

# Approach to the Anterior Pelvis (Enneking Type III Resection)

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## Indication

1. Tumors of the pubis
2. part of internal and external hemipelvectomy
3. pelvic fractures

## Technique

1. Positioning: Type III resections involve the excision of a portion of the symphysis or the whole pubis from the pubic symphysis to the lateral margin of the obturator foramen. The best position for these patients is the lithotomy or supine position. The patient is widely prepared and draped in the lithotomy position with the affected leg free to allow manipulation during the procedure. This allows the hip to be flexed, adducted, and externally rotated to facilitate exposure.
2. Landmarks: One should palpate the ASIS, the symphysis with the pubic tubercles, and the ischial tuberosity.
3. Incision: The incision may be Pfannenstiel like with vertical limbs set laterally along the horizontal incision depending on whether the pubic bones on both sides are resected or not. Alternatively, if only one side is resected, a curved incision following the root of the thigh may be used. This incision begins below the inguinal ligament along the medial border of the femoral triangle and extends across the medial thigh a centimeter distal to the inguinal crease and perineum, to curve distally below the ischium several centimeters (Fig.1).
4. Full thickness flaps are raised so that the anterior inferior pubic ramus is shown in its entire length, from the pubic tubercle to the ischial spine. Laterally, the adductor muscles are visualized, cranially the pectineus muscle and the pubic tubercle with the insertion of the inguinal ligament (Fig.2). The femoral neurovascular bundle with the saphenous nerve is identified and tagged. Medially, the urogenital diaphragm is visualized with the bulbospongiosus, the ischiocavernosus and the superficial transverse perineal muscles. It extends from the edge of the symphysis posteriorly to the anterior edge of the ischial tuberosity. Behind the urogenital diaphragm, there is a large potential dead space, the ischiorectal fossa.
5. Lateral dissection to the anterior inferior pubic ramus: If an isolated resection of the inferior pubic ramus is required, lateral dissection begins with the release of the pectineus and the adductor longus, gracilis and adductor magnus muscles. Between the pectineus and the adductor longus muscles, the anterior division of the obturator nerve is mobilized and protected. Then, the adductor brevis muscle is detached from the bone, and the posterior division of the obturator nerve is mobilized and protected (Figure 3). (The obturator nerve is sacrificed when the whole pubic bone is resected). This exposes the obturator externus

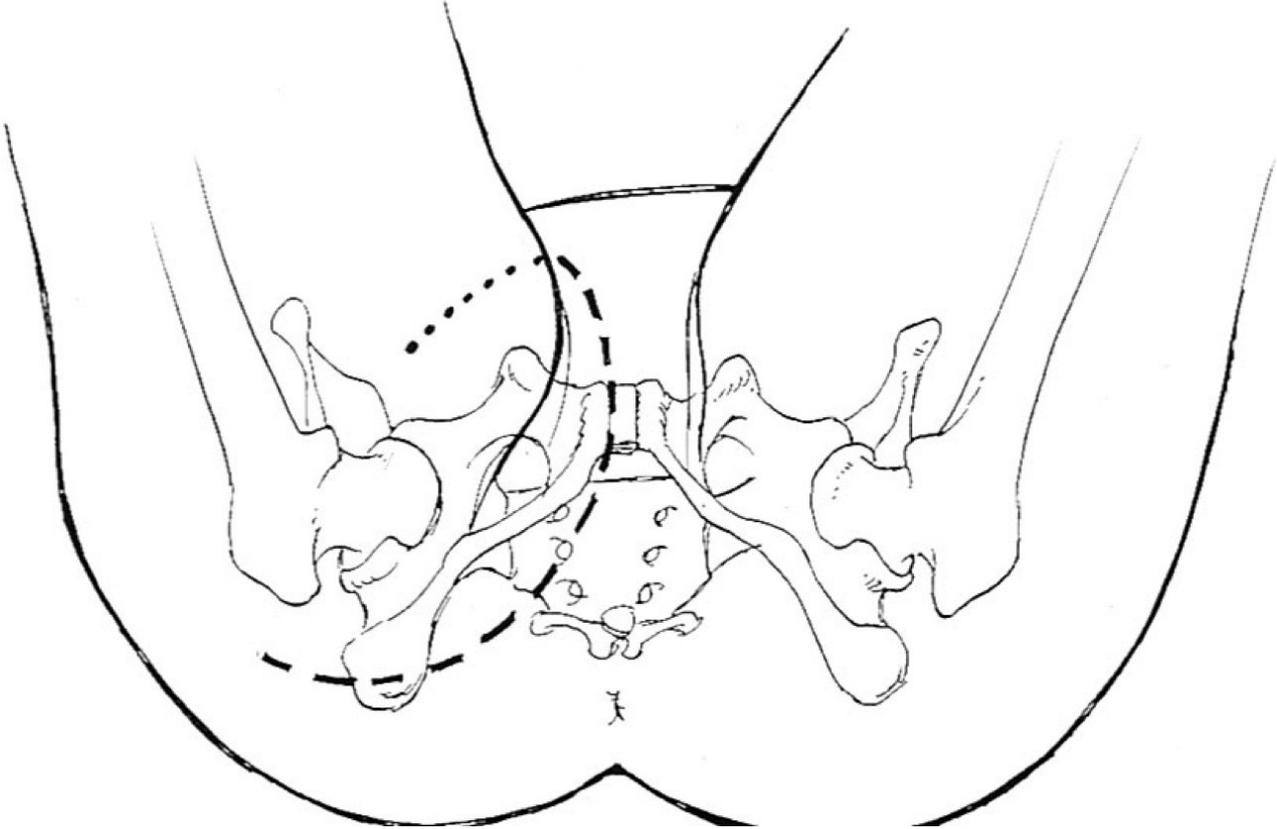
muscle, which is detached from the bone, as well as the obturator internus muscle. Branches of the medial circumflex femoris artery are ligated. Posteriorly, depending on the level of the osteotomy, the quadratus femoris muscle and/or the sacrotuberous ligament is released from the ischial tuberosity under protection of the sciatic nerve.

6. Medial dissection to the anterior inferior pubic ramus: The urogenital diaphragm with its muscles is carefully released from the anterior inferior pubic ramus to visualize the pudendal neurovascular structures and its branches (Fig.4). If these structures can be preserved, the pudendal nerve is mobilized and protected posteriorly towards the Alcock's canal, which lies on the interior surface of the obturator internus muscle and can be palpated back to the ischial spine (Fig.5). Thereby, the inferior rectal neurovascular branches are protected and retracted medially (Fig.6).
7. Osteotomy of the symphysis: The inguinal ligament is detached from the pubic tubercle to allow exposure of the superior pubic ramus. The cavum Retzii is opened and mobilized under careful protection of the bladder and prostate with its accompanying venous plexus, which can lead to considerable bleeding. Careful attention is paid to protect the deep dorsal vessels to the penis/clitoris, the urethra as well as the vagina/corpora spongiosa when dividing the symphysis. Other osteotomies (ischium, lateral superior pubic bone) are performed as the situation necessitates.
8. Exposures to the superior pubic arc in its entire length towards the acetabulum, and to the ischium are described under type II resection.

### **Pearls and Pitfalls**

- It is imperative that the incision allows both the exposure far laterally of the pubic rami and also medially towards the midline or across to or including the other side if required.
- Resections in this area require understanding of the complex urogenital anatomical structures. The urethra, prostate, urinary, bladder and rectum are all immediately adjacent.
- Injury to the pudendal nerve may result in numbness and dysfunction and there is a possibility of impotence.
- The dissection around the ischium can be difficult from the front because of the femoral neurovascular structures, but with careful dissection and retraction the bone can be exposed and a safe osteotomy performed.

Figures



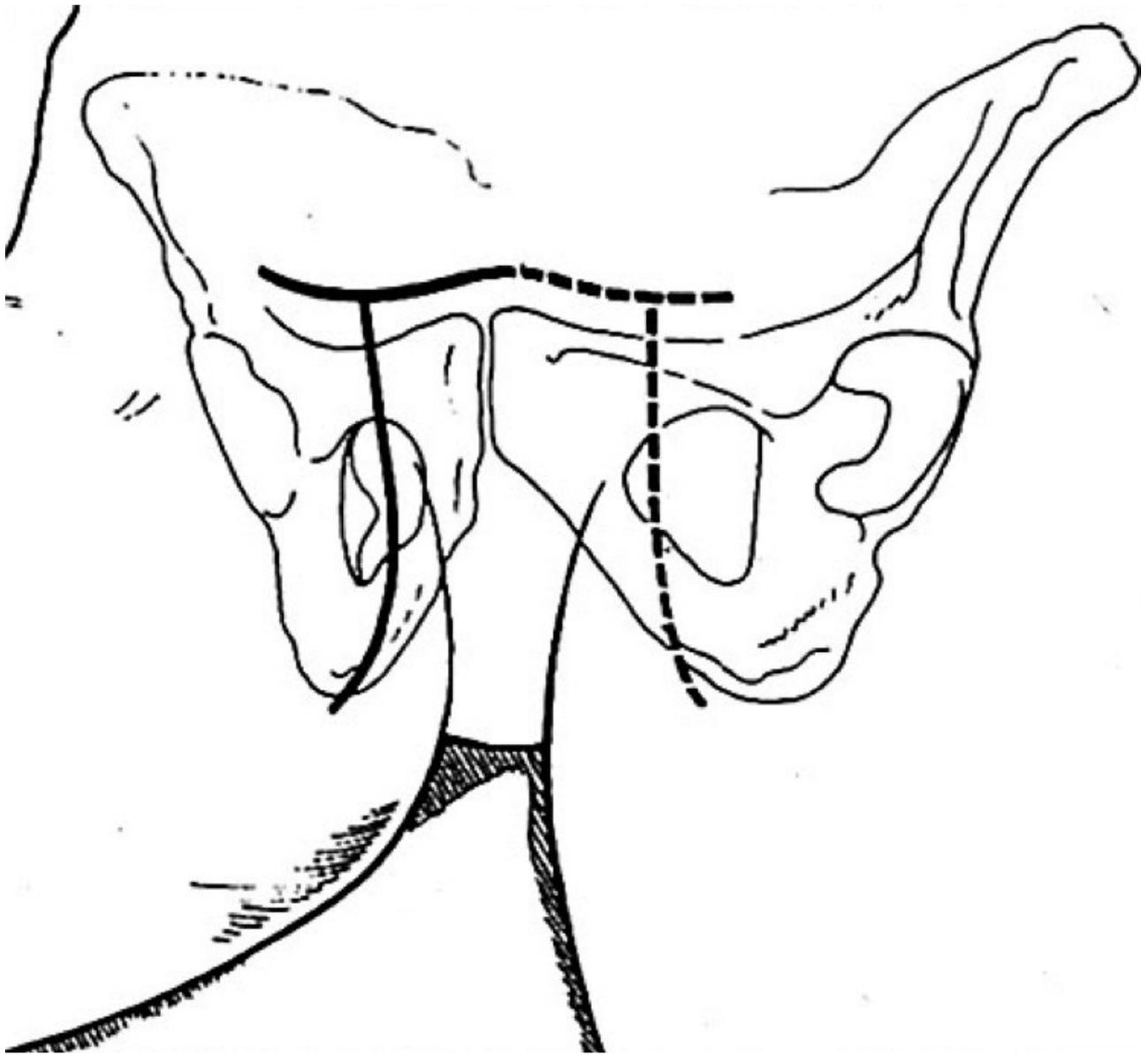
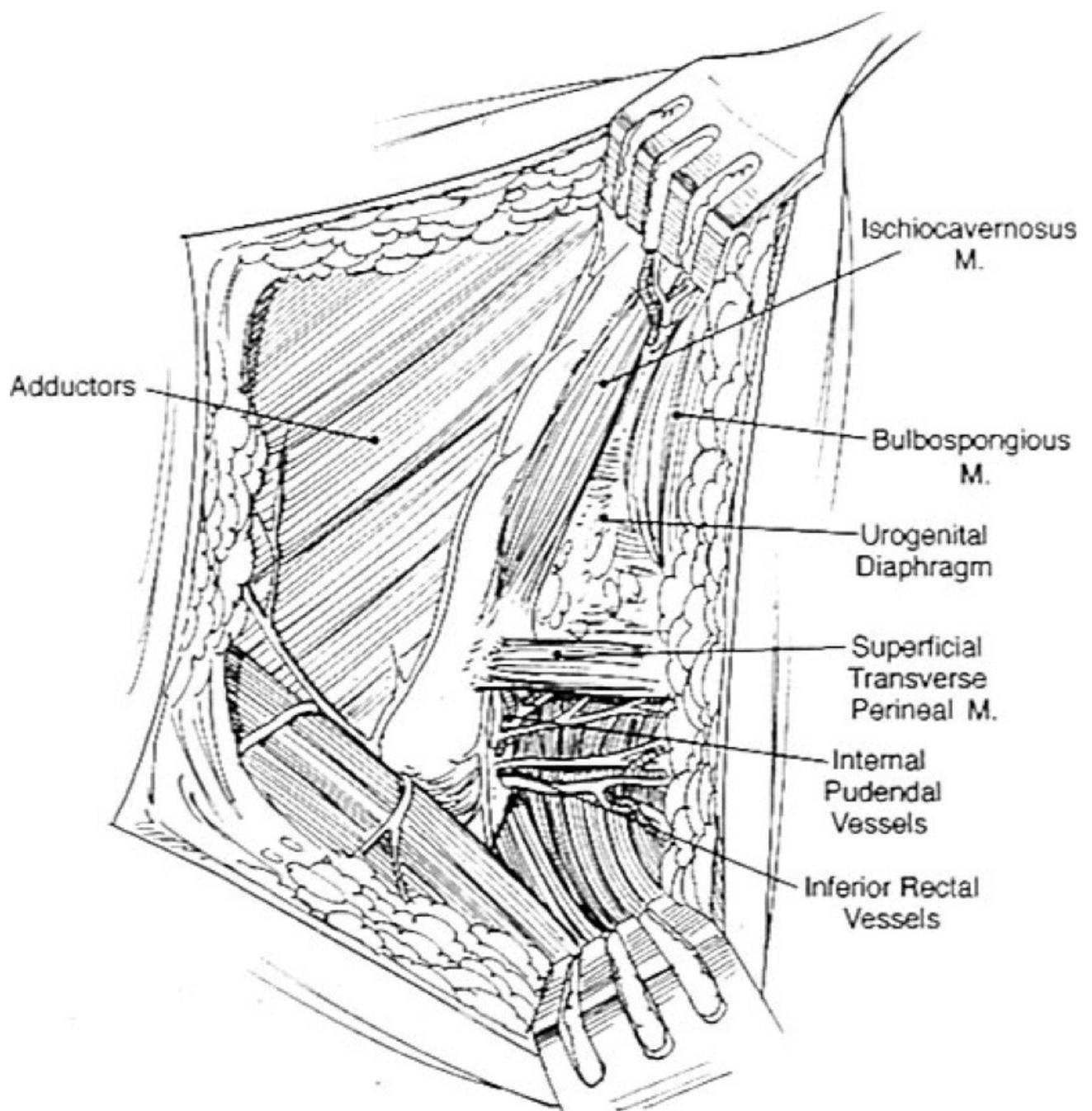


Figure 1: The incision is either curved along the inguinal crease down and posteriorly to the gluteal fold. If the entire symphysis is resected, then a Pfannenstiel like incision is used with vertical limbs towards the gluteal fold.



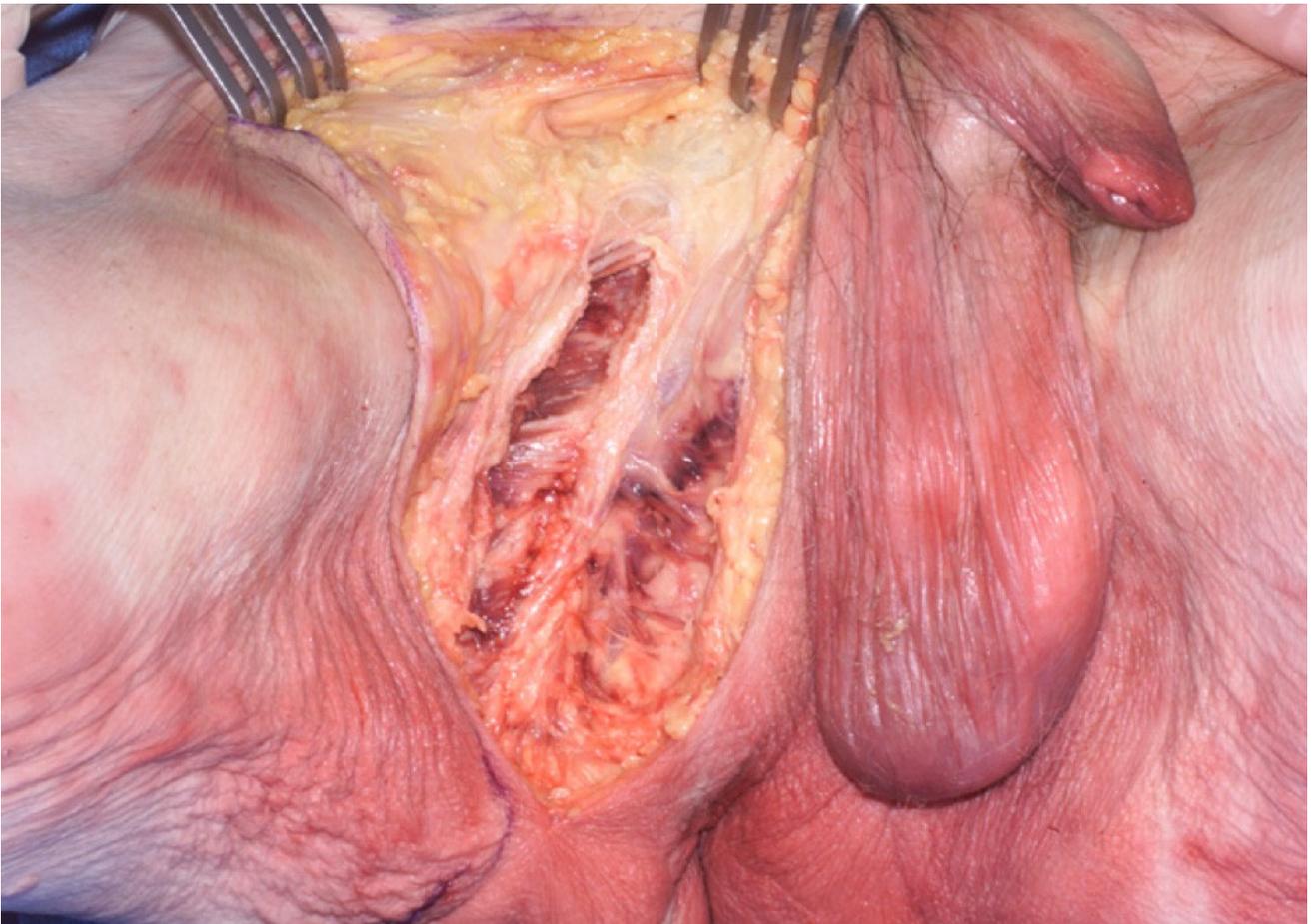


Figure 2: The anterior inferior pubic ramus is shown in its entire length, from the pubic tubercle to the ischial spine, which allows either medial or lateral dissection.

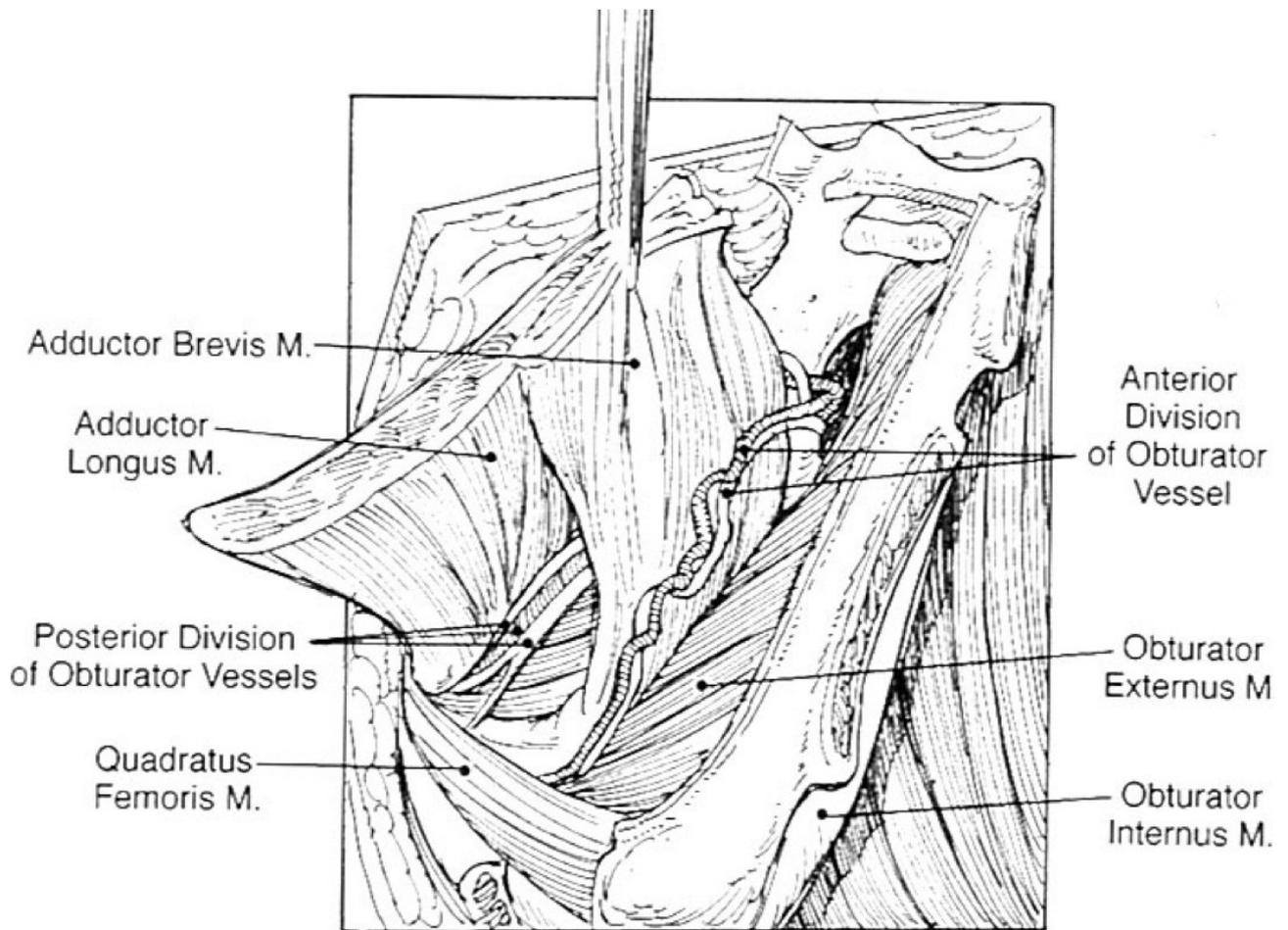
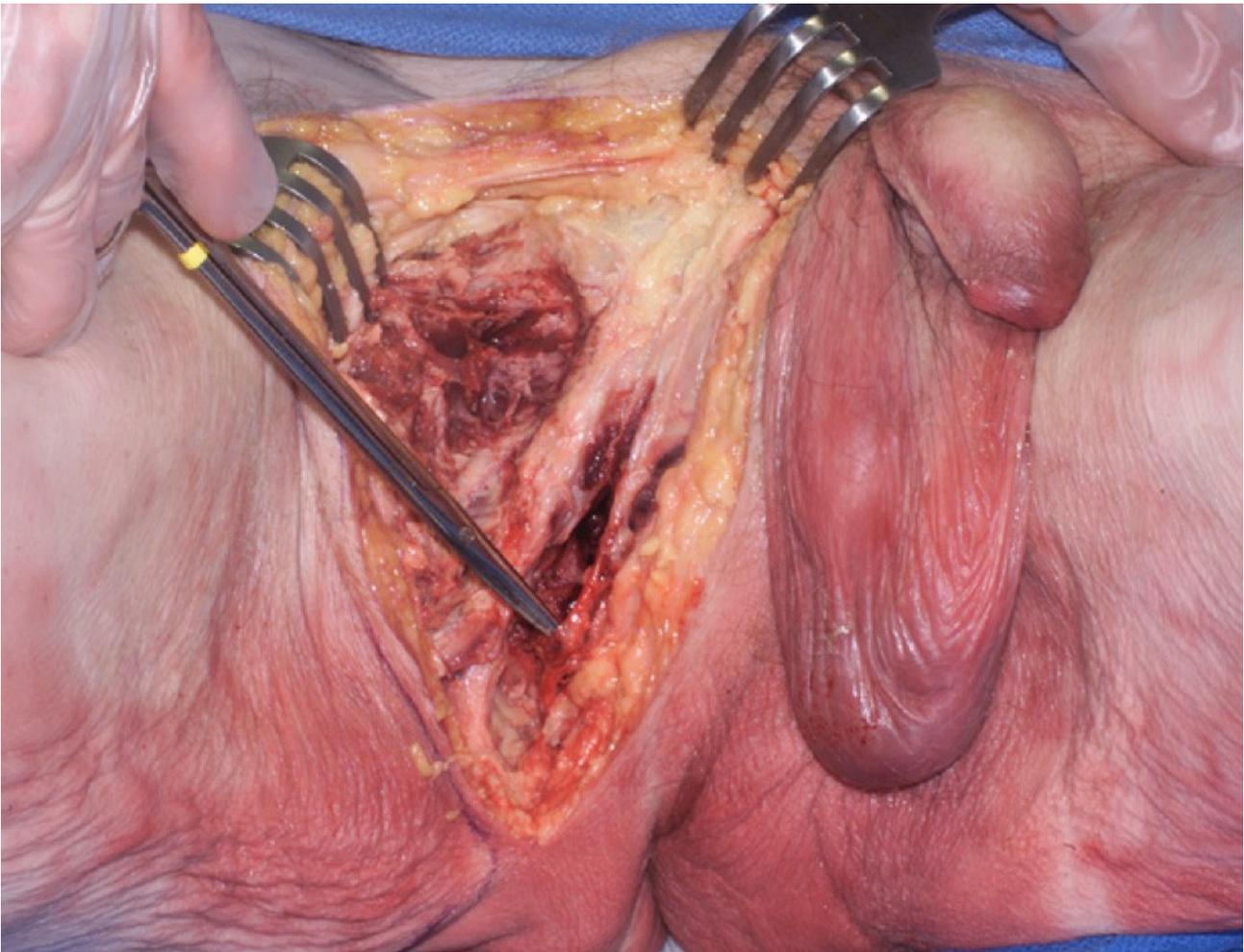


Figure 3: Releasing the adductor muscles, the obturator nerve with its anterior division between the pectineus and the adductor longus muscles as well as the posterior division posteriorly to the adductor brevis muscle are identified.

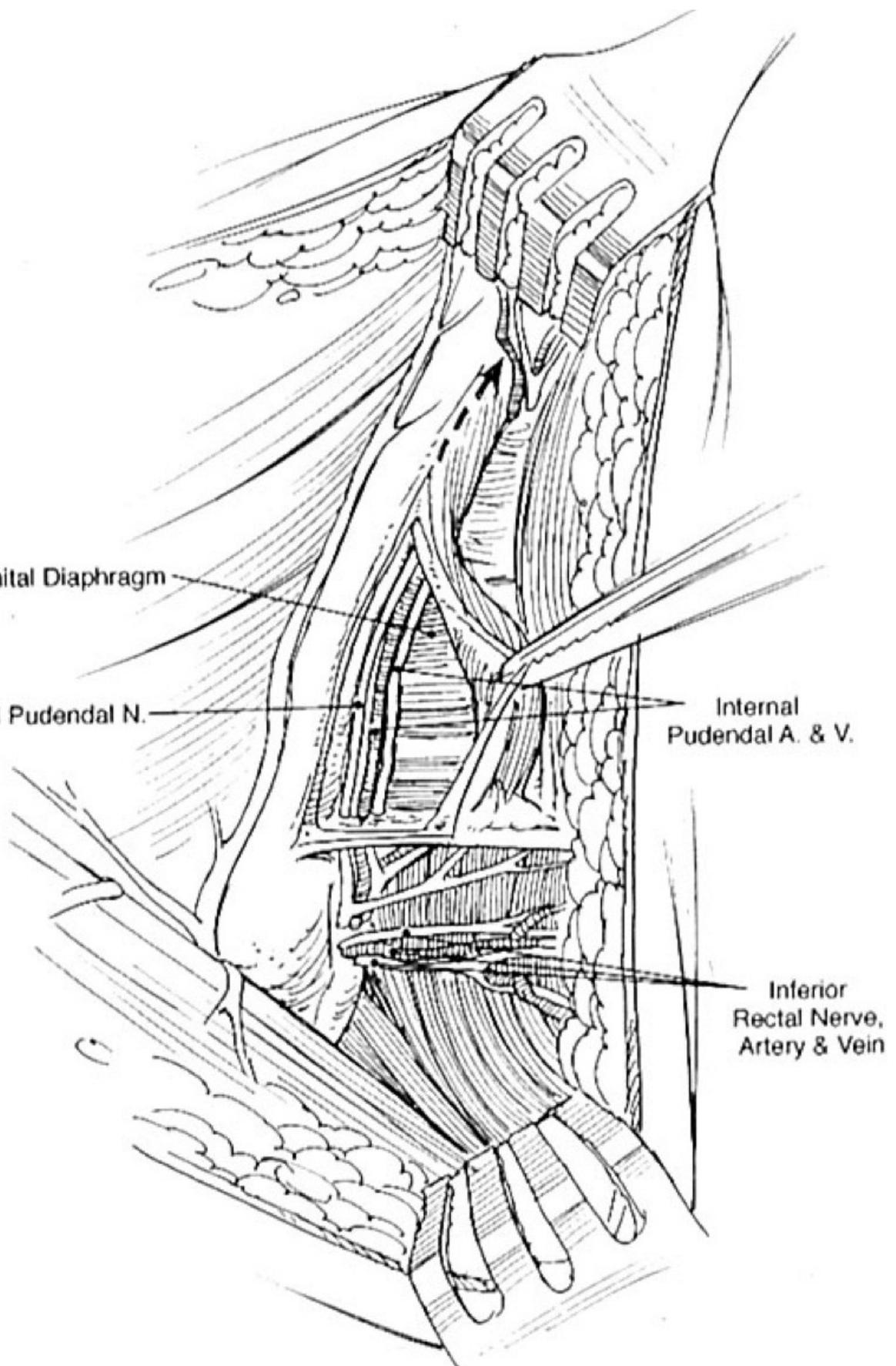


Urogenital Diaphragm

Internal Pudendal N.

Internal  
Pudendal A. & V.

Inferior  
Rectal Nerve,  
Artery & Vein



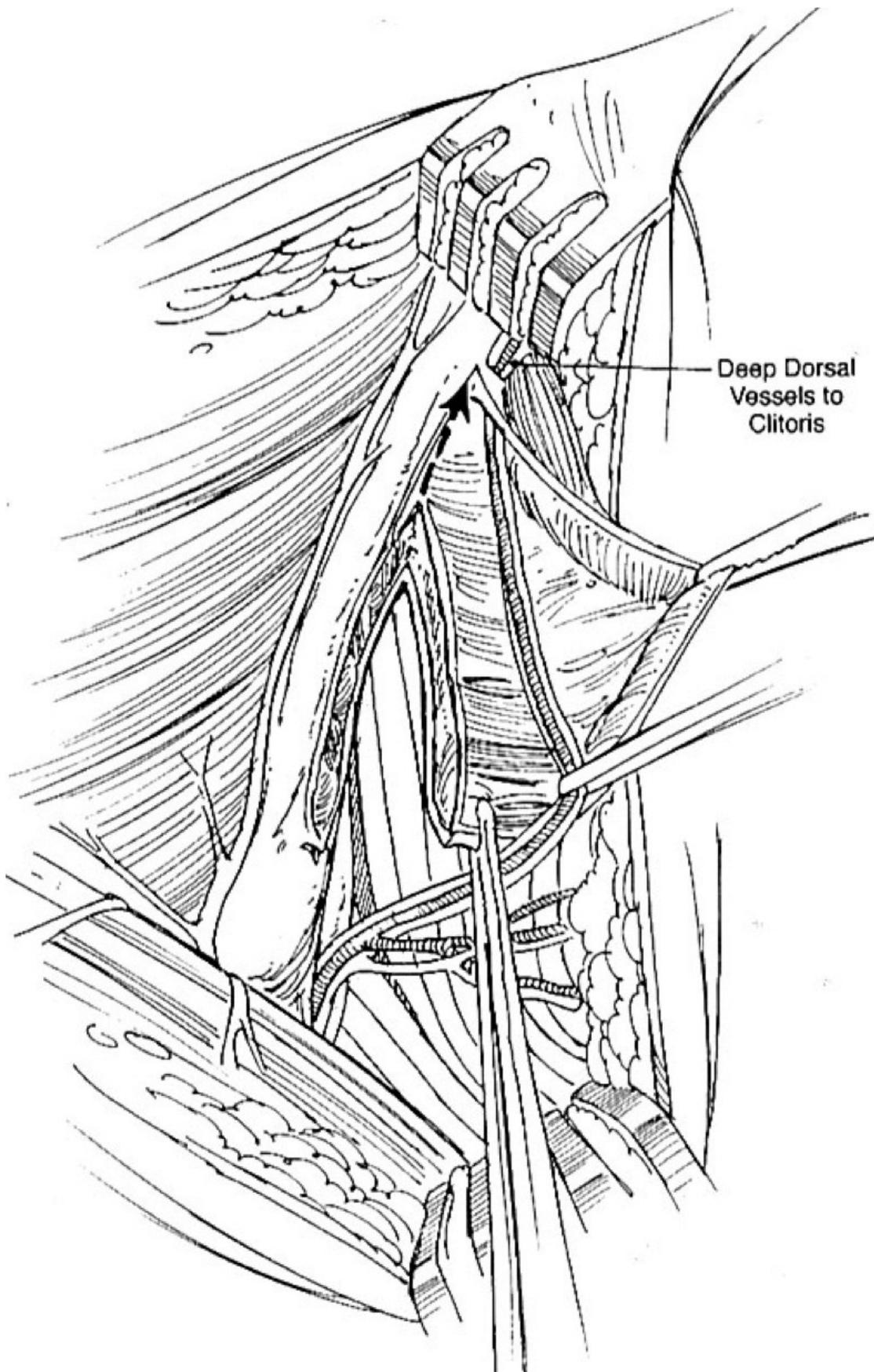
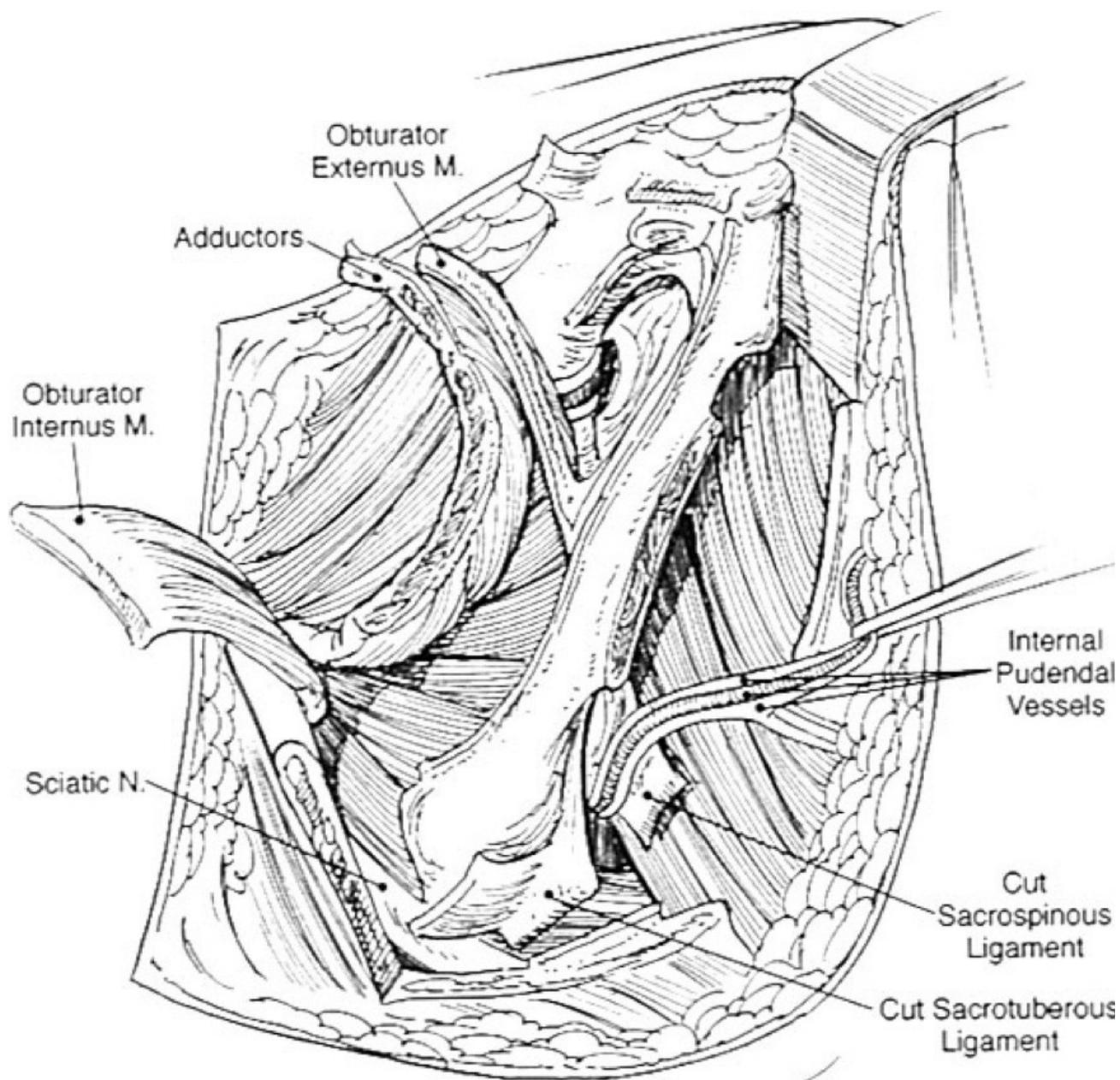


Figure 4: The urogenital diaphragm with its muscles is carefully released from the anterior inferior pubic ramus to visualize the pudendal neurovascular structures with its branches.



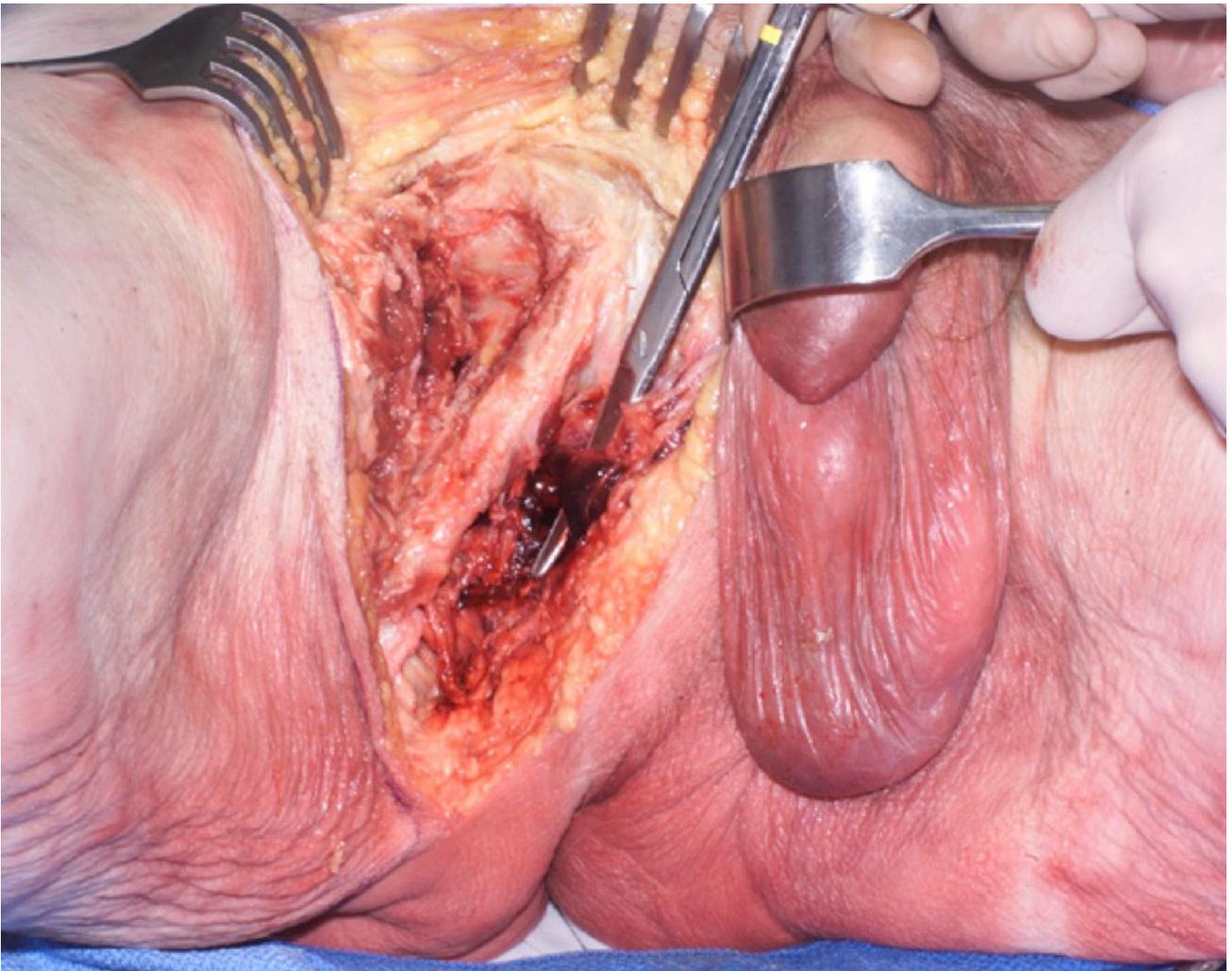


Figure 5: The pudendal nerve is identified and followed posteriorly towards the Alcock's canal, which lies on the interior surface of the obturator internus.

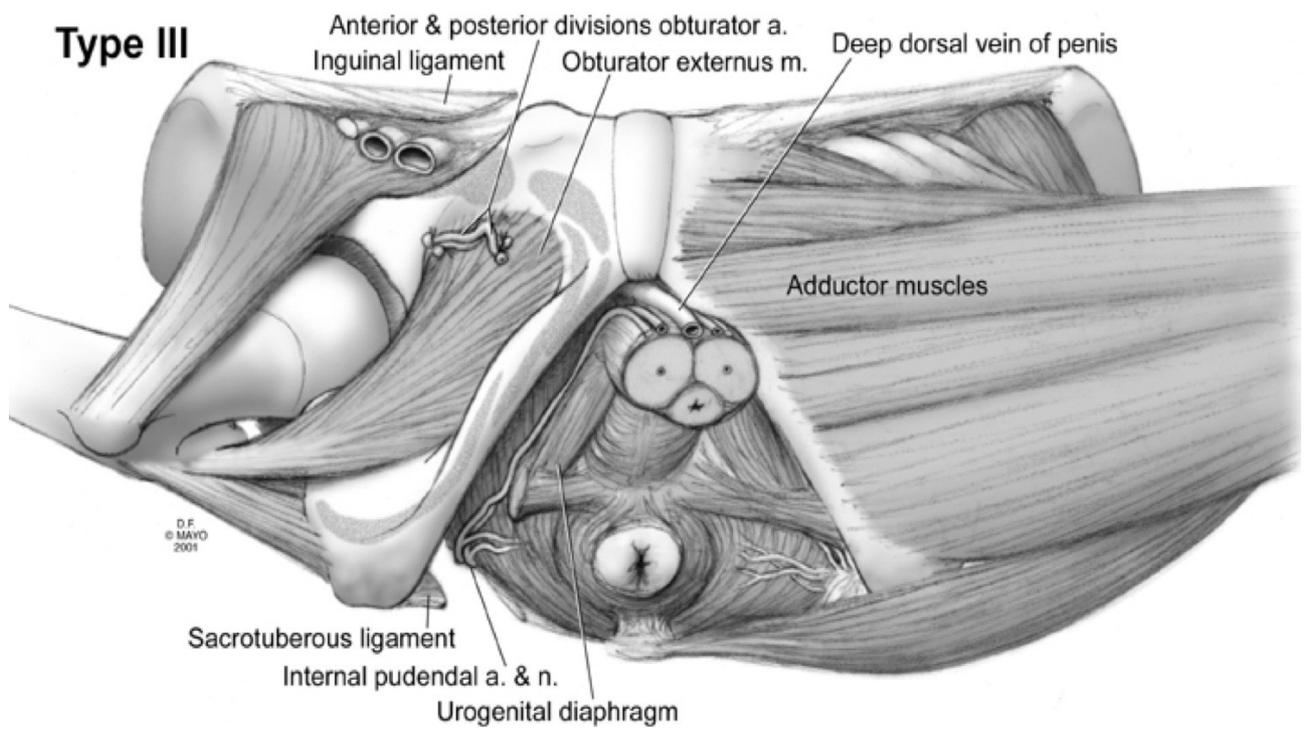


Figure 6: If the pudendal nerve is not transected during the extrapelvic exposure, it can be followed along the inferior ramus in its entire length.