

Center for Reconstructive Urethral Surgery



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1st Oceana Paediatric Urology Course

Valencia – Spain

1 – 2 April 2011

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Surgical reconstruction of the anterior urethra

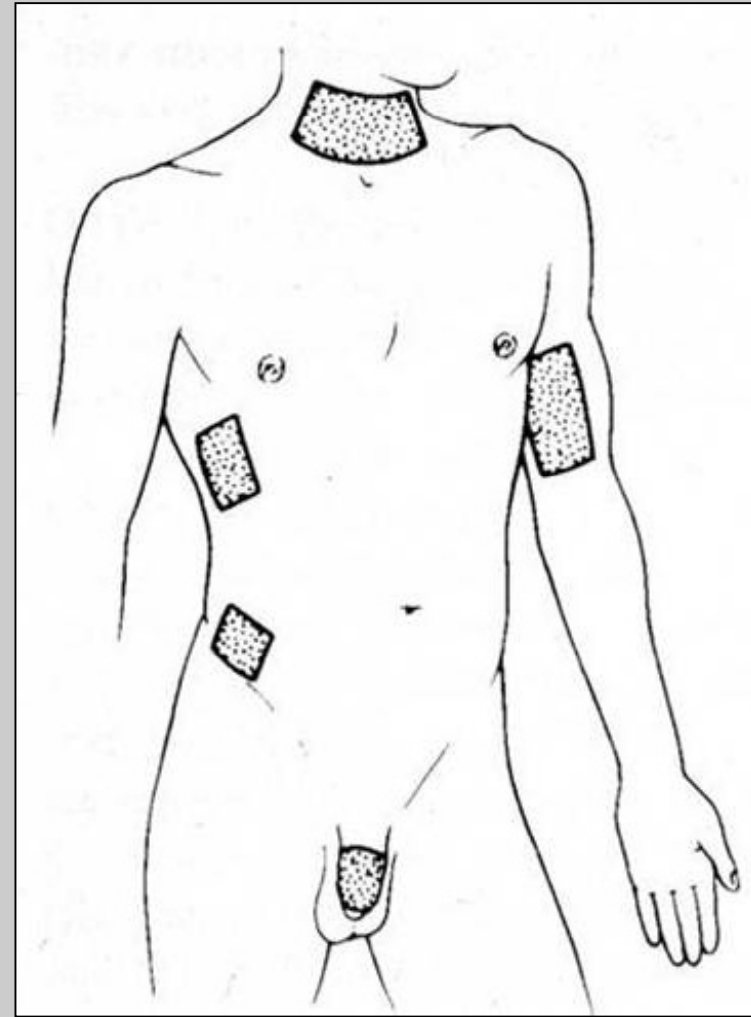
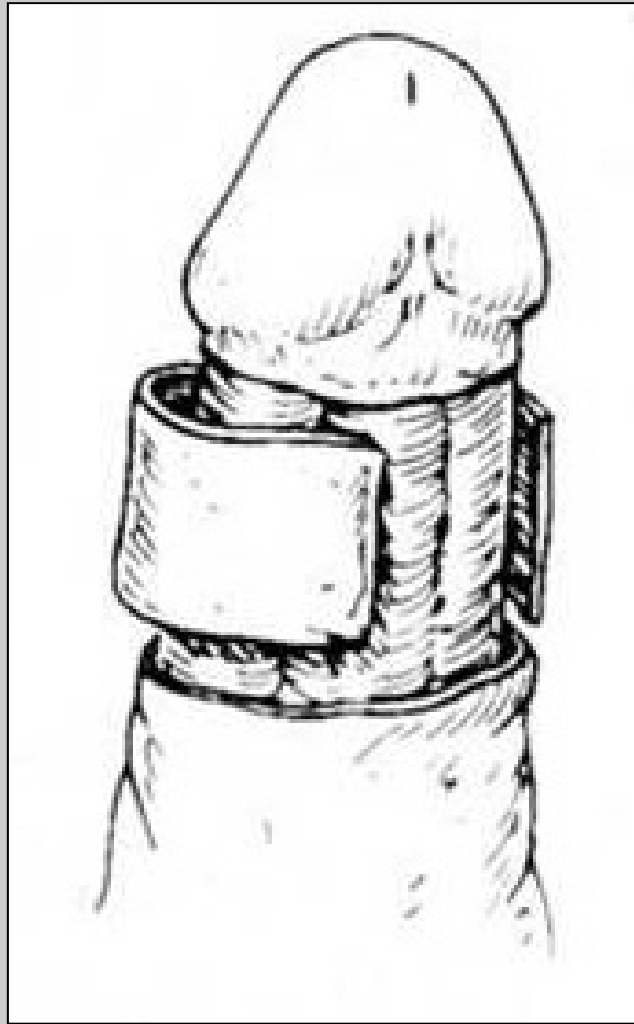
**Which tissue is best for
urethral
reconstruction?**



Substitute materials for urethroplasty

1. Genital or extragenital skin (1953 – Presman-Greenfield)
2. Bladder mucosa (1947 – Memmelar)
3. Oral mucosa (1941 – Humby)
4. Tissue engineered material (2010 – Falenkamp-Barbagli)

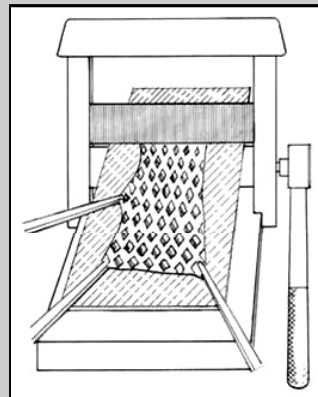
Genital or extragenital skin



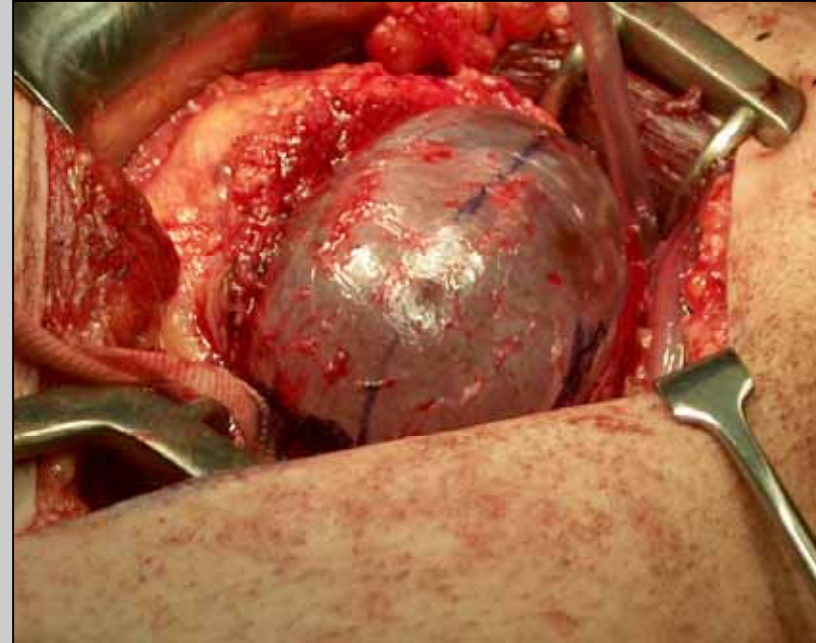
Retroauricular skin (A.R. Mundy)



Mesh-graft skin (F. Schreiter)

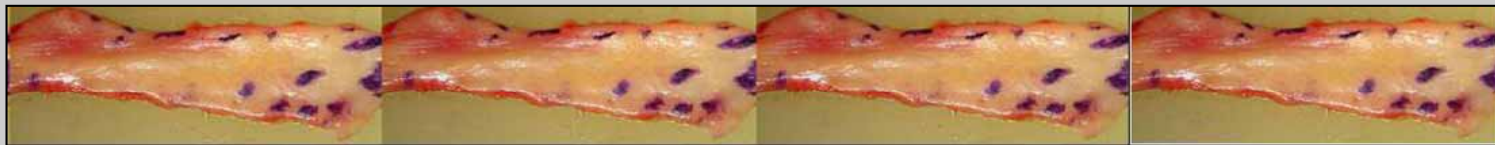


Bladder mucosa



In the era of robotic surgery, it is no longer necessary to open the abdomen of the patient to repair all types of urethral strictures !

Oral mucosa



4 cm

16 cm x 2.5 cm

Substitute material for urethroplasty

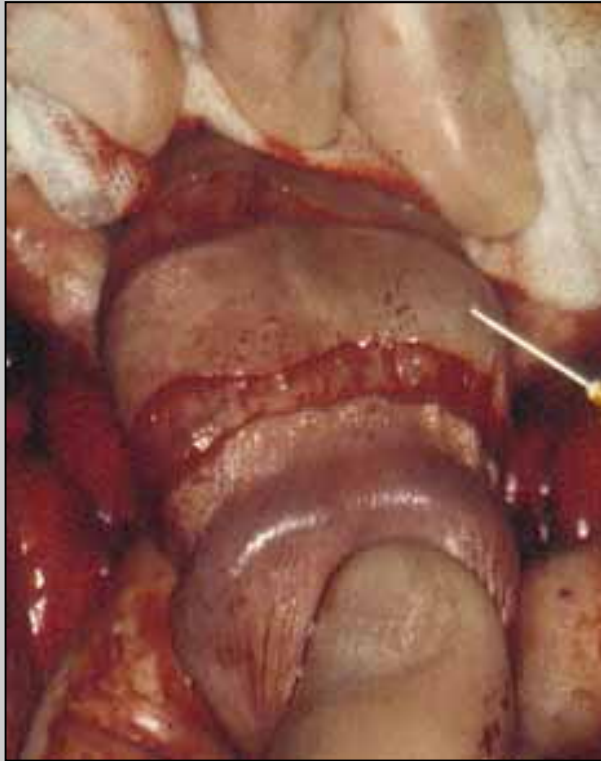
Skin or oral mucosa?

The literature on this topic does not provide any sure guidelines:

- **old reports**
- **no homogeneous series of patients**
- **different surgical techniques**
- **different criteria for evaluation of the results**

Substitute material for urethroplasty

skin



oral mucosa



Anatomical and biological differences

Harvesting site

Oral mucosa  **concealed**

Skin  **visible to the naked eye**



esthetic consequences



psychological sequelae

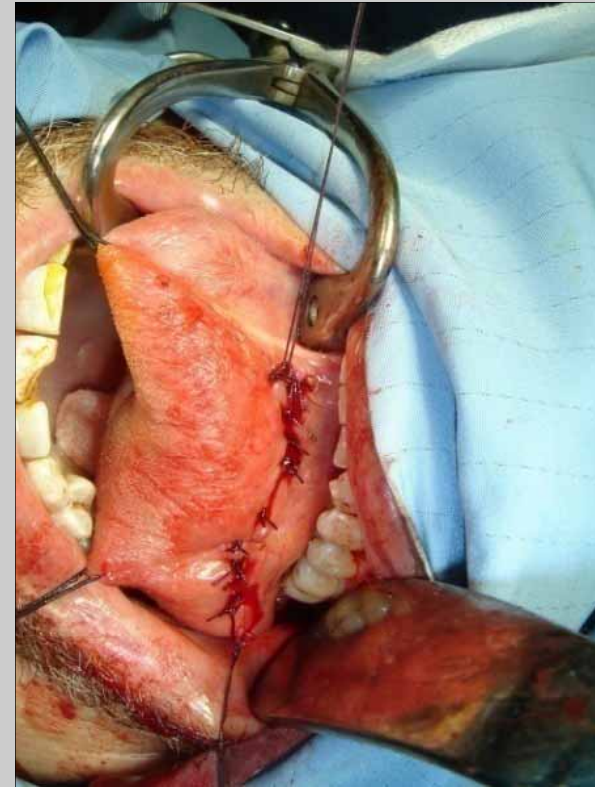
Harvesting site from the lip: visible to the naked eye



Negative esthetic consequences

Unsatisfactory post-operative patient acceptance

Oral mucosa: harvesting site



concealed

Genital skin: harvesting site



visible to the naked eye

Oral mucosa: evidence in the literature

The Oral Mucosa Graft: A Systematic Review

Michael R. Markiewicz,* Melissa A. Lukose, Joseph E. Margarone, III, Guido Barbagli, Kennon S. Miller and Sung-Kiang Chuang

Markiewicz MR et al., J Urol 2007; 178:387-394

In the literature, 1,267 articles on the use of oral mucosa in urethral reconstruction have been reported (1966-2006).

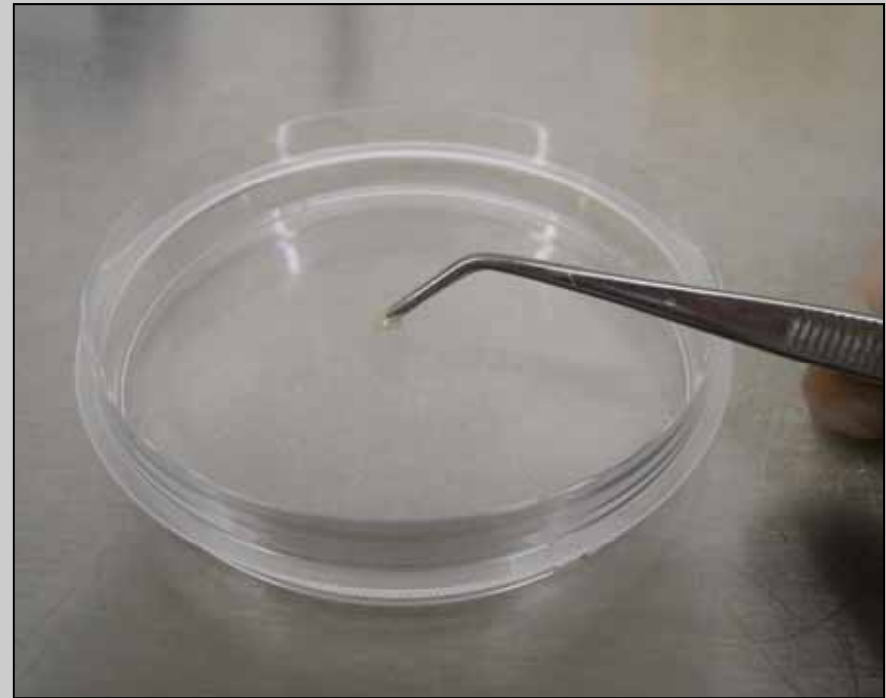
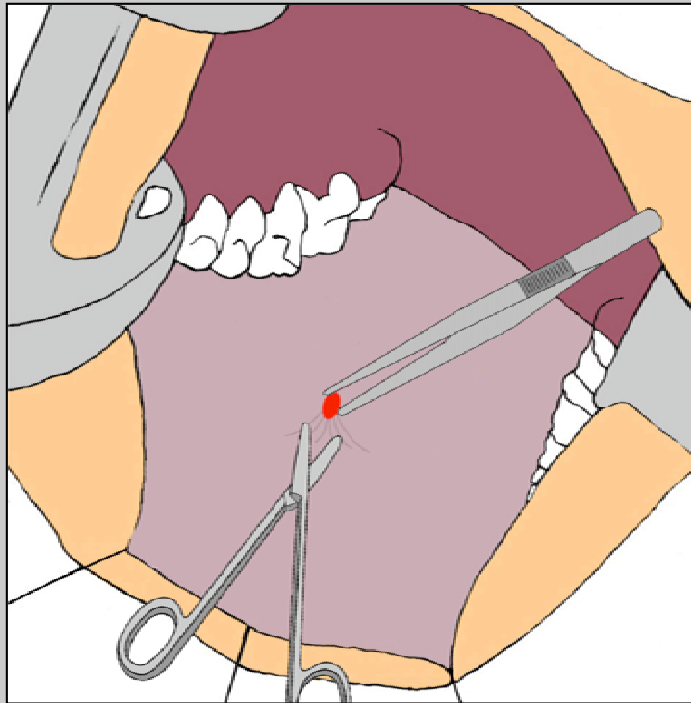
Tissue engineered material



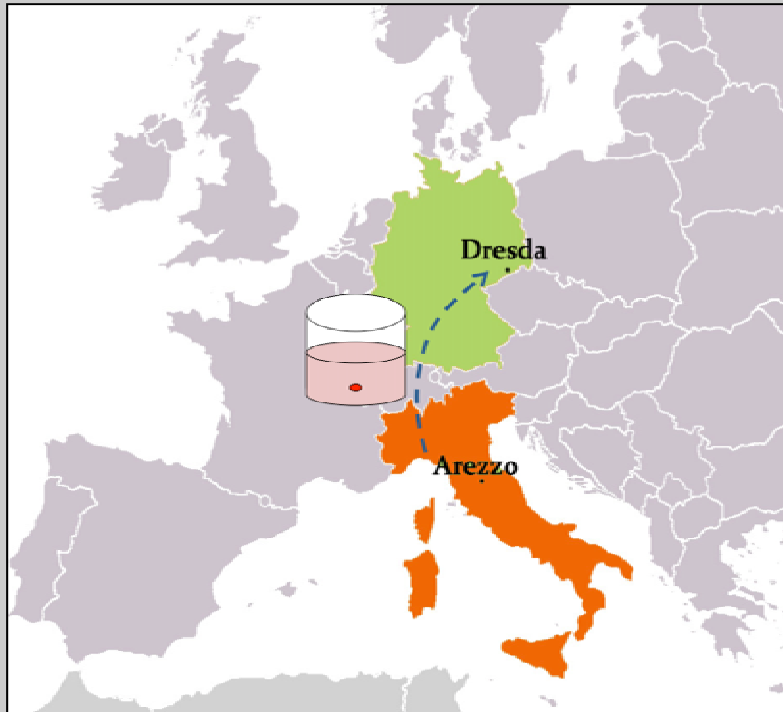
Mukocell's tissue engineering oral mucosa

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website: www.urethralcenter.it



**For the production of MukoCell's, a tiny oral mucosa biopsy is taken
from the mouth of the patient**



The oral mucosa biopsy is sent in Germany to the certified cell culture laboratory (Urotech)

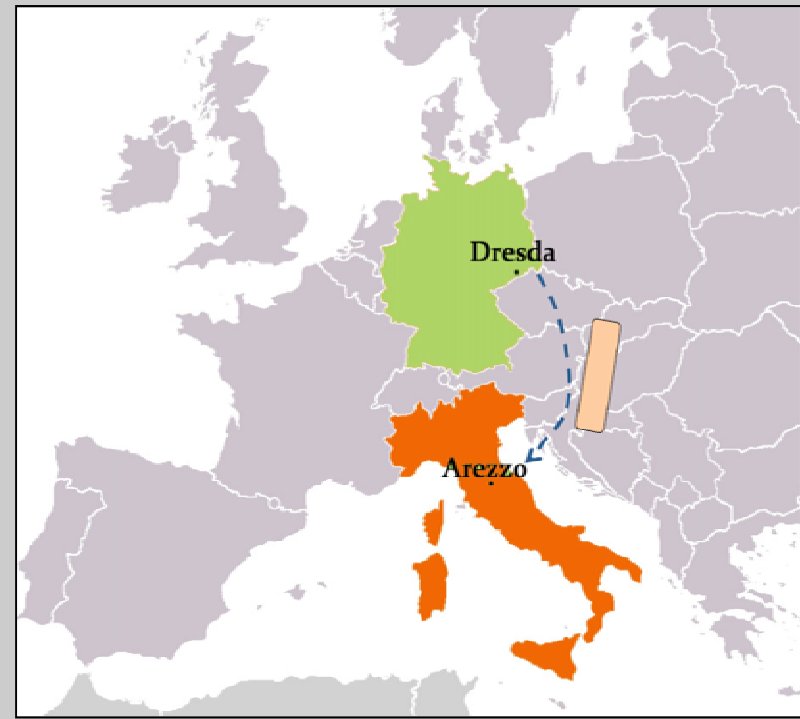
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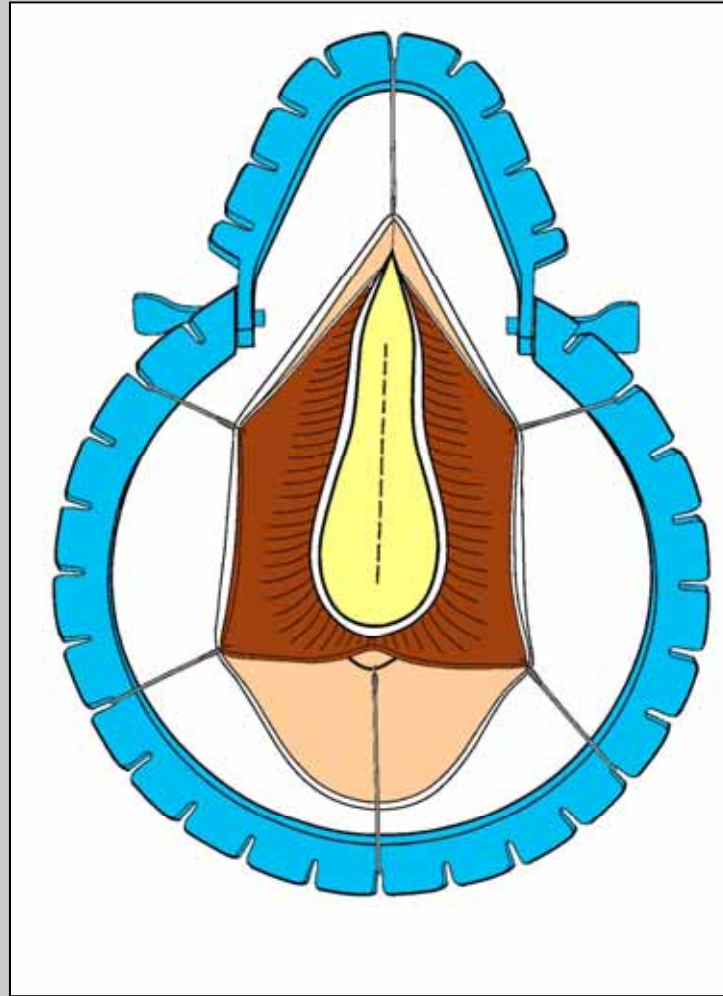
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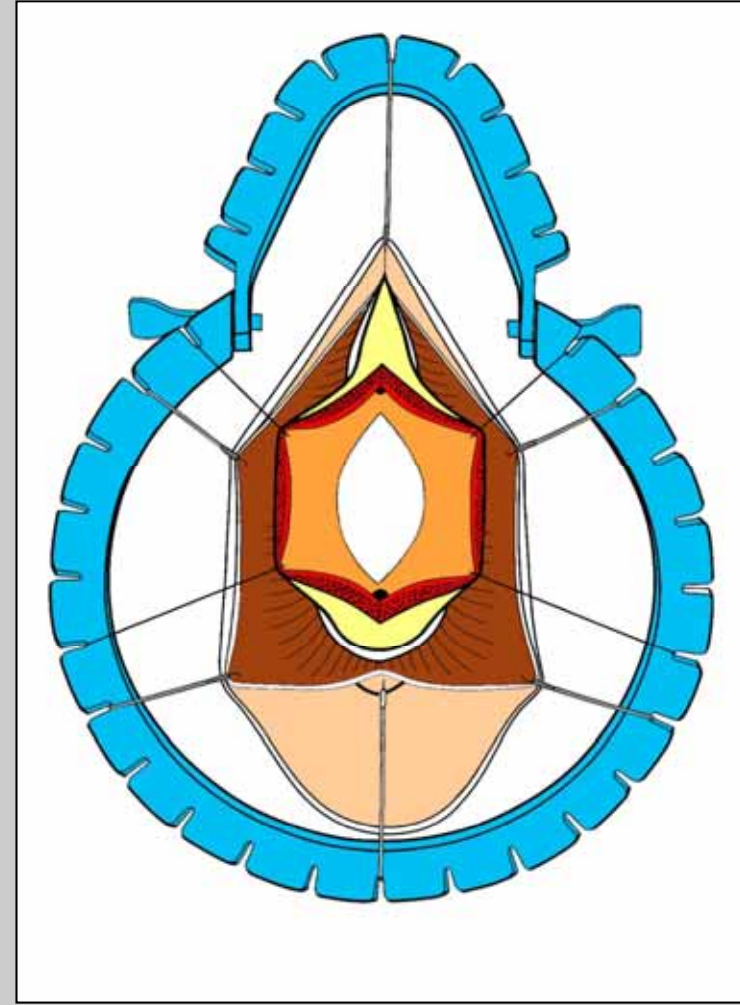
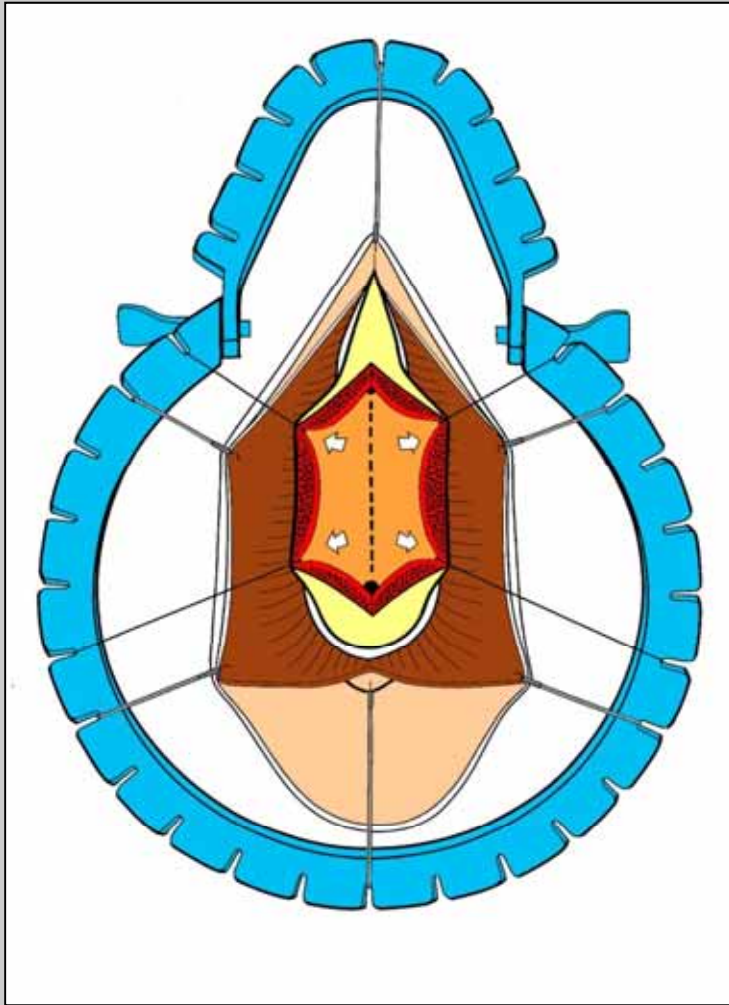
MukoCell's production is a validated procedure and takes about 3 weeks. During this time, cells are isolated from the biopsy, expanded and cultured on the surface of a collagen scaffold



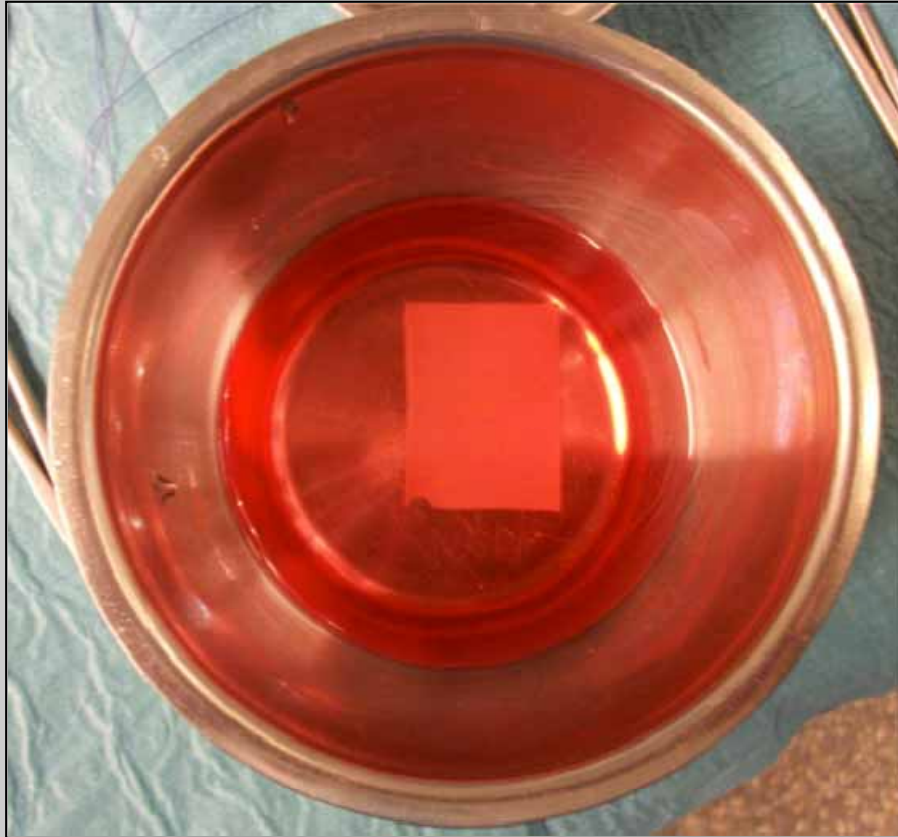
Patients's own oral mucosal construct is then packed in a sterile container and sent to the hospital, where it can be implanted into patient, undergoing urethral reconstruction surgery



The bulbar urethra is opened along its ventral surface



The urethral plate is longitudinally incised to obtain a wide window



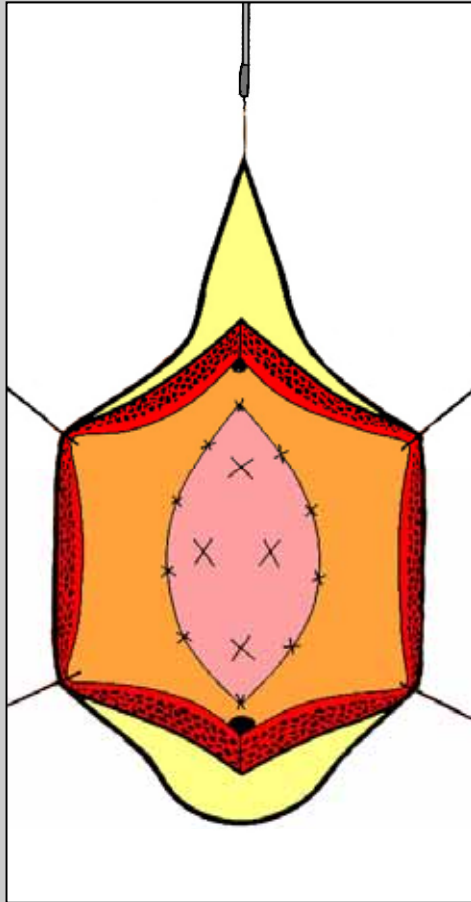
The Muko-cell's oral graft is ready for the transplant into the urethra



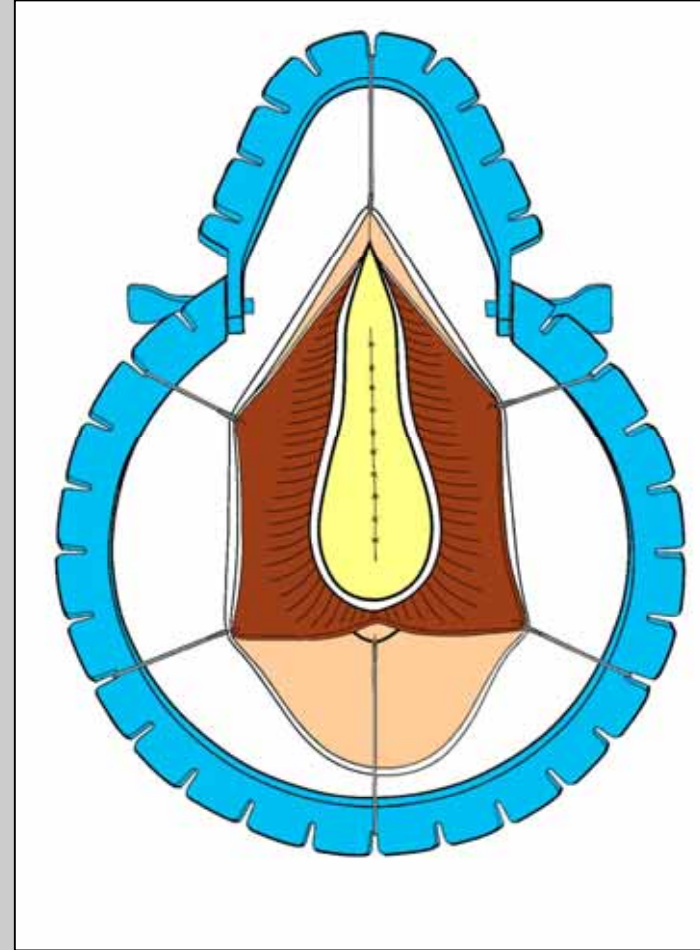
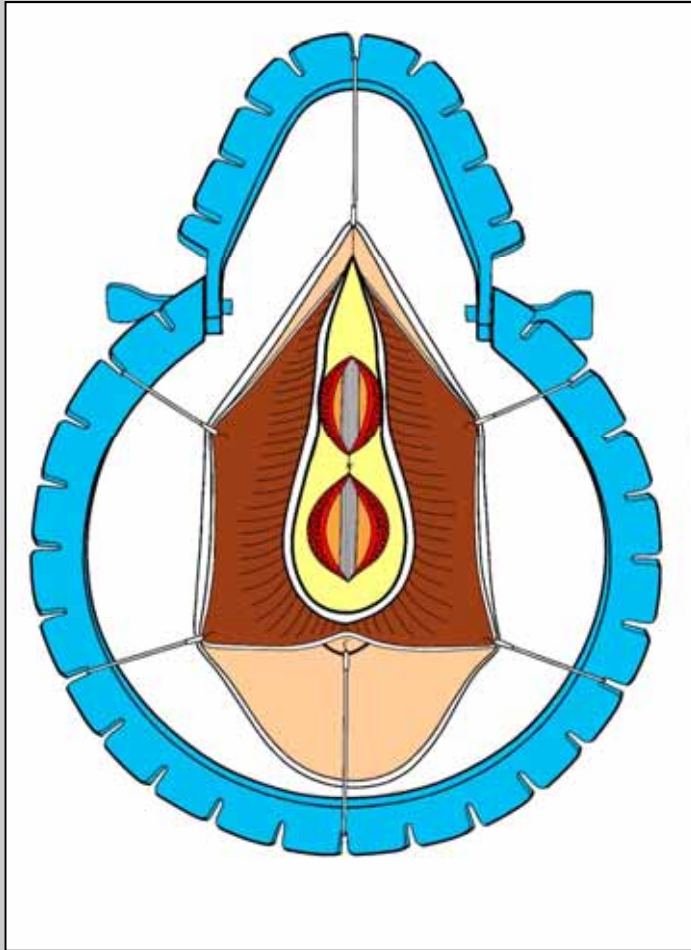
**The Muko-cell's oral graft is layed carefully on the window created
in the urethral plate**



The Muko-cell's oral graft is tailored according to the size of window created into the original urethral mucosal plate



The Muko-cell's oral graft is sutured and quilted deeply into the urethral plate window.



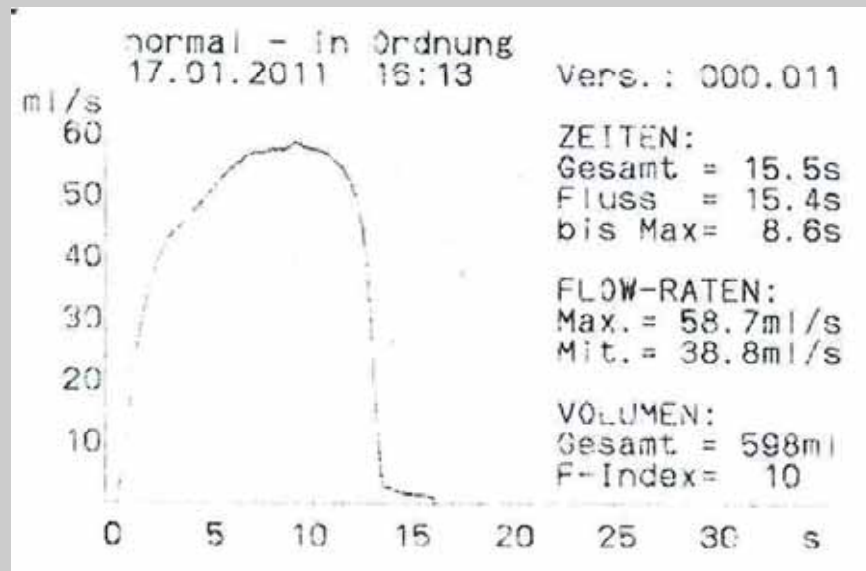
The bulbar urethra is closed over 16 Ch Foley silicone catheter



Pre-operative retrograde urethrography

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Four weeks after urethroplasty uroflowmetry and urethrography is made

Harvesting the oral mucosa

Surgical technique

Two surgical teams work simultaneously



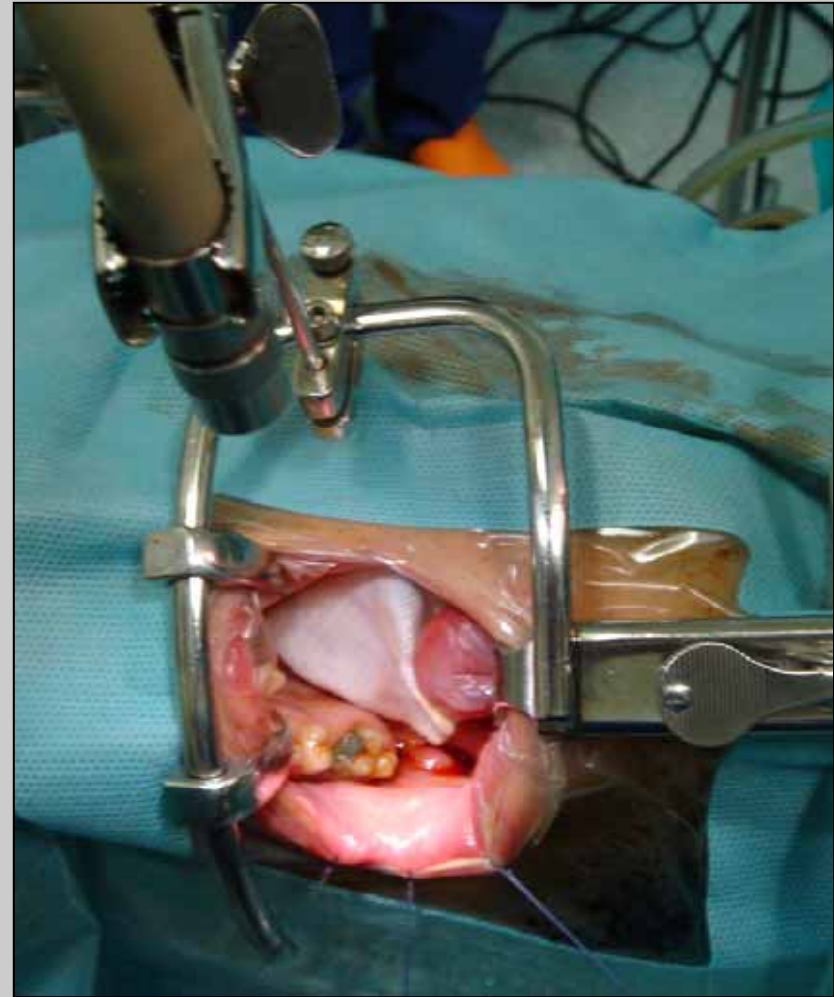
Two sets of surgical instruments



Oral mucosa



Urethroplasty



Appropriate mouth retractor with its own light



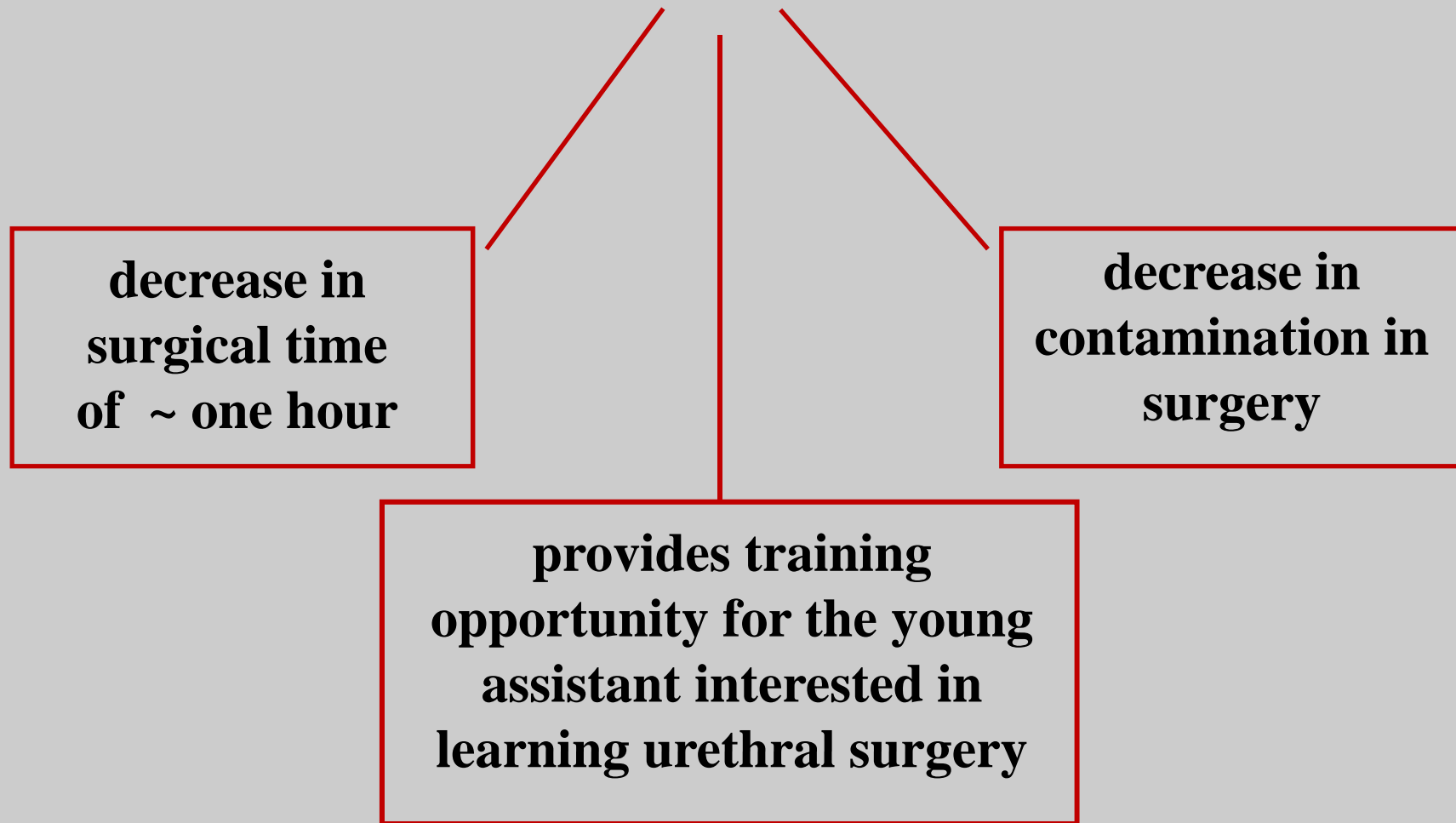
Only one assistant is needed to harvest the oral graft

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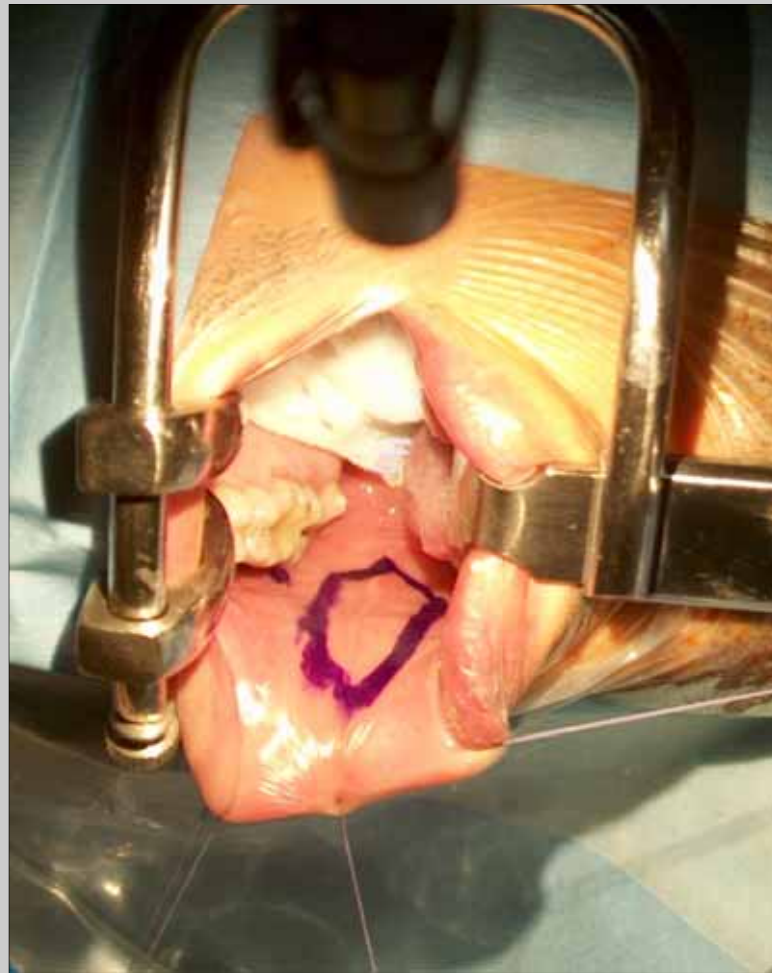
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Advantages of the double team



Jack McAninch – San Francisco - 1995

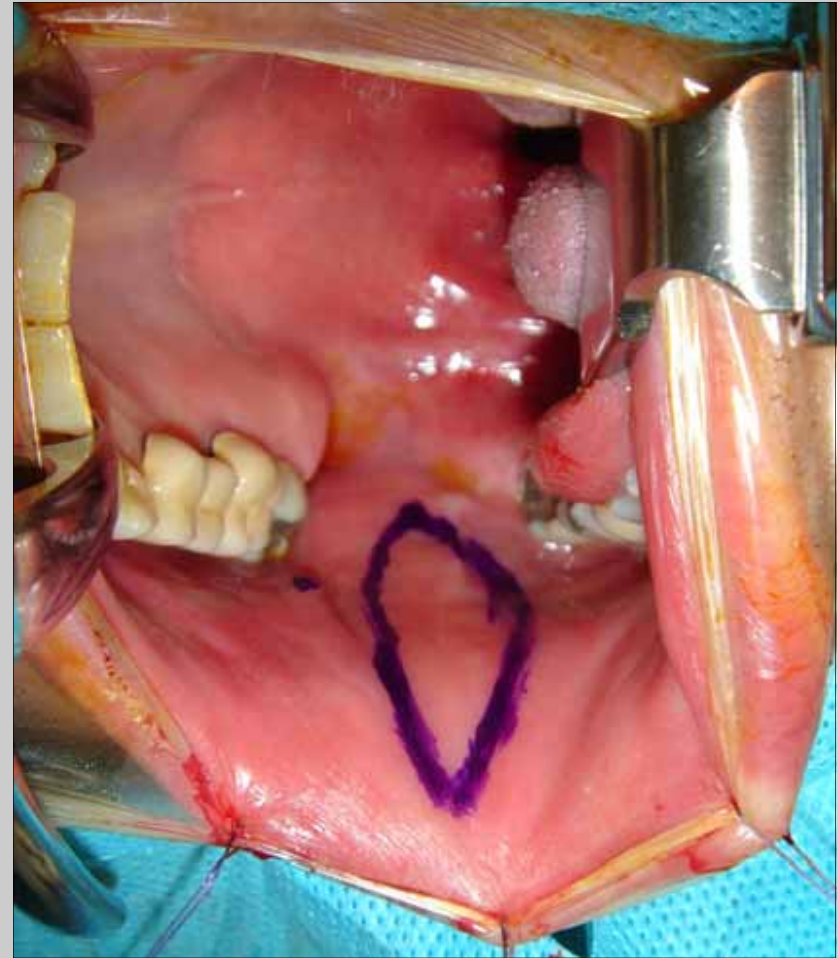
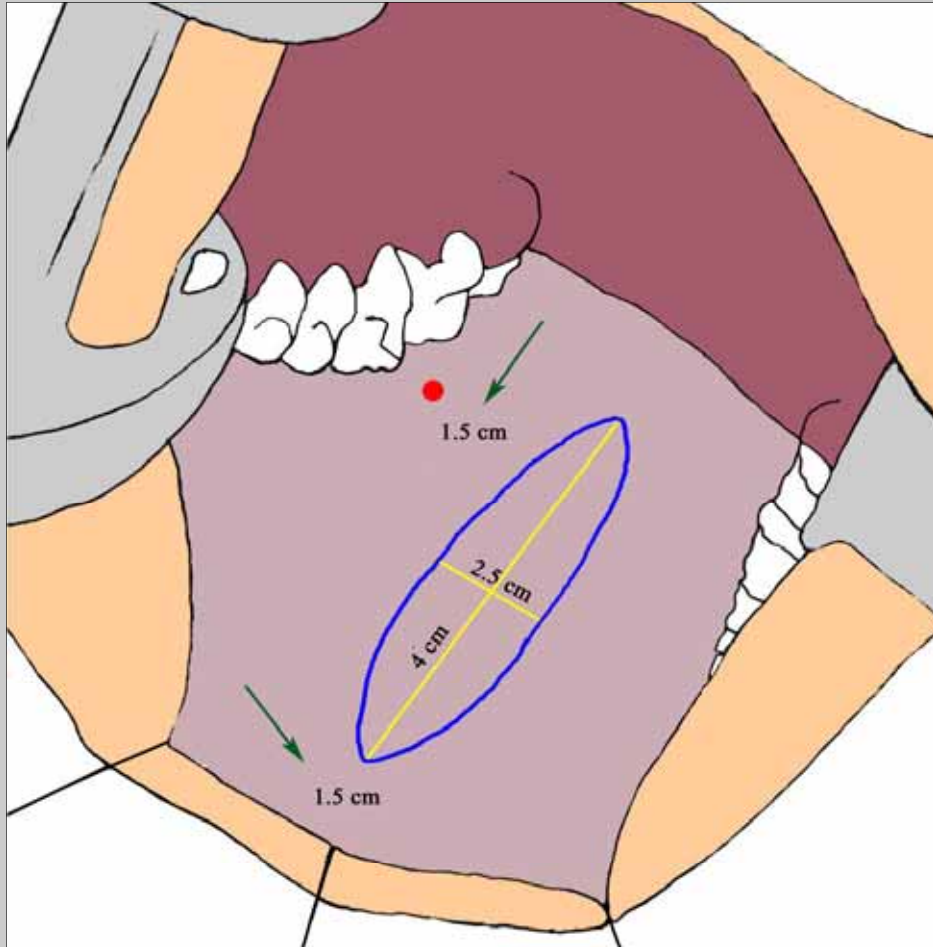
Harvesting oral mucosal graft from the cheek

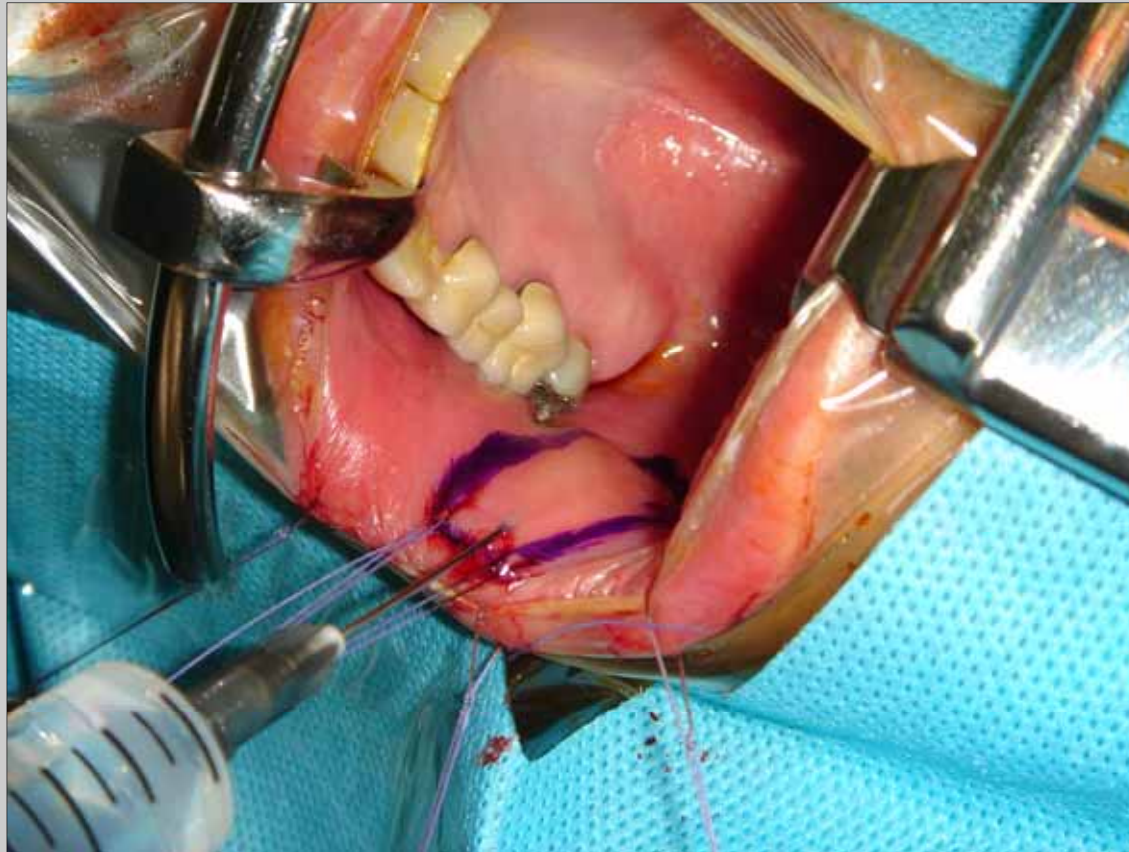


Surgical steps

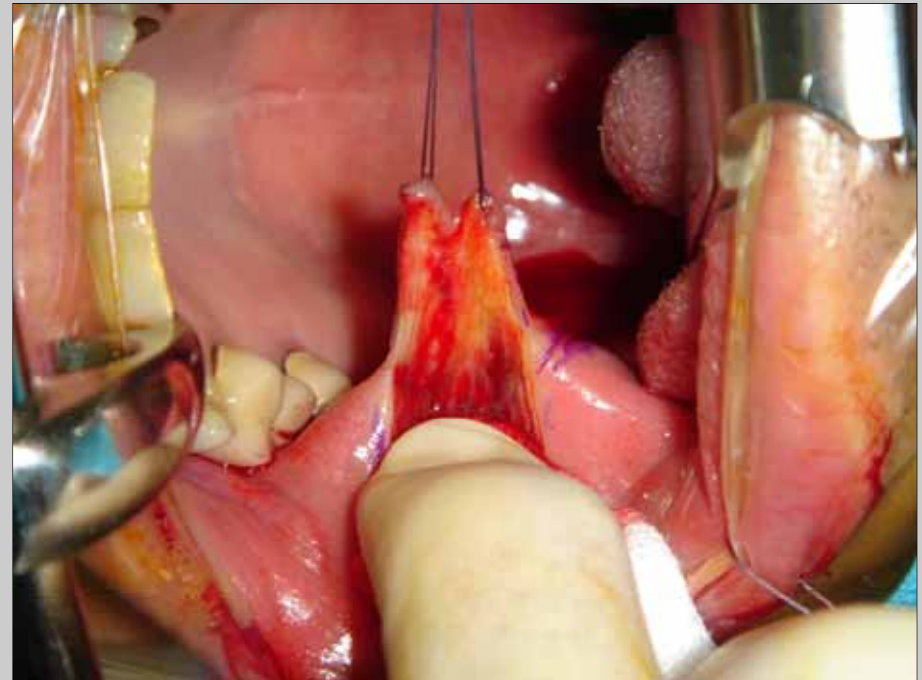
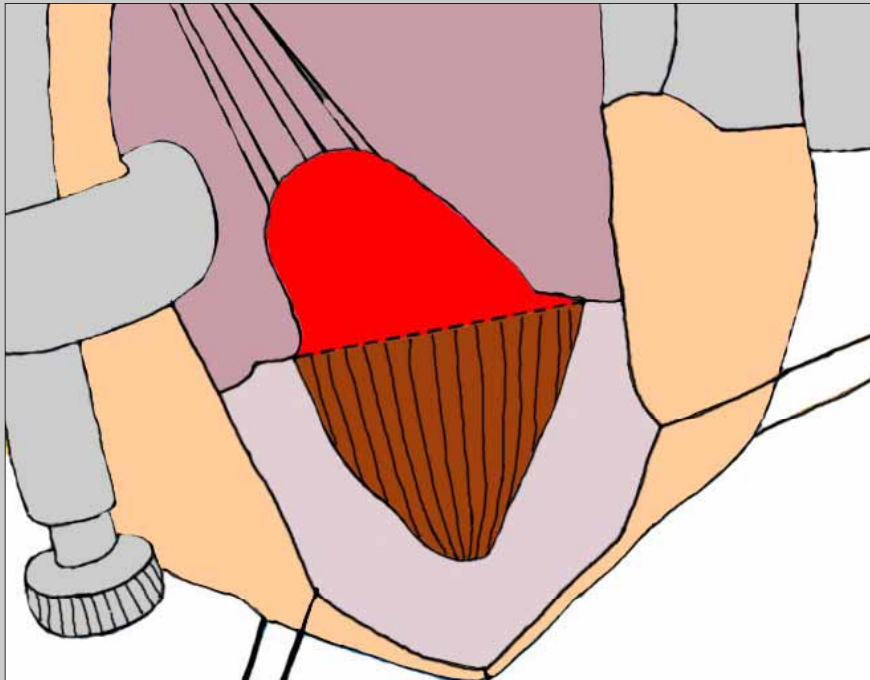
**The patient is intubated through the nose,
allowing the mouth to be completely free**

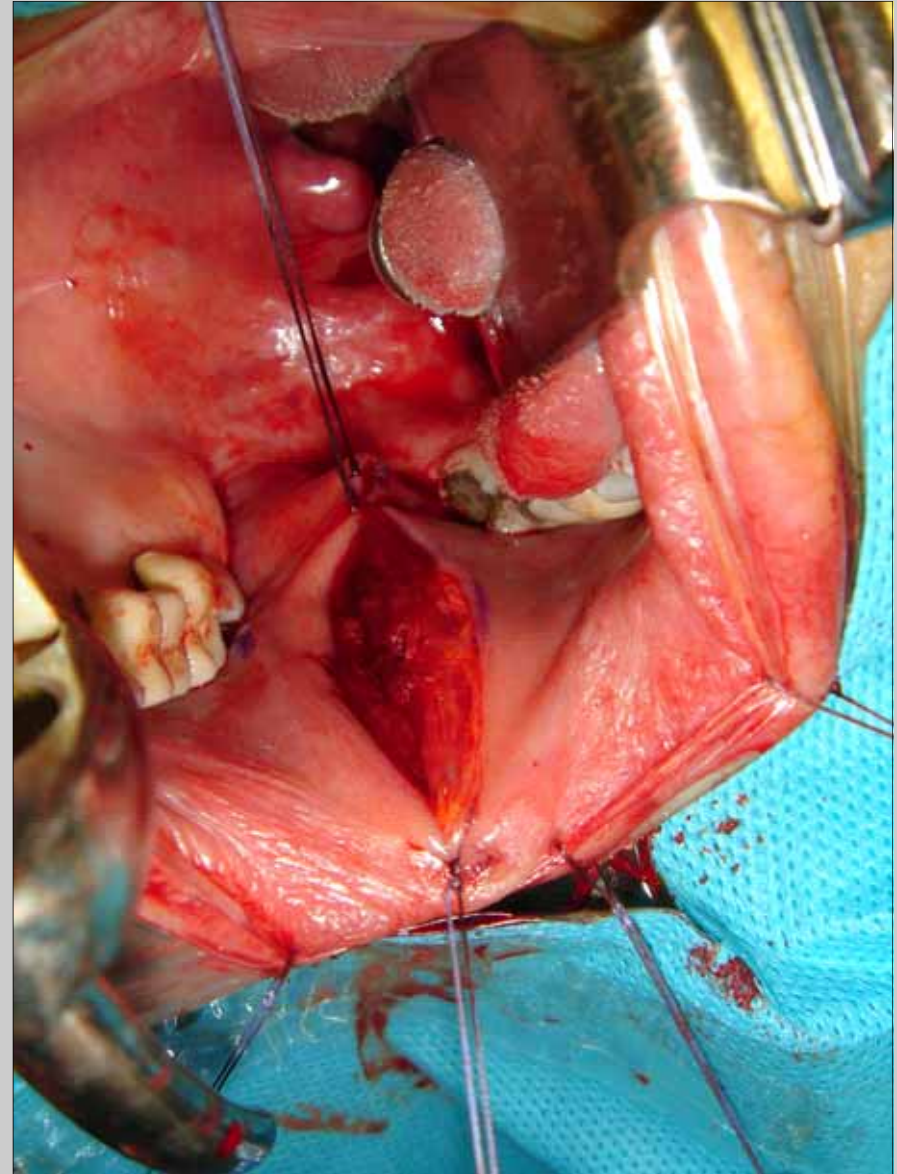
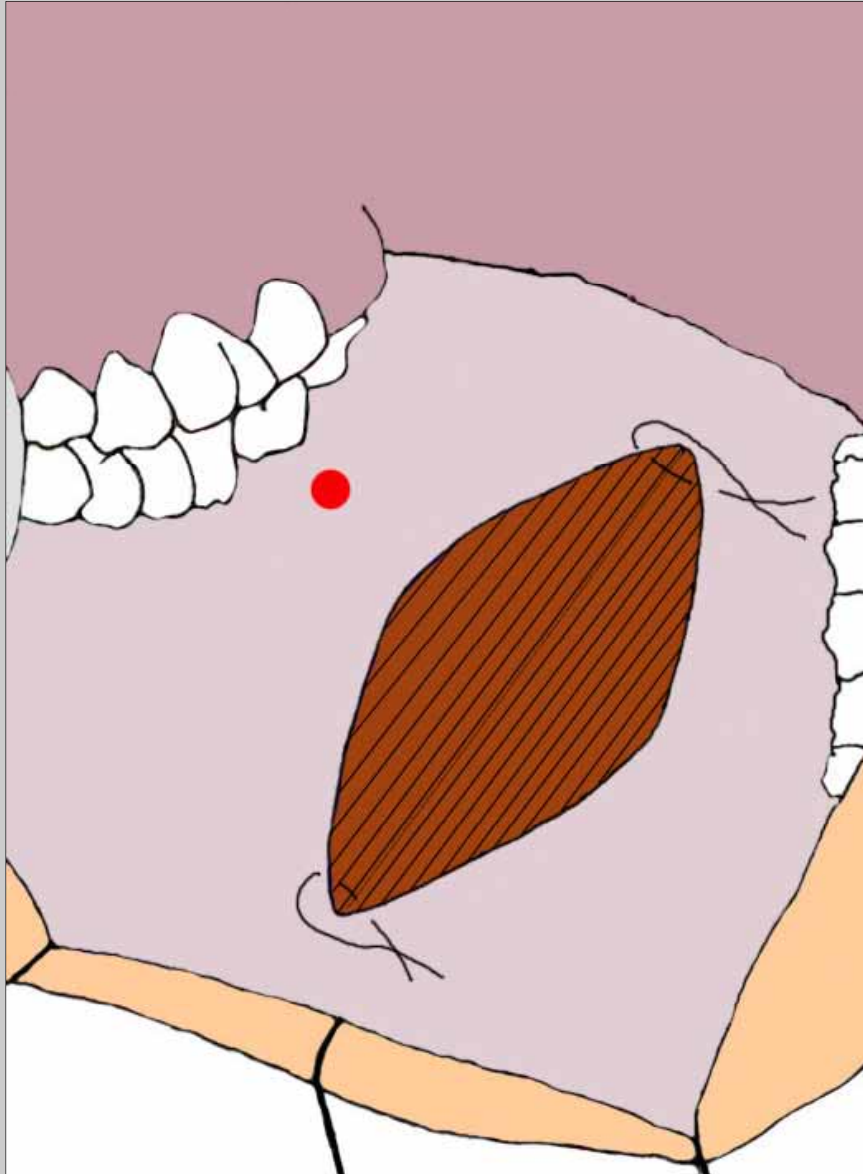


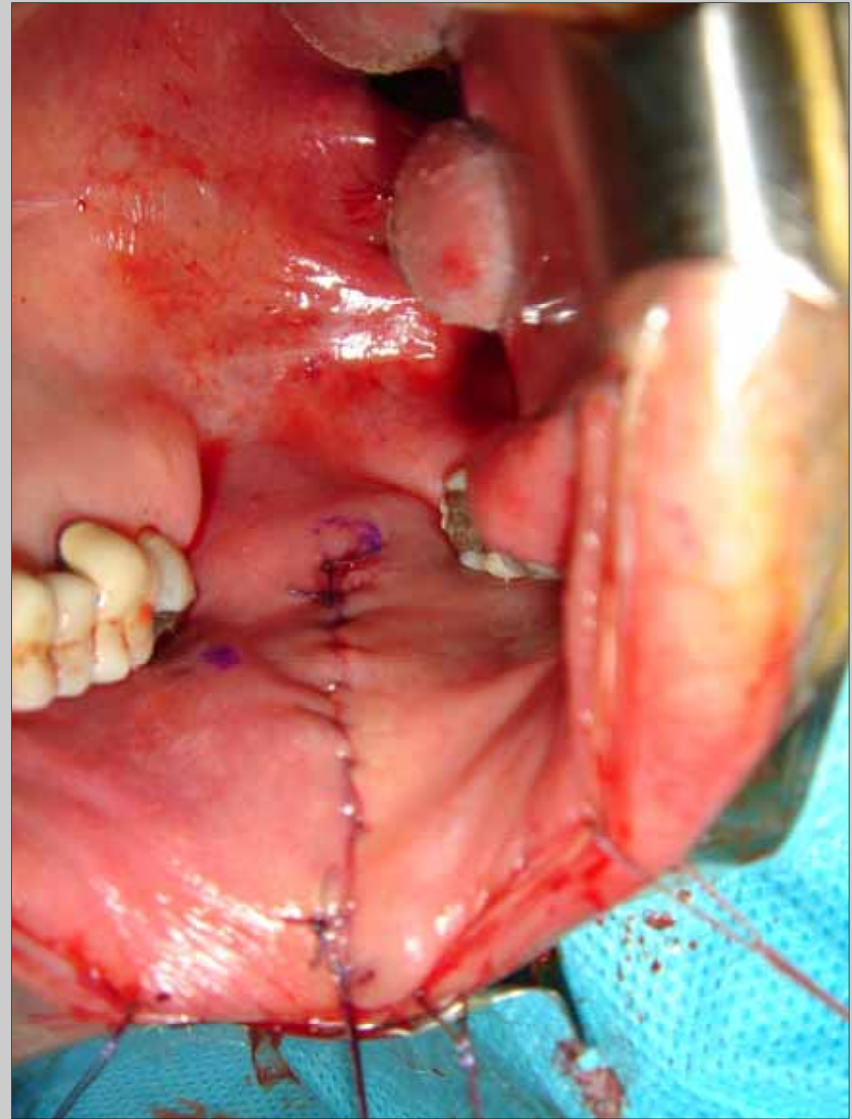
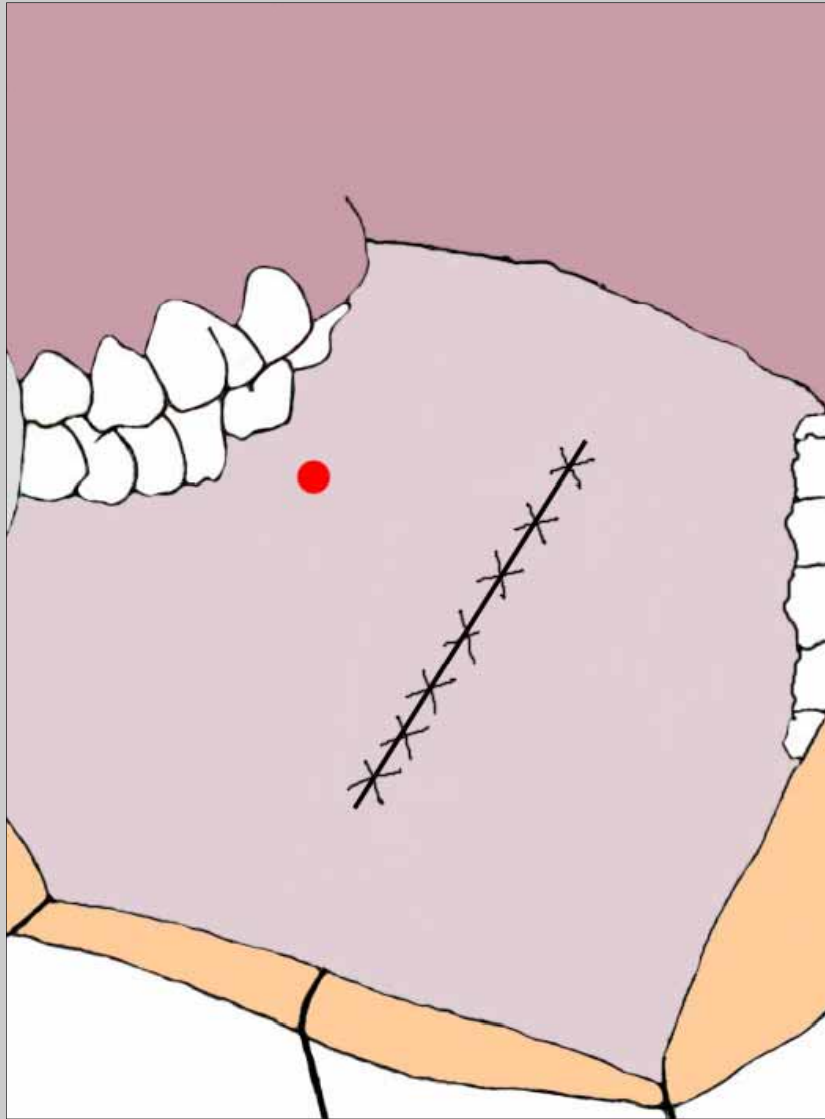




Lidocaine HCL 1% with epinephrine (1:100,000)









4 cm



6 cm

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eau
European Association of Urology



Platinum Priority – Reconstructive Urology

Editorial by Christopher Chapple on pp. 42–45 of this issue

Morbidity of Oral Mucosa Graft Harvesting from a Single Cheek

**Guido Barbagli^a, Santiago Vallasciani^a, Giuseppe Romano^b, Fabio Fabbri^c, Giorgio Guazzoni^c,
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Eur Urol 2010; 58: 33-41

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Patient satisfaction

“ Would you undergo oral mucosa graft harvesting using this technique again? ”

Yes : 98% of patients

No : 2% of patients

Barbagli G. et al, Eur Urol 2010; 58: 33-41

Evaluation of the results

objective



subjective

**If you don't look for complications following surgery,
you won't find complications !**

Harvesting oral mucosal graft from the tongue



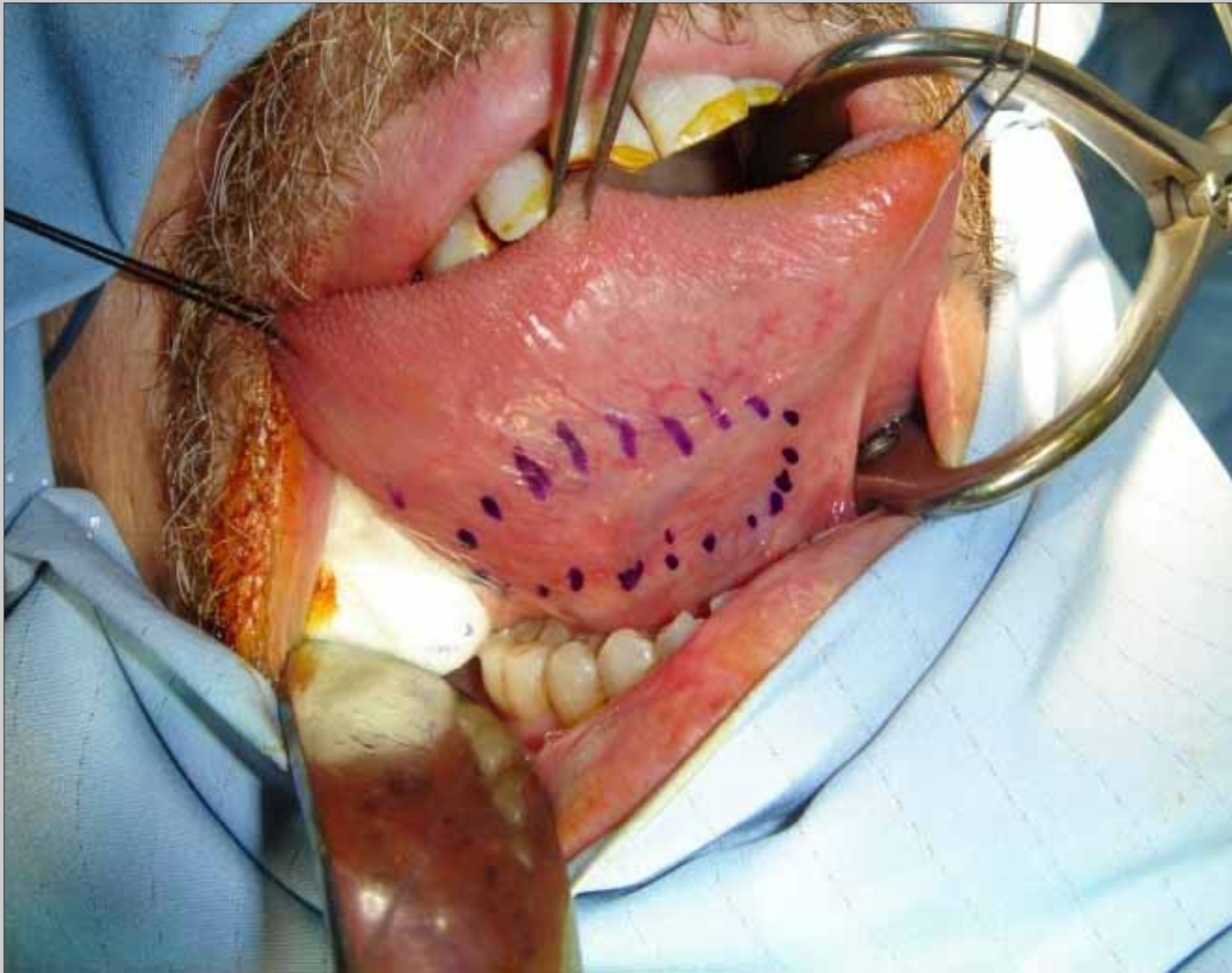
Surgical steps

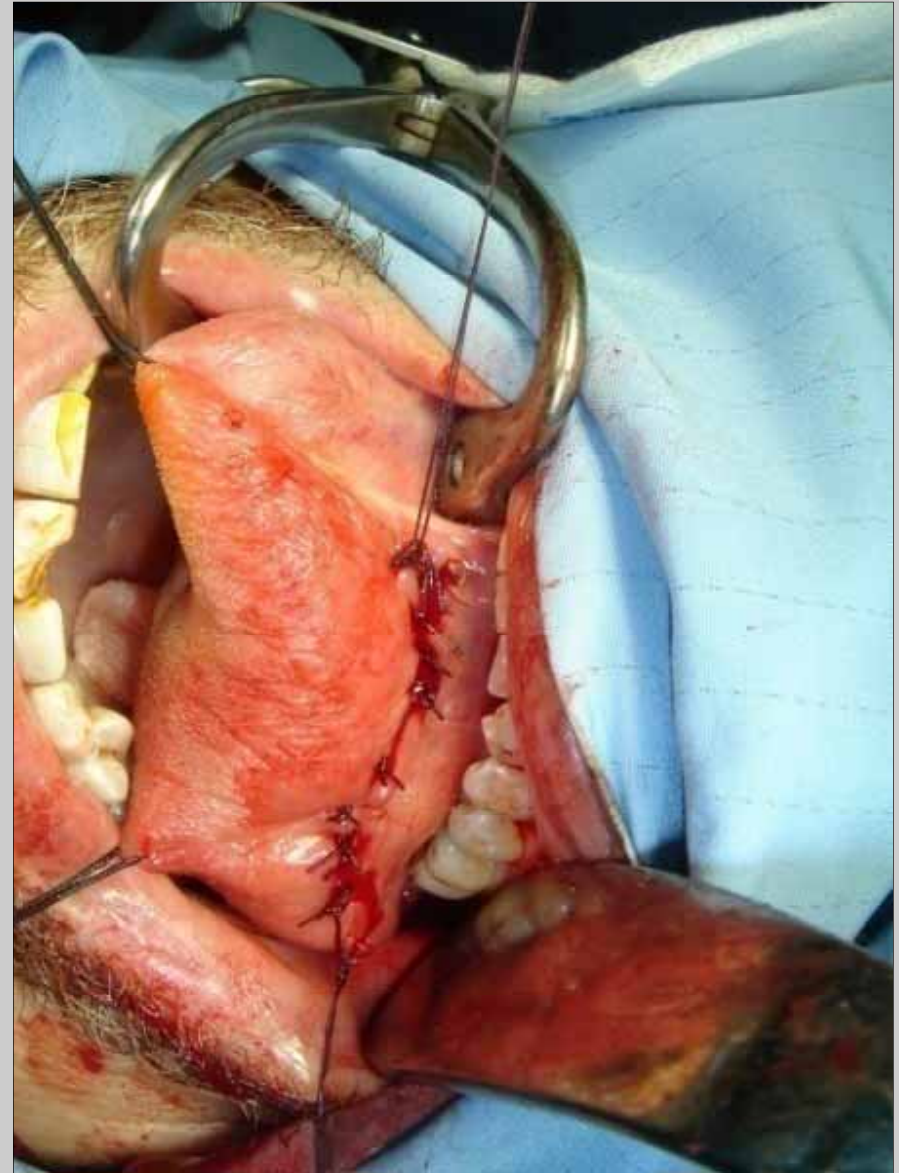
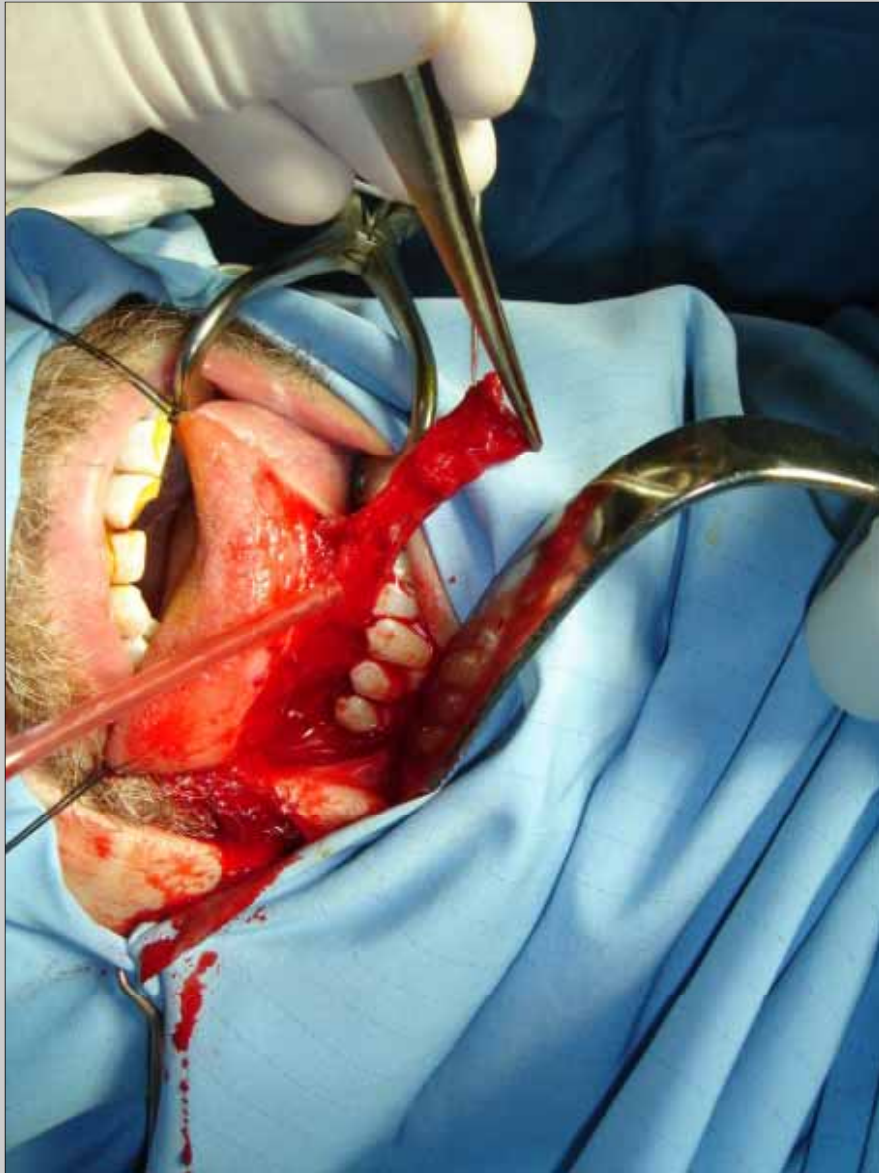


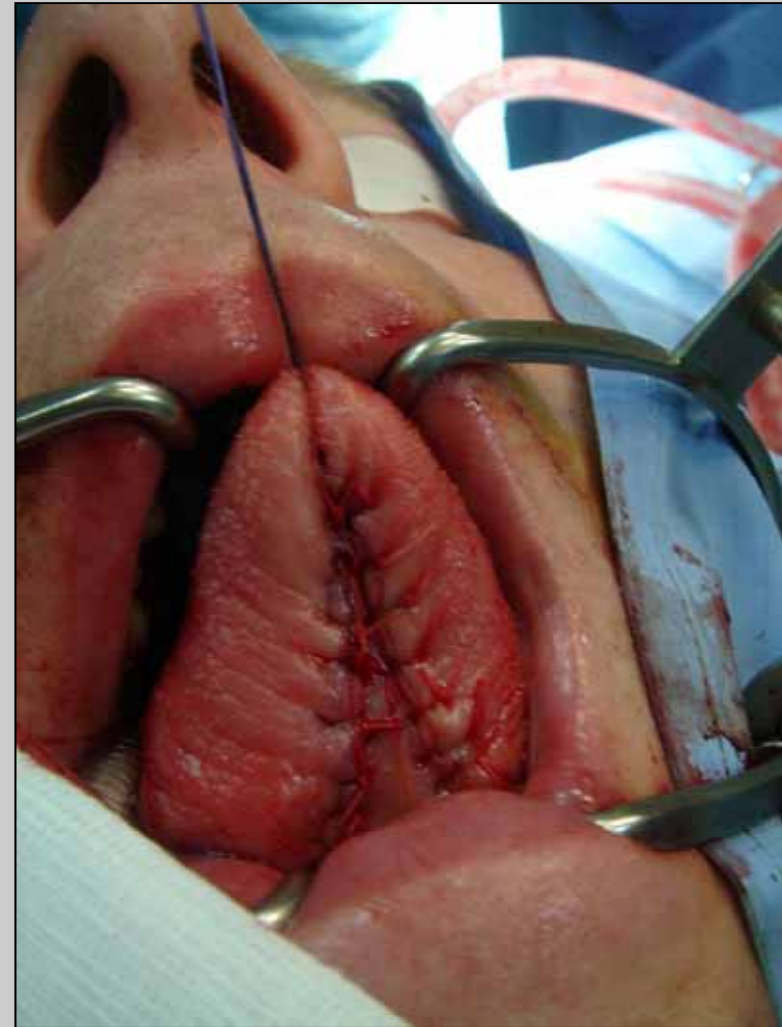
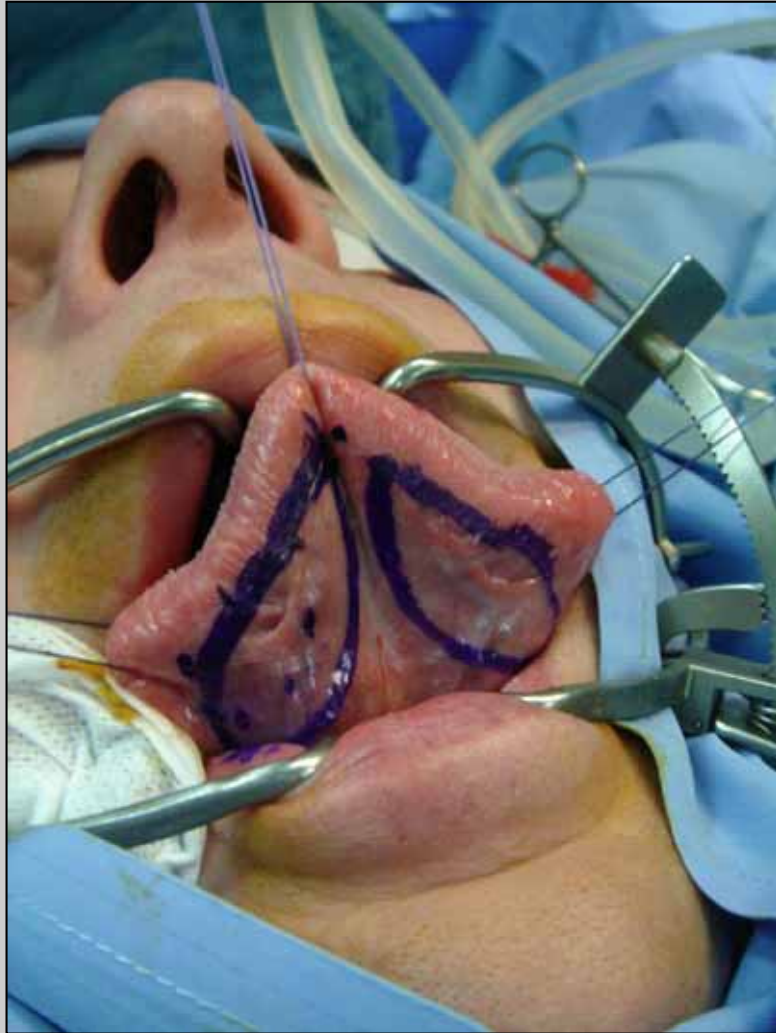
Wharton's duct



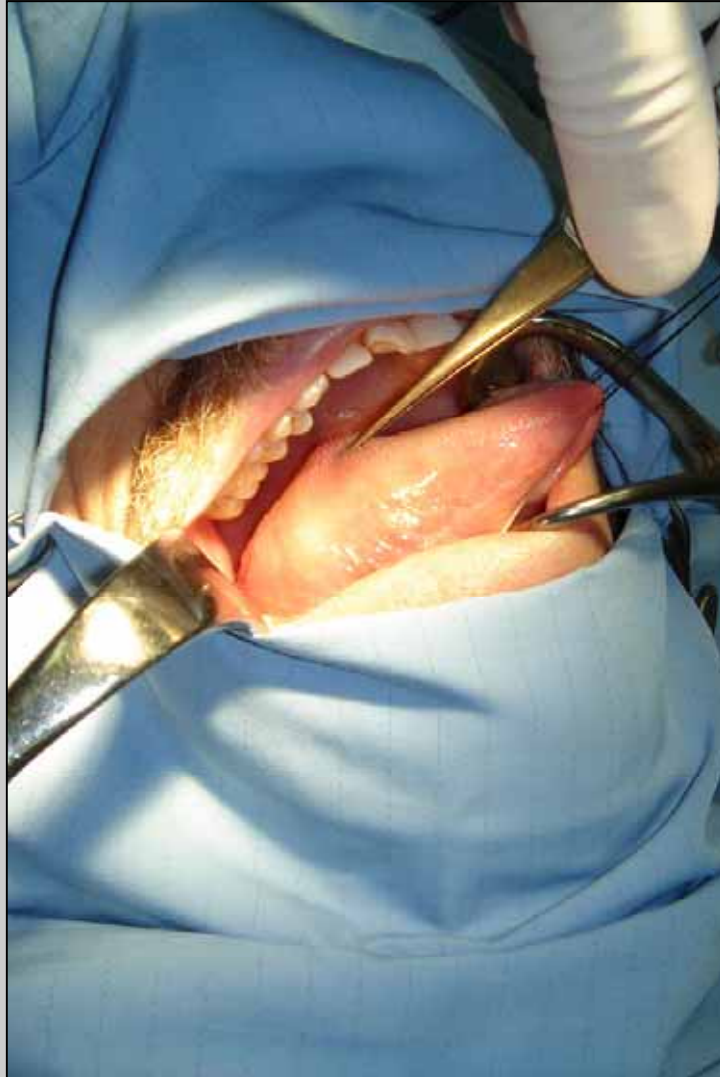
Lingual nerve







Double grafts harvesting



- ❖ The **tongue** represents the best alternative to the cheek
- ❖ Few reports in the literature

The use of oral mucosa in urethral surgery

Why ?

- **Its biological and histological characteristics**
- **Due to its elasticity, it is adaptable for any kind of urethroplasty (one-stage or two-stage) (onlay or inlay)**
- **In the literature (years 1966-2006), 1.267 articles on the use of oral mucosa for urethral reconstruction have been reported**

The use of oral mucosa in urethral surgery

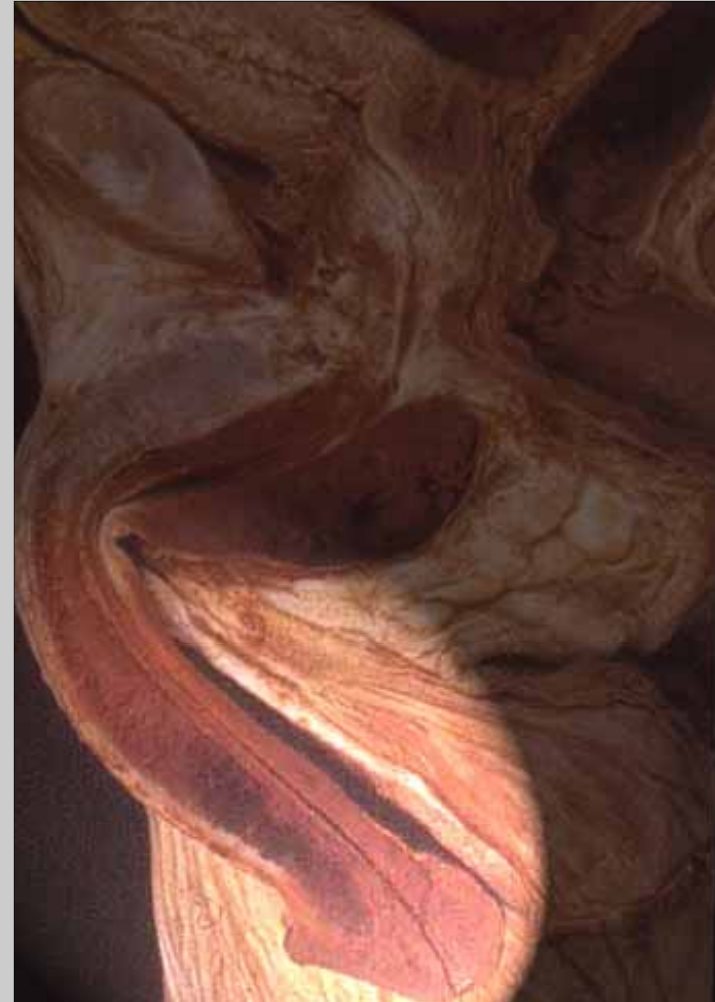
Why ?



The patient does not want to be
considered an experimental
animal

Penile urethra

**Basically, the surgical
technique for the repair of
penile urethral stricture is
selected according to
stricture etiology**



Penile urethral stricture

Etiology

- Failed hypospadias repair
- Lichen sclerosus
- Trauma
- Instrumentation
- Catheter
- Infection
- Other cause

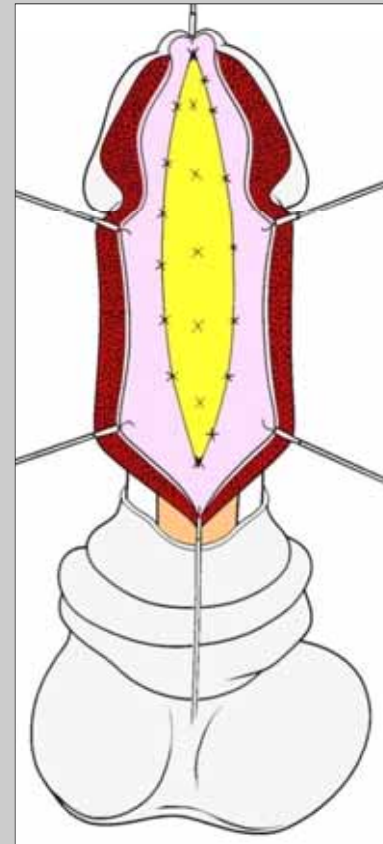
In penile urethral stricture due to:

- Trauma
- Instrumentation
- Catheter
- Infection
- Other cause



The penis is normal: one-stage repair

One-stage penile urethroplasty using Asopa's technique

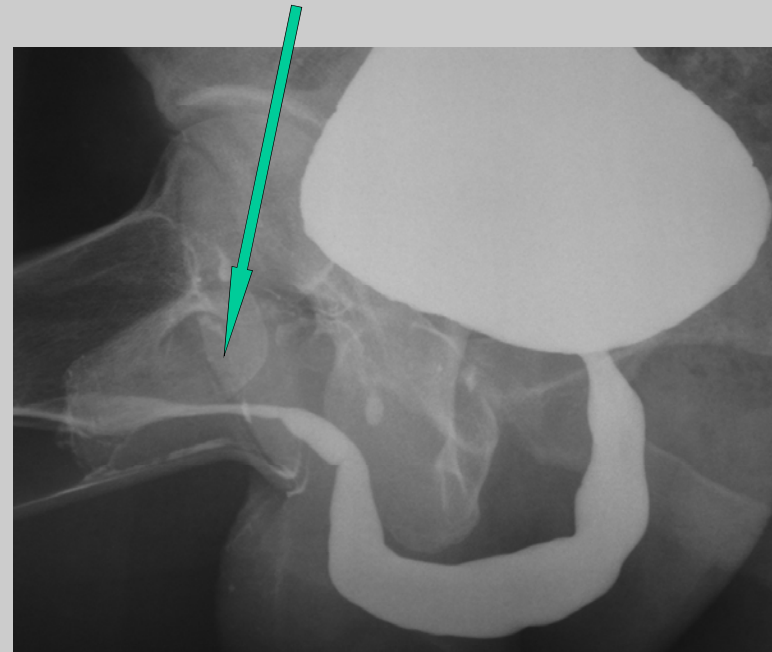
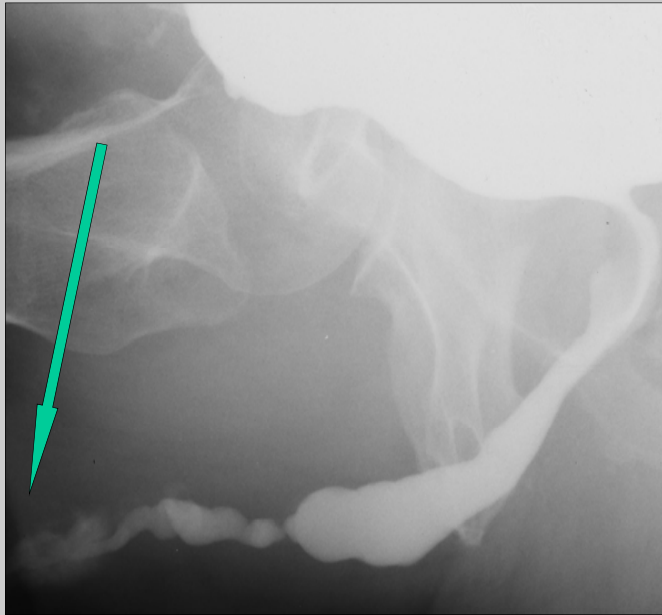


Asopa H.S. et al, Urology 2010; 58: 657-659

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Asopa's technique



Penile urethral stricture involving external urinary meatus or in the middle tract of the shaft

Asopa's technique



Asopa's technique



Asopa's technique



Asopa's technique



Asopa's technique



One-stage penile graft urethroplasty using Asopa's technique

Results

patients	type of repair	success
22	oral graft	81.8%
23	skin graft	78.3%

Barbagli G. et al, BJU Int 2008; 102: 853-860

In penile urethral strictures due to:



Failed hypospadias repair



Lichen sclerosus

The penis is abnormal: two-stage repair

Two-stage urethroplasty using oral mucosal graft



First stage



Complications following the first stage of urethroplasty



10-39% of patients showed scarring of the initial graft, requiring new grafting procedures

Barbagli G. et al, Eur Urol 2006; 49: 887-895

Second stage



Second stage



Complications following the second stage of urethroplasty



fistula



glans dehiscence



meatal stenosis

30% of patients showed complications following the second stage of urethroplasty, requiring surgical revision

Barbagli G. et al, Eur Urol 2006; 49: 887-895

Penile urethroplasty: conclusions

- ❖ **Two-stage penile urethroplasty using oral graft is not a simple procedure and requires great expertise to avoid a lot of traps**
- ❖ **Moreover, this two-stage procedure, also in the hands of the skilled surgeon, showed a high complication rate, either following the first stage or the second stage**



Bulbar urethra

Preparation of the patient



Simple lithotomy position

Preparation of the patient



Allen stirrups

Preparation of the patient



Sequential inflatable compression sleeves

Preparation of the patient for bulbar urethroplasty



**Pre-operative
urethroscopy**



Insert Sensor guide wire

Preparation of the patient for bulbar urethroplasty



Insert Sensor guide wire

Preparation of the patient for bulbar urethroplasty



**Inject methylene blue inside
the urethra
(G. Webster)**

Preparation of the patient for bulbar urethroplasty



Calibrate the distal urethra and identify the distal stop

Bulbar urethra

The surgical technique for the repair of bulbar urethral stricture is selected according to the stricture etiology and site (distal vs proximal)



Surgical technique according to **etiology** of bulbar urethral stricture

Trauma

End-to-end anastomosis
Augmented anastomotic repair

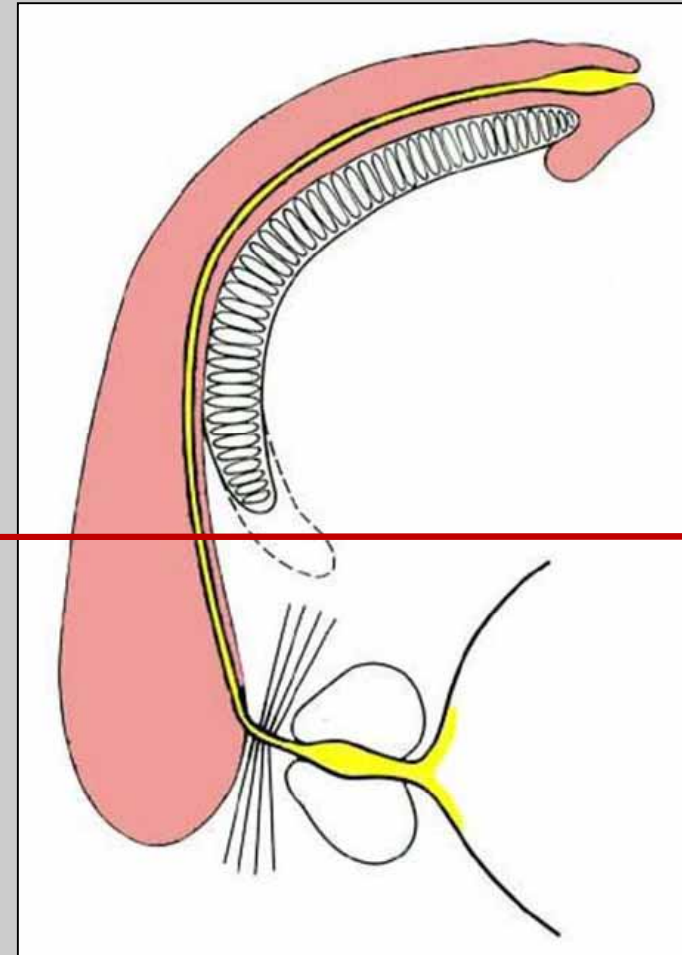
Instrumentation
Catheter
Infection
Other

Oral mucosa onlay

Surgical technique according to **site** of bulbar urethral stricture



Distal
Dorsal onlay

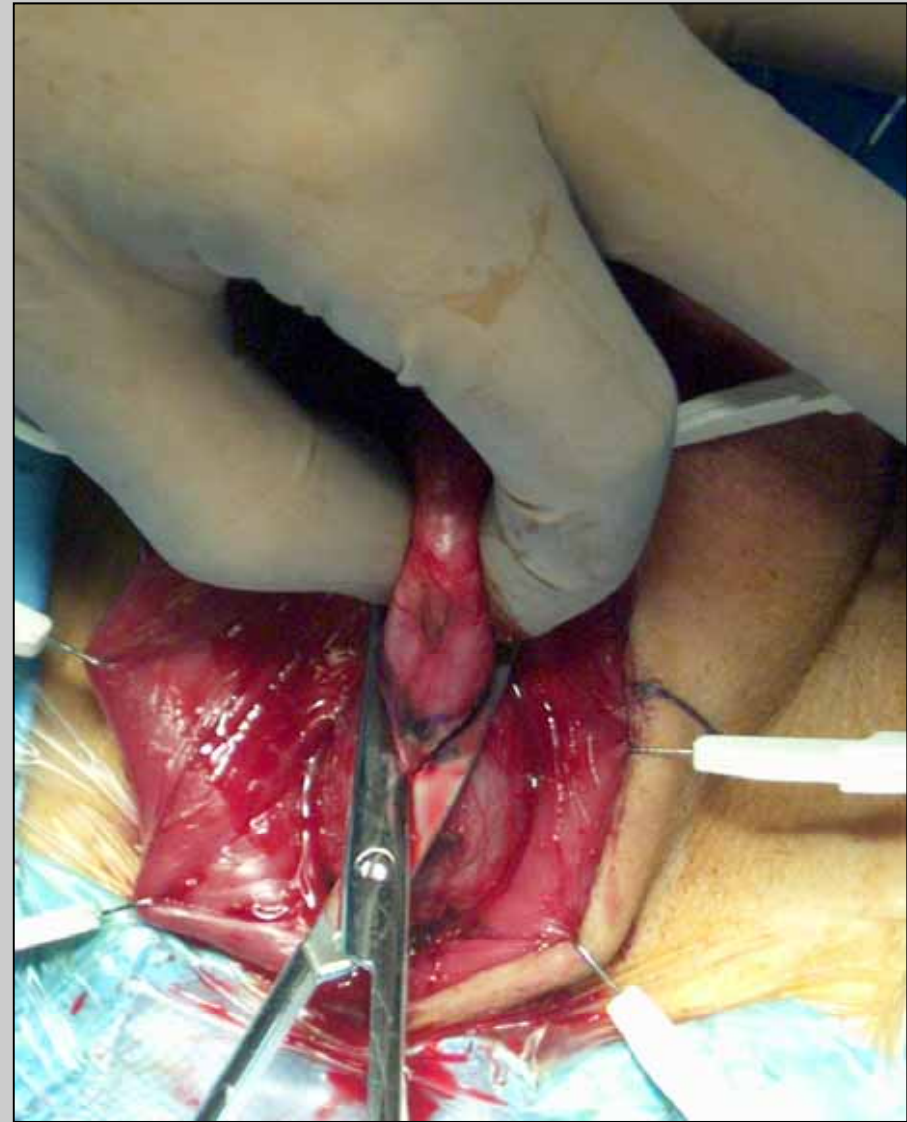
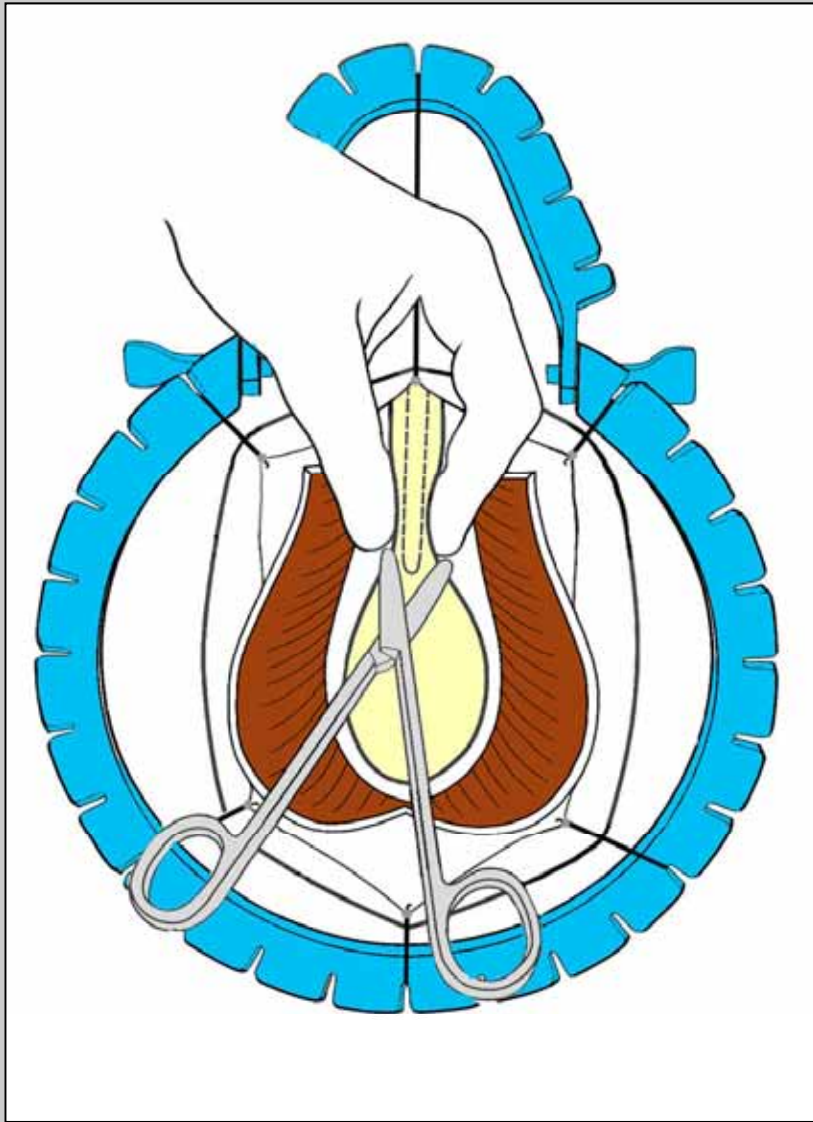


Proximal
Ventral onlay

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

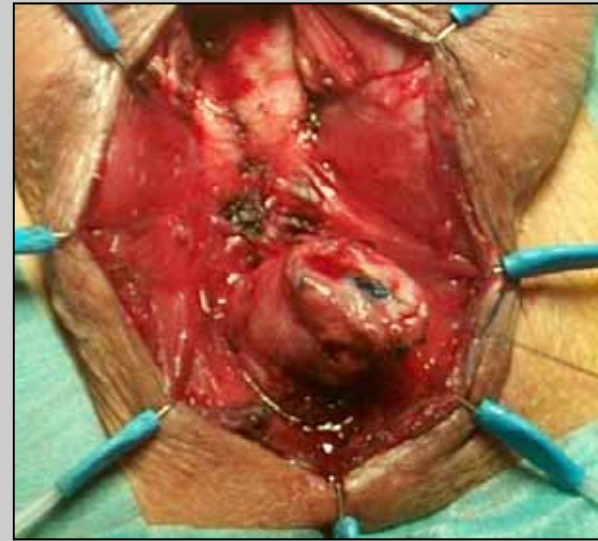


End-to-end anastomosis



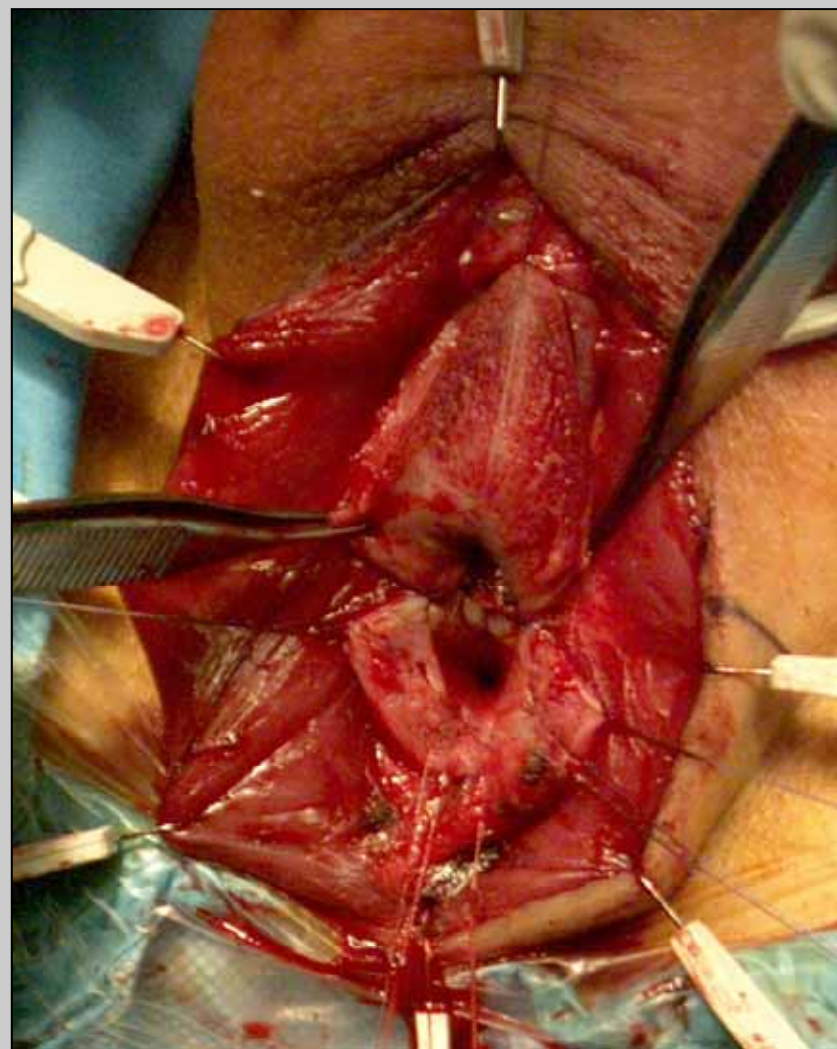
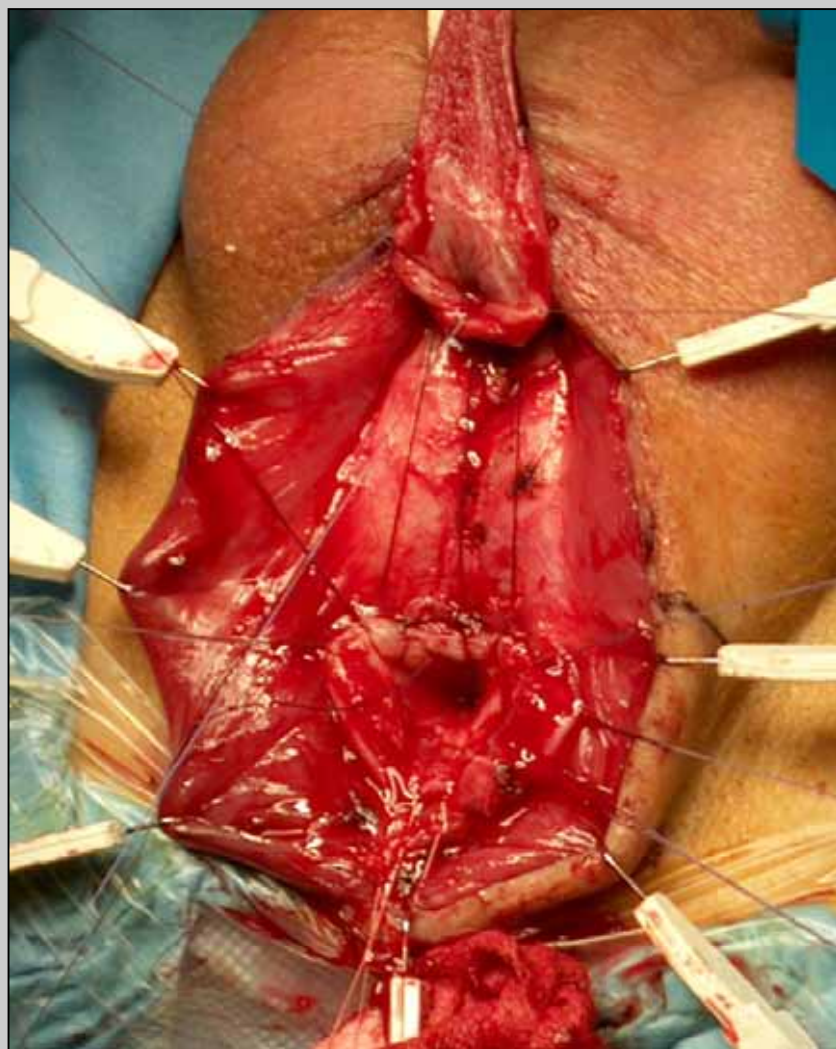


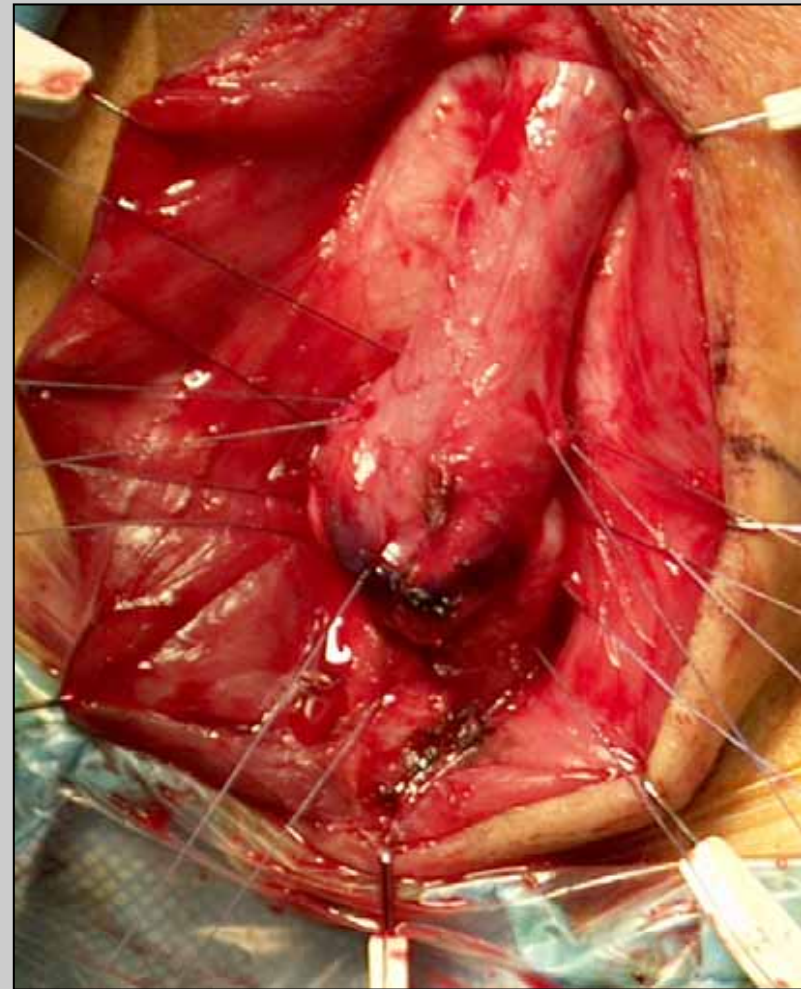
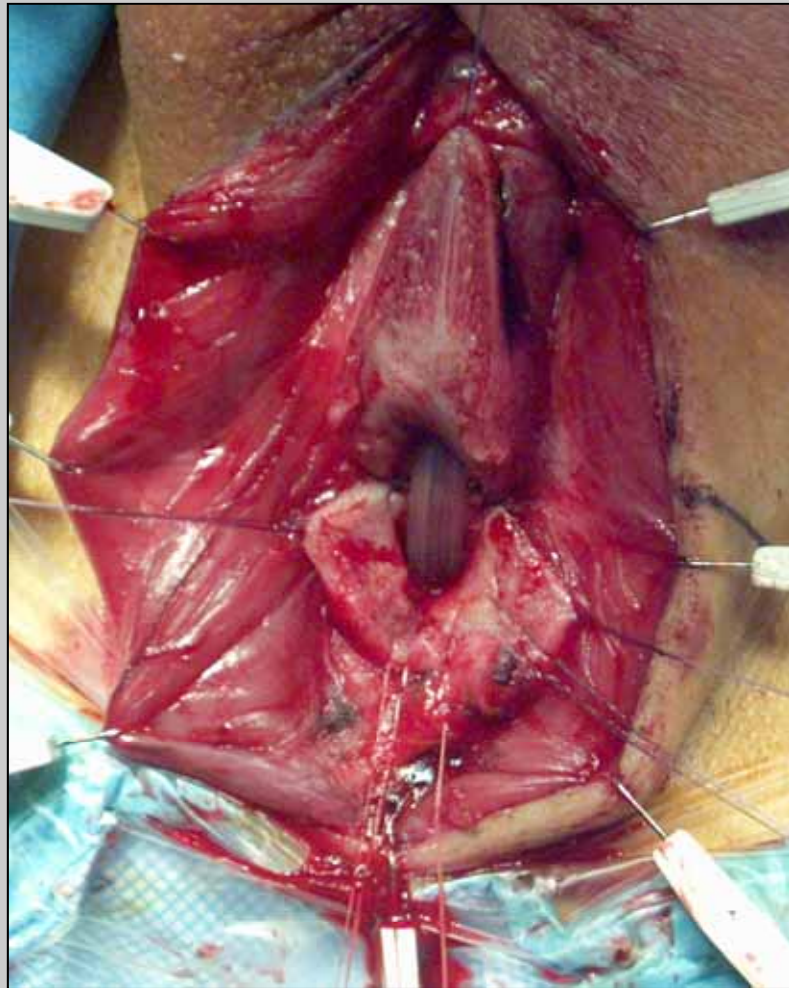
distal end



proximal end



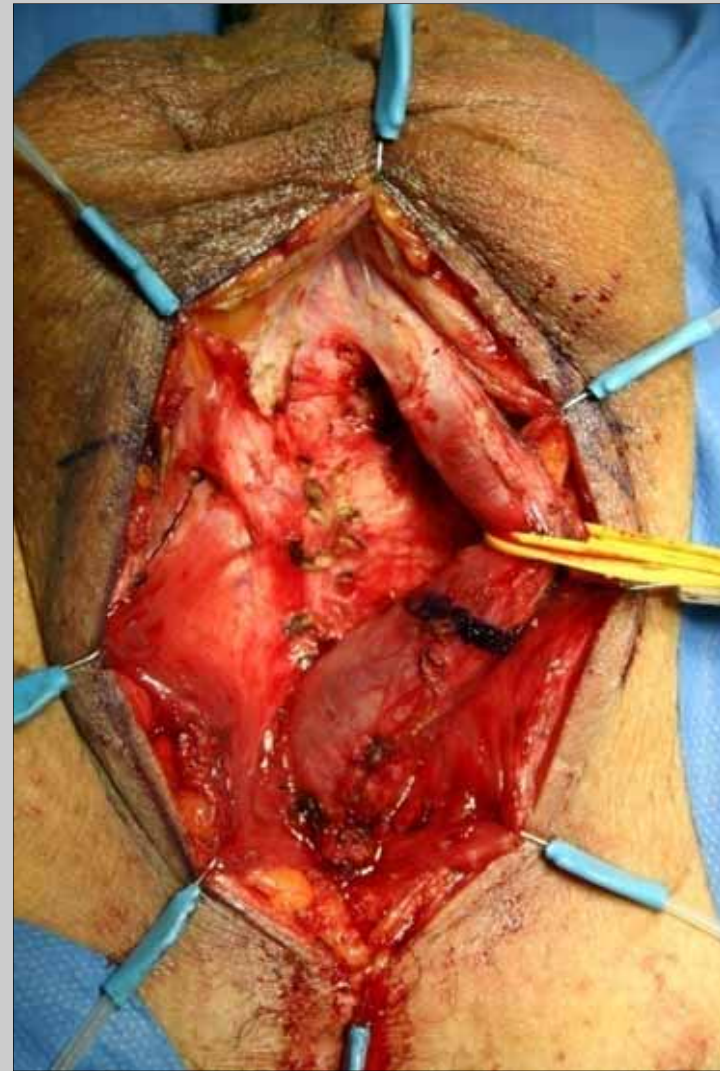
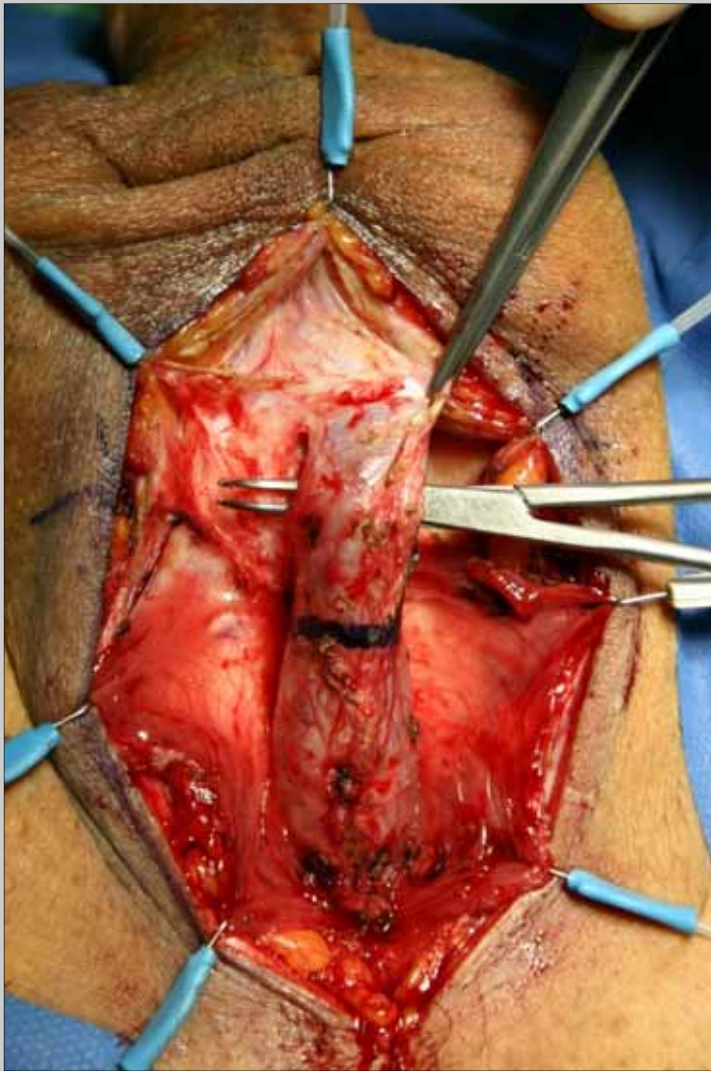


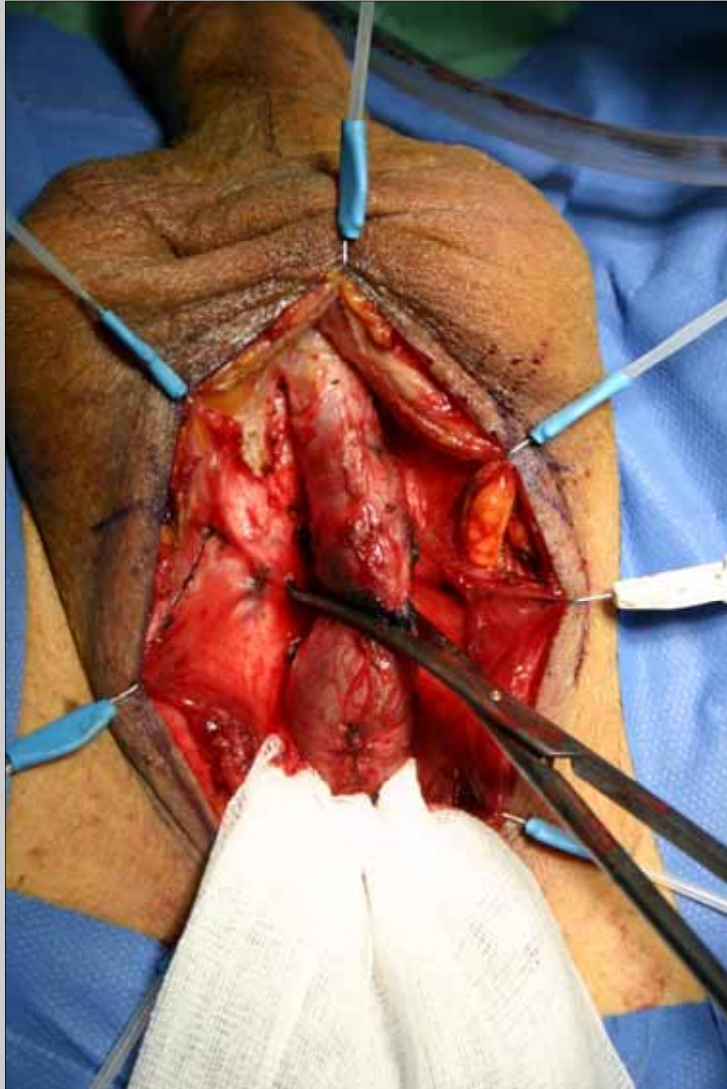


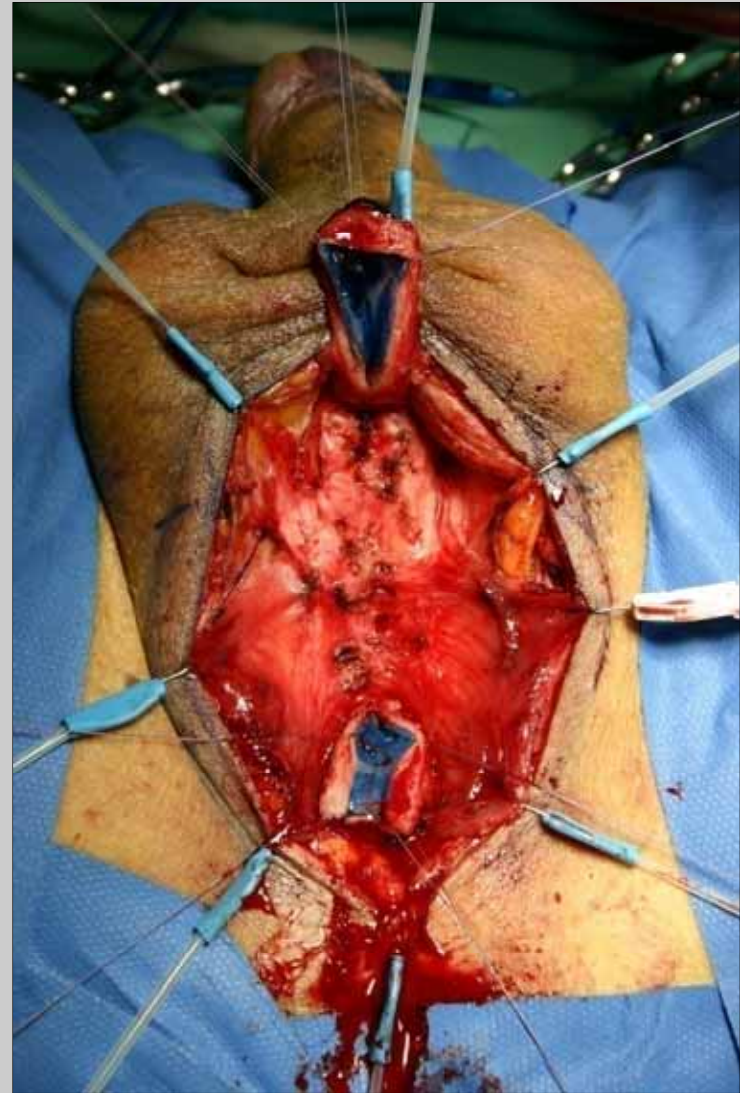
2 - 4 cm **traumatic** bulbar urethral stricture



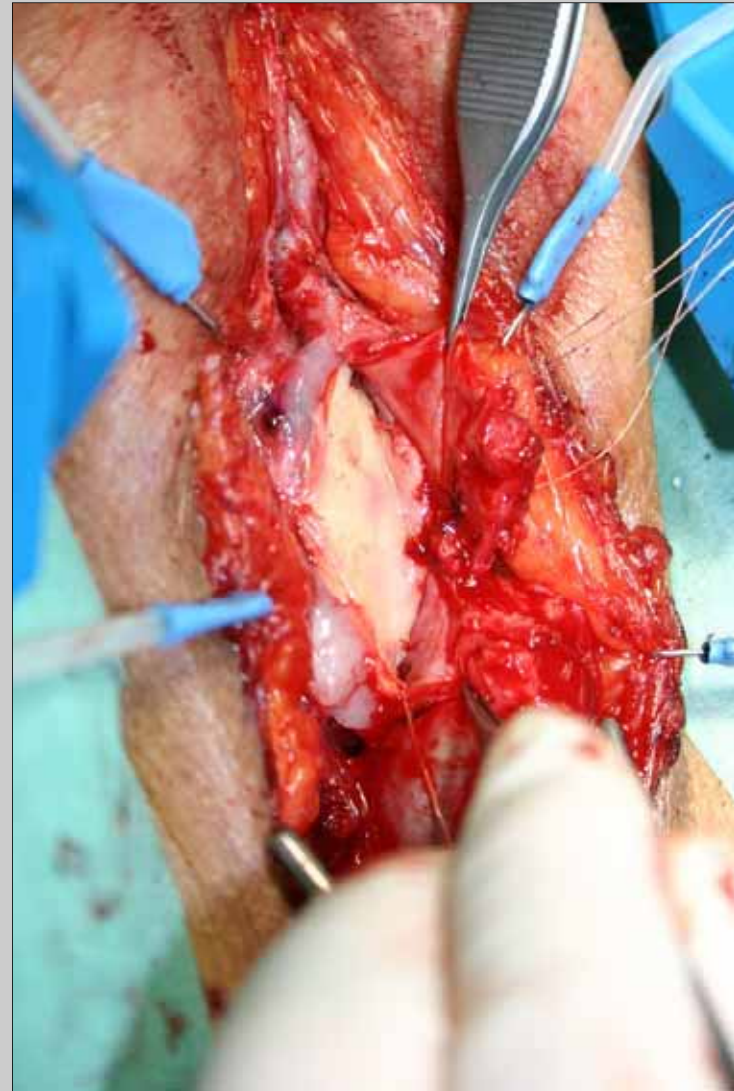
Augmented anastomotic repair

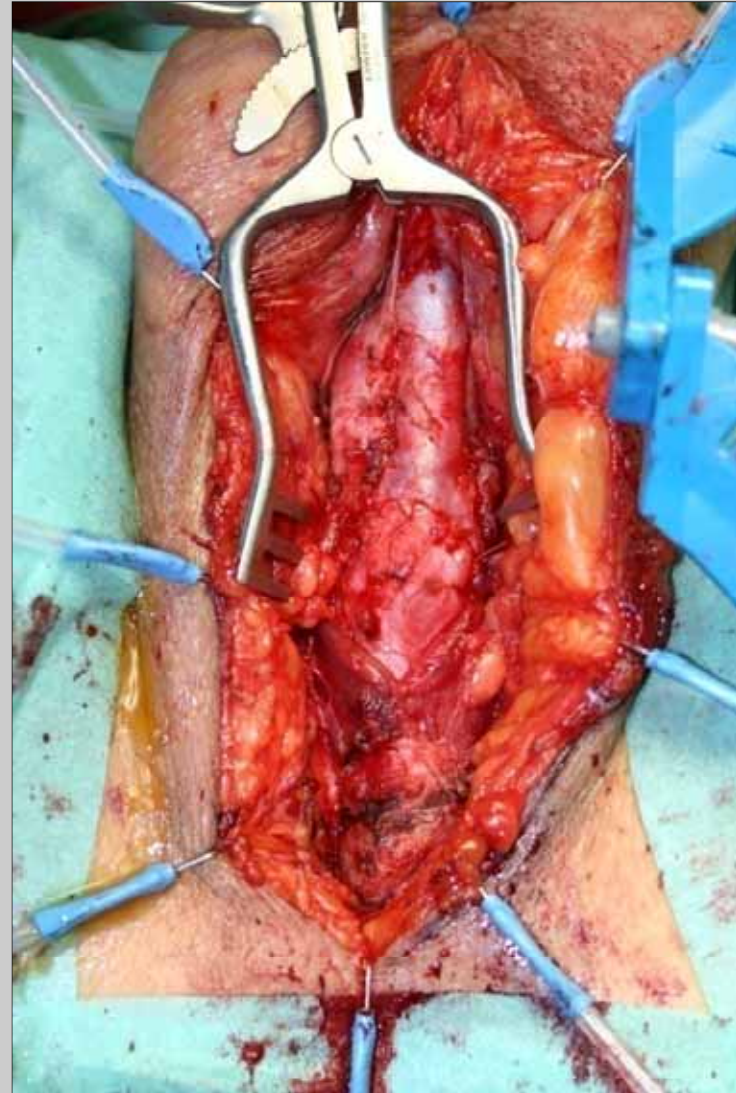
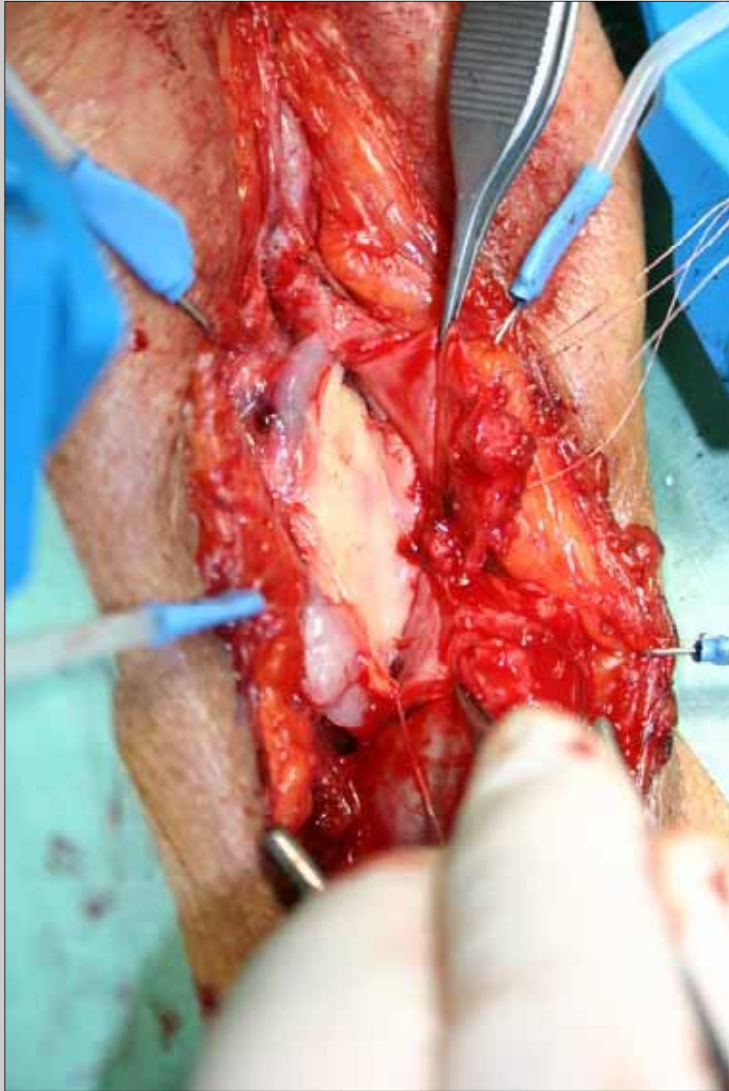


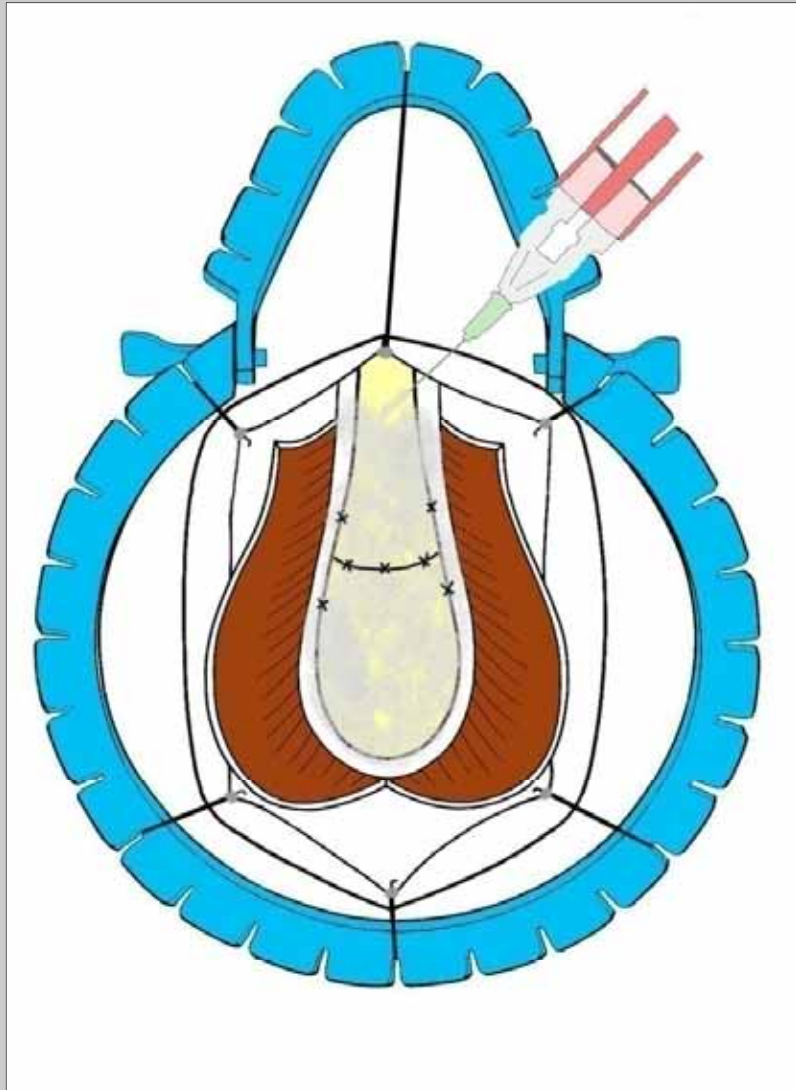




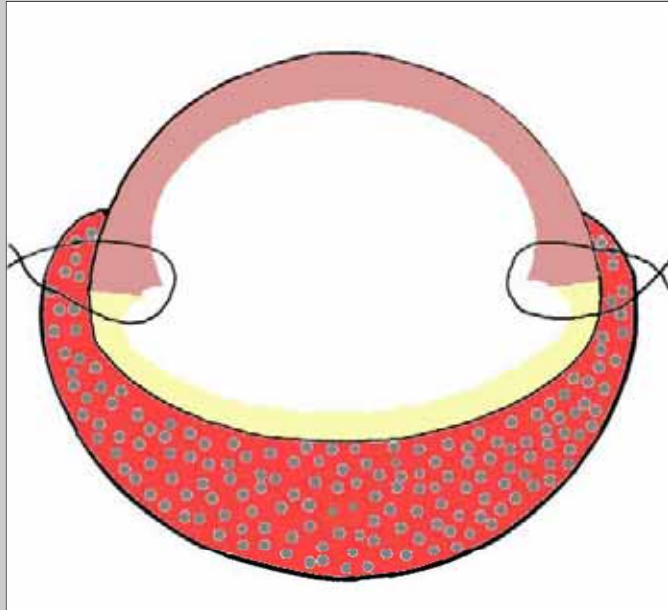




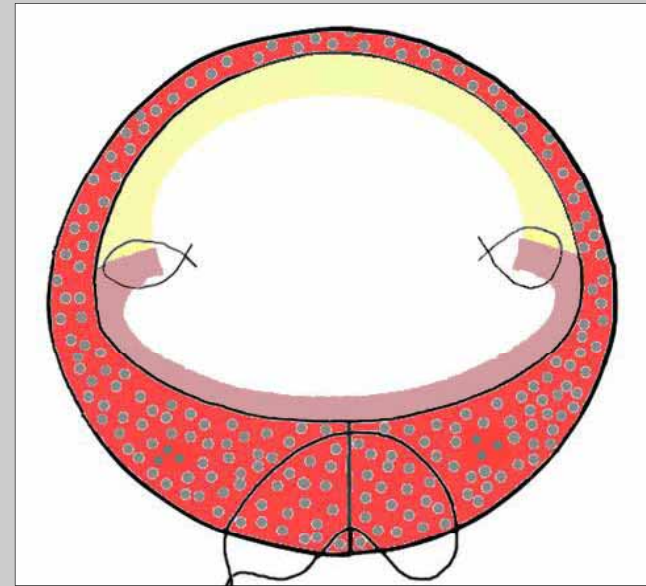




Oral mucosal graft onlay urethroplasty

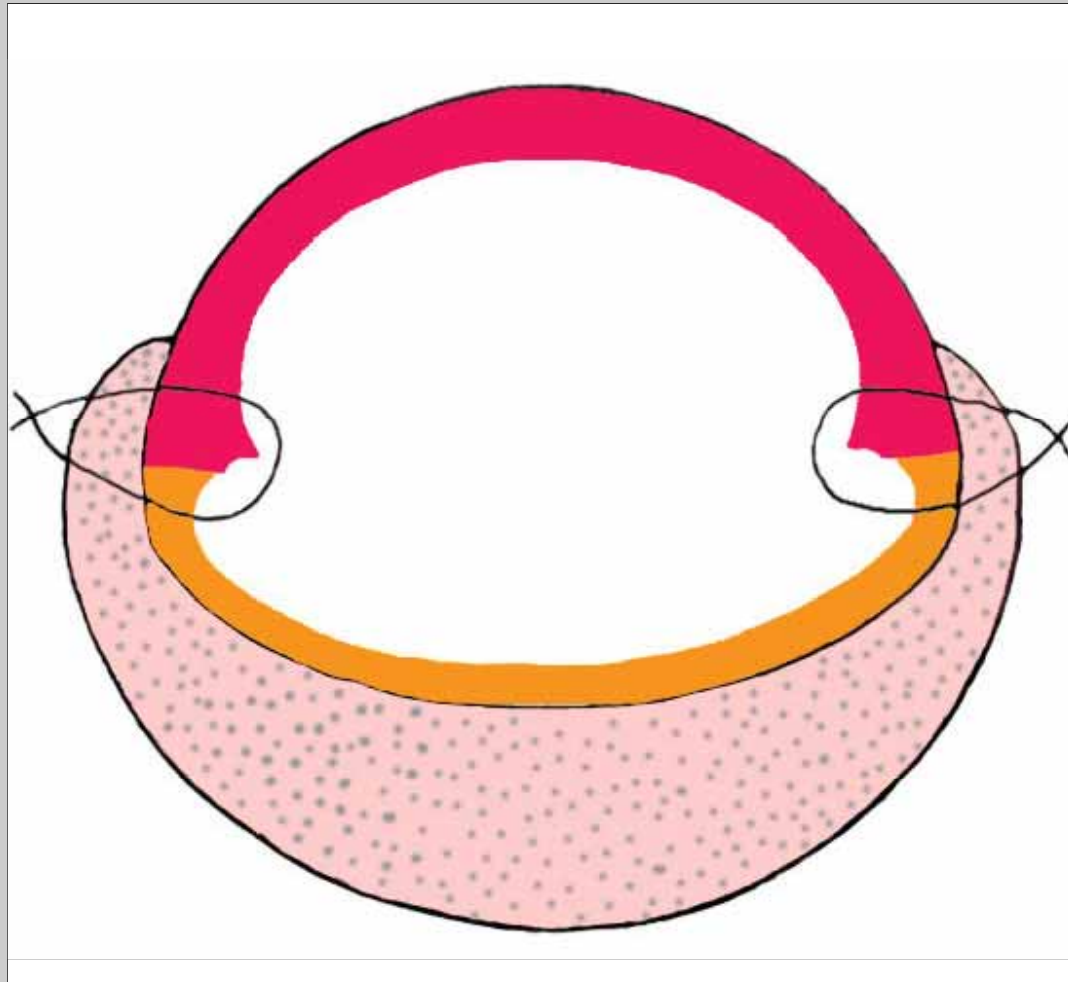


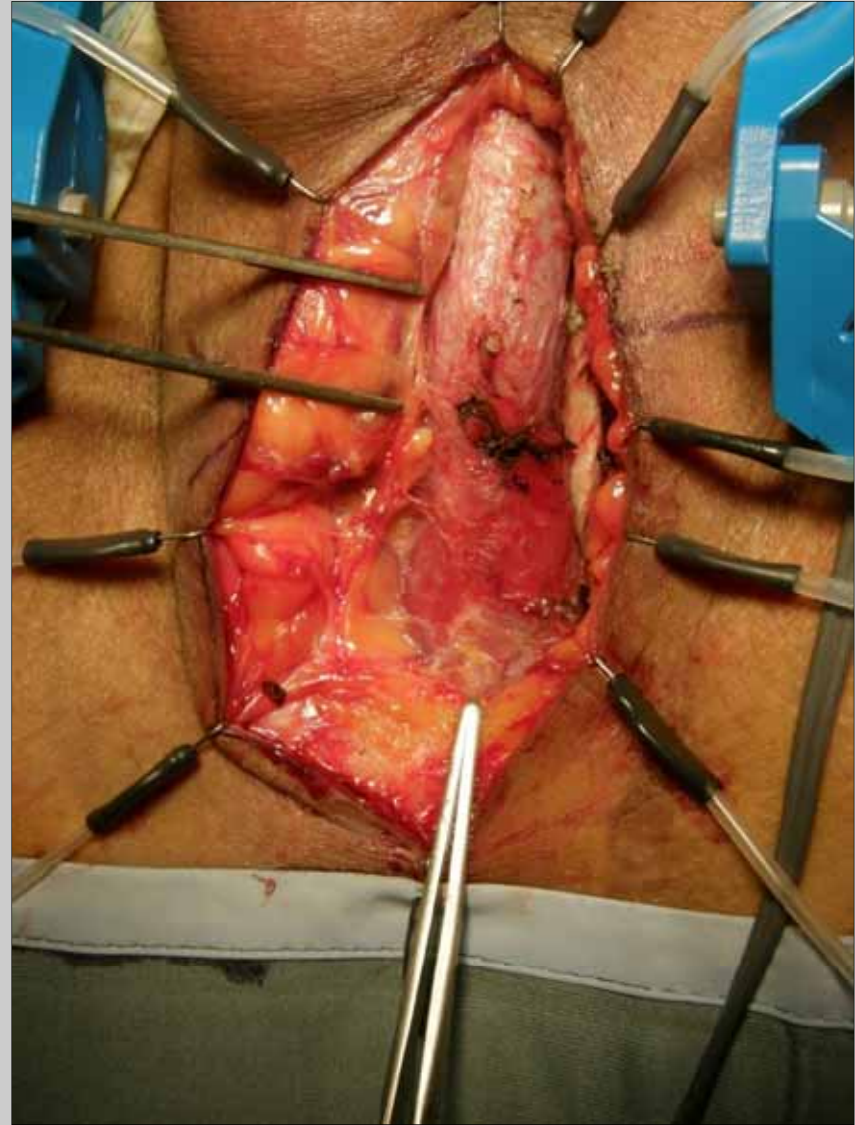
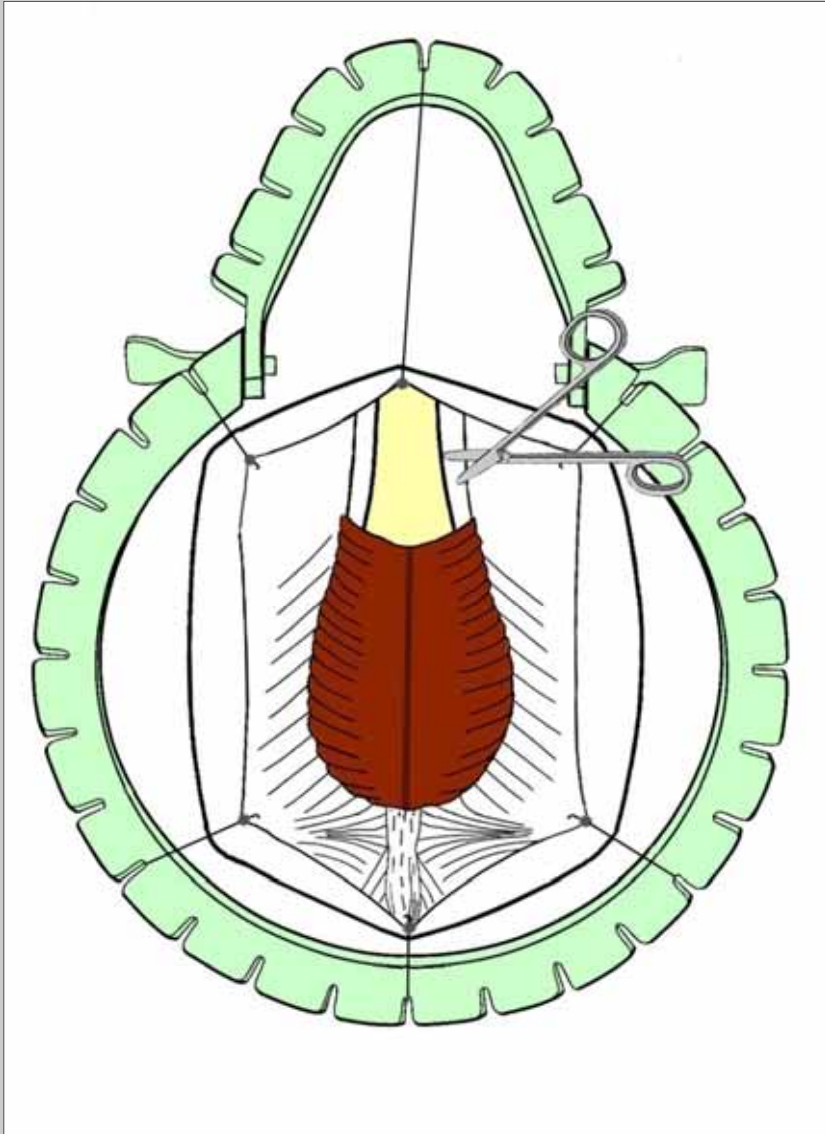
dorsal

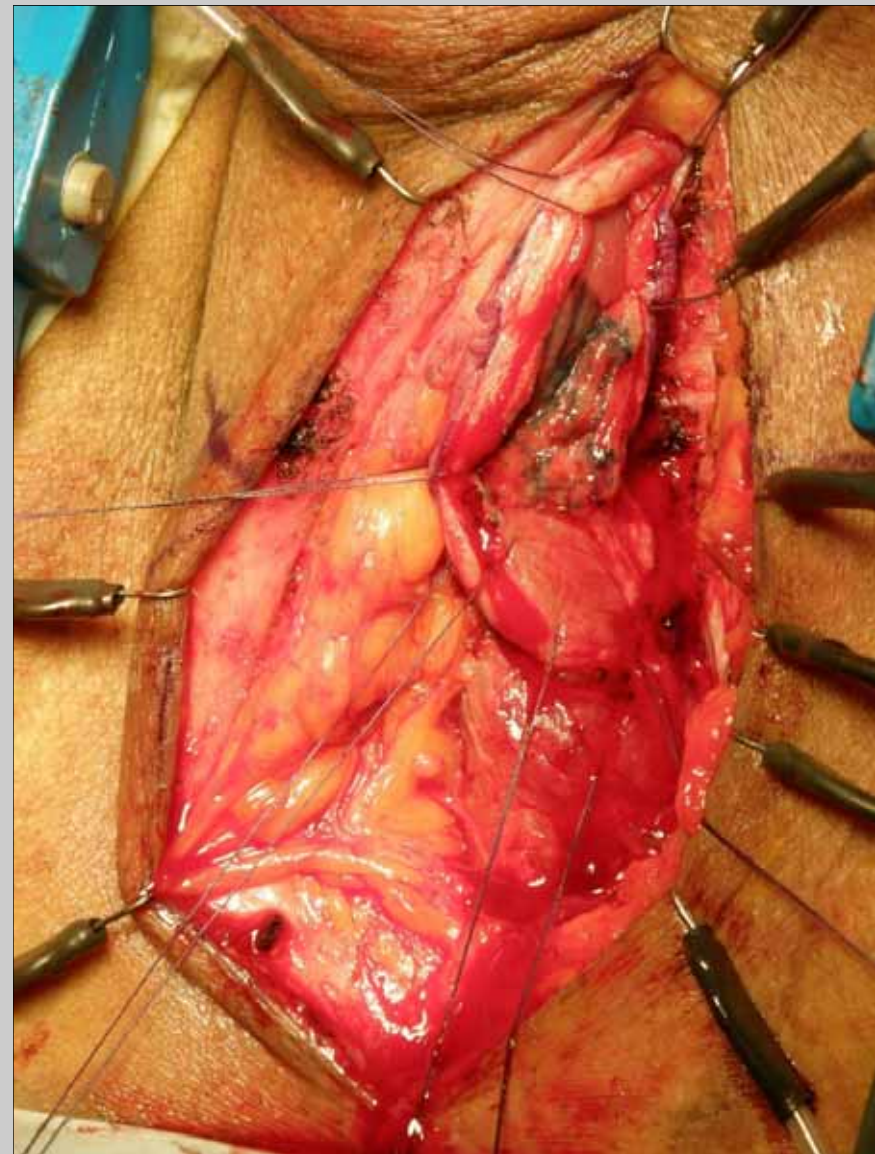
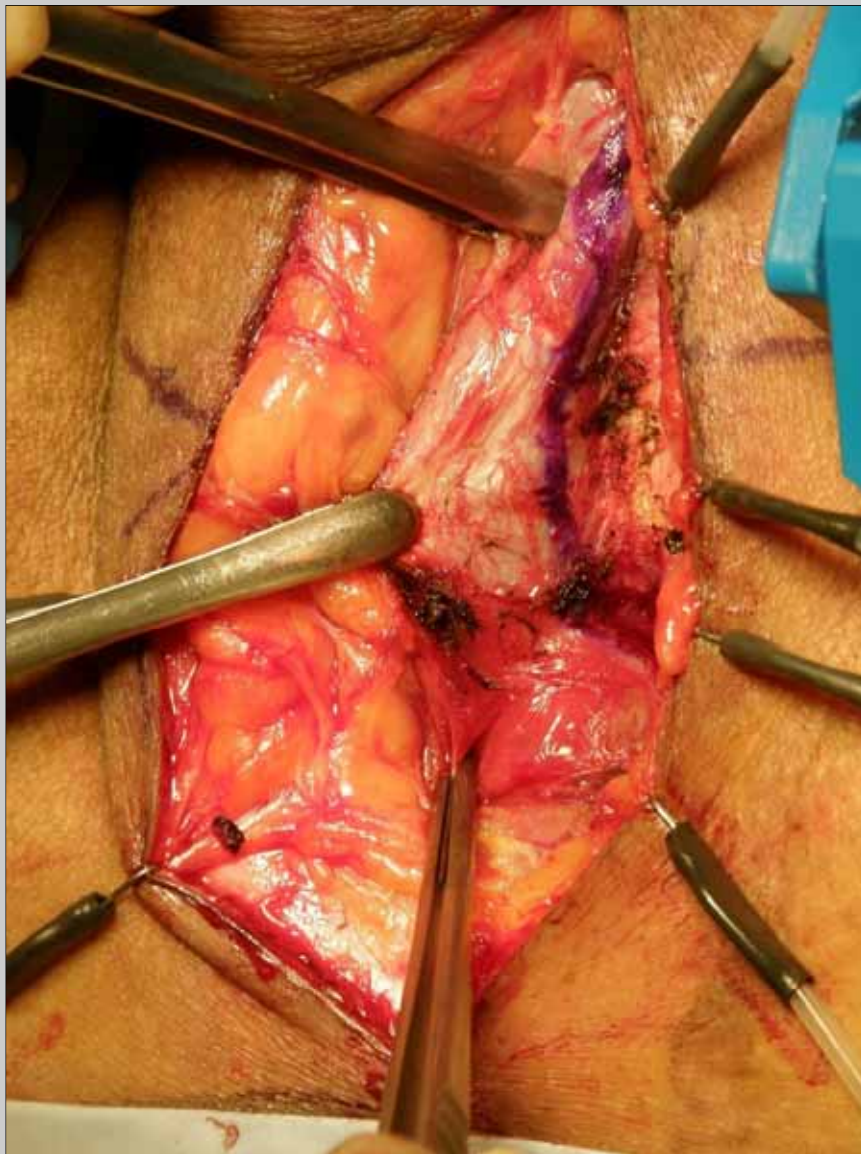


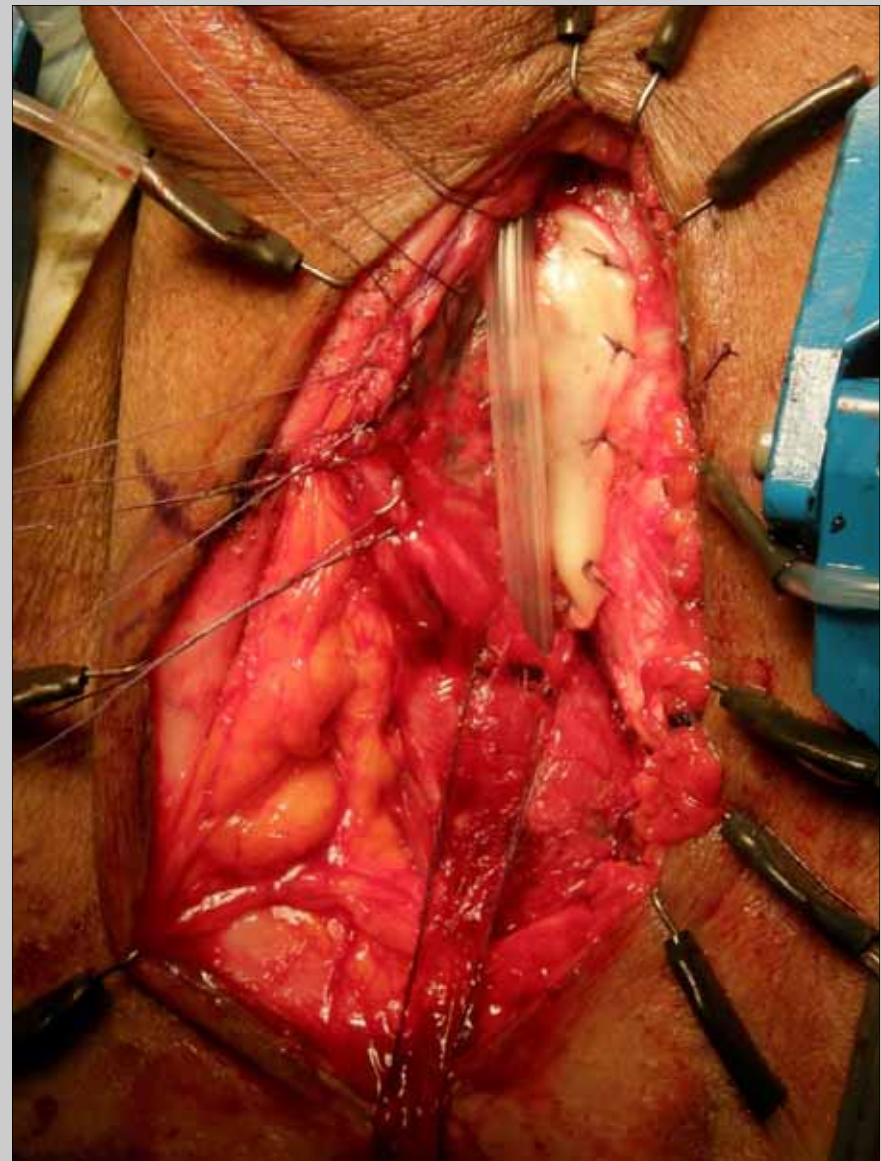
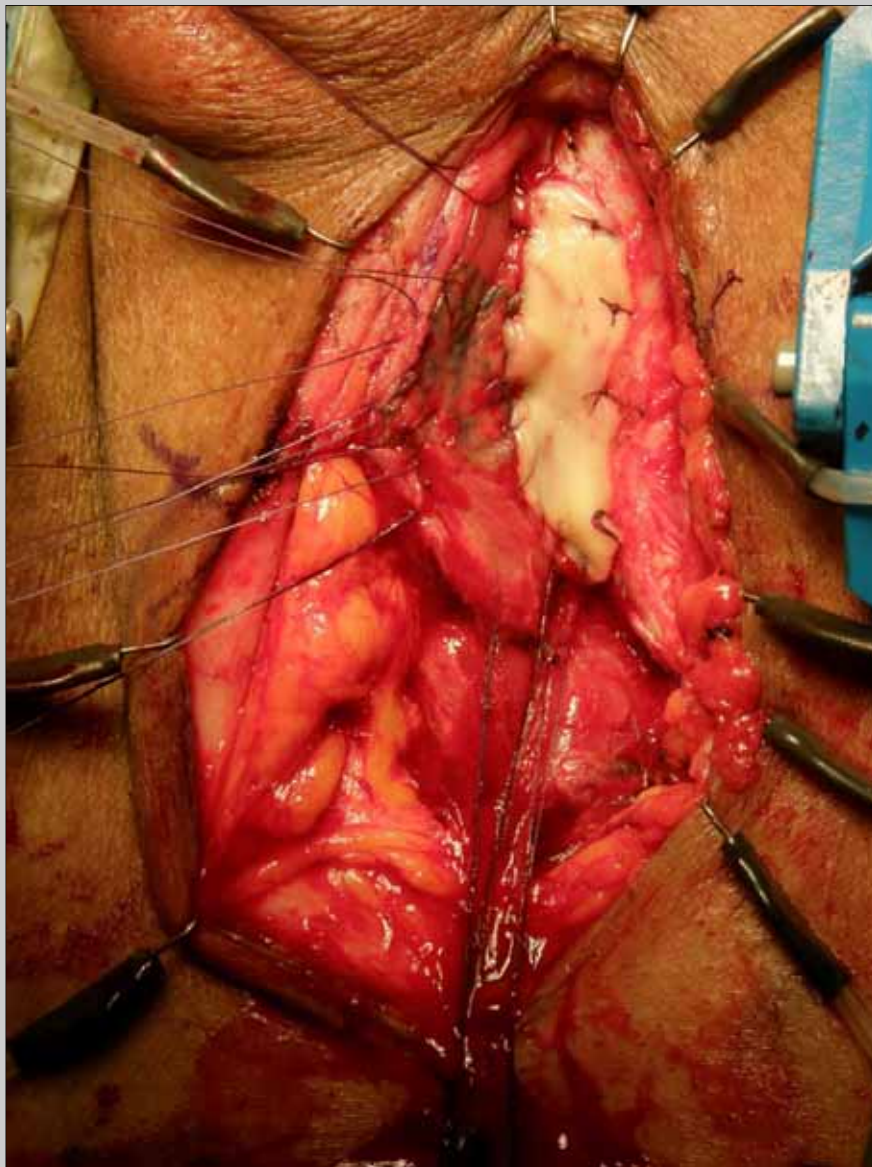
ventral

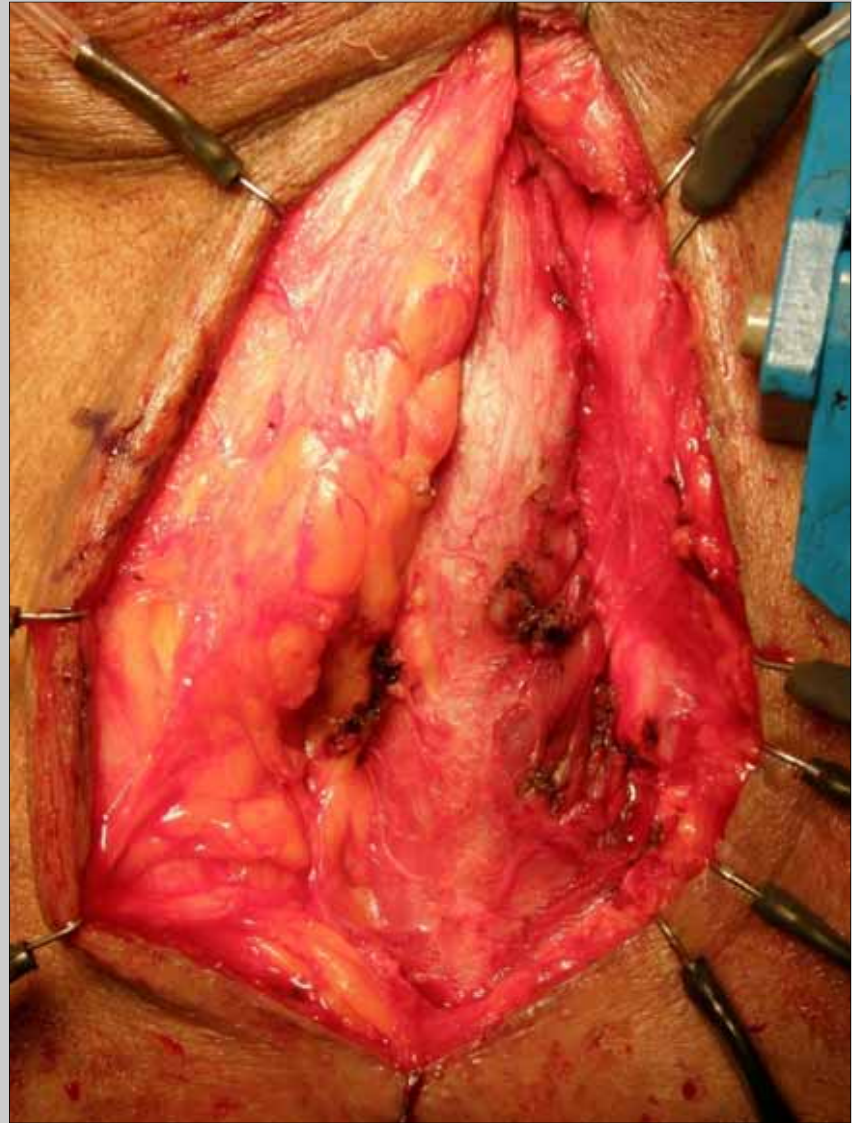
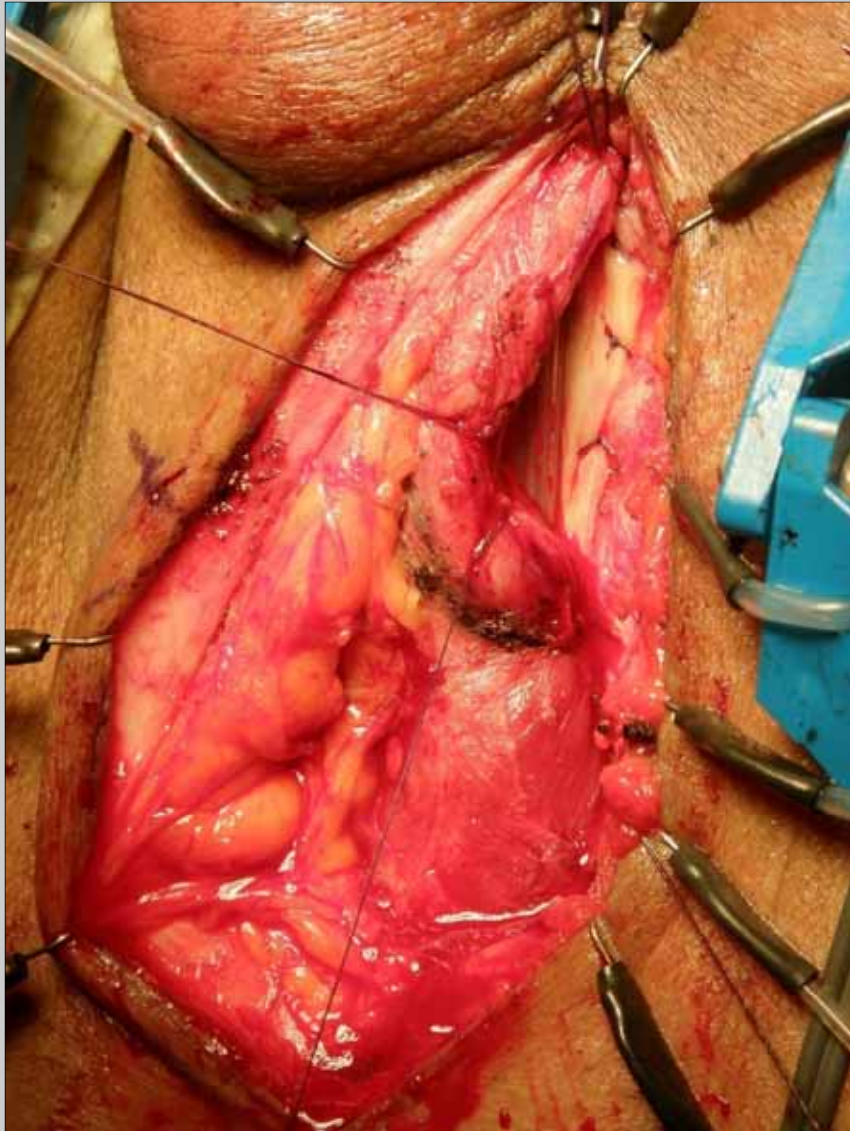
Muscle and nerve sparing dorsal onlay graft urethroplasty



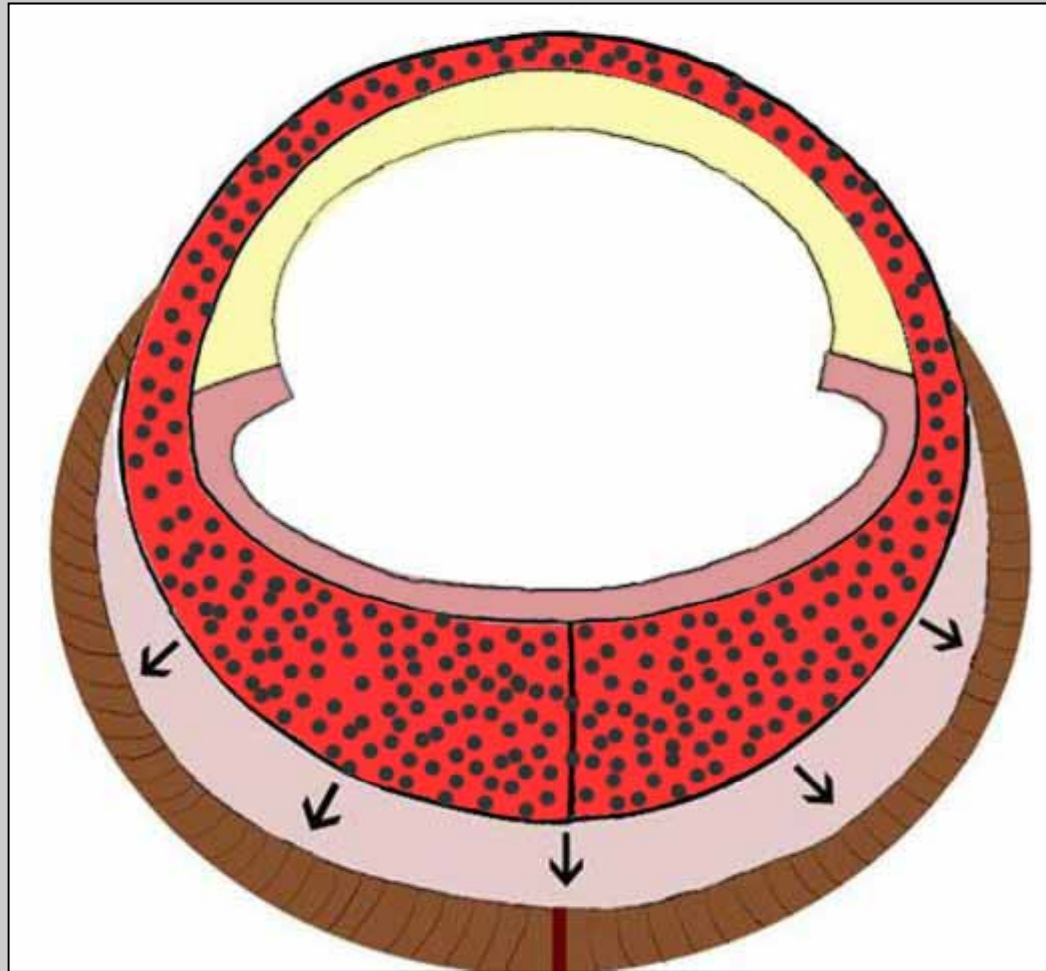


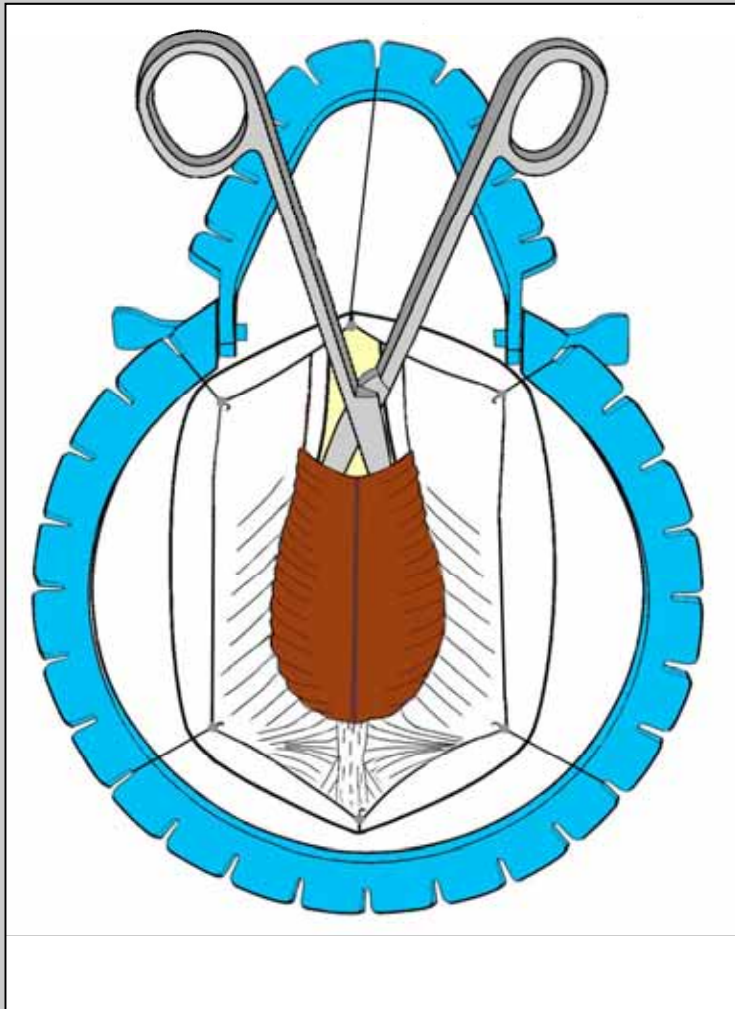






Muscle and nerve sparing **ventral** onlay graft bulbar urethroplasty



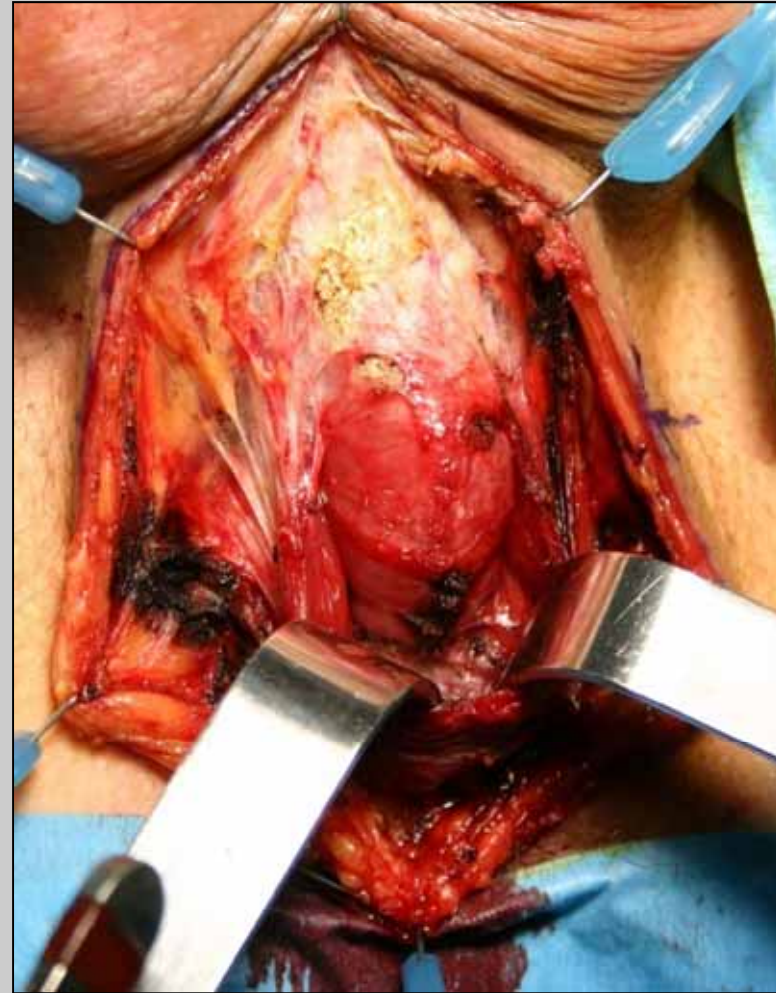
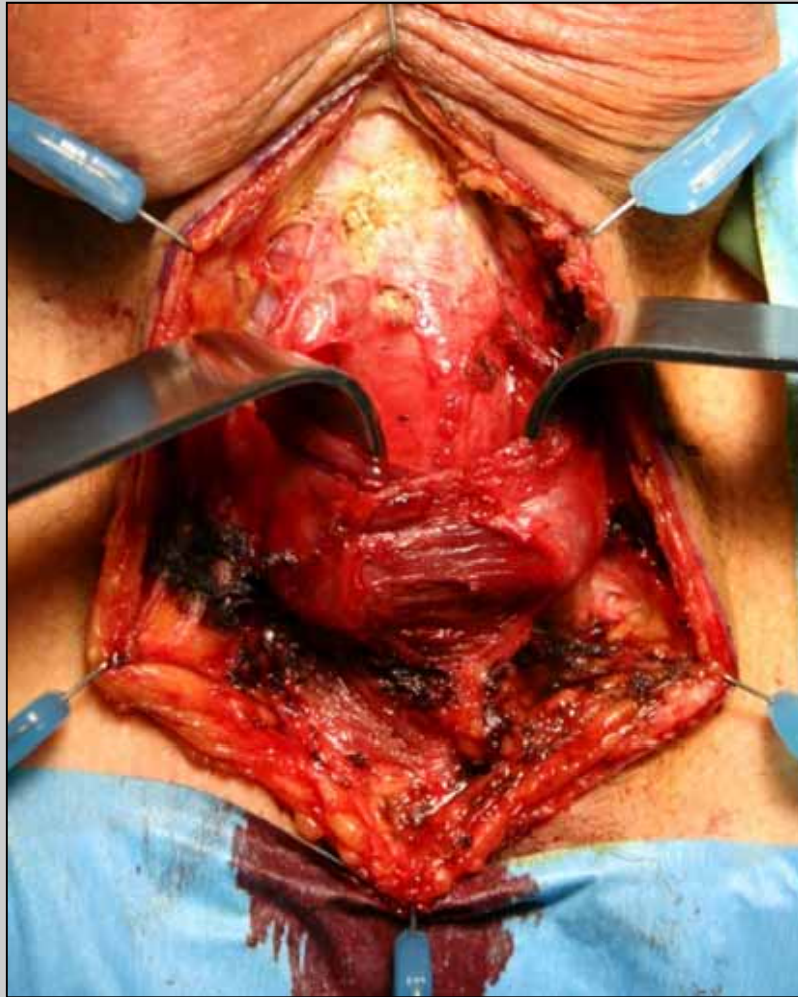


Barbagli G et al., Eur Urol 2008; 54:335-343

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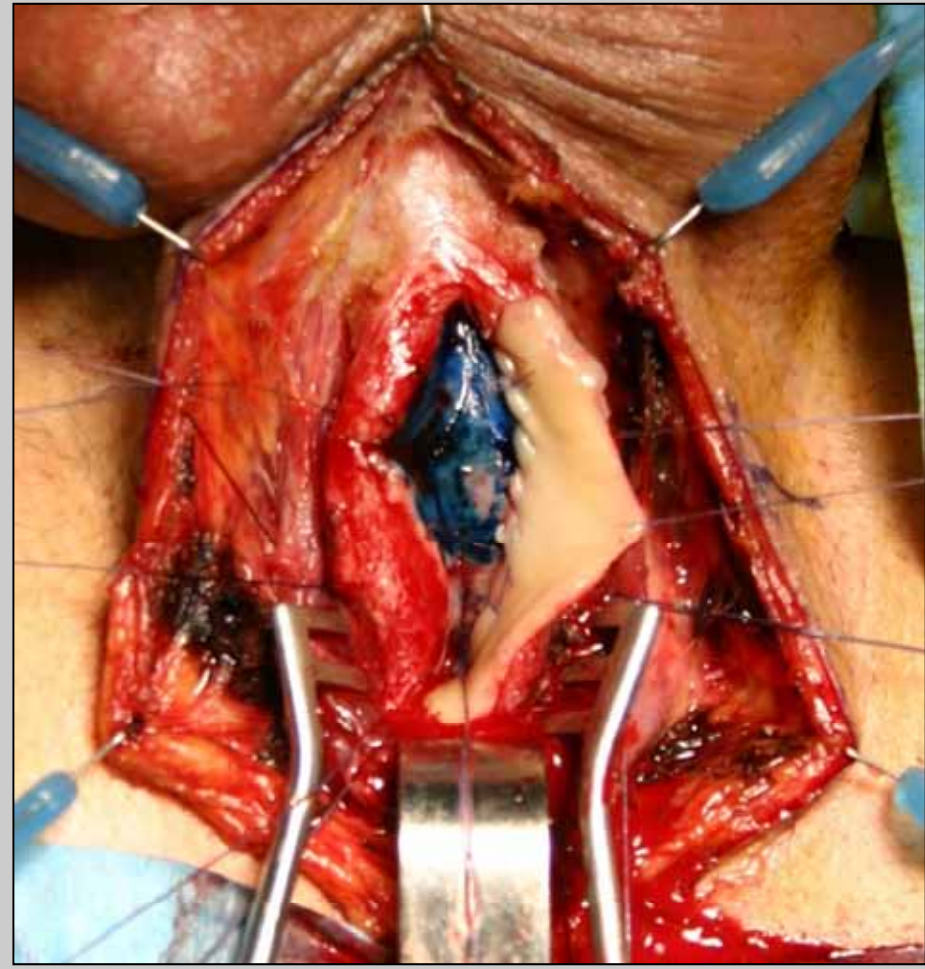
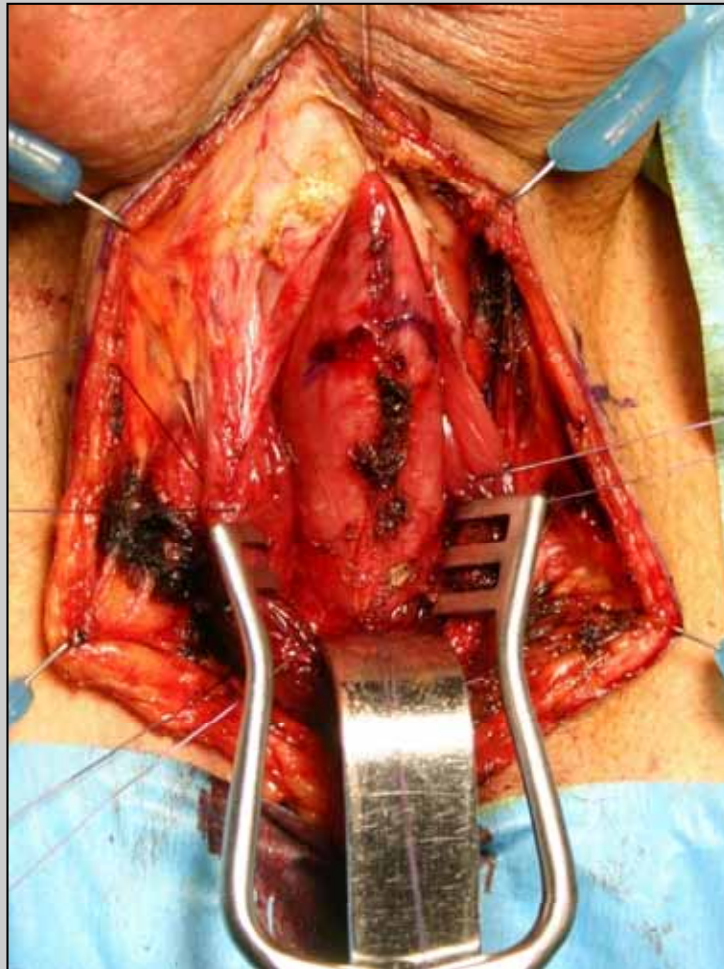


Barbagli G et al., Eur Urol 2008; 54:335-343

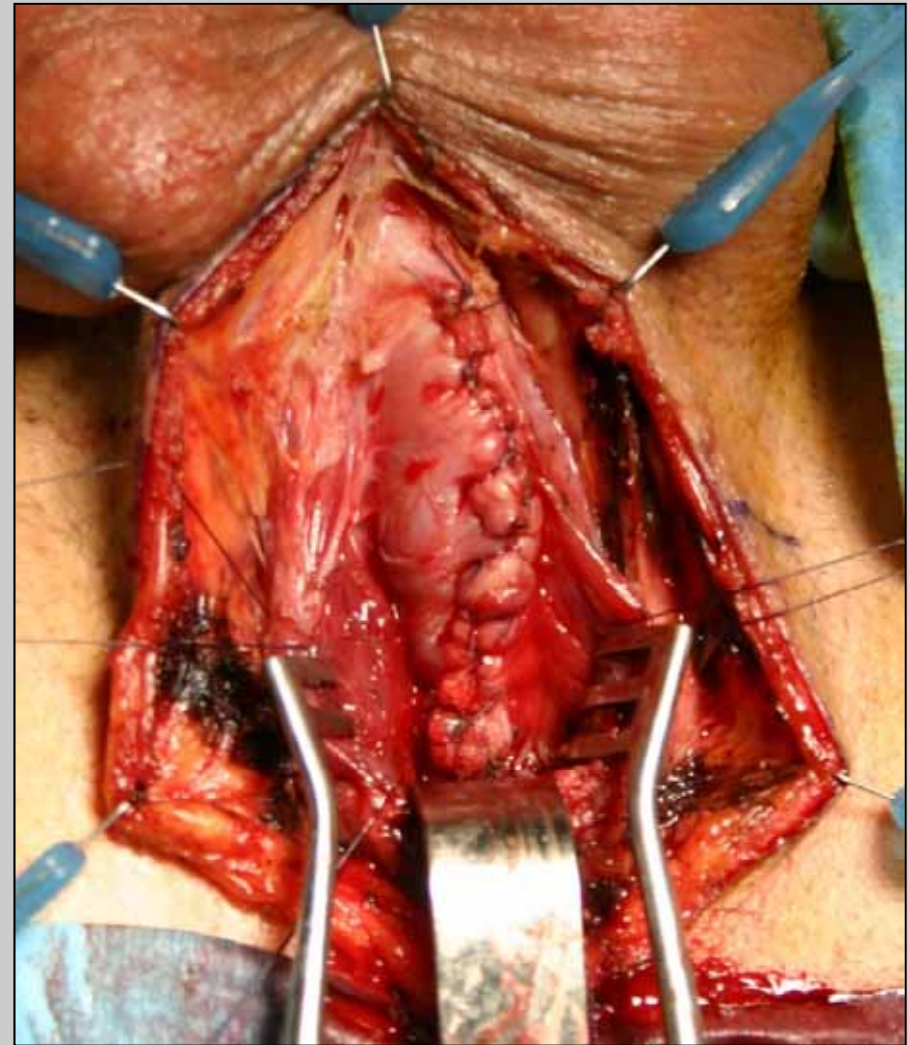
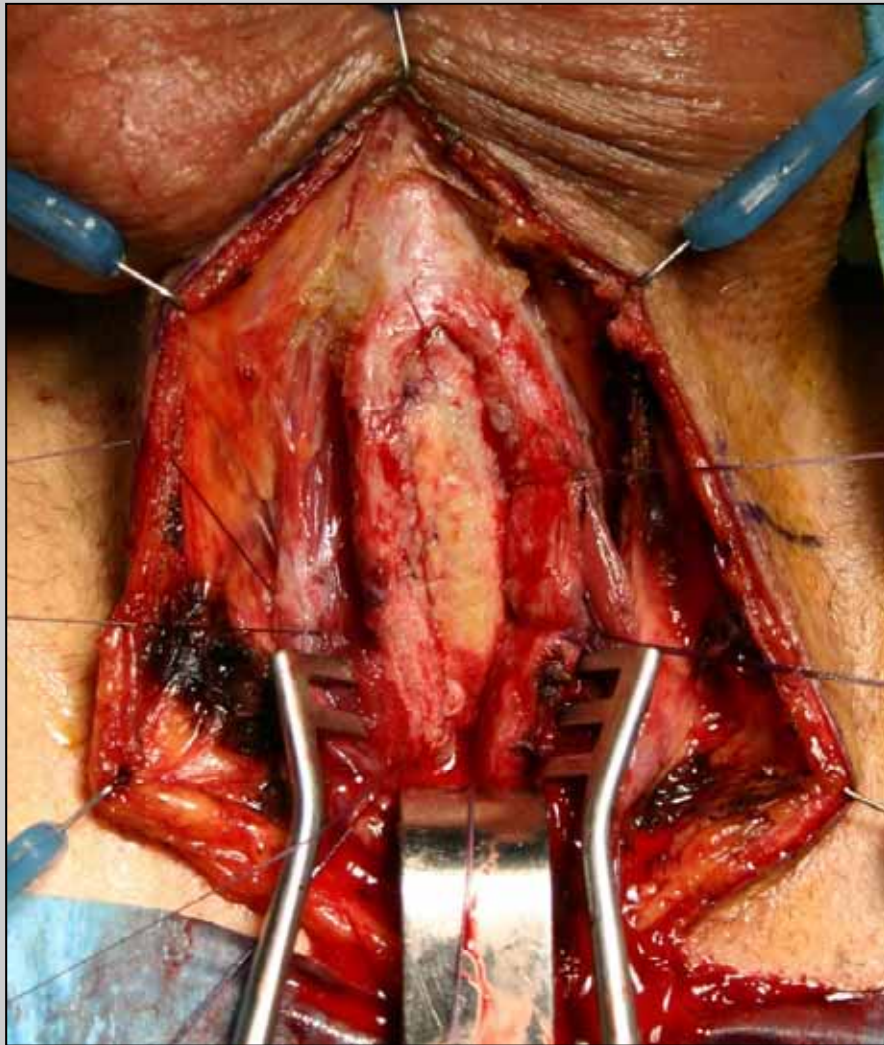
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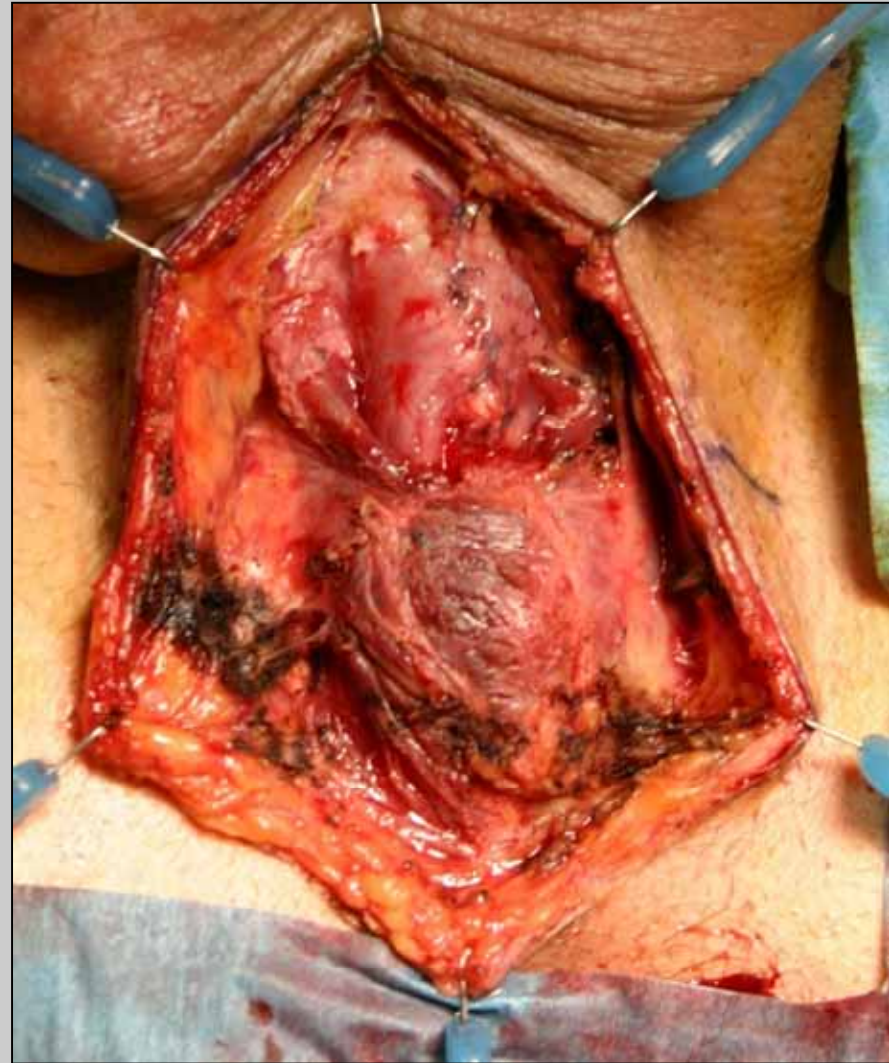
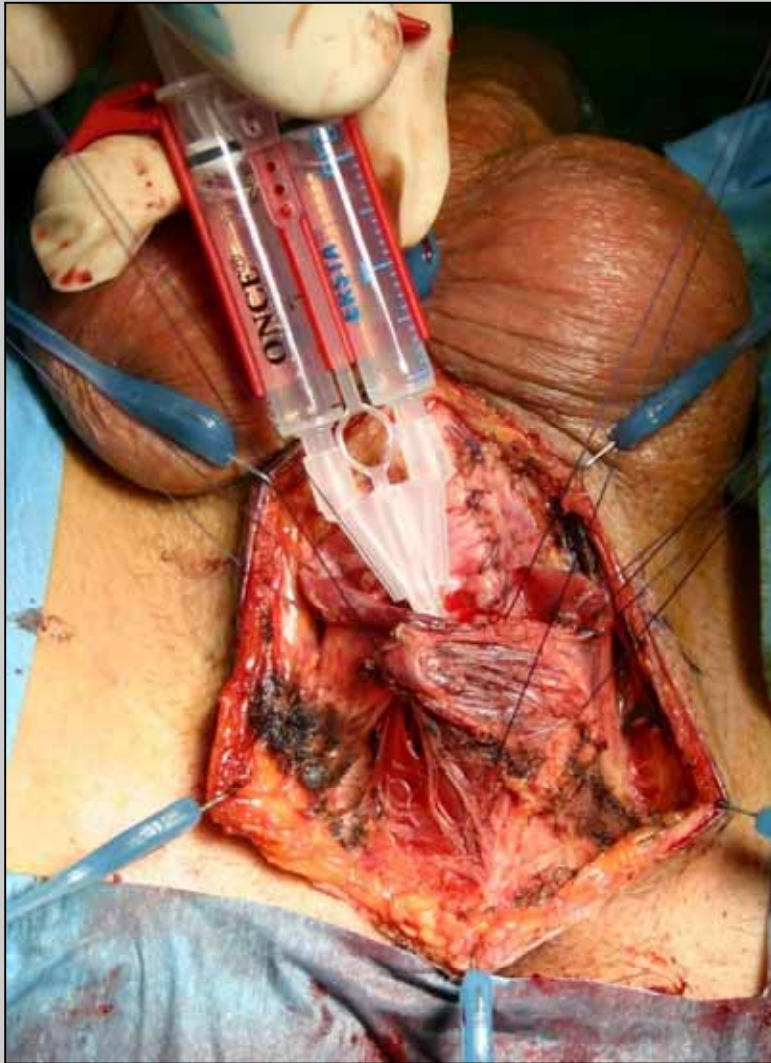


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Conclusions

- **Reconstructive surgery for urethral strictures is continually evolving and the superiority of one approach over another is not yet clearly defined**
- **The reconstructive urethral surgeon must be fully able in the use of different surgical techniques to deal with any condition of the urethra at the time of surgery**



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Instruction for pre-registration

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We sincerely hope that you or your Department will be interested in pursuing our project. Please do not hesitate to contact us for any question you may have.

Thank you and we look forward to hearing from you soon.

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