

# Key Anatomical Concepts, Landmarks and Proposed Terminology for Nerve-sparing Gynecologic Surgery: a Narrative Review

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## INTRODUCTION

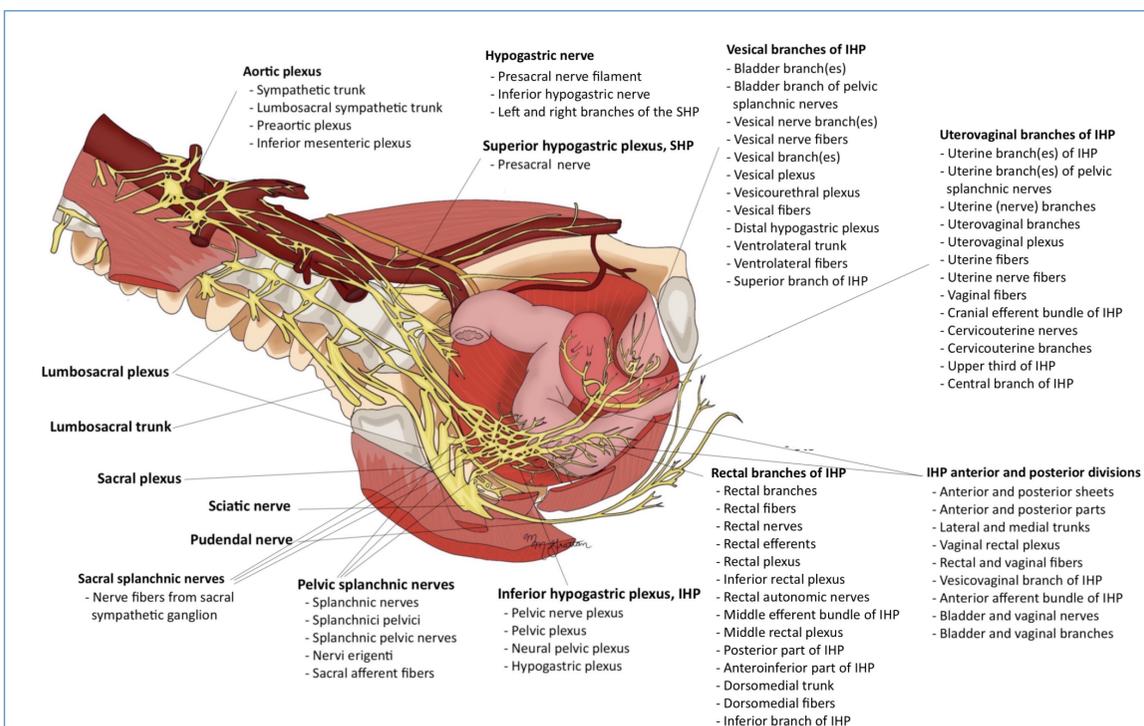
- Nerve-sparing gynecologic surgery allows for complete excision of malignancy or deeply infiltrating endometriosis while preserving autonomic pelvic function<sup>1</sup>, including bladder, bowel, and sexual function.
- Implementation of nerve-sparing techniques has been limited<sup>2</sup>.
  - Inconsistency in terminology<sup>3</sup> is a barrier, making learning nerve sparing approaches more challenging.
- Despite the existence of the Terminologia Anatomica reference<sup>4</sup>, clinicians and researchers continue to use a variety of names for certain structures, suggesting a possible disconnect between the anatomists' and surgeons' perspectives.
- We aim** to synthesize the terminology utilized in nerve-sparing surgical literature and propose standardized and non-conflicting terms to allow for consistent vocabulary, ultimately making nerve-sparing surgery accessible to every gynecologic surgeon.

## RESULTS

- 223 articles identified, 78 included after abstract screening (**Appendix**)
- 44/78 (54%) focused on cervical cancer, 14/78 (18%) on endometriosis
  - Others: combination of both, other gynecologic cancer, or anatomy
- 27/78 (35%) cadaveric/anatomical studies, 15/78 (19%) surgical videos, 13/78 (17%) case reports/series
  - Others: reviews, observational studies, 1 RCT

**Figure 1 – Pelvic Nerves**

Recommended standardized name bolded, alternative names plain



**Table 2 – Pelvic Spaces**

| Recommended Standardized Name | Alternative Names   |
|-------------------------------|---|
| <b>Retropubic space</b>       | Space of Retzius<br>Paravaginal space   |
| <b>Paravesical space</b>      |   |
| <b>Obturator space</b>        | Obturatoric space   |
| <b>Vesicovaginal space</b>    | Vesicocervical space  |
| <b>Yabuki space</b>           | Yabuki's fourth space<br>Fourth place<br>Avascular space located immediately below the entrance of the ureter into the bladder  |
| <b>Rectovaginal space</b>     | Vaginal-rectal space<br>Prerectal space   |
| <b>Presacral space</b>        | Waldeyer's presacral space<br>Avascular layer below the hypogastric nerve<br>Inferior retrorectal space<br>Waldeyer's space   |
| <b>Retrorectal space</b>      | Pararectal space<br>Okabayashi's space/Latzko's space<br>Pararectal fossa (medial/lateral)<br>Caudal/cranial chamber of pararectal space<br>Pelvisubperitoneal space<br>Deep retrorectal space<br>Avascular layer above the hypogastric nerve<br>Superior retrorectal space<br>Holy Plane<br>Heald's Holy Plane |
| <b>Iliolumbar space</b>       | Lumbosacral space   |

## METHODS

Literature search (PubMed): "pelvis" AND "nerve sparing"

- Included: nerve-sparing in gynecologic context
- Excluded: exclusively non-gynecologic surgeries, animal studies

Narrative review performed to synthesize terminology for:

- Nerves
- Fasciae
- Retroperitoneal spaces

Relevant additional references from these articles also included

Data extracted:

- Article type
- Surgery type
- Anatomical structure & function

Each unique term identified, categorized by structure, and reference frequency calculated

Consensus reached among all 4 reviewers for each term, considering:

- Popularity in literature
- Possibility of overlapping with other structure names

**Table 1 – Pelvic Fascia & Ligaments**

| Recommended Standardized Name | Alternative Names   |
|-------------------------------|---|
| <b>Endopelvic fascia</b>      | Pelvic fascia   |
| <b>Parietal fascia</b>        | Hypogastric fascia<br>Fascia of the piriformis muscle<br>Parietal hypogastric endopelvic fascia<br>Uterohypogastric fascia  |
| <b>Presacral fascia</b>       | Rectosacral ligament<br>Rectosacral fascia<br>Waldeyer's fascia   |
| <b>Visceral fascia</b>        | Mesorectal fascia<br>Proper rectal fascia<br>Fascia propria of rectum   |
| <b>Parametrium</b>            | Paracervix  |
| <b>Anterior parametrium</b>   | Ventral parametrium<br>Ventral paracervix<br>Vesicouterine ligament<br>Bladder pillar<br>Vesicocervical ligament<br>Posterior leaf vesicouterine ligament<br>Vesicocovaginal ligament                                       |
| <b>Lateral parametrium</b>    | Cardinal ligament<br>Lateral paracervix<br>Lateral ligament   |
| <b>Posterior parametrium</b>  | Uterosacral ligament<br>Sacrouterine ligament<br>Rectouterine ligament<br>Uterosacral peritoneal fold<br>Sacrovaginal ligament<br>Vaginosacral ligament<br>Dorsal parametrium<br>Dorsal paracervix<br>Rectovaginal ligament |
| <b>Rectal wings</b>           | Rectal lateral ligament<br>Lateral ligament of the rectum<br>Lateral rectal ligament<br>Rectal pillars  |
| <b>Paracolpium</b>            | Paravaginal tissues   |

## DISCUSSION & CONCLUSION

- A multitude of names were identified for key anatomical structures, including pelvic autonomic nerves, spaces, fasciae and ligaments
  - Terminology for branches of IHP are particularly unclear – i.e. 14 names used for rectal branches of IHP
- Significant overlap exists between alternative names for different structures, creating confusion for clinicians
- We propose consistent terminology of pelvic autonomic nerves, spaces, fasciae and ligaments to facilitate surgeons learning nerve-sparing approaches to gynecologic surgery

## APPENDIX – INCLUDED STUDIES

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