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Video Case

Family Planning

Objectives:

- → Discuss each of the longer term, hormonal, barrier and behavior methods of contraception in terms of mechanism of action and effectiveness and failure rate.
- → Describe the benefits of contraceptives other than birth control.
- → Identify the absolute and relative contraindications and risks of different contraceptive methods
- → Discuss the male and female surgical sterilization methods in terms of their types, reversibility and long term follow-up results.

- → Slides
- → Important
- → Golden notes
- → Extra
- → 439 Doctor's notes
- → 441 Doctor's notes
- → 441 Female Presentation
- → Reference

Female presentation

Video Case | Editing File

Overview (Onlinemeded - Hacker & Moore's) Extra

Definition: The ability of individuals and couples to control their number of children and the spacing between births.

Family planning plays a significant role in improving the health of women and provides a unique opportunity to optimize pregnancy outcomes by helping couples to control childbearing until conditions are favorable for them. As such, family planning contributes substantially to individual health care, to public health, and even to population control and environmental well-being.

Types of contraceptives

Hormonal

Hormonal contraceptives involve the use of estrogen and progestin analogs to prevent pregnancy. The contraceptive effect is mediated by negative feedback at the hypothalamus, ultimately leading to reduced pituitary follicle-stimulating hormone (FSH) and luteinizing hormone (LH) secretion. Without an LH surge, ovulation does not occur. **Progestin also makes implantation less likely**, as it **causes a thickening of cervical mucus**, **a decrease in tubal motility**, and the **inhibition of endometrial proliferation.**

Type	Description
Combined oral contraceptive (COC)	• Short-acting, reversible oral contraceptive containing estrogen and progestin
Progestin-only contraceptive pills (minipill)	• Short-acting, reversible oral contraceptive containing low doses of norethindrone
Contraceptive patch	• Short-acting, reversible contraceptive transdermal patch that provides sustained low doses of estrogen and progestin • Patch site should be alternated between the upper arm, upper torso, abdomen, and buttocks
Vaginal ring	• Short-acting, reversible flexible vaginal ring that contains ethinyl estradiol and etonogestrel (A long-acting progestin) • The ring is inserted into the vagina by the patient, kept in place for **3 weeks**, and then discarded. After a hormone-free week, a new ring is inserted.
Injectable progestin	• Depot medroxyprogesterone acetate(DMPA): long-acting progestin-only contraceptive • Intramuscular or subcutaneous injection administered **every 3 months**
Progestin intrauterine device	• Need to be replaced every **3 to 5 years** (varies with type of device).
Subdermal progestin implant	• The device (flexible plastic rod) is usually inserted subdermally in the upper arm and **lasts 3 years.**

Nonhormonal

Nonhormonal contraceptive methods are a birth-control option for individuals who do not tolerate or wish to avoid the use of hormones. These methods include behavioral methods, barrier methods, spermicides, and surgical sterilization.

Method	Examples
Behavioral methods	• Lactational amenorrhea • Coitus interruptus • Vaginal douche
Barrier methods	• Diaphragm • Condom • Spermicides
Intrauterine device	• Nonhormonal copper device (Need to be replaced every **10 years)**
Surgical sterilization	• Vasectomy for males • Tubal ligation or hysterectomy for females

Sterilization

- Sterilization is a surgical procedures usually involving ligation of the female oviduct or male vas deferens. After the procedure is performed, there is nothing to forget and nothing to remember.
- They are to be considered permanent and irreversible. 99% effective

Female sterilization

- **Tubal Ligation:**
  - Most common modality of pregnancy prevention in the United States.
  - Ligation of fallopian tube by clips, rings or removal of a segment of the oviduct is performed in an operating room through a transabdominal approach usually using a laparoscopy or minilaparotomy.
  - Failure rate is 1 in 200 this method is usually only done for older women (40+) with previous multiple C-sections and complications.
  - It is almost NEVER used for younger women
- **Hysteroscopy tube occlusion:**
  - Procedure performed vaginally either in the operating room or clinic.
  - Metal coils are inserted into the fallopian tubes and scar tissue develops, effectively blocking the tube.
  - To make sure that the tube is fully occluded, hysterosalpingogram is done 3 months after the procedure.
  - Can cause chronic pelvic pain.
- **Advantages:**
  - Decrease lifetime risk of primary high grade epithelial ovarian cancer (recent research suggest that it originates from the fallopian tubes)
  - Protection from pelvic inflammatory diseases.
- **Disadvantages:**
  - Ectopic pregnancy (7.3/1000)
  - Regret (increased risk of regret with low parity, performed at time of C-section, age>25 or done under pressure)

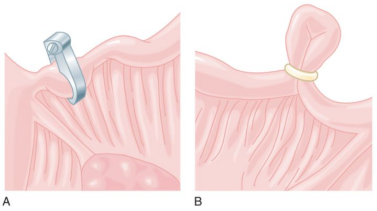


FIGURE 27-3 Tubal occlusion with **(A)** the Hulka clip and **(B)** the Falope ring. Cautery procedures use electric energy to destroy portions of each fallopian tube.

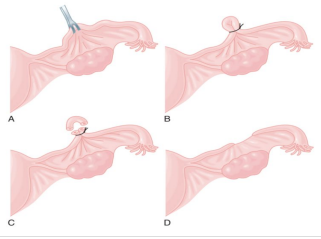
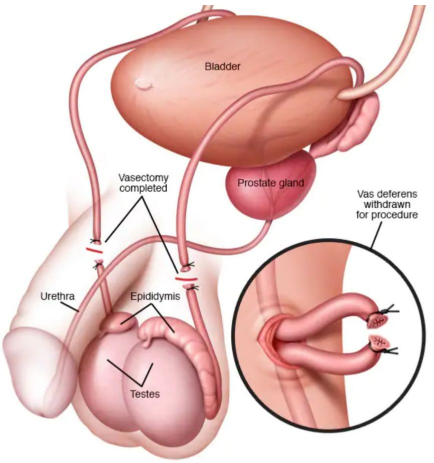


FIGURE 27-2 Pomeroy method of tubal ligation. **A,** Tube is grasped with Babcock forceps. **B,** A loop is ligated. **C,** The loop is excised. **D,** Several months later, the fibrosed ends of the tube separate.

Male sterilization

Vasectomy:

- Destruction or removal of a segment of vas deferens to prevent sperm from entering the rest of the seminal fluid.
- It's an outpatient procedure using local anesthesia.
- Failure rate is 1 in 500.
- A successful procedure can be confirmed by absence of sperm on a semen specimen obtained 12 ejaculations after the surgery.
- Sperm antibodies can be found in 50% of vasectomized patients.
- They should stop sexual intercourse at least 3 months because there will still be sperm in the semen. It generally takes at least 20-30 ejaculations, or 3 months, until your semen samples are considered free of sperm. But it may take longer to flush them all out.



Long-Acting Reversible Contraception

441 Dr: important to know the MOA of each one!

- 99% effective
- Long-acting reversible contraceptives (LARCs) provide effective contraception for an extended period without requiring user action (the best method).

Methods used includes the following:

- Subdermal progestin implant (Etonogestrel/ Nexplanon): is usually inserted subdermally in the upper nondominant arm and lasts 3 years.
  - **MOA: suppresses ovulation.**
  - **ADRs: spotting (irregular bleeding), slight increase in weight up to 10 pound, mood swings.**
  - **Advantage: immediate regain of fertility.**
  - **More effective than IUD.**
- Intrauterine device (IUD):
  - **Copper IUD (Paragard):** Works by creating an unfavorable environment for the sperm to fertilize the egg.
  - **LNG-IUS (Mirena) :** Works by increasing the thickness of cervical mucus to prevent sperm from entering the uterus. (more effective than copper IUD)
- Intramuscular injection (e.g. DMPA)

Advantages	Disadvantages
• Considered the most effective reversible method of contraception because patient compliance is not required. 'Typical use' failure rates, at <1% per year, are about the same as 'perfect use' failure rates (similar to sterilization procedures). • Long-lasting and convenient • Sell-liked by users and very cost-effective	• Higher up-front cost ($800–900 in United States), as compared with other methods such as oral contraceptive pills, the patch, and vaginal ring.

Intrauterine Contraception

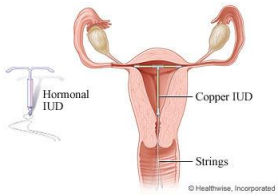
- Intrauterine contraception is a long-acting reversible contraceptive method that involves placement of a small T-shaped object inside the uterus.
- **Failure rate is <1%.**
- Continuation rates at 1 year are almost 80%.
- Can be used post-partum in breast feeding women & Smokers

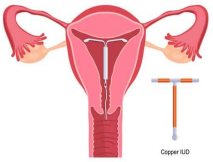
Mechanism of Action includes the following:

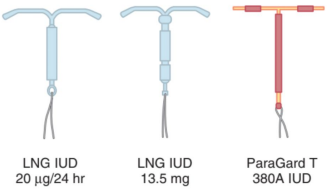
- Decreased sperm transport
- Increased tubal motility (causing failure of implantation of immature zygote) (the device increases tubal motility causing the fertilized egg to be transported to the uterus before the endometrium is receptive for implantation).
- Decreased implantation secondary to endometrial inflammation
- Phagocytic destruction of sperm and blastocyst
- Alteration of cervical mucus (only progesterone IUSs)

Four types of IUD are available in the United States:

- Copper IUD: "Paragard" contains 380 mm2 copper, **approved for 10 years** (abbrev TCu380A)
- Levonorgestrel (LNg) IUDs: "**Mirena**" contains 52 mg LNg, **approved for 5 years** (abbrev LNg52/5)
- Levonorgestrel (LNg) IUDs: "Liletta" contains 52 mg LNg, approved for 3 years (abbrev LNg52/3)
- Levonorgestrel (LNg) IUDs: "Skyla" contains 13.5 mg LNg, approved for 3 years







Absolute Contraindications
Include a confirmed or suspected pregnancy; known or suspected pelvic malignancy; undiagnosed vaginal bleeding; **Pelvic inflammatory disease** and known or suspected salpingitis.
Relative Contraindications
Include abnormal uterine size or shape; medical condition (e.g., corticosteroid therapy, valvular heart disease, or any instance of immune suppression increasing the risk of infection); nulligravida; abnormal Pap smears; and history of ectopic pregnancy
Side Effects
Same as Etonogestrel + increased menstrual bleeding and menstrual pain (with the copper IUD, but not with the progesterone IUSs).
Potential Complications
a. Expulsion is higher in young, low parity women. **b. Ectopic pregnancy:** The IUS does not increase ectopic pregnancies. However, with pregnancy from failed IUS, the likelihood of it being ectopic is higher because primarily, intrauterine pregnancies are prevented. **c. Septic abortion** occurs in 50% of patients with concurrent pregnancy. **d. Uterine perforation,** although rare, occurs more likely at time of insertion. **e. PID** may occur within the first 2 months after placement if pathogenic organisms are present in the reproductive tract.

Steroid Contraception

- Steroid contraception inhibits the midcycle luteinizing hormone (LH) surge, thus **preventing ovulation**; alters cervical mucus making it thick and viscid, thus retarding sperm penetration; and alters endometrium, thus inhibiting blastocyst implantation.
- You should wait for 2-3 weeks after delivery before giving combined pills as it increases the risk of DVT (which is already high)
- Mechanisms of action depend on the hormones used in the formulation.
  - **Estrogen**
    - Hypothalamus: suppresses release of GnRH
    - Pituitary: suppresses release of gonadotropins
      - Decreased LH production and release leads to inhibition of ovulation.
      - Decreased FSH level prevents ovarian folliculogenesis.
  - **Progestin**: synthetic progesterone
    - Inhibits GnRH and LH secretion and thus **suppresses ovulation** (main contraceptive mechanism)
    - Inhibits endometrial proliferation, thereby preventing the implantation of the embryo
    - Changes **cervical mucus** (↓ volume and ↑ viscosity) and impairs fallopian tube peristalsis, thereby inhibiting sperm ascension and egg implantation
    - Inhibits follicular maturation (If taken before the level of LH increases, it delays follicular development.)

Estrogen-Mediated Metabolic Effects	Progestin-Mediated Metabolic Effects
• Fluid retention from decreased sodium excretion • Accelerated development of cholelithiasis (Estrogen increases the amount of cholesterol relative to bile salts and lecithin in bile, increasing the saturation of bile with cholesterol, which leads to cholesterol crystal formation. Estrogen also alters bile acid composition, increasing the chance of gallstone formation.) • Increase in hepatic protein production (e.g., coagulation factors, carrier proteins, angiotensinogen) (Estrogen increases levels of factors II, VII, VIII, and X and fibrinogen, decreases levels of antithrombin and protein S, and increases resistance to protein C.) • Healthy lipid profile changes (increase in HDL, decrease in LDL) • Increased venous and arterial thrombosis. (Due to the increase in the clotting factors)	• Mood changes and depression from decreased serotonin levels • Androgenic effects (e.g., weight gain, acne); Unhealthy lipid profile changes (decreased HDL, increased LDL). • Breakthrough bleeding

Absolute Contraindications (441 Dr: important)
Include pregnancy, acute liver disease, history of vascular disease (e.g., thromboembolism, **DVT**, CVA, SLE), hormonally dependent cancer (e.g., breast), **smoker ≥35**, uncontrolled hypertension, migraines with aura, diabetes mellitus with vascular disease and known thrombophilia.
Relative Contraindications
Include migraine headaches, depression, diabetes mellitus, chronic hypertension and hyperlipidemia
Noncontraceptive Benefits
Include decreased ovarian and endometrial cancer, decreased dysmenorrhea and dysfunctional uterine bleeding, and decreased PID and ectopic pregnancy.

Steroid Contraception

Combination Modalities

- Combination OCPs. These contain both an estrogen and a progestin.
- Of all the steroid contraceptives, combination OCPs are the only one to have regular, predictable menses.
- They are administered most commonly in **one of two ways:**
  - Daily with 21 days on and 7 days off
  - Daily 24 days on and 4 days off
- When "off " the hormones, withdrawal bleeding will occur. Failure rate is 2% with ideal use.
- A newer combination is with daily hormones for 12 weeks followed by 1 week of placebo, which results in 4 periods a year rather than 13 with the traditional schedule.
- Beware of the drugs that decrease the efficacy of COCPs such as Anti-TB, Antiretrovirals (HIV), Antiepileptics.

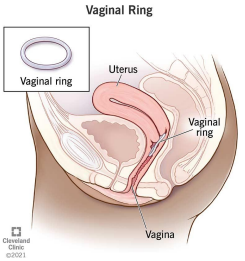
Types

Oral Contraceptives

- A unique combination of OCP (YAZ) reduces severe PMDD symptoms by 50%. It contains **ethinyl estradiol** and a new progestin, drospirenone. The dosing is 24 days of active pills then 4 days of placebo, rather than the traditional 21 days, followed by 7 days of placebo.

Combination Vaginal Ring

- Marketed under the trade name of NuvaRing, contains both an estrogen and a progestin. It is inserted into the vagina and then removed after 3 weeks for 1 week to allow for a withdrawal bleed.
- A major advantage is relatively stable and constant blood levels of hormones. Failure rate is similar to combination OCPs.



Transdermal skin patch

- Marketed under the trade name of Ortho Evra, contains both an estrogen and a progestin. A patch is replaced every week for 3 weeks then removed for 1 week to allow for a withdrawal bleed. Levels of steroids are 60% higher than combination OCPs.
- Patch site should be alternated between the upper arm, upper torso, abdomen, and buttocks


Abdomen


Upper arm


Upper torso


Buttock

Steroid Contraception

Progestin-Only Modalities

- Progestin-Only OCPs. They contain only progestins and are sometimes called **"mini pill."** They need to be taken daily and continuously. A frequent side effect is breakthrough bleeding. Failure rate is 3% with ideal use.
- **General**
  - Contraception for women in whom estrogen-containing contraceptives are contraindicated
  - A recent evaluation of women's views regarding contraceptive health benefits demonstrated that most women are unaware of the protective effects of OCPs against endometrial and ovarian cancer, PID, ectopic pregnancy, benign breast disease, anemia, and dysmenorrhea.
  - Can be used post-partum (also IUD)
- **Risks and Benefits:**
  - In nonsmoking women age >40, currently available OCPs are extremely safe.
  - Low-dose contraceptive pills do not significantly increase the risk of cancer, heart disease, or thromboembolic events in women with no associated risk factors (hypertension, diabetes, or smoking).
  - The combination estrogen/progestin pill tends to reduce menstrual flow and dysmenorrhea, and it regulates the menses, all of which would be excellent benefits for the patient.

Type	General info	Side effects	Failure rate
Progestin-Only Injectable 99% effective	**IM injection** of depo-medroxyprogesterone acetate (DMPA) Marketed under the trade name of Depo-Provera. It lasts for 12 to 14 weeks. The slow release allows administration only every **3 months for up to 2 years (if used for more than 2 years it will start to decrease the bone density)**	- Breakthrough bleeding. **- Prolonged time for fertility return** - Decreased bone mineral density (contraindicated in patients with osteoporosis)	<1%
Progestin-Only Subcutaneous Implant	Uses etonogestrel as the active ingredient and is marketed under the trade name of Nexplanon,. The core contains a small amount of barium, making it visible on x-ray. The continuous release continues for **3 years.**	- Breakthrough bleeding. (This is not favourable among muslim women as it interferes with praying and fasting)	<1%
"Morning-After" Pill (levonorgestrel) within 3 days or (ella) → contains ulipristal acetate within 5 days of intercourse	Uses levonorgestrel tablets and is marketed under the trade name of "Plan B," This postcoital contraception is administered as one tablet, immediately followed by one additional tablet in 12h. It must be taken within 72 hrs after intercourse. The earlier it's taken the batter the results.		1%

Barrier-Spermicidal methods

- 71-84% effective
- These are locally active devices preventing entry of sperm in through the cervix, thus preventing pregnancy (Least Efficacy, Non-Invasive and prn in usage. Higher risk of failure).
- There are several types which are :

1- Condoms (most common)

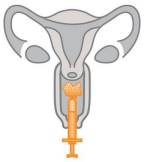
- A thin Penile sheaths that must be placed on the erect penis (male condom) or in the vaginal canal (female condom) prior to sexual intercourse
- No individual fitting is required.
- Prevents sexually transmitted infections (including HIV)
- The best contraceptive method if the wife has PID

2- Vaginal diaphragm

- Dome-shaped device placed in the anterior and posterior vaginal fornices holding spermicidal jelly against the cervix. It can be placed an hour before intercourse.
- Individual fitting is required. (If too large a size is used, it can result in urinary retention).
- No protection from sexually transmitted infections

3- Spermicides

- Active ingredient is nonoxynol-9, a surface-active agent that disrupts cell membranes (and thus the possible side effect of genital membrane irritation); These can take the form of jellies or foams placed into the vagina. used in conjunction with one of the above modalities bc its not a barrier).
- No protection from sexually transmitted infections



Advantages	Disadvantages
• Barrier methods become increasingly effective with advancing age and the associated natural decline in fertility. • Protect against some STDs (The only method that can protect you) **only condoms** • No systemic side effects.	• Failure rate approaches 20%. (Significantly higher than other methods.) • They are coitally dependent, requiring a decision for each use, thus decreasing spontaneity. • Barrier methods have no impact on excessive menstrual flow or excessively painful menses

Coitus Interruptus

- In this practice, also known as withdrawal or pull-out method, the man withdraws his penis from the woman's vagina prior to orgasm and ejaculation. It is one of the oldest contraceptive methods described.

Advantages	Disadvantages
• Readily available • Inexpensive • Free of systemic side effects.	• High failure rates. • No protection against STDs.. • High degree of discipline required. • Semen can enter vagina

Vaginal Douche

- With vaginal douche, plain water, vinegar and other products are used immediately after orgasm to theoretically flush semen out of the vagina. It has a long history of use in the United States.

Advantages	Disadvantages
• None	• High failure rates. • No protection against STDs.. • Semen can enter vagina and cervical mucus within 90 seconds of ejaculation. • Risk of promoting unintentional pregnancy by pushing semen into the cervical canal

Lactation

- With lactation, elevated prolactin levels with exclusive breastfeeding inhibit pulsatile secretion of GnRH from the hypothalamus. Effectiveness is dependent on the frequency (at least every 4-6 hours day & night) and intensity (infant suckling rather than pumping) of milk removal.
- **Method:**
  - Suckling at the breast → ↑ **prolactin** and ↓ **gonadotropin-releasing hormone** → suppression of ovulation
  - FSH levels are normal/high → follicle growth; however, ↓ LH leads to inhibited follicular maturation and the absent LH surge prevents ovulation

Advantages	Disadvantages
• Enhanced maternal and infant health, bonding, and nutrition. • Inexpensive. • Readily available. • Needs no supplies. • Free of systemic side effects. • Acceptable to all religious groups.	• High failure rate if not exclusively breastfeeding. Reliable for only up to 6 months. • No protection against STDs.

Natural Family Planning- Periodic Abstinence

- This method is based on avoiding sexual intercourse around the time of predicted ovulation. It assumes the egg is fertilizable for 12 to 24 hours and sperm is capable of fertilizing the egg for 24 to 48 hours. Requires high degree of discipline from both sexual partners. Prediction or identification of ovulation may be inferred from: menstrual records, basal body temperature charting (temperature rise from thermogenic effect of progesterone), change in cervical mucus from thin and watery to thick and sticky (reflects the change from estrogen dominance preovulation to progesterone dominance post-ovulation).
- Abstinence is the only 100% effective method, other methods have different rates of efficacy.

Advantages	Disadvantages
• Inexpensive • Readily available. • No steroid hormonal side-effects. • May be preferred for religious reasons.	• Inaccurate prediction of ovulation. • High failure rate because of human frailties and the passions of the moment.

Emergency Contraception (Extra)

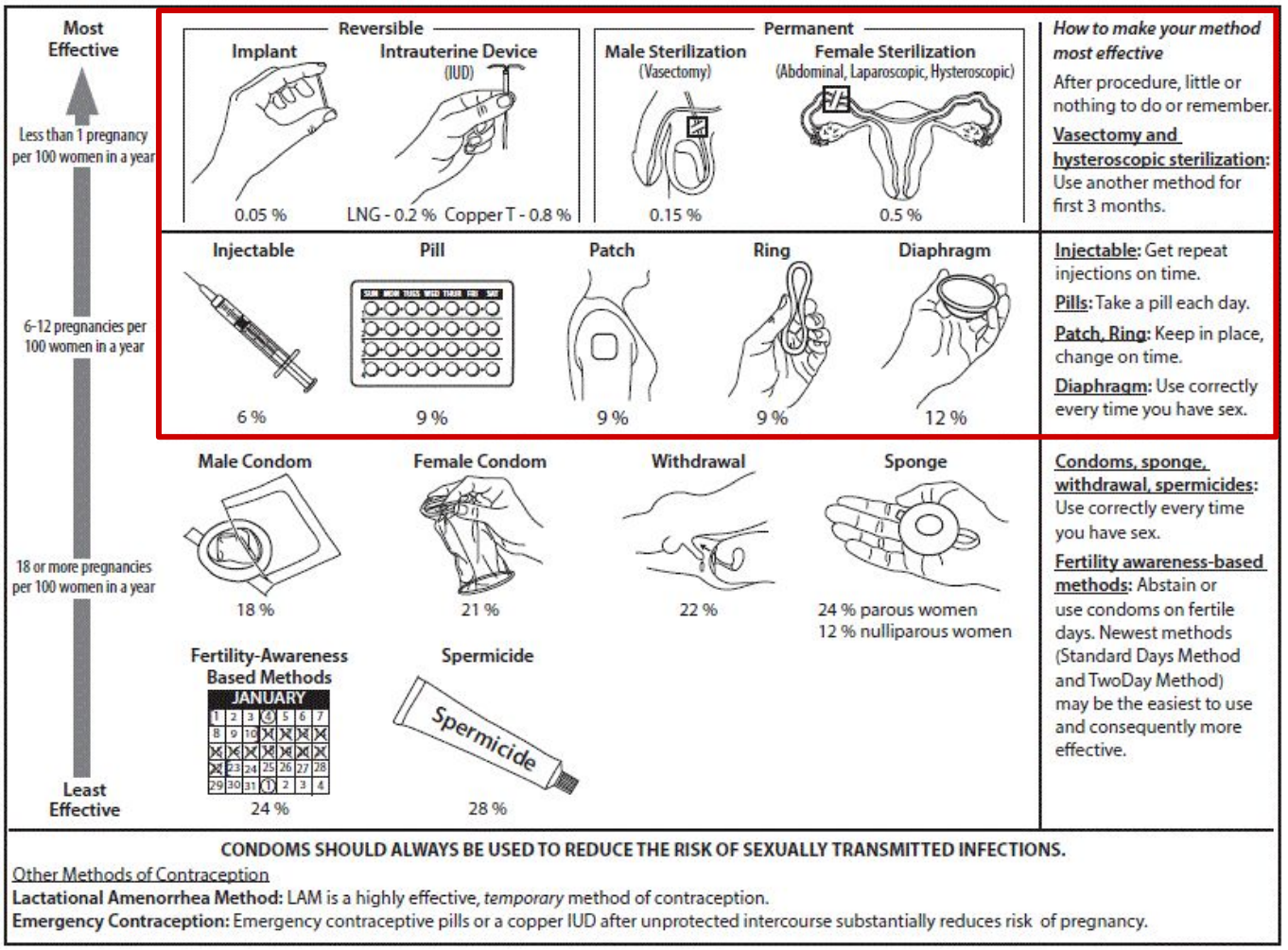
Emergency contraception (EC) is indicated for individuals who have had unprotected intercourse or contraception failure and who **do not** wish to conceive.

Overview of emergency contraception methods

Method		Timing after unprotected intercourse
Intrauterine devices (IUDs)	Copper IUD	• Within 5 days
	Progestin IUD	
Oral emergency contraception medication	Antiprogestins (ulipristal acetate)	
	Progestins (levonorgestrel)	• **Within 3 days**
	Combined oral contraceptives pills (Yuzpe regimen)	

441 Dr's Notes

- **MOST MCQS WILL BE ABOUT THE MOST EFFECTIVE CONTRACEPTIVE METHODS (in the red box).**
- **It is important to know the success rate & duration of each method.**



- **Why do we need to use contraception?**
  1. To optimize the medical condition of the patient before getting pregnant.
  2. Financial reasons.
  3. To treat other conditions like: chronic pelvic pain, dysmenorrhea, AUB, PCOS..etc.
- **Spermatogenesis requires 90 days > hence, why patients should abstain from intercourse for 3 months after a vasectomy.**
- **Sperms survive for up to 7 days inside the female reproductive tract.**
- **Oocytes survive for 24h in the fallopian tubes.**

Dr's Notes

437 notes

- Before starting any contraceptive methods (including: Combined OCP, Depo-provera, subdermal implants and IUD) you must make sure the patient is not pregnant. Either by a negative pregnancy test or starting contraception on the 5th day of menstruation.
- Combined OCP are also commonly used for women that suffer from menorrhagia, severe dysmenorrhea or even just to regulate irregular cycles. Regardless of marital status or sexual activity.

- Extra: These have very low efficacy (it does not work usually):
  - Natural family planning: monitoring cycles for fertile periods.
  - Withdrawal:"Coitus Interruptus." Pre-ejaculate can have semen in it. Failure to pull out once can result in failure. No STI protection.
  - Abstinence: Works if you really do it.

438 notes

- Asking About future fertility plans is important in choosing the method of contraception
  - Doesn't want to get pregnant anymore → sterilization
  - Want to have children → temporary methods of contraception

- **Contraindications to IUD:**
  - Adhesions
  - Previous multiple C-sections
  - Abnormal uterus position
- Best time to do tubal ligation is during the last c-section to avoid extra surgeries.

- **When to start the Contraceptive method?** The best way is to relate it to menstrual cycle:
  - Pills: Don't start at ovulation day
    - At beginning of cycle (day 1 or 5) to make sure no ovulation happens.
  - IUD:
    - Day 4-5 of (at the end of the cycle)
      - To make sure she's not pregnant w/o doing pregnancy test
      - To make sure ovulation haven't started
  - IM injections (Depo-Provera)/ implants:
    - given at the same day when sure she's not pregnant

Teaching case

★ **Risk Factors**

A 17 year old G0 female presents to clinic desiring information about contraceptive methods. She reports that she is sexually active with her boyfriend, using condoms occasionally, when she "needs them." She has never used any other methods. She has had 2 lifetime partners. She became sexually active at age 15 and had sex with her first partner 3-4 times but didn't use contraception. She has been sexually active with her current partner for the last year. She came today because she last had unprotected intercourse 3 days ago and is worried she might get pregnant. She has decided it's time for a more reliable method of contraception. She has never had a pelvic exam. She has history of well controlled seizure disorder and had appendicitis at age 11. She is taking valproic acid. She smokes one-half pack of cigarettes per day, drinks alcohol socially, and uses occasional marijuana. Her blood pressure is 100/60 and pulse is 68.

Q1: What pertinent historical information should you obtain from any patient prior to presenting recommendations for appropriate contraception?

- Sexual history
  - Onset of sexual activity
  - Number of partners since onset
  - History of STIs
- Medical history – contraindications to estrogen-containing hormonal contraceptives
  - Migraines with aura (typical migraine)
  - DVT (Thromboembolic disorder)
  - Uncontrolled hypertension
  - Smoking age>35
- Menstrual history
  - LMP (pregnancy is suspected if it was long time ago, confirmed with pregnancy test)
  - Irregular menses
- Future fertility plans

Q2: What physical exam and studies are required prior to prescribing hormonal contraceptives?

- Pap and pelvic exam have typically been "bundled services," i.e., these exams are required to prescribe contraceptives. There is no rationale for this bundling.
- In general, Pap smears should be initiated at the age of 21. So, this patient would not require one at this time.
- STI screening for a sexually active teenager should include chlamydia and gonorrhea which may be tested from a urine sample. Screening for other STIs should be done based on individual risk assessment.
- A blood pressure should be obtained in patients who desire estrogen-containing contraceptives to rule out hypertension. Hypertension is rare in this age group, but blood pressure is easy to obtain, non-sensitive and low cost.
- Coagulation profile.

Teaching case

Q3: Which contraceptive agents are most suitable for this patient?

- **OCPs**
  - They're the best thing for her Since she's young & doesn't have risk factors
  - The only issue is the Epilepsy meds she's having (Valproic acid) as its efficiency may decrease so we should inform her that she should manage with her neurologist about it to adjust the dose.
- **Barrier methods**
  - Least effective (71-84%)
  - Advantages: Protect for STIs since she has multiple partners.
- **Normal methods**
  - Avoid Intercourse 2 days before & after day 14 (as the ova live only 24Hrs)
  - Can't be done in irregular periods.
- **IM injections (Depo-Provera) / Subdermal implants:**
  - Long acting so it's good for her since she's young so that she doesn't forget

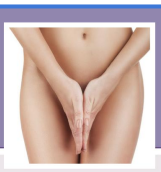
Q4: When/how to start the contraceptive method?

- Consider contraception as an "emergency"
- Best if patient leaves with a method
- Advance prescriptions of Plan B to all patients (except those with an IUD) Best if method begins that day if negative pregnancy test
  - Combination methods – Quick start: First pill on day of visit regardless of cycle, preferably in clinic.
  - Depo-provera–Same day shot.
  - Subdermal implant–Same day insertion.
  - IUD–Same day insertion.

Reference

Family Planning

Reversible Contraception, Sterilization, and Abortion



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CLINICAL KEYS FOR THIS CHAPTER

- There are three types of interventions available in family planning to prevent unwanted pregnancies. The first is contraception, which prevents fertilization by blocking the union of the gametes. The second is interception, which works after fertilization but before implantation. The third is abortion, which is defined as the interruption of an established pregnancy. The patient's perspective and preferences for family planning must always be the primary focus.
- Ongoing contraceptive options are grouped into three tiers that are based on their efficacy in typical use. **Tier 1** methods (implants, intrauterine devices [IUDs], and permanent contraception) have the lowest failure rates. **Tier 2** methods include injections, pills, patches, and rings. **Tier 3** methods include barrier and behavioral methods.
- Emergency contraception provides pregnancy protection after intercourse has taken place. It involves hormonal (oral contraceptives) or mechanical methods, which may be interceptive (e.g., placement of an IUD).
- Permanent contraception (previously referred to as *sterilization*) may be performed just after childbirth, between pregnancies, or as an interval procedure at any time. Tubal interruption is the most common technique. There has been a recent recommendation that fimbriectomy or complete salpingectomy should be used because it may reduce the risk of subsequent serous ovarian or peritoneal cancer.
- Elective termination of a pregnancy (abortion) is controversial and is unavailable in some areas of the United States. Medical and surgical abortion are as safe as other common procedures, such as tonsillectomy. Better access to effective contraception has been shown to reduce abortion rates.

Family planning plays a significant role in improving the health of women and provides a unique opportunity to optimize pregnancy outcomes by helping couples to control childbearing until conditions are favorable for them. As such, family planning contributes substantially to individual health care, to public health, and even to population control and environmental well-being.

Despite these recognized benefits, there is no other area of women's health that is as controversial and polarizing as family planning. Much of the controversy is based on a misunderstanding about reproductive facts, the safety of modern contraception, and the health risks posed by pregnancy and childbirth. Box 27-1 lists some important family planning facts and misconceptions held by many women and men.

Overview

Before going into detail about the various methods of family planning, it is important to note several facts about reproductive health. **About 85% of sexually active couples having unprotected intercourse for 1 year will experience pregnancy.** Pregnancy is not established within the uterus until about 7 days after conception, which itself may not occur for up to 5 to 7 days following intercourse. Half of all conceptions are lost before implantation, and **at least 10-15% of established pregnancies spontaneously abort.**

Although the goal of family planning is to provide couples with the ability to plan and prepare for pregnancy, efforts to date have fallen far short of that goal. **More than half of pregnancies that occur in the United**

BOX 27-1

FAMILY PLANNING FACTS

- All methods of birth control that would typically be prescribed to a woman today are far less hazardous to a woman's health than a pregnancy would be.
- In the United States, nearly half of all pregnancies are *unintended.* This has been the case for more than two decades.
- The maternal mortality rate in the United States is at its highest point in 15 years. There is currently 1 maternal mortality for every 30,000 live births.
- The mortality rate for healthy, young, nonsmoking women using oral contraceptives for 1 year is approximately 1 death in 1 million user-years.
- In spite of this, a large majority of women of reproductive age rate oral contraceptives to be more hazardous to a woman's health than pregnancy.
- A first-trimester elective pregnancy termination is safer than a tonsillectomy.
- Providing safe, affordable, and effective methods of contraception reduces the rates of abortion.

States are unintended, meaning that the woman did not want to become pregnant at the time she did. More than half of these unplanned pregnancies are eventually accepted.

Most women underestimate the health risks of pregnancy and overestimate the risks of contraception. There is no method of contraception that a clinician would prescribe to a woman that is as hazardous to her health as pregnancy itself. The contraceptive needs of a couple are often given lower priority and may not be mentioned, even when clinicians prescribe drugs that may be teratogenic to women of reproductive age. The controversy that surrounds family planning makes it essential for those caring for women of reproductive age to be informed about all the available methods of birth control and to be dedicated to educating couples about their importance and safety.

TABLE 27-1

FIRST-YEAR FAILURE RATES

Method	Percentage of Women Experiencing an Unintended Pregnancy within the First Year of Use	
	Typical Use	Perfect Use
No method	85	85
Spermicides	28	18
Fertility awareness–based methods	24	
Standard days method		5
2-Day method		4
Ovulation method		3
Symptothermal method		0.4
Withdrawal	22	4
Sponge		
Parous women	24	20
Nulliparous women	12	9
Condom		
Female (FC2)	21	5
Male	18	2
Diaphragm	12	6
Combined pill and progestin-only pills	9	0.3
ORTHO EVRA patch	9	0.3
NuvaRing	9	0.3
Depo-Provera	6	0.2
Intrauterine contraceptives		
ParaGard T 380A intrauterine copper contraceptive	0.8	0.6
Mirena LNG-IUS (20 µg/24 hr)	0.2	0.2
IMPLANON/NEXPLANON	0.05	0.05
Female sterilization	0.5	0.5
Male sterilization	0.15	0.10

LNG-IUS, Levonorgestrel intrauterine system.

Contraception

Ongoing contraceptive methods themselves may be categorized into reversible methods used before intercourse and those methods that are permanent. **The efficacy of a method is estimated by first-year failure rates measured under two different conditions: (1) correct and consistent use** (reflecting a method's full potential) **and (2) typical use** (estimates are derived from surveys of everyday, "real-world" users). Table 27-1 lists all the methods and their failure rates for both perfect and typical use. The differences in failure rates between the reversible Tier 1 methods and those in Tier 2 or 3 are so remarkable that **most authorities recommend that first-line contraceptive options for women of all ages be implants and intrauterine devices (IUDs) (Tier 1).** Any method is more effective than unprotected intercourse, and even one of the lower-tier methods can be made quite effective if the gap between typical use and correct and consistent use is reduced. Different forms of emergency contraception are available after coitus to provide a second chance of pregnancy prevention when nonuse or method misuse occurs.

Contraceptive practice in the United States has been greatly simplified by the publication of two important documents by the Centers for Disease Control and Prevention (CDC): the United States Medical Eligibility Criteria (US MEC) for Contraceptive Use and the U.S. Selected Practice Recommendations (US SPR) for Contraceptive Use. Each of these sets of guidelines is periodically updated based on the latest available evidence, and both sets in their entirety can be accessed online:

TABLE 27-3

ROUTINE EXAMINATIONS AND TESTS NEEDED BEFORE INITIATION OF CONTRACEPTIVE METHODS BY HEALTHY WOMEN

Examination Needed	IUD	Implant	Injectable	Combined Hormonal Contraceptive	Progestin-Only Pills
BP	C	C	C	A	C
BMI	C	C	C	C	C
Breast examination	C	C	C	C	C
Pelvic examination*	A	C	C	C	C

Adapted from Centers for Disease Control and Prevention: U.S. selected practice recommendations for contraceptive use, 2013. *MMWR Morb Mortal Wkly Rep* 62(5):1–46, 2013.
A, Essential and mandated; *BMI,* body mass index; *BP,* blood pressure; *C,* Does not contribute substantially to safe and effective method use; *IUD,* intrauterine device.
Laboratory tests: All methods were rated Category C for the following tests: glucose, lipids, liver enzymes, hemoglobin, presence of thrombogenic mutations, cervical cytology, and human immunodeficiency virus.
Note: Use of IUDs is the only contraceptive method for which sexually transmitted infection screening has any potential benefit; a woman may need risk- or age-related testing done at the time of placement if she has not previously had routine testing as recommended by the Centers for Disease Control and Prevention guidelines.
*Bimanual and speculum examinations.

FIGURE 27-1 The contraceptive implant (NEXPLANON; *left*) and the three intrauterine devices currently available in the United States: the levonorgestrel intrauterine system (LNG-IUD; *middle two*) and the ParaGard T 380A intrauterine copper contraceptive *(right).*

Immediate initiation of birth control and provision of adequate contraceptive supplies have both been shown to reduce unintended pregnancy rates and abortions.

TIER 1 REVERSIBLE CONTRACEPTIVE METHODS: IMPLANTS AND INTRAUTERINE DEVICES

The contraceptive implant (NEXPLANON) is a plastic rod mixed with the progestin etonogestrel. It measures 4 cm in length and 2 mm in diameter (Figure 27-1), and it releases the etonogestrel through a surrounding releasing membrane that is 0.06 mm thick. This contraceptive implant can be used by virtually any woman; only a history of recent breast cancer is an absolute contraindication. In addition, it has unsurpassed contraception effectiveness, is extremely convenient, and is rapidly reversible. It can be placed in a woman's arm in an office procedure that takes less than 5 minutes. This method provides 3 years of protection. In U.S. trials involving over 20,000 women-cycles, no pregnancies were seen when the implant was in place. With counseling, the continuation rate for implants is considerably higher than for any of the Tier 2 methods.

The implant suppresses ovulation in all users for at least 30 months and in virtually all women (97%) for at least its full 36 months of approved life. The progestin also thickens cervical mucus to prevent sperm from ascending into the upper genital tract, which would prevent fertilization in any case where ovulation may occur. Decreased efficacy is demonstrated only in women taking medications that increase hepatic clearance of sex steroids, particularly anticonvulsants and St. John's wort. As with most progestin-only methods, the risk of endometrial cancer is reduced, but uterine bleeding may be more unpredictable.

IUDs are the most commonly used method of reversible contraception worldwide, but they have only recently started to regain popularity in the United States. A problem with infection that occurred years ago with one particular IUD that is no longer on the market resulted in decreased acceptance of the method. Like the implant, IUDs are also remarkably effective methods that provide convenient, uninterrupted contraception that is rapidly reversible.

Currently there are three different IUDs available in the United States. Their features are summarized in Table 27-4, and they are illustrated in Figure 27-1. Each of the IUDs can be used by most women; the only contraindications to all IUD use are pelvic infection, cancer of the uterus, or distortion or inappropriate size of the uterine cavity. In addition, copper IUDs should not be used by women with copper allergies or Wilson disease, and levonorgestrel IUDs should not be used by women with recent breast cancer. IUDs are placed into the endometrial cavity in a minor office-based procedure that takes less than 5 minutes.

The main differences among the three currently available IUDs are in their duration of action and their impact on uterine bleeding. **Levonorgestrel is used in each of the hormonal IUDs** because it is a potent and

http://www.cdc.gov/reproductivehealth/unintendedpregnancy/usmec.htm and http://www.cdc.gov/reproductivehealth/unintendedpregnancy/usspr.htm. The US MEC rates the eligibility of women with a variety of medical conditions for each of the reversible Tier 1 and Tier 2 methods of birth control on a scale of 1 to 4, where 1 represents no concern and 4 represents an absolute contraindication. Added to this evaluation is a consideration of the risks that a woman would face with pregnancy and the likelihood she would experience a pregnancy if she were to use the method. For example, a woman with advanced diabetes may not experience any direct medical harm by using male condoms, but the 18% chance of pregnancy with typical use of condoms poses significant risks to her health. Table 27-2 contains a sample of the entire US MEC to illustrate its usefulness. The complete chart can also be accessed electronically at StudentConsult.com.

The US SPR separates the elements of well-woman care from those needed for contraception, provides clear direction about the evaluations needed (beyond taking a complete medical history) before offering the method, and describes what follow-up is needed after method initiation. It also offers advice on managing potential side effects associated with each of the methods. Table 27-3 highlights the recommended testing for each method and emphasizes the importance and feasibility of initiating every method of contraception at the time a patient is seen (any time in a woman's cycle as long as she is not pregnant).

TABLE 27-2

SAMPLE CHART OF U.S. MEDICAL ELIGIBILITY CRITERIA FOR CONTRACEPTIVE USE

Condition	Sub-condition	Combined pill, patch, ring		Progestin-only pill		Injection		Implant		LNG-IUD		Copper-IUD	
		I	C	I	C	I	C	I	C	I	C	I	C
Age		Menarche to <40 = 1		Menarche to <18 = 1		Menarche to <18 = 2		Menarche to <18 = 1		Menarche to <20 = 2		Menarche to <20 = 2	
		≥40 = 2		18-45 = 1		18-45 = 1		18-45 = 1		≥20 = 1		≥20 = 1	
				>45 = 1		>45 = 2		>45 = 1					
Diabetes mellitus (DM)	a) History of gestational DM only	1		1		1		1		1		1	
	b) Non-vascular disease												
	i) non-insulin dependent	2		2		2		2		2		1	
	ii) insulin dependent[‡]	2		2		2		2		2		1	
	c) Nephropathy/retinopathy/neuropathy[‡]	3/4*		2		3		2		2		1	
	d) Other vascular disease or diabetes of >20 years' duration[‡]	3/4*		2		3		2		2		1	
Headaches	a) Non-migrainous	1*	2*	1*	1*	1*	1*	1*	1*	1*	1*	1*	
	b) Migraine												
	i) without aura, age <35	2*	3*	1*	2*	2*	2*	2*	2*	2*	2*	1*	
	ii) without aura, age ≥35	3*	4*	1*	2*	2*	2*	2*	2*	2*	2*	1*	
	iii) with aura, any age	4*	4*	2*	3*	2*	3*	2*	3*	2*	3*	1*	

Key:
1 No restriction (method can be used)
2 Advantages generally outweigh theoretical or proven risks
3 Theoretical or proven risks usually outweigh the advantages
4 Unacceptable health risk (method not to be used)

From Centers for Disease Control and Prevention.
Updated June 2012. This summary sheet only contains a subset of the recommendations from the US MEC. For complete guidance, see: http://www.cdc.gov/reproductivehealth/unintendedpregnancy/USMEC.htm.
Most contraceptive methods do not protect against sexually transmitted infections (STIs). Consistent and correct use of the male latex condom reduces the risk of STIs and HIV.
C, Continuation of contraceptive method; *I,* initiation of contraceptive method; *NA,* not applicable.
*Please see the complete guidance for a clarification to this classification: www.cdc.gov/reproductivehealth/unintendedpregnancy/USMEC.htm.
‡Condition that exposes a woman to increased risk as a result of unintended pregnancy.

Reference

TABLE 27-4

DISTINGUISHING FEATURES OF AVAILABLE INTRAUTERINE DEVICES

	ParaGard T 380A Intrauterine Copper Contraceptive IUD	Mirena LNG-IUS 20 µg/24 hr	Skyla LNG-IUS 13.5 mg
Duration of action	10 years	5 years	3 years
Mechanism of action	Functional spermicide	Thickens cervical mucus to block sperm entry	Thickens cervical mucus to block sperm entry
Impact on bleeding	Increased duration and flow*	Significant decrease in blood loss with increasing amenorrhea over time	Lighter flow over time
Noncontraceptive	Nonhormonal method	Treatment for heavy menstruation, dysmenorrhea, adenomyosis, and endometriosis	Smaller size for nulliparous women

IUD, Intrauterine device; *LNG-IUS,* levonorgestrel intrauterine system.
*Increases may be reversed by use of nonsteroidal antiinflammatory drugs.

long-acting progestin requiring the release of low doses into the uterus to thicken the cervical mucus. The levonorgestrel intrauterine system (LNG-IUS) 20 µg/24 hours is approved for up to 5 years of contraceptive use. It is associated with a 5-year cumulative pregnancy rate of less than 1%. It also is the most effective medical therapy for heavy menstrual bleeding because it induces high rates of amenorrhea by directly suppressing the endometrium, thus leaving estradiol levels in the normal range.

The lower-dose LNG-IUS 13.5 mg is a smaller IUD with a narrower diameter designed for up to 3 years of use. It can be more easily (and more comfortably) placed into a woman who has not delivered vaginally, and its lower progestin dose induces amenorrhea for fewer women (only about 12%).

The ParaGard T 380A intrauterine copper contraceptive IUD is the most effective nonhormonal contraceptive method. It is approved for 10 years of use, but may be effective for 12 to 20 years. The copper ions released from the IUD immobilize sperm and inactivate the sperm's acrosomal enzymes that are needed for the sperm to penetrate through the zona pellucida of the ovum. Union of the gametes is prevented. Because the copper IUD is known to increase menstrual blood loss by 35-50%, it is not recommended for women with heavy menstrual bleeding at baseline.

TIER 2 CONTRACEPTIVE METHODS: INJECTIONS, PILLS, PATCHES, AND RINGS

Although formal estimates of typical-use failure rates differ slightly between the injections and the other members of this group, in the Contraceptive CHOICE study in the United States, researchers found that the first-year failure rates for pills, patches, and rings were 20 times higher than those for IUDs or implants. The most common reason for the comparatively high failure rate was inconsistent use or nonuse. However, **Tier 2 methods remain the most popular in the United States,** partially for historical reasons and partially for the noncontraceptive benefits (e.g., acne improvement) that some of them offer.

In the United States, there are two types of progestin-only injections with depot medroxyprogesterone acetate (DMPA): one that is injected intramuscularly every 11 to 13 weeks and one that is administered subcutaneously every 12 to 14 weeks. Each offers very high efficacy if reinjected on time. Being progestin-only methods, the only contraindication (Category 4 condition) to their use in the US MEC is a history of recent breast cancer.

DMPA profoundly thickens cervical mucus and suppresses ovulation. Mean return to fertility is 9 months following injection, but it is delayed even longer in obese women. DMPA also thins the endometrium, which can initially cause irregular bleeding and **can increase rates of amenorrhea over time.** The label warns that use beyond 2 years is not recommended, because of potential bone loss. However, because the bone impacts have been shown to be reversible, professional organizations universally recommend that this warning should not affect long-term use. **Some women gain weight with DMPA use,** and experience with the first injection may help to predict future weight gain. **The noncontraceptive benefits of DMPA are impressive, including reduction of heavy bleeding, dysmenorrhea, sickle cell crises, pain from endometriosis, and future risk of endometrial hyperplasia and cancer.**

The combined hormonal contraceptives (CHCs) have both estrogen and a progestin to provide cycle control. There are over 90 different brands of combined oral contraceptives with different hormonal formulations, different regimens, and different doses. In addition, the transdermal patch and vaginal ring are more convenient delivery options.

The primary mechanisms of action of all CHCs are to thicken cervical mucus and suppress ovulation. Traditionally, combination birth control pills were given in packets with 21 active pills and 7 placebo pills to provide monthly scheduled bleeding. As the doses of hormones in the active pills dropped, it was noted that ovarian function returned after 4 days of placebo use, so the number of active pills in the low-dose

formations was increased to at least 24, with 4 or fewer placebo pills. **Estrogen-containing pills significantly reduce menstrual blood loss and menstrual discomfort and offer noncontraceptive health benefits as well, including treatment of acne. These methods also significantly reduce the risk of endometrial and ovarian cancer.** Extended-cycle products provide distinct benefits to women with menstrual discomfort or medical problems that flare with bleeding (e.g., menstrual migraine and catamenial (monthly) seizures) by reducing the numbers of scheduled bleeding episodes.

The addition of estrogen to progestin adds rare but serious medical risks and more medical contraindications. **Risks that are clearly attributable to use of CHCs include increases in both venous and arterial thrombosis, resulting in pulmonary embolism, myocardial infarction, and stroke. Melasma** (facial pigmentation) and, uncommonly, **a reversible increase in blood pressure** are seen as a result of estrogen-containing contraceptive use.

Other side effects that have traditionally been attributed to oral contraceptive use, including headaches, breast tenderness, weight gain, mood changes, and gastrointestinal upsets, have been shown in prospective, double-blinded, placebo-controlled studies to occur at no higher frequency or with any greater intensity in pill users than in placebo users. It is not clear if the risk of gallbladder disease, hepatic adenoma, or breast cancer is increased with the use of oral contraceptives, because data derived from modern low-dose formulations are not consistent and at best show only minor impacts. Oral contraceptive use in *BRCA1* mutation carriers has not been shown to increase the incidence of breast cancer. Long-term studies have provided reassuring data that former use of oral contraceptives does not pose harm. In a large-scale study in which women who had ever used contraceptive pills were compared with never-users, those women who had ever used pills had lower overall mortality rates as well as lower mortality rates associated with cardiovascular disease and gynecologic and breast cancers.

The contraceptive patch and the vaginal ring were developed to relieve pill users of the requirement of daily administration. In the United States, consistent and correct use of oral contraception is infrequent. The once-a-week patch and the once-a-month vaginal rings demonstrated more consistent ongoing use in clinical trials than was seen with comparable pill users. **Both patches and the ring are designed to be used for 3 weeks and stopped for 1 week to induce scheduled bleeding.** When estrogen absorbed from the patch was found to be higher than doses absorbed from modern pills, the patch largely fell out of favor. The vaginal ring has increased in popularity as women have become more familiar with it. It is frequently used off-label without removal for 4 weeks at a time to induce amenorrhea. Newer formulations of both of these products may increase their use in the future.

Progestin-only pills (POPs) in the United States are generally reserved for breastfeeding women, but they have a much larger potential for use by women with medical problems. Because each pill in the packet is an active pill, instructions are easy to follow. For typical use, the failure rates of POPs are similar to those associated with any CHC. Because of their safety and rapid onset of action, POPs are clearly a "go to" choice for women whose evaluation for other methods is still pending.

TIER 3 CONTRACEPTIVE METHODS: BARRIERS AND BEHAVIORAL METHODS

There are several features of barrier and behavioral methods that set them apart from other methods. **They are generally available without a prescription** (except for diaphragms). That makes many of them available for episodic need when other methods are not available, as well as for ongoing use. However, their over-the-counter availability also shifts the burden of the cost onto the consumer (out-of-pocket expense) in the United States. **Tier 3 methods need to be used only at the time of intercourse, but that is the feature that most profoundly decreases their use and increases their failure rate.** Many offer varying levels of protection from sexually transmitted infections (STIs) as well as other noncontraceptive benefits, which can be very important to public health. They can generally be added to other methods or used together to enhance STI and/or pregnancy protection. The one notable exception is that male and female condoms should not be used together, because their effectiveness is decreased when they are combined.

Barrier Methods

When male condoms are used correctly and consistently, their first-year failure rate is 2%, but with typical use, their failure rate is 18%. Male condoms are the most commonly used method by adolescents at sexual debut. The use of condoms should continue to be supported as part of dual protection in that population for STI risk reduction.

Most male condoms used in the United States are made of latex. They are available in three sizes (snugger fit, large, and extra large), with variations in the diameter and lengths of the shaft as well as in the size and configuration of the portion of the condom that covers the glans. Some are smooth-tipped so that the man must leave room at the end to collect the ejaculate, whereas others are reservoir-tipped. Latex condoms are quite elastic, but they do not transmit heat and therefore can feel almost cold. **Latex allergies are found in 2-4% of the general population** and at greater rates in health care workers, people who work with latex, and those who need to self-catheterize. **Nonlatex**

condom options include a synthetic plastic isoprene (which has been used for years in surgical gloves) **and lamb cecum condoms.** The isoprene condoms are less elastic and are therefore available only in larger-sized condoms, but they do transmit heat. **The isoprene condoms also effectively block passage of the smallest viral particles and have high potential for reducing STI risk.** The so-called natural or cecum condoms block sperm and larger-size STI agents, but they do not block viruses as small as human immunodeficiency virus (HIV), human papillomavirus (HPV), or herpes simplex virus (HSV).

Female condoms have also been revised in recent years. To reduce costs, the FC2 female condom is now available in nitrite material. **Female condoms can also reduce STI risk.** They are best used by women whose partners will not use male condoms, because they have higher failure rates and are more expensive. **The FemCap is a silicone device shaped like a sailor's hat that applies spermicide to the cervix, which it covers with the bowl of the hat, while the brim of the hat is stabilized by the vaginal walls.** It is sized according to the patient's obstetrical history, "nulliparous," "parous" but no vaginal deliveries, and "parous" with "vaginal deliveries." The cap can be ordered online. Traditional diaphragms are rimmed silicone domes that need to be sized to fit across the vagina to cover the cervix with spermicide. A smaller, one-size diaphragm (SILCS) has been approved by the U.S. Food and Drug Administration (FDA). **The only available spermicide in the United States is nonoxynol-9 (N-9),** a detergent that disrupts the cellular membranes of sperm but also can disrupt vaginal epithelium and increase HIV transmission. **Spermicides are available as immediate-action foams and gels and delayed-action, but less messy, suppositories and films.** Newer, less destructive spermicides have been found to be as effective as N-9, and they may become available in the near future.

Behavioral Methods

Lactational amenorrhea is the most effective method in this category. Its low failure rate (2%) is limited to women who consistently (and exclusively) breastfeed during the first 6 months postpartum and who remain amenorrheic. After that time, pregnancy protection diminishes significantly, and ovulation often returns before the first menses. **Coitus interruptus (withdrawal) is one of the most commonly used behavioral methods historically.** Even for typical use, it works as well as many of the female barrier methods. Counseling about coital positioning is important to the success of coitus interruptus in that the man must learn to detect impending ejaculation and be able to withdraw his penis from the woman's vagina and direct the ejaculate away from her genital area before release.

Fertility awareness methods are designed to detect when a woman is at the greatest risk to conceive in her cycle. To be effective, these methods must take into account the life expectancy of sperm (5 to 7 days) and the duration of an ovum's ability to be fertilized (24 hours). Aids such as cycle beads for counting fertile days and smartphone apps can help a woman track her cycles and calculate her "at-risk days." **These methods work well only when cycles are reasonably regular (26 to 32 days).** The most easily implemented fertility awareness technique is called the *2-day method.* Each morning, the woman touches her vaginal introitus to determine if there is any moisture. Coitus is permitted only when her examination is dry of all secretions for 2 consecutive days.

Emergency Contraception

There are two FDA-approved hormonal methods for use following coitus. One is a series of products with high doses of the progestin levonorgestrel. Levonorgestrel suppresses ovulation up to the beginning of the luteinizing hormone (LH) surge. The efficacy of these products is inversely related to the time since exposure (4% failure rate at 72 hours) and to the woman's body mass index (BMI). These products are available by prescription or over the counter. The patient must pay full price for the over-the-counter packs. **The other hormonal product is the antiprogestin ulipristal acetate, which is given as a single dose within 5 days of exposure.** It is able to suppress ovulation until the peak of the LH surge. Its effectiveness does not diminish with time, although for obese women the pregnancy protection is less than for women with lower BMIs. It is available only by prescription.

The most effective method of postcoital pregnancy prevention (with a failure rate of 1 in 1000) is the placement of a copper IUD within 5 days of coitus. If placed late, after fertilization, it may work as an interceptive due to endometrial disruption caused during its placement. Another potential benefit with this placement is that the woman may enjoy up to 10 years of very effective contraception.

PERMANENT CONTRACEPTION

Also called *sterilization,* permanent contraceptive methods are available for both men and women. **Vasectomy is a safe, minor, office-based procedure that can be performed on men under local anesthesia in most situations.** There are various techniques available, but one of the most popular is the no-scalpel technique, in which the vas deferens is identified and grasped through the anesthetized skin. After it has been grasped, the vas deferens can be interrupted thermally, or it can be ligated. Complications include pain, hemorrhage, and infection, but long-term autoimmune problems have been disproven. Although no long-term efficacy trials have been done, **vasectomy is generally recognized to be a very effective method once azoospermia is achieved.** The man is asked to return 2 to 3 months

after the procedure for a follow-up semen analysis. Couples must use other contraceptive methods until lack of sperm in the ejaculate is demonstrated.

Female permanent contraception is slightly more common in the Unites States, even though vasectomy is a safer procedure. Many tubal interruption procedures are performed at the time of delivery. With cesarean delivery, a partial salpingectomy can be done following closure of the uterine incision. Following a vaginal delivery, a small infraumbilical incision can be made just above the fundus. The fallopian tubes can be identified by tracing each tube out to the fimbria. A site along the fallopian tube without adjacent large vessels can be tented and the tube tied off and interrupted. Different techniques have been used to reduce the risk of fistula formation and future failure. **Figure 27-2 illustrates the Pomeroy method of tubal interruption (ligation) performed soon after delivery.**

Tubal interruption is also available as an interval procedure. Traditionally, women have had the procedure done while they are under general or regional anesthesia, with **laparoscopic techniques** used to thermally destroy, remove, or clamp a narrow portion of the tube on each side. The success rates for these permanent contraceptive methods vary with the woman's age (higher failure rates are seen in younger women) and with the technique used (interval procedures have higher failure rates). The chance of subsequent pregnancy associated with any of these techniques is low, but **if pregnancy should occur, the chance that it will be an ectopic pregnancy is increased to at least 20%.** The greatest mortality risk associated with interval sterilization is the anesthetic risk (3 deaths per 100,000 cases). Figure 27-3 illustrates interval tubal occlusion with the Hulka clip *(A)* and the Falope ring *(B).*

Transcervical sterilization techniques have been introduced that can be done with local and intravenous anesthetic agents. Under hysteroscopic visualization, small coils are placed into the proximal ends of the fallopian tubes. These coils are filled with irritating fibers that induce local fibrosis of each tube. Complete tubal occlusion is documented 3 months later, usually with a hysterosalpingogram showing that none of the dye injected into the uterine cavity has entered into the tubes. Until tubal occlusion has been documented, couples must use other contraceptive methods.

Because it has been demonstrated that some serous ovarian and peritoneal carcinomas first develop in the fimbrial ends of the fallopian tubes, many have suggested that if a woman desires permanent contraception, it should be provided by fimbriectomy (removal of the distal end of the fallopian tube) or by salpingectomy (removal of the complete fallopian tube).

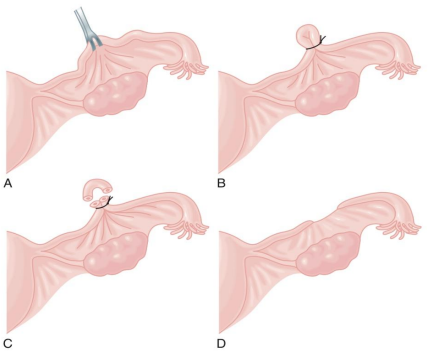

FIGURE 27-2 Pomeroy method of tubal ligation. **A,** Tube is grasped with Babcock forceps. **B,** A loop is ligated. **C,** The loop is excised. **D,** Several months later, the fibrosed ends of the tube separate.

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