

WORKSHOP DE CIRURGIA RECONSTRUTIVA UROLÓGICA



Uretroplastia com Retalho

Ricardo Borges
Serviço de
Urologia CHL
(Diretor: Dr. J. Garcia)



BLACK
FRIDAY



U-score (urethral stricture score)

| Variable | Points |
|--------------------------------|--------|
| Length of stricture (cm) | |
| ≤2 | 1 |
| >2 to ≤5 | 2 |
| >5 | 3 |
| Location | |
| Bulbar urethra | 1 |
| Penile urethra | 2 |
| Number of strictures | |
| 1 | 1 |
| >1 | 2 |
| Etiology | |
| Trauma, idiopathic, iatrogenic | 1 |
| Inflammatory, hypospadias | 2 |

- Reliable, validated grading scale
- Describe the surgical complexity of anterior urethral strictures
- The stricture's U-score correlates with surgical time and complexity of procedure required.
- Valuable tool to grade anterior urethral strictures and improve comparative research

Preoperative Assessment



Smith (1968): with normal bladder function, there will be no impact in flowrate until de urethra diameter is <10 French

Important to have a clear anatomical assessment of the **site** and **length** of the stricture.

Combined ascending and descending urethrogram to image the urethra, supplemented where necessary by urethroscopy



Non-obliterative

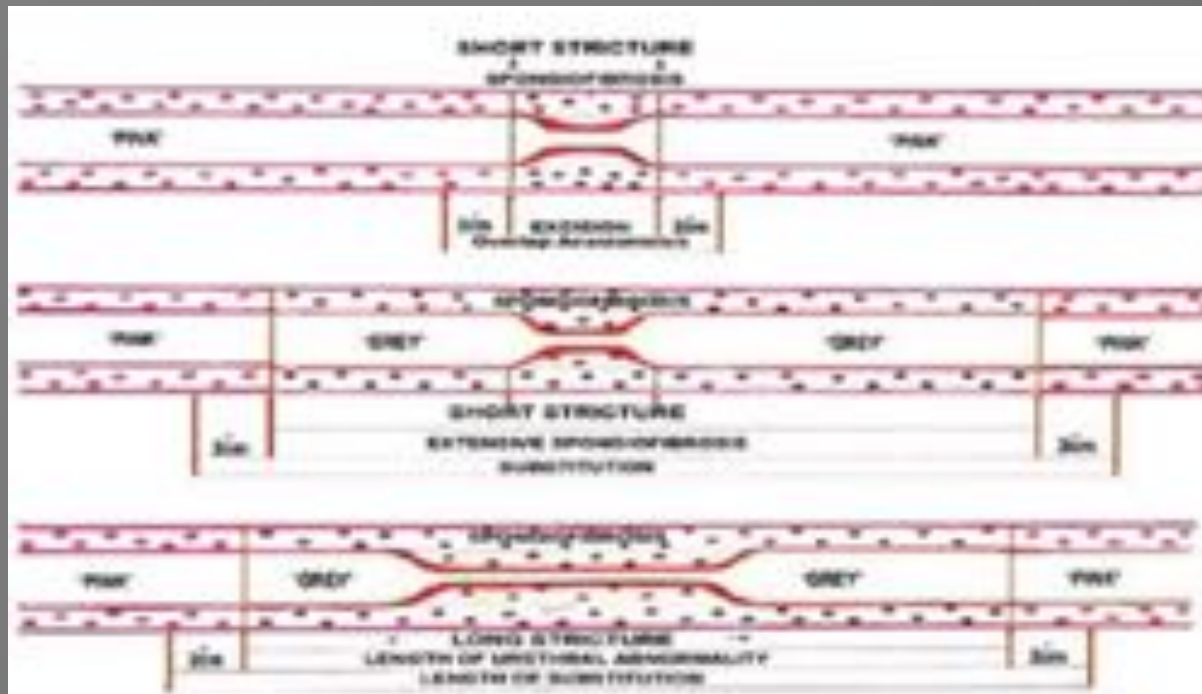


Obliterative

Preoperative Assessment

The length of urethral narrowing may not correspond directly to the length of ischemic spongiofibrosis

Turner Warwick, Urology, 1985



1. Intracorporal injection of contrast

Chapple, BJU Int, 2004
Barbagli, Scand J Urol Nephrol, 1995

2. Ultrasonography

Beckert, J Urol, 1991
Davies, J Urol, 2009

Clinical role not established!

Recommendations

ICUD on Urethral Strictures

SIU/ICUD Consultation on Urethral Strictures: The Management of Anterior Urethral Stricture Disease Using Substitution Urethroplasty

Christopher Chapple, Daniela Andrich, Anthony Atala, Guido Barbagli, Andre Cavalcanti, Sanjay Kulkarni, Afaf Mangera, and Yosuke Nakajima

1. The **first operation** is likely to be the **most successful**, and preference should be given to the simplest technique that is likely to be most effective, avoiding augmentation urethral reconstruction if possible (Level 3; A).
2. If augmentation (substitution) urethral reconstruction is being considered, an **only flap for strictures in the penile urethra can also be considered** (Level 3; B).
3. In most cases, **grafts are preferred over flaps** for augmentation urethral reconstruction, particularly in the bulbar urethra, since there is a **greater morbidity** with the use of flaps compared to with grafts, and they have **similar efficacy** (Level 2; B).

(...)

Flaps

vs.

Grafts



- Time-consuming (and tedious) to harvest
- Dissection is extensive
- Scarring and loss of the normal contour of the penis when its dartos layer has been redeployed from part or all of its circumference
- **Positive indications** in favor of a flap (all of which interfere with the ability of a graft to take):
 - ✓ some instances of **revision surgery**;
 - ✓ any cause of **local devascularization** such as radiotherapy (or severe peripheral vascular disease);
 - ✓ **local infection**

- Quick and relatively easier to harvest and deploy
- Inherently less reliable - in theory - because they have to be revascularized
- Similar restructure rate as flaps (15,5 e 14,5% respectively)

McAnninch, W J Urol. 1998

- **Positive indications:**
 - ✓ procedure of choice in augmentation when EPA is not possible
 - ✓ Lichen Sclerosus

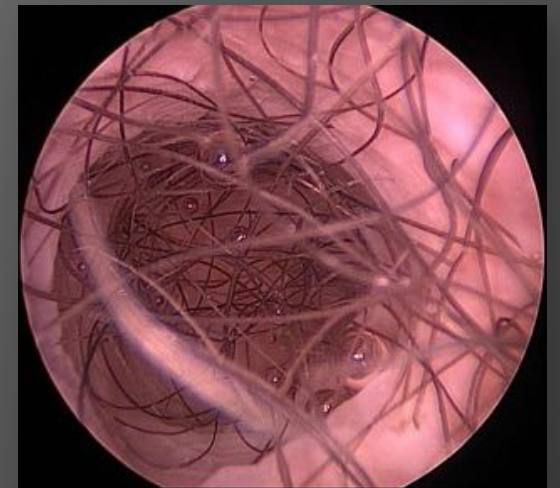
Recommendations

ICUD on Urethral Strictures

SIU/ICUD Consultation on Urethral Strictures: The Management of Anterior Urethral Stricture Disease Using Substitution Urethroplasty

Christopher Chapple, Daniela Andrich, Anthony Atala, Guido Barbagli, Andre Cavalcanti, Sanjay Kulkarni, Akaf Mangera, and Yosuke Nakajima

6. Tube substitution procedures should be avoided (Level 3-4; A).
7. Scrotal skin should be avoided where possible because of the high associated morbidity (Level 3; A).



1. Principles of tissue transfer

A **flap** refers to tissue that is transferred with its native blood supply intact



Jordan, 1992

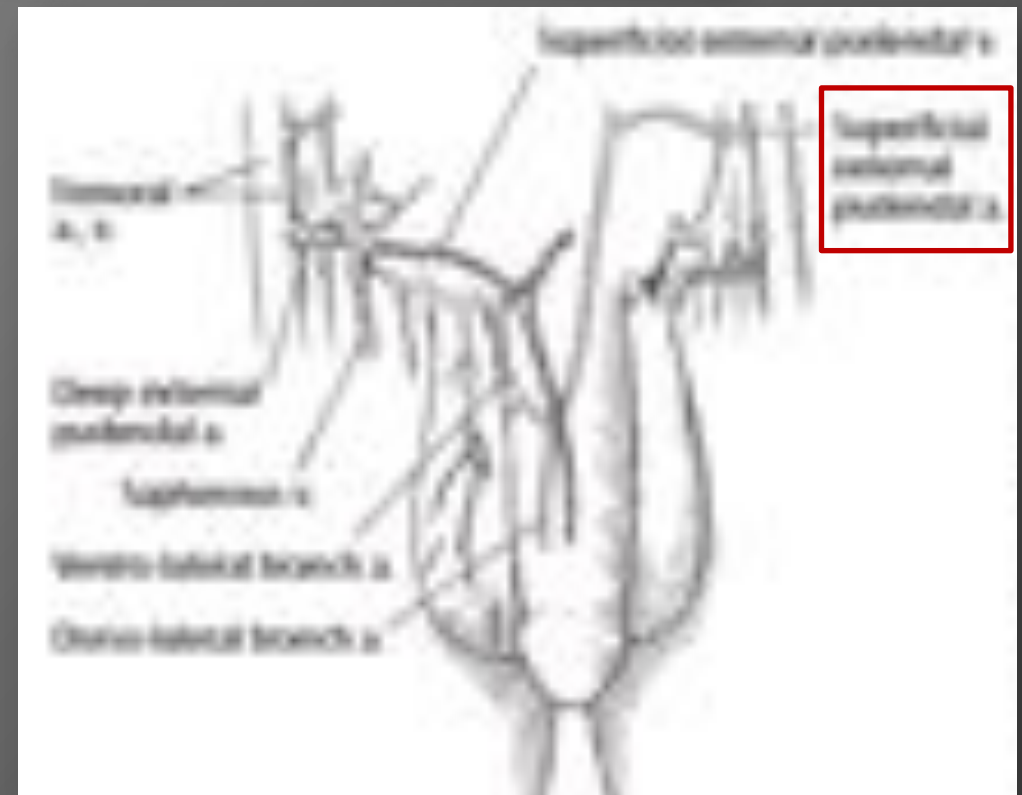
2. Blood supply to the urethra and Penile skin

Dual blood supply to the urethra
allows aggressive mobilization of the spongiosum



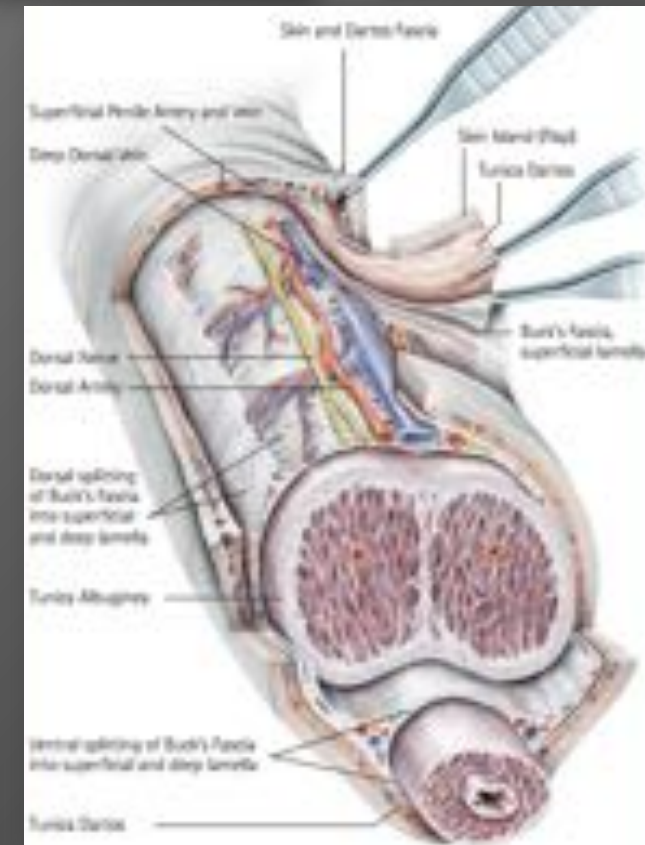
Hypospadias (+ severe forms)
Prior urethroplasty

Distal blood supply
compromised
-> ischemic stenosis



3. Flap techniques

1. **Penile skin flaps**, are a reliable and time-tested tool for urethral reconstruction
2. Use them correctly:
 - in the absence of prior flap surgery,
 - nonhirsute penile skin (foreskin and distal penile skin in particular)
 - reliable axial vascular supply
 - can be well mobilized and used to cover long urethral defects
3. Can be elevated from ventral or dorsal skin and taken in either the longitudinal or transverse direction.



3. Flap techniques

1. Orandi (1968)

- ventral, longitudinal flap
- lateral pedicle
- nonobliterative strictures within the penile shaft that are not due to BXO
- **Success rate: 71.8%**

Disadvantage:

proximal part of the pendulous or any part of the bulbar urethra: hair-bearing skin is involved in the reconstruction which can lead to recurrent infections and stone formation.



3. Flap techniques

For strictures isolated to the fossa navicularis...

2. Jordan (1987)

- smaller, ventral penile skin flap that is rotated onto the incised urethral opening
- Success rate: 100% (without LS). 50% (with LS)

Blandy, Cohney, Brannen's modification,
SeSy, Devine resurfacing

*Jordan, J Urol. 1987
Adv Urol. 2015*



3. Flap techniques

For longer strictures...

3. Quartey / McAninch

- both described methods of obtaining penile circular fasciocutaneous island flap
- versatile and hairless
- can supply enough tissue to cover near panurethral defects.
- minimal disfigurement of the penis (circumcision type incision)
- Success rate: 85-90%

- Modifications:
 - *Morey* - ventral midline extension (Q-flap).
 - *El Dahshoury* - zigzag-shaped annular penile fasciocutaneous flap (modified McAninch flap)

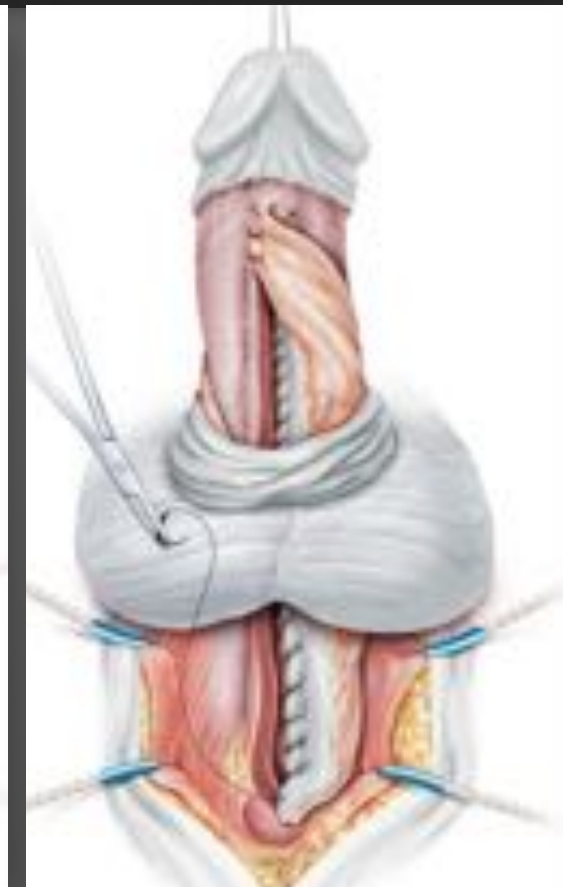


Quartey, J Urol. 1985
McAninch, J Urol. 1993
Buckley, BJUI. 2007

3. Flap techniques



CENTRO
HOSPITALAR
LEIRIA

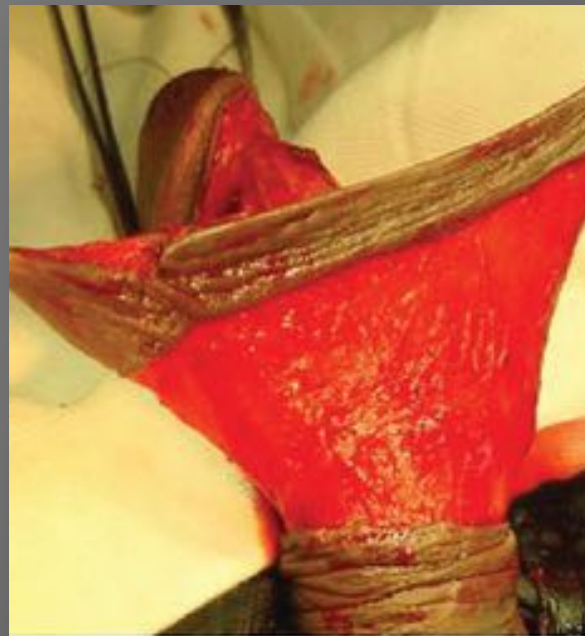


3. Flap techniques



SURGICAL TIPS - CRITICAL STEPS FOR SUCCESS

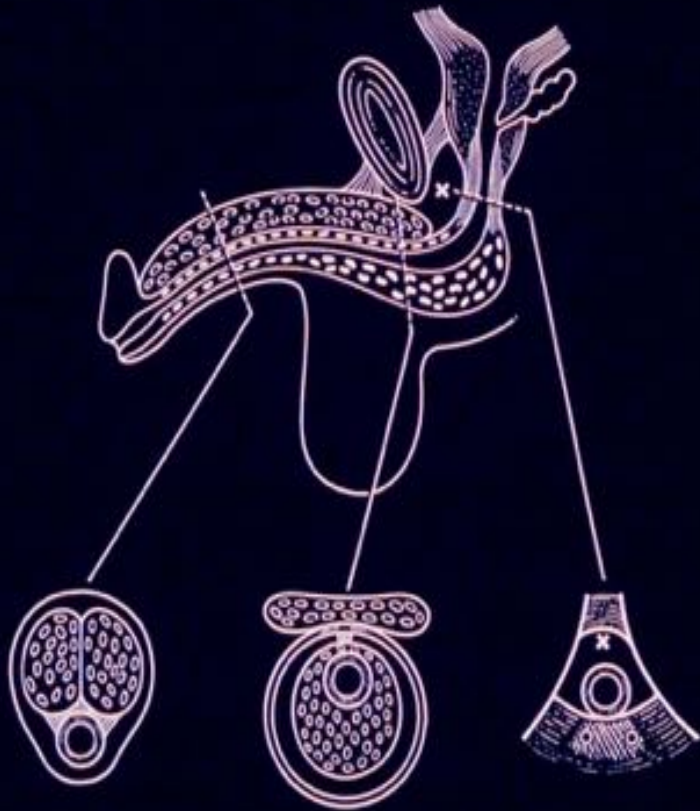
1. Stretch penile skin during initial width calibration for flap development, ideal width 20-25 mm.
2. Elevation of buck's fascia, support of the tunica dartos superficial to the neurovascular bundle.
3. Adequate mobilization of the skin and pedicle flaps.
4. Epithelium to epithelium anastomosis, water tight.
5. Complete stricture incision with calibration.



SURGICAL PITFALLS

1. Fasciocutaneous flap redundancy - diverticulum formation.
2. Skin necrosis - wrong dissection plane.
3. Incomplete flap mobilization - ventral bowing of the urethra.
4. Fistula formation - epithelial to epithelial breakdown.
5. Recurrent stricture - inadequate scar incision.

4. Selecting the right technique



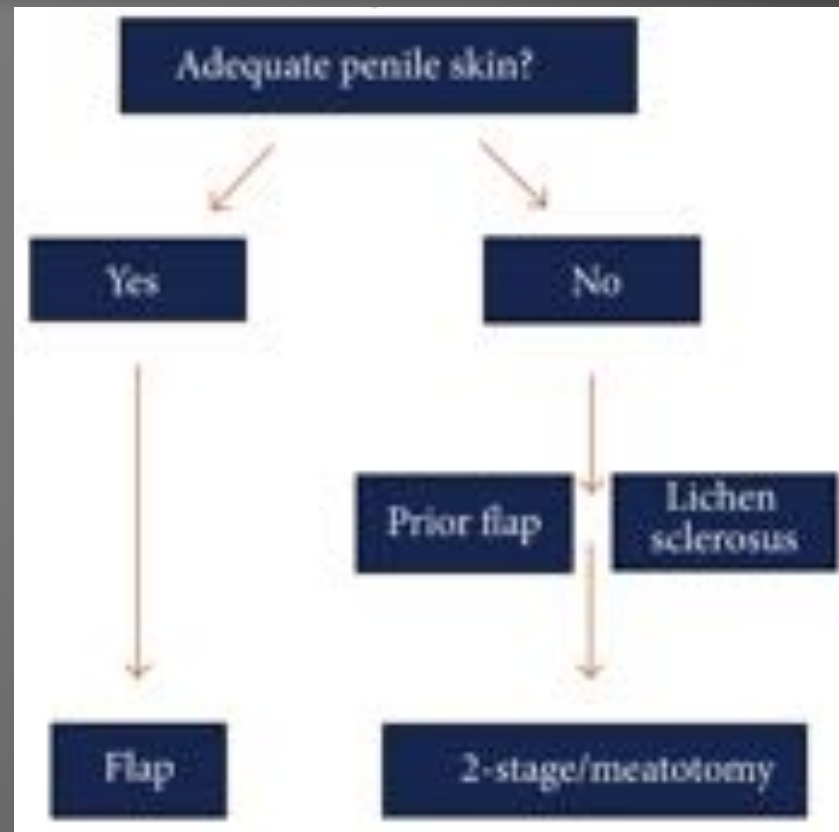
Turner Warwick, Urology, 1985

- Highly individualized
- Dependent on multiple factors
- Optimal repair will depend:
 - ✓ length and location of the stricture
 - ✓ presence or absence of healthy, abundant penile skin
 - ✓ whether or not the corpus spongiosum is intact.
- Decision-making process quite complex;
- Proper selection of tissue transfer technique is paramount to success.

5. Approach to the appropriate selection of grafts and flaps in urethral reconstruction

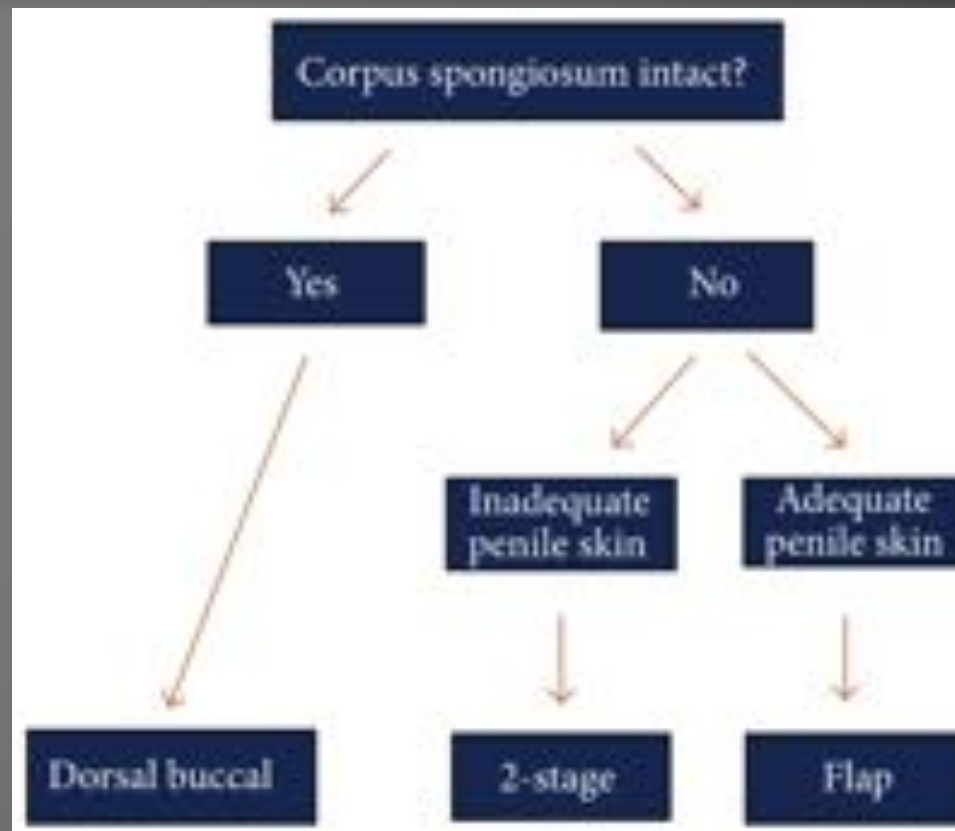


I. Glans and Fossa Navicularis



5. Approach to the appropriate selection of grafts and flaps in urethral reconstruction

II. Penile and Bulbar



5. Approach to the appropriate selection of grafts and flaps in urethral reconstruction

III. Special Situations

Segment of obliterated or near-obliterated urethra (not an adequate urethral plate to perform a ventral or dorsal onlay graft):

1. Too long for an EPA or an Augmented anastomosis
2. Short, but at risk of urethral ischemia with urethral transection (history of hypospadias or failed urethroplasty)

- ✗ Tubularized grafts or flaps - high failure rate (58%)
- ✓ Graft/Flap combination - success rate of 92% at 39 months



5. Approach to the appropriate selection of grafts and flaps in urethral reconstruction

Graft/Flap Combination



5. Approach to the appropriate selection of grafts and flaps in urethral reconstruction



Graft/Flap Combination

Also useful in:

Panurethral strictures that are too long for repair with BMG even when bilateral grafts are harvested.

- ... using as much **BMG** as possible in the **proximal** aspects of the stricture
- ... **penile skin flap** to repair the remainder of the stricture **distally**

5. Approach to the appropriate selection of grafts and flaps in urethral reconstruction



Graft/Flap Combination

Also useful in:

Long segment urethral strictures without a good graft bed (radiotherapy, multiple previous urethral reconstructions).

... use of a well vascularized **gracilis muscle flap (GMF)** to support a **ventral BMG**

Urethroplasty for High Risk, Long Segment Urethral Strictures with Ventral Buccal Mucosa Graft and Gracilis Muscle Flap

Drew A. Palmer, Jill C. Buckley, Leonard N. Zinman and Alex J. Vanni*

From the Leiria Hospital and Medical Center, Leiria, Massachusetts, and University of California San Diego (UCSD), San Diego, California

- 20 patients
- Success rate: 80% at 40 months
- Avoid urinary diversion/suprapubic tube

J Urol. 2014



6. Conclusions



- Common language (U-score)
- Adequate preoperative assessment
- Yes...there is still a role for flaps in the BMG era
- Criterious selection of technique and tissue transfer (Grafts vs. Flaps)