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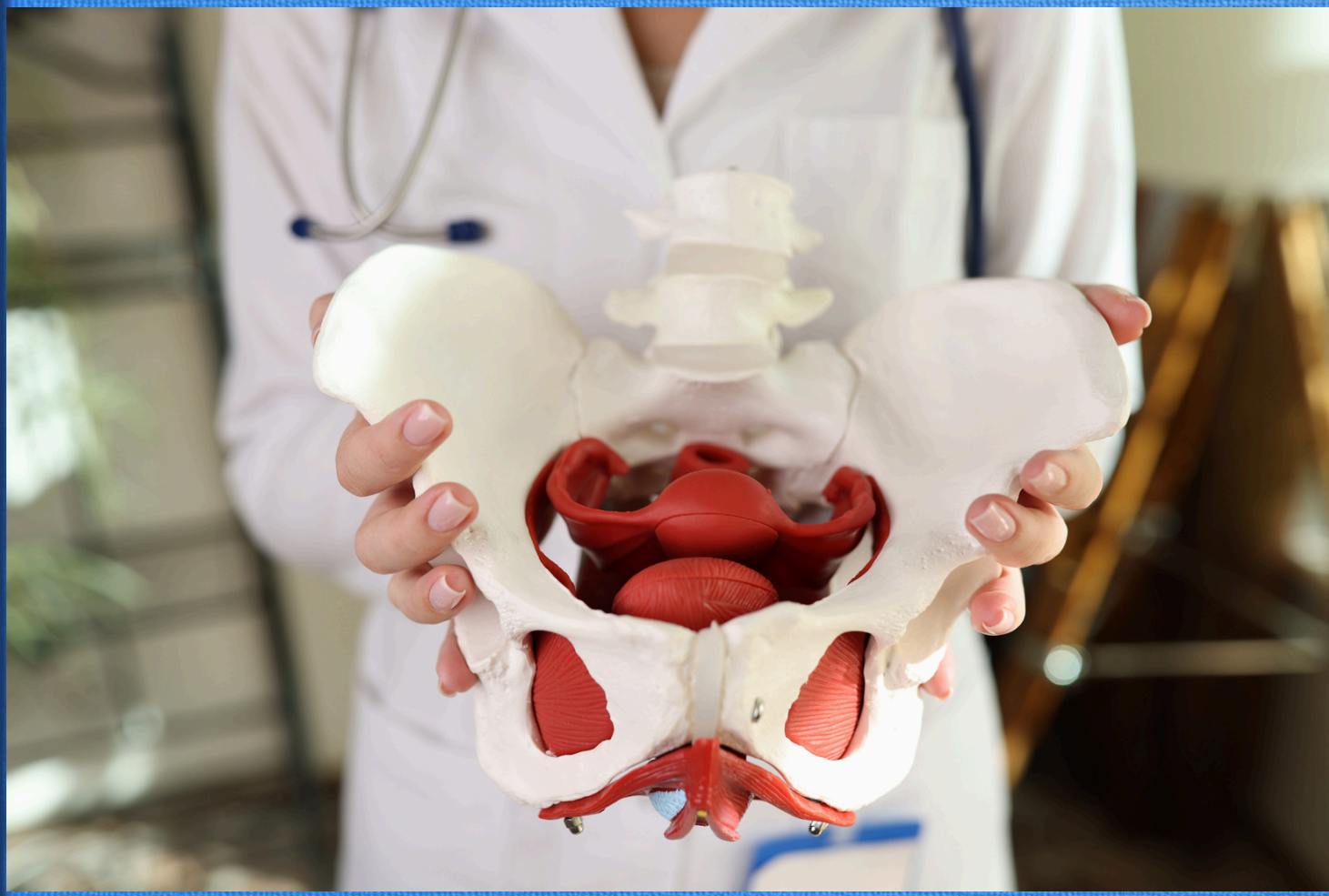
OPPORTUNITIES FOR ORGAN-PRESERVING RECONSTRUCTIVE SURGERY IN SEVERE FEMALE GENITAL PROLAPSE



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OPPORTUNITIES FOR ORGAN-PRESERVING RECONSTRUCTIVE SURGERY IN SEVERE FEMALE GENITAL PROLAPSE

MONOGRAPH

Compiled by

Kh. SH. Shavkatov

SAMARQAND – 2026

This monograph addresses severe female genital prolapse and the clinical potential of organ-preserving reconstructive surgery. The main focus is on selecting surgical tactics that provide not only anatomical correction but also functional recovery and better quality of life. The work presents a structured preoperative assessment model (symptoms, POP-Q staging, functional evaluation), criteria for choosing organ-preserving approaches, and principles of compartment-based surgical planning. Outcomes are assessed using an integrated framework that includes anatomical results, urinary/bowel/sexual function, patient-centered indicators, and complication profile at early, 6-month, and 1-year follow-up.

The monograph concludes that individualized organ-preserving reconstructive surgery is a clinically justified and effective strategy for severe female genital prolapse, with meaningful benefits for long-term stability and patient quality of life.

Opportunities for organ-preserving reconstructive surgery in severe female genital prolapse

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CHAPTER I. INTRODUCTION

1.1. § Relevance of the Problem and Its Socio-Medical Significance

Although the history of studying genital prolapse is long, the approach to this problem has changed substantially in recent decades: it is now interpreted not merely as an anatomical defect, but as a clinical syndrome closely linked to the patient's symptom burden, functional status, and quality of life. Therefore, in modern scientific literature, alongside anatomical stage, key outcome measures in prolapse assessment include urinary and bowel function, impact on sexual life, limitations in daily activity, and clinically perceived changes reported by the patient [ACOG, 2019; NICE NG123, 2019]. The development and ongoing revision of international recommendations (including the 2021 surveillance conclusions) indicate that POP is a broadly and deeply studied problem. However, this same process leaves open an unresolved practical and scientific issue: individualization of clinical decision-making—namely, selecting "the right method for the right patient" [NICE Surveillance, 2021; Maher et al., 2023].

One of the most important achievements in the degree of problem investigation is the unification of terminology and reporting standards. Joint IUGA/ICS documents recommended expressing POP and overall pelvic floor dysfunction using standardized terms; this significantly improved comparability of results across centers and countries [Haylen et al., 2010; Haylen et al., 2016]. Whereas "success" was previously assessed mainly by anatomical correction alone, outcome reporting now necessarily includes patient-perceived clinical improvement, symptom relief, and quality-of-life change. At the same time, due to differences in outcome definitions, follow-up duration, and study designs, evidence remains heterogeneous—especially in severe stages—and does not yet demonstrate with uniform rigor which reconstructive method is superior for which phenotype [Maher et al., 2023].

Major clinical guidelines present POP management algorithms in a sufficiently systematic manner. The ACOG Practice Bulletin (2019) comprehensively covers diagnostics, risk factors, conservative management, and surgical options [ACOG,

2019]. NICE NG123 (2019) provides an integrated practical pathway for urinary incontinence and POP; the 2021 exceptional surveillance showed that despite evidence review, the guideline structure was not fundamentally revised [NICE NG123, 2019; NICE Surveillance, 2021]. Thus, the issue is not that "the problem is insufficiently studied"; rather, core concepts and algorithms are established, but standardization of phenotype-adapted surgical choice in real clinical settings remains insufficient. In other words, many guideline-level questions have been answered, while individualized decision-making at the practice level remains under active scientific discussion [Maher et al., 2023; Cochrane, 2023].

The evidence base for surgery is also extensive. Cochrane's 2023 updated systematic reviews broadly synthesized RCT sources covering apical vaginal prolapse surgery and multiple comparative topics in POP surgery [Maher et al., 2023]. This confirms a high volume of scientific work in the field. However, the strength of evidence is not uniform for every point: reliability is high for some outcomes, while for others, strict universal conclusions are limited by variation in outcome definitions, technical details, and follow-up. Therefore, automatically applying a generalized claim such as "the best operation" to every clinical case is methodologically incorrect. Especially in severe prolapse (working definition: POP-Q stage III–IV), choice should be based not only on anatomical correction, but on integrated assessment of complication profile, recurrence risk, probability of reintervention, patient preferences, and long-term functional outcomes [NICE NG123, 2019; NICE Surveillance, 2021; Cochrane, 2023].

A critical analysis of literature on severe POP reveals another important pattern: although the number of studies is large, the most clinically important issue—long-term durability—has not been explored with equal depth in all studies. Short-term anatomical improvement (e.g., at 6–12 months) is reported frequently, but clinically meaningful outcomes at 24–36 months and beyond—such as symptom recurrence, functional dissatisfaction, need for retreatment, or reoperation—are not reported with uniform standards across all studies. Therefore, alongside the conclusion that "the field is sufficiently studied," it is scientifically correct and balanced to conclude

that there remains a need to evaluate long-term outcomes using standardized protocols [Maher et al., 2023; NICE Surveillance, 2021].

Another major direction influencing the degree of topic development is the evolution of safety debates and regulatory approaches related to mesh. These shifts have moved safety profile assessment, informed consent, shared decision-making, and individualized risk–benefit analysis to the center of POP surgery. As a result, scientific discussion has shifted from "which technique is faster/easier" to the clinically meaningful question: "which technique provides a better risk–benefit balance for which phenotype" [NICE NG123, 2019; NICE Surveillance, 2021; ACOG, 2019]. This does not negate that POP is well studied overall; rather, it indicates a high need for individualized strategies in practice.

Conservative treatment options are also sufficiently covered in scientific sources. In particular, the AUGS clinical consensus statement on pessary use describes practical effectiveness and safety in appropriately selected patients [AUGS, 2023]. However, it should also be noted that this source is primarily consensus-based, meaning not all points are supported by equally strong RCT-level evidence. Especially in symptomatic POP-Q stage III–IV cases, conservative methods may not always ensure long-term functional stability or may not be accepted as a definitive solution based on patient preference. This increases the relevance of studying uterus-preserving reconstructive surgery: the issue is not "conservative versus surgery," but "which method, at which stage, in which clinical setting" [NICE NG123, 2019; AUGS, 2023].

The epidemiological picture has also been widely studied. Recent systematic analyses show that POP prevalence varies substantially by country, age, population characteristics, and assessment methodology (symptom-based questionnaire approach versus anatomical clinical examination approach) [Hadizadeh-Talasaz et al., 2024]. This yields an important methodological conclusion for practice: despite abundant global data, it is incorrect to use one universal numeric model for local decision-making. Therefore, even when the degree of investigation is considered high, the need remains to evaluate reconstructive surgery outcomes in severe POP

using standardized and clinically meaningful outcome criteria [NICE Surveillance, 2021; Maher et al., 2023].

From a pathophysiological perspective as well, POP is sufficiently well described: weakening of the ligament-fascial complex, neuromuscular dysfunction, childbirth-related injury, age, menopause, and other factors are identified as key links in disease development [ACOG, 2019]. However, the clinical challenge is that these factors do not manifest in the same combinations or with the same severity in every patient; thus, POP is phenotypically heterogeneous. Therefore, evaluating outcomes not in an "average patient" but across phenotyped subgroups is becoming increasingly relevant. In interpreting outcomes of uterus-preserving reconstructive surgery in particular, it is scientifically and practically necessary to account for factors such as dominance of apical defect, concomitant compartment involvement, tissue quality, comorbidity, and the patient's functional priorities [Maher et al., 2023; Cochrane, 2023].

Significant progress is also observed in outcome assessment tools: validated quality-of-life questionnaires, symptom-based scales, and functional indicators are increasingly used. This approach helps identify the gap between anatomical "success" and patient satisfaction, and supports patient-centered clinical decision-making [NICE NG123, 2019]. At the same time, in severe POP specifically, there is still no full consensus in the literature on which functional indicators after uterus-preserving reconstructive surgery have the highest predictive value. Therefore, future studies should strengthen outcome integration through predefined, standardized protocols linked to long-term follow-up [Maher et al., 2023].

Thus, the overall scientific landscape can be assessed as follows: genital prolapse, including severe forms (POP-Q III–IV), is well studied in terms of diagnostics, terminology, and core management strategies; international guidelines, consensus statements, and systematic reviews are available; and comparative evidence on surgical options has been sufficiently accumulated [ACOG, 2019; NICE NG123, 2019; Haylen et al., 2016; Maher et al., 2023]. However, the most delicate practical issue—matching uterus-preserving reconstructive surgery to specific phenotypes,

evaluating long-term functional stability (at least 24–36 months) with uniform outcome criteria, and minimizing reintervention risk—remains an open scientific direction [NICE Surveillance, 2021; Cochrane, 2023].

For this reason, the topic “Studying the possibilities of uterus-preserving reconstructive surgery in severe female genital prolapse” is not a repetition of existing knowledge, but a logical continuation aimed at refining that knowledge to the level of clinical decision-making. In other words, identifying the boundary between what is well established (terminology, diagnostics, basic tactics) and where evidence remains heterogeneous (phenotype-specific selection, long-term integrated outcomes, prediction of reintervention) defines the core scientific significance of this research direction [ACOG, 2019; NICE NG123, 2019; NICE Surveillance, 2021; Haylen et al., 2016; Maher et al., 2023].

Genital prolapse (GP) is defined as a disorder of the normal physiological and anatomical position of the vagina or uterus, manifested by displacement of the genital organs toward the vaginal opening or their protrusion beyond it.

According to a number of authors, GP may be regarded as a pelvic hernia in the region of the vaginal introitus (Lisitsya V., 2015). In such cases, the hernia typically includes a hernial orifice, a hernial sac, and its contents, including internal genital organs, and often the urinary bladder, rectum, and loops of the small intestine [54].

Many researchers (Subak L. L., Waetjen L. E., Vanden Eeden et al., 2001) note that genital prolapse is widespread among women worldwide, both of reproductive age and in pre- and postmenopausal periods. For example, after age 50, nearly every second woman encounters this condition, and 11.1% of them require surgical treatment. According to the World Health Organization (WHO), by 2030, nearly 63 million women worldwide will suffer from genital prolapse, since by that time the elderly population is expected to double, which will further aggravate the problem of genital prolapse.

In recent years, an increase in pelvic organ prolapse has been recorded in the United States; accordingly, the number of women with this pathology is projected to rise from the current 3.3 million to 4.9 million by 2050, i.e., by more than 33% [150].

In the last century, significant changes occurred globally in the lives of women, families, and civilization. Women's lifestyles and social roles, as well as the nature of labor and everyday life, changed; physical activity declined, yet the problem of GP remains unresolved. Despite substantial progress in studying etiology and pathogenesis, identifying risk factors, and developing numerous correction methods, medical science has still not fundamentally solved the problem of GP nor reduced its prevalence to date [Radzinsky V. E., Durandin Yu. M., Gagaev Ch. G., 2006].

In modern society, there is a clear trend toward lower birth rates together with increased life expectancy [Radzinsky V. E., Durandin Yu. M., Gagaev Ch. G., 2006]. However, with increasing age, prolapse of the internal genital organs causes anatomical and functional disorders that lead to a significant decline in quality of life and social maladaptation (Glebova N. N. et al., 1997; Baisova E. I., 1999; Makarov O. V. et al., 2000; Shull B. L., 1999; Rappi N. K. et al., 2000; Furst A. et al., 2000). Although it does not directly threaten life, genital prolapse often leads to deterioration of psycho-emotional status, reduced sexual and reproductive function, and even disability.

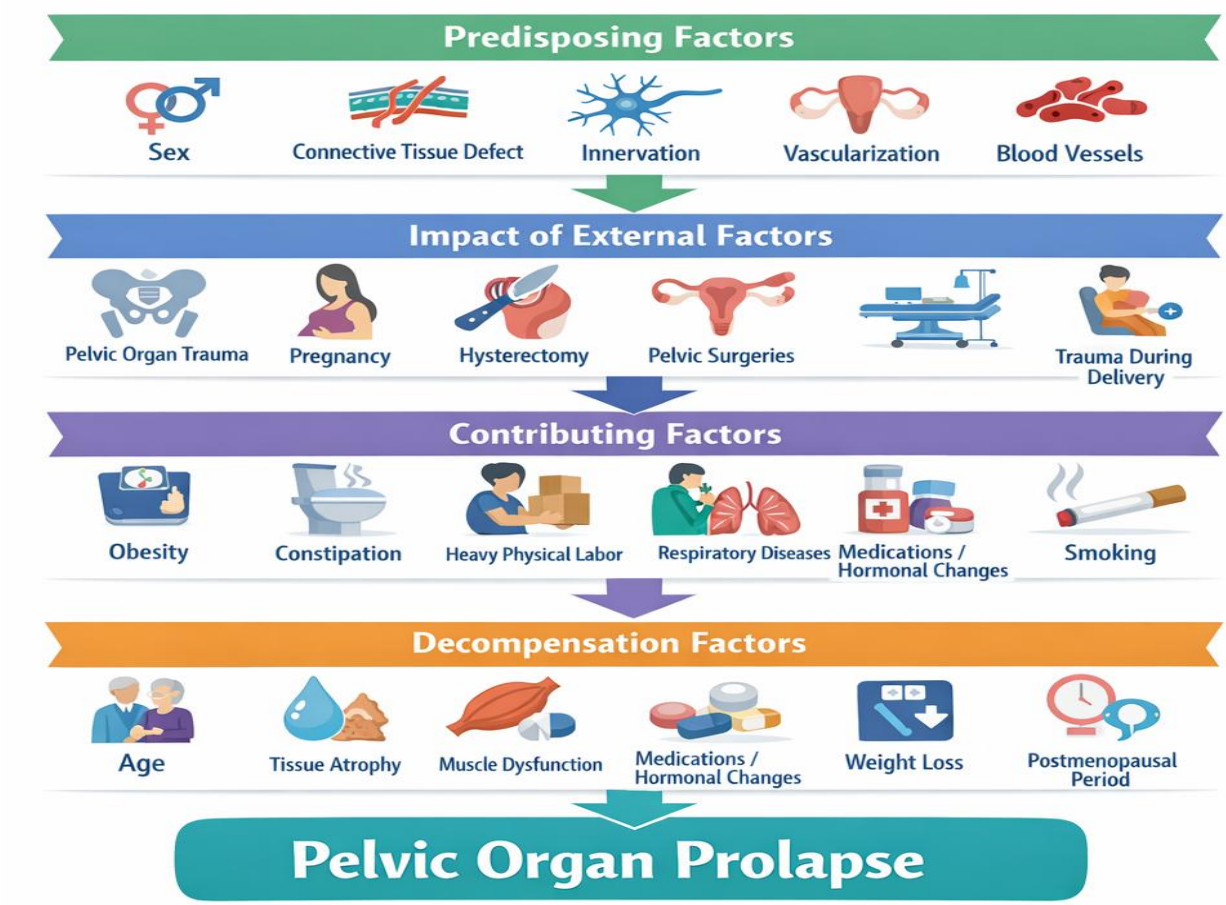
1.2. § Etiopathogenesis, Classification, and Modern Terminology of Genital Prolapse (POP-Q, IUGA/ICS)

Determining the true number of women with GP is very difficult, because statistical data generally consist only of gynecological visits and the frequency of surgical interventions for GP; therefore, there are no precise morbidity data. At the same time, there is a large proportion of patients who do not seek medical care at all or seek it very late; therefore, data in local and international literature on the prevalence of different stages and types of genital prolapse vary considerably.

According to many sources, risk factors for genital prolapse are divided into four groups:

1. **Predisposing** (genetic, racial);
2. **Initiating/primary** (pregnancy, childbirth, pelvic organ surgery, hysterectomy, injuries to pelvic floor muscles and nerves);

3. **Contributing/aggravating** (overweight, smoking, pulmonary diseases, constipation, heavy physical labor);
4. **Decompensating** (advanced age, postmenopausal period, myopathy, neuropathy, fatigue).



As women age, the frequency of genital prolapse increases. U.S. researchers report that approximately 1,004 patients aged 18–83 undergo medical examination each year, and the results show that the prevalence of genital prolapse has risen to about 40%.

Many classifications have been proposed to determine the degree of genital prolapse. For practical work, a classification based on the extent of downward displacement of the internal genital organs is convenient:

1. **Grade I** – the cervix descends to a point up to half the vaginal length.
2. **Grade II** – the cervix and/or vaginal walls descend to the level of the vaginal introitus.
3. **Grade III** – the cervix and/or vaginal walls descend beyond the vaginal introitus, while the uterine body remains above.

4. **Grade IV** – the entire uterus and/or vaginal walls are located outside the vaginal introitus, i.e., complete prolapse.

According to the classification of M. S. Malinovsky (1946), three degrees of internal genital prolapse were described; however, many researchers do not consider this classification objective.

In 2001, A. A. Popov proposed a modified classification of genital prolapse that took into account the involvement of adjacent organs—the bladder and rectum.

Currently, the two most commonly used systems are the **Baden–Walker classification** and the **Pelvic Organ Prolapse Quantification System (POP-Q)**.

In 1992, Baden and Walker proposed a semi-quantitative system to determine the distance between prolapsed organs and the hymen during physiological straining and to assess the degree of pelvic organ prolapse. The measurement unit is half the distance from the normally located organ to the hymen ("halfway system"):

1. **Grade I** – descent equals half the distance to the hymen.
2. **Grade II** – descent reaches the hymen.
3. **Grade III** – descent beyond the hymen up to half of the measured distance.
4. **Grade IV** – complete prolapse of the genital organ.

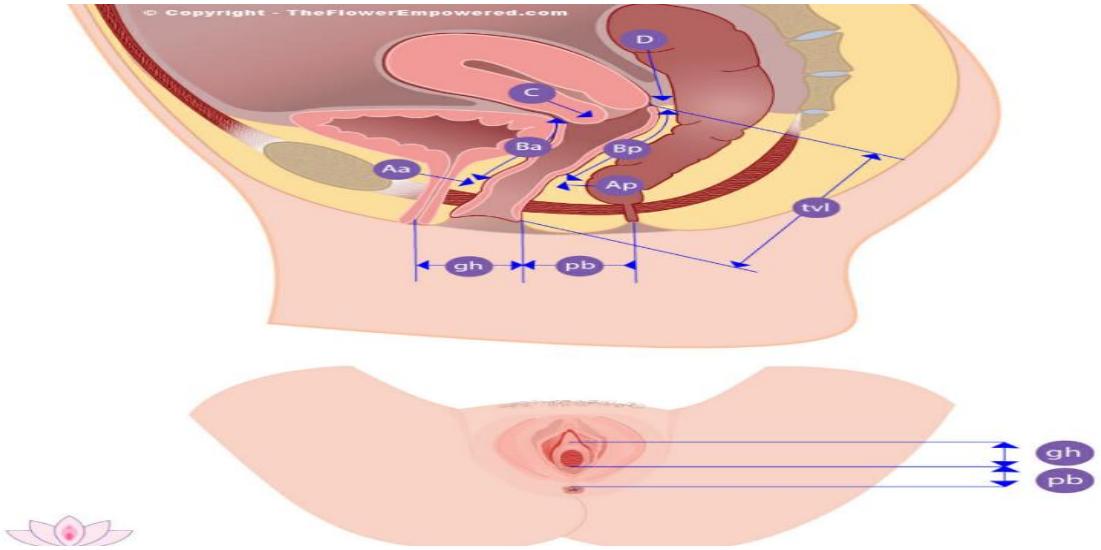
The International Urogynecological Association terminology standardization committee proposed the standardized **POP-Q** system based on quantitative measurements at nine points. During the Valsalva maneuver, when maximal changes are observed, the following points and parameters are recorded relative to the hymenal plane:

Aa – urethrovesical segment; **Ba** – anterior vaginal wall; **Ap** – lower rectal segment; **Bp** – posterior vaginal wall above levator level; **C** – cervix; **D** – posterior fornix; **TVL** – total vaginal length; **Gh** – genital hiatus; **Pb** – perineal body.

Accordingly, six anatomical points (Aa, Ba, Ap, Bp, C, D) are measured either above/proximal to the hymen (negative values in centimeters) or below/distal to the hymen (positive values in centimeters). The other three parameters (TVL, Gh, Pb) are measured directly. The prolapse stage is defined by the most descended part of

the vaginal wall. Usually, descent of the anterior wall (Ba), apical compartment (C), and posterior wall (Bp) is assessed.

Figure 1.1. Pelvic Organ Prolapse Quantification System (POP-Q)



Although the POP-Q classification may be somewhat difficult to use, it allows more precise assessment of pelvic organ prolapse severity before and after surgery, helps select the correct surgical strategy, and enables evaluation of treatment effectiveness in the postoperative period.

According to published sources, causes of genital prolapse include postpartum pelvic floor trauma, congenital connective tissue dysplasia, premenopausal and postmenopausal hormonal changes, and chronic diseases associated with metabolic and microcirculatory disorders.

Childbirth is one of the major risk factors for genital prolapse; therefore, increasing parity and postpartum injuries increase the probability of prolapse formation. However, one of the key roles in the development of this pathology is played by obstetric complications, including multiple deliveries, large fetus, prolonged labor, rapid or precipitous labor, breech delivery, vaginal and perineal trauma, use of obstetric forceps, and others. Some authors also note that prolongation of the second stage of labor contributes to the development of genital prolapse.

At present, the important role of connective tissue dysplasia in the development of genital prolapse has been proven. Since the middle of the last century, the theory of systemic connective tissue dysplasia has been developed. This theory helps explain

prolapse development in women with no childbirth history or with only one uncomplicated birth, as well as in women with normal hormonal background, no chronic disease, and no increased intra-abdominal pressure.

According to this theory, collagen and elastin play the central role in connective tissue formation, helping maintain tissue structure and ensuring contraction and relaxation. Combinations of mutations in genes responsible for fiber synthesis lead to abnormal organization of collagen and elastin chains, resulting in improper tissue structure that cannot tolerate necessary functional mechanical loads. Buyanova S. N. and co-authors identified links between genital prolapse and several extragenital disorders, including varicose veins, kyphoscoliosis, flat feet, habitual dislocations, hernias of various locations, and visceral ptosis. In patients with connective tissue dysplasia, atypical spatial organization of type I and II collagen with replacement by type IV collagen has been observed. This causes serious defects in ligament and fascial structure, decreases their mechanical strength, and leads to functional insufficiency of the pelvic floor. In addition, increased levels of hydroxyproline derivatives have been detected, indicating accelerated biological collagen degradation.

Data on the prevalence of connective tissue dysplasia are inconsistent, which is related to differences in classification and diagnostic approaches.

For diagnosis of connective tissue dysplasia, comprehensive examination is required, including clinical-genealogical evaluation, as well as biochemical and molecular genetic diagnostic methods.

Another risk factor is hormonal status, which has a significant negative impact on the pelvic floor. Estrogen deficiency contributes to worsening of genital prolapse, since perineal tissues contain numerous estrogen and progesterone receptors. Hypoestrogenism causes deterioration of blood supply to pelvic organs and tissues, promotes development of vaginal atrophic changes, and contributes to the formation and progression of genital prolapse.

Thus, in premenopausal and postmenopausal periods, disruption of pelvic floor tissue tone, strength, and elasticity explains the high prevalence of this disease

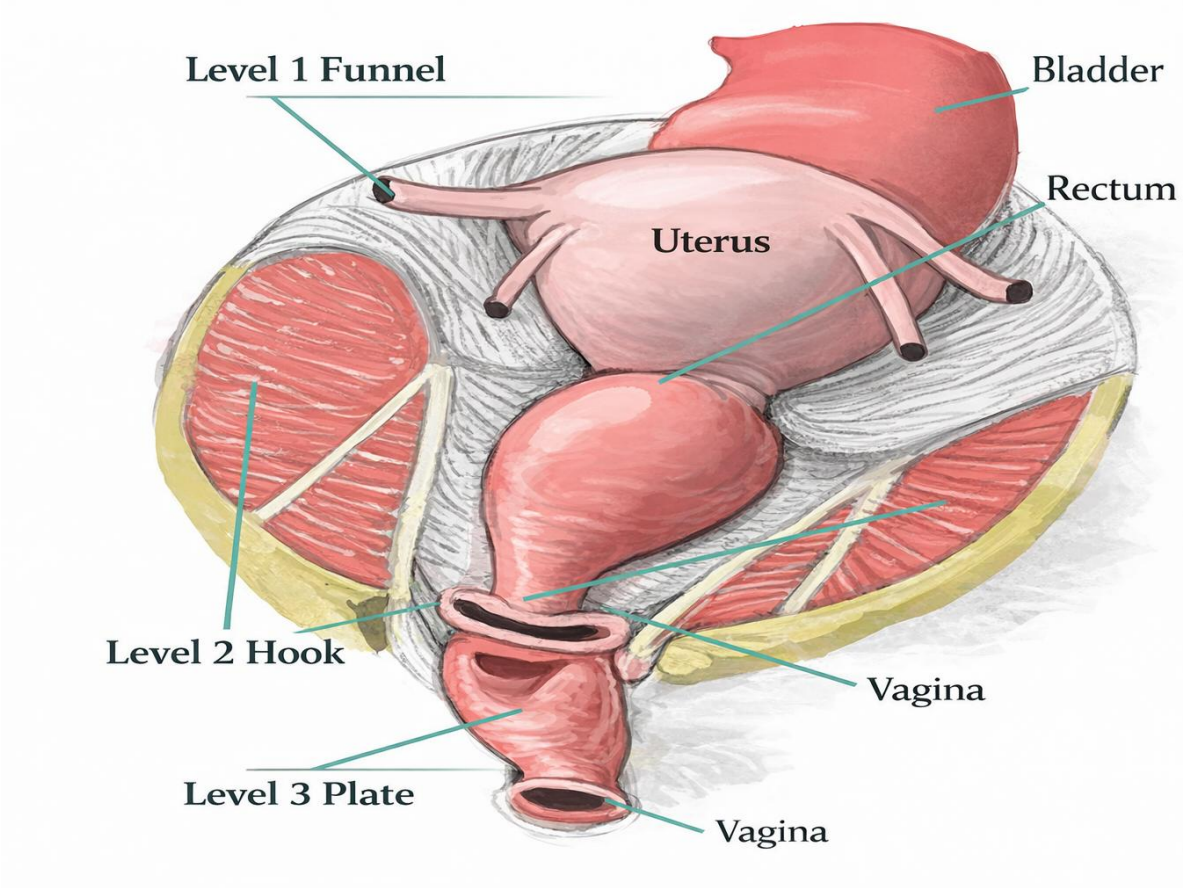
among older and elderly women. According to K. M. Luber and colleagues (2001), the annual increase in prolapse incidence is 0.17% in women aged 30–39 and 1.86% in women aged 70–79, meaning genital prolapse occurs about ten times more often in elderly women than in women of reproductive age.

Another important cause contributing to the development of genital prolapse is chronic pulmonary and intestinal disease. Frequent coughing and constipation increase intra-abdominal pressure, which leads to stretching of the musculo-fascial structures that normally maintain the physiological position of the internal genital organs in the pelvis.

Chronic diseases associated with impaired microcirculation and metabolic processes, such as diabetes mellitus and obesity, also contribute to the development of prolapse of the internal genital organs. In diabetes mellitus, hyperglycemia leads to microangiopathy of blood vessels, which reduces delivery of nutrients and oxygen to tissues; hypoxia, in turn, promotes destructive changes in organs and tissues. Obesity causes metabolic disturbances that may result in pelvic muscle insufficiency. In addition, obesity increases intra-abdominal pressure, which negatively affects the pelvic floor muscles and fascia and predisposes to the formation of genital prolapse.

In healthy women, in the upright position and with the bladder and rectum emptied, the uterus is located in the center of the small pelvis at the level of the symphysis (Figure 1.2). The uterine fundus does not extend beyond the plane of the pelvic inlet; the external cervical os is located in the plane connecting the ischial spines. The uterus is slightly tilted forward, with the fundus directed toward the anterior abdominal wall (**anteversio**), and forms an obtuse angle between the cervix and the uterine body (**anteflexio**). The vagina is located within the pelvic cavity and is directed upward, posteriorly, and anteriorly toward the posterior aspect of the cervix. The uterine adnexa are identified slightly posterior and lateral to the uterus. The base of the bladder is attached to the anterior uterine wall and the anterior part of the cervix; the urethra is attached to the anterior vaginal wall at its middle and lower thirds. The rectum is located posterior to the vagina and is connected to it by soft

tissue. On the upper posterior vaginal wall lies the posterior fornix, which is covered by peritoneum and forms the rectouterine pouch.



The normal position of the female genital organs is maintained by the following factors:

a) intrinsic tone of the genital organs,

b) coordinated interaction between diaphragmatic movement and internal organs,

c) the uterine ligamentous apparatus (suspensory, fixation, and supporting components).

The intrinsic tone of the genital organs depends on proper functioning of all body systems. Decreased tone develops due to reduced sex hormone levels, disorders of nervous system function, and age-related changes.

The **suspensory ligamentous apparatus** of the uterus includes the round and broad ligaments, as well as the suspensory and proper ovarian ligaments. These ligaments help centralize the uterus and maintain its normal physiological forward inclination.

The **fixation ligamentous apparatus** includes the uterosacral, cardinal, vesicouterine, and pubouterine ligaments. Its function is to maintain the uterus in a stable central position and prevent displacement.

The **supporting apparatus** of the uterus consists mainly of the pelvic floor muscles (lower, middle, and upper layers), dense connective tissue in the lateral vaginal walls, and the rectovaginal and vesicovaginal septa.

The **lower layer** of pelvic floor muscles includes:

- *m. sphincter ani externus*
- *m. bulbocavernosus*
- *m. ischiocavernosus*
- *m. transversus perinei superficialis*

The **middle layer** includes:

- *diaphragma urogenitale*
- external urethral sphincter
- *m. transversus perinei profundus*

The **upper layer** is formed by a paired **m. levator ani** muscle group.

Among multiple theories of pelvic organ prolapse pathogenesis, one of the most widely accepted by researchers is the **Integral Theory**, associated with P. Petros and U. Ulmsten. According to this theory, normal physiological function of the small pelvis and preservation of its anatomy are achieved through balanced action of three multidirectional forces in the pelvic region:

- anterior vector forces generated by anterior components of *m. levator ani*,
- posterior vector forces generated by posterior components of *m. levator ani*,
- and downward forces generated by *m. longitudinalis*.

Partial or complete disruption of connections between pelvic organs and supporting structures (muscles, ligaments, bones, fascia) leads to pelvic floor failure; when intra-abdominal pressure rises, this results in prolapse of the vaginal walls and/or uterus.

The pelvic support system can be conditionally divided into **three levels**:

1. **Level I** – funnel-like support that suspends the uterus and vagina;

2. **Level II** – hammock-like support responsible for the rectum, urethra, bladder, and vaginal walls;
3. **Level III** – "dish-like" muscular platform on which the pelvic organs rest.

Depending on the level at which damage occurs, different clinical-anatomical forms of prolapse develop (Table 1).

Level	Supporting structure	Clinical-anatomical manifestations
1	Cardinal ligament and uterosacral ligament	Uterine descent and descent of the proximal 1/3 of the vagina; enterocele; post-hysterectomy vaginal vault prolapse
2	Perivesical and periurethral fascia, *lig. pelviovesicale*, *lig. pelviourethrale*; rectovaginal septum; perirectal fascia; tendinous arch of the pelvic fascia	Cystocele, urethrocele, urethral hypermobility, urinary incontinence, rectocele, enterocele, paravaginal defect
3	Pelvic floor muscles and urogenital diaphragm, perineal tendon center (perineal body)	Pelvic floor muscle insufficiency, perineal hernia, urinary incontinence, gaping genital hiatus

Thus, genital prolapse develops as a result of polyetiologic anatomical and functional insufficiency of the pelvic floor.

In 1996, **J. DeLancey** proposed a level-based concept of pelvic organ support structures.

- **Level I** includes the uterosacral and cardinal ligaments, which support the vaginal apex and uterus and provide apical fixation. Damage at this level leads to descent of the vaginal apex.
- **Level II** is represented by the pubocervical and rectovaginal fascia (Halban and Denonvilliers fasciae) and the tendinous arch of the pelvis, supporting the middle third of the vagina. Injury at this level contributes to cystocele and rectocele.

- **Level III** includes the pubourethral ligaments and endopelvic fascia, which support the distal vagina and lower urinary tract. Dysfunction of these structures contributes to urethrocele formation.

Given the specific anatomy of the small pelvis, its blood supply and innervation, and the close inter-organ relationships, changes in pelvic constitution and topographic-anatomical defects over time lead not only to disorders of the internal genital organs and neighboring pelvic/abdominal organs, but also to broader anatomical and functional disturbances in the whole body.

According to many researchers, recurrence of genital prolapse depends on several factors:

- patient age,
- characteristics of obstetric-gynecologic and somatic history,
- topographic-anatomical features of prolapse,
- correctness of the selected surgical technique.

Therefore, each case of genital prolapse requires a differentiated, individualized approach. Reported recurrence rates range from 30% to 40%. Clinical practice shows that recurrent signs often appear within the first 3 years after surgery. Some authors report recurrence rates from 33% to 61.3%, while others report rates up to 70%.

In Uzbekistan, as in many countries over many years, the main radical gynecologic surgical option has been hysterectomy performed through abdominal, vaginal, laparoscopic, or combined approaches. According to published data, in primary prolapse, recurrence after abdominal hysterectomy is around 5%, and after transvaginal hysterectomy it increases to approximately 12%.

Vaginal vault prolapse, often combined with urinary, anorectal, and sexual dysfunction, has a significant negative effect on patients' quality of life.

Clinical manifestations of genital prolapse are diverse and may reflect not only direct anatomical defects of the pelvic organs but also associated bladder and bowel pathology. The most common complaint is a sensation of a foreign body in the vagina. Detailed evaluation of complaints demonstrates broad symptom

variability. Symptoms usually develop gradually; however, once disease severity reaches stages II–IV, quality of life decreases markedly.

Pelvic organ prolapse is associated not only with descent of the vagina and uterus, but also with displacement and dysfunction of adjacent organs (bladder, urethra, rectum), resulting in anatomical and functional impairment. For example, Popov reported functional disorders of adjacent organs in a high proportion of patients with pelvic prolapse. Therefore, this pathology remains a focus not only for gynecologists but also for urologists and proctologists.

Clinical manifestations related to genital prolapse can be grouped as follows:

1) Pelvic symptoms

- pronounced discomfort,
- sensation of a foreign body in or beyond the vagina,
- discomfort during walking,
- unpleasant and sometimes painful sensations.

2) Urinary symptoms

- urinary incontinence is reported with widely varying frequency,
- other lower urinary tract symptoms may coexist depending on prolapse type and severity.

3) Gastrointestinal symptoms

- constipation is common,
- difficulty retaining gas or stool,
- sensation of incomplete bowel emptying.

4) Sexual dysfunction

- reduced satisfaction with sexual life among sexually active women,
- pain during intercourse,
- decreased sexual desire.

Sexual discomfort is often associated with anatomical distortion and/or emotional distress, and may be aggravated by concurrent urinary or bowel symptoms.

Selecting an optimal treatment strategy requires timely and accurate diagnosis, including precise staging and assessment of clinical manifestations. This remains an important task not only for gynecologists but also for related specialists, particularly urologists and colorectal specialists.

In world practice, evaluation of patients with pelvic organ prolapse includes:

- collection of complaints and history,
- general clinical examination,
- gynecological examination (assessment of vaginal wall and uterine prolapse degree, perineal status),
- rectal examination (assessment of posterior vaginal wall prolapse, rectocele size, anal sphincter condition),
- laboratory tests,
- pelvic ultrasound,
- and, when indicated, combined urodynamic, radiologic, hysteroscopic, and cystoscopic investigations.

1.3. § Diagnostic Approaches and Clinical Assessment of Severe Stages

In clinical practice, the diagnosis of severe genital prolapse is often oversimplified to: “it is visible on examination, therefore the diagnosis is made.” A modern evidence-based approach does not allow this. In the current clinical concept, diagnosis is built in three tiers: the first tier is to determine symptoms and the true severity of patient burden; the second tier is to express the anatomical topography of prolapse numerically within a standardized system (POP-Q); the third tier is to evaluate functional disorders, comorbid conditions, and operative risk, and then produce an integrated conclusion for clinical decision-making [ACOG, 2019; NICE, 2019; Haylen et al., 2016].

In severe stages (III–IV), the purpose of clinical assessment is not merely to confirm the presence of prolapse, but to determine which compartment is dominant, to what extent apical support is compromised, which mechanisms underlie the symptoms, and which operative approach is likely to provide functional benefit for a specific patient. One of the most common errors at this point is assuming that a high anatomical stage automatically means “the same operation for everyone.” In fact, the same stage III–IV is not clinically uniform: in one patient, voiding dysfunction predominates; in another, defecatory dysfunction; in a third, the main complaint is deterioration in sexual quality of life. Therefore, assessment in severe prolapse must always include the triad of “anatomical + functional + patient goals” [AUGS Best Practice, 2017; NICE Surveillance, 2021].

The first and most important diagnostic step is a structured history. Symptoms such as a vaginal “bulge” sensation, worsening over the day, aggravation with prolonged standing, and the need for manual reduction indicate the clinical significance of prolapse. At the same time, urinary symptoms (urgency, frequency, stress or mixed incontinence, incomplete bladder emptying), bowel symptoms (difficult defecation, incomplete emptying, splinting), sexual discomfort, and limitations in daily activities should be documented without fail. These data are needed not only for diagnosis, but also to predict surgical scope and expected outcomes [ACOG, 2019; Raju et al., 2021].

Listing risk factors in the history is not a formal exercise; it is used to identify the clinical phenotype. The number of vaginal deliveries, instrumental delivery, macrosomia, menopause, chronic cough, constipation, obesity, previous pelvic surgery, and heavy physical workload are important not only for prolapse pathogenesis, but also for the postoperative recurrence profile. In severe disease, the combination of these factors modulates clinical decisions: for example, in a patient with underlying connective tissue weakness, a result described as “anatomical correction achieved” may not remain stable long-term [NICE, 2019; National Clinical Guideline, Ireland, 2023].

Standardization during physical examination is crucial for outcome quality. Examination may be performed in the lithotomy position with maximal Valsalva or cough provocation, and, if necessary, repeated in the standing position. Bladder status, examination conditions, mucosal trophic state, presence of erosion/ulceration, condition of the perineal body, and levator muscle function should be documented. In severe prolapse, mucosal trauma or decubital changes may alter both preoperative preparation and the timing of surgery [AUGS Best Practice, 2017; NICE, 2019].

The POP-Q system remains the “gold standard” for assessing severe stages. Its strength lies in converting subjective description into numerical coordinates. The parameters Aa, Ba, C, D, Ap, Bp, gh, pb, and tvl are useful not only for staging but also for identifying which compartment should be targeted. In stage III–IV disease,

correct assessment of the apical component is especially important, because failure to address apical support may lead to early repeat consultations [Haylen et al., 2016; Haylen et al., 2010].

Table 1. Minimum Mandatory Components of Diagnostic Assessment in Severe POP

Assessment block	What is determined	Why it matters
Structured history	Dominant symptoms (bulge, voiding dysfunction, defecatory dysfunction, sexual discomfort)	Links treatment indication to symptom severity
POP-Q physical examination	Compartments and stage (III–IV), apical involvement	Provides the anatomical basis for selecting surgical strategy
Urinary function	PVR, signs of UTI, incontinence phenotype	Defines the need for additional testing and a parallel management strategy
Bowel function	Signs of obstructed defecation	Guides planning of the extent of posterior compartment repair
Quality-of-life questionnaires	PFDI-20, PFIQ-7 (and PISQ when indicated)	Assesses outcomes using patient-centered measures
Risk profile	Comorbidities, prior surgery, tissue quality	Enables preoperative estimation of complication/recurrence risk

(Table framework based on ACOG, NICE, and IUGA/ICS consensus documents) [ACOG, 2019; NICE, 2019; Haylen et al., 2016].

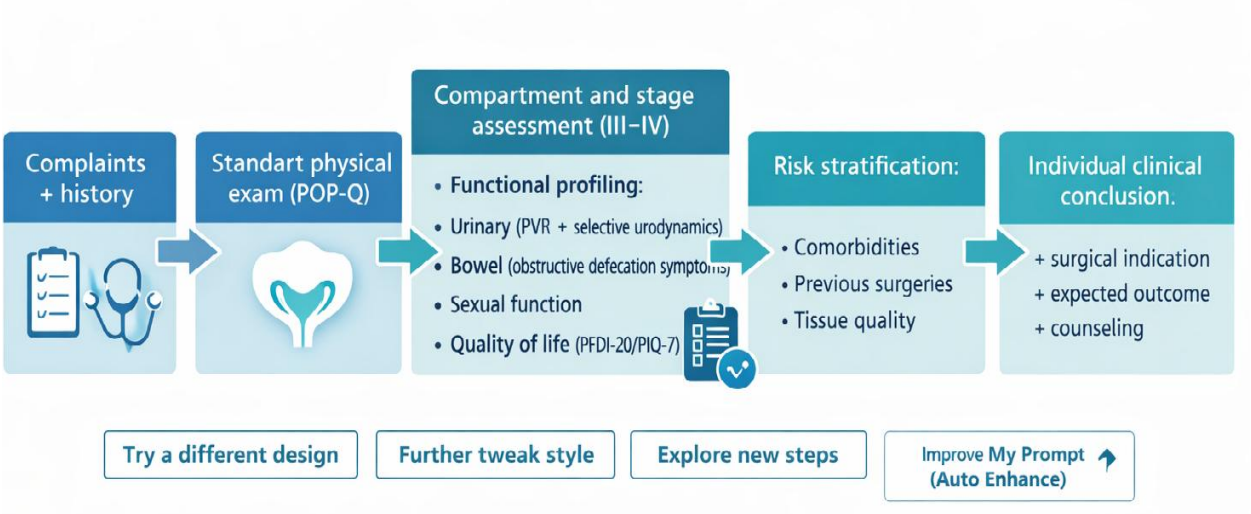
Assessment of the urinary system is a distinct domain in severe prolapse. If a patient reports incomplete bladder emptying, intermittent urinary stream, or recurrent UTI, post-void residual (PVR) should be measured. Routine invasive testing is not required for all patients; however, selective urodynamics may be considered in complex phenotypes. This selective approach avoids unnecessary investigations and links clinical decision-making to a specific question: what is the primary driver of symptoms in this patient? [NICE, 2019; IOG Guideline, 2023].

Symptoms of obstructed defecation are often underestimated in severe prolapse. In fact, in patients with a posterior compartment component, defecatory dysfunction

may be one of the most important determinants of postoperative satisfaction. Therefore, targeted bowel-related history taking should be included and, when indicated, coloproctology consultation or additional testing should be considered. This approach reduces the common error of assuming that "if anatomy is corrected, the problem is solved" [AUGS Clinical Guidance, 2018/2022].

Evaluation of sexual function is a sensitive but central component of clinical assessment in severe prolapse. In many cases, this block is insufficiently documented, which leads to misinterpretation of subjective postoperative satisfaction. If dyspareunia risk, sensation of vaginal narrowing, dryness, and psychosexual discomfort are not discussed in advance, clinical outcomes may remain unsatisfactory despite anatomical "success." For this reason, counseling and expectation management are specifically emphasized in guidelines [ACOG, 2019; AUGS Best Practice, 2017].

Quality-of-life instruments are not an optional endpoint of the diagnostic process; they are a core element of it. PFDI-20 and PFIQ-7 convert baseline symptom burden into quantitative data, and in follow-up they help determine the true clinical value of treatment. Without these tools, outcome assessment in severe prolapse often remains subjective and clinician-centered. This is precisely why modern guidelines require that outcomes not be limited to anatomical endpoints alone [NICE, 2021; ACOG, 2019].



Additional imaging (ultrasound, MRI, defecography, cystoscopy) is not a "mandatory package for everyone" in severe prolapse. These modalities are used in complex or unclear cases for differential diagnosis, reoperation planning, or detection of coexisting pathology. When the clinical problem is clear, physical examination and standard functional assessment are often sufficient. Excessive instrumental testing may increase time and resource use without adding meaningful diagnostic value [Raju et al., 2021; NICE, 2019].

The greatest practical value of clinical assessment in severe prolapse is reducing errors in procedure selection. If the dominant problem is not clearly phenotyped—for example, if the apical component is insufficiently assessed or functional complaints are not documented—patient satisfaction may remain low even after a technically correct operation. Cochrane syntheses highlight exactly this point: when interpreting differences between surgical options, the choice of endpoint is critically important [Maher et al., 2023].

Table 2. Common Diagnostic Errors in Severe POP and Their Consequences

Diagnostic error	Probable consequence	Prevention strategy
Incomplete POP-Q documentation	Misclassification of compartment involvement, non-optimal surgery	Use a standardized POP-Q protocol and complete recording
Failure to document symptom burden	"Anatomically good, clinically poor" outcome	Mandatory inclusion of PFDI-20/PFIQ-7
Superficial urinary assessment	Persistent postoperative voiding problems	PVR measurement and symptom-directed testing
Neglect of defecation domain	Dissatisfaction, persistent posterior compartment complaints	Targeted anorectal history + selective specialist consultation
Inadequate counseling	Unrealistic expectations, low satisfaction	Shared decision-making and clear risk communication

(Clinical error patterns summarized from guideline and review logic) [NICE, 2021; ACOG, 2019; Maher et al., 2023].

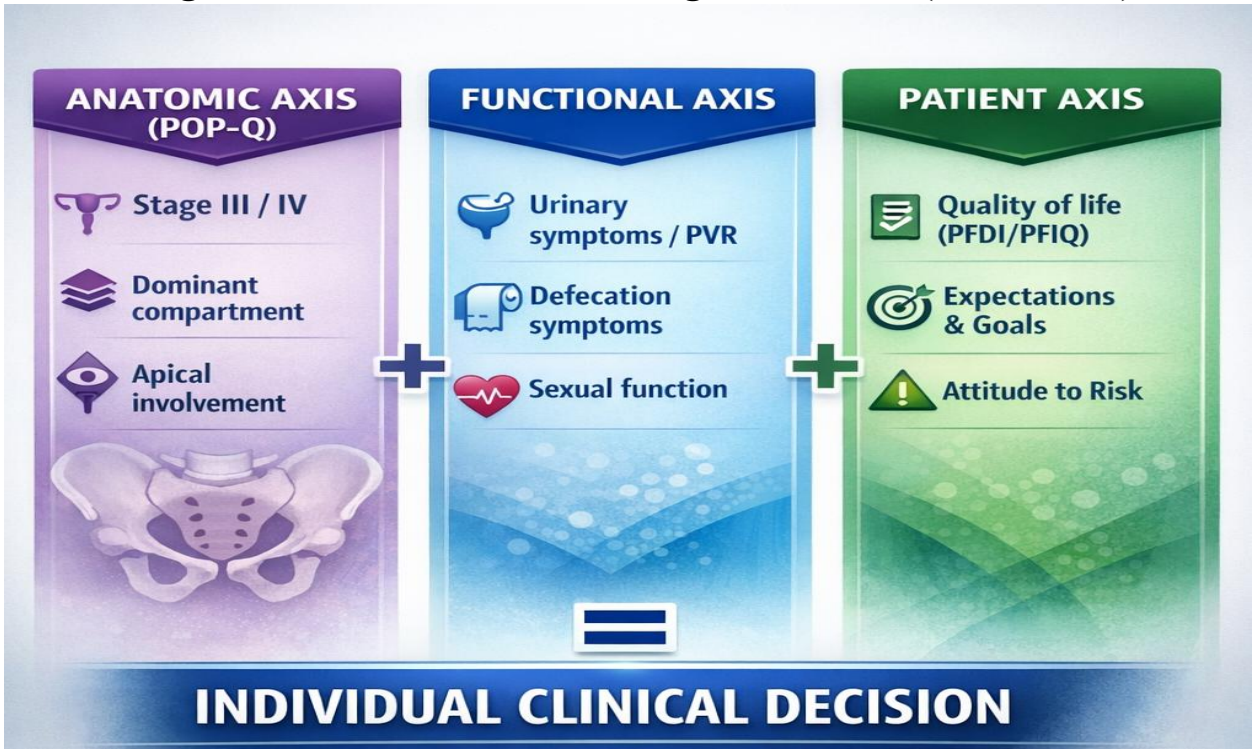
In complex cases, the role of multidisciplinary assessment increases. Involvement of a urogynecologist, gynecologist, urologist, colorectal specialist, and, when

needed, a physiotherapist, makes clinical conclusions more robust. This is particularly relevant for recurrent prolapse, patients with prior surgical history, and combined voiding-defecatory symptom phenotypes; in such settings, this approach helps reduce operative risk and improve follow-up quality [AUGS Clinical Guidance repository, 2025 listing; NICE, 2021].

During diagnostics, counseling should be viewed not as a final formal conversation but as an integral component of clinical assessment. Expected outcomes, possible complications, recurrence risk, postoperative recovery timeline, and realistic quality-of-life prognosis should be discussed in advance. This makes informed consent more meaningful and also improves the interpretation of satisfaction indicators during follow-up [ACOG, 2019; NICE, 2019].

A prognostic approach is also necessary in severe-stage assessment: which patient has higher recurrence risk, who is likely to show functional benefit sooner, and who may require additional rehabilitation. The literature does not support a "one factor—one outcome" model; instead, a combined risk profile (tissue quality, comorbidity burden, previous surgery, and lifestyle factors) is of primary importance [NICE, 2021; Cochrane, 2023].

Diagram 2. Clinico-Functional Integration Model (Severe POP)



(Integration principle synthesized from guideline consensuses and review literature) [ACOG, 2019; NICE, 2021; Haylen et al., 2016].

In conclusion, the diagnosis of severe genital prolapse today rests on three core requirements: first, standardized anatomical assessment (POP-Q); second, mandatory functional profiling (urinary, bowel, sexual, and quality-of-life domains); and third, clinical integration that incorporates individual risk context and patient goals. This approach improves the precision of surgical selection, reduces the "anatomical success but clinical dissatisfaction" paradox, and helps stabilize long-term outcomes [Maher et al., 2023; ACOG, 2019; NICE, 2019/2021].

1.4. § Surgical procedures used in the treatment of genital organ prolapse

When the first signs of prolapse appear, conservative treatment is usually recommended first: special pelvic floor muscle exercises and training with dedicated devices. The most widely known program is the training complex proposed by American obstetrician-gynecologist Arnold Kegel (1952). Today, pelvic floor muscle training is firmly included not only in treatment protocols for stage I–II prolapse and postpartum rehabilitation, but is also used during pregnancy.

In 1985, S. Plevnik recommended the use of vaginal cones as an effective method for pelvic floor muscle training. Similar devices had been used long before in various forms. For many years, the effectiveness of conservative modalities was debated; later systematic evidence supported that vaginal cone training can effectively strengthen pelvic floor muscles and improve urinary symptoms, including stress urinary incontinence.

At present, additional minimally invasive options for early prolapse correction include methods such as biorevitalization and platelet-based local therapies; laser technologies have also gained attention as alternatives for selected stage I–II prolapse cases and for postmenopausal or postpartum vaginal mucosal atrophy.

For moderate and severe prolapse, however, surgery remains the most effective correction method.

At the same time, surgery is not always feasible due to individual patient factors, refusal of surgery, or severe comorbid somatic disease. If surgery is contraindicated, pessaries of different shapes and sizes (usually latex or silicone) may be used.

Pessary therapy is an accepted conservative approach for genital pelvic hernia/prolapse. More than 100 pessary designs are described, and they are especially often used in elderly patients. This is a minimally invasive strategy, but complications may occur: malodorous discharge, contact bleeding, pressure ulcers/decubitus changes, urinary tract infections, vaginal wall erosion, chronic inflammation of vulvar and vaginal skin/mucosa, and, in long-standing neglected cases, epithelial atypia. Rare reports describe fistula formation after prolonged retained pessary use. Long-term adherence is also a challenge: a substantial proportion of women discontinue use within months, often because of insufficient symptom support or discomfort.

Therefore, for many patients with genital prolapse and significant functional impairment, surgery remains the only truly effective definitive treatment.

Despite many original techniques and their modifications, no single operation can be considered a universal “gold standard” for all patients. Choice of surgical method depends on:

- patient age,
- prolapse type and stage,
- need to preserve reproductive potential and sexual function,
- concomitant gynecologic and somatic pathology.

V. I. Krasnopolsky’s grouping of prolapse-correcting operations (1999)

1) Operations aimed at strengthening the pelvic floor

These may be performed as a primary procedure or as an adjunct to other prolapse surgeries.

2) Operations with partial vaginal obliteration

Examples include partial colpoperineocleisis and related narrowing procedures.

Le Fort median colporrhaphy is associated with relatively low recurrence in selected cohorts and creates strong tissue support for the uterus. However, it is suitable only for women without uterine pathology who do not plan future vaginal intercourse, which limits its use.

3) Operations based on shortening/strengthening uterine ligaments or fixation to stronger structures

This group includes procedures such as:

- shortening of round and uterosacral ligaments,

- Alexander–Adams operation (extraperitoneal shortening of round ligaments via the inguinal canal),
- ventrofixation/ventrosuspension variants.

A key limitation of some ventrofixation methods is alteration of normal pelvic anatomy, with risks such as pain, hematoma, enterocele formation, and relatively high relapse rates in some series.

4) Operations using alloplastic materials for ligament reinforcement and uterine fixation

Historically used, but many techniques declined because of relapse, graft/prosthesis-related complications, rejection, and fistula risks.

5) Operations reinforcing uterine fixation apparatus (uterosacral/cardinal ligaments)

The classic example is the Manchester operation (Donald, Manchester, 1888): shortening/transposition of cardinal ligaments with cervical procedure and anterior/posterior vaginal repair components. Reported recurrence varies across studies; postoperative urethral hypermobility may coexist.

6) Operations with rigid fixation of prolapsed organs to pelvic walls

Fixation targets can include pubic structures, sacrum, or sacrospinous ligament.

For example, sacrospinous colposuspension (Richter, 1967) is performed by placing nonabsorbable sutures through one or both sacrospinous ligaments and attaching them to the vaginal apex.

Important technical and functional concerns:

- fragile native tissues at fixation points may weaken durability,
- unilateral fixation can deviate the vaginal axis from physiologic orientation,
- chronic tissue tension may produce pain,
- de novo anterior compartment prolapse (e.g., cystocele) may develop in a subset of patients due to altered vaginal axis and increased anterior compartment load.

One of the most frequently performed modern surgical methods for genital organ prolapse is sacrocolpopexy (sacrovaginopexy) or sacrocervico-colpopexy (promontofixation), performed either via laparotomy or laparoscopic access. The principle of sacrovaginopexy is fixation of a non-absorbable synthetic mesh: one end is attached to the vaginal vault or cervical stump, and the other to the presacral ligament at the level of the sacral promontory. This helps maintain the internal genital organs in a physiological position. However, in many cases subtotal or total hysterectomy is performed at the first stage, which is not always desirable.

Even in experienced hands, operation duration is considerable (about 2–3 hours). The procedure is technically demanding and may be associated with risks for the patient, including prolonged endotracheal anesthesia, prolonged Trendelenburg positioning, possible injury to pelvic organs and presacral nerve plexuses, and risk of postoperative adhesive disease. Cost is also high, and complications may include osteomyelitis, severe pain syndrome, implant separation, or rejection.

An alternative to sacrocolpopexy in prolapse surgery is laparoscopic lateral colpopexy. In this technique, a mesh implant is fixed to the vaginal vault (or cervical stump) with non-absorbable sutures, and mesh arms are placed extraperitoneally, parallel to the parietal peritoneum, usually without additional fixation. As a result, additional support for the apical compartment is created through strong suspension of the vaginal vault.

This approach is considered when sacrovaginopexy is technically difficult—for example, due to adhesions, obesity, enlarged sigmoid colon, low position of the left common iliac vein, or promontory exostosis.

A seventh group includes radical operations such as vaginal hysterectomy. According to many authors, in peri- and postmenopausal women with complete uterine prolapse, one of the most common procedures is vaginal hysterectomy combined with anterior colporrhaphy and colpoperineolevatoroplasty. At the same time, many studies report high recurrence rates after surgery (about 33–61%). One particularly difficult recurrent form in clinical practice is post-hysterectomy vaginal vault prolapse.

Currently, prevention and treatment of post-hysterectomy vault prolapse include many transvaginal, open abdominal, laparoscopic, and combined techniques using native tissue repair, alloplastic, or synthetic materials for apical support.

The main transvaginal approaches are based on fixation of the vaginal vault to native tissues (uterine ligaments/adnexal support remnants) and different suspension techniques (unilateral or bilateral sacrospinous suspension, iliococcygeal fascia/aponeurotic fixation), with or without synthetic mesh. McCall culdoplasty is also widely used: it involves surgical obliteration of the deep

posterior cul-de-sac and fixation of the vaginal cuff to uterosacral/cardinal support structures after hysterectomy. A known limitation is possible ureteral kinking due to close ureteral proximity to uterosacral ligaments; therefore, surgeons may use simplified suturing, which does not always prevent recurrence effectively.

Abdominal procedures may also use native tissue reinforcement, such as aponeurotic flap colposuspension. In this method, dissected flaps are passed through openings in the external oblique aponeurosis and broad ligament region, then fixed to uterosacral supports. Potential drawbacks include excessive flap tension with chronic pain and possible ureteral injury during deep dissection.

So, surgical treatment of pelvic organ prolapse requires an individualized approach based on prolapse type, patient age, concomitant gynecologic/somatic disease, sexual activity, and related factors—often with obligatory pelvic floor reinforcement as a final reconstructive step.

At the same time, surgery for prolapse should aim not only to restore anatomy and strengthen pelvic connective structures, but also to correct functional disorders caused by prolapse. However, in elderly patients and in those with connective tissue dysplasia, native tissues may have insufficient strength for durable repair.

Use of allogeneic materials may provoke immune rejection reactions, while absorbable sutures may fail to provide long-term support, contributing to recurrence. According to literature, about 30% of women require repeat surgery for recurrent prolapse after primary correction; some reports describe rates up to 61.3%. De novo prolapse of the anterior vaginal wall is reported in approximately 24–31%, and posterior wall prolapse in 25–35%. Reported frequency of post-hysterectomy vaginal vault prolapse varies widely (0.5–43%).

Support of the apical vaginal compartment at the time of hysterectomy is associated with lower recurrence and improved outcomes.

The medical community still has no universally accepted alternative that completely solves the prolapse surgery problem. Given frequent relapse after traditional techniques, innovative solutions remain necessary. Early use of biological

materials (skin, fascial/aponeurotic flaps, allogeneic tissues) did not sufficiently reduce recurrence, which led to growing interest in synthetic implants.

Synthetic materials were first widely used in general surgery from the 1950s for abdominal and inguinal hernias, reducing recurrence substantially. From the 1970s, gynecologists began using synthetic implants for pelvic reconstruction; from the 1990s, transvaginal synthetic implants were actively used by urogynecologists to correct pelvic fascial defects.

Today, synthetic implants are most commonly made of polypropylene, polyester, or polytetrafluoroethylene (PTFE). They differ by fiber structure and weave pattern; fibers may be monofilament or multifilament. Woven implants are durable and have good structural memory, though loosening may occur. Tissue response depends strongly on biomaterial properties: PTFE, polyethylene, and silicone generally show lower biointegration, while polypropylene and mersilene are considered more biocompatible.

Histologic response to synthetic implants is typically described in stages:

1. first week—acute inflammatory response, capillary proliferation, granulation tissue, giant cells;
2. around two weeks—persistent granulation tissue with histiocytes/giant cells;
3. around four weeks—inflammation decreases, capillaries decrease, mature cellular remodeling continues;
4. later—formation of dense connective tissue around the implant.

Inflammatory response usually begins by day 3; fibroblast activation increases from day 10. Mechanical performance and biologic behavior of an implant depend on the balance between inflammatory cells and fibroblasts. For some materials (e.g., polypropylene, PTFE), tensile integration may increase over weeks.

According to widely used mesh classification principles, synthetic meshes are grouped by pore size and filament structure:

- **Type I**: macroporous (>75 μm), generally allowing better macrophage/fibroblast infiltration and collagen deposition;
- **Type II**: microporous (<10 μm), with limited cellular penetration and potentially higher infection risk;
- **Type III**: mixed macro/microporous, with higher adhesion potential;
- **Type IV**: submicronic pores (<1 μm), sometimes combined with Type I materials in specific settings.

Despite long-term use of synthetic implants in urogynecology, the ideal implant has not been definitively identified. In practice, polypropylene is often preferred due to hydrophobicity, chemical resistance, strength, elasticity, manufacturability, and cost-effectiveness.

Several ready-to-use mesh systems have been widely applied in pelvic reconstructive surgery:

- Perigee / Apogee systems for anterior, posterior, and apical prolapse;
- Pinnacle Pelvic Floor Repair Kit and Support System for post-hysterectomy anterior/apical defects;
- Elevate System for anterior/posterior and apical prolapse repair;
- Prolift System for combined compartment correction (with known complication concerns);
- OPUR system for anterior-apical prolapse with multi-arm/multi-point fixation to reduce mesh deformation.

A promising modern direction is development of biologic graft constructs and cell-colonized mesh technologies intended to improve integration and long-term outcomes.

Nevertheless, despite attempts to improve biocompatibility, mesh-related complications remain a major unresolved issue. Although synthetic prostheses reduced recurrence rates, rapid expansion of their use also increased intraoperative and postoperative complications compared with some native tissue repairs, leading to persistent division within the medical community between proponents and opponents of mesh-based prolapse surgery.

In general surgery, intraoperative complications include bleeding and hematoma formation; according to Krasnopolskaya (2018), this rate is about 7.6%. Injuries to the urinary tract and bladder, as reported by Radzinsky (2002), as well as bowel injuries (around 1.9% in some reports), are also described. Overall, domestic and international publications report intraoperative complication rates ranging from approximately 1.9% to 6.6%. The risk of injury to adjacent organs increases during repeat operations, especially after prior synthetic prosthesis use; therefore, such procedures should be performed only by experienced surgeons.

Delayed postoperative complications include bleeding, hematomas and their infection, purulent-septic complications, and formation of vesicovaginal,

rectovaginal, and other fistulas. Many researchers note that stress urinary incontinence may appear after prolapse surgery in a “latent” form in about 15% of cases; this is associated with preoperative cystocele severity and baseline continence status.

Mesh-related postoperative complications are usually grouped as follows:

1. **Vaginal mucosal erosion** (reported frequency varies widely, up to one-third in some series).
   Risk factors include advanced age, hypoestrogenism, atrophic tissue changes, diabetes mellitus, operative technique, excessive tissue tension, and implant type.
2. **Mesh exposure/migration into the bladder or rectum**, usually due to improper implant placement or unrecognized intraoperative injury.
3. **Vesicovaginal and rectovaginal fistulas.**
4. **Chronic pain syndrome** (reported up to 24.4% in some studies), often related to excessive mesh tension.
5. **Displacement, deformation, or twisting of synthetic prostheses.**
6. **Infectious-inflammatory complications** (around 10% in some datasets), associated with implant material/technical factors, insufficient secondary infection prevention, patient age, and immune status.

Analysis of multicenter data indicates that combined mesh-related and general surgical complications in genital prolapse correction may reach 22.4%. Because of these complications, the issue of synthetic prosthesis use remains unresolved and continues to be debated. At present, transvaginal synthetic implants are used mainly for recurrent pelvic organ prolapse.

In 2019, the FDA (U.S. Food and Drug Administration) ordered manufacturers of transvaginally implanted mesh for prolapse repair to stop selling these products in the U.S. market immediately, citing safety concerns. According to the regulator, manufacturers had not demonstrated sufficient assurance of safety and effectiveness for these implanted devices. Many European countries subsequently followed similar restrictive approaches.

Given global trends and the refusal of polypropylene implants in several countries, development of new materials for prolapse surgery became highly relevant. One such material is titanium, which is highly inert to surrounding tissues and mechanically durable. Comparative studies have suggested greater inertness and

safety versus conventional polypropylene in certain contexts, with improved tissue acceptance. In Western Europe, surgeons have used titanium-coated synthetic implants, aiming to reduce negative tissue responses linked to polypropylene. In Russia, mesh titanium implants of various shapes and sizes have been developed and introduced into practice, including ultra-thin mono- and multifilament titanium threads (high-purity alloys).

Titanium endoprostheses have been actively used for about a decade in general surgery, orthopedics, dentistry, and more recently urogynecology. For example, “titanium silk” endoprostheses are described as elastic meshes made from mono- or multifilament titanium threads. Specialized weaving can preserve stable porous-elastic architecture. A key feature is imparting stress-relief properties to the knitted metal structure, reducing inter-loop stress concentrations, improving plasticity, and preserving elasticity. The porous structure promotes close contact with the wound surface and supports faster penetration of biological fluids, potentially facilitating fibroblast/osteoblast colonization and implant integration.

Compared with untreated material, stress-relieved metal knit can spread more freely over the surgical wound bed, conform to shape, and retain modeled form after intraoperative adjustment. High plasticity also reduces biomechanical mismatch between implant and surrounding tissues, allowing placement even in delicate layers such as submucosal tissue.

Ultimately, surgical outcomes depend not only on the selected procedure, but also on subtle differences in operative technique and materials used during surgery. Patient-specific factors are equally important: somatic comorbidity, occupational physical load, hormonal profile, and, critically, surgeon expertise. The final result is determined by all these factors in combination.

Thus, literature review shows that complete uterine prolapse and post-hysterectomy vaginal vault prolapse remain increasingly important problems in gynecologic pathology. Despite many surgical techniques and the use or non-use of native tissue, alloplastic, or synthetic materials, the frequency of post-hysterectomy vaginal vault prolapse has not been eliminated. This necessitates further

improvement of treatment strategies for severe genital prolapse. Therefore, our study is dedicated to developing a new surgical method for complete uterine prolapse, preventing post-hysterectomy vaginal vault prolapse, and evaluating its effectiveness in premenopausal and postmenopausal patients with complete uterine prolapse.

1.5. § Final Conclusion of the Chapter

In Chapter I, based on scientific sources, it was substantiated that severe stages of female genital prolapse (POP-Q III–IV) in modern urogynecology should be viewed not merely as an anatomical defect, but as a multifactorial clinical syndrome. The relevance of the problem was shown at several levels: high prevalence of the condition, the marked impact of symptoms on daily life and social activity, the frequent coexistence of urinary and bowel dysfunction, and the persistent risk of recurrence and repeat intervention during long-term follow-up. From this perspective, it was emphasized that the primary clinical goal in managing severe prolapse should not be limited to “anatomical correction,” but should also include functional stability and improvement in quality of life.

In the theoretical section, the etiopathogenesis of POP was systematized according to modern concepts. Weakening of the fascial-ligamentous and muscular components of pelvic support, childbirth-related traumatic factors, age- and hormone-related changes, and chronic mechanical loading due to increased intra-abdominal pressure were described as interrelated mechanisms in disease development and progression. Importantly, because these factors occur in different combinations in individual patients, heterogeneous clinical phenotypes emerge; therefore, even patients with the same anatomical stage may present different symptom profiles and treatment outcomes. This confirms that a single “template” approach to severe prolapse is scientifically and practically limited.

Regarding classification and terminology, the chapter specifically highlighted the standards proposed by IUGA/ICS and the practical significance of the POP-Q system. Because POP-Q is based on numeric parameters, it moves clinical assessment away from subjective interpretation and toward a reproducible, inter-

center comparable format. Particularly in severe stages, the necessity of POP-Q for precise compartment differentiation, accurate assessment of the apical component, and operative planning was substantiated. At the same time, it was concluded that although classification provides an anatomical map, it is not sufficient on its own for selecting treatment strategy and must be integrated with functional and patient-centered indicators.

The section on diagnostic approaches demonstrated that assessment of severe prolapse requires a stepwise, integrated model: structured history, standardized physical examination with POP-Q staging, followed by targeted evaluation of urinary, bowel, and sexual function, and assessment of quality-of-life indicators using validated questionnaires. The role of selective instrumental investigations in diagnostics was clarified: they are not a "standard package for everyone," but should be used as problem-oriented tools in cases where they answer a specific clinical question. Thus, the most appropriate approach to severe-stage assessment is to create a clinical profile that integrates anatomical, functional, and prognostic data.

Analysis of the degree of scientific development of the problem and of surgical procedures used in POP showed that, although the evidence base in this field is substantial, the concept of a single "best universal method" is not sufficiently supported. Different operative approaches may provide advantages in specific clinical scenarios, but each has limitations in terms of complication profile, recurrence risk, reoperation risk, and functional outcomes. It was also noted that despite the availability of high-level evidence (guidelines, consensus statements, and systematic reviews), heterogeneity in outcome measures and differences in follow-up duration continue to necessitate individualized clinical decision-making. In this sense, the literature supports the conclusion that "the problem has been extensively studied," but not that "the problem has been fully resolved."

The principal scientific-practical conclusion derived from Chapter I is that the foundation of successful management in severe genital prolapse is standardized diagnostics, integrated clinical assessment, and an individualized surgical strategy matched to patient phenotype. Although anatomical restoration is important, final

clinical value is determined by functional outcome and patient satisfaction. Therefore, in subsequent chapters, evaluating organ-preserving reconstructive surgical options according to the principle of "which method, for whom, and when," and linking this to short- and long-term outcomes, is a methodologically sound direction.

CHAPTER II. DIAGNOSTICS, SURGICAL TACTICS, AND OUTCOME ASSESSMENT IN SEVERE GENITAL PROLAPSE

2.1. § Examinations: complaints, anamnesis, POP assessment, and determination of POP stage

Clinical evaluation of the study cohort was conducted in a comprehensive and standardized manner, integrating symptom analysis, general and gynecological examination findings, and detailed anamnestic data. In the diagnostic algorithm, structured history taking represented a central methodological component, since it enabled identification of etiological factors, disease progression patterns, and clinically relevant risk modifiers. Particular emphasis was placed not only on disease-specific complaints, but also on multidimensional patient profiling, including quality-of-life indicators, social adaptation, domestic environment, and occupational load. This broader biopsychosocial assessment was considered essential for accurate clinical phenotyping and individualized treatment planning.

The gynecological examination protocol followed generally accepted clinical standards and included visual, bimanual, and rectal assessment. Visual inspection of the external genitalia focused on objective signs of pelvic floor insufficiency, including widening of the genital hiatus associated with separation of the levator ani muscle components. Such findings were interpreted as clinically meaningful markers of pelvic support failure. In parallel, the trophic status of the vaginal mucosa and cervical condition were documented, as these parameters may influence both symptom severity and treatment strategy, particularly in advanced prolapse.

Bimanual examination was used to evaluate the internal genital organs with respect to position, size and shape, consistency, mobility, and associated tenderness. These parameters were analyzed not in isolation, but in relation to prolapse severity and

dominant clinical symptoms, allowing a more function-oriented interpretation of anatomical abnormalities. This approach improves preoperative decision quality by reducing the risk of purely morphology-driven treatment selection.

Functional assessment of the pelvic floor musculature was performed by asking patients to produce voluntary vaginal contraction. Preserved contractile response was interpreted as a positive functional sign, whereas reduced or absent contraction suggested pelvic floor muscle dysfunction and possible need for adjunctive rehabilitation strategies. In severe prolapse phenotypes, this step is particularly important for predicting postoperative functional recovery and long-term stability.

Rectal examination was systematically included to complement vaginal findings and to characterize posterior compartment involvement. This examination enabled assessment of the rectovaginal septum, anal sphincter tone, rectal mucosal status, and signs of anterior rectal wall bulging. Identification of a pouch-like protrusion of the anterior rectal wall was regarded as evidence suggestive of rectocele. Incorporation of rectal assessment into the primary diagnostic workflow reduced the likelihood of underdiagnosing defecatory dysfunction and helped align surgical planning with the full compartmental defect profile.

For objective grading of prolapse severity, the POP-Q (Pelvic Organ Prolapse Quantification) system was used as the principal classification framework (Figure 2.2). Application of POP-Q allowed standardized, reproducible, and numerically expressed documentation of compartment-specific descent, minimizing subjective interpretation and enabling interobserver and intercenter comparability. In advanced stages, this standardization is especially critical for accurate identification of apical involvement, selection of appropriate reconstructive strategy, and outcome benchmarking in follow-up.

Overall, the diagnostic model applied in this study was based on the integration of:

1. detailed anamnestic and symptom-based evaluation,
2. standardized anatomical assessment, and
3. functional and social-context profiling.

Such an integrated methodology provides stronger clinical validity than a purely anatomical approach and forms a more robust basis for individualized management of women with severe pelvic organ prolapse.

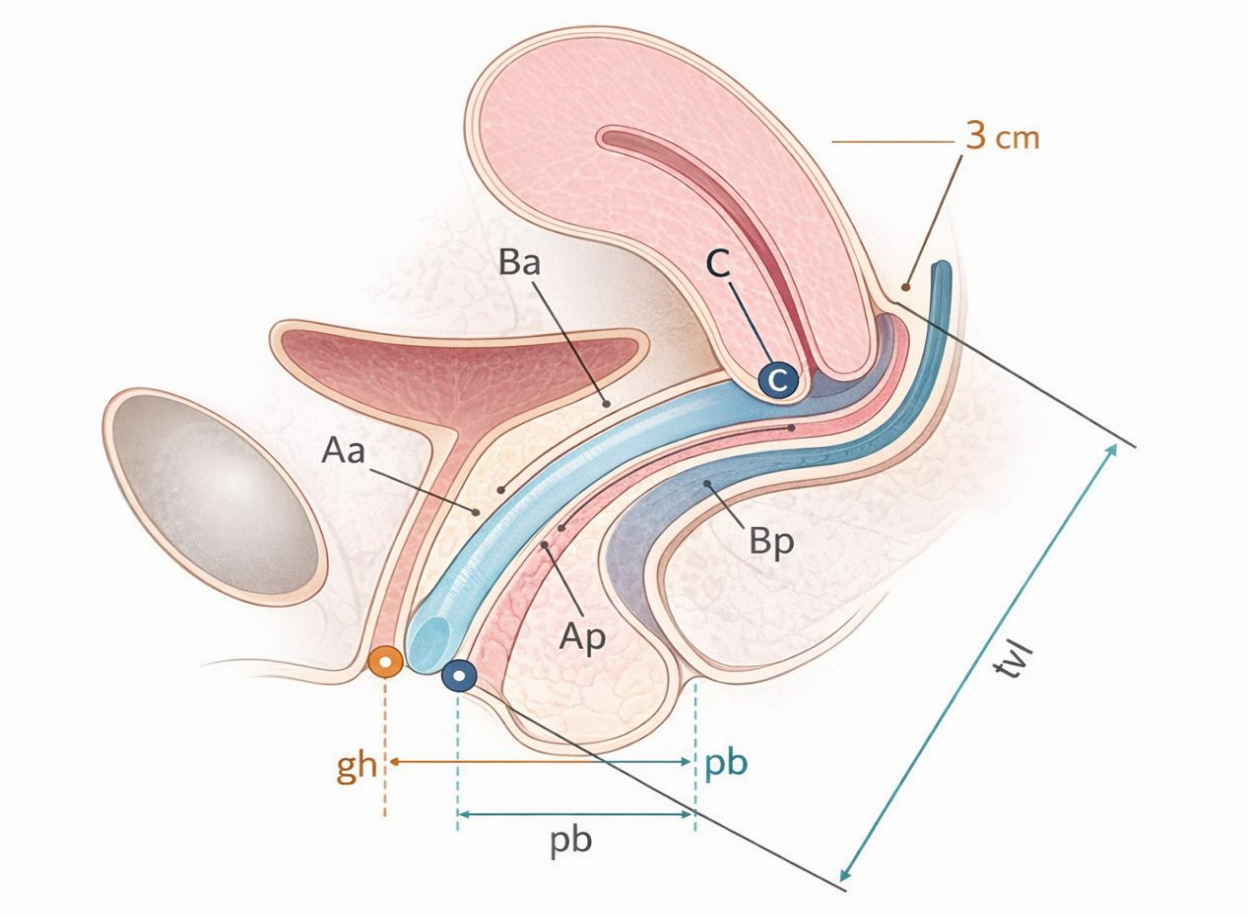


Figure 2.2. Determination of the degree of pelvic organ prolapse descent

Based on the defined POP-Q reference points, displacement or downward descent of pelvic organs is measured in centimeters (cm), and the severity of genital prolapse is determined accordingly.

The use of the POP-Q (Pelvic Organ Prolapse Quantification) classification in pelvic organ prolapse is important not only for grading uterine descent, but also for evaluating post-hysterectomy prolapse, including descent of the vaginal cuff and the anterior and posterior vaginal walls.

The principal POP-Q landmarks are as follows:

- **Aa** — a point on the anterior vaginal wall located 3 cm proximal to the hymenal ring.

- **Ba** — the most distal point of the anterior vaginal wall between points **Aa** and **C**; this point is particularly important for assessing prolapse after hysterectomy, including vaginal cuff-related descent.
- **Ap** — a point on the posterior vaginal wall located 3 cm proximal to the hymenal ring.
- **Bp** — the most distal point of the posterior vaginal wall between points **Ap** and **D**.
- **C** — the most distal edge of the cervix (or the vaginal cuff scar in women after hysterectomy).
- **D** — the posterior fornix (this point cannot be determined after hysterectomy).
- **TVL** — total vaginal length.
- **gh** — genital hiatus.
- **pb** — perineal body length (distance).

These measurements form the basis for objective staging of pelvic organ prolapse (Table 2.1).

POP-Q Prolapse Staging — Table2.1

Stage	English description (criteria)
0	No pelvic organ prolapse. Points Aa, Ap, Ba, Bp are all at −3 cm; points C and D are at −(TVL − 2) cm.
I	The most distal (lowest) point of the prolapse is more than 1 cm above the hymen (< −1 cm).
II	The most distal point is within 1 cm of the hymen (from −1 cm to +1 cm) (≥ −1 cm but ≤ +1 cm).
III	The most distal point protrudes more than 1 cm beyond the hymen, but there is no complete vaginal eversion: it remains at least 2 cm shorter than TVL (> +1 cm but < +(TVL − 2) cm).
IV	Complete vaginal eversion. The most distal point protrudes beyond the hymen and is within 2 cm of the total vaginal length (≥ +(TVL − 2) cm).

Pelvic organ prolapse is generally not considered a life-threatening pathology; therefore, the main reasons patients seek medical care are reduced quality of life, impaired social adaptation, and sexual dysfunction. Indications for surgical treatment should not be based solely on clinical, gynecological, and rectal examinations; standardized questionnaires (structured question–answer tools) are also important for selecting the appropriate surgical strategy.

At present, among the most commonly used instruments for prolapse-related assessment are the **PFDI-20** (Pelvic Floor Distress Inventory Questionnaire), used to evaluate symptom burden and quality-of-life impairment, and the **PFIQ-7** (Pelvic Floor Impact Questionnaire), used to assess the impact of symptoms on daily activities. In addition, extragenital comorbidities were studied in detail.

Given the objectives of our study, special attention was paid to collecting obstetric and gynecological history. For each patient, we evaluated the number of pregnancies and their course, characteristics of labor and delivery (including use of obstetric interventions, episiotomy or perineotomy, and whether manual uterine cavity examination was performed postpartum), and obstetric complications (perineal tears, cervical tears, and vaginal wall tears). We also considered neonatal birth weight and length as potentially relevant parameters.

Naturally, primary focus was placed on complaints directly related to pelvic organ prolapse and its complications. We thoroughly assessed disease duration and clinical course, timing of symptom progression, and emergence of additional complaints (for example, urinary or flatal incontinence at rest or during physical exertion). Particular attention was also given to lower abdominal pain, bloody genital discharge, voiding difficulties, and complaints related to passage of gas and stool.

Objective evaluation included general physical examination, assessment of somatic status, transvaginal bimanual examination, and functional testing. During vaginal examination, we assessed the degree of prolapse and/or descent of internal genital organs both at rest and during straining. With particular attention, we analyzed recurrence patterns and associated complications after reconstructive surgery for genital prolapse (without organ removal), as well as recurrence patterns and

complications after hysterectomy in prolapse patients. To identify the effect of advanced prolapse on adjacent organs and to detect clinical signs of cystocele, rectocele, enterocele, and urethral sphincter insufficiency, we performed the tampon test, cough stress test, and straining tests.

Questions.

PFDI-20 (Pelvic Floor Distress Inventory)

Instructions: Please answer the questions. Indicate which of the symptoms that bothered you during the last 3 months are present. If symptoms are not present at all: NO = 0 points. If the answer is YES, score as follows: “not bothersome” = 1 point, “sometimes” = 2 points, “often” = 3 points, “frequently” = 4 points. Thus, each item is scored from 0 to 4 points. Thank you.

Pelvic Organ Prolapse Distress Inventory 6 (POPDI-6) **Table 2.2.**

No.	Question	No	Yes	Yes	Yes	Yes
1	Do you usually feel pressure in the lower abdomen?	0	1	2	3	4
2	Do you usually experience heaviness in the pelvic area?	0	1	2	3	4
3	Do you have a bulge or something falling out that you can see or feel in your vagina?	0	1	2	3	4
4	Do you need to push on the vagina or part of the rectum to completely empty your bowel?	0	1	2	3	4
5	Do you usually have a feeling of incomplete bladder emptying?	0	1	2	3	4
6	Have you needed to push up on the vagina with your hand to start urination or to empty your bladder completely?	0	1	2	3	4

Colorectal-Anal Distress Inventory 8 (CRAD-8) **Table 2.3.**

No.	Question	No	Yes	Yes	Yes	Yes
7	Do you feel a need to strain hard to empty your bowel?	0	1	2	3	4
8	After defecation, do you feel that your bowel has not emptied completely?	0	1	2	3	4
9	Have you had episodes of stool incontinence (formed stool)?	0	1	2	3	4
10	Have you had episodes of stool incontinence, for example with diarrhea?	0	1	2	3	4

11	Do you have episodes of inability to hold gas?	0	1	2	3	4
12	Have you experienced pain during or after defecation?	0	1	2	3	4
13	Do you have a strong urge to defecate that is difficult to defer?	0	1	2	3	4
14	Has a part of your rectum protruded through the anus?	0	1	2	3	4

Urinary Distress Inventory 6 (UDI-6) **Table 2.4.**

No.	Question	No	Yes	Yes	Yes	Yes
15	Do you urinate frequently?	0	1	2	3	4
16	Do you have urine leakage associated with a strong urge to urinate?	0	1	2	3	4
17	Do you have urine leakage when coughing, sneezing, or laughing?	0	1	2	3	4
18	Do you lose small amounts of urine (drops)?	0	1	2	3	4
19	Do you have difficulty emptying your bladder?	0	1	2	3	4
20	Do you feel pain or discomfort in the lower abdomen or genital area?	0	1	2	3	4

Calculation: The arithmetic mean is calculated for each question group (ranging from 0 to 4), then multiplied by 25; thus, the score range is 0–100 points.

PFIQ-7 (Pelvic Floor Impact Questionnaire)

Instructions: Some women feel that symptoms related to the bladder, bowel, or uterine/pelvic organ prolapse affect their daily activities, relationships, and emotions. For each item below, place an “X” next to the answer that best describes your symptoms during the last 3 months. Please make sure that all three columns are marked for each question.

How often do symptoms related to the following affect you?

No.	Activity / Situation	Bladder or Urine	Bowel or Rectum	Uterus or Pelvic Organ Prolapse
1	Ability to do household chores (cooking, cleaning, laundry)?	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often
2	Ability to walk, swim, or exercise?	Never / Sometimes /	Never / Sometimes /	Never / Sometimes /

		Often / Very often	Often / Very often	Often / Very often
3	Ability to attend cinemas, concerts, or similar events?	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often
4	Ability to travel by car or bus for more than 30 minutes from home?	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often
5	Participation in social activities outside the home?	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often
6	Emotional health (nervousness, depression, etc.)?	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often
7	Feeling frustrated?	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often	Never / Sometimes / Often / Very often

Scoring note: Responses are typically coded as Never = 0, Sometimes = 1, Often = 2, Very often = 3.

Calculation: All questions are scored using the following scale: never = 0; sometimes = 1; often = 2; very often = 3.

The scores are summed separately for the 7 questions in the “Bladder or urine” column, the 7 questions in the “Bowel or rectum” column, and the 7 questions in the “Uterus or pelvic organ prolapse” column. The obtained sum is then used to calculate the arithmetic mean (range 0 to 3). After that, this value is multiplied by 100 and divided by 3 to obtain a final score ranging from 0 to 100 (Table 2.3).

Thus, the subjective severity of symptoms and their impact on the functional, psychological, and social components of quality of life were assessed. The PFDI-20 and PFIQ-7 questionnaires include assessment of the severity of symptoms caused by genital prolapse, as well as subjective evaluation of the severity of lower gastrointestinal dysfunction and urinary disorders.

Analysis of the study results showed that the PFDI-20 and PFIQ-7 questionnaires are reliable and valid, and can be used to assess quality of life in patients with pelvic organ prolapse, as well as to evaluate the subjective effectiveness of surgical treatment in patients operated on for the above pathologies.

Instrumental and Laboratory Methods of Investigation

1. Complete blood count (CBC)
2. Blood biochemistry analysis
3. General urinalysis
4. RW blood test
5. Blood test for hepatitis B and C
6. HIV blood test
7. ECG
8. Coagulogram

Ultrasound Examination Methods

Ultrasound examinations were performed using a Mindray DC device. Both transvaginal and transabdominal ultrasound approaches were used. Ultrasound was applied to assess the degree of uterine descent, determine the presence or absence of concomitant pathologies associated with genital prolapse, and evaluate the condition of adjacent organs, including the presence or absence of cystocele and/or rectocele.

All patients underwent comprehensive examinations in several stages:

- Stage 1: before surgery (to identify anatomical abnormalities and disease characteristics and to select the appropriate surgical approach);
- Stage 2: 3–5 months after surgery (to evaluate the effectiveness of surgical treatment);
- Stage 3: 3 years after surgery (to assess long-term surgical outcomes).

2.2. § Surgical Procedures for Genital Prolapse and Criteria for Surgical Eligibility

In severe genital prolapse, the issue of surgical treatment is not limited to correcting the anatomical defect alone. The practical goal is to correct prolapse while improving the patient's functional status, restoring daily activity, and achieving long-term clinical stability. Therefore, in selecting surgery, the key question should not be only "Which operation is technically feasible?" but first "For which patient is which operation clinically appropriate?" This principle reduces the risk of

complications in severe prolapse, prevents excessive or inadequate operative volume, and ultimately improves patient satisfaction.

Surgical procedures used for genital prolapse can be conditionally divided into several groups: vaginal reconstructive operations, approaches aimed at apical support, more radical options when necessary, and combined techniques. In severe stages, the main clinical task is to assess anterior, apical, and posterior compartment imbalance simultaneously and to individualize the corrective volume accordingly. Isolated correction of only one compartment may provide short-term anatomical improvement, but in the long term it can negatively affect clinical stability. For this reason, inter-compartment relationships must always be considered in surgical planning.

Criteria for surgical eligibility are central to clinical decision-making. First, the clinical significance of prolapse is assessed: that is, the presence of prolapse-related symptoms, their duration, and their impact on quality of daily life. Even with advanced anatomical descent, if clinical discomfort is minimal, the decision for surgery should be made cautiously; conversely, in symptomatic severe prolapse, operative treatment is justified. Thus, surgical indication should be based on an integrated model of "stage + symptoms + functional impairment."

The second criterion is the effectiveness of conservative management. If conservative measures (lifestyle modification, pessary use, and symptomatic approaches) do not provide the expected clinical benefit or fail to ensure durable improvement, operative strategy should be considered. At the same time, in some severe cases, anatomical deformity and functional limitation are so pronounced that conservative treatment remains only supportive, and surgery becomes the main solution.

The third criterion is the severity of functional dysfunction. Voiding difficulties, persistent residual symptoms, defecatory disorders, sexual discomfort, and psychofunctional limitations directly influence surgical decision-making. In this context, the aim of surgery is not merely to "reposition prolapse internally," but to

reduce functional burden. Therefore, along with anatomical stage, functional profiling is mandatory in selecting patients for surgery.

The fourth criterion includes the patient's age, reproductive plans, and individual priorities. Applying the same surgical option to all patients with severe prolapse is clinically inappropriate. The patient's need for organ preservation, quality-of-life goals, desire to maintain sexual function, level of social activity, and readiness for rehabilitation all play major roles in treatment selection. This approach shifts operative decision-making from a physician-centered to a patient-centered model.

The fifth criterion is general somatic status and perioperative risk profile. Before surgical enrollment, cardiovascular, respiratory, endocrine, and other comorbid conditions should be evaluated; anesthetic risk should be assessed; and thromboembolic and infectious prophylaxis plans should be established. Surgical decisions must rely not only on gynecological findings but also on overall safety criteria. This is especially important in severe prolapse, where operative volume may be broader and perioperative risk stratification is crucial.

Identifying contraindications is as important as defining indications. In cases such as acute inflammatory processes, decompensated systemic disease, high anesthetic risk, inadequate preoperative preparation, or likely inability to comply with rehabilitation requirements, surgery should be postponed or the strategy reconsidered. In clinical practice, correct decision-making at this stage significantly reduces subsequent complications.

Another key principle in choosing surgical procedures is adequacy of operative volume. An overly limited procedure may lead to early clinical recurrence due to residual defects, whereas an unnecessarily extensive procedure increases the risk of complications and functional discomfort. Therefore, the operative plan should follow the principle of being "minimally sufficient, yet functionally goal-directed." This is particularly relevant for organ-preserving strategies, where balance between anatomical reconstruction and functional outcome is essential.

The practical value of surgical eligibility criteria lies in standardizing clinical decisions. That is, decisions are based not on a single subjective factor but on a set

of complementary criteria: symptom severity, anatomical stage, functional status, response to conservative treatment, individual patient needs, and safety profile. As a result, surgical selection becomes consistent, auditable, and well documented.

Thus, in severe genital prolapse, the use of surgical procedures and criteria for surgical eligibility should be based on a comprehensive clinical model. The core of this model is individualized operative decision-making that integrates anatomy, function, and patient goals. In the next section, based on these criteria, the clinical rationale for selecting organ-preserving surgery and practical operative approaches will be discussed in detail.

Surgical Procedures Used in POP: General Classification

From a clinical perspective, POP surgery is divided into three major groups:

1. **Reconstructive procedures** (preserving organ and/or vaginal function)
2. **Obliterative procedures** (closure of the vaginal canal, usually for patients who do not plan future sexual activity)
3. **Radical approaches or reconstructive procedures associated with uterine removal**

This approach is consistent with NICE and other clinical sources, which emphasize that operative options should be selected according to the patient's goals, the presence of apical defects, and functional needs.

Uterus-Preserving POP Surgeries

Table 2.1

Category	Procedure	Brief description	Typical clinical use
Apical support preservation	Sacrospinous hysteropexy	Fixation of the uterus/apex to the sacrospinous ligament without hysterectomy	Uterine prolapse when uterine preservation is desired
Apical support preservation	Uterosacral hysteropexy (or uterosacral ligament suspension with uterine preservation)	Restoration of apical support through the uterosacral ligaments	When the apical component is predominant
Apical support preservation	Sacrohysteropexy (abdominal/laparoscopic/robotic)	Suspension of the uterus to the sacrum using mesh or graft	Selectively in younger patients who wish to

Category	Procedure	Brief description	Typical clinical use
			preserve the uterus
Vaginal reconstruction	Manchester operation (Fothergill procedure)	Cervical reduction plus ligamentous reconstruction in uterine prolapse associated with cervical elongation	In combined cervical elongation and uterine descent
Anterior compartment	Anterior colporrhaphy	Reconstruction of the anterior vaginal wall for cystocele correction	Dominant anterior compartment defect
Posterior compartment	Posterior colporrhaphy	Reconstruction of the posterior vaginal wall for rectocele correction	Posterior defects with defecatory symptoms
Perineal reconstruction	Perineorrhaphy / Colpoperineoplasty	Reinforcement of the perineal body and distal support	Wide hiatal opening and perineal insufficiency
Paravaginal defect	Paravaginal repair	Repair of lateral vaginal support defects	Selective cases with lateral support defects

These procedures—particularly anterior/posterior colporrhaphy, the Manchester procedure, and different types of hysteropexy—are widely described in the practical repertoire of POP surgery.

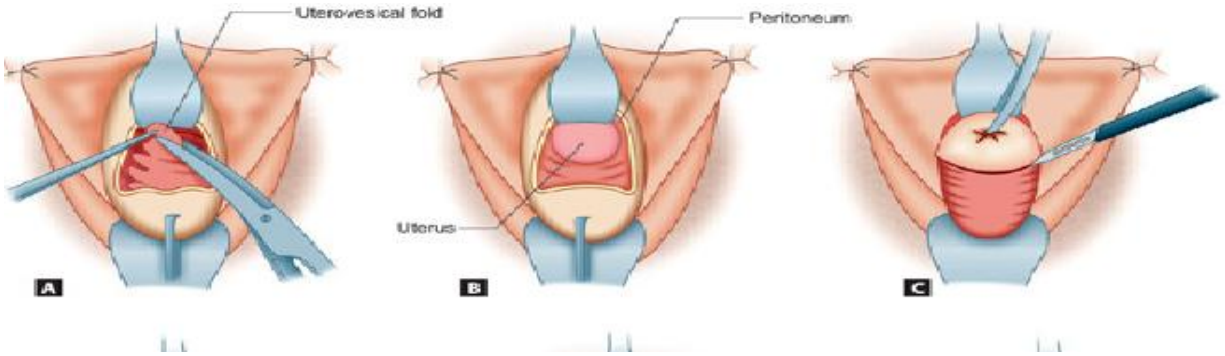
Radical Procedures or Surgeries Associated with Uterine Removal Table 2.2

Category	Procedure	Brief description	When considered
Vaginal approach	Vaginal hysterectomy + apical suspension	Removal of the uterus with additional restoration of apical support by fixation	When uterine preservation is not planned and clinical indications are present
Apical reconstruction	Vaginal hysterectomy + uterosacral ligament suspension (USLS)	Suspension of the vaginal apex to the uterosacral ligaments after hysterectomy	To reduce the risk of recurrent apical prolapse
Apical reconstruction	Vaginal hysterectomy + sacrospinous fixation	Fixation of apical support to the sacrospinous ligament	When the vaginal route is preferred

Category	Procedure	Brief description	When considered
Vault prolapse	Sacrocolpopexy (open/laparoscopic/robotic)	Mesh fixation of the vaginal vault to the sacrum	In post-hysterectomy vault prolapse when durable long-term apical support is needed
Obliterative	Colpocleisis (Le Fort colpocleisis)	Elimination of prolapse by partial or complete closure of the vaginal canal	Selectively in patients not planning sexual activity, typically older and/or high-risk patients

For vault prolapse and apical procedures, these types of options are presented systematically in the RCOG Green-top guidelines and NICE evidence reviews.

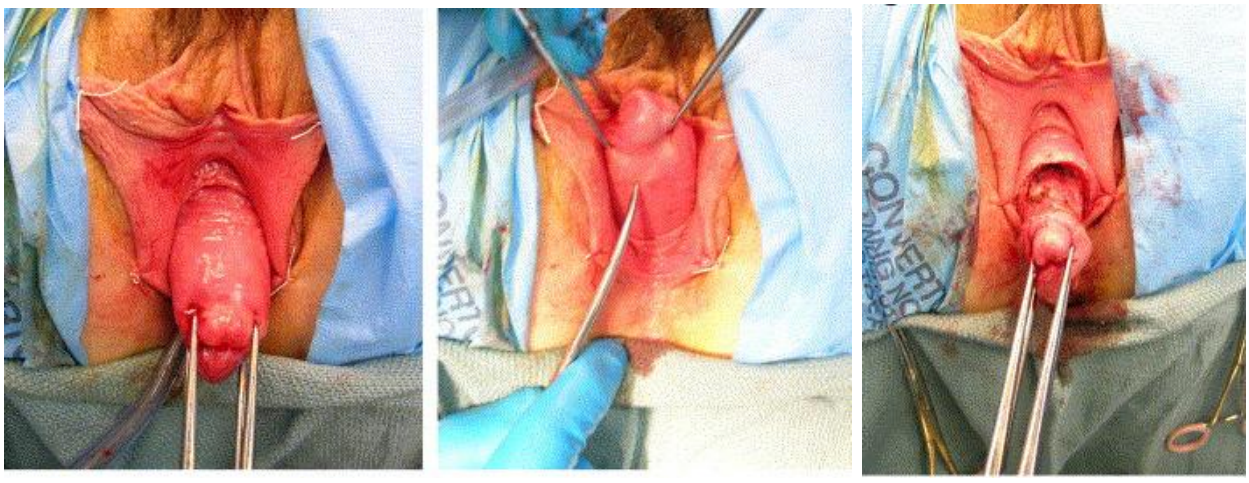
Manchester operation (Fothergill procedure)

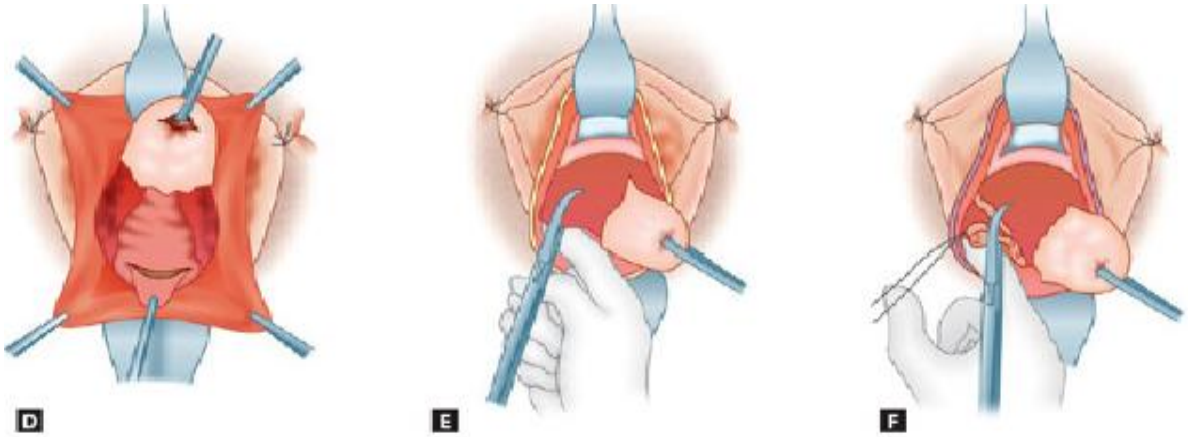


A-panel: *The anterior vaginal wall is incised, and dissection is being performed in the vesicouterine (uterovesical) pouch region (the stage of separating the bladder from the cervix).*

B-panel: *After dissection, the anatomical layers are exposed, and the direction of the peritoneum/vesicouterine fold and the uterine body is shown.*

C-panel: *The cervix is exteriorized, and the stage for cervical amputation (the trachelectomy component) is being performed*

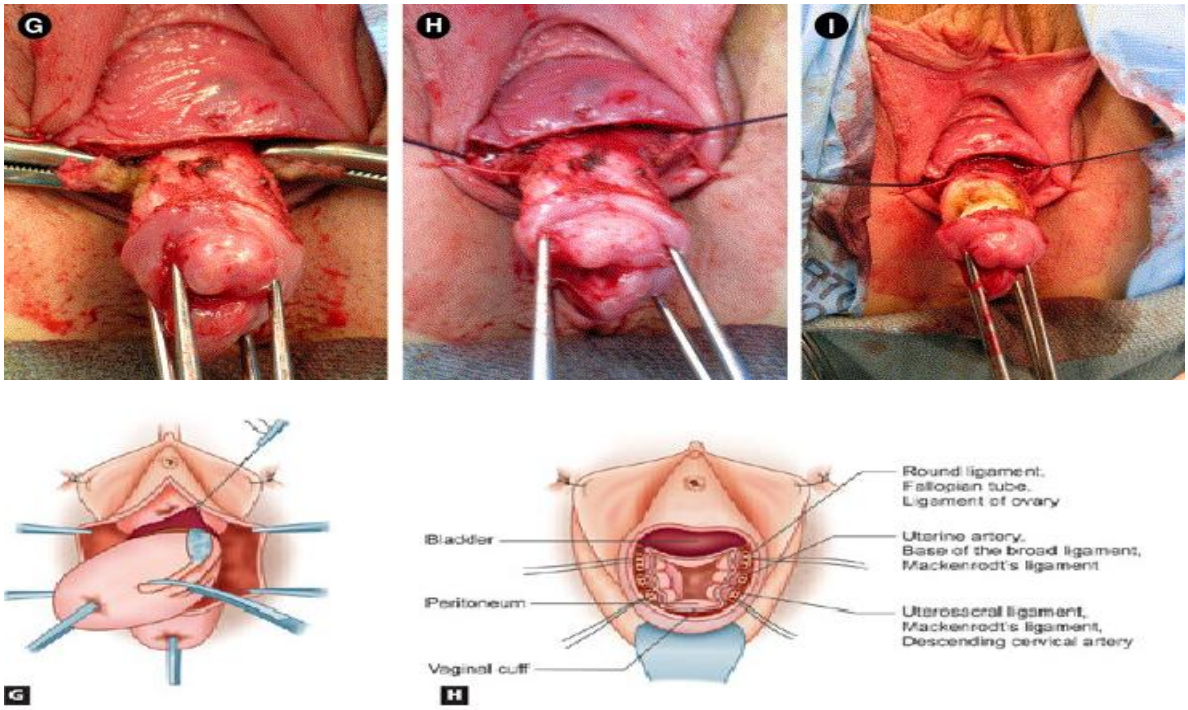




D-panel: *After cervical amputation, the operative field is exposed; this stage involves mobilization of the parametrial/cardinal complexes (Mackenrodt ligaments).*

E-panel: *The cardinal (± uterosacral) ligaments are brought anteriorly and fixed to the cervical stump (Fothergill plication). This is the key step for reinforcing apical support.*

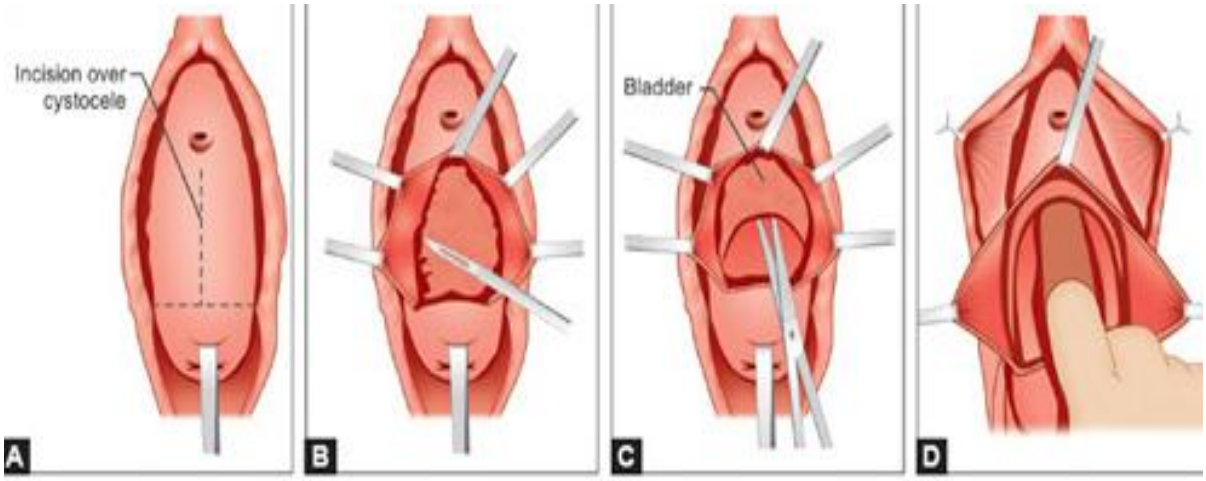
F-panel: *The cervical stump is covered with vaginal mucosa (Sturmdorf sutures), i.e., the final stage of reconstruction.*



G-panel: *After cervical amputation, the ligamentous complexes are fixed to the cervical stump/vaginal vault region, and preparation is made for restoration of the peritoneal layer. The goal here is to centralize the apex and redistribute supporting structures.*

H-panel: *Final reconstruction schematic: the inferior bladder border, peritoneum, vaginal cuff, and surrounding key anatomical structures (round ligament, tubo-ovarian ligament, uterine artery branches, and the cardinal and uterosacral complexes) are shown. In other words, this image illustrates the restored postoperative topography of the support apparatus*

Anterior colporrhaphy

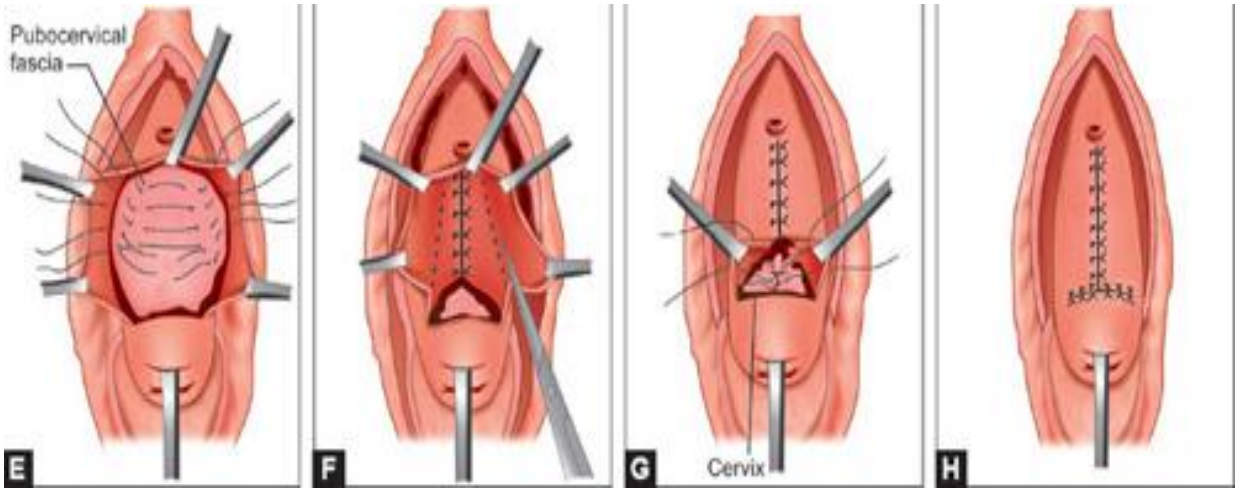


A: A midline incision on the anterior vaginal wall over the cystocele..

B: Separation of the vaginal mucosa, followed by dissection of the vesicovaginal fascia and preparation for plication.

C: Plication of the pubocervical (vesicovaginal) fascia (usually with continuous or interrupted sutures), i.e., reinforcement of bladder support

D: Resection of excess vaginal mucosa followed by final closure of the anterior vaginal wall.



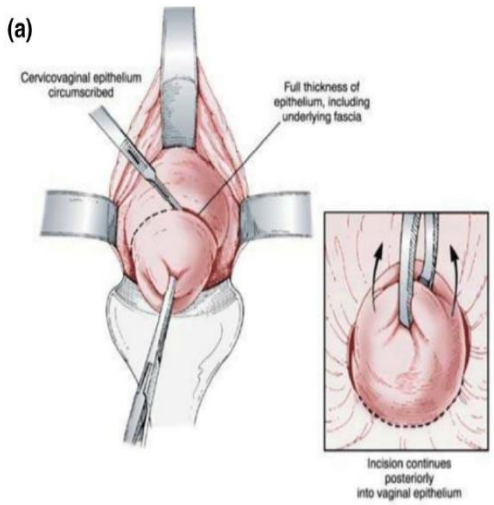
E: Continued plication of the pubocervical fascia (with centrally approximating sutures to reinforce bladder support).

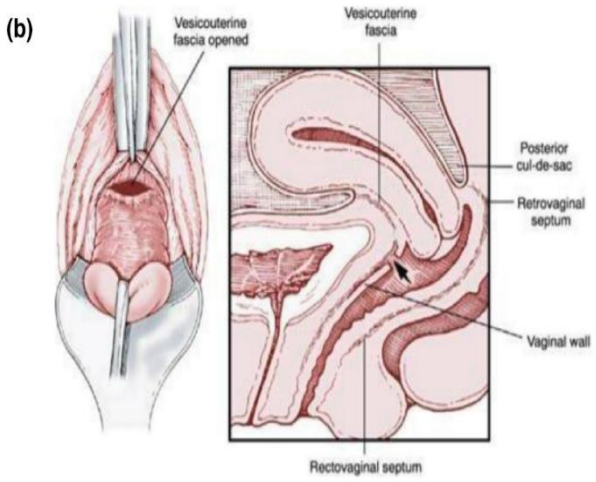
F: After plication, excess vaginal mucosa is marked and resected (in an elliptical/triangular pattern).

G: Adaptation of the distal portion around the cervix, with initiation of reconstructive mucosal suturing.

H: Final closure: suturing of the anterior vaginal wall is completed, with hemostasis achieved and the anatomical contour restored.

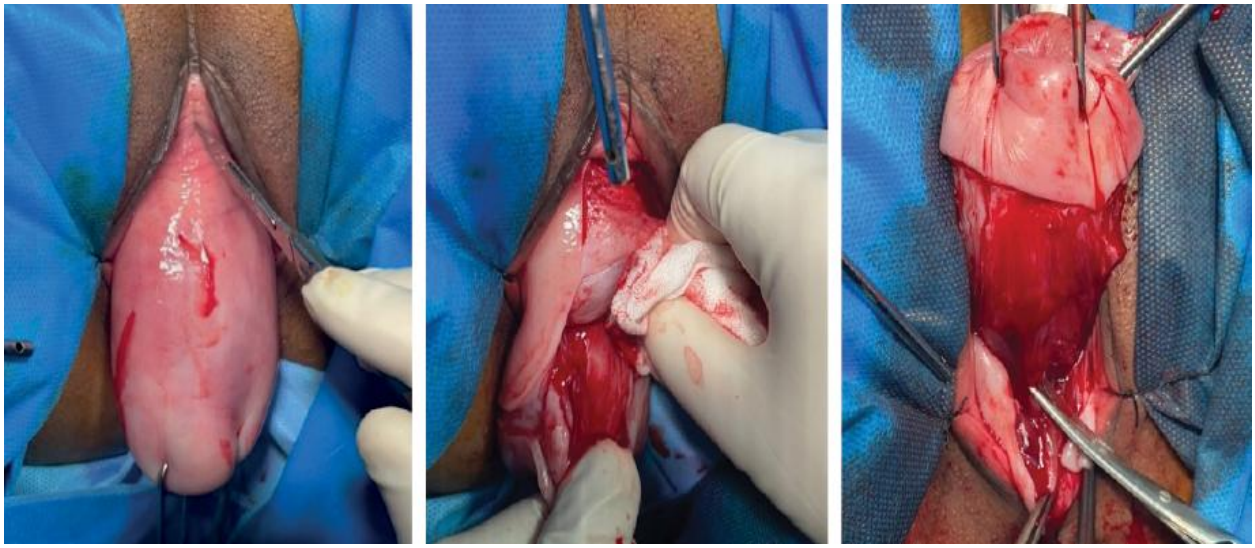
Vaginal hysterectomy



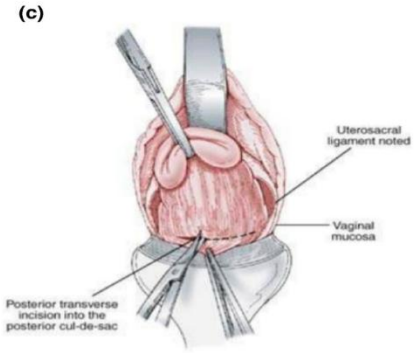


(a): *Circumferential incision of the cervicovaginal epithelium with posterior extension of the incision. In other words, this is the stage of separating the cervix from the vaginal wall using a full-thickness circumferential incision.*

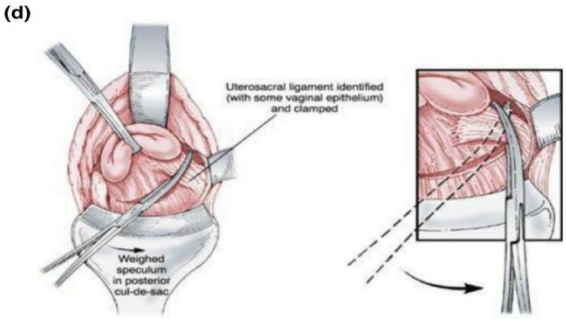
(b): *Opening the vesicouterine fascia and mobilizing the bladder upward (bladder dissection), while also identifying the rectovaginal septum/posterior cul-de-sac plane posteriorly.*



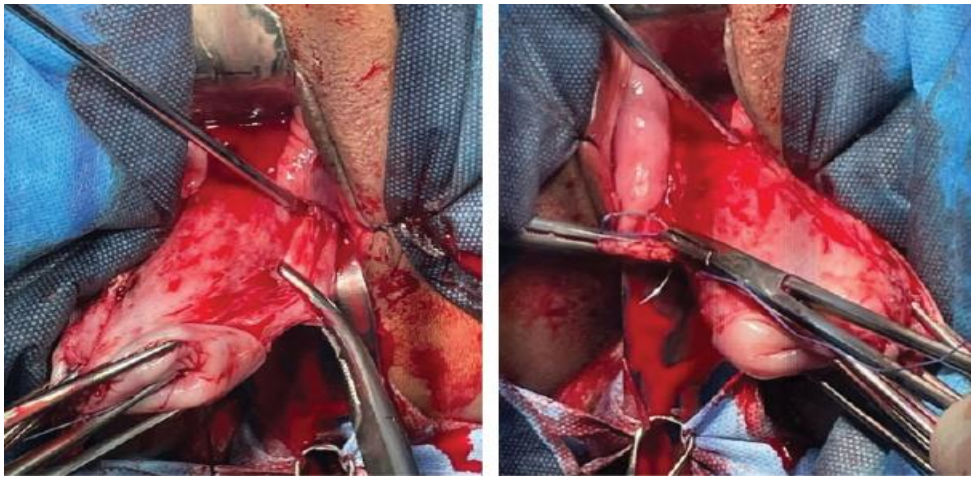
In brief: this is not yet the stage of uterine removal, but rather the stage of colpotomy plus safe opening of the anterior and posterior anatomical spaces.



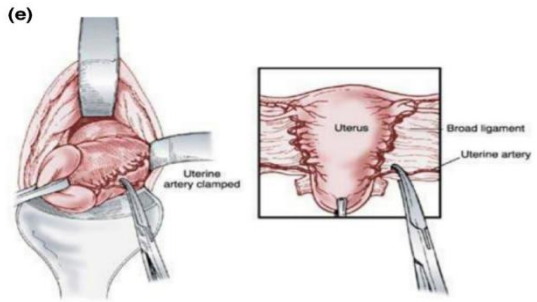
(c): *Transverse entry into the posterior cul-de-sac (Douglas pouch) (posterior colpotomy): an incision is made in the posterior vaginal mucosa to open the peritoneal cavity, and the uterosacral ligament landmark is identified.*



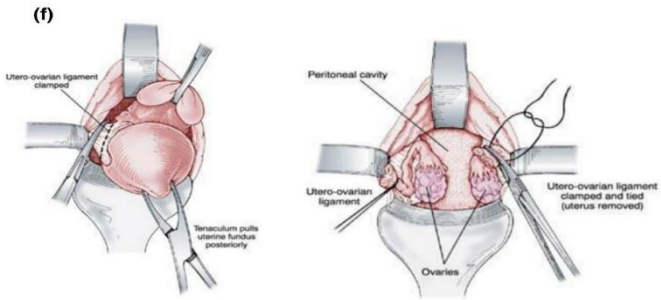
(d): *Identification and clamping of the uterosacral ligament (often grasped together with the vaginal mucosal edge), as a preparatory step for subsequent ligation/fixation.*



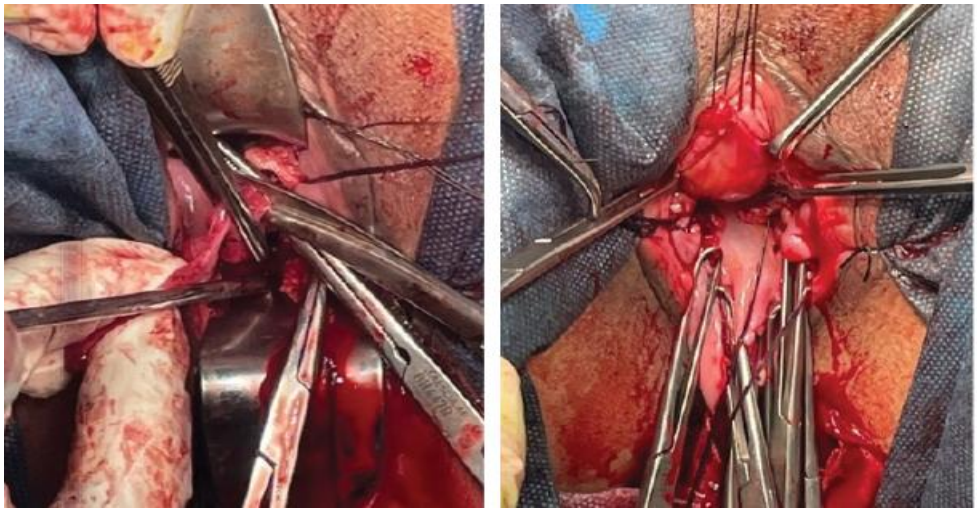
In brief: Posterior colpotomy → identification of the uterosacral ligament → clamping and preparation.



(e): *Clamping of the uterine vascular pedicle (uterine artery), with division and preparation for ligation (working sequentially upward along the broad ligament pedicles).*



(f): *Clamping, dividing, and ligating the upper pedicles (utero-ovarian ligament/adnexal pedicle), followed by uterine removal and final ligation of the remaining pedicle*



Short sequence: Management of the uterine artery pedicle → management of the utero-ovarian pedicle → uterine removal → final hemostasis/ligation.

"Quick Map" of POP Surgeries by Practical Clinical Goal **Table 2.3**

Clinical problem	Main surgical approach
Dominant anterior compartment defect (cystocele)	Anterior colporrhaphy ± apical support
Dominant posterior compartment defect (rectocele)	Posterior colporrhaphy ± perineorrhaphy
Uterine/apical prolapse with desire for uterine preservation	Sacrospinous/uterosacral hysteropexy or sacrohysteropexy
Uterine prolapse without a need for uterine preservation	Vaginal hysterectomy + apical suspension
Post-hysterectomy vault prolapse	Sacrocolpopexy or vaginal apical fixation
No planned sexual activity and high operative risk	Colpocleisis

Clinical-Practical Algorithm for Selecting Surgery in POP

Surgical strategy in POP is not based on the principle of "one operation for all patients." In practical decision-making, the main approach is to integrate the dominant anatomical defect, the severity of functional symptoms, and the patient's individual goals. From this perspective, the "quick map" serves as a tool for standardizing clinical reasoning, requiring clarification of the purpose of surgery

before selecting the name/type of operation. In clinical practice, the algorithm is conventionally applied in the following sequence:

Symptom profiling

- pressure/"bulge" sensation, urinary symptoms, defecatory symptoms, sexual discomfort;
- symptom persistence and degree of impact on quality of life (PFDI-20, PFIQ-7).

Assessment of anatomical dominance by compartment

- anterior (cystocele), posterior (rectocele), apical/uterine, or combined defects.

Mandatory evaluation of apical support

- even when anterior or posterior defects appear dominant, the apical component should not be disregarded;
- if an apical defect is present, apical fixation should be added to the corrective plan.

Patient-goal block

- desire for uterine preservation;
- priority of preserving sexual function;
- readiness for rehabilitation and long-term expectations.

Risk stratification

- somatic condition, anesthetic risk, thromboembolic/infectious risk, history of prior surgeries.

"Minimally sufficient, function-oriented" operative volume

- avoid both under-correction ("too little") and unnecessarily extended operative volume ("too much").

Linking "Quick Map" Rows to Clinical Decision-Making

A) Dominant anterior compartment defect (cystocele)

Recommended approach: Anterior colporrhaphy ± apical support.

In this setting, the aim of surgery is to restore bladder support structures and reduce urinary functional burden. If concomitant apical weakness is present, omission of apical support may increase the risk of early recurrence.

B) Dominant posterior compartment defect (rectocele)

Recommended approach: Posterior colporrhaphy ± perineorrhaphy.

The key objective is to restore continuity of the rectovaginal septum and posterior wall, thereby reducing defecatory symptoms. In distal support deficiency, perineorrhaphy helps stabilize functional outcomes.

C) Uterine/apical prolapse with desire for uterine preservation

Recommended approach: Sacrospinous/uterosacral hysteropexy or sacrohysteropexy.

Here, the clinical goal is to restore apical support while preserving the uterus.

Procedure selection is individualized according to reproductive and psychosexual preferences, technical feasibility, and risk profile.

D) Uterine prolapse without a need for uterine preservation

Recommended approach: Vaginal hysterectomy + apical suspension.

A major technical error in this category is completing hysterectomy without apical fixation. Without additional apical support, the risk of post-hysterectomy vault prolapse increases. Therefore, the "+ apical suspension" principle has practical mandatory value.

E) Post-hysterectomy vault prolapse

Recommended approach: Sacrocolpopexy or vaginal apical fixation.

In this condition, the underlying problem is loss of apical support. For long-term stability, it is important to centralize the apex and restore support at near-physiologic tension.

F) No planned sexual activity and high operative risk

Recommended approach: Colpocleisis (selective use).

Given shorter operative duration, relatively lower perioperative burden, and acceptable symptom control, this may be a rational option in high-risk/elderly patients. However, informed consent is essential, with explicit counseling regarding future sexual function limitations.

Major Failure Modes in Inappropriate Surgical Selection

Insufficient assessment of the apical component

→ functional dissatisfaction and recurrence despite anatomically "good" results.

Decision-making based only on anatomy

→ excessive operative volume in patients with low symptom burden.

Formalistic use of conservative management

→ premature surgical decisions without adequate incorporation of patient goals.

Excessive radicality

→ higher risk of complications, prolonged rehabilitation, and sexual/functional dissatisfaction.

Insufficient operative volume

→ residual defects and early re-presentation.

Practical Trade-Offs (What is gained at what cost?)

Uterine preservation

- high alignment with patient-centered goals
- higher technical selectivity and need for strict follow-up

Hysterectomy + apical suspension

- clear anatomical solution
- potentially greater operative volume and rehabilitation burden

Sacrocolpopexy

- potential for durable long-term apical stability
- higher material/technical/logistical demands

Colpocleisis

- acceptable practical risk-benefit balance in high-risk patients
- functional limitation (vaginal canal obliteration)

Final Conclusion for the Section

In POP, surgical selection is not merely choosing an operation name; it is a **goal-**directed clinical design. A rational surgical strategy emerges only when dominant compartment defects, apical support status, functional dysfunction, patient goals, and risk profile are integrated. The "quick map" standardizes this integration and converts decision-making into a reproducible and documentable format. As a result, it improves the likelihood of achieving not only anatomical correction but also durable functional improvement and quality-of-life stability.

2.3. § Selection Criteria for Organ-Preserving Surgery and Operative Approach

This section presents the clinical foundations of organ-preserving reconstructive management in genital prolapse. The core concept is that organ preservation is not simply "avoiding hysterectomy"; rather, it is an integrated model aimed at correcting anatomical defects, improving functional status, accounting for reproductive and psychological needs, and ensuring perioperative safety. Therefore, in operative

planning, technical feasibility should follow clinical purpose: in which patient, under which conditions, and with which organ-preserving approach can the most appropriate outcome be achieved?

Clinical Principles for Selecting Organ-Preserving Surgery

Selection for organ-preserving surgery is based on combined assessment of several criteria:

1. **Anatomical criteria**
    - compartmental structure of prolapse (anterior, apical, posterior);
    - presence of cervical elongation;
    - degree of preserved or weakened apical support;
    - coexistence of anterior/posterior wall defects.

In practical terms, these criteria define operative extent: whether isolated apical correction is sufficient or whether it should be combined with anterior colporrhaphy and posterior colpoperineoplasty.

2. **Functional criteria**
    - urinary dysfunction (frequency, urgency, stress component, sensation of incomplete bladder emptying);
    - defecatory symptoms (straining, incomplete evacuation, distal support insufficiency);
    - sexual discomfort;
    - degree of quality-of-life impairment (PFDI-20, PFIQ-7).

The aim of organ-preserving surgery is not merely anatomical “elevation,” but reduction of functional burden.

3. **Reproductive and psychological criteria**
    - explicit desire to preserve the uterus;
    - body-integrity and psycho-emotional considerations;
    - priority of maintaining sexual function;
    - realistic long-term expectations.

If these criteria are ignored, patient satisfaction may remain low despite good anatomical outcomes.

4. **Operative risk profile**
    - somatic comorbidities;
    - anesthetic risk level;
    - thromboembolic and infectious risk;
    - history of previous surgery and likelihood of adhesions.

The decision to preserve organs must never override safety; if risk is high, strategy should be reconsidered.

Indications for Organ-Preserving Surgery

Organ-preserving reconstructive management is clinically justified in the following settings:

- symptomatic uterine/apical prolapse with a patient preference for uterine preservation;
- uterine descent combined with cervical elongation;
- concomitant anterior and/or posterior compartment defects that are functionally reconstructable;
- overall condition compatible with reconstructive vaginal surgery;
- ability to comply with postoperative follow-up and rehabilitation.

Relative and Absolute Limitations

Conditions that may limit organ-preserving strategy must also be clearly assessed:

- clinical situations in which uterine preservation is inappropriate (e.g., pathologies requiring a more radical approach based on separate indications);
- decompensated systemic disease;
- high anesthetic risk;
- active inflammatory processes;
- mismatch between patient goals and expected outcomes of the selected procedure.

Incorrect decisions at this stage are a major source of subsequent complications and dissatisfaction.

Operative Approach: Combining Manchester Procedure with Anterior Colporrhaphy and Posterior Colpoperineoplasty

In more severe or combined prolapse patterns, isolated correction of a single compartment is often insufficient. Therefore, the selected operative model follows this logic:

- **apical component** — corrected via the Manchester procedure;
- **anterior compartment** — bladder support reinforced with anterior colporrhaphy;
- **posterior/distal support** — restored with posterior colpoperineoplasty.

The key advantage of this combined strategy is that it addresses not only the "visible" prolapse component but also clinically significant inter-compartment imbalance in a comprehensive manner.

Practical Indications for Manchester + Anterior Colporrhaphy + Posterior Colpoperineoplasty

This combination is particularly appropriate in the following settings:

1. Uterine prolapse associated with cervical elongation.
2. Clear cystocele in the presence of uterine/apical descent.
3. Posterior wall/perineal insufficiency or defecatory symptoms.
4. Patient preference for organ preservation and suitability for vaginal reconstructive surgery.

5. Need for maximal one-stage restoration of both anatomical and functional outcomes.

Technical Rationale: Why This Combination?

- The **Manchester component** restores apical centralization, addresses cervical elongation, and redistributes ligamentous support.
- **Anterior colporrhaphy** strengthens bladder support and reduces anterior wall laxity.
- **Posterior colpoperineoplasty** restores posterior and distal support and helps normalize genital hiatus function.

As a result, **apical + anterior + posterior/distal** components are corrected together, which increases the likelihood of more stable long-term functional outcomes.

Safety Principles: As operative scope increases in combined surgery, safety protocols must be strict:

1. **Preoperative preparation**
   - completion of full laboratory and instrumental evaluation;
   - anesthesiology assessment;
   - planning of infection and thromboembolism prophylaxis.
2. **Intraoperative safety**
   - precise dissection by anatomical planes;
   - control of risk zones related to bladder, ureter, and rectum;
   - stepwise hemostasis;
   - avoidance of excessive resection and over-tensioned suturing.
3. **Postoperative management**
   - monitoring for early complications (bleeding, infection, urinary retention, etc.);
   - dynamic assessment of functional outcomes;
   - structured rehabilitation and long-term follow-up plan.

Expected Clinical Outcomes: With correct patient selection and proper combined technique, the expected outcomes include:

- improved apical and vaginal support;
- reduced severity of urinary and defecatory symptoms;
- improved daily functioning and quality of life;
- higher patient-reported satisfaction;
- acceptable reduction in recurrence risk.

Section Conclusion: In POP, organ-preserving surgery is not merely a "uterus-preserving decision," but a goal-directed reconstructive strategy. Selection should be based on integration of anatomical defect patterns, functional needs, reproductive/psychological priorities, and safety profile. In appropriately selected patients, combining the Manchester procedure with anterior colporrhaphy and

posterior colpoperineoplasty is a clinically grounded approach for one-stage correction of multi-compartment defects.

Outcome Assessment Criteria and Follow-Up Protocol

This section presents a comprehensive model for evaluating the effectiveness of surgical treatment for genital prolapse. Assessment is not limited to anatomical correction; it integrates functional status, patient-centered outcomes, and the complication profile. The aim of this approach is to move beyond the statement "the operation was technically successful" and answer the clinically relevant question: "Did the patient's clinical condition and quality of life actually improve?"

Treatment outcomes are evaluated across four major domains:

1. Anatomical outcomes
2. Functional outcomes
3. Patient-centered outcomes
4. Safety and complication profile

Although each domain is independently important, the final clinical conclusion is based on their combined analysis.

Assessment of anatomical outcomes

Anatomical effectiveness is assessed dynamically using the POP-Q system.

Preoperative and postoperative findings are compared to determine:

- reduction in prolapse stage;
- stability of apical support;
- presence of residual defects in anterior and posterior compartments;
- newly developed or recurrent compartment imbalance.

A key interpretation principle is that complete anatomical "normalization" does not always equal clinical satisfaction. Therefore, POP-Q findings must be interpreted together with functional and subjective outcomes.

Assessment of functional outcomes

Functional assessment is one of the most important domains because it reflects the real-life impact of surgery. It includes:

A) Urinary function

- urinary frequency, urgency, stress component;
- episodes of urinary incontinence;
- sensation of incomplete bladder emptying;
- persistence or reduction of residual symptoms.

B) Bowel function

- straining during defecation;
- sensation of incomplete evacuation;
- gas/stool incontinence elements;
- dynamics of rectocele-related functional discomfort.

C) Sexual function

- discomfort or pain during sexual activity;
- prolapse-related psychofunctional limitation;
- postoperative adaptation and satisfaction.

Functional outcomes are not assessed as simple "present/absent" variables, but according to the degree of symptom reduction.

Safety profile and complication assessment

Safety assessment is based on systematic recording of early and late complications.

Early complications

- bleeding;
- infectious complications;
- urinary retention;
- wound-related problems.

Mid-term complications

- persisting or de novo functional symptoms;
- dyspareunia or perineal discomfort;
- early signs of recurrent anatomical descent.

Complication analysis includes not only frequency but also clinical significance (need for additional treatment, need for re-intervention, and impact on quality of life).

Follow-up protocol and time points

Follow-up is performed at standardized time points:

1. Early postoperative period
    - goal: identify early complications, assess primary recovery, ensure safety monitoring.
2. 6 months
    - goal: evaluate short-term anatomical and functional outcomes, and assess patient satisfaction and quality-of-life dynamics.
3. 1 year
    - goal: assess mid-term stability, estimate recurrence risk, and formulate individualized further recommendations.

At each visit, the same assessment module should be applied: clinical examination (POP-Q), functional symptoms, questionnaire results, and complication screening. This standardized approach ensures reliable comparability of outcomes.

Principle of outcome interpretation

Treatment effectiveness is interpreted using an integrated model rather than a binary "yes/no" format:

- anatomical improvement +
- reduction in functional symptoms +
- quality-of-life improvement +
- acceptable safety profile.

If only anatomical indicators improve while functional or patient-centered outcomes remain insufficient, overall effectiveness is considered limited. Conversely, even if anatomy is not absolutely ideal, a stable functional and subjective improvement is considered a clinically favorable result in practical terms.

Recurrence risk assessment and further clinical recommendations

Based on follow-up findings, recurrence risk is assessed individually. When risk-enhancing factors are identified, the following measures are recommended:

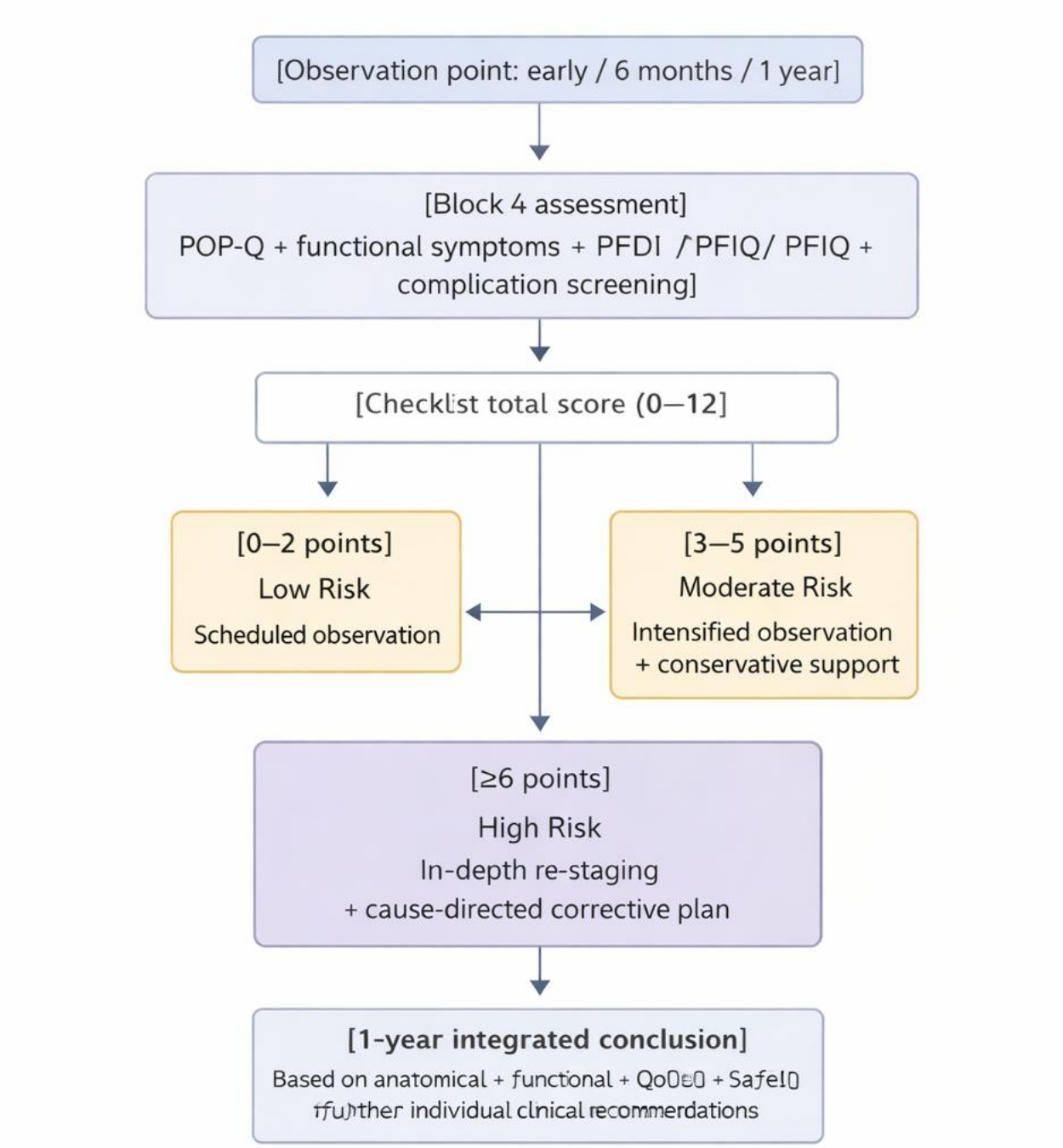
- intensified rehabilitation program;
- individualized lifestyle and load-management recommendations;
- targeted conservative support;
- joint follow-up with subspecialists when needed.

Thus, follow-up is not only a monitoring step but also a preventive stage aimed at reducing the risk of deterioration.

Table 2.4. Outcome Domains, Indicators, Methods, and Time Points

Assessment domain	Key indicators	Assessment method	Time point
Anatomical outcome	POP-Q point dynamics; stage reduction; apical support stability; residual/new compartment defects	Gynecological examination + POP-Q protocol	Pre-op, early post-op, 6

Assessment domain	Key indicators	Assessment method	Time point
			months, 1 year
Urinary function	Frequency, urgency, stress component, incomplete emptying sensation, residual symptoms	Targeted clinical interview + relevant PFDI-20 items	Pre-op, 6 months, 1 year
Bowel function	Straining, incomplete evacuation sensation, gas/stool incontinence elements, defecatory discomfort	Clinical interview + PFDI-20 (CRAD domain)	Pre-op, 6 months, 1 year
Sexual function	Dyspareunia, sexual discomfort, psychofunctional limitation dynamics	Confidential targeted survey/interview	Pre-op, 6 months, 1 year
Patient-centered outcome	Symptom reduction, restoration of daily activity, subjective satisfaction	PFIQ-7 + patient global assessment	Pre-op, 6 months, 1 year
Safety profile	Early complications (bleeding, infection, retention), late complications (dysfunction, discomfort, signs of recurrent descent)	Clinical examination, additional tests if indicated	Early post-op, 6 months, 1 year
Overall effectiveness	Integrated anatomical + functional + QoL outcome	Multicriteria clinical consensus conclusion	1 year



This checklist is an integrated postoperative follow-up tool for severe pelvic organ prolapse (POP). Patients are evaluated at three time points—early postoperative, 6 months, and 1 year—across four domains: anatomical status (POP-Q), functional symptoms, quality of life (PFDI/PFIQ), and complication screening. Each domain is scored, producing a total score from 0 to 12. Scores are interpreted as follows: 0–2 = low risk (scheduled routine follow-up), 3–5 = moderate risk (intensified follow-up plus conservative support), and ≥6 = high risk (in-depth re-staging and cause-

directed corrective plan). At 1 year, findings are synthesized into an integrated conclusion to guide individualized further clinical recommendations.

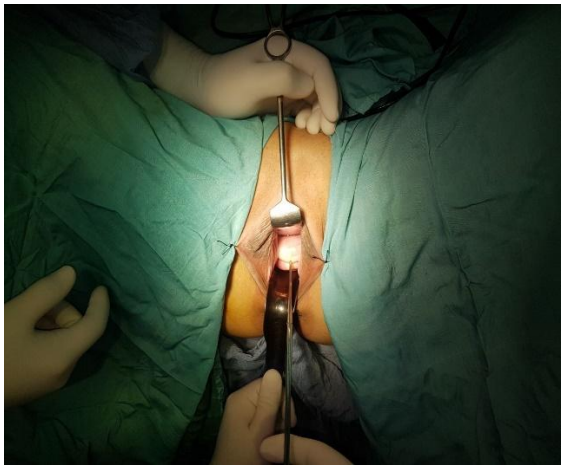
CHAPTER III. RESULTS OF ORIGINAL RESEARCH

3.1 § Organ-Preserving Surgical Technique in Women with Genital Prolapse

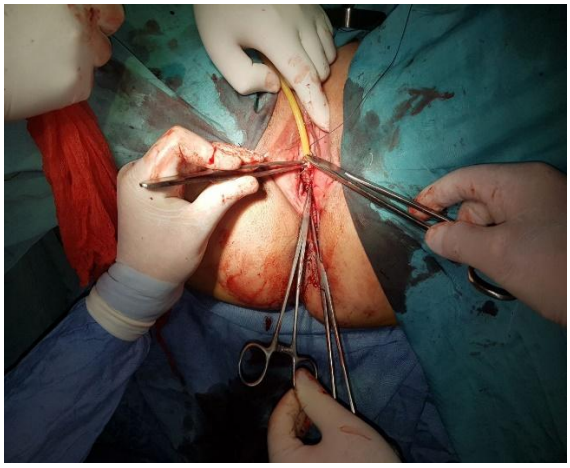
In the patients of our main study group, who presented with pelvic organ prolapse, we performed a specially developed surgical procedure that was selected as the treatment of choice by our team.

Scope of surgery: amputation of the elongated cervix, shortening of the cardinal ligaments, anterior colporrhaphy (elevation of the stretched/prolapsed anterior vaginal wall and bladder), and posterior colpoperineolevatorplasty (restoration of the normal anatomical relationship between the vaginal and rectal walls).

Operative stages: The patient is placed on the operating table in the lithotomy position (legs abducted and fixed in special stirrups). The external genitalia and vagina are prepared with 70% ethyl alcohol and 2% iodine solution. The operative field is draped with sterile surgical sheets. The vagina is exposed with specula, and the cervix is grasped with tenaculum forceps, gently tractioned anteriorly, and the mucosa of the posterior cervical wall is incised, dissected, and displaced downward (Figures 2.2 and 2.3).



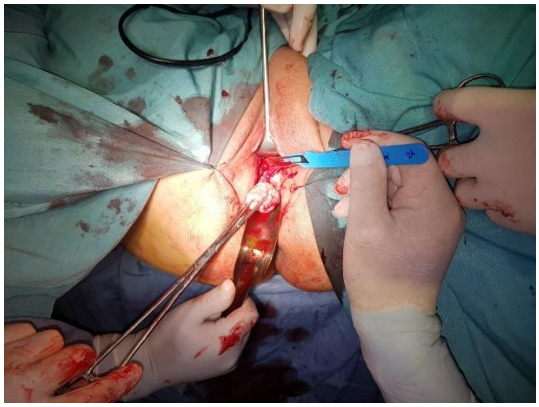
Figures 3.1



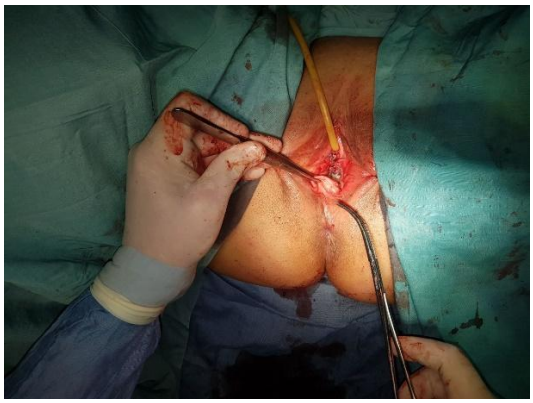
Figures 3.2

The anterior vaginal wall is incised in a rhomboid fashion and dissected; the bladder is elevated and sutured in the corrected position. A clamp is applied to the cardinal

ligament and the uterine artery (a. uterina), then they are transected and ligated. The same steps are performed on the contralateral side, and the elongated cervix is removed. In the subsequent stage, posterior colpoperineolevatorrhaphy is performed (Figures 3.3 and 3.4).



Figures 3.3



Figures 3.4

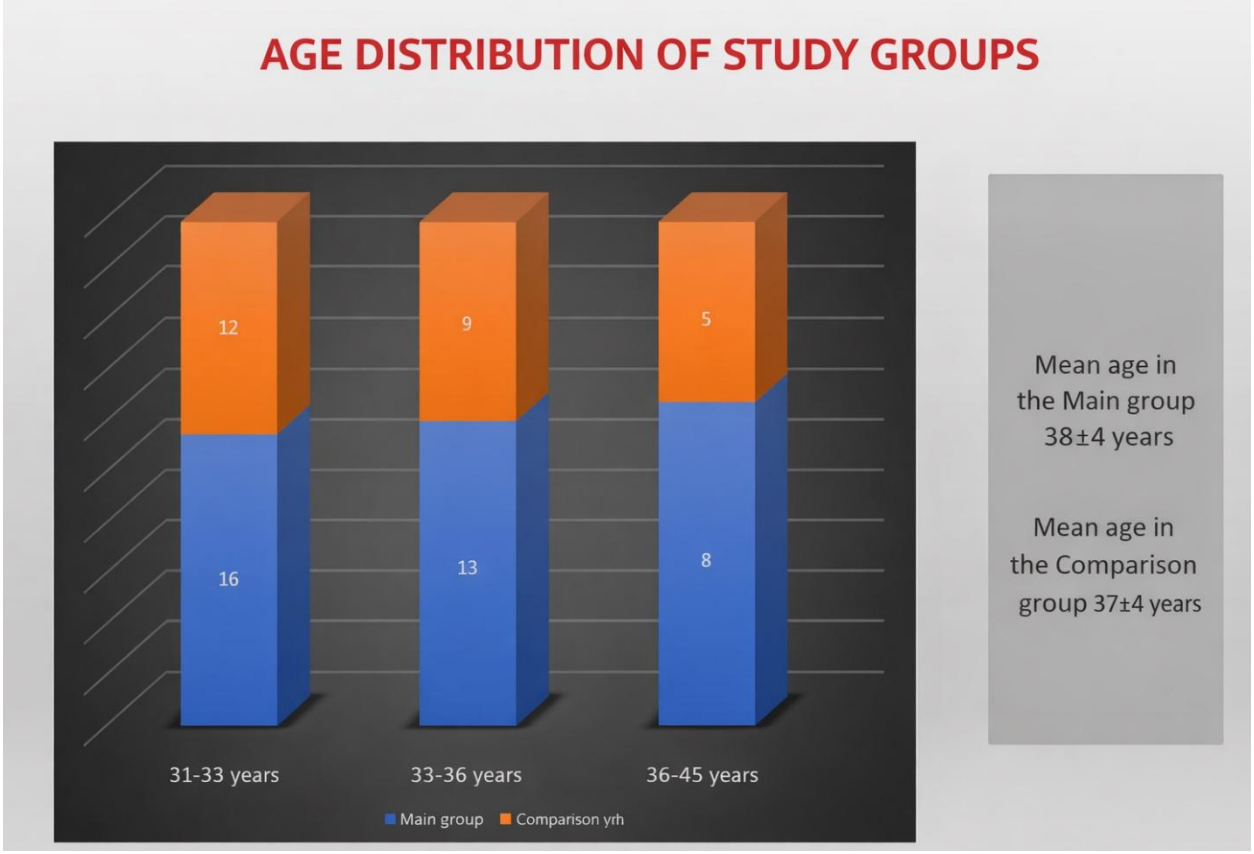
The advantages of the performed surgical procedure are as follows: urinary function improves, and dysuric symptoms and urinary incontinence are not observed. Patients are mobilized early and are typically discharged home within 4–5 days. In severe prolapse, this organ-preserving surgical approach enables complete relief from prolapse-related clinical manifestations and ensures improvement in women's quality of life in both the early and long-term postoperative periods. In addition, in women of reproductive age, sexual quality of life is fully restored, and the desire for planned pregnancy is observed to return.

3.2. § Clinical Characteristics of the Study Patients

The surgical procedure selected for the treatment of pelvic organ prolapse in women provides not only the opportunity to achieve the intended technical outcome, but also to ensure complete correction of genital prolapse and elimination of many associated complications. At the same time, by preserving reproductive organs, it creates broad opportunities for maintaining women's reproductive potential. To evaluate the effectiveness of the developed method, a comparative analysis was conducted of outcomes in the early postoperative period as well as expected long-term results. All patients presenting with genital prolapse underwent thorough

evaluation. Their age, disease history, complaints, degree of genital prolapse, comorbid conditions, postoperative course, recurrence, observed complications, gynecological findings, responses to standardized questionnaires, and results of specialized and instrumental examinations were assessed.

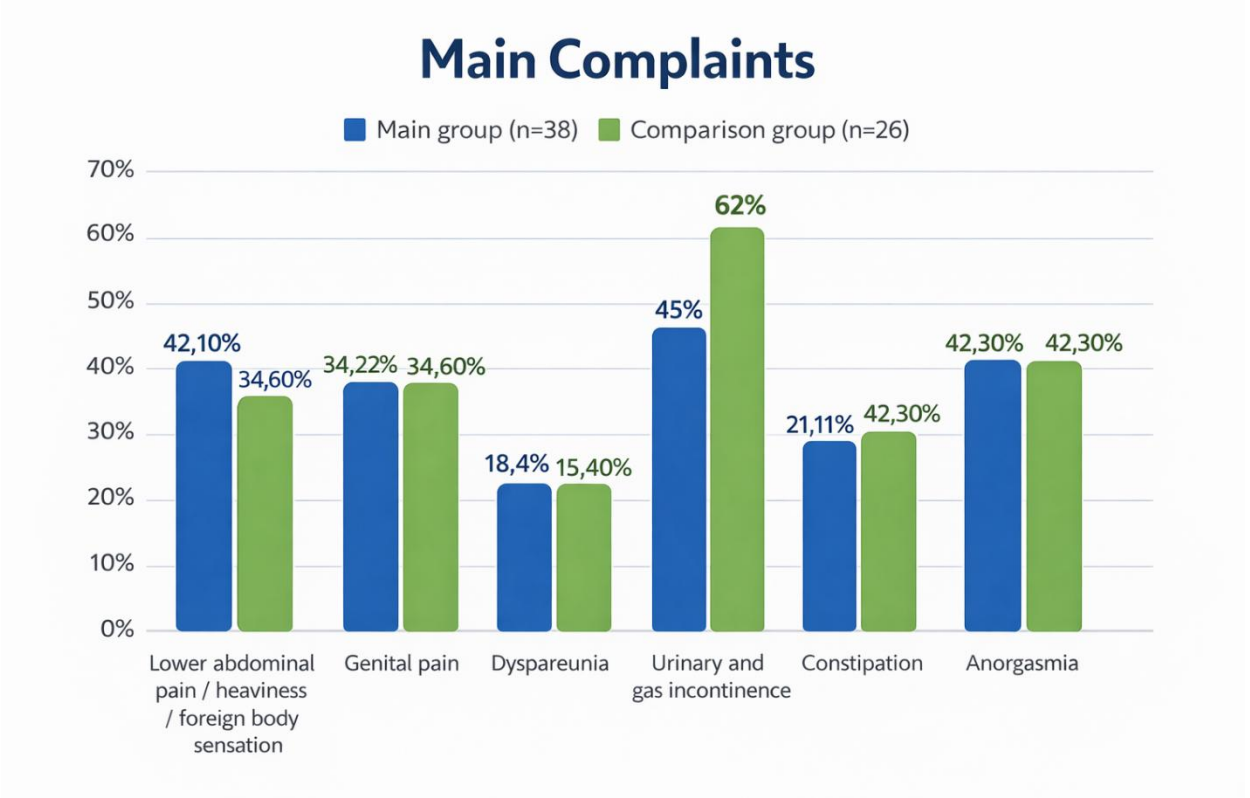
Age distribution of the study groups: The patients' ages ranged from 31 to 45 years. In Group I (n = 38), 42.1% were aged 31–33 years, 34.2% were aged 33–36 years, and 23.7% were aged 36–45 years. In Group II, 46.2% were aged 31–33 years, 34.6% were aged 33–36 years, and 19.2% were aged 34–45 years.The mean age in the main group was years, while in the comparison group it was 38 ± 4 years. No statistically significant age-related differences were identified between the groups (Figure 3.5).



In the next stage of our study, the main complaints of patients presenting with genital prolapse were investigated and analyzed.

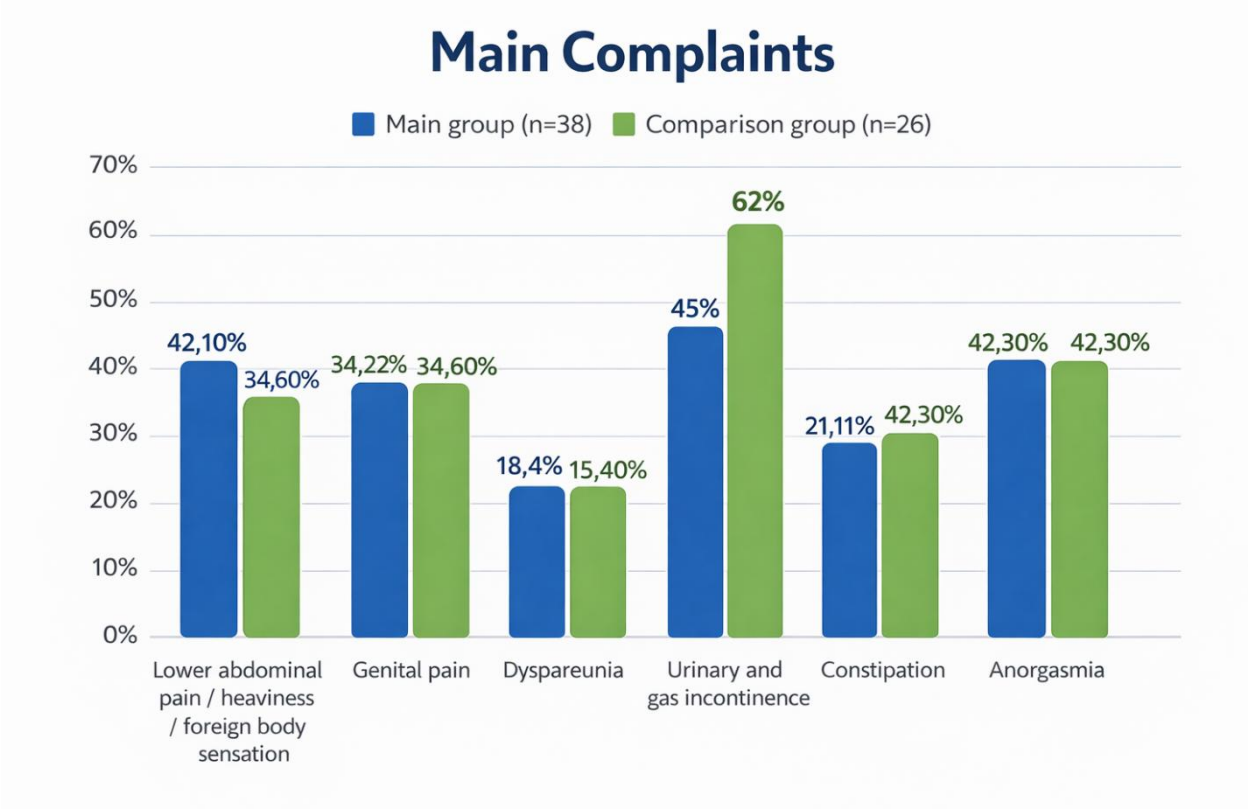
In the main group, 16 patients (42.1%) complained of lower abdominal pain and a foreign body sensation, while in Group II this complaint was reported by 9 patients

(34.6%). Dyspareunia was observed in 7 patients (18.4%) in Group I and 4 patients (15.4%) in Group II. Genitalgia was reported in 13 patients (34.2%) in Group I and 9 patients (34.6%) in Group II. Complaints of urinary and gas incontinence were noted in 17 patients (44.7%) in Group I and 16 patients (61.5%) in Group II. Constipation was reported by 8 patients (21.05%) in the main group, whereas 11 patients (42.3%) in Group II presented with this complaint. In addition, anorgasmia was reported by 15 patients (39.5%) in Group I and 11 patients (42.3%) in Group II (Diagram 3.2).



When analyzing the obstetric history of the patients, the number of women with one prior delivery was 12 (31.5%) in the main group and 9 (34.6%) in the comparison group. Women with two or more deliveries accounted for 26 (68.5%) in Group I and 17 (65.4%) in Group II. A history of induced abortion was recorded in 7 patients (18.4%) in Group I and 5 patients (19.2%) in Group II. Delivery of a macrosomic fetus was noted in 16 patients (42.1%) in Group I and 9 patients (34.6%) in Group II. Breech presentation occurred in 4 patients (10.5%) in Group I and 3 patients (11.5%) in Group II. In addition, cesarean delivery for various indications was

reported in 11 patients (28.9%) in Group I and 9 patients (34.6%) in Group II (Diagram 3.3).

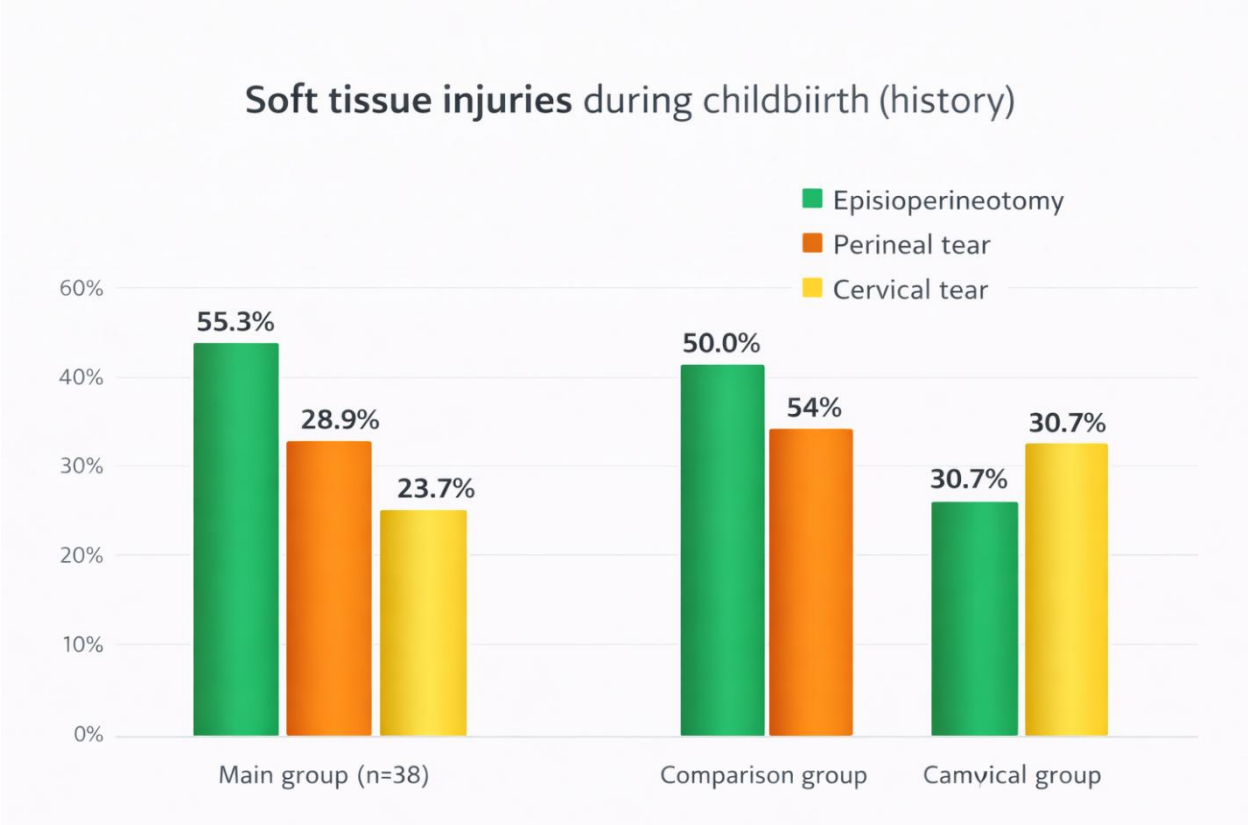


By analyzing the course of labor, it can be stated that in 60.2% of cases, obstetric assistance was required during childbirth or complications developed, which later became one of the causes of pelvic organ prolapse (descent and protrusion of the internal genital organs).

Among the patients, episiotomy and perineotomy were performed in 21 women (55.3%) in Group I and 13 women (50.0%) in Group II. Perineal tears of varying degrees were observed in 11 women (28.9%) in Group I and 14 women (53.8%) in Group II. In addition, cervical tears were recorded in 9 women (23.7%) in Group I and 8 women (30.7%) in Group II (Figure 3.4).

It should be emphasized that fewer childbirth-related complications were observed in the control group. Such complications, including episiotomy and/or perineotomy as well as cervical tears, and the use of obstetric surgical procedures during labor

may lead to serious consequences and significantly contribute to the development of severe forms of genital prolapse.

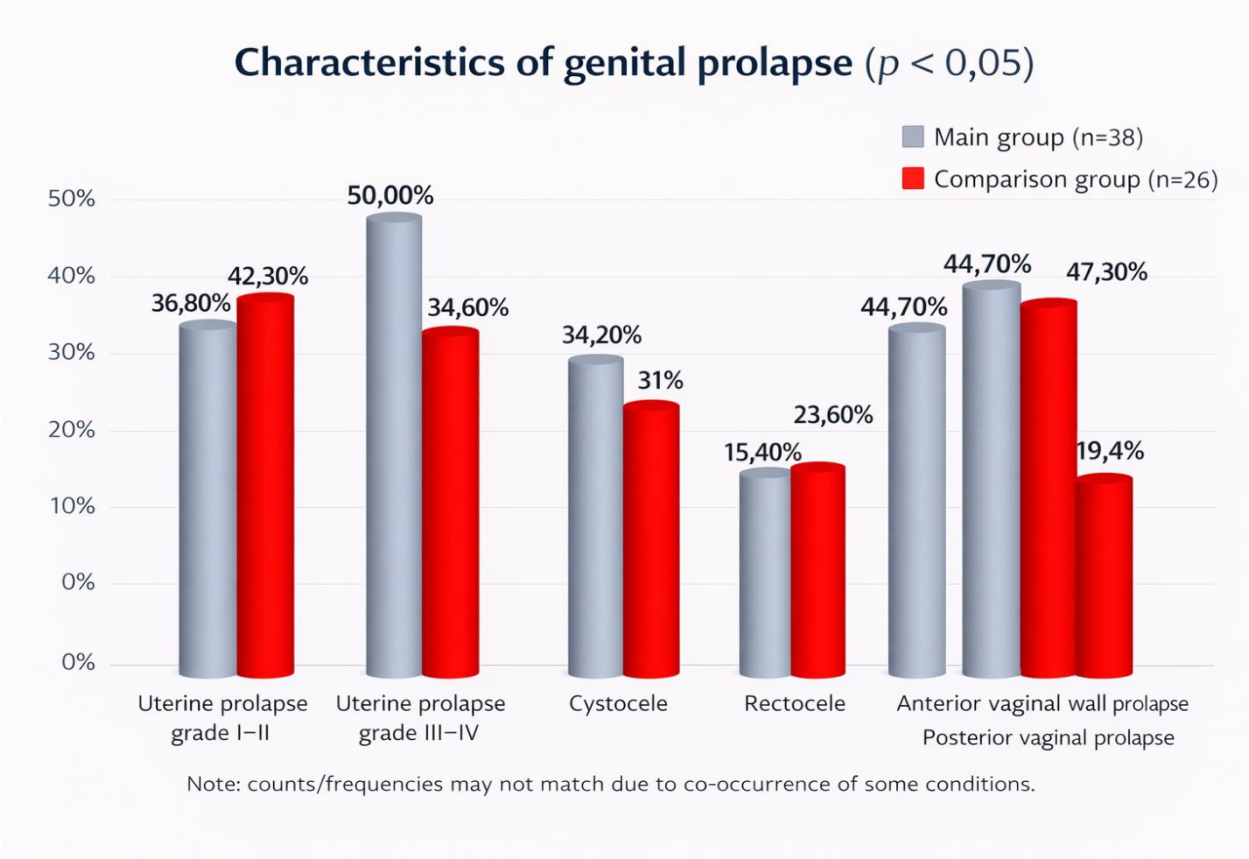


According to the POP-Q (Pelvic Organ Prolapse Quantification) classification proposed by the ICS (International Continence Society), analysis of prolapse characteristics showed the following:

In the main group, stage I–II uterine prolapse was observed in 14 patients (36.8%), while in the comparison group this figure was 11 patients (42.3%). Stage III–IV uterine prolapse was identified in 19 patients (50.0%) in the main group and in 9 patients (34.6%) in the comparison group.

In addition, prolapse of adjacent organs was also noted. In the main group, cystocele was found in 13 patients (34.2%) and rectocele in 9 patients (23.6%). In the comparison group, these values were 8 patients (30.7%) and 4 patients (15.4%), respectively.

Anterior and posterior vaginal wall prolapse was detected in 17 patients (44.7%) and 18 patients (47.3%) in the main group, whereas in the comparison group these figures were 11 patients (42.3%) and 6 patients (23.07%), respectively (Figure 3.5).



3.3. § Evaluation of short-term and long-term outcomes after surgical treatment of genital prolapse.

Women under our observation underwent general clinical and laboratory examinations at Samarkand City Maternity Complex No. 3 and at the private clinic “Samarkand Doctor Shifo Bakht” in Samarkand. After assessment by an anesthesiologist, internist, and cardiologist, the patients were admitted to the Gynecology Department of the “Samarkand Doctor Shifo Bakht” clinic. Patients in both groups were selected to be comparable in age, somatic status, gynecological morbidity, and medical history.

We studied somatic status, reproductive history, gynecological diseases, details of the primary surgical intervention, duration of the postoperative period, and specific postoperative findings. In the postoperative period, short-term and long-term

outcomes were evaluated, including disability status, complaints, quality of life, the effect of symptoms on daily activities, and sexual function index. Data were collected using specialized questionnaires (PFDI-20, PFIQ-7, and FSFI) and gynecological examinations at follow-up intervals from 1 month to 3 years.

Characteristics of the surgical period and short-term postoperative outcomes: The age of the patients ranged from 31 to 45 years. In Group I (38 patients), the age distribution was as follows: 31–33 years — 42.1%, 33–36 years — 34.2%, and 36–45 years — 23.7%. In Group II, the distribution was: 31–33 years — 46.2%, 33–36 years — 34.6%, and 34–45 years — 19.2%. The mean age in the main group was __ years, and in the comparison group it was 38±4 years. No significant age-related differences were identified between the groups.

All women included in the study were examined according to a unified standard: history taking, general examination, gynecological examination, and bimanual vaginal examination. During examination, we assessed the condition of the vaginal mucosa, the position of the cervix relative to the hymenal ring, its shape and mobility, uterine position, and degree of tenderness on palpation.

Using our proposed method for correction of genital prolapse, the duration of surgery ranged from 45 to 60 minutes, with a mean of 52.5±1.5 minutes. All surgical steps were performed via a transvaginal approach, and all complications caused by the disease were eliminated in 100% of cases. In the comparison group, surgical management was not standardized and was selected according to prolapse characteristics and clinical presentation; as a result, various disease-related complications and clinical symptoms persisted in the postoperative period in some patients.

Intraoperative blood loss in the main group was reported as 300–400 ml, with an average of 250±10 ml. More substantial blood loss was observed in the comparison group, depending on the extent of the operation: 400–500 ml, averaging 300±50 ml.

No additional intraoperative complications were observed in the main group. In the comparison group, urinary tract injury was recorded in 4 patients (15.38%).

To confirm the effectiveness of the surgical method used for genital prolapse, we analyzed the characteristics of the early postoperative course. The following parameters were compared: operation duration, blood loss volume, maximum body temperature increase, tissue recovery, drainage features at the surgical site, number of women with stump-related changes and infiltrates, length of postoperative hospital stay, and recovery/response time.

Indicators	Groups	Value	Outcome
Tissue healing	Main group (n=38)	88,1%	positive
	Таққослаш гуржи (n=26)	41,9%	positive
Culitis, infiltrate	Main group (n=67)	—	not observed
	Таққослаш гуржи (n=31)	29,3%	observed
Psycho-emotional state	Main group (n=67)	90%	good
	Таққослаш гуржи (n=31)	64%	good
Response time	Main group (n=67)	4–5	good
	Таққослаш гуржи (n=31)	7–10	satisfactory
After surgery recurrence	Main group (n=38)	—	—
	Таққослаш гуржи (n=26)	29%	observed
After surgery recurrence	Main group (n=38)	—	—
	Таққослаш гуржи (n=26)	29%	observed

As shown in the table, the method we proposed improves tissue repair and trophic support. This, in turn, promotes faster wound healing, enables earlier mobilization, and completely prevents stump inflammation and infiltrate formation in tissues. In the main group, improved tissue repair was observed in 88.1% of patients, which is almost twice as high as in the comparison group.

Another key advantage of our method is that improved tissue perfusion and healing help prevent stump inflammation and infiltrate formation in the early postoperative

period. In the comparison group, stump inflammation/infiltrate formation was observed in 9 patients (29.3%) after surgery, which consequently prolonged the length of hospital stay.

During postoperative inpatient monitoring, in the main group, 7 patients (18.4%) had a body temperature up to 37.3°C that persisted for 2–3 days.

The developed method was also associated with the absence of early postoperative complications and earlier ambulation. Most patients in the main group—32 women (84.21%)—stayed in hospital for 4–5 days after surgery. In the comparison group, postoperative hospitalization was typically 8–10 days; if surgery was performed via an abdominal approach, hospitalization exceeded 10 days. This is nearly twice as long as in the main group. In summary, considering patients' age and medical history, earlier discharge in the main group had a favorable effect on psycho-emotional status.

The implementation of the selected surgical technique for genital prolapse makes it possible to significantly reduce operative time, blood loss, postoperative complications, and total hospital bed-days. This is particularly important in patients undergoing repeat surgery for genital prolapse, as it reduces concern about recurrence and significantly improves psycho-emotional well-being.

3.4. § Evaluation of long-term postoperative outcomes

Long-term postoperative outcomes were assessed at 6, 12, and 24 months after hospital discharge. Nearly all women who underwent surgery with the proposed technique reported satisfaction with the treatment results. During follow-up interviews and clinical examinations, no postoperative complaints related to pelvic floor dysfunction, quality of life, or sexual function were identified.

Complaints associated with pelvic floor dysfunction, quality of life, and sexual function were evaluated using specialized questionnaires:

PFDI-20 (Pelvic Floor Distress Inventory-20) — an index used to assess the severity of pelvic floor dysfunction symptoms.

PFIQ-7 (Pelvic Floor Impact Questionnaire-7) — an instrument used to evaluate the impact of pelvic floor dysfunction on quality of life, including psychological and social domains.

The questionnaire below, used to assess pelvic floor dysfunction, includes three stages.

At stage 1, complaints related to the genital organs are evaluated; at stage 2, complaints related to the gastrointestinal tract are assessed; and at stage 3, complaints related to the urinary system are examined.

PEDI-20

	Main group (n=38)			Comparison group (n=26)			
	Pre-op	6 months post-op	12 months post-op	Pre-op	6 months post-op	12 months post-op	24 months post-op
(POPDI-6)	91 points	20,8 points	8,33 points	98 points	25 points	36,4 points	30,9 points
(CRAD-8)	80 points	15,4 points	5,4 points	45 points	18 points	26.5 points	17.5 points
(UDI-6)	77 points	23,4 points	6 points	74 points	24 points	38.4 points	25.7 points
(POPDI-6)	91 points	20.8 points	8.33 points	98 points	25 points	36.4 points	30.9 points
(CRAD-8)	80 points	15.4 points	5.4 points	45 points	18 points	26.5 points	17.5 points
(UDI-6)	77 points	23.4 points	6 points	74 points	24 points	38.4 points	25.7 points

Using the questionnaire-based point scoring system, assessment of pelvic floor dysfunction after the improved surgical procedure demonstrated significant positive outcomes.

Specifically, before surgery, the score for stage 1 questions was 91 points; at 24 months after surgery, this decreased to 4.1 points. For stage 2 questions, the baseline score was 80 points, which declined to 3.12 points at 24 months. For stage 3 questions, the initial score was 77 points, and this later decreased to 2 points.

As shown in Table 4.6, in the comparison group some complaints persisted, and in certain cases these complaints increased during the postoperative period.

For the PFIQ-7 (Pelvic Floor Impact Questionnaire-7), which was used to evaluate the psychological and social impact of pelvic floor dysfunction on quality of life, the following preoperative results were obtained.

Long-term outcomes after surgery

Questionnaire	Long-term outcomes					
	Bladder/urinary		Bowel/rectum		Uterus or pelvic organ prolapse	
	Pre-op	12 months	12 mo	24 months	12 months	24 months
PFIQ-7						
Main group (38 patients)	88.9	14.2 points	02points	0	0	0
Comparison group (26 patients)	69.5	22,85 points	22,85 points	16,7 points	0	0
PFIQ-7						
Main group (38 patients)	69.5	22,85 points	—	0	0	0
Comparison group (26 patients)	69.5	22,85 points	22,85 points	16.7 points	4.76 points	29.9 points

Thus, the subjective severity of symptoms and their impact on functional, psychological, and social components of quality of life were assessed. The PFDI-20 and PFIQ-7 questionnaires included evaluation of symptom severity associated with genital prolapse, as well as subjective assessment of lower gastrointestinal dysfunction and urinary symptoms.

Analysis of the study results showed that the PFDI-20 and PFIQ-7 questionnaires are reliable and valid instruments for assessing quality of life in patients with pelvic organ prolapse, and they can also be used to evaluate the subjective effectiveness of surgical treatment in patients operated on for these conditions.

In our main group, interviews with all 38 patients showed that 100% of women reported a marked improvement in overall health status after surgery compared with their preoperative condition and complaints.

CONCLUSIONS

Based on the conducted research on the topic “Exploring the possibilities of organ-preserving reconstructive surgery in severe female genital prolapse”, the following expanded conclusions can be formulated.

Severe pelvic organ prolapse (POP) should not be interpreted as an isolated anatomic descent only. In real clinical practice, it represents a complex and progressive disorder that combines structural failure of pelvic support with functional, psychosocial, and quality-of-life impairment. Our clinical observations support the idea that this pathology increasingly affects women of reproductive age, not only older age groups as traditionally assumed. This age shift has major implications: disease burden appears earlier in life, symptoms persist longer, and the cumulative effect on work, social participation, sexual function, and family life becomes significantly greater. In the studied cohort, complicated obstetric history emerged as one of the strongest background factors associated with severe pelvic floor failure. This trend confirms that modern POP management must move from a “late-stage correction” model to an “early-risk recognition and personalized reconstruction” model.

A key conclusion of this work is that severe POP (stages III–IV) requires integrated compartment-based assessment and cannot be adequately managed by a single-template operation. The anterior, apical, and posterior compartments are functionally interdependent. Surgical correction focused on only one compartment may yield temporary anatomical improvement, but often leaves the patient with persistent symptoms or predisposes to recurrent imbalance in another compartment. Therefore, preoperative planning must include systematic evaluation of dominant and associated defects, with explicit correlation between anatomy and symptoms. This methodological principle is central to obtaining stable medium-term outcomes and reducing avoidable re-interventions.

Our analysis of available surgical options in severe prolapse confirms that multiple procedures are currently used in practice, including anterior colporrhaphy, posterior

colpoperineorrhaphy, Manchester-type operations, and other fixation approaches. However, the mere availability of procedures does not guarantee durable success. Conventional approaches, when applied non-selectively, may still be followed by considerable rates of complications and recurrence. In the analyzed clinical material, previously observed complication/recurrence patterns remained clinically relevant, demonstrating that technique selection is more important than technique availability. The decisive factor is not "which operation is popular," but "which operation best matches this specific patient's defect pattern and functional priorities."

A particularly important finding is that individualized combined surgery (one or two procedures selected according to prolapse phenotype and symptom profile) provides better clinical stability than isolated, non-individualized correction. In women with severe stage III–IV prolapse, combining reconstructive steps based on actual compartment pathology was associated with approximately two-fold reduction in unfavorable long-term outcomes compared with less tailored approaches. This supports a practical surgical doctrine: in severe prolapse, operation volume should be clinically sufficient and function-oriented, not minimally symbolic and not unnecessarily radical. Adequacy, not extremity, determines long-term success.

The study also demonstrates that severe prolapse in reproductive-age women has a multidimensional burden extending far beyond gynecologic discomfort. It affects routine mobility, daily work capacity, emotional stability, intimate relationships, and social confidence. Functional disturbances—especially urinary symptoms, bowel dysfunction, and sexual complaints—are often the determinants of actual suffering. In many patients, symptoms such as urinary leakage, gas incontinence, genital discomfort, dyspareunia, reduced sexual confidence, and anorgasmic complaints lead to social withdrawal and reduced quality of life. Therefore, clinical success must not be measured only by prolapse stage reduction; it must include restoration of daily and psychosocial functioning.

Another major conclusion is methodological: outcome evaluation in severe POP must be multidomain and longitudinal. A purely anatomical endpoint is insufficient

for real-world effectiveness assessment. In this study, we used an integrated follow-up concept with fixed time points (early postoperative, 6 months, and 1 year) and standardized assessment blocks:

- anatomic result (POP-Q dynamics),
- functional result (urinary, bowel, sexual domains),
- patient-centered result (symptom burden and quality of life),
- safety profile (early and delayed complications).

This framework allows objective differentiation between:

1. technical success without meaningful functional benefit,
2. balanced success with both structural and subjective improvement, and
3. high-risk trajectories requiring early corrective action.

The patient-reported outcome data further strengthen this conclusion. Structured questionnaires demonstrated substantial postoperative improvement in symptom burden and quality-of-life indices. The reported changes in PFDI-20 and PFIQ-7 scores indicate clinically meaningful reduction of pelvic floor-related distress and practical recovery of social functioning. Importantly, these improvements were not limited to one domain; they appeared across multiple symptom clusters, suggesting that appropriately selected reconstructive surgery can provide broad functional benefit rather than only local anatomical correction. This supports the use of validated questionnaires as routine follow-up instruments, not optional research tools.

Safety analysis showed that early and mid-term complications remain possible and should be expected as part of realistic counseling, but their impact is strongly influenced by operative planning quality, perioperative protocol adherence, and follow-up intensity. Bleeding, infection, urinary retention, perineal discomfort, and de novo symptoms are clinically significant not merely by frequency but by their consequences: need for additional treatment, effect on rehabilitation, and impact on

quality of life. Therefore, complication analysis must include severity and practical burden, not only incidence reporting. A clinically useful safety model is one that links each complication pattern to a predefined response pathway (observation, conservative support, targeted correction, or re-staging).

The proposed follow-up algorithm (early / 6 months / 1 year) is a practical outcome of this work and can be used as a reproducible clinical standard in routine care. By combining POP-Q findings, functional symptom dynamics, validated patient questionnaires, and complication screening into a single scoring/stratification logic, clinicians can identify low-, moderate-, and high-risk recovery trajectories. This allows proactive rather than reactive management. In other words, follow-up becomes not just a reporting formality but an active preventive tool against deterioration and recurrence.

From an organ-preservation perspective, the study supports the clinical value of reconstructive strategies aimed at preserving anatomy and function whenever indications are appropriate. Organ-preserving surgery should not be considered a "compromise" option; in carefully selected severe prolapse cases it can be a rational and effective strategy with substantial quality-of-life gains. At the same time, patient selection remains critical. Organ-preserving intent must be guided by explicit criteria: prolapse phenotype, tissue status, functional burden, reproductive and sexual priorities, somatic risk profile, and expected adherence to follow-up. The right question is not whether organ preservation is generally better, but in whom it is truly beneficial and durable.

A practical contribution of this research is the transition from procedure-centered thinking to decision-centered surgery. The decision pathway proposed in this work can be summarized as:

1. Standardized preoperative phenotyping (anatomy + function + patient goals),
2. Compartment-balanced operation planning,
3. Function-oriented reconstruction (not anatomy-only correction),

4. Structured postoperative surveillance with early risk stratification,
5. Cause-directed intervention in moderate/high-risk trajectories.

This model improves consistency of care and reduces dependence on purely subjective operator preference.

In broader clinical terms, the study confirms that severe genital prolapse in reproductive-age women is not a narrow specialty issue but a public health and women's quality-of-life issue. Earlier recognition of high-risk profiles (especially after complicated obstetric history), timely referral, and access to individualized reconstructive treatment can reduce long-term disability and social burden. The findings therefore support stronger integration between urogynecologic assessment, reproductive counseling, and rehabilitation follow-up.

Final integrated conclusion

The conducted research demonstrates that in severe female genital prolapse:

- the disease is increasingly encountered in younger, including reproductive-age, women and has progressive clinical behavior;
- severe stages require integrated compartment-based diagnosis and individualized operative planning;
- non-selective single-technique correction is less reliable in the long term than phenotype-based combined reconstructive strategies;
- individualized combined surgery can significantly decrease unfavorable long-term outcomes, including recurrence tendency;
- treatment effectiveness must be evaluated by a multidomain model (anatomical + functional + patient-centered + safety), not anatomy alone;
- structured follow-up at early, 6-month, and 1-year points is essential for objective assessment and early preventive correction;
- validated symptom/quality-of-life tools (including PFDI-20 and PFIQ-7) are highly informative for real clinical benefit assessment;

- organ-preserving reconstructive surgery, when applied according to clear indications, is a clinically justified approach that improves both function and quality of life.

In summary, this work substantiates a clinically practical and scientifically grounded framework for managing severe genital prolapse: personalized, organ-preserving, function-oriented reconstructive surgery with standardized long-term outcome control. This framework can be used as a methodological basis for institutional protocols, clinical training, and further prospective research.

PRACTICAL RECOMMENDATIONS

1. **Implement a standardized preoperative assessment pathway for all women with suspected severe POP.**
   Routine evaluation should include structured symptom history, compartment-focused pelvic examination, POP-Q staging, and targeted functional assessment (urinary, bowel, and sexual domains). This prevents anatomy-only decision-making and improves surgical planning accuracy.

2. **Use compartment-based surgical planning rather than a single-technique approach.**
   In stage III–IV prolapse, anterior, apical, and posterior defects should be analyzed as an integrated complex. Isolated correction of one compartment should be avoided when multi-compartment dysfunction is present, as this increases the risk of persistent symptoms and recurrence.

3. **Define explicit criteria for selecting organ-preserving reconstructive surgery.**
   Candidate selection should be based on prolapse phenotype, functional burden, age, reproductive priorities, sexual activity goals, and somatic risk profile. Organ preservation should be considered a planned strategy, not an incidental intraoperative choice.

4. **Apply combined reconstructive procedures when clinically indicated.** In severe prolapse with mixed compartment defects, combining procedures (e.g., apical support with anterior/posterior repair) is recommended when it improves anatomical balance and functional outcomes. Operation volume should be clinically sufficient and function-oriented.
5. **Use validated patient-reported outcome measures in routine practice.** PFDI-20 and PFIQ-7 should be recorded preoperatively and during follow-up (6 and 12 months) to objectively quantify symptom burden and quality-of-life change. This enables evidence-based comparison of treatment effectiveness over time.
6. **Establish a fixed postoperative follow-up schedule with the same assessment module at each visit.** Follow-up should be performed in the early postoperative period, at 6 months, and at 1 year. Each visit should include POP-Q reassessment, functional symptom review, complication screening, and patient-centered outcome evaluation for reliable longitudinal comparison.
7. **Introduce recurrence-risk stratification into daily clinical workflow.** At each follow-up point, patients should be categorized into low-, moderate-, or high-risk trajectories based on integrated anatomical, functional, and symptom-progression signals. Moderate/high-risk patients require intensified surveillance and early corrective measures.
8. **Strengthen perioperative safety and rehabilitation protocols.** Standardized prevention of bleeding, infection, urinary retention, and pelvic floor deconditioning should be incorporated into care pathways. Early rehabilitation counseling (load management, bowel/voiding hygiene, pelvic floor support) should be individualized to reduce late dysfunction and recurrence risk.

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