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Video Bank

The Glanular-Frenular Collar (GFC) technique: Dual approach to hypospadias reconstruction

Hüseyin Özbey [a,b,*]

[a]Department of Pediatric Surgery, Division of Pediatric Urology and Andrology, Sechenov First Moscow State Medical University, Moscow, Russia

[b]Tunaboylu Sok. Deniz Apt. No. 17/3, Bakırköy, 34147, İstanbul, Turkey

* Correspondence to: Hüseyin Özbey, Department of Pediatric Surgery, Division of Pediatric Urology and Andrology, Sechenov First Moscow State Medical University, Moscow, Russia, Tel.: +905325403720
huseyinbey@hotmail.com
(H. Özbey)

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Summary

Introduction
The Glanular-Frenular Collar (GFC) technique has evolved since it was first described in 2017. The technique involves reconstruction of the *septum glandis*, which has been overlooked in the history of hypospadias, and formation of the frenulum, creating the ventral wall of the glanular urethra without dissecting the glans, leaving room for the formation of the navicular fossa.

Material and methods
We present a case of distal hypospadias corrected with the GFC technique and demonstrate the important steps of the surgical technique.

Results
The aesthetic result corresponded to the normal anatomy of the glans and frenular triangle, and the functional result showed a free and wavy shape of urine that resembled the normal flow from the urethra.

Discussion
In the normal anatomy of the penis, the wings of the glans are separated ventrally by the *septum glandis* and the frenulum. The navicular-shaped glanular urethra and its vertical, elliptical opening are covered by the fibroelastic septum glandis, unlike the penile urethra, which is surrounded by the corpus spongiosum.

Conclusion
Reconstruction of hypospadias should include the formation of a *septum glandis*, frenulum, and navicular fossa. The GFC technique demonstrates the importance of a dual surgical approach for glanular and penile urethra reconstruction.

The glanular urethra differs from the penile urethra in that it forms a fossa (navicularis) with a specific shape, with different boundaries, attachments and elasticity [1,2]. The main component of this difference is the fibrous-ligamentous framework of the penis, including the "septum glandis", particularly at the frenular junction between the glans and the shaft of the penis. After the gradual termination of the corpus spongiosum, the septum glandis and the frenulum form the ventral wall of the glanular and subcoronal urethra [3,4].

A dual embryonic origin has been proposed for the development of the male urethra, indicating that glanular part of the urethra develops via a completely different mechanism than that of the penile shaft. The ventral foreskin covering the glans from proximal to distal to seal the septum and form the frenulum between the wings of the glans, has been well demonstrated in various studies [5]. Therefore, uniform tubularization of the neourethra with additional covering tissue (e.g. Dartos flap) to simulate the spongiosum fits the penile urethra, but does not correspond to the normal anatomy of the glanular urethra. In addition, the dissection of the glans wings and the circumferential covering of the glanular urethra do not correspond to normal anatomy.

The main concept of the Glanular-Frenular Collar (GFC) technique is to correct hypospadias by surgically continuing the embryonic development of the penile and glanular urethra from the point at which it ceases [6]. The GFC technique involves the creation of the "septum glandis" and the "frenulum" as its epithelial extension as the "gold standard" for the repair of hypospadias [7]. In this new version of the GFC technique, the glans wings are not incised subepithelially, but the "U" incision ends at the inner foreskin and the edge of the glans. This video describes the steps of the GFC technique in which two different reconstruction approaches are reserved for the glanular and penile urethra:

1. Anatomical separation of the outer and inner foreskin and the preparation of a

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well-vascularized inner foreskin serve to create the ventral wall of the glanular urethra including the septum glandis and the frenulum between the glans wings [6]. Pulling up the inner foreskin collar upward with a holding suture placed approximately 10—15 mm from the glans penis to work from inside the foreskin (the most important step!). This helps bring the soft tissue under the inner foreskin (which is believed to include the diverted ends of the tunica albuginea of the corpus spongiosum) symmetrically and evenly to the midline (holding sutures: 5/0 polypropylene).
2. Subepithelial tubularization of the penile urethra over the 8 FG feeding tube. continues over the inner foreskin, thus closing the midline ventral foreskin defect. Limited spongioplasty is performed up to the mid-glanular level, where it gradually terminates in normal anatomy (using 7/0 polydioxanone).
3. The soft tissue under the inner foreskin can be positioned and fixed easily and without tension in the space (cleft-like area) between the glans wings. Thus, the transition of penile urethra spongioplasty to the septum is ensured (using 7/0 polydioxanone).
4. Circumferential closure with or without trimming the remaining inner and/or outer foreskin. In my practice, the dorsal foreskin, including the so-called dog-ears, is usually removed as part of circumcision (using 6/0 undyed polyglactin).

The urethral dripping stent is secured with a glanular suture (5/0 polypropylene) and left in place for approximately 5—7 days.

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Conflicts of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpurol.2024.02.028.