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Corresponding Author	Family Name	Lasmar
	Particle	
	Given Name	Ricardo Bassil
	Suffix	
	Division	Medicine Faculty, Department of Surgery
	Organization/University	Federal Fluminense University
	Address	Av Marques do Paraná 303, Centro, Niterói, Rio de Janeiro, Brazil
	Email	ricardo@lasmar.com.br
Author	Family Name	Lasmar
	Particle	
	Given Name	Bernardo Portugal
	Suffix	
	Division	Department of Gynecology
	Organization/University	Estacio de Sá University (UNESA)
	Address	Rio de Janeiro, Brazil
	Division	Department of Gynecological Endoscopy
	Organization/University	Central Hospital Aristarcho Pessoa (HCAP-CBMERJ)
	Address	Rio de Janeiro, Brazil
Abstract	The five limiting factors of office hysteroscopic myomectomy are related to the patient, the myoma, the technique, the technology, and the hysteroscopist. For the patient, her sensitivity to pain and discomfort to endure the procedure. The size, topography, and intracavitary portion of myoma are parameters that should be evaluated for decision of the procedure. The technique and technology are fundamental to enable the office procedure and, finally, as important as well, is the expertise of hysteroscopist, which is determinant to perform office hysteroscopic myomectomy.	
Keywords (separated by “ - ”)	Office procedure - Hysteroscopic myomectomy - Factors limiting	

Ricardo Bassil Lasmar and Bernardo Portugal Lasmar

35.1 Introduction

Leiomyomas are the most common tumors of the uterus and the female pelvis. They are benign tumors consisting of smooth muscle cells associated with variable amount of fibrous connective tissue. According to Muller and Ludovici [1], they are tumors of smooth muscle cells origin, and according to Townsend [2] they are of unicellular origin. They are well-defined, but nonencapsulated lesions (pseudo-capsule) (Fig. 35.1).

Although they are mentioned and accepted as present in 77% of autopsies, it is difficult to determining the real incidence of leiomyomas [3]. They are usually present in family history and the highest incidence rate is in nulliparous and African-American women [4].

It is more common during menacme when symptoms and dimensions are significant. The majority of the patients are asymptomatic; but the symptomatology is significant in submucous fibroids. The most frequent complaint is abnormal uterine bleeding (AUB) associated with anemia in some cases. AUB is frequently caused by the rupture of dilated vessels on the surface of the nodule. Other causes of bleeding would be: Increased endometrial surface, increased uterine vascularization, changes in uterine contractility pattern, exposure and ulceration of the submucous myoma surface, degeneration of the myomatous nodule, and uterine venous ectasia by compression of the venous plexus by the nodules [5].

The submucous myoma must be classified before surgery and it is done with hysteroscopy and ultrasound (US) or magnetic resonance imaging (MRI) (Fig. 35.2).

There are two classifications, one of European Society for Gynaecological Endoscopy (ESGE) with three levels (0, 1, and 2) [6] and STEPW [7] classification with three groups (I, II, and III). According to this classification it is possible to know, previously, the difficulty and complexity of hysteroscopic myomectomy (Fig. 35.3).

The first hysteroscopic myomectomy was reported in 1978, by Neuwirth, resecting four fibroids from the uterine cavity [8]. In 1986, Goldrath approached intracavitary submucous fibroids using only a grasping forceps through the vagina [9].

Lasmar, in 2001, reported the possibility to remove submucous fibroid with intramural component by hysteroscopy handling it also mechanically with direct mobilization [10].

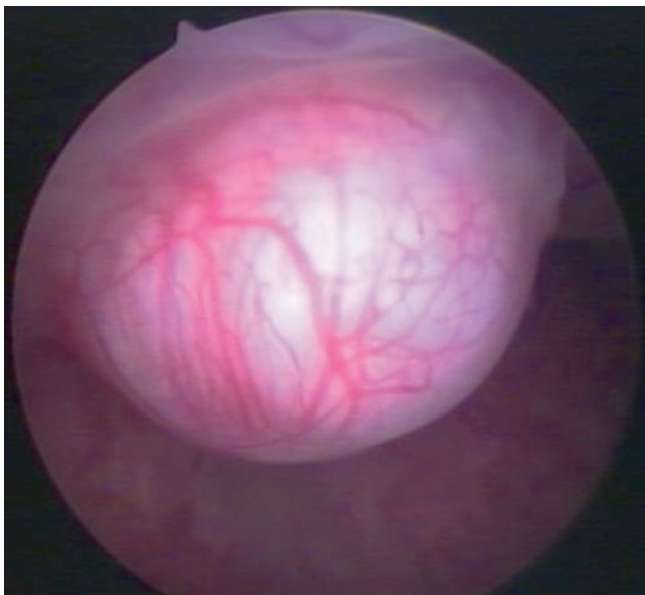


Fig. 35.1 Submucous myoma (Author image)

R.B. Lasmar, M.D., Ph.D. (✉)
Medicine Faculty, Department of Surgery, Federal Fluminense
University, Av Marques do Paraná 303, Centro, Niterói,
Rio de Janeiro, Brazil
e-mail: ricardo@lasmar.com.br

B.P. Lasmar, M.D.
Department of Gynecology, Estacio de Sá University (UNESA),
Rio de Janeiro, Brazil

Department of Gynecological Endoscopy, Central Hospital
Aristarcho Pessoa (HCAP-CBMERJ), Rio de Janeiro, Brazil

Nowadays, the surgery for submucous myoma is done by different way; mechanically, with scissor, grasping or morcellation; energy, monopolar, bipolar, radiofrequency, and laser.

In the majority of the cases, hysteroscopic myomectomy is done in hospital with anesthesia, but in special cases it can be done in office.



Fig. 35.2 Submucous myoma and MRI

35.2 Limiting Factors of Office Hysteroscopic Myomectomy (OHM)

First, it is important to point out the difference between limits and contraindication: limits could be overcome depending on the patient, leiomyoma, technique, technology that is applied, and on surgeon's experience. Whereas, contraindications rule out this specific type of procedure.

Another key aspect is the definition of hysteroscopy at outpatients setting described in the text. We currently observe that physicians are fitting their offices so that they can provide anesthesia during the procedure. According to the Brazilian legislation, in order to perform anesthesia in an office setting, it must be equipped with medical gases, cardiopulmonary resuscitation equipment, corridors, and elevators large enough to fit a patient on a gurney. This entire structure is very similar to that of a hospital, despite the fact that the setting is an outpatient setting. Thus, we will approach the topic from the outpatient scenario, with no hospital infrastructure, which in our opinion shows excellence of office hysteroscopy.

Therefore, the performance and the success of hysteroscopy are directly associated with pain threshold of the patient, use of appropriate equipment, and expertise of the surgeon.

The literature provides few references on the limits of office hysteroscopic myomectomy (OHM). Thus, we felt encouraged to describe based on our experiences and observations.

Office hysteroscopic surgery, including myomectomy, presents a number of advantages: the possibility of immediate treatment of the lesion at the time of diagnosis reduces anxiety

	Size (cm)	Topography	Extension of the base	Penetration	Lateral Wall	Total
0	≤ 2	Low	≤ 1/3	0	+1	
1	> 2 to 5	Middle	> 1/3 to 2/3	≤ 50%		
2	> 5	Upper	> 2/3	> 50%		
Score	+	+	+	+	+	

Score	Group	Complexity and therapeutic options
0 to 4	I	Low complexity hysteroscopic myomectomy.
5 to 6	II	High complexity hysteroscopic myomectomy. Consider GnRH use? Consider Two-step hysteroscopic myomectomy.
7 to 9	III	Consider alternatives to the hysteroscopic technique

Fig. 35.3 Submucous myoma classification—STEPW—Lasmar classification

of the patient, as well as the complaints. Furthermore, it is less expensive when compared to hospital surgery, and for the hysteroscopy expert, the pleasure of performing the state of the art in hysteroscopy.

The first important limitation to office hysteroscopic myomectomy (OHM) is patient's sensitiveness to discomfort/pain of the procedure. For some women, the time required to carry out the procedure is the maximum amount of time they tolerate. Some professionals suggest paracervical anesthesia, whereas others indicate sedation. In our outpatient setting, the entire procedure is conducted with no anesthesia. Patients are given only oral analgesic/antispasmodic drug 30 min prior to initiating the procedure.

In our practice, we use the leiomyoma mobilization technique with grasping or scissors and mechanical energy. Thus, we perform outpatient myomectomy at the time of examination, since the myoma classification allows for it. According to this technique, we section the endometrium and the fibrous ridges on the entire circumference of the myoma. Then we approach the pseudocapsule, perform mechanical mobilization of the nodule, releasing it from the myometrium. In our opinion, the best myomectomy technique involves working with the myoma pseudocapsule, trying to do the same way that is done in laparotomic or laparoscopic myomectomy. With this technique the hysteroscopic myomectomy is faster, with less bleeding and pain [11] (Fig. 35.4).

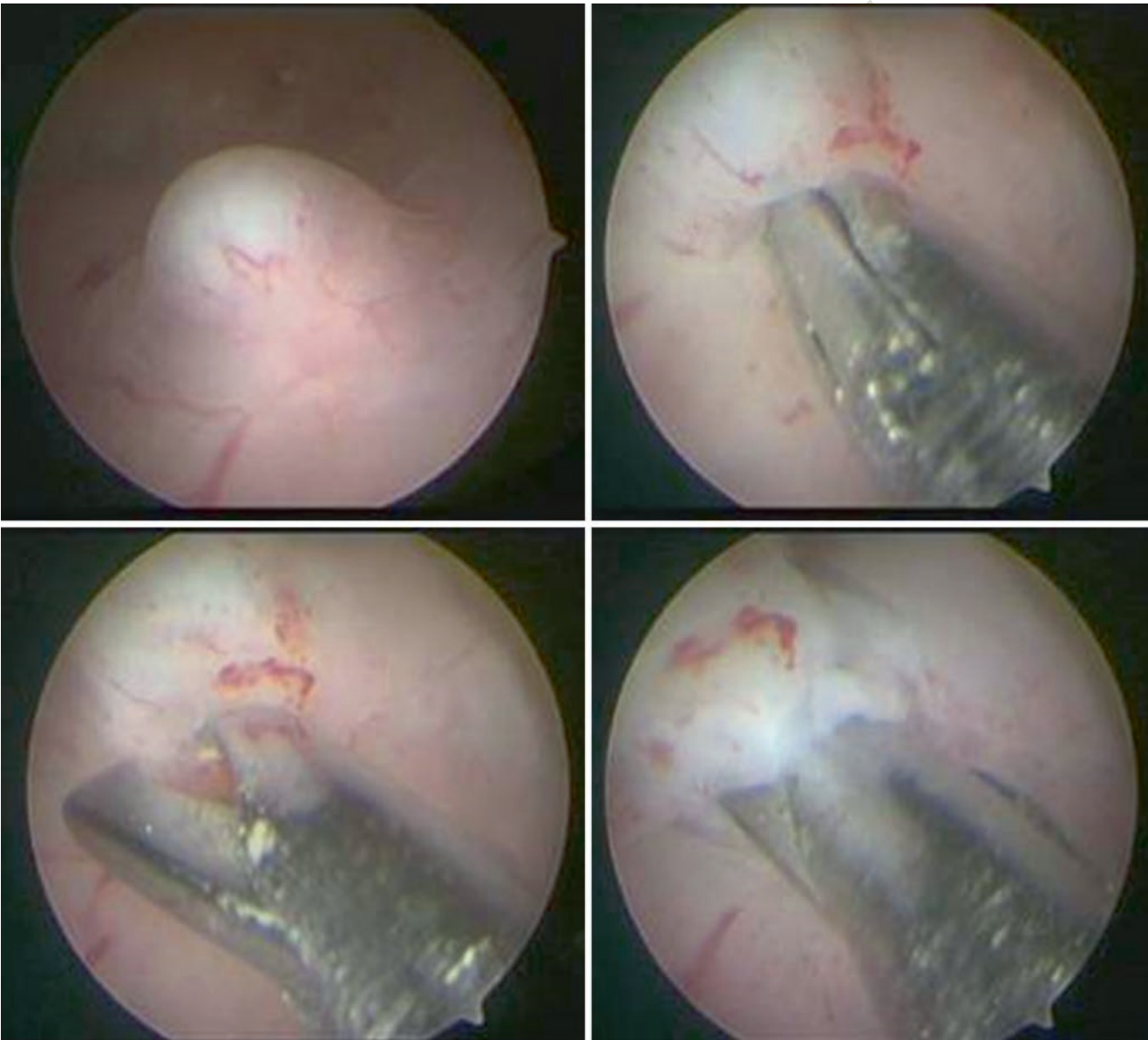


Fig. 35.4 Office hysteroscopic myomectomy with direct mobilization of myoma, approaching pseudocapsule (Author image)

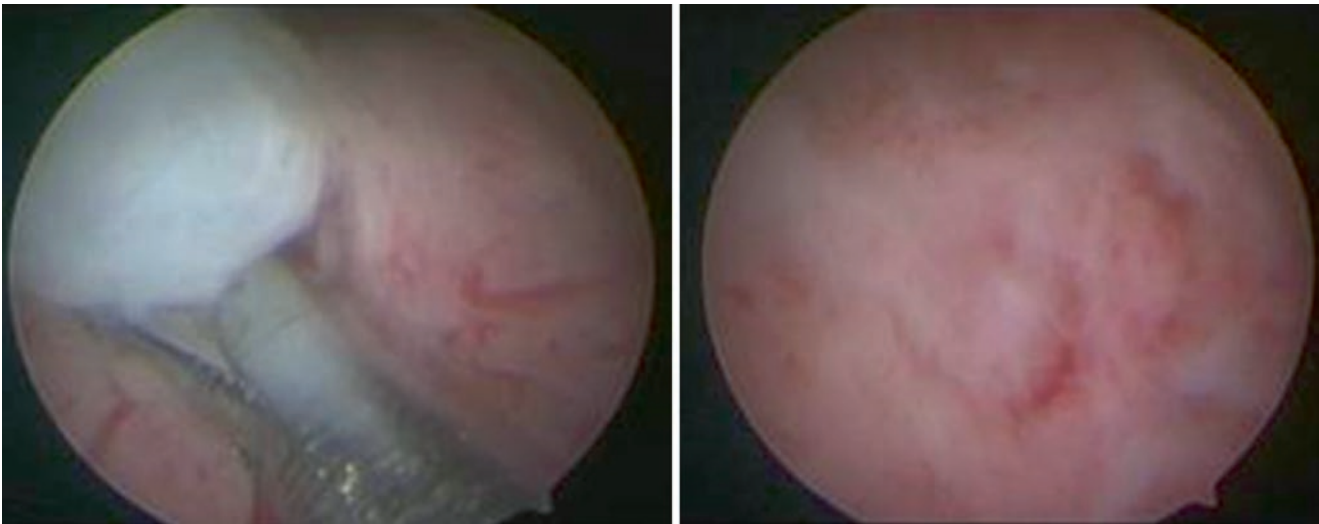


Fig. 35.4 (continued)

The second factor to determine the limits of OHM is classification of the myoma. The limits for outpatient procedures are myoma with broad myometrial penetration (ESGE level 2), large size, with a broad implantation base, located on the cornual or fundus, and classified as group II or III according to the Lasmar (STEPW) classification. The submucous leiomyomas level 0 and 1 or leiomyomas classified as Lasmar Group I are the most favorable for OHM, but if presenting limiting factors, they must be evaluated by the hysteroscopy surgeon.

A number of authors reported the myoma size as an important limiting factor. For outpatient surgery, three centimeters seem to be the limit, depending on other parameters, such as location and myometrial penetration. Most experienced surgeons perform office hysteroscopic myomectomy, with or without anesthesia regardless of the technology used, when the myoma measures one to two centimeters and is completely located in the uterine cavity [12].

Leiomyomas larger than 2 cm, that which cannot be removed from the uterine cavity following myomectomy, may be left free in the uterine cavity and will be expelled some days after the procedure. This causes no problem to the patient, except for pain similar to more intense menstrual cramps when the fibroid is expelled [13].

Regarding the submucous myoma, we consider four parameters to evaluate the feasibility of OHM, as follows: intracavitary portion, extension of the insertion base in the uterine wall, location, and size (Table 35.1).

Intracavitary portion of the myoma: OHM can be performed considering the larger portion of fibroid located inside the uterine cavity. This applies to myomas type 0 or 1 according to the Wamsteker classification. Type 2 myomas are considered limited for outpatient setting surgery in only one procedure. In these cases, myolysis may be attempted with different types of energy: monopolar, bipolar, laser,

Table 35.1 Suggestion for limiting of office hysteroscopic myomectomy (OHM)—Lasmar

Type	Bases	Localization	Size, cm	OHM
0	<1/3	Inferior and middle	<5	Yes
0	<1/3	Upper or cornual	≤2	Yes
1	<1/3	Inferior and middle	<5	Yes
1	<1/3	Upper	≤2	Yes
1	<1/3	Upper	≥3	No
1	<1/3	Cornual	≤1	Yes
1	<1/3	Cornual	≥2	No
1	>1/3	Inferior and middle	≤2	Yes
1	>1/3	Inferior and middle	≥3	No

radiofrequency, OPPIuM technique to do the surgery in two times. The OPPIuM (office preparation of partially intramural leiomyomas) technique is an outpatient procedure, used to downgrade type I and II leiomyomas and enable subsequent easier and safer resectoscopy. This is not the topic of the chapter [14] (Fig. 35.5 and 35.6).

The base of myoma insertion in the uterine wall: Surgery is recommended when the base of myoma occupied 1/3 or less of the uterine wall. Fibroid with a larger base would also be bigger in size, leading to two limiting parameters. It is possible to do office hysteroscopic myomectomy in bases bigger than 1/3, but generally in two operative times (Fig. 35.7).

As to *location*, it is more feasible to perform myomectomy on the anterior or posterior wall, regardless of the surgical technique or technology employed. The same does not apply to myoma located on the fundus or cornual region. These locations *per se* are not contraindications but they depend on the assessment of two more parameters (Fig. 35.8 and 35.9).

The *size* of the leiomyoma is also important; if larger than 5 cm, they are not appropriate for outpatient procedure. Nevertheless, large myomas with a narrow base may be

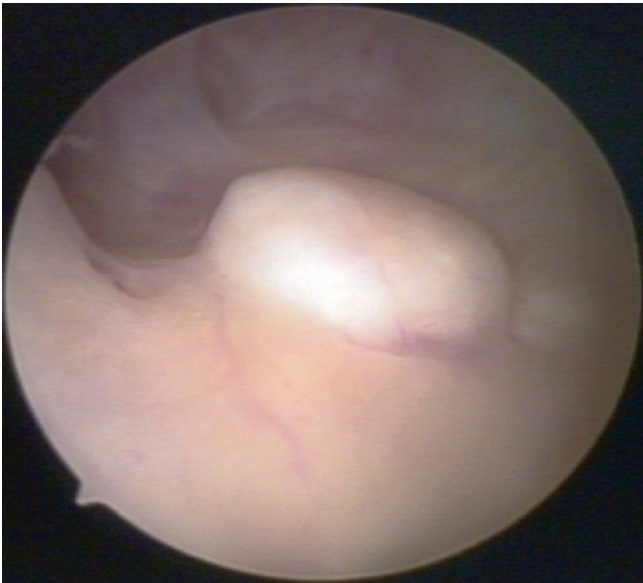


Fig. 35.5 Submucous myoma type 0 (Author image)

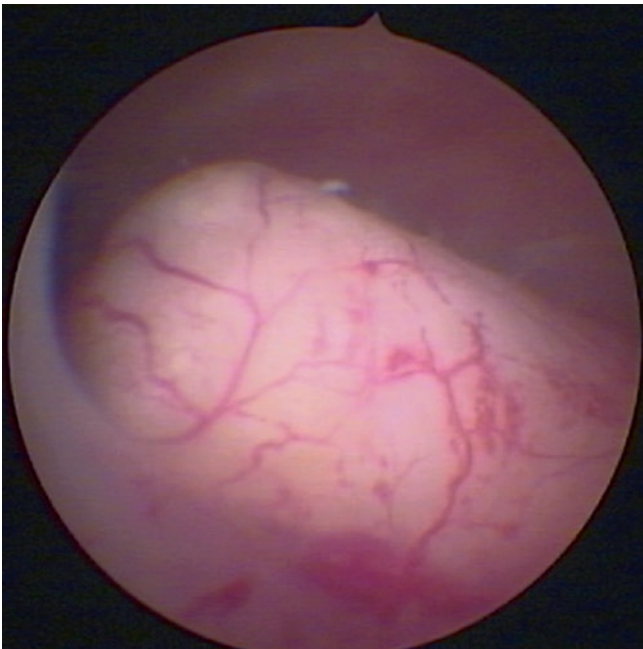


Fig. 35.6 Submucous myoma type 1 (Author image)

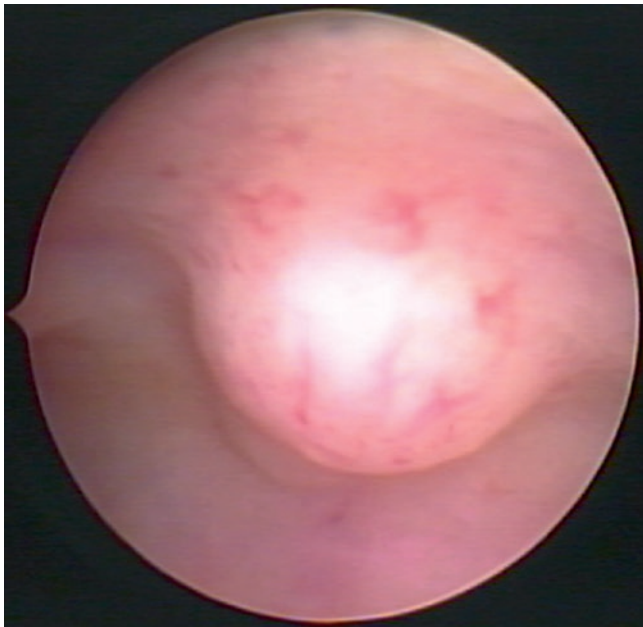


Fig. 35.7 Submucous myoma type 1 with its basis <1/3 of the wall (Author image)

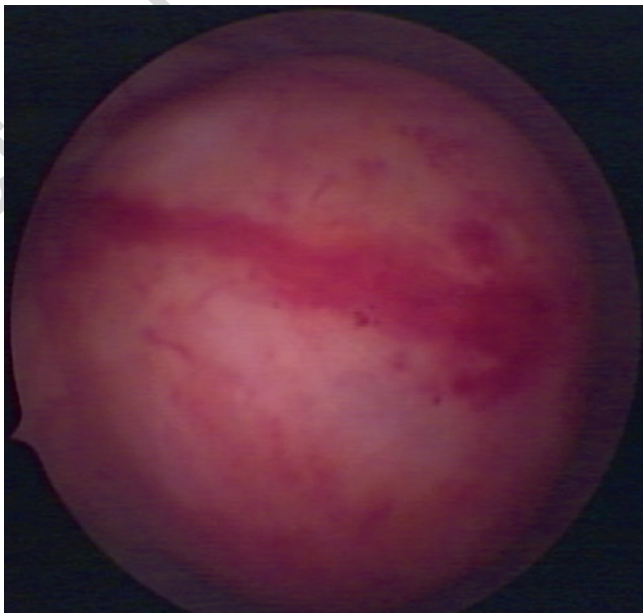


Fig. 35.8 Fundus submucous myoma (Author image)

165 enucleated, left free in the uterine cavity in order to be
166 expelled some days later. In these cases, we suggest evaluat-
167 ing the limits of office hysteroscopic myomectomy, which
168 probably depends on the hysteroscopic experience of the sur-
169 geon, the technique applied, and the uterine cavity size.
170 The *technique* and *technology* work together, because
171 depending on the technology involved the technique will be
172 different. Dispositives that reduces the myoma volume like:
173 morcellation; bipolar mini resectoscope; bipolar probe and
174 myolysis, myoma bigger than 3 cm or with more intramural

175 portion are limits to one step office hysteroscopic myomec-
176 tomy (Table 35.2).
177 In the technology that approach the myoma basis, using
178 the pseudocapsule, the intramural portion is the most impor-
179 tant limit. The fundus and corneal place are difficult too,
180 because of the difficult access of these regions.
181 For the hysteroscopist, the office hysteroscopic procedure
182 is the evolution, it is accessible for everyone who can do a
183 good investigation of the uterine cavity without discomfort

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178 [AU3]
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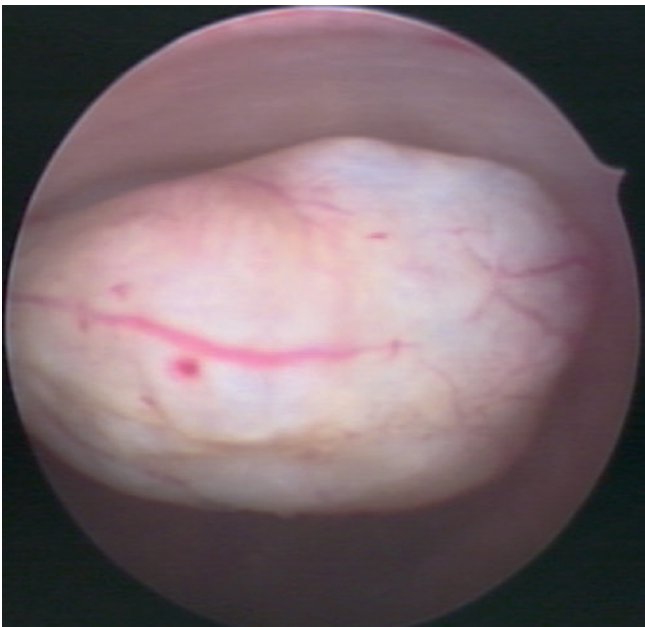


Fig. 35.9 Submucous myoma in cornual place

Table 35.2 Limits and options of office hysteroscopic myomectomy

Limits	Options		
Patient sensibility	Anesthesia		
Size	Leave in the cavity	Myolysis	
Penetration	Mobilization	Enucleation	Two steps
Bleeding	Coagulation	Stop	
Fundus place	Mobilization	Two steps	
Cornual place	Mobilization	Two steps	

and carefully, must train with orientation and good technique. We suggest starting with hysteroscopy with direct vision biopsy, going to polypectomy and after to the myomectomy. For office hysteroscopic myomectomy, the expertise of the hysteroscopist is determinant in all the techniques.

35.3 Final Considerations

Limits for OHM depend on a number of factors; if combined, they make the procedure even more difficult.

These factors are related to the patient, the myoma, the technique, the technology applied, and the surgeon.

As for the patients, the limiting factor is their discomfort threshold, which may allow diagnostic examination but not outpatient surgery. In this case, the solution includes local or general anesthesia.

The size of the fibroid, its location on the fundus or cornual, and the degree of myometrium penetration are key factors to hinder or contraindicate OHM. The combination of factors contributes to making OHM more difficult.

The equipment and the type of energy may enhance the feasibility of an outpatient procedure. Mobilization is more

useful in myomas with deeper myometrium penetration, whereas morcellation techniques are recommended until 2 cm myomas.

Fundus and cornual leiomyomas are difficult to remove, regardless of the technique.

The experience of the surgeon is crucial to perform OHM. For those starting to perform office surgery, we advise to start OHM in smaller leiomyomas, 1–2 cm, which are completely located in the uterine cavity. Thus, they do not have to worry about immediate extraction or late expulsion of the nodule.

Don't forget, the office hysteroscopic myomectomy is an option for the patient with a special submucous myoma.

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Author Queries

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Queries	Details Required	Author's Response
AU1	Please check the sentence "Lasmar, in 2001, reported the..." for clarity.	
AU2	Can "Myolis" be changed to "Myolysis" in Table 35.2. Please advise.	
AU3	Please check the sentence "In the technology that approach..." for clarity.	

Uncorrected Proof