ABSTRACT: Although benign, pelvic organ prolapse is a real public health problem, affecting mostly women above sixty-five. Eighty-year-old women have an 11.1% lifetime risk of undergoing surgery for prolapse or stress urinary incontinence and 29% will need a second procedure.

Surgical approach may be abdominal (sacrocolpopexy by laparotomy, laparoscopy or robot-assisted) or vaginal (autologous, or prosthetic reinforcement). In addition to anatomical correction, surgical objectives include • improvement of the patient’s quality of life • prolapse symptoms relief • normal urinary, digestive and sexual functions and especially • avoiding iatrogenic sequelae.

Thus, the choice of the surgical approach does not only depend upon the site and the severity of the prolapse. Urogynecological surgeons should take into consideration the patient’s expectations and life style, her age – a determinant factor in deciding upon the best approach –, and her relapse risk factors. They should master both approaches, and the management of surgical complications. Therefore, an apprenticeship in a reference pelviperinéologie center is a must. In addition, surgeons should be aware of and consider contraindications to each procedure, for instance contraindications to transvaginal prosthesis reinforcement like risk factors of bad healing or infection. Urogynecology specialists have to take into consideration known anatomical and functional results of each technique as cited in the medical literature and act in accordance with international recommendations. The surgery’s main objective is to ameliorate the patient’s discomfort and her quality of life without causing iatrogenic dysfunctional symptoms (urinary, digestive, sexual). The pelvic organ prolapse being a benign pathology, the patient’s satisfaction is the main marker of the procedure success.

In short, regarding the surgical management of pelvic organ prolapse in women the answer to the question How to choose the best approach? is not binary. It depends on several factors, and regardless of the choice, it must remain a minimally invasive act, at an acceptable cost.

RÉSUMÉ: Le prolapsus des organes pelviens de la femme est un réel problème de santé publique, touchant surtout les femmes âgées de plus de 65 ans. A 80 ans, la femme présente un risque de 11,1% d’être opérée pour un prolapsus ou une incontinence urinaire à l’effort, avec un risque de réopération de 29%.

La voie d’abord peut être abdominale (pronostification par voie ouverte, laparoscopie ou robotique) ou vaginale (autologue ou prothétique). Les objectifs de l’opération ne comprennent pas seulement la correction anatomique du prolapsus, mais aussi l’amélioration de la qualité de vie de la patiente, le soulagement de la gêne occasionnée par ce prolapsus, le rétablissement ou la préservation des fonctions urinaire, digestive et sexuelle, et surtout éviter les complications iatrogènes.

Le choix de la voie d’abord ne dépend pas seulement du site et de la sévérité du prolapsus. Le chirurgien en urogynécologie doit prendre en considération les attentes de la patiente, son style de vie, son âge – un facteur déterminant du choix de la voie d’abord – ainsi que ses facteurs de risque de récidive, maîtriser les différentes approches chirurgicales et savoir gérer leurs complications ; c’est pourquoi un apprentissage dans un centre de référence en pelviperinéologie est indispensable.

Le chirurgien doit prendre en considération les contre-indications de chaque procédure, par exemple les contre-indications au renforcement prothétique vaginal : les facteurs de risque d’une mauvaise cicatrisation vaginale ou d’infection prothétique. Il doit aussi connaître les résultats anatomiques et fonctionnels des différentes techniques tels que cités dans la littérature médicale, faire le choix en fonction et suivre les recommandations internationales concernant le traitement chirurgical des prolapsus. L’objectif ultime de l’intervention chirurgicale est l’amélioration de la gêne de la patiente et de sa qualité de vie sans créer de nouveaux dysfonctionnements (urinaire, digestif et sexuel). Puisque le prolapsus des organes génitaux est une pathologie fonctionnelle, la satisfaction de la patiente est le marqueur le plus important de la réussite de la technique chirurgicale utilisée.

En résumé, la réponse à la question Comment choisir la meilleure voie d’abord ? pour le traitement chirurgical du prolapsus dépend de plusieurs facteurs. Quel que soit le choix, elle doit être la moins invasive possible et d’un coût abordable.
INTRODUCTION

Pelvic organ prolapse is a real public health problem. This benign pathology, often asymptomatic, can affect 50% of parous women [1] but does not always require surgical treatment.

The prevalence of pelvic organ prolapse is steadily increasing due to increasing life expectancy with a resulting increase in the number of cases over 65 years [2].

In a retrospective cohort study on 376 women, Olsen et al. [3] estimated that by the age of 80, women have a 11.1% lifetime risk of undergoing a surgical operation for pelvic organ prolapse and/or stress urinary incontinence (SUI), and a 29% rate of reoperation. Moreover, the risk of relapse increases among second hand patients (17% against 12% for first hand patients) [3]. These results emphasize the need to offer the most appropriate surgical technique from the beginning.

Prolapse surgery has long been a subject of dichotomy between the school of the abdominal approach and that of the vaginal approach. Over time, the controversy increased with the advent of new technologies: laparoscopy and robotics.

The conflict persists due to the lack of randomized prospective studies comparing sacrocolpopexy and vaginal meshes; however, the goal is to restore the woman’s functional anatomy regardless of the surgical approach. Every surgeon should master the different approaches, because the choice of the most appropriate one is similar to selecting a set of golf clubs during a tournament: there is a different club for every shot.

The possible approaches are the following:

- **Vaginal approach**: autologous or prosthetic surgery
  - by laparoscopy, which has become the gold standard of prolapse surgery;
  - by laparotomy, which has become a rare surgical procedure, in case of contraindications to laparoscopy and if the vaginal approach is undesirable, for instance in complex prolapse with multiple relapses;
  - robotically assisted, another mini-invasive approach currently being evaluated and compared to laparoscopy.

- **Abdominal approach**: sacrocolpopexy
  - Level I concerns the cervical, upper vaginal support and high posterior digestive compartment, corresponding to the insertion of cardinal and uterosacral ligaments into the vaginal fundus and into the uterine isthmus. Clinical manifestations of level I support defects include hysteroptosis, and post-hysterectomy colpoptosis, proximal rectocele and/or an enterocele posteriorly.
  - Level II, or mid-vaginal support, the largest one, concerns the anterior compartment, where the vagina is in direct contact with the bladder, and the posterior compartment where the rectum is in direct contact with the vagina. Its deterioration leads to a cystocele and/or a middle rectocele.
  - Level III, or pelvic support, the smallest one, concerns the posterior compartment where the rectum is in direct contact with the bladder, and the anterior compartment where the vagina is in direct contact with the bladder, and the posterior compartment where the rectum is in direct contact with the vagina. Its deterioration leads to an enterocoele.

**Definitions**

Pelvic organ prolapse is an abnormal migration or permanent or transitory hernia of one or several pelvic organs modifying the form and/or the location of the vaginal walls that may advance until their protrusion through the urogenital cleft [4].

The different forms of prolapse are:

- Prolapse of the anterior vaginal wall: cystocele.
- Prolapse of the uterus or remaining cervix: hysteroptosis or cervical ptosis.
- Prolapse of the vaginal vault following hysterectomy: colpoptosis.
- Prolapse of the posterior vaginal wall that can be caused by a bulge of a part of the rectum in the vagina (rectocele) and/or the posterior cul-de-sac (elytrocele), and/or small intestine (enterocele).

**Anatomical reminder**

There are three anatomical levels at the pelvic floor level [5] (Table I):

- Level I concerns the cervical, upper vaginal support and high posterior digestive compartment, corresponding to the insertion of cardinal and uterosacral ligaments into the vaginal fundus and into the uterine isthmus. Clinical manifestations of level I support defects include hysteroptosis, and post-hysterectomy colpoptosis, proximal rectocele and/or an enterocoele posteriorly.
- Level II, or mid-vaginal support, the largest one, concerns the anterior compartment, where the vagina is in direct contact with the bladder, and the posterior compartment where the rectum is in direct contact with the vagina. Its deterioration leads to a cystocele and/or a middle rectocele.
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### TABLE I

**PELVIC ORGAN CLASSIFICATION USING De LANCEY THEORY [5]**

<table>
<thead>
<tr>
<th>Level 1 / Superior</th>
<th>Level 2 / Medial</th>
<th>Level 3 / Inferior</th>
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</thead>
<tbody>
<tr>
<td><strong>Anterior Urinary</strong></td>
<td><strong>Middle Gynecological</strong></td>
<td><strong>Posterior Digestive</strong></td>
</tr>
<tr>
<td>Hysteroptosis</td>
<td>Post-hysterectomy colpoptosis</td>
<td>Proximal rectocele or Enterocoele</td>
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<tr>
<td>Cystocele</td>
<td>Urethral segment prolapse</td>
<td>Distal rectocele (destruction of the perineal body)</td>
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**REMINDERS**

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**TABLE I**

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|-----------------|-----------------|-------------------|
| **Anterior Urinary** | **Middle Gynecological** | **Posterior Digestive** |
| Hysteroptosis | Post-hysterectomy colpoptosis | Proximal rectocele or Enterocoele |
| Cystocele | Urethral segment prolapse | Distal rectocele (destruction of the perineal body) |
Level III, corresponding anteriorely, to the urinary compartment and to the sub-urethral vaginal segment, and posteriorly, to the anal cap behind the perineal body. This level support defect can result in distal rectocele or perineal descent.

The pelvic viscera are held in place by a fixation system formed by the visceral “ligaments” containing vascular and nervous elements of the viscera, and by a system that supports the pelvic floor including the endopelvic fascia and the different muscles of the pelvic floor, in particular the levator ani with a static part, the iliococcygeal muscle, and a dynamic part, the puborectal sling that passes behind the urogenital diaphragm and the rectum. Pelvic floor defects result from damage to these muscular, neurological, and connective tissue elements. There currently exists no way to directly repair these elements. Additionally, reconstruction of the perineum and its reinforcement are ensured by the native tissues that can either be repaired (raphae), or reinforced with autologous, heterologous or especially synthetic tissue [6-7].

Prolapse risk factors
Multiple mechanisms can cause pelvic prolapse, resulting from deterioration of the anatomical structures and from excessive pressure exerted upon them [8]. The essential factor is obstetrical trauma, or pregnancy itself, specially in the presence of fetal macrosomia regardless of the mode of delivery [9]; delivery is responsible for pelvic and perineal damage resulting from stretching, tearing or even avulsion of the muscular and conjunctive tissues and/or pudendal nerves [10].

The other factors include: congenital predisposition (caucasoid, ligamentous laxity, connective tissue anomalies), ageing, menopausal hormone deficiency, lumbar lordosis, abdominal wall muscles atrophy, excessive intra-abdominal pressure (asthma, chronic bronchitis, severe constipation, strenuous physical efforts), increasing body mass index, iatrogenic factors (hysterectomy, treatment of stress urinary incontinence and other pelvic surgery, specifically prolapse surgery) [4].

Prevalence of prolapse
The prevalence of prolapse is somewhere between 2.9% and 97.7% depending on the studies. It varies between 2.9% and 11.4% when a questionnaire for detecting prolapse is used or between 31.8% and 97.7% when conducting clinical examinations with the Baden classification system or the Pelvic Organ Prolapse (POP-Q) classification. It should be emphasized that the first two stages of the POP-Q and Baden classification correspond to prolapses that are intravaginal or at the level of vaginal introitus and therefore extremely limited, thus explaining the very high prevalence figures.

Swift observes a progressive aggravation of prolapse with increasing age, showed by a statistically significant reduction of the proportion of stage 1 at the expense of stages 2 and 3 (Table II) [11].

Concerning the type of prolapse, the study of the compartments of prolapse in the literature reveals a predominance of the anterior compartment prolapse compared to the posterior compartment which is itself more frequent than the middle compartment [12-14].

Often, cystocele is associated with hysteroptosis (in 20% of cases according to Hendrix [15]).

The posterior colpocele is often secondary to hysterectomy or other pelvic surgery (Burch Procedure, cysto-pexy, etc.). An isolated rectocele is fairly infrequent (7%) [6], and is often related to chronic constipation and increasing parity. A prolapse of the vaginal vault is often associated with a history of hysterectomy.

OBJECTIVES OF TREATMENT FOR PROLAPSE
Pelvic organs prolapse in women is above all a functional pathology. Its surgical correction must improve the functional symptoms and the quality of life in a sustainable manner.

Thus, there are four main outcomes to consider in prolapse surgery:
1) To relieve symptoms related to prolapse (perineal heaviness, vaginal bulging, loss of self-esteem due to a change in body image);

<table>
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<tr>
<th>TABLE II</th>
<th>PREVALENCE OF PROLAPSE BY ANATOMICAL COMPARTMENT (POP-Q)</th>
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<td>STUDY</td>
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POP-Q: Pelvic Organ Prolapse Quantification
2) To correct the anatomical deteriorations by raising the prolapsed organ (correction of the ptosis) and by supporting it in its ideal position;
3) To avoid creating new anatomical deteriorations or new functional disorders such as chronic urinary or genital infections, dysuria or dyschezia, urinary or fecal incontinence, dyspareunia;
4) To allow normal urination, defecation, and as the case may be, normal sexual activity or in some cases, pregnancy.

The question that follows is how to make the best choice, taking into consideration the above objectives, in order to have lasting results at the least cost and with the least morbidity.

Unfortunately, the answer is neither binary nor does it comply with any mathematical formula.

The choice of the approach depends upon many factors:
- patient’s expectations
- patient’s age and physical activity
- patient’s risk factors of relapse
- contraindications of procedure(s)
- surgeon’s experience and practice
- anatomical results of the different procedures
- surgery effects on the functional symptoms
- results concerning the quality of life and level of satisfaction.

1. Patient’s expectations

They are numerous:
- Relief of the inconvenience caused by the prolapse, in particular vaginal bulging or heaviness and discomfort;
- Resumption of daily activities (sports, dance, walking, travelling, gardening, professional activities);
- Precise information on the different surgical possibilities as a complement to those already gathered on the Internet: advantages of laparoscopy, number of trocars and abdominal incisions, advantages of the “natural” and relatively painless vaginal approach, details about synthetic implants, description of the complications and risk of reoperation and within what time limit.

One must know how to listen to patients and respond to their requests, even if there is no single answer.

2. Patient’s age

Pelvic organ prolapse concerns women of all ages. Its prevalence increases with age up until approximately 50 years (4.1% between 30 and 39 y, 6.2% between 40 and 49 y) to subsequently remain stable (11.8% between 50 and 59 y; 12.2% between 60 and 69 y; and 11% between 70 and 79 y) [16]. Nygaard et al. find lower prevalences, but with the same tendency to stagnate after menopause [17].

Following menopause, prolapse severity appears to be age correlated, marking the continuation of the degenerative process [11, 13] (Table III).

Young women prolapse

Among very young women, prolapse concerns usually one compartment taking the form of a hysteroptosis secondary to collagen disease, or especially following a difficult labor [9, 18].

The treatment must take into consideration the fertility desires of these women.

The standard treatment was the Manchester technique that has fallen into disuse because of its poor results, in particular regarding the preservation of fertility and pregnancy complications. The other standard technique was Richardson’s sacrospinous uterine fixation [19-20], later replaced by modern techniques using implants (laparoscopic sacrohysteropexy).

Prolapse in young women before menopause involves often several compartments. Treatment must be comprehensive and sustainable in light of life expectancy, for the preservation of the uterus is not systematic. It thus calls for prosthetic repair.

The current gold standard is laparoscopy or robot-assisted sacrocolpopexy by setting a vesico-vaginal mesh and another recto-vaginal one.

The vaginal prosthetic approach is not preferred among young women because it has been associated to dyspareunia and painful prosthetic retraction in 10% of operated women [21]. It is indicated in stage 3 and 4 prolapse, and in the case of one-compartment recurrences.

Elderly women

Among elderly women over 70 seeking treatment for their prolapse, vaginal approach with native tissue is the best option. It includes hysterecomy, anterior and/or posterior repair and preserved vaginal permeability if necessary for multicompartamental prolapse. Recto-vaginal fascia plication with levator ani low myorrhaphy is the optimal operation for an isolated rectocele, the sacrospinofixation for the ptosis of the vaginal vault, and culdoplasty for enterocele.
Abdominal surgery (promontofixation) is theoretically possible at this age but it carries more significant risks of intra- and postoperative complications than the autologous vaginal approach.

Prosthetic vaginal surgery is theoretically possible at this age but related studies are lacking. It is indicated in the event of recurrence of prolapse at the level of the anterior and/or medial compartment following prior estrogenic vaginal preparation.

Menopausal women between 60 and 70 years

With regard to patients in the 60 to 70 age bracket, the choice of the approach is contingent upon other factors because age alone is no longer determinant. Abdominal and transvaginal prosthetic reinforcement are valid options as well as native tissue repair in some cases.

3. Relapse risk factors

According to Olsen et al. 29% of patients operated for prolapse and/or urinary incontinence are likely to be reoperated for recurrence in the operated compartment or in another [3].

The different relapse risk factors are:

- Severe prolapse with a POP-Q stage greater than or equal to 3 [22].
- Congenital or acquired collagen disease, polymorphism of the progesterone receptors [23].
- Age under 60 years in light of life expectancy [24-25].
- Body mass index greater than 30 capable of causing permanent damage to the pelvic tissues [26]. However, the functional and anatomical results would be comparable to the non-obese according to Bradley et al. [27].
- Chronic cough (asthma, chronic obstructive pulmonary bronchopathy) resulting in chronic excessive abdominal pressure [28].
- Occupations and sports generating chronic excessive abdominal pressure with excessive use of abdominal muscles (ballet dancers, carrying heavy loads, etc.).
- Quick recurrence following well executed surgical treatment for prolapse.

In the presence of one or several relapse risk factors or following prolapse recurrence, one must know how to choose the best technique and approach. In such cases, a prosthetic reinforcement of the prolapse is recommended, by laparoscopy or by vaginal approach, especially in the case of a prolapse of the anterior and/or middle compartment(s), while taking into consideration the other factors affecting the choice of the approach.

4. Absolute & relative contraindications of the different approaches

They can help in the choice of the best approach.

The contraindications for sacrocolpopexy are those of laparoscopy:
- Contraindication to general anaesthesia (respiratory failure, severe heart failure, etc.).
- True obesity with a BMI greater than 30-35. The risk of conversion to laparotomy is increased, and can reach 10% [29]. In addition to that, obese patients may experience more complications than non-obese patients (14% vs 2.6%, p < 0.05) [30].
- A history of multiple laparotomies with a risk of morbidity of 0.32% by laparoscopy and 0.11% already upon patient installation.
- A progressive spinal pathology, for instance spondylodiscitis.

The contraindications to the transvaginal prosthesis approach are related to a risk of poor vaginal healing or infection:
- Poorly controlled diabetes, extended corticosteroid therapy, immunodepression.
- Poor quality of the vaginal mucosa: severe vaginal atrophy (hence the importance of a prior vaginal preparation with local hormones).
- Tobacco intoxication multiplying the risk of prosthetic exposure by three [31].
- History of pelvic radiation.
- A history of exposure or infection of prosthesis by vaginal approach represents a high risk of complication in the event of insertion of a new prosthesis.

Placing the patient in lithotomy position for vaginal surgery with autologous or prosthetic tissue may prove impossible in the event of severe pathology that prevents hip flexion.

The patient must be informed of operative risks in the presence of these key predictors of intra- or postoperative technical complications, as well as of possible alternatives.

5. The surgeon’s experience and practice

As with any surgery, and particularly in prolapse management, the surgeon himself is a factor of choice of the approach. Surgeons are even referred to by the approach they adopt: a “vaginalist”, an “abdominalist”, or more recently “laparoscopist” or even “robotist.”

Ideally, a surgeon specialized in urogynecology should master all approaches: vaginal repair with native tissues and prosthetic, and abdominal (laparoscopic and robot-assisted).

The promontofixation by laparoscopy requires a longer operating time than by laparotomy. The learning curve is quite long; for it is necessary to master laparoscopic surgical techniques and female pelvic anatomy, and to learn to perform the different technical steps as quickly as possible with low morbidity and as effectively as possible. The Strasbourg team stabilized its operating time at 211 min after 18 to 24 operations (maximum of 360 min, minimum of 150 min) with objective and subjective success rates of 95.8% and 94% respectively [32]. They attribute the reduction in the operating time to training on one hand and to the introduction of several tricks that facilitate performance of the operation on the other hand.

As for trocar-guided tension-free vaginal mesh technique (Prolift™), its learning curve is shorter than the one for laparoscopic promontofixation: 10 operations for the anterior mesh procedure in roughly 40 min and 18 for
the posterior mesh procedure, going down from 60 to 24 min [33]. Consequently, in order to master both approaches, the learning curve is hardly negligible.

The surgeon who wants to manage pelvic organ prolapses must be an experienced laparoscopist as well as an expert in the vaginal approach in order to reduce operating time, morbidity and operating costs, and to improve results. To achieve these goals, an apprenticeship in a reference centre for urogynecology is recommended. Furthermore, the surgeon has to remain up to date with the latest techniques, new materials (vaginal meshes and other), medical literature and medico-legal aspects.

6. Anatomical results

Anatomical correction is one of the goals of prolapse treatment; however, it is not necessarily correlated with functional symptoms, the patient’s quality of life and level of satisfaction. Furthermore, failure rates vary depending on the definition used for assessing the anatomical success [34].

When the prolapse is unicompartamental, the treatment may only concern the affected compartment, or overall treatment of the three compartments, taking into account the common physiopathology (see table 1).

Concerning isolated cystocele, a level 2 prolapse, it is secondary to a lateral detachment of the arcus tendinous of the pelvic fascia and/or to a medial defect by alteration of the vesico-vaginal fascia.

Surgical possibilities are:

- **Vaginal approach with native tissue**: plication of the vesico-vaginal fascia (of Halban) by non-absorbable suture, with colpotomy upon request. This option shows a high rate of recurrence (43% of relapses one year after the surgery according to Sand) [35-36].

- **Paravaginal repair of the arcus tendinous of the pelvic fascia** has not proven its effectiveness [37-40]. This option can only be considered for older women who are not very active, with no sexual activity, or when prosthetic reinforcement is impossible. Moreover, it must always be associated with hysterectomy and ligament repair for reinforcing the level 1.

- **Transvaginal prosthesis**: reinforcement of the vesico-vaginal space with a polypropylene prosthesis with a transobturator anchoring system by keeping the Halban’s fascia flat against the vagina. This method has proven effective over the long term on the anatomical correction of cystoceles, with success rates of 81% to 95% after one to three years’ follow-up, compared to the traditional anterior colporrhaphy in the different randomized trials [41-43].

According to Nieminen et al., recurrence rate was assessed at 12% against 41% after simple colporrhaphy three years after surgery [44-45]. However, anterior prosthetic reinforcement could specifically expose the patient to risk of prolapse of another compartment in 23% of cases according to Withagen et al., nevertheless only 4% of the patients were reoperated [46].

**Abdominal prosthesis**: promontofixation by laparoscopy or by robot by anchoring a retrovesical prosthesis to the promontory, with or without posterior retrovaginal prosthesis, with or without supracervical hysterectomy.

Criticism of this technique targets the absence of correction of the paravaginal defect without major consequences on the functional result, the possible elongation of the cervix that may subsequently require an act of trachelectomy if it causes patient discomfort, and the development of a low rectocele due to a posterior dissection that does not reach the level of the perineal body.

Furthermore, a relapse in the previously unaffected posterior compartment may occur following the insertion of a single anterior prosthesis, hence the importance of insertion of retrovaginal prosthesis without anchoring it to the promontory, even in the absence of a rectocele [47-48].

**Prolapse of the median compartment or level 1** that may touch the uterus in place, or the cervix or the vaginal apex post hysterectomy is due to the destruction of the uterosacral and cardinal ligaments.

Surgical possibilities are:

- **Vaginal approach with native tissue**: ligamentous repair associated to hysterectomy. This option may be considered in the case of isolated hysteroptosis among rather young patients (with uterosacral and adnexal ligaments of good quality). Fatton et al. [49] achieved good anatomical results after two years of extraperitoneal suspension of the uterosacral ligaments to the vaginal vault (85.5%) [50-51]. Among older women, especially among patients having had previous hysterectomy, the gold standard for correction of a prolapse of the medial compartment is by sacro-spinous fixation (Richter technique), consisting of attaching the vaginal vault to the uni- or bilateral sacrospinal ligament with non-absorbable sutures. This technique has a risk of relapse in the form of an anterior prolapse ranging from 25% to 30% [52-53].

- For women who wish to become pregnant, vaginal approach by fixation of the uterosacral ligaments to the sacrospinous ligament is another option (Richardson’s technique).

- **Transvaginal prosthesis**: It consists of approaching the sacrospinous ligament by an anterior or posterior route with prosthetic reinforcement either by anterior or posterior Elevate (AMS) or by posterior Prolift™ (Gynecare) or Apogee or other vaginal meshes. In case of an anterior- or posterior-associated prolapse, an anteroposterior prosthesis kit is a therapeutic possibility.

- **Abdominal prosthesis**: Another alternative is the abdominal approach by promontofixation (laparoscopic or robot-assisted) with the insertion of two pre- and retrovaginal prostheses with or without supracervical hysterectomy according to the patient’s desire. The anterior prosthesis is fixed to the upper part of the vagina till its middle part and to the uterine isthmus, and fixed posteriorly to the anterior sacral ligament.

An exhaustive review of the literature conducted by Maher et al. demonstrates that promontofixation gives the...
best anatomical results and less dyspareunia than sacrospinous fixation of the vaginal vault [54].

Another prospective randomized study conducted by Maher et al. compares objective and subjective results of laparoscopic promontofixation and anteroposterior vaginal prosthetic reinforcement for the treatment of vaginal vault prolapse. Two years after surgery, promontofixation patients presented a higher rate of objective success (77% vs. 41% p < 0.001), with a lower rate of reoperation (5% vs. 22% p < 0.006); adding to that, they were more satisfied overall than those operated by transvaginal prosthesis approach [55].

Yet another review of the literature conducted by Diwadkar et al. in 2009, comparing standard autologous, prosthetic vaginal approaches and promontofixation for treatment of vaginal vault prolapse reveals that the rate of reoperation for recurrence was the least for transvaginal prosthesis, followed by promontofixation and then by the standard vaginal approach (3.9 vs. 2.2 vs. 1.3%), knowing that the monitoring period for transvaginal prosthesis (17 months) was the shortest. Meanwhile, the rate of reoperation was the highest in the vaginal prosthesis group to manage complications (8.5%) [56].

As for the repair of an isolated rectocele, surgical possibilities are:
- Plication of prerecti fascia by vaginal approach, with low myorrhaphy;
- Mesh augmented posterior repair (posterior Prolift or posterior Elevate, etc.) in case of a total length stage 3 or 4 rectocele or especially in case of relapse;
- Promontofixation with fitting a tension-free prosthesis between the vaginal wall and rectum, attached to the elevators inferiorly and to the posterior vaginal wall.

Promontofixation has a success rate of approximately 92% at three years, while autologous repair by vaginal approach has a 76% to 90% success rate according to medical literature [57-58]. Meanwhile, vaginal prosthetic reinforcement doesn’t add much to anatomical results while leading to increased morbidity risks (mesh exposure, vaginal erosion, prosthetic shrinkage, dyspareunia) [57], unless it’s a relapse or stage 3 or 4 rectocele. Vaginal approach with autologous tissue is also superior to the endoanual approach [59-60]. In short, vaginal repair with native tissue by plication of the prerecti fascia by non-absorbable suture is the consensual treatment for isolated rectoceles.

7. Results on functional symptoms
The associated functional symptoms, often the leading reason for consultation, are threefold: urinary, digestive and sexual. They should be taken into consideration when establishing operative indication.

Urinary results
Stress urinary incontinence
Treatment of genuine stress urinary incontinence (SUI) associated with prolapse does not interfere with the choice of the approach. “Gold standard” treatment for stress urinary incontinence is the suburethral support system with a retropubic or transobturator sling. This intervention may be performed in association with laparoscopic promontofixation as with vaginal surgical treatment with autologous tissue or synthetic mesh with no difference regarding results and secondary effects. In the case of occult urinary incontinence upon clinical assessment, there is yet no consensus for treating SUI at the same time as prolapse regardless of the approach, since 35% to 60% of these women remain dry following surgical treatment of prolapse without associated SUI treatment [61].

Overactive bladder
Furthermore, genitourinary prolapses, especially cystoceles, are often associated with overactive bladder symptoms especially urgencies or with obstructive symptoms (dysuria, incomplete bladder emptying, need to reduce the prolapse by using their fingers to push the prolapse up to aid urinary voiding, etc.). This association is above all statistical, by pure coincidence or through a causal link, and that by denervation of the pelvic floor, or by obstruction mean (myogenic lesion) [62].

The causal relationship between prolapse and overactive bladder is more plausible because anatomical prolapse correction by surgery or by insertion of a pessary improves the irritative and obstructive urinary signs. De Boer et al. (2010) and Basu et al. demonstrated that overactive bladder incidence increased among patients having a pelvic organ prolapse, with a significant reduction of this incidence following surgical correction of the prolapse regardless of the approach [63-64]. Obstructive symptoms are likewise associated with the degree of prolapse, and correction of the latter should reduce the severity of this obstruction [65].

Digestive results
Rectocele is often associated with digestive disorders especially terminal constipation or dyschezia. Correction of rectocele will reduce the obstruction and theoretically correct digestive complaints. Surgical treatment by vaginal approach is superior to endoanual approach from this standpoint [54]. According to a study conducted by Bradley et al., promontofixation seems to improve obstructive digestive symptoms in 75% to 86% of patients after 12 months [66]. It also resolves the problem of fecal incontinence in 76% of cases, one year after surgery. By contrast, de novo fecal incontinence seems to occur among 1% to 5% of patients. However, Forsgren et al. find more pronounced dyschezia among women operated of promontofixation [67]. In fact, few authors deal with this subject in the literature. In principle, until proof of the contrary, and from the moment we no longer anchor the posterior prosthesis to the anterior sacral ligament, sacrocolpopexy and vaginal approach are comparable regarding improvement of obstructive digestive symptoms.

In case of a descending perineum associated with prolapse and obstructive digestive complaints, anchoring of the different pelvic viscera by laparotomy or especially by laparoscopy, thus a promontofixation with placing two or even three prostheses (retrovesical, retrovaginal et rectal) seems to be the best solution [68].
Results on sexual activity

For sexually active women at the preoperative stage, the surgical operation must not have any deleterious effects upon their sexuality. For those for whom prolapse might hinder normal sexual activity by physical or rather emotional impact, one of the objectives of the surgical operation is to improve it [69-70].

Data deriving from the literature concerning sexuality following surgical treatment of prolapse are contradictory: the “pathology” treated (prolapse and/or urinary incontinence) primarily concerns women over the age of 60, a population among whom sexuality is not always an essential criterion. It often alters sexuality, not as much from a purely “organic” perspective as much as indirectly by the psychological repercussion and the loss of self-respect that it causes. Thus, there is usually an overall improvement in sexuality following surgery explained in great part by the disappearance of the “intravaginal ball” and/or the psychological repercussion and the loss of self-respect, that is usually an overall improvement in sexuality following surgery explained in great part by the disappearance of the “intravaginal ball” and/or the urinary incontinence [71]. This improvement is hardly dependent upon the type of surgery itself as long as it is properly performed. In fact, Bouchet et al., in a retrospective study comparing repercussions from abdominal and vaginal approaches on sexuality, demonstrated that the only factor influencing sexuality was age, independently of the approach [72].

The treatment of prolapse by large colpectomy of the Lefort type is obviously contraindicated among sexually active women, except in the absence of other surgical options.

Prolapse treatment by vaginal approach with native tissue, contrary to common belief, is both a reliable surgery and capable of preserving sexuality. Surgical treatment of rectocele has often been suspected of causing dyspareunia and sexual dysfunction due to myorraphy that is too tight, that raises too high and/or causes excessive narrowing of the introitus [73-74].

Therefore, consensual surgical attitude limits myorraphy, if necessary, to the lower part and limits the extent of the perineorraphy and is based on the folding of the pre-recti fascia.

As for the treatment of cystocele, the data available in the literature is rather reassuring with regard to the quality of sexual relations following plication of the prevesical fascia (Halban) and colpotomy [74].

Regarding the surgical correction of prolapse of the medial compartment, Maher et al., (2001) report a low rate and comparable rate of dyspareunia whether the patient has a uterine sacrospinofixation or a sacrospinofixation of the vaginal fundus associated to vaginal hysterectomy [75]. A review of the literature conducted by Fatton et al. reveals that the risk of dyspareunia remains limited in the absence of prior reconstructive surgery on condition of respecting good practice rules [76]. Regardless of the chosen technique, it is important to respect the length of the vaginal wall and to avoid funnel-like strictures of the last third of the vagina facilitated by large colpectomies and asymmetrical fixations.

The treatment of prolapse by transvaginal prosthesis that potentially targets a population of sexually active women would entail an average rate of de novo dyspareunia of 12.8% in case of using mixed synthetic/biological prostheses and 7.1% in case of using synthetic prostheses [77]. Correlation between painful retraction, a major problem of synthetic prostheses by vaginal approach, and dyspareunia is probably not linear: Fatton et al. find in a series of 125 patients operated by the Prolift technique a 15% rate of painful retraction on clinical examination between 6 and 12 months following surgery and a 3.4% rate of de novo dyspareunia. Of the 13 sexually active patients experiencing painful retraction, eight had no dyspareunia, illustrating the discordance between the two entities [76]. Feiner et al. describe the clinical presentation then the treatment of 17 patients referred to their centre, after being operated by anterior or total Prolift, Apogee or Perigee and presenting symptomatic prosthesis retraction, 14 among them having disabling dyspareunia. These patients were reoperated (mobilization, partial or total resection of the prosthesis). 88% of patients presented a clear reduction of pain, and 64% showed improvement in dyspareunia [78].

As for sacrocolpopexy, a surgery that concerns especially “young” women and therefore sexually active ones, it offers an improvement in their sex life following surgery [79]. Price et al. reveal a rate of 8% of de novo dyspareunia, while Handa et al. find a rate of 14.5% [80]. Nevertheless, in this latter series, 44.7% of women who weren’t sexually active prior to the operation resumed sexual activity after surgery. Generally speaking, studies are reassuring concerning the impact of promontofixation on patients’ sexual life.

The comparative studies currently at our disposal show that promontofixation is comparable to the vaginal approach with native tissue [81], yet superior to sacrospinal fixation regarding the impact on sexuality [54]. Sacrospinal fixation of the uterosacral ligaments is equivalent to simple vaginal hysterectomy [81]. Vaginal repair with native tissue is comparable to transvaginal prosthesis in improving the PSIQ-12 sexuality score [82-85].

A prospective randomized clinical trial would be necessary to compare promontofixation and transvaginal prosthesis: more and more women under 60 years of age are subject to high grade prolapse requiring prosthetic reinforcement, and in most cases, the literature does not allow us to opt for vaginal prosthetic surgery among sexually active women.

8. Results concerning patients’ quality of life and level of satisfaction

Let us not forget, in our review, that the ultimate goal of the prolapse surgical cure is “improvement in patients’ quality of life.” Consequently, a preoperative assessment of the impact of the prolapse and associated symptoms on patients’ quality of life is recommended together with a review of the repercussions of the surgical correction on the quality of life of these patients with the help of the appropriate questionnaires.
Maher et al. deduce in their literature review in Cochrane Database that vaginal approach repercussions on the quality of life are identical to those of the abdominal approach, although sacrospinal fixation presents a rate of anterior and middle relapse greater than that of promontofixation, and a higher rate or dyspareunia [54].

The level of satisfaction is in fact correlated with hymeneal cutoff. Indeed, a study conducted by Barber et al. shows that two years after promontofixation with or without Burch, the rate of anatomical failure is 45% for a POP-Q greater than stage I and 9% for a prolapse that protrudes from the hymen, 4% for a new treatment (pessary or reoperation) (Figure 1) [34, 86].

In other words, the patients were satisfied with their surgery when the corrected prolapse did not protrude from the hymen (the equivalent of a Baden-Walker stage 0 to 2). Indeed, Barber et al. found that the absence of sensation of a vaginal bulging (90% of the population) is the best appropriate criteria measuring satisfaction and improvement of the patient’s quality of life, while anatomical success alone is not sufficient [34].

Concerning the treatment of the medial compartment, an exhaustive review of the literature between 1985 and 2008 conducted by Diwadkar comparing vaginal approach with native tissue (sacrospinal fixation of the vaginal vault or uterosacral ligaments, or McCall culdoplasty), transvaginal prosthesis and promontofixation, demonstrates that transvaginal prosthesis carries with it more complications (fistulae and prosthetic exposures) and reoperations, while the vaginal approach with autologous tissue produced the most recurrences [56]. In fact, the vaginal approach with native tissue displayed 13.5% of complications at 32.6 months, of which only 1.9% required revision surgery. Promontofixation (laparotomy or laparoscopy) had a rate of complications of 17.1% at 26.5 months, including 2.2% of prosthesis erosion. Only 4.9% of patients had to be revised for complications. The group of patients operated by transvaginal prosthesis presented 14.5% of complications at 17.1 months, 5.8% of which involved infection or prosthetic erosion; 8.5% of patients were surgically revised, essentially for managing complications, but only 1.3% were revised for recurrent prolapse. Lawndi et al. in a cohort study evaluating the impact of pelvic organ prolapse surgery on the quality of life, find that only 10% of patients operated, all approaches combined, are dissatisfied after their surgery, and that this is especially due to de novo overactive bladder symptoms [87].

**Advantages and disadvantages:**

In short, both vaginal (native and prosthetic) and abdominal approaches have a high rate of satisfaction and positive functional and anatomical results if the indications are well established and the surgery properly carried...
out. A rapid comparison can be drawn between laparoscopic promontofixation and transvaginal prosthesis from Table IV.

CONCLUSION

Prolapse of the pelvic organs is thus a functional pathology that does not jeopardize the patient’s vital prognosis. Its management is always subject to controversy regarding the ideal approach from the beginning. As we have exposed above, the choice of the approach depends in fact upon several criteria: the patient’s age, her physical activity and expectations, the surgeon’s training and experience, the contraindications to each approach, the risk factors for relapse, anatomical mapping and severity of the lesions, the accompanying functional symptoms and the economic cost of the procedure.

The choice of the approach is not binary. Urogynecology is a multidisciplinary entity. The surgeon treating pelvic organ prolapse must master the standard vaginal, prosthetic, and abdominal approaches, especially laparoscopy or robotics nowadays, and must of course know how to manage the complications arising from both of these approaches.

Evidence-based medicine favors the abdominal approach which, according to randomized studies, is the most solid over the long term, while the standard vaginal approach has the most elevated rate of recurrence at the level of the anterior compartment. The transvaginal prosthesis technique, meanwhile, is effective over the long term according to the different existing studies. The rate of exposure of the prosthesis has clearly declined since the spread of this technique and growing awareness of the risk factors of this complication. Risk factors and solutions of painful prosthetic retraction and dyspareunia remain subjects to controversy.

Lest we forget, standard vaginal approach still has certain indications and advantages, especially when done by expert hands.

Ultimately, prolapse surgery remains a functional surgery with the initial goal of improving the quality of life of our patients and, regardless of the approach, it must remain minimally invasive and at an acceptable cost.

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