AAGL 26

55TH GLOBAL CONGRESS ON MIGS

BOSTON, MASSACHUSETTS
NOVEMBER 13-16, 2026

Syllabus

PG-14007

Obstructive Mullerian Anomalies Throughout the Lifespan

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Table of Contents

Course Program: Course Description, Learning Objectives, Course Outline 3

Financial Disclosures 4

Overview of Mullerian Anomalies, Embryology, ASRM Criteria and Timing of Repair
J. Dietrich 5
D. Elborno 8

Obstructive Uterine Anomalies, Types and Differences on Imaging/Workup, Hysteroscopic and Laparoscopic Management
S. Cizek 9

Vaginal Anomalies and Native Tissue Vaginoplasty Techniques
J. Dietrich 15

Vaginal Graft Vaginoplasty Types and Techniques
J. Geynisman-Ta and D. Elborno 19

Cultural and Linguistic Competency & Implicit Bias 23

PG-14007: Obstructive Mullerian Anomalies Throughout the Lifespan

Chair: Jennifer Dietrich
Co-Chair: Stephanie M. Cizek
Faculty: Stephanie M. Cizek, Jennifer Dietrich, Dana Elborno, Julia Geynisman-Tan

Course Description

This course provides a comprehensive review of Müllerian anomalies, with a particular focus on obstructive anomalies and their surgical management. Using a case-based discussion format, participants will review the embryology of these conditions as well as approaches to management during early puberty, including imaging, diagnostic workup, and treatment of uterine and vaginal obstruction. The course will include discussion of diagnostic strategies such as advanced imaging and examination under anesthesia to achieve accurate diagnosis. Particular attention will be given to distinguishing complex conditions, for example, differentiating OHVIRA (Obstructed Hemivagina and Ipsilateral Renal Anomaly) from unilateral cervicovaginal agenesis or dysgenesis in the setting of a didelphys uterus. We will review surgical management including specific laparoscopic and hysteroscopic resection techniques, as well as vaginoplasty procedures performed with and without grafts. The course will additionally address ethical considerations regarding the timing of reconstructive surgery. This session will be of interest to minimally invasive gynecologic surgery (MIGS) specialists as well as general obstetrician–gynecologists. It will be presented by pediatric gynecology experts from across North America with extensive experience managing these conditions in childhood and facilitating transition to adult care.

Learning Objectives: *At the end of this course, the participant will be able to:* 1) Improve recognition and diagnostic accuracy of complex Müllerian anomalies; 2) Review appropriate imaging and evaluation strategies; and 3) Discuss surgical management, including laparoscopic, hysteroscopic, and reconstructive techniques.

Course Outline

10:15 am	Welcome, Introduction and Course Overview	J. Dietrich
10:20 am	Overview of Mullerian Anomalies, Embryology, ASRM Criteria and Timing of Repair	D. Elborno and J. Dietrich
10:45 am	Obstructive Uterine Anomalies, Types and Differences on Imaging/Workup, Hysteroscopic and Laparoscopic Management	S. Cizek
11:10 am	Vaginal Anomalies and Native Tissue Vaginoplasty Techniques	J. Dietrich
11:35 am	Vaginal Graft Vaginoplasty Types and Techniques	J. Geynisman-Tan and D. Elborno
12:00 pm	Discussion Questions & Answers	All faculty
12:15 pm	Adjourn	

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Disclosure of Relevant Financial Relationships

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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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COURSE CHAIR DISCLOSURE

Jennifer E. Dietrich, MD, MSc*

COURSE CO-CHAIR DISCLOSURE

Stephanie M. Cizek, MD*

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).

Stephanie M. Cizek, MD*
Jennifer E. Dietrich, MD, MSc*
Dana Elborno, MD*
Julia Geynisman-Tan, MD*

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.

Adult Manifestations of Müllerian Anomalies: What Every Gynecologist Should Know

Jennifer E. Dietrich MD, MSc · Professor Baylor College of Medicine, Division of Pediatric and Adolescent Gynecology, Chief of Pediatric and Adolescent Gynecology Texas Children's Hospital

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

1

Disclosure

I have no financial relationships to disclose.

2

Objectives

- Adult manifestations of mullerian anomalies and what to anticipate.
- Identify complex mullerian anomaly conditions and concurrent conditions that may overlap.
- Identify which patients with non-obstructive and obstructive Müllerian anomalies warrant referral to a specialist center

3

Obstructive Müllerian Anomalies: The Basics



A structural blockage of the outflow tract — the shared endpoint of several different embryologic defects.

THE CLASSIC PRESENTING TRIAD

Primary Amenorrhea
No menses by age 15, or 3 years after thelarche

Cyclic Pelvic Pain
Monthly pain from trapped, cycling menstrual blood

Pelvic / Abdominal Mass
Hematocolpos or hematometra on pelvic ultrasound and/or MRI pelvis, in addition to a sometimes palpable or visible bulge on exam

THE SPECTRUM OF OBSTRUCTION

Imperforate Hymen → Transverse Vaginal Septum → Distal Vaginal Atresia → Cervical Agenesis → Obstructed Hemivagina

Same downstream physiology — trapped menstrual blood — but different embryologic origin, level of obstruction, and operation.

Pfeifer et al., Fertil Steril 2021 · Skinner & Quint, J Minim Invasive Gynecol 2017

4

Non-Obstructive Müllerian Anomalies: The Basics

No structural blockage of the outflow tract , with a variety of presentations.

THE CLASSIC PRESENTING TRIAD

Primary Amenorrhea
No menses by age 15, or 3 years after thelarche

Typically, no cyclic pelvic pain
Menstrual blood is not trapped

No Pelvic / Abdominal Mass
Ultrasound and MRI may reveal uterine anomaly without outflow tract obstruction

THE SPECTRUM OF NON-OBSTRUCTION

Uterovaginal agenesis → Bicornuate uterus → Septate uterus (partial or complete) → Uterine didelphys with nonobstructive longitudinal vaginal septum → Unicornuate uterus with/without nonobstructive uterine remnant

Frequently diagnosed later due to absence of pain.

Dietrich JE, Millar D, Quint E. NASPAG Committee Opinion. Non obstructive mullerian anomalies. JPAG. 2014: vol. 27(6), pp. 396-402 .

5

Why This Matters for the Adult Gynecologist

These condition are not always caught in adolescence and recognizing it later changes the workup entirely.

How It Can Present in Adulthood

- ? Unexplained cyclic pelvic pain that outlasts a "normal" workup
- ? Primary infertility, including uterine factor with congenital absence, or recurrent pregnancy loss, with a coexisting uterine anomaly
- ? Dyspareunia or difficulty with intercourse from a partial or missed septum
- ? An incidental finding on pelvic ultrasound or MRI ordered for another reason
- ? A teenager's "resolved" pain that was actually medically suppressed, not diagnosed

Why Early Recognition Matters

- ! Up to ~30–40% of these patients have an associated renal anomaly worth screening for
- ! Untreated obstruction raises the risk of endometriosis from retrograde menstruation
- ! Delayed diagnosis often means a more complex, reoperative repair later
- ! Fertility- and uterus-preserving options narrow the longer obstruction goes unrecognized
- ! A timely referral to a Müllerian-experienced team is the single biggest lever an adult OB/GYN has

Dietrich et al., J Pediatr Adolesc Gynecol 2014 · ACOG Committee Opinion 779, Obstet Gynecol 2019 · Kapczuk et al., J Clin Med 2023

6

Mullerian Anomalies : MAC2021

Built on the 1988 AFS classification, ASRM's 2021 update is the first to formally incorporate cervical and vaginal anomalies.



1 A spectrum, not a checklist

Müllerian anomalies represent a spectrum of arrested development. MAC2021 replaced the old numbered classes with 9 flexible "anomaly categories" that can overlap.

Müllerian agenesis · Cervical agenesis · Unicornuate uterus

2 Vaginal findings cross-reference freely

Vaginal anomalies are frequently seen combined with uterine and cervical findings (e.g., uterus didelphys with obstructed hemivagina)

Uterus didelphys · Bicornuate uterus · Septate uterus

3 Two vaginal categories, named explicitly

Longitudinal vaginal septum and transverse vaginal septum stand as their own categories for the first time, alongside cervical agenesis.

Longitudinal vaginal septum · Transverse vaginal septum · Complex anomalies

Pfeifer et al., Fertil Steril 2021 · American Fertility Society, Fertil Steril 1988 · Ludwin et al., Ultrasound Obstet Gynecol 2022

7

Next Frontier for MAC: Cervical Anomalies & Vaginal Atresia

Cervical Anomalies

Cervical agenesis is already a MAC2021 category, but its subtypes (complete agenesis vs. segmental/distal dysgenesis with a functioning fundus) are not yet separately coded, but will likely follow Rock's depictions.



Transverse Vaginal Septum

EMBRYOLOGY
Failed canalization at the vaginal-plate / urogenital-sinus junction — a membrane within an otherwise formed vagina.

IMAGING
Thin-to-thick membrane; upper vagina distended proximal to it.

SURGERY
Transperineal septum resection ± vaginal pull-through, mucosa-to-mucosa re-anastomosis when possible.

Distal Vaginal Atresia

EMBRYOLOGY
Sinovaginal bulbs fail to form/descend — the distal vaginal segment itself is absent or fibrous, not just a membrane.

IMAGING
Funnel-shaped hematocolpos tapering toward the introitus; no discrete thin septum.

SURGERY
Full pull-through vaginoplasty, often needing graft/flap tissue — no adjacent mucosa to bring down; higher stenosis/reoperation risk.

That distinction matters clinically — it determines whether uterine-sparing cervicovaginal reconstruction is feasible, versus a case better served by hysterectomy. Anticipated: finer-grained cervical subcategories in future revisions.

Dietrich et al., J Pediatr Adolesc Gynecol 2014 · Skinner & Quint, J Minim Invasive Gynecol 2017 · Monzouri & Dietrich, J Pediatr Adolesc Gynecol 2015. Rock JA, Roberts CP, Jones HW. Congenital anomalies of the uterine cervix: lessons from 30 cases managed clinically by a common protocol. Fertil Steril. 2010;94 (5): 1858-1863.

8

Concurrent Anomalies: What Else to Screen For



A Müllerian anomaly is rarely an isolated finding — screening for associated anomalies belongs in the initial work-up, not after.

Systems to Screen

- Renal / urinary tract — agenesis, ectopic or pelvic kidney, duplicated collecting system; the most common associated anomaly
- Skeletal / vertebral — scoliosis, vertebral fusion or segmentation defects, as seen in the MURCS association
- Anorectal / hindgut — anorectal malformations and cloacal anomalies, especially with complex or high anomalies
- Cardiac — septal or outflow-tract defects, more often in syndromic or complex presentations
- Named associations — OHVIRA/HWW syndrome, MURCS, and VACTERL each pair a Müllerian finding with a predictable partner anomaly

Pitfalls of Missing Them

- A normal-looking contralateral kidney can hide a solitary or ectopic one — missed before surgery, it raises the risk of injury during pelvic dissection
- Regular menses from the unaffected side (e.g., didelphys) can delay diagnosis for years — cyclic pain gets written off as primary dysmenorrhea
- Ordering a renal ultrasound or a pelvic MRI alone — not both — can miss one half of a linked anomaly pair
- An unrecognized vertebral, renal, or cardiac anomaly outlives the vaginal repair — it needs its own long-term follow-up, not just a resolved symptom
- Missing the second anomaly turns one timely referral into two delayed ones — and the renal anomaly usually carries the greater long-term risk

ACOG Committee Opinion 779, Obstet Gynecol 2019 · Santos & Dietrich, J Pediatr Adolesc Gynecol 2016 · Bonetti et al., Int J Gynecol Obstet 2025

9

Timing of Repair & the Multidisciplinary Team



Obstructive anomalies are rarely surgical emergencies — rushing the operation is the most avoidable source of a poor outcome.

Why Definitive Repair Waits for Puberty

- Estrogenized tissue is more vascular and elastic — dissection planes are easier to identify and heal more reliably than prepubertal tissue.
- Prepubertal imaging is often unreliable: a small, unstimulated uterus and vagina can misrepresent the true anatomy before menarche.
- Acute pain or hematocolpos can be bridged medically — GnRH agonist or continuous oral contraceptives to suppress menses, ± image-guided or laparoscopic decompression — rather than forcing an unplanned operation.
- Deferral allows time to assemble imaging review, counseling, and the full surgical team — the single biggest driver of long-term success.

The Multidisciplinary Team

- **PAG / Reproductive Surgery** leads diagnosis, surgical planning, and long-term follow-up
- **Pediatric Urology** co-manages associated renal or urinary-tract anomalies
- **Colorectal Surgery** involved when an anorectal malformation coexists
- **Radiology (Müllerian-experienced)** distinguishes septum vs. atresia vs. agenesis on MRI
- **Genetics** evaluates associated renal, skeletal, and syndromic patterns
- **Psychology / Social Work** supports the patient and family through diagnosis and recovery

ACOG Committee Opinion 779, Obstet Gynecol 2019 · Dietrich et al., J Pediatr Adolesc Gynecol 2014 · Skinner & Quint, J Minim Invasive Gynecol 2017

10

As the Adult OB/GYN: What to do when an adolescent presents and what to refer?

Outcomes hinge on nuance — embryologic subtype, tissue plane, and reoperative history — that favor centers experienced with these anomalies.

What You Can Do

- Recognize the presentation: primary amenorrhea, cyclic pain, a palpable pelvic mass
- Order pelvic ultrasound and a renal ultrasound: renal anomalies accompany up to 40% of cases, higher still with unilateral obstruction
- Start temporizing medical suppression (GnRH agonist or continuous OCPs) to control menses/pain while awaiting definitive care
- Counsel the patient and family, and coordinate a timely referral
- Avoid an unguided incision or exam-under-anesthesia without a defined surgical plan in place

Refer to a Specialist

- Surgical correction of transverse vaginal septum, distal vaginal atresia, or cervical agenesis/atresia
- Any complex or combined anomaly (e.g., didelphys with obstructed hemivagina)
- Reoperative or stenotic cases from a prior repair
- Cases where uterine- or fertility-preserving technique is being weighed
- Whenever the embryologic subtype and the correct operation is uncertain

ACOG Committee Opinion 779, Obstet Gynecol 2019 · ACOG Committee Opinion 728, Obstet Gynecol 2018 · Skinner & Quint, J Minim Invasive Gynecol 2017

11

As the Adult OB/GYN: What to do when a patient presents with a known condition that may have been managed in adolescence?

Outcomes hinge on nuance — embryologic subtype, tissue plane, and reoperative history — that favor centers experienced with these anomalies.

What You Can Do

- Recognize the condition and any concurrent anomalies, if present
- Identify any problem concerns whether related to vaginal stenosis and risks to be aware of for the future.
- Obtain any old records
- Counsel the patient and family, and coordinate a timely referral to other adult specialists if indicated
- Avoid an unguided incision or exam-under-anesthesia without a defined surgical plan in place

Current Patient Goals

- Menstruation normal or difficult
- Sexual function
- Fertility
- Obstetric implications and mode of delivery options
- Long term expectations

Chapter-Belfort book here

12

Congenital Reproductive Tract Anomalies: Operative Concerns for the Obstetrician

Reproductive tract anomalies affect ~7% of females. Most repairs happen before pregnancy, but safe delivery still depends on knowing the prior anatomy.

Preoperative Planning

- Take a directed history: prior Müllerian/vaginal surgery, DSD or anorectal malformation reconstruction, and any urinary or intestinal diversion
- MRI is the preferred imaging modality for uterovaginal anatomy even in adulthood; screen for renal anomalies, present in ~30% of these patients
- Mode of delivery is a joint decision so weigh risk to vaginal, uterine, bladder, urethral, and rectal structures

Delivery & Postpartum Risks

- Septate, bicornuate, or didelphic uteri raise risk of preterm labor, malpresentation, IUGR, and abnormal placentation or uterine rupture
- History of vaginal graft or major perineal reconstruction.
- Arrange multidisciplinary postpartum follow-up when bowel or bladder concerns arise

1. Adeyemi-Fowode O, Dietrich JE. Operative Concerns in Congenital Anomalies of the Reproductive Tract, 2. Operative Techniques in Obstetric Surgery (Belfort et al, eds). Wolters Kluwer; Ch2.1, 52–58.

13

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2. Ludwin A, Martins WP, Ludwin I. *ASRM Müllerian Anomalies Classification 2021: a critical review.* Ultrasound in Obstetrics & Gynecology, 2022, vol. 59(5), pp. 559–567.
3. Dietrich JE, Millar DM, Quint EH. *Obstructive reproductive tract anomalies.* Journal of Pediatric and Adolescent Gynecology, 2014, vol. 27(6), pp. 396–402.
4. Dietrich JE, Millar DM, Quint EH. *Non-obstructive Müllerian anomalies.* Journal of Pediatric and Adolescent Gynecology, 2014, vol. 27(6), pp. 386–395.
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9. Kapczuk K, Zajączkowska W, Madziar K, Kędzia W. *Endometriosis in adolescents with obstructive anomalies of the reproductive tract.* Journal of Clinical Medicine, 2023, vol. 12(5), article 2007.
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12. Operative Techniques in Obstetric Surgery (Belfort et al, eds). Chapter 2.1. Publisher: Wolters Kluwer; pp. 52–58.

14

Müllerian Anomalies

Stephanie Cizek, MD · Clinical Associate Professor
Pediatric and Adolescent Gynecology · Stanford University School of Medicine

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1

Disclosure

- I have no financial relationships to disclose.

2

Objectives

- Identify types of obstructive uterine anomalies and differentiate them from nonobstructive variants
- Interpret imaging modalities used in diagnosis, including ultrasound and MRI
- Develop an appropriate diagnostic workup for patients presenting with pain, amenorrhea, or hematometra
- Compare hysteroscopic and laparoscopic approaches for management of obstructive uterine anomalies
- Recognize potential complications and strategies to optimize reproductive and functional outcomes

3

Ten ASRM Categories, Four Cases Today

Müllerian agenesis	Cervical agenesis	**Unicornuate uterus** *Cases 1A + 1B*	Uterus didelphys	Bicornuate uterus
Septate uterus *Cases 3A + 3B*	Longitudinal vaginal septum	Transverse vaginal septum	Complex anomalies	**Other anomalies** *Case 2: ACUM*

Same category, very different surgery

- **Septate uterus:** partial septum, complete septum with septate or duplicated cervices, Robert's uterus
- **Other anomalies:** ACUM, T-shaped uterus

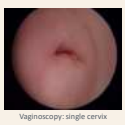
Pfeifer SM et al. Fertil Steril 2021;116:1238-52. ASRM MAC2021 interactive tool.

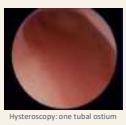
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Case 1A: Background

19 y/o with complex anomalies

- Cloacal exstrophy variant: duplicated urethra, vagina, uterus
- Prior reconstruction; told half of the duplicated uterus was removed
- Age 13: menarche
- EUA/hysteroscopy: TVL 4 cm, single cervix, unicornuate uterus
- 6 years of menstrual suppression
- Removed own IUD; no contraception


Vaginoscopy: single cervix


Hysteroscopy: one tubal ostium


Renal US: unicornuate uterus (yellow arrow), no horn seen

Cizek S, Wolf J, Levy D, Breech LL. NASPAG 2019 (poster).

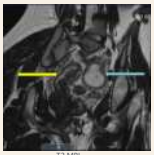
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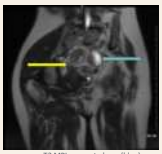
Case 1A: Management



US 7w5d: empty right uterus (yellow), horn pregnancy (blue)


Specimen: left tube and horn pregnancy


T2 MRI


T2 MRI: separate horn (blue)

Initially told the pregnancy was "in the uterus"

Uncertain location on US: get MRI

Cizek S, Wolf J, Levy D, Breech LL. NASPAG 2019 (poster). Siegrist S, et al. Arch Gynecol Obstet 2013;287:687-95.

6

A Uterine Horn Pregnancy Is an Ectopic Pregnancy

50-90%
rupture if left in place (natural history)

0-13%
fetal survival

36%
ruptured in modern reports, many excised early

"Cornual" means different things

Location	Rupture risk
Rudimentary horn	50-90%
Interstitial	20-50%
Angular	13-23%

Manage as an ectopic
- Sperm reach a non-communicating horn transperitoneally
- Rupture is mid-trimester; maternal deaths follow rupture

Lower modern rupture rates reflect earlier diagnosis and excision, not a safer pregnancy

Arleo EK, DeFilippis EM. Clin Imaging 2014;38:763-70. Siwatch S et al. Arch Gynecol Obstet 2013;287:687-95. Emrich NLA et al. Arch Gynecol Obstet 2026;313:194.

7

Ultrasound or MRI for Anomalies?

Ultrasound: first line
- First-line for uterine shape (ASRM 2024)
- Coronal plane shows fundal contour and cavity together
- Agrees with MRI (kappa 0.88)
- Pair with exam of cervix and vagina
  - Consider EUA for young patients

MRI: definitive evaluation
- Obstruction and hematometra
- Cervix and vagina
- Endometrium in a horn; ACUM
- Kidneys in the same study
- No transvaginal probe needed

ASRM Practice Committee. Fertil Steril 2024;122:251-65. Bermejo C et al. Ultrasound Obstet Gynecol 2010;35:593-601.

8

Who Deserves a Closer Look?

1. **Known renal anomaly**
   Agenesis, pelvic or dysplastic kidney: image the uterus too
2. **Severe dysmenorrhea near menarche**
   Especially if it fails NSAIDs and suppression
3. **Lateralized pain or pelvic mass**
   Hematometra, or a 'fibroid' in a teenager; sometimes mistaken for an adnexal mass
4. **On menstrual suppression**
   Obstruction can be silent for years



Of patients with known renal anomalies,

~30%

will have a Müllerian anomaly

O'Flynn O'Brien KL et al. J Pediatr Adolesc Gynecol 2021;34:154-60. Mooren ERM et al. J Pediatr Adolesc Gynecol 2021;34:681-5. Jayasinghe Y et al. Obstet Gynecol 2005;105:1456-67.
Figure: Sanfilippo's Textbook of Pediatric and Adolescent Gynecology, 2nd ed, 2020.

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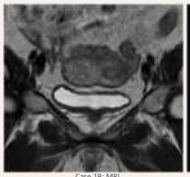
Case 1B: Background

31 y/o G1, no known anomalies
- Contraception since teenage years: Depo-Provera, then Nexplanon
- Unplanned pregnancy with Nexplanon in place
- Dated by 6-week US; patient removed Nexplanon
- NT US at 13 weeks: pregnancy in uterine horn; asymptomatic

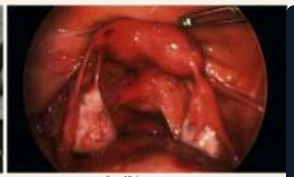


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Case 1B: Management

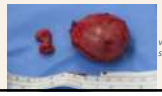


Case 1B: MRI



Case 1B: laparoscopy

2-step surgical management
- Significantly overlapping myometrium
- Unclear anomaly (cannot rule out Robert's uterus)
- Engorged vessels in pregnancy



vs. Case 1A: horn completely separate, excised in one step

11

Cases 1A + 1B

1 Takeaways

- Menarchal patients can still have an obstructing Müllerian anomaly
- A rudimentary horn pregnancy is an ectopic pregnancy
- Remove even non-communicating functional horns
- Optimize preservation of the cervix on the remaining unicornuate uterus (even if it means 2 surgeries)

12

MRI: Match the Sequence to the Question

Question	Sequence / plane	What you see
Septate or bicornuate?	Oblique coronal T2 along the uterine long axis (or 3D T2)	Fundal contour: flat/convex vs deep cleft
Blood behind an obstruction?	T1 fat-sat	T1-bright hematometra, hematocolpos, ACUM, endometrioma
Endometrium in a horn?	Sagittal + oblique T2	Zonal anatomy (endometrium, junctional zone)
One cervix or two?	Oblique axial T2 across the cervix	Two stromal rings ('owl's eye') vs one
Vaginal septum or agenesis?	Sagittal/axial T2 with vaginal gel or vitamin E capsule	T2-dark septum; length of atresia
Kidneys?	Large-FOV coronal T2 of abdomen	Agenesis, ectopic or dysplastic kidney

Order it right: "Müllerian anomaly protocol," antiperistaltic agent, kidneys included, contrast usually not needed

Dixit R et al. Insights Imaging 2025;16:40. Jegannathan D, Indiran V. S Afr J Radiol 2018;22:a1259.

13

Why Remove a Non-Communicating Horn?

Ectopic risk

Transperitoneal sperm migration; rupture is mid-trimester

Hematometra & pain

Closed cavity; cyclic pain often refractory to suppression

Endometriosis

Retrograde flow; 75% in a small adolescent series

Who gets surgery?

- **Functional horn (contains endometrium), communicating or not:** laparoscopic excision + ipsilateral salpingectomy, ideally before pregnancy
- **Non-functional horn:** generally no excision needed
- **Confirm first:** T2 MRI for endometrium

Jayasinghe Y et al. Obstet Gynecol 2005;105:1456-67. Kapczuk K et al. J Clin Med 2023;12:2007. Emrich NLA et al. Arch Gynecol Obstet 2026;313:194.

14

Case 2: Presentation

16 y/o G0 with dysmenorrhea

- Severe dysmenorrhea since menarche at age 11
- Missing days of school every month
- US: likely cavitary adenomyosis
- Failed therapies:
  - NSAIDs
  - Combined estrogen-progestin pills
  - Multiple progestin-only pills

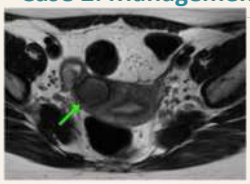


Ultrasound

Kcuk O, Cizek SM. AAGL SurgeryU video, 2023.

15

Case 2: Management





ACUM VIDEO HERE

Kcuk O, Cizek SM. AAGL SurgeryU video, 2023. Drawing: ASRM MAC2021 (Pfeifer SM et al. Fertil Steril 2021;116:1238-52).

16

ACUM: Accessory Cavitated Uterine Mass

Acién criteria

1. Isolated accessory cavitated mass
2. Normal uterine cavity, tubes and ovaries
3. Excised with pathology confirmation
4. Cavity lined by endometrium (glands + stroma)
5. Chocolate-brown fluid
6. No adenomyosis (small adjacent foci allowed)

Lateral, under the round ligament insertion; the tube does not communicate

88 cases reviewed

21.9 mean age (yr)

68% dysmenorrhea

83% laparoscopic excision

76% complete relief (54.5%) or improvement (21.6%) after excision

Dekkiche S et al. Front Reprod Health 2023;5:1197931.

17

Know the Anatomy: ACUM and Its Mimics

	ACUM	Non-comm. horn	Robert's uterus	Cystic adenomyosis
Main cavity	Normal, triangular	Unicornuate (banana)	Asymmetric; one blind hemicavity	Normal
Mass / contour	Well-defined, lateral, under round ligament	Separate horn	Normal fundus	Ill-defined, in diffuse adenomyosis
MRI clue	Concentric layers, T1-bright center	Own endometrium + junctional zone	Septum to cervix	Thick junctional zone; small T1-bright cysts
Tube	Normal; no communication	Arises from horn	Normal, bilateral	Normal
Approach	Laparoscopic excision	Laparoscopic excision	Hysteroscopic ± laparoscopy	Medical first

Misread an ACUM as Robert's uterus, and a hysteroscopic "septum" incision cuts a normal cavity

Dekkiche S et al. Front Reprod Health 2023;5:1197931. Celli V et al. Int J Environ Res Public Health 2022;19:5840. Acién P, Acién M. F S Rep 2021;2:357-8. Gulino FA et al. J Clin Ultrasound 2024;52:619-28.

18

Endometriosis: Treat It All at Once?

46%
endometriosis at surgery for obstructive anomalies

~70%
complete resolution of dysmenorrhea after relieving obstruction

18%
developed it later anyway

Do at index surgery
- Fix the anatomy
- Photograph and stage findings
- Biopsy for diagnosis
- Treat what was consented
- Post-op suppression

Consider deferring
- Endometrioma cystectomy: AMH falls ~1.1 ng/mL
- Deep disease near bowel, bladder, ureter
- Anything outside the consent
- Long cases that add risk to the main repair

Kapczuk K et al. J Clin Med 2023;12:2007. Raffi F et al. J Clin Endocrinol Metab 2012;97:3146-54. Becker CM et al. Hum Reprod Open 2022:hoac009.

19

Your Op Note Is Their Prenatal Record

Cavity
Was a cavity entered? Which one?

Myometrium
Location, depth, and length of the defect

Repair
Number of layers, suture

Write the plan
- When to try to conceive
- Labor vs planned cesarean, and why
- Rupture risk counseling (~0.9% estimate after ACUM excision)

Landmarks
Relation to cornua, tubes, round ligament, cervix

Adnexa
Which tubes and ovaries remain

Findings
Endometriosis stage, photos, pathology

Give the patient a copy. Nobody is going to find your clinic note.

Dekkiche S et al. Front Reprod Health 2023;5:1197931.

20

Case 2

2 Takeaways

Know the anatomy: ACUM is not a horn, a septum, or adenomyosis

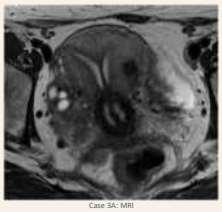
Endometriosis is tempting to treat all at once. Consider not.

Your op note is their prenatal record

21

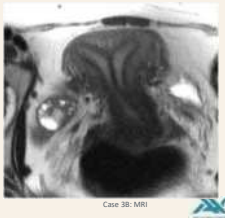
Cases 3A + 3B: Presentation

Case 3A: 38 y/o with infertility
Uterine and vaginal septum found during infertility workup



Case 3A: MRI

Case 3B: 37 y/o with infertility
Known vaginal septum and duplicated cervices



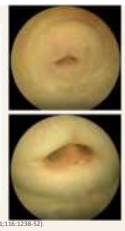
Case 3B: MRI

22

Cases 3A + 3B: Presentation

Case 3A: 38 y/o with infertility
Uterine and vaginal septum found during infertility workup





Case 3B: 37 y/o with infertility
Known vaginal septum and duplicated cervices





Drawings: ASRM MAC2021 (Pfeifer SM et al. Fertil Steril 2021;116:1238-52).

23

Cases 3A + 3B: Presentation

Case 3A: 38 y/o with infertility
Uterine and vaginal septum found during infertility workup

Case 3B: 37 y/o with infertility
Known vaginal septum and duplicated cervices

HYSTEROSCOPY VIDEO

24

Septate Cervix or Two Cervices?

One cervix, septate

- Septum may be resected
- No evidence it raises insufficiency risk (ASRM 2024, weak)

Two cervices, duplicated

- Do NOT cut between them
- Incise the uterine septum above the internal os only

How to tell

Vaginoscopy	3D TVUS coronal	MRI axial T2
[Insert: your photo, 2 cervices vs 1 cervix with 2 os]	*[Insert: your 3D US image]*	*[Insert: Dixit 2025 Fig 8.2, 'owl's eye' (CC BY 4.0)]*

ASRM Practice Committee. Fertil Steril 2024;122:251-65. Dixit R et al. Insights Imaging 2025;16:40.

25

Hysteroscopic Approach

1. **Vaginoscopy** — Identify both os; resect LVS if it blocks access or causes symptoms
2. **Target** — Consider balloon catheter in one hemicavity
3. **Incise** — From the other side, just above the internal os
4. **Finish** — Advance to fundus under US guidance; residual <1 cm is fine

Cervical septum RCT (n=28)

Resect vs preserve a single-cervix septum:

36 vs 73 min operating time
Less fluid absorption
Preserve arm: 2 pulmonary edema, 3 bleeding >150 mL

Laparoscopy too?

Rarely needed if 3D US or MRI shows a normal fundal contour. US guidance is enough.

Rock JA et al. Fertil Steril 1999;72:942-5. Parsanezhad ME et al. Fertil Steril 2006;85:1473-7. ASRM Practice Committee. Fertil Steril 2024;122:251-65.

26

Cases 3A + 3B

3 Takeaways

- Septate cervix or duplicated cervices? Know which
- Both can be managed hysteroscopically
- Concurrent laparoscopy is rarely needed
- Should you remove the uterine septum at all?

27

Take-Home Points

Cases 1A + 1B	Case 2	Cases 3A + 3B
Suppression, renal anomaly, or dysmenorrhea: look for a horn	**Confirm anatomy before you cut; ACUM has a normal cavity**	**Never cut between two true cervices**
A horn pregnancy is an ectopic; excise functional horns	**Fix the anatomy first; endometriosis can wait**	**Septum resection: shared decision, not routine**

28

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31

Native Vagina Reconstruction Using Native Vaginal Mucosa

Surgical Technique Review: decision-making, pitfalls, and nuances

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1

Disclosure

I have no financial relationships to disclose.

2

Objectives

- Describe the anatomic scope of native-mucosa reconstruction and distinguish obstructive anomalies from vaginal agenesis.
- Compare the pull-through, Z-plasty, push-through, and balloon-assisted techniques, and identify which intraoperative findings favor each.
- Apply postoperative dilation protocols and counsel patients on the complication profile and long-term functional outcomes of native-mucosa repair.

3

Why Native Mucosa, First



The guiding principles…

Preserve Hormonally-Responsive Epithelium

Avoid the morbidity of substitution

— Native vaginal mucosa is estrogen-sensitive, self-lubricating, elastic, and there is no substitute tissue matches it.

— Skin grafts, bowel segments, and peritoneal flaps each carry their own long-term surveillance burden: contracture, mucous discharge, or malignant transformation risk over decades.

A Single-Stage, Lower-Morbidity Option

The default first-line approach

— When adequate native mucosa is present and mobilizable, native-tissue repair is simpler, faster, and avoids a second donor-site operation.

— Guidelines consistently favor native-tissue mobilization whenever anatomy allows it and substitution is reserved for when it doesn't.

Miller & Breech, Clin Obstet Gynecol 2008;51:223–236 • Debiec & Amies Oelschlager, Clin Obstet Gynecol 2020;63:512–527

4

When Native-Mucosa Techniques Apply

Scope matters: these techniques mobilize tissue that already exists — they don't create a vagina from nothing

Vagina Present, Obstructed : all or portion

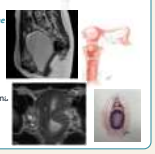
Native mucosa exists proximal to the obstruction — mobilize and re-approximate it.

— Transverse vaginal septum

— Distal / lower vaginal atresia

— OHVIRA — obstructed hemivagina

— Imperforate hymen (technically distinct, same principle)



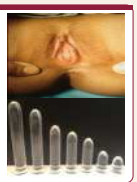
Vagina Absent (Agenesis)

No proximal mucosa to mobilize — different toolkit entirely.

— MRKH / Müllerian agenesis

— Dilation of the native introital dimple is first-line, nonsurgical, and uses existing tissue

— Surgical substitution (peritoneum, bowel, skin graft) reserved for failed dilation



→ **Pull-through, Z-plasty, push-through, and balloon-assisted techniques all apply here**

Dietrich, Millar & Quint, J Pediatr Adolesc Gynecol 2014;27:396–402 • Edmonds et al., Fertil Steril 2012;97:686–690

5

Preoperative Evaluation & Planning

The operative plan is only as good as the anatomic picture behind it

MRI — **MRI as the anatomic roadmap**
Characterizes the length and level of obstruction, septal thickness and pliability, and associated uterine/cervical findings — the single most important preoperative study.

REN — **Renal tract imaging**
Renal anomalies accompany a substantial share of obstructive Müllerian anomalies and are especially common with unilateral obstruction (OHVIRA).

EUA — **Exam under anesthesia before consent to a fixed plan**
Imaging can still underestimate the true gap or misclassify atresia as a simple septum — confirm findings and be ready to adjust before the family is committed to one specific operation.

MDT — **Multidisciplinary imaging review**
Radiology experienced in Müllerian anomalies should review studies alongside the surgical team, not in isolation.

ACOG Committee Opinion No. 779, Obstet Gynecol 2019;133:e363–e371 • Debiec & Amies Oelschlager, Clin Obstet Gynecol 2020;63:512–527

6

Timing Still Governs the Operating Room

The same post-pubertal principle from anomaly management drives surgical success

1. **Estrogenized mucosa mobilizes better**
   More vascular and elastic tissue tolerates dissection and tension far better than prepubertal tissue, directly affecting how far mucosa can be safely mobilized.
2. **Bridge acute symptoms medically, not surgically**
   GnRH agonists or continuous OCPs, ± image-guided decompression, control pain and hematocolpos while the definitive repair is planned electively.
3. **Elective planning beats emergent repair**
   A rushed operation for an acute presentation is one of the most avoidable predictors of a technically compromised repair potentially resulting in stenosis.

Dietrich, Millar & Quint, J Pediatr Adolesc Gynecol 2014;27:396–402 • ACOG Committee Opinion No. 779, Obstet Gynecol 2019;133:e363–e371

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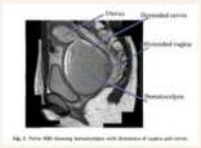
Technique 1: Pull-Through Vaginoplasty

BEST FOR: TVS and distal vaginal atresia with a short gap (roughly ≤ 3 cm) to the introitus

1. **Confirm anatomy and drain hematocolpos via the perineal approach.**
2. **Make a horizontal incision at the introitus / vestibule. The 3 and 9 o'clock rule for safety!**
3. **Mobilize the proximal vaginal mucosa caudally, developing the plane between rectum and bladder/urethra.**
4. **Advance the mobilized mucosa to the introitus without tension and resect the cone portion that is narrow in order to reach normal vaginal caliber.**
5. **Suture circumferentially, mucosa-to-mucosa, to create a continuous epithelial-lined canal proximal to distal.**
6. **Place a mold/stent as needed to maintain patency during early healing when >3cm distance to bridge to perineum as stenosis risk is high.**

PITFALL

The simplest option only works when tension-free mobilization is truly possible. Forcing a repair under tension is the most common technical cause of early breakdown and restenosis. If the gap is borderline, have a graft or Z-plasty alternative ready before committing.



Proximal vaginal mucosa → **Mobilized caudally** → **Advanced to introitus (tension-free)** → **Sutured mucosa-to-mucosa**

Mansouri & Dietrich, J Pediatr Adolesc Gynecol 2015;28:433–436 (sentinel series) • Skinner & Quint, J Minim Invasive Gynecol 2017;24:901–908

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Technique 2: Z-Plasty Vaginoplasty

Garcia / Grünberger modification

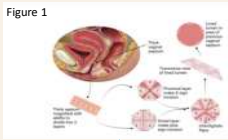
BEST FOR: Thicker or broader-based transverse septa where a single circumferential incision risks a tight scar ring

WHY IT MATTERS

A straight circumferential anastomosis concentrates contractile forces into one ring, exactly the geometry that produces a stenotic band. The Grünberger series reported no significant long-term complications across 13 patients using this modification.

1. **Design interdigitating triangular (zig-zag) mucosal flaps on the proximal and distal edges of the septum instead of a straight circular incision.**
2. **Excise the central septal tissue while preserving the flap edges.**
3. **Interdigitate the proximal and distal flaps so the final suture line is a zig-zag, not a circle.**
4. **Suture flap tips into the opposing flap bases, mucosa-to-mucosa.**

Figure 1



Interdigitating flap closure — the zig-zag suture line breaks up any single contracting scar band

Wiesmann, Bodner, Spangler & Grünberger, Fertil Steril 2003;79:608–612. ★ Figure 1: Courtesy of J. E. Dietrich developed through Biorender.

9

Technique 3: Push-Through Technique

BEST FOR: Cases where caudal mobilization of the proximal segment is difficult, high-risk, high stenosis, or the upper pouch is under excessive tension

TRADE-OFF

The original comparative series found push-through useful when postoperative constriction was anticipated or pull-through was intraoperatively difficult, a problem-solving alternative, not a universal first choice.

1. **Rather than pulling the proximal vaginal mucosa down to the introitus, the upper vaginal pouch is advanced (pushed) distally as a unit. May be performed laparoscopically or via laparotomy.**
2. **Reduces tension on the anastomosis when the proximal segment is deep or poorly mobile.**
3. **Originally described across three anatomic groups: isolated TVS, partial vaginal aplasia, and a double genital system with an obstructed hemivagina.**
4. **A mold is typically recommended afterward, particularly for thicker septa or partial aplasia, to prevent early recontracture.**



Upper vaginal pouch → **Advanced (pushed) distally as a unit** → **Anastomosed at reduced tension**

van Bijsterveldt & Willemsen, J Pediatr Adolesc Gynecol 2009;22:157–161

10

Technique 4: Balloon-Assisted Vaginoplasty

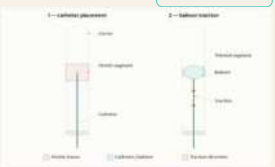
Modified balloon technique

BEST FOR: Longer-segment atresia (≥ 3 cm), or as a staged, less invasive first step before or instead of formal pull-through

EMERGING ROLE

A newer, less-established adjunct compared to pull-through, Z-plasty, or push-through — published series are small. Best framed as an option that can lower the bar for a subsequent primary mobilization.

1. **Under image guidance, a balloon catheter is advanced through the atretic or obstructed segment.**
2. **Graduated balloon dilation gradually thins and stretches the tract, expanding the potential space.**
3. **Can be performed as a staged first step to reduce the eventual surgical gap, or as a standalone minimally invasive option in select anatomy.**
4. **A vaginal model/stent appropriately sized to the newly created tract is essential afterward — wrong sizing is linked to recurrent stenosis.**



Balloon catheter advanced under imaging → **Graduated dilation expands the tract** → **Sized mold maintains the new caliber**

Zhang, Meng, Du et al., Pediatr Surg Int 2022;38:631–635

11

Technique 5: Transverse Vaginal Septum Excision

BEST FOR: A discrete transverse vaginal septum with healthy, well-vascularized proximal and distal segments suitable for tension-free approximation

1. **Confirm septal level, thickness, and any perforation on exam under anesthesia and MRI; drain hematocolpos if present.**
2. **Incise the septum centrally to enter the proximal vaginal segment and confirm continuity with the cervix/upper tract.**
3. **Excise the septum circumferentially, leaving a cuff of mucosa on both the proximal and distal margins.**
4. **Mobilize the proximal and distal mucosa as needed so the cut edges meet without tension.**
5. **Anastomose the proximal and distal vaginal mucosa circumferentially, mucosa-to-mucosa, unifying the canal.**
6. **Place a vaginal mold/stent to preserve caliber and support the anastomosis during healing if the septum was >1cm thickness.**

PITFALL

As with pull-through repair, closing the anastomosis under tension is the leading driver of breakdown and ring stenosis. For a thick or high septum, plan an interdigitating (Z-plasty) closure instead of a straight circumferential line before you commit.



Proximal vagina → **Septum excised** → **Edges mobilized, tension-free** → **Anastomosed, proximal to distal**

Williams, Nakhal & Hall-Craggs et al., BJOG 2014;121:1653–1658 • van Bijsterveldt & Willemsen, J Pediatr Adolesc Gynecol 2009;22:157–161

12

Technique 6: Longitudinal Vaginal Septum Excision

BEST FOR: A symptomatic, non-obstructive longitudinal septum dividing the vagina into right and left canals — dyspareunia, difficult tampon use, or obstructed labor

1. **Confirm the septum is non-obstructive and map its extent with exam under anesthesia and MRI; exclude a coexisting renal anomaly.**
2. **Place traction sutures or clamps on the septum to put it under tension and define its cephalad and caudal extent.**
3. **Excise the septum from introitus to its cephalad attachment, staying within the septal plane to protect the right and left vaginal mucosa.**
4. **Secure hemostasis along the resection bed; a vessel-sealing device is a described option in this confined space.**
5. **Anastomose the right and left vaginal mucosal edges at the resection line, unifying the two canals into a single lumen.**
6. **Confirm a single, patent canal on exam; place a mold/stent if caliber is borderline or a thick vaginal septum (>1cm) was encountered.**

PITFALL

Postoperative bleeding is the most frequently reported complication of longitudinal septum resection. Confirm hemostasis before closing.



Right hemivagina → Septum excised → Left hemivagina → Anastomosed, right to left

Perez-Milicua, Hakim, Adeyemi & Dietrich, J Pediatr Adolesc Gynecol 2016;29(6) (LigaSure technique) • Postoperative bleeding after longitudinal vaginal septum resection, J Pediatr Adolesc Gynecol 2023;36(6):563–565

13

Special Scenario: OHVIRA

Uterus didelphys + obstructed hemivagina + ipsilateral renal anomaly — a native-mucosa repair with its own nuances





Septal resection joins the two cavities

The obstructed hemivagina is separated from the patent side by a longitudinal septum, not a transverse one, this is a septal resection between two native cavities, not a pull-through.



NUANCES SPECIFIC TO OHVIRA

— Vaginal septum adenosis has been reported, keep it on the differential for unexplained postoperative discharge.

— Hymenal integrity can be preserved with a vaginoscopic or laparoscopy-assisted approach when culturally or personally important to the family.

— Ipsilateral renal anomaly is often assumed to be agenesis, but a dysplastic/atrophic kidney with an ectopic ureter can present later as persistent vaginal drainage.

— A minority require a two-stage approach — for incomplete resection, infection/anatomic distortion, or restenosis.

Zurawin, Dietrich, Heard & Edwards, J Pediatr Adolesc Gynecol 2004;17:137–141 (sentinel) • Santos & Dietrich, J Pediatr Adolesc Gynecol 2016;29:7–10 (sentinel) • Smith & Laufer, Fertil Steril 2007;87:918–922

14

Choosing Among the Techniques

Four intraoperative variables decide which tool fits — and can override the preoperative plan

Evaluate 4 Intraoperative Variables

Distance to Introitus	Thickness & Pliability	Aperture at the Stricture	True Anatomic Diagnosis
Proximal mucosa within ~3 cm generally mobilizes for a tension-free pull-through; beyond that, stenosis risk climbs.	A thin, elastic membrane behaves very differently under tension than a thick, fibrotic plate — pliability, not thickness, decides feasibility.	A pinpoint opening versus a broad-based obstruction changes both exposure and the anastomotic geometry available.	What looks like a simple TVS on MRI can prove to be distal atresia once opened — the plan must pivot in real time.

→ Pull-Through or Push Through · Z-Plasty · Anastomosis · Balloon-Assisted

Technique selection — chosen intraoperatively from these four variables together

Mansouri & Dietrich, J Pediatr Adolesc Gynecol 2015;28:433–436 • Skinner & Quint, J Minim Invasive Gynecol 2017;24:901–908

15

Intraoperative Technical Pearls

The margin for error is anatomic as much as technical

Protect the urethra and rectum

The bladder/urethra anteriorly and rectum posteriorly sit immediately adjacent to the dissection plane — the leading source of injury in unfamiliar hands.

True mucosa-to-mucosa apposition

What separates a durable repair from one prone to circumferential banding is epithelium-to-epithelium healing — mucosa-to-skin approximation stenoses more often.

Choose stent/mold size deliberately

An undersized mold fails to prevent recontracture; an oversized one risks pressure necrosis at the fresh suture line — fit it to the reconstructed caliber.

Keep a second plan in the room

Graft or flap options, and an experienced second surgeon, should be available before starting — not summoned after the anatomy proves harder than imaging suggested.

Debiec & Amies Oelschlager, Clin Obstet Gynecol 2020;63:512–527 • Dietrich, Millar & Quint, J Pediatr Adolesc Gynecol 2014;27:396–402

16

Postoperative Protocol

Dilation is part of the operation, not an afterthought

1. **Mold / stent duration**
   Kept in place through the earliest, most fragile phase of mucosal healing before transitioning to active dilation.
2. **Dilation regimen**
   Structured escalation of dilator size and frequency, individualized to the repair — begun as soon as healing allows and continued well beyond the immediate postoperative period.
3. **Scheduled follow-up exam**
   Early re-examination catches silent restenosis before it re-obstructs outflow — waiting for symptoms means waiting too long.
4. **Patient & family education up front**
   Adherence to dilation is a documented, real-world barrier, not a formality — counsel on it before surgery, not only after a complication.

Adeyemi-Fowode & Dietrich, J Pediatr Adolesc Gynecol 2017;30:490–494 (sentinel) • Mansouri & Dietrich, J Pediatr Adolesc Gynecol 2015;28:433–436 (sentinel)

17

Complications: Early

What shows up in the first days to weeks after repair

Stenosis at the anastomosis

The most common complication overall — can be evident within weeks, even after a technically sound mucosa-to-mucosa repair.

Wound separation / breakdown

Tension on the suture line is the leading technical cause — a preventable complication tied directly to technique selection.

PID/TOA

Retained or reaccumulated hematocolpos behind an incompletely draining repair can progress to infection, occasionally requiring urgent surgical revision.

Poor mold/stent tolerance

Devices that are the wrong size or poorly secured may be removed early by the patient or care team, undermining the early healing window or result in pressure necrosis.

Mansouri & Dietrich, J Pediatr Adolesc Gynecol 2015;28:433–436 (sentinel series) • Harou et al., Cureus 2026;18:e102218

18

Complications: Late & Reoperation

There is still no consensus on optimal technique or protocol — which is exactly why these numbers matter

Restenosis months to years later

Can occur even after an initially patent, apparently successful repair — lifelong awareness, not just early follow-up, is warranted.

Vaginal septum adenosis

Documented in obstructed-hemivagina cohorts and associated with vaginal stenosis — outcomes should be tracked well past the immediate postoperative period.

Two-stage repair not rare

Published series report a meaningful minority of patients needing a second procedure — for incomplete resection, infection/anatomic distortion, or restenosis.

Autograft/flap failure when used

Any interposition tissue added to bridge a longer gap becomes its own potential site of contracture and failure.

Williams et al., BJOG 2014;121:1653–1658 • Smith & Laufer, Fertil Steril 2007;87:918–922

19

Long-Term Outcomes: Sexual Function & QoL

The functional goal is what ultimately justifies the operative risk

Surgical Reconstruction ≈ Non-Surgical Dilation

Comparable quality of life & sexual satisfaction, per validated instruments (WHOQoL-Bref, GRISS)

1. **Function follows anatomy — loosely**
   A patent, adequately sized canal is necessary but not sufficient; psychosexual outcomes depend heavily on counseling, timing, and patient engagement with dilation, not technique alone.
2. **Data gap for obstructive-anomaly cohorts**
   Most long-term functional outcome data comes from vaginal-agenesis populations — dedicated follow-up specific to pull-through/Z-plasty repair remains comparatively sparse.
3. **Counsel accordingly**
   Set expectations that a technically successful repair is the start of the functional journey, not the end — dilation adherence and follow-up remain part of achieving the outcome.

Kimberley, Hutson, Southwell & Grover, Fertil Steril 2011;95:238–241

20

Counseling & Shared Decision-Making

The conversation before surgery shapes the experience of everything after it

1. **Name the possibility of a staged repair up front**
   Families who hear about a potential second procedure before surgery tolerate it far better than those who learn about it only after a complication.
2. **Set the dilation commitment as part of the plan, not an add-on**
   Documented barriers to adherence — discomfort, embarrassment, logistics — are best addressed in counseling before they threaten the surgical outcome.
3. **Include the patient at an age-appropriate level**
   Adolescents engaged in their own care planning show better follow-through with the postoperative regimen that determines long-term success.
4. **Align the plan with menstrual and future fertility goals**
   The chosen technique and its risks should be framed against what matters to this specific patient and family, not a generic outcome.

Adeyemi-Fowode & Dietrich, J Pediatr Adolesc Gynecol 2017;30:490–494 (sentinel) • ACOG Committee Opinion No. 779, Obstet Gynecol 2019;133:e363–e371

21

Why Expertise Still Decides the Outcome

No single technique fits every anatomy — judgment is the actual skill being exercised

Every technique shares the same core requirement: tension-free, true mucosa-to-mucosa healing.

— There remains no consensus on the single best technique, postoperative protocol, or predictors of long-term complication across the published literature.

— The rarity of these operations means most surgeons will encounter only a handful of cases in a career — experience concentrates outcomes at high-volume centers.

— Referral to a center experienced with the full range of these techniques remains the single highest-leverage decision a generalist can make.

Skinner & Quint, J Minim Invasive Gynecol 2017;24:901–908 • Mansouri & Dietrich, J Pediatr Adolesc Gynecol 2015;28:433–436

22

Acknowledgments

- Thanks to my team for covering so I can be here with you!

23

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24

Timing of repair: the calculus

- Depends on type of anomaly AND patient specific factors
- Complexity of anomaly determines operative approach and post-op management
- Readiness for surgery is an independent variable which must be individualized according to maturity, time/energy bandwidth, privacy, relationship status, physical ability to participate in post-op care
- Perioperative considerations + post-operative care + patient readiness = timing of repair

1

A "general" guide

- Hymenal obstruction: tanner 3-4
  - In infancy, if neonatal obstruction symptomatic
- OHVIRA: post-menarche (obstructed side with dilated cervix, avoid over excision and injury to cervix)
- Transverse septum vs vaginal atresia: ~age 16
  - Consider sooner: fails medical management, <3cm, thin septum/atretic segment, mature and wants sooner repair/demonstrates willingness to participate in post-op care
  - Consider delay: medical management working well, high/thick blockage, needs staged procedure, social barriers to post-op care
- MRKH: ~age 18

2

Questions to assess readiness

- What is your personal motivation for having this surgery?
- How do you feel about your condition?
- Do you understand what amount of sensation or function will/won't be possible with this surgery?
- How is your self-esteem?
- Are you struggling with anxiety or depression?
- Are you currently sexually active or planning to be soon?
- If your family/partner supportive?
- Do you have a private place to dilate?
- Do you anticipate any barriers to dilating?
- How confident are you that you will succeed? If not what are your concerns?

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3

Barriers to success

Psychosocial	Motivational problems and poor compliance
	Unstable relationship
	Interpersonal conflict
	Parental misunderstanding of diagnosis
	Sociocultural factors
	Mental health issues
Cognitive issues that affect comprehension	Young age
	Underlying learning disability
	Lack of knowledge of process
Logistical	Lack of privacy
	Travel distance to clinic
	Busy schedule
Anatomic	Discomfort and pain
	Scar from "hymenectomy"
	Absence of dimple
	Multiple congenital anomalies

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4

Menstrual suppression

- Continuous CHC (pills (norethindrone/EE or patch)
  - 53-72% amenorrhea rate, median 1.5 days bleeding/84 days
  - Patch with 12% amenorrhea at 3 months and caution re: VTE
- POP
- Depo-provera (41-70% amenorrhea rate at year 1)
- Nexplanon (14-20% amenorrhea rate)
- GnRH agonist with add-back
- Barriers: irregular bleeding, breakthrough pain, ED visits

5

The complete picture:

- In addition to patient's readiness, timing of repair will depend on the following pre-op decisions:
  - Necessity for pre-op dilation to facilitate repair
  - Thickness of septum or atretic segment
  - Single step or staged surgery
  - Need for graft/post-op mold
  - Post-op stent can be deferred if:
    - Obstruction less than 3 cm away from perineum
    - Thin atretic segment vs septum
    - Can monitor closely for stenosis

6

Vaginal graft vaginoplasty Types/techniques

Dana Elborno MD
Julia Geynisman-Tan MD

NOVEMBER 13-16, 2026 · BOSTON · #AAGL26

7

Disclosure

"I have no financial relationships to disclose."

8

Objectives

- List types of grafts available for vaginoplasty
- Describe utility and application of grafts for surgical repair of vaginal anomalies
- Illustrate differences of commercially available grafts and allografts
- Examine optimal graft characteristics
- Discuss reasonable surgical approaches in 2026

9

The calculations

Estimated neovaginal surface area

A typical neovaginal canal:

- **Length:** ~12–14 cm
- **Diameter:** ~3–4 cm

Area=π×diameter×length

Approximate result:

≈120–150 cm^2 total lining area

10

Graft Guide:

- Grafts that allow for epithelialization of vaginal canal must:
  - Enable migration
  - Promote proliferation of cells
  - Maintain structural integrity
  - Preserve basement membrane, replace deficient and missing ECM components in the wound
- Unique to neovagina:
  - Possibility of spontaneous epithelialization likely involves migration of epithelial cells from the vaginal dimple in a cranial direction, or potentially from pluripotent stem cells in obliterated müllerian ducts.
  - Original WSG technique described without a graft, but left Mold in place for 4-6 months…

11

When to consider:

- MRKH
- Thick transverse septum
- Apical atresia
- History of stenosis
- Previously radiated tissue
- Prior infection

12

Graft Guide:

Living mucosal grafts	Buccal mucosa, bowel	Transplanted epithelium survives
Skin grafts	Split-thickness skin	Epidermal stem cells regenerate
Acellular matrices	OASIS, Kerecis, amnion Artificial dermis, interceed	Host cells repopulate scaffold

13

Comparisons:

Properties	Buccal: oral mucosa	STS graft: dermis/ epidermis	Bowel: intestinal mucosa and muscle	Kerecis: Fish dermal ECM	Oasis: acellular porcine SIS
Size/thickness	8 x 3 x 0.15 cm per cheek	Variable About 0.3 mm in thickness	Variable 3-5 mm in thickness	4x6 cm - 7x 20 cm ~1 mm in thickness	3 x 3.5 cm- 7 x 20 cm ~0.3 mm in thickness
Surface characteristics: lubrication, hair	Non keratinized, some mucuous, no hair	Keratinized skin, no mucous, +hair	Intestinal mucosa, + mucous, no hair	Scaffold, no mucuous, no hair	Scaffold, no mucuous, no hair
Harvest process	Moderate difficulty, oral discomfort	Donor site visible scarring	Major abdominal surgery	None	None
Risks	Limited size, but can epithelialize 20x the size of harvested tissue	Contraction, dryness, hair, fistula	Cancer?, excess discharge, prolapse	Contraction, granulation tisse	Contraction, granulation tissue
Benefits	Similar to native	Epithelialize fast	Low risk stenosis	No graft site	No graft site

14

Buccal:

- Buccal- a 4 cm graft can stretch somewhat
- Risk of scarring, lip deviation/retraction, damage to Stenson's duct, hematoma formation
  - May require additional team
  - Tissue may not be usable
    - Already be scarred from cheek biting/previous surgery
    - Infectious/AI disease (HSV, candida, aphthous ulcers)
  - Affects post-op diet and recovery
  - Both overall have high patient satisfaction rate
  - Risks ~1% for post-op numbness/infection from graft sit

15

OASIS

- Extracellular matrix derived from porcine small intestinal submucosa
- Used to treat variety of wounds
- Similar to dermis, provides scaffold for cellular growth and migration
- Successful integration of OASIS Matrix Products may form a caramel-colored or off-white gel.
- Caramelization occurs as part of the natural wound progression process. Because this caramelization or off-white gel contains ECM components, which continue to replace deficient and missing ECM components in the wound, the caramelized material should not be removed.

16

Kerecis



17

Product variations:



18

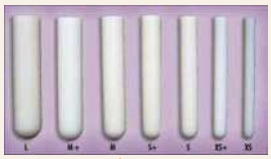
Suture Best Practices

- If the graft lasts one week, the suture tensile strength should too
- Sutures that persistent far into the self-stenting period will lead to pain or bleeding during the early weeks of stenting that can limit the patient's success
- Secure the graft to the vagina using 2-0 monocryl or 3-0 vicryl suture
- Do not secure the graft to the mold which will be removed in one week

19

Stent Best Practices

- After mold removal and confirmation of the length and width of the neovaginal space, you don't want this space to stricture at the apex.
- Patients should be instructed to use dilators with a uniform diameter across their length





20

Followup Best Practices

- Weekly x2 → Every other Week x2 → Can begin penetrative intercourse if desired but should not replace dilation since partner size/penetration depth is unknown and track is not fully developed
- Monthly x2 → Puts you at 12- 14 weeks postop – can decrease dilation to several times weekly
- By 6 months can either dilate or have intercourse 1-2 x per week.

21

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22

References (Last Slide)

- Please list EVERY reference cited in the presentation without exception.
- Compile using the following citation format: authors, article titles, journal/book, year, volume, inclusive pages.

23

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/