

## Menarche

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**ABSTRACT**

Menarche is a female's first menstrual period and a landmark event for females during puberty. Historically, menarche has been thought of as a time when women were "unclean." However, cultural acceptance and scientific knowledge of menarche has greatly increased. Menarche occurs as part of the typical progression of puberty caused by rises in luteinizing hormone (LH), follicle stimulating hormone (FSH), and estrogen. The achievement of menstruation is associated with reproductive capability. Menarche that occurs earlier or later than expected should be evaluated by an experienced clinician and may signal a serious underlying problem. Currently, researchers are evaluating whether menarche is occurring earlier than in years past. An area of concern is whether environmental chemicals are affecting the timing of puberty.

**Main Text:**

Menarche is a female's first menstrual period. Menarche is considered to be a landmark event for females during puberty. A menstrual period is the sloughing of the lining of the uterus (womb). Menstrual periods occur approximately every 28 days in females. The purpose of the menstrual cycle is to prepare the uterus (or womb) for implantation of a fertilized egg. If fertilization does not occur, the menstrual lining sloughs and the female has a menstrual period.

From a historical perspective, menstruation was thought of as a necessary evil endured by women ("the inferior sex"). Women were thought to be unclean during menstruation and were excluded from societal rites such as entering temples. According to Aristotle, menses were "formless matter which, in the course of each month, accumulated gradually in the womb" (Wood 1981, 715). Semen, however, was a "pure male form" and created a fetus when imposed on the "menstrual matter" (Wood 1981, 715). Fortunately, since the time of Aristotle, scientific knowledge has expanded to better understand menstruation as a normal part of reproductive physiology. Many, although not all, cultures today accept the normalcy of the menstrual period.

Menarche occurs as part of the progression of puberty. Puberty typically starts between ages 8-14 years for girls. The timing of menarche may vary by race. African American females reach menarche on average at 12.0 years which is slightly earlier than Caucasian females who reach menarche at an average of 12.6 years (Greydanus et al. 2010, 318).

Menarche is achieved as a result of a sequence of hormonal changes. Within the brain, the hypothalamus releases pulsatile secretions of gonadotropin releasing hormone (GnRH). This leads to a rise in luteinizing hormone (LH) and follicle stimulating hormone (FSH)

within the pituitary (also in the brain). LH and FSH stimulate the ovaries. Maturation of this system leads to ovulatory menstrual cycles meaning an egg is released during the middle of the cycle in preparation for fertilization.

The menstrual cycle consists of three phases: follicular phase, ovulation, and luteal phase. During the first phase, the follicular phase, days 1-14, a follicle within the ovary grows which houses an oocyte (an egg). Also during the follicular phase, the endometrial lining grows. During ovulation, the next phase, an oocyte is released from a follicle. The oocyte travels down the fallopian tube where it may be fertilized if sperm are present. The follicle that initially housed the oocyte (egg) becomes the corpus luteum (luteal phase). If pregnancy does not occur, the corpus luteum regresses and menstruation occurs (Greydanus et al. 2010, 320-323).

Menstrual cycles typically occur every 28 days ( $\pm 7$  days) and last 4 days ( $\pm 2-3$  days). Median blood loss during the menstrual period is about 30 milliliters (ml) per month. The upper limit of normal blood loss is 60-80 ml per month (Greydanus et al. 2010, 319). Menstrual hygiene products are popular in today's society and include menstrual pads and tampons.

Menarche that comes earlier than expected should be evaluated by an experienced clinician. In the newborn period, bleeding may occur as a result of withdrawal from the mother's hormones. Early bleeding may be caused by precocious (early) puberty. If there are no other signs of puberty, causes such as vulvovaginitis (infection of the female genitals), trauma, a foreign body, child abuse, genital tumors, hypothyroidism, or McCune-Albright syndrome need to be excluded (Tomboc 2001, 65).

Delayed menarche is similarly concerning. Mayer-Rokitansky-Kuster-Hauser syndrome is absence of the vagina with or without absence of the uterus. This syndrome occurs in 1 in every 4000 to 10,000 female births. Another cause of delayed menarche is imperforate hymen. Hormonal causes include polycystic ovarian syndrome (PCOS) and congenital adrenal hyperplasia (O'Dea 2001, 79-81).

Problems that may accompany menstruation include irregular, heavy, or painful menstrual periods. Periods may be irregular for approximately two years after menarche. Periods that are irregular should be evaluated by a clinician. Premenstrual syndrome occurs in a large proportion of reproductive age females and includes symptoms such as mood swings, anxiety, depression, bloating, and fatigue.

Current research is evaluating whether puberty and menarche are occurring earlier than in years past. However, studies have been inconclusive in their results. More research needs to be done on environmental factors that may play a role in menstruation. There is concern that chemicals in the environment disrupt the hormones that lead to puberty and affect body size and pubertal timing.

SEE ALSO: Adolescence; Birth control/Contraception; Puberty; Reproduction; Sex education; Teen sexuality; Teen pregnancy.

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Stephanie Stockburger is an Assistant Professor at the University of Kentucky, in Lexington, Kentucky. She completed her medical school and pediatrics residency at the University of Kentucky. She is part of the Division of Adolescent Medicine in the Department of Pediatrics.

Dr. Hatim A. Omar is Professor of Pediatrics and Obstetrics and Gynecology and Chief of Adolescent Medicine & Young Parent Program at the University of Kentucky in Lexington. He is the founder & Chairman of the Stop Youth Suicide Campaign. He served as a member of Executive committee of the Section on Adolescent Health of the American Academy of Pediatrics and the Board of Directors of the North American Society for Pediatric and Adolescent Gynecology. Dr. Omar has published extensively in all areas of care for adolescents in various peer-reviewed scientific journals, authored many books and was featured on many media outlets. He the recipient of: **Founders of Adolescent Health Award: Community Leadership** from the American Academy of Pediatrics: Section on Adolescent Health 2007; **Commonwealth of Kentucky Governor's Award** for Community Service and Volunteerism 2000; The **William Lions Award**, and the **Miracle Maker Award** and many others.