The Shettles Method of Sex Selection [1]

By: Blight, Alysse Keywords: Shettles Method [2] Landrum Shettles [3] Sex selection [4] X-Chromosome-Bearing Sperm [5] Y-Chromosome-Bearing Sperm [6]

In the 1960s in the United States Landrum B. Shettles developed the Shettles method, which is a procedure for couples to use prior to and during an intercourse to increase their chances of conceiving a fetus [7] of their desired sex. Shettles, a physician, who specialized in obstetrics and gynecology, found a difference in the size and shape of male sperm [8] cells that he correlated with the different sex chromosomes they carry. Based on that finding, Shettles developed procedures for couples to follow based on whether they desire a female or a male fetus [7] and published them in the 1970 book, *Your Baby's Sex: Now You Can Choose*. The Shettles method is based on the idea that male-producing sperm [8] prefer alkaline conditions, whereas female-producing sperm [8] prefer acidic conditions. The method provides couples with a procedure intended to enhance the favored environment for the sperm [8] that will supposedly produce the desired sex, including female douches to be used before intercourse and how to time sexual intercourse [9] within the female menstrual cycle. The book *Your Baby's Sex: Now You Can Choose*, made the Shettles method a widely popular method of natural sex selection.

During the mid-twentieth century, Shettles studied the physiology of human reproduction. He conducted his research at Columbia University [10] in New York City, New York, where he was a faculty member of the College of Physicians and Surgeons and a staff member of the Columbia-Presbyterian Medical Center. At the time, he was also a fellow of the American College of Obstetricians [11] and Gynecologists. Throughout the 1950s, Shettles worked with *in vitro* [12] fertilization [13], or fertilization [13] of a human female egg [14] by human male sperm [8] that occurs outside of the womb [15] in a laboratory setting. Unlike many researchers at the time, Shettles successfully fertilized human eggs using that method. He made photographic records of his work, which enabled people to directly study human development from the moment of conception [16].

Then, during the 1960s, Shettles shifted the focus of his research to exploring the differences between male sperm [8] cells based on which sex chromosome they carry. Prior research had determined that humans [17] have two sex chromosomes, or structures of genetic material that determine their sex, designated with the letters X and Y. In humans [17], females have two X chromosomes, while males have one X chromosome and one Y chromosome. During conception [16], the female egg [14] contributes one X chromosome and the male sperm [8] contributes either an X or a Y chromosome. Therefore, male sperm [8] cells determine the sex of the child conceived. Researchers had also described the differences between the two male sex chromosomes as being that X chromosomes are larger than Y chromosomes.

Shettles investigated whether he could differentiate X-carrying sperm [8] and Y-carrying sperm [8] by their physical appearance. He began to examine the size and shape of what were called the heads of the sperm [8] cell, or the end of the sperm [8] cell that carries the genetic information. Shettles found that the use of traditional microscopy [18], which required staining that killed the sperm [8], distorted the shape of the cells. It was not until he attempted to view live sperm [8] under a phase-contrast microscope [19], which illuminated the specimen differently than a traditional microscope [19], that he was able to observe their actual shape. Then, Shettles was able to identify two distinct types of sperm [8] cells based on their size and shape.

In the late 1960s Shettles examined over 500 sperm [8] specimens using a phase contrast microscope [19] and concluded that the small, round-headed sperm [8] contained male-producing Y chromosomes, or androsperm, while the large, oval-shaped sperm [8] contained the female-producing X chromosomes, or gymnosperm. During his research, Shettles also noticed that most samples did not contain an equal number of both types of sperm [8]. To analyze the potential effect that difference had on the actual sex outcome of a child, Shettles began checking the family history of the men who provided the sperm [8] specimen. Although rare, he did find some instances of men whose semen [20] contained significantly more round-headed androsperm. In those cases, the men had a male-dominant family history. Similarly, yet still rare, Shettles also found that men whose semen [20] contained significantly more oval-shaped gymnosperm had produced more female children. Shettles concluded that the two distinctly shaped sperm [8] cells correlated to the two sexes of the possible offspring. With that, Shettles began to look for more differences between the two types of sperm [8] cells that could lead to a means of sex selection.

By exposing the sperm [8] cells to the various environments throughout the female reproductive tract, Shettles found that androsperm and gymnosperm survived longer and swam better in different environments. He observed the sperm [8] samples in solutions of vaginal and cervical secretions under a microscope [19] and found that gymnosperm survived longer in the acidic conditions of the vagina [21], while androsperm swam faster in the alkaline conditions of the cervix [22]. The vaginal environment is generally acidic, while the cervix [22] and uterus [23] are generally alkaline. However, the closer a woman is to ovulation [24], or the point in the menstrual cycle in which eggs are released from the ovaries, the more alkaline her cervical secretions to the vagina [21] become.

Detecting ovulation [24] is an important factor for following the Shettles method accurately, as the timing of intercourse has a large impact on the sex of the child, according to Shettles's research. The female menstrual cycle is generally a twenty-eight day cycle that begins on the first day of menstruation [25]. Women are considered to be fertile for about seven to ten days after menstruation [25] ends. The peak of that fertile period is normally around the fourteenth day, when ovulation [24] is thought to occur. Women are the most fertile during ovulation [24] because that is the time when one of the ovaries releases the egg [14] that makes its way to the uterus [23] as the body prepares for a possible fertilization [13]. The uterus [23] is the easiest location for the sperm [8] to travel to fertilize the egg [14], otherwise it must travel through the female reproductive tract to reach the egg [14] is the ovaries where it is normally contained.

The Shettles method of sex selection is based on the different environments that are prominent throughout the female reproductive tract during the menstrual cycle. The most important aspect of the method is timing sexual intercourse [9] within the menstrual cycle according to which sex the couple desires. To produce a female, couples should abstain from intercourse two to three days before ovulation [24]. Prior to that, intercourse is encouraged, as the time between the end of menstruation [25] and at least three days before ovulation [24] is when females are more likely to be produced. However, to produce a male, couples should abstain from intercourse from the beginning of the menstrual cycle until the day of ovulation [24]. The day of ovulation [24], as well as the following two to three days, are when the chances of producing a male are the highest.

The Shettles method suggests different douches that the female should use preceding intercourse to prepare the reproductive tract and to enhance the environment necessary to produce a fetus [7] of the desired sex. An acidic douche containing two tablespoons of white vinegar to one quart of water should be used to increase the likelihood of producing a female fetus [7]. An alkaline douche containing two tablespoons of baking soda to one quart of water should be used to increase the likelihood of producing a male fetus [7]. To be effective, the douches should be used prior to intercourse on every occasion. According to Shettles, those solutions are harmless to both the mother and the fetus [7].

As for the act itself, the Shettles method includes further details about the position assumed and the timing of female orgasm during intercourse. The position that is best for producing a male involves deep vaginal penetration from the rear, so sperm [8] cells get deposited close to the cervix [22] where the environment is naturally alkaline. However, couples should assume a face-to-face position and perform shallow penetration during intercourse to produce a female so the sperm [8] pass through the acidic environment of the vagina [21]. As for the female orgasm, the chemistry of secretions can affect the environment of the reproductive tract. The secretions that occur during a female orgasm are alkaline and therefore provide an additional measure of alkalinity within the environment, which is favorable for producing a male fetus [7]. Therefore, the female should have an orgasm before the male if the couple wants to increase the likelihood of producing a male fetus [7]. If the couple desires a female fetus [7] instead, then the woman should refrain from having an orgasm at least until after the sperm [8] has already been ejaculated to avoid the addition of alkalinity to the environment. In his 1970 book, Shettles claimed an eighty percent success rate for his method based on research from his own patients. However, he did not guarantee that his method would result in success on every occasion.

The Shettles method has been both supported and contested in other studies. In 1979, a study published in *The New England Journal of Medicine* that included over three thousand births concluded that the timing of sexual intercourse [9] during a woman's menstrual cycle affects the sex of the fetus [7]. More specifically, that study demonstrated that male fetuses were more often produced when intercourse occurred closest to ovulation [24], which is consistent with the Shettles method. However, in 1991 a smaller study published in *The American Journal of Obstetrics and Gynecology* produced opposite results, which demonstrated that significantly fewer male births occur when conception [16] takes place during ovulation [24]. Another study published in *The New England Journal of Medicine* in 1995 refuted all claims that timing of intercourse affected the outcome of a fetus's sex, and it argued that there was no association between the two.

Despite the inconclusive evidence that both confirm and contest the Shettles method, the original publication of the method in the book *Your Baby's Sex: Now You Can Choose* has maintained popularity throughout its forty consecutive years in print. Since its original publication in 1970, there have been six revised editions of the book and greater than one million copies sold. In each edition, the basis of the method has been strongly maintained, but procedures were slightly refined to improve their convenience and feasibility for couples at home.

In the sixth edition of the book *Your Baby's Sex: Now You Can Choose*, published in 2006, Shettles claimed that other methods of sex selection proposed since the book's original publication have failed because they cannot be replicated and are ethically questionable. Shettles maintains that his method is the only sex selection method to be continuously supported by scientific data, and therefore is the most reliable. Based on the support Shettles has received from religious entities and ethicists within the scientific community, he also claims that his method is the most ethical one available. The sixth edition of *Your Baby's Sex: Now You Can Choose* provided data from updated studies that showed a seventy-five percent success rate for couples that tried for females and an eighty percent success rate for couples that tried for males. However, after the sixth edition was published, another study was conducted on the shape of sperm [8] cells that demonstrated that there were no shape differences between sperm [8] carrying X or Y chromosomes. That study negated Shettles's original research, which set the foundation for his method.

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Subject

Sex Preselection [30] Choice of sex of offspring [31] Sex predetermination [32] Family planning [33] Sex chromosomes [34] Gonosomes [35] Spermatozoa [36] Sperm [37] X-Bearing Sperm [38] Y-Bearing Sperm [39]

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