Proctologic Anatomy

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PROCTOLOGIC ANATOMY

To my wife

Foreword

The names of Milligan, Morgan, and Gorsch will always be associated with the advanced knowledge of the anatomy of the pelvic outlet. It is but fitting that a man of Dr. Gorsch's experience as a teacher and a delver into anatomy should have brought all the data up to date and presented them in this compact monograph. To all surgeons, especially the embryo surgeon who hopes some day to gain proficiency as a specialist, this book will be invaluable.

JEROME M. LYNCH, M.D.

Preface to the Second Edition

Since the publication of the first edition of this book in 1941 proctology has received recognition as a separate specialty with an independent, approved, certifying Board—the American Board of Proctology.

The rapid progress and broadening interest in this field has yielded a large number of articles and several textbooks to the proctologic literature. Several contributions to the anatomic literature, notably that of Uhlenhuth, have also been of considerable proctologic interest.

The author has thoroughly reviewed and evaluated the bulk of these contributions and he would again emphasize that the diagnosis, pathogenesis, and particularly the surgery of proctologic disorders, require a basic and broad anatomic background which is not yet available to the postgraduate student or the practicing proctologist.

It has therefore been the author's purpose to again consolidate in one volume the modern and generally accepted concept of the perineopelvic anatomy and to present it in an orderly and readily comprehensible form with particular emphasis on its practical application. There has been some unavoidable repetition in doing this.

In the preparation of this edition the entire material has been revised, largely rewritten and brought up to date. Where the anatomy is still equivocal, the author has been guided by his own dissections and has offered descriptions of practical rather than academic value.

Notable revisions are the chapters on the anatomy of the anal canal, the anorectal musculature, the perineopelvic spaces and the levator ani muscle. The detailed anatomy of the pelvic

fascia is assuming increasing importance in the broadening scope of pelvic surgery and the chapter on this difficult subject has therefore been entirely rewritten and presented in a simple manner more readily understandable and useful to the student as well as the practicing surgeon.

If the author has in some measure bridged the gap between anatomist and practicing proctologist he will consider his efforts well repaid.

R. V. G.

Preface to the First Edition

The author's experience in the special practice, and more particularly in the postgraduate teaching field of proctology has impressed him with the desirability of increasing the facilities for specialized anatomical training to future proctologic aspirants.

The limited anatomical training offered by the present medical school does not meet the requirements or demands for the present or future standards of proctologic practice. Special training in anatomy is not within the scope of the medical school and it is not desirable that it should be. This is a definite and important obligation to be fully assumed by the postgraduate schools.

The author is also convinced that the diagnosis, patholysis and treatment of proctologic disorders falls definitely below the standards of other medical specialties. This applies in particular to the surgical aspect of proctology.

Furthermore the fragmentary descriptions of the anatomy in the modern proctologic textbooks are probably designed for the general practitioner but can scarcely suffice as an adequate anatomic basis for special practice in the surgical field of proctology.

The practice of proctology is a complex specialty, largely surgical, in which a broad, basic anatomical background of the entire pelvic viscera is quite essential to the performance of satisfactory surgery, as well as to a correct and complete conception of the pathogenesis and clinical course of not only proctologic, but also the closely allied gastroenterologic, gynecologic and urologic diseases.

My purpose, therefore, is to present a comprehensive and simple description of the essential perincopelvic anatomy as I have actually observed it, emphasizing its more important surgical and

pathogenic aspects and its particular application to the proctologic field.

Special consideration has been given to the important musculature of the anal canal.

I am fully appreciative that considerable anatomic detail has been omitted. However, the work was not intended to cover the entire subject of pelvic anatomy, but rather to offer it primarily from the proctologic viewpoint. If I have accomplished this in some slight degree, I shall have considered my efforts as amply rewarded.

R. V. Gorsch

Acknowledgements

Sincere thanks and due credit are extended to the authors whose illustrations have been used or to whom reference has been made.

I am indebted in particular to Dr. Eduard Uhlenhuth for his excellent illustrations on the pelvic fascia and musculature. To Dr. George Becker the author is again indebted for his photographs of additional anatomic dissections added to this edition.

To Mr. C. Naunton Morgan of London, England, I extend my sincere thanks for his helpful suggestions.

R. V. G.

Contents

CHAPTER I

The Pelvis, Pelvic Floor and Perineal Triangles

Phylogenetically and embryologically the development of the pelvic viscera and their perineal outlets may be traced through successive stages in which the complete division of a common excretory cavity—the cloaca—finally reaches the complex adult pattern.

Progressive ontogenous development has formed the adult visceral systems. These in their functional adaptations have acquired peculiar anatomic and histologic structures which in modern medicine have come to be considered as more or less independent systems with distinctive pathologic processes.

However, the surgical specialties primarily concerned with this development—urology, gynecology and proctology—are closely allied in symptomotology and treatment. It has therefore seemed advisable to emphasize the broader pelvic outlook essential to a sound anatomic, pathogenic and surgical grasp of these closely related surgical specialties. The tendency in proctology is to narrow its scope to the anal ring.

A short review of the pelvis, the pelvic floor and its triangles is therefore included.

The Pelvis

In its broader sense the pelvis is the large bony canal bounded anteriorly by the pubo-ischial rami, laterally by the hip bones

(the ossa innominata) and posteriorly by the sacrum. The bony wall, entirely complete above, is deficient below, the interval being partly closed by the great sacrosciatic or sacrotuberous ligament.

The pelvic viscera and the adjacent soft parts encroach somewhat on the bony pelvis. At the pelvic inlet these include the psoas, the iliacus muscles, the ureters, the pelvic nerve plexuses and the large vessels; at the pelvic outlet they include the piriformis, the obturator internus muscles and the composite musculofascial structures of the pelvic floor which, in the female, have an important functionally adaptive arrangement.

Largely as a result of obstetric practice, the true pelvis is commonly described as extending from the pelvic inlet or superior strait, or more commonly the plane of the pelvic inlet, to the pelvic outlet or inferior strait (fig. 1).

The plane of the pelvic inlet, anatomically, is bounded anteriorly by the symphysis pubis, laterally by the iliopectineal lines and posteriorly by the superior border of the first sacral vertebra and the alae of the sacrum (fig. 2).

The pelvic outlet, or inferior strait, is roughly rhomboid in outline, extending from the inferior margin of the symphysis outward, backward and downward along the rami of the pubes and ischia to the tuberosities and thence along the lower margin of the sacrotuberous ligaments to the sacrum and coccyx in the midline. The pelvic outlet corresponds to the perineum in its broader sense.

The pelvic aperture, genital hiatus or genital cleft is the interpubic interval in the pelvic outlet. It contains the visceral outlets which are enveloped by the levator ani muscles and their extensions.

The essential sex differences of the male and female pelvis are of more importance from the obstetric viewpoint. However, the broader pelvic outlet in the female, with its peculiar muscular and fascial arrangement, is also of proctologic significance to the formation of the perineopelvic spaces.

The true pelvis, extending from the pelvic inlet to the outlet, has the shape of a curved cylinder, the anterior depth of which corre-

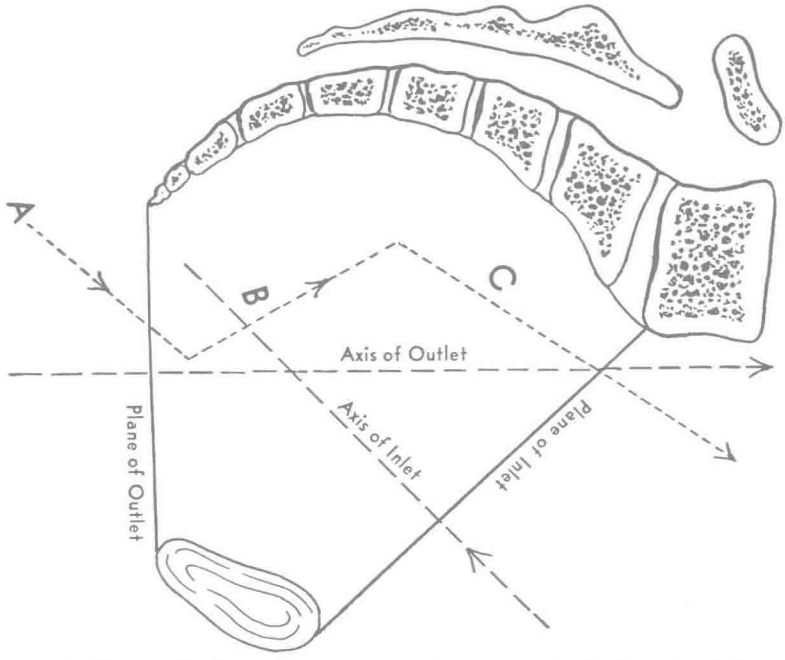

FIG. 1. The pelvic planes. A, the axis of the anal canal; B, the axis of the rectal ampulla; C, the axis of the sigmoid. These changing axes are important in proctosigmoidoscopy.

sponds roughly to that of the symphysis pubis, while the posterior depth, of comparatively much greater dimensions, extends from the sacral promontory to the coccyx. Its axis varies gradually and follows roughly the sacrococcygeal curve (figs. 3 and 4).

In the newborn and infant the pelvis is somewhat cone-shaped and relatively much smaller than in the adult. The sacrum has yet to attain its prominent anterior curve as in the adult and the plane of the pelvic inlet is almost horizontal, factors which predispose the infant to prolapse of the rectum. During the first two years the pelvis grows rapidly. With the changing mechanics of the erect position and the increased activity in walking the sacrum descends between the ilia and by the end of the second decade the pelvis has almost assumed its adult pattern.

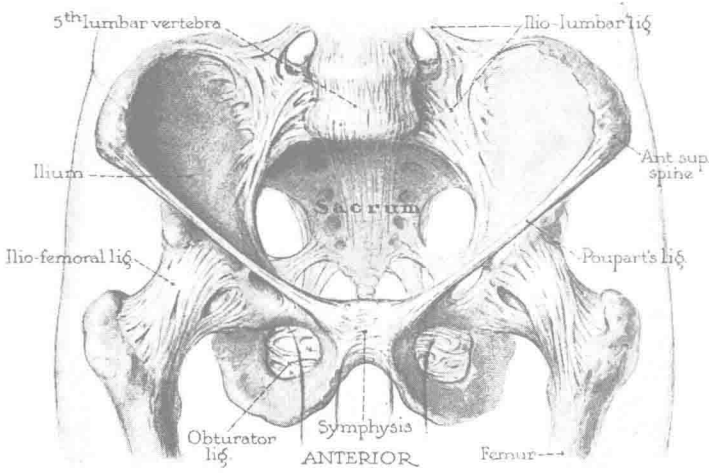

FIG. 2. The pelvic inlet from above. (Courtesy of S. H. Camp & Company.)

THE PELVIC FLOOR

The pelvic outlet is commonly described as being closed by the pelvic diaphragm or the pelvic floor. There is some looseness in the terminology referring to the pelvic floor or diaphragm; the two terms are frequently confused. Anatomically these are different structures and the terms should not be used interchangeably.

Largely as a result of the gynecologist's conception of the utero-vaginal supports, the pelvic floor has been referred to as consisting of an upper and lower portion or, loosely, an upper and lower diaphragm (fig. 5). For example, according to Johnston, two diaphragms support the uterus and this writer refers to the lower diaphragm as the pelvic floor. On the other hand, Farrar refers to the upper pelvic floor as including the levator ani muscles, commonly described, together with the coccygeal muscles and their fascia, as the pelvic diaphragm.

From the practical, if not strictly anatomic, standpoint, it appears simplest, notwithstanding the fact that the pelvic floor actually extends below the plane of the pelvic outlet, to consider the pelvic floor as including all the musculofascial strata from the peritoneum above to the skin below.

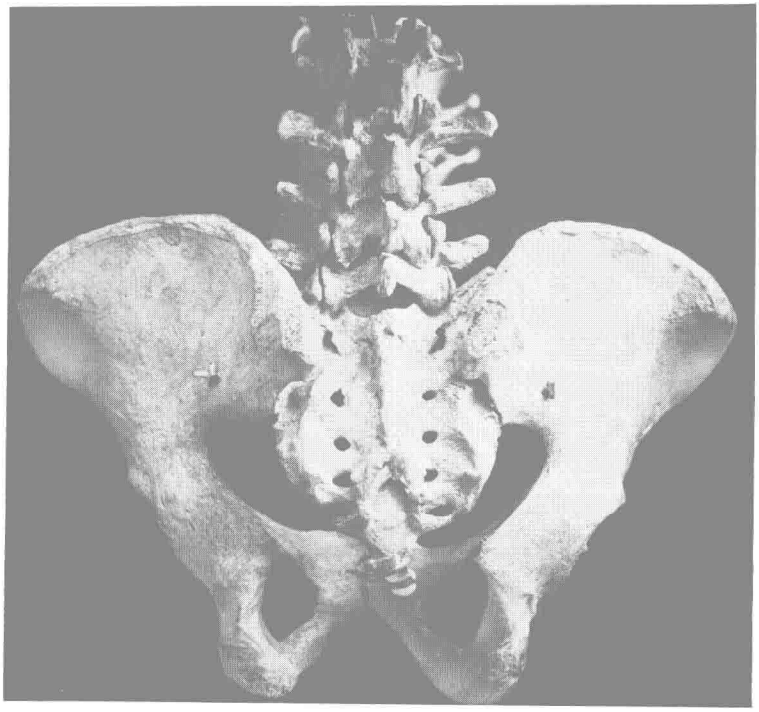

FIG. 3. (top) The pelvis from behind.

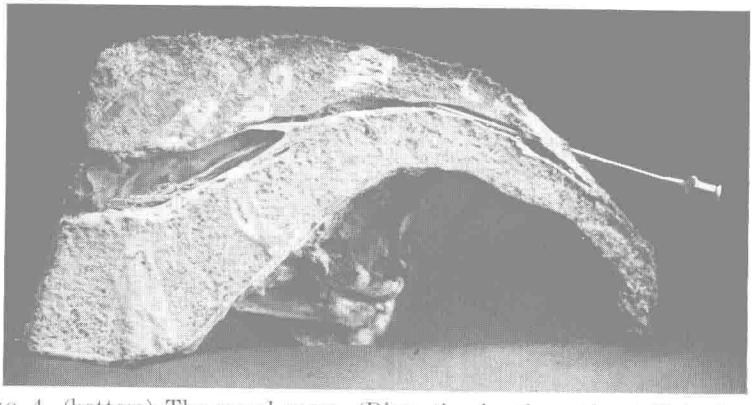

FIG. 4. (bottom) The sacral curve. (Dissection by the author.) Note the end of the dura. The needle lies in the *sacral*, not the spinal, canal.