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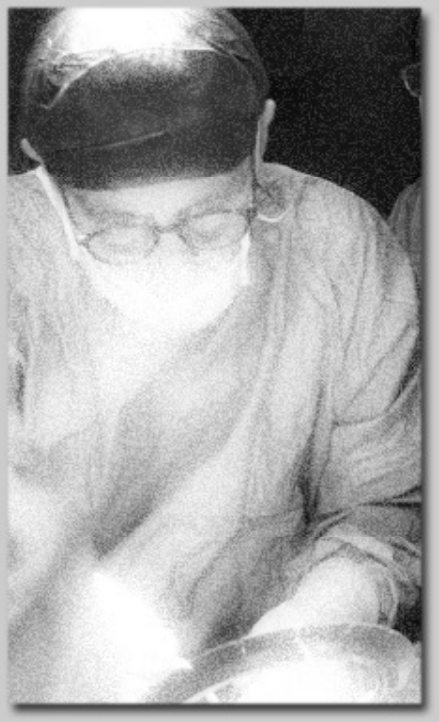

GUIDO BARBAGLI, M.D.

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Ahmedabad – India

25 – 26 June 2011

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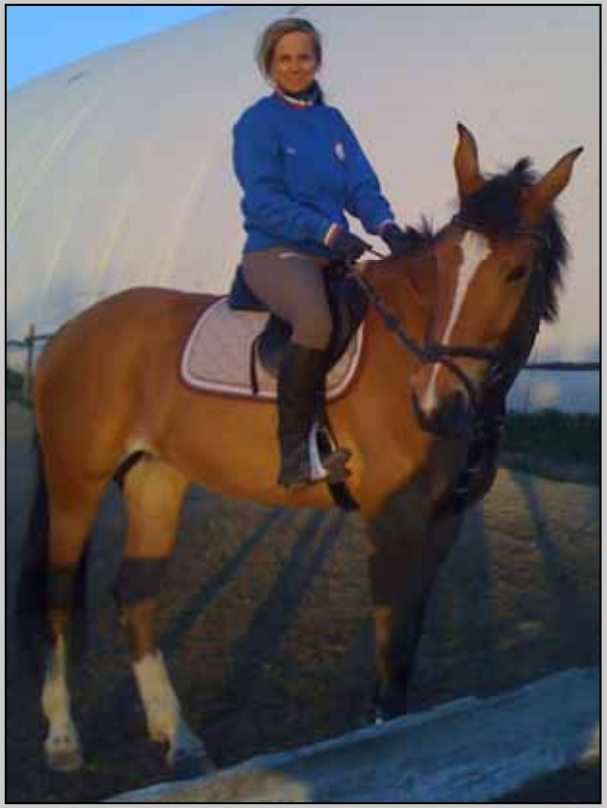
The Team

Salvatore Sansalone



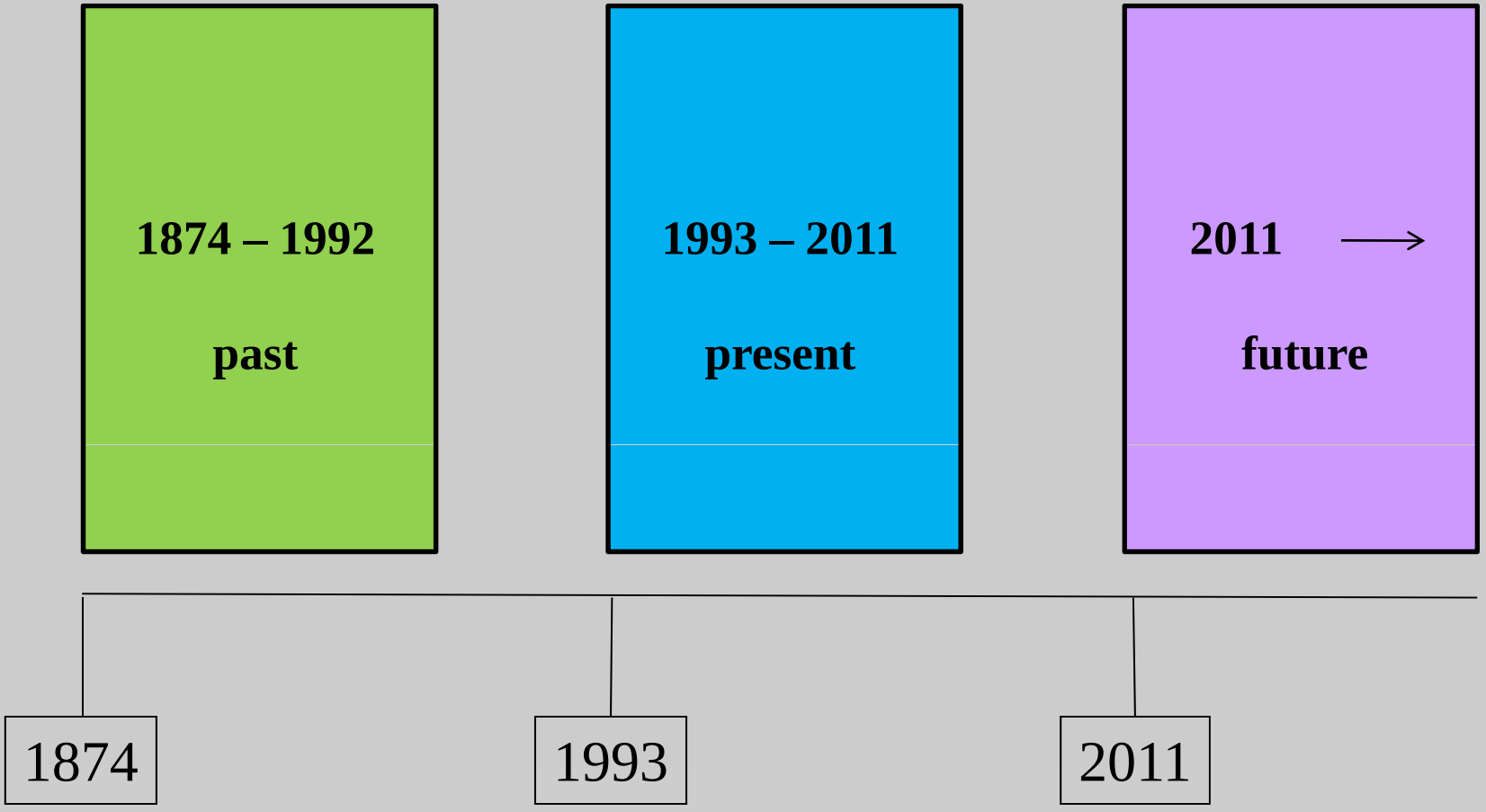
Sofia Balò

Giuseppe Romano

Bulbar urethroplasty:

- past
- present
- future

History of bulbar urethroplasty (1874 - 2011)



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Bulbar urethroplasty:

the past

(1874 – 1992)

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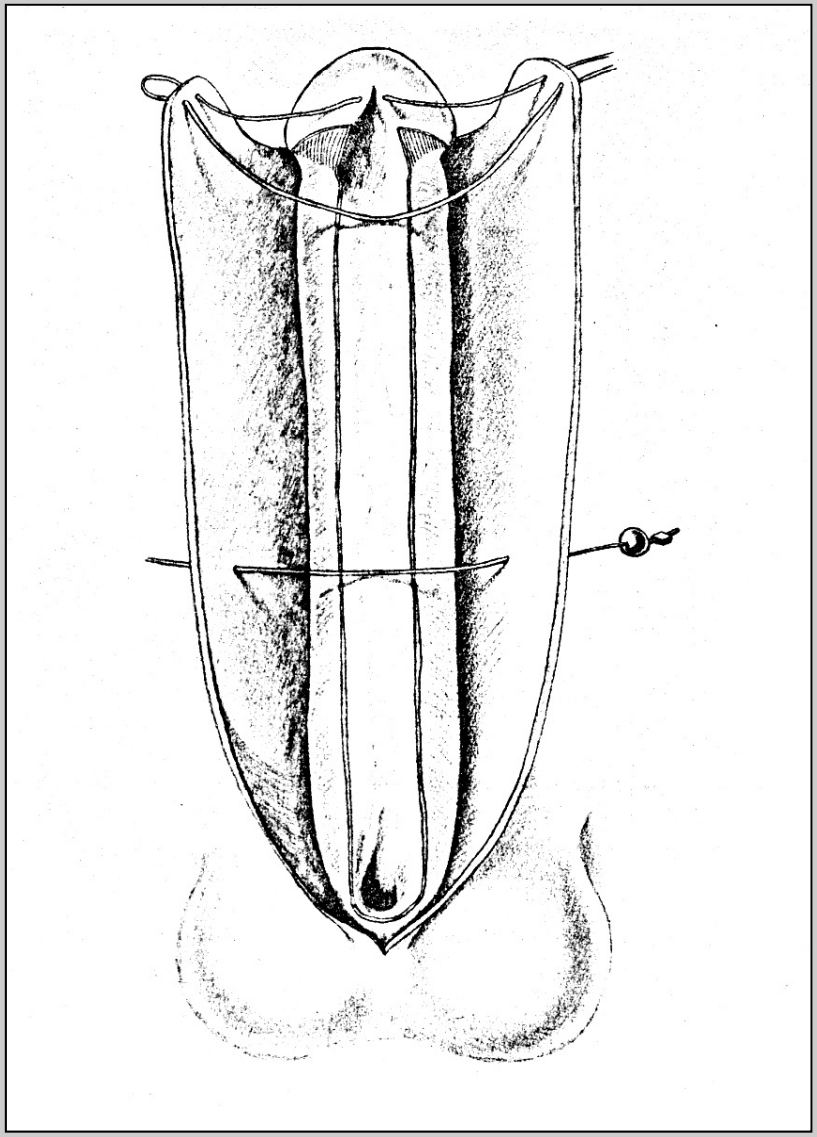
1874 - 1992

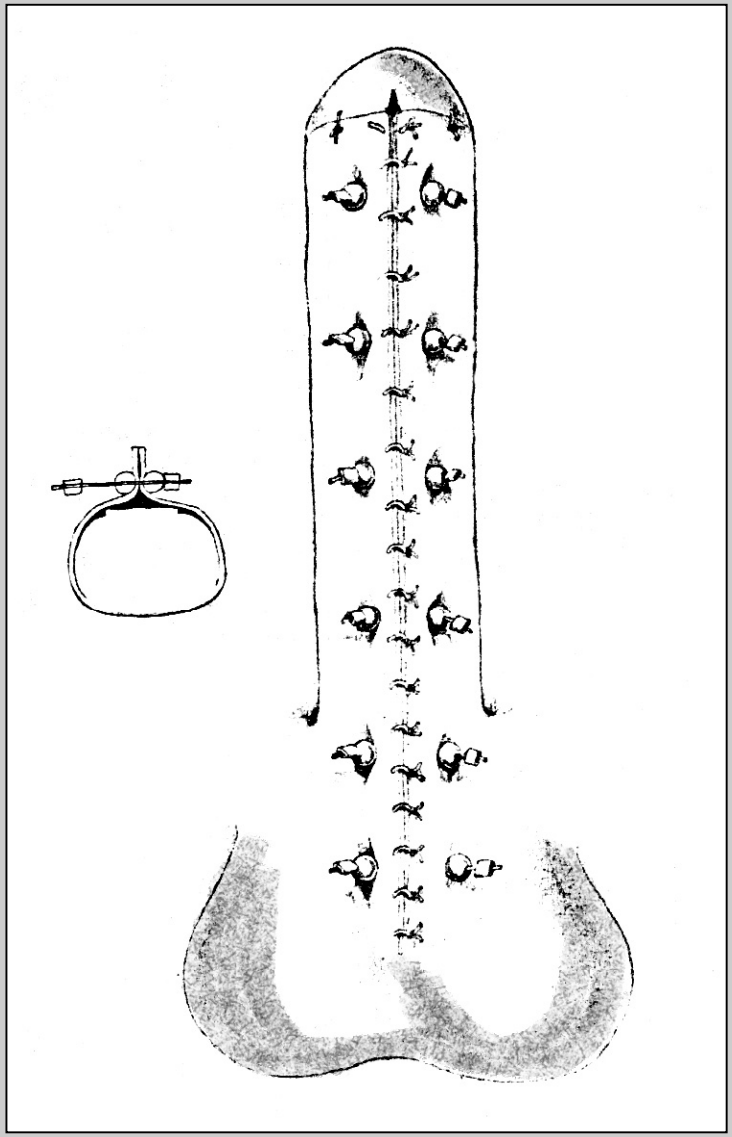
One of the basic principles in reconstruction of urethra consists in the formation of an epithelial tube from a buried strip of skin.

Duplay S - Arch gén de méd - 1874; 133: 657-682

Marion G, Pérard J - Paris, Masson et Cie, 1942

Browne D, Proc Roy Soc Med – 1949; 42: 466-468





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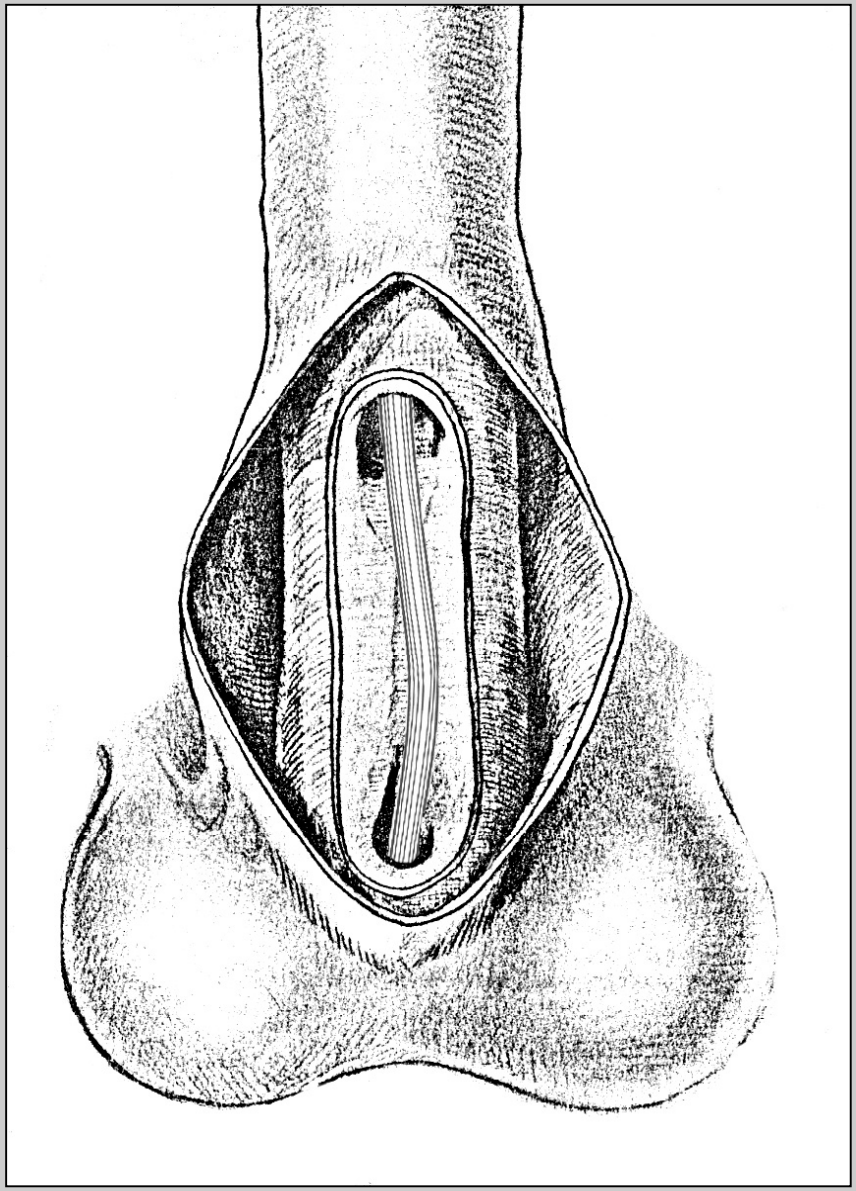

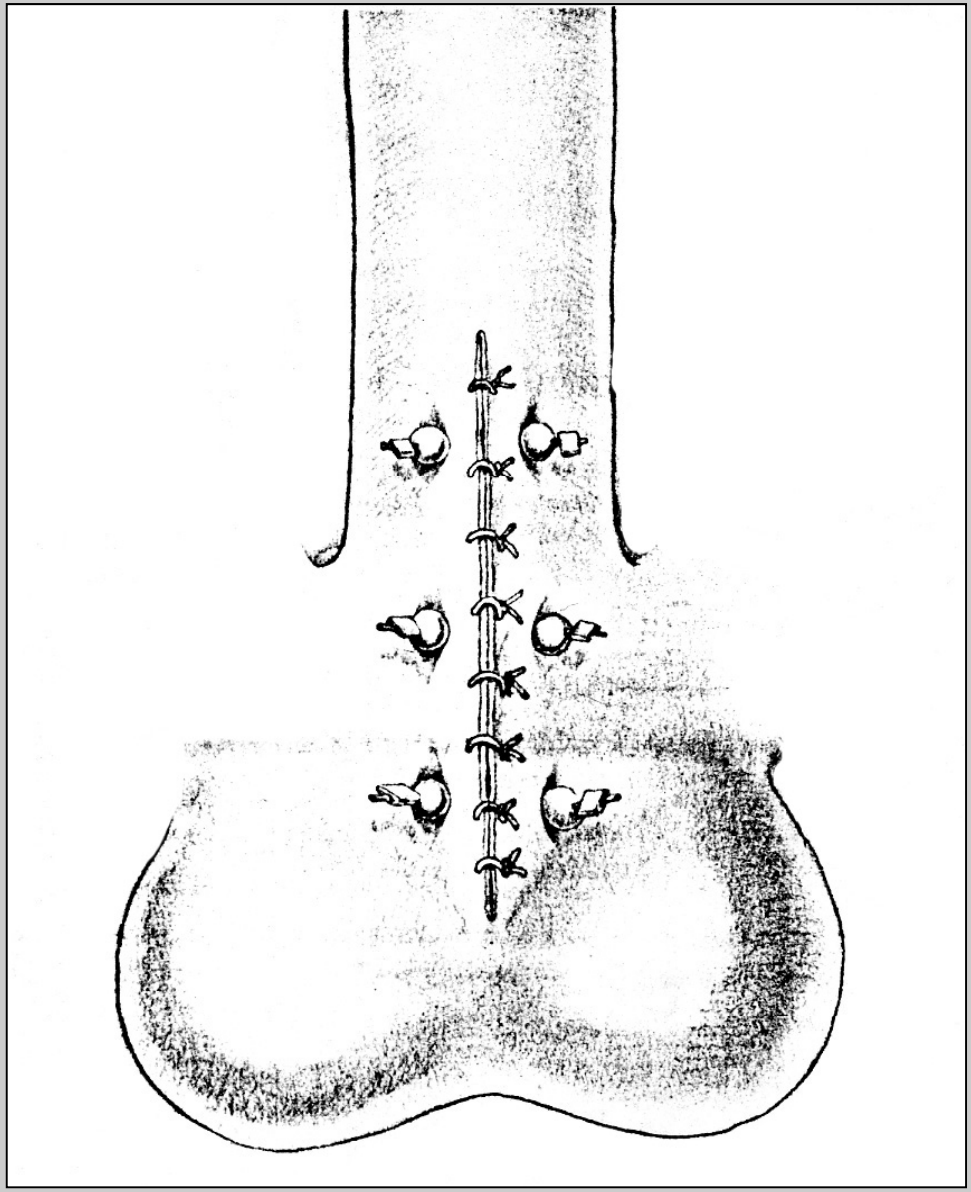

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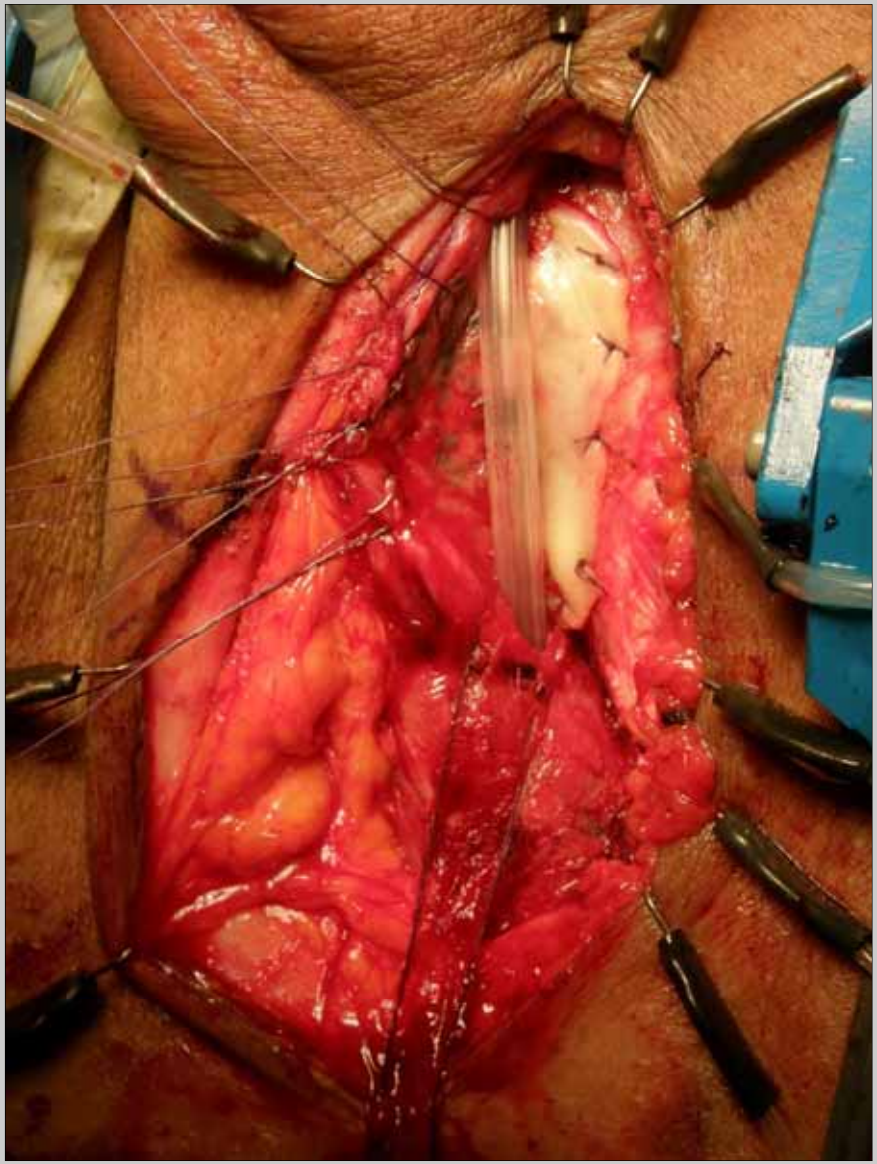

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1874 - 1992

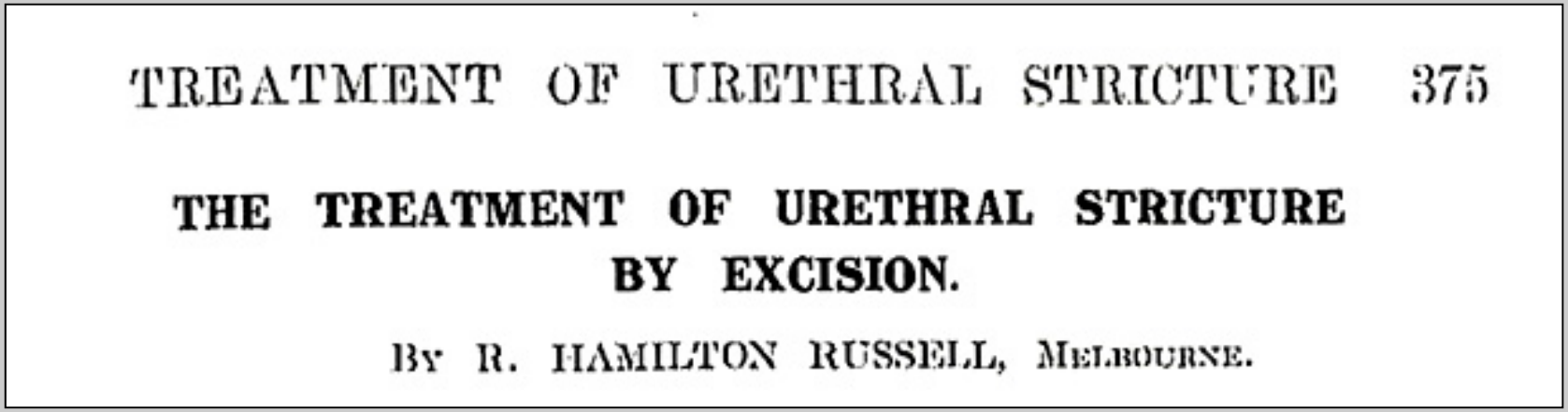
The principle of the buried strip of intact epithelium, described by DUPLY-MARION-BOWNE, was later applied to develop new surgical techniques:

End-to-end anastomosis (H. Russel, 1914)

Two-stage urethroplasty (B. Johanson, 1953)

1874 - 1992

In 1914, H. Russel described a new end-to-end anastomosis based on the principle of the buried strip of intact epithelium.



TREATMENT OF URETHRAL STRICTURE 375

THE TREATMENT OF URETHRAL STRICTURE BY EXCISION.

By R. HAMILTON RUSSELL, Melbourne.

Br J Surg 1914; 2: 375-383

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of obstruction, and the directions of the urethral channels behind and in front of the stricture no longer correspond, but are out of alignment; in fact the posterior urethra tends to be pushed forward and to one side of the stricture, greatly aggravating the difficulty of micturition, and rendering the introduction

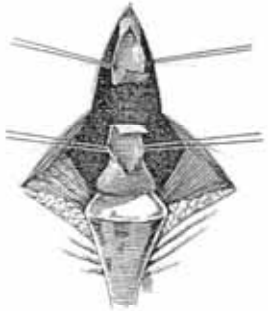

FIG. 208.—The stricture and the surrounding fibrous tissue have been excised, and the cut ends of the urethra are loosened and freed by undercutting.

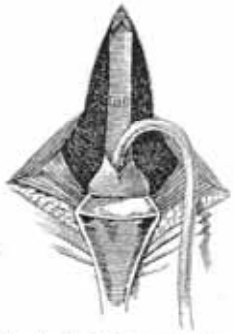

FIG. 209.—The cut ends united by five interrupted sutures.

of an instrument almost impossible. This is shown in a somewhat exaggerated way in *Fig.* 207.

Again, the surgeon must decide as to his exact procedure after the stricture is exposed to view; the urethra will appear as a 'strip,' interrupted and damaged at the seat of stricture, and the exact amount it will be necessary to remove must be determined on the spot. If the mucous membrane seems but little damaged, only the peri-urethral masses need be cut away. As a rule, however, it is necessary to excise a portion of ragged and injured mucous membrane. It will be found that the completeness of the exposure renders it easy to conserve the mucous membrane to the utmost; nevertheless I have on more than one occasion removed upwards of an inch of the urethra.

FIG. 210.—Suture of the lateral perineal incisions, the median wound being left open; a catheter is fastened in the bladder.

The position of the catheter insures that the urethral wound which has been sutured shall be protected from contact with urine during healing; when the catheter is taken out it will be found that the wound will close very rapidly, and healing will be complete in a few days. In brief, the restoration of the

Br J Surg 1914; 2: 375-383

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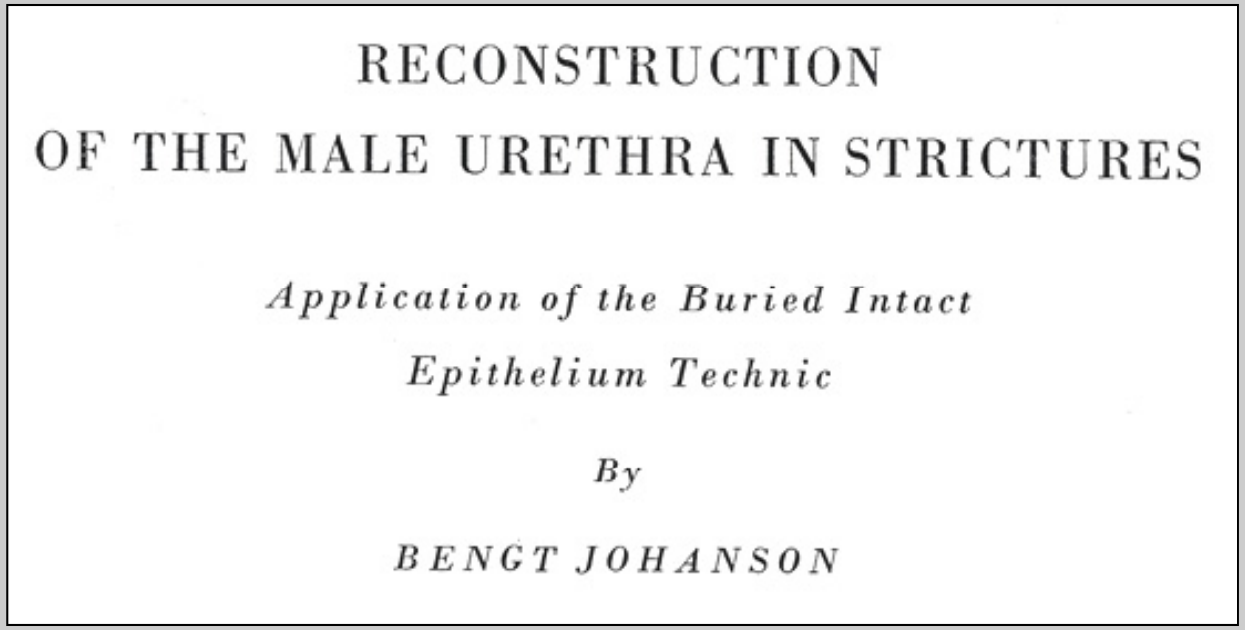
1874 - 1992

In 1953, B. Johanson described a new two-stage urethroplasty based on the principle of the buried strip of intact epithelium.



RECONSTRUCTION

OF THE MALE URETHRA IN STRICTURES

Application of the Buried Intact Epithelium Technic

By

BENGT JOHANSON

Acta Chirurgica Scandinava 1953; (supplementum 176): 5-89

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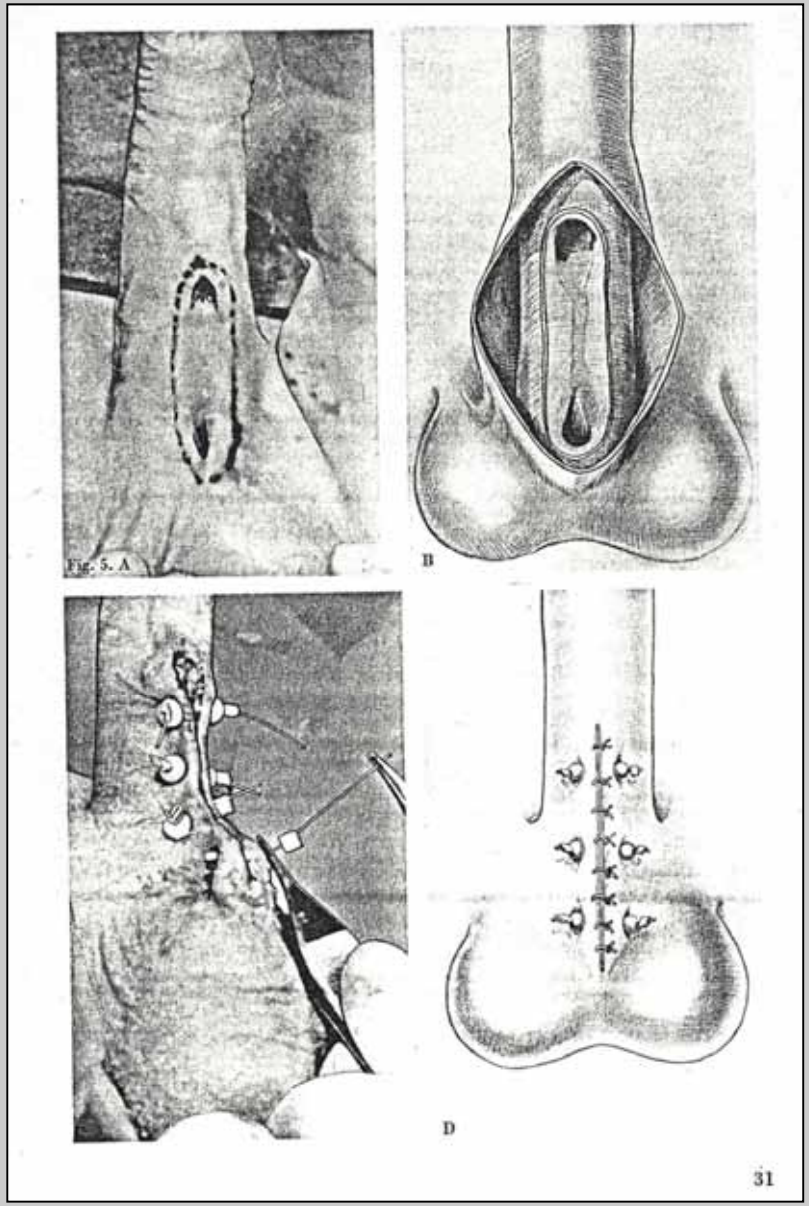

Acta Chirurgica Scandinava 1953; (supplementum 176): 5-89

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The past (1874 – 1992)

No homogenous series of patients

No homogeneous criteria for the evaluation of results

No Patient Reported Outcome (PRO)

Penile skin (flap vs graft) was a preferred material

Aggressive and invasive surgical techiques

The past (1874 – 1992)

One-stage penile skin flap (A. Orandi, 1968)

Scroto-urethral inlay (R. Turner-Warwick, 1968)

Scrotal flap perineostomy (J.P. Blandy et al., 1968)

ONE-STAGE URETHROPLASTY [1]

By AHMAD ORANDI

From The John W. Draper Research Laboratory, Fergus Falls, Minnesota, U.S.A.

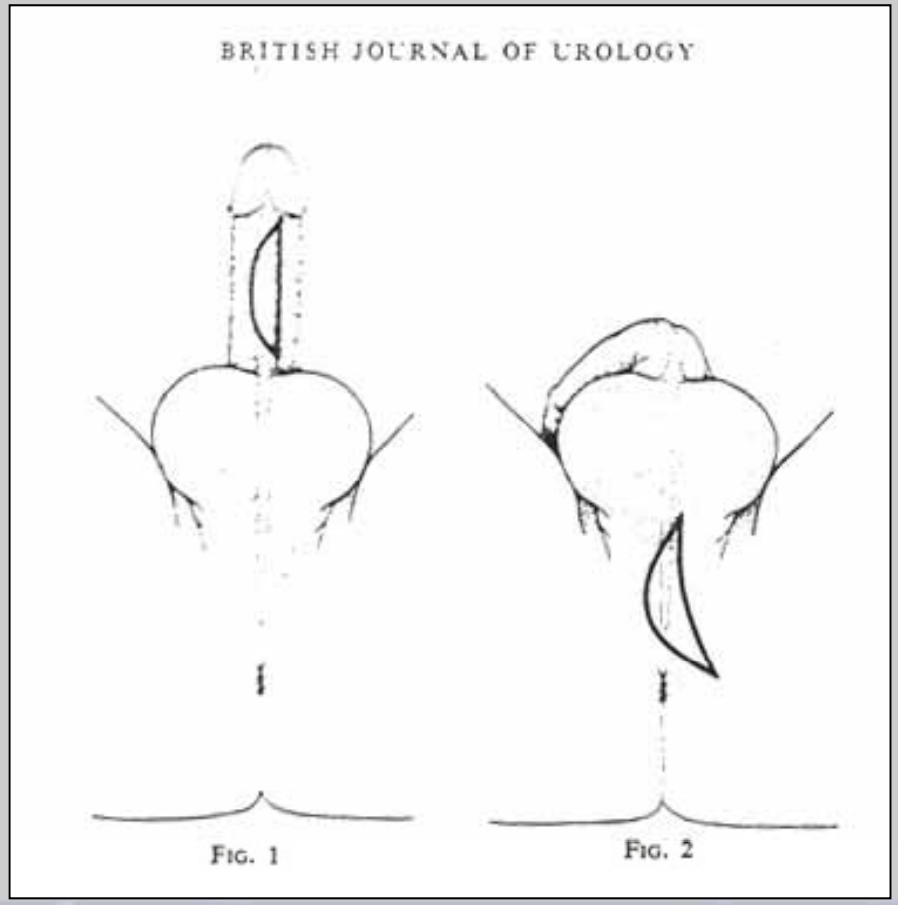

FIG. 1 FIG. 2

Br J Urol 1968; 40: 717-719

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THE REPAIR OF URETHRAL STRICTURES IN THE REGION OF THE MEMBRANOUS URETHRA

RICHARD TURNER-WARWICK

From The Middlesex Hospital and the Institute of Urology, London, England

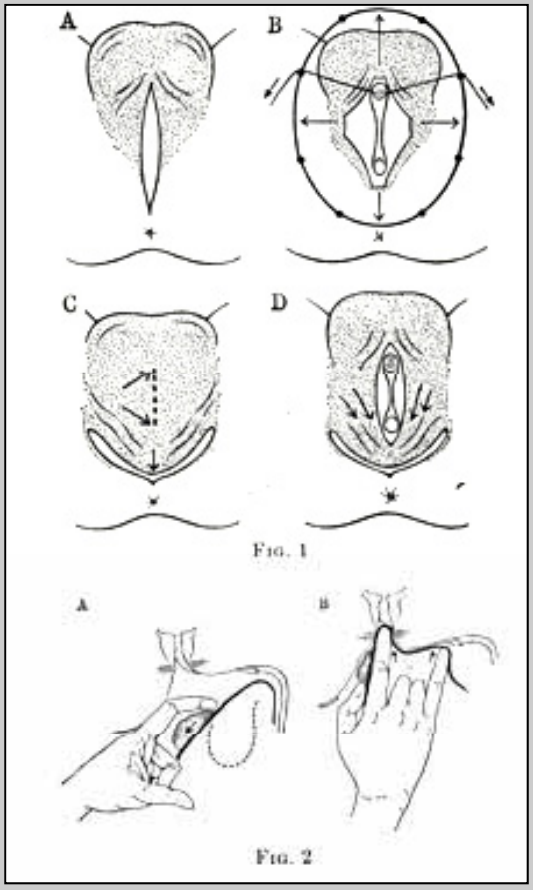

FIG. 1

FIG. 2

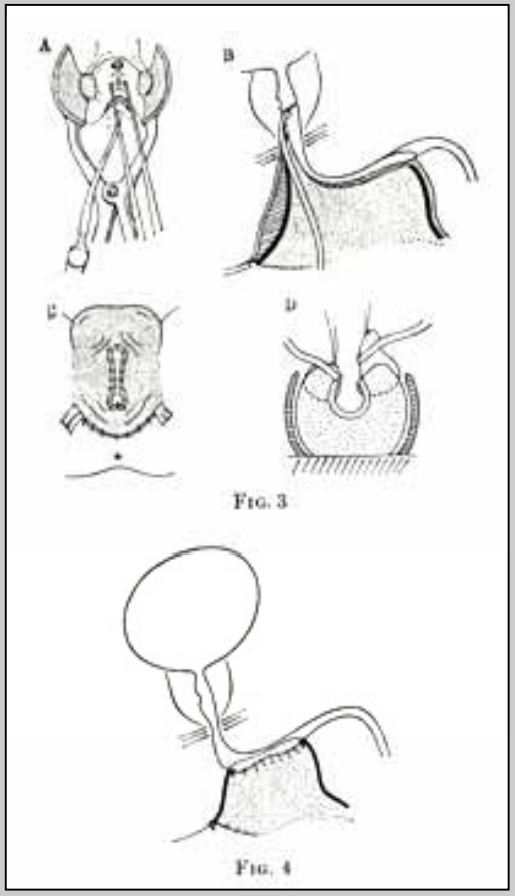

FIG. 3

FIG. 4

J Urol 1968; 100: 303-314

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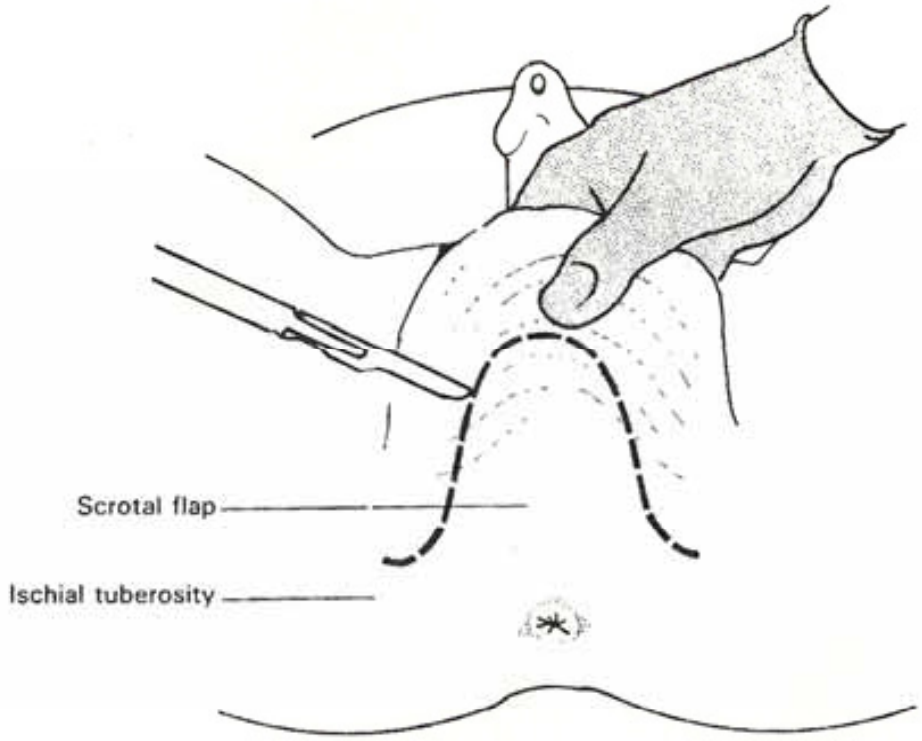
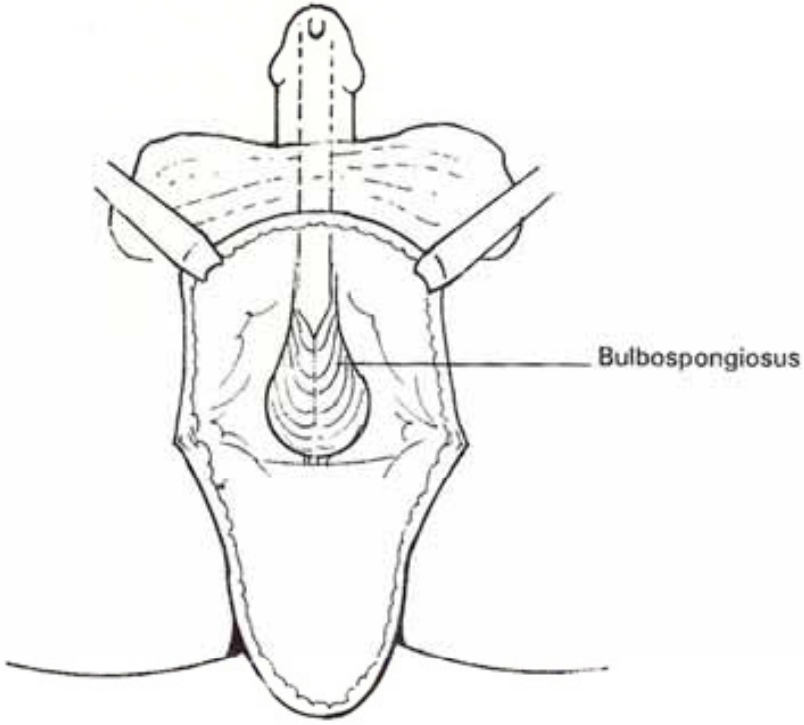
Blandy JP, Singh M, Tresidder GC.

Urethroplasty by scrotal flap for long urethral strictures





BrJ Urol 1968; 40: 261-267

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Bulbar urethroplasty:

the present

(1993 – 2011)

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The present

Homogenous series of patients

Homogeneous criteria for the evaluation of results

Patient Reported Outcome (PRO)

Oral mucosa is the preferred material

Sparing and conservative surgical techiques

0022-5347/93/1492-0276$03.00/0
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Vol. 149, 276–278, February 1993
Printed in U.S.A.

THE USE OF BUCCAL MUCOSA PATCH GRAFT IN THE MANAGEMENT OF ANTERIOR URETHRAL STRICTURES

A. W. EL-KASABY, M. FATH-ALLA, A. M. NOWEIR, M. R. EL-HALABY, W. ZAKARIA AND M. H. EL-BEIALY

From the Department of Urology, Ain-Shams University, Cairo, Egypt

Journal of Urology 1993; 149: 276-278

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RAPID COMMUNICATION

WHEN AND HOW TO USE BUCCAL MUCOSAL GRAFTS IN ADULT BULBAR URETHROPLASTY

ALLEN F. MOREY AND JACK W. MCANINCH

Urology 1996; 48: 194-198

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0022-5347/96/1551-0123$03.00/0
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Vol. 155, 123–126, January 1996
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DORSAL FREE GRAFT URETHROPLASTY

GUIDO BARBAGLI, CESARE SELLI, ALDO TOSTO AND ENZO PALMINTERI

From the Department of Urology, University of Florence, Florence, Italy

Journal of Urology 1996; 155: 123-126

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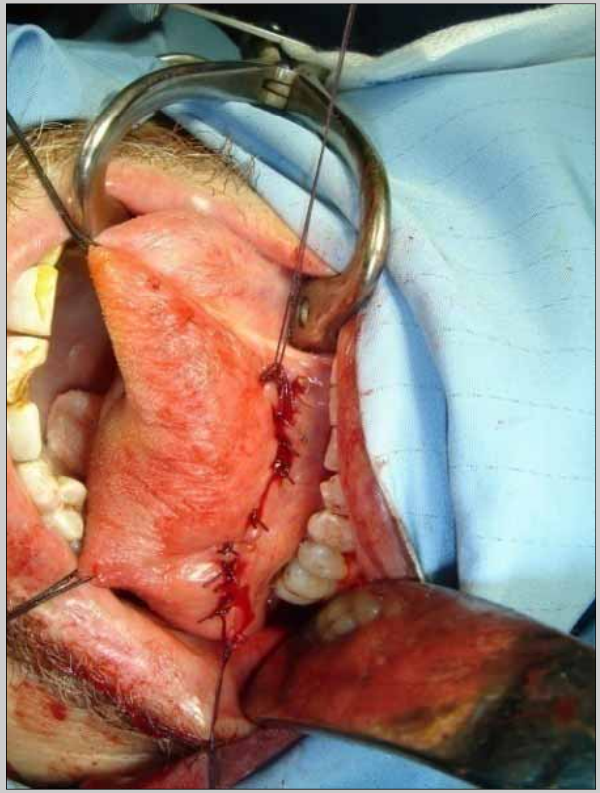
The present

The oral mucosa represents the best material for urethral reconstruction.

The majority of bulbar urethral strictures can be repaired by using one-stage sparing techniques.

The oral mucosa is the best material for urethral reconstruction.

Harvesting site



Oral mucosa → **concealed**

Harvesting site

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

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Oral mucosa: biological characteristics

Easy to adapt for any type of urethroplasty

One-stage

Two-stage

Inlay

Onlay

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Patient Reported Outcome

EUROPEAN UROLOGY 58 (2010) 33–41

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

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], *Massimo Lazzeri* [d,*]

[a] *The Centre for Reconstructive Urethral Surgery, Arezzo, Italy*
[b] *Unità Operativa Urologia, Ospedale San Donato, Arezzo, Italy*
[c] *Department of Urology, San Raffaele Turro University-Hospital, Milan, Italy*
[d] *Department of Urology, Santa Chiara-Firenze, Florence, Italy*

European Urology 2010; 58: 33-41

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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).

Bulbar urethroplasty: current techniques

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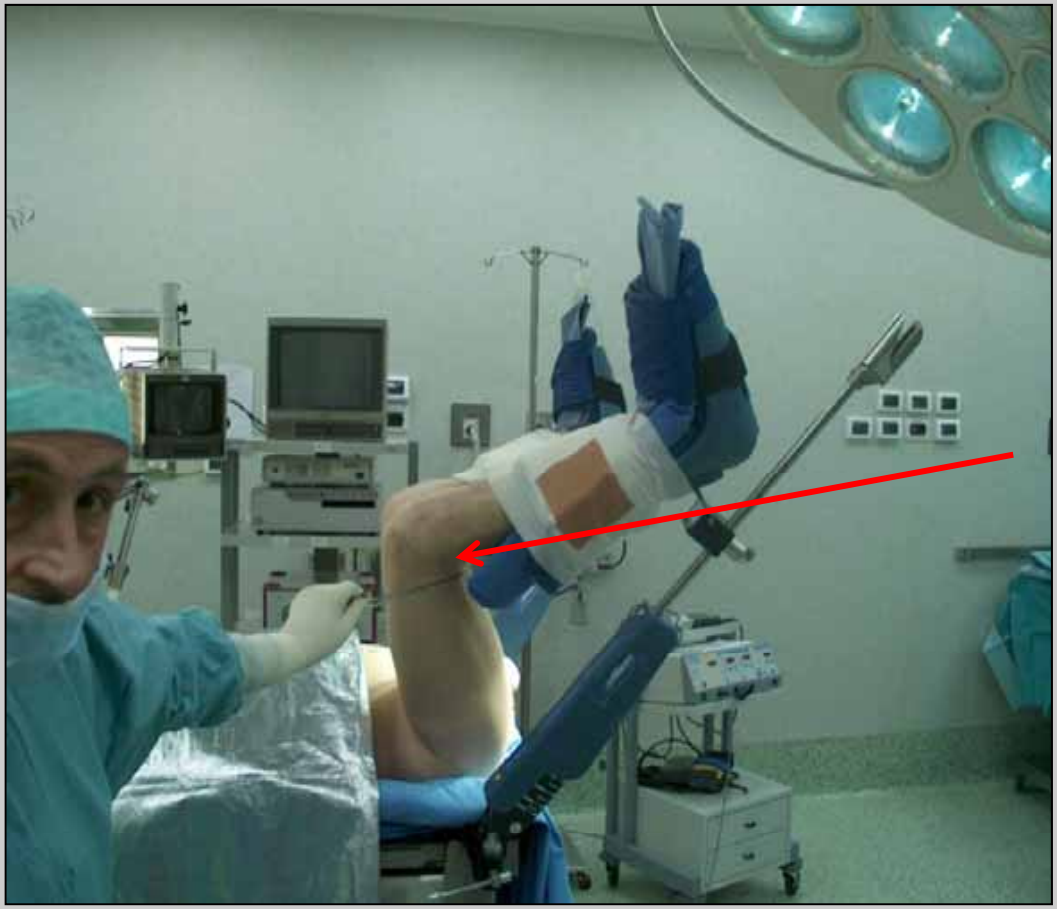
Preparation of the patient

Simple lithotomy position

Preparation of the patient



Allen stirrups

Preparation of the patient

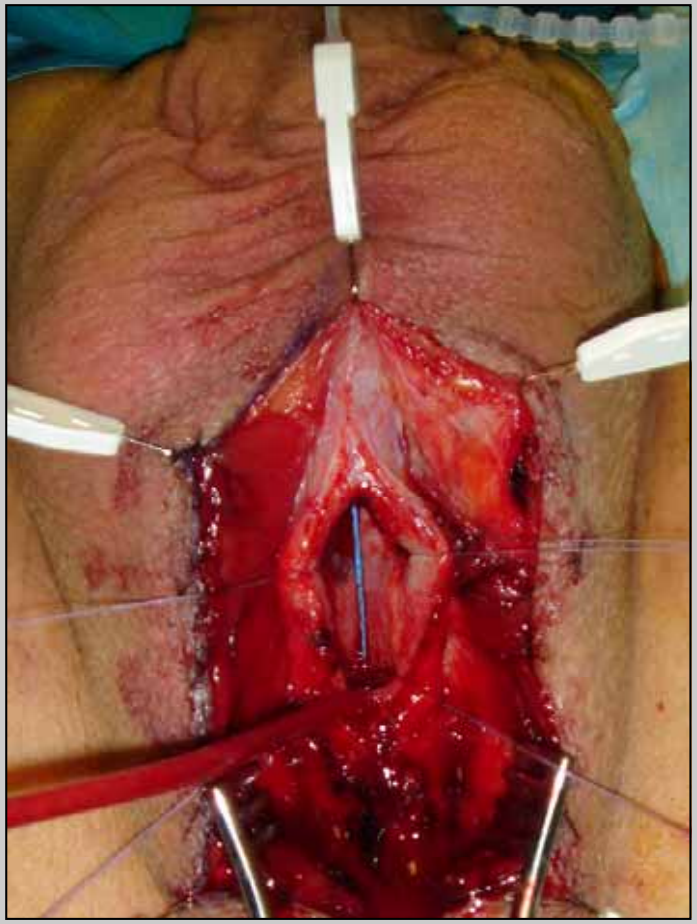
Sequential inflatable compression sleeves

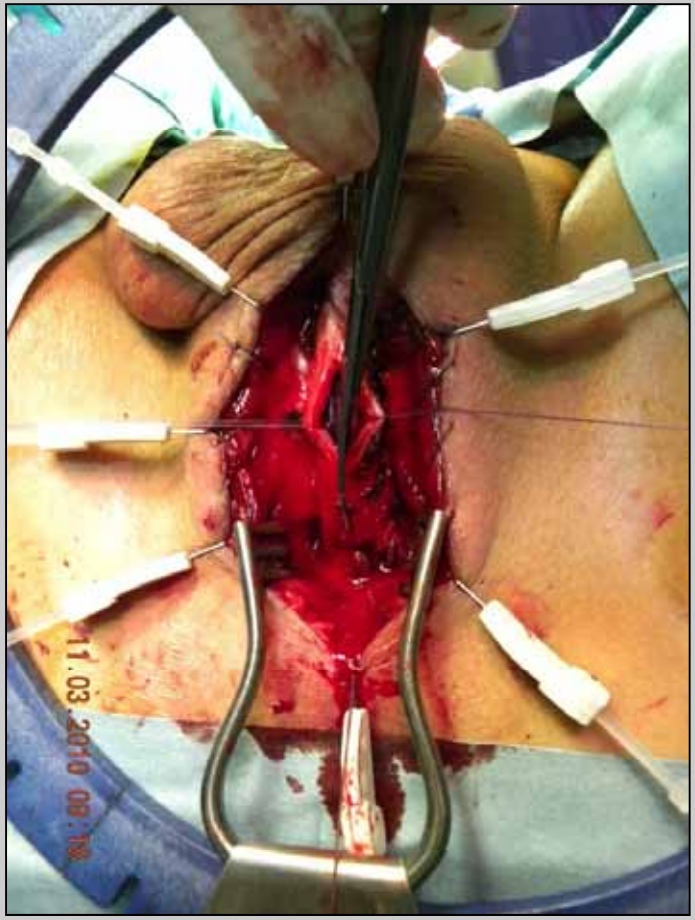
Preparation of the patient for bulbar urethroplasty

Pre-operative urethroscopy

Insert Sensor guide wire

Preparation of the patient for bulbar urethroplasty





Insert Sensor guide wire

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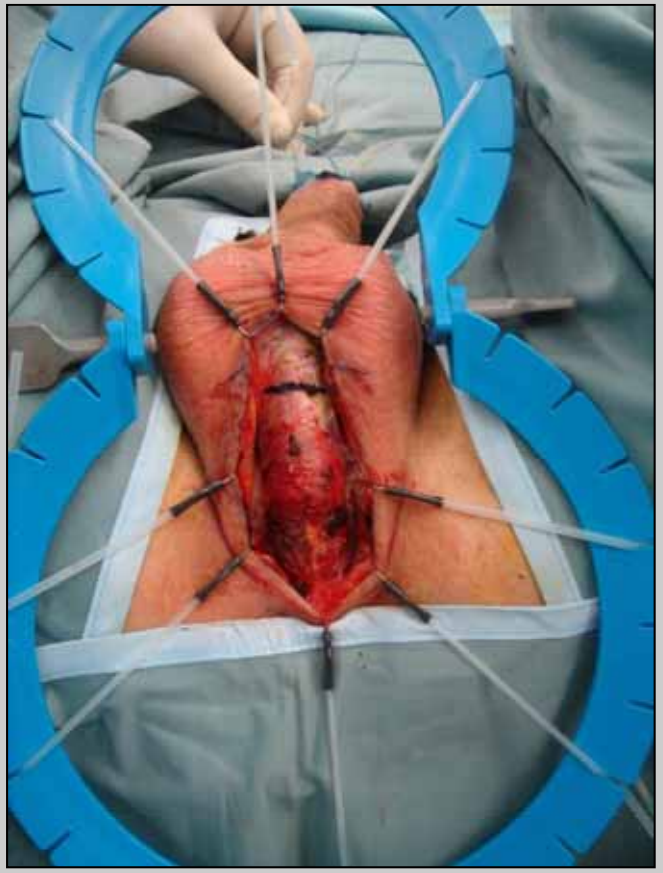
Preparation of the patient for bulbar urethroplasty

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

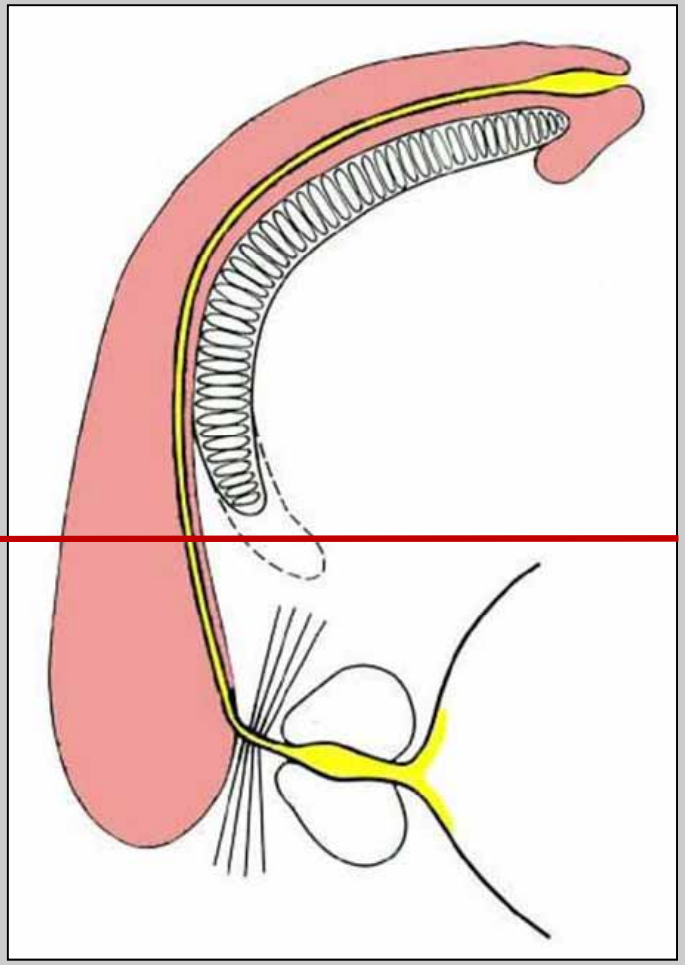
Trauma → **End-to-end anastomosis**
Augmented anastomotic repair

Instrumentation
Catheter
Infection
Other
→ **Oral mucosa onlay**

Surgical technique according to site of bulbar urethral stricture

Distal

Dorsal onlay



Proximal

Ventral onlay

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1 - 2 cm traumatic bulbar urethral stricture

End-to-end anastomosis

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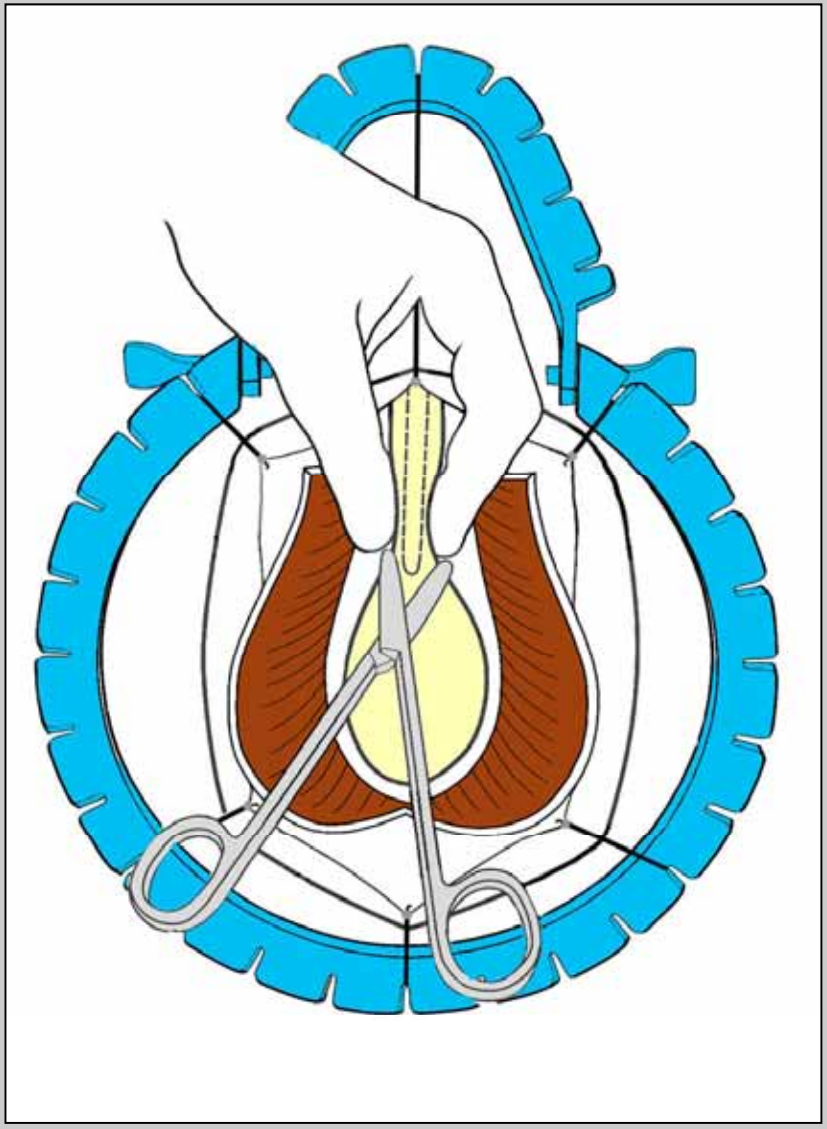

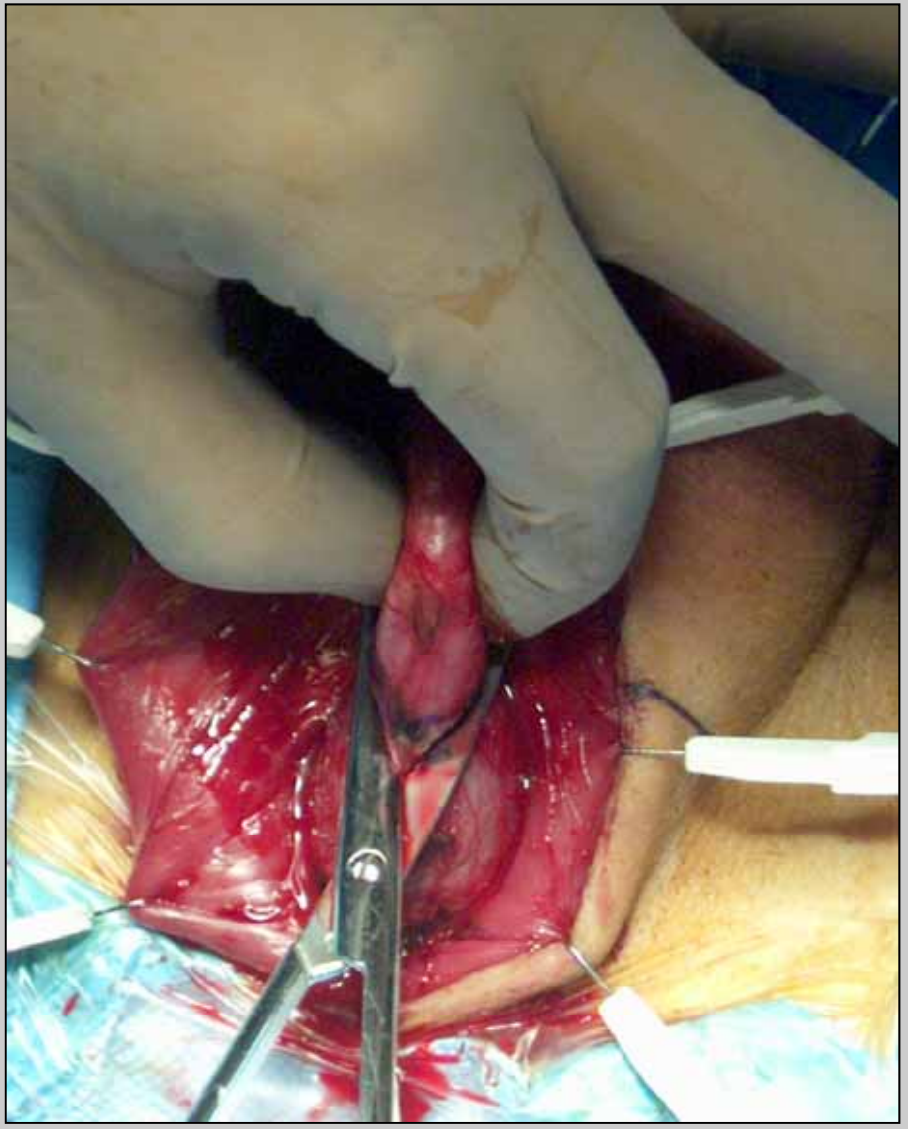

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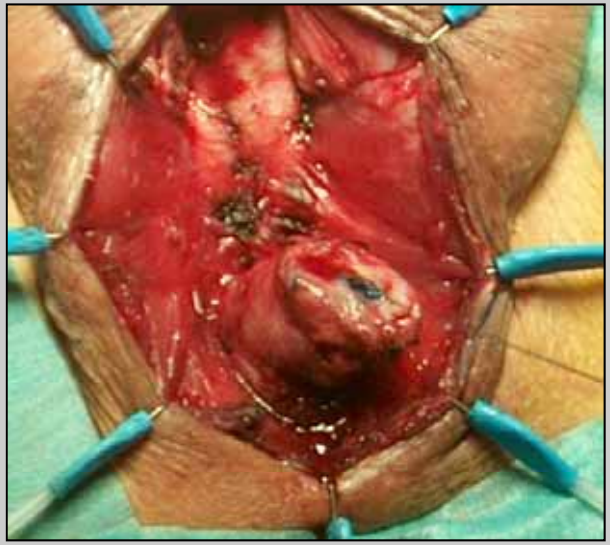
distal end



proximal end

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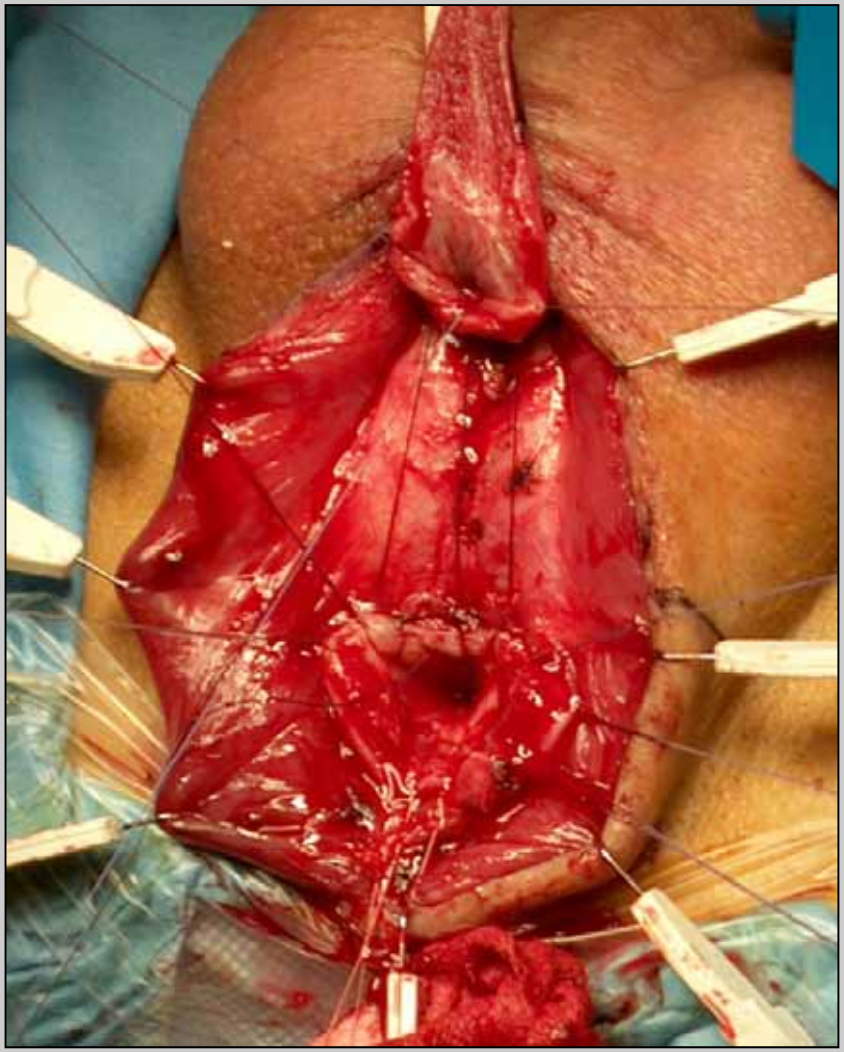

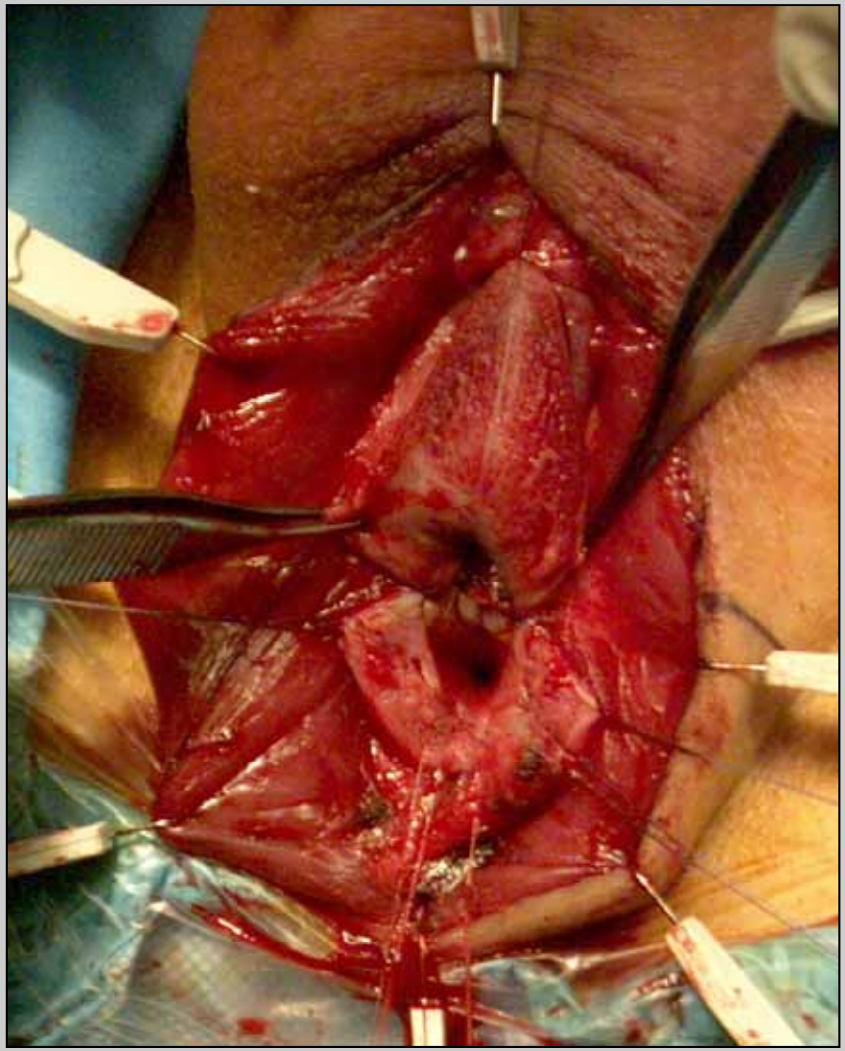

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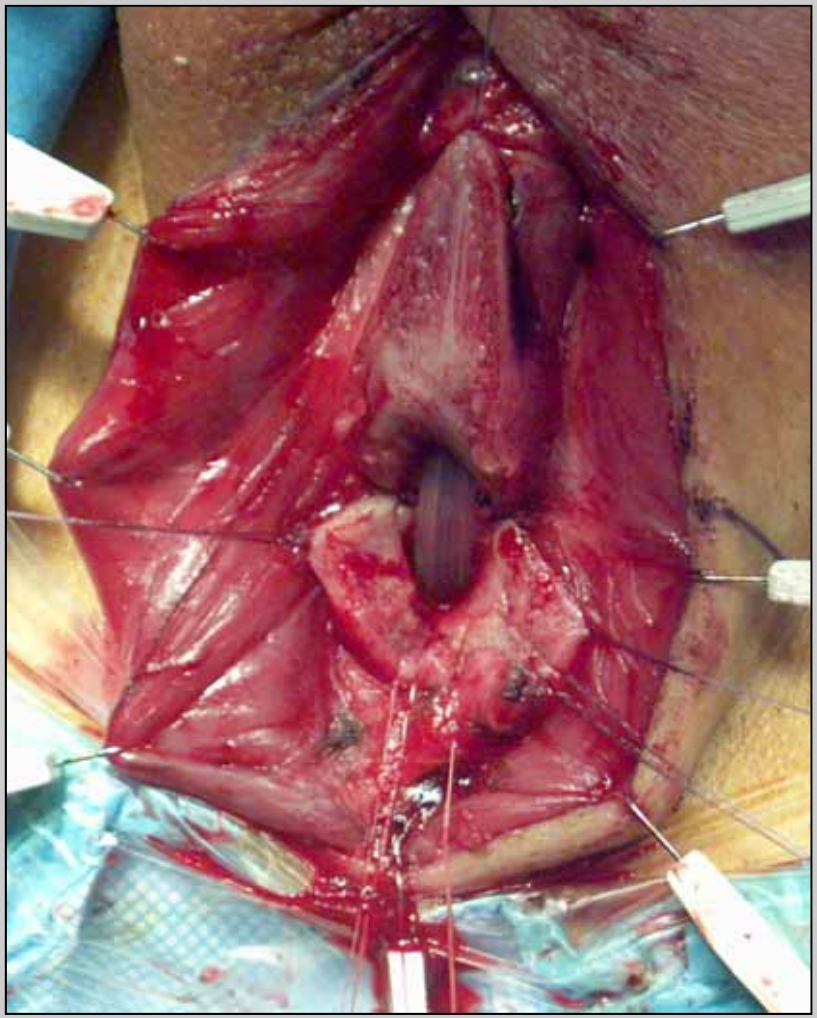

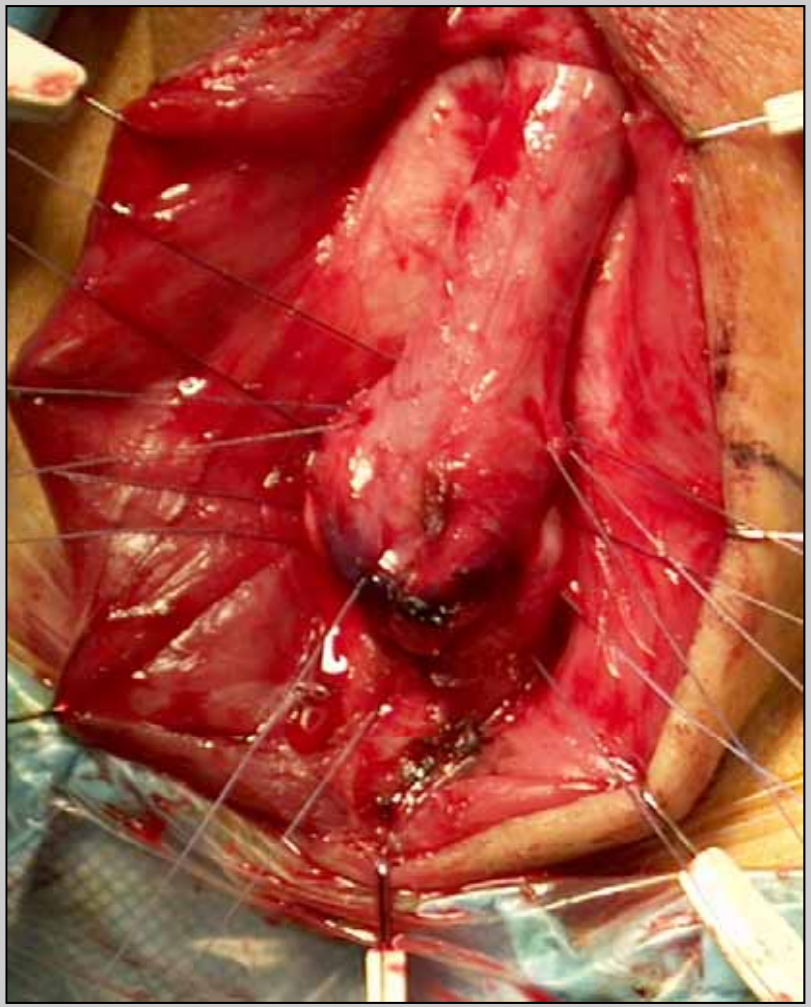

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2 - 4 cm traumatic bulbar urethral stricture

Augmented anastomotic repair

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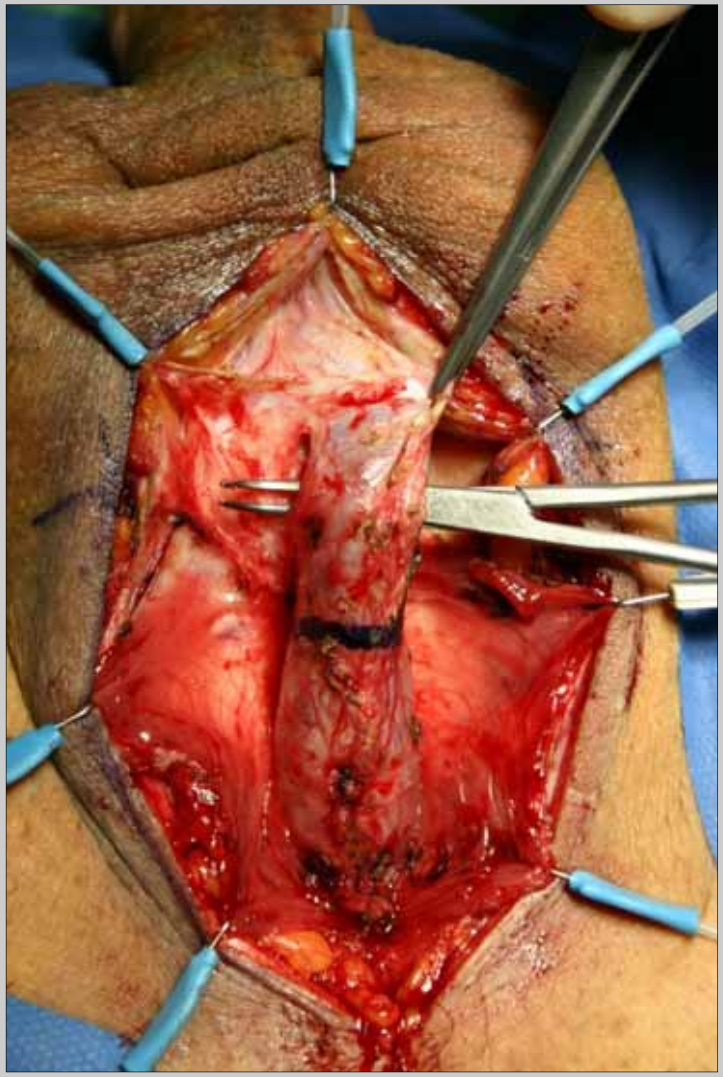

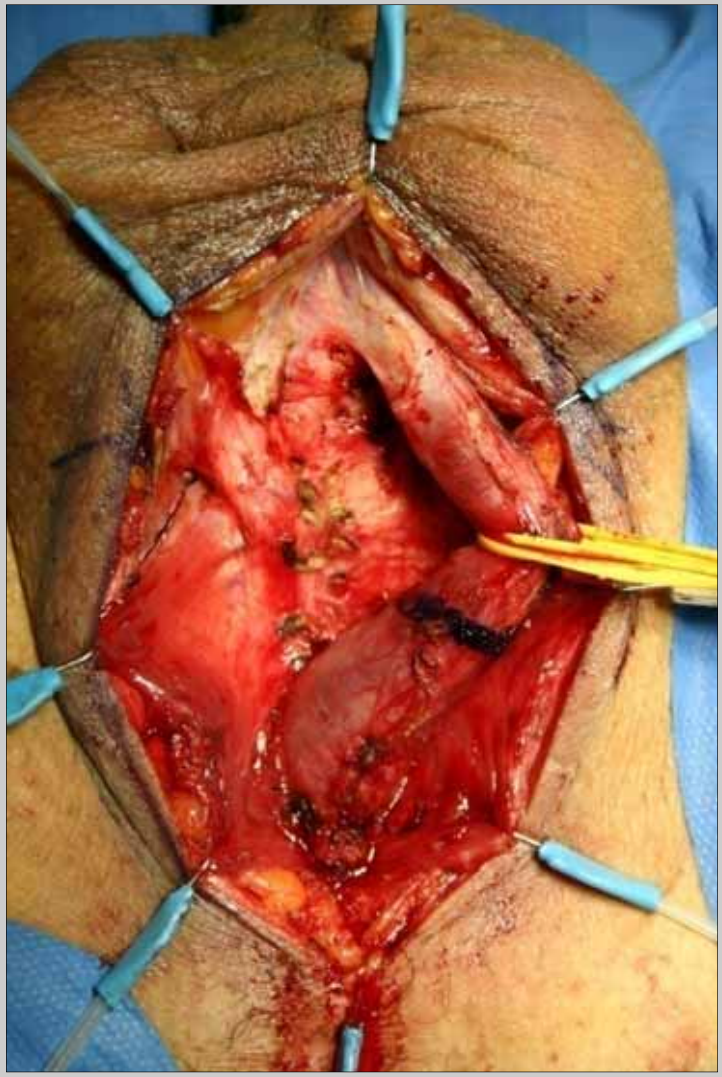

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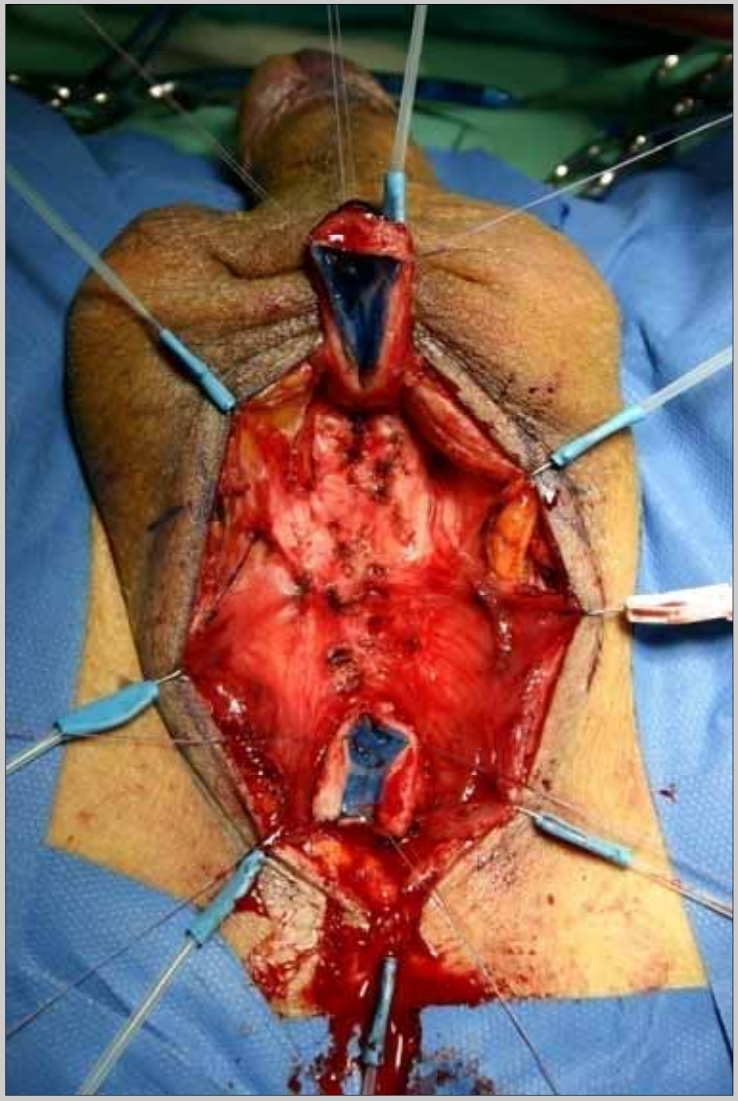

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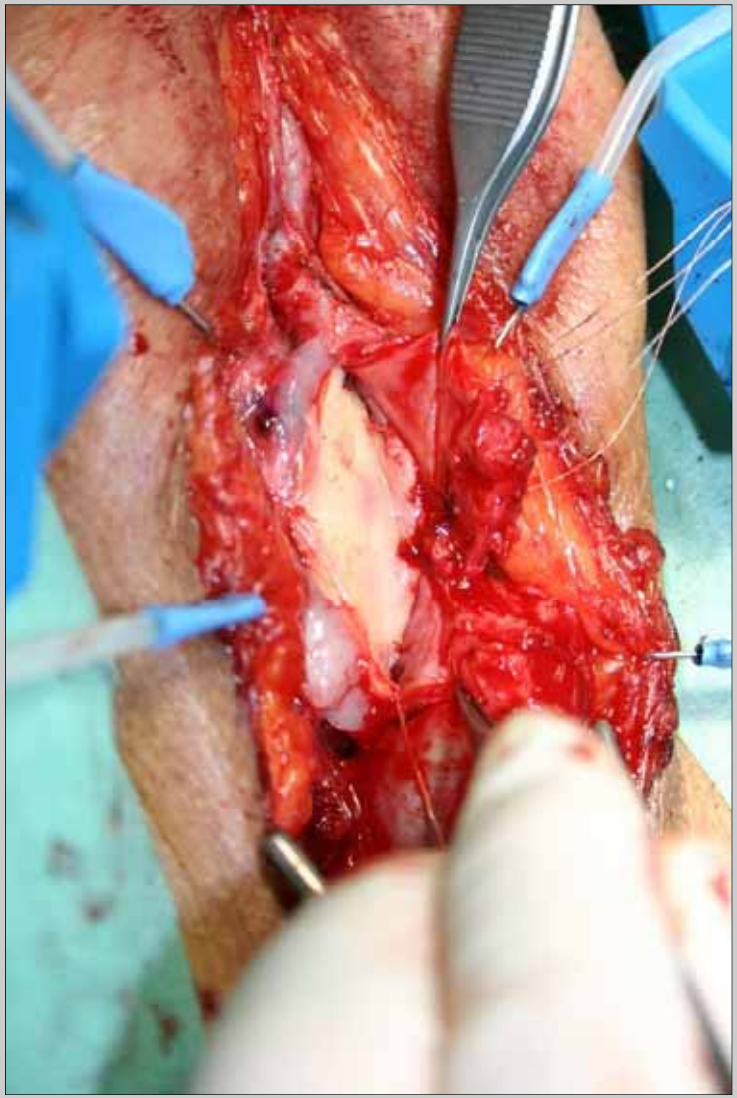

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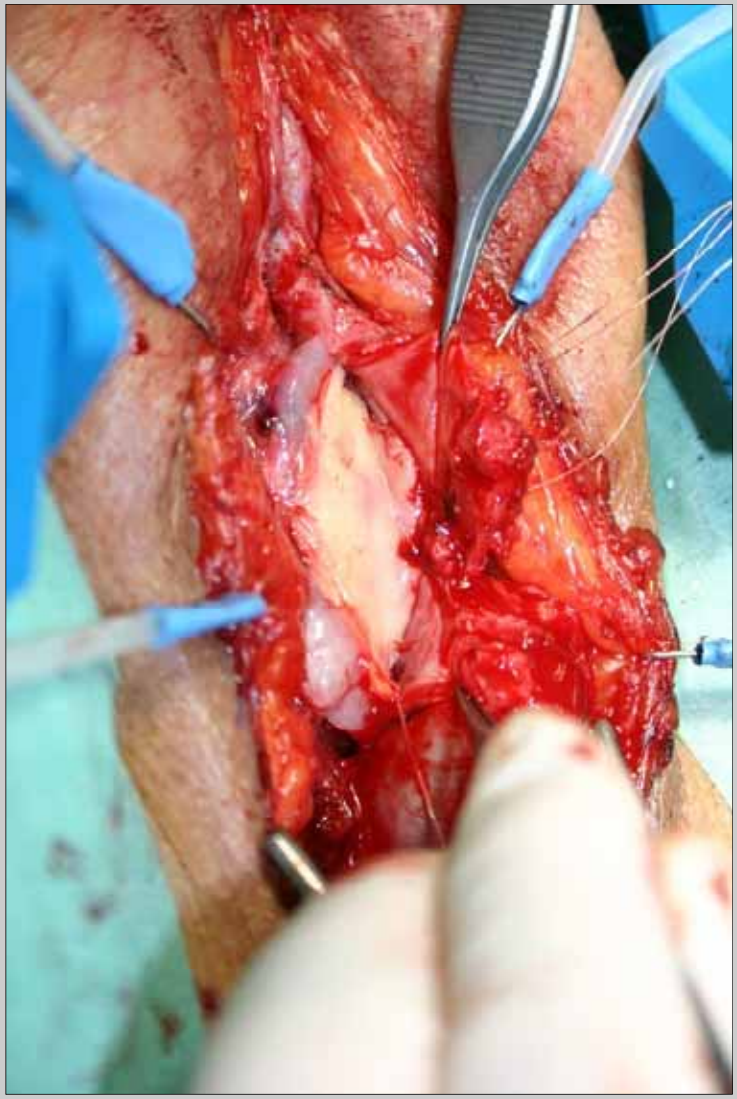

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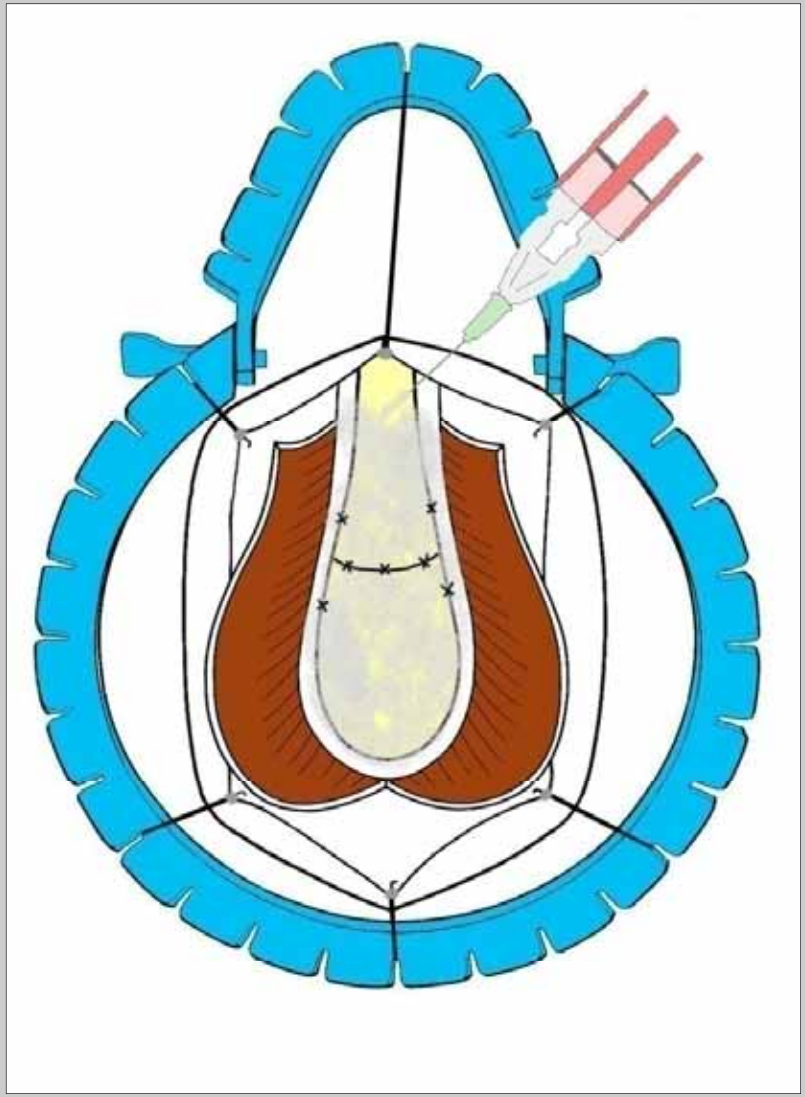

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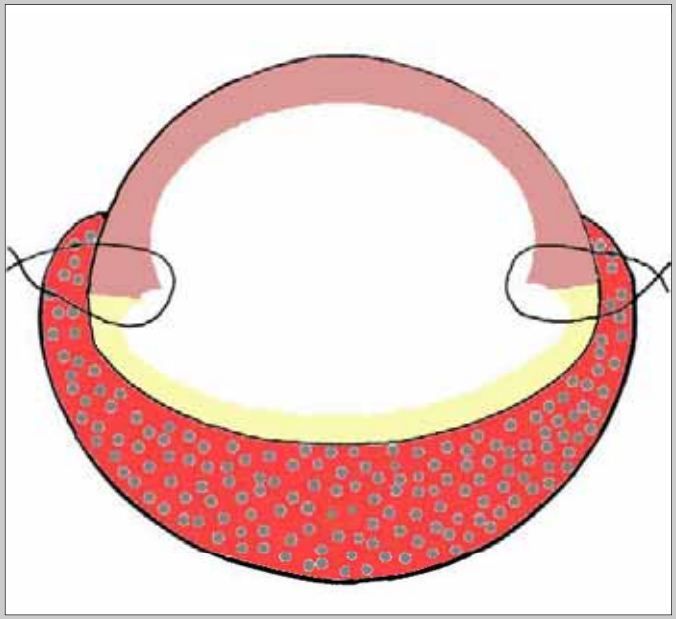
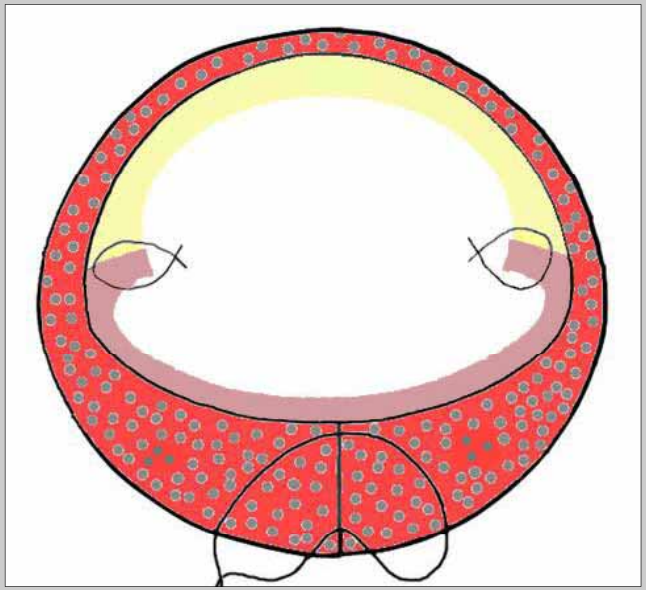
Oral mucosal graft onlay urethroplasty



dorsal



ventral

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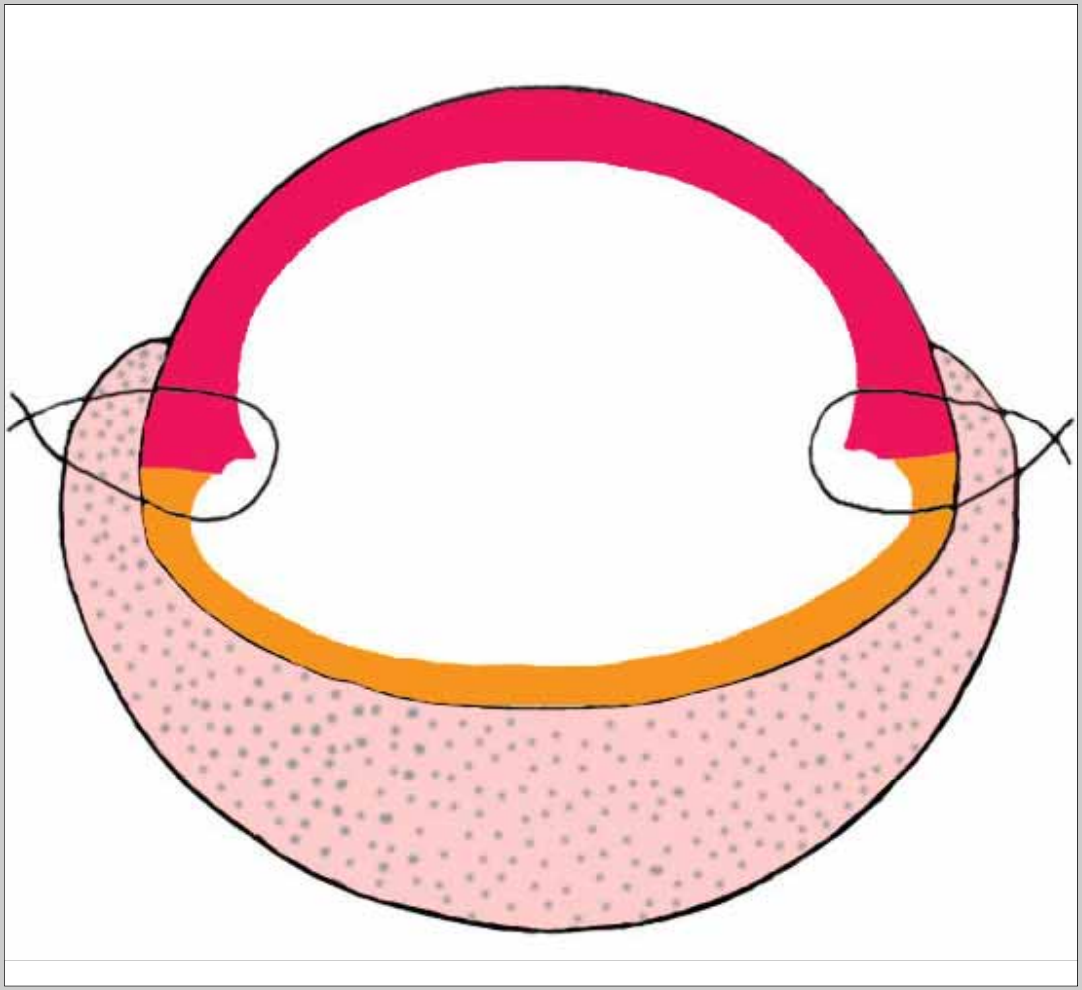
Muscle and nerve sparing dorsal onlay graft urethroplasty



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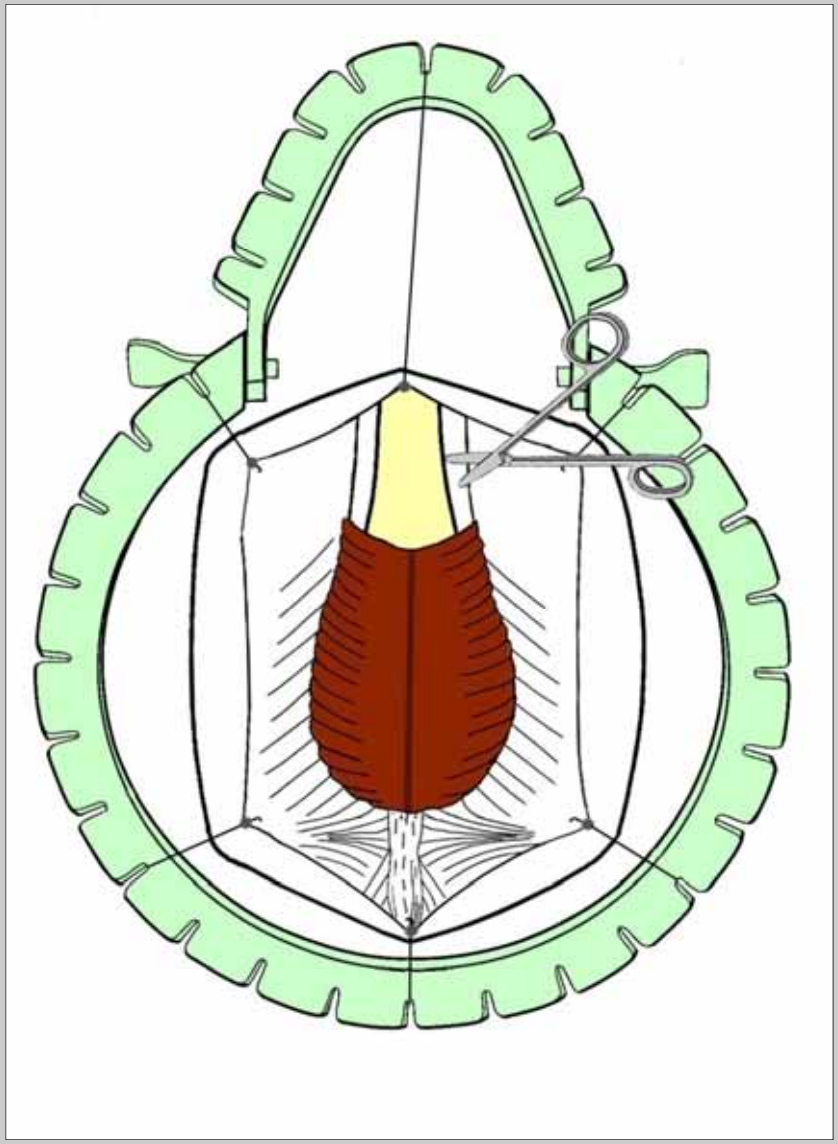

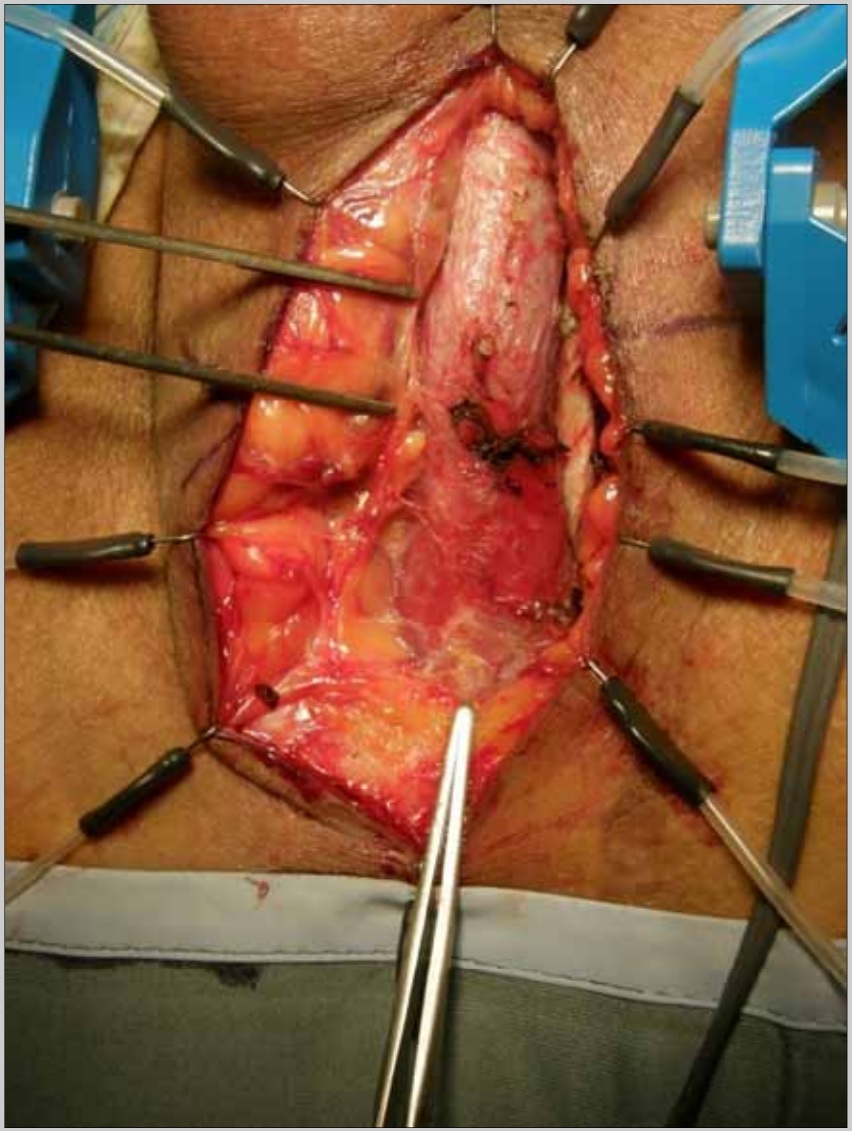

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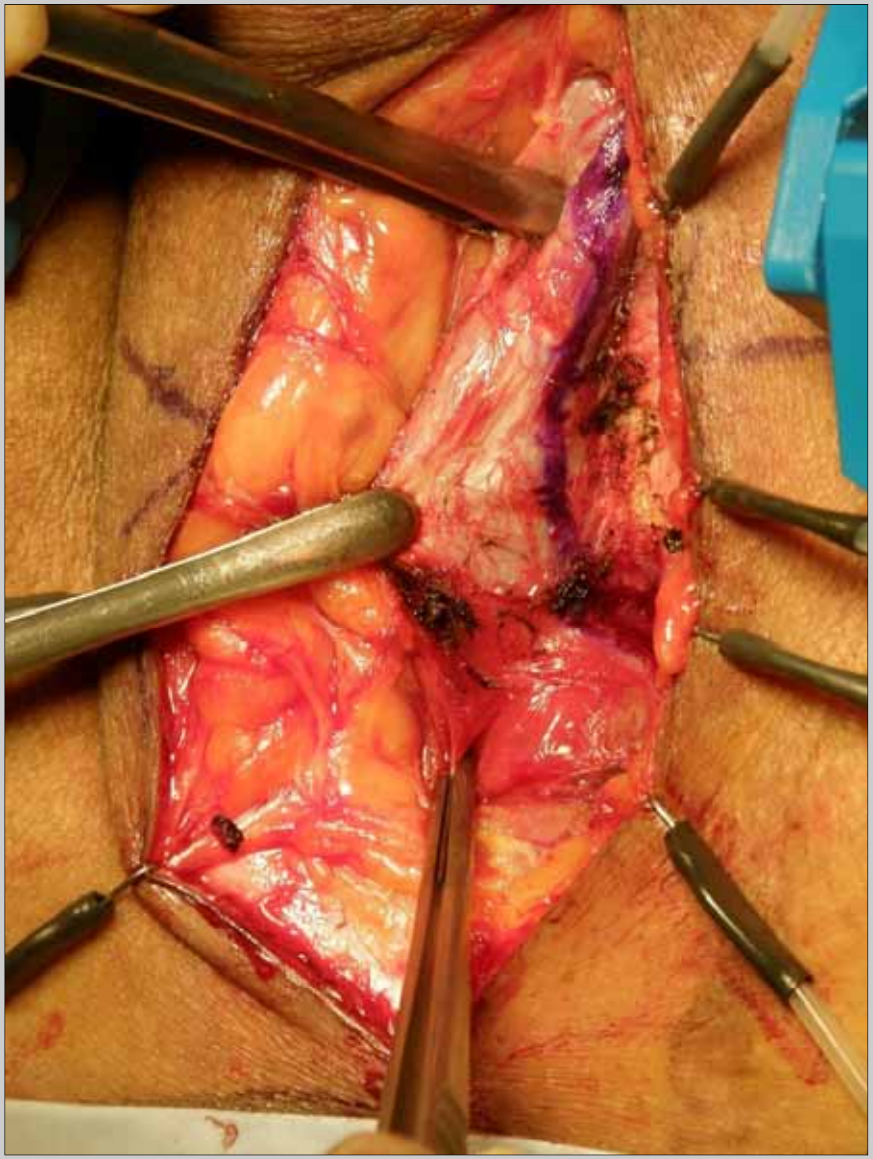

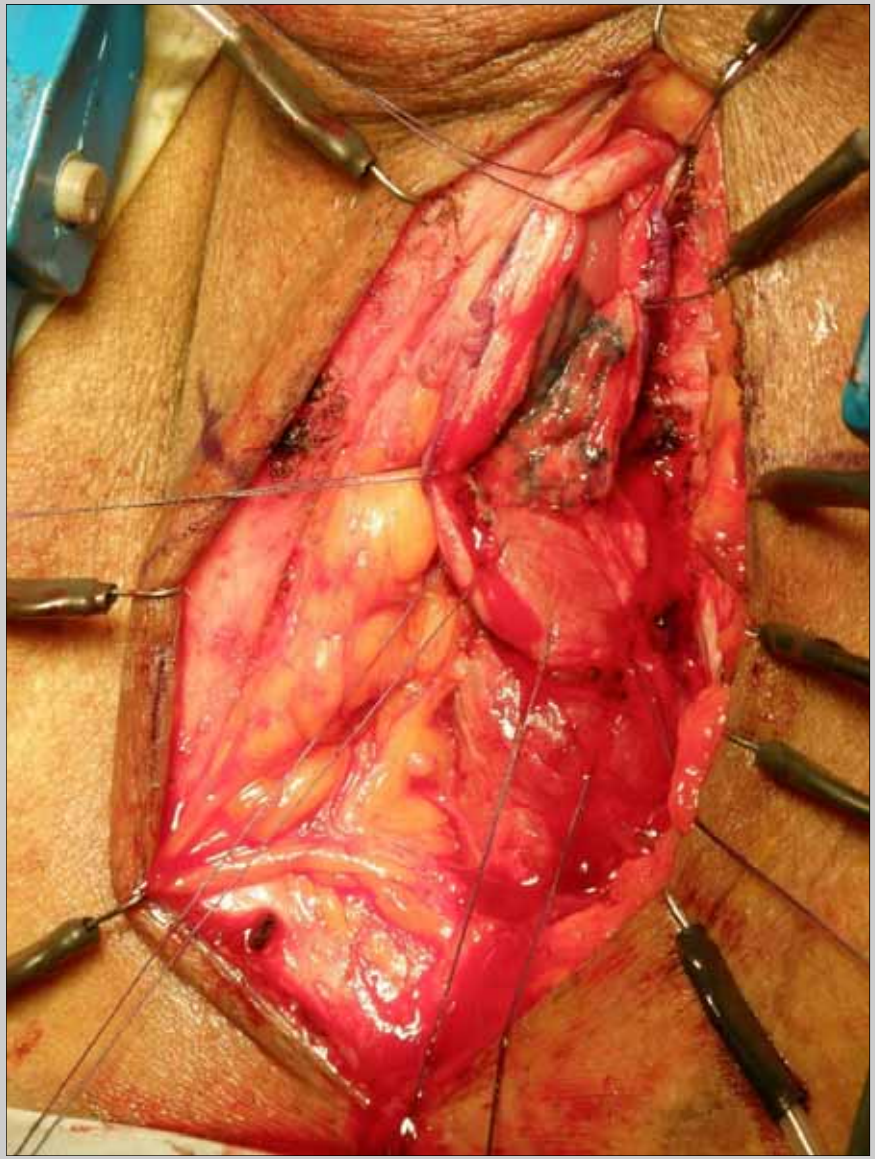

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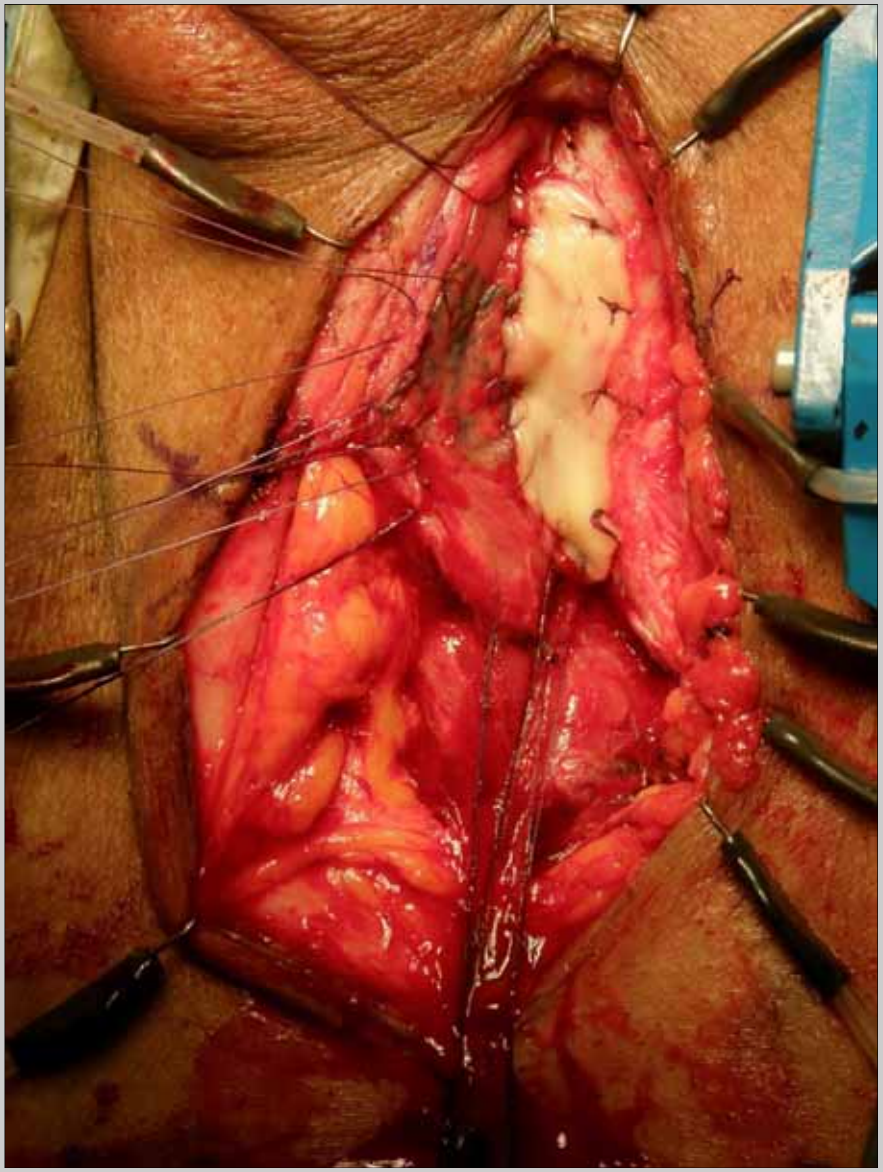

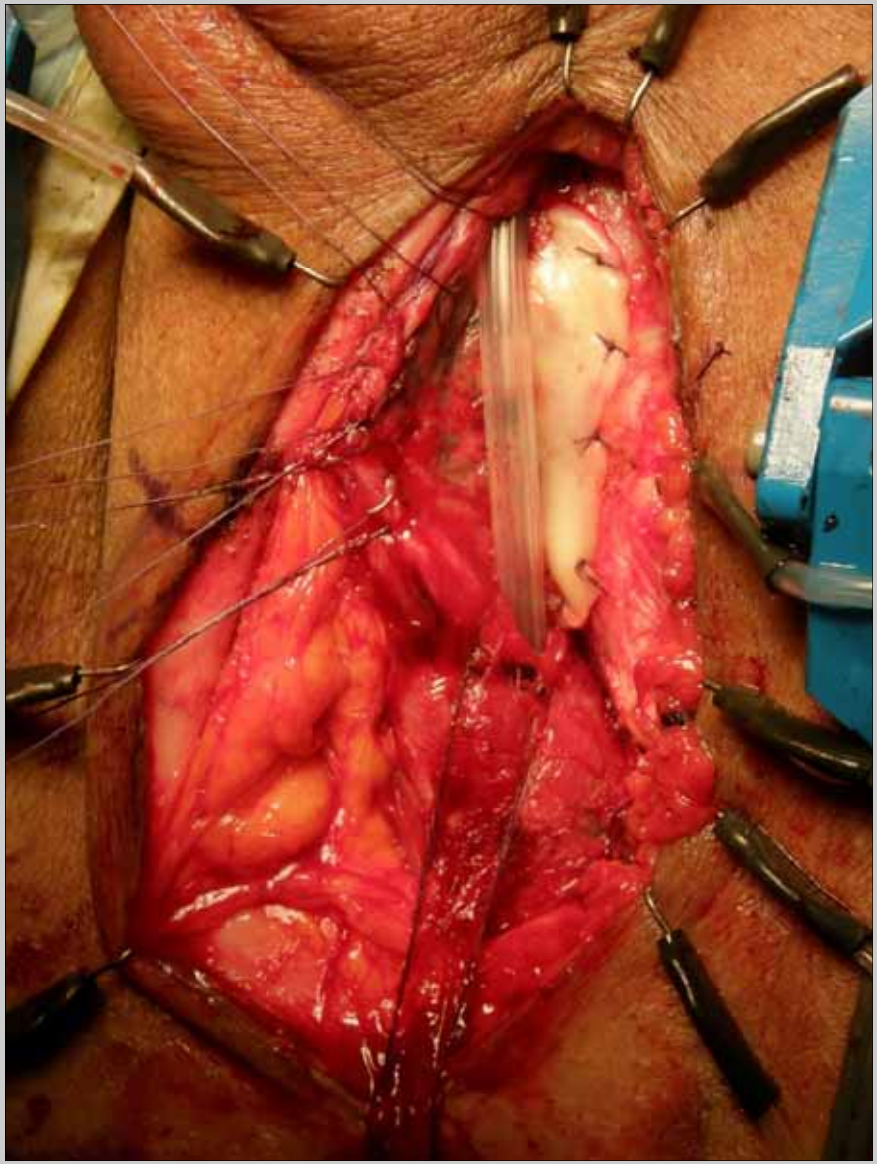

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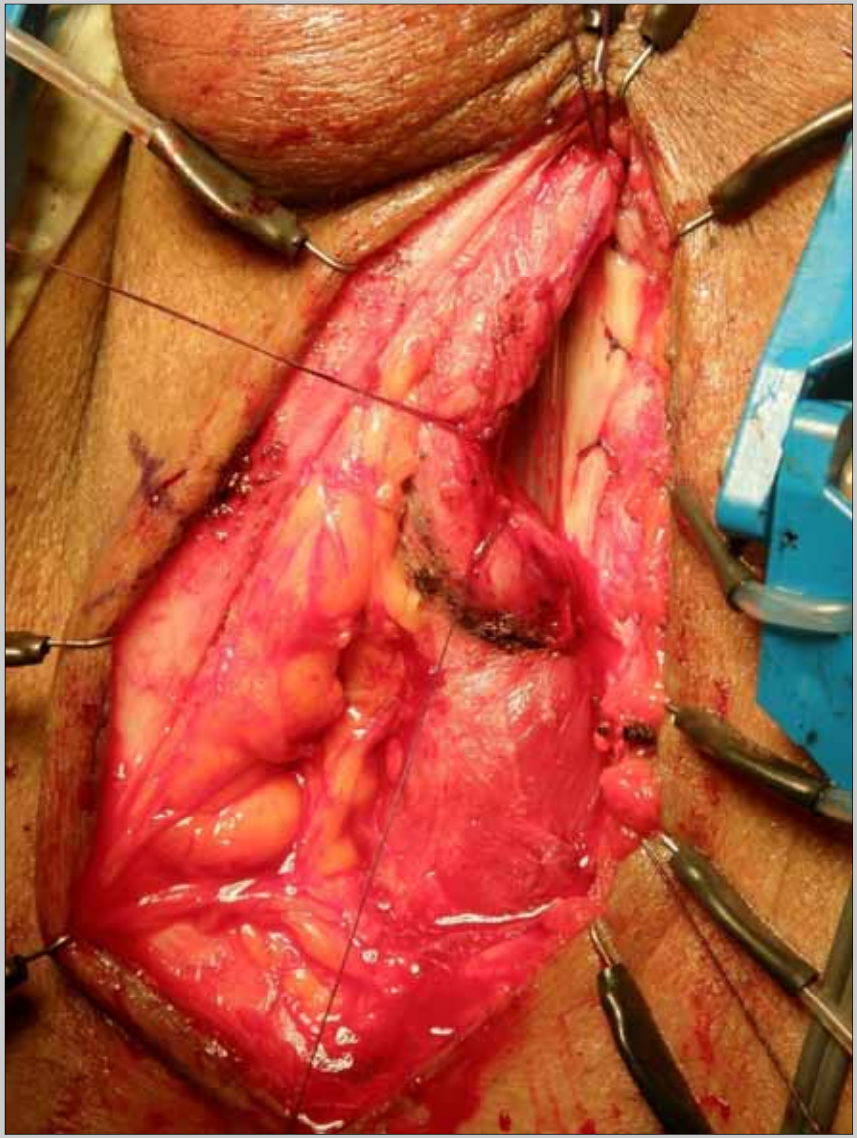

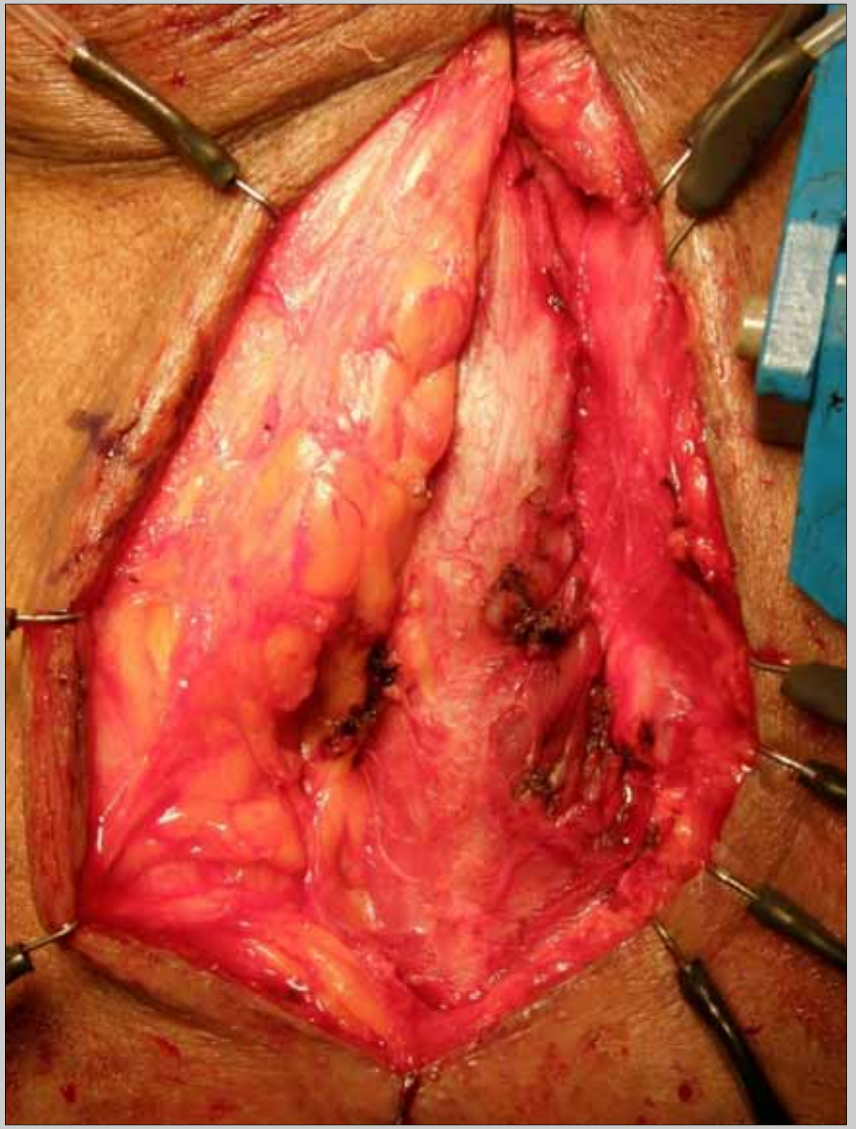

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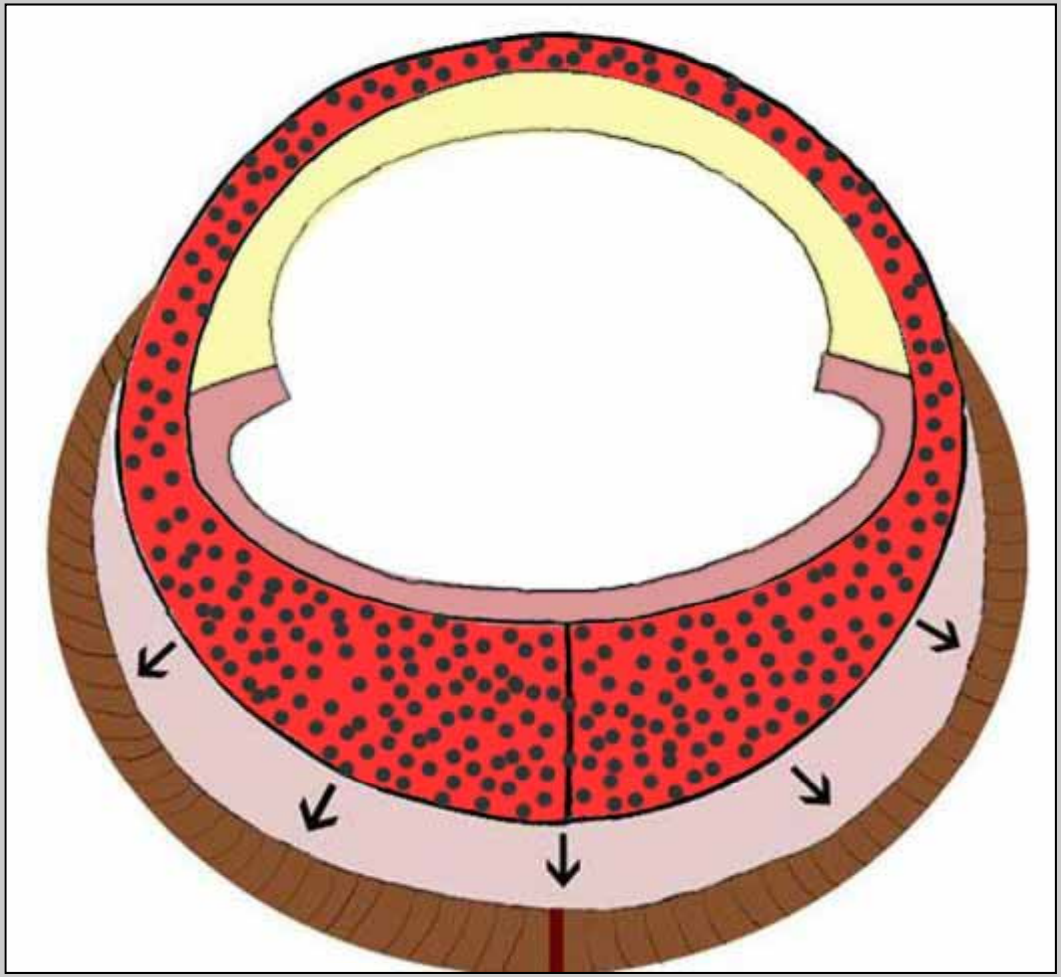
Muscle and nerve sparing ventral onlay graft bulbar urethroplasty



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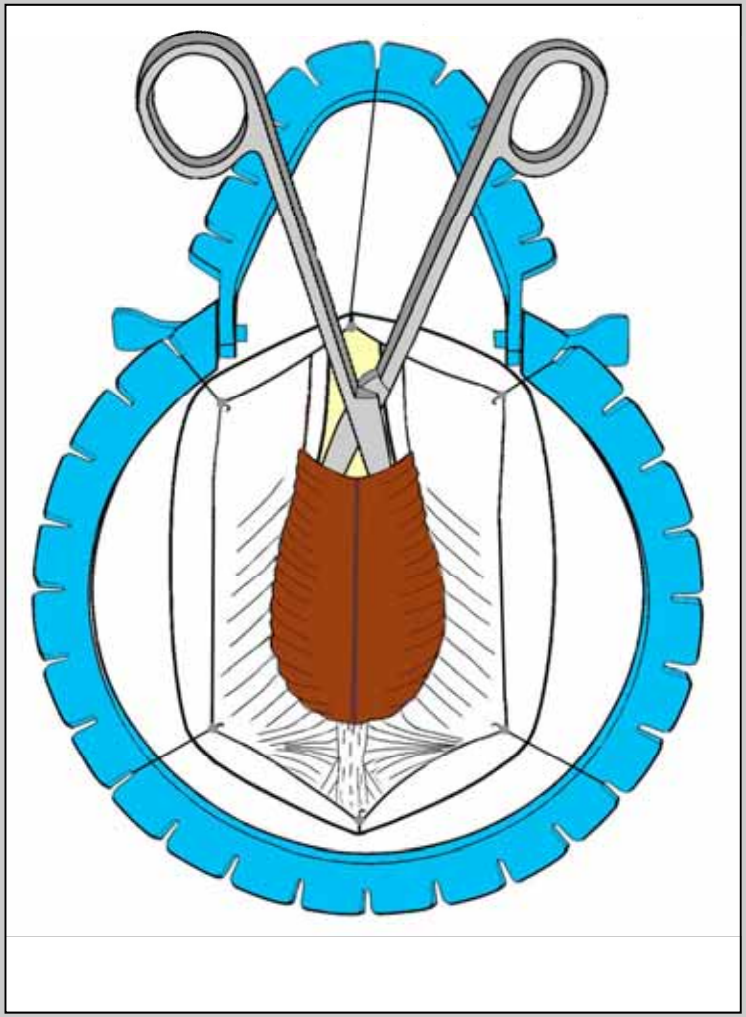
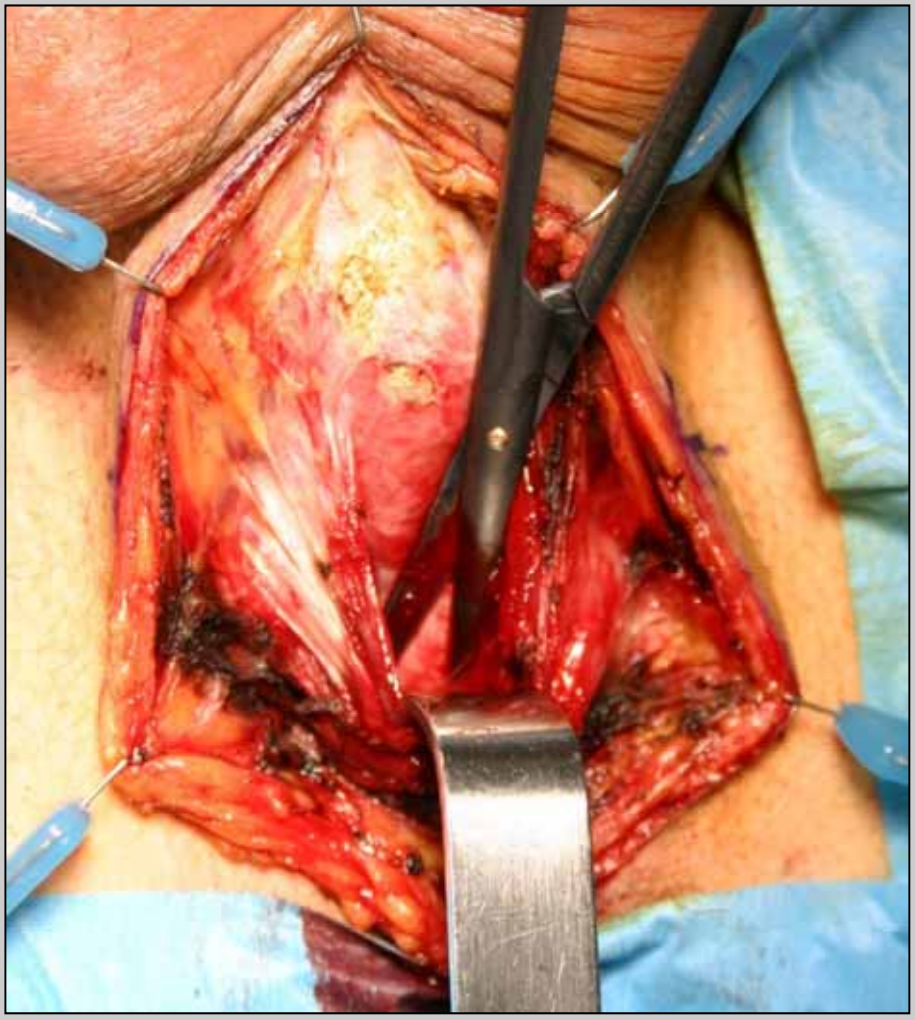
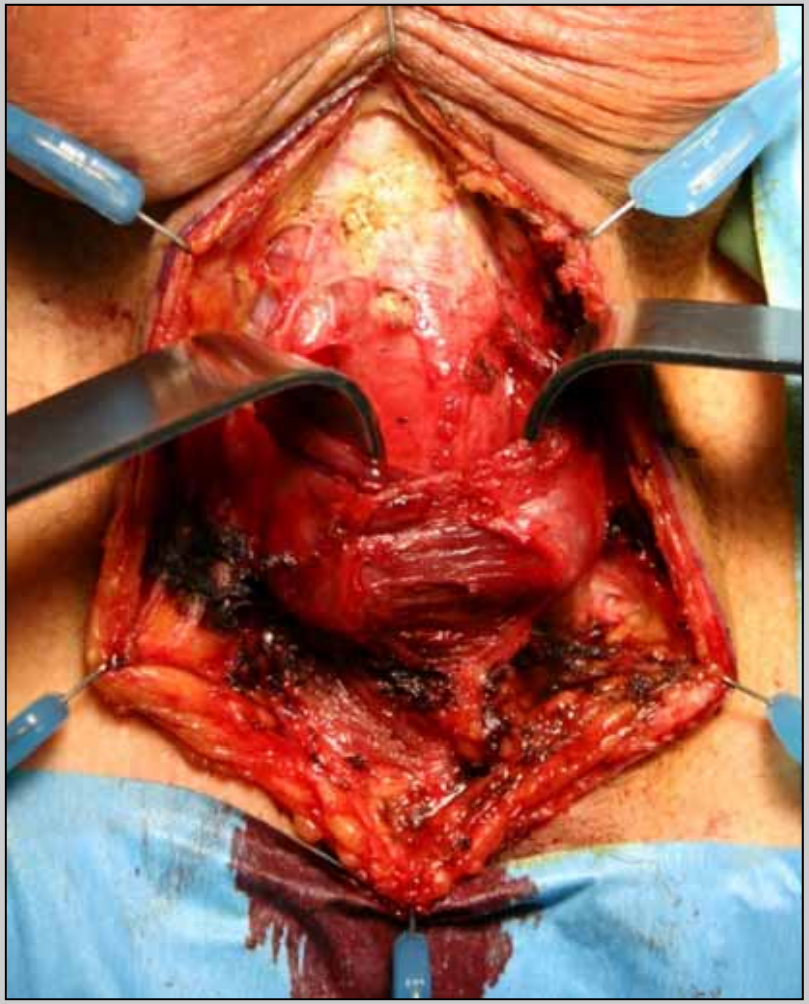
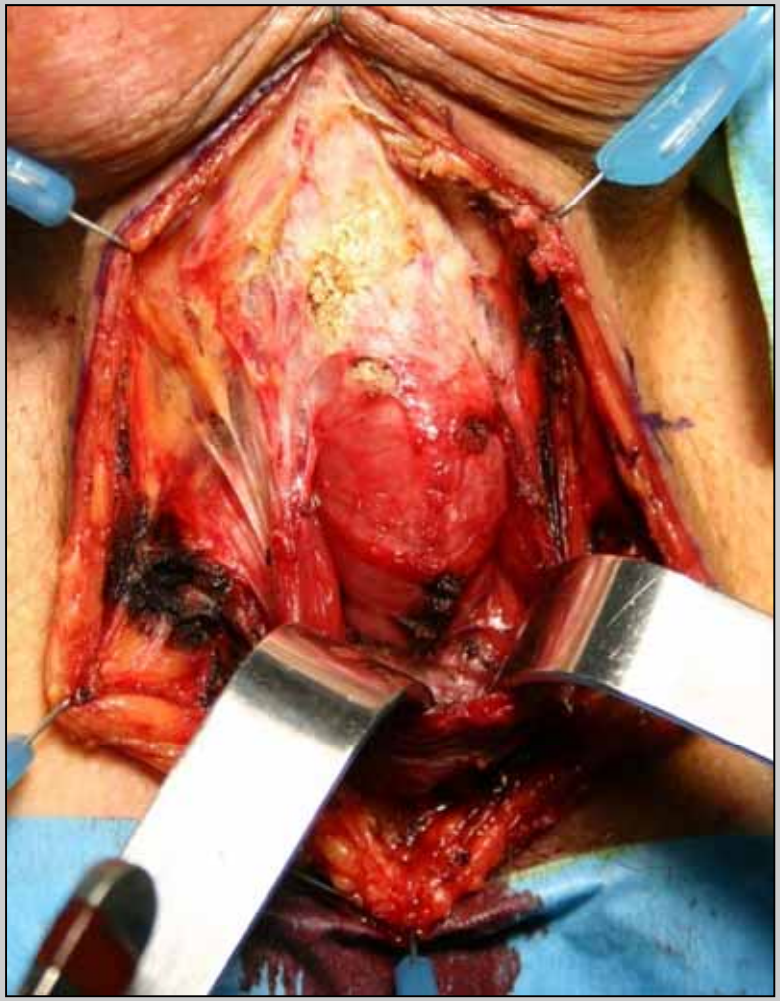




Barbagli G et al., Eur Urol 2008; 54:335-343





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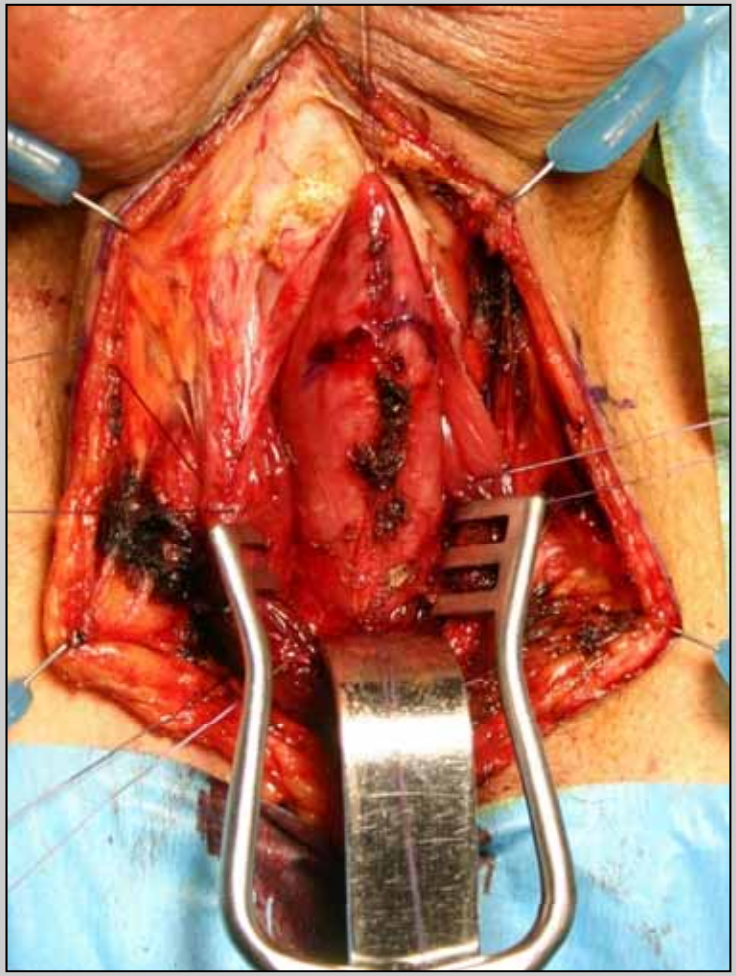

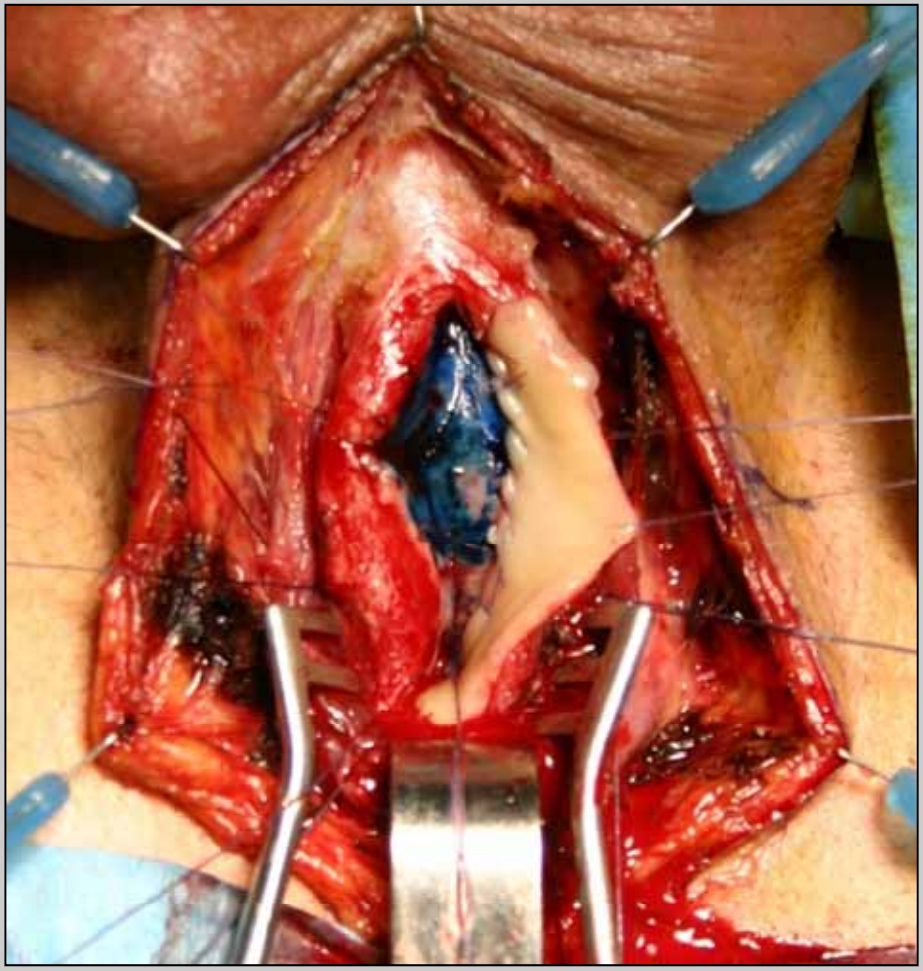

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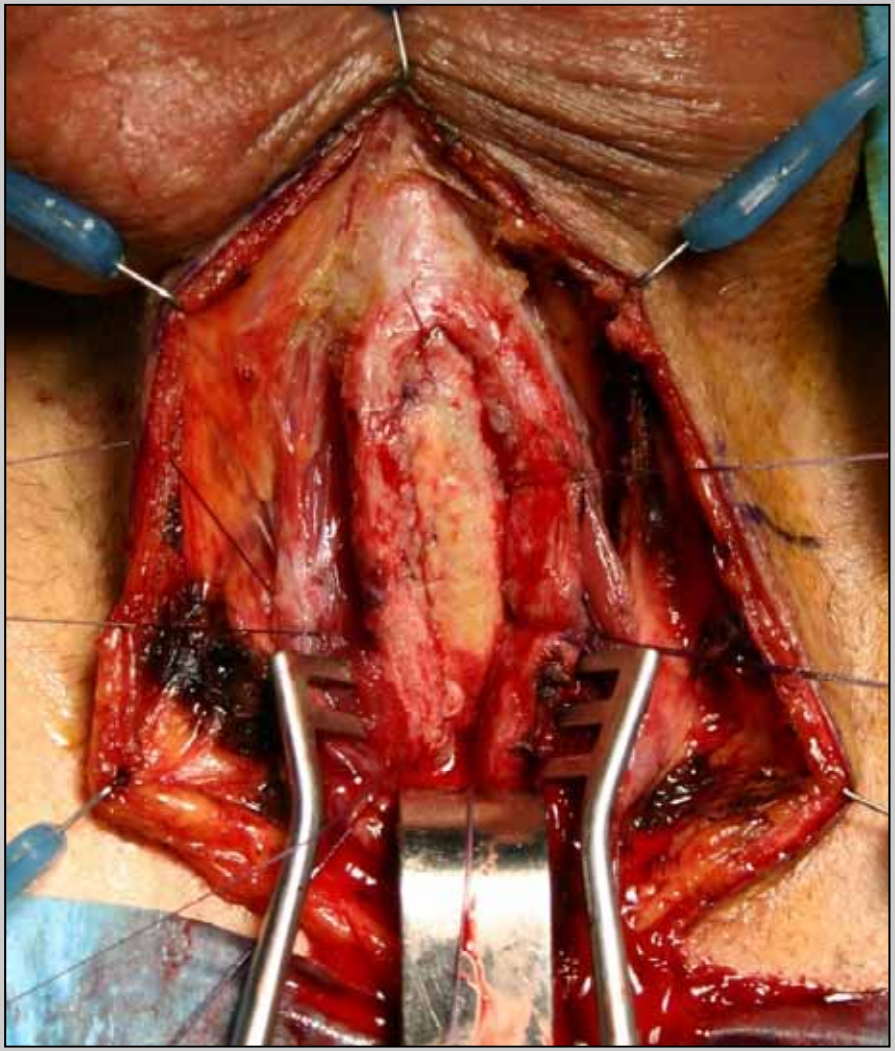

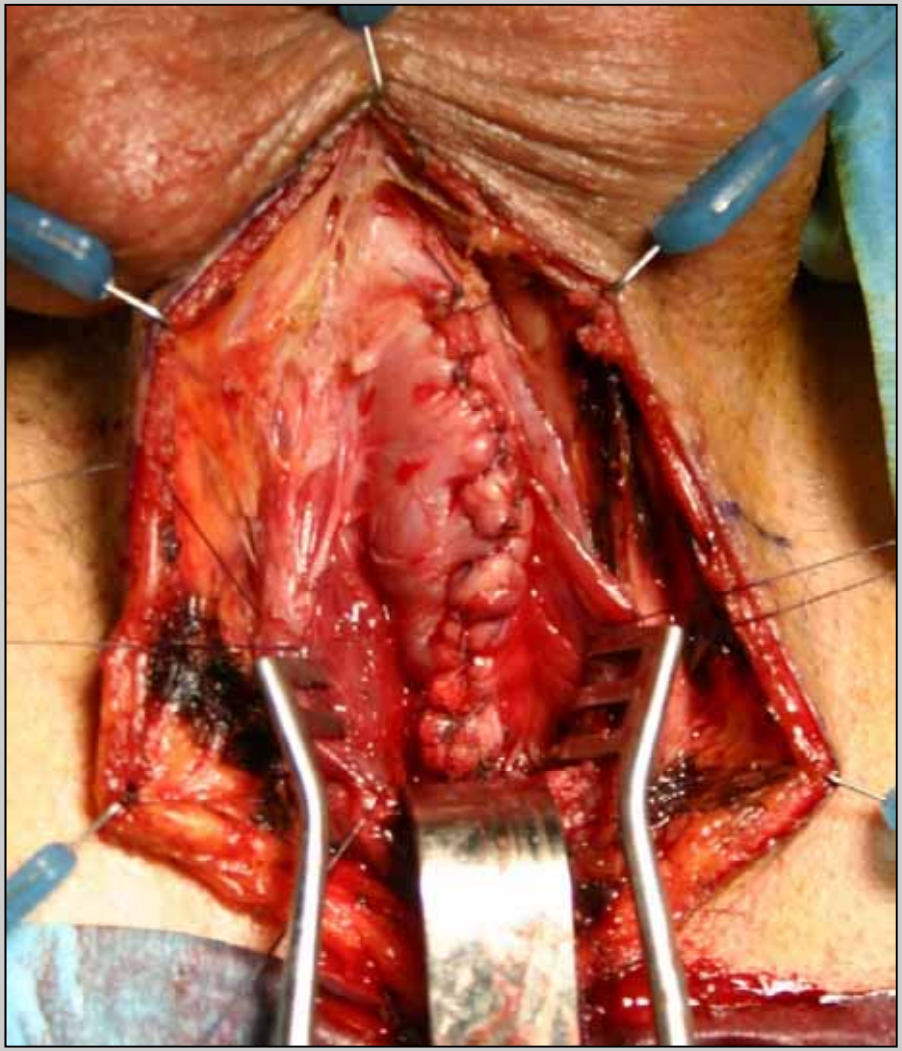

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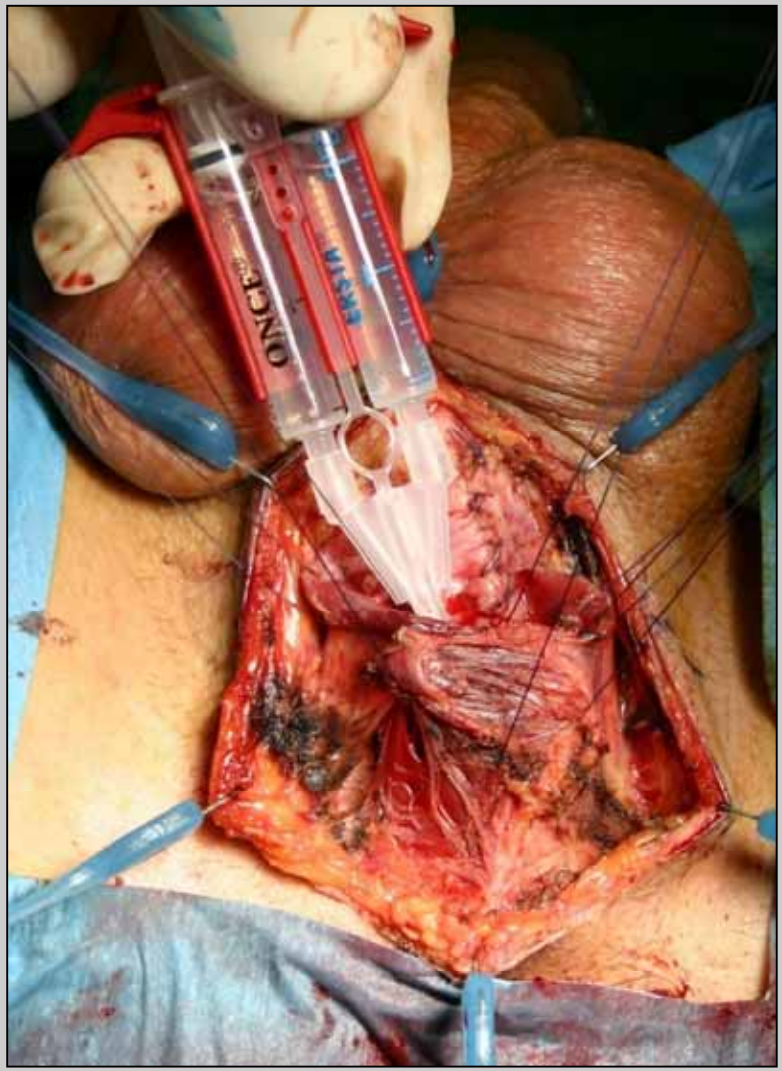

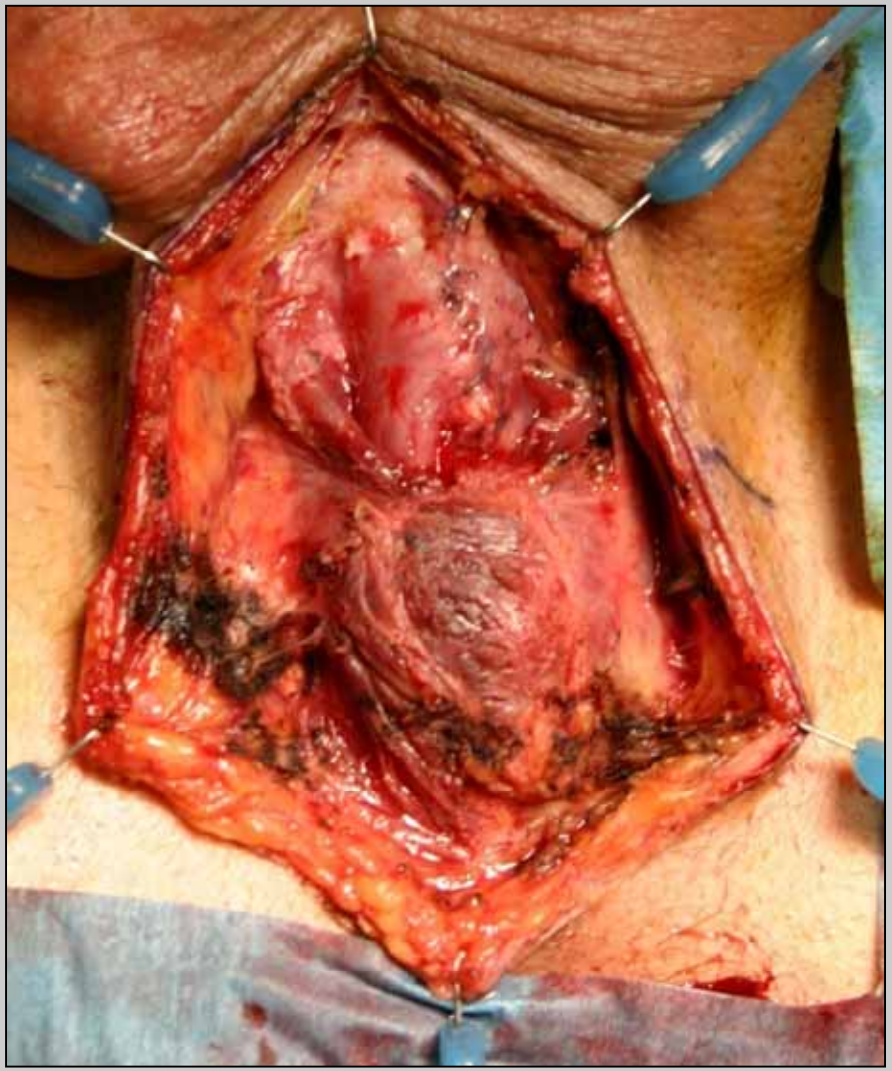

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Bulbar urethroplasty:

the future

(2001 ➡

Tissue-engineered buccal mucosa for substitution urethroplasty

S. BHARGAVA*†, C.R. CHAPPLE*, A.J. BULLOCK†, C. LAYTON† and S. MACNEIL†
*Royal Hallamshire Hospital, Department of Urology, Section of Reconstruction, Urodynamics and Female Urology, and †University of Sheffield, Division of Clinical Sciences (North), Sheffield, South Yorkshire, UK

British Journal Urology 2004; 93: 807-811

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Tissue-engineered oral mucosa graft urethroplasty

Fahlenkamp D, Barbagli G, Romano G, Lazzeri M

Dresda – Chemnitz (Germany)

December 8 - 2010

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

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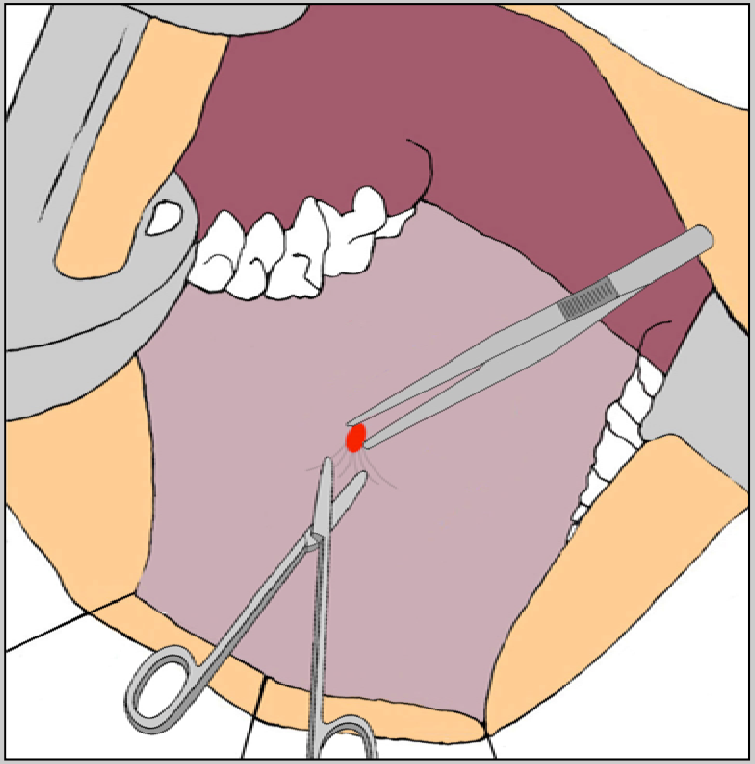
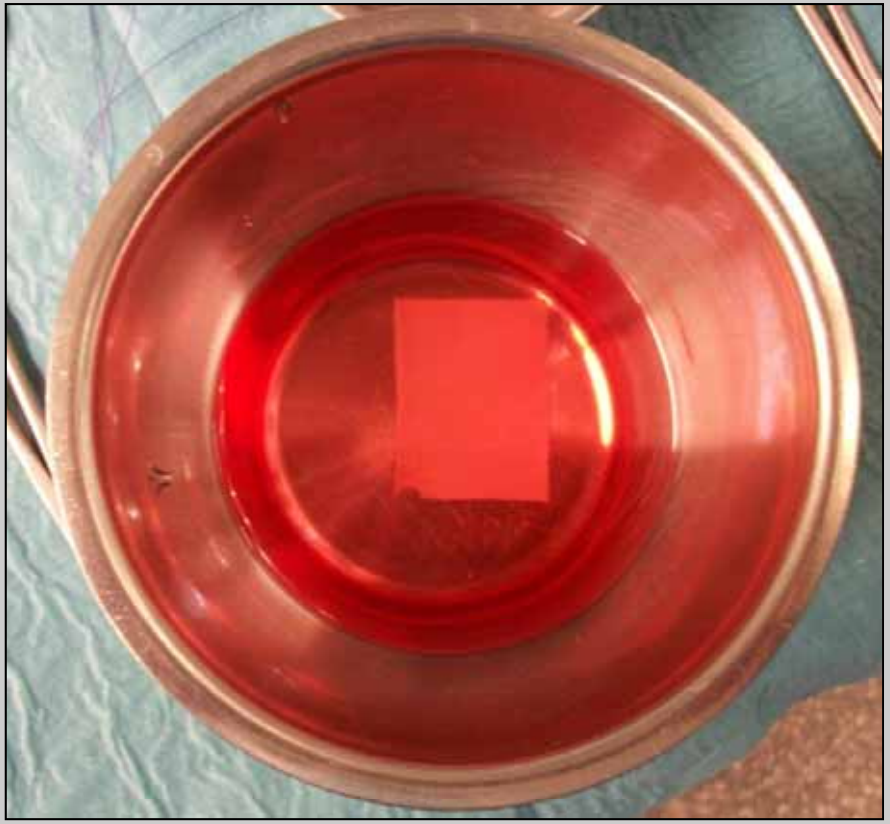
The tissue-engineered oral mucosa graft was arranged in laboratory in Dresda (Germany), one of the most advanced pharmaceutical clean room facilities for manufacturing of cell-based medicinal products according to "Good Manufacturing Practice" (GMP)



A tiny oral mucosa biopsy is taken from the mouth of the patient and sent to the certified cell culture laboratory

The new graft 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

Bulbar urethroplasty with dorsal inlay of tissue engineeed oral mucosa graft

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Pre-operative retrograde urethrography

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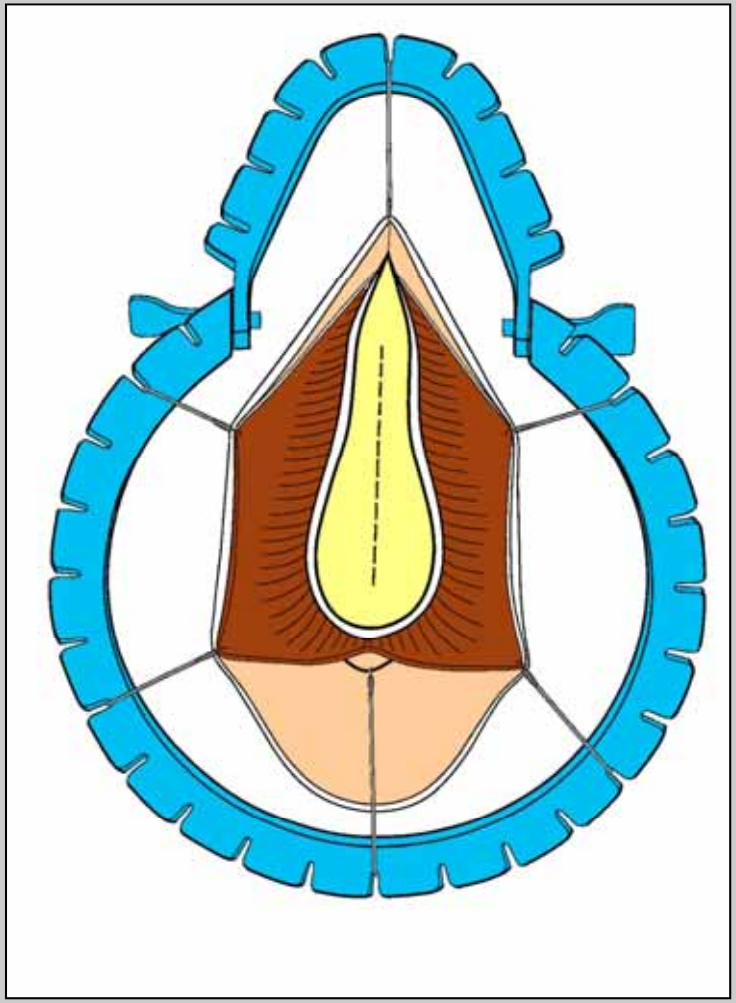

The bulbar urethra is opened along its ventral surface

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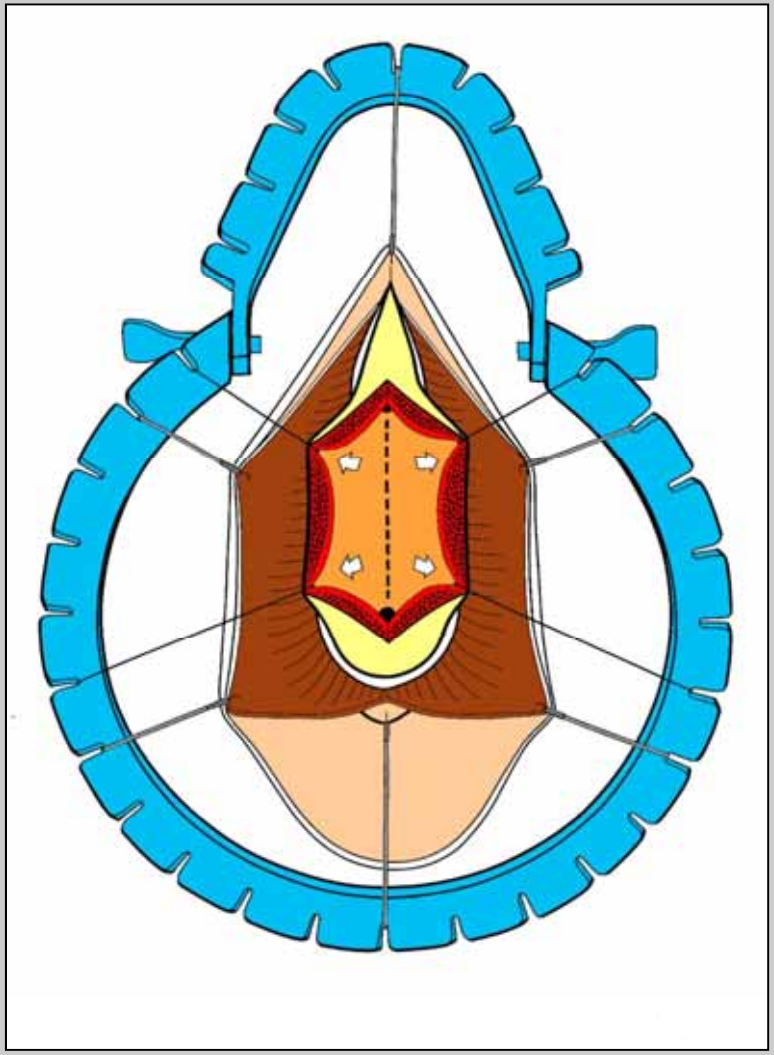

The urethral plate is longitudinally incised

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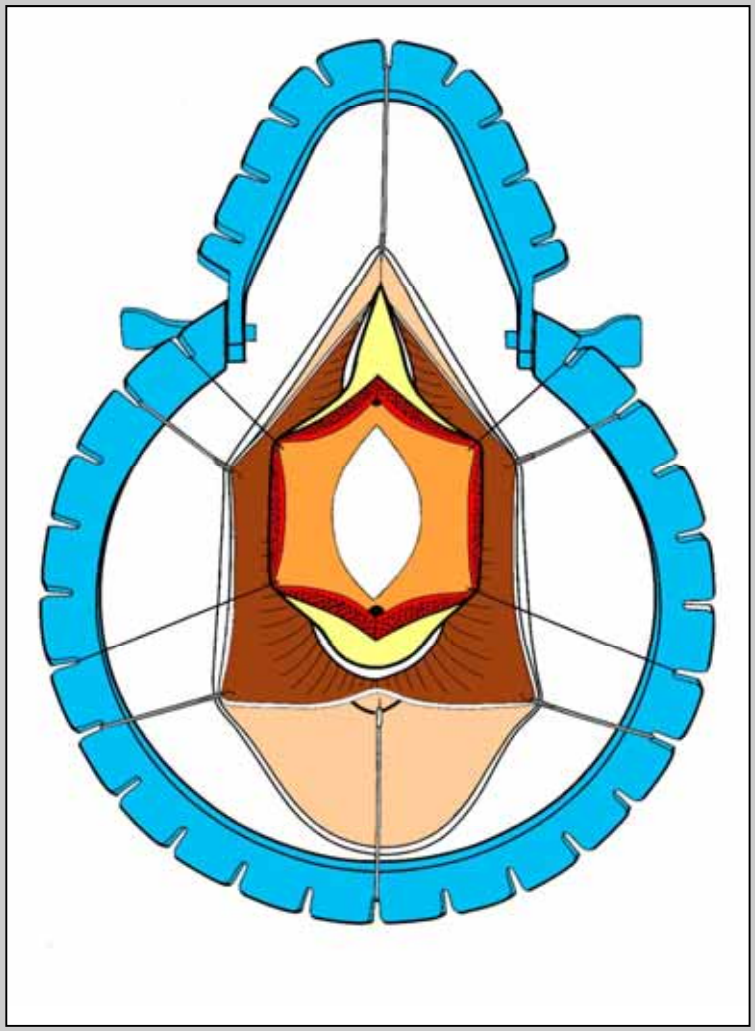

The urethral plate is longitudinally incised to obtain a wide window

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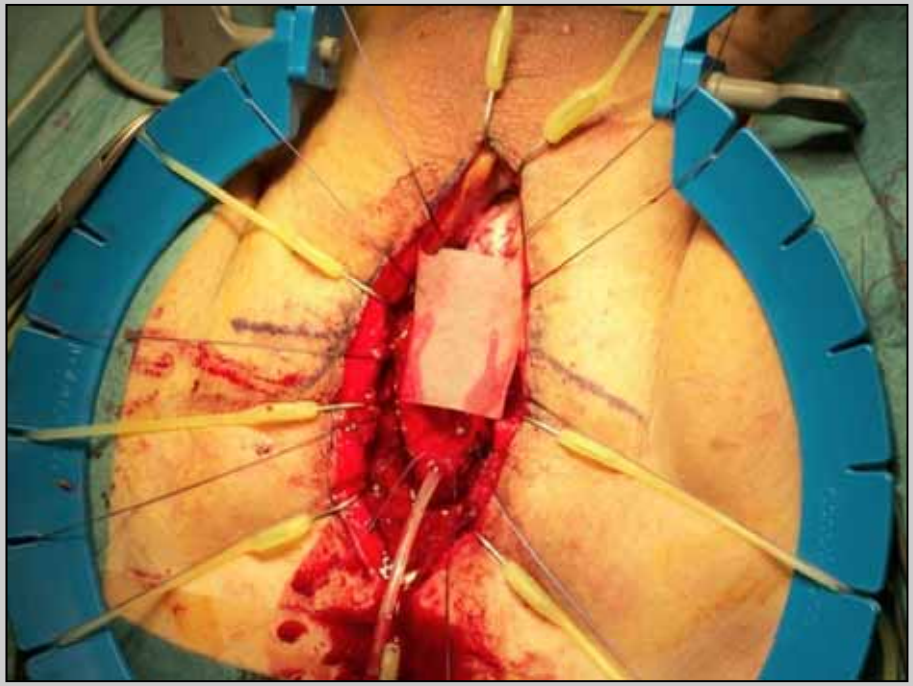
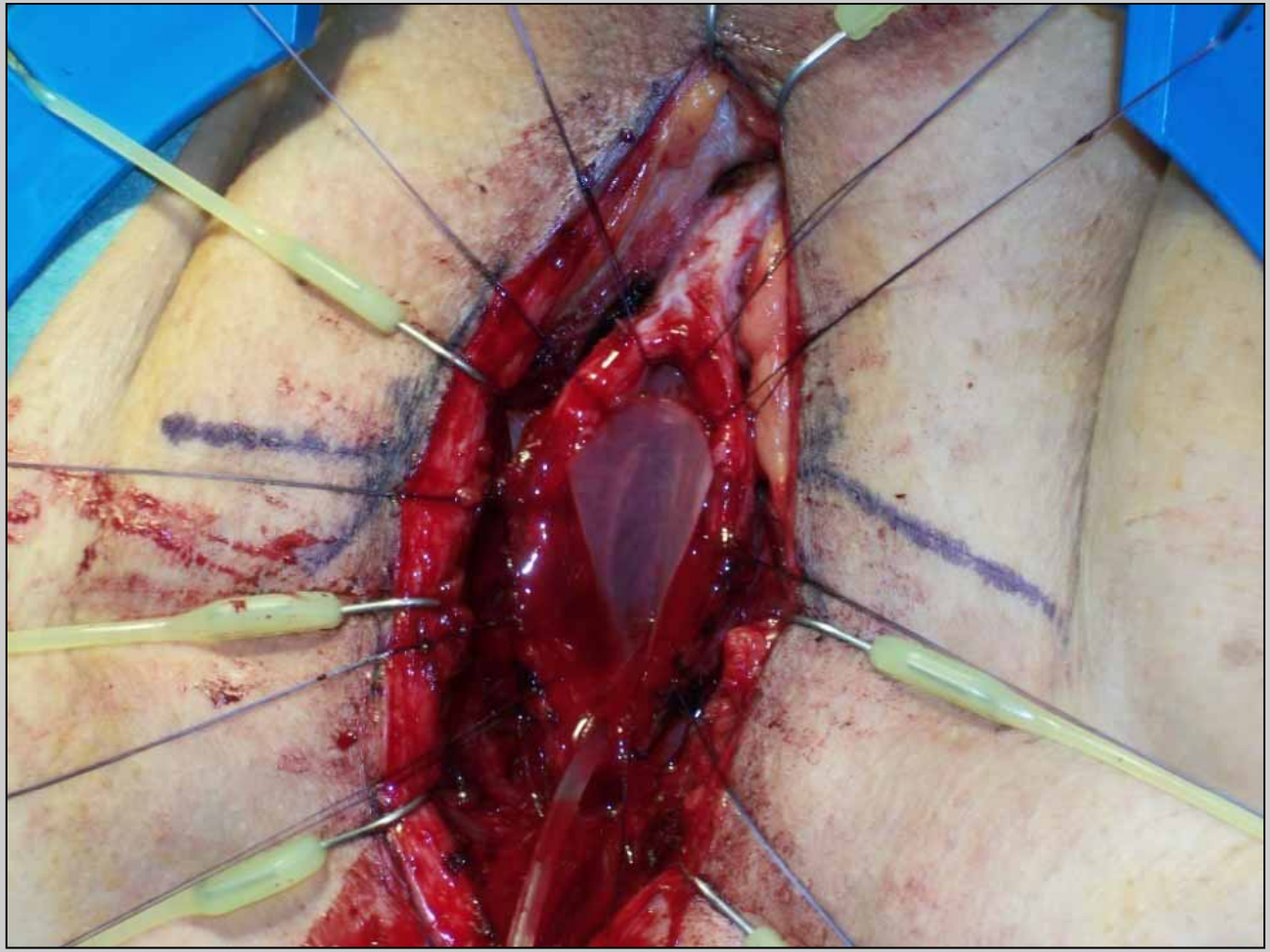


The tissue engineered oral graft is ready for the transplant into the urethra



The tissue engineered oral graft is layed carefully on the window created in the urethral plate

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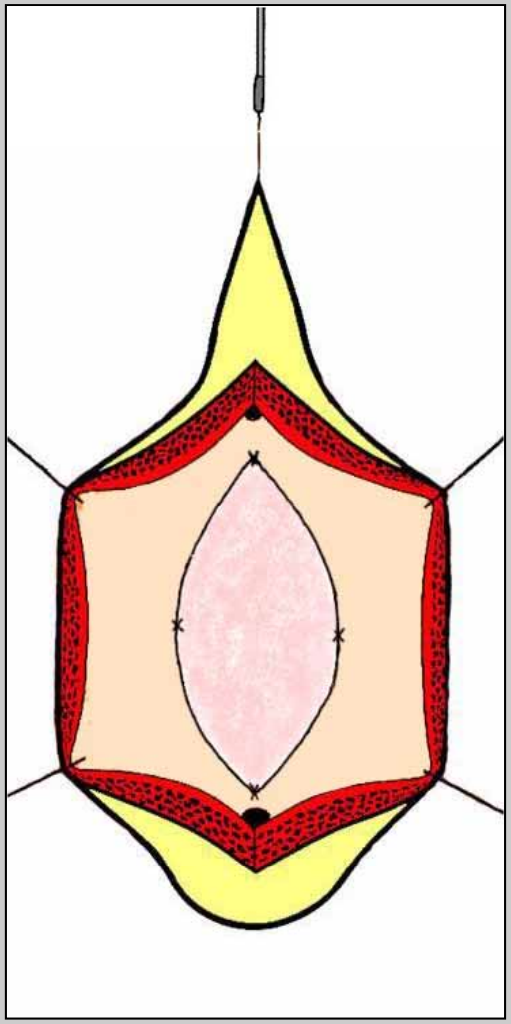
The tissue engineered oral graft is tailored according to the size of window creted into the original urethral mucosal plate



The tissue engineered oral graft is sutured and quilted deeply into the urethral plate window

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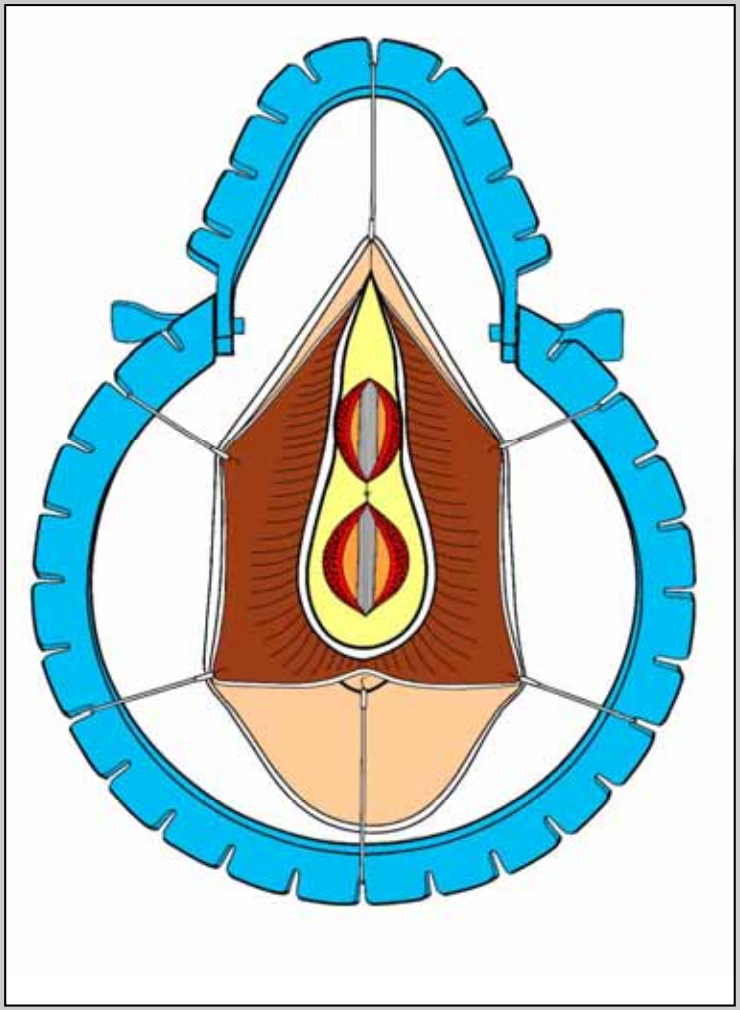

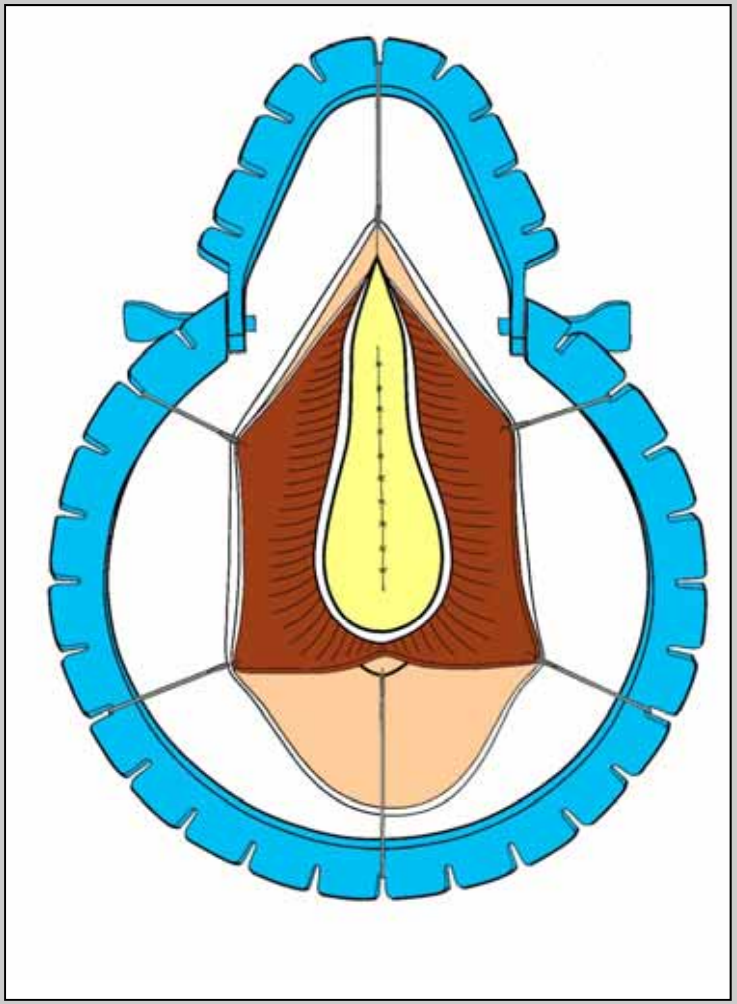

The bulbar urethra is closed over 16 Ch Foley silicone catheter

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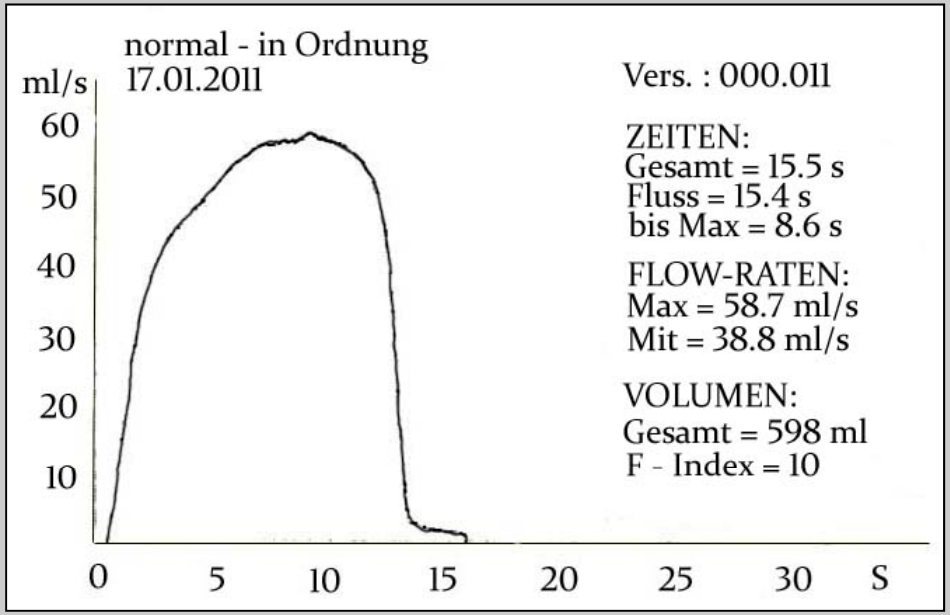

Four weeks after urethroplasty uroflowmetry and urethrography is made

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This tissue-engineered oral mucosa graft urethroplasty

will be soon ready at our Center,

the first Center selected for using this product in Italy

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Our preliminary experience

The oral mucosa coming from laboratory is significantly different from the oral mucosa coming from the mouth of patient

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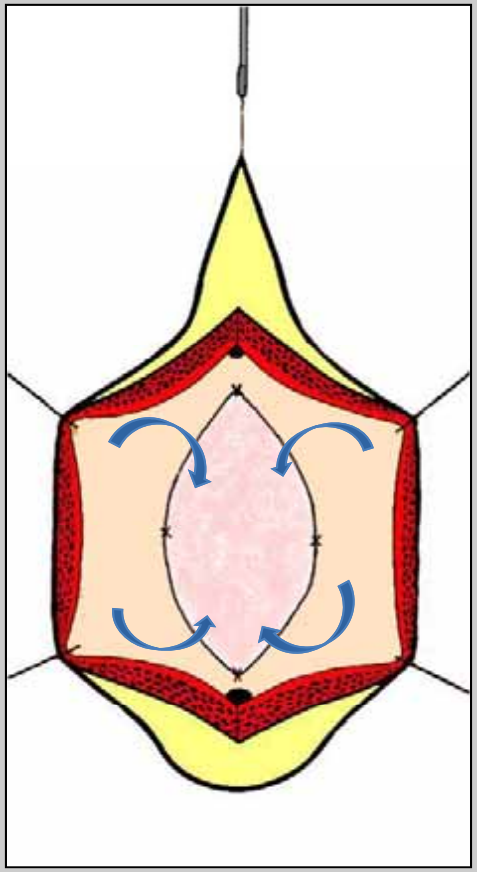
Our preliminary experience

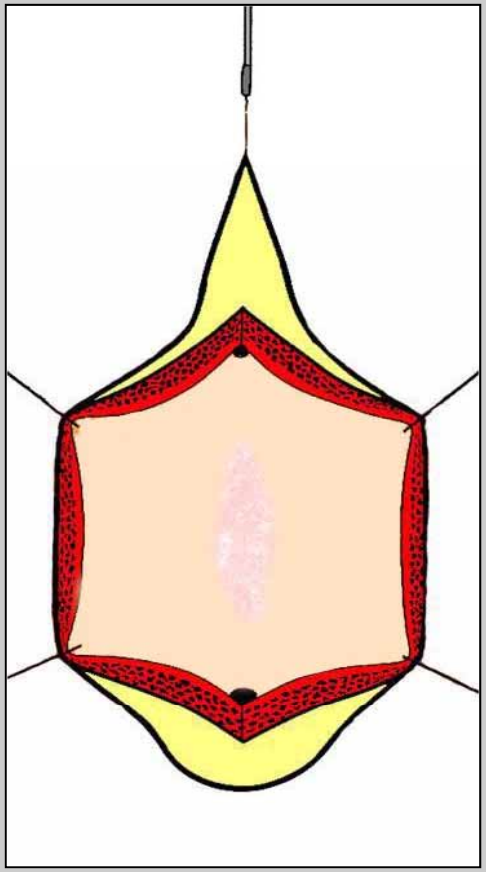
?

The oral mucosa coming from laboratory is probably

not adaptable for any type of urethroplasty

Our preliminary experience





At present, the use of oral mucosa coming from laboratory is not a common surgical procedure and should be performed only in a Centre of excellence for urethral surgery

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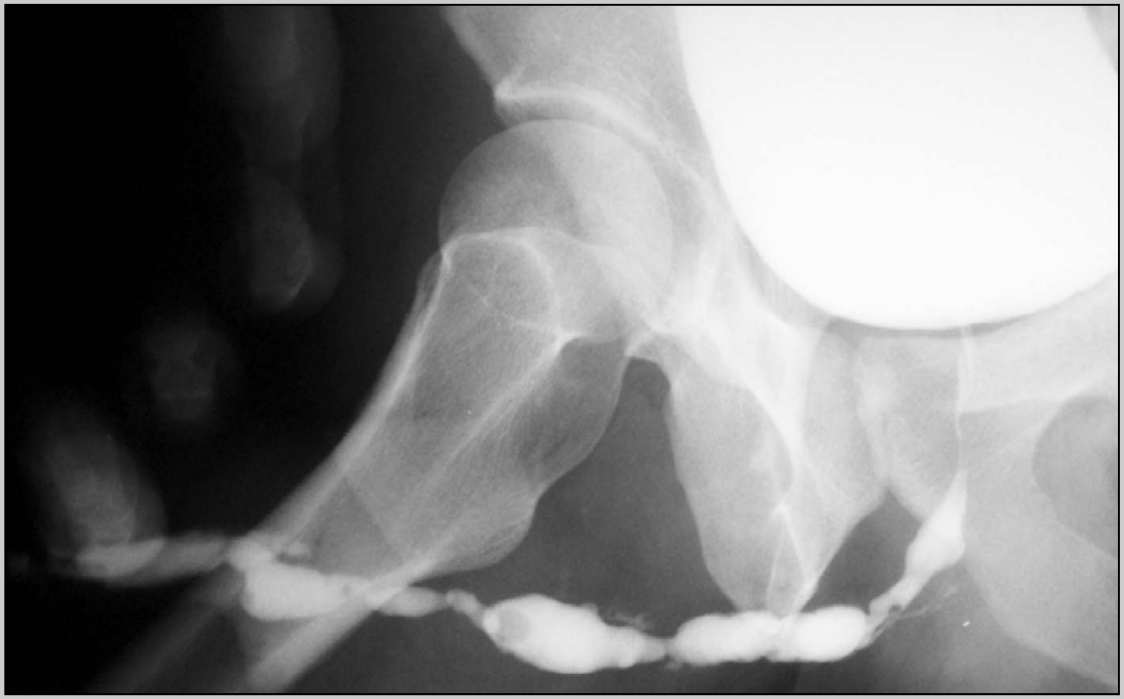
Our preliminary experience



Further studies in a large series of patients, with extended follow-up, are now necessary to investigate if and how the oral mucosa coming from laboratory could be used in patient with complex urethral stricture

Urethral surgery will have improved only when corpus spongiosum is made available, and a new spongiosum-made urethra can be transplanted in the patient

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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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