DERLEME / *REVIEW*

# New Contraceptive Methods in Use

## *KULLANIMA GİREN YENİ KONTRASEPSİYON YÖNTEMLERİ*

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**Abstract**

Despite the availability of many prescription and non-prescription contraceptive methods, the rate of unintended pregnancy remains high. Frequently cited reasons for discontinuing a method when contraception is still desired include side effects, difficulty of use, safety concerns, and lack of access to health care. In designing the newer contraceptives, attention has been given to improving the side effect profiles of older methods and to developing delivery systems that do not require daily patient adherence. Perhaps the most interesting area is that of alternative hormonal delivery systems, such as vaginal rings, transdermal patches and creams, new implants and intrauterine systems, which offer not only greater convenience but also the potential to provide effective contraception at lower and more constant plasma hormone levels.

**Key Words:** Contraception, contraceptive agents, female

**Özet**

Günümüzde pek çok reçeteli veya reçetesiz kullanılan kontrasepsiyon metodları olmasına rağmen, istenmeyen gebelik oranları hala yüksektir. Kontrasepsiyon istenmesine rağmen, metodun terk edilmesinin en önemli nedenleri yan etkiler, kullanım güçlüğü, metodun güvenilirliği ve sağlık hizmetlerine ulaşma güçlüğüdür. Yeni kontraseptifler üretilirken yan etkilerinin eski yöntemlere göre daha az olmasına ve yeni salınım sistemleriyle günlük kullanıma gerek kalmamasına özen gösterilmektedir. Üzerinde en fazla durulanlar ise alternatif hormonal salınım sistemleri örneğin vajinal halkalar, transdermal patch ve kremler, yeni implant ve intrauterin sistemlerdir. Bu metodlar hem kullanım kolaylığı hem de düşük seviyelerde sabit hormon seviyeleriyle etkili kontrasepsiyon sağlamaktadır.

**Anahtar Kelimeler:** Kontrasepsiyon, kadın kontrasepsiyon metodları

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Despite the availability of many prescription and non-prescription contraceptive methods, the rate of unintended pregnancy remains high. Over her lifetime, one of every two women will experience one or more unintended pregnancies.[1] 11% of pregnancies were resulted in intended abortion in our country according to Population and Health Research of Turkey 2003. High percentage of intended abortus is due to high rate of unintended pregnancies. 29% of women in Turkey were not using any contraceptive methods. 43% of women were using modern, 29% traditional contraceptive methods. One cause of the high rate of unintended pregnancies is misuse or discontinuation of contraception.

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Frequently cited reasons for discontinuing a method when contraception is still desired include side effects, difficulty of use, safety concerns, and lack of access to health care.[2] Furthermore, personal beliefs and preferences influence a woman's willingness to use a contraceptive method correctly. Consequently, patient dissatisfaction and inconsistent or incorrect use may result in unintended pregnancy.

For example, the success of oral contraceptive pills (OCP), the most widely used reversible method, is highly dependent on daily adherence. A 1998 study found that as many as 47% of users missed one or more pills/cycle. The large number of unintended pregnancies among OCP users stems from premature discontinuation and misuse.[3,4]

One cost analysis found that compared with pregnancy and abortion, contraception saves an estimated $ 9.000 to $ 14.000 per woman of childbearing age over a five-year period.[5] Although some methods of contraception have side effects, morbidity and mortality rates are significantly

higher for pregnancy and childbirth than for the use of any contraceptive method alone.[6] A 1999 study by the World Health Organization found that more than half a million women die every year from pregnancy and childbirth.[7]

In the past 10 years, the range of contraceptive options available has increased significantly. In designing the newer contraceptives, attention has been given to improve the side effect profiles of older methods and to develop delivery systems that do not require daily patient adherence. Some of these contraceptive options available in other countries may soon be introduced in Türkiye.

## New Female Barrier Methods

Research has continued to develop several new female barrier methods that are modified versions of diaphragms, cervical caps, and sponges. These devices have been designed to be easier to insert and remove, and more difficult to dislodge during intercourse. All of them are non-hormonal. They have no interference with the menstrual cycle, instant reversibility of fertility when the method is discontinued and no interference with breastfeeding or breast milk. However they are less effective than hormonal contraception.

Women who can not tolerate the side effects of hormones, who have contraindications to IUDs or are allergic to latex rubber of the condom or do not want to rely on the male to use the condom would be very successful using these barrier methods. Effectiveness depends on the motivation of the user and whether she uses the methods consistently and properly every time she has sex.

The **Lea's Shield** is a modified diaphragm-like device in one size which completely covers the cervix, thereby blocks sperms' access to the cervix. It is a pure medical grade silicone rubber with flexible construction. Its shape is round with smooth edges, valve in center and integrated control loop for removal (Figure 1). The device is easy to insert and remove. It's washable and reusable. It was approved by the Food and Drug Administration (FDA) in March 2002.

A cervical cap is held in place by the cervix, thus, sizing the cervix is very critical in fitting a

**Figure 1.** View of Lea's Shield.

cervical cap. Also a diaphragm is anchored in place by the pubic bone and the posterior fornix. Since this distance varies from woman to woman, the diaphragm must be fitted and sized in order to avoid dislodgment during sex. But the Lea's Shield works by volume and is held by the vagina's muscles. Once inserted, the air trapped between the cervix and the device will be vented out of the one-way valve, creating a tight fit (seal) between the vagina's wall and the device. The bowl of the Lea's Shield is large enough to accommodate any normal sized cervix. It should remain in place at least 8 hours after intercourse, but be worn no longer than 48 hours before removing to wash. It is recommended to use spermicide with the Lea's Shield.

Clinical studies which included a high number of parous women shows that the Lea's Shield has a better efficacy then the diaphragm and the cervical cap. In the nulliparous group, none became pregnant. All women had only an 8.7% chance of getting pregnant within 6 months when using the Lea's Shield.[8]

There are no known local or systemic side effects. Severe obesity may make its placement difficult. Women using any vaginal inserted product may encounter an urinary tract infection and toxic shock syndrome if product used during menses and/or left in place too long. So in patients with history of urinary tract infection and toxic shock syndrome, observation for these are recommended.[9] Women having high risk of HIV or HIV infected are also not advised to use shield with spermicide because repeated and high-dose use of the spermicide nonoxynol-9 is associated with increased risk of genital lesions, which may increase the risk of acquiring HIV infection.[10]

**Figure 2.** View of FemCap.

The **FemCap** is a modified cervical cap with a strap to aid in removal of the device. It is a new latex-free, silicone sailor hat-shaped cervical barrier method (Figure 2). It is inexpensive, non-allergenic and reusable for one year.

The FemCap comes in three sizes. The inner diameter of the rim determines its size. The smallest rim diameter (22 mm) is intended for women who have never been pregnant. The medium (R: 26 mm) cap is intended for nulliparous women who never had a vaginal delivery. The largest (R: 30 mm) is intended for women who have had a vaginal delivery of a full-term baby.

The FemCap is designed to conform to the anatomy of the cervix and the vagina to ensure maximum fit and comfort. The FemCap includes a brim, a dome, a groove between the dome and the brim, and a removal strap. The FemCap is designed with a unique groove facing the vaginal opening. This groove is intended to store the spermicide and to trap the sperm. This groove will be utilized in the future to store any microbicidal spermicide.

There is a wide range of effectiveness among users. It is estimated that the FemCap may achieve up to 96-98% success in preventing pregnancy if used perfectly.[11]

There are no known systemic side effects. Severe obesity may make cap placement difficult. Cap use is not appropriate for a client with a markedly distorted cervical anatomy, with cervical intraepithelial neoplasia and cervical cancer.[9] Because some cap users have developed abnormal Papanicolaou smears within 3 months of beginning, a Papanicolaou smear is recommended before, and after 3 months of using the cervical cap.[12] Also observation for urinary tract infections is recommended and a link to toxic shock syndrome is noted if used during menses and/or left in place too long. Repeated and high-dose use of the spermicide nonoxynol-9 was associated with increased risk of genital lesions, which may increase the risk of acquiring HIV infection. So the device mustn't be used in women with high risk of HIV, HIV infected or AIDS.[10]

**Contraceptive Sponge** Natural sea sponges soaked in spermicide and inserted in the vagina before intercourse have been used throughout history for contraception. The sponge creates a physical barrier between the semen and the cervix and traps the sperm in the sponge. It also acts as a chemical barrier by releasing spermicide. It does not protect against HIV/AIDS, although may provide some protection from other STDs. No special fitting is required. The sponge provides between 12 and 24 hours of protection, depending on which brand is used. First-year failure rates were 17.4- 24.5%.[13]

Side effects and complications of sponges are similiar to the cap and diaphragm. So observation for urinary tract infections and toxic shock syndrome is recommended and shouldn't be used in female with high risk of HIV or HIV infected or AIDS.[10]

Three contraceptive sponges currently are available in some counties:

The Today Sponge is a small polyurethane foam sponge containing 1 gram of nonoxynol-9. It combines a spermicide with a barrier contraceptive. It offers an immediate and continuous presence of the spermicide nonoxynol-9 throughout a 24-hour period. It is a one-size, over-the-counter product. Its effectiveness initiates immediately after insertion and women must wait at lease six hours after the last act of intercourse before removing it. Generally neither partner can feel the sponge during intercourse. The effectiveness for Today Sponge is 89% to 91%. Allergy to or irritation from the spermicide in it is not common.[14]

The Protectaid Contraceptive Sponge contains a combination of low-doses of three spermicides: N-9 (6.25 mg), benzalkonium chloride (6.25 mg), and sodium cholate (25 mg). The combination of spermicides may offer some protection against STIs. It can be worn for 12 hours.[15]

The Pharmatex sponge is impregnated with 5 g of cream containing 1.2% benzalkonium chloride. It can be worn for up to 24 hours.[16]

## New Implants

Norplant, introduced in the 1980s, was the first contraceptive implant. It is a system of 6 silastic capsules that release levonorgestrel for a duration of 5 years. Despite the changes in menstrual bleeding patterns common to all progestin-only methods, Norplant proved highly acceptable to many women.[17] Progestin implants for female contraception are now growing into a family of options. Implant systems provide effective, long-acting, reversible contraception for women.

A comprehensive study of infant development and progestogen-only contraceptives found no adverse effect on development of infants whose mothers used progestogen-only methods during breastfeeding.[9,18,19]

Jadelle is also called as Norplant II. It has been approved in Europe for 5 years' use. Two thin, flexible rods made of silicone tubing, are inserted just under the skin of a woman's upper, inner arm in a minor surgical procedure. Each rod contains 75 mg of levonorgestrel for a total of 150 mg.[20]

Jadelle is one of the most effective reversible contraceptives available. Pregnancy is prevented in Jadelle users by a combination of mechanisms. The most important are the inhibition of ovulation, the main effect is based on changes in the cervical mucus and endometrial atrophy and the thickening of the cervical mucus, making it impermeable to sperm. Other mechanisms may add to these contraceptive effects. The cumulative pregnancy rate in clinical trials was 0.3 for three years and 1.1% for five years. Jadelle has a lower failure rate than the pill and most IUDs. Its efficacy is comparable to that of surgical sterilization. Even among heavier women, annual pregnancy rates for Jadelle users over three years and five years are well below those of oral contraceptives. If there are no contraindications, the rods may be used by women throughout their reproductive years.[20]

To make sure the woman is not pregnant, Jadelle rods should be inserted within seven days after the onset of menstrual bleeding or immediately following an abortion. Protection from pregnancy is provided within 24 hours, when insertion is performed during the first week of a woman's menstrual cycle. If Jadelle implants are inserted at any other time in the menstrual cycle, the possibility of a preexisting pregnancy must be ruled out and a nonhormonal contraceptive method (such as condoms, spermicides, or diaphragms) must be used for at least seven days following insertion to avoid pregnancy. The contraceptive action stops within two to three days after removal of the rods. If a woman wants to continue using Jadelle, a new set can be inserted when the old set is removed. Clinicians should feel the insertion site to be sure they can locate both rods before attempting to remove them. If they cannot be felt, the rods can be located through x-ray, ultrasound, or compression mammography. Removal complications or difficulties were reported in 7.5 percent of more than 1,100 women who had Jadelle removed.[21]

Because Jadelle contains no estrogen, the most common side effects are changes in menstrual bleeding patterns. Bleeding irregularities (including spotting, longer or heavier periods than previously, or no bleeding) are most common side effect reported by rod users. Other adverse reactions reported by the women during Jadelle use were application site reaction, discoloration, or pain; dizziness; headache; leukorrhea; mastalgia; nausea; pelvic pain; urinary tract symptoms; vaginitis; and weight gain. Women using Jadelle have also experienced acne, appetite changes, contact dermatitis, hair loss, lesions or inflammation of the cervix, libido decrease, and nervousness. Rarely, an infection may occur at the implant site, or there may be a brief incidence of pain or itching at the insertion site. Many of these adverse events associated with use of Jadelle are commonly experienced by users of other hormonal methods.[21,22]

Jadelle should not be used in pregnancy; active thrombophlebitis or thromboembolic disorders; undiagnosed abnormal genital bleeding; acute liver disease; liver tumors; known or suspected breast cancer; a history of idiopathic intracranial hypertension; or hypersensitivity to levonorgestrel or any of the other components of the rods.[23]

Implanon is a single, flexible sub-dermal implant 4cm x 2mm which contains 68mg of a synthetic progestagen, etonorgestrel. It is designed to be inserted under local anaesthetic directly under the skin of the inner aspect of the non-dominant upper arm.The implant releases approximately 40 micrograms of etonorgestrel /day which inhibits ovulation by suppressing the LH surge, increases viscosity of cervical mucus, reducing sperm penetration and motility, provides effective contraception for 3 years. Implanon is effective immediately if inserted during day 1-5 of the patient's menstrual cycle. At any other time in the cycle it is important to be certain the patient could not be pregnant and alternative contraception should be used for seven days after insertion. After removal etonorgestrel levels fall rapidly and are undetectable after a week and the majority of women will ovulate in the first month. It is a highly effective, convenient contraceptive method with a Pearl Index of <0.07 per 100 woman years, provided it is inserted correctly at the correct time of the menstrual cycle. It's suitable for women with a contraindication to oestrogen.[24]

Disturbance of menstrual pattern is usual, so the method will only be acceptable to women who can tolerate this. Menstrual disturbance is the commonest reason for removal requests. There is no proven method of treatment. NSAID'S e.g. mefanemic acid or oestrogen supplementation could be tried based on varying anecdotal results only. Other side effects (5-10%) are similar to the Jadelle and include breast tenderness, fluid retention, weight gain, skin disorders and mood change.[25]

Implanon is not visible on X ray or CT scan. Implanon is usually identifiable by ultrasound examination.[26] If Implanon cannot be visualized on ultrasound, depending on the clinical situation, presumptive evidence of non insertion can be based on progesterone levels consistent with ovulation serum level of etonorgestrel can be estimated further imaging of arm by MRI will be arranged.[27]

Absolute contraindications of Implanon are same with the Jadelle. Efficacy in women over 100 kg could be less- etonorgestrel levels are inversely related to body weight.[19]

## Hormonal IUDs (Levonogestrel Intrauterine System)

Levonorgestrel intrauterine system (Mirena) is a small T-shaped device which contains a total of 52 mg levonorgestrel. It releases 20 mcg of levonorgestrel/day and provides effective contraception for at least five years. It inhibits ovulation, increases viscosity of cervical mucus, reducing sperm penetration and motility. This intrauterine system has been shown to be as effective as copper-containing intrauterine devices (IUDs). There is a failure rate of 0.16/100 women years of use. Pregnancy rates are comparable with those occurring with surgical sterilization. It should be inserted within 7 days of the first day of a period. Screening for sexually transmitted diseases should be done prior to insertion. Although copper-containing IUDs can increase bleeding and dysmenorrhea, the levonorgestrel system actually lessens these symptoms.[28,29]

The typical bleeding profile with the new intrauterine system is irregular bleeding or spotting for the first six months of use, followed by very light menses, with 20 percent of women having amenorrhea at one year of use. Because estradiol levels are maintained, osteopenia is not associated with this contraceptive method. Because of the safety profile of the new intrauterine system and the high rates of oligomenorrhea and amenorrhea, can be a useful alternative to hysterectomy in certain situations.[30]

Only minimal side effects have been found with the intrauterine system. Side effects unique to the levonorgestrel system have been related to the hormonal component and include headache, lower abdominal pain, back pain, skin disorders, vaginal discharge, benign breast problems, vaginitis, depression, mood changes, nausea, weight gain. Evidence suggests that the risk of PID is lower with the levonorgestrel system.[28,31]

Absolute contraindications of Mirena are pregnancy, puerperal sepsis, immediate post septic abortion, unexplained vaginal bleeding, malignant gestational trophoblastic disease, diagnosed or suspected hormone dependent cancer, uterine fibroids with distortion of the uterine cavity, ana-

tomical abnormalities of uterine cavity, current pelvic inflammatory disease and sexually transmitted disease, pelvic tuberculosis. The system should be used with caution in women with a history of migraine, hepatic disease, high blood pressure, deep venous thrombosis, pumonary embolism, stroke, current and history of ischaemic heart disease. Low-dose levonorgestrel may affect glucose tolerance in women with diabetes and blood glucose should be monitored.[9,32]

## New Birth Control Pills

OCP are highly effective methods. The estrogen contained in OCP works in combination with the progestin component to suppress gonadotropin secretion. The estrogen also works synergistically with the progestin to affect the uterine lining and cervical mucus production. The overall balance of the two hormones forms an environment that prevents ovulation, sperm transport to the upper genital tract, fertilization, and implantation.

The efficacy of OCPs, except sterilization, depends upon the reliability with which they are used. Correct and consistent use of these methods can result in lower failure rates. Only one of 1,000 women who take OCPs perfectly becomes pregnant within a year. Reversibility data are clear. Despite a possible few months' lag in the return of normal menstrual cycles, most women resume their previous level of fertility once they stop taking oral contraceptive pills.[33]

Premature discontinuation of OCPs most commonly occurs because of the following side effects: breakthrough bleeding, nausea, headache, breast tenderness, acne, hirsutism, mood swings and weight gain. Patients should be counseled that many side effects subside over the first few months of oral contraceptive pill use. Time or a change to another preparation may solve the problem.[34,35]

Absolute contraindications of OCP are pregnancy, lactation (<6 weeks postpartum), liver disease, venous thromboembolism, cerebrovascular or coronary artery disease, structural heart disease, diabetes with complications, breast cancer, headaches with focal neurologic symptoms, major surgery with prolonged immobilization, age >35 years and smoke 20 cigarettes or more per day, hypertension (blood pressure >160/100 mmHg or with concomitant vascular disease). OCP should be used with caution in women with postpartum <21 days, lactation (6 weeks to 6 months), undiagnosed vaginal or uterine bleeding, age >35 years and smoke fewer than 20 cigarettes per day, history of breast cancer but no recurrence in past 5 years, interacting drugs, gallbladder disease.[9]

Yasmin is a low-dose, monophasic OCP that contains drospirenone 3 mg and 0.03 mg ethinyl estradiol. Drospirenone, an analogue of spironolactone, differs from other progestins by exhibiting both antimineralocorticoid and antiandrogenic effects. Due to its antiandrogenic diuretic properties, Yasmin has the added benefit of improving acne, seborrhea, and hirsutism as well as providing good weight stability or even slight weight loss from decreased water retention. It is more than 99% effective when taken correctly and helps decrease the amount of PMS water retention.[36]

Drospirenone exhibits antimineralocorticoid activity that influences the regulation of water and electrolyte balance in the body. Because this activity may increase potassium levels, Yasmin should not be used by women with kidney, liver or adrenal disease. It should be used with caution in women taking medications that can lead to hyperkalemia, such as other potassium-sparing diuretics, angiotensin-converting enzyme inhibitors, aldosterone antagonists, and nonsteroidal anti-inflammatory drugs.[37]

Seasonale is a newer birth control pill that contains 0.15 mg levonorgestrel and 0.03 mg ethinyl estradiol. It is similar to others in that it is 99% effective, uses the same type of hormones, is a once-daily pill, and has similar side effects. What makes Seasonale different from other birth control pills is that it has 3 months of active pills, instead of 3 weeks. Seasonale reduces the number of yearly menstrual periods from 13 to four, so women menstruate only once each season. Tablets containing the active hormones are taken for 12 weeks (84 days), followed by one week (7 days) of placebo tablets.[38]

Although Seasonale users have fewer scheduled menstrual cycles, the data from clinical trials show that many women, especially in the first few

cycles of use, had more unexpected bleeding and spotting between the expected menstrual periods than women taking a conventional 28-day cycle oral contraceptive. Cycle control and safety of the regimen were similar to that reported for other OCPs.[39] Longterm risks and benefits with extra hormonal exposure remain to be established.

Anya, also marketed under the name Lybrel, is the first birth control pill that suppresses the menstrual period for a full year. It contains ethinyl estradiol and levonorgestrel. Anya works just like the regular OCP. What distinguishes Anya from other types of birth control pills, though, is the fact that the hormonal pill should be taken every single day of the year.[40]

In clinical studies, Anya has proven to be just as effective in preventing pregnancy as other combination OCP. Because it completely suppresses periods, Anya may be particularly suited to women suffering from: severe PMS, dysmenorrhea, endometriosis and uterine fibroids. Anya may also be preferred by women with extremely busy or erratic schedules.[40]

The most common side effect is irregular menstrual bleeding. It should be noted that no clinical studies have been performed studying the long-term effects of Anya. One concern for women is that suppression of menstruation for such a long period may result in an irreversible loss of bone density, a documented side-effect of depo-provera-another hormonal contraceptive that suppresses menstruation for months at a time.[40]

## Combined Hormonal Injection

The combined hormonal injection (CHI) is another method of contraception that does not require daily adherence. Two new, once-a-month, combined injectable contraceptives have been developed called Cyclofem (also called CycloProvera or Lunelle) (25 mg of medroxyprogesterone acetate and 5 mg of estradiol cypionate) and Mesigyna (50 mg noretisteronenantate and 5 mg estradiol valerate). The advantages of using CHI are: convenient, monthly dosage, rapid return to fertility after stopping the injections (about 2 -3 months), typically, regular monthly cycles.

Clinical trials have shown this contraceptive method to be highly effective, with failure rates of zero to 0.2 pregnancies per 100 women-years. Because of the added estrogen, bleeding patterns usually are regular and comparable with the bleeding patterns occurring with combination OCP.[41,42]

The injection is administered every 28 to 30 days and supplies a steady concentration of hormones. The first injection of CHI is usually taken during the first 5 days of a woman's menstrual cycle. It is recommended that each follow-up injection be taken 28-30 days after the last one. If the shot is given after 33 days, it may not be effective.[41,43]

Advantages, limitations, indications, precautions and mechanism of action of CHI are similar to other combined hormonal contraceptives.[44]

## Vaginal Contraceptive Ring

The combined hormonal vaginal ring (NuvaRing) has a unique delivery system. The ring, measuring 54 mm in diameter and having a 4-mm cross-sectional diameter, is composed of ethylene vinyl acetate copolymers and magnesium stearate.[45] The circular ring is flexible and easily inserted into the vagina (Figure 3). Unlike the diaphragm, the vaginal ring does not have to be in a specific position, because absorption of the hormones can occur anywhere in the vagina.

The ring works in a similar manner as OCPs, but daily action by the patient is not required. It releases ethinyl estradiol at a rate of 15 mcg/day and etonogestrel at a rate of 120 mcg/day. It is worn vaginally for 3 weeks and removed for 1 week. During the ring-free interval, withdrawal bleeding should occur. The ring may be removed for up to 3 hours without concern for pregnancy, but must be

**Figure 3.** View of vaginal contraceptive ring.

replaced by the end of that time. If it is removed for longer than 3 hours, backup contraception should be used for the next 7 days. If the ring is left in for more than 4 weeks, however, pregnancy should be ruled out. If negative, another ring may be inserted and backup contraception used for 7 days.[45,46]

In a one-year study, the overall failure rate for the vaginal ring was 0.65 pregnancies per 100 women-years.[47] The majority of women in the study considered insertion and removal of the vaginal ring to be easy, and 90 percent used the device correctly. Adverse effects that led to discontinuation of vaginal ring use most often were related to foreign body sensation, coital problems, and expulsion of the device. However, only 3.6 percent of women in the study stopped using the device for these reasons.[47]

NuvaRing is not recommended if a cystocele, rectocele, or uterine prolapse is present.[48] Because it is a hormonal method, it has similar risks that are associated with birth control pills. In terms of cycle control, the vaginal ring is associated with a lower incidence of breakthrough bleeding than levonorgestrel ethinyl estradiol OCPs, and with a higher rate of normal withdrawal bleeding.[49]

## Contraceptive Patch

In 2002, the FDA approved the use of a combination contraceptive patch (Ortho Evra). The hormonal contraceptive patch delivers 150 µg norelgestronmin, the active metabolite of norgestimate, and 20 µg of ethinyl estradiol to the bloodstream every 24 hours. The 20-$cm^2$ patch consists of a beige outer protective layer, a middle drug layer, and a clear adhesive layer that is removed before application. It is applied once/week for 3 consecutive weeks (days 1-21), followed by 1 patch-free week. The patch should be replaced on the same day each week, with menses occurring during days 22-28 of the cycle.

The patch is applied on day 1 of the next 28-day cycle, even if menses has not ceased. If it is removed for longer than 7 days, protection from pregnancy is not guaranteed, and the woman must use backup contraception until a new patch has been worn for 7 days. The patch may be applied to the buttock, abdomen, upper outer arm, or upper torso excluding breasts. Skin should be clean and dry, intact, and not red or irritated. If the patch detaches and it has been less than 24 hours since application, it should be reapplied to the same site or a new patch should be used. If it has been detached for longer than 24 hours after initial application or if the duration is not known, a new patch should be applied immediately and a new cycle should begin. Backup contraception should be used for the first 7 days of the new cycle.[50]

The overall failure rate for the contraceptive patch has been reported to be only 0.88 pregnancies per 100 women-years, with a method failure rate of 0.7 pregnancies per 100 women-years.[51] However, this form of contraception may be less effective in women weighing more than 90 kg.[51]

In a study comparing the contraceptive patch and OCPs, spotting occurred at a higher rate in the first two months of patch use. However, spotting rates for the two contraceptive methods were similar in subsequent cycles. A key finding in this study was that compliance was significantly greater with patch use than with OCP use. Although adverse event rates were similar with both contraceptive methods, application site reactions were unique to the patch, and breast discomfort was more common in the first two months of patch use. Finally, the study showed that patch adhesion appears to be reliable, with only 2.8 percent of the patches partially detaching and 1.8 percent completely detaching. The patient should be encouraged to participate in her usual physical activities (eg., sauna, swimming).[52]

## Conclusion

Effective methods of contraception are essential for reproductive health. The development of new and improved methods of contraception is a key component of the strategy to improve the quality of family planning programmes. The priorities of the development of new methods and approaches are easier to use, have improved service delivery, have fewer side effects, are affordable, and respond to the needs of various groups of users.

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