Hormone Releasing Intrauterine Devices [1]

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Hormone releasing intrauterine devices or hormonal IUDs are contraceptive devices placed in a woman's uterus [3] to prevent pregnancy [4] by continuously releasing a low dose of certain hormones [5]. Jouri Valter Tapani Luukkainen, a medical researcher at the University of Helsinki, introduced the first hormonal IUD in 1976. Luukkainen's IUD was a plastic device shaped like a capital T. The horizontal shafts of the IUD held a reservoir of the hormone [6] Levonorgestrel that the IUD slowly released at a constant rate over the IUD's lifetime, allowing the hormonal IUD to remain effective for five to seven years. Women can use hormonal IUDs for long term contraception [7] that requires no maintenance on the part of the user. The hormonal IUD provides women an option for reliable long-term birth control [8] that does not require maintenance to remain effective.


The hormonal IUD has several mechanisms of action that contribute to preventing pregnancy [4]. All IUDs cause the uterus [3] to become inflamed because the woman's immune system responds to the IUD as a foreign body. That response makes the uterus [3] inhospitable to both sperm [16] and potential embryos because the woman’s immune system responds to inflammation by actively targeting foreign cells. The inflammatory response prevents pregnancy [4] on two fronts, by preventing sperm [16] from reaching and fertilizing an egg [10] and by preventing any fertilized eggs from implanting in the uterus [3] and developing into a pregnancy [4].

Along with the inflammatory response, there are specific mechanisms of contraceptive action unique to the hormonal IUD. Those effects are attributed to the constant release of a low dose of a synthetic form of the hormone [6] progesterone [14]. To fertilize an egg [10] and form an embryo, sperm [16] must travel through a layer of mucus that covers the woman’s cervix [20], the opening at the base of the uterus [3]. In women who use a hormonal IUD, the hormone [6] release causes the cervical mucus to thicken, which makes it difficult for sperm [16] to fertilize an egg [10]. Hormonal IUDs also prevent ovulation [13] in some women because high levels of the hormone [6] progesterone [14] suppress ovulation [13]. If no egg [10] is released from an ovary [11], there is no opportunity for an egg [10] to be fertilized by sperm [16] and result in a pregnancy [4]. Because hormonal IUDs mainly work by releasing a hormone [6] that controls fertility, the device does not need to fit perfectly within the uterus [3] to be effective. That quality makes hormonal IUDs a viable [21] option for most women, even those who have abnormally shaped uterus.

The hormonal IUD developed in the late 1970s was an improvement on earlier IUD technology that had existed since the early part of the twentieth century. Before modern IUDs that release hormones [5], or copper ions in the case of copper IUDs, IUDs were inert devices that prevented pregnancies by provoking an inflammatory response in the uterus [9]. That inflammatory response made the uterus [3] a hostile environment for sperm [16] or potential embryos and therefore prevented pregnancy [9]. In 1909, medical doctor Richard Richter developed the first intrauterine device in Germany. That early IUD was a wagon circle of coarse silkworm [22] gut covered in a layer of celluloid plastic. Richter’s IUD was not widely used at the time of its development because of laws in Germany that prohibited birth control [8].

In 1929, Ernst Gräfenberg, also a physician in Germany, developed an IUD named the Gräfenberg ring, which was a ring made of coiled silver wire. Gräfenberg researched the efficacy of his IUD and reported that 1.6 percent of women using the IUD became pregnant. Although Gräfenberg’s IUD was effective, it soon became associated with cases of pelvic inflammatory disease [23], a type of pelvic infection. Gräfenberg's peers denounced Gräfenberg and the Gräfenberg ring, and the ring's popularity in Germany declined. The early types of IUDs that were made of metal often caused problems when they were inserted, including pain or lacerations that could later become infected.

In 1958, the introduction of the plastic IUD mitigated some of the problems women had faced with the earlier metal IUDs. In
require surgery. Women who become pregnant while using an IUD are at risk of having an ectopic pregnancy [3] because the placement procedure may introduce bacteria into the woman's uterus [3], and require surgery to remove. Some women who use hormonal IUDs develop a cyst on their ovaries [11]. According to the manufacturers of Mirena, Skyla, and Kyleena, those cysts usually go away on their own and do not require surgery. Women who become pregnant while using an IUD are at risk of having an ectopic pregnancy [26], or a
Hormonal IUDs are an effective form of long-term reversible birth control that allows women to have greater control over their fertility. Hormonal IUDs are a popular form of contraception that is over 99 percent effective at preventing pregnancy, IUDs can be used long term, a factor that, when combined with the high effectiveness, makes IUDs a viable alternative to sterilization procedures. Women can also use hormonal IUDs to treat heavy menstrual bleeding and alleviate the symptoms of menorrhagia.

Sources


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Subject
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