

# The key role of the transverse pre-cervical arc of Gil-Vernet in urethral closure

JOSÉ M. GIL-VERNET

Centro de Urología Gil-Vernet, Teknon Medical Center, Barcelona, Spain

The precervical arc of Gil-Vernet (Figure 1), was described circa 1951 by Salvador Gil-Vernet, famous Urologist/Anatomist and grandfather of the author<sup>1</sup>. This structure was key to the conceptualization of the proximal and distal urethral closure mechanisms by Petros & Ulmsten and in the Integral Theory itself<sup>2</sup>. In the original 1990 description for urethral closure<sup>1</sup>, three opposite directional muscle forces stretched the urethra in opposite directions to tension it against the pubourethral ligament (PUL), figure 2. The downward vector force (downward arrow, figure 2), then rotated the proximal vagina and bladder base around the transverse precervical arc of Gilvernet (figure 1) [‘S’, figure 2] to close (“kink”) the bladder neck. This was the first time in the literature where the function of this anatomical discovery by Professor Salvador Gil Vernet (1892-1987) was described.

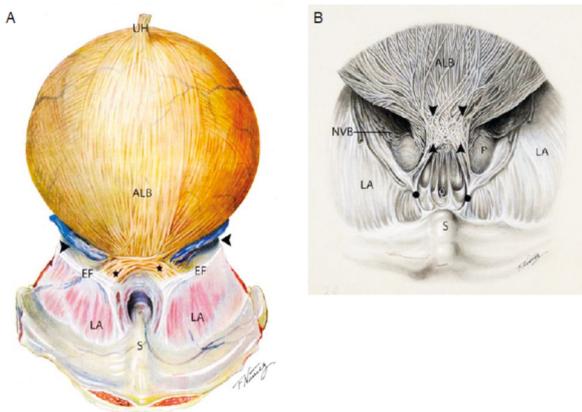


Figure 1. – *Transverse precervical arc*. Original drawing from Salvador Gil-Vernet’s collected works (circa 1951). A UH: urachus; ALB: detrusor anterior longitudinal bundle; vesicoprostatic sulcus with vasculo-nervous bundle (arrowheads); EF: endopelvic fascia; S: symphysis pubis; transverse precervical arc (stars). B NVB prostate neurovascular bundle; transverse precervical arc (arrowheads); pubovesical ligament (filled circles).

## REFERENCES

1. Gil-Vernet JM. Morphology and fuction of vesico-prostate-urethral musculature. Ed. Canova, Treviso 1968.
2. Petros PE & Ulmsten U. An Integral Theory of female urinary incontinence. Acta Obstetrica et Gynecologica Scandinavica 1990; 69 Supp. 153: 1-79.

## Correspondence to:

Dr. JM Gil-Vernet Sedó  
 Centro Médico Teknon  
 Vilana 12 - Barcelona 08022 - Spain  
 email: centrogilvernet@gmail.com

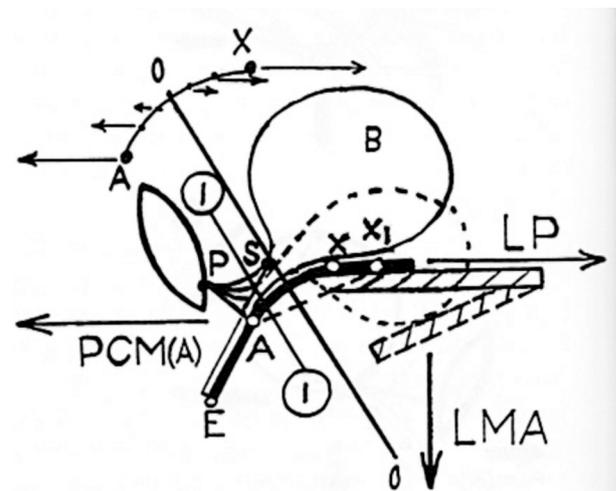


Figure 2. – *Original diagram* ACTA Obstet. et Gynecol. Scand. 19901.

*Urethral closure* I-I is the resting position of bladder neck. The heavy black line represents the vagina. During effort PCM (A) the anterior portion of m.pubococcygeus pulls the distal vagina A-E forwards against the pubourethral ligament ‘P-A’ to close distal urethra from behind and firmly anchor the distal urethra. Levator plate (LP) pulls backwards against P-A extending the proximal vagina from X to X1 and bladder neck to 0-0. X is the vesico-vaginal ligamentous attachment of bladder base to the anterior vaginal wall immediately below the cervix. P-S is the pubovesical ligament which inserts into ‘S’, a fibro-muscular thickening in the lower anterior wall of bladder ‘B’ known as the ‘pre-cervical arc of Gil Vernet’. LMA (conjoint longitudinal muscle of the anus) contracts downwards against the cardinal/uterosacral ligaments to pull down on the anterior border of LP. This ultimately pulls down X1 to effect closure at bladder neck much like kinking a hose.

*Urinary stress incontinence (USI) causation*. In the original description for urinary stress incontinence (USI) causation, (1) the pubourethral ligament P-A loosens (elongates) and the bladder base/urethra complex “opens out” (funnels), exactly as what happens during micturition when PCM(A) relaxes. LP/LMA vectors (arrows) open out the vagina (heavy black line, fig1) and bladder base/urethra between X1 and A and urine is lost. In the prototype operation, the length P-A was restored by the midurethral sling tape, which also restored the distal and bladder neck closure mechanisms<sup>1</sup>.