

Center for Reconstructive Urethral Surgery



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Japanese Neurogenic Bladder Society Meeting



Kofu - Japan

September 29th - October 1st, 2010

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Center for Reconstructive Urethral Surgery

Reconstruction of penile and bulbar urethra

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Evaluation of anterior urethral stricture

Urethrography

- **Retrograde**
- **Voiding**

Ultrasonography

Urethroscopy

Evaluation of anterior urethral stricture

- Site
- Number
- Length
- Spongiofibrosis
- Associated conditions

Retrograde urethrography

Site



penile or bulbar ?

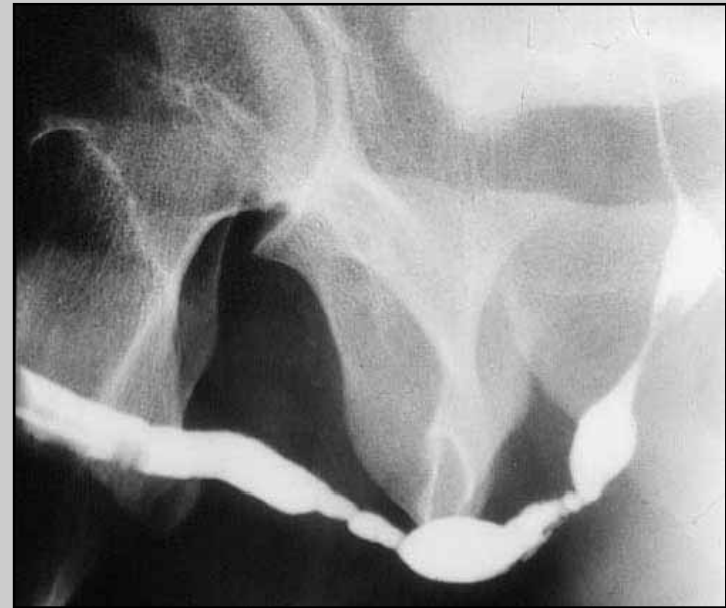
bulbar: distal or proximal ?

Retrograde urethrography

Number



single or double ?



penile and bulbar ?

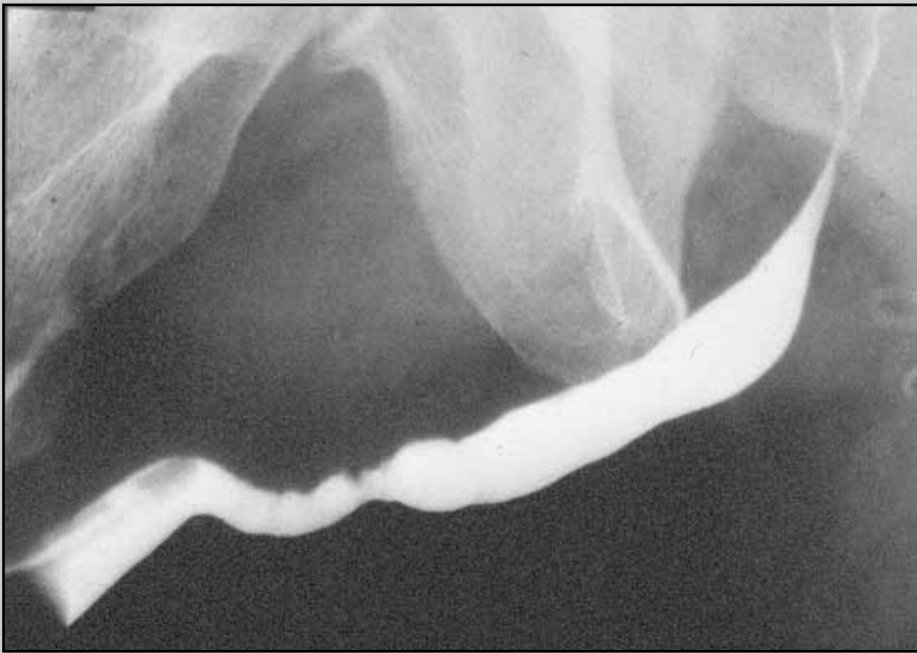
Retrograde urethrography

Length



Retrograde urethrography

Spongiofibrosis



wide urethral plate



scarred urethral plate

Retrograde urethrography



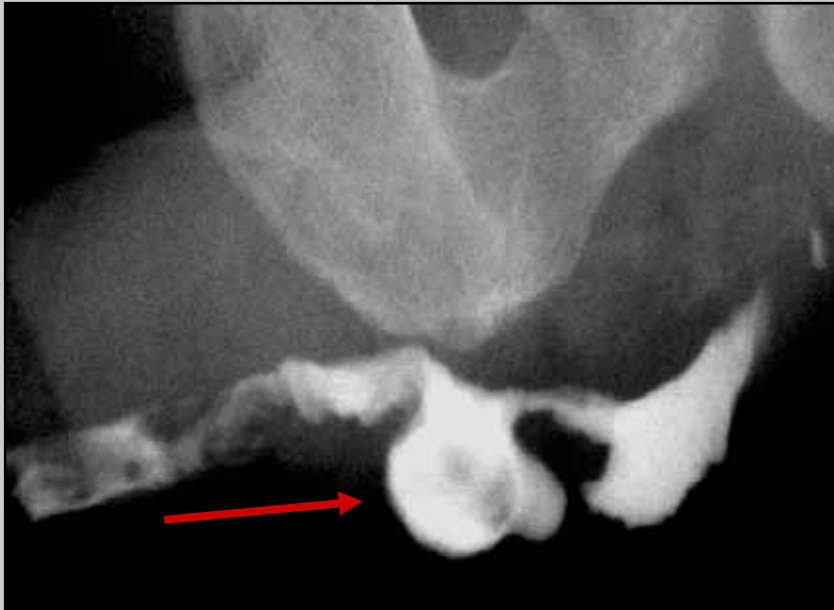
No-oblitative



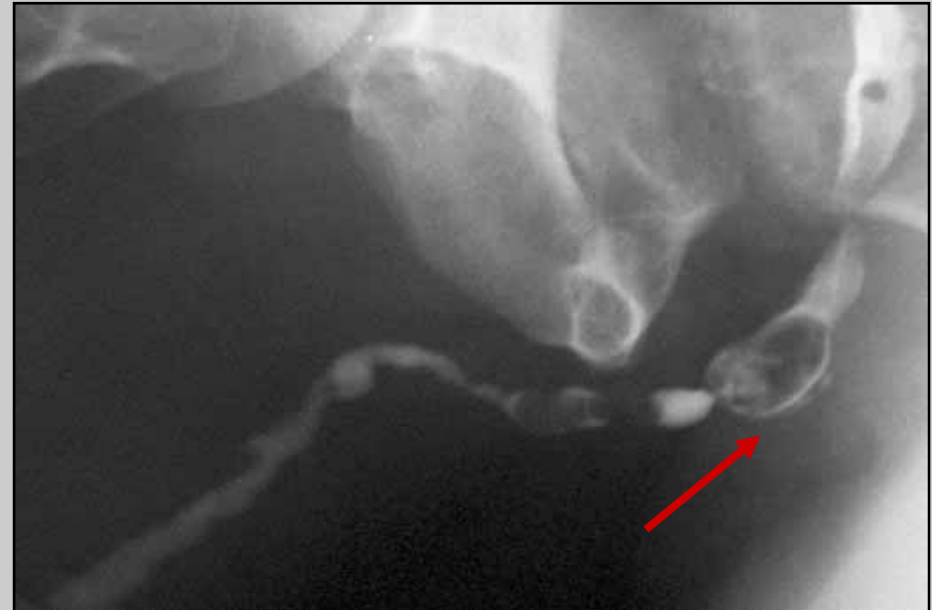
oblitative

Retrograde urethrography

Associated conditions



diverticulum

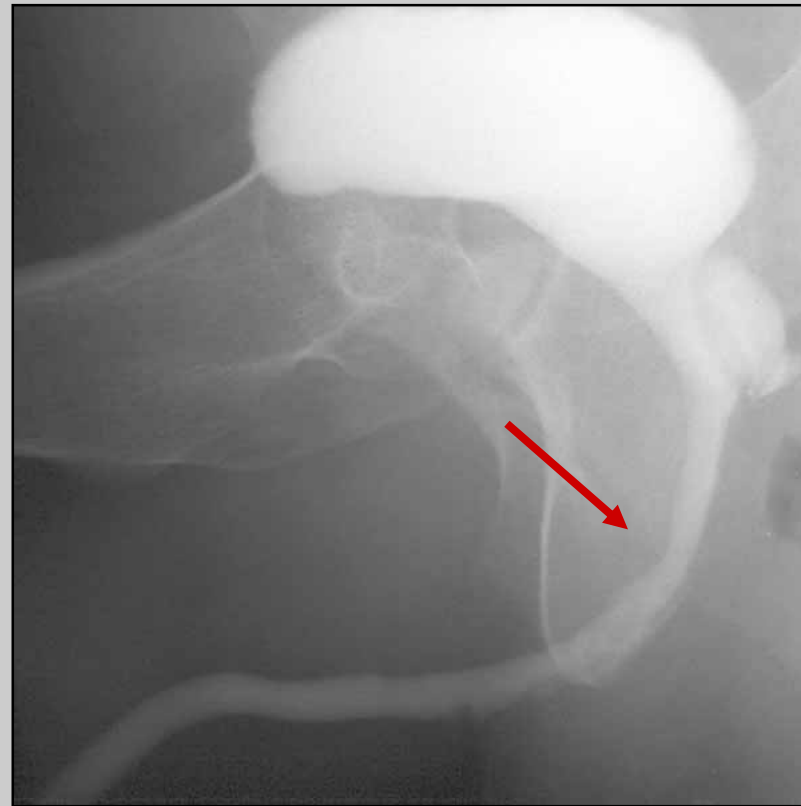


stone

Voiding urethrography



retrograde



voiding

Voiding urethrography



retrograde



voiding

Voiding urethrography

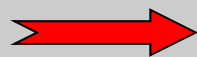


retrograde



voiding

delayed treatment



No-delayed treatment

Voiding urethrography in patients who underwent bulbar urethroplasty:

evaluation of the result



good



satisfactory

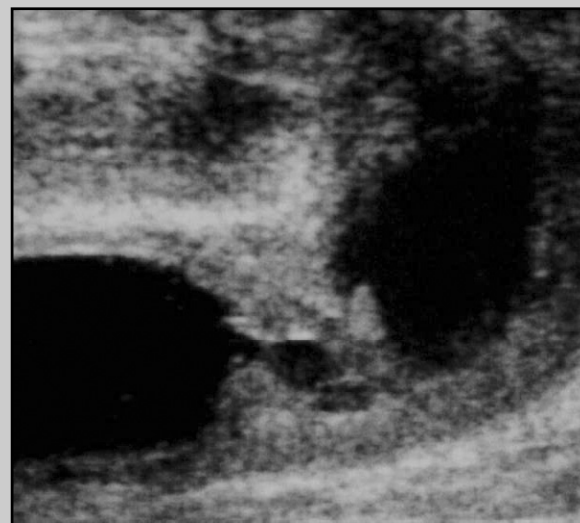


poor

Urethral sonography



Stricture length and spongiofibrosis



Urethroscopy



No-obliterative



obliterative

**The pre-operative evaluation of urethral stricture
using all these standard investigations showed
2% of failures, and the intra-operative
management of stricture may present different
features.**



Anterior urethral stricture

Urethrotomy or urethroplasty ?

**Easy and quick procedure or complex and long
procedure ?**

Stricture etiology

Urethrotomy ?

NO

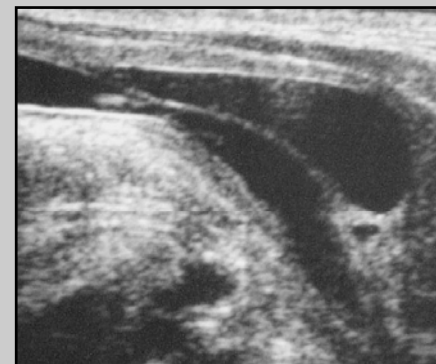
- failed hypospadias repair
- lichen sclerosus
- traumatic stricture

YES

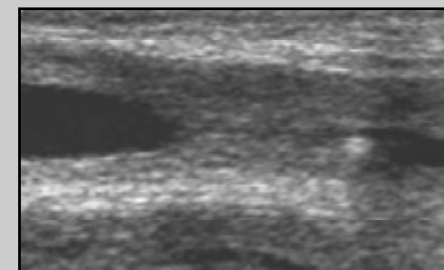
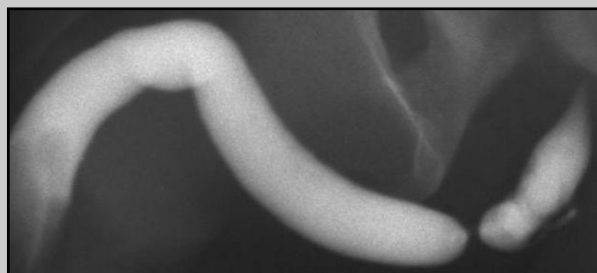
- congenital
- instrumentation
- infection
- unknown

Success rate of urethrotomy based on stricture etiology

congenital 66%

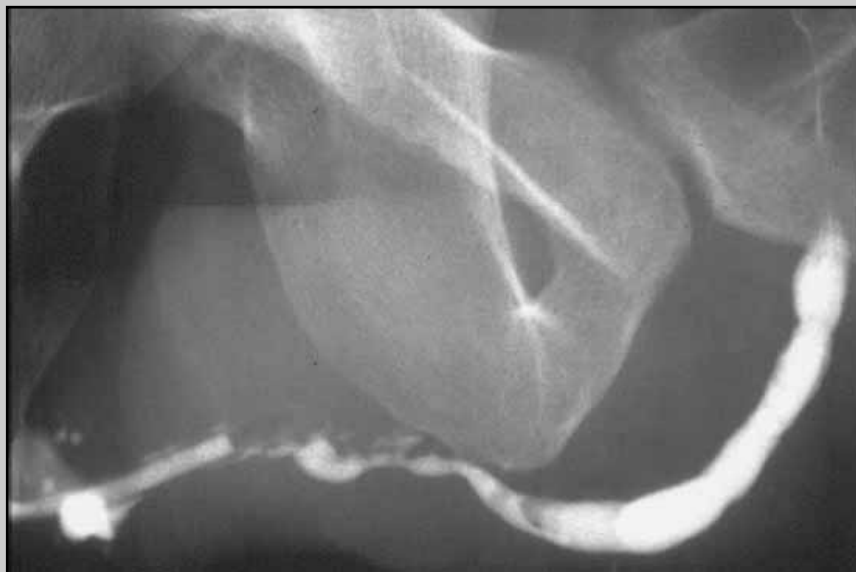


trauma 16%



Pansadoro V. and Emiliozzi P, J Urol 1996; 156:73-75

Success rate of urethrotomy based on stricture site



penile urethra 16 %



bulbar urethra 42 %

Pansadoro V. and Emiliozzi P, J Urol 1996; 156:73-75

Success rate of urethrotomy based on stricture length

stricture < 1 cm

71%

stricture > 1 cm

18%

Pansadoro V. and Emiliozzi P, J Urol 1996; 156:73-75

Associated adverse conditions

stent



tumor



stone



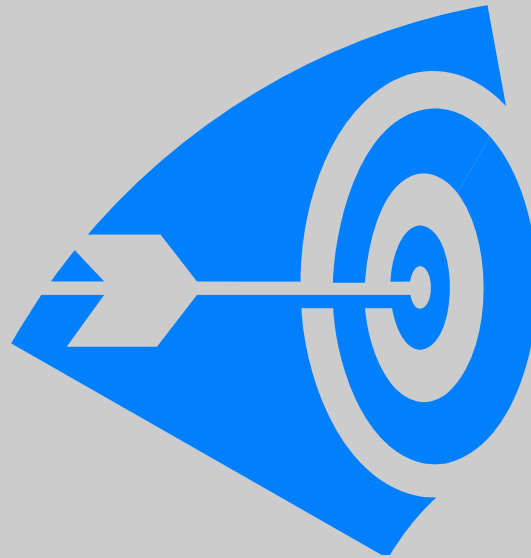
diverticulum

abscess

fistula

~~Urethrotomy~~

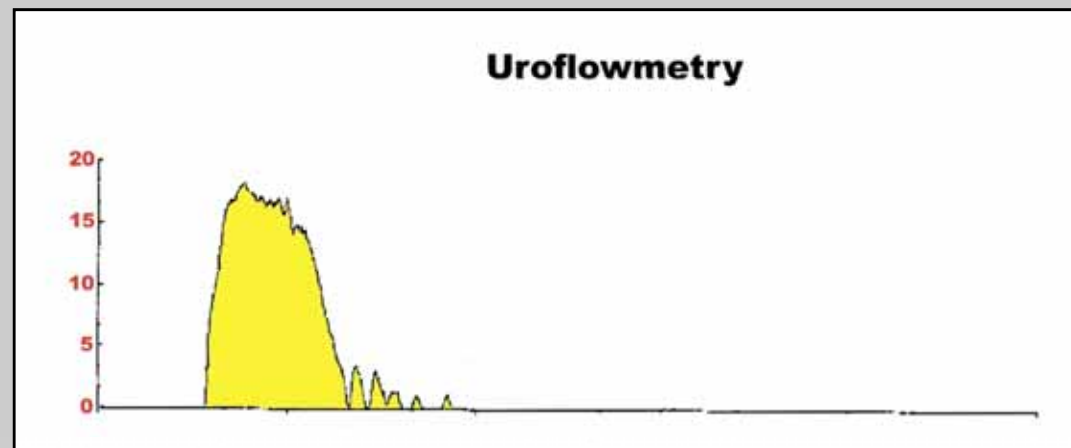
How many times can I repeat urethrotomy ?



**It depends on how long the patient has been
disease-free**

< 1 year **→** **I can't**

> 1 year **→** **I can**



Which type of urethroplasty ?

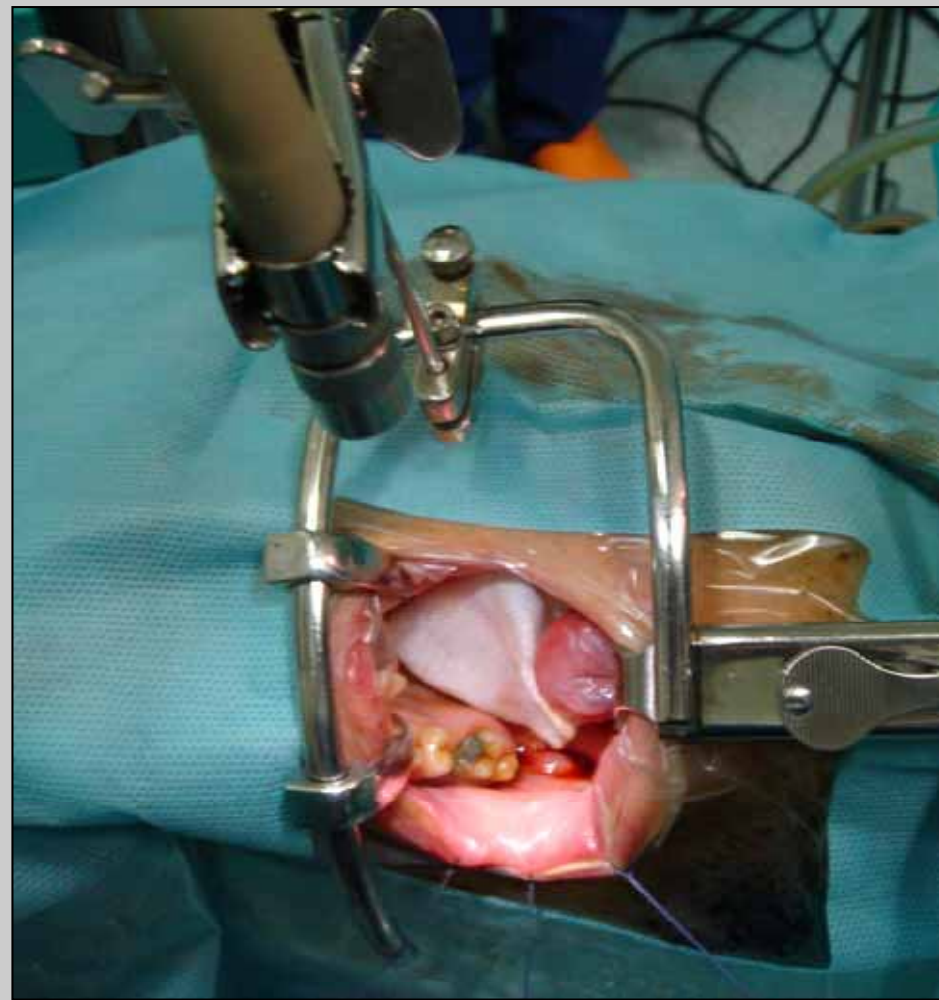
Preparation of the patient for oral mucosa urethroplasty



Two teams work simultaneously



Two sets of instruments



Appropriate mouth retractor with its own light

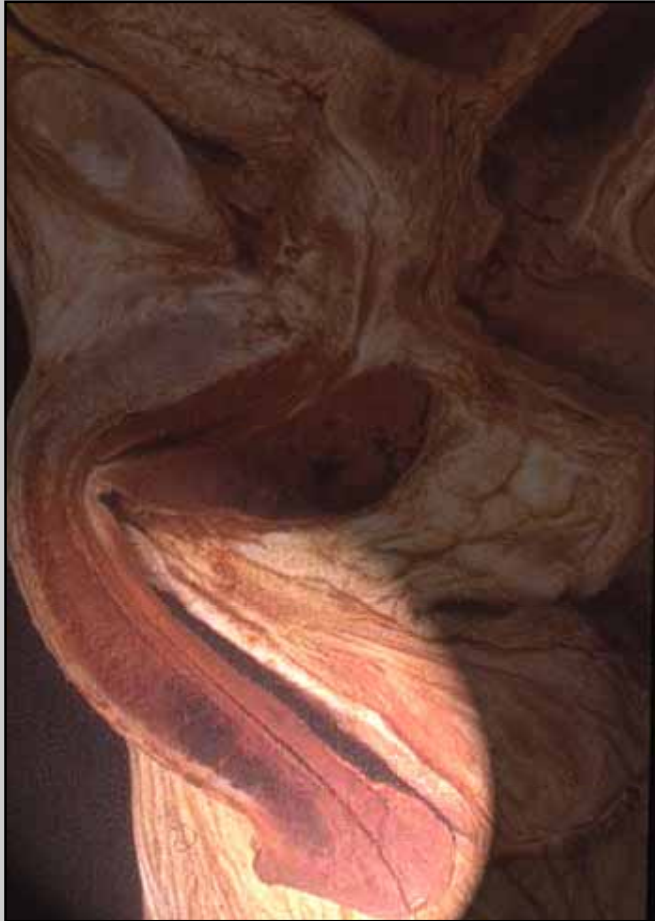


Only one assistant is needed to harvest the oral graft

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Penile urethra



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

Etiology of penile urethral strictures

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

In penile urethral strictures due to:

- Trauma
- Instrumentation
- Catheter
- Infection
- Other cause



**The penis is not involved in the urethral disease:
one-stage repair**

In penile urethral strictures due to:



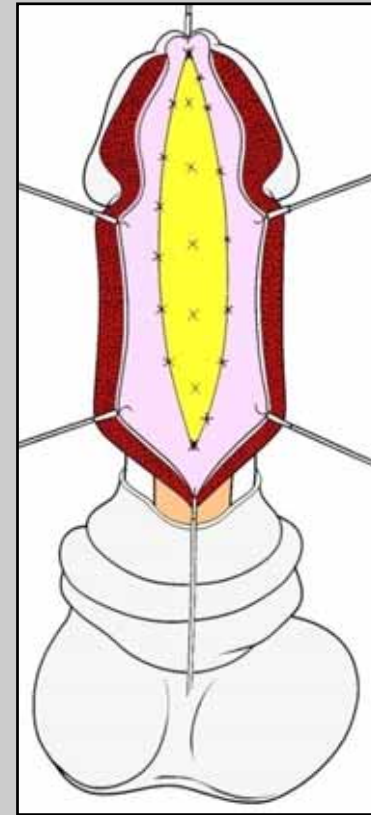
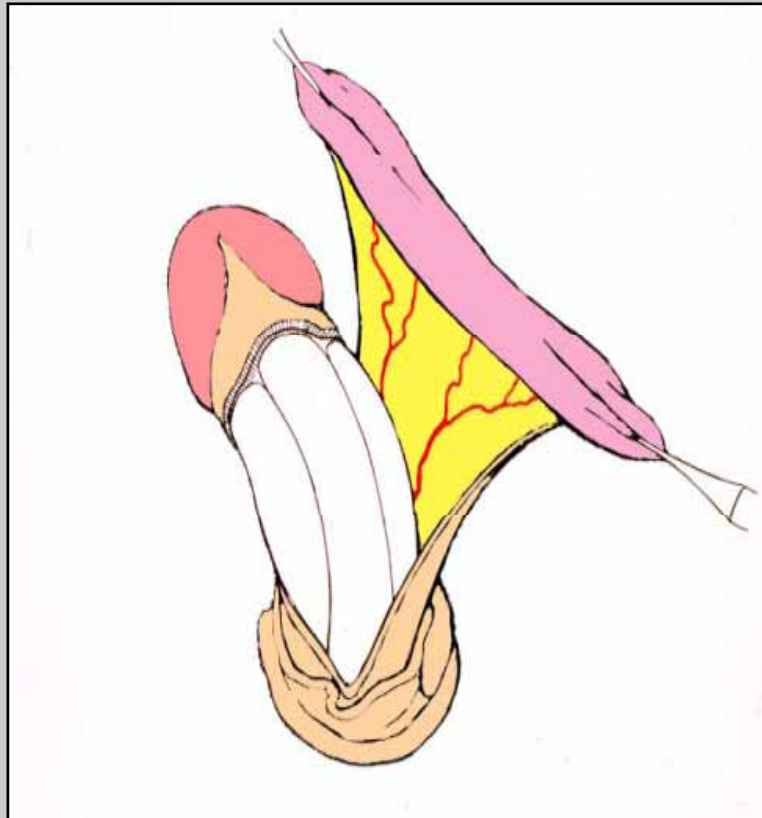
Failed hypospadias repair



Lichen sclerosus

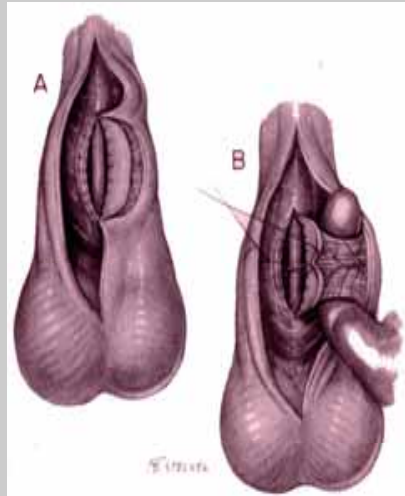
**The penis is fully involved in the urethral disease:
two-stage repair**

One-stage penile urethroplasty

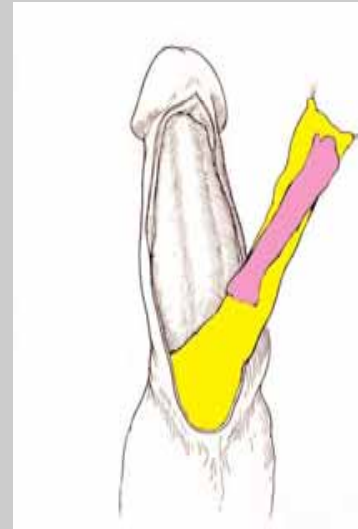


Flap or graft?

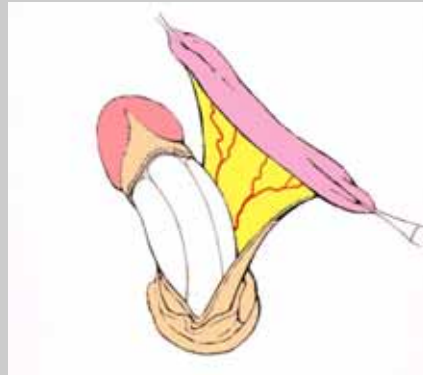
One-stage flap urethroplasty



ORANDI

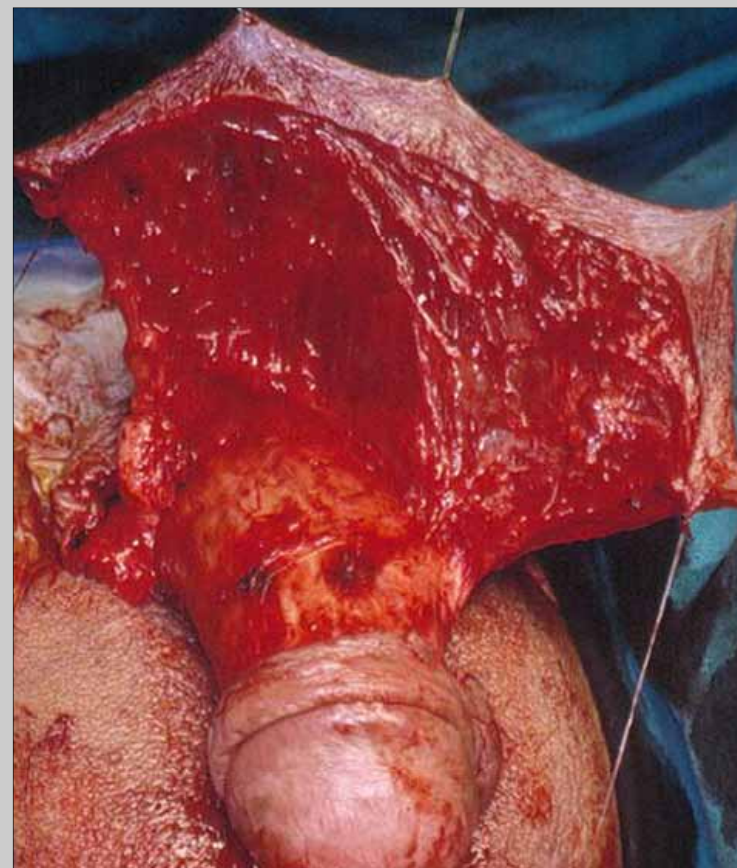
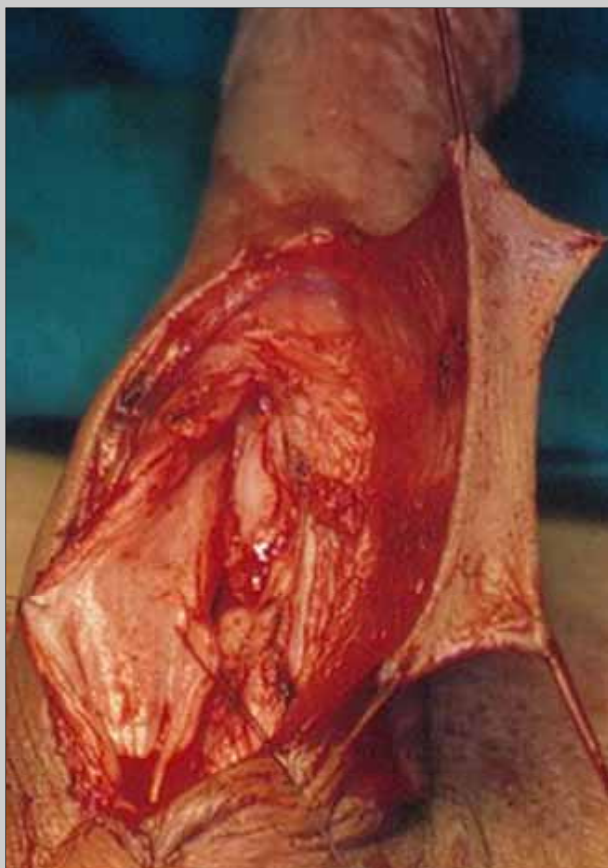


JORDAN

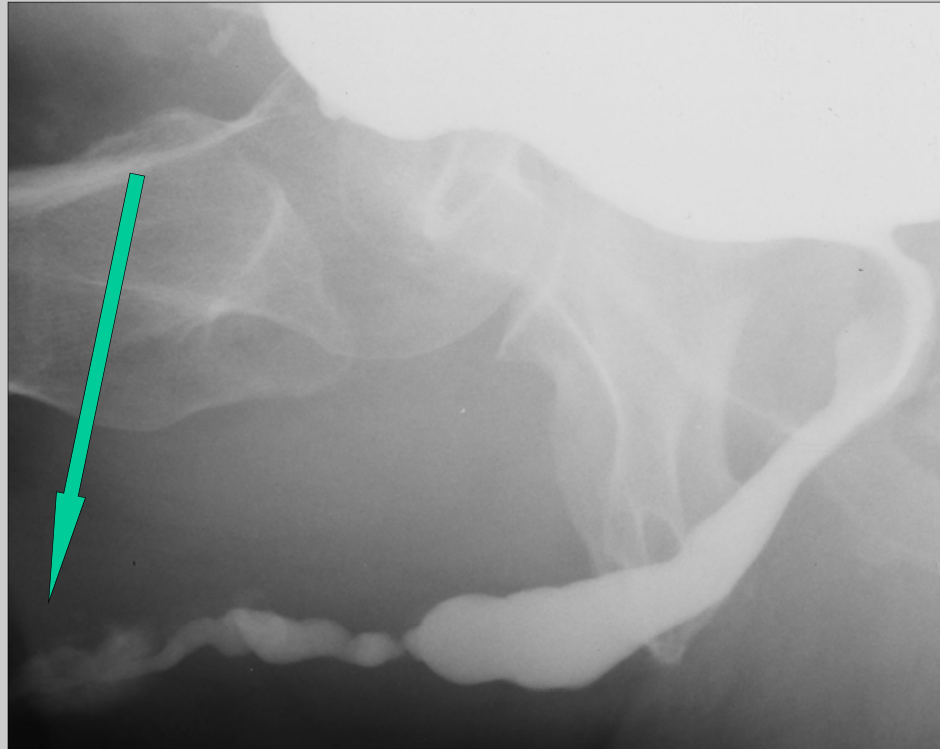
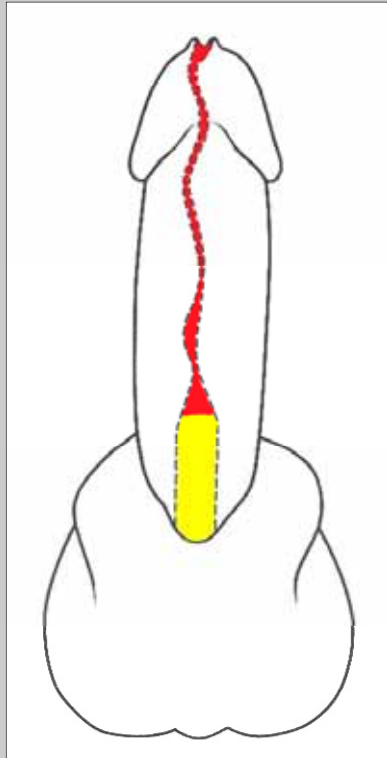


McANINCH

Dartos fascial flap with skin island

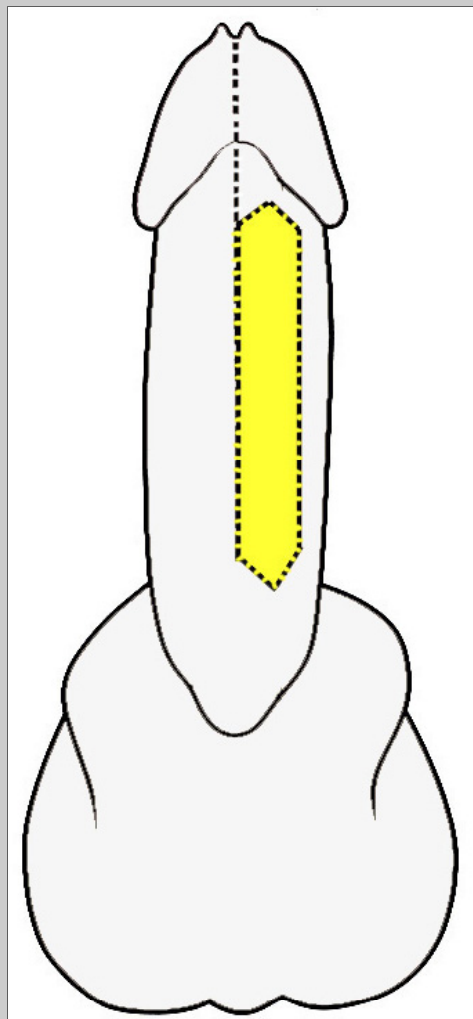


Jordan's flap

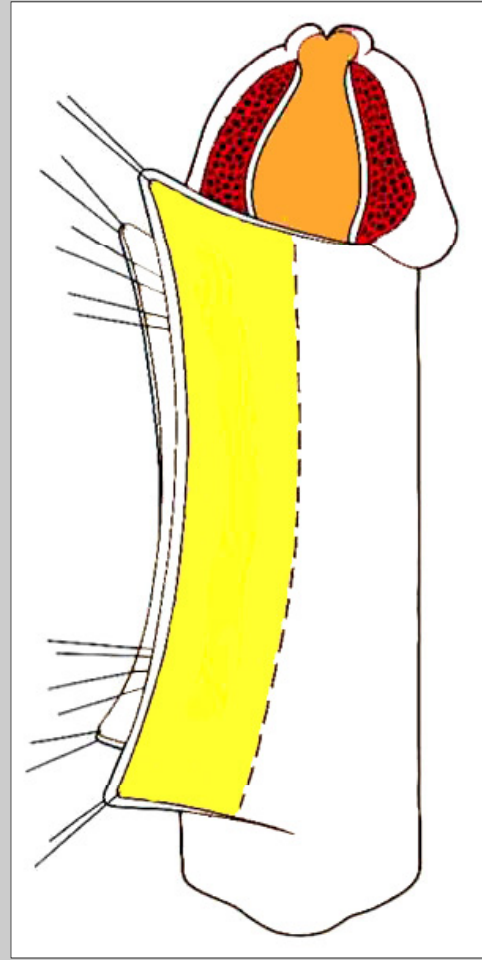
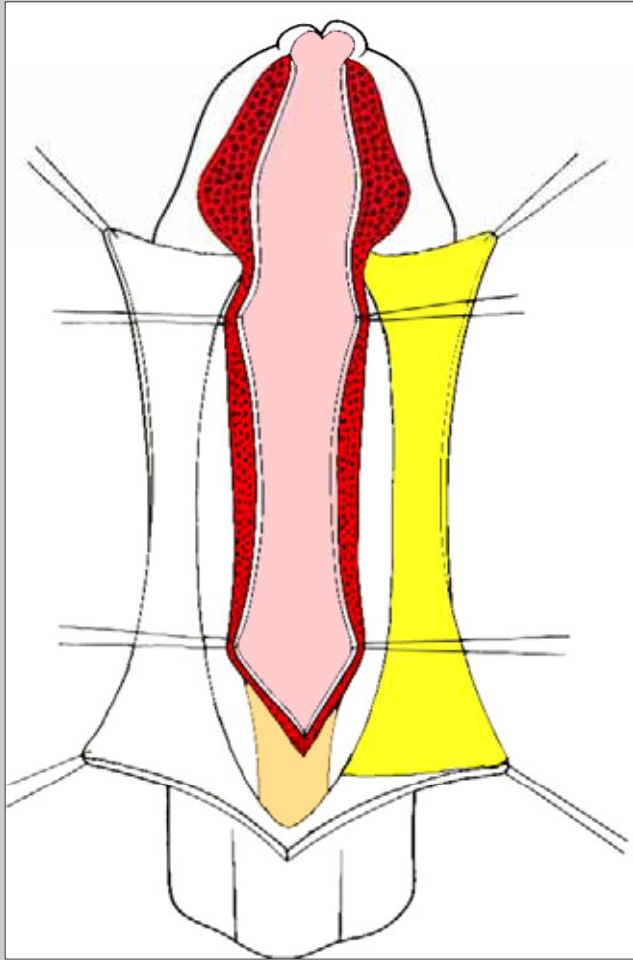


Penile urethral stricture involving external urinary meatus

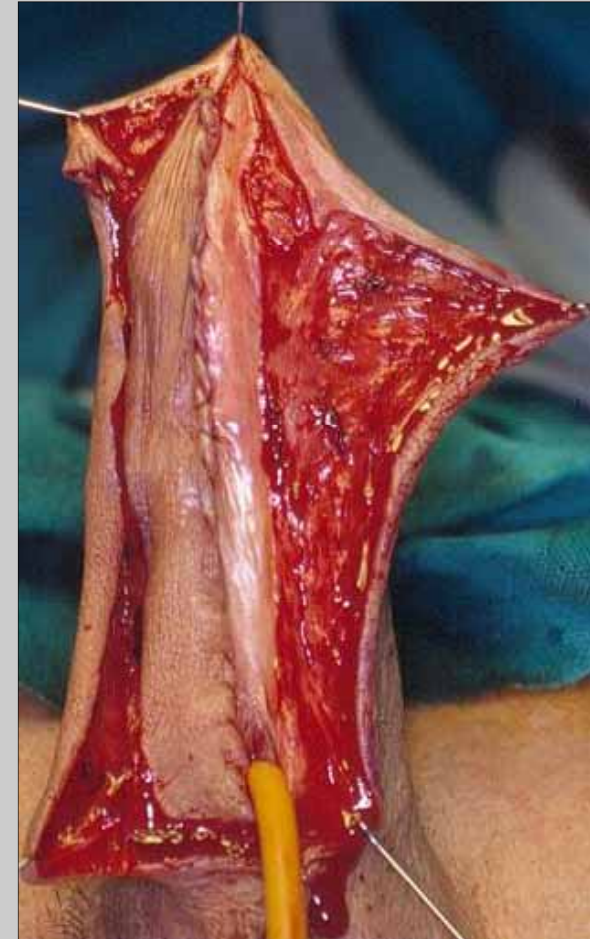
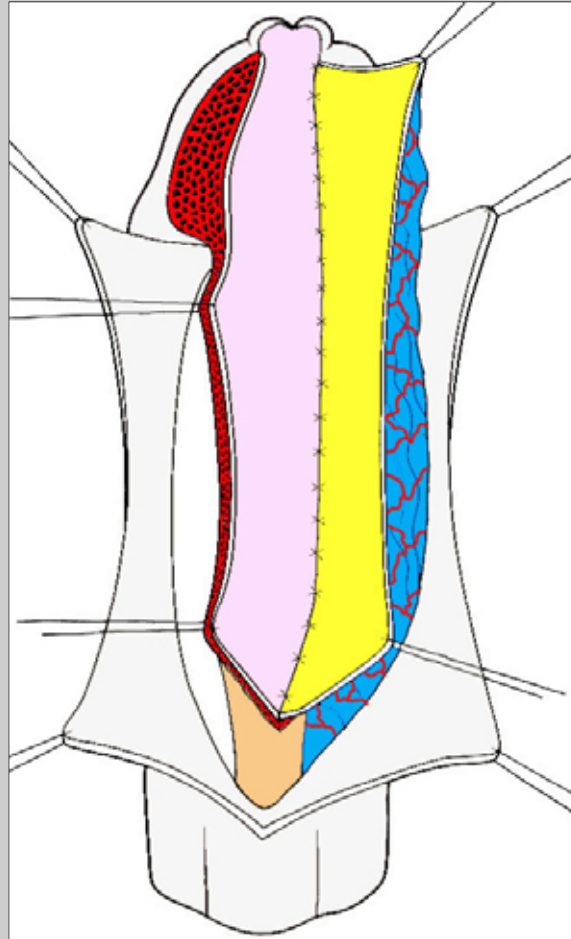
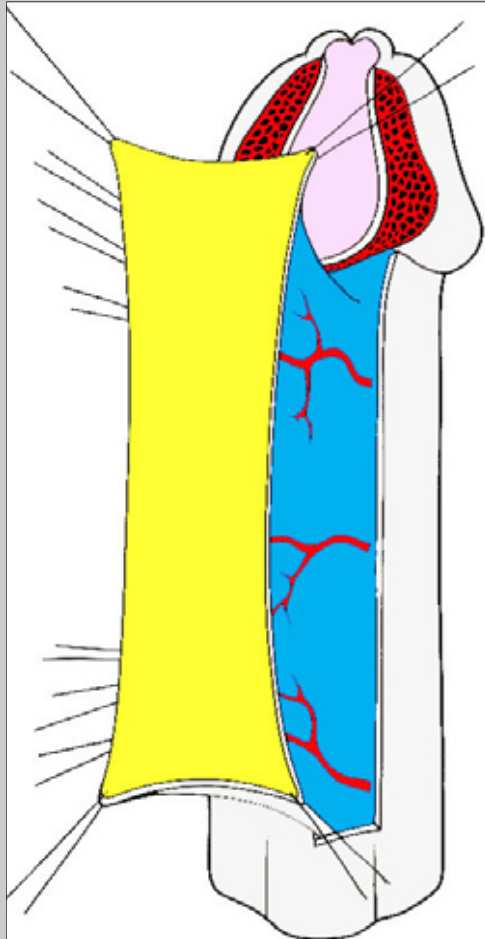
Jordan's flap



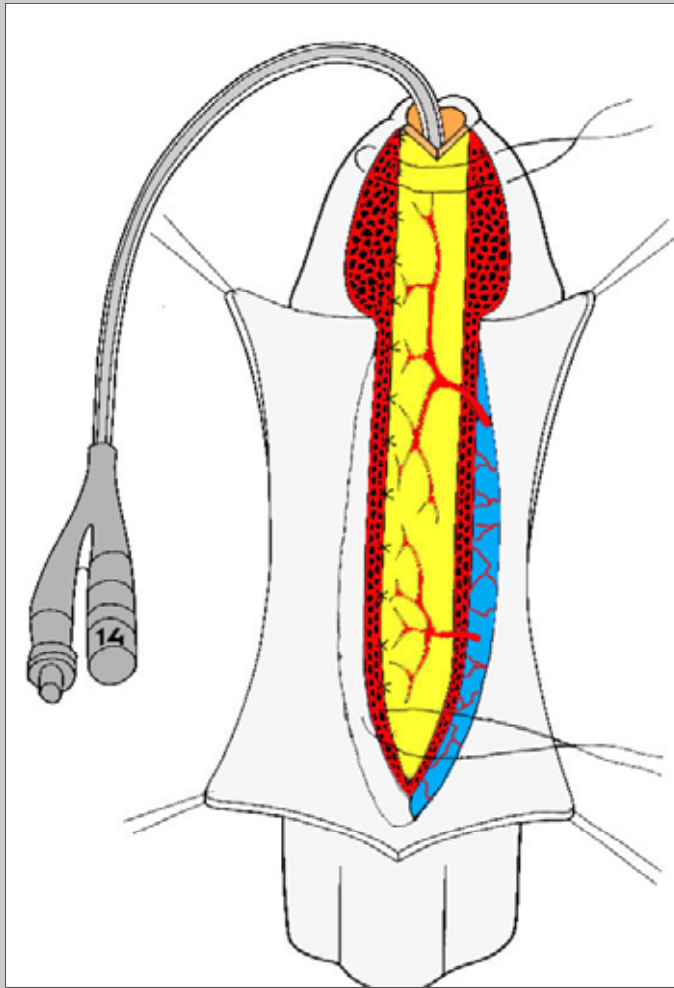
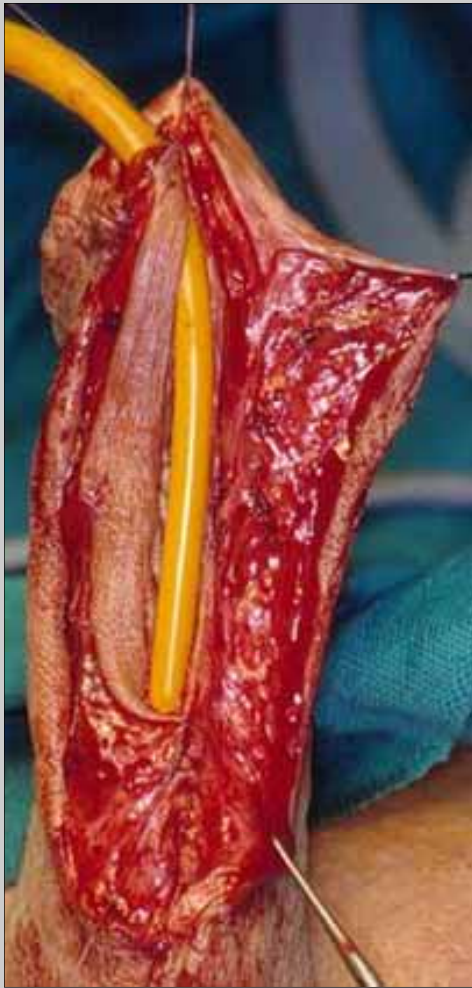
Jordan's flap



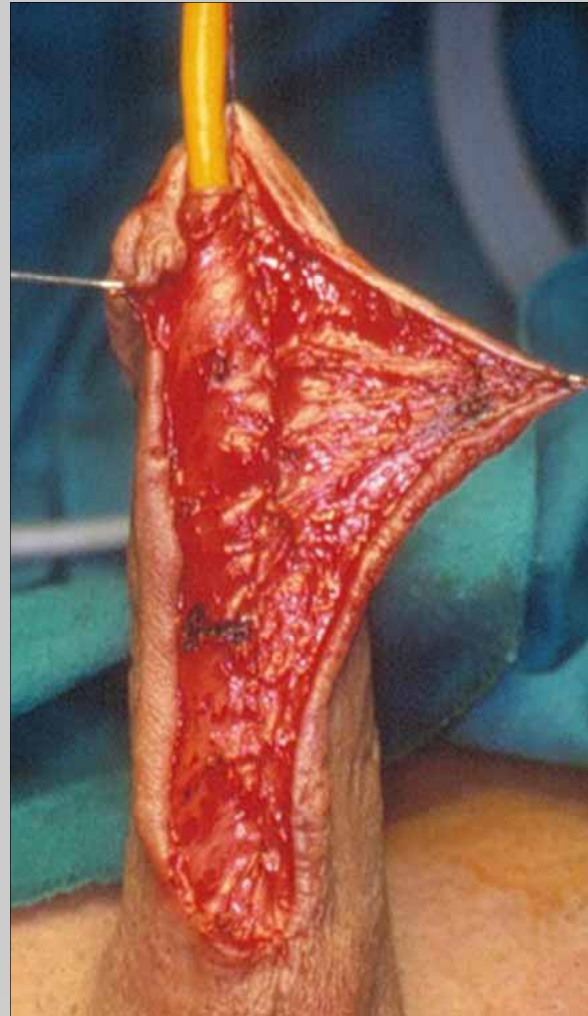
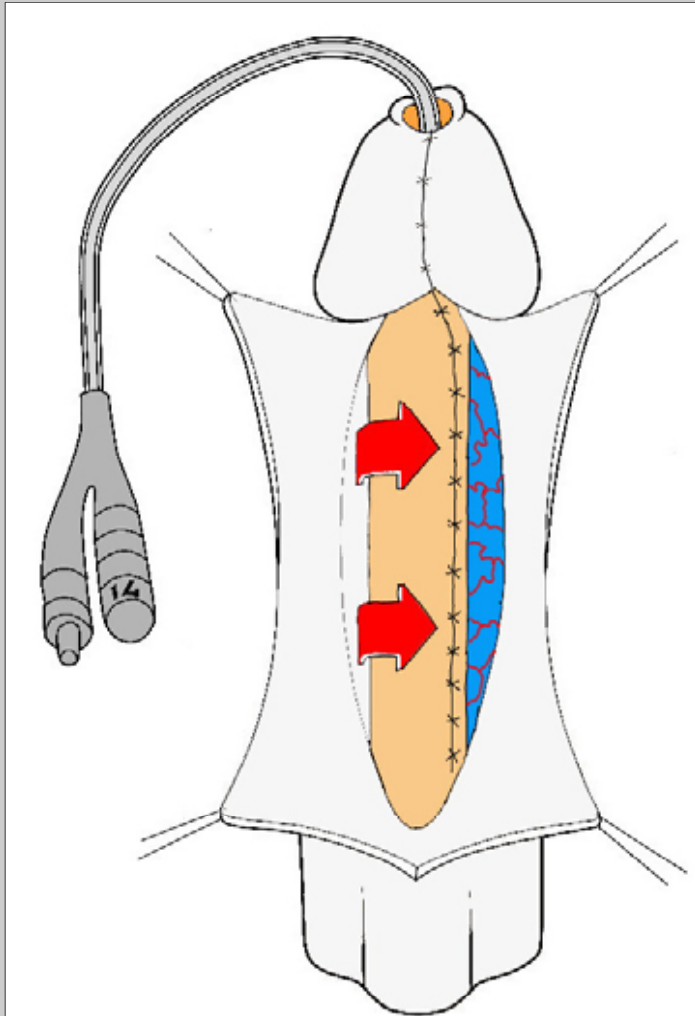
Jordan's flap



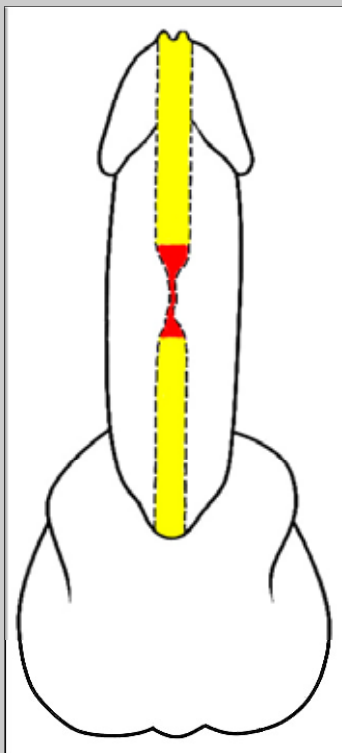
Jordan's flap



Jordan's flap

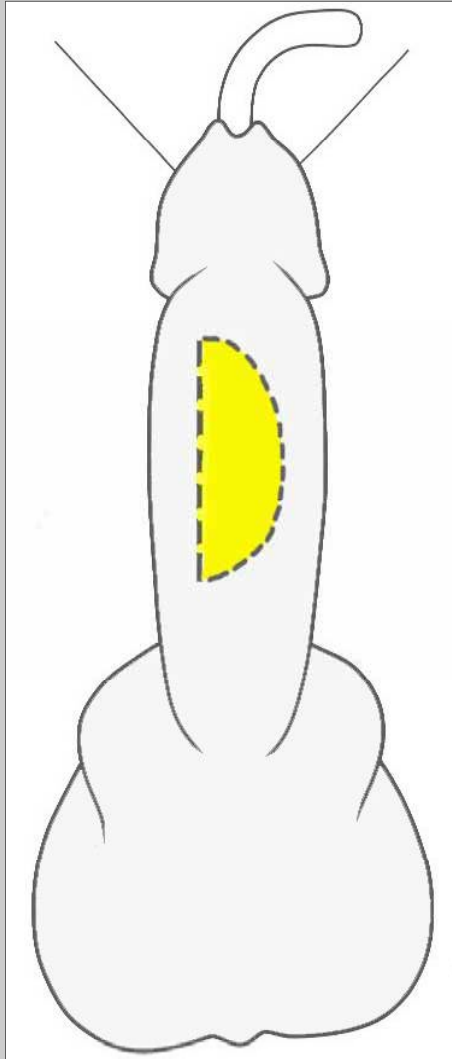


Orandi's modified flap

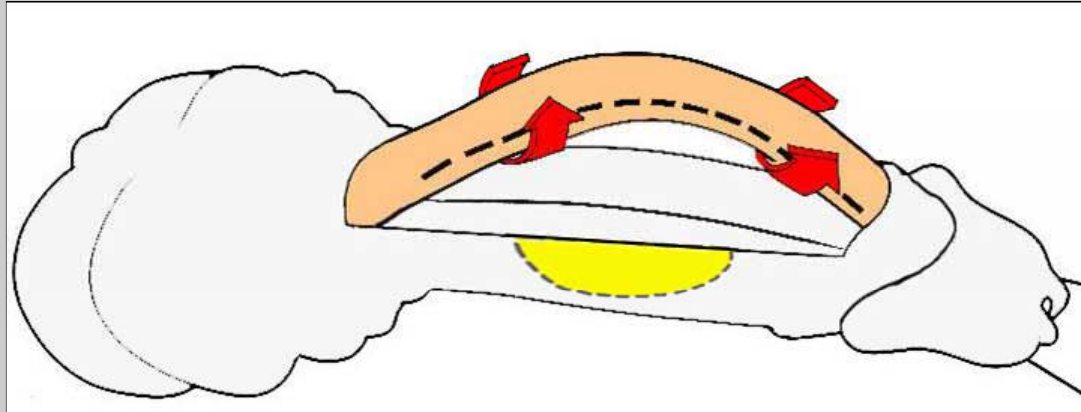


Penile urethral stricture in the middle tract of the shaft

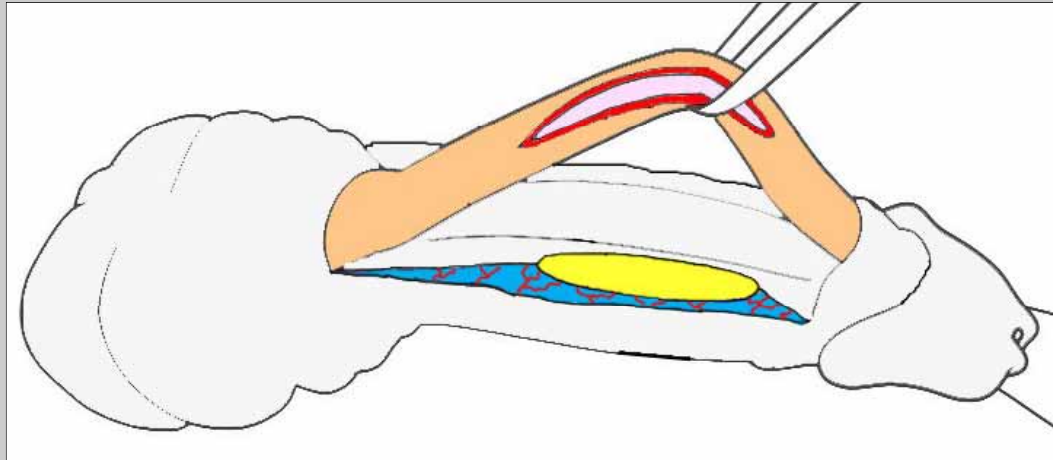
Orandi's modified flap



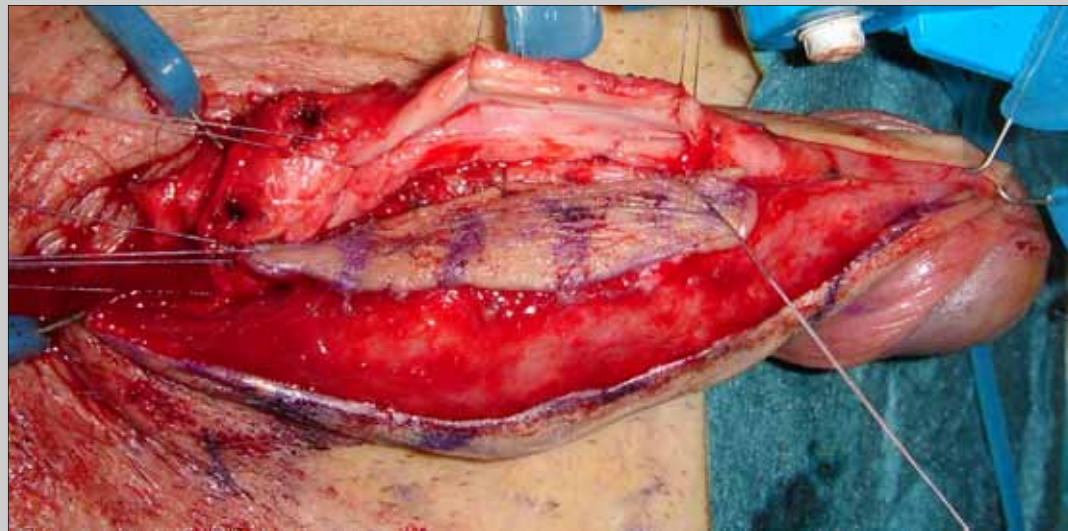
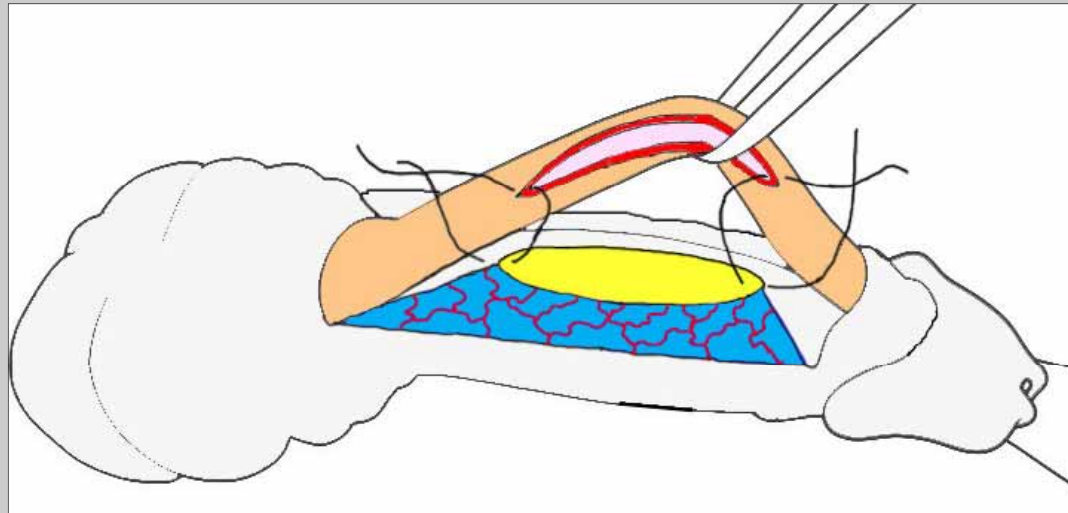
Orandi's modified flap



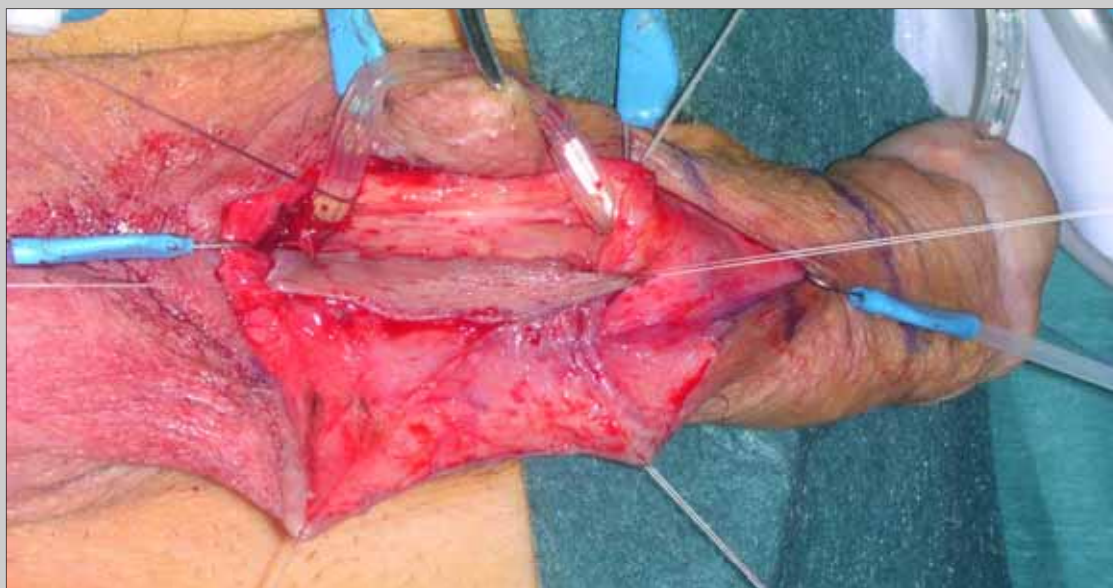
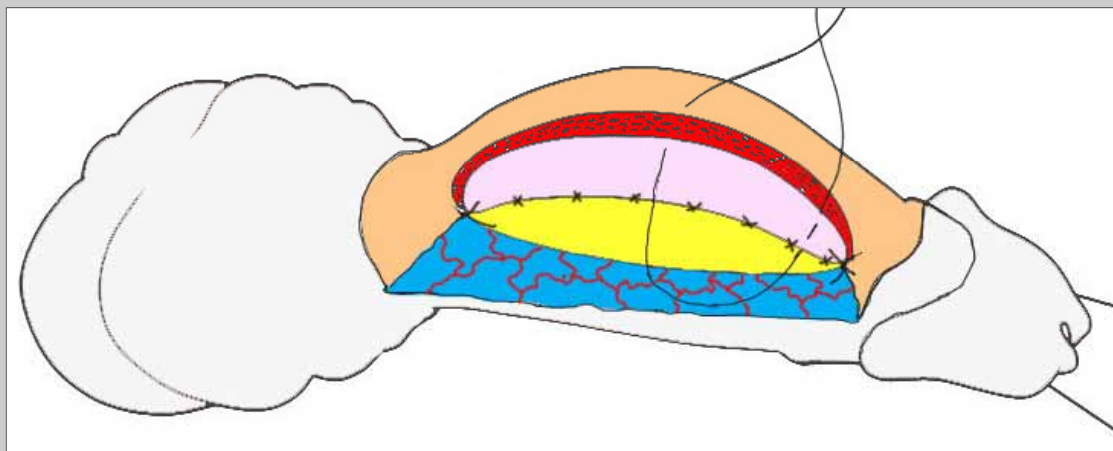
Orandi's modified flap



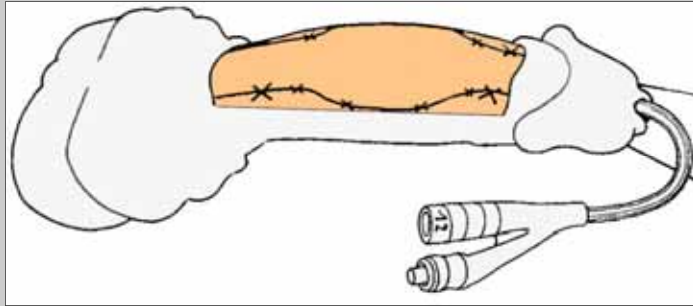
Orandi's modified flap



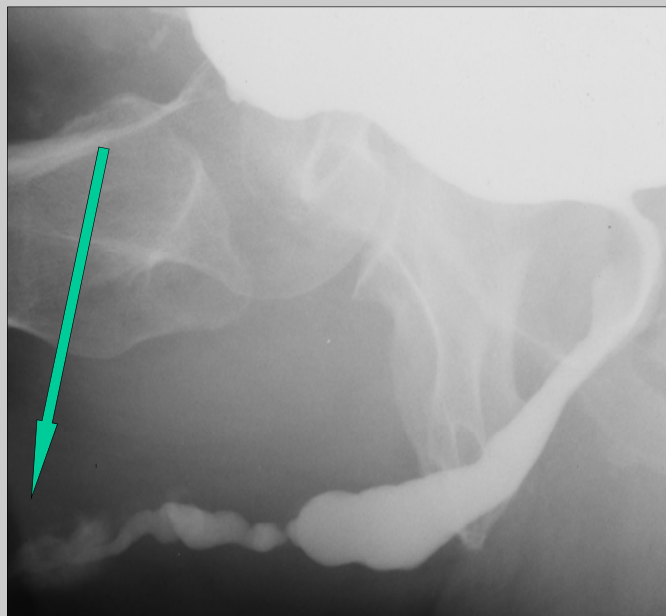
Orandi's modified flap



Orandi's modified flap

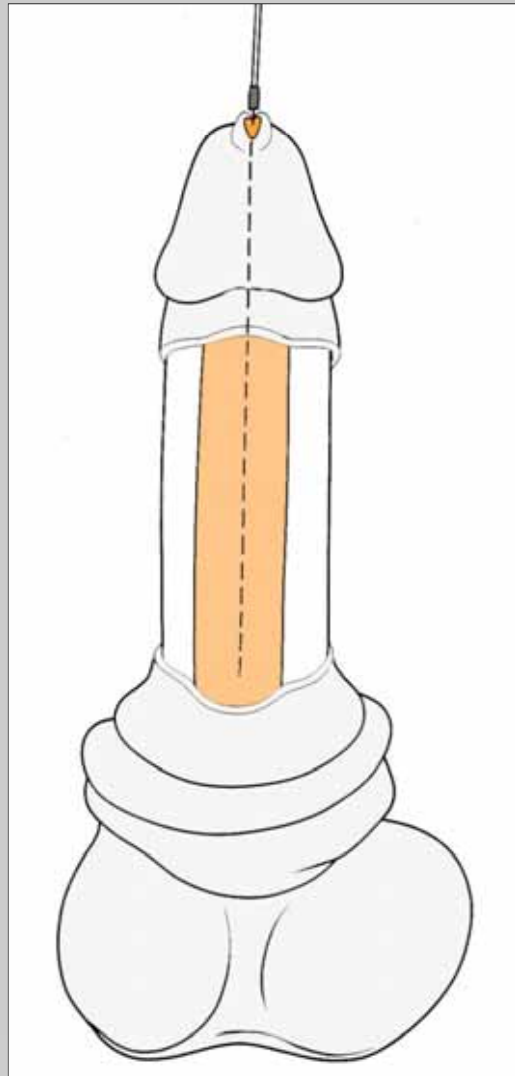


Asopa's graft

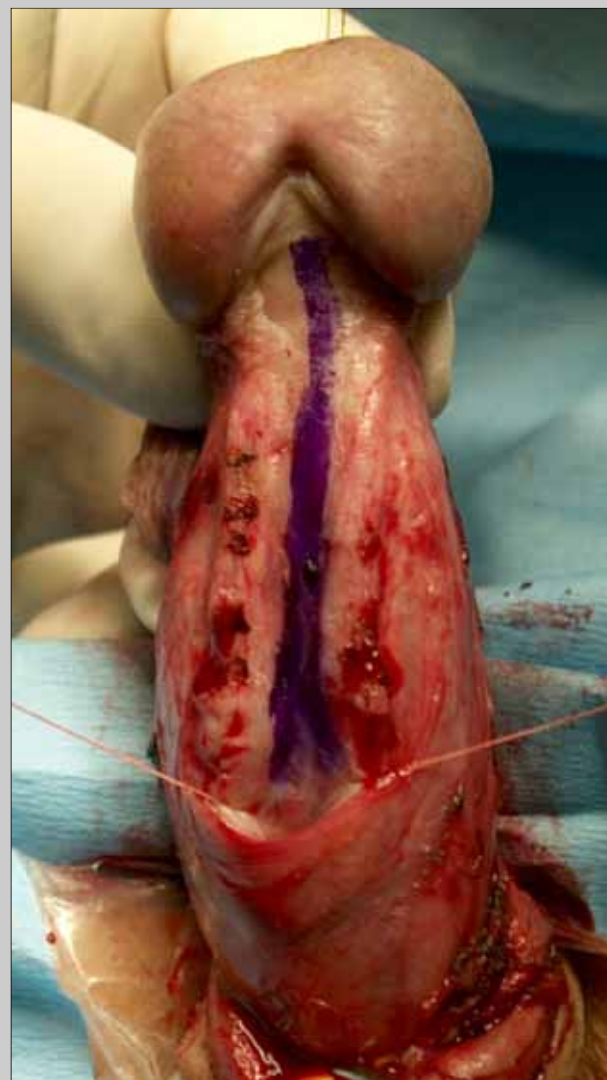
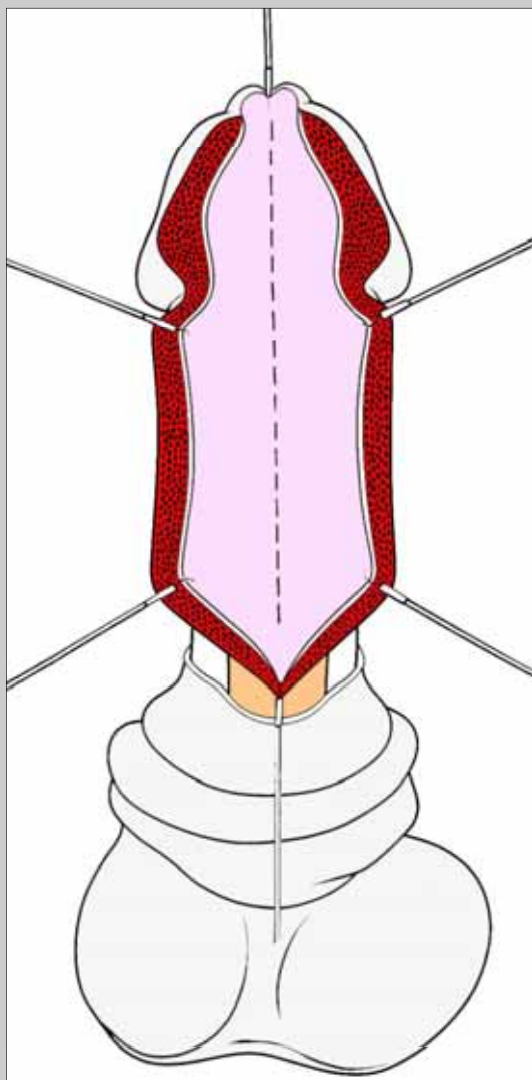


Penile urethral stricture involving external urinary meatus or in the middle tract of the shaft

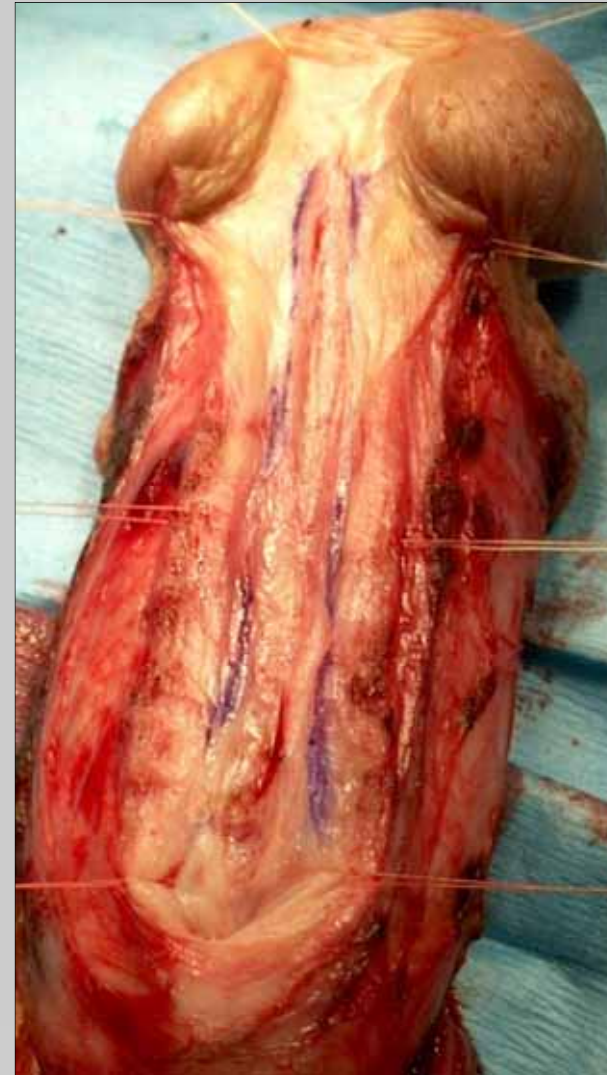
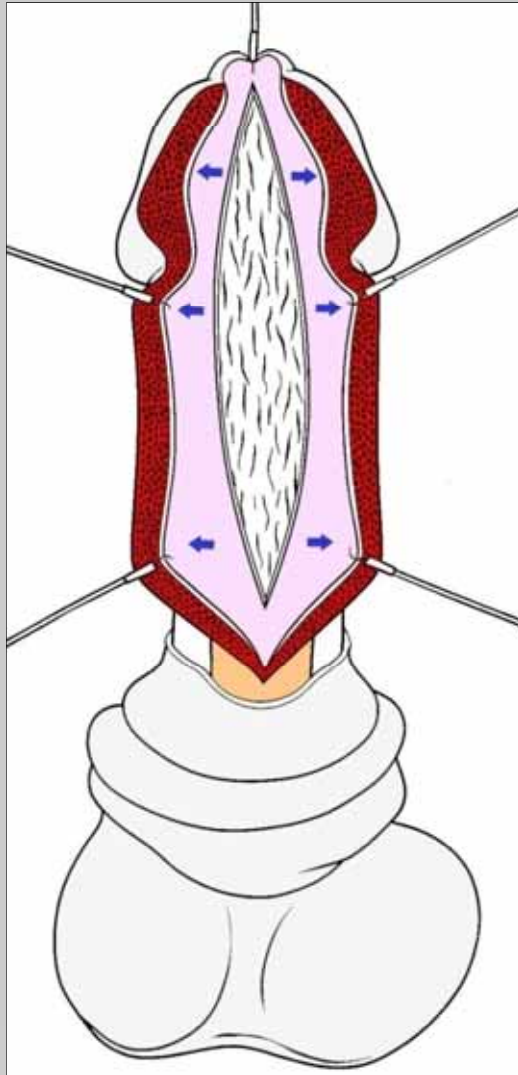
Asopa's graft



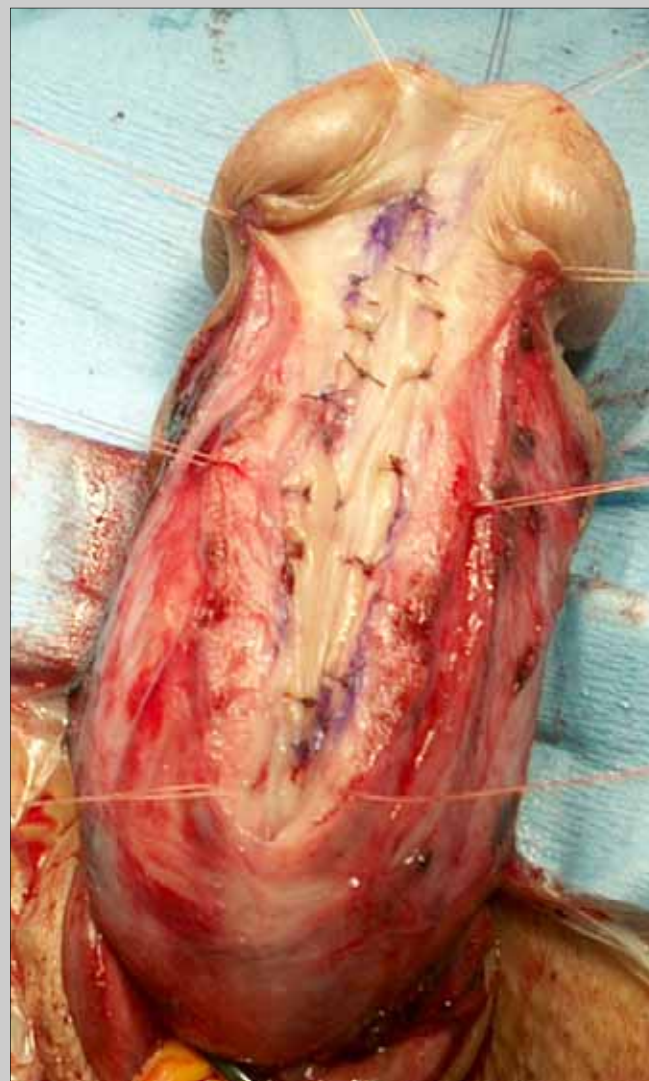
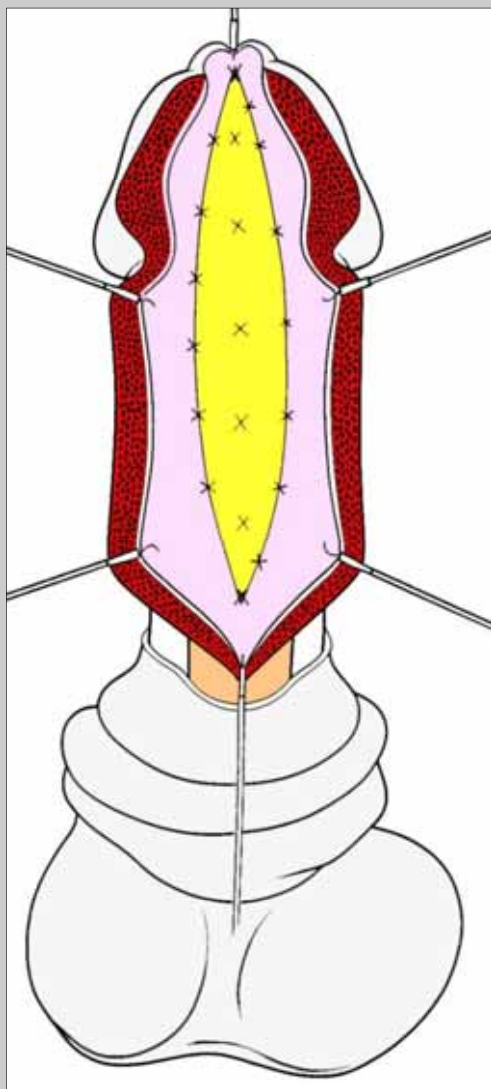
Asopa's graft



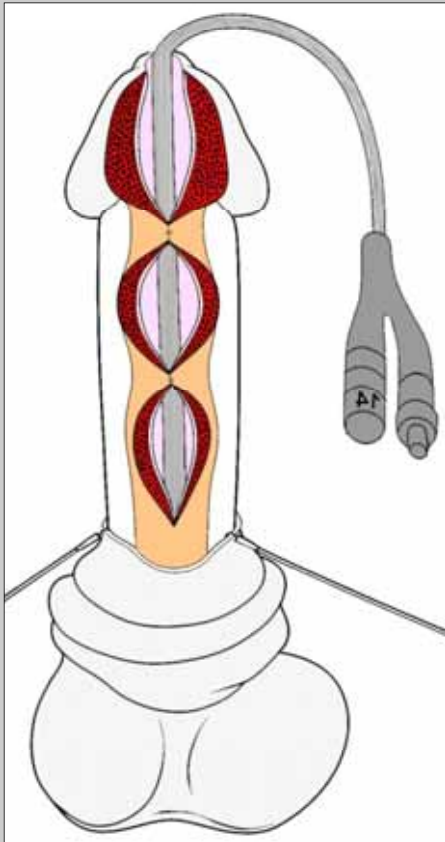
Asopa's graft



Asopa's graft



Asopa's graft



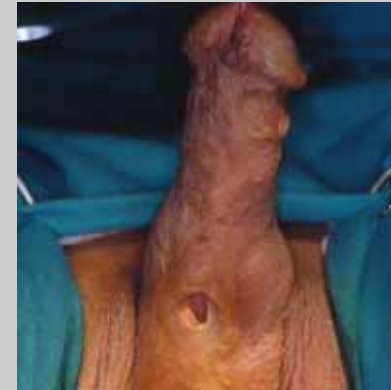
Complications following one-stage penile urethroplasty



penile hematoma



skin necrosis



fistula



penile-glans torsion



sacculation



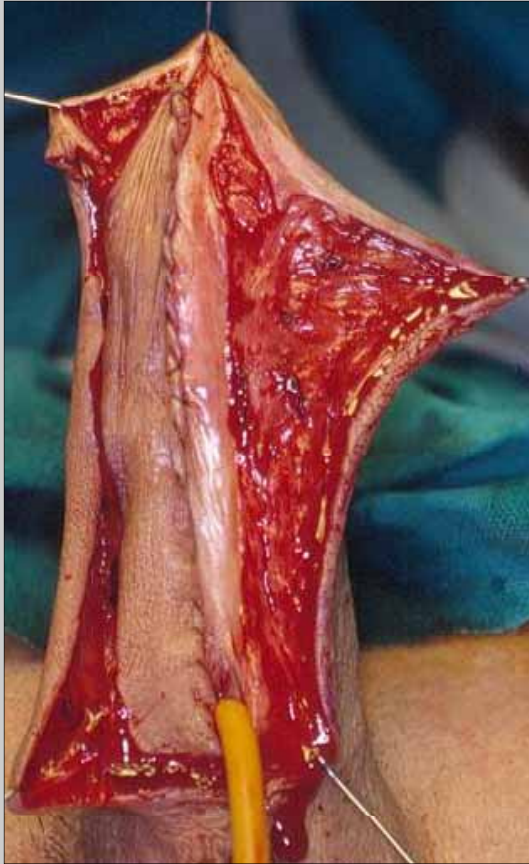
meatal stenosis

One-stage penile flap or graft urethroplasty

Results

patients	type of repair	success
18	flap	66.7%
22	oral graft	81.8%
23	skin graft	78.3%

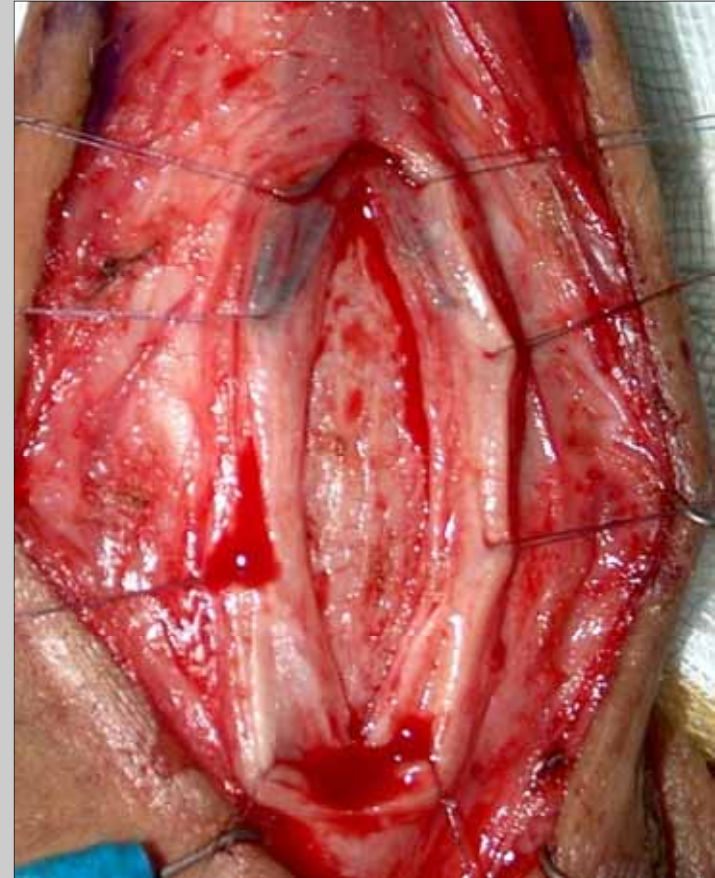
Barbagli et al, BJU Int 2008; 102:853-860



flap

?

graft



Basically, the choice between flap or graft one-stage urethroplasty should be made according to the status of the urethral plate and according to the surgeon's background, training and preference

Two-stage urethroplasty using oral mucosal graft



**Penile urethral stricture in patient with failed hypospadias repair
or lichen sclerosus**

First stage



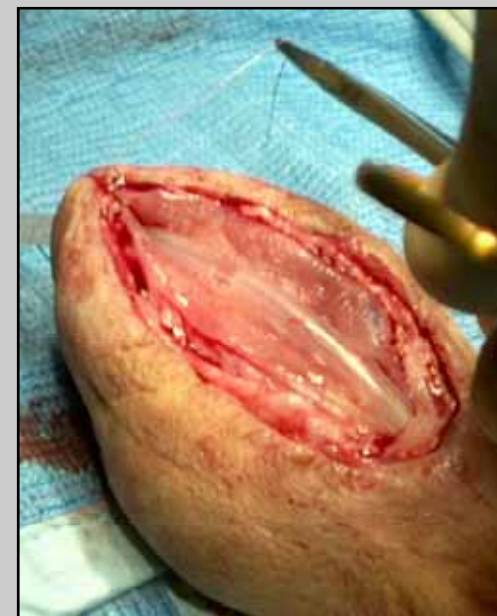
Complications following the first stage of urethroplasty



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

Barbagli G et al, Eur Urol 2006; 49:887-832

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

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

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

Bulbar urethra



Basically, the surgical technique for the repair of bulbar urethral strictures is selected according to the **stricture length**

Preparation of the patient for bulbar urethroplasty



Simple lithotomy position

Allen stirrups

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

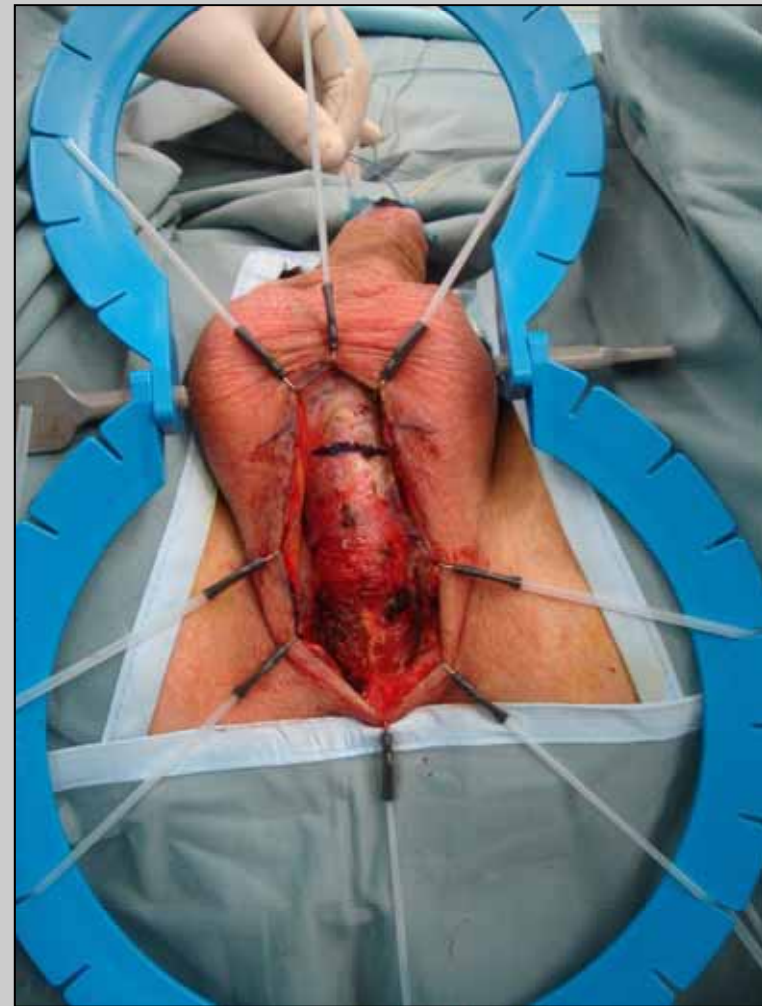


**Inject methylene blue inside
the urethra
(G. Webster)**

Preparation of the patient for bulbar urethroplasty

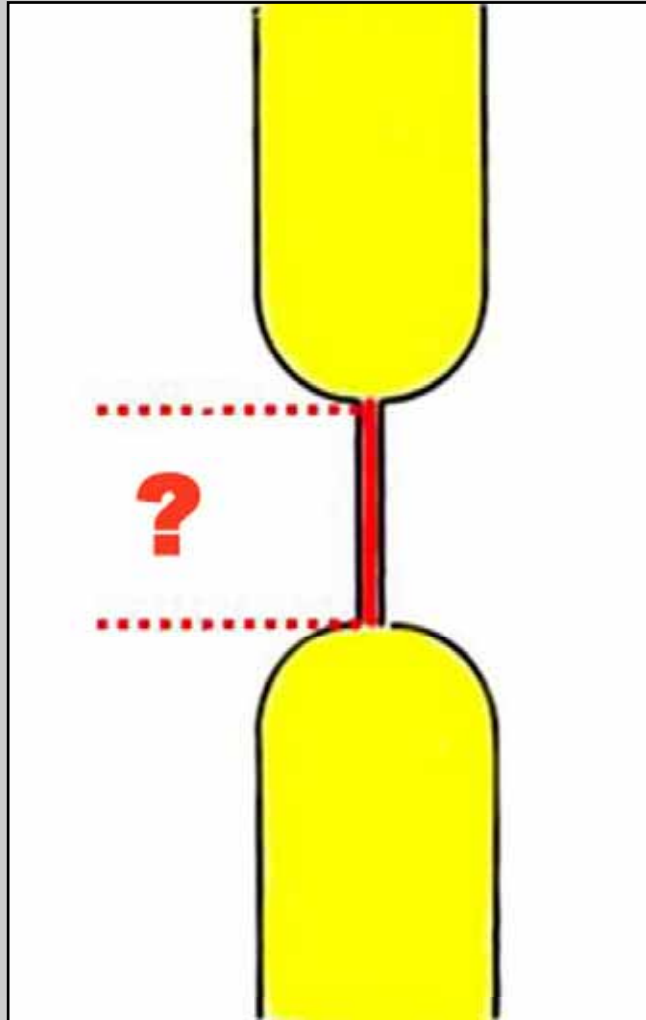


Calibrate the distal urethra



Identify the distal stricture site

Which type of bulbar urethroplasty ?



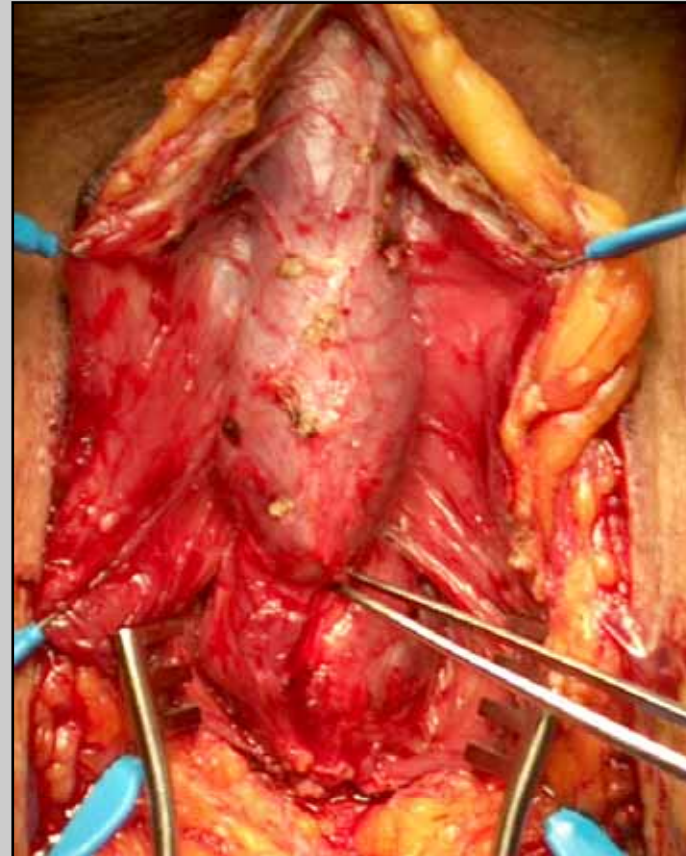
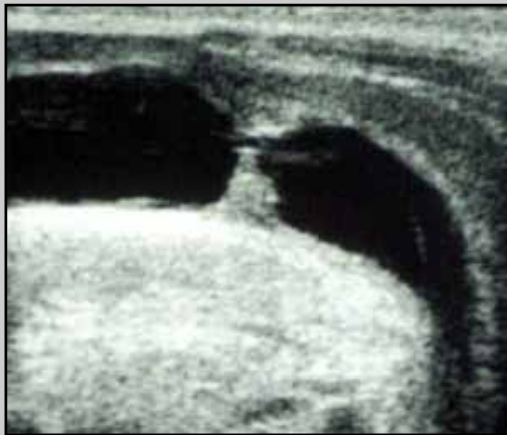
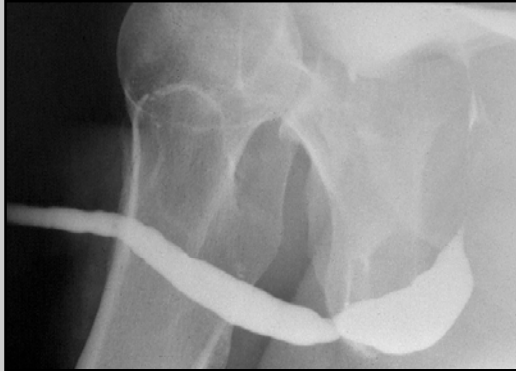
1 - 2 cm: end-to-end anastomosis

2 – 4 cm: augmented anastomotic repair

> 4 cm: substitution urethroplasty

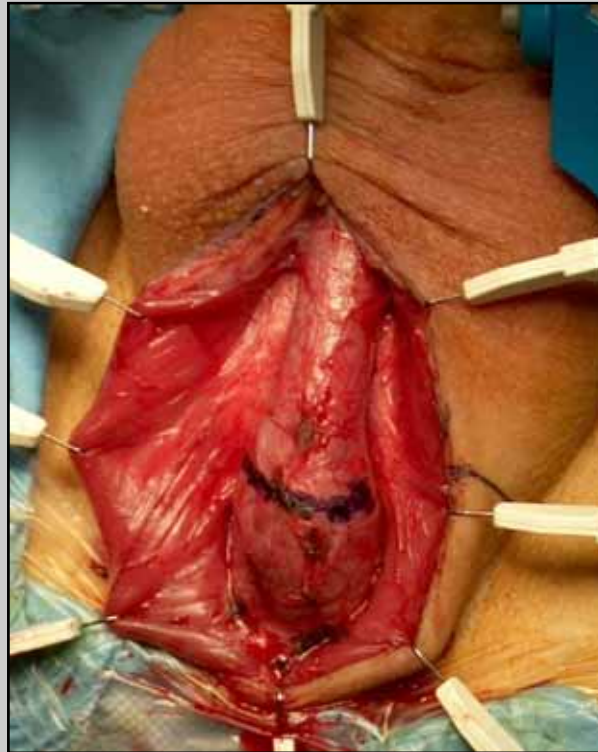
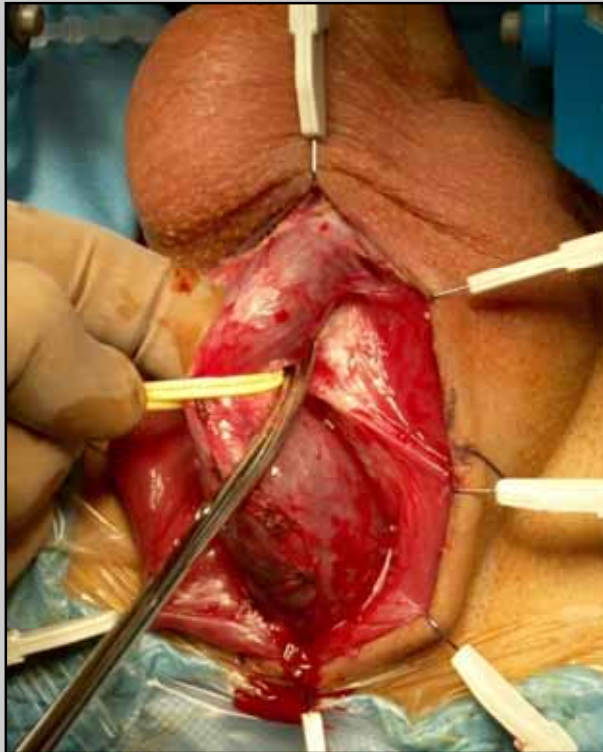
stricture associated with local adverse conditions: two-stage urethroplasty

1 - 2 cm bulbar urethral stricture

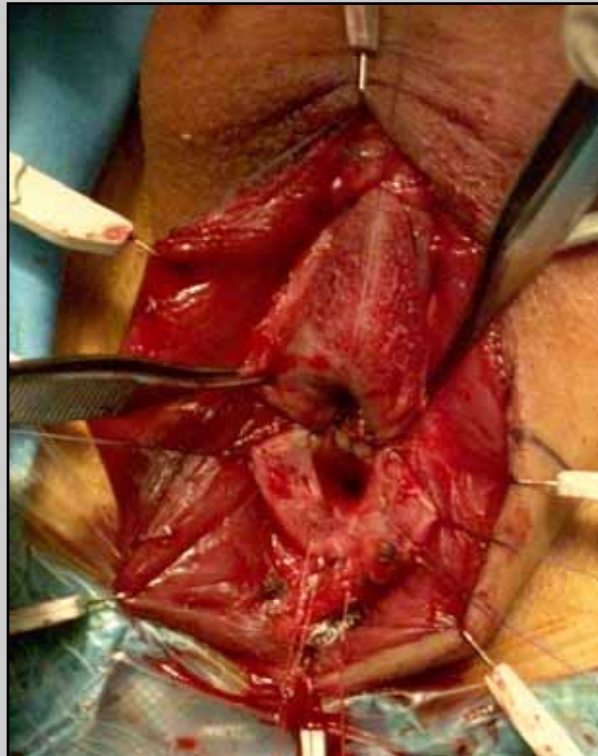


End-to-end anastomosis

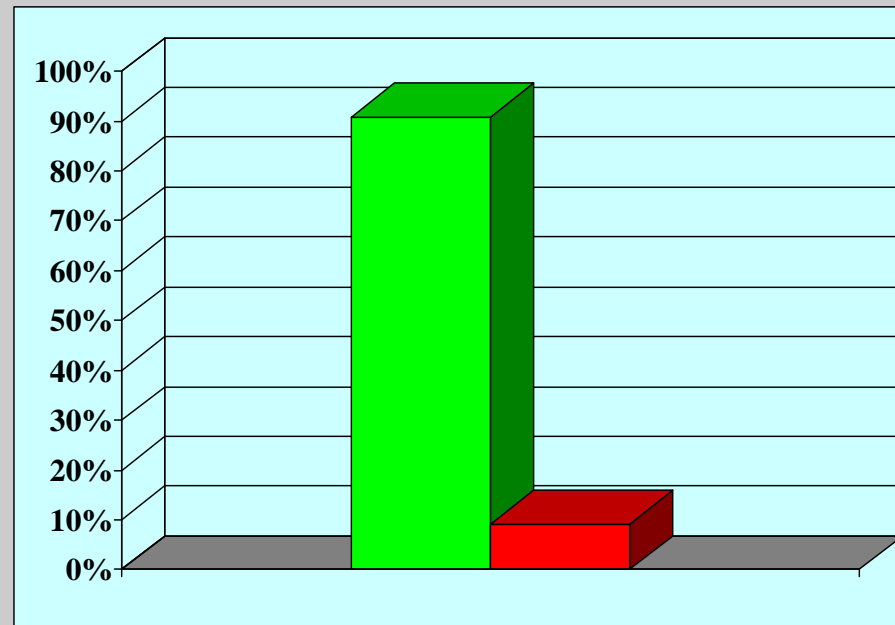
End-to-end anastomosis



End-to-end anastomosis



**Results on 153 patients who underwent
end-to-end anastomosis
Mean follow-up 68 months**



<div></div> success	139 (90.8%)
<div></div> failure	14 (9.2%)

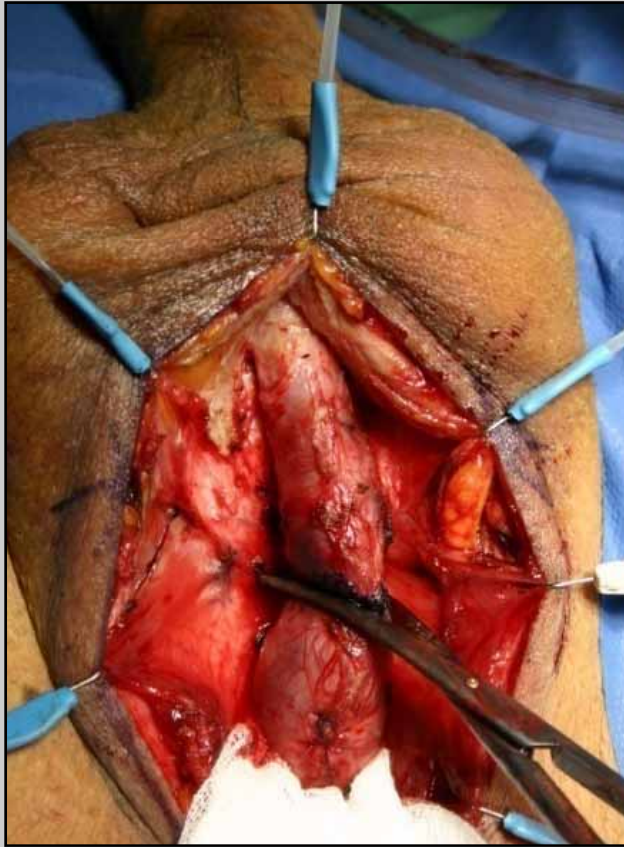
Barbagli G et al, J Urol 2007; 178:2470-2473

2 - 4 cm bulbar urethral stricture



Augmented anastomotic repair using oral graft

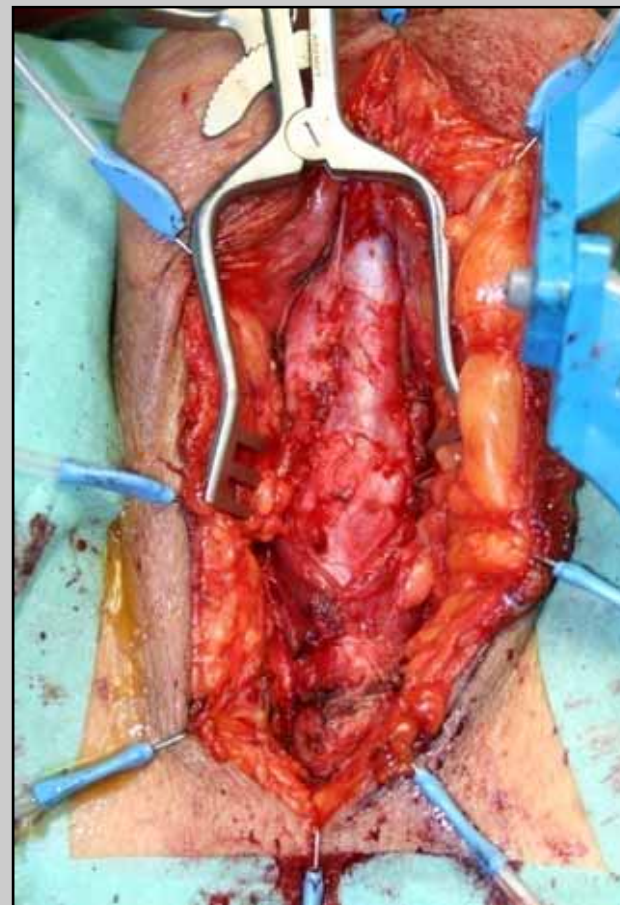
Augmented anastomotic repair using oral graft



Augmented anastomotic repair using oral graft

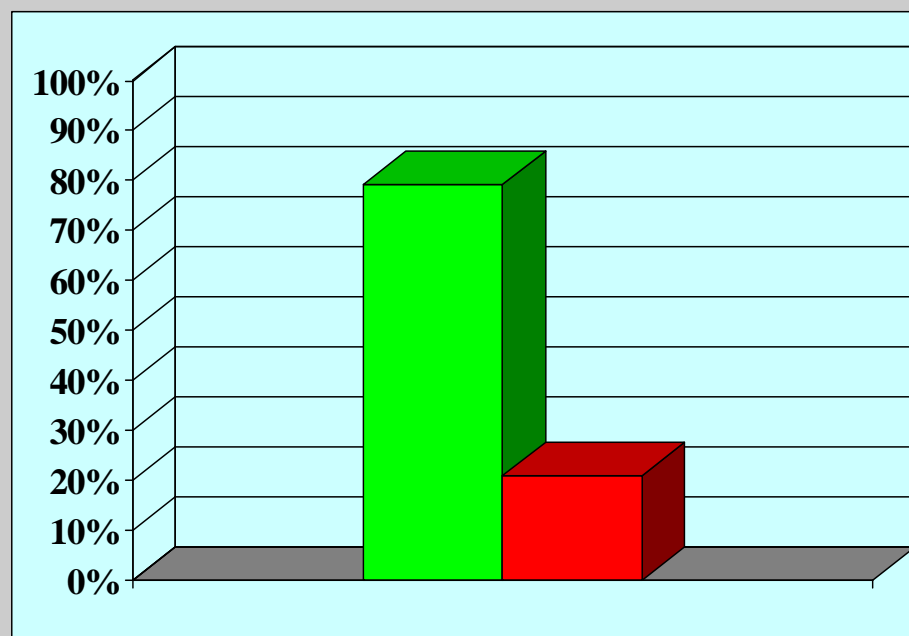


Augmented anastomotic repair using oral graft



Results on 24 patients who underwent augmented anastomotic repair using dorsal oral mucosal graft

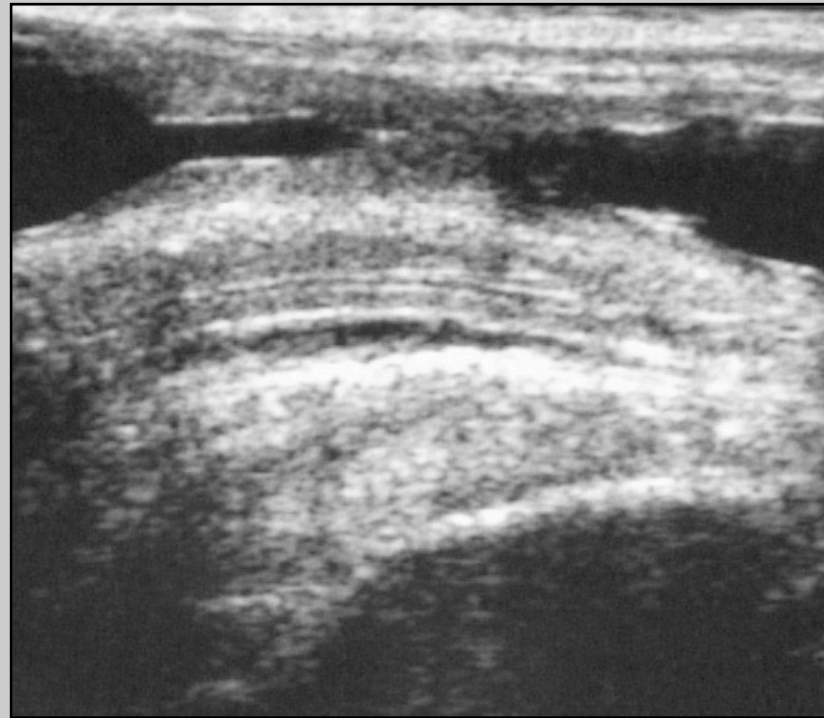
Mean follow-up 31 months



<div></div> success	19 (79.2%)
<div></div> failure	5 (20.8%)

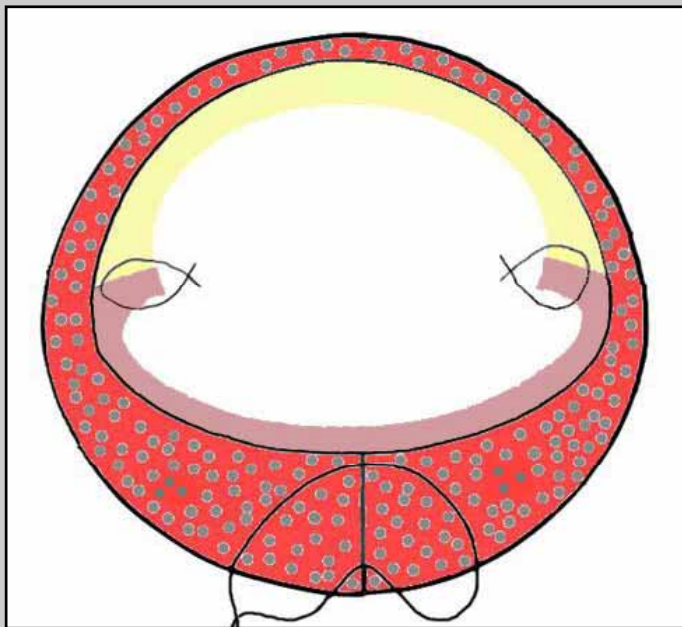
Barbagli G et al, Eur Urol 2008; 53:828-833

> 4 cm bulbar urethral stricture



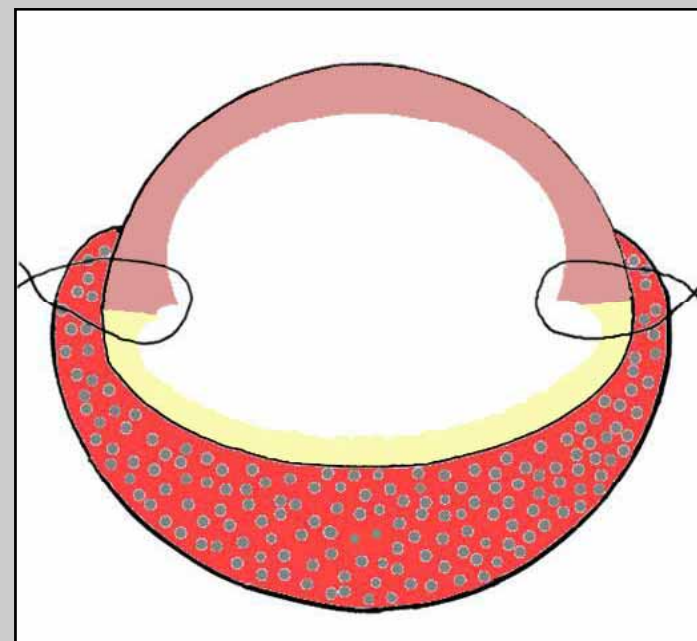
Substitution urethroplasty

Substitution urethroplasty



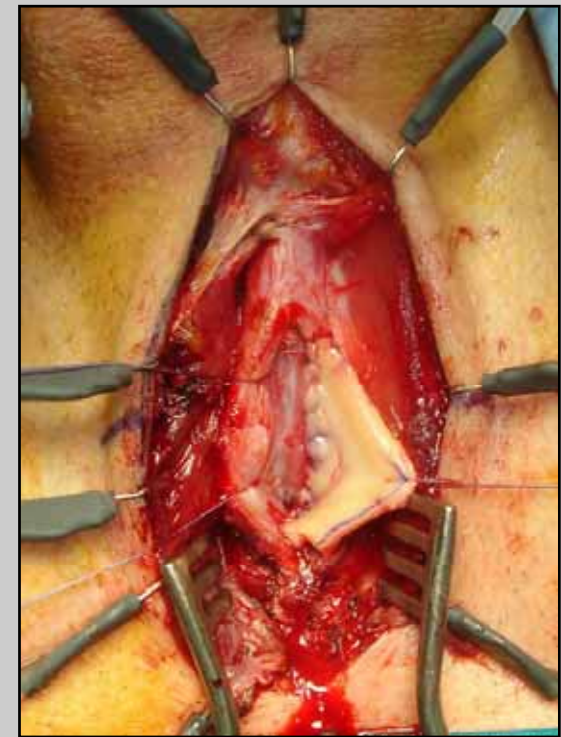
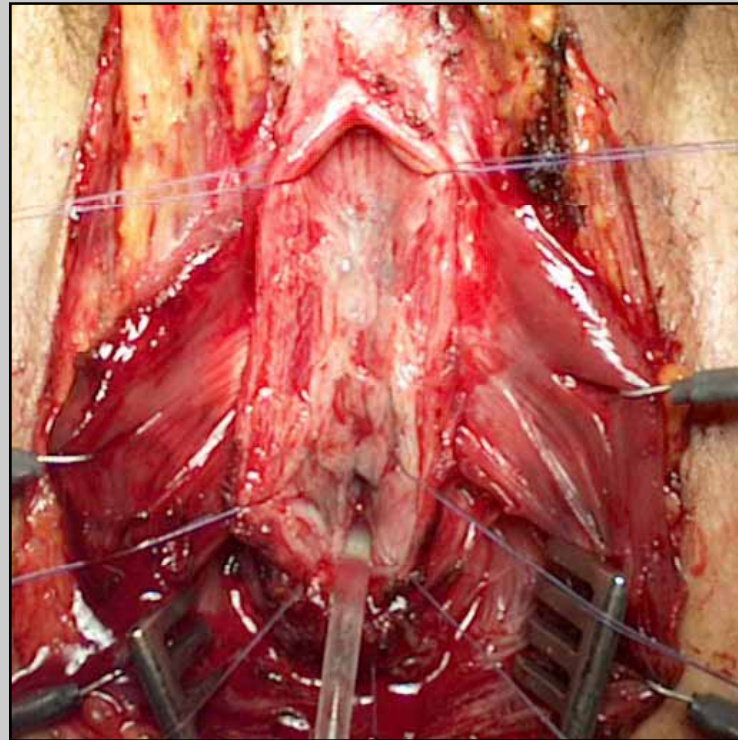
ventral

?

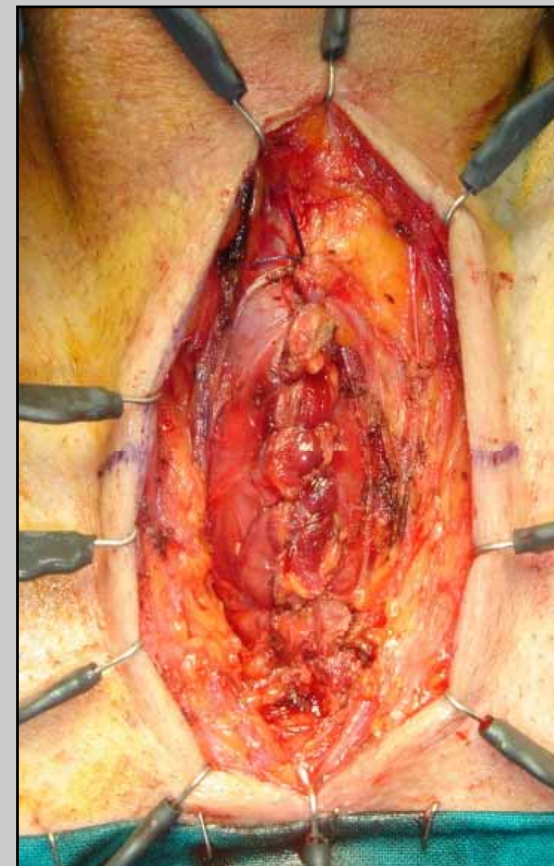
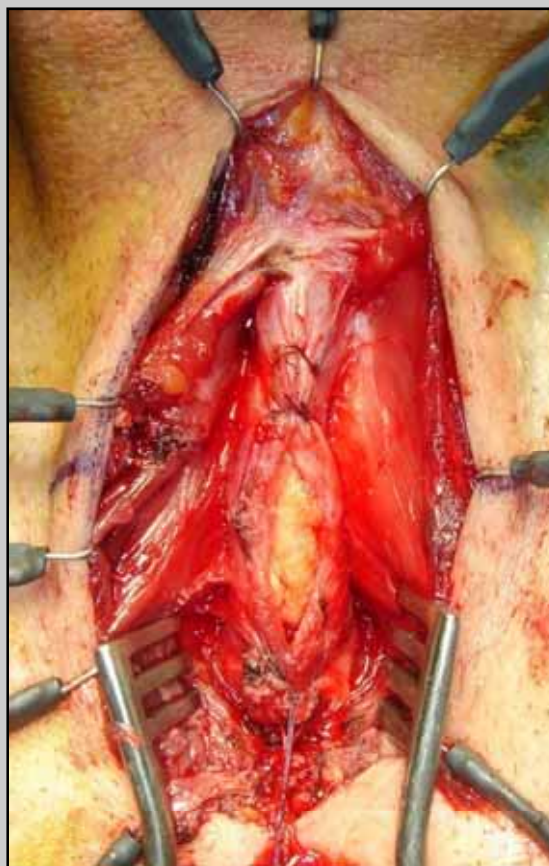
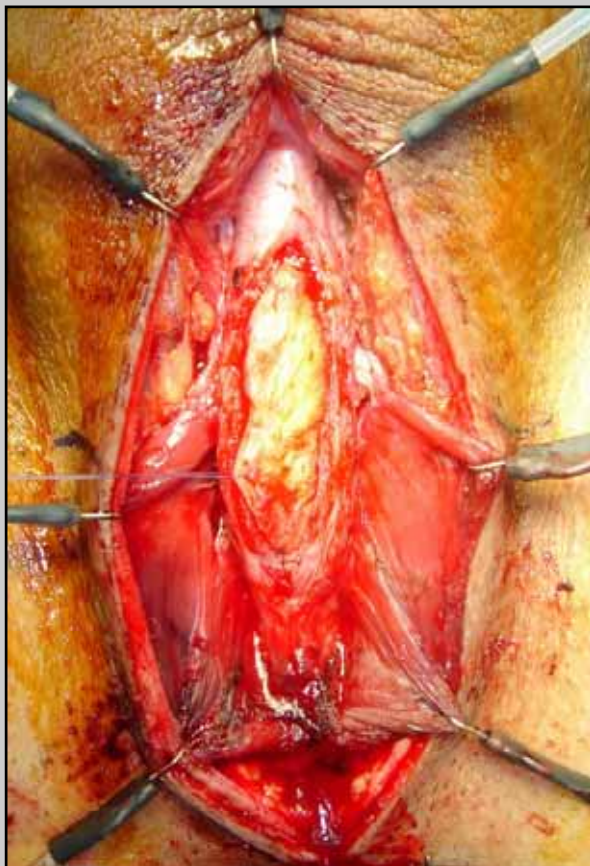


dorsal

Ventral onlay graft urethroplasty

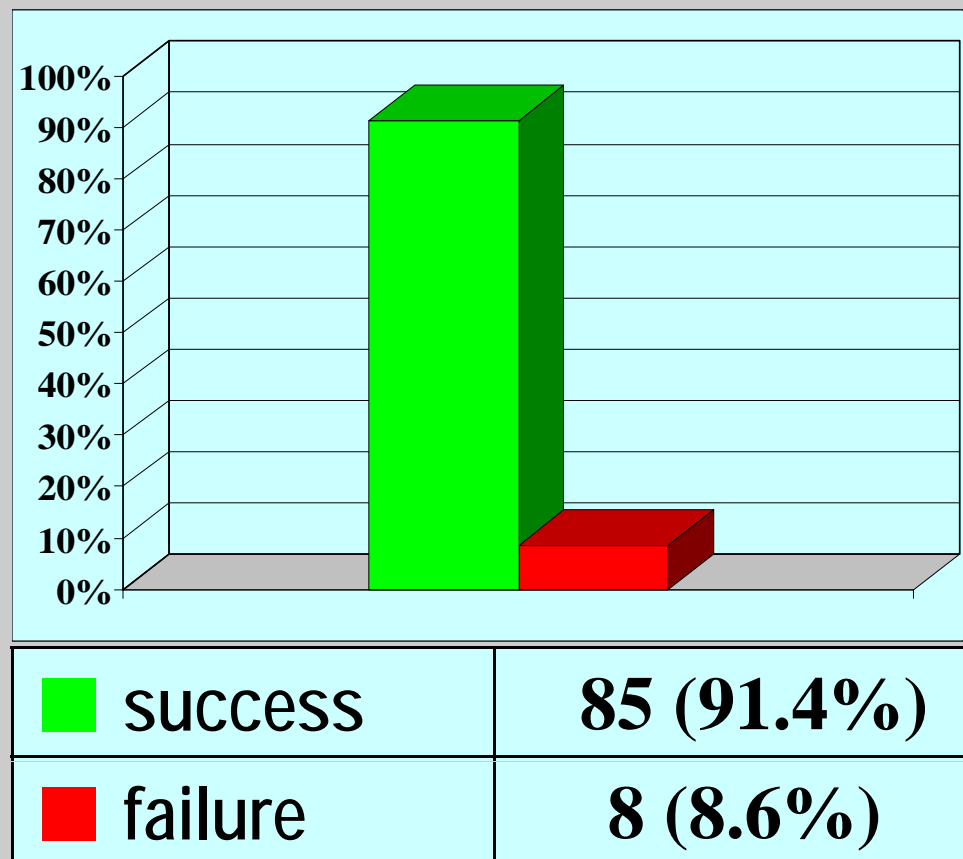


Ventral onlay graft urethroplasty



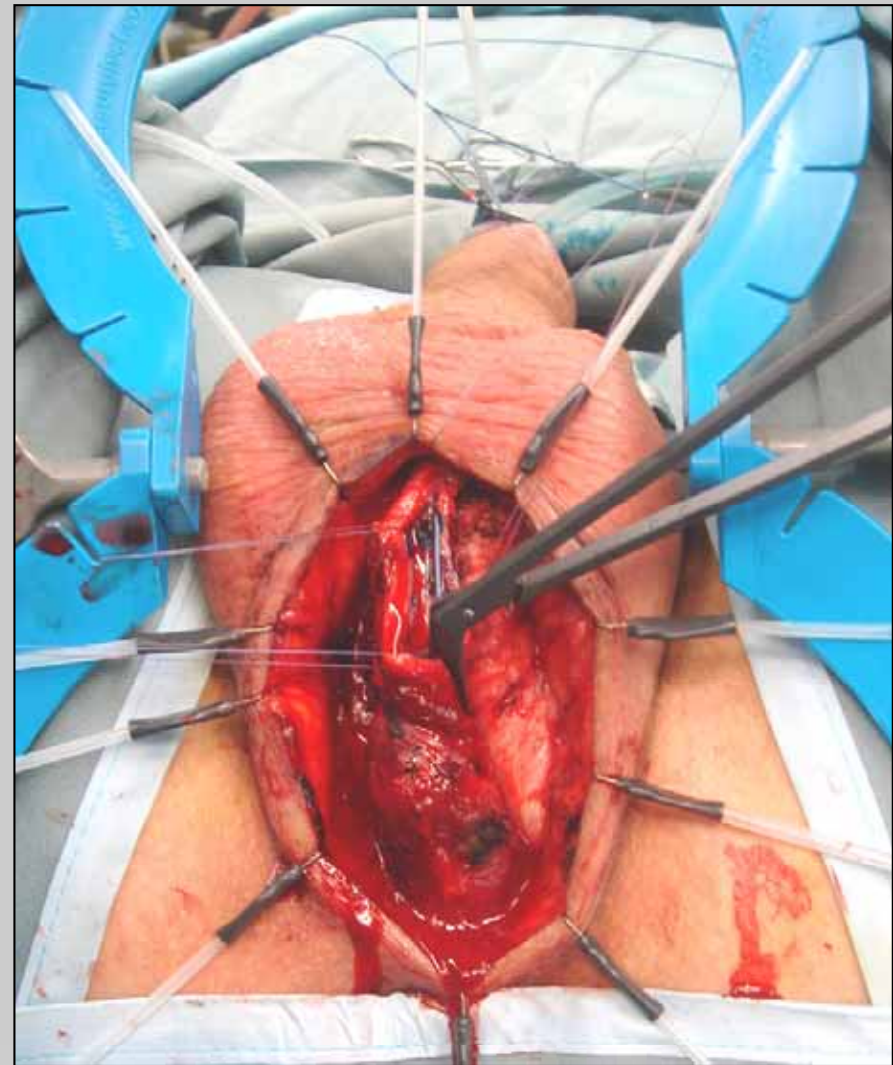
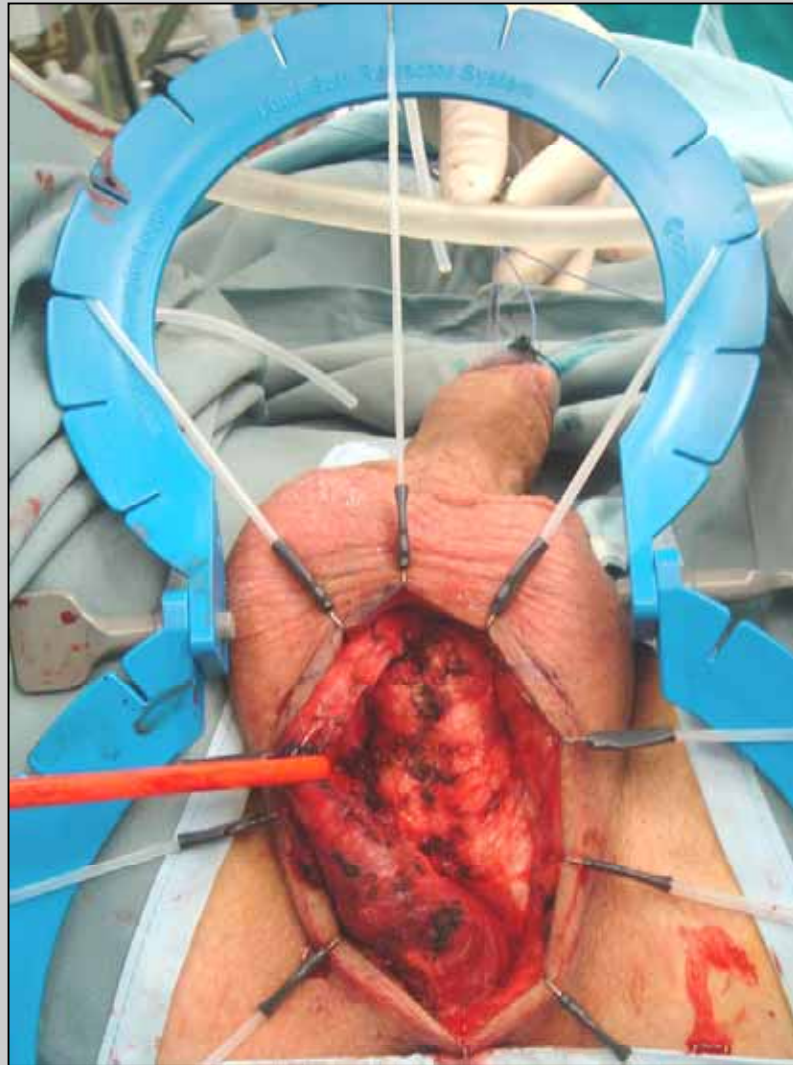
Results on 93 patients who underwent ventral onlay graft urethroplasty with oral mucosa

Mean follow-up 36 months

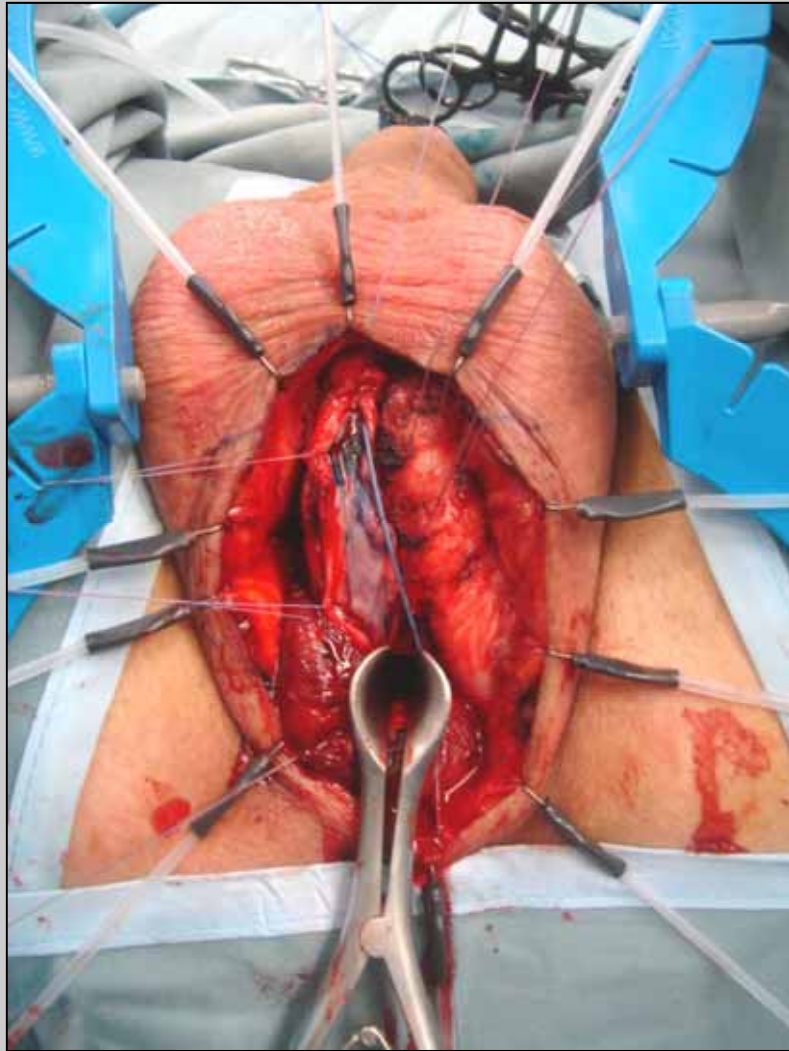


Barbagli G et al, Eur Urol 2008; 53:828-833

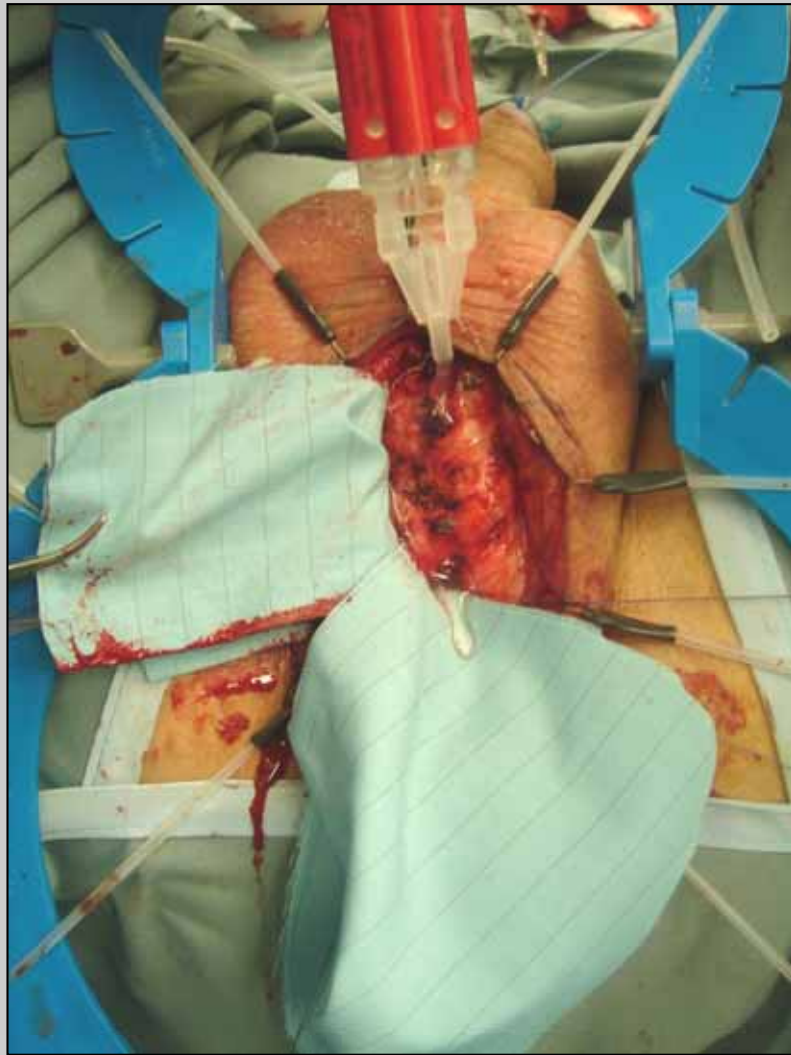
Dorsal onlay graft urethroplasty



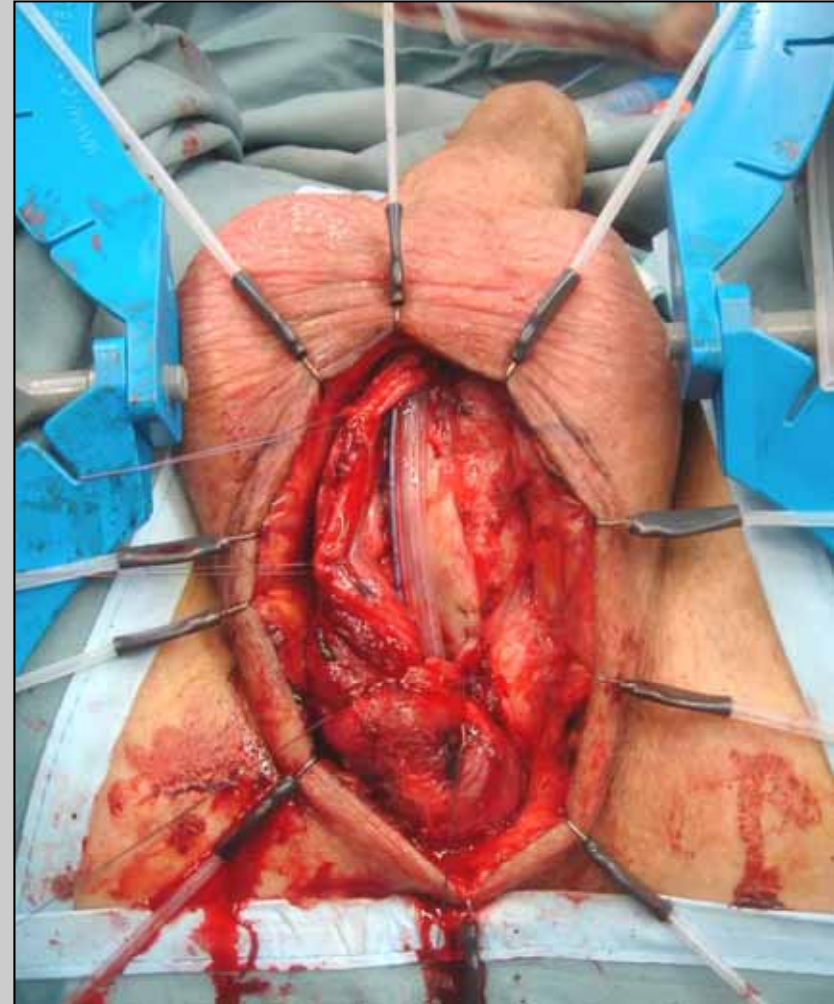
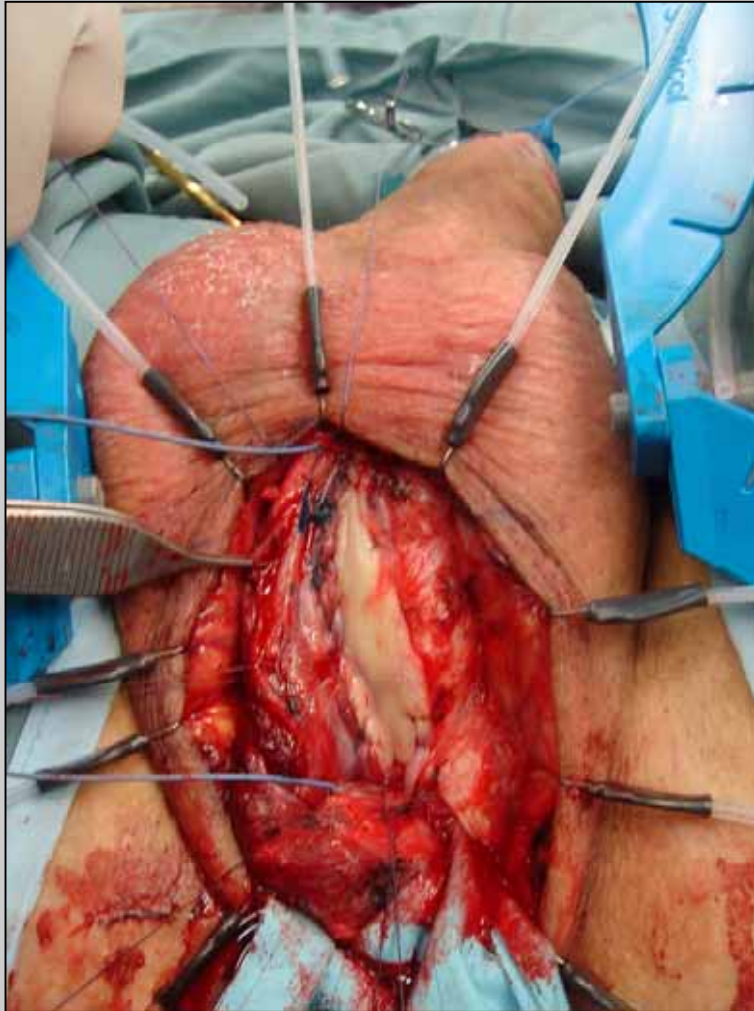
Dorsal onlay graft urethroplasty



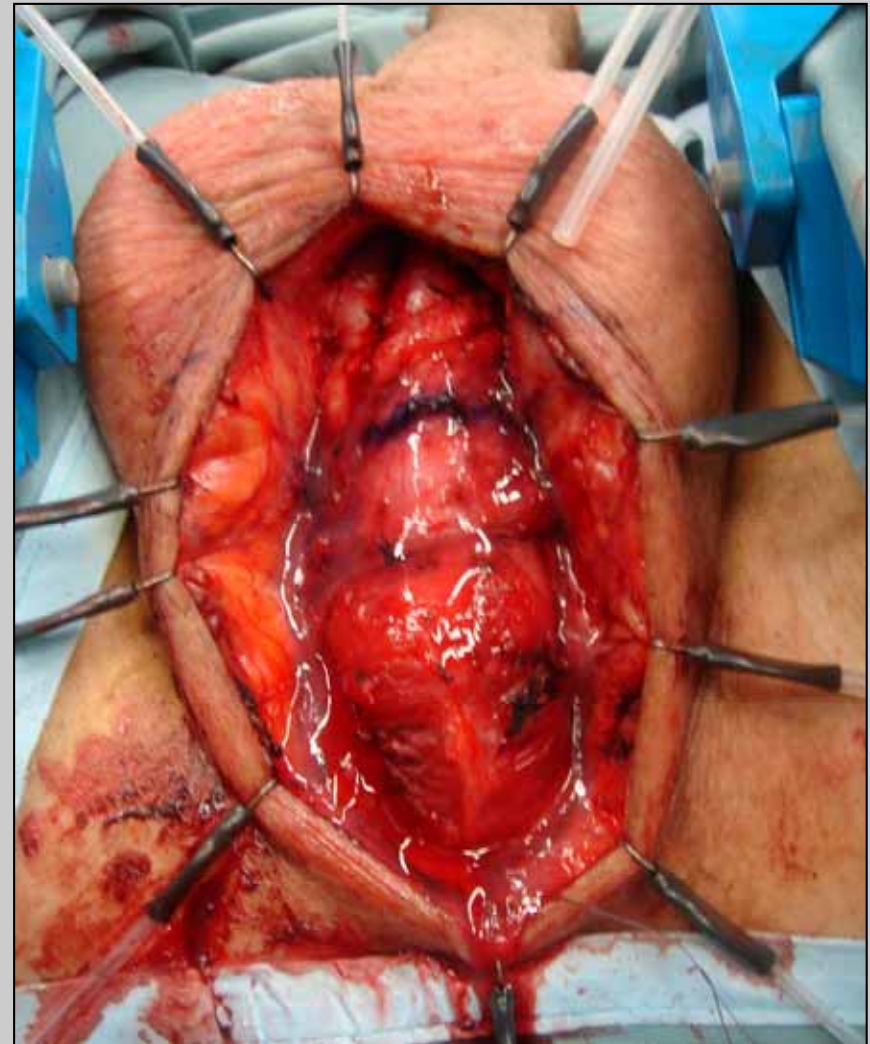
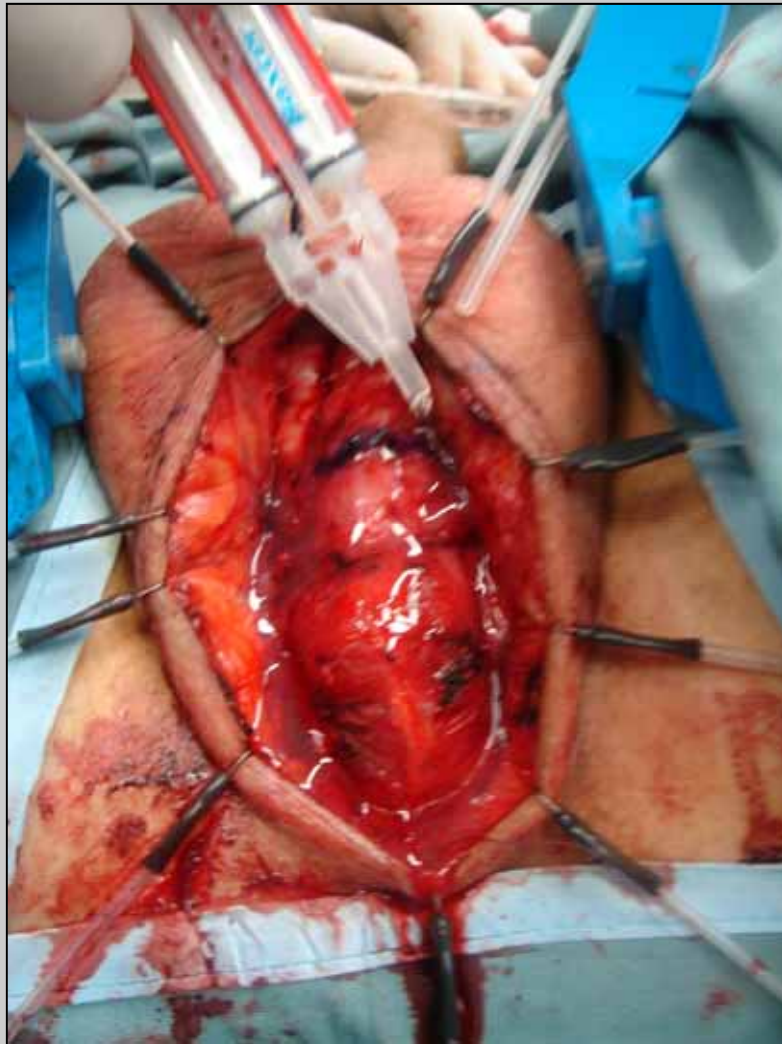
Dorsal onlay graft urethroplasty



Dorsal onlay graft urethroplasty

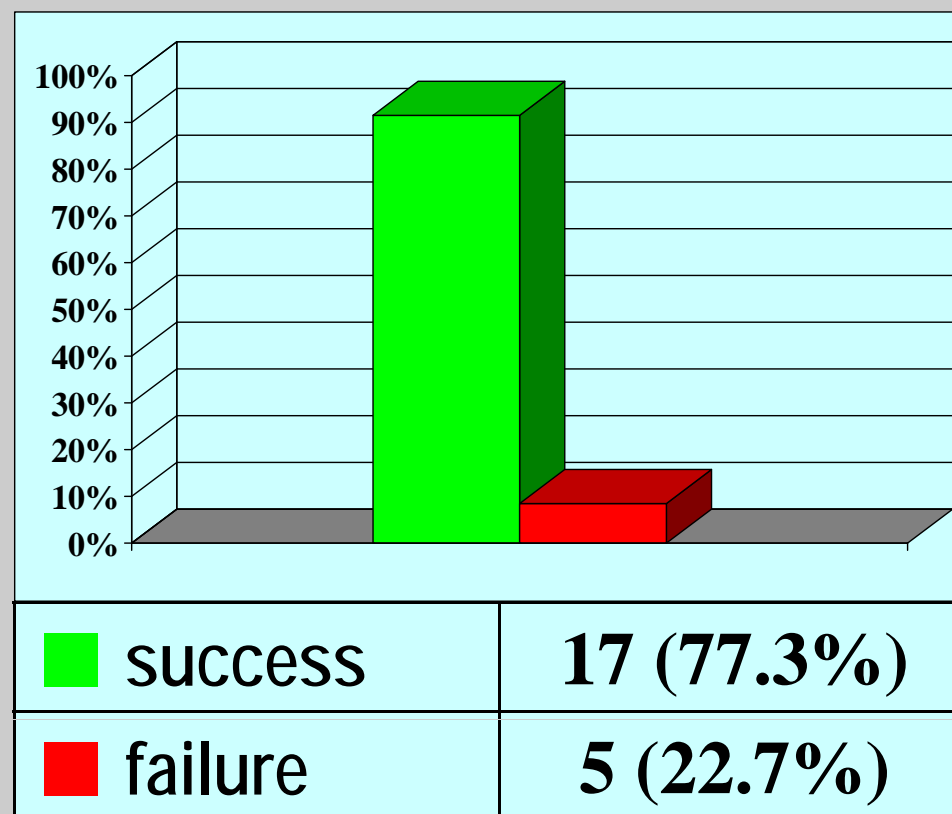


Dorsal onlay graft urethroplasty



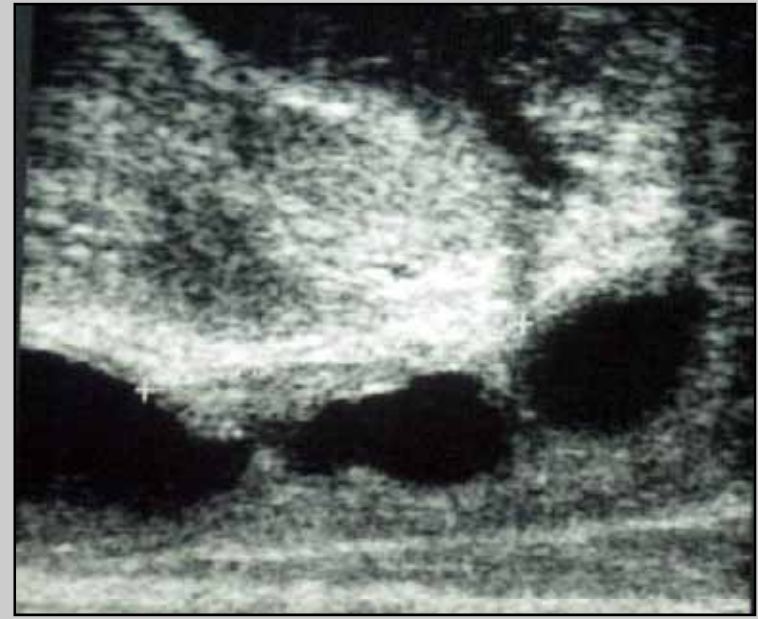
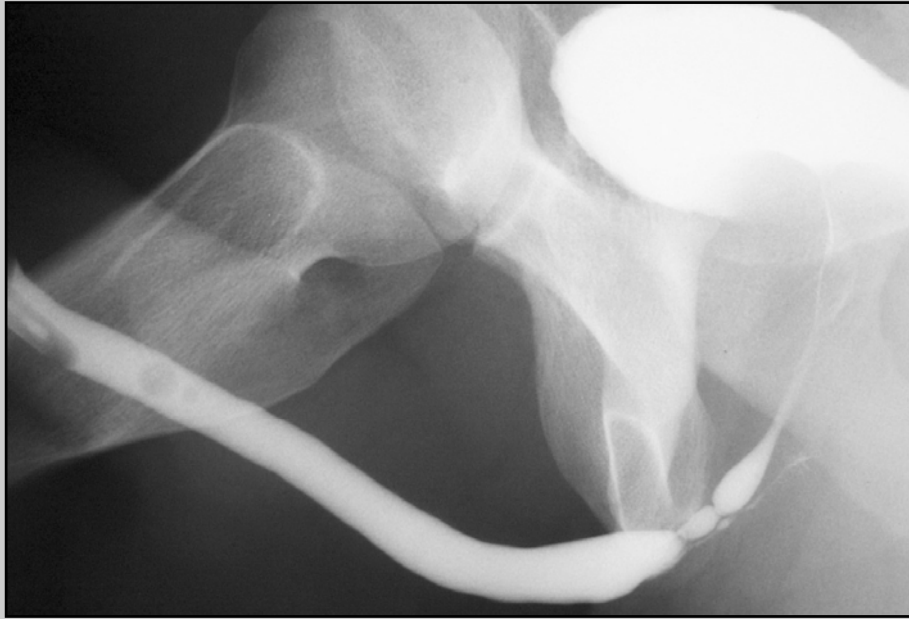
Results on 22 patients who underwent dorsal onlay graft urethroplasty with oral mucosa

Mean follow-up 41 months



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

Ventral onlay graft



No-traumatic uncomplicated proximal bulbar urethral strictures

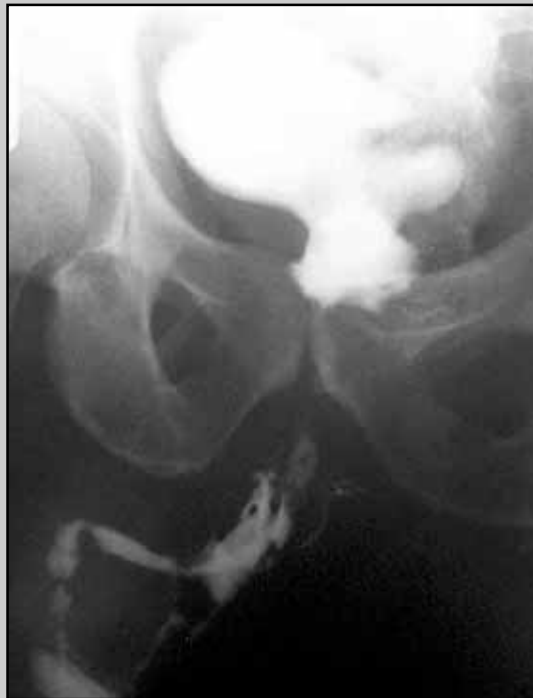
3-4 cm in length with limited spongiofibrosis

Dorsal onlay graft



No-traumatic long **distal** bulbar urethral strictures

Bulbar urethral stricture associated with local adverse conditions



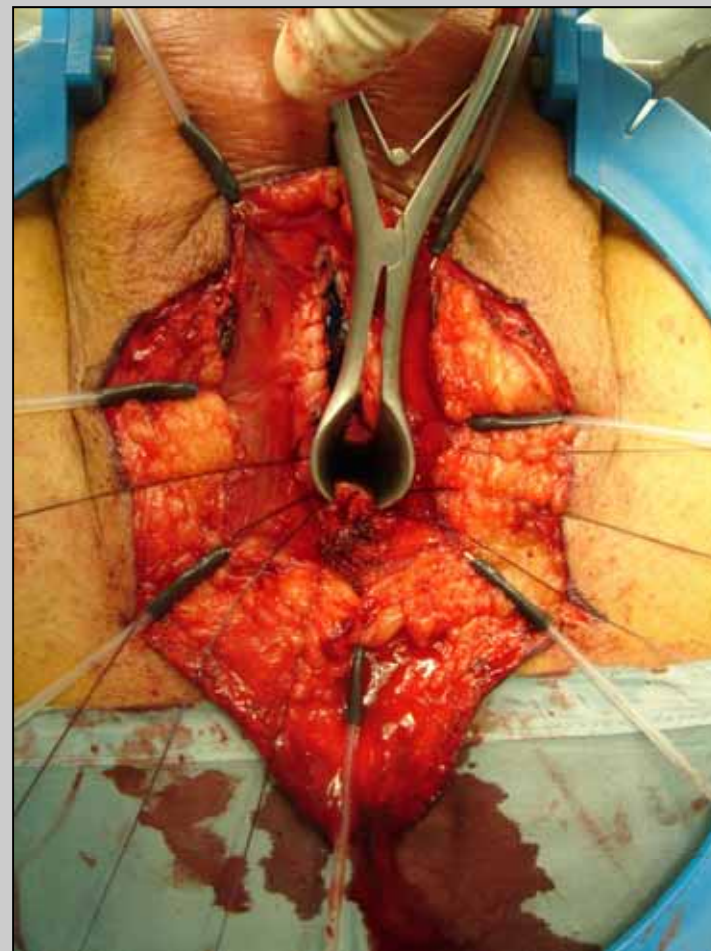
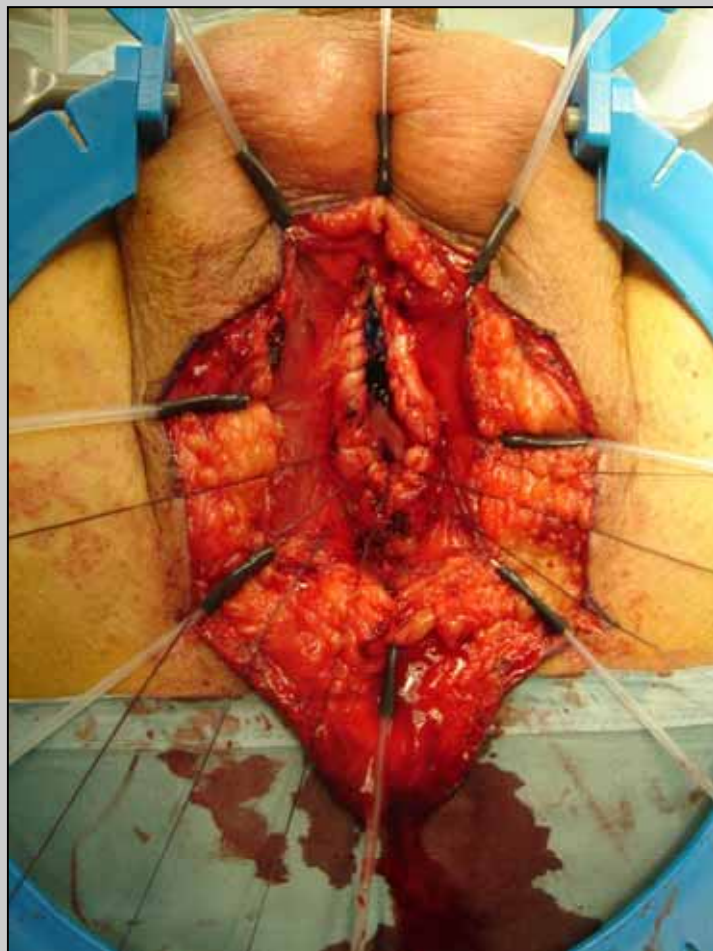
Two-stage urethroplasty

First stage: perineal urethrostomy



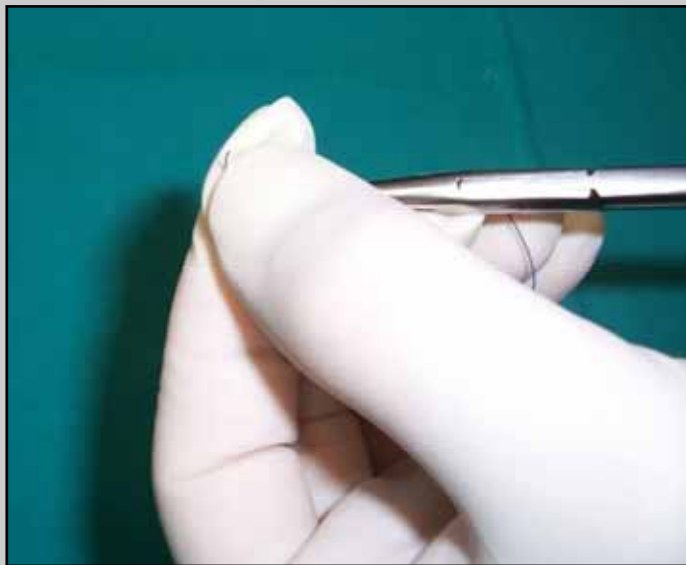
Barbagli G et al, J Urol 2009; 182:548-557

First stage: perineal urethrostomy

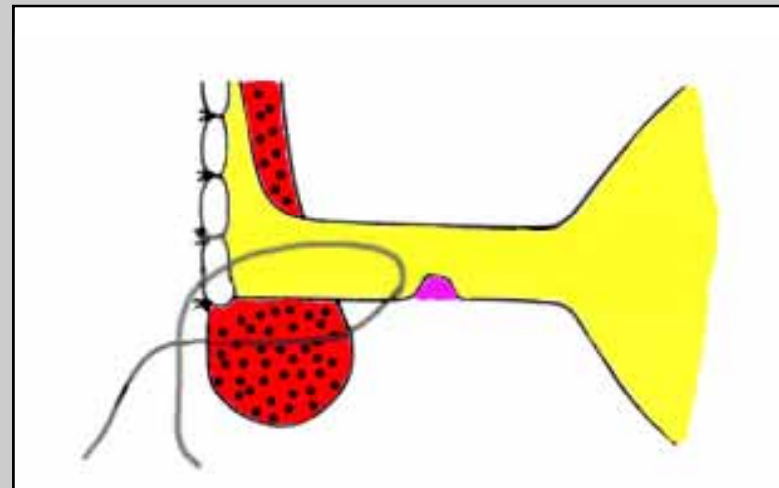
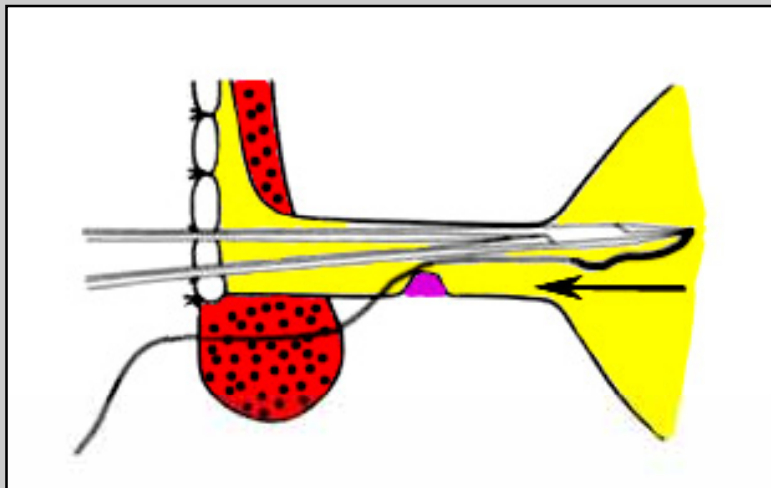
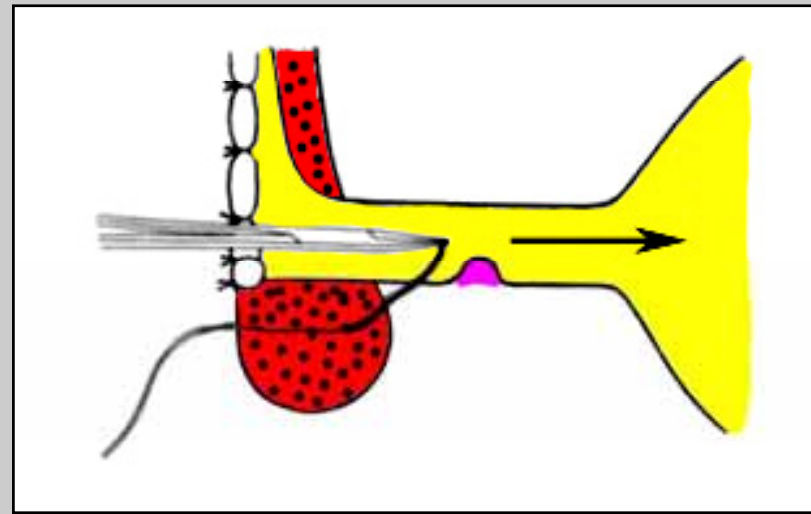
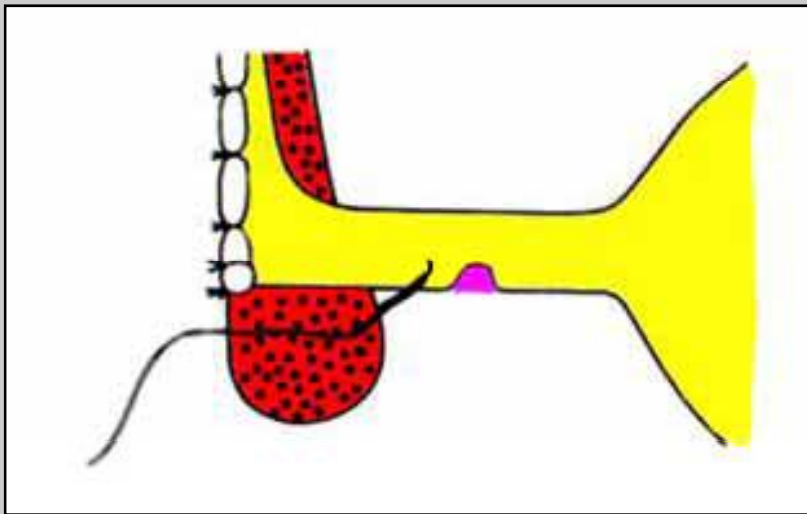


Barbagli G et al, J Urol 2009; 182:548-557

Webster's technique

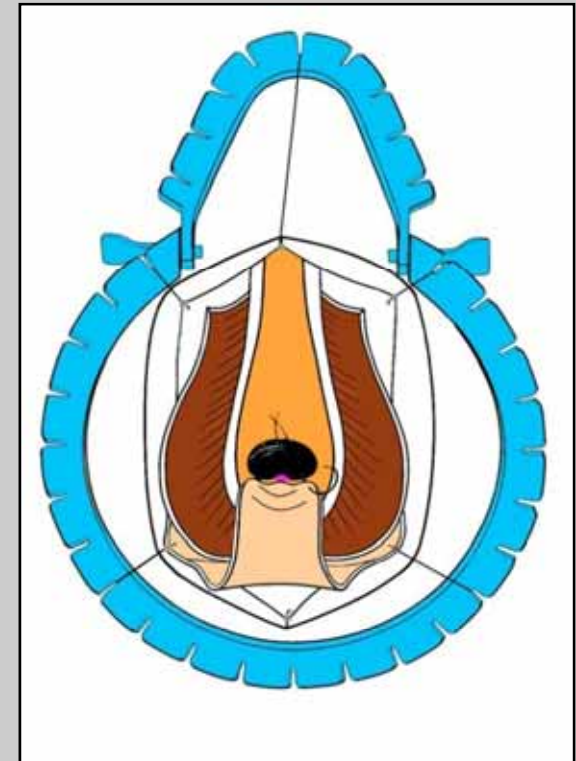
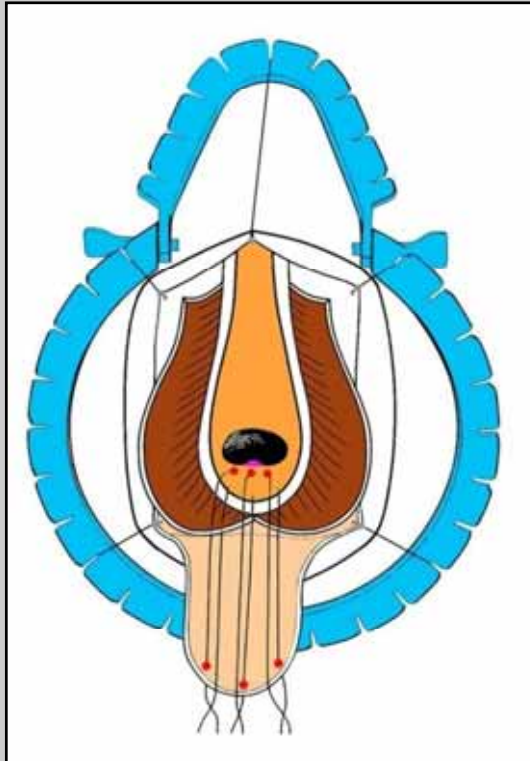
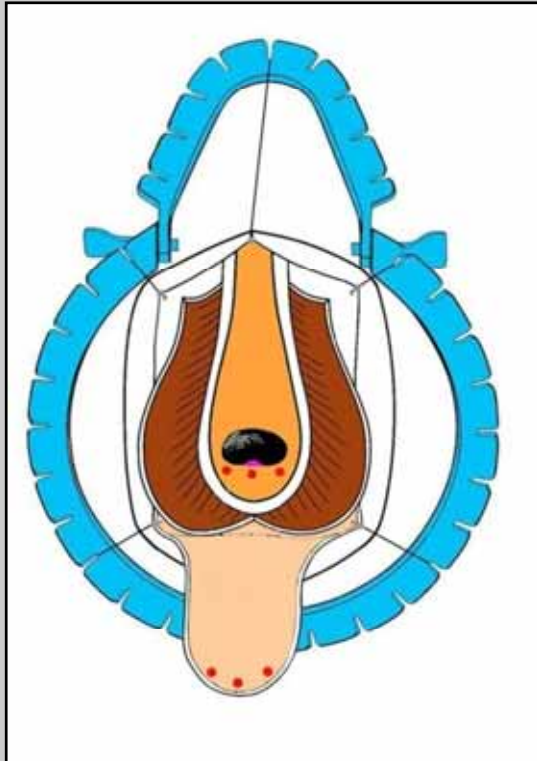


Barbagli G et al, J Urol 2009; 182:548-557



Barbagli G et al, J Urol 2009; 182:548-557

First stage: perineal urethrostomy



Barbagli G et al, J Urol 2009; 182:548-557

First stage: perineal urethrostomy



Barbagli G et al, J Urol 2009; 182:548-557

First stage: perineal urethrostomy



Barbagli G et al, J Urol 2009; 182:548-557

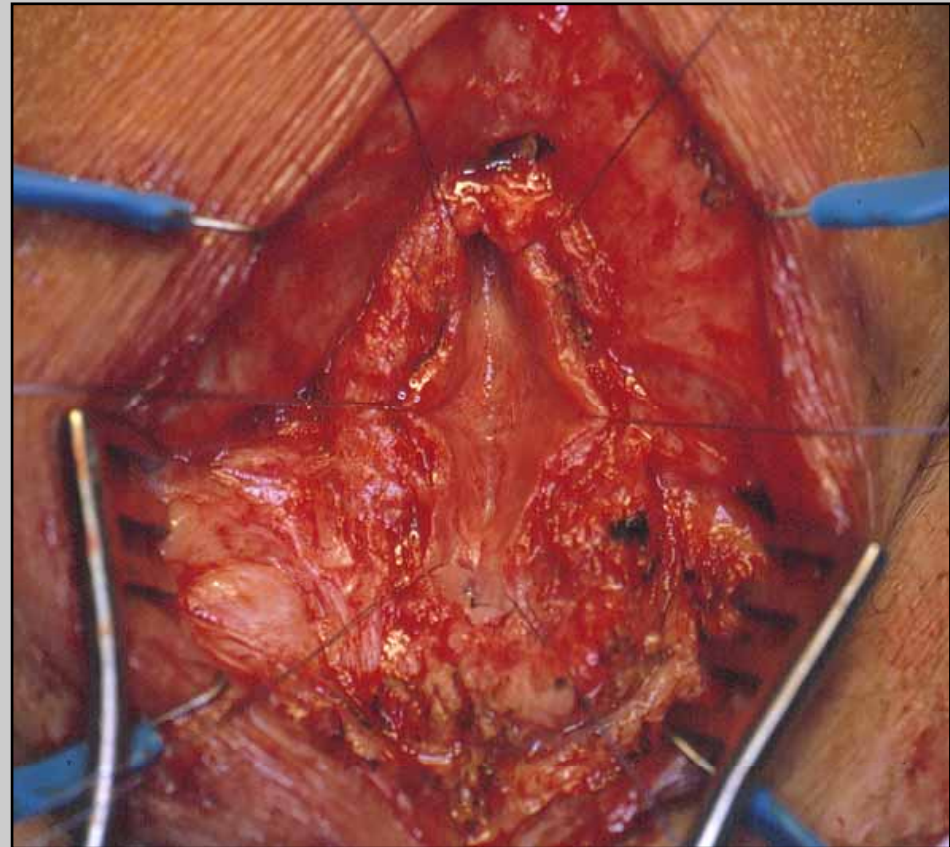
First stage: perineal urethrostomy



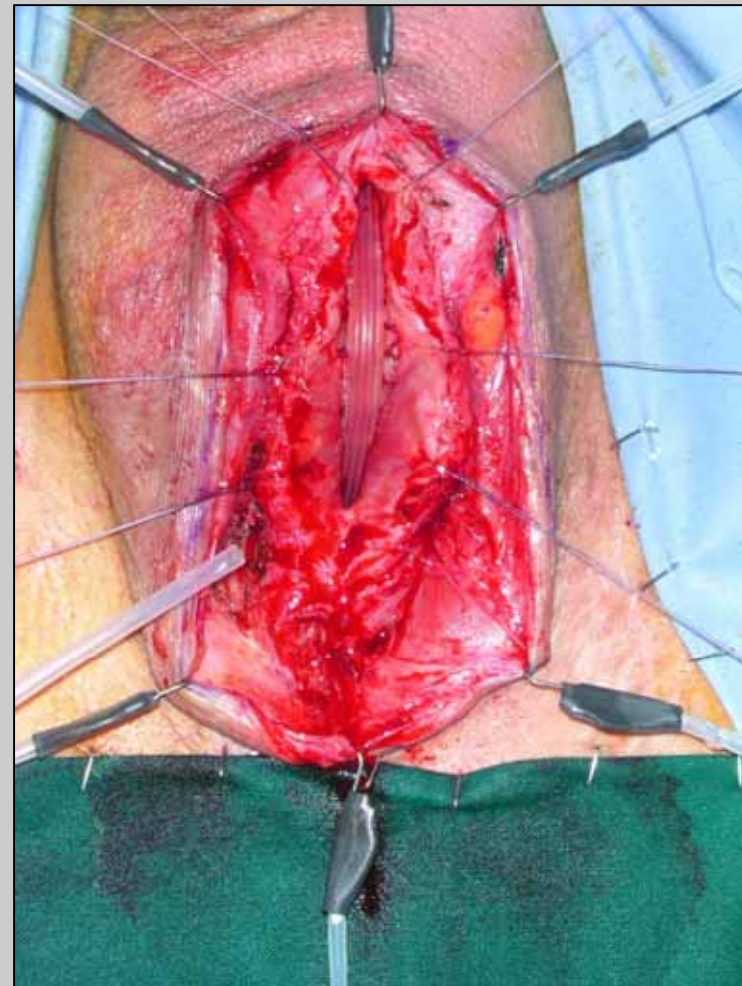
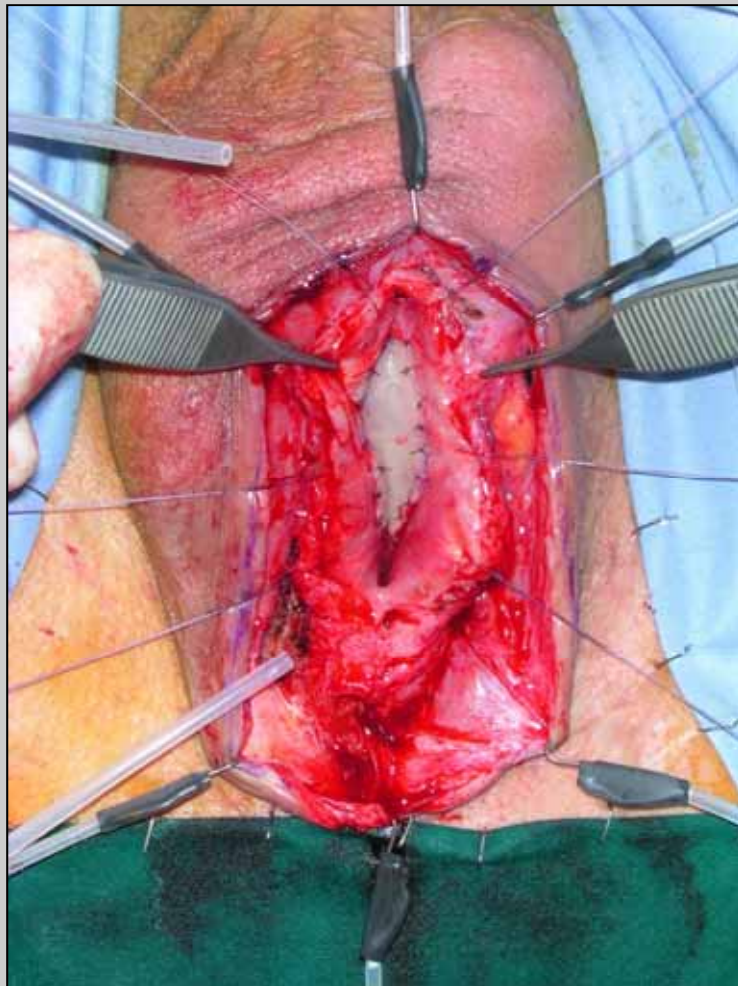
Second stage: closure of perineal urethrostomy



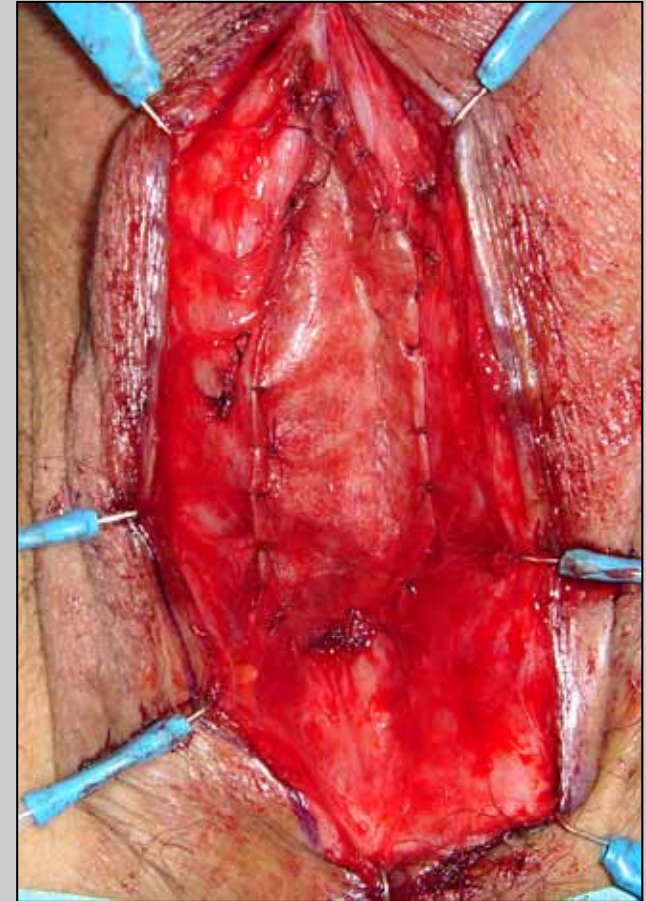
Second stage: closure of perineal urethrostomy



Second stage: closure of perineal urethrostomy

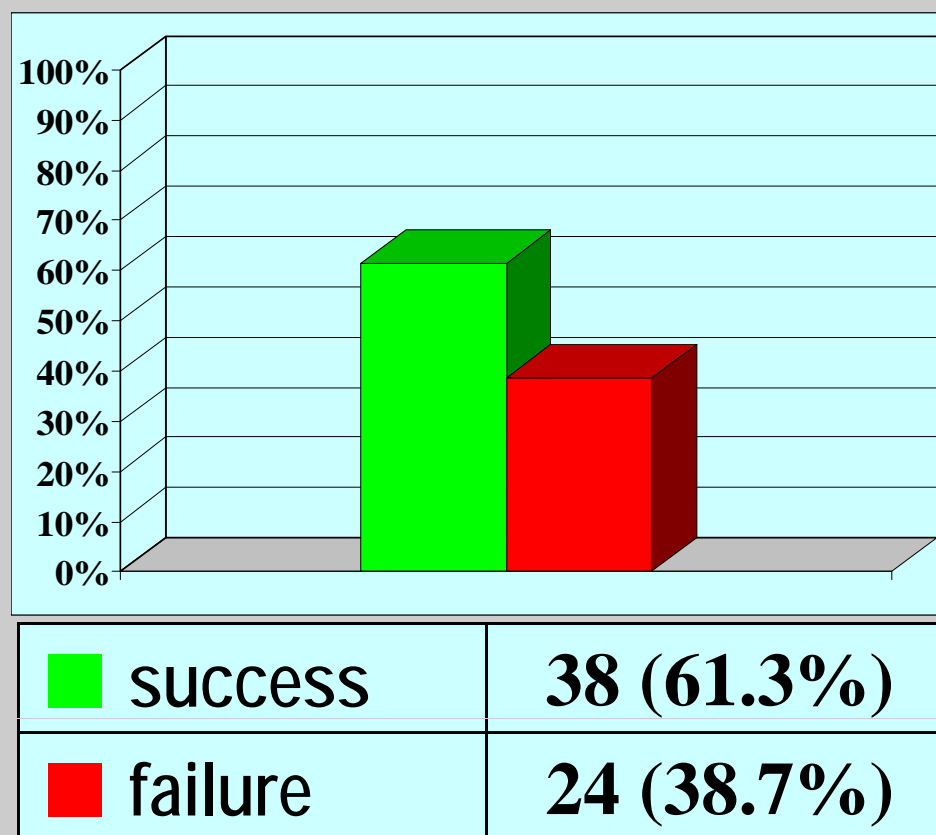


Second stage: closure of perineal urethrostomy



Results on 62 patients who underwent two-stage urethroplasty

Mean follow-up 84 months



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

Thank you !

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website: www.urethralcenter.it