



The Effect of Hormones on Female Sexuality and Menopause

Curriculum Unit 88.05.06

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INTRODUCTION

Human beings are born with glands in their bodies. These glands are called endocrine glands and they secrete hormones that control the rate of biochemical processes in the body. This unit will address itself to the stimulating hormones which cause other organs to produce their own characteristic hormone. Such will be the endocrine system and the hormones secreted as related to: 1. puberty or adolescence, 2. menstruation, 3. reproduction, 4. physiological and psychological changes, 5. menopause, 6. Osteoporosis, and 7. physicians from puberty to menopause, (pediatricians, obstetrician, gynecologist, urologist, and gerontologist.) Included are also lesson plans, a pre and post test, experiment, a reading list for teachers, vocabulary list and a bibliography.

The objective of this unit is to acquaint the students with the location and the function of the endocrine glands and the hormones they produce from puberty to the change of life, menopause. They will also be provided with information to assist in making wise decisions in life and insight on their physiological change.

This unit maybe taught in grades 7-12 and especially in Life Science and Biology classes. Parts may also be used in grades five and six. This unit will also correlate with units on Human Sexuality.

ADOLESCENCE OR PUBERTY

The adolescence period of young people extends from puberty to adulthood. The normal range is between twelve and twenty years.

During the first ten years of growth, this period is usually uniform. The body size usually meet the child's needs. Once the child reaches adolescence, "disharmony commences in the physiological development, growth and emotional maturation. The teenager becomes a blend of maturity and immaturity in body, mind and emotions." ¹ Physical growth is indicative of the first half of adolescence and intellectual and emotional growth in the latter half.

The sexual maturity of an individual's adolescent life is referred to as puberty. The normal age for puberty to

begin in girls is between 10-14 years. The boy's age for puberty is about a year behind the girl.

What is normal for one child is not necessarily normal for another and the sooner parents and child realize this, the less unnecessary anxiety will be exhibited during the adolescent growth period. The disharmony may also be observed in the individual's body growth.

Certain body parts may grow while others may lag. "Organ imbalance leads to organ instability. Thus laziness and awkwardness may result" ² The average boy's greatest height increase is between 12 and 14.5 years and continues to grow until age 18. Girls grow tallest between 10.5 to 14 years.

The reaching of puberty in the male is marked by the presence of pubic hair and the growth of the sexual organs and their ability to function. He is also capable at this time of achieving an erection of the penis. His voice deepens along with the broadening of the shoulders.

The lengthening of the legs are evident while his feet and hands grow larger.

Menstruation in the female is a sign of reaching puberty. The fear and shock interplays in this event when she has not been properly prepared. Irregularities and physical discomfort are common the first year. Parallel with menstruation is the broadening of the hips, the development of the breasts and the appearance of pubic hair.

The emotional factor is the most important aspect in the adolescent years. The adolescent is no longer considered a child but she or he may still exhibit childish wishes and habits. During this time the individual may also have many adult problems and emotions. He or she may long for both world and is unable to understand his peculiar position during this period. This may lead to a feeling of insecurity which may lend itself to arrogance.

Normally during the adolescent period the emotional parent ties should be widened to even more interests and relationships. If emotional maturity is stifled, it could lead to rebellion.

Puberty brings about anatomical, physiological, and endocrinological changes in the human which causes the individual to become sexually reproductive. These changes are caused by a message sent from the hypothalamus to the pituitary gland to release the FSH (follicle stimulating hormone), LH (luteinizing hormone). "The onset of puberty is believed to occur as a consequence of a change in the steady state of the prepubescent pituitary-gonadal system. It has been hypothesized that there is over years 6-10 a decrease in the feedback sensitivity of the central nervous system-pituitary axis, resulting in an increase in the secretion of GnRH, which in turn initiates the increased secretion of LH and FSH above the prepubescent low basal levels." ³

MENSTRUATION

Life consists of a series of changes. During the constant changes in life the body undergoes many cycles. One such cycle is the menstrual cycle which commences at puberty and continues through the child bearing years or menopause.

The commencing of the menstrual cycle is one sign of maturity, of becoming a woman. Month after month this cycle is repeated and is normally interrupted by pregnancy. After the birth of the baby the cycle resumes.

In order for the menstrual cycle to commence certain organs and glands become involved or start functioning.

The onset of menstruation is called menarche. There are a variety of intervals between periods. It is thought that the 28 day cycle may be a myth because few women have a perfectly regular cycle. The interval between periods may change many times during a woman's life. There are many circumstances that may affect the menstrual cycle, such as: illness, abrupt change of climate, or severe emotional stress. "The cycle is particularly irregular during the early years and again at menopause." ⁴

Some women may experience premenstrual tension. These symptoms may occur 10-14 days prior to the onset of the menstrual period. These symptoms may include "headache, bloating of the abdomen, fullness and pain of the breasts, increased irritability, depression, and emotional instability. The symptoms usually disappear hours after the menstrual flow starts." ⁵

The pituitary gland produces and stimulates the growth hormones. It is through the blood that this information is carried to the bones and tissue. This gland is about the size of a pea at menarche and is located at the base of the brain, (see diagram 5.) This gland is also called the master gland, the chief gland, or the control gland. It is the pituitary gland that notifies the gonads that it is time to start functioning. The pituitary sends a follicle stimulating hormone to stimulate the growth and development of follicles in the ovaries. The ovaries secrete estrogen which aid in the maturation of the follicle.

The ovaries are two glands containing thousands of follicles or egg sacs on either side of the uterus. Once a month ovulation occurs. In one of the 2 ovaries an egg or ovum matures and breaks out of its sac or graafian follicle and out of the ovaries. Luteotropic hormone (LTH) secretes progesterone which aid in follicle growth and maturation.

The two fallopian tubes, with fringed open ends near the ovaries, are less than 5 inches long, (see diagram 3). These tubes provide passageway to the uterus. It is also through these tubes that the egg travels enroute to the uterus after ovulation. The uterus or womb is a hollow organ. The lining is called the endometrium, from which the menstrual flow comes, (see figure 1). Every month the lining of the uterus (endometrium) builds up into a spongy mass of tissue containing blood to form a bed for the fertilized egg. If the egg is unfertilized it will disintegrate and will shed.

The vagina or birth canal is the passageway from the uterus to the outside of the body, (see diagram 1). It is through this channel that the menstrual flow leaves the body by way of the cervix.

The menstrual cycle is divided into four phases: 1. the menstrual phase - the actual shedding of the endometrium, 2. post menstrual phase - this is resting stage immediately following menstruation. During this time, the pituitary sends out hormones to the ovum and another egg begins to ripen, 3. intermenstrual phase the ovaries release a hormone which stimulates the endometrium and causes it to thicken. Ovulation occurs (a mature egg breaks out of the graafian follicle) the mature egg enters the fallopian tube, and the endometrium provides a nesting place for its development, and 4. premenstrual phase - the lining of the uterus continues to grow and thicken in preparation for the fertilized egg. If the egg is not fertilized the corpus luteum stops producing progesterone and the egg disintegrates. The lining is shed and a new cycle commences. If fertilization and implantation does take place the corpus luteum continues secreting progesterone and menstruation does not occur.

The proliferative phase includes the postmenstrual phase and the intermenstrual phase. It is during this phase that the hormone estrogen which is produced by the ovaries prepares the uterus and the walls begin to

thicken.

The secretory phase which is the premenstrual phase. It is during this phase that ovulation occurs and the portion that remains in the ovary is called the corpus luteum. The corpus luteum secretes progesterone which prepares the lining of the uterus to receive and nurture the fertilized egg.

During the normal menstrual flow, the individual discards 1-1/2 to 5 ounces of blood over the several days. This loss of blood is quickly replaced and does not cause weakening.

The female organs of reproduction include the ovaries, fallopian tubes, the uterus, the vagina, and the external genitalia, (see diagram 3). The ovaries and glands are located in the pelvis. The FSH, LH and estradiol are essential for the complete development of the mature ovum, which involves both follicular and oocyte maturation.

Progesterone is a hormone of pregnancy. This hormone stimulates the fallopian tubes and uterus in glandular secretions. Progesterone suppresses muscular contractions of the fallopian tubes and uterus which is critical to the maintenance of the pregnancy. Progesterone maintains the structure of the spiral arteries that provide blood to the secretory endometrium of the uterus. Progesterone acts on the cervix to greatly increase the viscosity of the cervical mucus.

The ovaries produce ova and the sex hormones, progesterone and estrogen. One is located on each side of the pelvis, lateral to the uterus. Each ovary is attached to the side of the uterus by a short ovarian ligament.

Out of the 2 million primary oocytes at birth, during sexual life only about 400 of these follicles become mature and the rest regress in size throughout life. At menopause, only scars remain.

The fallopian tubes, sometimes called the uterine tubes, or oviduct are bilateral muscular ducts. These ducts mucosa contain ciliated epithelium, which are little hair-like bodies. They are about 4 inches long. The dilated end near the ovaries has a number of fingerlike processes called fimbriae.

The function of the oviduct is a passageway to convey the ova from the ovaries to the uterus. It is in these tubes that fertilization takes place, (see diagram 3).

The uterus is a hollow, thick walled, pear shaped, muscular organ. The uterus is located in the pelvic area between the rectum and the bladder. The three parts of the uterus includes (1) the body, which expands over the oviduct; (2) the isthmus, or middle, slightly constricted portion; (3) the cervix, the lower part that surrounds the cervical canal.

The uterus is the organ in which the embryo grows and develops until the time of parturition.

The vagina is a fibromuscular tube which is anterior to the rectum and anal canal and posterior to the bladder and urethra. It is the organ of copulation and during parturition it serves as the exit from the uterus.

The lining of the vagina secretes an acid fluid that serves as a cleanser and lubricant.

The external female genitalia are often grouped together under the vulva, which include the mons pubis, the labia majora, the labia minora, the clitoris, the vestibular of the vagina and the greater vestibular glands.

The mons pubis, is a fatty pad of tissue located on the pubic bone above the genital organs. After puberty it is

covered with hair and has the shape of an inverted triangle. The labia majora, is the external folds of skin that protects the vagina. It conceals most of the external reproductive organs. This organ is homologues to the scrotum in the male. Located in the labia majora are large sebaceous glands that become pigmented after puberty. (see diagram 2)

The labia minora, are two longitudinal folds that borders the vagina.

The clitoris is located at the apex of the triangular area, it is homologues to the penis in the male. This organ contains erectile tissue and becomes firm and filled with blood when stimulated.

The vestibule of the vagina is situated posterior to the clitoris. The urethra opens into the area anteriorly and the vagina opens posteriorly.

The bartholin's glands function is to moisten. These glands open on either side of the vaginal orifice.

MENOPAUSE

There is considerable variations at what age menopause begins. Menopause is a time in a womans life when menstruation ceases and she is no longer capable of reproducing. This climax is commonly called the change of life.

The primary cause of menopause is due to the changes sent out by the endocrine system mainly the pituitary gland and hypothalamus gland and ovaries, which cause a physiological cessation of the menstrual period. This is due to a gradual reduction of the hormones in the ovaries that control the menstrual cycle. The ovaries wither and are no longer to produce estrogen in-quantity. Usually the woman is between 45 and 52 years when the gradual cessation of menstruation begins. Menopause often take place over a period of 1 or 2 years. In some cases it is spread out over several years. Prior o menopause the menstrual period generally becomes irregular in the amount of the flow and the duration of the flow. Also the length of time between successive cycles.

Many women are able to go through menopause without any difficulty, however, some women do have disturbing nervous, circulatory, and endocrine symptoms. "Nervous system symptoms include headache, dizziness, insomnia, drowsiness, neuralgia, numbness in the legs, and itching. Circulatory symptoms include hot flashes perspiration, a sensation of choking or suffocating, rapid pulse, and shortness of breath. Hot flashes refer to hot tingling sensations that involve the whole body while hot flush refers to involvement of the head, neck and upper chest. Endocrine system signs are due mainly to diminished production of female hormones and include changes such as arteriosclerosis caused by the decreased hormonal levels." 6

When a woman undergoes artificial menopause through an operation where by her ovaries are removed hormonal replacement is prescribed. In case of hysterectomy, when the uterus is removed, the woman will no longer menstruate. Hormones are again prescribed and over a prolonged period of using hormones may cause side effects in some patients.

Through estrogen replacement therapy, menopause can be delayed. This involve synthetically taking doses of estrogen into the body. The dosage is determined by a physician. The plan is similar to taking birth control pills. The end results is planned bleedings or menstruation. This may confuse some women into thinking they

can still become pregnant. However, once the ovaries have withered there is no possibility of pregnancy. The bleeding is due to the administration of hormones.

OSTEOPOROSIS

Osteoporosis is a common bone disorder and is estimated that e million women in the United States may be affected. It is characterized by insufficient bone calcification. Some recognizable causes of osteoporosis are as follows: “adrenal cortical hyperfunction, acromegaly, a prolonged calcium deficiency, prolonged immobilization, and a reduced level of estrogen, as in postmenopausal women.” ⁷

PSYCHOLOGICAL CHANGES

There may be some psychological symptoms that accompany menopause. There may be emotional upsets varying from slight changes in dispositions to actual psychosis. “Symptoms often include depression anxiety, irritability, and tension.” ⁸ Some symptoms may be due to growing old or temporary hormonal imbalance.

The decrease of estrogen secretion after menopause does not necessarily decrease a woman’s sex drive. If there are any abnormalities it is due to psychological factors not hormonal.

Some women fear, that their sexual attractiveness have ended, the departure of grown children, feelings of uselessness which may trigger psychotic depression. They become depressed, worry over real and imaginary illnesses and cries easily and often.

PHYSIOLOGICAL CHANGES

Some physiological changes will occur as the female estrogen production decline which will bring about menopause. If the female goes untreated, she will age much more quickly than a man of similar years. Some of the physiological changes are “marked skin changes, disfiguring fat deposits, the breast may begin to atrophy and the external genitals begin to regress.” ⁹

In childless women the vaginal lining is smooth after menopause.

Estrogen deficiency resulting from menopause may result in obesity, which is believed to result from decreasing caloric expenditure, and osteoporosis due to decreasing protein anabolism.

PHYSICIANS

From the time an infant is born his cells, tissues and organs begin to deteriorate. As an individual proceeds through the different cycles of life, various physician specialists should be consulted to enhance the individuals knowledge as to what is taking place in the body. This enlightenment should make the transitions from puberty to menopause more easier to cope with.

From the time a child is born she should be seen by a pediatrician. Pediatric's is a branch of medicine that deals with the prevention, diagnosis and treatment of diseases and disorders of children. The physician is called a pediatrician.

Obstetrics is that branch of medicine and surgery that concerns itself with the management of pregnancy and labor, also complications and disorders arising from them. The physician is called an obstetrician.

Gynecology is the study, diagnosis and treatment of diseases and disorders of the female genitalia and the reproductive endocrine system. The physician is a gynecologist.

The urologist concerns himself with the urogenital tract in the male and the urinary tract of the female.

Geriatrics; gerontologist, has to do with the physiological and the psychological problem of the aged.

The basic problems of the aged are security, social recognition, finances, food, a place to live and health care.

The most common physiological diseases or disorders of the aged are heart and circulatory, while the psychological problem will be in the area of the socioeconomics.

CONCLUSION

In puberty, hormones stimulate other organs to produce hormones and therefore, cause other organs in the body to start functioning. In the female the hypothalamus sends a message to the pituitary gland which causes the FSH, and LH to cause the ovaries to start producing estrogen and progesterone. It is these hormones that cause the menstrual cycle to commence. It is also the regression of these hormones that will cause the menstrual cycle to terminate at a period in life called menopause.

Menopause can be a frightening and traumatizing when the female is not made aware of some of the signs along the way. Much of this fear is credited to the lack of knowledge of hormonal change in the body. This insufficient knowledge may stem back as far as puberty or menstruation and the function of the hormones. This lack of knowledge can lead to mixed feelings and relate to more complex problems. There are many physician specialists that can help during various periods in life to arrest many of the anxieties associated with menopause.

VOCABULARY

1. menopause: menstruation ceases and reproductive life ends
2. puberty: period when gonads obtain normal adult function
3. menstruation: a periodic discharge of blood and body fluid from the uterus
4. amenorrhea: absence of menstruation
5. reproduction: producing one of its own kind
6. gonads: reproductive organs (ovary and testis)
7. hormones: a chemical secreted by special glands or tissues in the blood
8. pediatrics: a branch of medicine which deals with the treatment of diseases of children and infants
9. gynecology: medical science which the disease, reproductive physiology and endocrinology of the female
10. obstetrics: a branch of medicine which deals with the care of women during pregnancy, childbirth, and after delivery
11. gerontology: scientific study of the aging
12. ovulation: the releasing of ova from the ovaries
13. homologous: organic compounds that have the same structure
14. osteoporosis: a bone disorder due to insufficient bone calcification
15. calcification: deposit of calcium in the body parts
16. steroid: certain hormones formed by natural compounds
17. estrogen: a steroid hormone produced mainly by the ovaries
18. progesterone: a female hormone secreted by the corpus luteum of the ovaries
19. uterus: a pear shaped organ located in the pelvic girdle that provides a place for the embryo to grow
20. pituitary: an endocrine gland that secretes hormones that affect growth, other glands, and kidney
21. testosterone: a male sex hormone produced in the testes which controls the secondary sex characteristics

PRE TEST-POST TEST

TRUE/FALSE@3H(after2H):IF THE ANSWER IS FALSE, CORRECT THE ERROR.

1. the adolescent period extends from puberty to adulthood.
2. Menstruation is a sign of menopause.
3. The normal menstrual cycle is about 28 days.
4. The female produce estrogen and testosterone.
5. The normal age for puberty in girls is between 10-14 years.
6. The egg travels through the fallopian tube to the oviduct.
7. Menstruation involves the shedding of the walls of the scrotum.
8. Menopause is caused by the changes sent out by the endocrine glands.
9. The menstrual cycle is divided into four phases.
10. One of the signs of puberty in males is that he is able to reach an erection.
11. The ovaries contain thousands of spermatogenesis.
12. Some of the nervous system symptoms of menopause are hot flashes and hot flushes.
13. Hormones travel by way of the blood.
14. The onset of menstruation is called menarche.
15. Once a month fertilization occurs and an egg is released from the ovaries.
16. Once the ovaries have withered there is a slight chance of becoming pregnant.
17. Another name for uterus is womb.
18. The pituitary gland produce and sends out growth hormones.
19. Osteoporosis occurs after skeletal growth.
20. Progesterone is a hormone of pregnancy.
21. The reproductive organs are mainly located in the pelvic area.
22. A pediatrician is a doctor that specializes in the causes and treatment of childhood diseases.
23. Amenorrhea means the absence of menstruation.
24. Ovulation follows fertilization.
25. Reproduction is a period in life when reproductive life ceases.

LESSON PLANS

1. Adolescence or Puberty

OBJECTIVE: to explain the physical changes in the body brought about during puberty

- a.) pre test
- b.) range of adolescent period
- c.) physiological changes
- d.) normal age of puberty in the female and the male
- e.) the emotional factor as it relates to puberty
- f.) the hormonal changes that trigger puberty

2. Menstruation

OBJECTIVE: to explain the phases of the menstrual cycle

- a.) signs of maturity
- b.) varied cycles
- c.) symptoms of premenstruation
- d.) hormones that relate to menstruation
- e.) ovulation
- f.) organs of menstruation
- g.) four phases of menstruation

3. Physiological and Psychological Changes

OBJECTIVE: to become more knowledgeable of some of the physiological and psychological changes in the body

- a.) physiological symptoms
- b.) psychological symptoms
- c.) involuntional melancholia
- d.) estrogen deficiency

4. Experiment: ONE POTATO TWO POTATO

OBJECTIVE: to illustrate how one potato can produce many potatoes

MATERIALS

one potato with eyes

can

four inches of dirt

100ml of water

scapel

PROCEDURE

The students will cut the eyes from the potatoes

place the potato in 3 inches of soil and cover with 1 inch of soil

sprinkle 100ml of water over the soil

water daily as needed

keep in a warm area

in 30 days check the roots for signs of new potatoes growing

write hypothesis

5. Movie: "TEEN TALK"

OBJECTIVE: to find out how other girls and their mothers found out about menstruation

- a.) questions and answers to be shared with the class

1. How did you feel about the movie?
2. Can you identify with any one in the film?
3. How did you find out about menstruation?
4. How did you feel when you got your first period?
5. Has this film helped to arrest some of the anxieties you may be feeling? Explain!
6. and 7. Reproduction

OBJECTIVE: to discuss the reproduction organs, the location, the function, and the associating hormones

- a.) estradiol and progesterone
- b.) FSH and L
- c.) ovaries
- d.) fallopian tubes
- e.) uterus
- f.) vagina g.) external genitalia

8 . Menopause

OBJECTIVE: to explain the effect of hormones upon menopause

- a.) reduction of hormones in the ovaries
- b.) the age for menopause
- c.) physiological changes associated with menopause d.) estrogen replacement therapy

9. Osteoporosis and Physician Specialist

OBJECTIVE: to discuss the different physician specialists from puberty to menopause to differentiate between osteomalacia and osteoporosis

- a.) pediatrician
- b.) gynecologist and obstetrician
- c.) urologist
- d.) gerontologist
- e.) who can contract rickets
- f.) when osteomalacia can occur and symptoms
- g.) characteristics of osteoporosis

10. Vocabulary Test and Post Test

OBJECTIVE: to be able to spell the terms on the vocabulary list and to measure growth from post test

- a.) spelling test b.) post test

Notes

1. Van Nostrand's Scientific Encyclopedia p. 647
2. Ibid p. 647
3. Hormones p. 499
4. Encyclopedia Americana p. 636
5. Ibid p. 636
6. Encyclopedia Americana p. 636
7. Hormones p. 393
8. Encyclopedia Americana p. 634
9. Van Nostrand's Scientific Encyclopedia p. 523

Reading List for Teachers

1. Burt, J. J. and Brower, Linda A.; Education for Sexuality; Concepts and Programs for Teaching; W. B. Sandero Company, Philadelphia, 1970.
2. Israel, S. L. Diagnosis and Treatment of Menstrual Disorders and Sterility, 5th edition, N.Y. Hoeber Medical Division, Harper and Row Publishers, 1967.
3. Zacharias, Leona; Wurtman, R. J.; and Schatzoff, M; Sexual Maturation in Contemporary American Girls, American Journal of Obstetrics and Gynecology 108: 833-846, November 1, 1970.

Reading List for Students

1. Dodge, Eva F.; "The Doctor Talks about Menstruation," Journal of the American Medical Women's Association, 24: 716-719, Sept. 1969.
2. Hayes, M. V.; *A Boy Today...A Man Tomorrow* ; Optimist International, St. Louis, 1972.

3. "From Fact to Fiction;" Educational Dept, Tampax Incorporated, Lake Success, New York.

BIBLIOGRAPHY

1. *From Fiction To Fact* , Educational Department, Tampax Incorporated, Lake Success, New York.
2. *Encyclopedia Americana* , Encyclopedia Americana Corporation, 1980.
3. Miller, Majorie A. and Leavell, Latie C., *Anatomy and Physiology* ; 16th edition, The MacMillan Company, New York, 1972.
4. Norman, Anthony B. and Litwak, Gerald, *Hormones*, Academic Press INC., New York, 1987.
5. Silver, Rae and Feder, Harvey H. , *Hormones and Reproductive Behavior* ; W.H. Freeman and Company, San Francisco, 1979.
6. Van Nostrand's Scientific Encyclopedia, Van Nostrand Reinhold company, 5th edition, New York, 1976.

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