AAGL 26

55TH GLOBAL CONGRESS ON MIGS

BOSTON, MASSACHUSETTS
NOVEMBER 13-16, 2026

Syllabus

Panel 556

No Fibroid Left Behind: The Science, Skill, and Significance of Complete Hysteroscopic Myomectomy

HONORARY CHAIR
Charles H. Koh, MD

SCIENTIFIC PROGRAM CHAIR
Nash S. Moawad, MD

PRESIDENT
Michael Hibner, MD, PhD



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Panel-556: No Fibroid Left Behind:
The Science, Skill, and Significance of Complete Hysteroscopic Myomectomy

Chair: Ted L. Anderson
Faculty: Ted L. Anderson, Linda D. Bradley, Malcolm G. Munro

Course Description

Submucosal leiomyomata (FIGO 0-2) constitute approximately 25% of fibroids. However, with contributions to abnormal uterine bleeding, subfertility, and dysmenorrhea, they represent a disproportionate share of patient complaints. There is compelling evidence that residual fibroid fragments from incomplete removal increase the health care burden, resulting in additional medical interventions, hysteroscopic re-operations, or even hysterectomy to resolve clinical symptoms and address the medical, emotional, and social stressors to the patient. In this session, we discuss the clinical, cultural, and economic importance of complete submucosal fibroid removal. Recognizing there is "more than one way to skin that proverbial cat," we will describe the utility of selecting the right tools and techniques to achieve the operative imperative of "No Fibroid Left Behind."

Learning Objectives: *At the end of this course, the participant will be able to:* 1) Recognize the clinical, emotional, and fiscal implications of incomplete removal of submucosal fibroids; 2) Describe the tools and techniques that facilitate effective hysteroscopic myomectomy; and 3) Apply the optimal surgical strategies required to achieve complete fibroid removal.

Course Outline

3:15 pm	Welcome, Introduction and Course Overview	T. Anderson
3:20 pm	Your Patient Deserves Better: The Real Burden of Incomplete Hysteroscopic Myomectomy	T. Anderson
3:35 pm	The Training Gap Stops Here: Resectoscope Mastery for Every Hysteroscopist	L. Bradley
3:50 pm	Retrieve, Remove, Succeed: The Electromechanical Path to Zero Residual Fibroids	M. Munro
4:05 pm	Discussion Questions & Answers	All faculty
4:15 pm	Adjourn	

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Disclosure of Relevant Financial Relationships

As an ACCME-accredited provider, AAGL is responsible for ensuring that accredited education is fair, balanced, free of commercial bias, and supports safe, effective patient care. AAGL maintains control over all aspects of educational planning, content, faculty selection, delivery, and evaluation.

All individuals in a position to control educational content are required to disclose financial relationships with ACCME-defined ineligible companies within the past 24 months. AAGL identifies and mitigates all relevant financial relationships before individuals assume their respective roles. Educational content is also subject to independent peer review by individuals without relevant financial relationships.

Disclosure information and acknowledgment of any commercial support are provided to learners before the activity to promote transparency and maintain the independence and integrity of the education.

Asterisk (*) denotes no financial relationships with ACCME-defined ineligible companies to disclose.

PLANNER DISCLOSURES

The following members of AAGL have been involved in the educational planning and/or review of this course (listed in alphabetical order by last name).

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Adrian Balica, MD*
Jamal Mourad, DO – Proctor: Intuitive Surgical
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Steven Radtke, MD*
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Jean Uy-Kroh, MD*
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Linda Michels, AAGL Executive Director*
Linda Bell, AAGL Admin Support*
Nancy Williams, COO, CME Consultants*

SCIENTIFIC PROGRAM COMMITTEE

Nash Moawad, MD, MS, Chairman – Consultant (ended 12/2024): Medtronic, Womed, Integra Life Sciences
Amani Harris, MD*
Ted Lee, MD – Advisory/Consultant: Johnson & Johnson, Regeneron Pharmaceuticals
Nucelio Lemos, MD, PhD – Speakers Bureau: Pfizer, Inc., Medtronic; Advisory Board: Knight Therapeutics, Vecfer Pharma
Mario Malzoni, MD*
Emad Mikhail, MD – Consultant: Johnson & Johnson
Hannah Palin, MD*
Megan Wasson, DO*
Michael Hibner, MD, PhD*
Jose "Tony" Carugno, MD*
Angela Chaudhari, MD - Consultant: Tag/Dream Medical, Johnson & Johnson; Speakers Bureau: Johnson & Johnson
Linda D. Bradley, MD, Medical Director*
Linda Michels, Executive Director, AAGL*

COURSE CHAIR DISCLOSURE

Ted L Anderson, MD, PhD *

FACULTY DISCLOSURES

The following faculty have agreed to support their presentations and clinical recommendations with the best available evidence from the medical literature (in alphabetical order by last name).

Ted L Anderson, MD, PhD*
Linda D. Bradley, MD*
Malcolm G Munro, MD - Speakers Bureau: CSL-Vifor, Karl Storz, Phamacosmos; Consultant: Rejoni Inc, Womed, Flo Health; Stockholder: Rejoni Inc, Womed

MITIGATION OF RELEVANT FINANCIAL RELATIONSHIPS

All relevant financial relationships have been mitigated.

Drs. Lee, Lemos, Mikhail, and Chaudhari's planning decisions, as part of the Scientific Program Committee (SPC), were peer reviewed by other planners on the SPC who had disclosed no financial relationships with ineligible companies, and found to be fair, balanced, and free of commercial bias. Dr. Moawad's financial relationships ended 12/2024, thus mitigating them. For most of his AAGL Professional Education Committee service, Dr. Mourad had no financial relationships to disclose. He recently disclosed a new relationship as a Proctor for Intuitive Surgical. Since then, he has not participated in activities involving control or influence over accredited educational content; therefore, no additional mitigation was necessary.

The presentation content for course faculty, Dr. Munro, has been peer reviewed and found to be fair, balanced, and free from commercial bias.

Panel 556

No Fibroid Left Behind:

The Science, Skill, and Significance of Complete Hysteroscopic Myomectomy

Moderator: **Ted L. Anderson, MD, PhD**
(Vanderbilt University School of Medicine, Nashville, TN)

Panelist: **Linda D. Bradley, MD**
(Cleveland Clinic, Cleveland, OH)

Panelist: **Malcom G. Munro, MD**
(UCLA David Geffen School of Medicine, Los Angeles, CA)

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Course Agenda

Ted L. Anderson, MD, PhD
Your Patient Deserves Better:
The Real Burden of Incomplete Hysteroscopic Myomectomy

Linda D. Bradley, MD
The Training Gap Stops Here:
Resectoscope Mastery for Every Hysteroscopist

Malcom G. Munro, MD
Retrieve, Remove, Succeed:
The Electromechanical Path to Zero Residual Fibroids

2

Course Objectives

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  - Recognize the clinical, emotional, and fiscal implications of incomplete removal of submucosal fibroids;
  - Describe the tools and techniques that facilitate effective hysteroscopic myomectomy; and
  - Understand the optimal surgical strategies required to achieve complete fibroid removal.

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Panel 556

Your Patient Deserves Better:

The Real Burden of Incomplete Hysteroscopic Myomectomy

Ted L. Anderson, MD, PhD, FACOG, FACS
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4

Disclosure

I have no financial relationships to disclose

5

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Uterine Myomas: Scope of the Problem



- The most common pelvic neoplasm in females
  - uterine smooth muscle tumors composed largely of myocytes
  - excessive deposition of extracellular matrix substances (mainly collagen)
  - surrounded by a fibro-neurovascular pseudocapsule
    - separates the fibroid from adjacent myometrium
- Arise in reproductive age females
  - almost never seen in prepubertal females
    - occasionally seen in adolescent females
- Incidence varies with race and age
  - Pilot ultrasound screening study of asymptomatic women age 18-30
    - fibroid prevalence was 7% of White patients and 26% of Black patients
    - estimated cumulative incidence by age 50 is ~ 70% in White women and > 80% in Black women
- Impact on health related to number, size, and location
  - 30-50% of patients experience symptoms of AUB, infertility, pain, and/or mass effect

Baird DD, Dunson DB, Hill MC, Cousins D, Schectman JM. High cumulative incidence of uterine leiomyoma in black and white women: ultrasound evidence. *Am J Obstet Gynecol.* 2003;188(1):100–107.

Stewart EA, Laughlin-Tommaso SK, Catherino WH, et al. Uterine fibroids. *Nat Rev Dis Primers.* 2016;2:16043.

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Parker WH. Etiology, symptomatology, and diagnosis of uterine myomas. *Fertil Steril.* 2007;87(4):725–736.

Islam MS, et al. *Hum Reprod Update.* 2018;24(1):59–85

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Mt Vesuvius vs Mt. Everest





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Clinical Impact of Myomas

- Heavy, prolonged, and/or irregular menstrual bleeding
- Subfertility and other impacts on pregnancy
- Pelvic pain or pressure
- Urinary or bowel function
  - external compression
  - inflammatory field effect
- Venous compression – vascular congestion
- Dysmenorrhea and/or dyspareunia

Stewart EA, Laughlin-Tommaso SK. Uterine fibroids (leiomyomas): Epidemiology, clinical features, diagnosis, and natural history. In: UpToDate, Barbieri RL (Ed), Wolters Kluwer. (accessed on February 7, 2025)

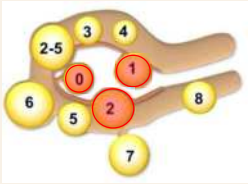
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Clinical Impact of Myomas

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  - external compression
  - inflammatory field effect
- Venous compression – vascular congestion
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- Estimated direct health care costs of over $10 billion in the USA
  - Historically cited as contributing to ~ 33% of hysterectomies

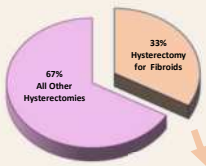
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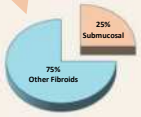
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Submucosal Fibroids



~500,000 hysterectomies/yr
~33% for fibroids (165,000)
~25% submucosal



Myomectomy can be performed safely
Minimal risk with experienced surgeon
Potential for significant impact
reducing affiliated morbidity
preserving / enhancing fertility

~41,250 hysterectomies potentially involve submucosal fibroids

ACOG. Diagnosis of abnormal uterine bleeding in reproductive aged women. Practice Bulletin No. 128. *Obstet Gynecol 2012;120:197.*

ACOG. Endometrial Cancer. Practice Bulletin 149. *Obstet Gynecol 2015;125:1006.*

Deutsch A et al. Resectoscopic surgery for polyps and myomas: A review of the literature. *JMIG 2017;24:1104-1110.*

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Submucosal Fibroids and AUB

Most common presentation of submucosal fibroids





Mechanisms

- Pseudocapsule vasculature supplying growing myoma
- Aberrant angiogenesis similar to malignant solid tumors
  - chaotic formation of blood vessels in vicinity of myomas
- Vasculature around myomas is structurally deficient
  - propensity for easy breakage and leaking
- Endometrial venous lakes
  - Related to physical pressure exerted by myomas
- Disrupting normal contraction of the uterus
- Disrupting endometrial shedding and regeneration

Uimari O, Subramaniam KS, Vollenhoven B, Tapmeier TT. Uterine Fibroids (Leiomyomata) and Heavy Menstrual Bleeding. *Front Reprod Health.* 2022; 4:818243.

Lumsden MA, Wallace EM, Clinical presentation of uterine fibroids. *Baillière's Clin Obstet Gynecol.* 1998; 12:177-195.

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Submucosal Fibroids and Subfertility

Contribute to infertility in up to 10% of patients

May be sole cause of infertility in up to 5% of patients

Resection of submucosal fibroids is associated with approximately twofold higher clinical pregnancy rates compared with fibroids left in situ



Mechanisms

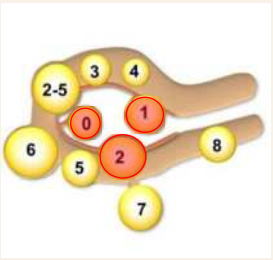
- distortion of endometrial cavity inhibits implantation
- alteration of endometrial surface impairs embryo receptivity
- larger myomas may hamper sperm transport
- impact on endometrial and myometrial blood supply
- compromise of tubal patency
- chronic inflammation alters endometrial environment
- altered molecular markers have global effect on receptivity and decidualization via paracrine mechanisms

Guo XC, Segars JH. The impact and management of fibroids for fertility: an evidence-based approach. *Obstet Gynecol Clin North Am.* 2012; 39:521.
Freytag D, Günther V, Maass N, Alkatout I. Uterine Fibroids and Infertility. *Diagnostics (Basel)* 2021; 11(8):1455.
Practice Committee of the American Society for Reproductive Medicine. Removal of myomas in asymptomatic patients to improve fertility and/or reduce miscarriage rate: a guideline. *Fertil Steril.* 2017;108(3):416–425.

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Fibroids: Treatment Options



- Focus mainly on submucous myomas
  - FIGO type 0,1,2
  - distortion of endometrium
- Estimated about 25% of myomas
  - disproportional percentage are symptomatic
  - focus on abnormal bleeding and subfertility
- Interventions
  - Hysterectomy
  - Embolization
  - RF Energy
  - Resection (myomectomy)
- Challenges in resection
  - linear motion of resection tools
  - non-linear uterine cavity
  - Instrument coupled with telescope

Stewart EA. Uterine fibroids (leiomyomas): Treatment overview. In: UpToDate, Barbieri RL (Ed), Wolters Kluwer. (accessed on February 7, 2025)

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	Size (cm)	Topography	Extension of the Base	Penetration	Lateral Wall	Total
0	< 2	Low	< 1/3	0		
1	> 2 – 5	Middle	> 1/3 – 2/3	< 50%	+ 1	
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

Lasmar RB, Xinmei Z, Indman PD, et al. Feasibility of a new system of classification of submucous myomas: a multicenter study. *Fertil Steril.* 2011;95:2073–2077.

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Fibroid size (Fibroid Diameter ≠ Fibroid Size)

- Most important consideration in determining successful single session resection
- A small increase in diameter = exponentially large jump in volume

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left(\frac{d}{2}\right)^3 = \frac{\pi}{6}d^3 \approx 0.524 \times d^3$$

Mathematical Calculation of the Volume of a Sphere. Archimedes ~225 BC

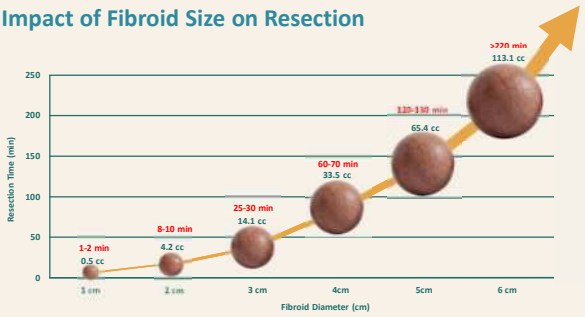
- Relationship between fibroid diameter and total volume is cubic, not linear
- 4 cm fibroid is not twice as large as a 2 cm fibroid - ~8x the size by volume

Catena U, LaFera E, Giannarelli D et al. Feasibility of single step hysteroscopic myomectomy: fibroid size is the most significant factor based on data from a single centre and surgeon. *Facts Views Vis Obgyn* 2025;17(2):110-120

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Impact of Fibroid Size on Resection



Catena U, LaFera E, Giannarelli D et al. Feasibility of single step hysteroscopic myomectomy: fibroid size is the most significant factor based on data from a single centre and surgeon. *Facts Views Vis Obgyn* 2025;17(2):110-120
Emanuel MH. Hysteroscopy and the treatment of uterine fibroids. *Best Practice & Research Clinical Obstetrics & Gynaecology* 2015; 29(7):920-929.
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Lasmar RB, Lasmar BP, Moawad NS. Hysteroscopic myomectomy. *Medicina* 2022;58:1627

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Consequences of Incomplete Resection

- Series of 528 myomectomies
  - 91 incomplete resections
    - 37 repeated immediately (fertility indications); 41 observed with ongoing menorrhagia
  - Repeat myomectomy or hysterectomy within 2 yrs
    - 80% of incomplete resections; 2% of complete resections
- Series of 177 submucosal myomectomies for AUB
  - bleeding controlled in >84% of patients after complete resection
  - bleeding controlled in <70% of patients after incomplete resection
- 41 patients with incomplete resection of submucosal fibroids
  - repeat surgery in 29.8% at 1 yr; 45.2% by 2 yrs; 55.8% by 3 yrs

van Dongen H, Emanuel MH, Smeets J et al. Follow-up after incomplete hysteroscopic removal of uterine fibroids. *Acta Obstetricia et Gynecologica* 2006;85:1463-1467
Wamsteker K, Emanuel MH, de Kruif JH. Transcervical hysteroscopic resection of submucous fibroids for abnormal uterine bleeding: results regarding the degree of intramural extension. *Obstet Gynecol.* 1993 Nov;82(5):736-40.
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Vercellini P, Zaina B, Yaylayan L, et al. Hysteroscopic myomectomy: long-term effects on menstrual pattern and fertility. *Obstet Gynecol.* 1999;94:341–347.

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Consequences of Incomplete Resection

- Incomplete symptom treatment
- Increased repeat myomectomy or hysterectomy
- "X% removed" is not itself a validated fertility endpoint: the operative estimate should be interpreted alongside the postoperative cavity anatomy
- The percentage resected is the strongest predictor of a normal postoperative cavity assessment, but fertility outcomes after partial versus complete removal have not been quantified
- Considering completion resection is consistent with evidence favoring removal of cavity-distorting myomas. The magnitude of benefit specifically from completing a partial resection is unknown.

Keltz MD, Greene AD, Morrissey MB, Vega M, Moshier E. Sonohysterographic predictors of successful hysteroscopic myomectomies. *JSLS*. 2015;19(1):e2014.00105

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Priority Goals of Hysteroscopic Surgery

- Focus **is not** on speed or convenience
- Focus **is** on
  - Achieving surgeon and patient objectives
  - Completion of operative task
  - Patient safety
  - Being prepared for "what if"
- Use the right technique/tool for the right procedure
- Understand the pathophysiology of the target tissue
- Attain proficiency on the instrument(s) you are using

"The right patient at the right time for the right purpose"
Use Good Judgement

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Panel 556

No Fibroid Left Behind:

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Moderator: **Ted L. Anderson, MD, PhD**
(Vanderbilt University School of Medicine, Nashville, TN)

Panelist: **Linda D. Bradley, MD**
(Cleveland Clinic, Cleveland, OH)

Panelist: **Malcom G. Munro, MD**
(UCLA David Geffen School of Medicine, Los Angeles, CA)

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The Training Gap Stops Here

Resectoscope Mastery for Every Hysteroscopist

Linda D. Bradley, M.D.
Professor, Obstetrics, Gynecology and Reproductive Biology
Director, Center for Hysteroscopic Services
Cleveland Clinic, Cleveland, Ohio · Medical Director, AAGL
bradlel@ccf.org

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Disclosure

- Financial relationships:
  - Medical Director: AAGL
  - Royalties: UpToDate (book chapters); Wolters Kluwer (book chapter)
- Off-label use: this presentation discusses off-label use of misoprostol for cervical and uterine preparation, and of dilute vasopressin.

2

Objectives

- Describe the fibroid pseudocapsule and explain why it should be preserved
- Apply uterine preparation and dynamic fluid pressure (uterine deflation) to move the intramural component into the cavity
- Demonstrate a stepwise resectoscopic technique for complete removal of FIGO type 1 and 2 fibroids
- Plan a safe staged procedure when complete resection in one sitting is not possible

3

Why I love the bipolar resectoscope

All FIGO types Types 0, 1 and 2, and type 3 for experienced surgeons	**Access to the plane** Enucleation along the pseudocapsule	**Cold loop option option** Energy-free dissection that spares healing tissue	**One-step completion** Finishes deep intramural fibroids in one sitting	**Hemostasis built in built in** Coagulate a bleeding vessel without a tool change
Dense fibroids too too Handles firm and calcified myomas	**Targeted biopsies biopsies** Directed secondary biopsies in the same procedure	**Coexisting lesions lesions** Polyps, retained products, endomyometrial sampling	**A skill that transfers** Septum, adhesions, niche repair, ablation	**Hard-to-reach lesions** Fundal, cornual and endocervical: reshape the loop, use deflation

Master the loop, and the fibroid has nowhere to hide.

4

The training gap

Common surgery, limited training
Operative hysteroscopy is a core gynecologic procedure, yet most programs still rely on "see one, do one, teach one."

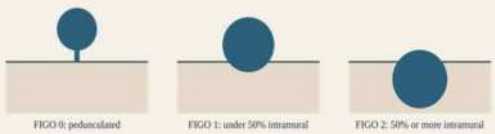
Fewer resectoscopic cases
Resectoscopic volume in residency and fellowship is shrinking.

FIGO 1 and 2 expose it
The fibroids that challenge us most are exactly where the missing skill shows.

Neis et al., Surg Endosc 2016

5

FIGO 2 lives in the myometrium



A tool that works on the cavity surface stops at the endometrial line. Complete removal means working safely into the myometrium.

The resectoscope is the workhorse and the champion. It also removes fibroids over 2 cm.

FIGO classification: Munro et al., Int J Gynaecol Obstet 2011 and 2018

6

The operation starts before the OR

- Map the fibroid: SIS, 3D ultrasound, or MRI when needed
- Classify: FIGO type, size, location (STEPW for complex lesions)
- My limits: fibroid 5 cm or smaller, serosal margin 5 mm or more
- Decide on staging before surgery
- Informed consent: discuss the risks and the likelihood of complete vs incomplete resection

Planned staging is strategy. Unplanned residual could be a failure.

Widrich, Bradley et al., Am J Obstet Gynecol 1996 (SIS) | Lasmar et al., J Minim Invasive Gynecol 2005 (STEPW)

7

Prepare the uterus

Early proliferative phase
When possible, schedule then. The endometrium is thin, so the fibroid isn't obscured by lush secretory tissue.

Misoprostol (Cytotec) at bedtime
400 mcg (two 200 mcg tablets) by mouth at bedtime the night before. Softens the cervix, promotes contractions.

Intracervical vasopressin vasopressin
10 units in 100 mL saline. Inject 5 mL into the cervical stroma at 10, 1, 4 and 7 o'clock. Inform anesthesia before injecting.

The goal: a contracting uterus that pushes the intramural component into the cavity, where you can see it clearly. can see it clearly.

8

Set up for safety

- Team huddle first: anesthesiology, circulating nurses and trainees review the case difficulty. All eyes on the patient
- Bipolar resectoscope with isotonic saline
- Automated fluid management; lowest pressure that gives a clear view, below MAP
- Saline deficit limit: 2,500 mL; 1,500 mL if elderly or comorbid
- Vasopressin: dilute, aspirate first, inform anesthesia before injecting the cervix
- Complications 1 to 12% (most series 1 to 5%): perforation, fluid overload, cervical injury

AAGL Practice Report, J Minim Invasive Gynecol 2013 | Umranikar (BSGE/ESGE), Gynecol Surg 2016 | ACOG Committee Opinion No. 800, 2020

9

Technique 01: Clear the cavity portion

- Slice the intracavitary component flush with the endometrium
- Activate only while moving the loop toward you
- Keep the loop in view at all times
- Clear the fibroid fragments often so you can see

10

Technique 02: No blind instruments

Avoid
- Polyp forceps
- Corson graspers
- Rongeurs
- Myoma graspers
- Any blind grab for fragments

Instead
- Let fragments tumble out with the outflow
- Remove them with the loop under direct vision
- Beyond careful, tactile dilation, nothing enters the cavity blind

Why: blind instruments raise the risk of perforation, and grabbing a fibroid that is still attached can invert the uterus.

A secret: each time the fragments tumble out, the cavity deflates, the uterus contracts, and the myoma moves farther into the cavity. Not a nuisance. A helper.

11

Technique 03: Use dynamic fluid pressure

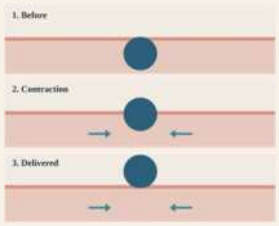
- Liberally vary intrauterine pressure between 150 and 15 mm Hg (per your (per your pump)
- Monitor the fluid deficit continuously with an automated pump
- Deflate the uterus: lower the pressure or remove the hysteroscope
- Let the myometrium contract
- The intramural portion moves toward the cavity
- The pseudocapsule comes into clearer view



12

Technique 04: Let the uterus help

- Misoprostol and vasopressin have already started the work
- Keep distension pressure low while it delivers
- Hydromassage and bimanual massage
- Resect each portion as it moves into the cavity
- Expect surprises: as the uterus remodels, fibroids not seen before protrude. Treat them in the same case



13

Video

MIND OF A SURGEON WINNER, AAGL 2023

Hysteroscopic Resection of FIGO Type 3 Fibroids: The Uterine Deflation Technique

Liron Bar-El, M.D., and Linda D. Bradley, M.D.

[Insert video]

14

What the outcomes show

77.6%	83.7%	88%	2.8×
complete in one step. Fibroid size was the only independent predictor.	complete in one step with cold loop enucleation.	one-step feasibility with deep enucleation vs 71% with slicing alone, when most myomas were type 2.	higher early complication rate when the resection was incomplete.
Catena, 2025, n=125	Mazzon 2018, n=1,215	Indraccolo 2020, meta-analysis of 24 studies	Lima 2020, n=338

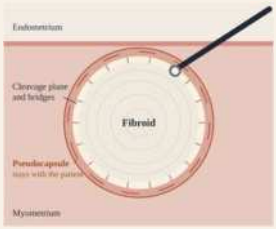
Complete removal is achievable, and incomplete removal carries real risk.

Catena, Facts Views Vis Obgyn 2025 | Mazzon, Biomed Res Int 2018 | Indraccolo, Biomed Res Int 2020 | Lima, Rev Bras Ginecol Obstet 2020

15

Technique 05: Find the pseudocapsule

- Work in the plane between fibroid and pseudocapsule
- Whiter, firmer fibroid against the pink, vascular pseudocapsule
- Fine fibrous bridges cross the plane
- The pseudocapsule stays with the patient
- Dissect cold: no energy in the myometrium



16

Protect the pseudocapsule

What it is	Why we protect it	What damages it
Compressed, vascularized myometrium around the fibroid. Not a true capsule: a neurovascular layer rich in neurofibers and neuropeptides that drive healing. Thicker over submucous fibroids.	Supports physiologic myometrial healing. Less fibrosis and fewer synechiae. May protect uterine integrity in a future pregnancy (theoretical).	High-wattage electrocoagulation and aggressive traction. Fewer neuropeptides at the wound, then ischemia, necrosis and fibrosis, with possible impact on contractility in labor.

Operate only to the pseudocapsule. The fibroid comes out. The pseudocapsule stays.

Tinelli et al., Eur J Obstet Gynecol Reprod Biol 2019 | Tinelli et al., Biomed Res Int 2018 | Mazzon et al., Fertil Steril 2014

17

Other published techniques

Technique	Core idea	Evidence
Cold loop (Mazzon, 1995)	Slice to the endometrial level, then energy-free blunt dissection along the pseudocapsule	1,215 patients: 83.7% complete in one procedure
Enucleation in toto (Litta, 2003)	Collins electrode incises the endometrium at the reflection line; the myoma protrudes and is enucleated	Type 2 myomas, one procedure
One-step Lin technique (Lin, 2012)	Lin dissecting loop enters the plane, water dissection widens it, graspers extract under ultrasound	1,569 patients; 2 perforations (graspers)
OPPIuM (Bettocchi, 2009)	Office incision of the endometrium over a G1 or G2 myoma; contractions push it into the cavity	Pilot, 59 women: 93.2% became mostly intracavitary
Planned two-step resection	Resect the cavity portion; the remainder migrates; complete at a second procedure	Standard for large or deep type 2
Laser and vaporization	Office diode laser or vaporizing electrodes	Little or no specimen for histology

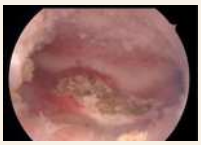
Mazzon 1995; Mazzon, Biomed Res Int 2018 | Litta, J Am Assoc Gynecol Laparosc 2003 | Lin, Gynecol Minim Invasive Ther 2012 | Bettocchi, J Minim Invasive Gynecol 2009 | Clark (ESGE), Facts Views Vis Obgyn 2024

18

The result: leaving no fibroid behind



Before



Complete



Every fragment removed

One procedure. Planned well, done well, and complete.

Every fragment goes to pathology.

19

Staging is mastery, not failure

When to plan two steps

Multiple, large, deep or opposing myomas. Fluid deficit reaching threshold. Loss of the plane or a thinning margin.

After intentionally incomplete type II

Surgery-free at 1, 2 and 3 years: 70.2%, 54.8%, 44.2%.

1 **Stage 1** Resect safely

2 **Document** What remains

3 **Stage 2** Repeat SIS or MRI, then complete

4 **Complete** Cavity restored

Van Dongen et al., Acta Obstet Gynecol Scand 2006

20

My standard

1. Map before you operate
2. Prepare the uterus
3. Find the plane
4. Vary intrauterine pressure throughout the resection
5. Watch the fluid deficit closely: deeper fibroids (types 1 to 3) absorb more
6. Remove it completely, or know exactly what remains and why
7. No blind instruments: let fragments tumble out, or remove them with the loop
8. Fertility patients: postop estrogen, intrauterine balloon, second look at 2 to 4 weeks

Complete resection is a technique. The training gap stops here.

21

Acknowledgments

- Liron Bar-El, M.D., Cedars-Sinai Medical Center, Los Angeles, California, co-author of the surgical video

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24

No Fibroid Left Behind: The Science, Skill, & Significance of Complete Hysteroscopic Myomectomy

Hysteroscopic Myomectomy using Electromechanical Morcellating & Extraction Devices

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1

Disclosures: Malcolm G. Munro

- Speaker for:
  - Karl Storz Endoscopy Americas
  - Pharmacosmos
  - CSL Vifor
- Stockholder Options:
  - Rejoni LLC
  - Womed
- Consultant
  - Rejoni Inc
  - Womed
  - Flo Health

2

Hysteroscopic Myomectomy with Electromechanical Devices
Objectives

- Discuss appropriate evaluation of the uterus when considering the performance of hysteroscopic myomectomy
- Identify the leiomyoma phenotypes appropriate for hysteroscopic myomectomy
- Summarize methods for entry into and dissection within the pseudocapsule
- **Describe the principles of hysteroscopic myomectomy that apply to electromechanical systems**
  - **Enucleation into the endometrial cavity with pseudocapsule dissection (except FIGO Type 0)**
  - **Morcellation and extraction as a single step**
    - **Morcellation**
    - **Extraction**
- **Discuss the current limitations of electromechanical morcellation and extraction systems**

3

Hysteroscopic Myomectomy
Electromechanical Morcellation & Extraction Devices

- Patients with leiomyomas and related symptoms
- Patient Selection: Evaluation for phenotype
  - Ultrasound
  - MRI
  - Diagnostic Hysteroscopy
  - Minimizing the risk of adverse events
- Preparation
  - Patient
  - Procedure
  - Minimizing the risk of adverse events
- Techniques
  - Concepts & Strategies
  - Instruments
  - Application
  - Minimizing the risk of adverse events

4

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Indications for Hysteroscopic Myomectomy

- Abnormal Uterine Bleeding (AUB-L_{SM})
- Infertility
- Preparation for embryo transfer
- Recurrent pregnancy loss (RPL)

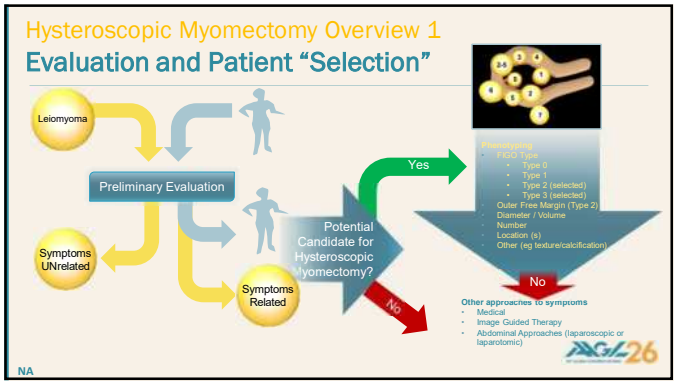
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6

Hysteroscopic Myomectomy Overview 1
Evaluation and Patient "Selection"



7

Hysteroscopic Myomectomy Overview 1
Evaluation and Patient "Selection"

You MUST read your own images!!!

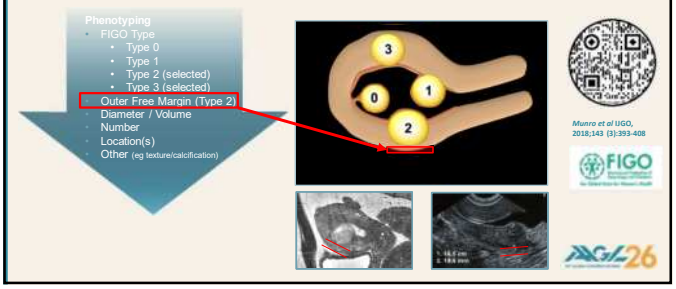
Ultrasound - It is strongly encouraged that:
- You use sonohysterography (SHG)
- You obtain your own images

MRI
- You know what you need to know; the radiologist doesn't



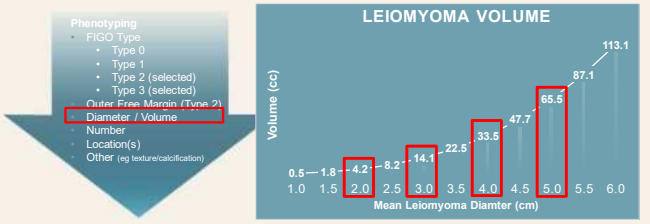
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Hysteroscopic Myomectomy Overview 1
Evaluation and Patient "Selection"



9

Hysteroscopic Myomectomy Overview 1
Evaluation and Patient "Selection"



10

Hysteroscopic Myomectomy
Electromechanical Morcellation & Extraction Devices

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  - Instruments
  - Application
  - Minimizing the risk of adverse events

11

Uterine Preparation for Hysteroscopic Myomectomy
Considerations: Medical Preparation

- **Endometrial Thinning** (eg. progestins, GnRH agonists or antagonists)
  - Facilitates visualization
    - Reducing endometrial debris in the visual field
    - Better appreciation of incisional targets
- **Volumetric Reduction** (GnRH modulators, PRMs)
  - Restoration of iron balance
  - May reduce surgical time related to morcellation
- **Reduced Media Intravasation**
  - Reduced vascularity
  - Reduced surgical time



12

Hysteroscopic Myomectomy
Electromechanical Morcellation & Extraction Devices

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  - Concepts & Strategies
  - Instruments
  - Application
  - Minimizing the risk of adverse events

- Careful selection and preoperative evaluation
- Distending media management protocol and systems
- Sound technical training and intimate familiarity with equipment
- Ultrasound guidance where appropriate
- Good visualization
- Work in the pseudocapsule for Type 1 and 2 leiomyomas

13

Hysteroscopic Myomectomy
Electromechanical Morcellation & Extraction Devices

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- **Techniques**
  - **Concepts & Strategies**
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  - **Application**
  - **Minimizing the risk of adverse events**

14

Hysteroscopic myomectomy
Electromechanical Devices vs Loop Resection

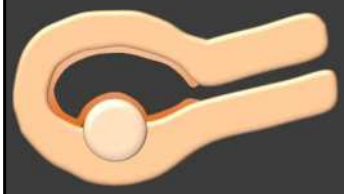
Study / design	Myoma population	EM device	EM time (min)	Comparator	Control time (min)	Time measure	P (time)	Complete resection / success (EM vs control)	P
Hamidouche et al. 2015 • retrospective n=83	FIGO 0–2	MyoSure	30	Versapoint 24F bipolar loop	31	Operative duration	.98	EM 64% RF Loop 69%	.65
Lee & Matsuzono 2016 • retrospective n=29	FIGO 0–2 spectrum†	MyoSure	36.6	Monopolar loop	53.6	Operating time‡	.005	Clinical satisfaction* EM 93.3% RF Loop 84.6%	.841
van Wessel et al. 2021 • RCT n=83	FIGO 0–1 ≤3 cm	TruClear 8.0	9.2	8.5-mm bipolar resectoscope	13.4	Operating time	.04	EM 89% RF Loop 95%	NR
Valero et al. 2022 • prospective observational • n=80	FIGO 0–2	MyoSure	16.84 ± 11.11	Mini-resectoscope	13.43 ± 10.53	Resection time	.129	EM 83.3% RF Loop 81.5%	NS¶
Yong et al. 2023 • retrospective myoma subgroup n=229	FIGO 0, 1, 2 • multiple	MyoSure Lite	T0 23.63 ± 12.07 T1 27.67 ± 14.48 T2 41.22 ± 17.34	8.5-mm bipolar resectoscope	T0 34.85 ± 17.26 T1 38.08 ± 19.97 T2 47.13 ± 21.30	Operative time	T0 .046 T1 .043 T2 .131	EM 82.14% RF Loop 94.02%	.005

† Lee & Matsuzono did not assign formal FIGO grades; the 0–2 spectrum is based on the reported degree of intracavitary protrusion. ‡ Lee operating time; anesthesia to procedure completion, including positioning/preparation/setup. § Complete resection rate (CRR) was not reported; 3-month clinical satisfaction is shown instead. ¶ Valero reported no statistically significant difference in complete resection; the exact P value was not available in the abstract.

Sources: Hamidouche 2015 PMID 25247706; Lee & Matsuzono 2016 PMID 26761122; van Wessel 2021 PMID 33871838; Valero 2022 PMID 35033832; Yong 2023 PMID 37211442.

15

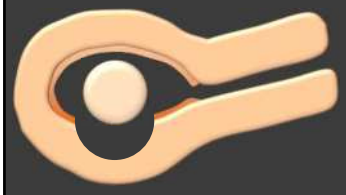
Hysteroscopic Myomectomy Techniques
Concepts & Strategies



1. Free up the tumor, if necessary
   - Types 1 (deep), 2, and 3.
2. Morcellate
   - All submucous leiomyomas
3. Remove from the endometrial cavity
   - All submucous leiomyomas

16

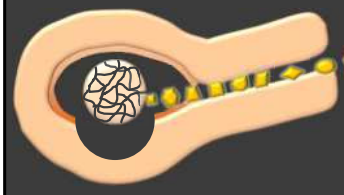
Hysteroscopic Myomectomy Techniques
Concepts & Strategies



1. Free up the tumor, if necessary
   - Types 1 (deep), 2, and 3.
2. Morcellate
   - All submucous leiomyomas
3. Remove from the endometrial cavity
   - All submucous leiomyomas

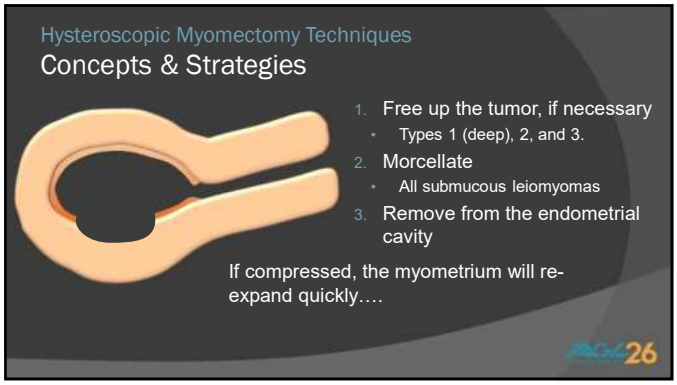
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Hysteroscopic Myomectomy Techniques
Concepts & Strategies

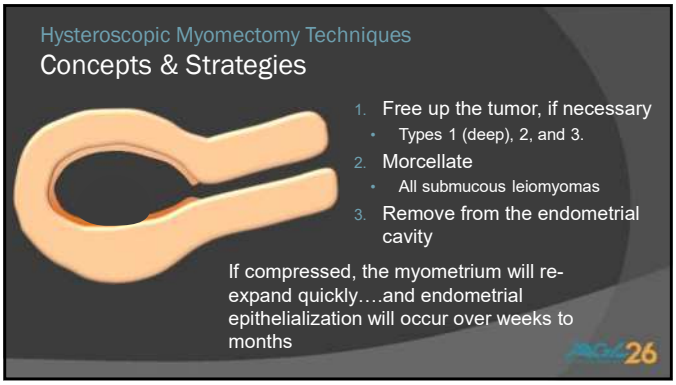


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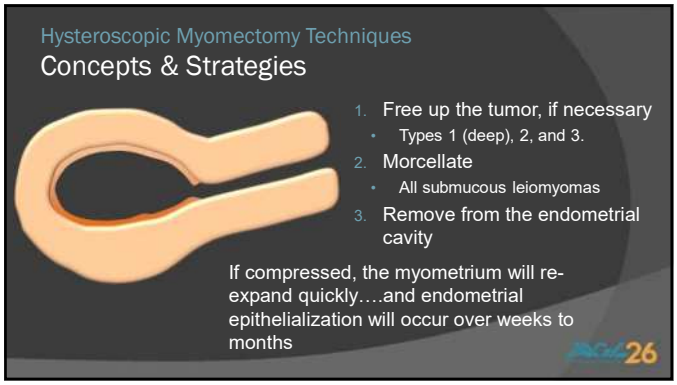
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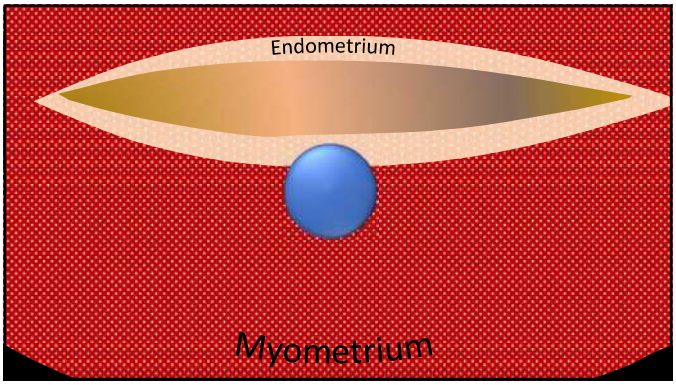
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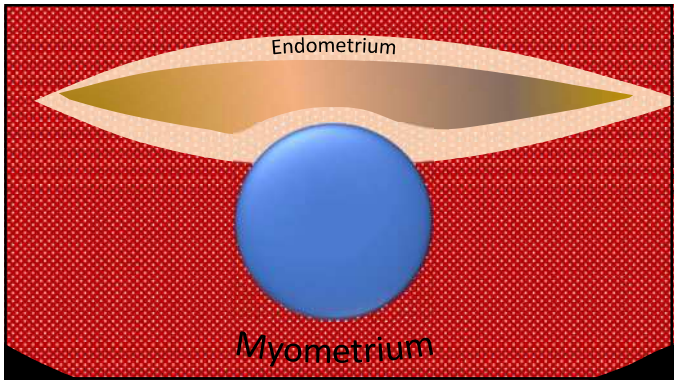
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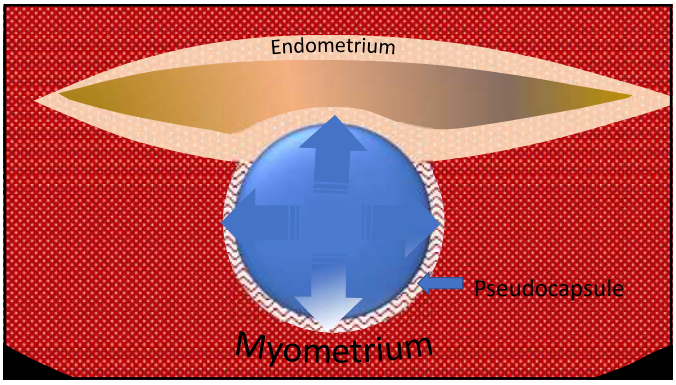
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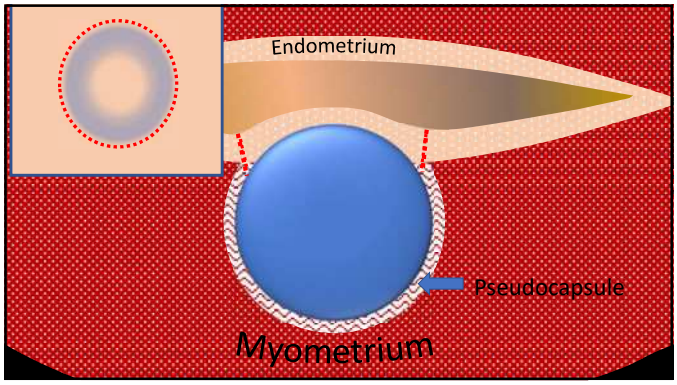
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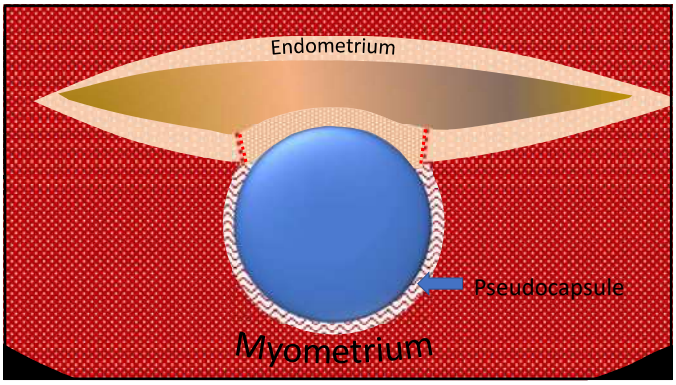
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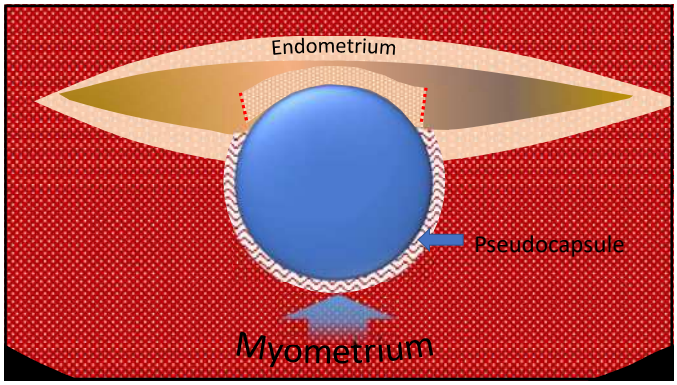
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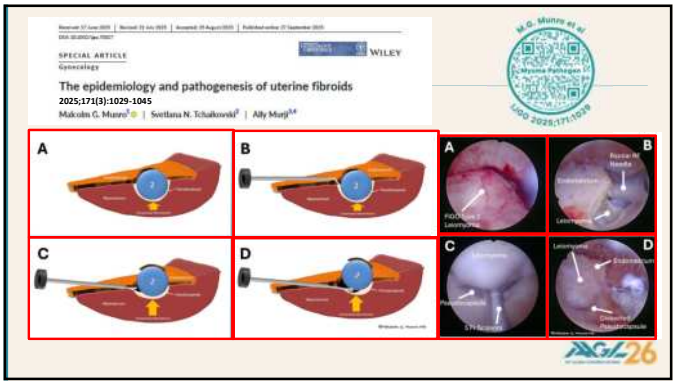
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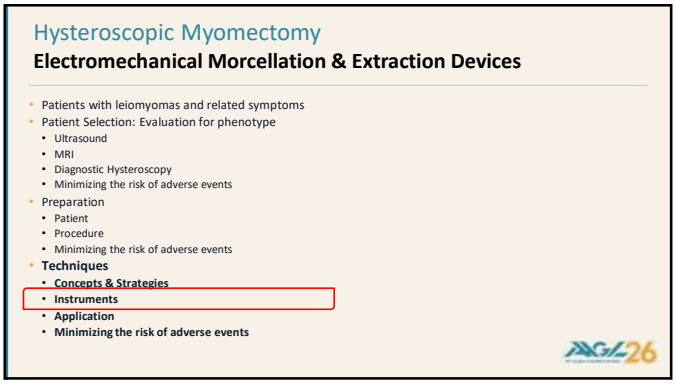
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Hysteroscopic Myomectomy Techniques

Instruments



1. **Free up the tumor, if necessary**
   - Types 1 (deep), 2, and 3.
- Incision
  - Electrosurgical (bipolar strongly preferred)
  - Mechanical scissors
- Dissection in the pseudocapsule
  - Scissors
  - Blunt dissector

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Hysteroscopic Myomectomy

Finding the pseudocapsule







ELSEVIER

Journal of Minimally Invasive Gynecology, Vol 16, No 6, November/December 2009

Instruments and Techniques

A New Hysteroscopic Technique for the Preparation of Partially Intramural Myomas in Office Setting (OPPIuM technique): A Pilot Study

Stefano Bettocchi, MD, Attilio Di Spiezio Sardo, MD*, Gennaro Cosi, MD, Luigi Nappi, MD, Maurizio Guido, MD, Elena Greco, MD, Laura Pinto, MD, Anna Lisa Campodoni, MD, and Carmine Nappi, MD

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JMIG

Original Article

Is Cold Loop Hysteroscopic Myomectomy a Safe and Effective Technique for the Treatment of Submucous Myomas With Intramural Development? A Series of 1434 Surgical Procedures

Ivan Mazzon, MD, Alessandro Favilli, MD, Mario Grasso, MD, Stefano Horvath, MD, Gian Carlo Di Renzo, MD, PhD, and Sandro Gerli, MD*

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Bipolar Release, Dissection, Electromechanical Morcellation

Type 2

J Minim Invasive Gynecol. 2016 Jan;23(1):12-3.

ELSEVIER

JMIG

VIDEO ARTICLE

Hysteroscopic Myomectomy of FIGO Type 2 Leiomyomas Under Local Anesthesia: Bipolar Radiofrequency Needle–Based Release Followed By Electromechanical Morcellation

Malcolm G. Munro, MD, FACOG, FRCS(c)*

From the Department of Obstetrics and Gynecology, David Geffen School of Medicine at UCLA/Kaiser Permanente Medical Center, Los Angeles, CA.

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Hysteroscopic Myomectomy Instrumentation

Pseudocapsule Dissection

Types 1 (deep), 2, & 3

- Incision
  - Electrosurgical (bipolar strongly preferred)
  - Mechanical scissors



- Dissection in the pseudocapsule
  - Scissors
  - Blunt dissector



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Hysteroscopic Myomectomy Techniques

Pseudocapsule Incision



Entering pseudocapsule
Posterior Type 2
Bipolar RF Needle



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Hysteroscopic Myomectomy Techniques

Pseudocapsule Dissection







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Hysteroscopic Myomectomy Instrumentation

Morcellation and Removal

All Types 0, 1, 2, & 3

- Electrosurgical
  - Bipolar strongly preferred



- Electromechanical





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Instrumentation for Hysteroscopic Surgery

Electromechanical Morcellation and Extraction

- Four available systems
  - Aveta® (Meditrina)
  - Bigatti (Karl Storz)*
  - Myosure® (Hologic Inc)
  - Truclear® (Medtronic)
- Dedicated, proprietary endoscope systems.
- Single use*, side aperture, morcellation & suction probes
- Saline media



* Reusable

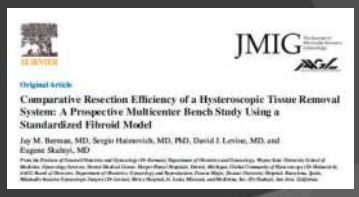
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Hysteroscopic Myomectomy Instrumentation

Electromechanical Morcellation & Extraction

Not all devices are the same

- Diameter of cannula
- Rate of oscillation/rotation
- Instrument – tissue interface
- Suction pressure

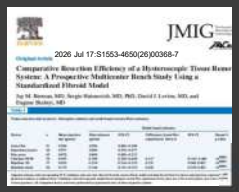


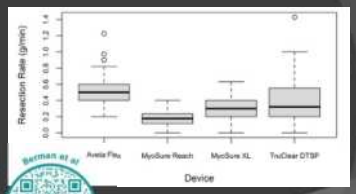
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Hysteroscopic Myomectomy Instrumentation

Electromechanical Morcellation & Extraction

Not all devices are the same



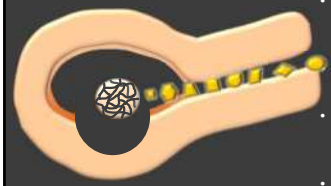




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Hysteroscopic Myomectomy Instrumentation

Extraction from the Endometrial Cavity



3. **Remove from the endometrial cavity**
   - Mechanical
     - Ring forceps, curettes (US Direction)
     - Resectoscope (inactivated loop)
   - Electromechanical
     - Simultaneous aspiration
   - Electrosurgical (Bipolar strongly preferred)
     - Loop resection and simultaneous aspiration
     - Vaporization
   - Expectant

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Hysteroscopic Myomectomy Instrumentation

Extraction from the Endometrial Cavity

3. **Remove from the endometrial cavity**
   - Mechanical
     - Ring forceps, curettes (US Direction)
     - Resectoscope (inactivated loop)
   - Electromechanical
     - Simultaneous aspiration
   - Electrosurgical (Bipolar strongly preferred)
     - Loop resection and simultaneous aspiration
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   - Expectant



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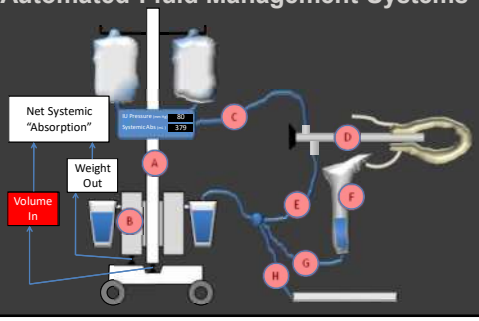
Hysteroscopic Myomectomy Instrumentation
Intraoperative Ultrasound

- Transabdominal
- Selective use; small OFM
- Distorted anatomy
- Training



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Hysteroscopic Myomectomy Instrumentation
Automated Fluid Management Systems





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Hysteroscopic Myomectomy
Electromechanical Morcellation & Extraction Devices

- Patients with leiomyomas and related symptoms
- Patient Selection: Evaluation for phenotype
  - Ultrasound
  - MRI
  - Diagnostic Hysteroscopy
  - Minimizing the risk of adverse events
- Preparation
  - Patient
  - Procedure
  - Minimizing the risk of adverse events
- **Techniques**
  - **Concepts & Strategies**
  - **Instruments**
  - **Application**
  - **Minimizing the risk of adverse events**

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Hysteroscopic Myomectomy Overview
Conceptual Principles of Hysteroscopic Myomectomy

1. Removal of the leiomyoma from the myometrium
   a. NOT Type 0
   b. Type 1
   c. Type 2

   Dissection IN THE PSEUDOCAPSULE
2. Morcellation
3. Extraction from the endometrial cavity

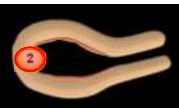
4. Alternative Approaches
   a. Vaporization (a potential addition or alternative to 2 & 3)
   b. Mobilization and expectant management (anticipating spontaneous expulsion)

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Hysteroscopic Myomectomy
FIGO Type 2
Bipolar Release Technique

Malcolm G. Munro MD, FRCS(c), FACOG

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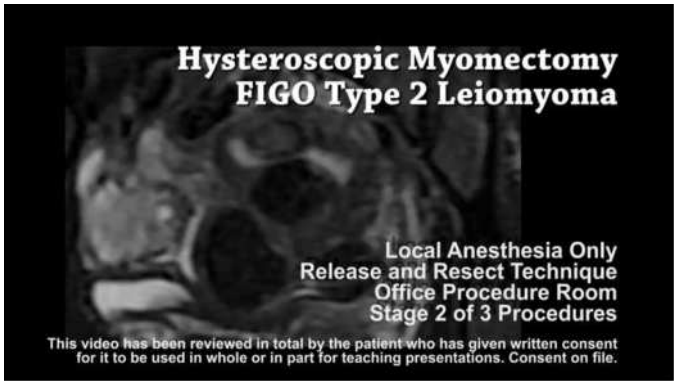
Electromechanical
Fundal Type 1 and 2 Leiomyomas and Electromechanical Systems



Most Type 2 tumors, and fundal Type 1 and 2 leiomyomas are difficult for these systems to access effectively



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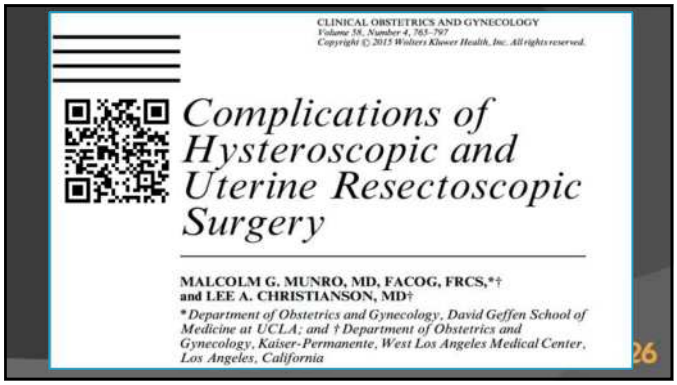
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Hysteroscopic Myomectomy

Electromechanical Morcellation & Extraction Devices

- Patients with leiomyomas and related symptoms
- Patient Selection: Evaluation for phenotype
  - Ultrasound
  - MRI
  - Diagnostic Hysteroscopy
  - Minimizing the risk of adverse events
- Preparation
  - Patient
  - Procedure
  - Minimizing the risk of adverse events
- **Techniques**
  - **Concepts & Strategies**
  - **Instruments**
  - **Application**
  - **Minimizing the risk of adverse events**

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Hysteroscopic Myomectomy: Adverse Events

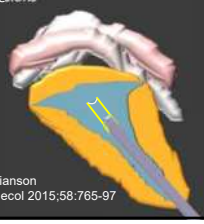
Adverse Events

Immediate

- Anesthesia
- Neurologic
  - Positioning-related
- Mechanical
  - Laceration
  - Perforation
- Visceral
- Distension Media
  - Volume
  - Electrolyte
- Gas Emboli
- RF Energy

Delayed

- Infection
- Intrauterine Adhesions
- RF Energy



Munro & Christianson
Clin Obset Gynecol 2015;58:765-97

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Hysteroscopic Myomectomy

Type 2 or 3 Leiomyomas



Considerations for Ultrasound/Laparoscopy Guidance/Monitoring

- Outer-free margin below threshold of comfort (eg <5-8 mm)
- Dissection challenges
  - Concomitant / adjacent / surrounding adenomyosis
  - Uncertain outer-free margin depth
  - ?Previous myomectomy



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Hysteroscopic Myomectomy

Electromechanical Morcellation & Extraction Devices

- Patients with leiomyomas and related symptoms
- Patient Selection: Evaluation for phenotype
  - Ultrasound
  - MRI
  - Diagnostic Hysteroscopy
  - Minimizing the risk of adverse events
- Preparation
  - Patient
  - Procedure
  - Minimizing the risk of adverse events
- Techniques
  - Concepts & Strategies
  - Instruments
  - Application
  - Minimizing the risk of adverse events

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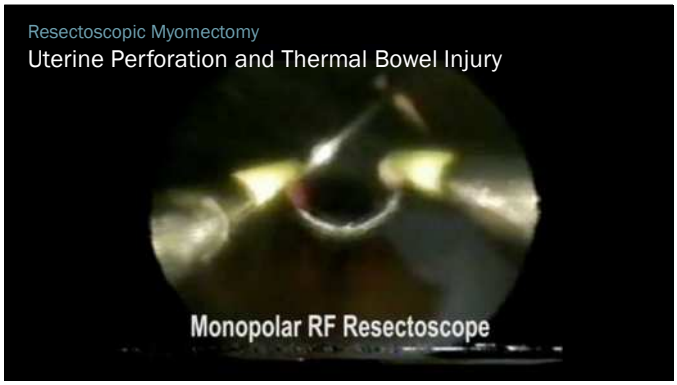
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Hysteroscopic Myomectomy Type 2 Myomas
Mazzon Pseudocapsule Dissection Technique



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Resectoscopic Myomectomy
Uterine Perforation and Thermal Bowel Injury



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Office Based Hysteroscopy: Office Infrastructure & Supplies
What do you need?



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CULTURAL AND LINGUISTIC COMPETENCY & IMPLICIT BIAS

The California Medical Association (CMA) outlines standards for Cultural Linguistic Competency and Implicit Bias in CME. The goal of the standards is to support the role of accredited CME in advancing diversity, health equity, and inclusion in healthcare. These standards are relevant to ACCME-accredited, CMA-accredited, and jointly accredited providers located in California. AAGL is ACCME-accredited and headquartered in California.

CMA developed the standards in response to California legislation (Business and Professions (B&P) Code Section 2190.1), which directs CMA to draft a set of standards for the inclusion of cultural and linguistic competency (CLC) and implicit bias (IB) in accredited CME.

The standards are intended to support CME providers in meeting the expectations of the legislation. CME provider organizations physically located in California and accredited by CMA CME or ACCME, as well as jointly accredited providers whose target audience includes physicians, are expected to meet these expectations which began on January 1, 2022. AAGL has been proactively adopting processes that meet and often exceed the required expectations of the legislation.

CMA CME offers a variety of resources and tools to help providers meet the standards and successfully incorporate CLC & IB into their CME activities, including FAQ, definitions, a planning worksheet, and best practices. These resources are available on the CLC and IB standards page on the CMA website.

Important Definitions:

Cultural and Linguistic Competency (CLC) – The ability and readiness of health care providers and organizations to humbly and respectfully demonstrate, effectively communicate, and tailor delivery of care to patients with diverse values, beliefs, identities and behaviors, in order to meet social, cultural and linguistic needs as they relate to patient health.

Implicit Bias (IB) – The attitudes, stereotypes and feelings, either positive or negative, that affect our understanding, actions and decisions without conscious knowledge or control. Implicit bias is a universal phenomenon. When negative, implicit bias often contributes to unequal treatment and disparities in diagnosis, treatment decisions, levels of care and health care outcomes of people based on race, ethnicity, gender identity, sexual orientation, age, disability and other characteristics.

Diversity – Having many different forms, types or ideas; showing variety. Demographic diversity can mean a group composed of people of different genders, races/ethnicities, cultures, religions, physical abilities, sexual orientations or preferences, ages, etc.

Direct links to AB1195 (CLC), AB241 (IB), and the B&P Code 2190.1:

Bill Text – AB-1195 Continuing education: cultural and linguistic competency.
Bill Text – AB-241 Implicit bias: continuing education: requirements.
Business and Professions (B&P) Code Section 2190.1

CLC & IB Online Resources:

Diversity-Wheel-as-used-at-Johns-Hopkins-University-12.png (850×839) (researchgate.net)
Implicit Bias, Microaggressions, and Stereotypes Resources | NEA
Act, Communicating, Implicit Bias (racialequitytools.org)
https://www.contemporaryobgyn.net/view/overcoming-racism-and-unconscious-bias-in-ob-gyn
https://pubmed.ncbi.nlm.nih.gov/34016820/
https://hr.ucdavis.edu/departments/learning/certificate/implicit-bias
https://pmc.ncbi.nlm.nih.gov/articles/PMC7011228/