



Letter to the Editor

Anatomical relationship between the foreskin and the urethra



Dear Editor,

I read with interest the article 'Comparison of preputioplasty and circumcision in distal hypospadias correction: long-term follow-up' written by van den Dungen et al. [1]. The authors define the 'normal' penile appearance either with or without foreskin (circumcised), depending on the cultural standards. Their study is conducted in patients with hypospadias repair, combined with a preputioplasty or circumcision to attain a 'normal' penile appearance. I would like to point out that the normal development of the glanular urethra is closely related to the normal development of the foreskin. And, circumcision is a surgical procedure in which the normally developed foreskin is partially and circumferentially removed at its distal end.

Histological examination and reconstruction of the pathogenesis of hypospadias showed that the shape and position of the urethral orifice are determined by the growth of primordial fascial tissues and distal corpus spongiosum proximal to the terminal part of the urethra and not by fusion of 'urethral folds'. It is believed that the frustration of the distalward growth of the median primordial fascial tissues and the ventral prepuce and frenulum over the urethral meatus results in hypospadias [2].

Recent studies using optical projection tomography and scanning electron microscopy also provided advanced understanding of urethral development in the human glans penis. It is shown that the urethral development within the glans occurs via an entirely different mechanism from that in the penile shaft, and the urethral groove does not extend into the glans penis. The development of prepuce and frenulum (a thin layer of mesenchyme) in the ventral midline is related to the development

of glanular urethra. It is proposed that the mesenchymal confluence ventral to the urethra provides a ventral epidermis/prepuce attachment and formation of the ventral wall of the glanular urethra [3,4].

At this point, it should be mentioned that Dr Friedrich Gustav Jacob Henle (1809–1885) was first to describe the anatomical features of the glans penis and the distinct attachments of the 'septum glandis' and frenulum [5]. The septum glandis is a fibrous tissue surrounding the fossa navicularis and has two major components; the upper and lower median septum. The upper median septum is a dense connective tissue of collagen and elastic fibers, which is an extension of the tunica albuginea of the corpus cavernosum penis. It is a ligamentous connection between the corpus cavernosum and the glans penis. The lower median septum is described as the extension of the tunica albuginea of the corpus spongiosum. The glanular urethra (fossa navicularis) is surrounded by a fine layer of these fibrous extensions that originate from the corpus cavernosum and the corpus spongiosum. This fine layer dissolves distally into individual bars around the urethral orifice and divides the glans into outer and inner layers. The lower median septum is connected to the frenulum of the foreskin, running between the glans wings [6]. The magnetic resonance imaging study has recently revealed detailed information about the anatomy of the glans penis, with particular reference to the glanular urethra, septum glandis, and frenulum [7].

It is obvious that in normal penile development, there is a certain action on the ventral side of the foreskin which leads to the development of the ventral wall of the glanular and subcoronal urethra. In hypospadias surgery, a comparison of preputioplasty and circumcision is not possible if this anatomical relationship between the foreskin and the urethra is overlooked. Such a comparison is only possible if the existing foreskin is used as a reconstruction material to seal the area between the glans wings and to form a septum and a frenulum as in normal anatomy [8].

Author statements

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Competing interest

No conflict of interest.

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