



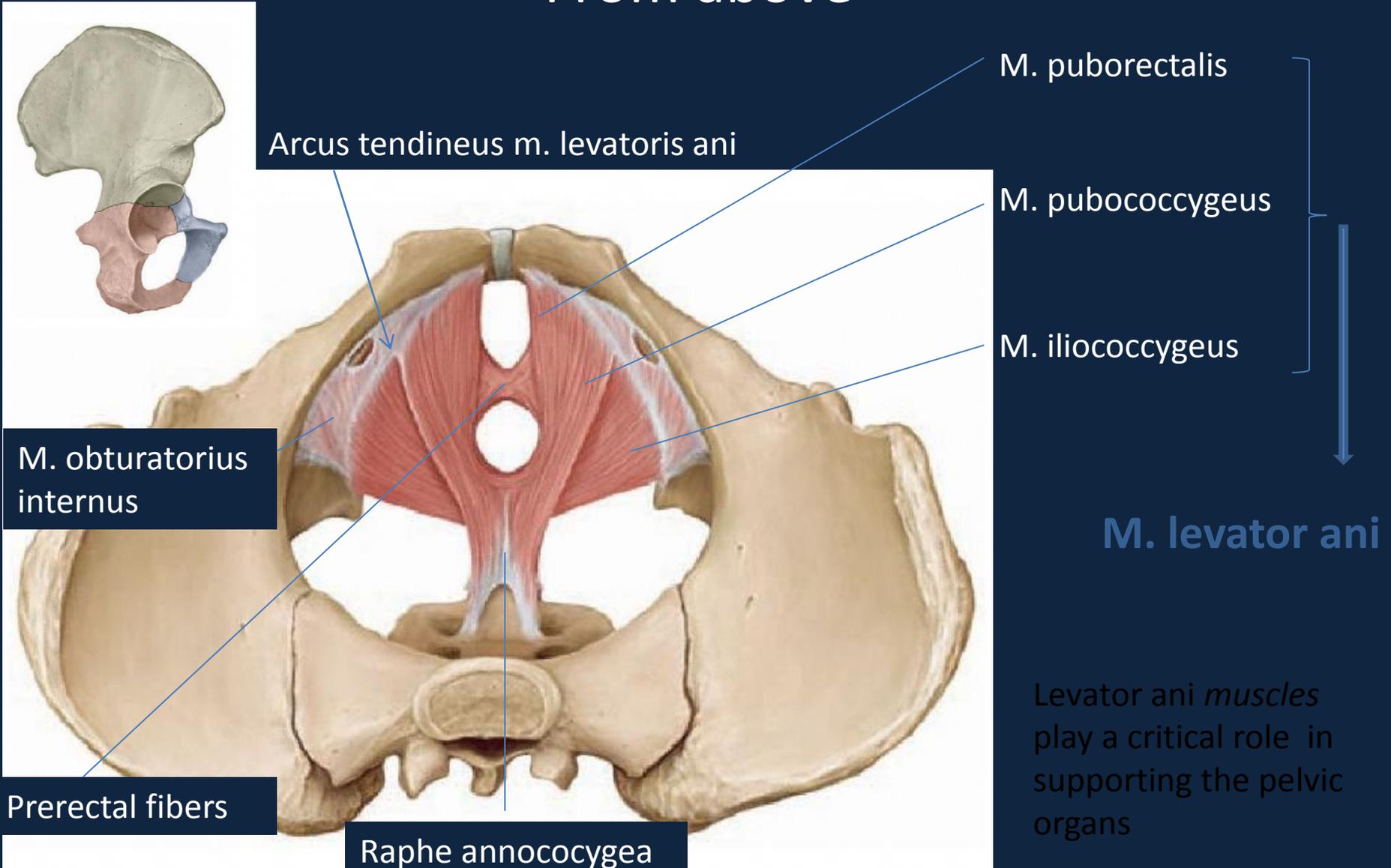
# Basic knowledge of pelvic floor neuroanatomy

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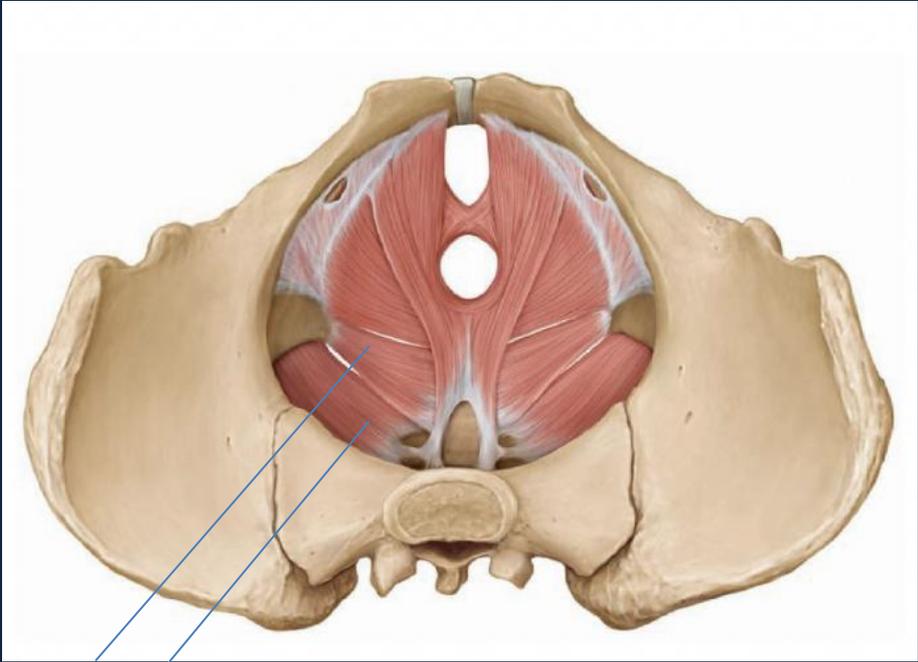
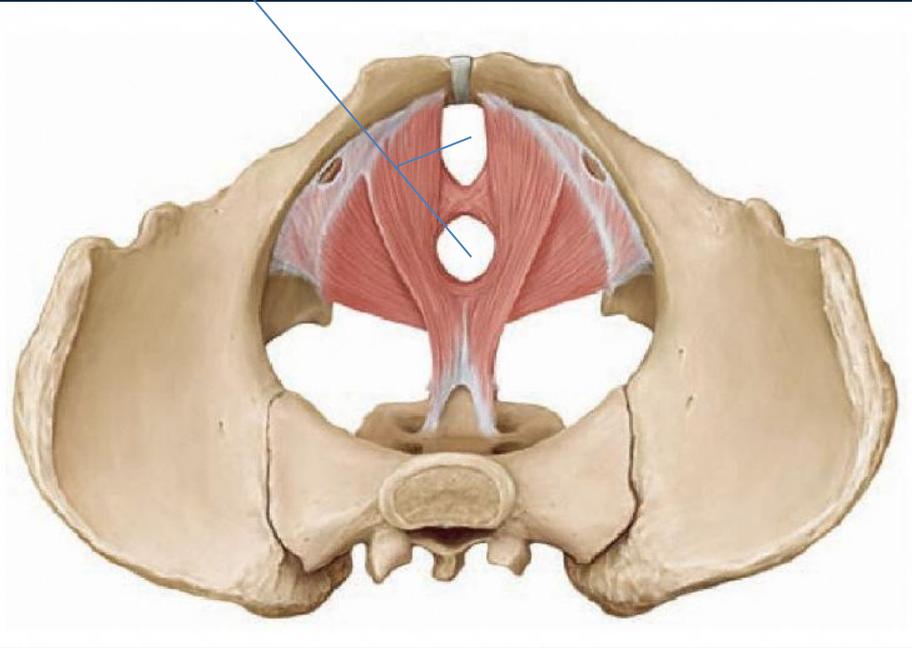
- Effectors (female pelvic floor muscles)
- Nerves

# From above



# From above

Hiatus levatorius



M. coccygeus

M. piriformis

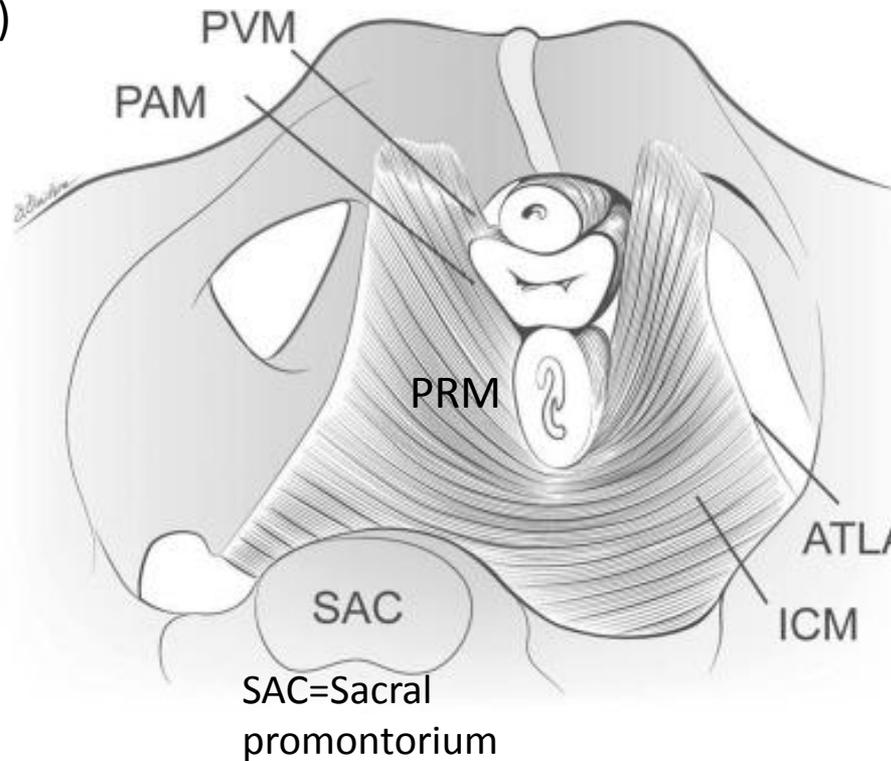
form posterior pelvic outlet

# Regions (I) of the levator ani muscle: iliococcygeal, pubovisceral (3 subdivisions!) and puborectalis

PBM=Pubovaginals (1)

PAM=Puboanalis (2)

PRM=Puborectalis



SAC=Sacral promontorium

ATLA = arcus tendineus of the levator ani muscle

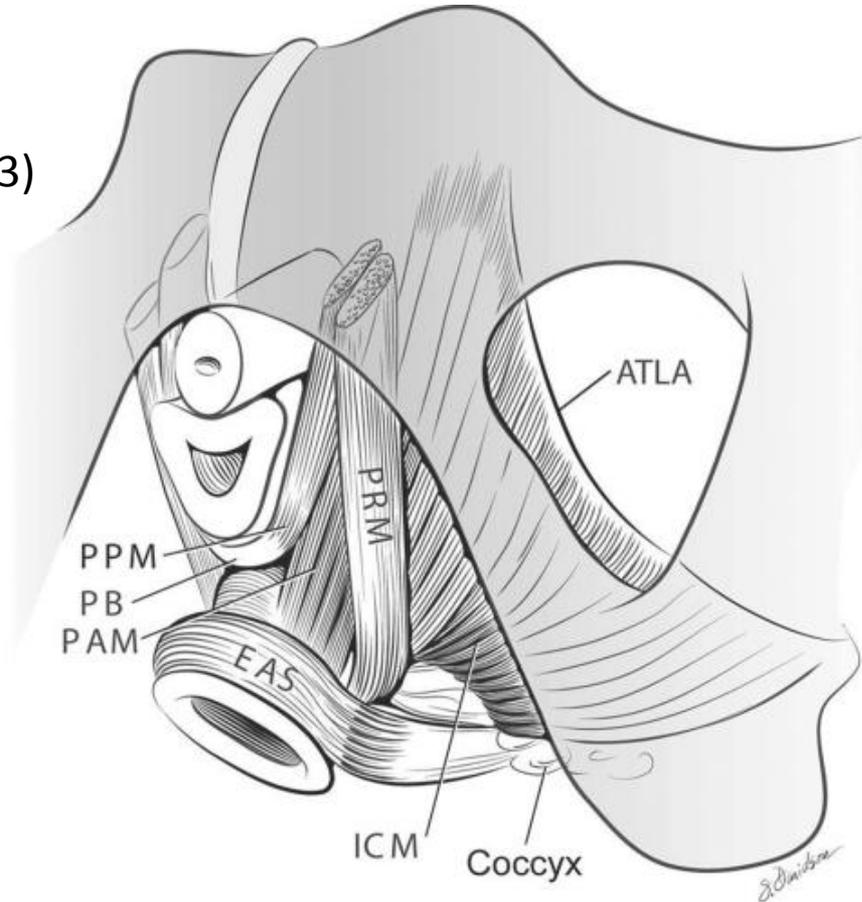
ICM=Iliococcygeal muscle

# Regions (II) of the levator ani muscle: iliococcygeal, pubovisceral (3 subdivisions!) and puborectalis

PPM=puboperineus (3)

PAM=puboanalis (2)

PB=perineal body



ATLA= arcus tendineus of the levator ani muscle

PRM=puborectalis

ICM=iliococcygeal muscle

EAS=external anal sphincter

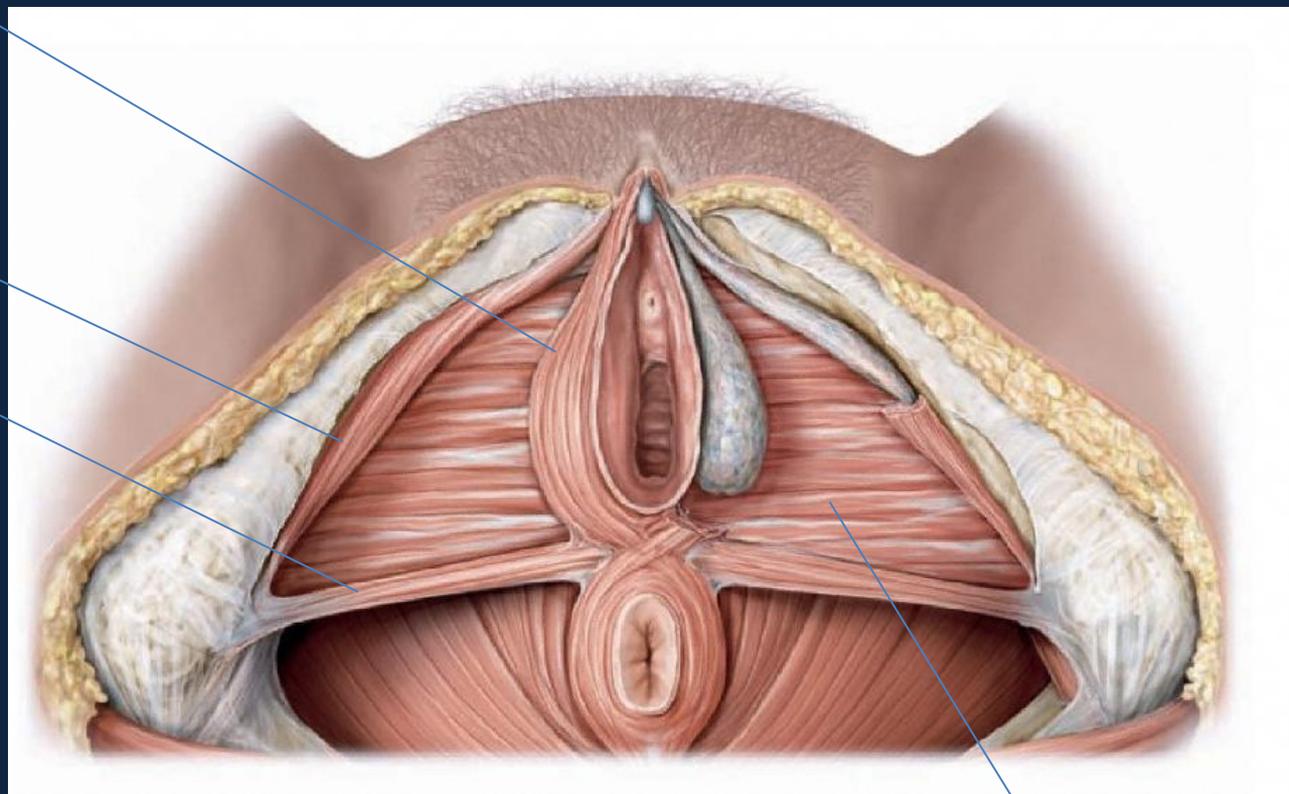
*Pelvic diaphragm is funnel shaped*

# Diaphragma urogenitale (I)

M. bulbospongiosus

M. ischiocavernosus

M. transversus  
perinei  
superficialis



M. transversus perinei  
profundus

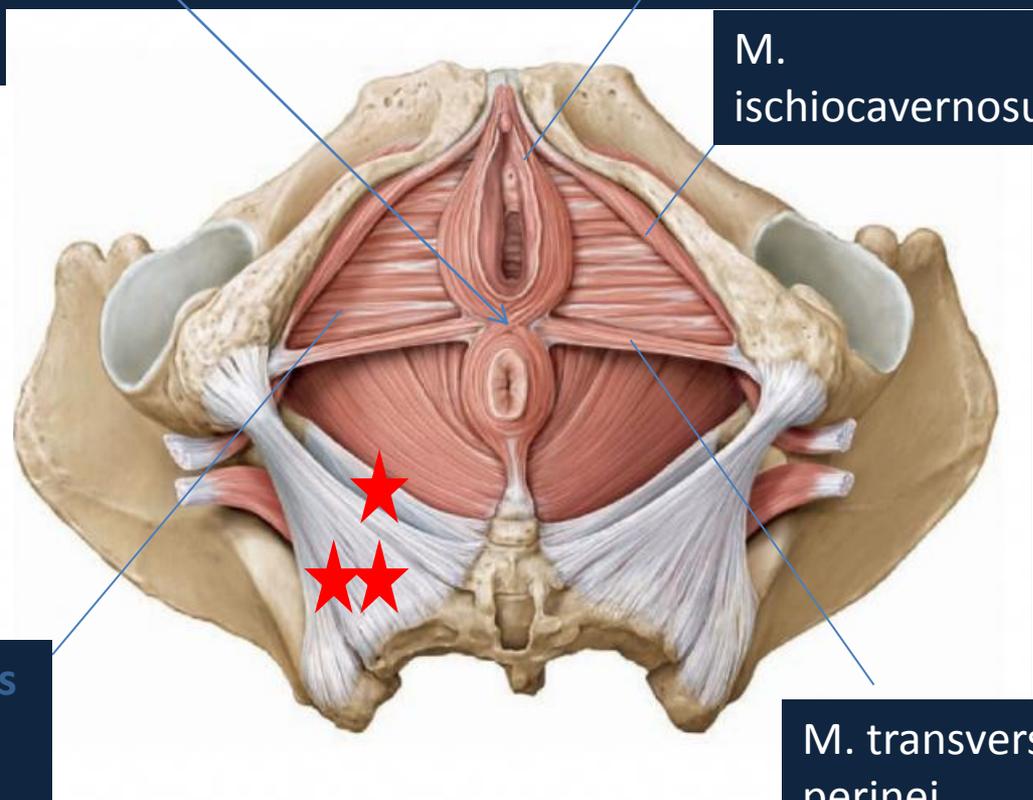
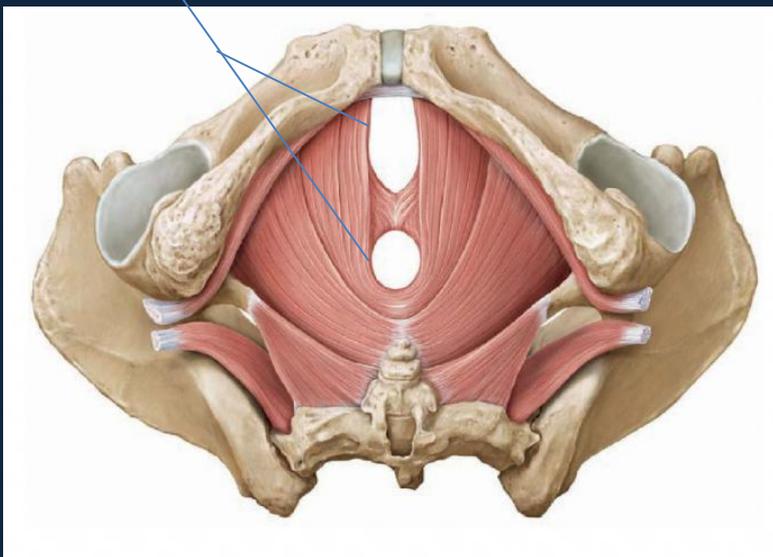
# Diaphragma urogenitale, inferior view

CENTRUM PERINEI

M. bulbospongiosus

Hiatus levatoris

M. ischiocavernosus



M. transversus perinei profundus

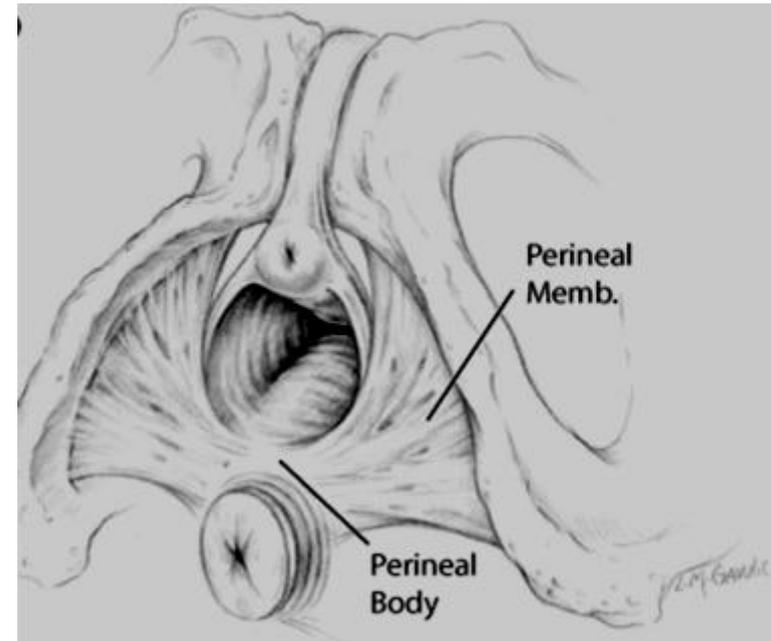
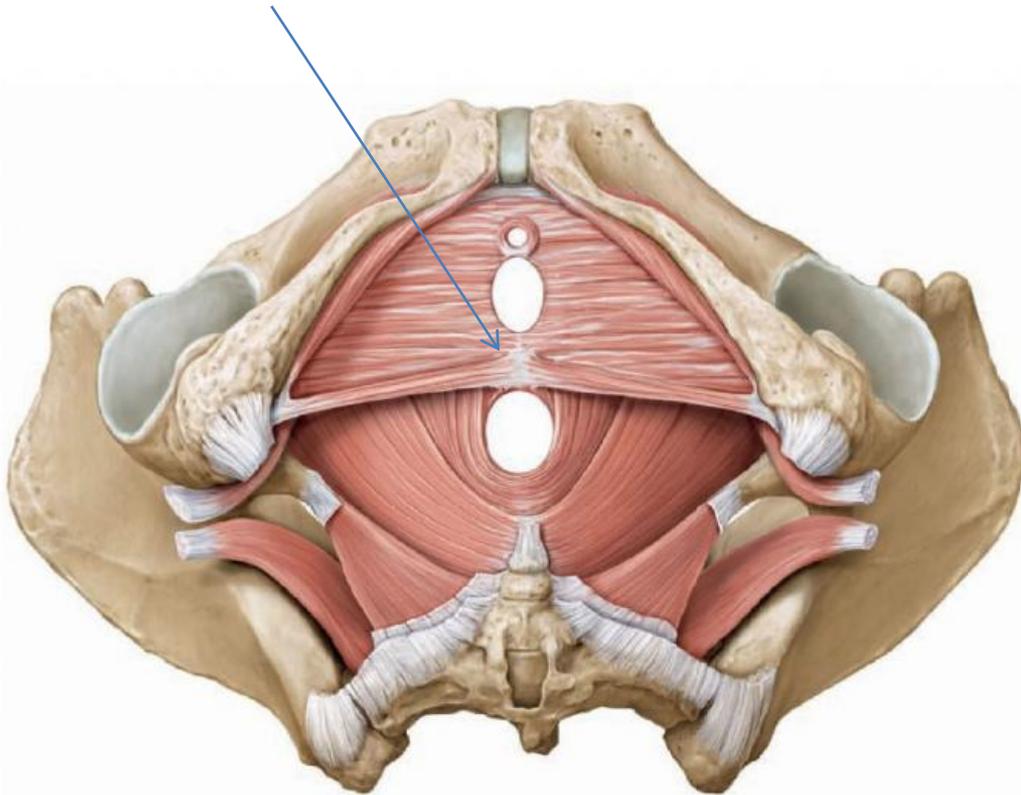
M. transversus perinei superficialis

★ Lig. sacrospinale

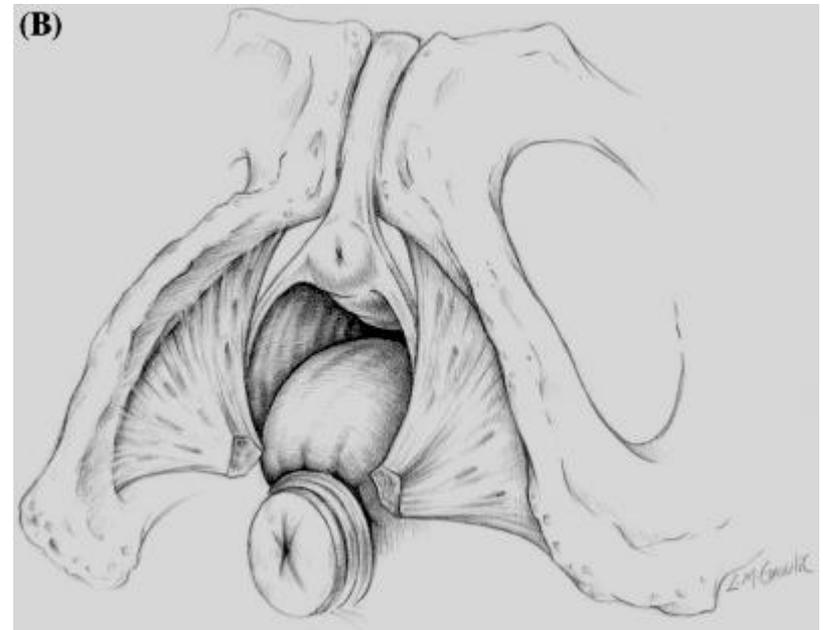
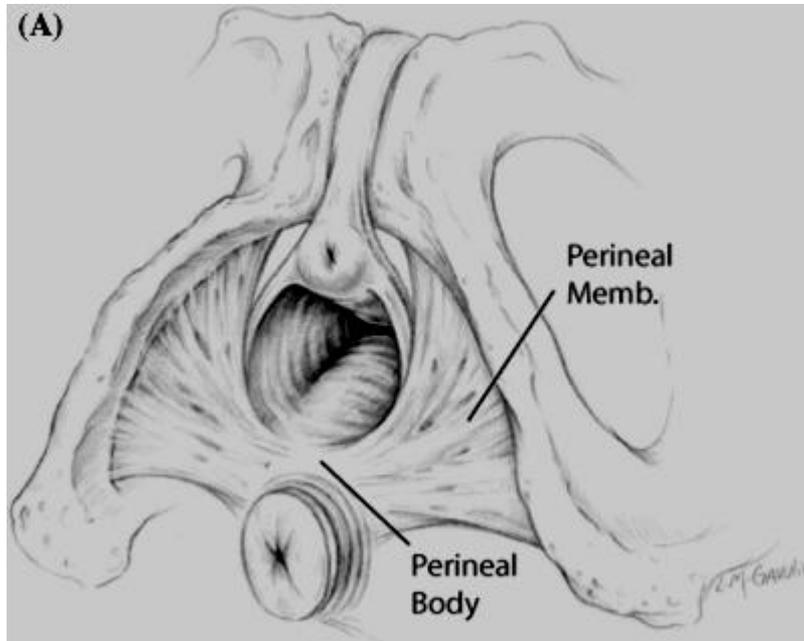
★★★ Lig. sacrotuberale

# Muscles of the pelvic floor with partially removed sphincters

CENTRUM PERINEI



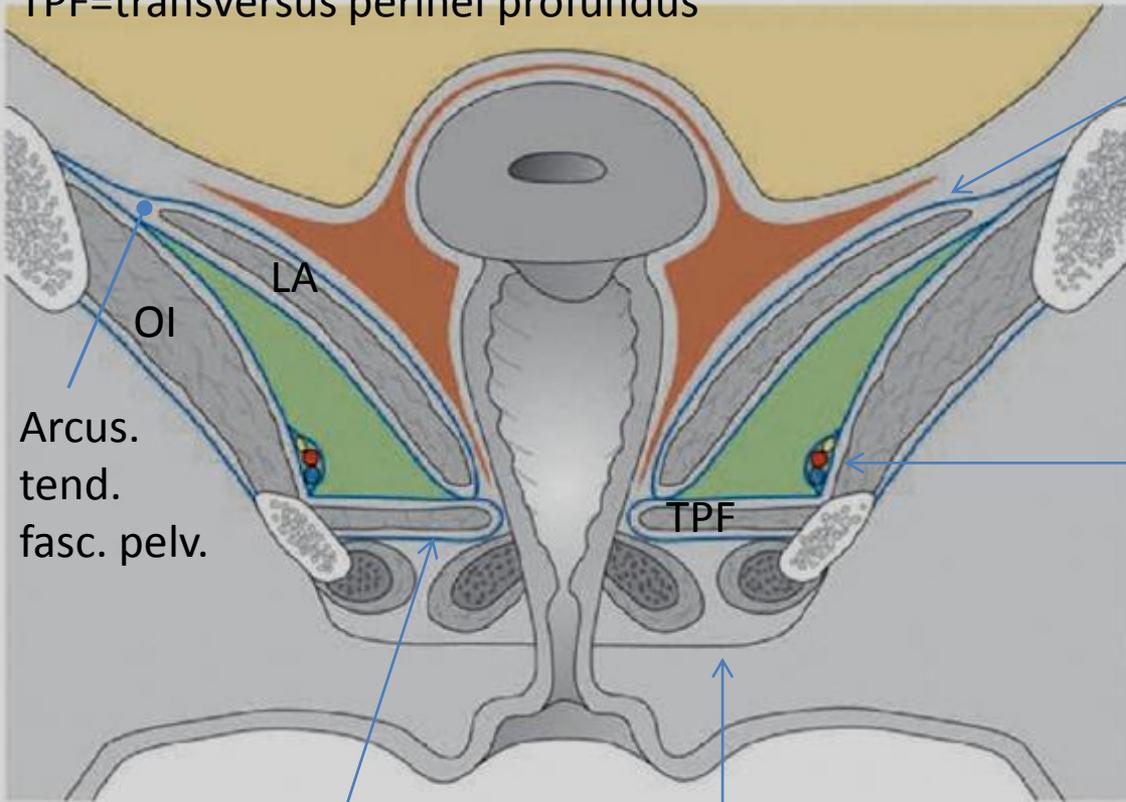
**Perineal membrane="urogenital diaphragm"  
(Ashton-Miller&Delancey 2007)**



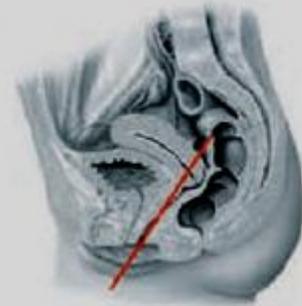
Separation of the perineal membrane fibers in the perineal body leaves the rectum unsupported and results in a low posterior prolapse

# Pelvic fasciae

LA=levator ani,  
 OI=obturatorius internus,  
 TPF=transversus perinei profundus



**Endopelvic fascia= fascia diaphragmatis pelvis sup.**



Pudendal canal

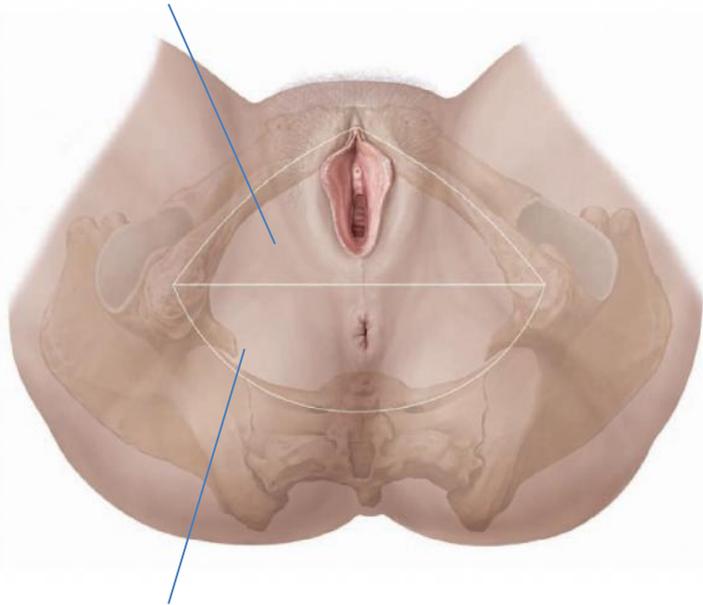
- Peritoneal
- Subperitoneal
- Subfascial = fossa ischianalis
- Fascia

**Perineal membrane**

**Fascia perinei superficialis (Colle's fascia)**

# Superficial fasciae

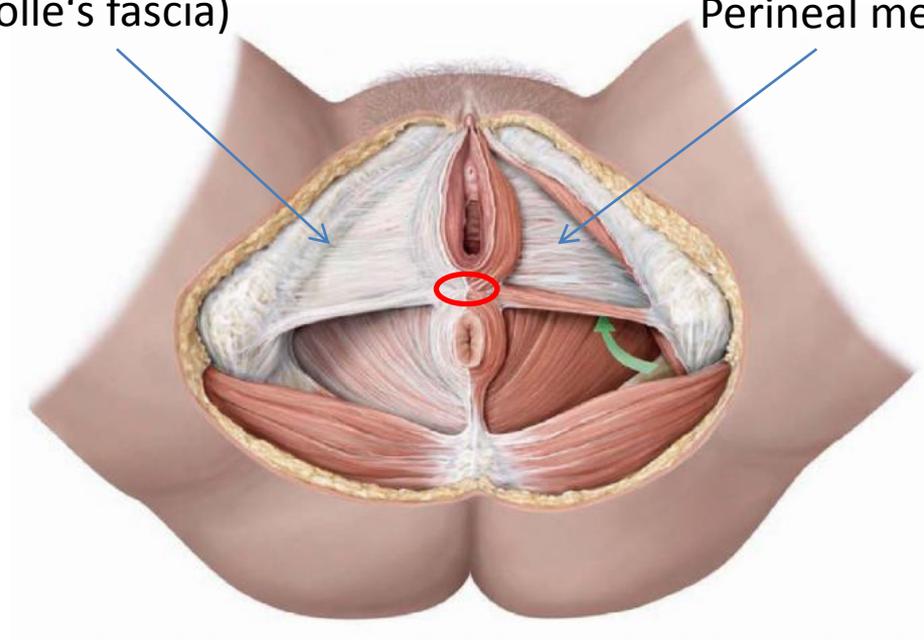
Regio urogenitalis



Regio analis

Fascia perinei superficialis  
(Colle's fascia)

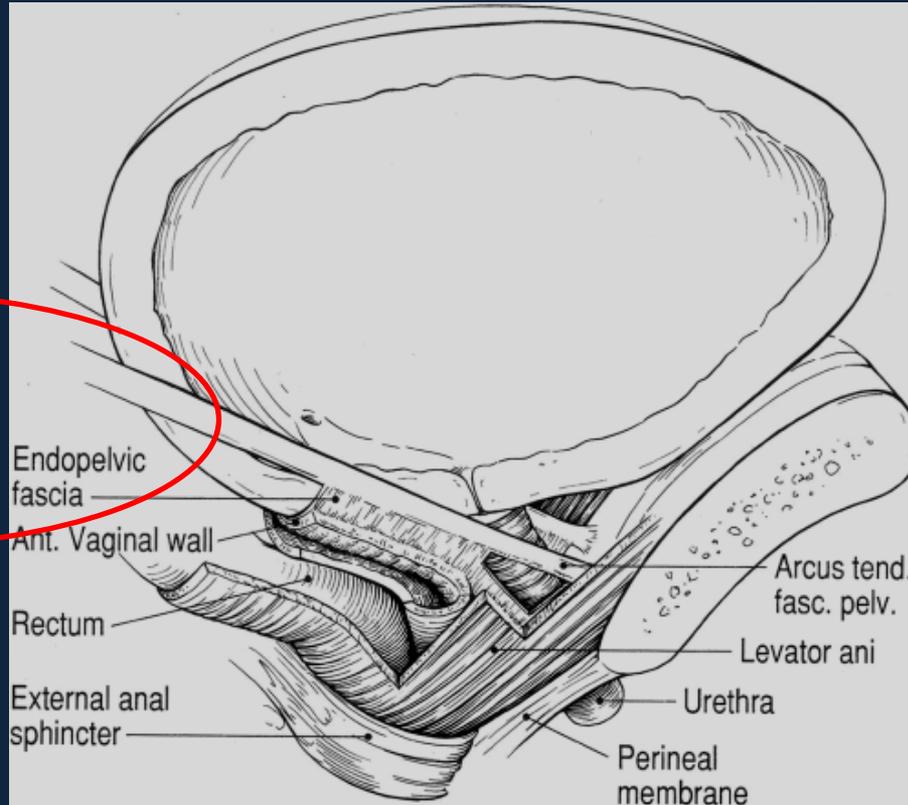
Perineal membrane



**○ = CENTRUM PERINEI = CENTRUM of PERINEAL BODY**

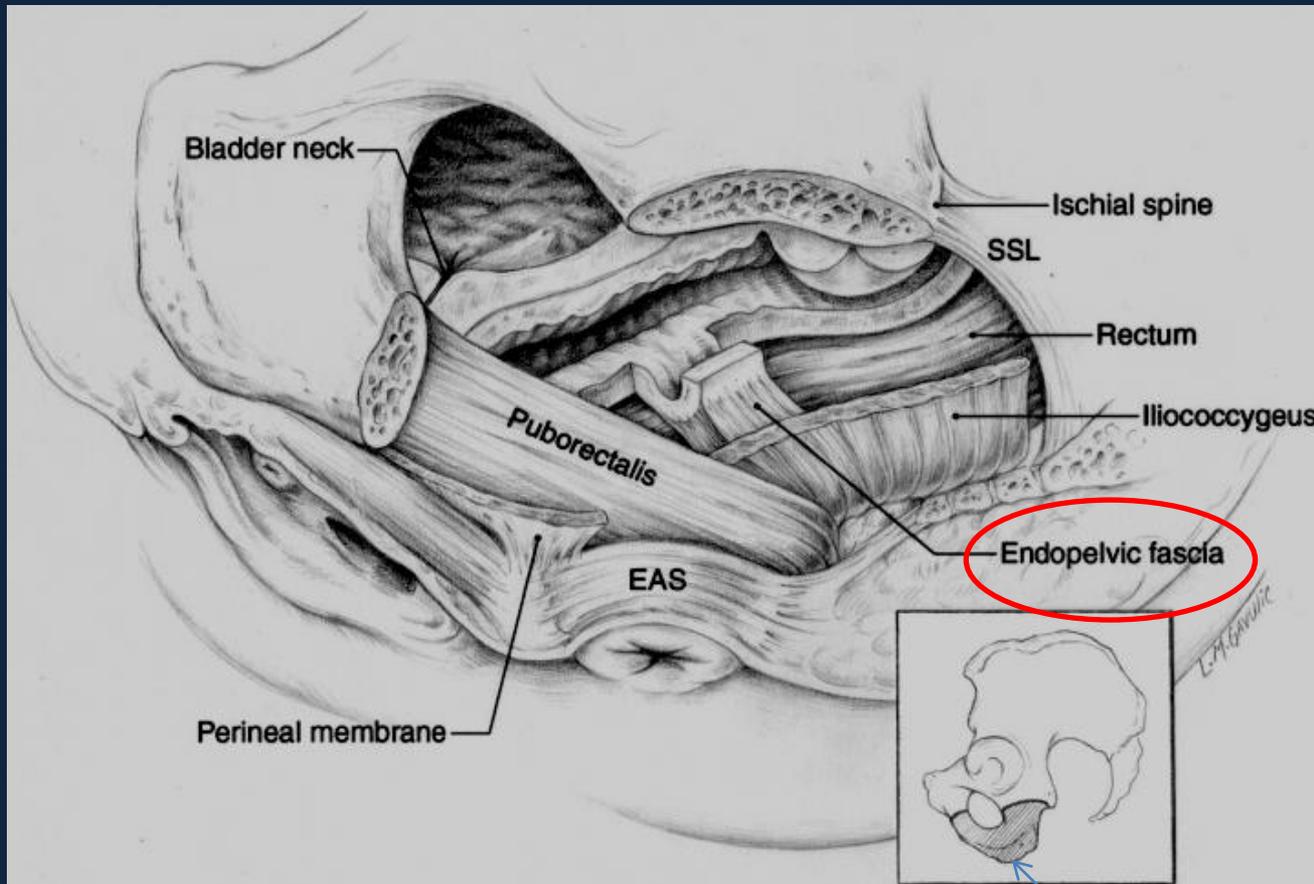
# Interactions between muscles and endopelvic fascia I

Fascia diaphragmatica pelvis superior =

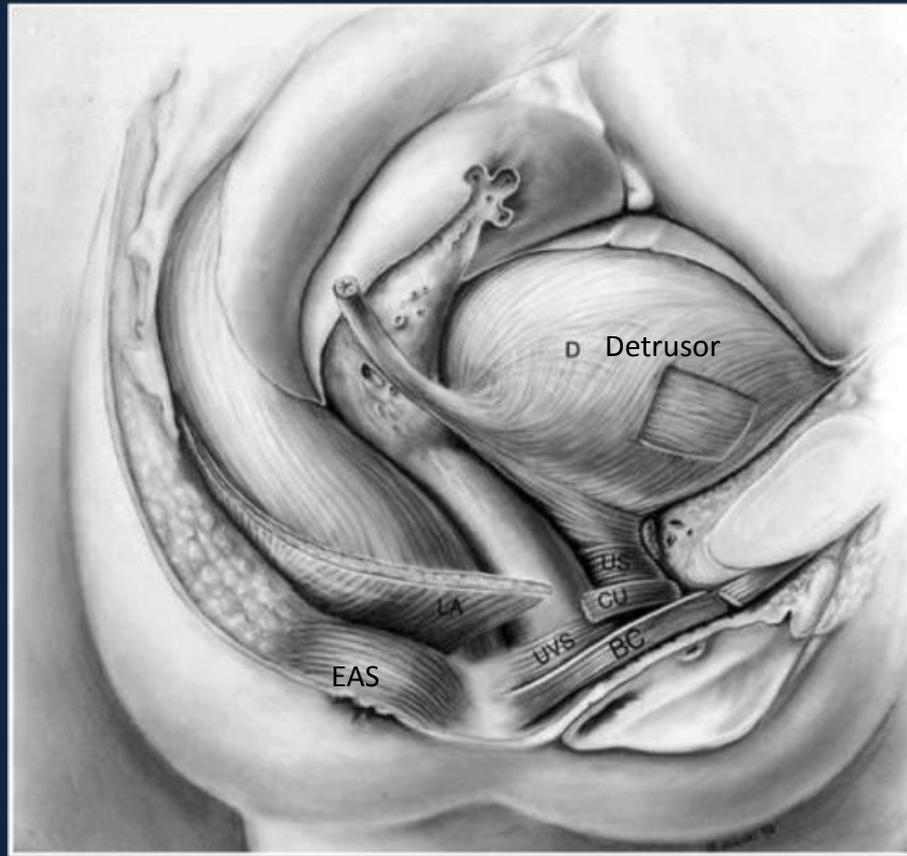


The fasciae act to stabilize the organs in their position + pelvic floor muscles should provide constant tonic activity

# Interactions between muscles and endopelvic fascia II



# Sphincters



LA=levator ani (iliococygeus)

EAS=external anal (rhabdo)sphincter

US=urethral external  
sphincter=urethral  
rhabdosphincter (15-  
64)

*CU=compressor urethrae  
(54-76)*

*UVS=urethrovaginal  
sphincter (54-76)*

BC=bulbocavernosus  
(bulbospongiosus)

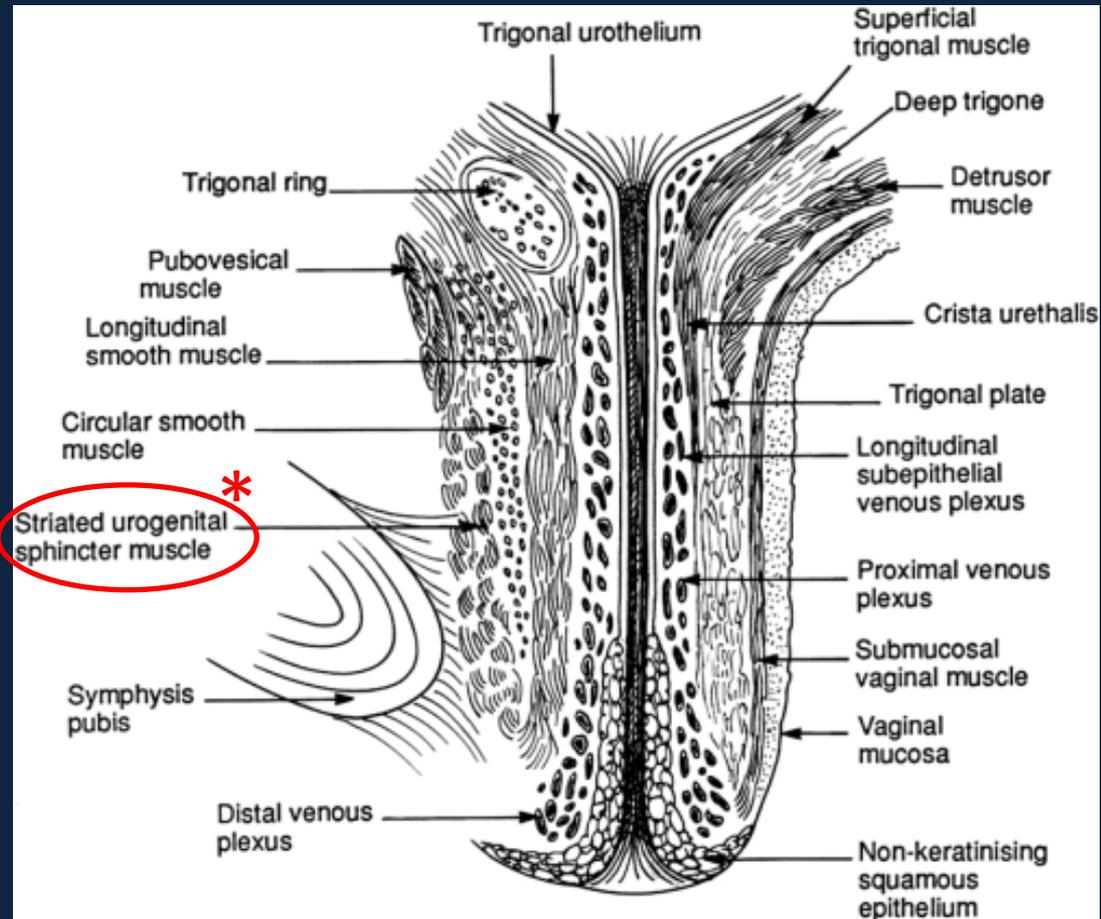
Do not have muscle spindels!

# Midsagittal section of the older female urethra

- \* -Composed of slow twitch fibers
- loss of muscle with age in the posterior wall

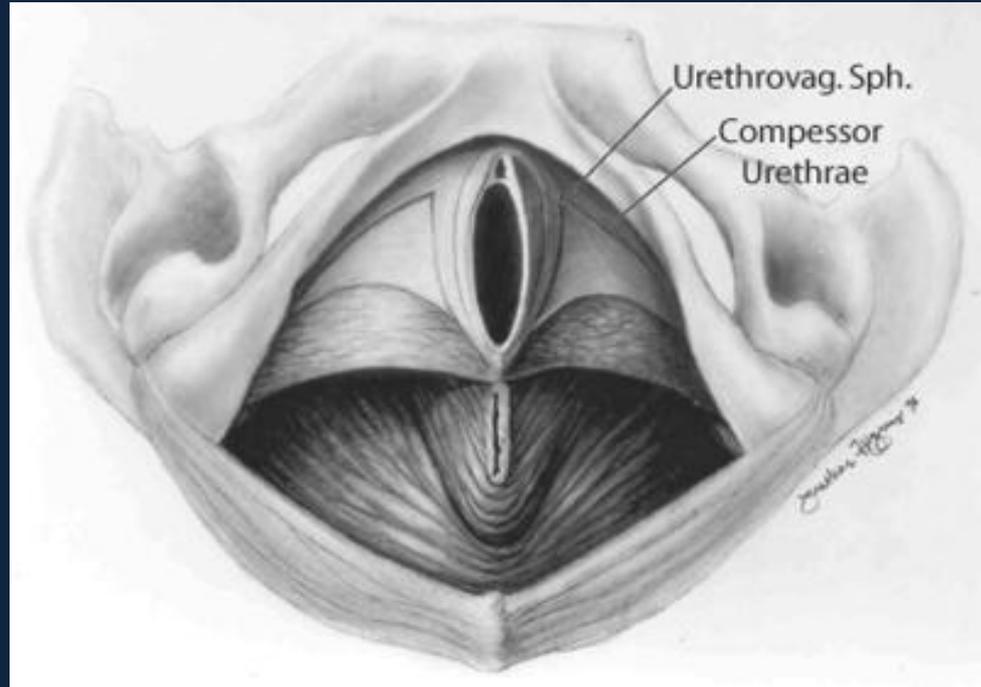
-Smooth muscles are present in upper 4/5 of the urethra

-? Longitudinal layer initiates micturition

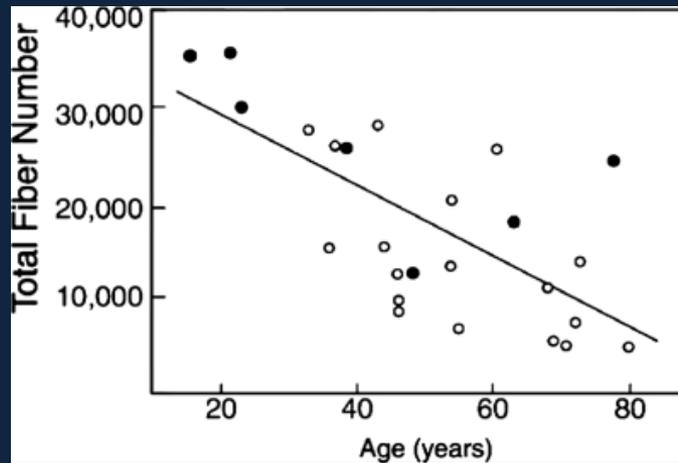


# *Compressor urethrae and urethrovaginal sphincter*

- Both are muscles of the urogenital diaphragm
- Start at 54th percentile extent to 76
- direction is no circular



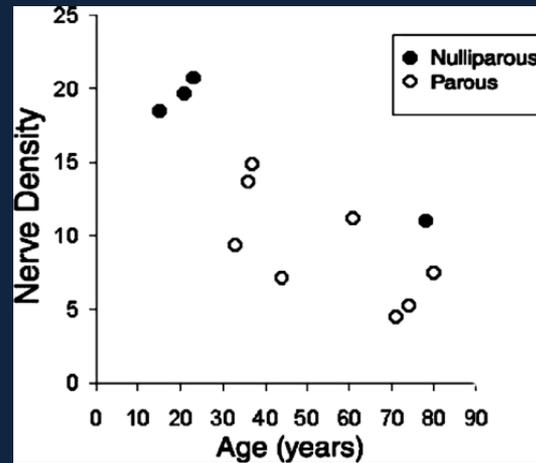
# Aging



Striated muscle fibers of urethral wall

- Mean musc. fiber diameter is similar
- ↓
- Significant loss of muscle with age

# Aging



Ventral urethral wall

- Nerve density decreases



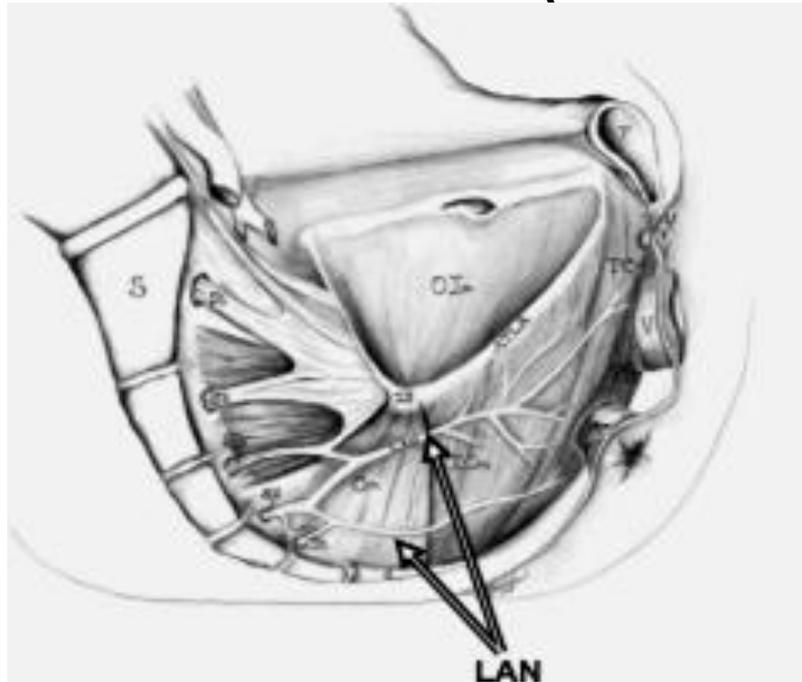
- Denervation responsible for (some) muscle loss

# Innervation

- Striated muscles- somatomotor
- Smooth muscles- parasympathetic
- Sensory (somatic afferent and visceral afferent)

# Somatomor

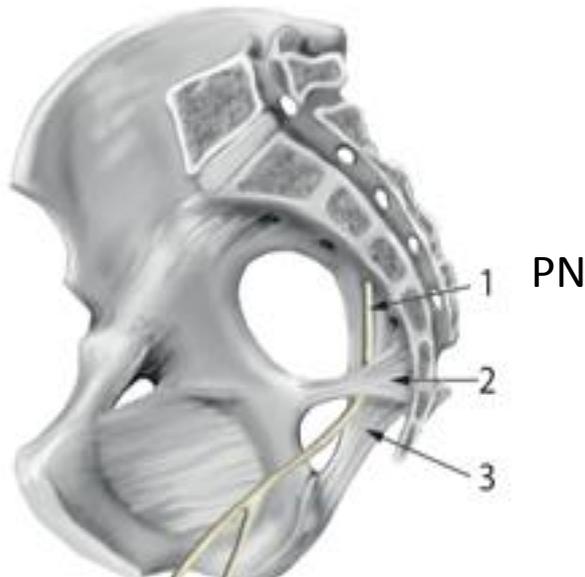
- Levator ani nerve (LAN) in human primary from S3-S5 ventral roots (Thor & de Groat 2010)



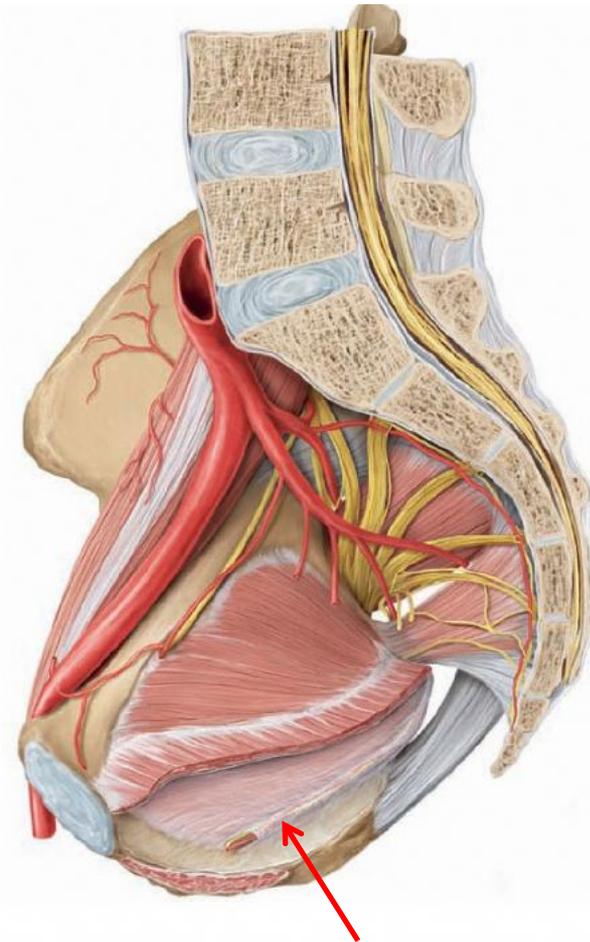
Controversy : ? Role of pudendal nerve ( in experimental animals large  $\alpha$ -motor neurons, hallmark of skeletal muscle innervation are absent in pudendal nerve)

# Innervation of rhabdosphincters

- Pudendal nerve (PN)

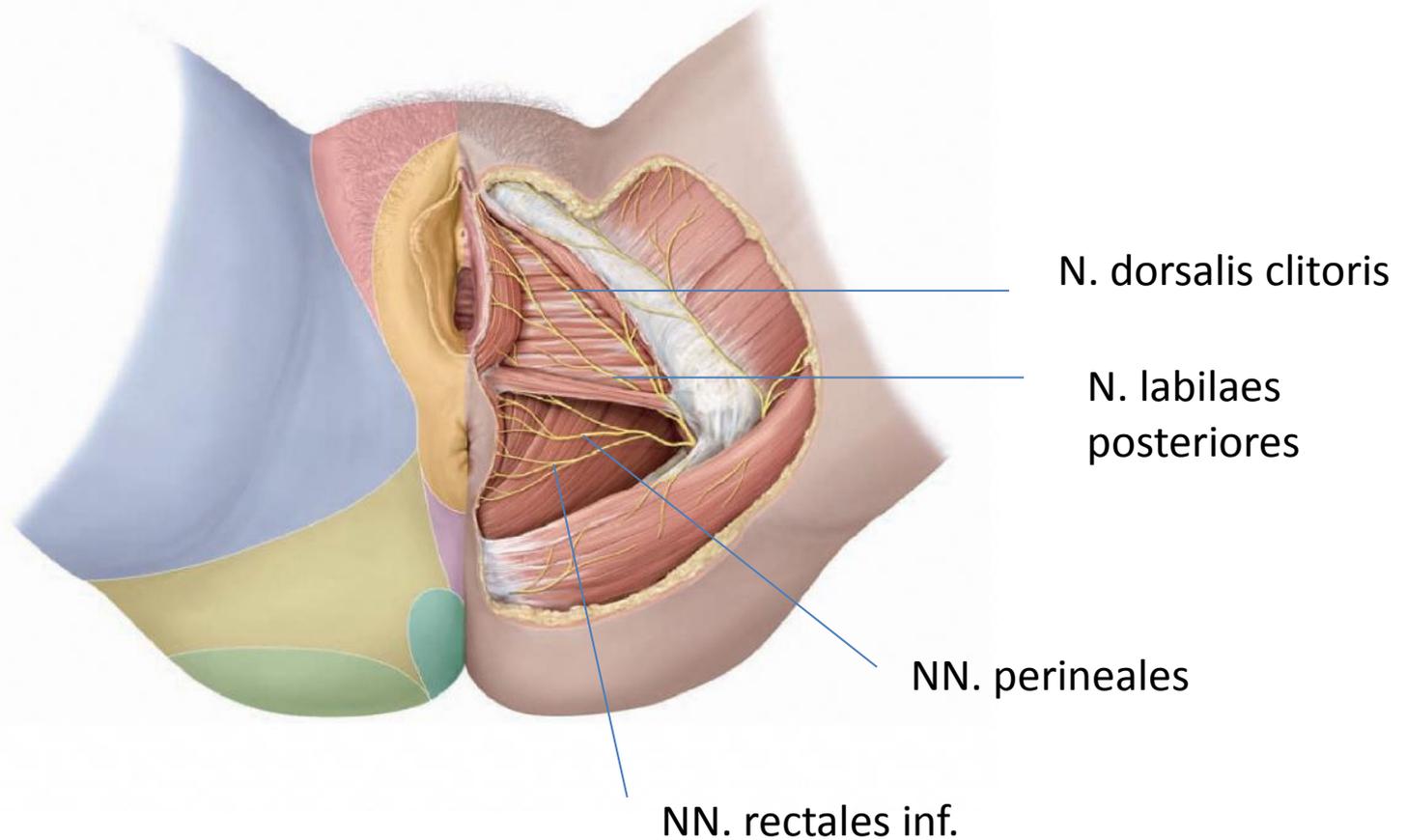


Origin S2-S4 (S1-S3)



PN in pudendal canal (wall of the ischioanal fossa)

# Somato sensory innervation - pudendal nerve



Pain fibers may travel with sympathetic nerves