Ovulation induction: medications and when it is used

What ovulation induction means

Ovulation induction refers to the use of medication to stimulate follicular development and ovulation in someone who is not ovulating reliably. The goal is usually monofollicular ovulation: the development and release of one mature egg, or occasionally a small number of follicles depending on the treatment context.

This is related to, but not identical with, controlled ovarian stimulation used in in vitro fertilization. In IVF, clinicians often aim to recruit multiple follicles so that multiple eggs can be retrieved. In ovulation induction with timed intercourse or intrauterine insemination, too many follicles can create an unacceptably high risk of twins, triplets, or higher-order multiple pregnancy. For that reason, conservative dosing and monitoring are central to safe care.

Ovulation is governed by the hypothalamic-pituitary-ovarian axis. The hypothalamus releases GnRH, which stimulates pituitary secretion of follicle-stimulating hormone and luteinizing hormone. FSH supports follicle growth; a midcycle LH surge triggers final egg maturation and ovulation. Many ovulation induction medications act by increasing endogenous FSH signaling,

directly providing FSH or LH activity, or timing ovulation with an hCG trigger that mimics the LH surge.

When ovulation induction is used

Ovulation induction is most commonly considered when a person has anovulation, meaning ovulation does not occur, or oligo-ovulation, meaning ovulation occurs infrequently or unpredictably. This may present as irregular menstrual cycles, very long cycles, absent periods, or difficulty confirming ovulation despite tracking.

Common clinical contexts include:

Polycystic ovary syndrome: PCOS is a frequent cause of irregular ovulation. Treatment selection also depends on metabolic factors, body weight, androgen symptoms, and other fertility findings.
Hypothalamic ovulatory dysfunction: Stress, low energy availability, substantial exercise, eating disorders, low body weight, or certain chronic illnesses can suppress GnRH pulsatility and reduce FSH/LH stimulation.
Unexplained infertility: In some cases, ovarian stimulation with timed intercourse or intrauterine insemination may be discussed even when ovulation is occurring, although this is more accurately described as ovarian stimulation rather than induction of absent ovulation.
Preparation for intrauterine insemination: Medications may be used to improve timing and follicle development before IUI, especially when ovulation is irregular or when mild stimulation is part of the plan.
Selected endocrine disorders: Thyroid disease, hyperprolactinemia, and other hormonal conditions may disrupt ovulation. In these cases, treating the underlying disorder may be necessary before or instead of ovulation induction.

Ovulation induction is not appropriate for every fertility situation. For example, if there is severe tubal disease, significant male factor infertility, primary ovarian insufficiency, or another factor that prevents egg and sperm from meeting, ovulation medication alone may have limited benefit. A complete fertility evaluation helps avoid months of treatment that is unlikely to address the real barrier.

Oral medications: letrozole and clomiphene citrate

Two of the most widely used oral medications are letrozole and clomiphene citrate. Both are taken early in the menstrual cycle in many protocols, but they work differently.

Letrozole is an aromatase inhibitor. It temporarily reduces estrogen production, which decreases negative feedback at the hypothalamus and pituitary. In response, the pituitary increases FSH secretion, supporting follicular development. Letrozole is commonly used for ovulation induction in people with PCOS and is often favored because of ovulation and live birth data in that population. It generally has a short half-life, and its anti-estrogenic effect is transient.

Clomiphene citrate is a selective estrogen receptor modulator. It blocks estrogen receptors, especially at the hypothalamic level, making the brain perceive a lower estrogen state. This can increase GnRH, FSH, and LH secretion. Clomiphene has been used for decades and remains an important option. However, because of its anti-estrogenic effects, some people experience thinner endometrium or less favorable cervical mucus, and side effects may include hot flashes, mood changes, bloating, breast tenderness, and visual symptoms. Any visual disturbance should be discussed promptly with a clinician.

With either oral agent, the aim is not simply to "take a fertility pill," but to confirm a biologically appropriate response. Clinicians may use cycle history, urinary LH testing, mid-luteal progesterone, and/or ultrasound to assess whether ovulation occurred and whether the response was safe. Dose escalation, if needed, should be guided by a professional rather than attempted independently.

Injectable gonadotropins and hCG trigger shots

Injectable gonadotropins contain FSH activity, LH activity, or both. They directly stimulate the ovaries and can be effective when oral medications fail or when the underlying condition requires direct gonadotropin replacement. According to ASRM guidance, they may be used in anovulatory women after unsuccessful oral therapy and in specific settings such as hypogonadotropic hypogonadism, where endogenous pituitary gonadotropin production is insufficient.

Because gonadotropins act directly on the ovary, they are powerful and require careful monitoring. Small dose adjustments can substantially change follicle recruitment. The major safety issue is multifollicular development, which increases the risk of twins, triplets, and higher-order multiples. Gonadotropins also carry a higher risk of ovarian hyperstimulation syndrome than oral agents, particularly in people with high ovarian reserve or PCOS.

An hCG trigger injection may be used when a follicle reaches an appropriate size and hormone pattern. Human chorionic gonadotropin binds the LH receptor and mimics the natural LH surge, promoting final oocyte maturation and ovulation. Timing after the trigger is coordinated with intercourse, IUI, or another fertility procedure. Trigger timing should be clinician-directed, because giving it too early, too late, or in the setting of too many mature follicles can reduce effectiveness or increase risk.

Other medications and adjuncts

Some patients need treatment beyond the standard oral agents or gonadotropins. The specific approach depends on the diagnosis.

Metformin: In insulin-resistant PCOS, metformin may improve metabolic parameters and can support ovulatory function in selected patients. It is not a universal ovulation induction medication and is often used for metabolic indications.
Dopamine agonists: If hyperprolactinemia is suppressing ovulation, medications such as cabergoline or bromocriptine may be used under medical supervision to lower prolactin and restore ovulatory cycles.
Thyroid treatment: Hypothyroidism or hyperthyroidism can interfere with ovulation and early pregnancy. Treating thyroid dysfunction may be part of the fertility plan.
Pulsatile GnRH: In some forms of hypothalamic amenorrhea, pulsatile GnRH can physiologically stimulate pituitary FSH and LH secretion, though access varies by region and practice setting.
Lifestyle and nutritional restoration: When low energy availability, significant weight change, or intense exercise contributes to hypothalamic suppression, medical, nutritional, and mental health support may be central to restoring ovulation safely.

These examples highlight why ovulation induction should begin with diagnosis. The best "fertility medication" for one person may be inappropriate for another if the mechanism of ovulatory dysfunction is different.

Evaluation before starting treatment

Before prescribing ovulation induction, clinicians typically confirm that the treatment target is reasonable and that pregnancy would be safe to pursue. The evaluation may include menstrual history, pregnancy testing, pelvic ultrasound, ovarian reserve assessment, thyroid-stimulating hormone, prolactin, androgen testing when PCOS is suspected, and screening for other medical conditions.

A fertility workup often includes semen analysis, because sperm factors are common and may change the recommended treatment. Tubal patency testing may be discussed, particularly if there is a history of pelvic inflammatory disease, endometriosis, ectopic pregnancy, pelvic surgery, or prolonged infertility. If both fallopian tubes are blocked, inducing ovulation will not solve the mechanical barrier to fertilization.

Age and duration of trying also matter. People aged 35 and older are often advised to seek evaluation after six months of trying, and earlier consultation may be appropriate with irregular cycles, known reproductive conditions, prior chemotherapy, recurrent pregnancy loss, or absent periods. These timelines are general; individualized guidance is best.

Monitoring during an induction cycle

Monitoring strategies vary by medication, diagnosis, and practice setting. The purpose is to answer three questions: Are follicles growing? Is ovulation likely or confirmed? Is the cycle safe to continue?

Common monitoring tools include:

Transvaginal ultrasound: Measures follicle number and size and may assess endometrial thickness.
Serum estradiol: Helps estimate ovarian response, especially with injectable gonadotropins.

Urinary LH testing: Can help detect a spontaneous LH surge in some cycles.
Mid-luteal progesterone: A blood test roughly one week after expected ovulation can support evidence that ovulation occurred.
Cycle tracking: Menstrual timing, cervical mucus observations, and basal body temperature may provide supportive information but do not replace medical monitoring when higher-risk medications are used.

Sometimes a clinician may recommend cancelling a cycle or avoiding intercourse/IUI if too many follicles develop. This can be emotionally disappointing, especially after injections, appointments, and anticipation. However, cancellation is a safety measure designed to reduce the risk of high-order multiple pregnancy and serious maternal-fetal complications.

Risks, side effects, and realistic expectations

Ovulation induction can be very helpful, but success is not guaranteed in any single cycle. Pregnancy depends on egg quality, sperm quality, tubal function, uterine factors, timing, age, and chance. Many protocols are reassessed after several cycles if ovulation occurs but pregnancy does not.

Potential risks include:

Multiple gestation: Twins and higher-order multiples are more likely with ovulation induction than in spontaneous conception, especially with gonadotropins. Multiple pregnancy increases risks of preterm birth, hypertensive disorders, gestational diabetes, cesarean delivery, neonatal complications, and pregnancy loss.
Ovarian hyperstimulation syndrome: OHSS involves enlarged ovaries and fluid shifts. Symptoms can range from bloating and discomfort to severe abdominal pain, rapid weight gain, vomiting, shortness of breath, blood clots, and kidney or electrolyte problems.
Ovarian cysts: Functional cysts may occur and can delay a treatment cycle.
Medication side effects: These vary by drug and may include hot flashes, headaches, mood symptoms, breast tenderness, pelvic discomfort, injection-site reactions, or visual symptoms with clomiphene.
Emotional burden: Repeated monitoring, timed intercourse, cycle uncertainty, and pregnancy testing can be stressful. Psychological support is a legitimate part of fertility care.

Safety-focused care aims for the lowest effective intensity. More follicles are not always better, especially outside IVF. A carefully monitored cycle that does not proceed may still be good medical decision-making if it prevents an unsafe outcome.