

# Endometriosis

Tissue that looks and acts like the lining of the uterus grows outside the uterus, bleeds every month with your period, and causes pain, scarring, and trouble getting pregnant.

## THE STORY IN ONE SENTENCE

Tissue that looks and acts like the lining of the uterus grows outside the uterus, bleeds every month with your period, and causes pain, scarring, and trouble getting pregnant.

“Endometriosis is when tissue like the uterus lining grows in the wrong places—on the ovaries, tubes, or belly—bleeds every cycle, and causes pain and infertility.”

## Normal anatomy — the body's job

The endometrium (the lining of the uterus) grows on the inside wall of the uterus, thickens during the first half of the menstrual cycle under estrogen, and sheds through the cervix and vagina during your period if no pregnancy occurs. This cycle repeats every month, and the tissue stays inside the uterus and leaves the body when it bleeds.

## BODY'S JOB

The endometrium's job is to build a soft, blood-rich cushion for a fertilized egg to implant and grow. If no egg implants, the lining breaks down, bleeds, and exits the body as your period. This keeps the uterus ready for the next cycle.

1. Estrogen (a hormone made by the ovaries) rises in the first half of the cycle and tells the endometrium to grow thick and spongy.
2. If no pregnancy happens, estrogen drops and progesterone (another ovary hormone) falls, which signals the endometrium to break down.
3. The lining sheds, bleeds, and flows out through the cervix and vagina as your period.
4. The cycle starts over, with new endometrial cells growing again on the inside wall of the uterus.

## What breaks

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Tissue that looks and acts like the endometrium grows outside the uterus—on the ovaries, fallopian tubes, the outer uterus wall, the lining of the pelvis, the bowel, or the bladder—where it does not belong.

### CLINICAL TERM

Endometrial-like tissue implants outside the uterine cavity, most commonly on the ovaries, posterior cul-de-sac, uterosacral ligaments, fallopian tubes, peritoneum, and rectosigmoid colon. These ectopic (out-of-place) implants respond to cyclic estrogen and progesterone, proliferate, and bleed during menstruation, but the blood cannot escape, leading to local inflammation, fibrosis, and adhesion formation.

## How the body compensates

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The body tries to contain and heal the repeated bleeding by forming scar tissue (fibrosis) and adhesions (sticky bands that glue organs together), but this compensation traps organs, blocks tubes, and worsens pain over time.

1. {'step': 'Ectopic endometrial tissue bleeds every cycle', 'why': 'Because it responds to estrogen and progesterone just like normal endometrium, thickening and then shedding blood—but the blood is trapped in the pelvis with no way out.'}
2. {'step': 'Local inflammation and immune response', 'why': 'The trapped blood irritates surrounding tissue, and macrophages (immune cells that eat debris) and cytokines (inflammatory signals) flood the area to try to clean it up, causing pain and swelling.'}
3. {'step': 'Fibrosis and adhesion formation', 'why': 'Repeated cycles of bleeding and inflammation trigger scar tissue (fibrosis) and sticky bands (adhesions) that glue the ovaries, tubes, bowel, or bladder together, trying to wall off the problem but instead distorting anatomy and causing chronic pain.'}
4. {'step': 'Endometrioma formation (chocolate cysts)', 'why': 'Blood trapped inside the ovary month after month forms a cyst filled with old, dark blood that looks like chocolate, stretching the ovary and causing deep aching pain.'}
5. {'step': 'Nerve sensitization', 'why': 'Chronic inflammation and scarring irritate pelvic nerves, lowering the pain threshold and causing deep, burning pain even between periods (central sensitization).')}

## Domino effect

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1. Endometrial-like tissue implants outside the uterus — Cells that should only grow inside the uterus land on the ovaries, tubes, or pelvic lining—likely from blood flowing backward during periods, cells transforming, or spreading through blood vessels—and start growing there.
2. Tissue bleeds every menstrual cycle — The misplaced tissue responds to estrogen and progesterone from the ovaries, swells, and then bleeds during your period just like the lining inside the uterus, but the blood has nowhere to go and sits trapped.
3. Trapped blood irritates surrounding tissue — Blood pooling in the pelvis triggers inflammation—immune cells rush in, release chemicals that cause pain and swelling, and try to clean up the blood, but this happens every single month.
4. Scar tissue and adhesions form — The body tries to heal the irritated spots by laying down scar tissue (fibrosis) and sticky bands (adhesions) that glue organs together, distorting anatomy and trapping organs in fixed positions.
5. Fallopian tubes or ovaries get blocked or stuck — Adhesions can kink or block the fallopian tubes, or bury the ovaries in scar tissue, making it hard for eggs to travel or be released, which causes infertility.
6. Chronic pelvic pain develops — Repeated inflammation, scarring, and nerve irritation lower the pain threshold (sensitize nerves), causing deep, aching pain during periods, sex, bowel movements, or even between periods.
7. Deep infiltrating disease invades organs — In severe cases, endometrial tissue burrows deep into the bowel, bladder, or uterosacral ligaments (the ligaments that hold the uterus in place), causing pain with pooping, blood in stool or urine, and bowel or bladder obstruction.
8. Quality of life declines — The combination of chronic pain, painful sex, infertility, fatigue from ongoing inflammation, and repeated surgeries or treatments wears down physical and emotional well-being, affecting work, relationships, and daily life.

## Symptoms · what the patient feels, and why

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- Pelvic pain that gets worse during your period: Tissue that normally lines the inside of the uterus (called endometrium) grows in spots outside the uterus where it does not belong — like on the ovaries, bowel, or pelvic walls. Each month, hormones (especially estrogen) make this misplaced tissue swell and bleed just like the lining inside the uterus does, but the blood and swelling have nowhere to go. This trapped blood irritates nearby nerves and causes inflammation (redness and soreness), which triggers pain that spikes when hormone levels are highest during menstruation.

- Pain during or after sex (deep pain with sex (dyspareunia)): When endometriosis tissue grows on the ligaments behind the uterus (the uterosacral ligaments) or on the back wall of the vagina, pressure from intercourse stretches or tugs those inflamed, stuck-down spots. The tissue is already irritated and scarred, so any movement or touch sends sharp pain signals from those nerves.
- Heavy or irregular menstrual bleeding: Endometriosis lesions release inflammatory chemicals (cytokines and prostaglandins) that can interfere with the normal shedding and repair of the uterine lining. In some cases, endometriosis also grows into the muscle wall of the uterus itself (a related condition called adenomyosis), which makes the uterus contract harder and bleed more heavily during periods.
- Trouble getting pregnant (infertility): Endometriosis can damage or block the fallopian tubes with scar tissue (adhesions), trap the egg inside a cyst on the ovary (called an endometrioma or chocolate cyst because old blood turns dark brown), or create an inflamed environment in the pelvis that harms sperm and egg quality. All of these make it harder for sperm to meet the egg and for a fertilized egg to implant in the uterus.
- Painful bowel movements or blood in the stool during your period: Endometriosis tissue can grow on the outside (or sometimes the inside) of the bowel (intestines). When hormones cause that tissue to swell and bleed each month, the bowel wall becomes inflamed and tender. Passing stool stretches the inflamed spot, triggering pain. If the lesion erodes deep enough, it can cause bleeding into the bowel that shows up in the stool.
- Painful urination or blood in the urine during your period: Endometriosis tissue can grow on the bladder wall. During menstruation, hormones make that tissue swell and bleed, irritating the bladder lining. When the bladder fills and stretches, or when it squeezes to push out urine, it presses on the inflamed endometriosis spot and causes pain. Deep lesions can bleed into the bladder, causing blood in the urine (hematuria).
- Tender nodules or lumps felt behind the uterus on pelvic exam: Endometriosis tissue growing on the uterosacral ligaments (the bands that hold the uterus in place behind the vagina) forms small, firm lumps. Inflammation and scar tissue make these spots tender when a doctor gently presses on them during an internal exam. These nodules are a strong physical sign that endometriosis is present in the deep pelvis.
- Uterus is tilted backward and does not move freely (fixed retroverted uterus): Endometriosis causes inflammation that leads to scar tissue (adhesions) forming between organs in the pelvis — like gluing the uterus to the back wall of the pelvis or to the bowel. These adhesions pull the uterus backward (retroversion) and lock it in place so it cannot move when gently pushed during a pelvic exam. A stuck uterus suggests moderate to severe endometriosis with widespread scarring.

## Focused exam

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- Pelvic pain that gets worse during the period (cyclical painful periods (dysmenorrhea)): The patches of uterus-lining tissue living outside the uterus swell and bleed every month when the ovaries send out hormones — this monthly rhythm is the signature sign that tells you the tissue is in the wrong place and following the period cycle.
- Deep pain during sex (dyspareunia), especially with deep penetration: The misplaced tissue sits on the back wall of the uterus, the ligaments that hold the uterus, and the pouch behind it — when something pushes into the pelvis during sex, it stretches these already-sore spots and proves the disease is sitting deep in the pelvis, not just on the surface.
- Tender nodules or lumps you can feel on exam in the back of the pelvis (uterosacral ligaments or cul-de-sac): These bumps are clumps of endometriosis tissue you can touch with your fingers during a pelvic exam — finding them is like spotting the actual trouble spot on a map, telling you exactly where the tissue has planted itself.
- Uterus tilted backward and stuck in place (fixed retroversion) that does not move when you push on it: Endometriosis makes scar tissue (adhesions) that glues the uterus to the bowel, the back of the pelvis, or the ovaries — a uterus that will not budge when you push on it during the exam means the disease has tied it down with these ropes of scar.
- Pain with bowel movements during the period (dyschezia): If endometriosis tissue grows into the wall of the bowel, it bleeds and swells there every month too — this symptom tells you the disease has spread beyond the pelvis and is sitting on or inside the intestine, which can lead to blockage.
- History of infertility or trying to get pregnant for more than one year without success: Endometriosis scars and blocks the fallopian tubes (the tunnels that carry the egg), changes the fluid around the egg so sperm have a harder time swimming, and makes the uterus lining less welcoming for a fertilized egg to stick — the trouble getting pregnant points to the disease wrecking the parts needed to make a baby.

## Diagnostics · every test answers a question

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- Pelvic ultrasound (transvaginal is best) → Is there a blood-filled cyst (endometrioma or 'chocolate cyst') on the ovary that shows endometriosis tissue has been bleeding and collecting there?
- CA-125 blood test → Is there a marker in the blood that goes up when the tissue inside the pelvis is inflamed or bleeding?
- MRI of the pelvis (if ultrasound is not clear or surgery is being planned) → Can we see deep spots of endometriosis in places ultrasound cannot reach, like the bowel wall, the bladder, or the ligaments behind the uterus?

- Laparoscopy with biopsy (camera surgery through a small cut in the belly) → What does the tissue actually look like inside, and can we take a sample to prove it is endometriosis under the microscope?
- Assessment of pain with a validated pain scale (numeric rating scale or visual analog scale) → How bad is the pain, and is it interfering with daily life, work, or sex?

## Treatment logic

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- Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen 400–800 mg or naproxen 220–500 mg during the period → Blocks prostaglandins (chemicals the bleeding tissue makes that cause swelling and pain) — this turns down the pain signal and reduces cramping during the period.
- Combined oral contraceptive pills (estrogen plus progestin) or progestin-only pill, patch, or IUD (like levonorgestrel IUD) → Stops or lightens the monthly hormone surge from the ovaries, so the misplaced tissue does not swell and bleed as much each month — fewer bleeds mean less pain and slower tissue growth.
- GnRH agonist (like leuprolide) or GnRH antagonist (like elagolix) → Shuts down the pituitary gland (the control tower at the base of the brain) so it stops telling the ovaries to make estrogen and progesterone — this starves the endometriosis tissue and shrinks it like a plant without water.
- Laparoscopic excision or ablation surgery (cutting out or burning the tissue spots) → The surgeon looks inside with a tiny camera, cuts out or burns away the patches of tissue, and frees up organs glued together by scar tissue — this removes the source of bleeding and pain right at the spot.
- Fertility treatments like in vitro fertilization (IVF) or intrauterine insemination (IUI) → Bypasses the scarred fallopian tubes and hostile uterus environment by mixing sperm and egg outside the body (IVF) or placing sperm directly into the uterus (IUI) — this gives the couple a way to get pregnant even when the natural path is blocked.

## Medications

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### NSAIDs (ibuprofen, naproxen) · Nonsteroidal anti-inflammatory drug

NSAIDs block an enzyme called COX (cyclooxygenase) that makes prostaglandins, the chemicals that cause pain, cramping, and swelling in the pelvis when endometriosis tissue bleeds each month.

1. Endometriosis tissue bleeds during your period, just like the lining inside the uterus does.
2. That bleeding releases prostaglandins, which trigger pain signals and cause the nearby tissue to swell and cramp.

3. NSAIDs block the COX enzyme so your body makes fewer prostaglandins.
4. With less prostaglandin around, the pain and cramping ease up—but the endometriosis patches themselves stay in place.

**SAFETY WATCH**

Can irritate your stomach lining and cause ulcers or bleeding, especially if you take them every day for a long time or on an empty stomach. · Can raise blood pressure and strain the kidneys in people who already have kidney problems or heart disease. · Avoid if you have a history of stomach ulcers, kidney disease, or heart failure unless your doctor says it is safe. · Take with food to protect your stomach.

**Combined oral contraceptives (birth control pills with estrogen and progestin)****· Hormonal contraceptive**

Birth control pills keep estrogen and progestin steady in your blood all month, which stops your ovaries from releasing an egg and tells the endometriosis tissue to stay thin and quiet instead of thickening and bleeding every cycle.

1. Normally, your brain's hypothalamus tells the pituitary gland to send signals that make your ovaries release estrogen in waves, causing the uterine lining—and any endometriosis tissue—to grow thick each month.
2. The pill floods your system with a steady, lower dose of estrogen and progestin from outside.
3. The pituitary sees that hormone level and stops sending the big surges of signals, so your ovaries quiet down and make much less estrogen.
4. With less estrogen around, the endometriosis patches shrink and bleed less—or stop bleeding entirely—and the pain eases.
5. Many doctors prescribe the pill continuously (skipping the placebo week) so you have no period at all, which keeps the tissue from being triggered every month.

**SAFETY WATCH**

Very small risk of blood clots (deep vein clot formation (thrombosis) or pulmonary embolism (a clot lodging in a lung artery)), especially in women who smoke, are over 35, or have a clotting disorder. · Can cause nausea, breast tenderness, mood changes, or spotting in the first few months. · Not safe if you have a history of stroke, heart attack, certain cancers (breast or liver), or migraine with aura. · Tell your doctor if you smoke or have high blood pressure, because those raise clot risk.

## **Progestin-only pills, shot (Depo-Provera), implant (Nexplanon), or IUD (Mirena, Liletta) · Progestin-only contraceptive**

Progestin is a hormone that thins the lining of the uterus and endometriosis tissue, makes periods lighter or stops them completely, and quiets the signals from the brain that would otherwise tell the ovaries to make estrogen surges.

1. Progestin delivered steadily by pill, shot, implant, or IUD keeps a constant level in your blood.
2. It acts on the hypothalamus and pituitary to turn down their signals, so your ovaries release little to no estrogen.
3. Without estrogen surges, the endometriosis tissue and the uterine lining both shrink and stop thickening each month.
4. Many women stop having periods entirely (amenorrhea), which means the tissue never gets the monthly trigger to bleed and hurt.

### **SAFETY WATCH**

Irregular bleeding or spotting is very common in the first three to six months; it usually settles down but can be annoying. · The shot (Depo-Provera) can cause bone-density loss if used for many years, so doctors often check bone health and recommend calcium and vitamin D. · Mood changes, weight gain, and acne can happen in some women. · Safe for women who cannot take estrogen (smokers over 35, history of clots, migraine with aura).

## **GnRH agonists (leuprolide [Lupron], goserelin [Zoladex], nafarelin [Synarel]) · Gonadotropin-releasing hormone agonist**

GnRH agonists first overstimulate, then completely shut down the brain signals that tell your ovaries to make estrogen, putting you into a temporary menopause so the endometriosis tissue starves and shrinks.

1. Normally, your hypothalamus releases pulses of GnRH (gonadotropin-releasing hormone), which tells your pituitary to send out LH and FSH, the hormones that make your ovaries produce estrogen.
2. When you give a GnRH agonist by injection or nasal spray, it floods the pituitary with a constant, high level of GnRH-like signal.
3. At first, the pituitary responds by releasing a big surge of LH and FSH (the 'flare' effect), which can make symptoms worse for a week or two.
4. Then the pituitary's receptors become exhausted and shut down—they stop responding entirely.
5. With no LH or FSH being released, your ovaries go quiet and make almost no estrogen.

6. Endometriosis tissue needs estrogen to grow; without it, the patches shrink, stop bleeding, and cause much less pain.
7. Because full menopause causes bone loss and hot flashes, doctors usually add back a low dose of estrogen and progestin ('add-back therapy') after the first month to protect your bones and ease symptoms while still keeping the disease suppressed.

**SAFETY WATCH**

Hot flashes, night sweats, vaginal dryness, and mood swings—just like natural menopause—because estrogen is very low. · Bone-density loss if used for more than six months without add-back hormones; your doctor will monitor with bone scans (DEXA) if treatment is prolonged. · Headaches and joint pain are common. · Add-back therapy (low-dose estrogen and progestin) is now standard to reduce these side effects while keeping the disease controlled. · Not used in women who are trying to get pregnant right away, because it suppresses ovulation.

**GnRH antagonist (elagolix [Orilissa], relugolix combination [Myfembree]) · Gonadotropin-releasing hormone antagonist**

GnRH antagonists immediately block the brain receptor that triggers ovary signals, lowering estrogen fast without the initial flare that agonists cause. The combination pill (relugolix with add-back hormones built in) keeps estrogen low enough to shrink endometriosis but high enough to protect bones and ease menopause symptoms.

1. GnRH antagonists sit on the pituitary's GnRH receptors and block them directly, so the pituitary cannot send out LH and FSH.
2. Unlike agonists, there is no flare—estrogen drops right away, within days.
3. Lower estrogen means the endometriosis tissue shrinks and stops bleeding, and pain improves.
4. Elagolix comes in two doses: a lower dose that partially suppresses estrogen (so you still have some periods but less pain) and a higher dose that suppresses it more completely (often stopping periods).
5. Relugolix combination packs the antagonist with a small amount of estrogen and progestin in the same pill, so you get the disease control plus built-in add-back to protect your bones and reduce hot flashes from the start.

**SAFETY WATCH**

Hot flashes, night sweats, and mood changes if estrogen is suppressed deeply, though the combination pill (Myfembree) reduces these. · Bone-density loss with prolonged use; doctors usually limit treatment to 6–24 months depending on the dose and monitor bone health. · Liver enzyme elevations have been reported, so liver tests are checked before starting and during treatment. · Headaches, nausea, and fatigue can occur. · Not for use during pregnancy or breastfeeding.

**Aromatase inhibitors (letrozole [Femara], anastrozole [Arimidex]) · Aromatase inhibitor**

Aromatase inhibitors block the enzyme aromatase, which turns other hormones into estrogen in fat tissue, muscle, and the endometriosis patches themselves. By cutting off that local estrogen production, the tissue shrinks even when the ovaries are already quiet.

1. Even when your ovaries are suppressed (by birth control, progestin, or GnRH drugs), your body's fat, muscle, and the endometriosis tissue itself can still make small amounts of estrogen using an enzyme called aromatase.
2. Aromatase inhibitors block that enzyme, so no new estrogen can be made outside the ovaries.
3. With almost no estrogen anywhere in the body, the endometriosis tissue shrinks further.
4. These drugs are reserved for severe, treatment-resistant endometriosis and are almost always combined with a progestin or birth control pill to prevent the ovaries from making cysts in response to the low estrogen.

**SAFETY WATCH**

Hot flashes, joint and muscle pain, and fatigue—because estrogen is extremely low. · Bone-density loss, so bone scans (DEXA) and calcium/vitamin D supplements are standard. · Can cause ovarian cysts if used without progestin or birth control. · Mood changes and vaginal dryness are common. · Only used for a limited time, and your doctor will watch bone health closely.

**Red flags**

- Severe, sudden pelvic pain that does not go away — may mean an endometriosis cyst on the ovary has ruptured or twisted (ovarian torsion), cutting off blood supply and causing tissue to die

- Blood in the stool or urine during your period, or painful bowel movements that make you unable to pass stool — may mean endometriosis has grown deep into the bowel or bladder wall and needs urgent evaluation
- Trouble getting pregnant after one year of trying (or six months if you are over 35) — endometriosis is a common hidden cause of infertility and needs specialist evaluation and treatment

## Nursing priorities

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1. Assess pain level using a 0 to 10 scale and ask when pain happens in relation to the menstrual cycle. — Endometriosis pain follows estrogen (female hormone) peaks, so tracking the timing separates it from non-cyclic conditions and measures treatment success.
2. Check vital signs including temperature and blood pressure to rule out infection or internal bleeding. — Fever suggests pelvic inflammatory disease instead of endometriosis, and low blood pressure with fast heart rate may signal a ruptured endometrioma with bleeding into the abdomen.
3. Give nonsteroidal anti-inflammatory drugs like ibuprofen 400 to 800 milligrams every 6 to 8 hours for pain control. — These drugs block prostaglandins (chemicals that cause uterine cramping and inflammation), reducing both the pain and the inflammatory response from endometrial tissue.
4. Teach the patient that hormonal birth control pills or progestin therapy can thin the endometrial tissue and stop monthly bleeding. — Suppressing ovulation stops the monthly estrogen surge that makes endometrial implants bleed and swell, breaking the pain cycle.
5. Ask about fertility goals before starting any hormone therapy. — Some treatments like GnRH agonists (medicines that shut down the ovaries temporarily) prevent pregnancy during use, so women trying to conceive need fertility-focused care like surgery or in vitro fertilization instead.
6. Screen for anxiety and depression using simple questions about mood, sleep, and daily function. — Chronic pelvic pain alters brain pain pathways and stress hormones, causing depression in up to 86 percent of women with endometriosis and requiring mental health support alongside physical treatment.
7. Document any palpable masses or nodules during abdominal and pelvic exam. — Tender nodules in the posterior cul-de-sac (space behind the uterus) or fixed retroverted uterus (tilted backward and stuck) suggest deep infiltrating disease that may need surgical excision rather than just medicine.

8. Educate that laparoscopy (camera surgery through small belly cuts) is the only way to diagnose endometriosis for certain, but treatment can start based on symptoms alone. — Visual confirmation with biopsy is the gold standard, but empirical treatment (starting hormones without surgery) prevents surgical risks and works well for many women with typical symptoms.

## Sources

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- ACOG Practice Bulletin No. 114, 2010 (reaffirmed 2022): Management of Endometriosis
- ESHRE (European Society of Human Reproduction and Embryology) Guideline on Endometriosis, 2022
- American Society for Reproductive Medicine (ASRM) Endometriosis Guidelines, 2021

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