



## Newer Contraceptive Delivery Systems

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- India is the second largest country with rapidly increasing population. Govt. of India in 1951, has adopted a Goal of population stabilization and has offered a wide range of contraceptives under the national family welfare programme.
- Lately, variety of newer contraceptives are available and their usage is rising all over the world.

### Types of newer contraceptives

- Progesterone only injections
  - Depot Medroxy Progesterone Acetate DMPA
  - Norethisterone Enanthate NET EN
- Combined Injectable contraceptives
  - DMPA + estradiol cypionate Cyclofem
  - Net En + estradiol valerate Mesigna
- Contraceptive Vaginal Ring
- Contraceptive Implants
  - Norplant, LNG Rod, Norplant II, Implanon.
- Contraceptive Transdermal Patch
- Contraceptive Intrauterine LNG Device
- Injectable Contraceptives :
- Injectable contraceptives have been in use for over 20 years, although in India, it is still not become very popular method. All over the world it is estimated that, 13 million women use DMPA and 1 million using Net En
- DMPA and Net En approved as contraceptives by WHO, IPPF as well as countries like Sweden, France, Germany, UK and USA

In India, injectable preparations not included in the National Family Welfare Programme

### DMPA – Depo Provera



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- It contains Progestogen derived from natural progesterone which is in microcrystalline suspension that delays absorption after injection
  - Dose of 150 mg given deep intramuscular which is effective for 3 months

### **Net EN – Noristerate**

- It contains Progestogen derived from 19 nortestosterone which is used in oily solution
- After injecting in body progesterone is converted to active form, norethindrone
- It is given in the dose of 200 mg every 2 months

### **Effectiveness**

- Both DMPA and Net En are highly effective and the failure rates are very low ranging between 0.1 – 0.4 % which are as low as OC pills and much lower than IUD

### **Effectiveness depends on**

- Timing of injection – next injection should be given within 5-7 days of expiry of previous date
- Technique of injection – should be given deep IM for proper absorption of the drug
- Regularity of injections

### **Mode of action**

- Inhibition of ovulation

### **Levels of FSH and LH are lowered and they prevent LH surge – Kamitz, IPPF Med. Bulletin, 1992.**

- Cervical mucus also becomes thick, creating a barrier for sperms
- Endometrium is made less suitable for implantation

### **Advantages**

- Convenient to use
- No regular, frequent medication needed
- No interference with sexual act
- No estrogenic side effects
- Suitable for lactating women
- Causes some weight gain
- Most importantly, can be used by almost all women. Absolute contraindications very few, pregnancy, undiagnosed genital bleeding and breast cancer

### **Side effects**

- Changes in menstrual patterns – irregular menstrual bleeding, spotting and temporary amenorrhoea : These are not serious changes but commonest cause for dissatisfaction and discontinuation of injections which can be minimized by proper counselling and use of low dose OC pills
- Effects on fertility : median delay in return of fertility for DMPA is 5.5 months and for Net En it is 2.6 months
- Carcinogenic effects : initial reports of increased risk of breast nodules and cancer in beagle dogs were reported.

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However, WHO has categorically reported that, long term users are not at increased risk of Cervical, ovarian or liver cancer and the injectable contraceptives do offer protection against endometrial cancer. Also they do not increase overall risk of breast cancer

### **Combined Injectable Contraceptives**

- Cyclofem which contain DMPA 25 mg + estradiol cypionate 5 mg
- Mesigna which contain Net En 50 mg + estradiol valerate 5 mg

They are given once a month every 30 +/- 3 days

Effectiveness : 0.2 % or less for cyclofem

0.4 % or less for mesigna

### **Injectables for future**

- Levonorgestrel Butanoate injectable  
5 to 10 mg of LNG Butanoate, given every 3 monthly  
Advantages : less ovarian suppression, less amenorrhoea and quicker return of fertility
- Injectable microspheres and microcapsules  
consist of biodegradable copolymer of one or more hormones  
- 3 monthly microsphere inj NetEn 65 mg  
- 3 monthly microcapsule inj 50 mg norgestimate ( new progestogen )
- Male Injectable Contraceptives  
- Testosterone enanthate 200 mg every week
- Vaccines

### **Contraceptive Vaginal Ring**



- NuvaRing is a soft, flexible ring that is approximately two inches in diameter. The ring is worn in the vagina for three weeks. It is then removed for one week. The menstrual period will usually occur during this week.
- It contains a combination of estrogen and progestin. The primary difference is in the method by which the medication is delivered into the body. The hormones contained within the ring are absorbed continuously, directly into the blood stream through the vaginal wall.
- Mechanism of action : Progesterone is absorbed in small amounts and prevents the ovulation. The endometrial lining also becomes thinner than usual, which would inhibit implantation of a fertilized egg. In addition, the cervical mucus also becomes thicker and this helps prevent sperm from

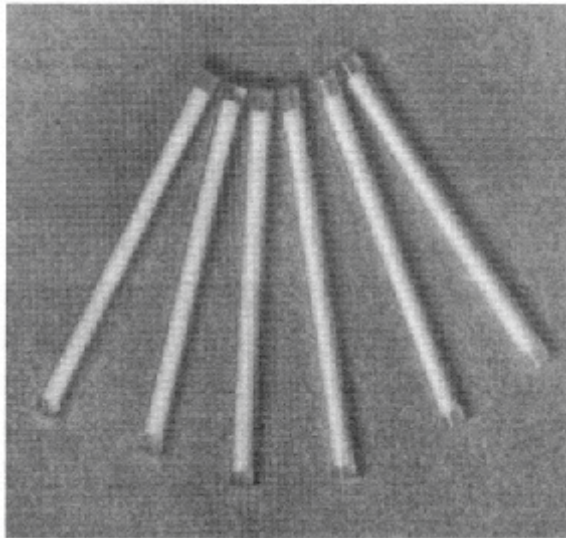
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entering the uterus. When properly placed, the ring is held in place by the vaginal muscle structure, even during exercise or intercourse.

### How effective is NuvaRing?

- According to studies provided to the Food and Drug Administration (FDA) during the approval process, effectiveness ratings are listed at 99% when used according to label instructions. This is comparable to the patch and better than the Pill's effectiveness ratings.

### Contraceptive Implants



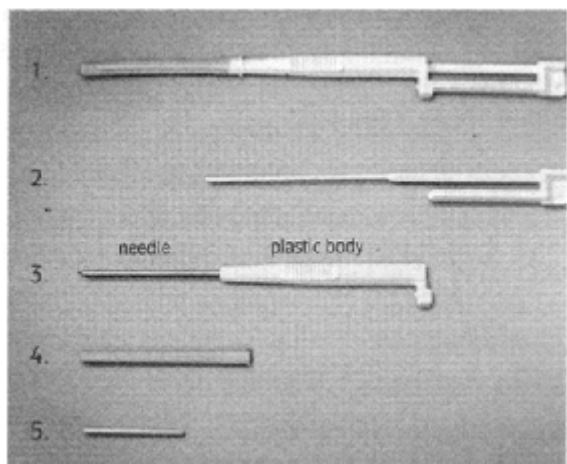
Norplant : It consists of 6 silastic capsules of diameter of 2.4 mm and a length of 3.4 cm, each containing 36 mg of LNG. The system is effective for 5 years.

Norplant releases 50-80 microgram of LNG in the first year and later 30-35 ug.

Norplant II , Jadelle, LNG Rod : It consists of 2 silastic rods, each 44 mm long with 70 mg LNG and is effective for 5 yrs

**Implanon** : Implanon is a type of birth control implant, receiving FDA-approval in July 2006

It is a single rod device of size of 40 mm length and 2 mm diameter. It comes with a preloaded applicator and is made from a flexible plastic and is inserted just under the skin on the inner side of upper arm in subcutaneous tissue. It releases 30 ug per day of 3 keto desogestrel and is effective for 3 years. Insertion requires a local anesthetic and only takes a few minutes. The implant can also be removed anytime before the 3 years are up. Implanon does not contain latex or silicone and will not



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dissolve, so it must be removed.

As of November 2011, the FDA has approved the use of Nexplanon in the US, a newer version of Implanon. Other than a few minor changes, such that Nexplanon is radiopaque and has a slightly different applicator/insertion procedure, Nexplanon is almost identical to Implanon.

### **Implanon Disadvantages:**

Irregular bleeding is the most common side effect for women using Implanon. One should expect the periods to be irregular and unpredictable throughout the time she is using the birth control implant. For many women, periods become fewer and lighter, and in time, they may stop altogether. Other women report having longer and heavier periods while others experience an increase in spotting and breakthrough bleeding (between periods). In studies, about 1 out of 10 women stopped using Implanon because of bleeding changes.

About 1 out of 3 contraceptive implant users have no periods after one year.

Implant site complications were experienced by 3.6% of clinical study participants. Pain was the most frequent implant site complication, reported during and/or after insertion, occurring in 2.9% of subjects. Additionally, hematoma, redness, and swelling were reported by 0.1% to 0.3% of women.

Removal complications occurred in 1.7% of participants and included: implant couldn't be felt, broken or damaged implant, difficult localization, and slight movement.

### **Implanon Side Effects:**

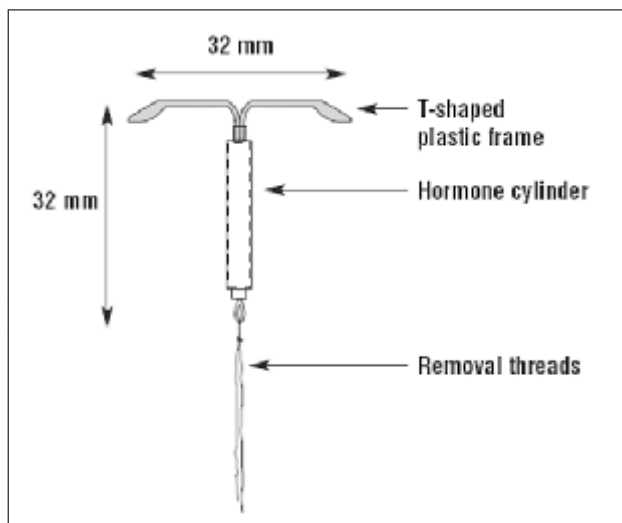
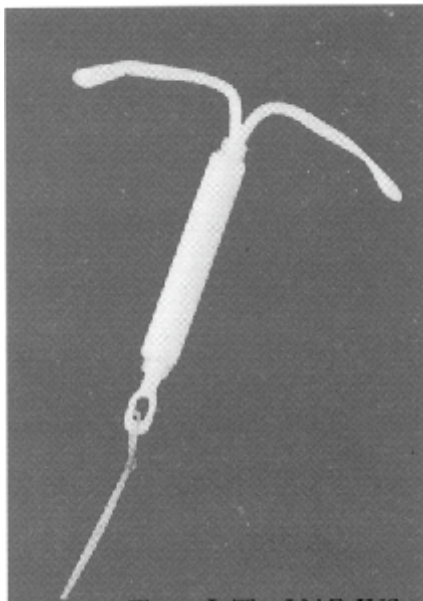
Besides irregular bleeding, the most frequent side effects causing women to stop using Implanon include mood swings, weight gain, breast tenderness, headache, acne, and depression.

Newer Implants :

ST 1435 sigle rod implant

Capronor 2 biodegradable

### **LNG IntraUterine System :**



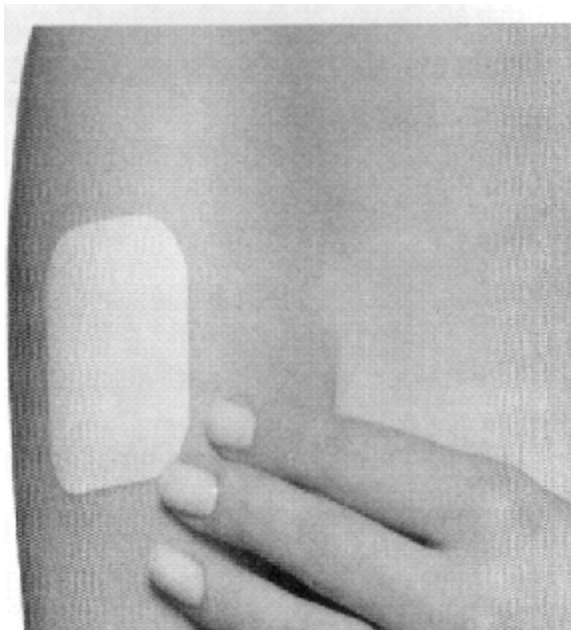
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Mirena (levonorgestrel-releasing intrauterine system) consists of a T-shaped polyethylene frame (T-body) with a steroid reservoir (hormone elastomer core) around the vertical stem. The reservoir consists of a white or almost white cylinder, made of a mixture of levonorgestrel and silicone (polydimethylsiloxane), containing a total of 52 mg levonorgestrel. The reservoir is covered by a semi-opaque silicone (polydimethylsiloxane) membrane. The T-body is 32 mm in both the horizontal and vertical directions. The polyethylene of the T-body is compounded with barium sulfate, which makes it radiopaque. A monofilament brown polyethylene removal thread is attached to a loop at the end of the vertical stem of the T-body.

Mirena (levonorgestrel-releasing intrauterine system) contains 52 mg of levonorgestrel. Initially, levonorgestrel is released at a rate of approximately 20 mcg/day. This rate decreases progressively to half that value after 5 years. Effective for 5 years.

Transdermal Patch : It contains 20 ug of ethinyl estradiol and 150 ug of norelgestromin . The patch is to be worn continuously for one week and then replaced with a new one

Total 3 weeks use and one week patch free



**Conclusion :**

- Newer contraceptives are highly effective, convenient and safe reversible methods
- They offer privacy and empower women the choice of spacing the next child
- Proper counselling about menstrual irregularity reduce discontinuation rates
- Their advantages outweigh the disadvantages. Injectable contraceptives not only offer freedom to choose motherhood, but also have promising future as contraception for generation next.