OPEN REPAIR (URETHROPLASTY) FOR ANTERIOR URETHRAL STRICTURES IN MALES:

Staged augmentation urethroplasty ("two-stage" urethroplasty)

This approach may become multi-stage urethroplasty as revision (usually due to graft contracture) after the first stage has been reported in 0-20%. Recommended in men with more complex urethral stricture disease. An interval of at least four to six months has been proposed before proceeding to the tubularisation of the urethra.

Recommendations	Strength rating
Offer men with penile urethral stricture disease augmentation urethroplasty by either a single-stage or staged approach taking into consideration previous interventions and stricture characteristics.	Strong
Offer an interval of at least four to six months before proceeding to the second stage of the procedure provided that outcome of the first stage is satisfactory.	Weak
Do not offer anastomotic urethroplasty to patients with penile strictures > 1 cm due to the risk of penile chordee post-operatively.	Strong
Counsel patients with penile strictures that single-stage procedures might be converted to staged ones in the face of adverse intra-operative findings.	Strong

Single-stage augmentation urethroplasty

Overall patency rate for all types is 75.7%. No high-level evidence exists to state that one technique is superior to another, but it seems that the dorsal graft location is more commonly used compared to the ventral one.

A critical factor with respect to single-staged procedures is the careful selection of patients, as men with long and complex strictures might not be good candidates. In case of adverse intra-operative findings, a single-stage approach must be converted into a staged approach.

Anastomotic urethroplasty in men with penile urethral strictures

Historically, the use of anastomotic urethroplasty in the management of urethral stricture disease has been discouraged due to the risk of chordee post-operatively. It has been performed in selected patients with very short strictures (usually < 1 cm) with 80-93% patency rate.

Specific considerations for failed hypospadias repair-related strictures

Men with failed hypospadias repair (FHR) have history of multiple interventions, and poor-quality tissues, and might require complex procedures for a satisfactory functional and cosmetic outcome. They may have low self-esteem due to urinary and sexual dysfunction and unsatisfactory cosmesis and can have scarred penile skin. Outcomes with skin grafts or flaps can be unsatisfactory.

Recommendations	Strength rating
Men with failed hypospadias repair (FHR) should be considered complex patients and referred to specialist centres for further management.	Weak
Propose psychological and/or psychosexual counselling to men with unsatisfactory cosmesis and sexual or urinary dysfunction related to FHR.	Weak
Do not use penile skin grafts or flaps in failed FHR patients with lichen sclerosus or scarred skin.	Strong

Specific considerations for lichen sclerosus-related penile urethral strictures

Lichen sclerosus is a skin condition that can lead to scarring, and recurrence rates after skin graft/flap augmentation urethroplasties have been reported to be high (50-100%). Single-stage oral mucosa graft (OMG) urethroplasty provides patency rates between 65 and 100% and is not inferior to staged OMG urethroplasty.

Recommendations	Strength rating
Do not use genital skin in augmentation penile urethroplasty in men with lichen sclerosus (LS) related strictures.	Strong
Perform single-stage oral mucosa graft urethroplasty in the absence of adverse local conditions in men with LS related strictures.	Weak

Distal urethral strictures (meatal stenosis, fossa navicularis strictures)

Post-meatoplasty/urethroplasty patency rates in men with meatal stenosis or fossa navicularis/distal urethral strictures range between 57-100% depending on type of surgical intervention with high patient satisfaction and minimal complications.

Recommendation	Strength rating
Offer open meatoplasty or distal urethroplasty to patients with meatal stenosis or fossa navicularis/distal urethral strictures.	Weak

Urethroplasty for "Short" bulbar strictures

The length of a "short" bulbar stricture is poorly defined. In general, are those amenable to stricture excision and subsequent tension-free anastomotic repair (around 2 cm).

Recommendations	Strength rating
Use transecting excision and primary anastomosis (tEPA) for short posttraumatic bulbar strictures with (nearly) complete obliteration of the lumen and full thickness spongiofibrosis.	Strong
Use non-transecting excision and primary anastomosis or free graft urethroplasty instead of tEPA for short bulbar strictures not related to straddle injury.	Weak

For short post-traumatic strictures, excision and primary anastomosis (EPA) with transection of corpus spongiosum (tEPA) has good patency rates. For short bulbar strictures not related to straddle injury tEPA, non-transecting EPA (ntEPA) and free graft urethroplasty (FGU) have the same patency rates, but ntEPA and FGU have less erectile dysfunction or penile complications than tEPA.

Urethroplasty for "Longer" bulbar strictures

For strictures not amenable to EPA, FGU provides an 88-91% patency rate at short to medium follow-up.

Recommendations	Strength rating
Use free graft urethroplasty for bulbar strictures not amendable to excision and primary anastomosis (EPA).	Strong
Use augmented anastomotic repair for bulbar strictures not amenable to EPA but with a short, nearly obliterative segment within the whole strictured segment.	Weak

Staged urethroplasty for bulbar urethral strictures

Patency rates of 33.3-90% depending upon patient and stricture characteristics. Patient satisfaction is high with all types.

Recommendations	Strength rating
Offer staged urethroplasty to men with complex anterior urethral stricture disease not suitable for single stage urethroplasty and who are fit for reconstruction.	Weak
Do not perform staged bulbar urethroplasty for lichen sclerosis if single stage urethroplasty is possible.	Weak
Consider staged procedure in patients unsure about perineal urethrostomy versus urethral reconstruction.	Weak
Warn men that staged urethroplasty may comprise more than two stages.	Weak

Urethroplasty for penobulbar or panurethral strictures

Publications about panurethral urethroplasties generally come from high volume centres. Different materials and techniques might be needed for reconstruction.

Recommendations	Strength rating
Offer panurethral urethroplasties in specialised centres because different techniques and materials might be needed.	Weak
Combine techniques to treat panurethral strictures if one technique is not able to treat the whole extent of the stricture.	Weak

Perineal urethrostomy (PU)

Provides very good short- and long-term outcomes for men with complex urethral stricture disease who are unable to have complex reconstruction due to co-morbidities.

All types of PU yield equivalent very good outcomes.

Recommendations	Strength rating
Offer perineal urethrostomy (PU) as a management option to men with complex anterior urethral stricture disease.	Strong
Offer PU for men with anterior urethral stricture disease who are not fit or not willing to undergo formal reconstruction.	Weak
Choose type of PU based on personal experience and patient characteristics.	Weak
Consider augmented Gil-Vernet-Blandy perineal urethrostomy or "7-flap" PU in men with proximal bulbar or membranous urethral stricture disease.	Weak
Consider "7-flap" urethroplasty in obese men.	Weak