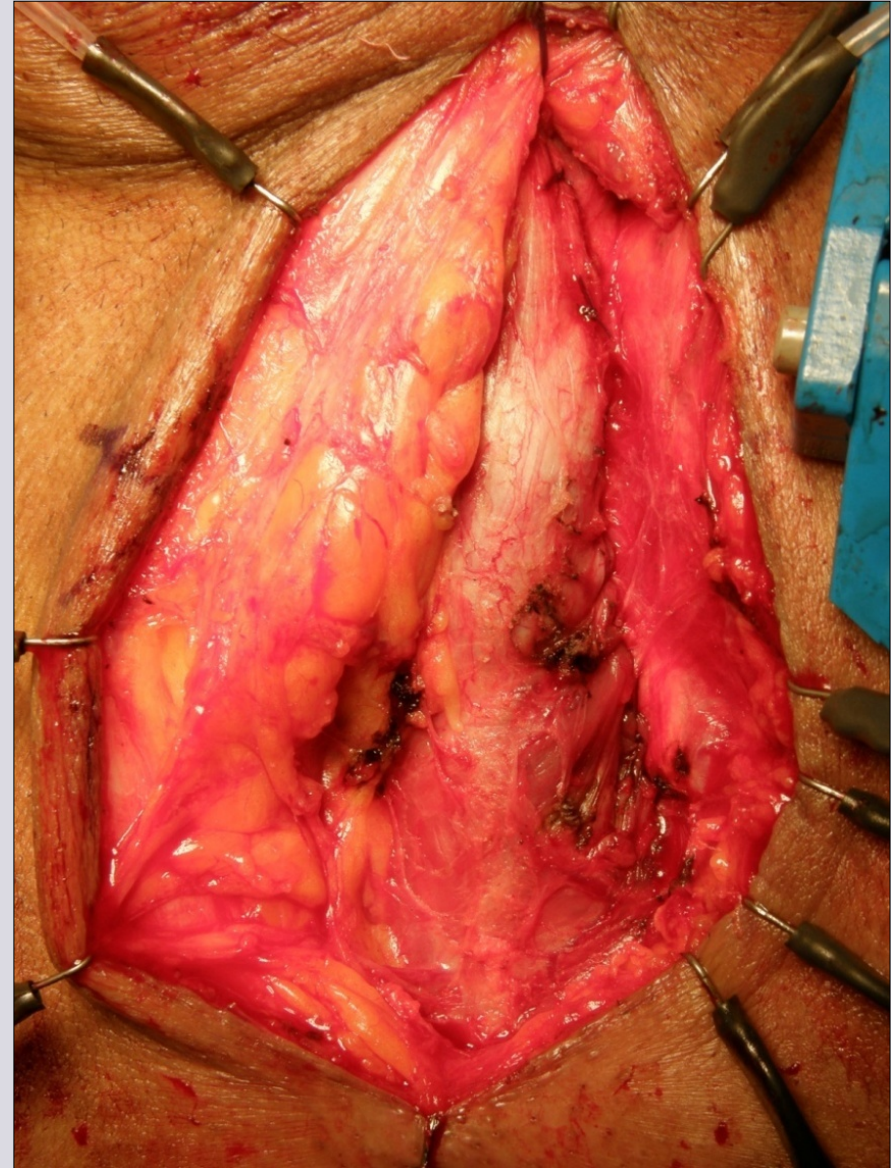
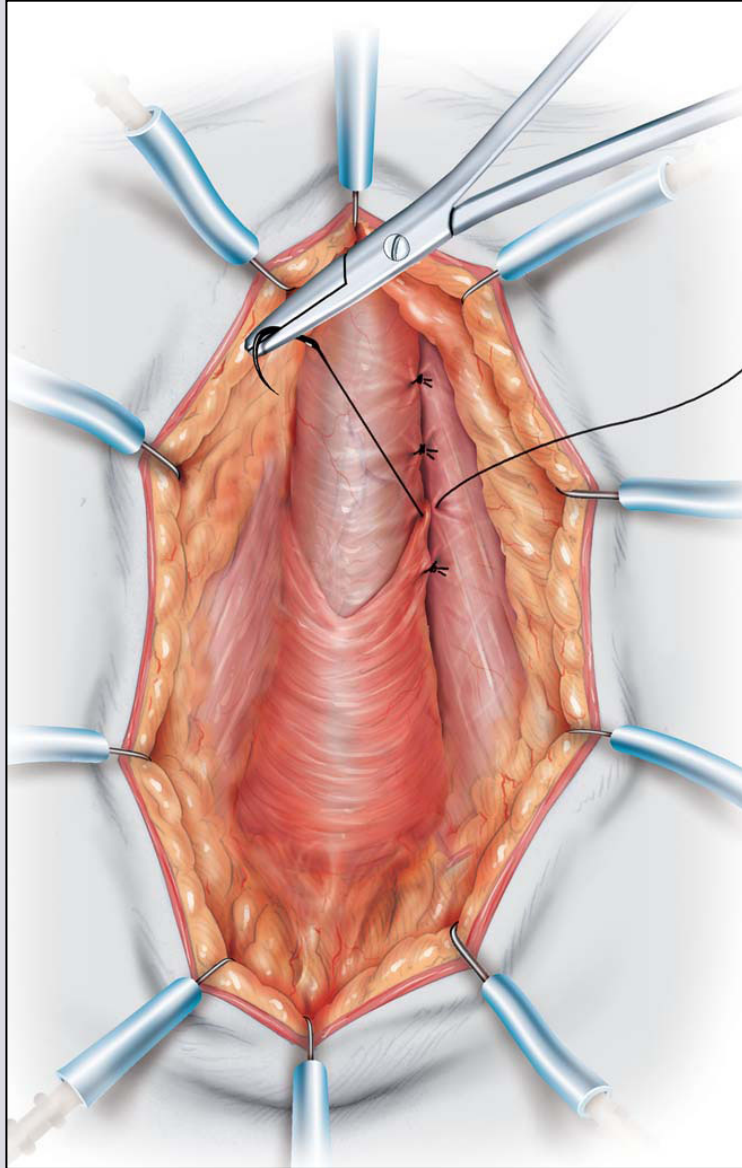
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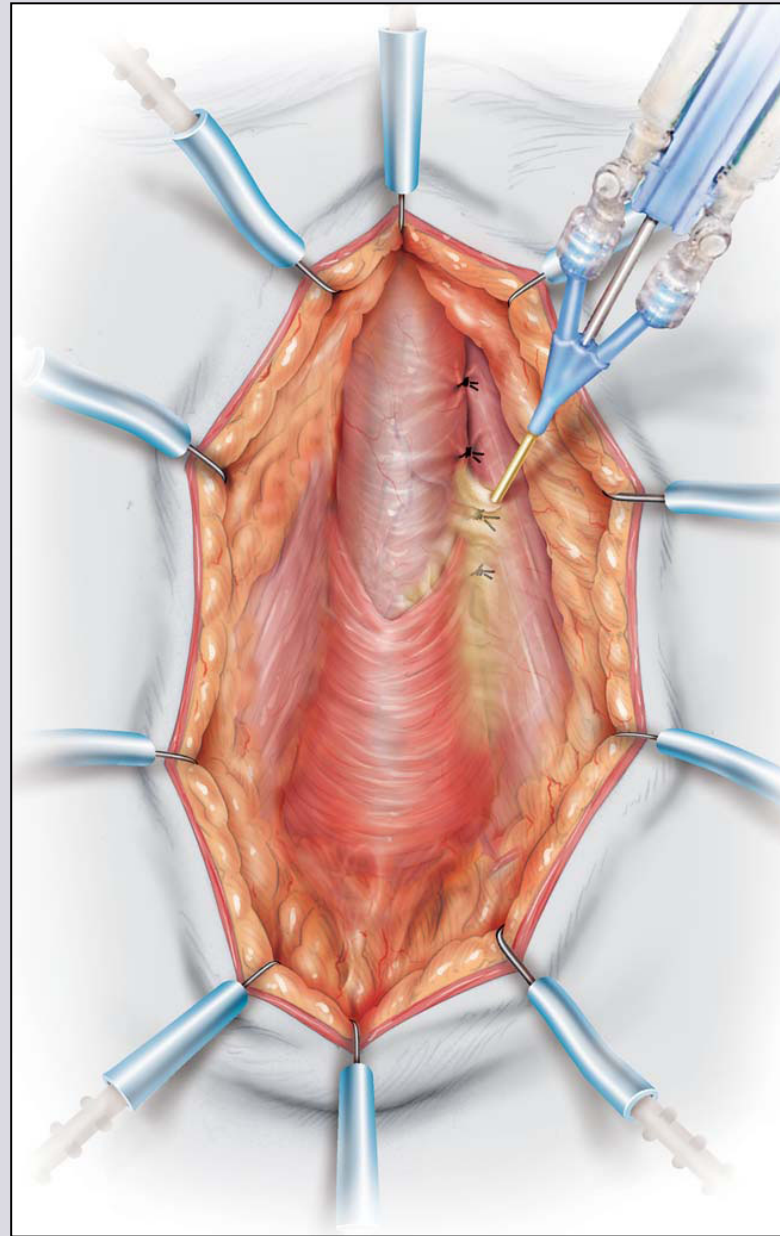
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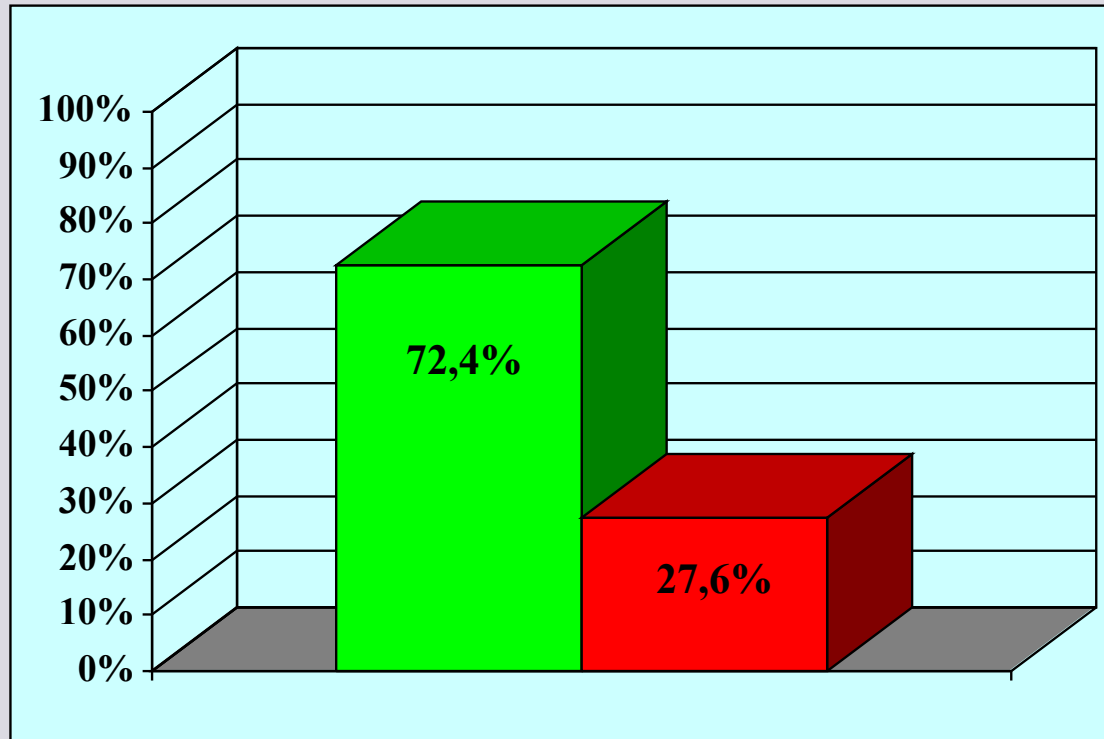
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**29
patients**



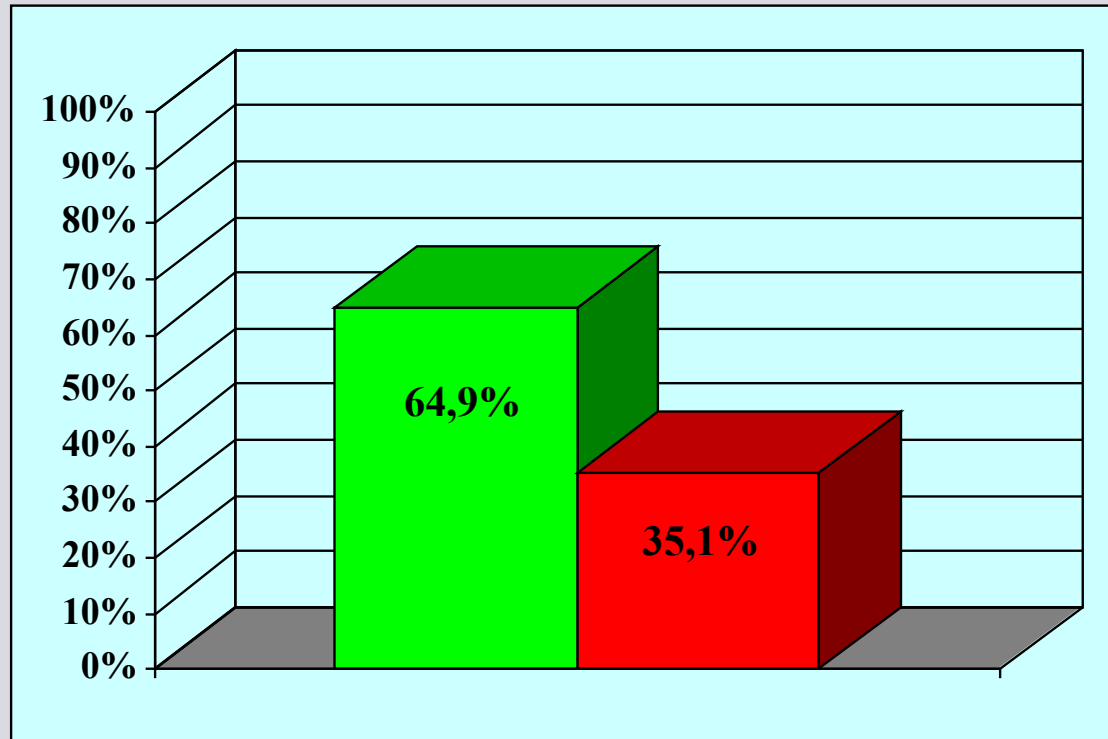
**oral
graft**

■ success	21 (72.4%)
■ failure	8 (27.6%)

	minimum	maximum	mean
Follow-up (months)	7	158	76
Age (years)	24	77	42

December 31, 2011

**37
patients**

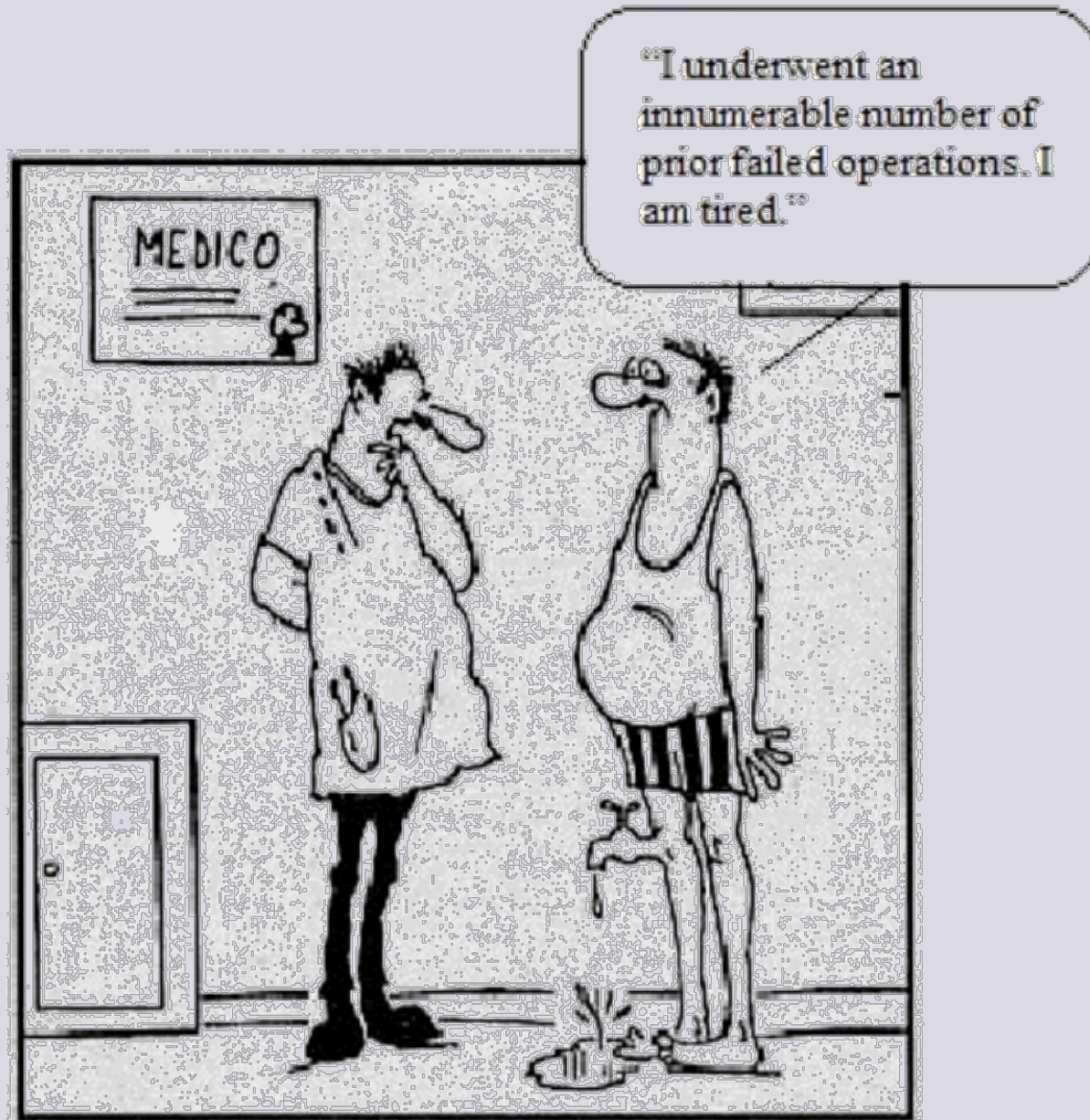


**skin
graft**

■ success	24 (64.9%)
■ failure	13 (35.1%)

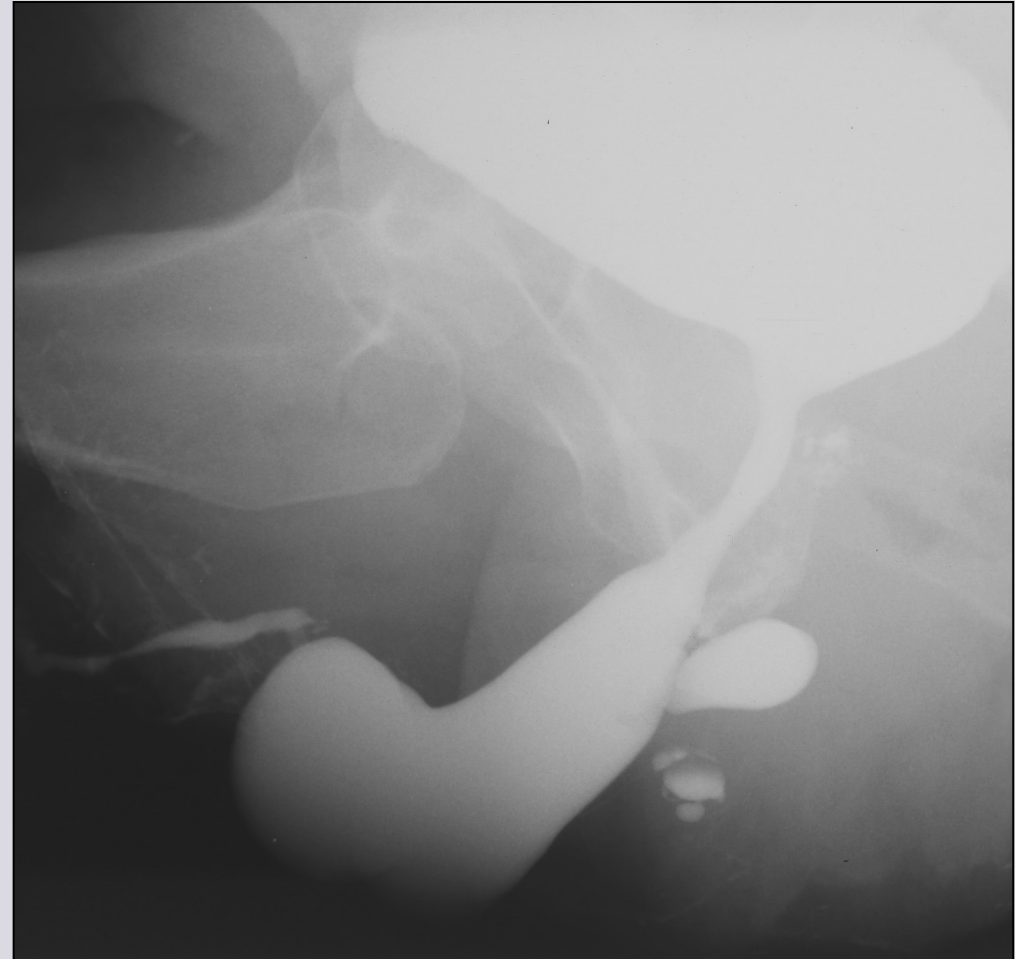
	minimum	maximum	mean
Follow-up (months)	140	209	171
Age (years)	19	73	45

December 31, 2011



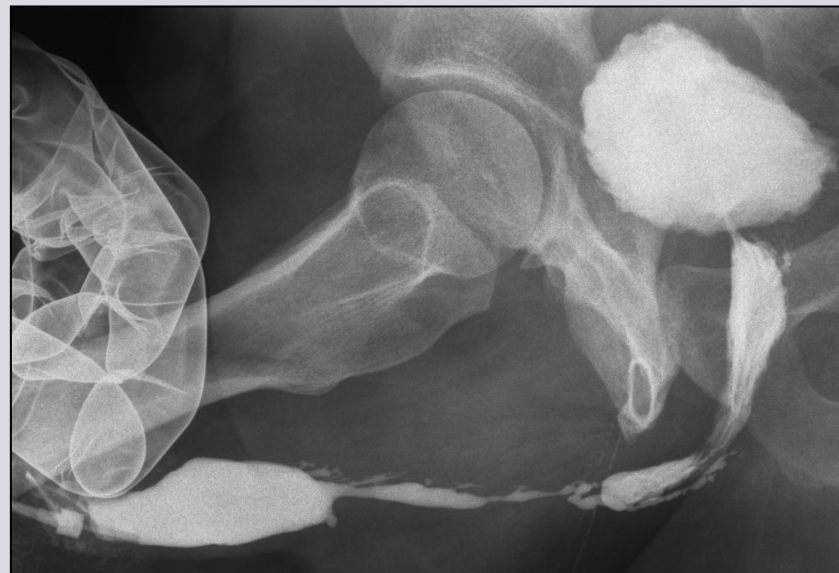
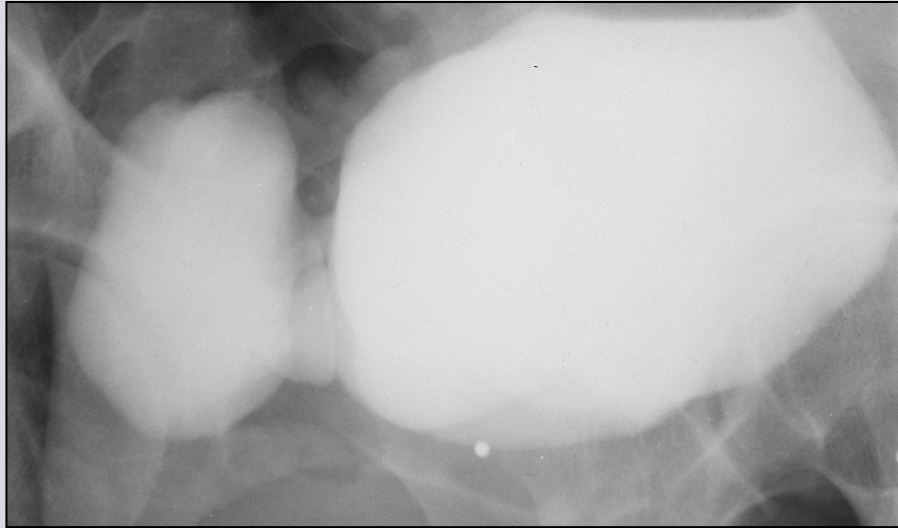
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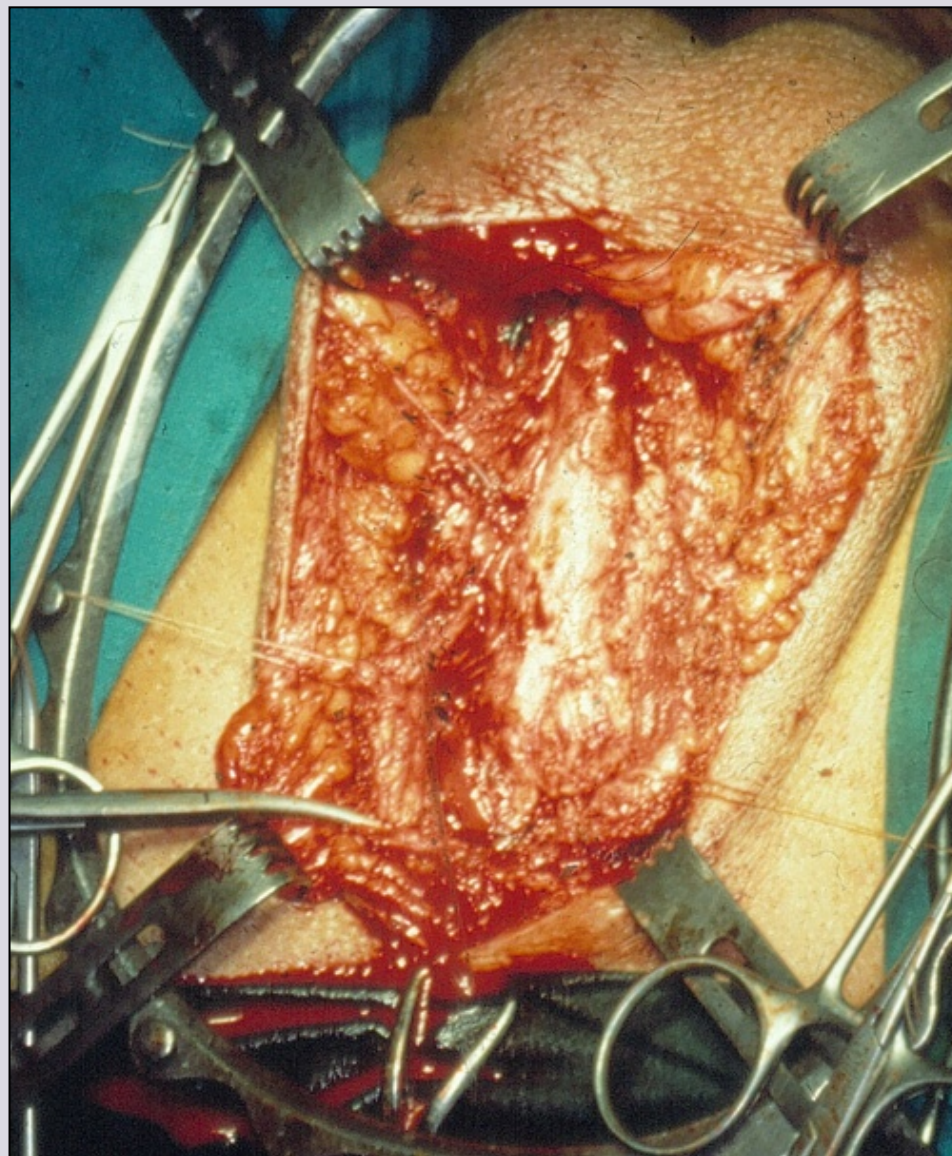
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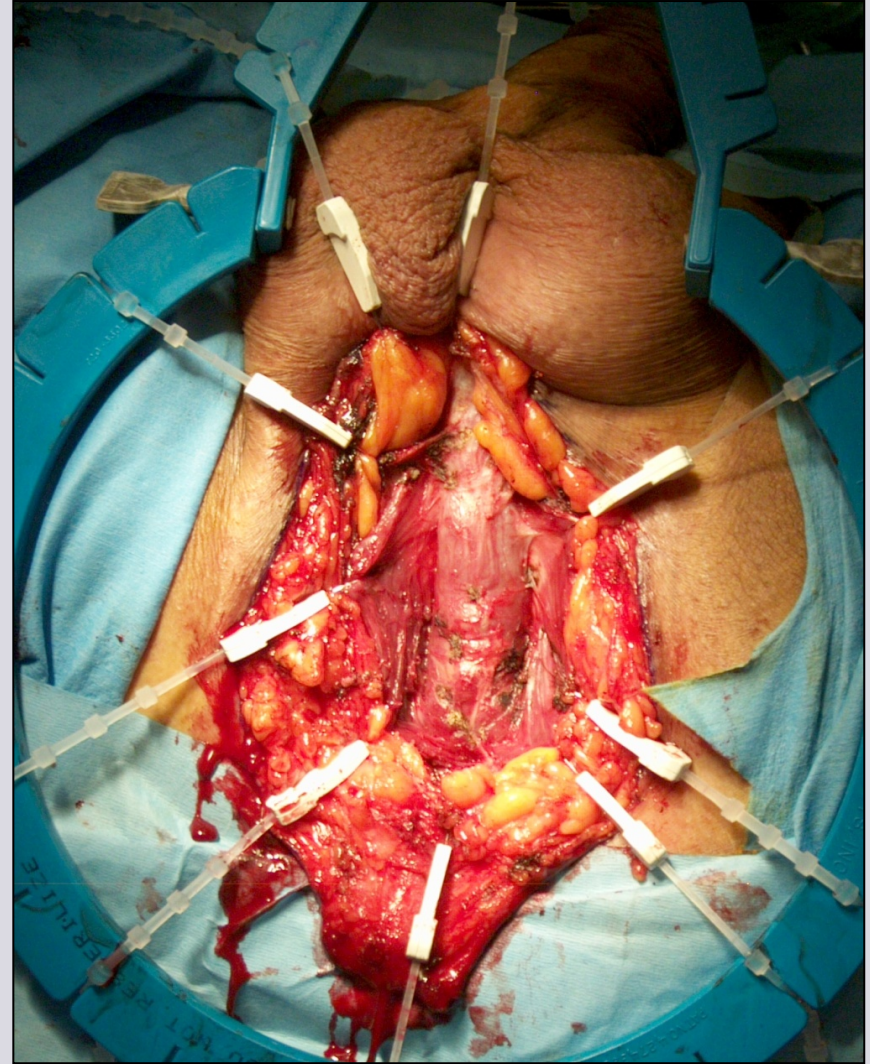


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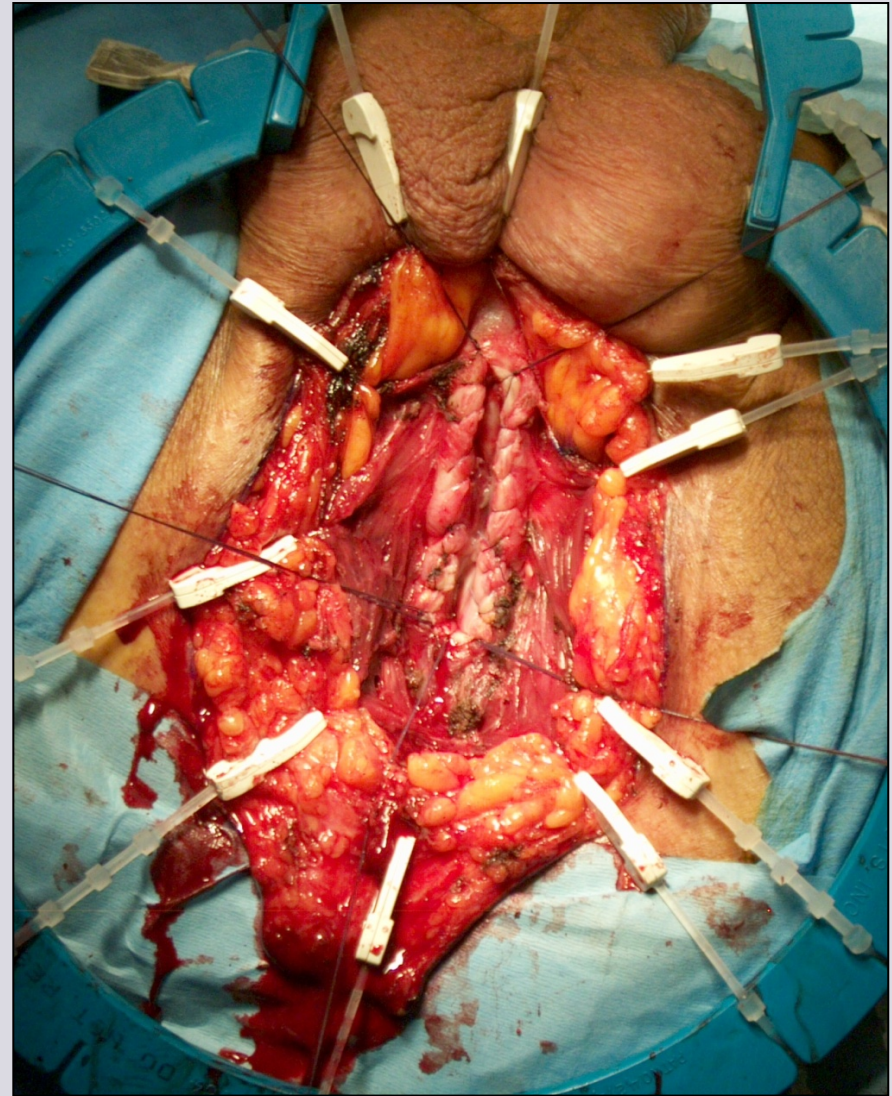
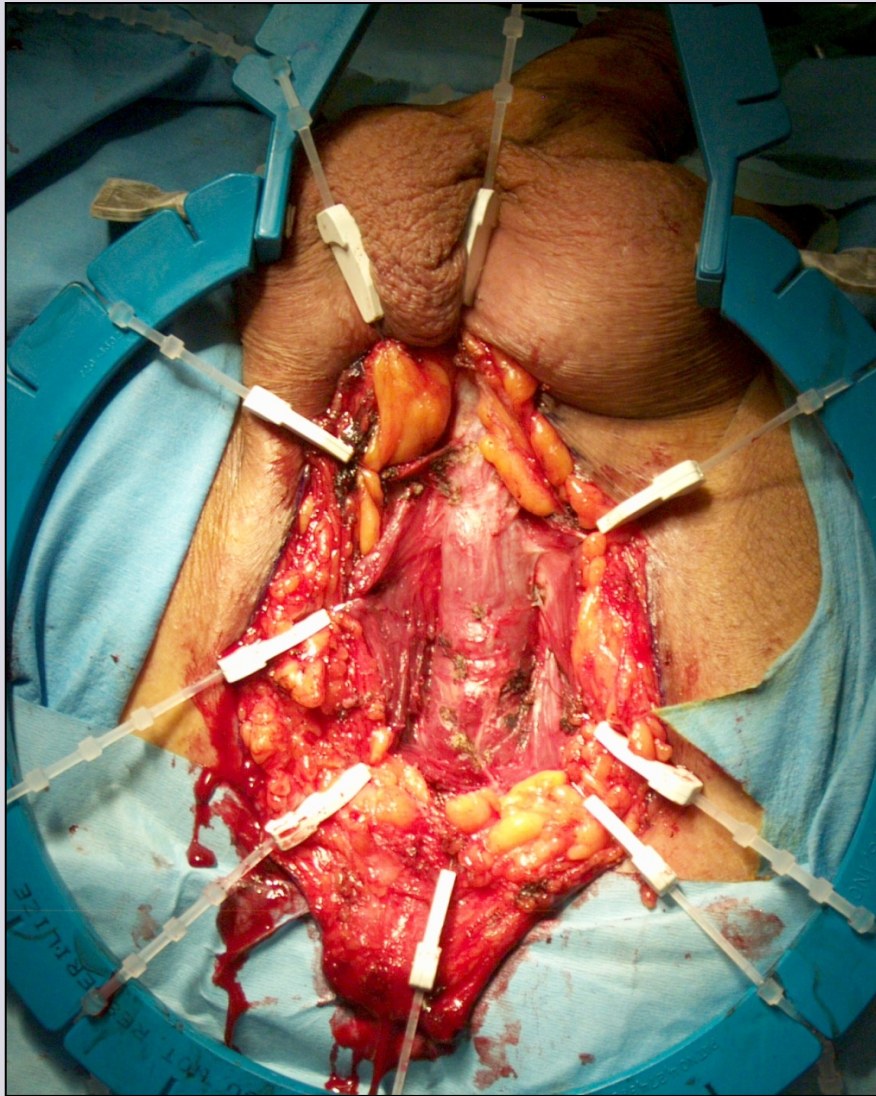
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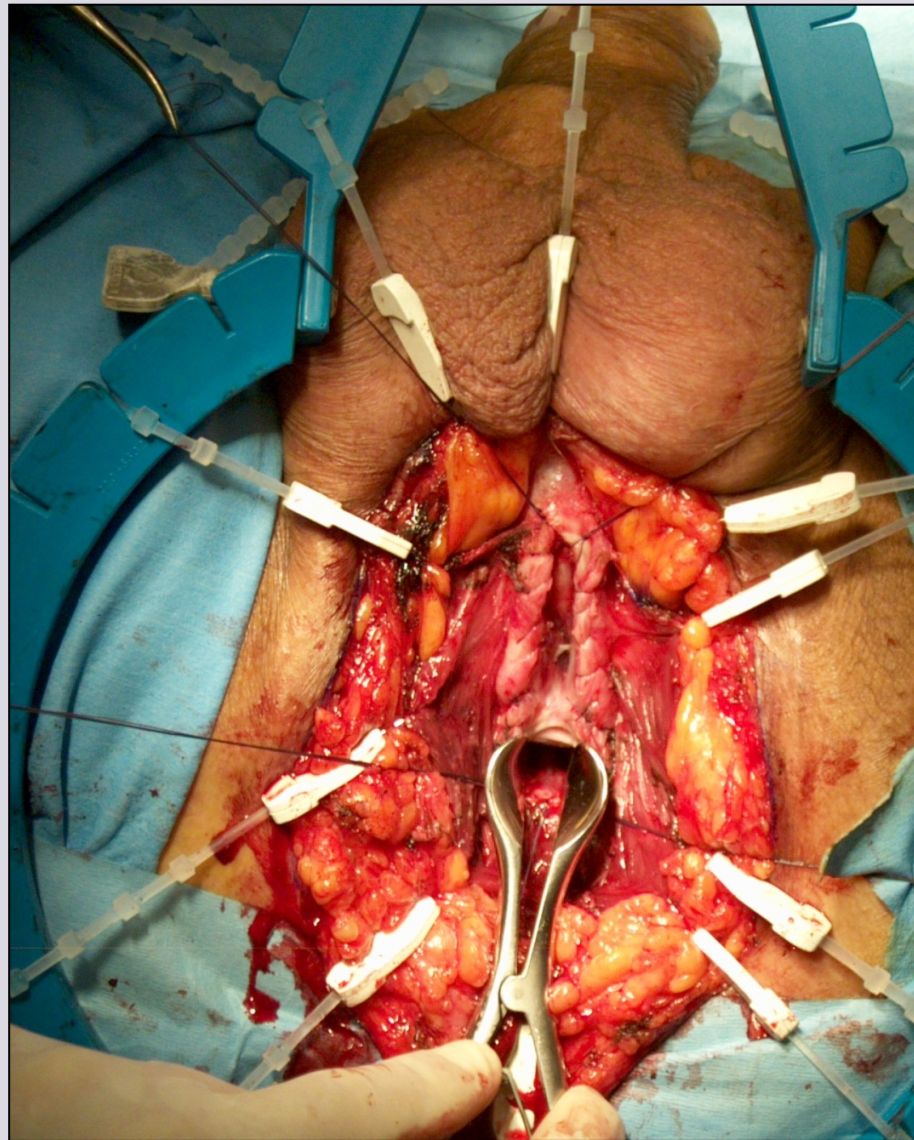
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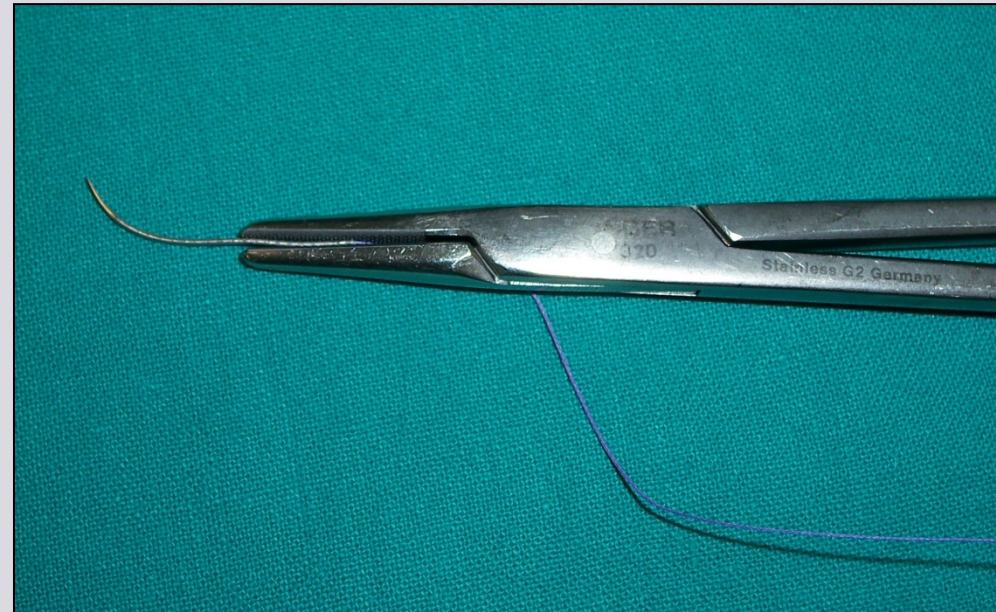
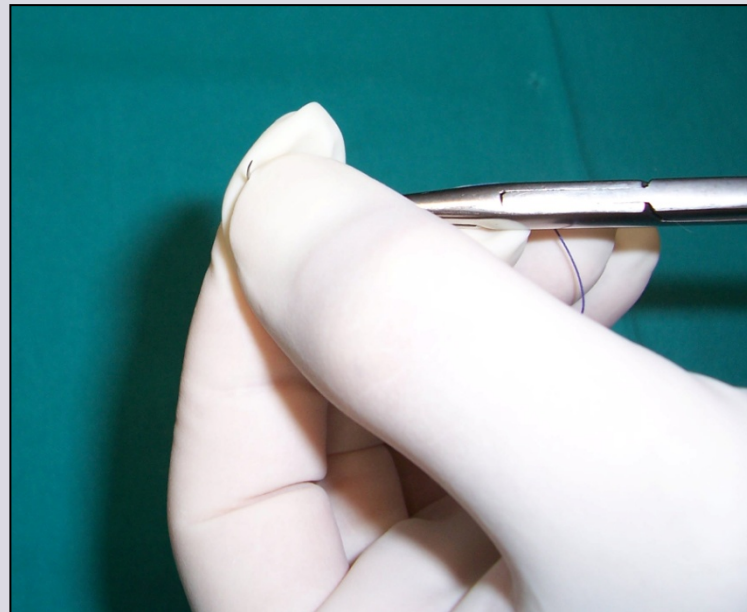
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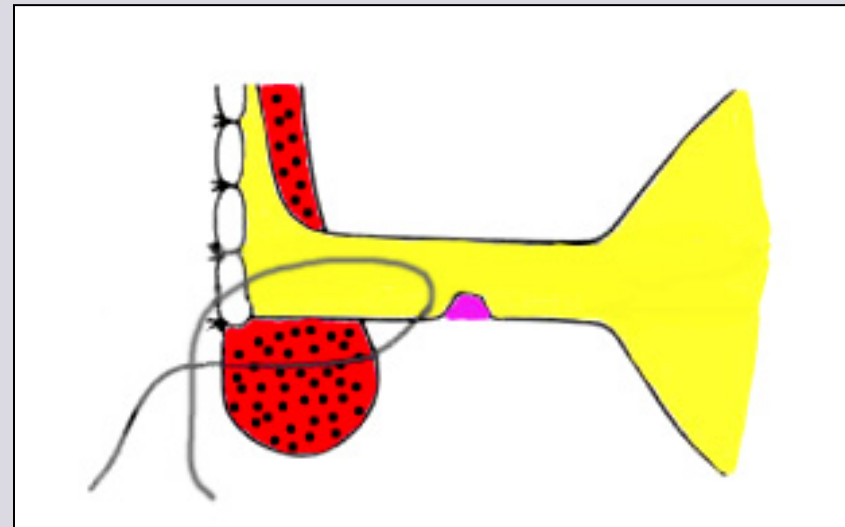
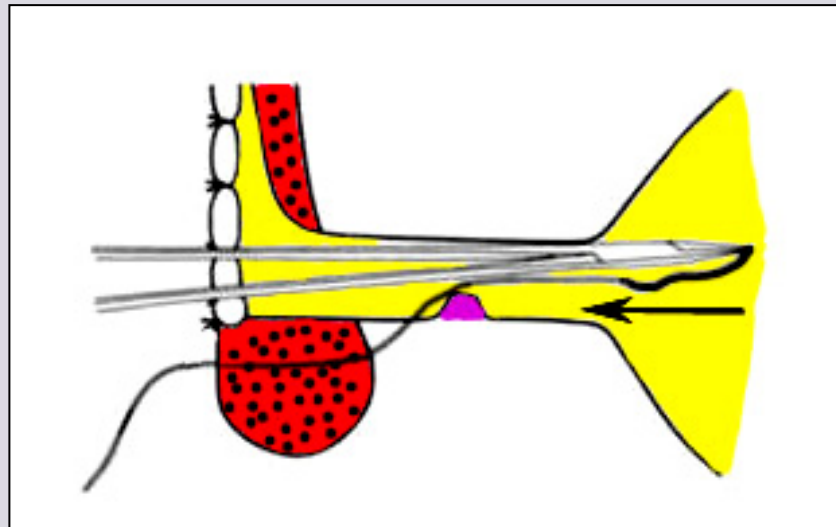
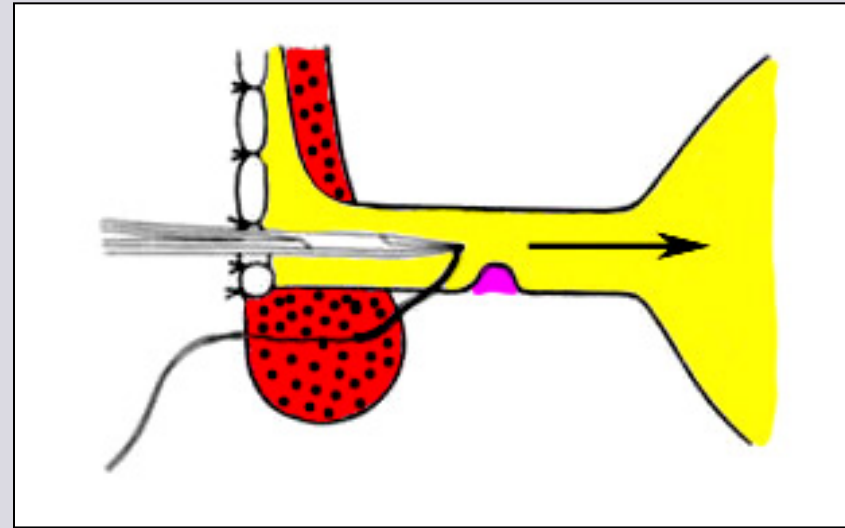
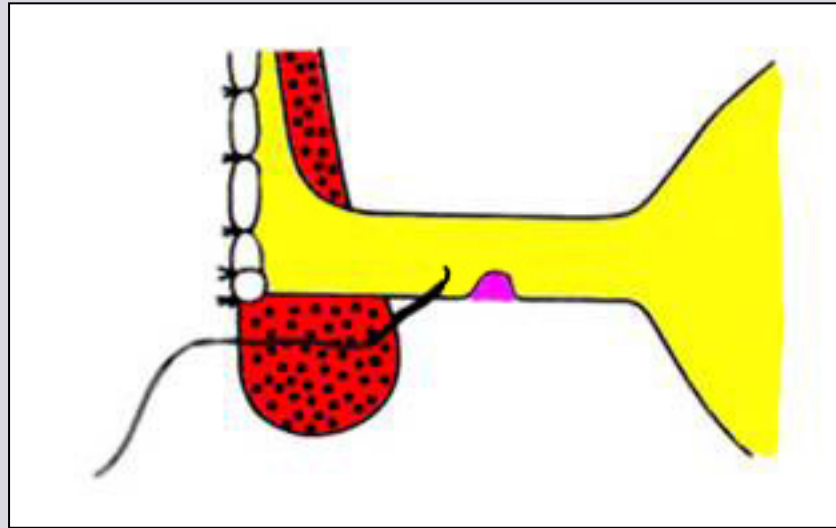
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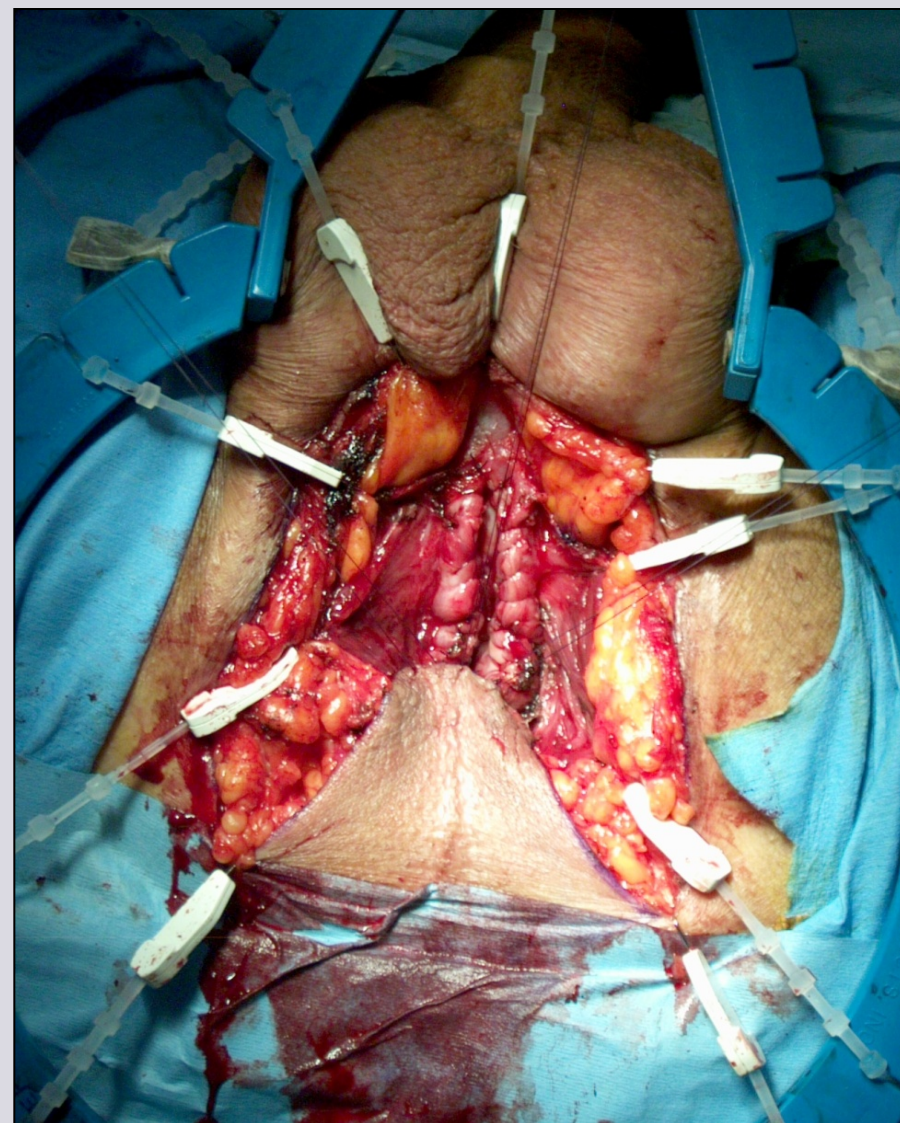
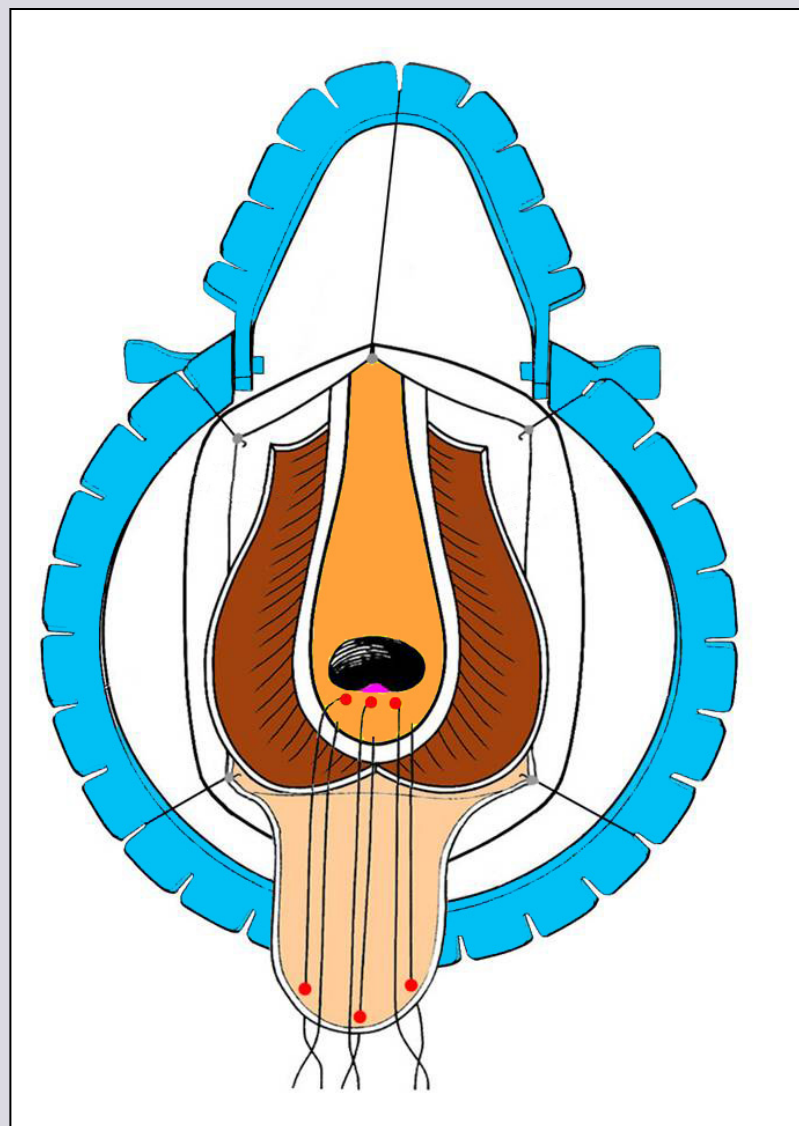
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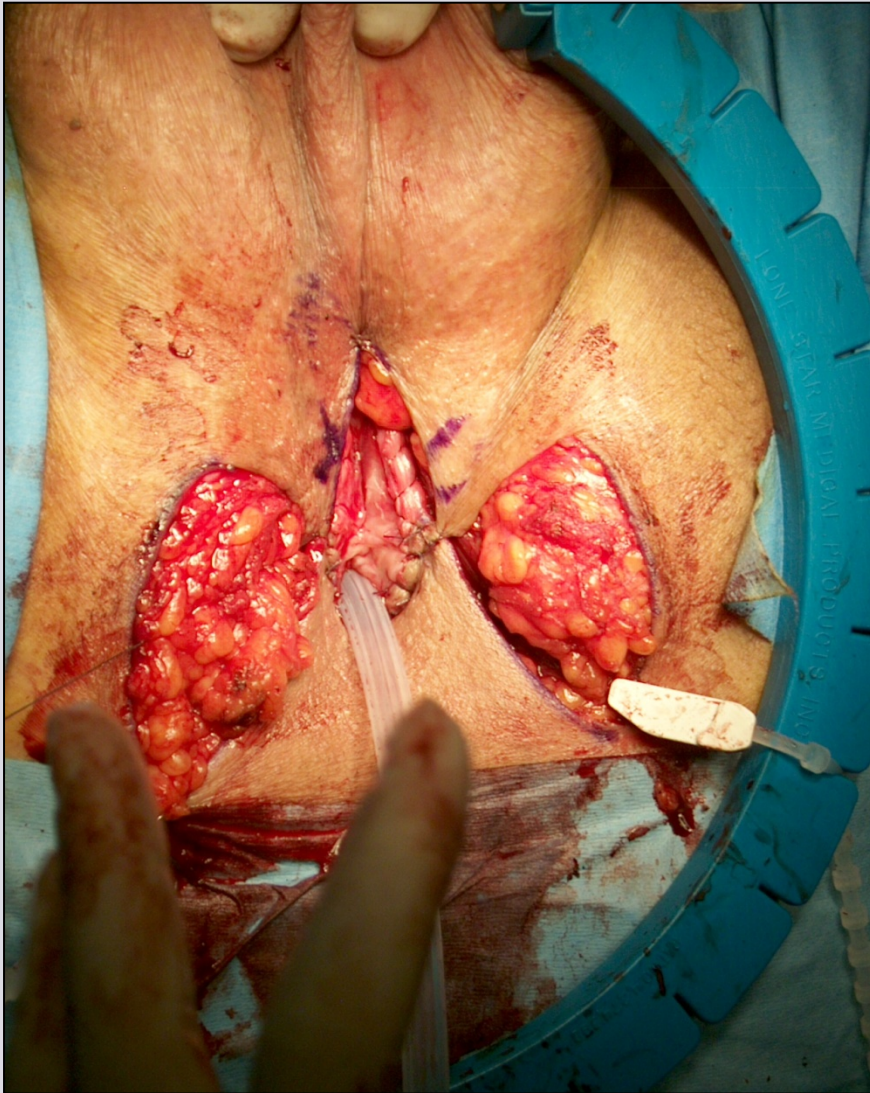
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Tissue-engineered oral mucosa graft urethroplasty

Fahlenkamp D, Barbagli G, Romano G, Ram-Liebig G

Dresden – Chemnitz (Germany)

2010 – 2011 - 2012

e-mail: info@urethralcenter.it

Websites: www.uretra.it
www.urethralcenter.it



The **tissue-engineered oral mucosa graft urethroplasty** was performed at the **Department of Urology in Chemnitz (Germany)**, under the direction of **Prof. Dirk Falhenkam**

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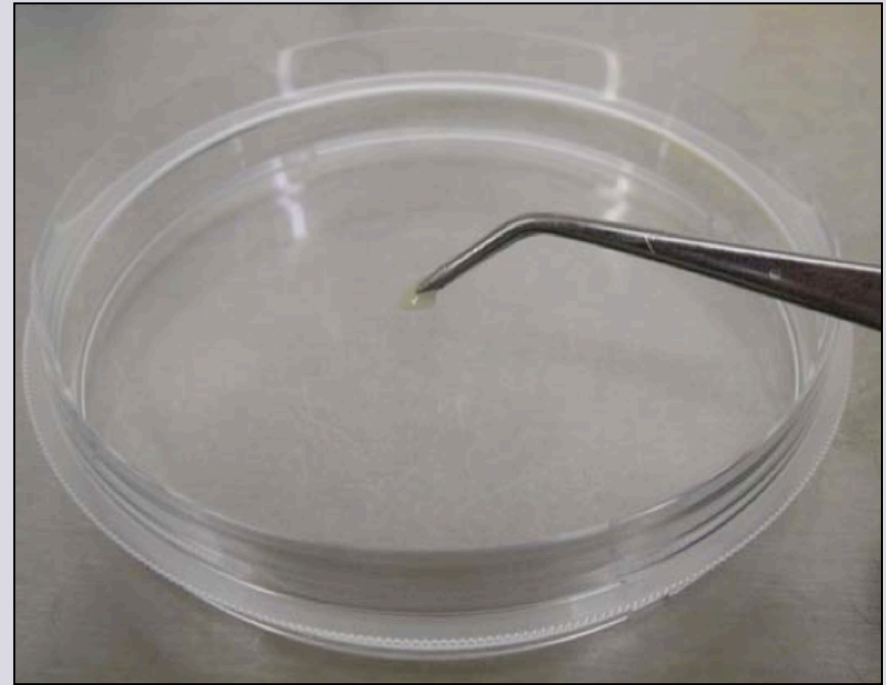
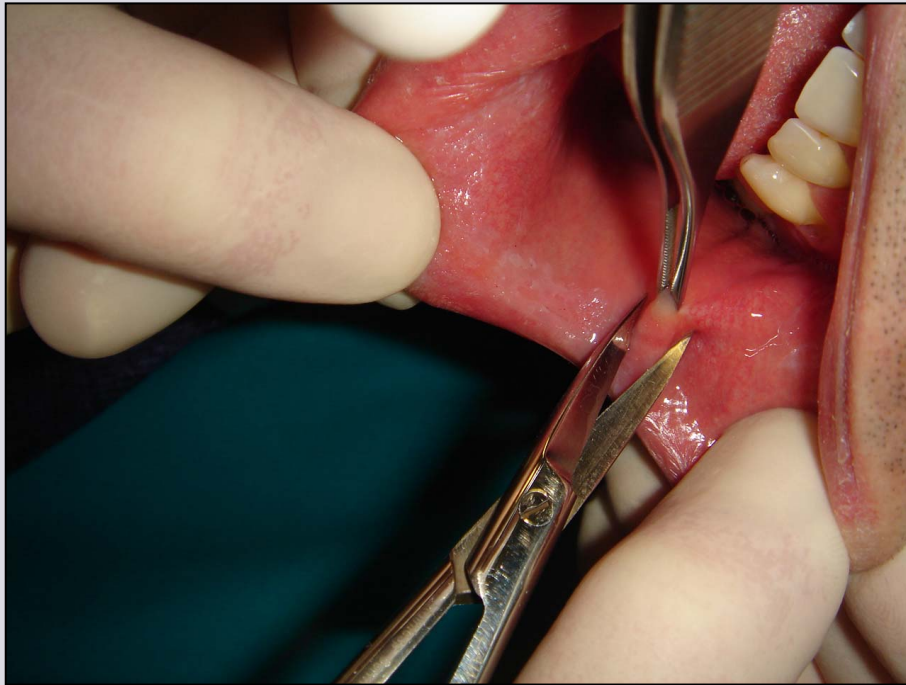
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Pre-operative retrograde urethrography



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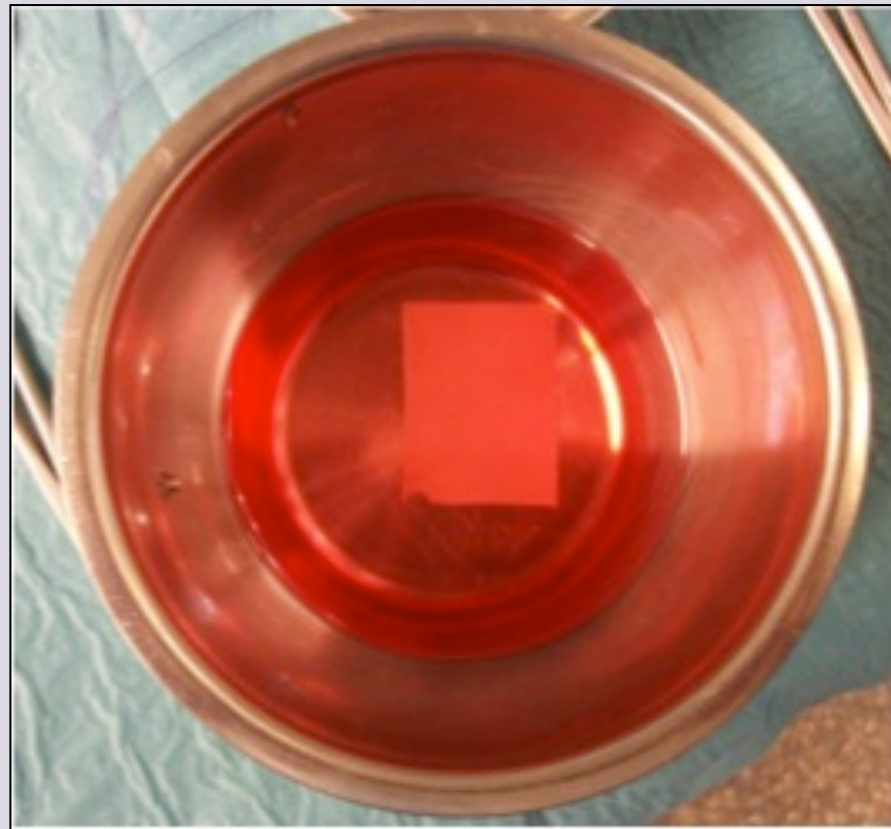
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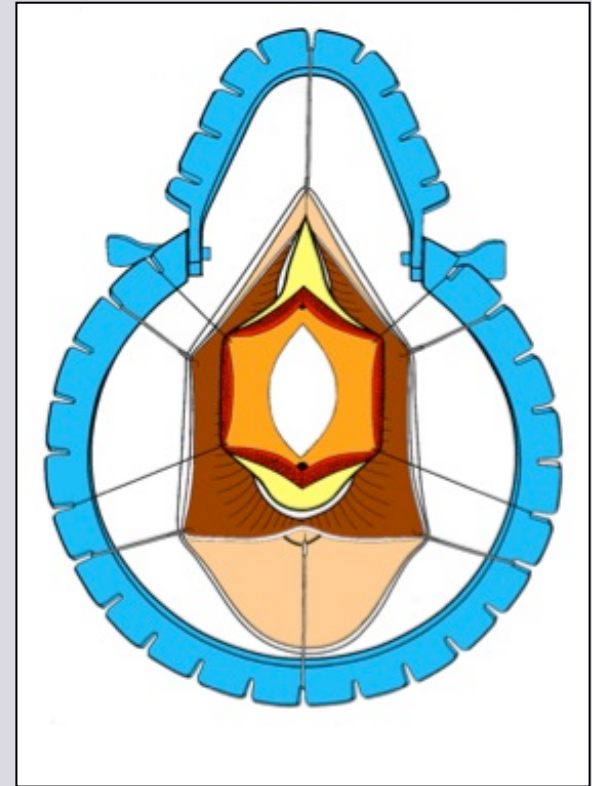
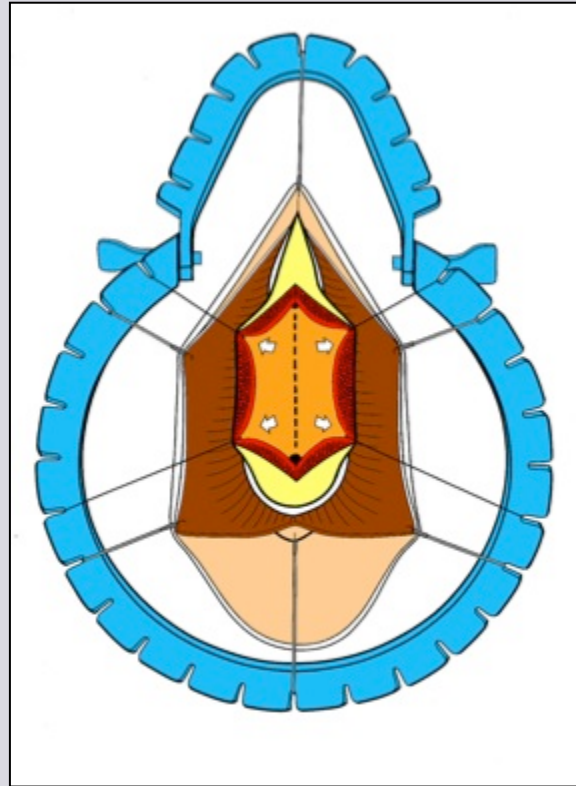
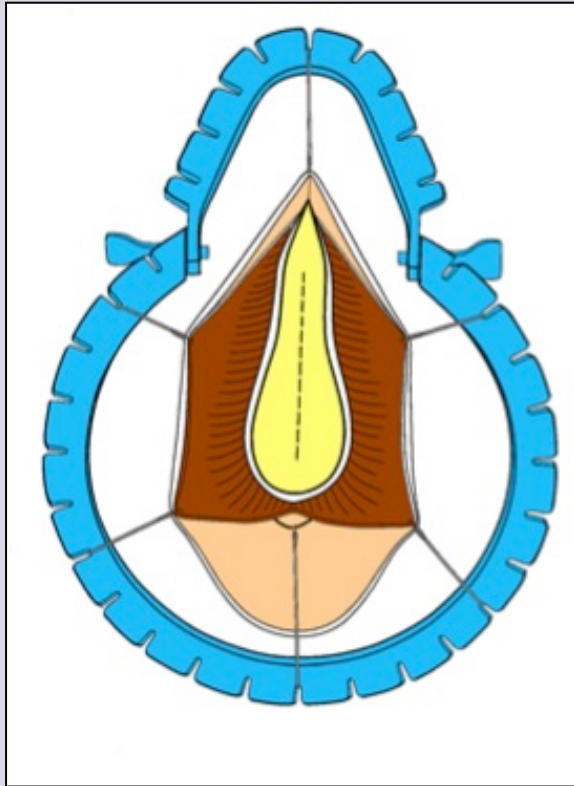
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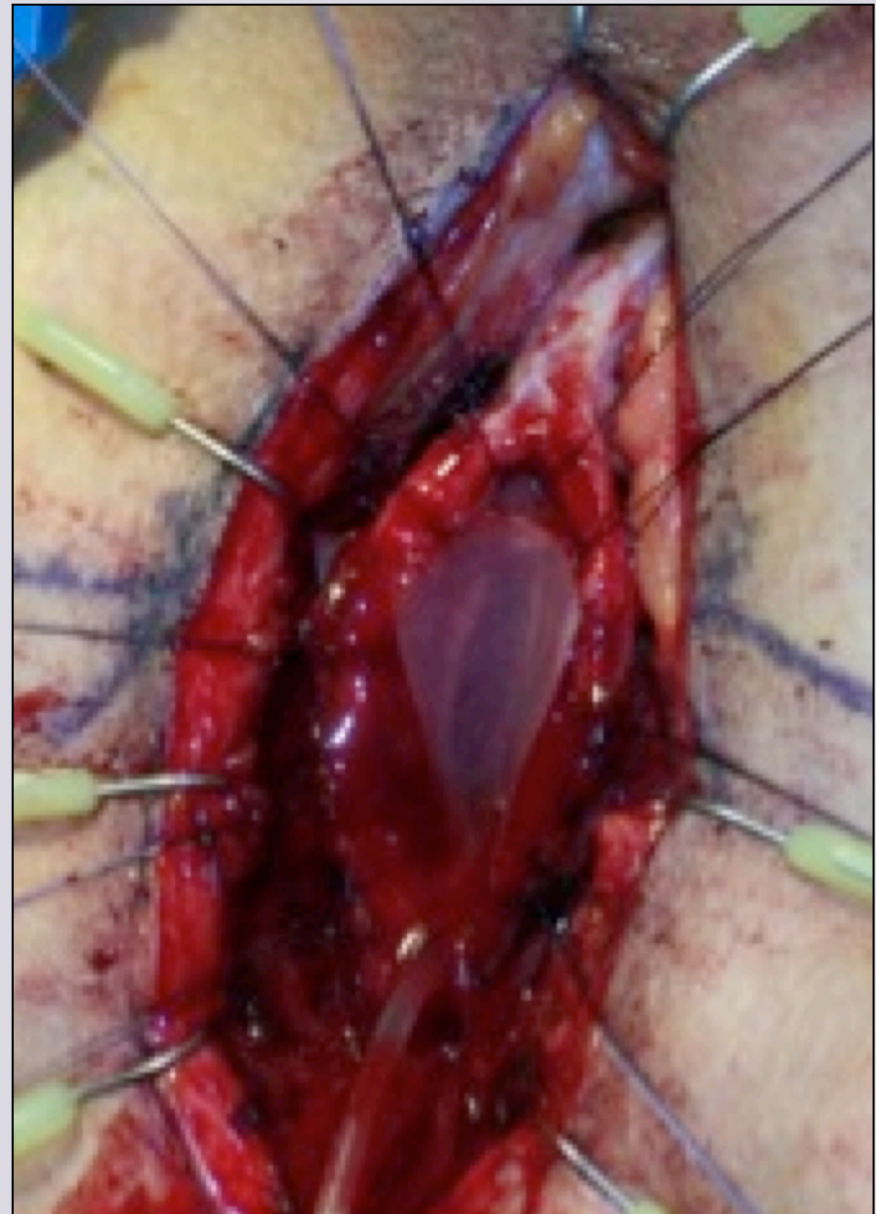
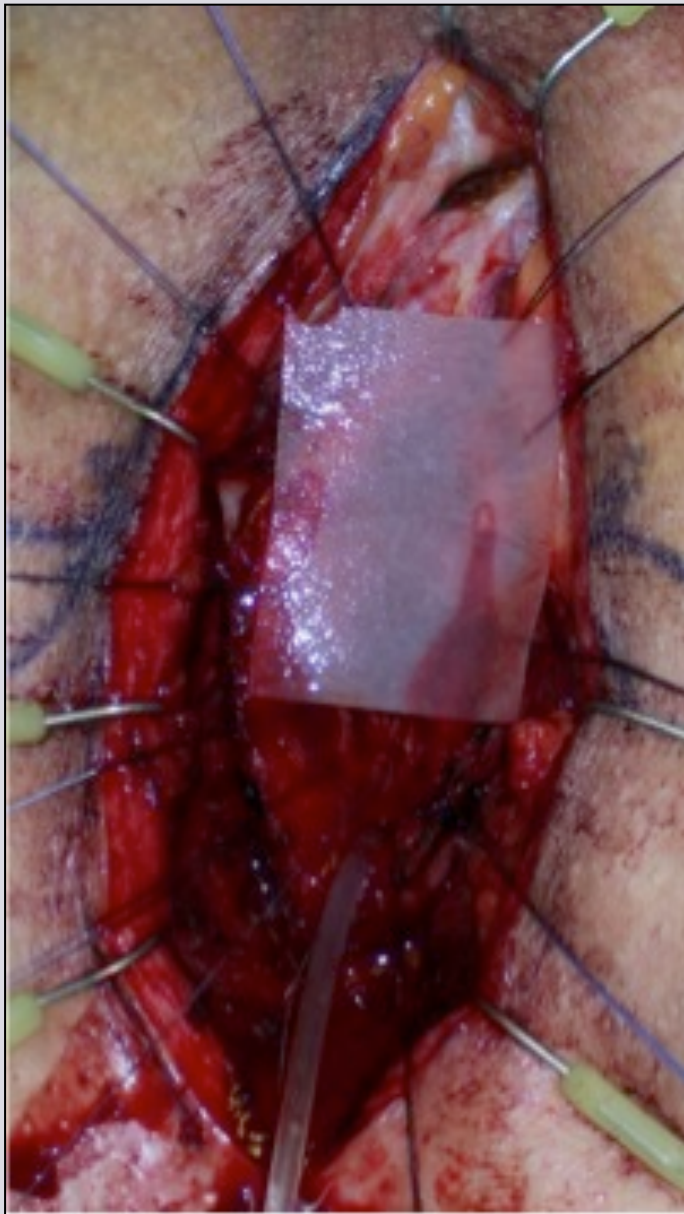
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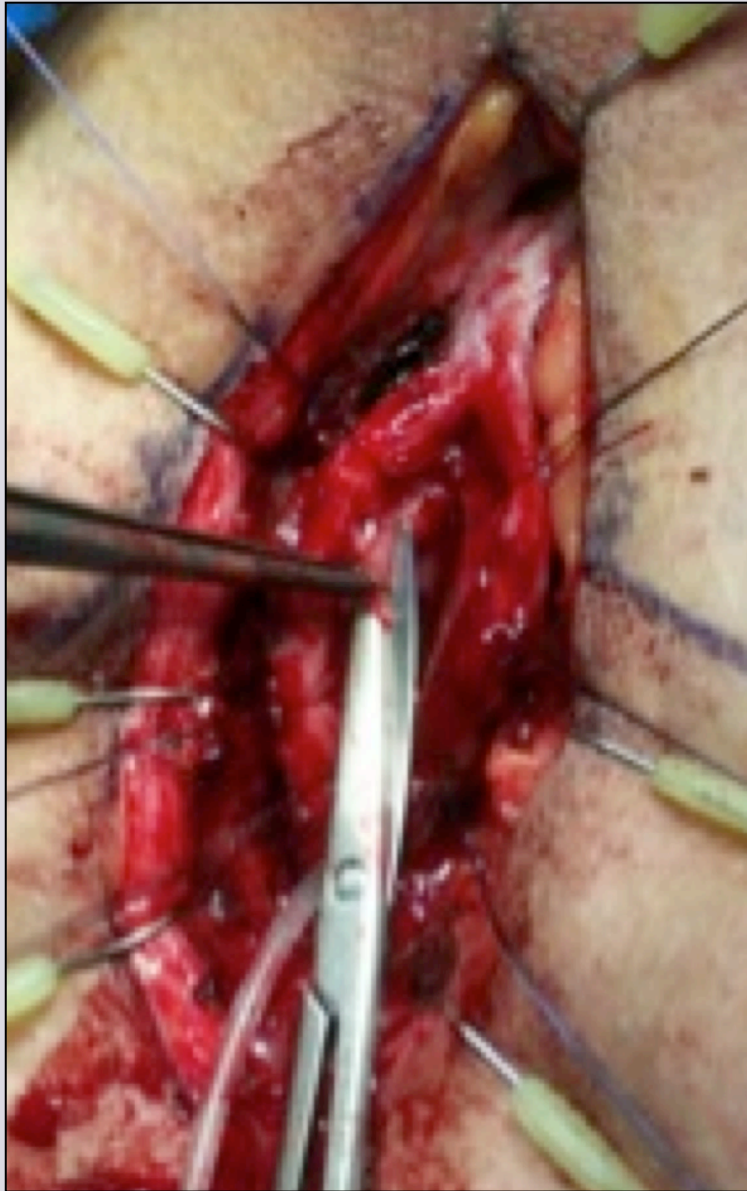
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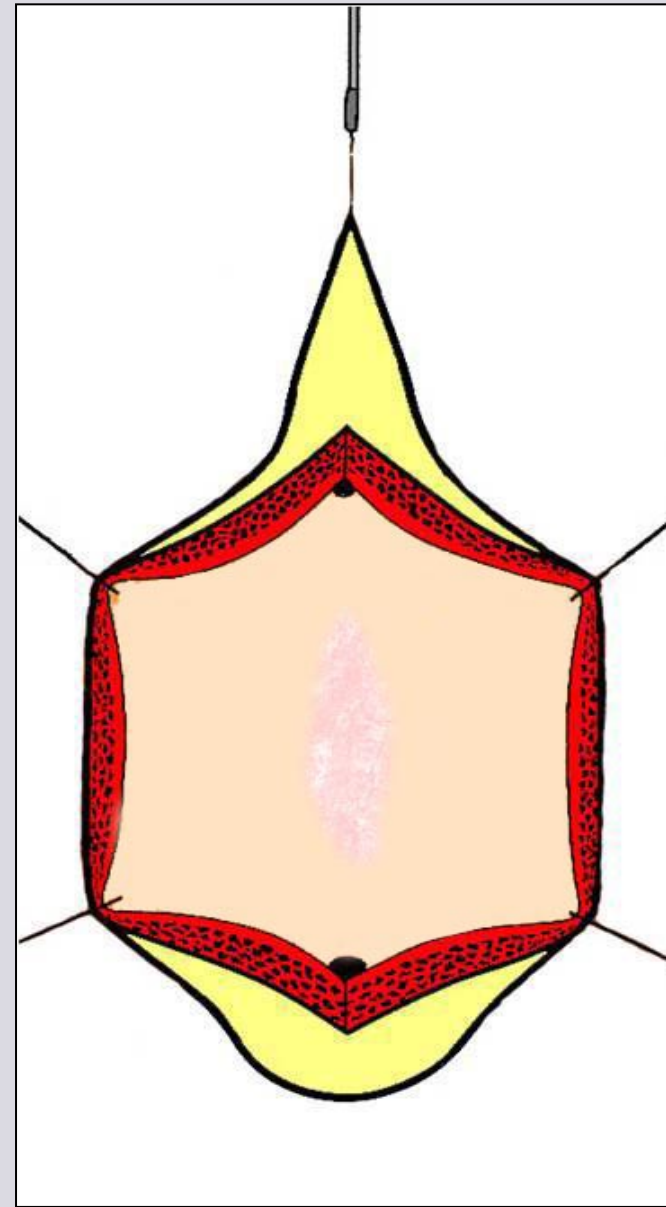
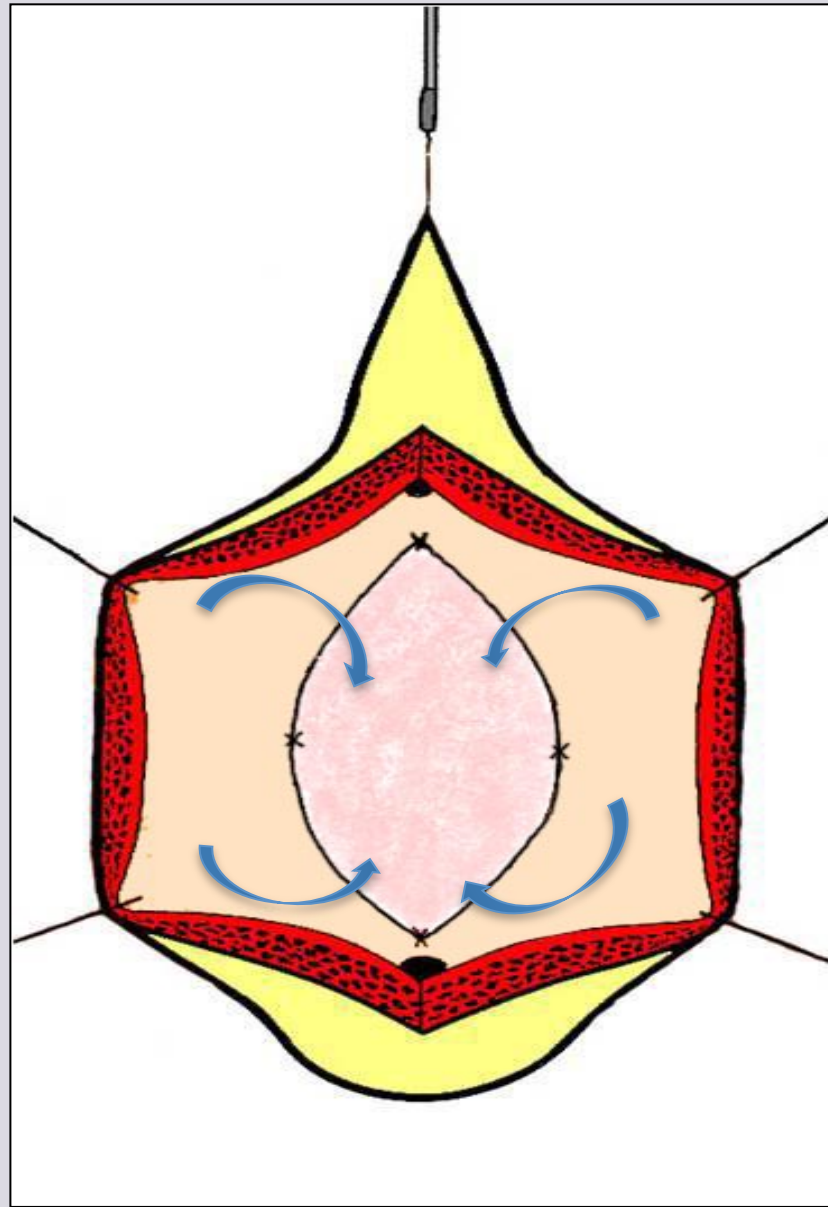
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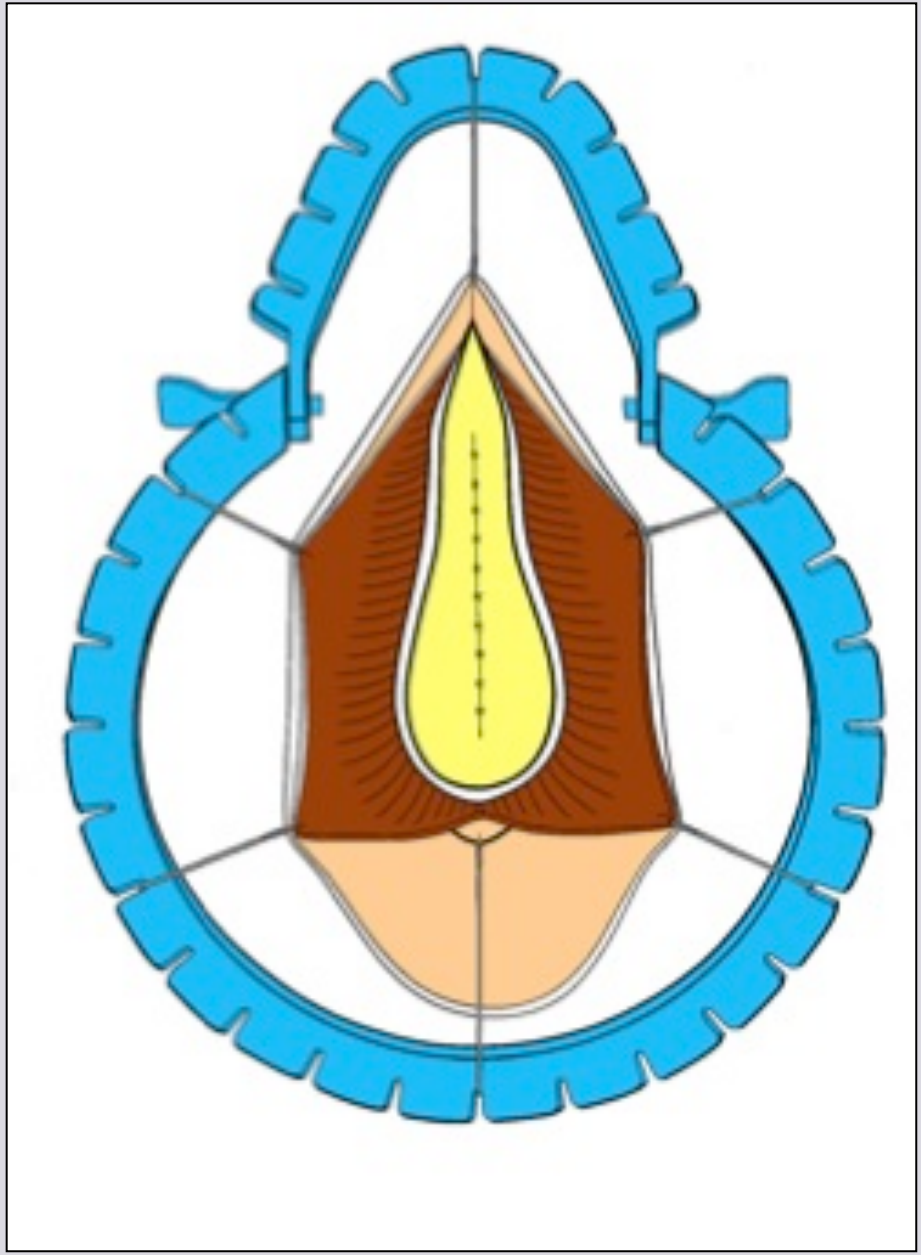
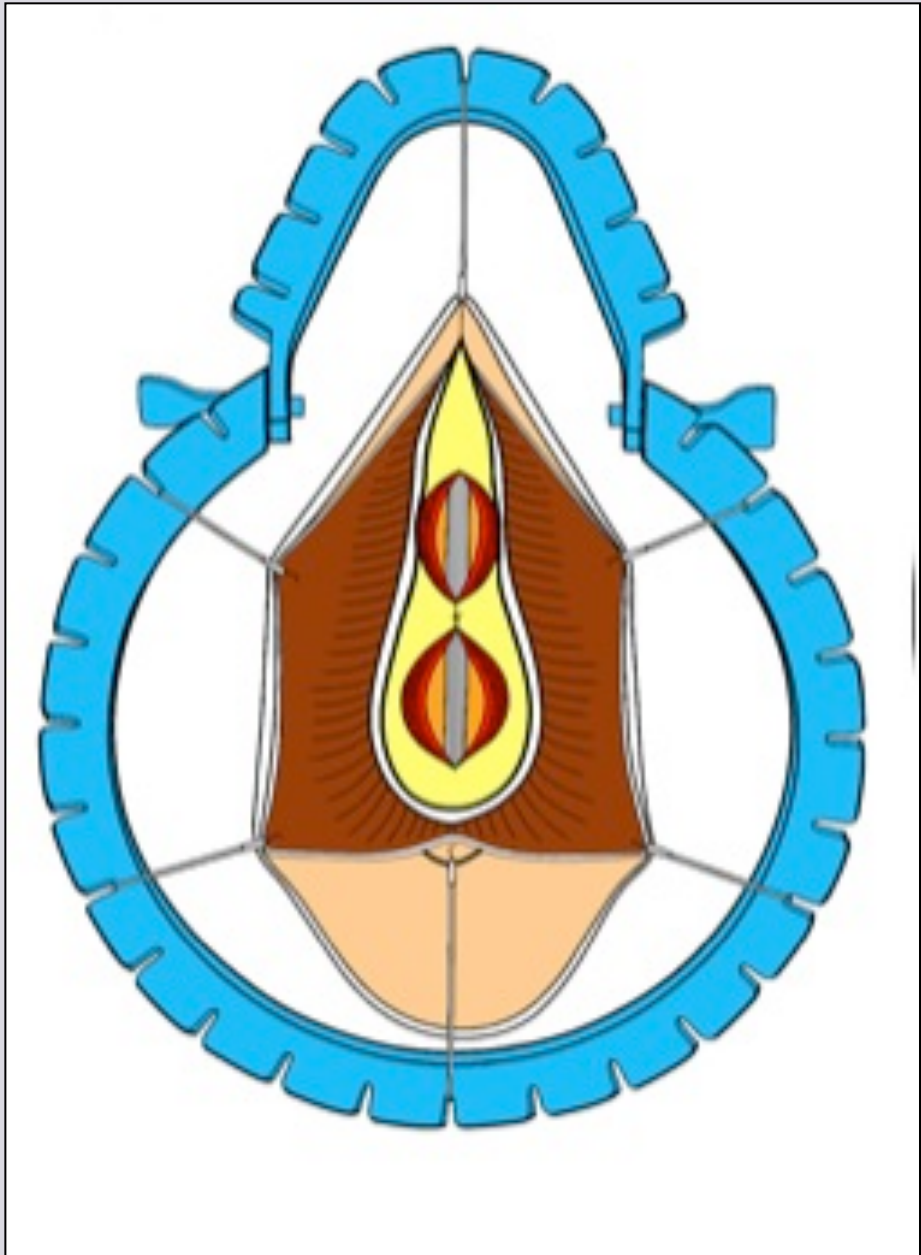
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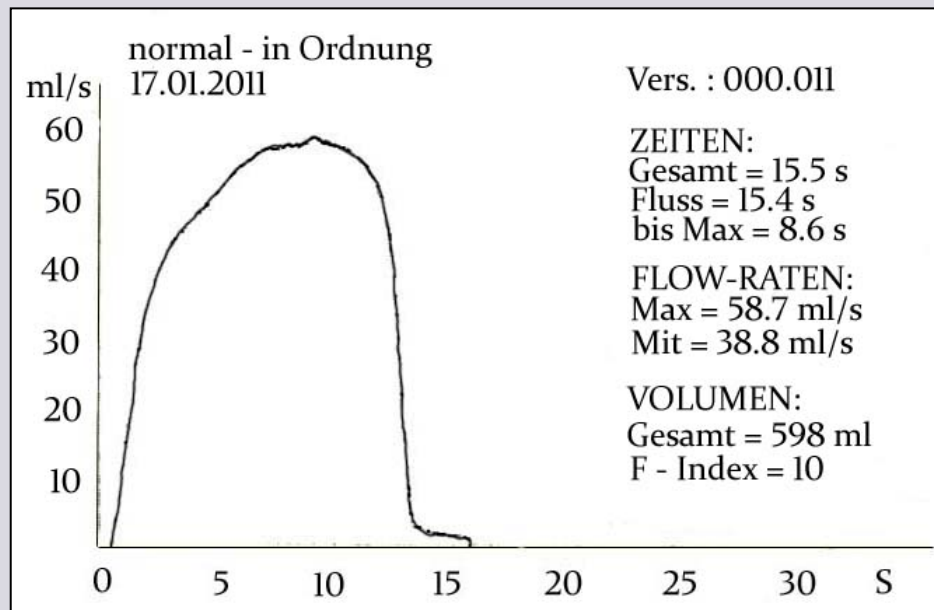
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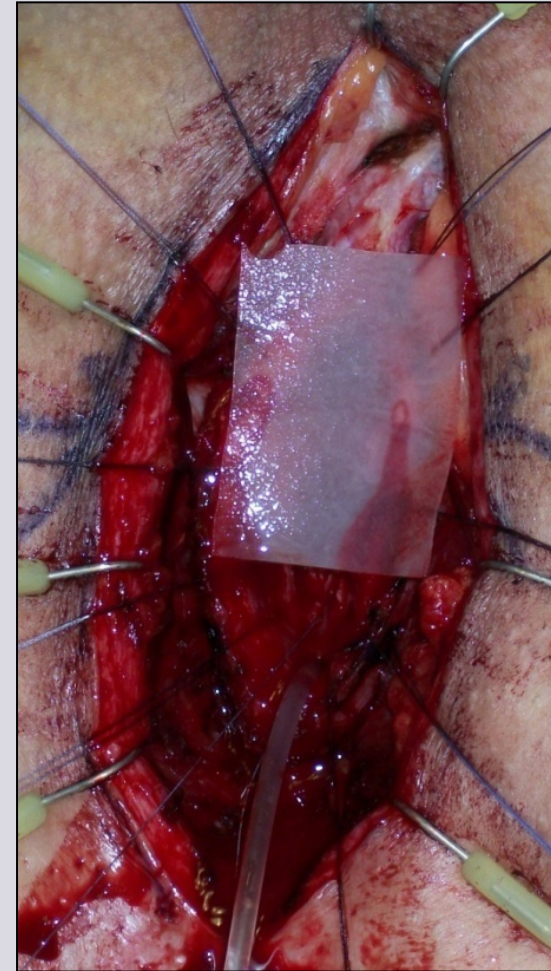


Post-operative uroflowmetry and urethrography

Our preliminary experience

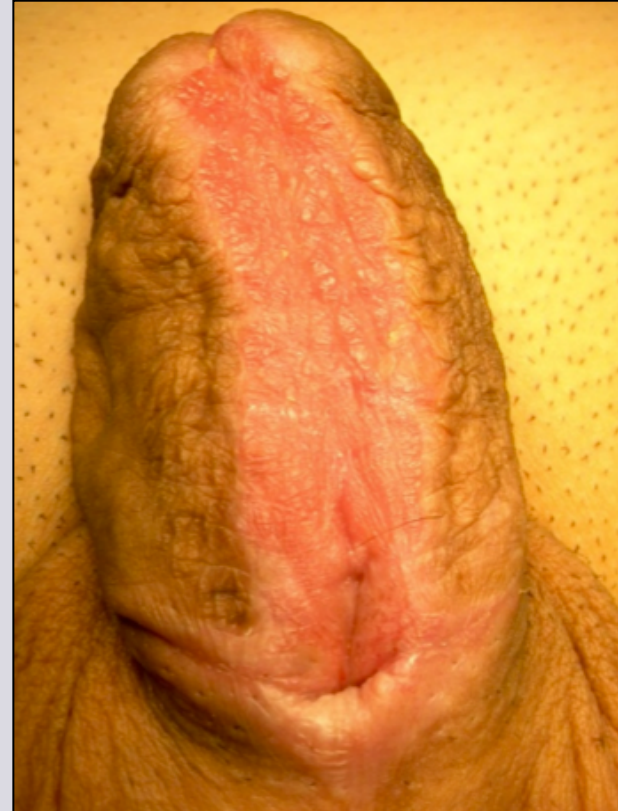
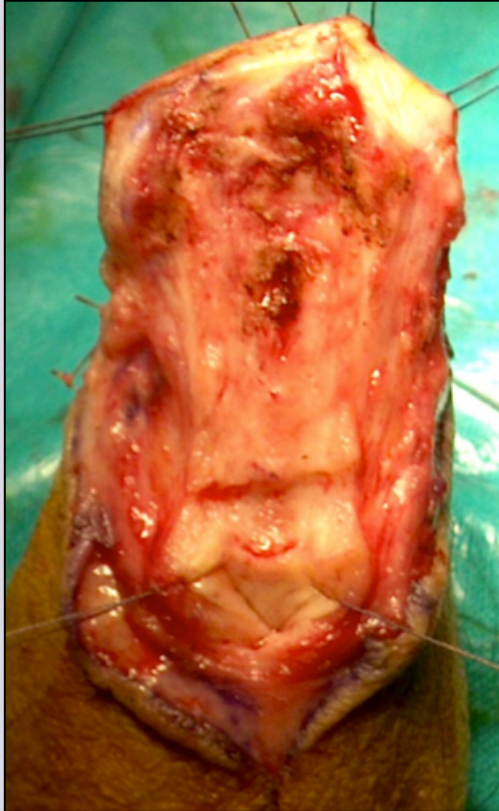


Oral mucosa



Tissue engineered oral mucosa

Our preliminary experience



Is tissue engineered oral mucosa adaptable for any type of urethroplasty ?

Our preliminary experience



The use of tissue engineered oral mucosa is not a simple surgical procedure and should be performed only in a Centre of excellence for urethral surgery.

Tissue-engineered autologous urethras for patients who need reconstruction: an observational study

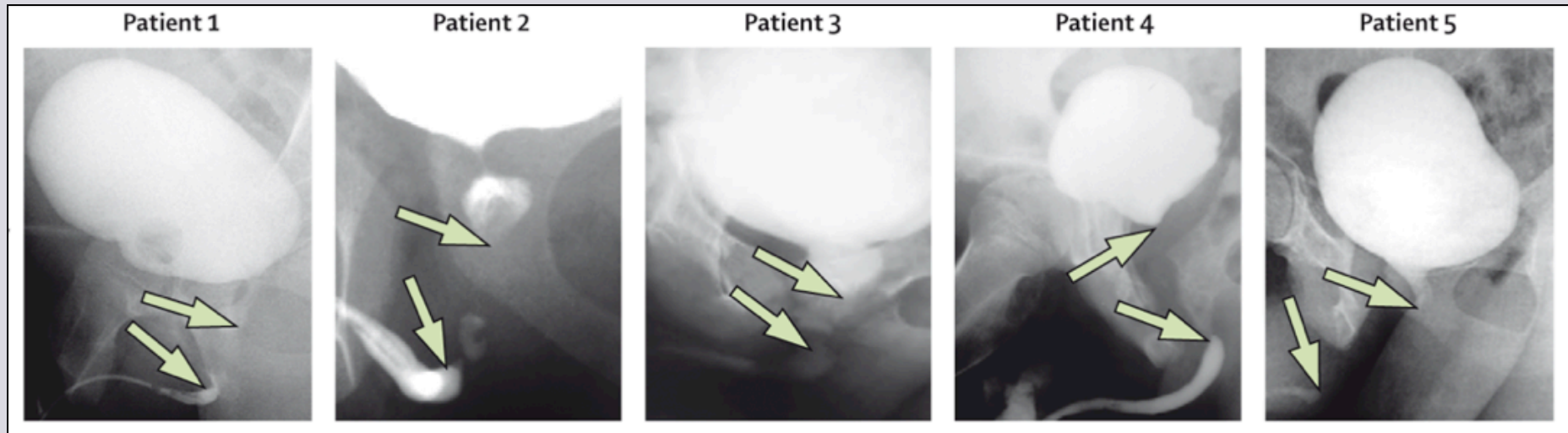


Atlantida Raya-Rivera, Diego R Esquiliano, James J Yoo, Esther Lopez-Bayghen, Shay Soker, Anthony Atala

Lancet 2011; 377: 1175-1182

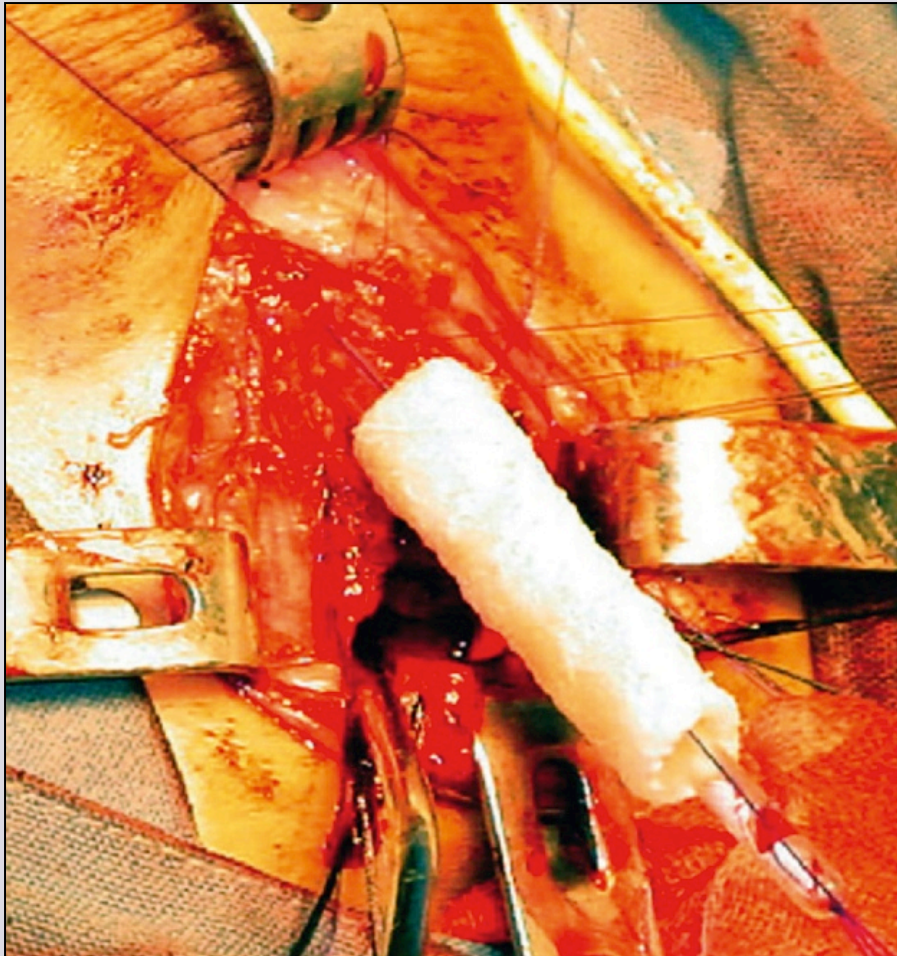
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5 patients (median age 11 years) with recurrent posterior stricture after pelvic trauma

Tissue engineered tubularized urethra created by autologous cells

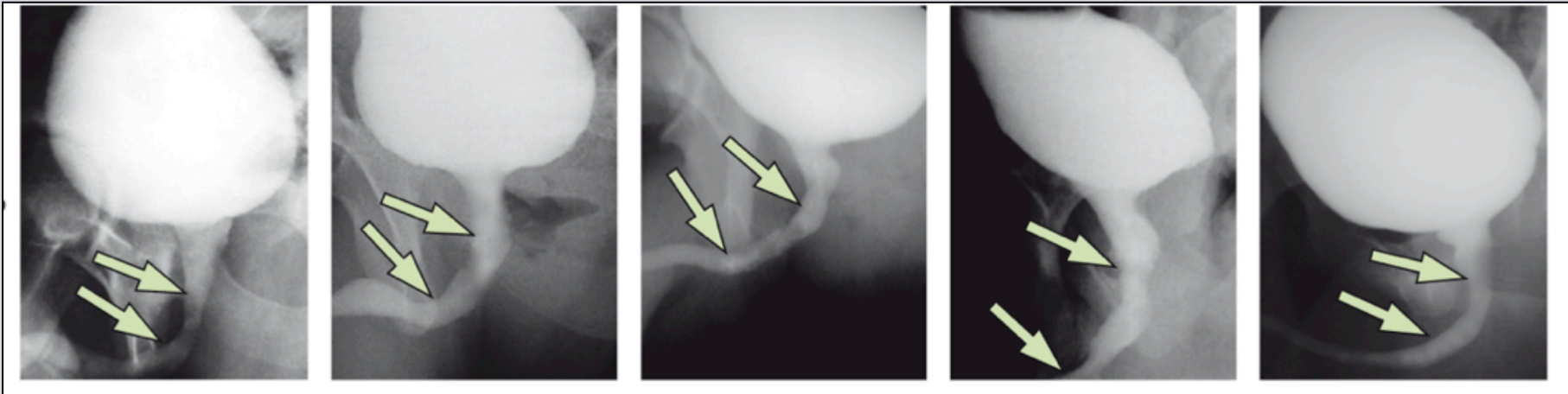


1cm x 1cm bladder biopsy

Smooth muscle and urothelial cells were collected and cultured

Biodegradable mesh made of polyglycolic acid was tubularized

Urothelial cells were seeded onto the luminal surface and muscle cells onto the outer surface of the tubularized scaffold



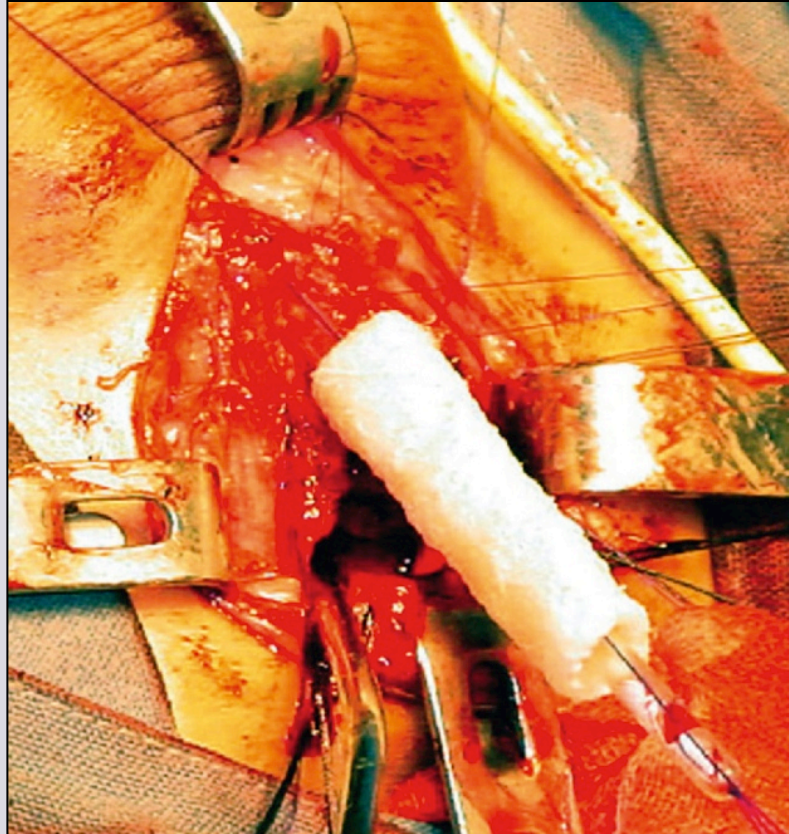
Median followup was 71 months
(range 36-76 months)



Conclusions

In the era of robotic surgery, it is also time to change urethral surgery!

- ❖ **Increase the use of minimally invasive techniques in urethroplasty, reducing the incidence of complications and improving patient quality of life.**
- ❖ **Increase the use of appropriate questionnaires to better evaluate the outcome of urethroplasty.**



Conclusions

The future is just outside the door, as tissue engineered material for urethral reconstruction is already available.

How do we use this new grafting material for urethroplasty?