Reevaluation of the fetal muscle development of the vesical trigone

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PURPOSE
Fetal development of the interureteral muscle, a precondition of a sufficient opposite anchoring of the ureterovesical junction, and the muscle architecture of the bladder neck was investigated using immunohistochemical analysis.

MATERIALS AND METHODS
We investigated the ureterotrigonal units in 38 fetal specimens (16 females, 22 males) and 7 newborns (2 females, 5 males) at 9 to 40 weeks of gestation. Histology was based on serial consecutive sections of the bladder base. Anti-human alpha-smooth muscle actin immunostaining was used to demonstrate the time course of muscle development and arrangement.

RESULTS
A much earlier developmental stage of the trigone muscle configuration during fetal life was noted than has been reported to date. The condensation of myoblasts located mainly in the dorsal wall of the trigone and at the bladder outlet was present beginning at 12 weeks of gestation. The trigone develops continuously as a single circular muscular layer corresponding to the posterior part of the vesical sphincter muscle. Muscle fibers forming the interureteral junction were demonstrable beginning at 14 weeks of gestation.

CONCLUSIONS
There is a close connection between the trigonal smooth muscle layer and the vesical sphincter muscle forming the main part of the trigone by 12 weeks of gestation. Fetal development of the trigone, in particular the muscle architecture of the bladder neck, which consists of only a ring-shaped muscular layer, and the transverse oriented interureteral muscle results in a functional entity representing the anatomical basis for a competent ureterovesical junction.

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