

Urethral strictures

Urethral stricture = scarring of corpus spongiosum and overlying urothelium

Occurs in anterior urethra only: posterior urethral 'strictures' more correctly referred to as either distraction defects (after pelvic #), or contractures (prostate/BN)

Normal urethral diameter 30F

Eccentric (dorsal) placement of bulbar urethra within corpus spongiosum.

C. spongiosum (urethra) has dual blood supply – antegrade artery to the bulb (internal pudendal) and retrograde dorsal penile artery

Aetiology

Traumatic

Straddle injury

Perineal trauma

Urethral instrumentation

Inflammatory

BXO

Infective

Gonococcus, chlamydia

Presentation

Asymptomatic

Obstructed voiding

UTI

Prostatitis

Impaired ejaculation

Rarely acute urinary retention

Evaluation

Crucial to determine the length, location, depth, and density

Endoscopy

Ascending and descending urethrography

? USS for depth of fibrosis (underestimates degree of fibrosis)

Operative bouginage (distal and proximal with Fogarty catheter)

Management

Reconstructive ladder considered outdated

Internal urethrotomy appropriate for primary management of short bulbar urethral strictures; urethroplasty should be considered as primary management for all others

(i) Dilatation

Canny-Ryalls or Cluttons

Stretch stricture without tearing – frequently forgotten

Ideally sequential catheters over period of weeks

Equally effective as optical urethrotomy provided done carefully to avoid tearing urethral mucosa (Steenkamp 1997)

(ii) Internal urethrotomy

30-40% overall success rate

74% overall success rate for short (<1.5cm) bulbar urethral strictures a/w minimal spongiofibrosis (Pansadoro 1996); ~ 50% of all short bulbar urethral strictures cured by first urethrotomy

Poor results for non-bulbar and multiple strictures; Overall 32% success rate for anterior urethral strictures at 98 months (Pansadoro 1996)

Maintaining urethral patency

3-7 days urethral catheterisation equivalent to 6 weeks

Urethral patency can be maintained by urethral dilatation, but this needs to be performed long-term (> 12 months); stricture typically returns after cessation of ISD

No role for urethral stents – success rates and satisfaction

levels at 10 yrs very low (~20-30%); also can migrate, cause perineal pain and difficult to remove (absolutely contraindicated in non-bulbar urethral strictures and after substitution urethroplasty using skin islands)

Recurrent strictures

Repeat internal urethrotomy a/w poor outcome (~ 6% cure)

Urethroplasty recommended in patients fit enough (physically and mentally)

Role of laser urethrotomy undefined

(ii) Anastomotic urethroplasty (excision and primary anastomosis)

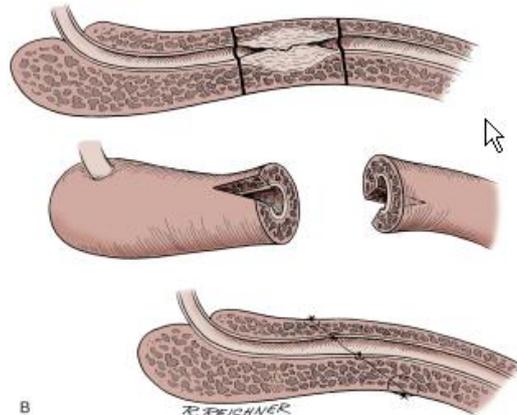
Most reliable method

Ideal for bulbar strictures < 2cm

Not suitable for penile strictures as unacceptable rates of chordee

4 elements: excision, mobilisation, spatulation, anastomosis

Crucial to observe good tissue handling techniques, preventing ischaemia and allowing a tension-free anastomosis



A number of steps may be employed to adequately bridge defect without introducing tension and subsequent chordee (4):

- (i) Distal mobilisation of suspensory ligament of penis (2-3cm)
- (ii) Separation of proximal corporal bodies
- (iii) Inferior pubic osteotomy
- (iv) Re-routing of urethra around lateral corporal body

(iii) Substitution urethroplasty (incision/excision and tissue transfer)

May utilise graft or flap [grafts derive blood supply from new site – imbibition and inosculation; flaps take blood supply from donor site]

- Grafts (4)
- Skin (full thickness or partial thickness)
 - Buccal mucosa
 - Bladder mucosa (largely historical)

Rectal mucosa (historical)

Either one-stage onlay technique (ventral, lateral or dorsal) or two-stage (excision, onlay graft & second-stage tubularisation – Shreiter and Noll)

Flaps Penile or de-epithelialised scrotal skin, raised on dartos fascia of penis or scrotum

Grafts much easier to perform and suited to proximal anterior urethra; flaps difficult but good for distal urethra.

For both grafts and flaps, onlay techniques better than tubularisation

High rates of recurrence following use of skin for BXO strictures (known as Koebner phenomenon) – potentially improved results with buccal mucosa grafts, which is resistant to BXO

Typically

Bulbar stricture	Dorsal onlay buccal mucosa graft
Penile stricture	
BXO	Two-stage buccal mucosa graft*
Non-BXO	Flap (Orandi) or graft
Hypospadias	Flap or two-stage post-auricular (Wolfe)

* Two-stage procedures reduce recurrence rate c.f single stage tubed graft, but revision rate higher

Dorsal onlay buccal mucosa graft (Barbagli 1995)

Reliable technique, esp for bulbar urethral strictures

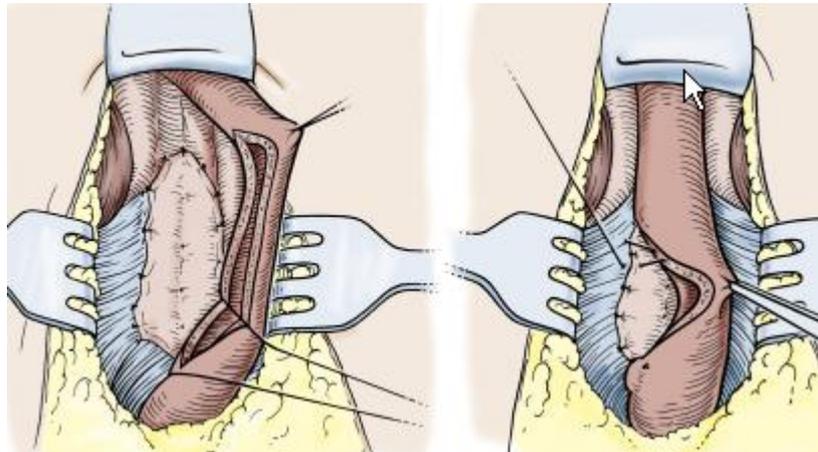
Inner cheeks (~6cm) and lower lip donor sites

Dorsal urethral incision, application of buccal mucosa to ventral tissue (corpus cavernosum or triangular ligament)

Excellent results (see below)

Standard ETT satisfactory for buccal harvesting; infiltration with adrenaline and lignocaine.

Consent for



Outcomes

Anastomotic urethroplasty much more reliable than substitution urethroplasty

Recurrence rates:

	<u>3 yrs</u>	<u>10 yrs</u>
Anastomotic urethroplasty	90%	90%
Substitution urethroplasty	95%	60% (5% per year attrition rate)

	Anastamotic urethroplasty	Substitution urethroplasty (Pedicled foreskin)	Substitution urethroplasty (Buccal mucosa)
5 year recurrence rate	12%	21%	4% at 38 months for dorsally placed graft
10 year recurrence rate	13%	31%	15% at 37 months for ventrally placed graft
15 year recurrence rate	14%	58%	19% at 37 months for tubed graft
Complication rate	7%	33%	NR
Complications	NR	Erectile dysfunction Post void dribble Palpable or visible pouch UTI Fistula Chordee	NR

Andrich 2003 and Bhargava 2004

Appendix

Grafts and flaps

Graft 'tissue excised from a donor site which re-establishes its blood supply by revascularisation'

Process by which revascularisation occurs = 'take'

Take = 3 to 4 days

2 processes – imbibition and inosculation

Imbibition

48 hours

Graft survives by 'drinking' nutrients from host bed

Graft temperature lower than host temperature

Inosculation

48 hours

Development of true circulation

Graft temperature rises to that of host

Features affecting 'take'

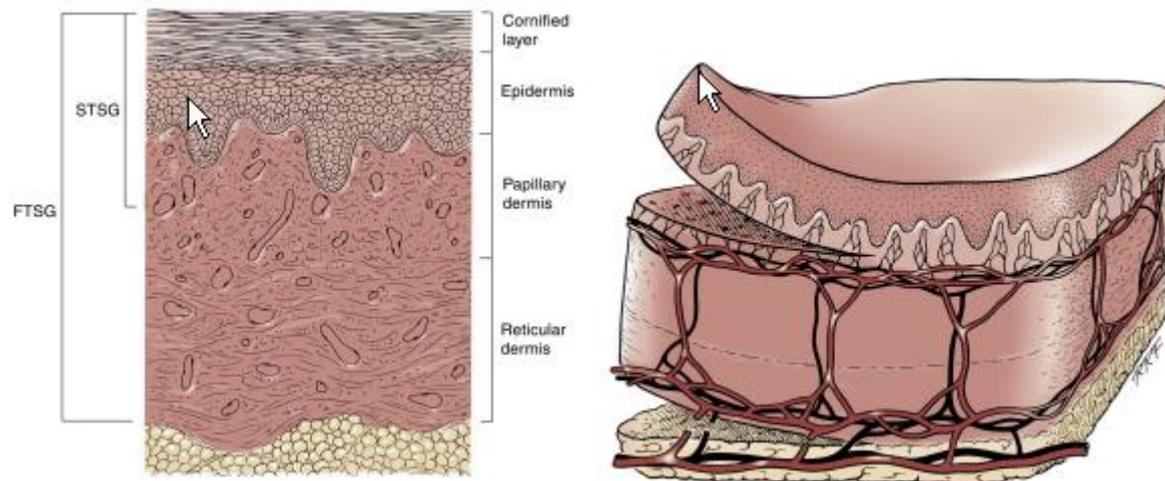
Graft type (see below)

Donor site vascularity (tendon, smoking, PVD etc.)

Infection

Movement

Grafts



Superficial plexus aka intradermal plexus – lies below epidermis in papillary dermis

Subdermal plexus lies at interface between skin and subcutaneous fascia.

Subdermis has high collagen and lymphatic content but fewer larger vessels – therefore elasticity maintained (less likely to shrink) but less favourable vascular characteristics

Split skin graft

Epidermis only

Favourable vascular characteristics

More likely to shrink and be brittle

Full thickness skin graft

More durable

Less favourable vascular characteristics

Bladder mucosa

Superficial and deep plexi but much more cross communication

Buccal mucosa*

True panlaminar vascular plexus

Thought to be ideal graft

Flap The term flap implies that the tissue is excised and transferred with the blood supply either preserved or surgically re-established at the recipient site
May be cuticular, fasciocutaneous or musculocutaneous based on location of defined vascular supply

* Advantages of buccal mucosa

Easy to harvest

Easy to handle

Thaick

Panlaminar vascular plexus – good take

Waterproof

Antibacterial

Resists skin diseases

Harvesting buccal mucosa

Normal intubation OK vs. nasal intubation

Avoid Stensen's duct opposite second upper molar

Mark excision site

0.5% lignocaine and adrenaline

Tenotomy scissors (superficial vs. deep)

2cm wide, at least 1cm from vermilion border

Side effects worse for closure vs. secondary intention (Mundy J Urol 2004)

Lignocaine lozenges

Reconstructive ladder for urethral strictures

Urethral dilatation

Optical urethrotomy

Urethroplasty

Anastomotic urethroplasty

Substitution urethroplasty

Graft

One-stage

Two-stage

Flap

Local rotation flap (Orandi)

Urethral stent

Urolume

Memokath