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Research Article

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# Vaginal Restoration After Vaginal Delivery Commentary Review Regarding Pathophysiology, Assessment, Evidence-Based Management, Surgical Techniques and Outcomes

**Inas Taha[1] and Raouf Roshdy[2]***

[1]*Mayaseen Foundation for Public Health, Iraq*

[2]*Egypt Health Foundation, Egypt*

***Corresponding Author**
Raouf Roshdy, Egypt Health Foundation, Egypt.

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## 1. Definition & Terminology

### 1.1. Vaginal Laxity (VL)

Vaginal laxity is the subjective sensation of vaginal looseness or reduced introital tightness [1]. It affects sexual function and quality of life directly, and sits within the broader spectrum of pelvic floor dysfunction (PFD). Critically, it does not always correlate with objective anatomical findings on exam [2].

| | |
|---|---|
| **Synonym** | Vaginal relaxation syndrome (VRS), genital laxity |
| **ICD-10 Reference** | N81.x (Pelvic organ prolapse spectrum); N94.89 (Other conditions) |
| **Symptom-Anatomy Gap** | A substantial minority of women with VL have no measurable prolapse on exam (Al-Mousa, Al-Badr, and Al-Tannir 2022) |
| **Reporting Bias** | Condition is underreported because of social stigma (Al-Mousa, AlBadr, and Al-Tannir 2022) |

### 1.2. Epidemiology

- Reported prevalence varies widely by population and definition from roughly 8% in a Brazilian primiparous cohort assessed six months postpartum (Vasconcelos Monteiro et al. 2025) to 38% in a large cross-sectional self-report survey (AlMousa, Al-Badr, and Al-Tannir 2022) to as high as 48% in other cited series [3].
- Al-Mousa, Al-Badr, and Al-Tannir (2022) found women with a single delivery were roughly five times more likely to report laxity than nulliparous women (OR 5.06, 95% CI 1.67–15.3).
- VL frequently co-occurs with stress urinary incontinence and pelvic organ prolapse.
- The figure “up to 64% of postpartum women” for VL-related sexual dysfunction, cited in the original draft, could not be traced to a specific source and has been removed. Sexual dysfunction after vaginal delivery more broadly has been reported in the 41–83% range at six months in at least one prospective cohort (Silva et al. 2025), but that figure describes overall postpartum sexual dysfunction, not VL-attributable dysfunction specifically, and should not be substituted for it without a source that actually isolates VL as the cause [4].

## 2. Pathophysiology

### 2.1. Structural Anatomy of the Pelvic Floor

Vaginal support depends on three interdependent components: pelvic floor musculature (primarily the levator ani complex), endopelvic fascial condensations that provide passive connective-tissue support, and the neurological integrity of the pudendal nerve and its branches [5,6]. Injury to any one of the three can produce a similar clinical picture, which is part of why treatment has to be individualized rather than protocol-driven.

### 2.2. Key Mechanisms of Injury During Vaginal Delivery

#### A. Levator Ani Muscle Avulsion

- The levator ani is the primary active support structure of the vaginal walls.
- A systematic review and meta-analysis of 25 studies (n = 9,333) found major levator avulsion diagnosed in an average of 22% of parous women, with a reported range of 12.7–39.5% depending on the study population and imaging method [7].
- Identified on 3D/4D transperineal ultrasound or MRI as a morphological defect at the muscle’s insertion on the pubic bone.

- Strongly associated with forceps delivery: the same meta-analysis found an odds ratio of 6.25 (95% CI 4.33–9.0) for forceps versus normal vaginal delivery, and a separate meta-analysis reported OR 6.94 (95% CI 4.93–9.78) for the same comparison [8].

### B. Connective Tissue Disruption: Endopelvic Fascia

- The pubocervical fascia (anterior) and rectovaginal fascia (posterior) provide passive vaginal support.
- Fascial tears produce discrete, site-specific defects: central, lateral, apical.
- A shift in the Type I (strong) to Type III (weak) collagen ratio, and upregulation of matrix metalloproteinases (MMPs) during labor, are established mechanisms of connective-tissue remodeling in pregnancy and childbirm more broadly; I was not able to verify a source tying this specific collagen-ratio figure to vaginal laxity outcomes specifically, so this is presented as a plausible, literature-consistent mechanism rather than a directly confirmed finding for VL.

### C. Pudendal Nerve Stretch Injury

- A 3D computer simulation using cadaveric pudendal nerve anatomy found that during the second stage of labor, the nerve branches innervating the anal sphincter are stretched beyond the 15% strain threshold known to cause permanent injury in comparable peripheral nerves [9].
- Prolonged pudendal nerve terminal motor latency (PNTML) after vaginal delivery is a consistent finding across multiple studies, though reported rates vary considerably by cohort and diagnostic threshold from roughly 10% to over 40% in different series [10,11]. The original draft's figure of "80% of women" could not be traced to a source and has been removed rather than retained on the strength of a plausible-sounding number.
- Partial denervation of pelvic floor musculature follows nerve stretch injury, along with reduced proprioception.
- Recovery is typically partial over weeks to months; a minority of women are left with a measurable, persistent deficit.

### D. Hormonal Factors: Postpartum Estrogen Decline

- Postpartum estrogen drops sharply within the first days after delivery.
- Genitourinary syndrome of menopause (GSM)-like changes can follow: vaginal mucosal thinning, reduced lubrication.
- Breastfeeding prolongs the hypoestrogenic state through lactational amenorrhea.
- The specific claims that ERβ is the dominant estrogen receptor subtype in the vaginal lamina propria, and the detailed mechanism attributed to relaxin, were in the original draft without attached citations. These are directionally consistent with reproductive endocrinology but I have not independently verified them against a primary source, and they should be checked against a current histology/endocrinology reference before publication.

## 3. Risk Factors

| Risk Factor | Category | Evidence | Notes |
|---|---|---|---|
| Forceps delivery | Obstetric | OR 6.25–6.94 for levator avulsion vs. normal delivery (Wong et al. 2024; Friedman et al. 2019) | Strongest single obstetric risk factor identified in metaanalysis |
| Vacuum delivery | Obstetric | OR 2.41 for levator avulsion vs. normal delivery (Wong et al. 2024) | Lower avulsion risk than forceps |
| Prolonged 2nd stage | Obstetric | original draft's specific threshold and evidence grade not independently confirmed | Biologically plausible mechanism (cumulative nerve/muscle stretch); needs a direct citation before |
| Fetal macrosomia | Fetal | plausible mechanism, not independently sourced here | Larger head circumference is a recognized risk factor for pelvic floor trauma generally |
| Episiotomy | Obstetric | Contested in the literature | Mediolateral versus midline technique affects risk differently; this remains a genuinely debated area rather than settled evidence |
| Multiparity | Patient | OR 5.06 (95% CI 1.67–15.3) for VL after a single prior delivery vs. nulliparous (Al-Mousa, Al-Badr, and Al-Tannir 2022) | Cumulative effect of repeated deliveries |
| Advanced maternal age | Patient | OR 1.06 (95% CI 1.02–1.10) per year, for levator avulsion (Wong et al. 2024) | Modest but statistically significant independent effect |
| Connective tissue disorders | Patient | | Biologically plausible (EhlersDanlos, Marfan); not independently sourced here |
| Obesity (BMI >30) | Patient | | Biologically plausible via chronic intra-abdominal pressure; not independently sourced here |
| Family history of POP/SUI | Genetic | the "40% heritability" figure in the original draft could not be traced to a source and has been removed | Family history is a recognized, if imprecisely quantified, risk factor in the pelvic floor literature |

## 4. Clinical Impact & Symptom Domains

### 4.1. Sexual Function

Reduced friction and sensation during intercourse is commonly reported as the primary complaint that drives women to seek consultation for VL. Female Sexual Function Index (FSFI) scores are reduced in women reporting VL relative to those without the symptom, including lower vaginal resting pressure, pelvic floor strength, and endurance in at least one prospective cohort. Partner-perceived laxity is reported in the literature as well, though it is far less studied than the patient's own experience [12].

### 4.2. Urinary Symptoms

- Stress urinary incontinence (SUI), urgency incontinence, and overactive bladder symptoms are all reported to co-occur with VL.
- The specific co-occurrence figure "~30–40%" from the original draft was not independently traceable to a source and has been removed; the qualitative association is supported by the review cited above.

### 4.3. Vaginal Flatus (Queefing)

Air trapping in a widened vaginal canal is the generally accepted mechanism for this symptom. It is commonly reported anecdotally but genuinely under-studied in the formal literature I could not locate a primary epidemiological source quantifying its prevalence, so no percentage is given here. It is, however, frequently the specific complaint that brings a woman into clinic, because it is difficult to describe to a partner or physician.

### 4.4. Pelvic Organ Prolapse Association

- VL frequently coexists with, or precedes, low-stage pelvic organ prolapse.
- The POP-Q staging system provides objective classification (Stages 0–IV) [13].
- VL is not synonymous with prolapse. The two are distinct but mechanistically related conditions [14].

## 5. Assessment: Clinical & Objective

### 5.1. Clinical Assessment

#### A. Digital Vaginal Examination

- Modified Oxford Grading Scale (0–5) for pelvic floor muscle contraction strength [15].
- Assessment at the introitus (perineal body), mid-vagina, and apex.
- Introital gape is commonly estimated clinically as the width of the examiner's fingers at the introitus.

#### B. Perineal Body Assessment

- POP-Q landmarks Gh (genital hiatus), Pb (perineal body) are standardized measurements.
- Loss of perineal body integrity is widely regarded as one of the more surgically correctable components of VL.

### 5.2. Objective Measurement Tools

| Tool | Measures | Clinical Use | Limitations |
|---|---|---|---|
| Perineometry | Intravaginal squeeze pressure ($cmH_2O$) | RCT outcomes, PFMT monitoring | Operator variability; no structural imaging |
| 3D Transperineal Ultrasound | Levator hiatus area, avulsion, puborectalis integrity | Regarded as the reference standard for muscle morphology (Guo et al. 2024) [16] | Requires expertise; equipment cost |
| Endoanal/Endovaginal US | Sphincter complex, rectovaginal fascia | Obstetric anal sphincter injury (OASI) | Limited posterior vaginal wall data |
| MRI Pelvic Floor (3T) | Full muscle/fascia/nerve anatomy | Research; complex cases pre-surgery | Cost, availability, not routine |
| Vaginal Tonometry | Distensibility and compliance | Research tool | Not widely validated clinically |
| FSFI / PISQ-12 | Validated sexual function questionnaires | Patient-reported outcomes | Subjective; requires patient literacy |

## 6. Conservative Management: First-Line Treatment

### 6.1. Pelvic Floor Muscle Training (PFMT)

PFMT commonly known as Kegel exercises is the internationally recommended first-line therapy for pelvic floor dysfunction, including vaginal laxity, SUI, and mild prolapse [17].

| Parameter | Recommended Protocol |
|---|---|
| Contraction type | Both fast-twitch and slow-twitch fibers are typically targeted in standard PFMT protocols |
| Duration | Multi-week, supervised programs are consistently used in the trials underlying current recommendations (Dumoulin, Hay-Smith, and Mac Habée-Séguin 2018) |
| Supervision | Supervised PFMT is generally reported as more effective than unsupervised home exercise |
| Evidence Level | Grade A recommendation from the International Consultation on Incontinence, based on Cochrane-level evidence (Dumoulin, Hay-Smith, and Mac Habée-Séguin 2018) |

- A Cochrane systematic review of 31 randomized or quasi-randomized trials (n = 1,817) found PFMT superior to no treatment, placebo, or inactive control for stress, urgency, and mixed urinary incontinence, with women with stress UI roughly eight times more likely to report cure after PFMT.
- The specific effect-size range (Cohen's d 0.5–1.2) and exact repetition/rest protocol given in the original draft were not independently traceable to the cited source and have been generalized above rather than stated as precise figures.

### 6.2. Electrical Stimulation (ES)

- Transcutaneous or intravaginal current is used to stimulate pudendal nerve efferents and pelvic floor motor units.
- The specific stimulation frequencies (35–50 Hz for motor recruitment; 10–20 Hz for detrusor inhibition) given in the original draft are consistent with general neuromuscular electrical stimulation parameters used elsewhere in urogynecology, but I could not verify them against a source specific to vaginal laxity treatment and would flag this for the co-authors to confirm against their preferred ES protocol reference.
- Most commonly discussed as an adjunct when voluntary pelvic floor contraction is minimal or absent.

### 6.3. Transcutaneous Tibial Nerve Stimulation (TTNS)

- TTNS is a neuromodulation technique that targets the sacral nerve roots (S2–S4) via the posterior tibial nerve, applied at the medial malleolus.
- TTNS has an established evidence base in overactive bladder and urgency urinary incontinence.
- **The "Egyptian multicenter RCT" claim from the original draft has been removed**. No authors, journal, or year were given, and I could not locate a matching trial after repeated searches. This is not the same as saying no such trial exists only that it could not be verified, and an unverifiable trial claim should not appear in a document intended for peer review.

### 6.4. Functional Physiotherapy & Core Integration

- A holistic approach integrates diaphragmatic breathing, core stability (transverse abdominis), and pelvic floor co-activation an approach broadly consistent with current pelvic floor physiotherapy practice.
- Biofeedback-assisted rehabilitation using real-time EMG helps patients identify the correct muscles and avoid substituting the glutes or adductors.

## 7. Energy-Based Devices (EBDs)

**This Section Covers Emerging, Not Yet Fully Established Treatments. FDA Warning Applies, See 7.3.**

### 7.1. Radiofrequency (RF) Therapy

#### A. Mechanism

- Controlled thermal energy is delivered to the vaginal submucosal and muscularis layers, producing an immediate tightening effect through collagen denaturation, followed by fibroblast activation and neocollagenesis over subsequent weeks [18].
- Devices include monopolar, bipolar, and fractional RF platforms.

#### B. Evidence

- The strongest sham-controlled evidence for RF in vaginal laxity is the VIVEVE I trial: a randomized, controlled, blinded study in which a single treatment of surface-cooled monopolar RF produced significantly better FSFI improvement than sham at 6 months, with treatment-emergent adverse events comparable between arms (11.1% active vs. 12.3% sham) [19].
- Correction to The Prior Draft: this RCT finding had been attributed to "Karcher et al., 2016." Karcher and Sadick (2016) is a narrative review of energy-based devices, not the RCT being described, and does not itself report a shamcontrolled 6-month trial. It remains a useful citation for the device-mechanism overview above, but not for the trial result.

### 7.2. $CO_2$ Fractional Laser

#### A. Mechanism

- Fractional microablative columns create controlled micro-injuries in the vaginal epithelium and lamina propria, stimulating collagen synthesis and reepithelialization [20].

#### B. Evidence

- A prospective, self-controlled study of 101 women with mild-to-moderate vaginal relaxation syndrome found significant improvement in FSFI, Vaginal Laxity Questionnaire, and Vaginal Health Index scores across three $CO_2$ laser sessions, sustained through 12 months of follow-up (Lauterbach et al. 2022; see also a related descriptive cohort in Asian women, Yang et al. 2022, showing similar FSFI and VHI gains with objective tissue-elasticity improvement on vaginal tactile imaging) [21,22].
- The specific "30–45% require maintenance by 18–24 months" figure from the original draft was not independently traceable and has been removed rather than retained.

### 7.3. Critical Appraisal & Regulatory Status

FDA Safety Communication, July 30, 2018: Energy-Based Devices (Radiofrequency and Laser) are Not Cleared or Approved For "Vaginal Rejuvenation," Cosmetic Vaginal Procedures, or Related Indications. Risks Include Vaginal Burns, Scarring, Dyspareunia, and Permanent Injury (U.S. Food and Drug Administration 2018) [23].

- Most devices marketed for these procedures hold FDA 510(k) clearance for other gynecologic indications not specifically for vaginal laxity.
- A subsequent AUGS clinical consensus statement on vaginal energy-based devices found that most specific practice statements did not reach expert consensus, citing a lack of evidence [24].
- Patient informed consent must explicitly address investigational status and risk profile.

## 8. Surgical Management

### 8.1 Indications for Surgery

- Severe vaginal laxity with significant functional impairment.
- Failure of an adequate trial of conservative management.
- Coexisting structural defect: rectocele, enterocele, perineal body deficiency.
- Associated pelvic organ prolapse requiring concurrent repair.
- Patient preference after comprehensive counseling.

### 8.2. Posterior Colporrhaphy

Posterior colporrhaphy addresses rectovaginal fascial defects and redundant posterior vaginal wall tissue. It is the foundational procedure for posterior vaginal compartment repair.

#### A. Technique: Surgical Steps

- Identify the posterior vaginal wall defect by examination under anesthesia.
- Infiltrate with dilute vasopressin solution for hemostasis.
- Make a midline longitudinal incision of the posterior vaginal epithelium from perineal body to vaginal apex.
- Sharply dissect the vaginal epithelium from the underlying rectovaginal fascia.
- Plicate the rectovaginal fascia with delayed absorbable sutures in the midline.
- Excise redundant vaginal epithelium conservatively over-excision is a recognized contributor to dyspareunia [25].
- Close the vaginal wall with interrupted or continuous absorbable sutures.

### 8.3. Perineoplasty: Key Procedure

- Perineoplasty is a reconstructive procedure for perineal body deficiency, addressing a keystone support structure of the vaginal introitus and posterior wall.

#### A. Anatomy Reconstructed

- Perineal body (corpus perineale): a fibromuscular structure at the vaginal-rectal confluence.
- Converging muscles: external anal sphincter, bulbospongiosus, superficial and deep transverse perinei.

#### B. Surgical Steps: Perineoplasty

- Delineate the introitus assess perineal body height, skin quality, and scar tissue burden.
- Inject dilute vasopressin into the perineal skin and subcutaneous tissue.
- Make an inverted-V or diamond-shaped skin excision centered on the fourchette, including all scar tissue.
- Dissect in the rectovaginal space to mobilize the posterior vaginal wall.
- Identify and approximate the bulbospongiosus and transverse perinei muscles in the midline.
- Plicate the levator ani at the level of the perineal body only not mid-vaginal if indicated, bearing in mind the dyspareunia risk noted above.
- Close the perineal skin in layers.
- Calibrate postoperatively to a comfortable introital width neither too tight nor residually lax.

### 8.4. Combined Procedures

| Combination | Indication | Notes |
|---|---|---|
| Perineoplasty + Posterior Colporrhaphy | VL + rectocele | Most commonly reported combination |
| Posterior repair + Sacrospinous fixation | VL + apical prolapse | Addresses vault suspension concurrently |
| Posterior repair + Midurethral sling | VL + stress urinary incontinence | May unmask occult SUI once prolapse is reduced |
| Posterior repair + Anterior colporrhaphy | Multi-compartment prolapse | Higher operative complexity; detailed counseling needed |
| Posterior repair + Hysterectomy | VL + uterine pathology | Hysterectomy decision driven by uterine pathology, not VL alone |

## 9. Complications

### 9.1. Surgical Complications

| Complication | Reported Range | Source | Management |
|---|---|---|---|
| Dyspareunia (de novo) | Kahn and Stanton 1997 | Kahn and Stanton 1997 | Vaginal dilators; topical estrogen; revision surgery if severe |
| Rectal injury / fistula | Reported as rare across case series | General surgical literature | Intraoperative repair if recognized; delayed fistula surgery |
| Nerve injury (pudendal) | Reported as uncommon | General surgical literature | Usually resolves; physiotherapy |

**Dyspareunia is Consistently Reported as The Most Clinically Significant Complication and A Leading Driver of Patient Dissatisfaction. Surgical Restraint Particularly Avoiding Routine Levator Plication is The Single Most Evidence Supported Preventive Measure (Kahn and Stanton 1997).**

*A note on the rows marked: the original draft gave specific percentage ranges for these complications without an attached source. Rather than*

*invent plausible-sounding citations, I've left these blanks pending a real source a formal complications review (for example, a recent systematic review of posterior compartment repair outcomes) should be added here before publication.*

## 10. Outcomes & Patient Satisfaction

### 10.1. Surgical and Conservative Outcomes

The original draft's specific outcome figures POP-Q improvement rates, PGI-I "much better" percentages, FSFI domain-specific improvement rates, SUI resolution with concurrent sling, and Oxford grading improvement after supervised PFMT were presented without attached sources. I was not able to verify these particular numbers within the scope of this pass. General direction (surgery and supervised PFMT both improve anatomical and patient-reported outcomes in the majority of appropriately selected patients) is well supported by the literature cited throughout this document, but the precise percentages should not be published without a direct source. I'd recommend pulling these from a recent systematic review or meta-analysis of surgical/conservative VL outcomes specifically, which I have not identified in this pass.

### 10.2 Key Prognostic Principles

| | |
|---|---|
| **Patient Selection** | Widely regarded as the strongest predictor of outcome symptom severity, realistic expectations, absence of severe connective tissue disorder |
| **Technique Restraint** | Conservative plication is associated with lower dyspareunia rates than aggressive plication (Kahn and Stanton 1997) |
| **Parity After Surgery** | Subsequent vaginal delivery is commonly discouraged after reconstructive perineal/posterior repair, on the general surgical principle of protecting a repair from repeat mechanical trauma |
| **Hormone Status** | Preoperative topical estrogen in postmenopausal women is commonly used to optimize tissue quality before pelvic reconstructive surgery |
| **Timing Postpartum** | Surgical assessment is generally deferred for a period of months postpartum to allow spontaneous recovery, particularly during breastfeeding-associated hypoestrogenism |

## 11. Evidence-Based Management Algorithm

The following stepwise approach reflects the general shape of current practice for vaginal laxity management, individualized to the patient's symptoms, severity, comorbidities, and reproductive plans. Specific durations and session counts should be confirmed against current society guidelines before this algorithm is presented as a formal protocol.

| Step | Intervention | Rationale |
|---|---|---|
| **Step 1** | Supervised PFMT ± biofeedback | Grade A, first-line evidence (Dumoulin, HaySmith, and Mac Habée-Séguin 2018) |
| **Step 2** | PFMT + Electrical Stimulation and/or TTNS | Adjunctive neuromuscular support when voluntary contraction is weak or absent |
| **Step 3** | Energy-based device (RF or $CO_2$ laser) | Investigational; informed consent required (U.S. Food and Drug Administration 2018) |
| **Step 4** | Surgical: Perineoplasty ± Posterior Colporrhaphy | After conservative failure or when a structural defect is identified |

## 12. Future Directions

### 12.1. Regenerative Medicine

- Platelet-Rich Plasma (PRP): a recent randomized, single-blind, placebocontrolled trial (n = 52) found PRP injection into the anterior vaginal wall produced greater improvement in sexual function than saline control over 6 months, using FSFI and PGI-I as outcome measures [26].
- Mesenchymal stem cell (MSC) therapy for pelvic floor injury remains in the preclinical stage; an animal model of simulated childbirth injury found MSC treatment restored vaginal wall biomechanical properties and connective tissue composition after combined pudendal nerve crush and vaginal distension injury [27].
- Adipose-derived stromal cells (ADSCs) are discussed as a related regenerative approach, though I did not locate a specific trial in vaginal laxity to cite here.

### 12.2. Tissue Engineering & Biomaterials

- Bioabsorbable scaffold and electrospun nanofiber mesh research for fascial augmentation is an active preclinical research area; I was not able to verify a specific vaginal-laxity-relevant source within this pass and would recommend the authors supply their preferred citation here.
- Synthetic mesh complications are widely cited in the pelvic floor literature as the direct rationale for pursuing biocompatible alternatives.

### 12.3. AI-Based Imaging & Diagnostics

- Deep learning algorithms have been developed to automate levator hiatus measurement on 3D pelvic floor ultrasound; one such model, trained and tested on 600 volumetric datasets from 475 parous women, achieved close agreement with expert sonographer measurements.
- A related CNN-based tool for automated levator hiatus

recognition showed good agreement with manual measurement across functional states in postpartum women [28].

- Predictive modeling to forecast surgical success from preoperative imaging remains an active but early-stage research area.

### 12.4. Personalized Rehabilitation

- Wearable EMG biofeedback devices for home pelvic floor training are an active area of device development.
- The claim that telehealth pelvic floor physiotherapy has "demonstrated noninferiority to in-person care in early RCTs" was not independently verified in this pass and should be checked against a specific trial before publication.
- Genotype-guided therapy using polymorphisms in collagen genes such as COL3A1 to predict conservative therapy response is a plausible future research direction based on general knowledge of collagen genetics in pelvic floor disorders, but it is a proposed direction, not a demonstrated clinical capability, and should be framed as such.

## 13. Key Take-Home Messages

| # | Key Message | Clinical Implication |
|---|---|---|
| 1 | Vaginal laxity prevalence estimates vary widely (2– 48%) and the condition is consistently reported as underreported | Ask postpartum patients directly do not wait for spontaneous report |
| 2 | Pathophysiology is multifactorial: muscle, fascia, nerve, and hormonal contributors | Assessment must be comprehensive, not merely anatomical |
| 3 | Conservative management (PFMT) is first-line, Grade A evidence (Dumoulin, Hay-Smith, and Mac Habée-Séguin 2018) | Supervised therapy before escalation to device- or surgery-based treatment |
| 4 | Energy-based devices are emerging and not yet standard of care, per FDA and AUGS (U.S. Food and Drug Administration 2018; American Urogynecologic Society 2022) | Use only with full informed consent |
| 5 | Perineoplasty and posterior colporrhaphy are the established surgical options, and levator plication carries a documented dyspareunia cost (Kahn and Stanton 1997) | Surgical restraint reduces the most feared complication |
| 6 | Patient selection is widely regarded as more predictive of outcome than surgical technique | Realistic expectations and correct counseling matter as much as operative skill |
| 7 | Regenerative medicine and AI-assisted imaging are active, early-stage research areas with some real early trial data (Clarke et al. 2026; Guo et al. 2024) | Worth monitoring, not yet ready for routine adoption |
| 6 | Patient selection is widely regarded as more predictive of outcome than surgical technique | Realistic expectations and correct counseling matter as much as operative skill |
| 7 | Regenerative medicine and AI-assisted imaging are active, early-stage research areas with some real early trial data (Clarke et al. 2026; Guo et al. 2024) | Worth monitoring, not yet ready for routine adoption |

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