

Normal Vulvovaginal Health in Adolescents



Abigail C. Mancuso MD, Ginny L. Ryan MD, MA*

Department of Obstetrics & Gynecology, University of Iowa Carver College of Medicine, Iowa City, IA

ABSTRACT

As adolescence is often the first time a woman will see a gynecologist, it is important for health care providers to understand and be capable of explaining the changes that occur to a young woman during these years. Many adolescents and their caretakers who seek gynecologic care for what they consider vulvovaginal abnormalities may be misinterpreting completely normal changes; education and reassurance are the best treatment in these cases. Most medical literature on vulvovaginal health focuses on abnormalities and there is a paucity of information on what is considered "normal." This goal of this review is to describe normal anatomic and physiologic vulvovaginal changes that occur during the adolescent years, as well as to offer advice on how to educate and reassure young women during this vulnerable time.

Key Words: Adolescent health, Anticipatory guidance, Vulvovaginal health, Preventive care, Anatomy

Introduction

Adolescence is defined by the anatomic and physiologic stages of puberty and young women experiencing these changes are often unsure whether they are normal. The teenage years are often the first time an adolescent will see a gynecologist. Some of the most common reasons for seeking gynecologic care include questions regarding normal pubertal development, menstrual disorders, contraception, sexually transmitted infections (STI) and nonsexually transmitted infections.¹ Nevertheless, many teenagers are uncomfortable asking parents or gynecologists about their concerns and are instead using the Internet to research these issues; such searches may provide misleading information regarding the normalcy of what they are experiencing and may invoke fear. As health care providers it is important that we understand and can explain what is normal and abnormal in order to help alleviate fears for young women in this age group.

Anatomy

The anatomical changes of adolescent genitalia combined with normal exploration of sexuality can cause embarrassment for young women and concerns regarding how their external anatomy compares to others.² Common changes that occur during adolescent years include increased fullness of the mons pubis and labia majora as these areas accumulate adipose tissue.^{3,4} Labia majora length in reproductive aged women ranges from 7-12 cm with a mean of 9.3 cm. Prior to completion of puberty (between ages 8-13), the clitoris measures an average of 16 mm in length.⁵ This increases through adolescence with androgen stimulation and ranges between 5-35 mm, with an average of 19.1 mm, throughout

the reproductive years.^{5,6} Pubic hair growth is usually seen between ages 10-13.⁷ Color of the genital area can vary considerably, becoming lighter or darker than the surrounding skin, and rugosity of labia can vary from absent (smooth) to marked.⁶

Prior to estrogenization, vulvar mucosa is thin and red, and the tissue surrounding the hymen can appear erythematous.⁸ During and after puberty, the epithelial tissue increases in thickness and is at its thickest during the adult reproductive years.⁹ The labia minora continue to develop, eventually becoming a completely separate layer and joining at the posterior commissure.⁴ The normal labia minora length in reproductive aged women has been found to vary between 20-100 mm with a mean of 60.6 mm.⁶ Although the labia majora usually cover the vulva,⁸ this is not always the case and it is important to reassure young women that there is a wide range of normal when it comes to anatomic differences in external genitalia.

Increasing adolescent usage of the Internet to explore sexual and reproductive health results in more exposure to nudity and pornography that can exacerbate an increasing self-consciousness regarding the appearance of external genitalia.² An expanding number of adolescents are also shaving or waxing their pubic hair, adding to this self-consciousness.¹⁰ These trends have resulted in more and more adolescents presenting to providers with concerns about labial size and/or requesting female cosmetic genital surgery.² The American Congress of Obstetricians and Gynecologists (ACOG) currently discourages these procedures, as there is a lack of good evidence documenting the safety and long-term satisfaction.¹¹ ACOG also questions the ethical basis of performing these procedures for cosmetic reasons. Instead, ACOG encourages clinicians to inquire about the reasons behind a request for such surgery and to explain that there are many differences among female genitalia that are completely normal. This advice is important in an adolescent population that is especially vulnerable to insecurities.

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* Address correspondence to: Ginny L. Ryan, MD, MA, Department of Obstetrics and Gynecology, University of Iowa Carver College of Medicine, 200 Hawkins Drive, 31332 PFP, Iowa City, IA 52242; Phone: (319) 384-9170; fax: (319) 384-9367

E-mail address: ginny-ryan@uiowa.edu (G.L. Ryan).

There are few studies on the normal evolution of the labia minora over time. Available data and experience do suggest, however, that asymmetry of labia noted during adolescence may eventually correct itself without surgery² and that labia minora protrusion noted during adolescence may be temporary if labia minora growth occurs prior to fat deposition in the labia majora.³ Surgery during this time of growth may not only be unnecessary but could lead to the need for further surgery in the future as the labia continue to grow over time. Potential postoperative complications such as altered sensation, scarring, dyspareunia, infection, and adhesions can be avoided through simple education and reassurance.

There are concomitant changes in a young woman's internal genitalia during adolescence. In childhood, vaginal epithelium is thin and consists only of basal and parabasal layers of cells.³ Prior to puberty, the vaginal orifice measures less than 10 mm, and the mucosa appears red and folded and is very sensitive.⁸ With puberty and estrogen stimulation, intermediate and superficial layers of cells develop in the vagina, the introitus increases in diameter, and the urethral orifice is more easily discernible.⁹ Vaginal length increases from about 5.5–8 cm prior to puberty to about 6.5–12.5 cm.^{6,8} The vestibular mucosa thickens and develops a cobblestoned and roughened appearance, and the hymen thickens and often develops fimbriations. Normal anatomic variants such as deep notches, hymenal tags, or absent areas of the superior hymen may be seen.⁴ Hymenal tags may lie inside the vaginal canal and can give the appearance of a deep notch or absent hymen posteriorly.⁴ An external hymenal ridge is sometimes seen with a midline avascular area on the fossa navicularis.⁴

Discharge

Vaginal discharge is one of the top 25 reasons women visit primary care offices and an even more common reason for women to present to gynecologic offices.¹² About 75% of women will have vaginitis during their lifetimes and this often presents for the first time during adolescence.¹² Nevertheless, a significant number of cases of vaginal discharge in adolescents who present to a healthcare provider turn out to be normal physiologic discharge.¹³ Physiologic leukorrhea commonly precedes first menses by 3–6 months at the time of onset of cyclic ovarian activity.⁴ This discharge is generally thin, white, mucoid, odorless, non-irritating and varies with the menstrual cycle (after menarche).¹² It can also appear nonhomogeneous with clumps of desquamated epithelial cells.¹⁴ Such normal vaginal discharge is a combination of cervical secretions and uterine, follicular, and peritoneal fluid, and is a mixture of transudate through the mucous membranes, secretions from glandular structures, bacteria, bacterial products, and desquamated epithelial cells.^{14,15}

Physiologic leukorrhea can vary in consistency and amount based on hormone levels throughout the menstrual cycle.¹⁴ Immediately following menstruation, discharge is scant. With rising estrogen levels toward mid-cycle, discharge changes to a cloudy sticky consistency and then becomes more profuse and clear with ovulation.¹² As progesterone levels rise following ovulation, secretions become

more sticky and thicker and then change back again right before the onset of menses to a clear, watery discharge.¹² Several other factors can influence physiological discharge, including age, exogenous hormones, malignancy, presence of semen, personal habits and hygiene,¹⁶ medications such as antibiotics, diabetes, foreign bodies, spermicides, and vaginal douching.¹⁵ An ectropion (a normal developmental finding in which the squamocolumnar junction is on the ectocervix and regresses into the cervical canal with age) may cause significant vaginal discharge when prominent.¹ Wet prep of physiological discharge at any point during the menstrual cycle should show only normal vaginal epithelial cells without inflammation and have a pH of <4.5.^{12,14}

Lactobacilli become the predominant organism in the vagina during the reproductive years.⁴ Estrogen stimulation during puberty increases glycogen concentration in the superficial cells that is metabolized by lactobacilli. The resulting acidic environment (normal pH 3.8–4.4) plays a key role in defense against infection by making the vagina inhospitable to many other bacterial species. The lactobacilli also produce endopeptidase and hydrogen peroxide which may have an antibiotic effect.¹⁵ *G. vaginalis* and *M. hominis* are associated with bacterial vaginosis but can also be found in many healthy women.¹⁵

It can be hard to predict whether or not an infection is present based on the clinical appearance and symptoms of vaginal discharge, because these can be variable in both normal and abnormal discharge. It is important to query the nature and amount of discharge, whether this is different from baseline, and whether there is an abnormal odor. Only about 30% of women with symptomatic discharge are found to have a diagnosis of abnormality when wet prep, pH, urinalysis, gonorrhea cultures, and urine cultures were used¹⁷ and when specific bacterial and yeast culture techniques were used, only about 50% were found to have a diagnosis of abnormality.¹⁸ Vaginal discharge alone is a poor predictor of infection and other factors should be taken into account such as sexual history, hygiene, and whether there are other associated symptoms such as pruritus or vulvar irritation.¹² Adolescents who complain of “recurrent vaginal discharge” but are otherwise asymptomatic may instead have copious amounts of desquamated cells. Importantly, adolescents do not need a pelvic exam in order to test for STIs (these can be tested in urine and serum) or other infections (these can be tested with a self-acquired wet mount or urine test).¹

Evaluation and Management

When adolescents present to physicians with vulvovaginal complaints, it is important to provide a comfortable environment for these patients to talk about topics that may be embarrassing for them. This can be facilitated by asking open-ended questions and allowing the adolescent to explain in her own words what is going on, and by being especially conscientious to ask questions in a non-judgmental manner.¹² If a pelvic exam is to be performed, explaining the steps prior to and during the exam may help alleviate anxiety. Showing diagrams and photographs of the female genital tract, as well as offering a hand mirror so the adolescent can examine their own genitalia, can also be used to demonstrate the changes

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