

Center for Reconstructive Urethral Surgery



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European Association of Urology

25° Anniversary EAU Congress

ESU Course 9

Advanced management of urethral stricture disease

Barcelona - Spain

April 16 - 20, 2010



Professor Sava Perovic – Belgrade - Serbia

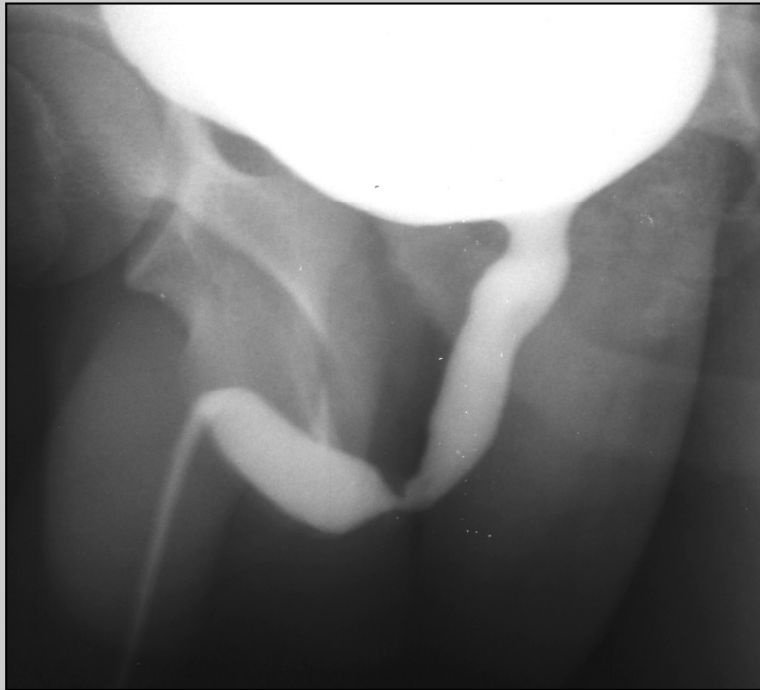
New developments in urethral stricture disease

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Should we preserve the bulbospongiosum muscle?

May 2005



39 year old man

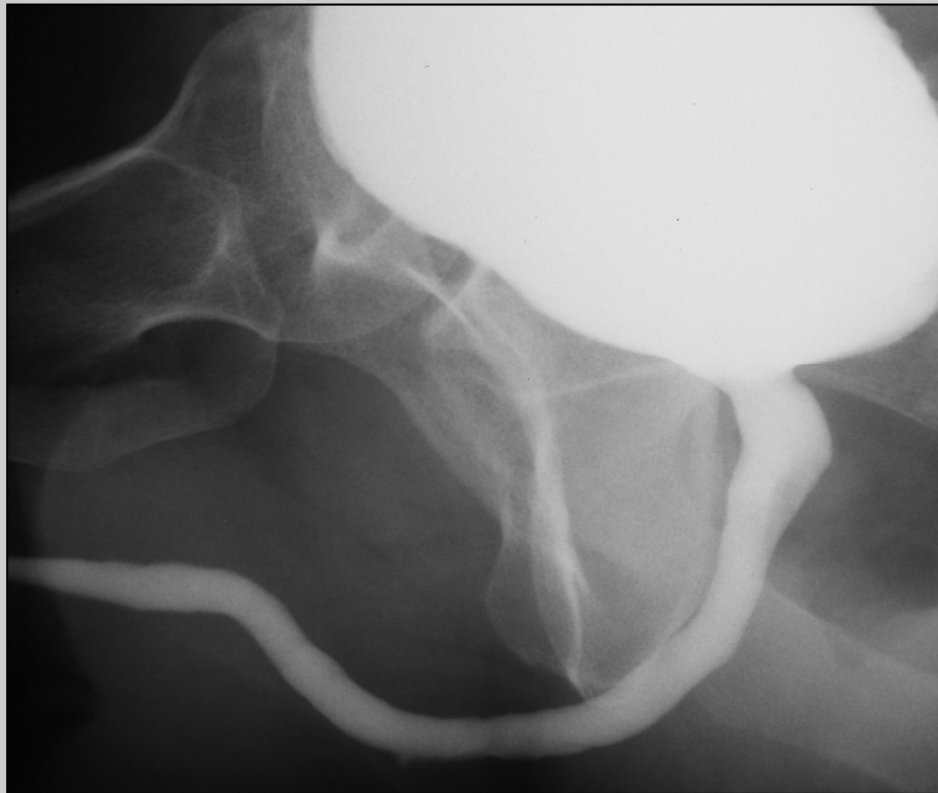
No associated diseases

**Previous history of urethral
instrumentation**

Two internal urethrotomies

End-to-end anastomosis

November 2005



PF: 32 ml/sec

post-voiding dribbling

loss of ejaculation

**semen sequestration in the
urethral bulb**

Questionnaire to investigate sexual dysfunction after bulbar end-to-end anastomosis

Changes in Ejaculation

Did you complain of ejaculation disorders after the surgery?

Yes

No

Did you recognize changes in ejaculation after the surgery comparing it with your previous status?

Yes

No

Does ejaculation occur with difficult stream?

Yes

No

If Yes, what is the stream like?

No stream

Very poor spontaneous stream

The stream occurs only by manually compressing the perineum

Is the ejaculation difficulty present:

Always

Sometimes

Seldom

Did you have negative changes in the relationship with your partner due to difficult ejaculation?

Yes

No

Did you have children after the surgery?

Yes

No

6 questions to investigate ejaculatory disorders

Barbagli G. et al, J Urol 2007; 178: 2470-2473

Neurovascular Penile Disorders

Did you complain of penile erection disorders after the surgery?

Yes

No

Does your glans fully swell during erection?

Yes

No

If No:

Glans is not swollen

Glans is partially swollen

Glans is fully swollen at the beginning of erection, but it was not maintained fully swollen throughout the sexual activity

Did you have negative changes in your sexual activity due to this problem?

Yes

No

If Yes, what kind of problems did you recognize?

Psychological problems

Problems during vaginal intercourse

Other minor problems

Did you recognize a change in penile sensitivity after surgery?

Yes

No

If Yes, where did you localize sensitivity changes?

In the glans

In penile skin

In distal penile shaft

Including all penile shaft

What was the penile sensitivity like after surgery?

Decreased

Increased

Not specifically altered

Was the penile sensitivity changed in relation to:

Touch

Cold/hot

All stimulus

During the erection do you complain of cold glans?

Yes

No

Did you have negative changes in your sexual activity due to this problem?

Yes

No

7 questions to investigate neurovascular penile disorders

Barbagli G. et al, J Urol 2007; 178: 2470-2473

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Final Assessment of Surgery

Are you satisfied of surgical outcome and what is your judgment of final results?

- | | |
|-------------------|--------------|
| 1. Not satisfied | 1. Negative |
| 2. Poor satisfied | 2. Poor |
| 3. Satisfied | 3. Good |
| 4. Very satisfied | 4. Excellent |

If your answer was 1 or 2

Is it because you did not improve urinary function?

Is it because your sexual activity was worsened?

Would you repeat the surgery?

Yes

No

If No, why?

Due to postoperative pain

Due to psychological problems

Because the outcome was different from what I foresaw

Two questions to investigate final patient satisfaction

Barbagli G. et al, J Urol 2007; 178: 2470-2473

This non-validated questionnaire was administered to 60 out of 153 patients who underwent bulbar end-to-end anastomosis, according to the following inclusion criteria:

- ❖ **Age 20 to 50 years old**
- ❖ **No diabetes or vascular diseases**
- ❖ **No previous failed open urethroplasty**
- ❖ **No further surgery required after the anastomosis**

Barbagli G. et al, J Urol 2007; 178: 2470-2473

Results

12 (20%) patients showed decreased ejaculation force.

2 (3.3%) patients showed ejaculation was possible only by manually compressing the perineum at the level of the urethral bulb.

14 (23.3%) patients showed ejaculatory dysfunction.

Barbagli G. et al, J Urol 2007; 178: 2470-2473

In our experience, patients who underwent substitution onlay graft urethroplasty showed the same incidence of:

- ❖ **post-voiding dribbling**
- ❖ **decreased ejaculation force or loss of ejaculation**
- ❖ **partial semen sequestration in the urethral bulb**



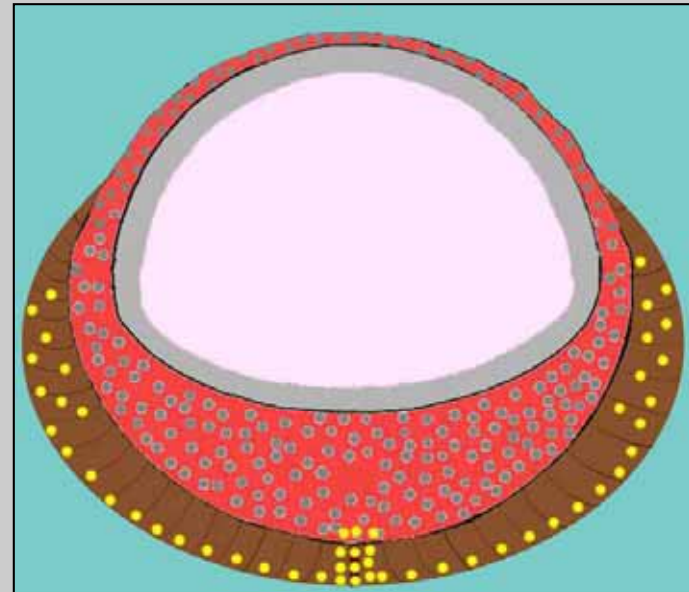
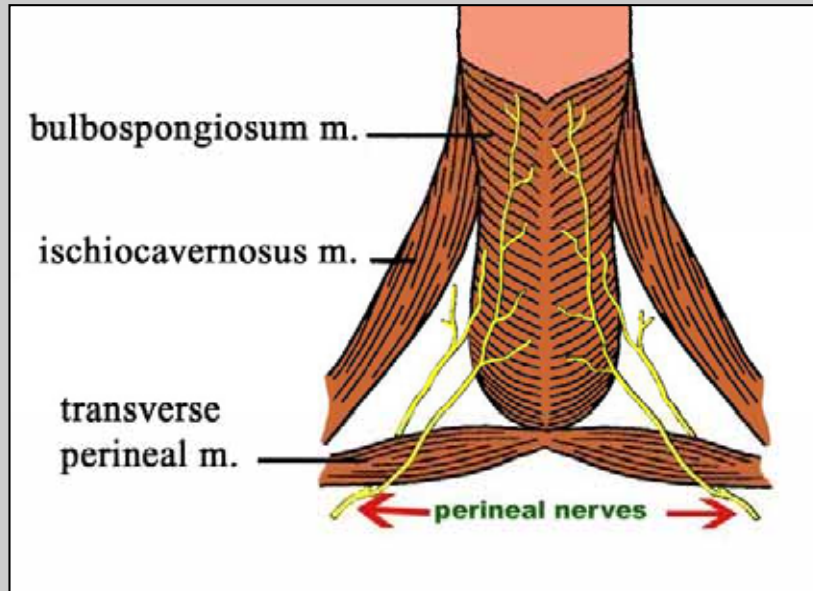
Barbagli G. et al, Eur Urol 2008, 54: 335-343

Why?

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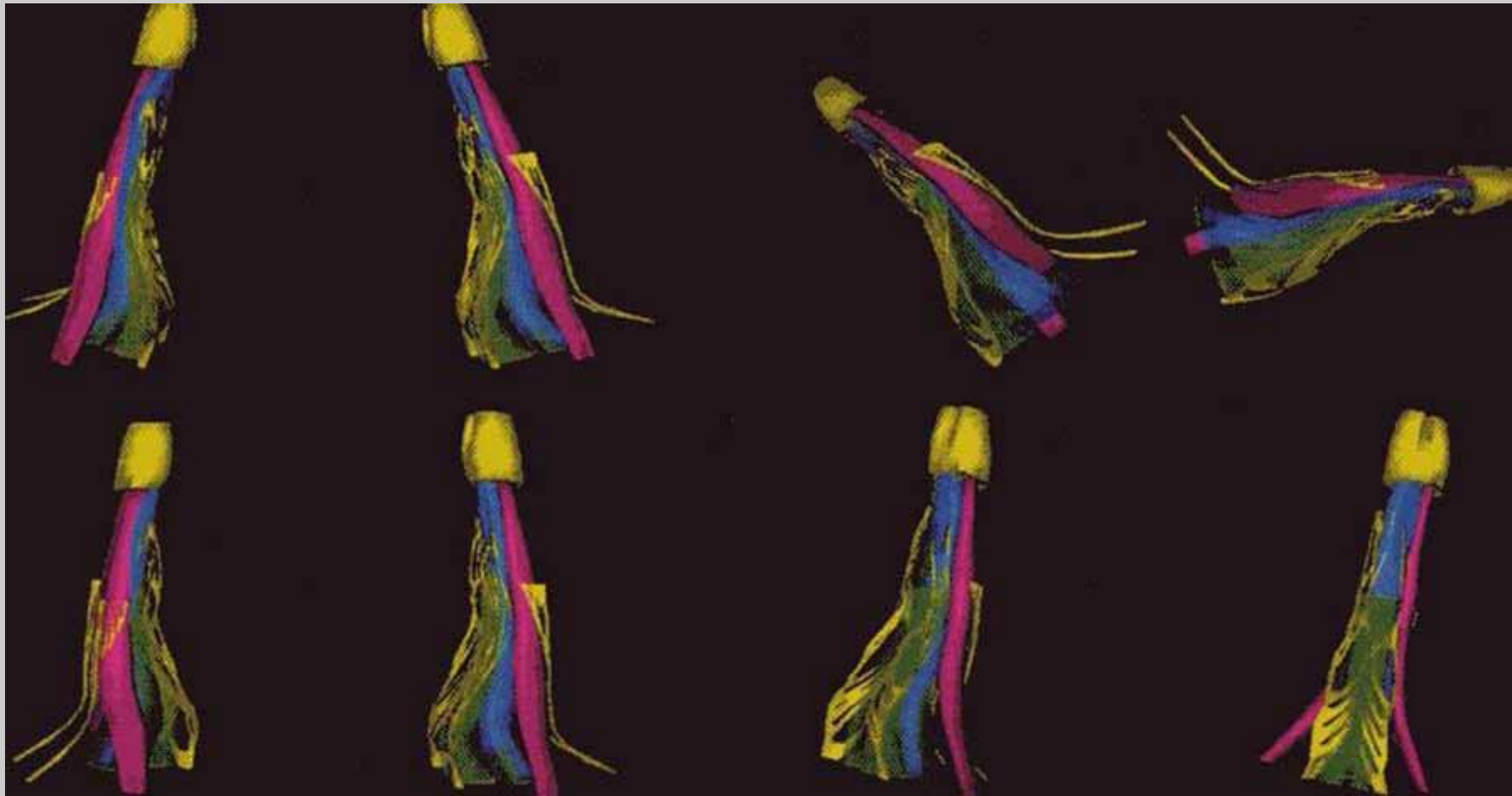
Functional anatomy of bulbospongiosum muscle



Perineal nerves innervate the bulbospongiosum muscle and have fine branches that penetrate the corpus spongiosum.

Yucel and Baskin, BJU International 2003; 92: 624-630

Functional anatomy of the bulbospongiosum muscle



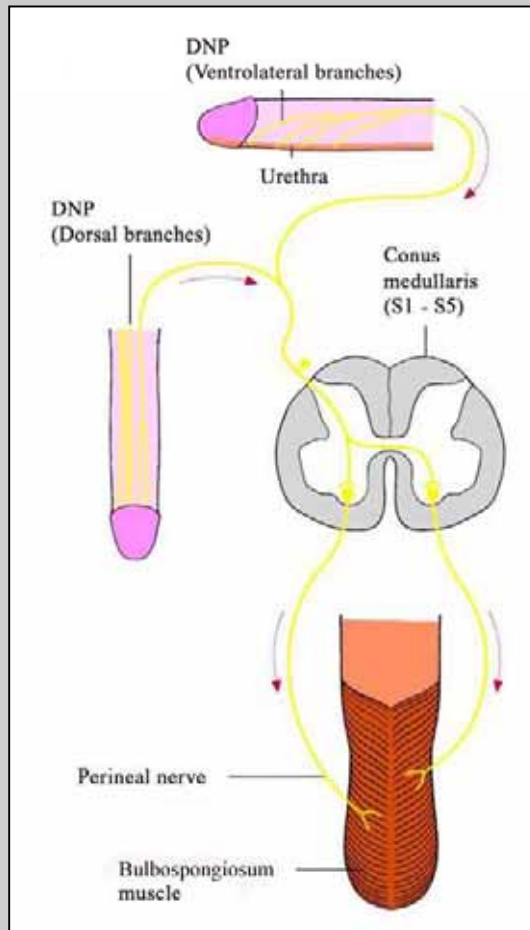
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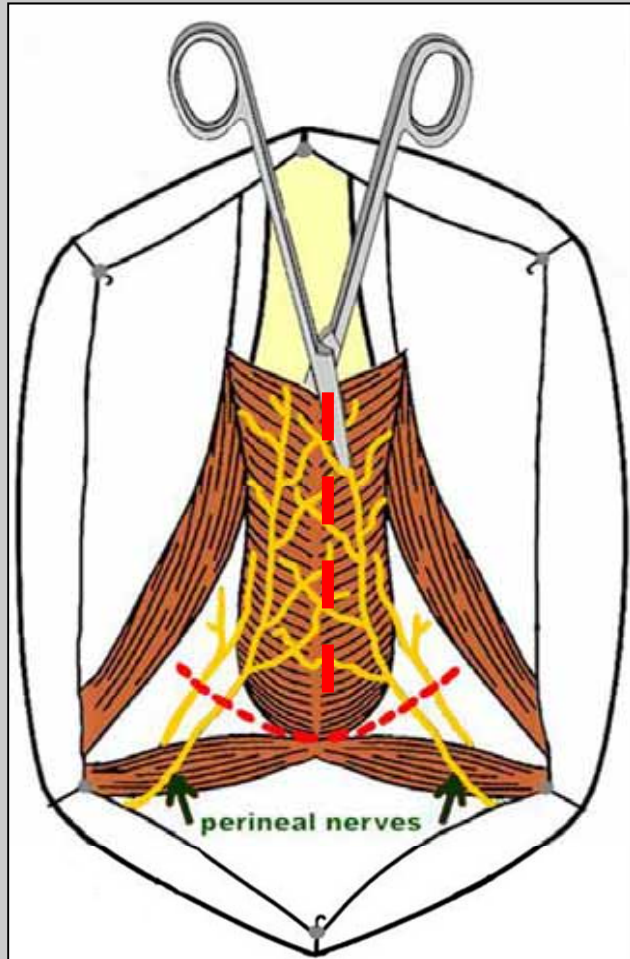
Functional anatomy of the bulbospongiosum muscle



- ❖ Bulbospongiosum muscle contractions are elicited by stimulation of the dorsal nerve of the penis and following stimulation of the perineal nerve.
- ❖ Rhythmic contractions of the bulbospongiosum muscle expel semen and urine from the urethra, thus avoiding semen and urine sequestration in the urethral bulb.

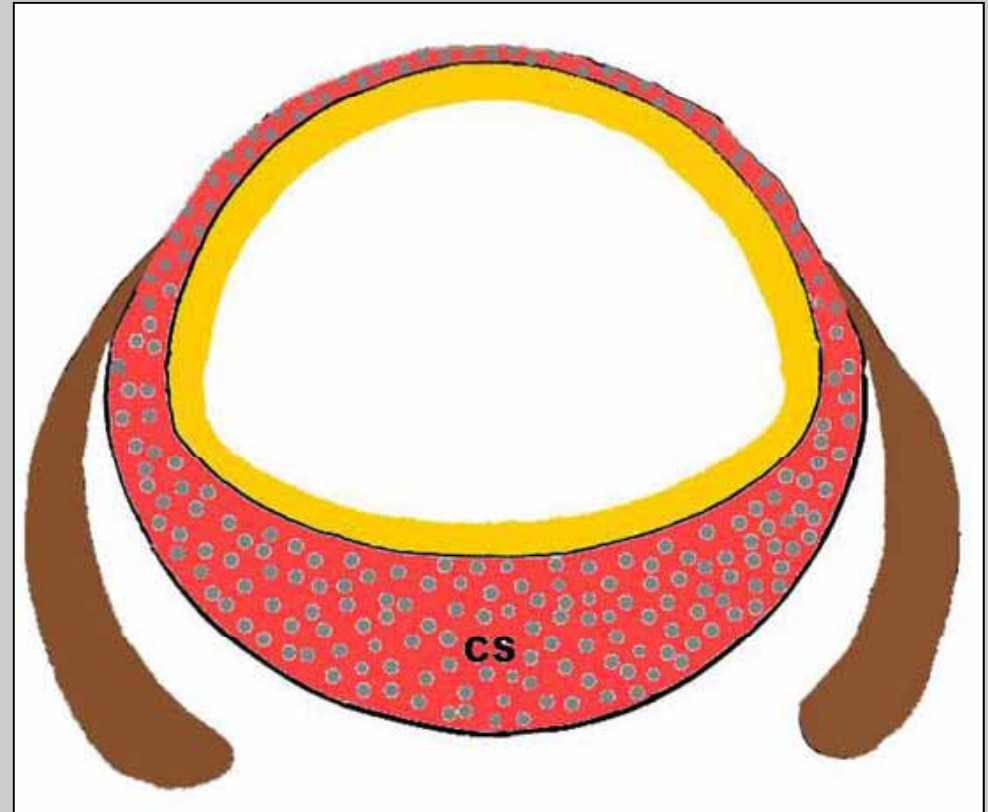
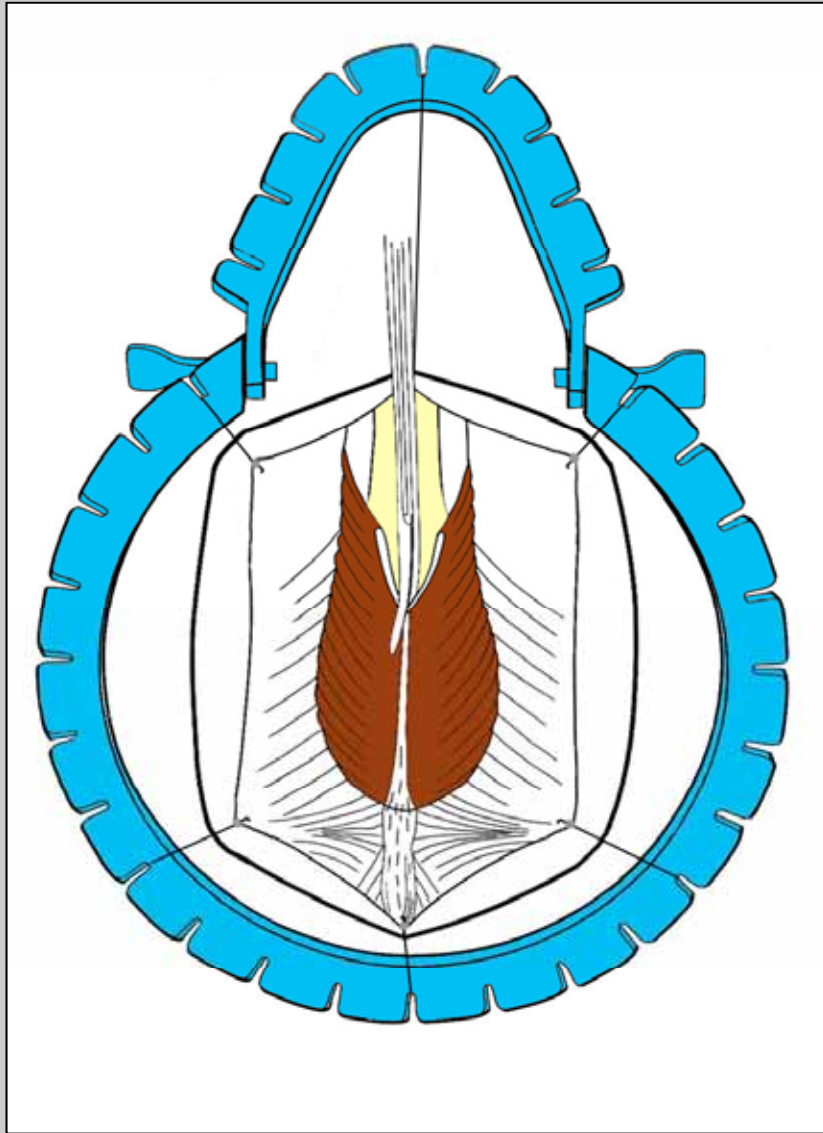
Yang and Bradley, BJU International 2000; 85:857-863

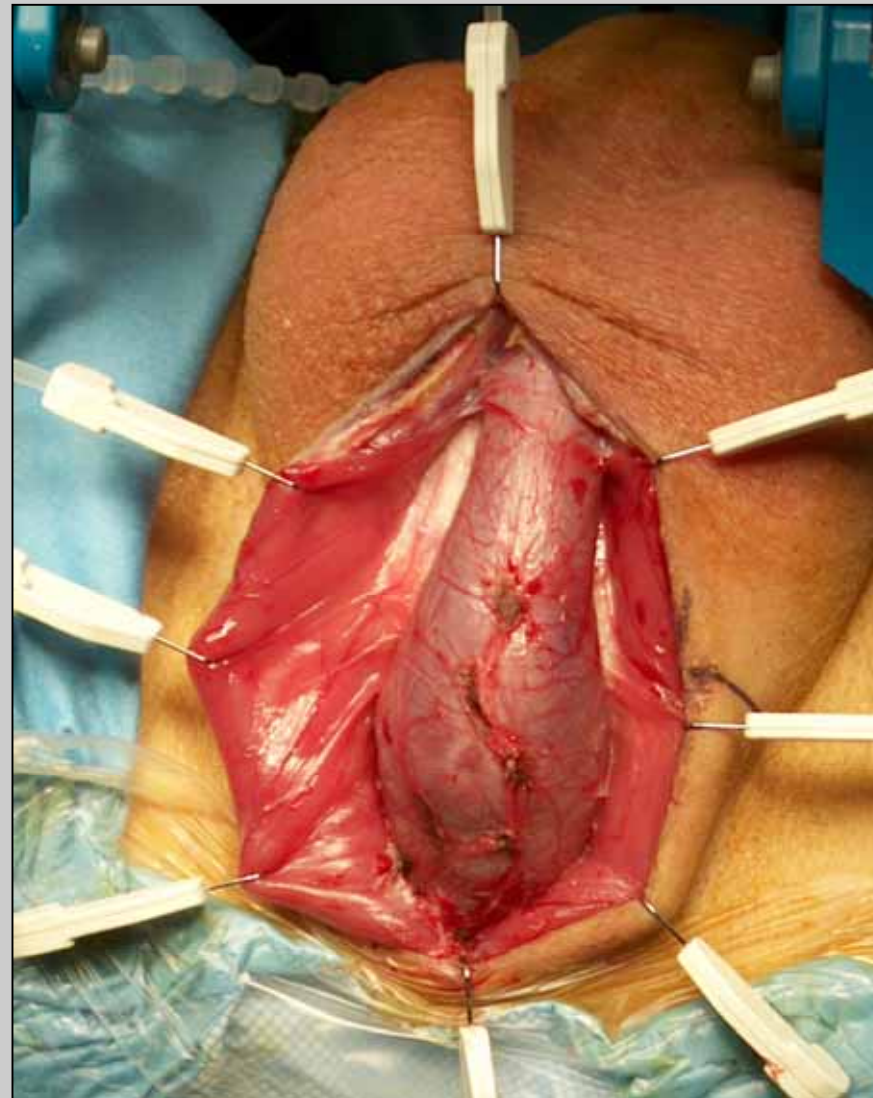
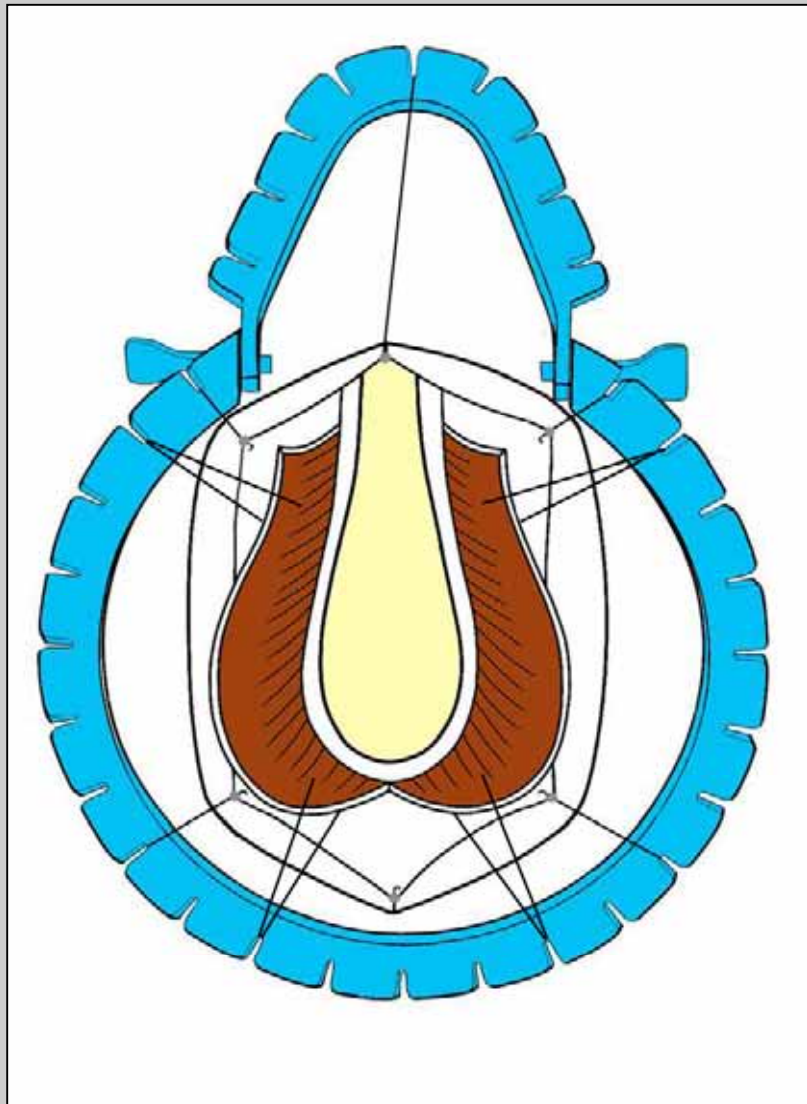
Functional anatomy of the bulbospongiosum muscle

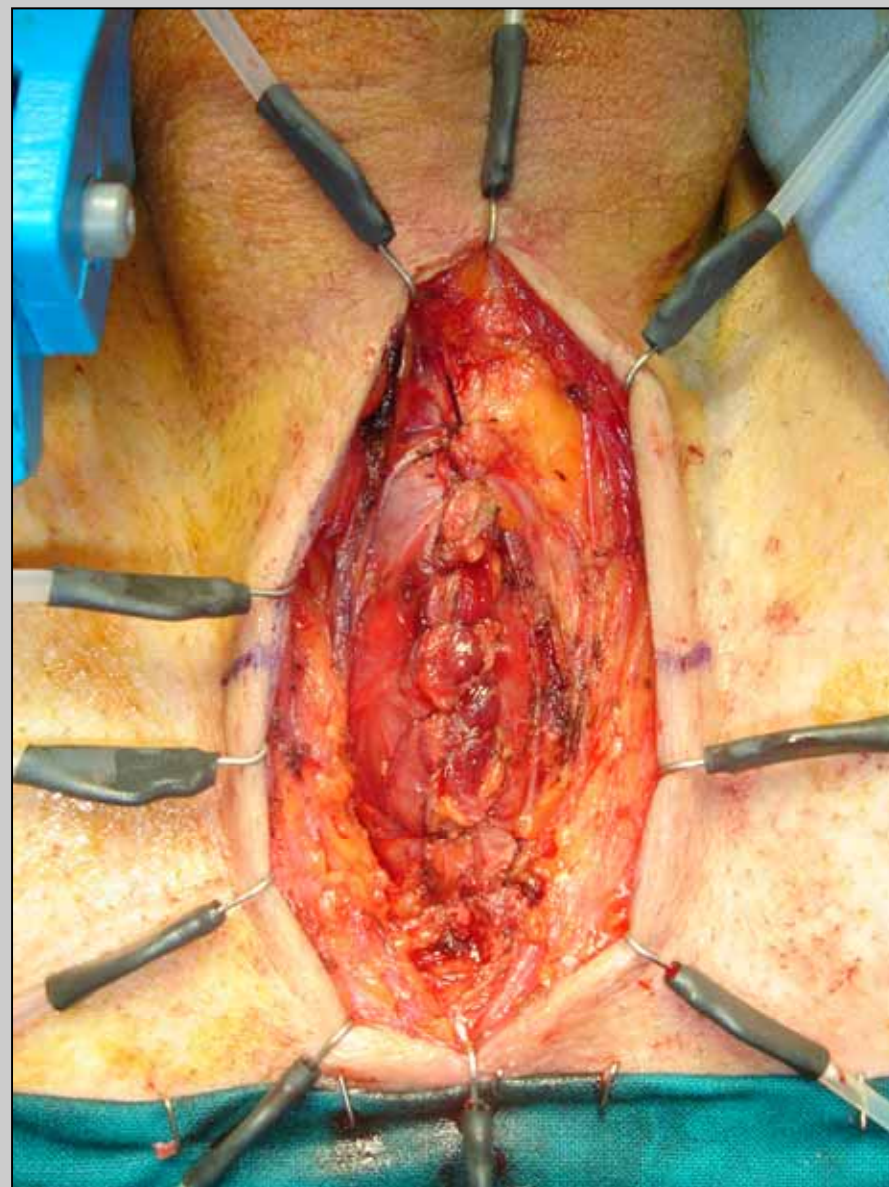
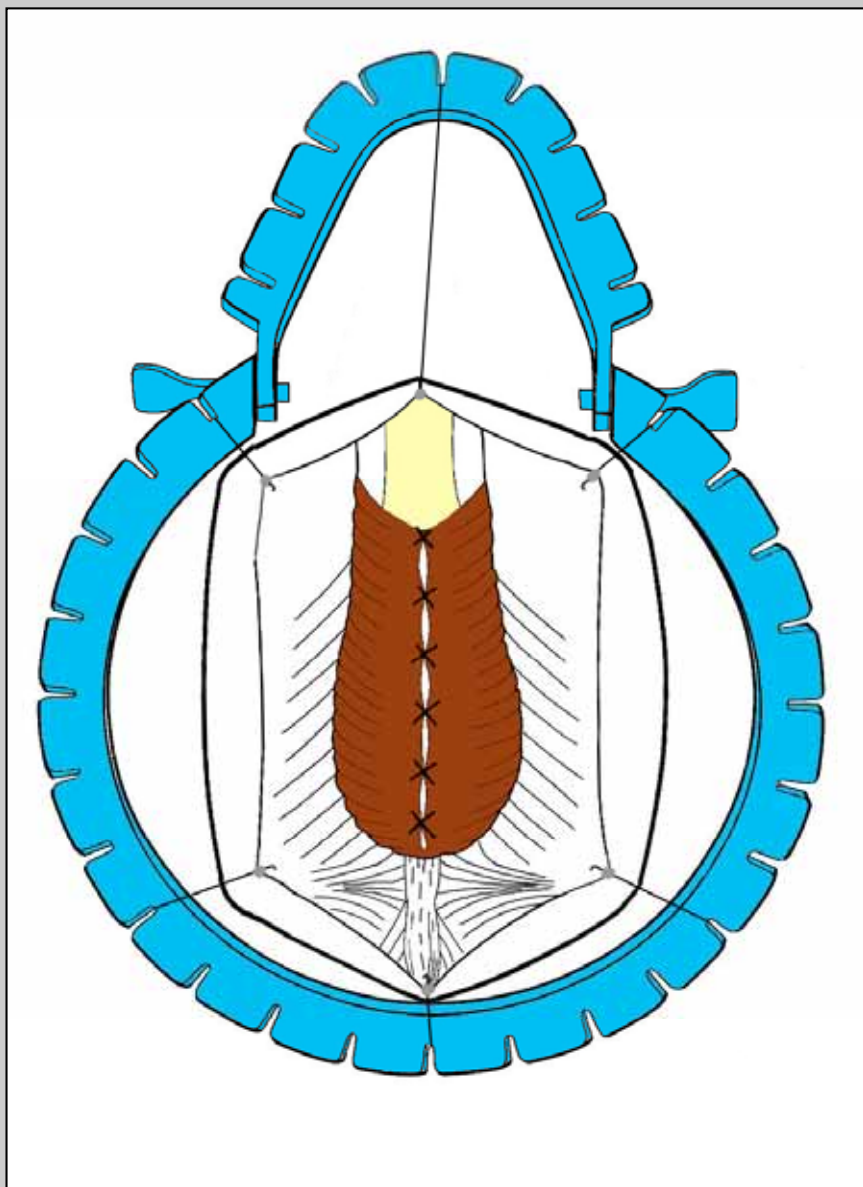


- ❖ Ejaculatory disorders may result from disruption of one or more of the reflex pathways providing innervation of the bulbospongiosum muscle.
- ❖ These disorders may manifest as decreased force of semen expulsion and low semen volume caused by inefficient bulbospongiosum contractility.

Yang and Bradley, BJU International 2000; 85:857-863



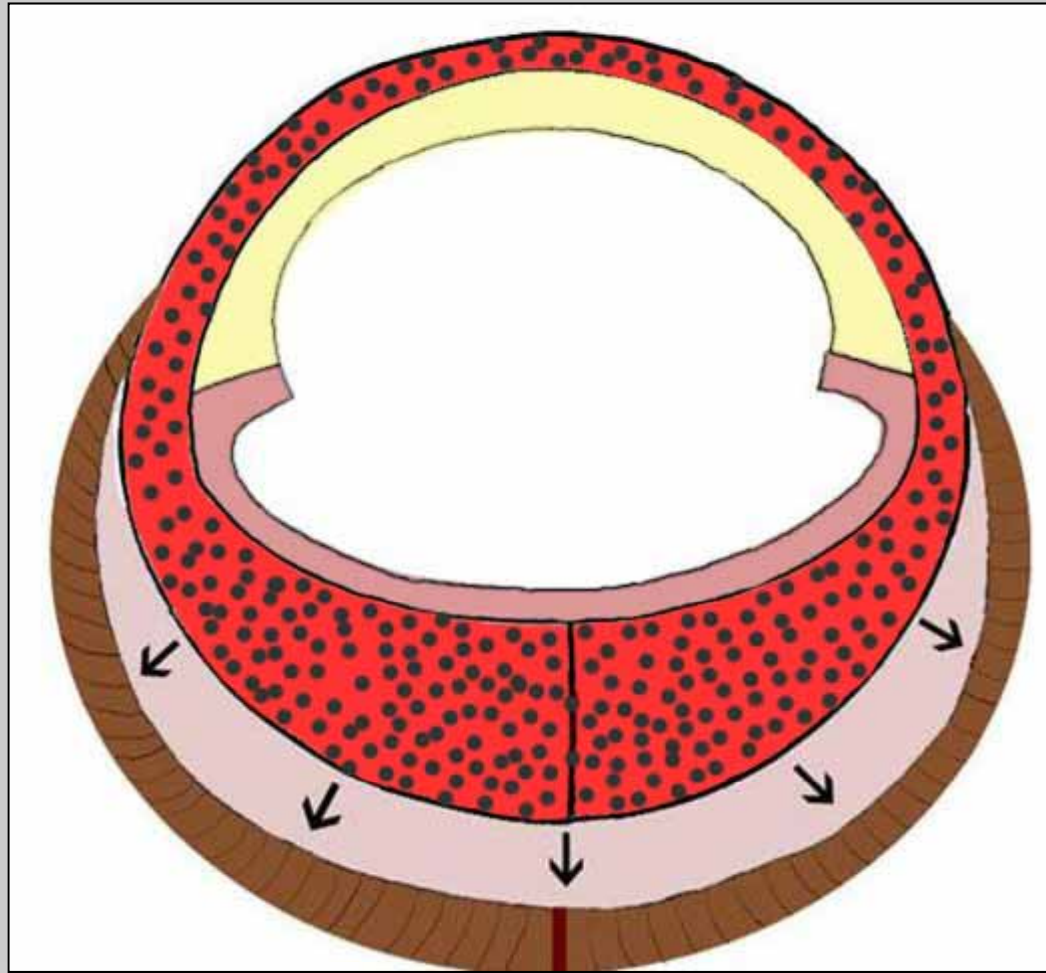


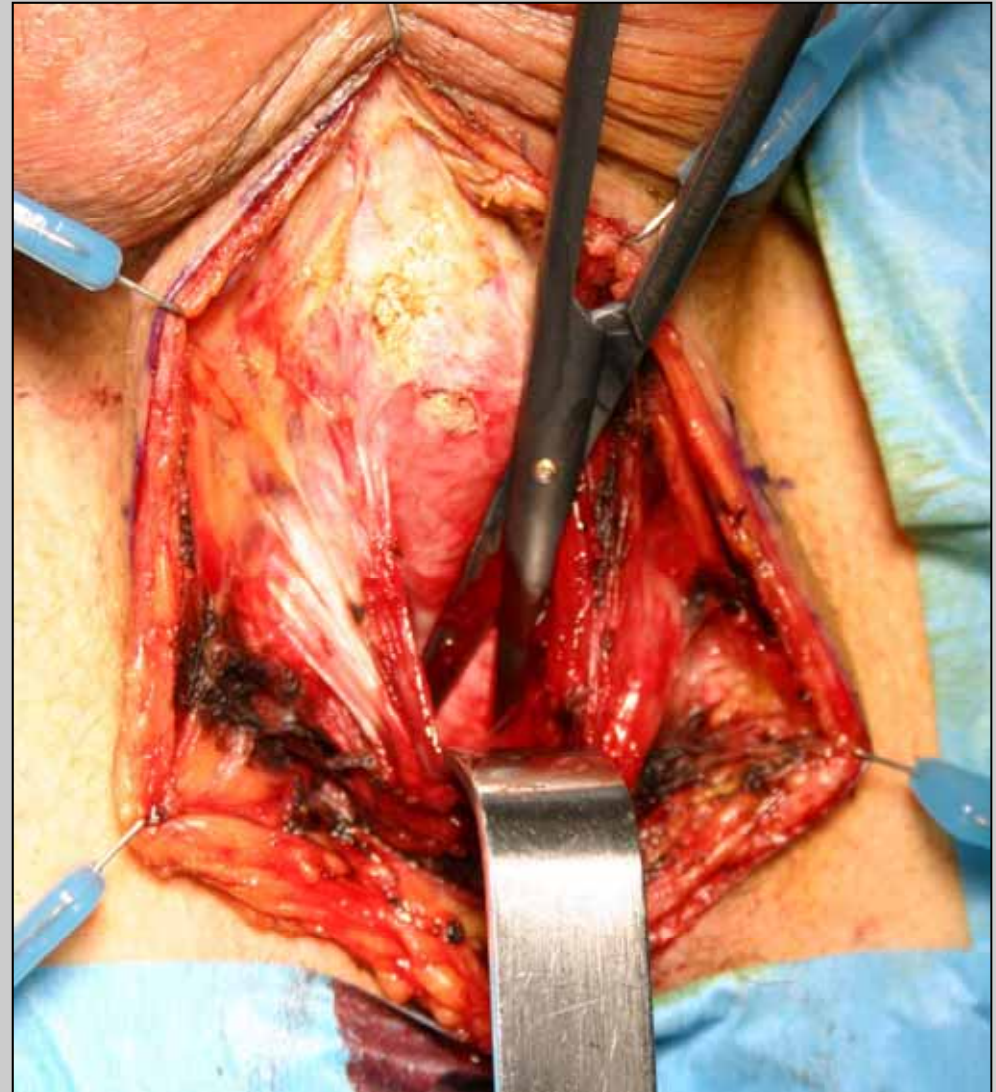
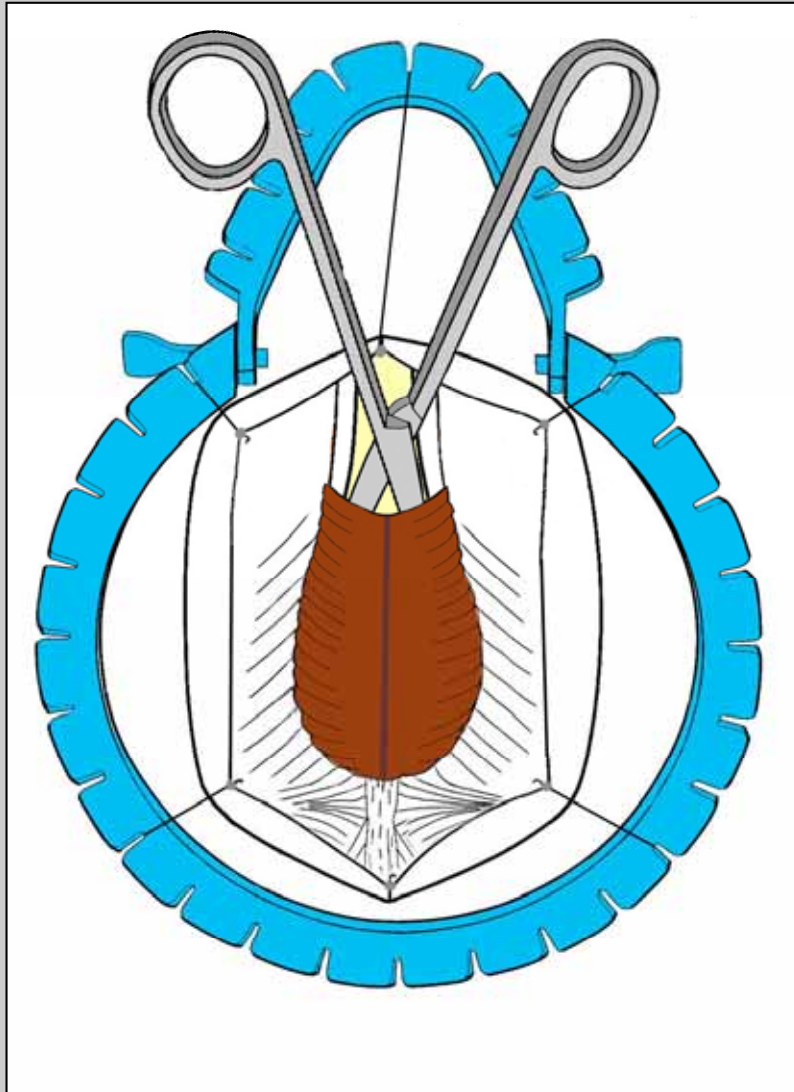


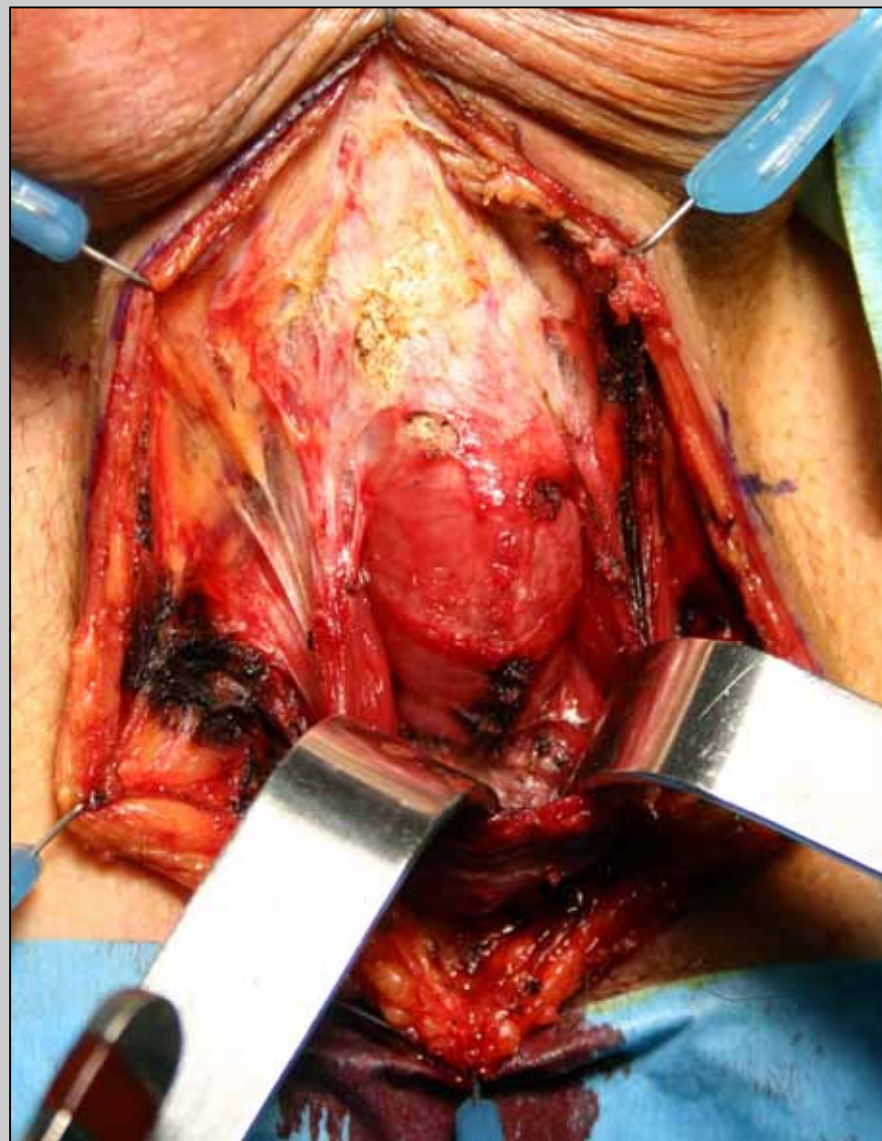
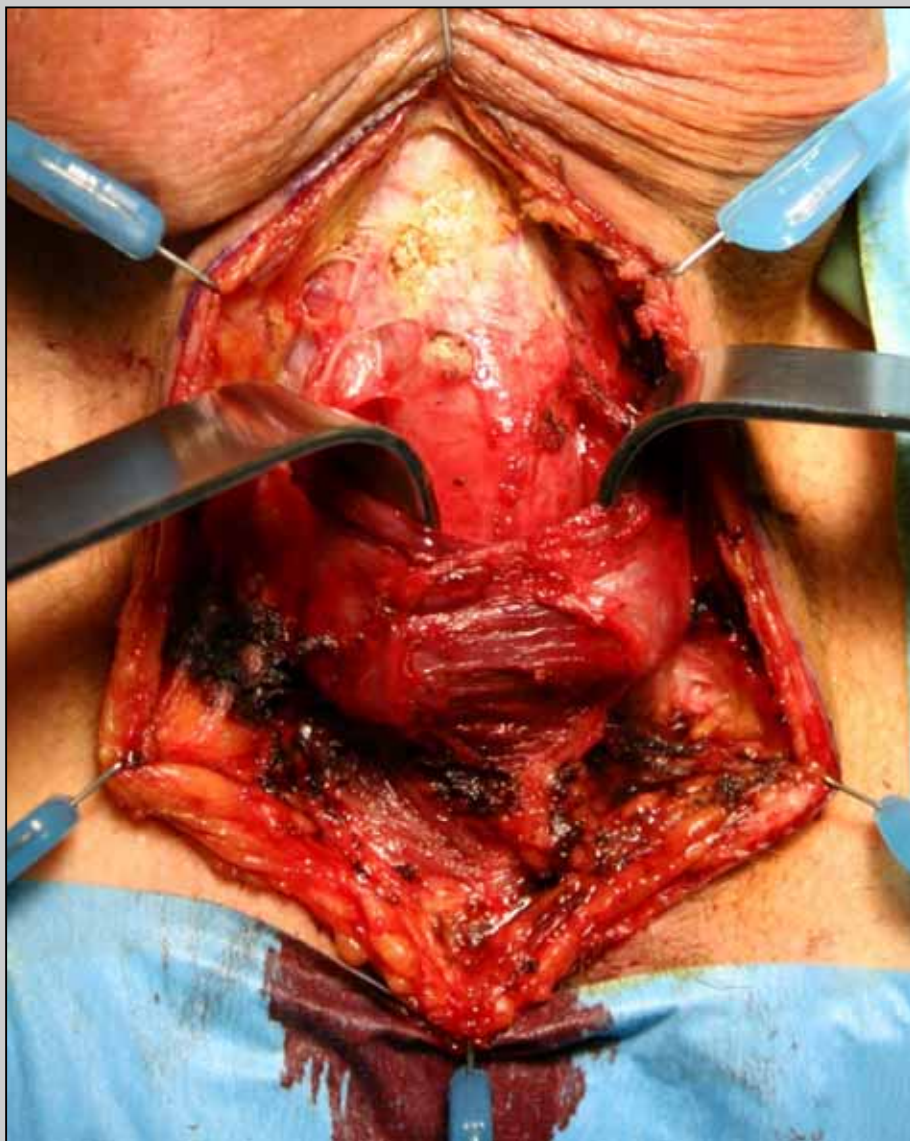
Can we preserve the bulbospongiosum muscle?

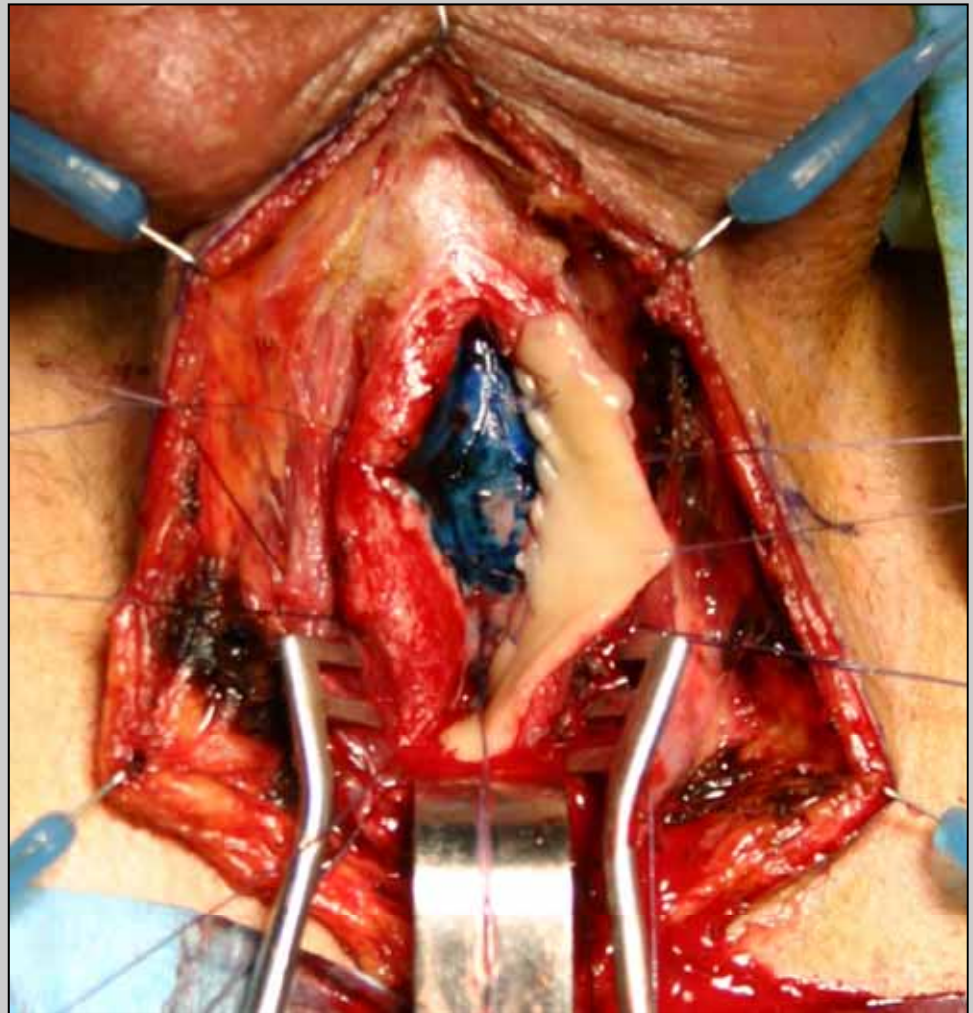
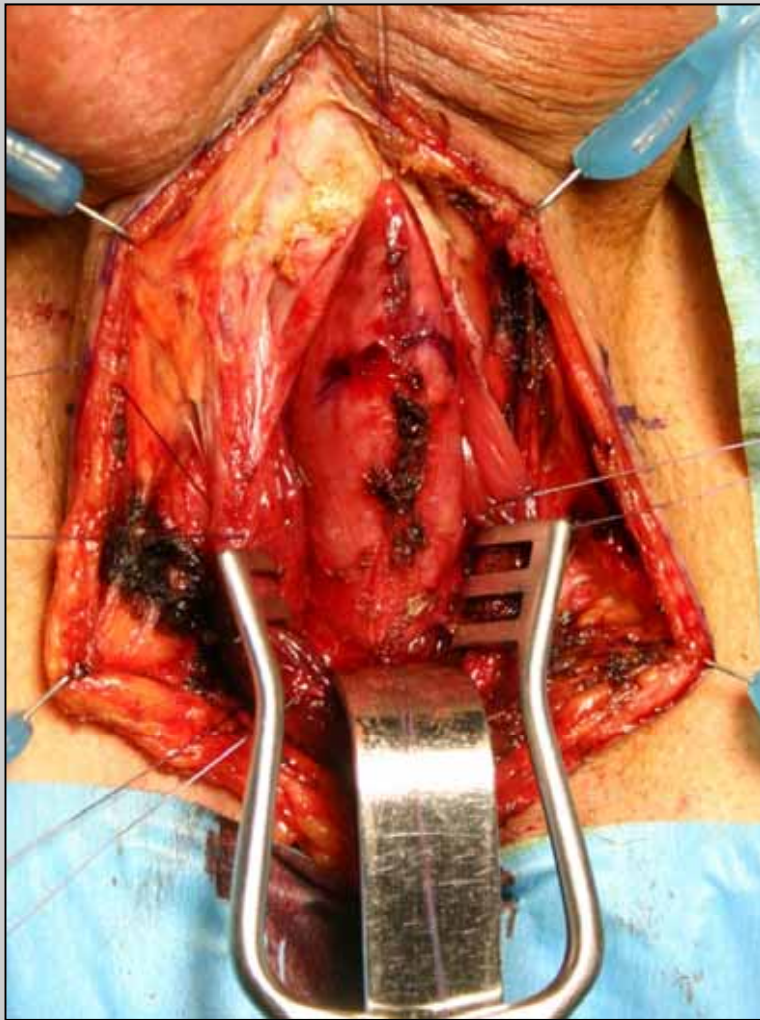


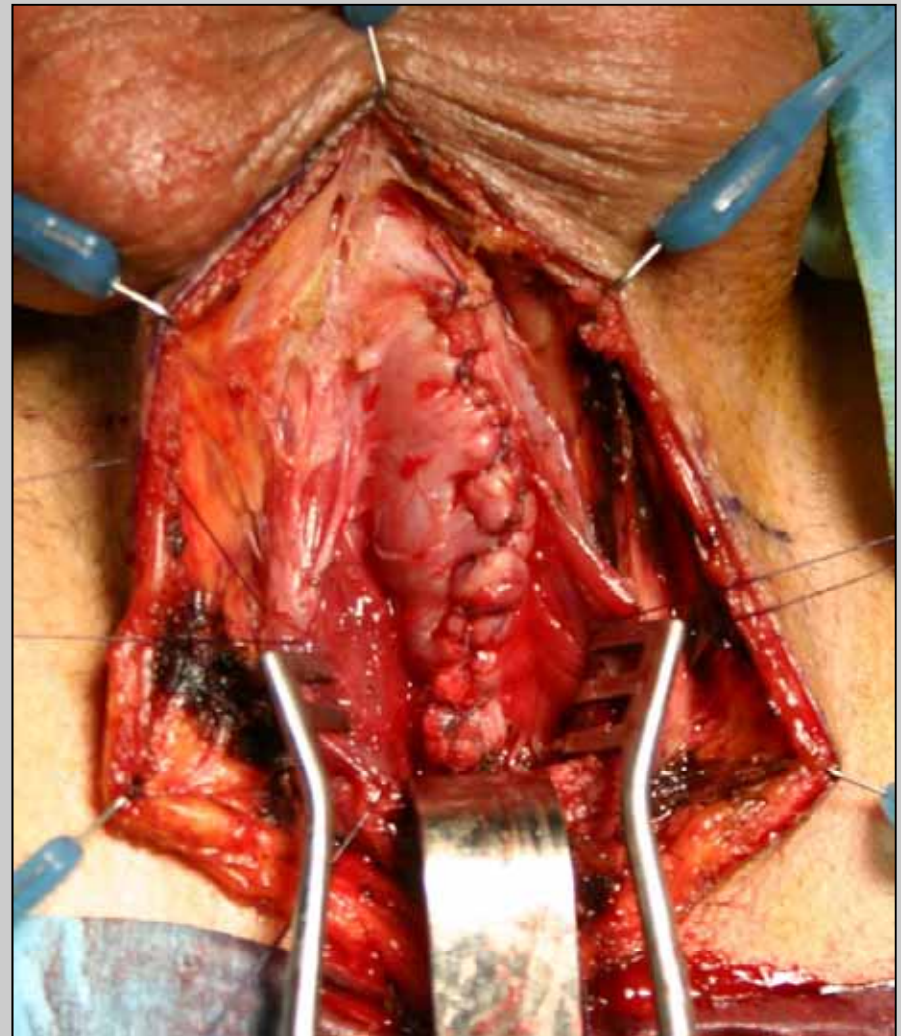
Muscle and nerve sparing ventral onlay graft bulbar urethroplasty

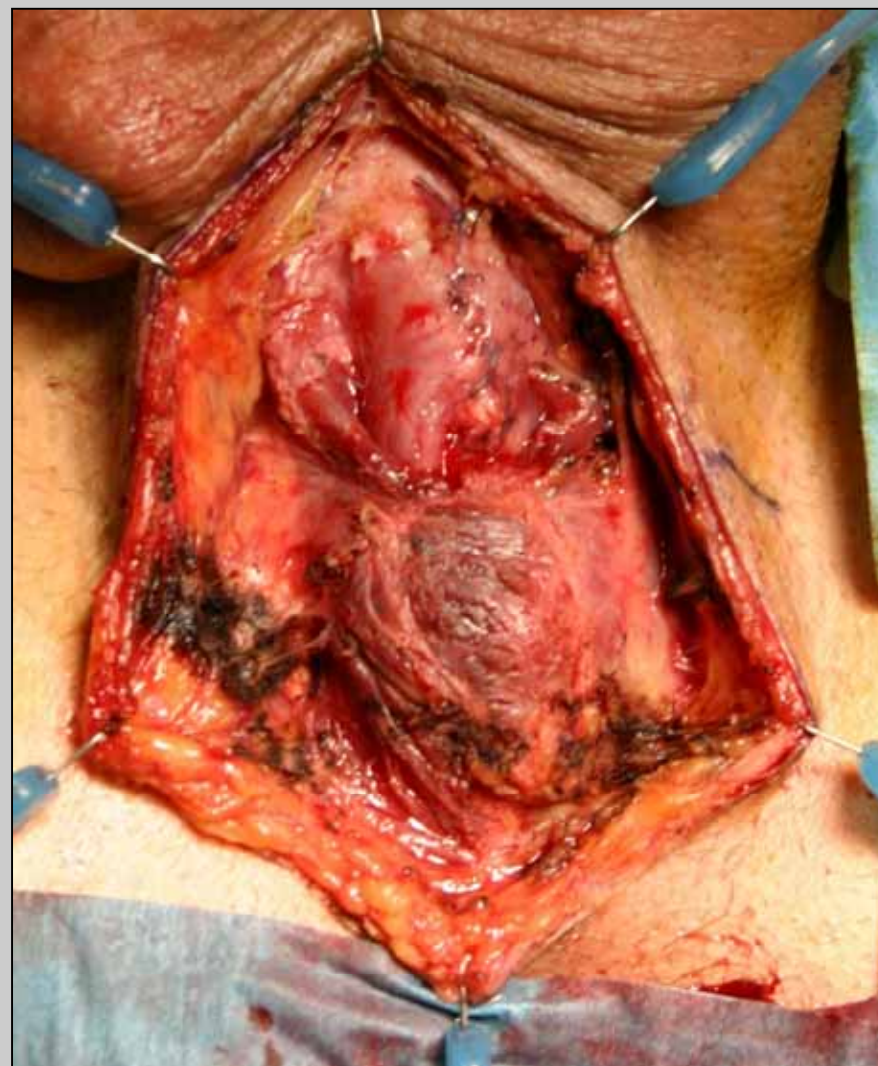
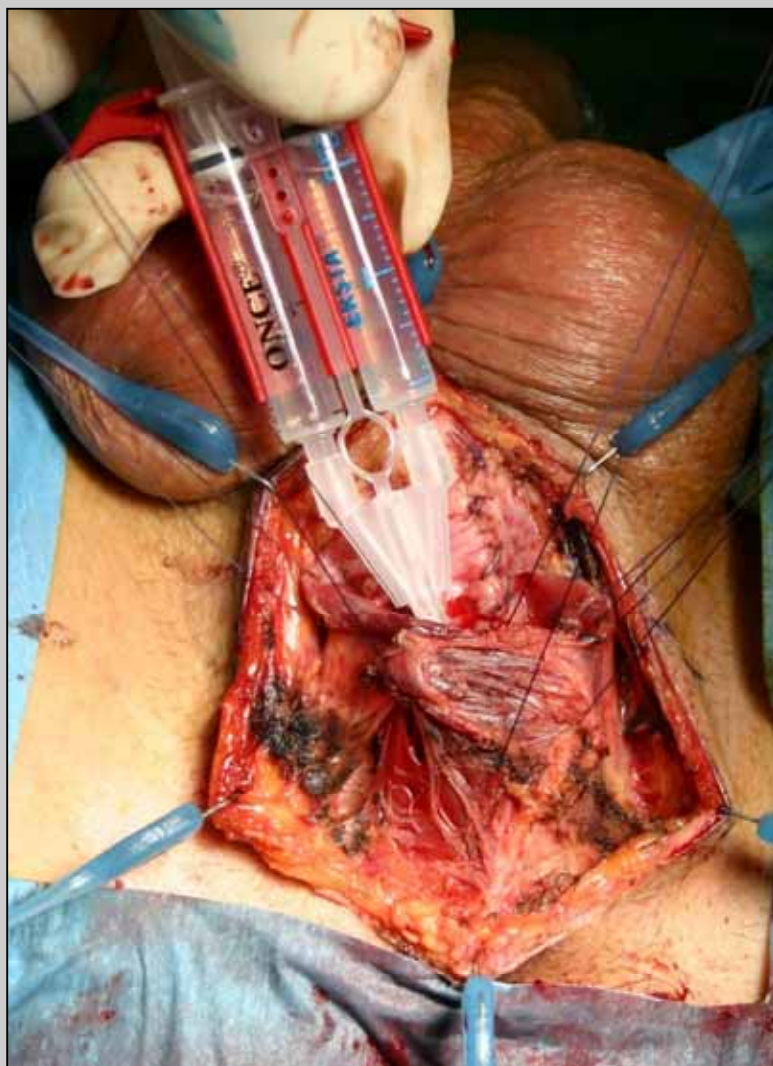




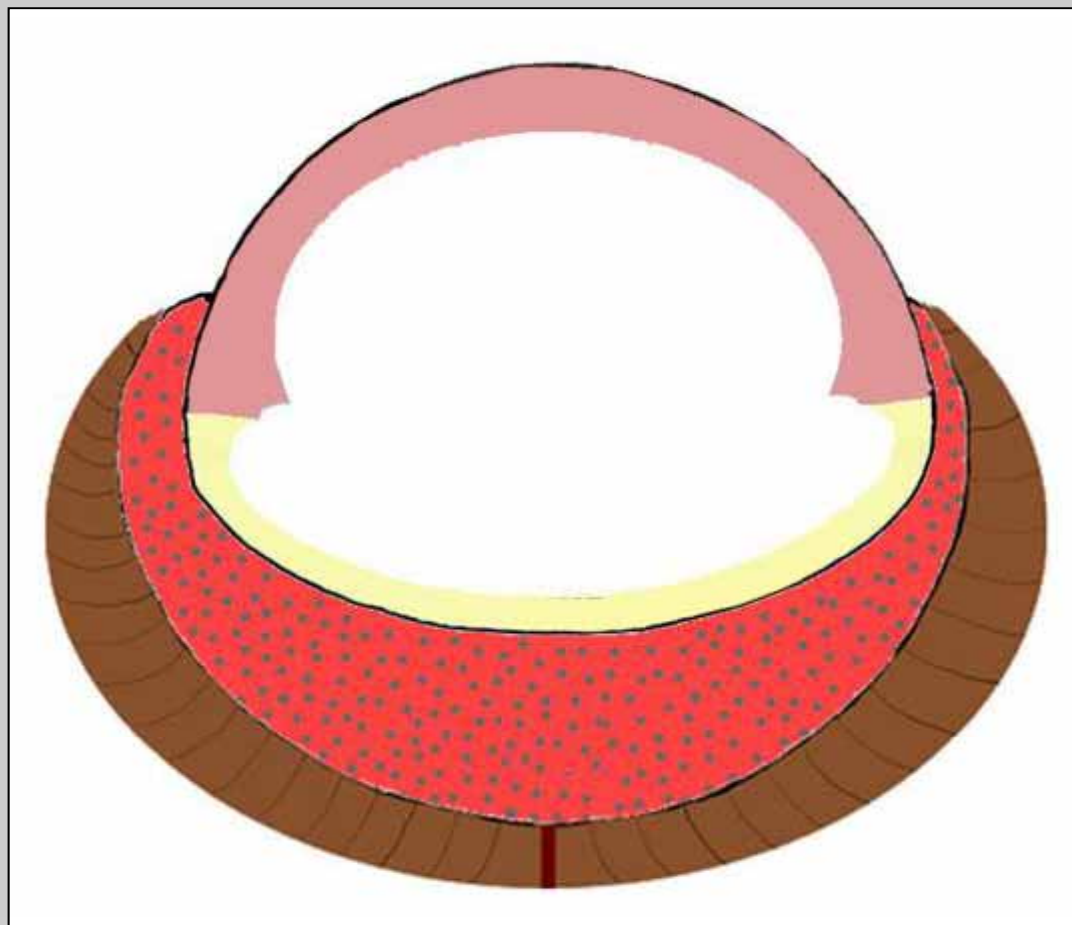


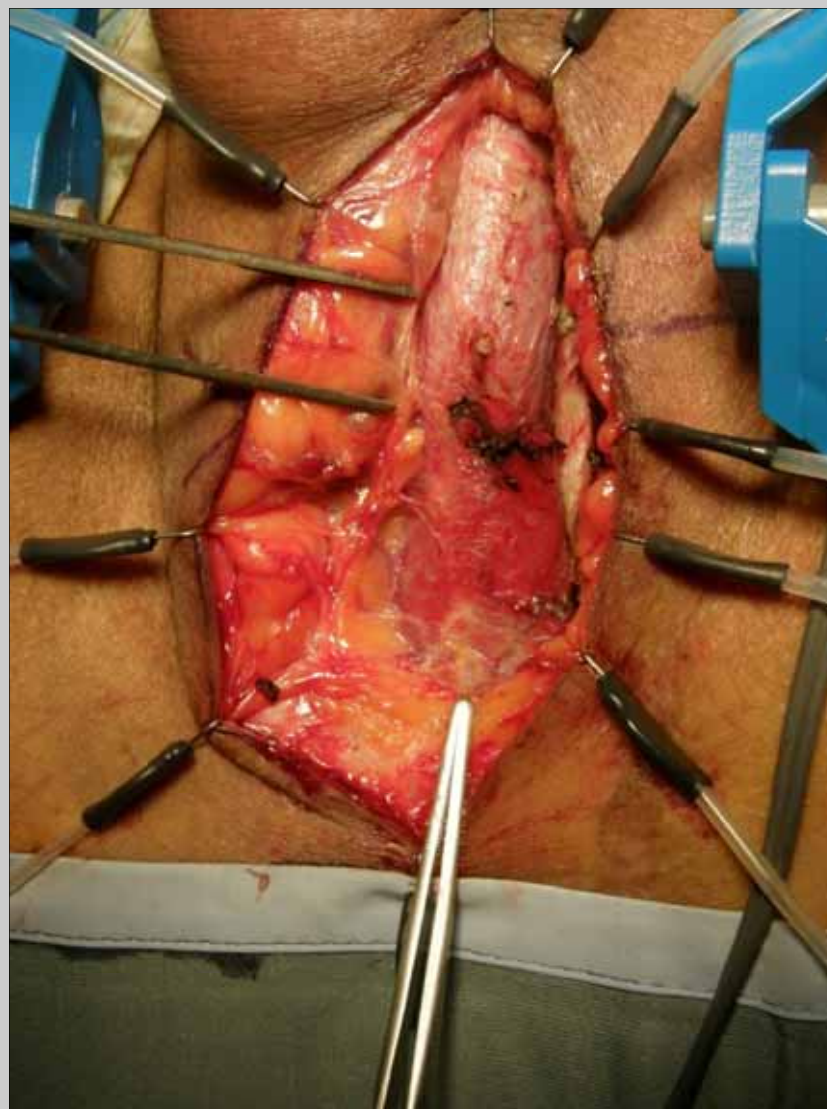
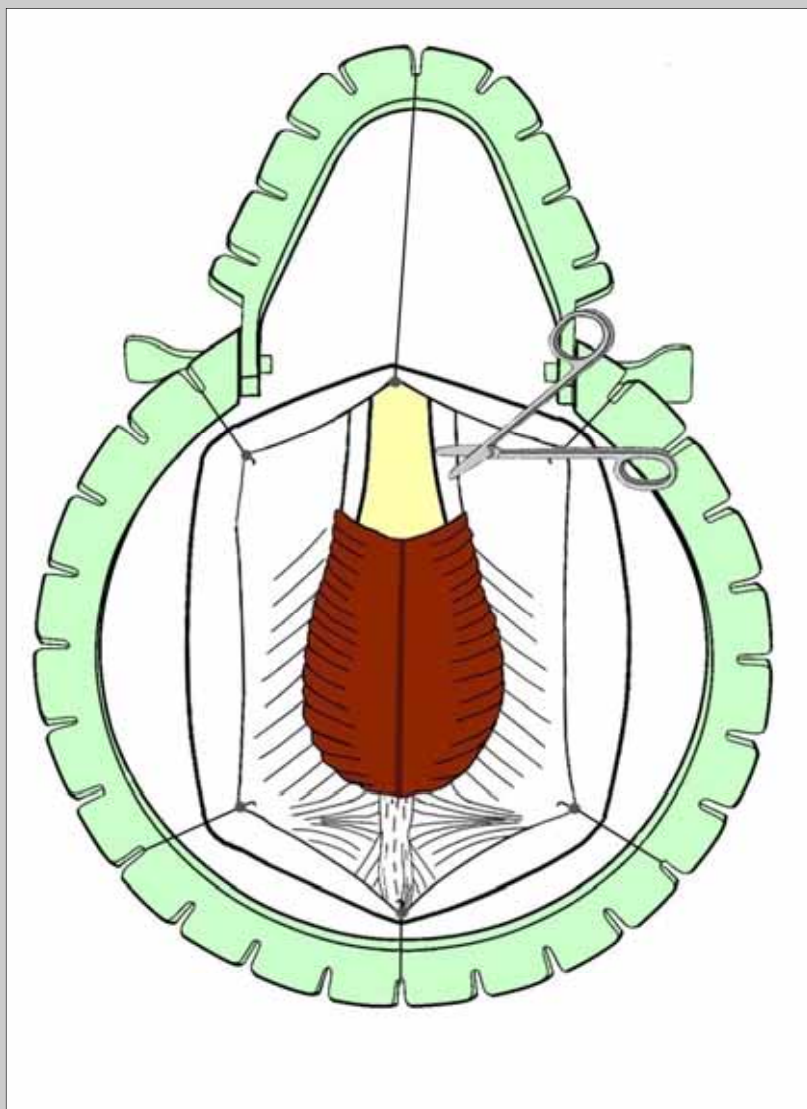


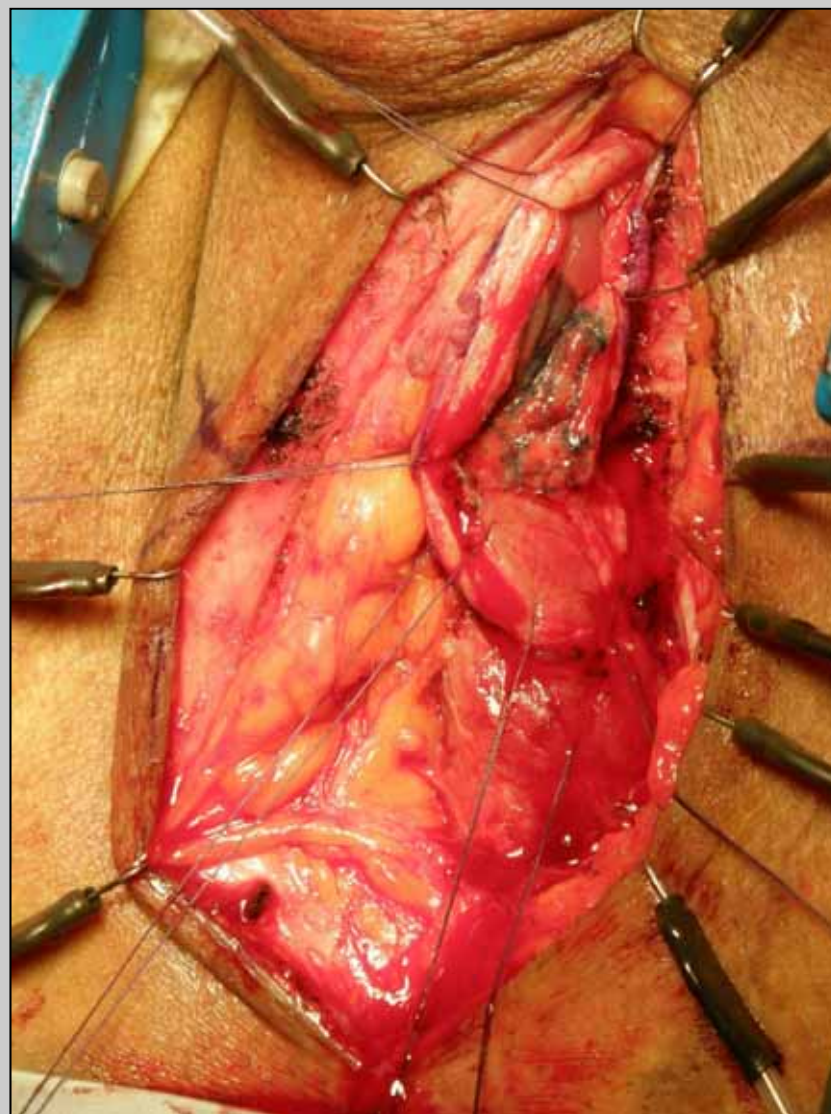
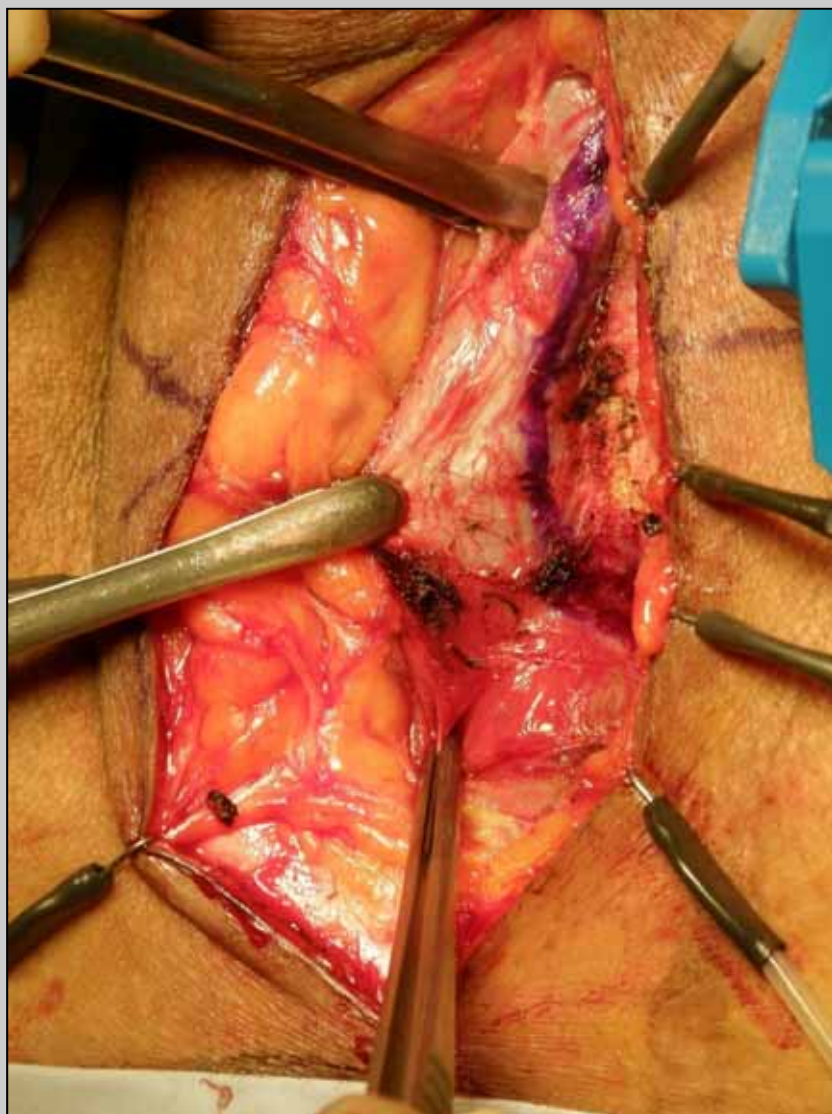


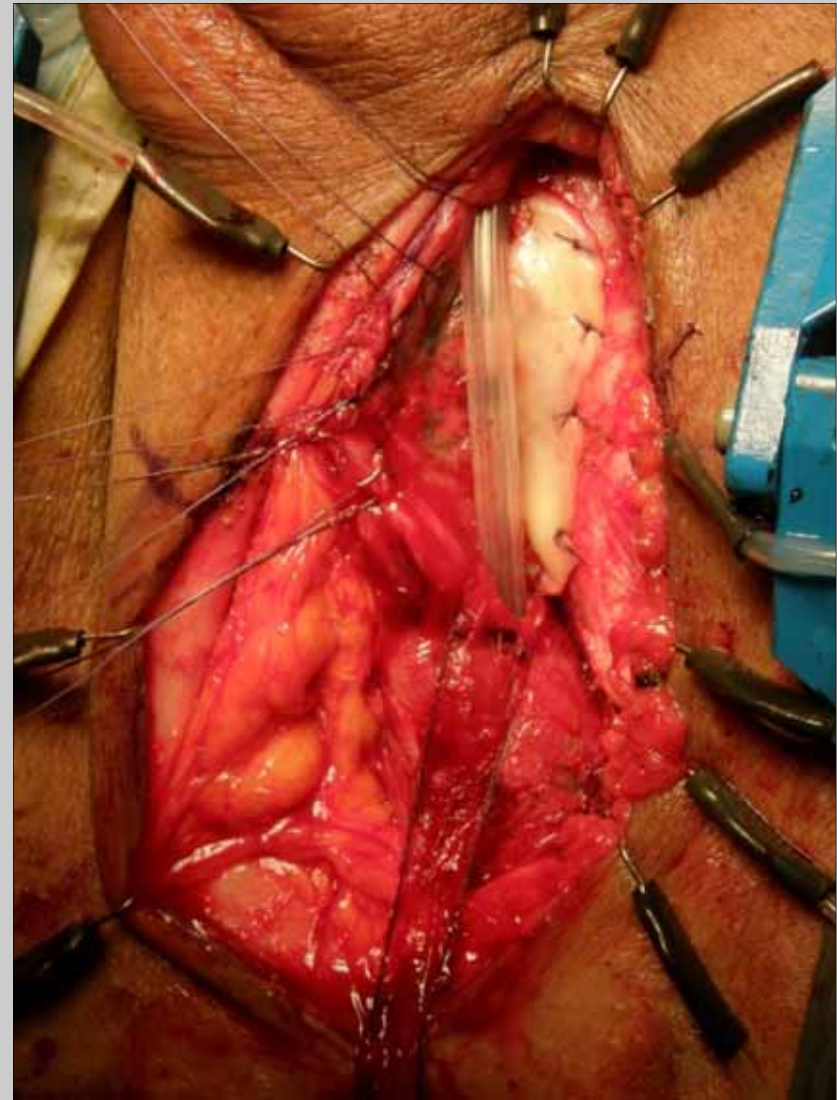
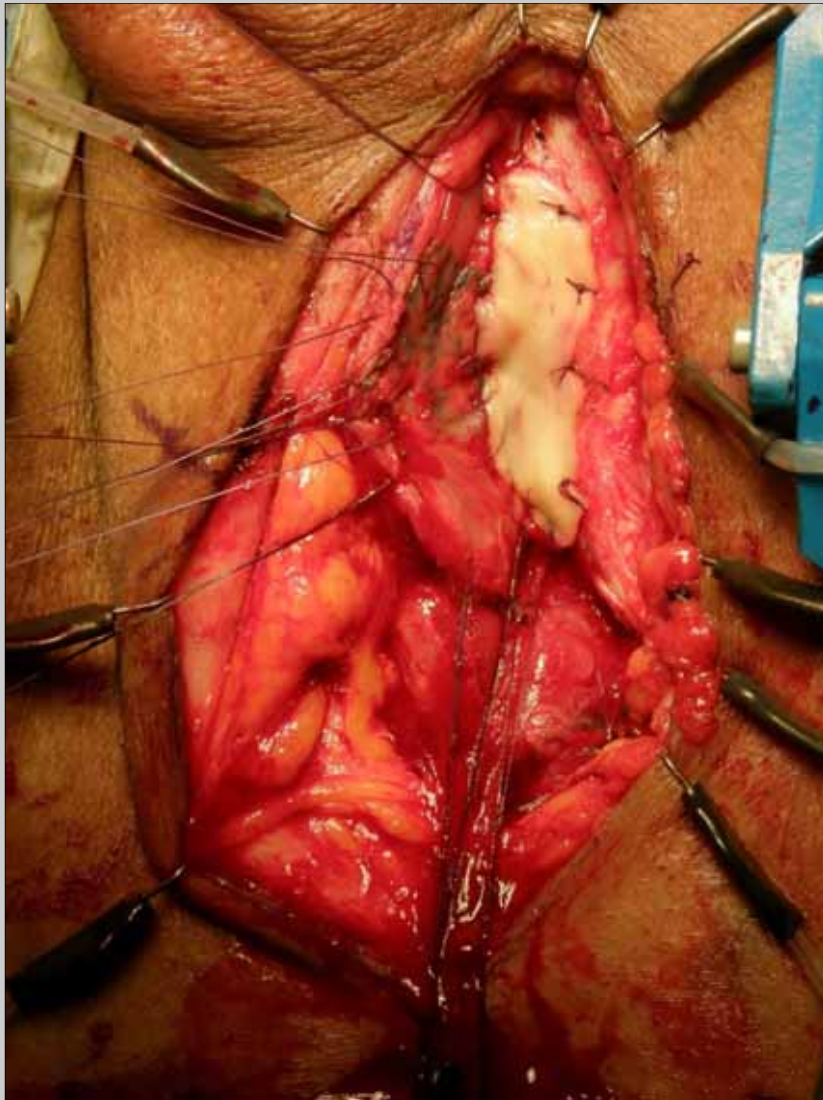


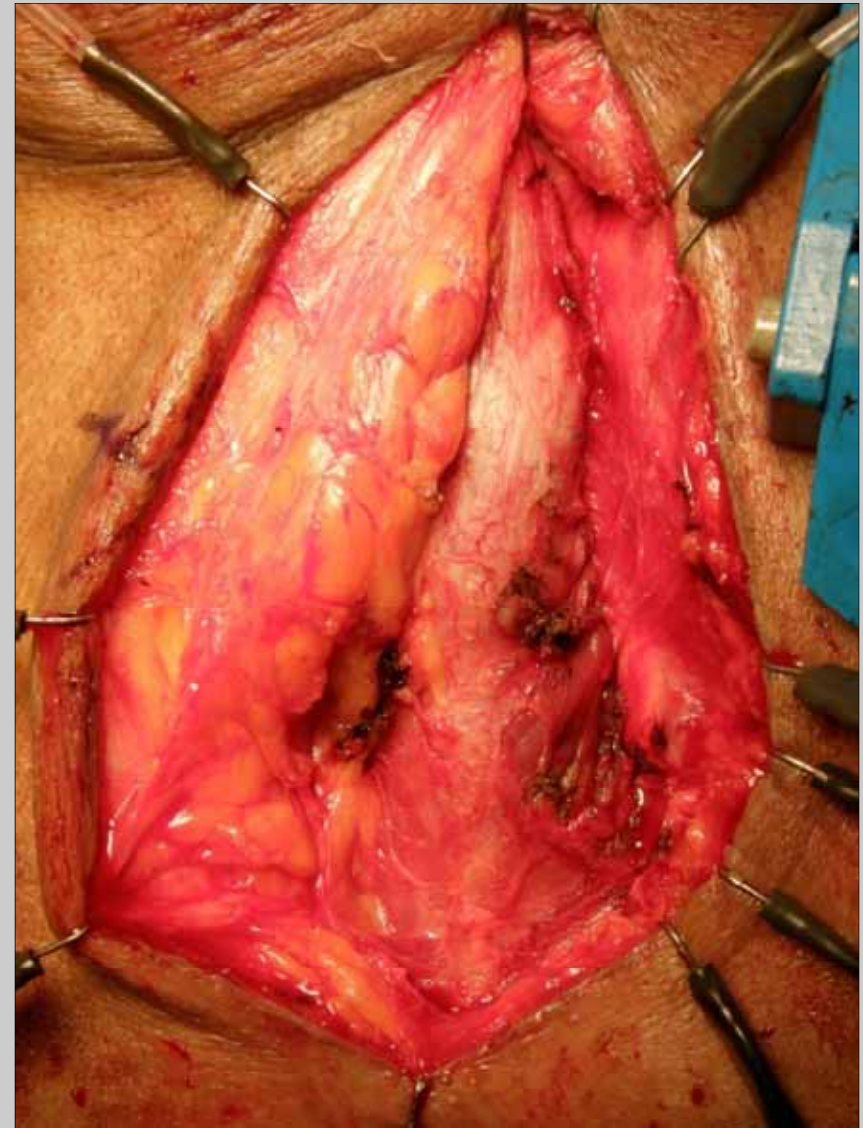
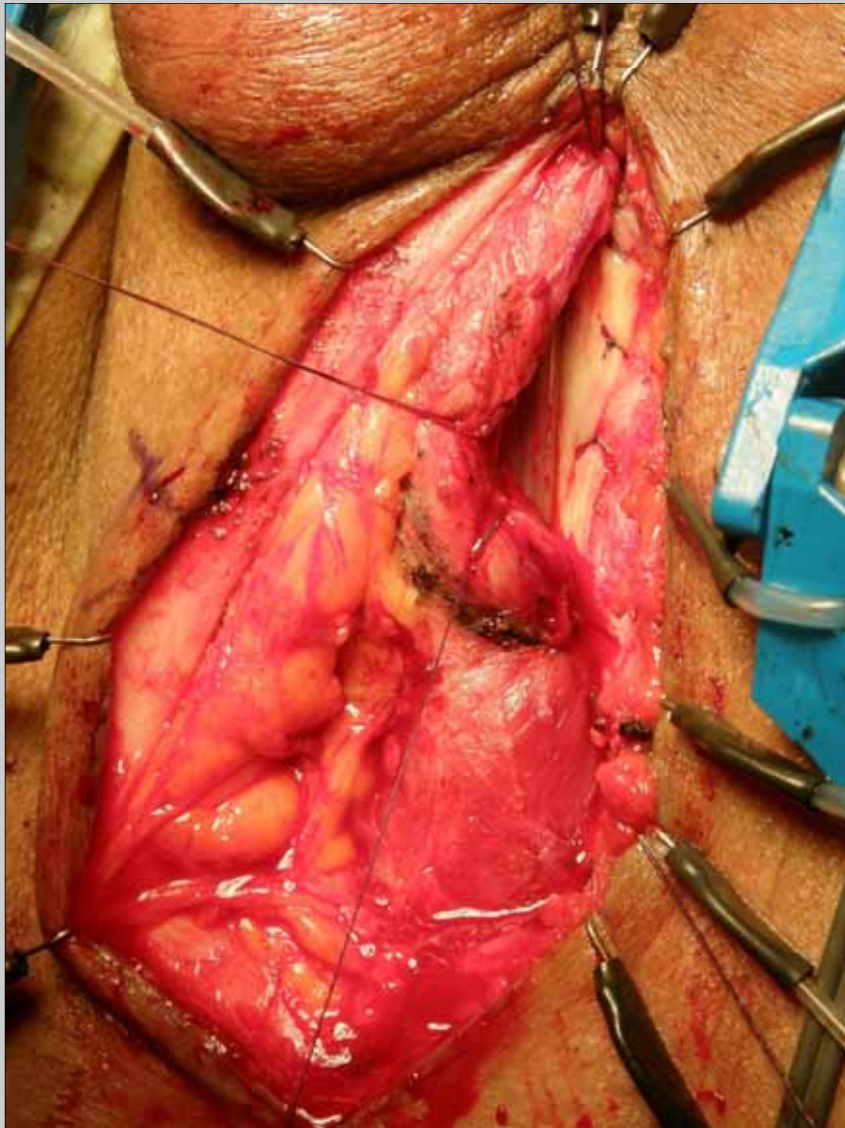
Muscle and nerve sparing dorsal onlay graft bulbar urethroplasty











Results

- ❖ Out of all patients who underwent ventral or dorsal muscle and nerve sparing onlay graft bulbar urethroplasty, none showed a decreased force of semen emission or post-voiding dribbling at 6 and 12 months after surgery.
- ❖ The average follow-up on this **limited series** of patients was 15.2 months (range 12 to 26 months).
- ❖ We are working on gathering data on a larger series of patients with a more extended follow-up.

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

Should we preserve the bulbospongiosum muscle?

- ❖ At present, preservation of the bulbospongiosum muscle is described only in ventral or dorsal onlay graft techniques.
- ❖ Preliminary results on a **limited** series of patients treated using muscle and nerve sparing techniques are encouraging.
- ❖ Urethral surgeons are warmly invited to develop further studies including a large series of patients to establish if these techniques are really superior to the standard procedures, avoiding post-operative sexual and urinary sequelae.

Should we transect the urethra?

Reconstructive Urethral Surgery to be Addressed at 2009 GURS Meeting



Dr. Guido Barbagli
Arezzo, Italy



Dr. Massimo Lazzeri
Florence, Italy

The Society of Genitourinary Reconstructive Surgeons (GURS) will sponsor a scientific session on the state-of-the-art of reconstructive urethral surgery at the 2009 AUA annual meeting in Chicago (Sunday, April 26, 1:00–5:15 p.m., Hilton Chicago). At the beginning of the 21st century urethral reconstructive surgery continues to attract interest among urologists, and the challenge is to make room for a new reconstructive urethral science that combines the learning and expertise of the past with the surgical benchmarks of our times to achieve the best care for our patients.

ing urethral stricture disease as well as the original technique of harvesting oral mucosal graft from the cheek. In 1996 he popularized ventral onlay graft urethroplasty which still represents one of the most widespread techniques of 1-stage bulbar urethral reconstruction. Doctor Mulcahy, who will discuss the prevention and management of infective complications of implants, is a leader in the field of genitourinary prosthesis.

“It is the responsibility of GURS to train the next generation of reconstructive surgeons, with the goal of advancing the art and science of reconstructive surgery by encouraging members of the urological community to gain up-to-date knowledge.”

terior urethra, and whether penile length affects surgical steps and outcome of posterior urethroplasty. This session will offer attendees the opportunity to hear from 2 prominent urologists involved mainly in posterior urethroplasty, working in 2 countries where pelvic fracture urethral distraction defects are frequent and the population is reported to have smaller penises compared to other countries.

Finally, in session 5 Dr. Allen F. Morey will introduce a guest lecturer from the Society for Urodynamics and Female Urology (SUFU), Dr. Ann E. Gornley. Doctor Gornley is President of SUFU, and will present the techniques and results of female urethroplasty. Urethral strictures are less frequently reported in women than in men, and the literature is sparse on this topic, lacking guidelines for the diagnosis and management of this uncommon problem.

AUANews 2009; 14:14

Etiology of bulbar urethral strictures

Trauma

Unknown

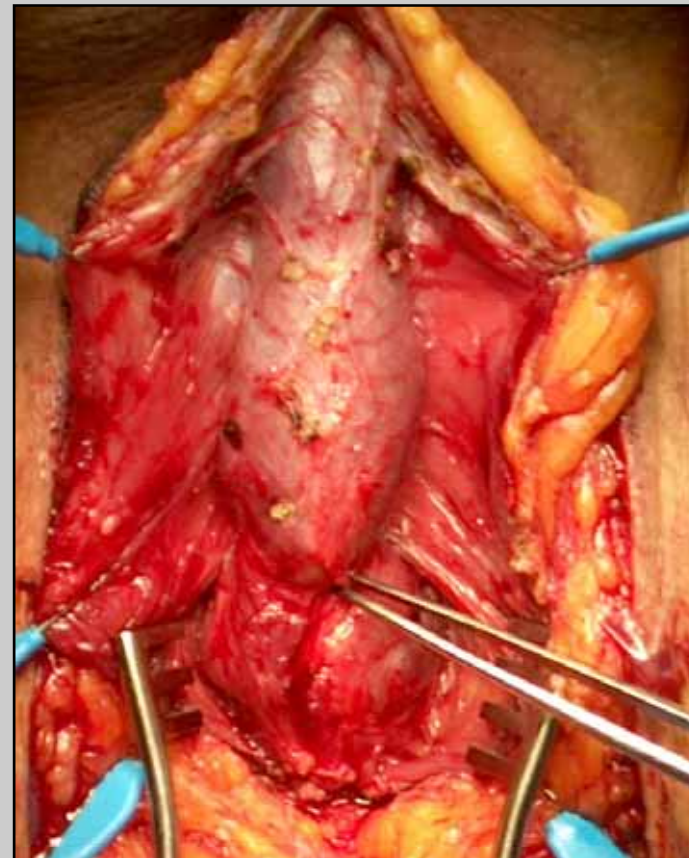
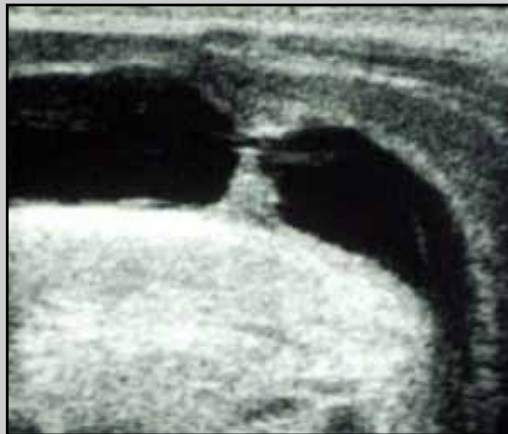
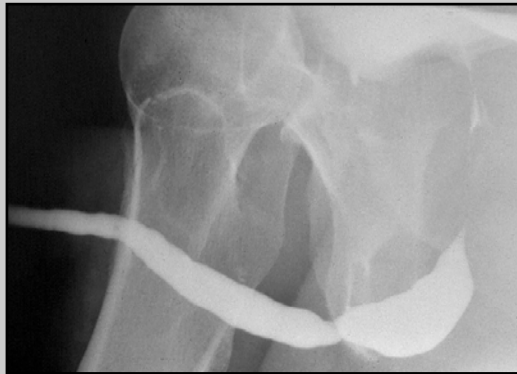
Instrumentation

Catheter

Infection

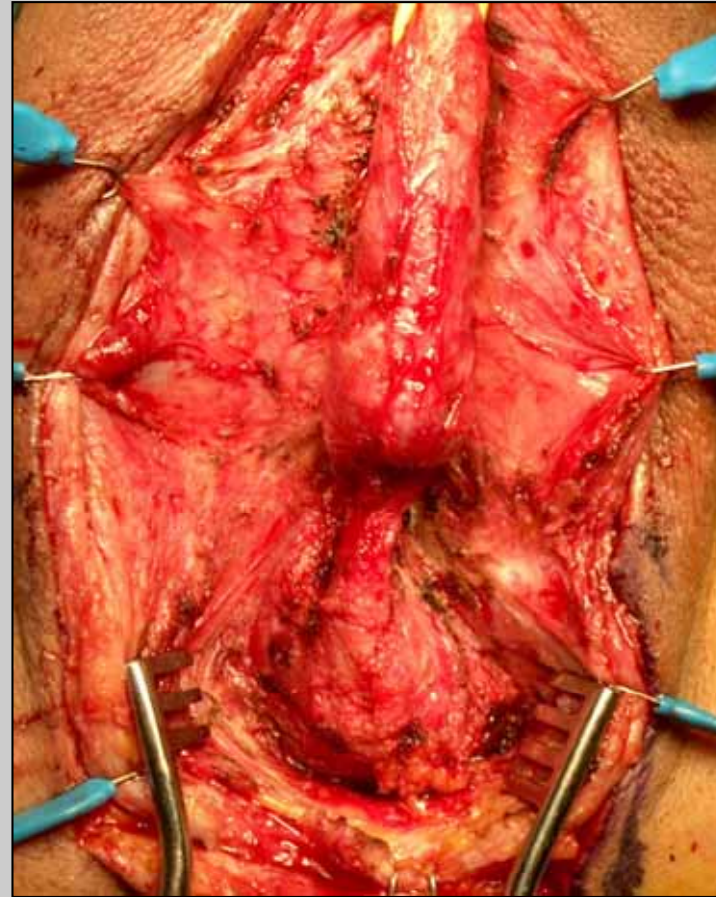
Other

1 - 2 cm traumatic bulbar urethral stricture



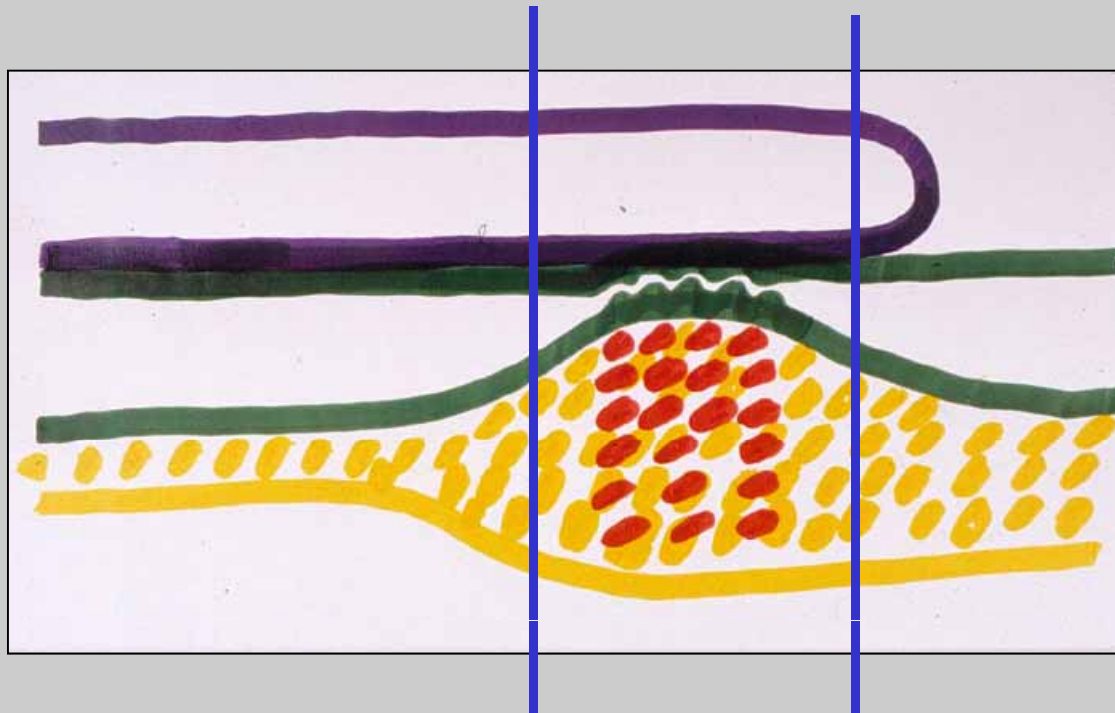
End-to-end anastomosis

2 - 4 cm traumatic bulbar urethral stricture

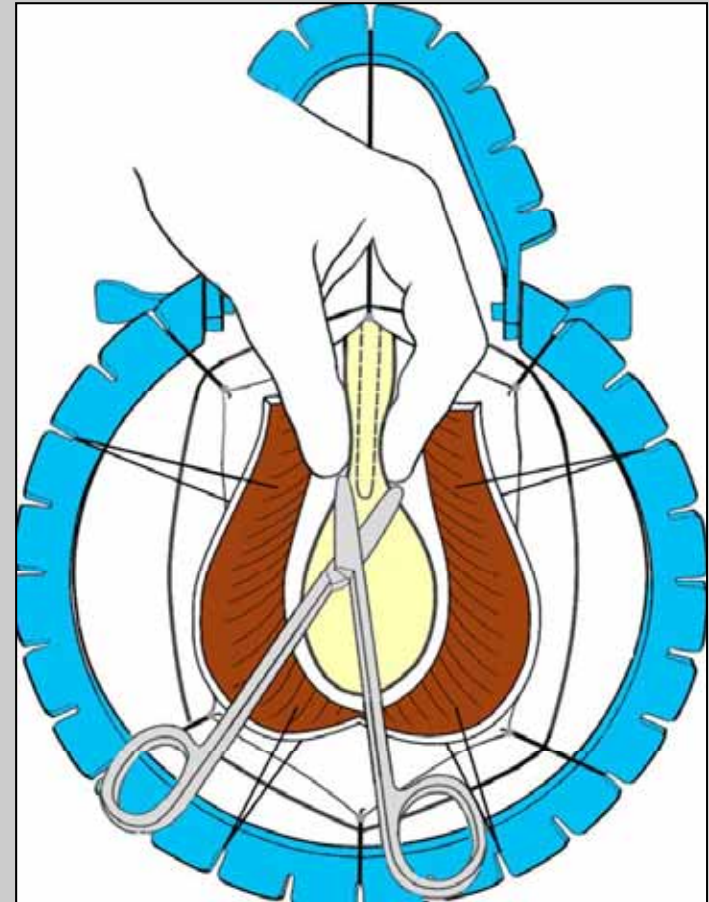
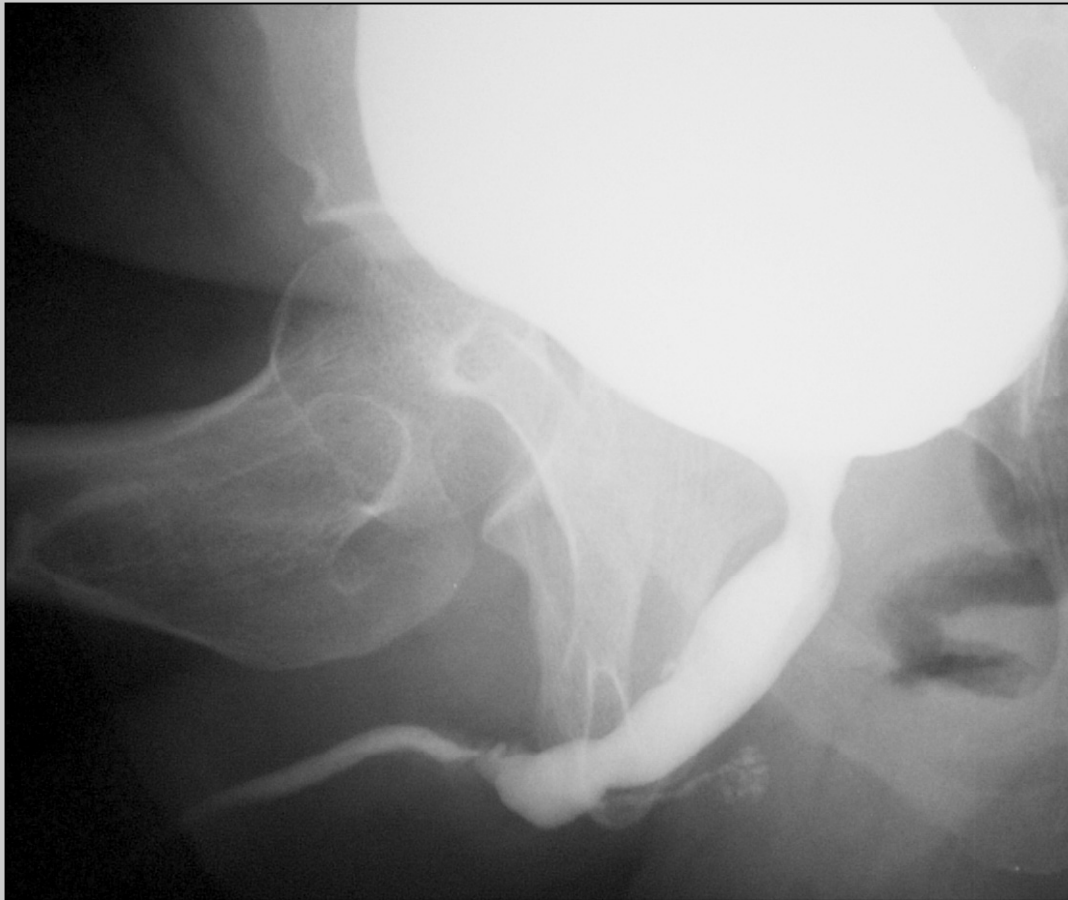


Augmented anastomotic repair using oral graft

In traumatic bulbar urethral strictures, it is mandatory to transect the urethra to fully remove the scar tissue



Should we transect the urethra in short, non-traumatic bulbar urethral strictures?



Transect



Transecting the urethra allows complete removal of the scarred tissue but may cause vascular and neuronal damage to the urethra, thus promoting stricture recurrence and sexual dysfunction.

BUCCAL MUCOSAL ONLAY URETHROPLASTY VERSUS ANASTOMOTIC URETHROPLASTY (AU) FOR SHORT URETHRAL STRICTURES: WHICH IS BETTER? *Hosam S Al-Qudah*, Baltimore, MD; Richard A Santucci, Detroit, MI*

J Urol 2006; 175: 103 (abstract 313)

- ❖ **Anastomotic urethroplasty (28 patients) showed 7% recurrence rate and 18% risk of sexual dysfunction.**
- ❖ **Oral mucosal onlay urethroplasty (19 patients) showed 0% recurrence rate and 0% risk of sexual dysfunction.**
- ❖ **Retrospective survey.**
- ❖ **Etiology of strictures (traumatic vs non-traumatic) was not recorded.**
- ❖ **Follow-up criteria (questionnaire?) were not reported.**

Questionnaire to investigate sexual dysfunction after bulbar end-to-end anastomosis

Changes in Ejaculation

Did you complain of ejaculation disorders after the surgery?

Yes

No

Did you recognize changes in ejaculation after the surgery comparing it with your previous status?

Yes

No

Does ejaculation occur with difficult stream?

Yes

No

If Yes, what is the stream like?

No stream

Very poor spontaneous stream

The stream occurs only by manually compressing the perineum

Is the ejaculation difficulty present:

Always

Sometimes

Seldom

Did you have negative changes in the relationship with your partner due to difficult ejaculation?

Yes

No

Did you have children after the surgery?

Yes

No

6 questions to investigate ejaculatory disorders

Barbagli G. et al, J Urol 2007; 178: 2470-2473

Neurovascular Penile Disorders

Did you complain of penile erection disorders after the surgery?

Yes

No

Does your glans fully swell during erection?

Yes

No

If No:

Glans is not swollen

Glans is partially swollen

Glans is fully swollen at the beginning of erection, but it was not maintained fully swollen throughout the sexual activity

Did you have negative changes in your sexual activity due to this problem?

Yes

No

If Yes, what kind of problems did you recognize?

Psychological problems

Problems during vaginal intercourse

Other minor problems

Did you recognize a change in penile sensitivity after surgery?

Yes

No

If Yes, where did you localize sensitivity changes?

In the glans

In penile skin

In distal penile shaft

Including all penile shaft

What was the penile sensitivity like after surgery?

Decreased

Increased

Not specifically altered

Was the penile sensitivity changed in relation to:

Touch

Cold/hot

All stimulus

During the erection do you complain of cold glans?

Yes

No

Did you have negative changes in your sexual activity due to this problem?

Yes

No

7 questions to investigate neurovascular penile disorders

Barbagli G. et al, J Urol 2007; 178: 2470-2473

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This non-validated questionnaire was administered to 60 out of 153 patients who underwent bulbar end-to-end anastomosis, according to the following inclusion criteria:

- ❖ **Age 20 to 50 years old**
- ❖ **No diabetes or vascular diseases**
- ❖ **No previous failed open urethroplasty**
- ❖ **No further surgery required after the anastomosis**

Barbagli G. et al, J Urol 2007; 178: 2470-2473

Results

11 (18.3%) patients complained of decreased sensitivity of the glans or distal penile shaft.

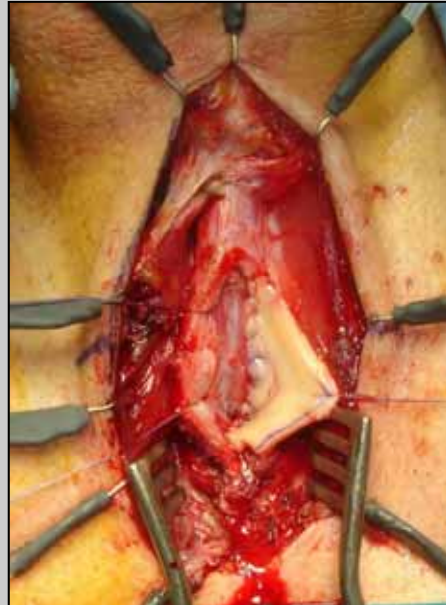
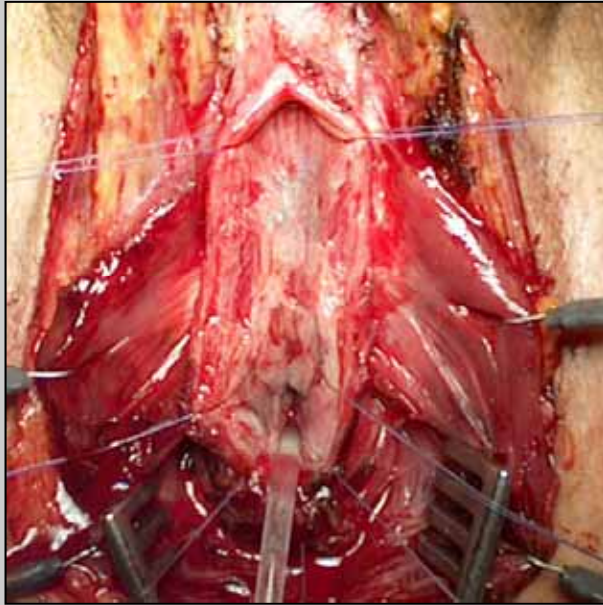
7 (11.6%) patients complained of a glans that was neither full nor swollen during erection.

1 (1.6%) patient had a cold glans during erection.

19 (31.6%) patients showed sexual dysfunctions.

Barbagli G. et al, J Urol 2007; 178: 2470-2473

Non-transecting



Avoiding transection of the urethra is a vascular-nerve sparing procedure, but it does not allow removal of the scarred tissue.

Can non-removal of the inflammatory and scarred tissues cause stricture recurrence in non-traumatic bulbar urethra stricture?

No

In 170 patients who underwent onlay graft procedures, without removing the inflammatory and scarred tissues, the success rate was 81.8%, at mean follow-up of 56 months.

Barbagli G. et al, Eur Urol 2008, 53: 828-833

Should we transect the urethra?

Yes : in traumatic urethral stricture

No : in non-traumatic urethral stricture

**Comparative results between end-to-end anastomosis and
onlay graft urethroplasty in non-traumatic bulbar urethral
strictures, 1-3 in cm length**

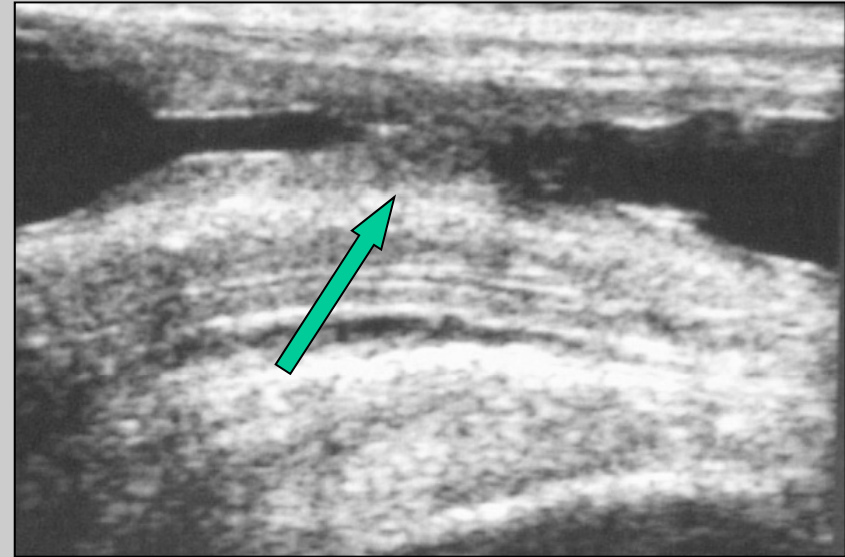
End-to-end anastomosis: 160 patients – success rate 88.7%

Onlay graft urethroplasty: 8 patients – success rate 75%

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2-4 cm non-traumatic stricture that covers a particularly narrow area of > 1 cm in length

Onlay graft without transecting the urethra

Augmented anastomotic repair transecting the urethra



Management of urethral stricture disease: developing options for surgical intervention

ANDREW C. PETERSON and GEORGE D. WEBSTER

Department of Surgery, Division of Urology, Duke University Medical Center, Durham, North Carolina, USA

BJU International 2004, 94: 971-976

“ We find that excisional augmented anastomotic urethroplasty provides favourable long-term results when compared with dorsal alone “

A PROPOSAL THAT WHENEVER POSSIBLE STRICTURE
EXCISION BE A PART OF ALL BULBAR URETHROPLASTIES:
A PROGRESSIVE APPROACH TO PATIENT SELECTION

Fernando C Delvecchio, Jennifer Tash Anger, George D Webster, Durham,
NC*

J Urol 2004, 171: 17 (abstract 66)

- ❖ The authors reported that **augmented anastomotic repair**, transecting the urethra, had only a 5.2% failure rate in 38 patients, compared with a 9% failure rate in 11 patients who underwent a simple **onlay graft** without transecting the urethra.
- ❖ They concluded that excision of the worst stricture segment avoids a long onlay in a poor urethral bed where failure often occurs at the location of even the smallest stricture caliber.

**AUGMENTED ANASTOMOTIC URETHROPLASTY (AAR) IN PATIENTS
WITH DENSE URETHRAL STRICTURE DISEASE** *Robert Abouassaly*,
Kenneth W Angermeier, Cleveland, OH*

J Urol 2006; 175: 38 (abstract 117)

- ❖ These authors recommended complete excision of the stricture and use of an **augmented anastomotic repair** transecting the urethra for strictures that cover a particularly narrow area of 1-2 cm in length.
- ❖ Out of 69 patients, 63 were successful (91%) with a mean follow-up of 34 months.

- ❖ **These authors reported only an objective evaluation of the results and did not perform a subjective evaluation.**
- ❖ **These authors did not investigate, by way of a questionnaire, the incidence of sexual dysfunction in this series of patients.**



Should we transect the urethra?

- ❖ Urethral surgeons are warmly invited to develop further randomized studies including a large series of patients, according to the following parameters:
- ❖ No traumatic urethral strictures.
- ❖ Objective evaluation of the urinary functional outcome using the standard investigations.
- ❖ Subjective evaluation of the incidence of sexual dysfunction and patient satisfaction using a questionnaire.

Should we suture or use fibrin glue?

Fibrin glue

Fibrin glue contains two solutions of human products:

- 1. fibrinogen, Factor XII, plasmafibronectina, plasminogen dissolved with an aprotin solution (bovine).**
- 2. activate thrombin component (human) mixed with a calcium chloride solution.**

❖ **When combined, a dense gelatinous clot is quickly formed at the point of application.**



❖ **This fibrin sealant is non-synthetic and biocompatible with the natural fibrinolytic mechanism, thus healing is promoted without inflammation and fibrosis formation.**

Use

- ❖ The application of fibrin glue mainly relates to its sealing power, as it has been shown to be a beneficial adjunct to sutures for closing wounds and promoting healing since it increases tissue plane adherence, accelerates revascularization, reduces hemorrhage, prevents seroma formation and decreases inflammation.
- ❖ Fibrin sealant is also used as tissue glue in the reconstruction of complex genital skin loss.
- ❖ Fibrin glue used with skin graft and tissue-engineered skin substitutes has a hemostatic effect, increasing the percentage of graft take, and has a protective effect against infection.
- ❖ In studies on tissue engineering, fibrin glue does not only help attach the transplanted cells to the recipient bed, but also enhances migration of growth factors and is itself a nutrient.

Safety



- ❖ **Fibrin sealant has been widely used in Europe, Japan and the United States.**
- ❖ **Discussion on the safety of fibrin glue is important, as this sealant is composed of human products.**
- ❖ **Donors are initially screened and retested after 3 months for human HIV, Epstein-Barr virus, cytomegalovirus and hepatitis A, B and C before plasma processing. A large study on sealant use showed no seroconversion to any of the above mentioned diseases. Moreover, the plasma is then thermally treated to ensure further viral safety.**

EXPERIENCE WITH FIBRIN GLUE IN BULBAR URETHRAL RECONSTRUCTION USING DORSAL BUCCAL MUCOSA GRAFT

G. BARBAGLI, S. DE STEFANI, M. C. SIGHINOLFI, C. A. POLLASTRI, F. ANNINO,
S. MICALI, AND G. BIANCHI

Urology 2006; 67: 830-832

Bulbar Urethroplasty with Dorsal Onlay Buccal Mucosal Graft and Fibrin Glue

**Guido Barbagli ^{a,*}, Stefano De Stefani ^b, Maria Chiara Sighinolfi ^b,
Filippo Annino ^b, Salvatore Micali ^b, Giampaolo Bianchi ^b**

^a Center for Urethral and Genitalia Reconstructive Surgery, Arezzo, Italy

^b Department of Urology, University of Modena-Reggio Emilia, Modena, Italy

Eur Urol 2006; 50: 467-474

Fibrin glue as a sealant



End-to-end anastomosis: 5 patients
success rate: 100%
median follow-up: 41 months

Ventral onlay graft urethroplasty: 2 patients
success rate: 100%
median follow-up: 44 months

www.urethralcenter.it

e-mail: info@urethralcenter.it

website: www.urethralcenter.it

Fibrin glue as a glue



Augmented anastomotic repair using oral graft: 6 patients

success rate: 66.7%

median follow-up: 46 months

Dorsal onlay graft urethroplasty: 5 patients

success rate: 100%

median follow-up: 45 months

Fibrin glue as a sealant or glue

18 patients

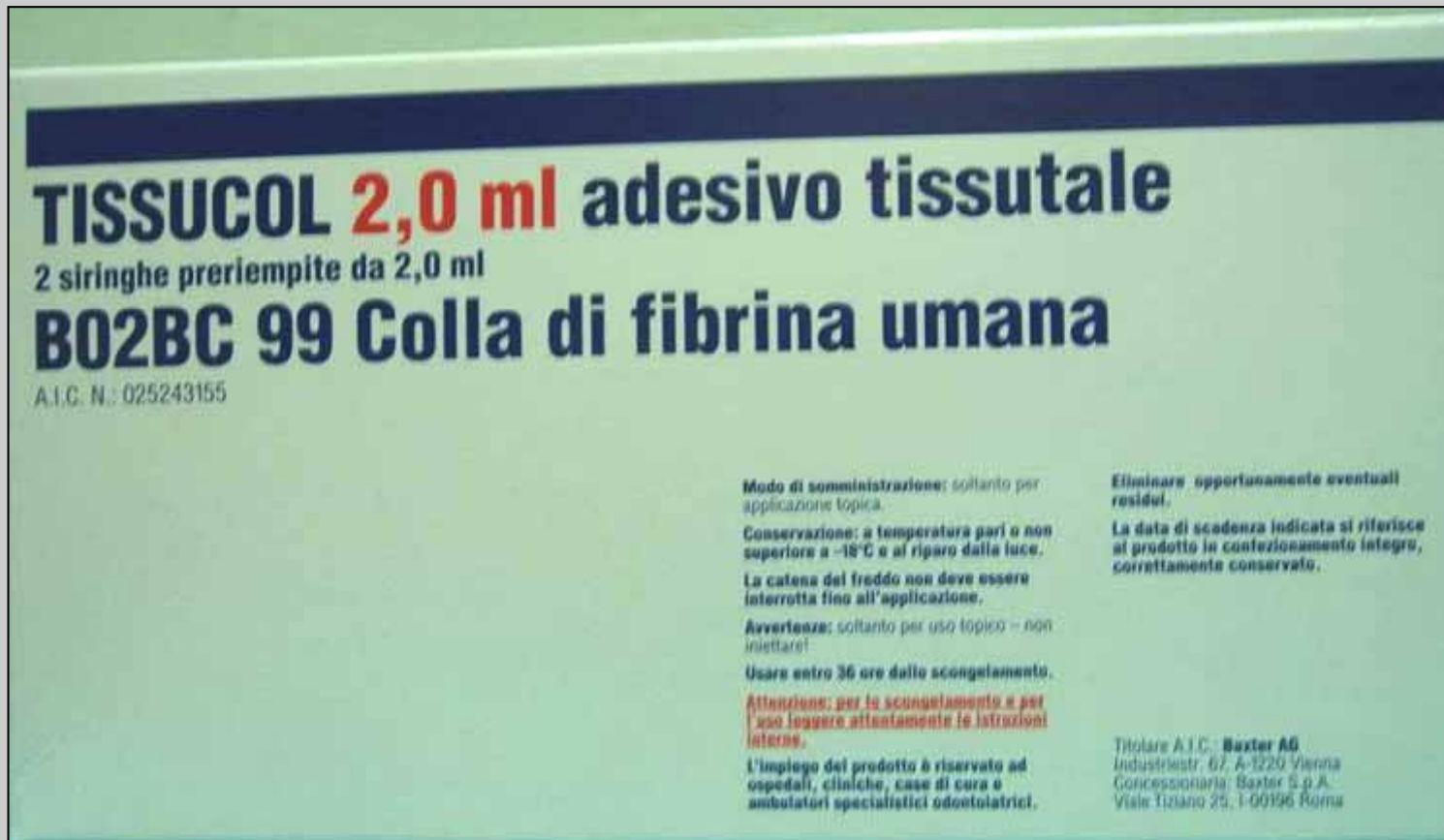
Success rate: 88.8%

Follow-up: range 38-56 months

Should we use fibrin glue?

- ❖ Our preliminary experience using fibrin glue as a sealant or glue during urethroplasty has been shown to be a beneficial adjunct to sutures for promoting healing and graft-taking, and decreasing inflammation.
- ❖ Fibrin glue provides sure graft-taking and revascularization of the oral graft applied over the corpora cavernosa, thus reducing the use of suture material.
- ❖ Urethral surgeons are warmly invited to develop further randomized studies including a large series of patients to establish if the use of fibrin glue may reduce the incidence of post-operative hemorrhage and seroma formation, and decrease infection.

Fibrin glue



Euro 198.00

Suture material



Euro 6.30

6.30 x 6 = Euro 37.80

Fibrin glue and suture material

Fibrin glue	Euro 198.00
Suture material	Euro 37.80
Difference	Euro 160.20

$$160.20 \times 300 = \text{Euro } 48,060.00/\text{year}$$

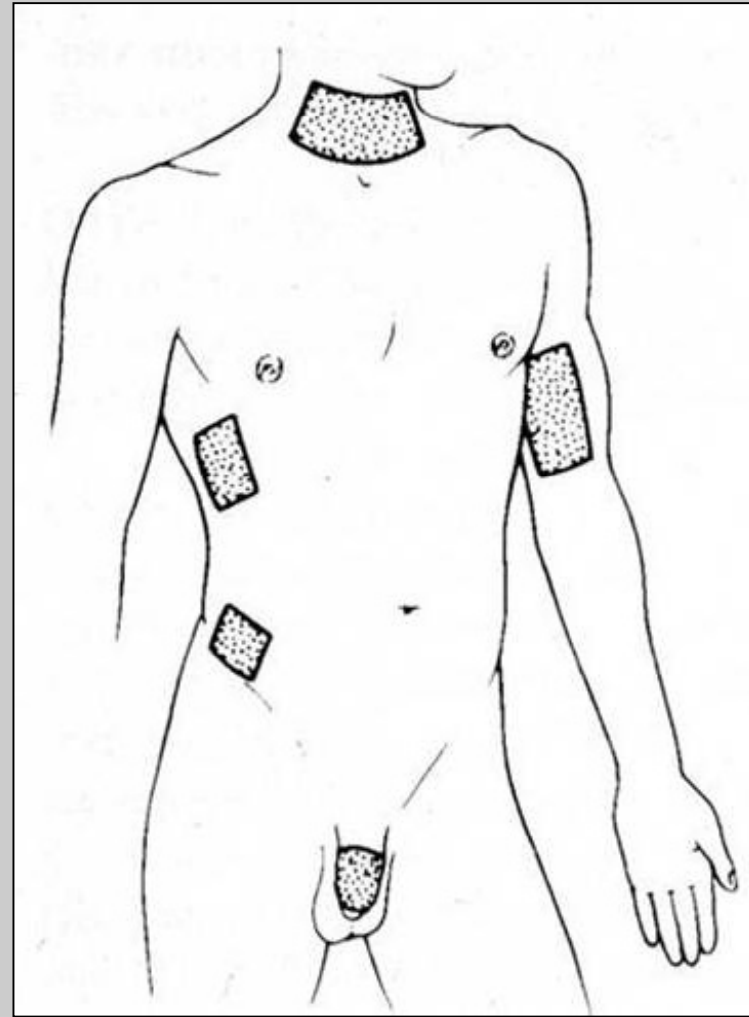
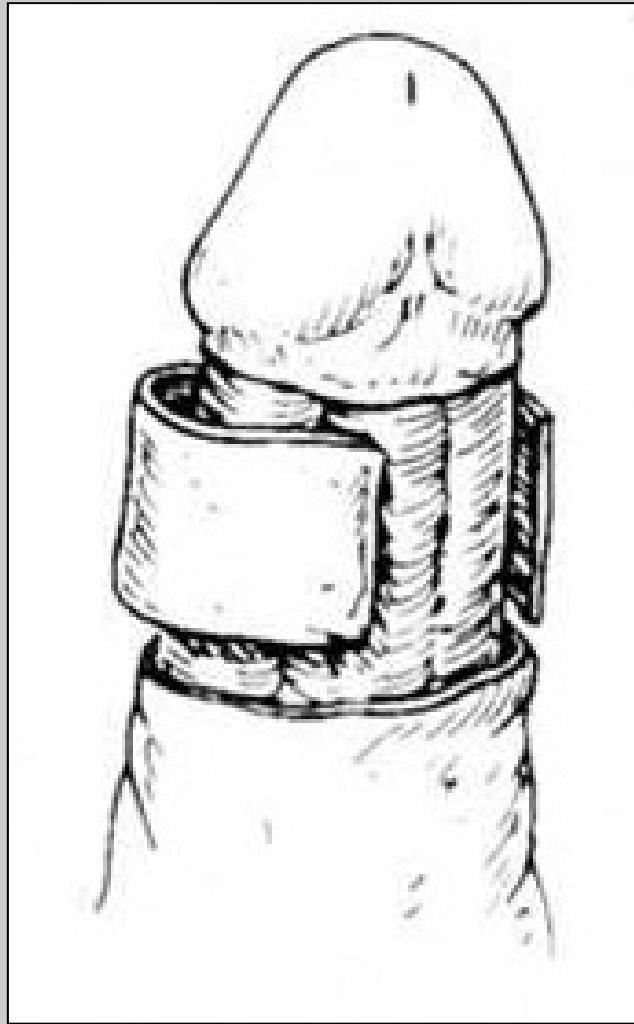
Which tissue is best?

Substitute material for urethroplasty

1. Genital or extragenital skin
2. Bladder mucosa
3. Oral mucosa
4. Colonic mucosa
5. Other material
6. Tissue engineered material



1. Genital or extragenital skin



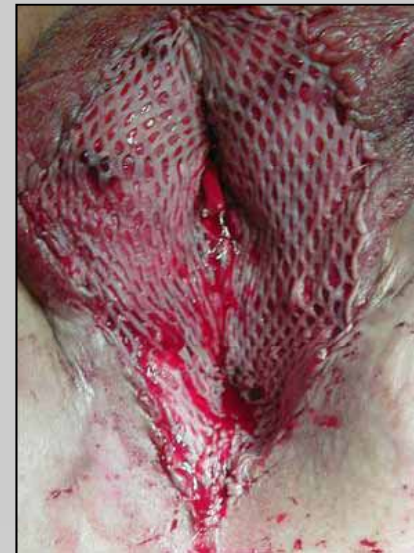
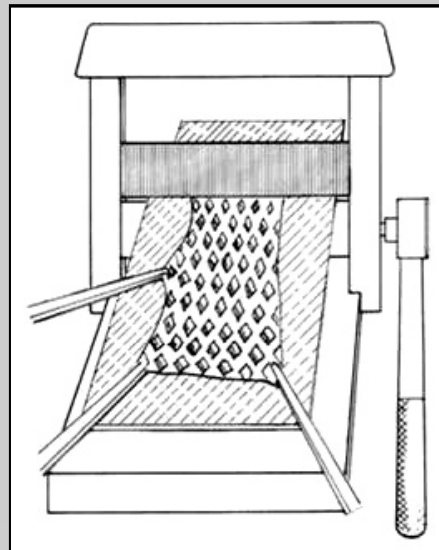
1. Extragenital skin

retroauricular (A.R. Mundy)

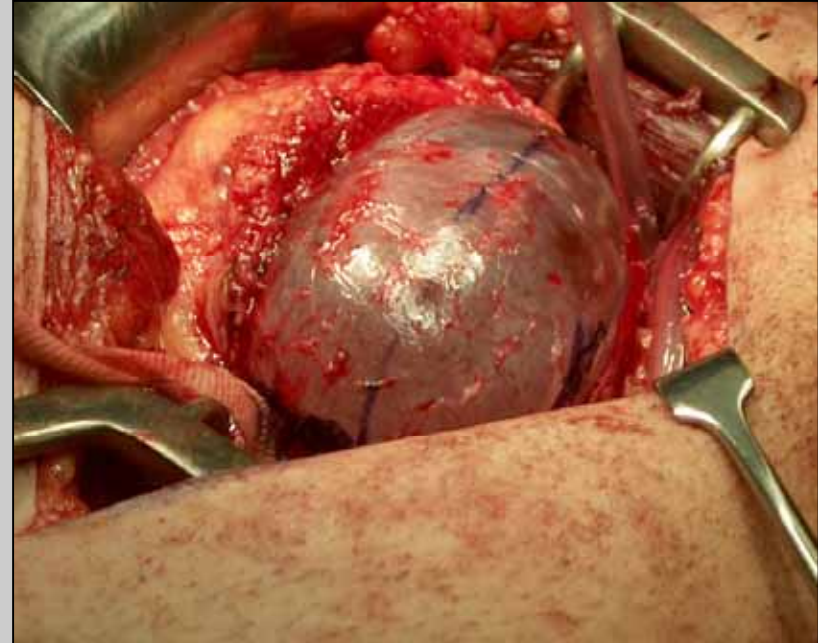


1. Extragenital skin

mesh-graft (F. Schreiter)

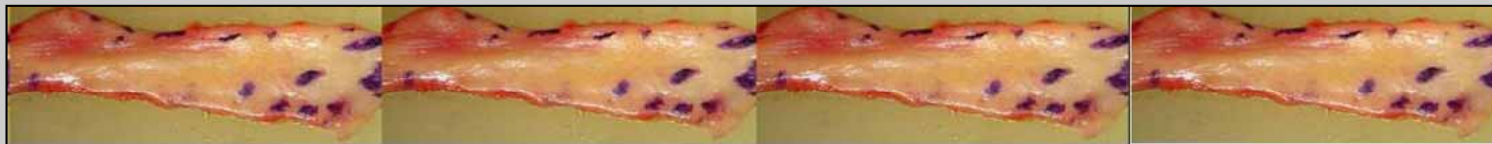


2. Bladder mucosa



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 !

3. Oral mucosa



4 cm

16 cm x 2.5 cm

3. Colonic mucosa

Urethral Reconstruction Using Colonic Mucosa Graft for Complex Strictures

Yue-Min Xu,* Yong Qiao, Ying-Long Sa, Jiong Zhang, Qiang Fu and Lu-Jie Song

J Urol 2009; 182: 1040-1043



4. Other material

The Tunica Vaginalis Dorsal Graft Urethroplasty: Initial Experience

Roberto C. Foinquinos, Adriano A. Calado, Raimundo Janio, Adriana Griz, Antonio Macedo Jr, Valdemar Ortiz

Internazionale Braz J Urol 2007; 33: 523-531

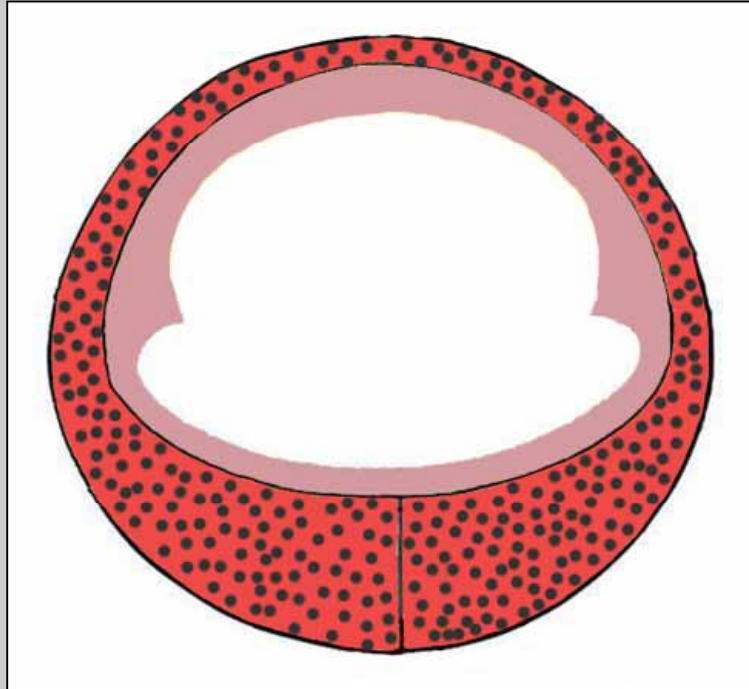
SMALL INTESTINE SUBMUCOSA IN URETHRAL STRICTURE REPAIR IN A CONSECUTIVE SERIES

STEFAN HAUSER, PATRICK J. BASTIAN, GUIDO FECHNER, AND STEFAN C. MÜLLER

Urology 2006; 68: 263-266

anecdotal reports

6. Tissue engineered material



Urethral surgery will have improved only when corpus spongiosum is made available and a new **spongiosum-made urethra** is transplanted into the patient.

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 materials for urethroplasty



**Anatomical, biological and clinical differences between skin
and oral mucosa**

Harvesting site

Oral mucosa  **concealed**

Skin  **visible to the naked eye**



esthetic consequences



psychological sequelae

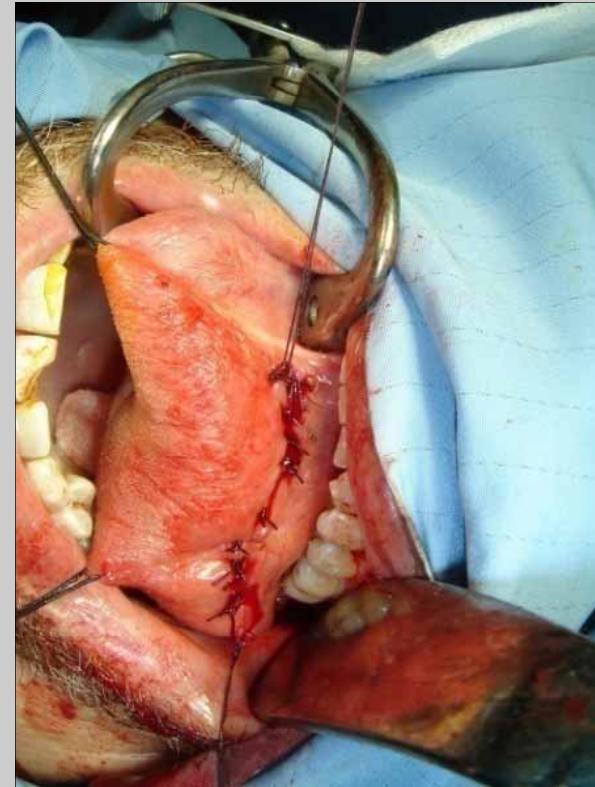
Harvesting site from the lip: visible to the naked eye



Negative esthetic consequences

Unsatisfactory post-operative patient acceptance

Oral mucosa: harvesting site



concealed

Genital skin: harvesting site



visible to the naked eye

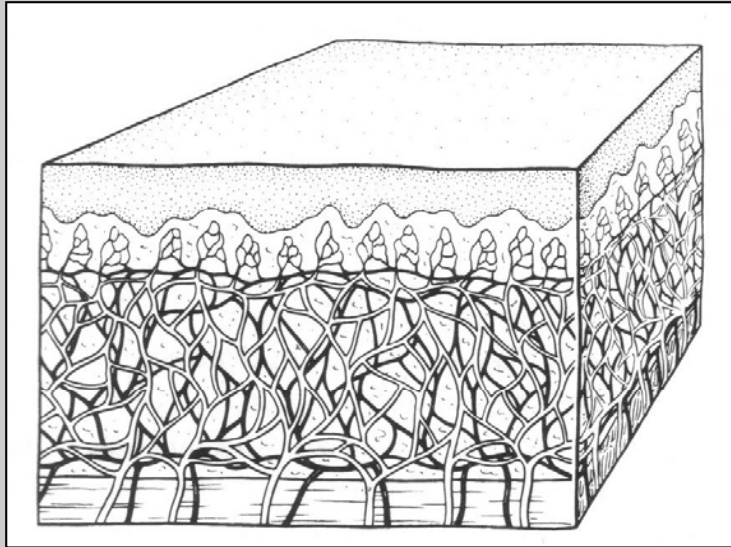
Extragenital skin: harvesting site



visible to the naked eye

Biological characteristics

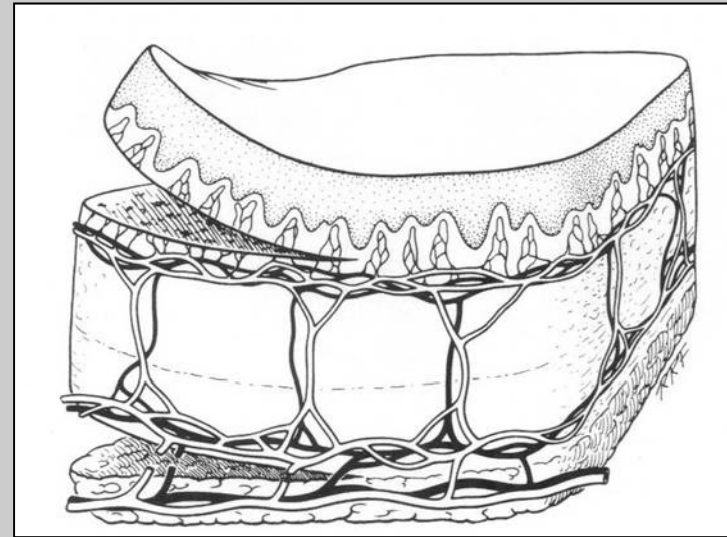
Oral mucosa



Thick epithelium

Slightly vascular lamina propria

Skin



Thin epithelium

Thick avascular lamina propria

Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197

Oral mucosa: biological characteristics

Resistant to infection



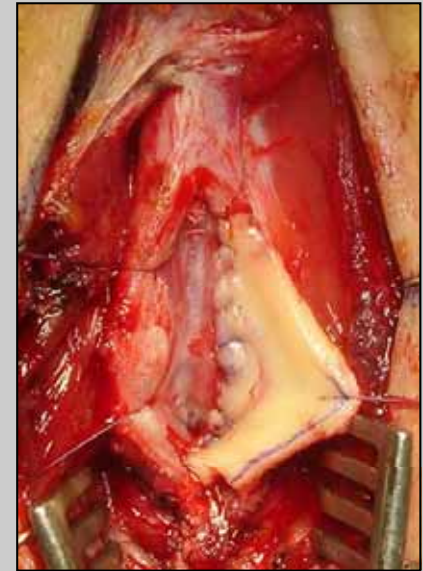
- ❖ Oral mucosa hosts a number of micro-organisms, yet the tissue's inflammatory response to these organisms is minimal.
- ❖ There are multiple immunological processes intrinsic to the oral mucosa that makes it impervious to native flora colonization.

Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197

Oral mucosa: biological characteristics

Compatible with the urethral environment

- ❖ Histological studies have demonstrated that the oral mucosa is highly compatible with the urethral recipient site, at times being indistinguishable from the surrounding tissues.
- ❖ The structural integrity of oral mucosa remains intact following transplantation to a distant site.



Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197

Oral mucosa: biological characteristics

Elastic and resilient



Frequently exposed to compression, stretching and shearing forces, the oral mucosa is highly resilient, due to his particular lamina propria-oral epithelium interface.

Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197

Oral mucosa: biological characteristics

Easy to adapt for any type of urethroplasty



One-stage



Two-stage



Inlay



Onlay

Oral mucosa: biological characteristics

Rarely affected by lichen sclerosis



Andrich DE and Mundy AR, Eur Urol 2008; 54: 1031-1041

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).

The use of oral mucosa in urethral surgery

Why ?



**The patient does not want to be
considered an experimental
animal**

Substitute material for urethroplasty

Skin or oral mucosa?

Comparative evaluation of the results

Penile one-stage inlay graft urethroplasty

Results

type of repair	success
oral graft	81.8%
skin graft	78.3%

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

Bulbar one-stage onlay graft urethroplasty

Results

type of repair	success
oral graft	82.8%
skin graft	59.6%

Barbagli G. et al, Eur Urol 2008; 53: 828-833

Harvesting oral mucosa: how to avoid complications



cheek



lip



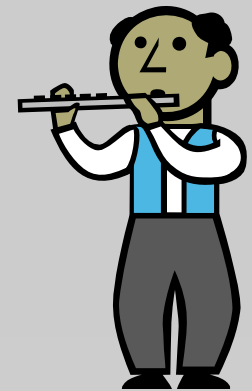
tongue

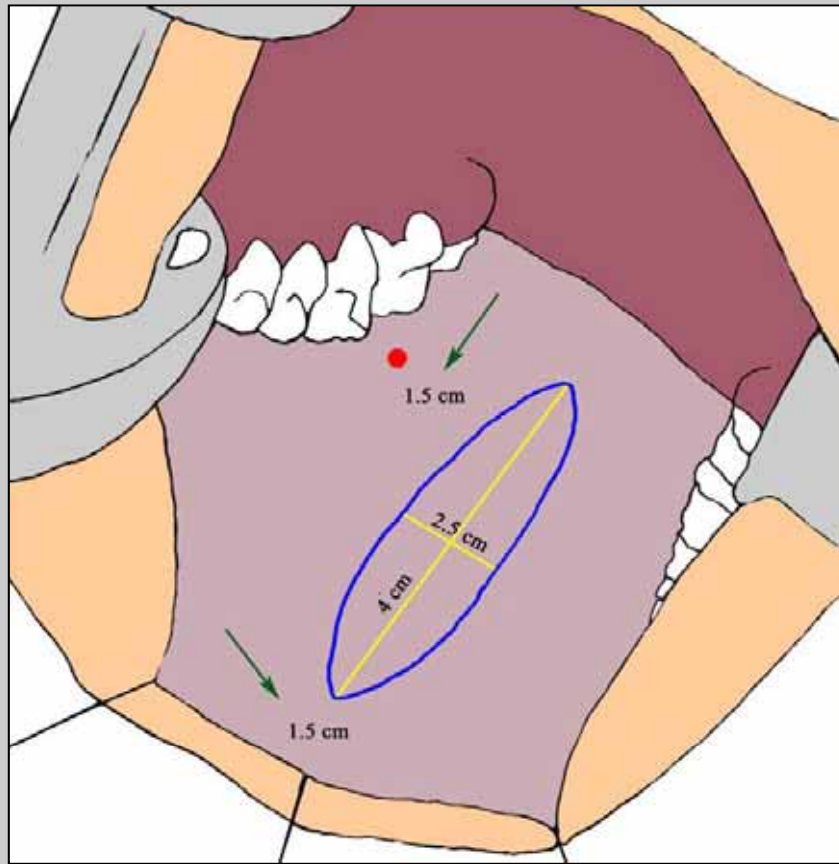
Site conditions which do not permit oral mucosa harvest



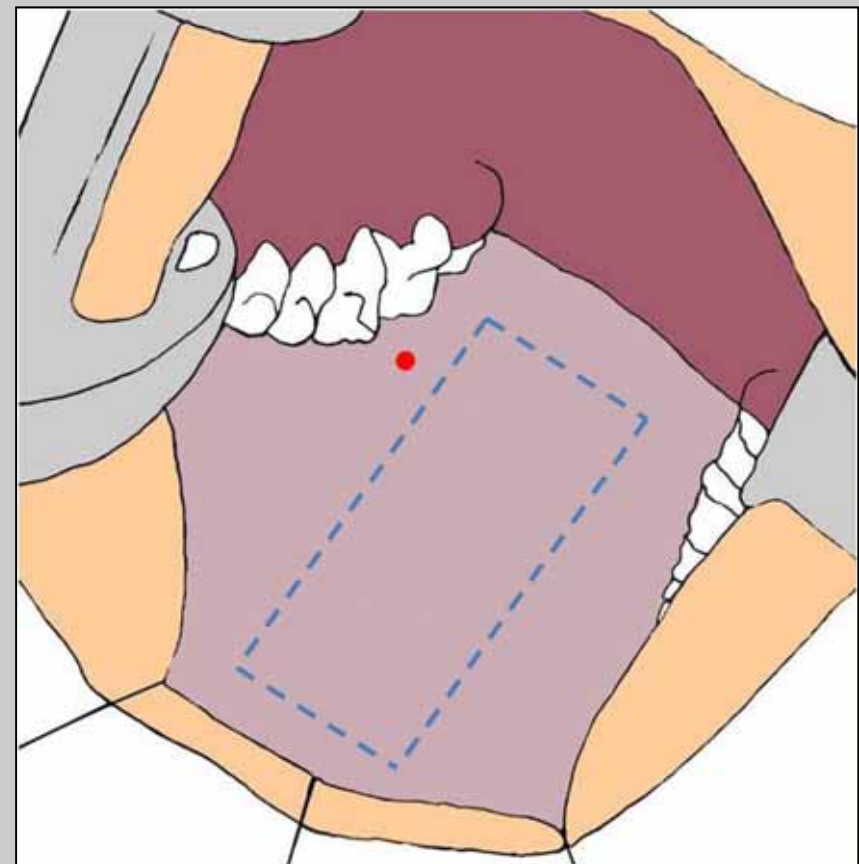
Site conditions which do not permit oral mucosa harvest

- ❖ Patients who have an infectious disease affecting the mouth (candida, varicella-virus or herpes virus)
- ❖ Patients with pathological oral dermatosis
- ❖ Patients with morsicatio buccarum (cheek chewing)
- ❖ Patients who had previous surgery on the mouth or tongue
- ❖ Patients who play a wind instrument
- ❖ Patients who chew tobacco or pan masala (India)

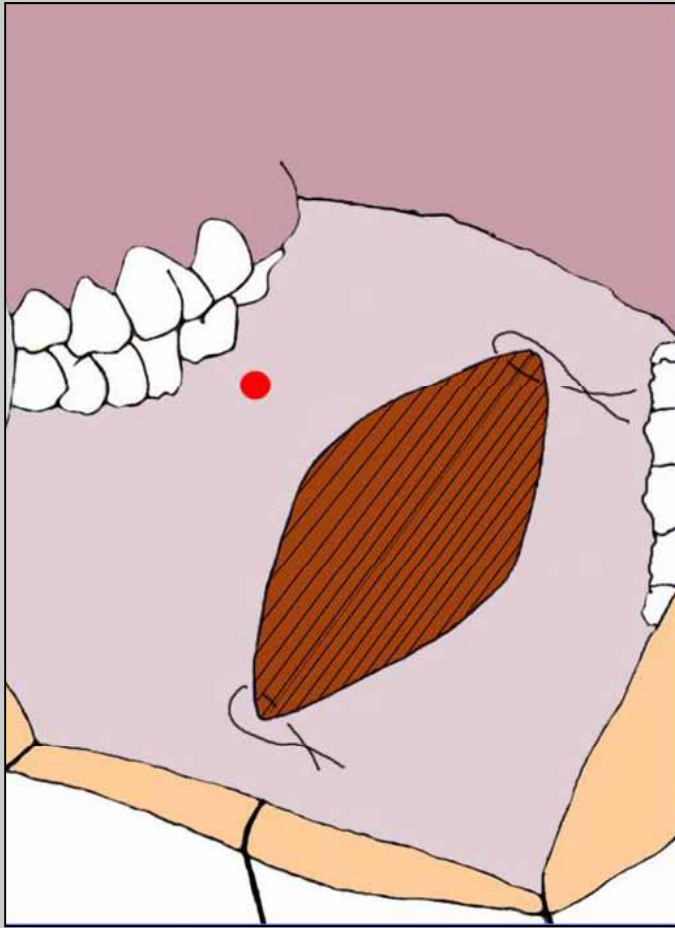




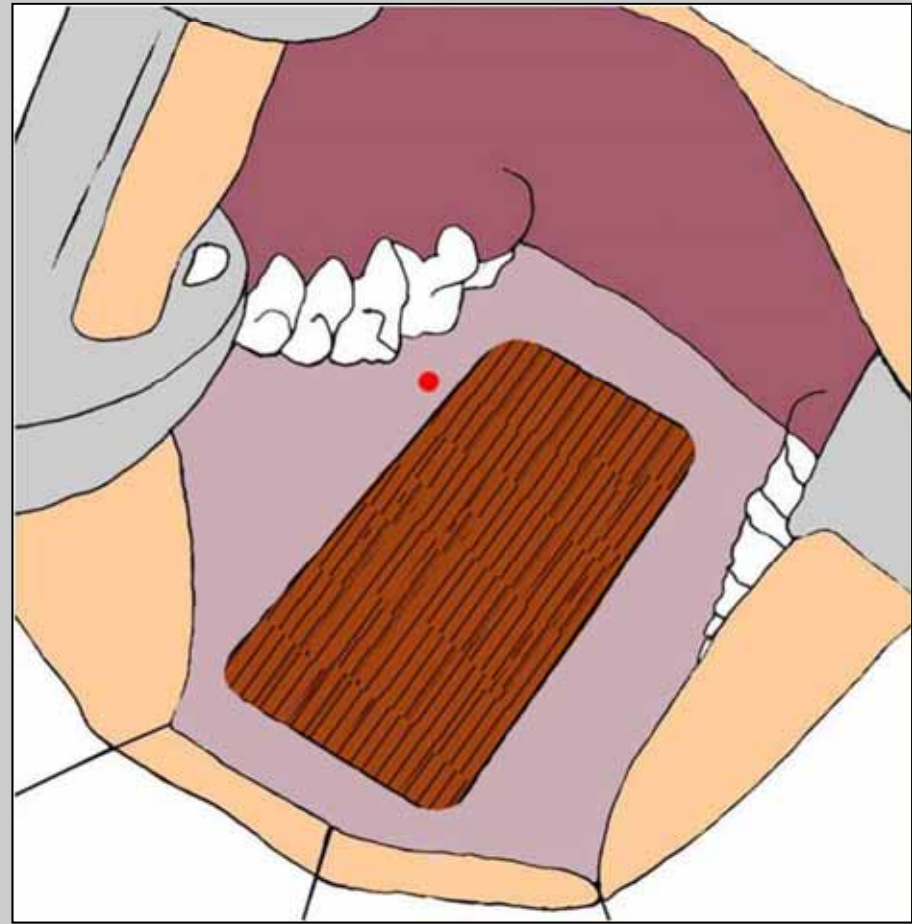
Ovoid shape



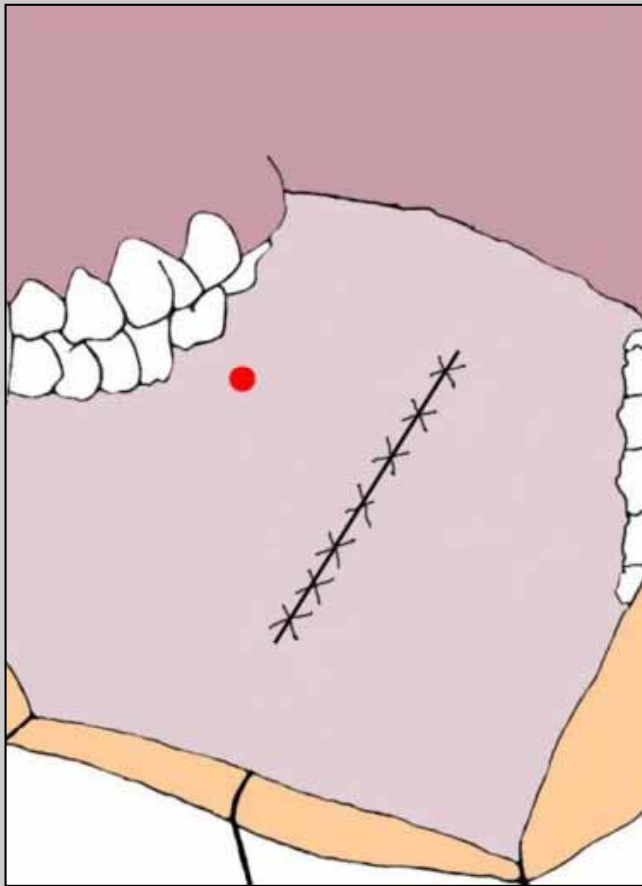
Rectangular shape



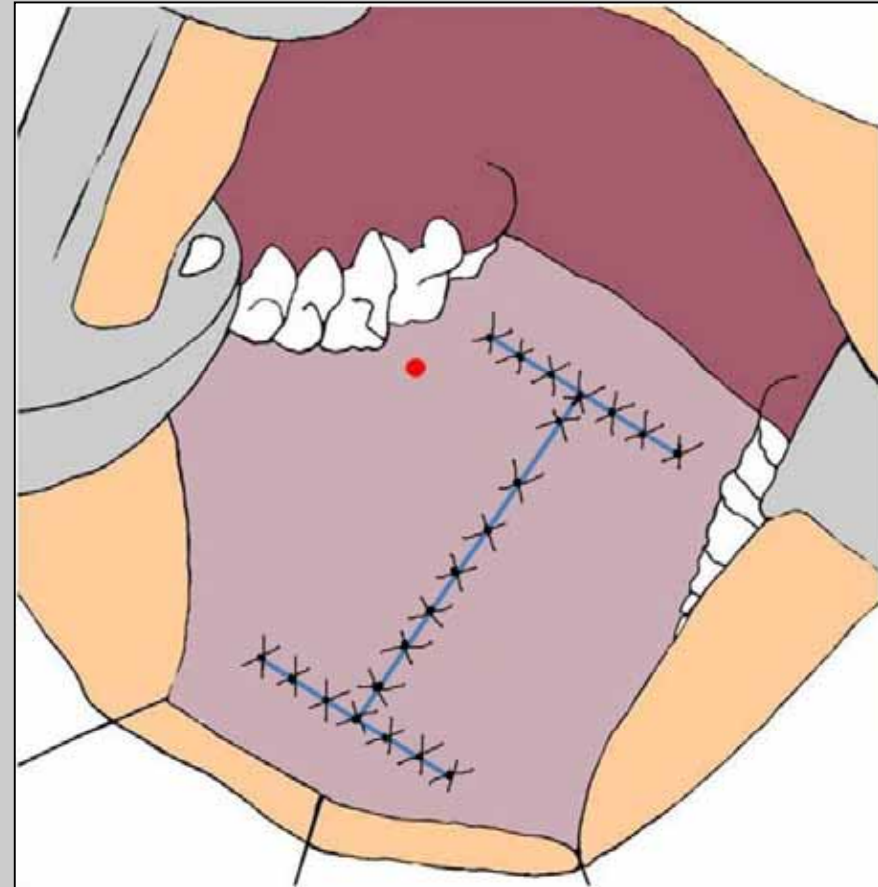
Ovoid shape



Rectangular shape



Ovoid shape



Rectangular shape

Morbidity of oral mucosal graft harvesting from a single cheek

Barbagli G. et al, Eur Urol 2010; in press

Early complications in 350 patients

bleeding: 4.3%

pain: none 49.2, slight 36%, moderate 13.7%, severe 1.1%

swelling: none 33.7%, slight 41.2%, moderate 24.6%, severe 0.5%

use of anti-inflammatory drugs for oral pain: 3.7%

Barbagli G. et al, Eur Urol 2010; in press

Early complications in 350 patients

58.6% patients were able to resume a normal diet
within 3 days

31.4% patients were able to resume a normal diet
within 6 days

10% patients were able to resume a normal diet
within 10 days

Barbagli G. et al, Eur Urol 2010; in press

Late complications in 350 patients

infection: 1.7%

perioral numbness: for one week 73.4%, for one month 22.9%,
for three months 3.7%

discomfort related to the tightness of suture closure: none 48%, slight 40.3%,
moderate 10.9%, severe 0.8%

discomfort due to mouth scar: none 82.8%, slight 14.6%, moderate 2.6%,
severe 0%

Barbagli G. et al, Eur Urol 2010; in press

Late complications in 350 patients

difficulty with mouth opening: none 98.3%, slight 1.4%, moderate 0.3%, severe 0%

difficulty smiling: none 99.7%, slight 0.3%, moderate 0%, severe 0%

dry mouth: none 97%, slight 2.6%, moderate 0.4%, severe 0%

Barbagli G. et al, Eur Urol 2010; in press

Patient satisfaction

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

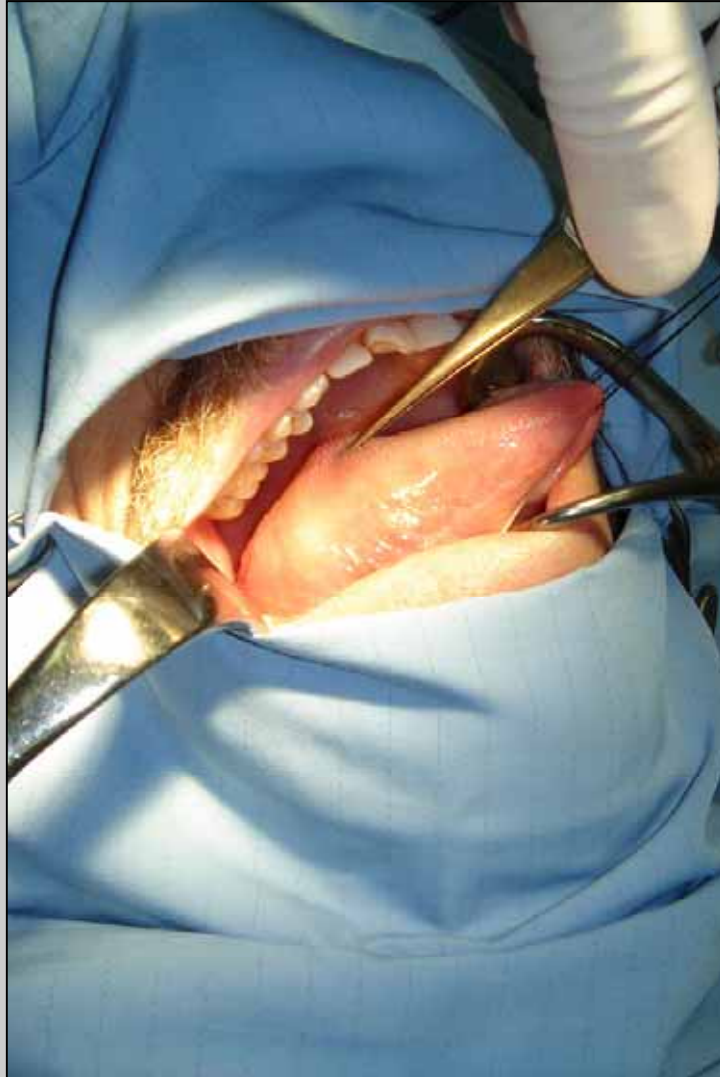
Yes : 98% of patients

No : 2% of patients

Barbagli G. et al, Eur Urol 2010; in press



- ❖ The **cheek** represents the best harvesting site in the mouth.
- ❖ Low post-operative morbidity and excellent patient satisfaction.
- ❖ Numerous articles reported in the literature.



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

THE BRITISH JOURNAL OF SURGERY
A ONE-STAGE OPERATION FOR HYPOSPADIAS

BY GRAHAM HUMBY

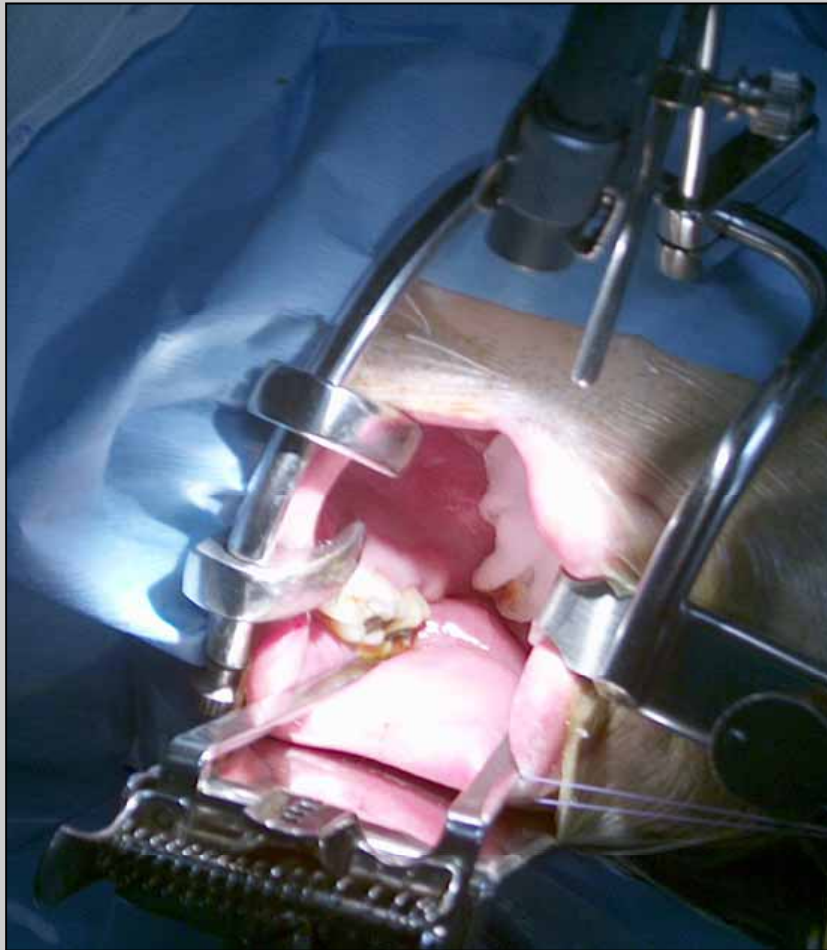
F.M.S. SURGEON AND SURGICAL ASSISTANT TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

WITH A FOREWORD BY

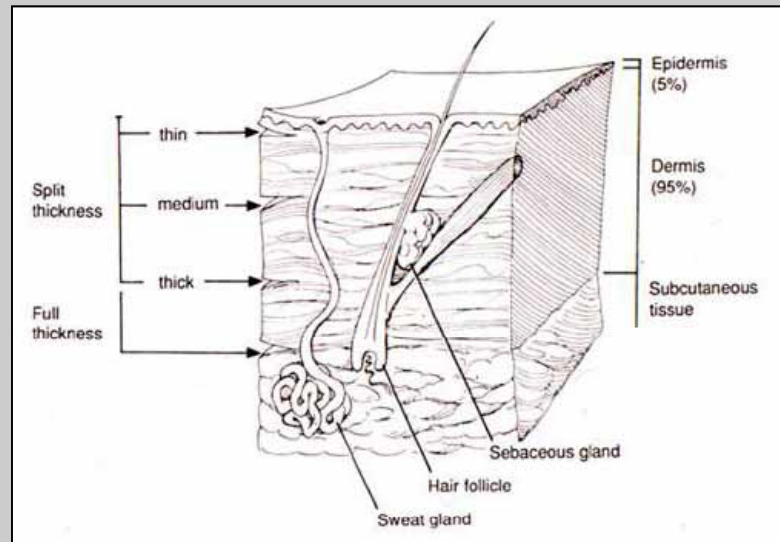
T. TWISTINGTON HIGGINS

SURGEON TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

Humby G, Br J Surg 1941; 29: 84-92



- ❖ **Oral mucosa is the best material for urethroplasty.**
- ❖ **Using oral mucosa, it is possible to repair the majority of anterior urethral strictures.**
- ❖ **Oral morbidity following oral graft harvesting is low and patient satisfaction is high.**



In selected cases, the use of extragenital or genital skin represents the only alternative to oral mucosa.

The skin may be harvested in different sites, according to the patient and stricture characteristics:

- **preputial - penile skin**
- **retroauricular skin (A.R. Mundy)**
- **mesh-graft skin (F. Schreiter)**

Conclusions

Should we preserve the bulbospongiosum muscle? Yes

Should we transect the urethra? No

Should we use fibrin glue? Yes

Which tissue is best? Oral mucosa

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.**

Evaluation of the results

objective



subjective

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

www.urethralcenter.it



Next month, this lecture will be fully available on our website

Thank you !