

CHAPTER 7: SEXUALITY

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KEY POINTS^a

1. Declining sexual function is common with aging. There may be an additional decrement associated with the menopausal transition.
2. The causes of decreased sexual activity are multiple and include physiologic, psychologic, and social factors.
3. Definitions and Classification of Female Sexual Dysfunction, given by the consensus panel of the Sexual Function Health Council of the American Foundation for Urologic Disease, provide a standardized system for clinical diagnosis and treatment and are recommended for use by health care professionals [D].
4. Sexual interest, behavior, and activity should be routinely assessed at office visits on a regular basis, and a plan should be developed to address the woman's concerns.
5. Hormonal and behavioral therapy have had variable success in the treatment of sexual dysfunction but should be considered in patients who desire treatment for their dysfunction [B].

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1. INTRODUCTION

“Sex is a biologic expression of love and part of a universal human behavior with roots stretching back to the beginning of humankind.”

Won-whe Kim, M.D., Ph.D.

As women live longer, are healthier and more educated, have more leisure time, and are more aware of their own sexuality, they become inquisitive and sometimes apprehensive about changes in sexual function after menopause. Sarrel and Whitehead,

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^a Evidence categories are given in square brackets. A = randomized controlled trials (rich body of data); B = randomized controlled trials (limited data); C = nonrandomized trials and observational epidemiologic studies; D = Panel expert judgement. (See also table 1–1.)

in their survey of postmenopausal women, found a high prevalence of sexual problems, corroborating these changes in sexual function after menopause.¹ When women experience changes in their sexual function, they frequently turn to their health care provider for help with their problems.

The prevalence of female sexual disorders, in both premenopausal and postmenopausal women, ranges from 25 to 63 percent.

The prevalence of female sexual disorders, in both premenopausal and postmenopausal women, ranges from 25 to 63 percent.²⁻⁴ The recently published U.S. National Health and Social Life Survey included survey data from 1,749 women between the ages of 18–59 years (table 7–1).⁵ Sexual dysfunction was more prevalent in women

(43 percent) than men (31 percent). One-third of women lacked sexual interest, and almost one-fourth stated that they were unable to experience orgasm in menopause. According to the survey, 20 percent of those women reported lubrication difficulties, and another 20 percent reported that sex provided them little pleasure. Relevant to this survey, sexual dysfunction appeared to be more common in menopausal women than in premenopausal women. Similarly, more than 86 percent of postmenopausal women in Sarrel and Whitehead's survey reported a variety of psychosexual problems.¹ Due to the high prevalence of sexual dysfunction and the importance that patients attach to sexual function, it is essential to identify and address these problems in our patients. Ultimately, it will assist them in improving their quality of life and interpersonal relationships.

Much attention has been given to male sexual dysfunction, and only recently has attention shifted to better understand and identify female sexual dysfunction as a research priority. Clinicians receive little or no training in the diagnosis or treatment of sexual dysfunction and lack information on its causes and ways to prevent the changes that may

occur. The clinician's individual clinical impressions and previous experience are frequently used as the basis for clinical practice and are conveyed to the patient as truth, without evidence to support those views. Regrettably, most practitioners' clinical experience is not representative of most women's experience in the menopause. This is in part because those presenting for treatment are only a small proportion of women troubled. Those who choose to identify themselves to the clinician as having a problem represent only a fraction of women with problems.^{6,7} Armed with the appropriate facts, the clinician will be rewarded because all patients appreciate clinician awareness and competency in this field.

Because of these barriers, many studies in this review have methodologic weaknesses, including sample bias, low measurement sensitivity, and lack of detail on sexual preference. Population-based surveys suggest a link between menopause and changes in sexuality. Yet, relatively few studies of the menopausal transition in middle-aged women have inquired about sexual functioning. Of those, only a minority have used a validated questionnaire to assess the different aspects of sexual functioning. In addition, cross-sectional studies are unable to distinguish between effects of social change on different age groups and aging, and some improperly infer causation from associations. (See also ch. 3, sec. 3.)

Not insignificant is the controversy surrounding the study of sexual relationships. Kim noted that in some ethnic groups it is almost impossible to get an accurate answer from women about their sexual activities (Kim WW, personal communication). He accurately commented that there are very few norms set biologically or statistically, and, as a consequence, analyses done with questionnaires and interviews might not be reliable. Some interviewees are not sincere in answering the questions, and some give false information, as they feel shy about presenting their thoughts and feelings frankly. He emphasized that in most Asian countries,

TABLE 7-1**Prevalence of Female Sexual Disorders (Percent of Women)**

	Lacked Interest in Sex (n = 1,486)	Unable to Achieve Orgasm (n = 177)	Experienced Pain During Sex (n = 1,479)
Age (years)			
18-29	32	26	21
30-39	32	28	15
40-49	30	22	13
50-59	27	23	8
Marital Status			
Currently married	29	22	14
Never married	35	30	17
Divorced, separated, widowed	34	32	16
Race			
Caucasian	29	24	16
Black	44	32	13
Hispanic	30	22	14
Other	42	34	19

where over half the world's population lives, the situation is even more complicated. Women are raised under the influence of Confucian ideology from early childhood and are taught that they should not even be allowed to express their desire to have sex. All the myths and misconceptions concerning female sexuality, especially in old women, remain. They believe, "It is natural to be away from sex when you are old" or "Remarriage after the death of your spouse should never be thought of."

Population-based surveys suggest a link between menopause and changes in sexuality.

Other methodological problems limit study in this field. Until recently, there were no objective, standardized definitions of both the physiologic and psychologic basis of female sexual dysfunction and menopause. On the other hand there is still no consensus on an age cohort

that covers the menopausal transition. Should it be 45–55 years of age, or should it be defined by shorter intervals? There are differences between naturally and iatrogenically induced menopausal women and these distinctions are often not made in discussions of sexual dysfunction. Furthermore, the differences between those who choose to take exogenous hormones and those who wish to make the menopausal transition without pharmacotherapies are not well defined. Therefore, how we approach these women differently is confusing. Objective measures of hormonal change are not defined or standardized; instead, the absence of uterine bleeding repeatedly defines menopause. (See ch. 2 for definitions.) Questionnaires are not designed to reflect how women experience, problems and data analysis techniques have to be more appropriate. (See ch. 3 and 4 for biases in women sampling.)⁸ The studies reviewed in this chapter represent the available current evidence and must be used as a basis for best practice.

This chapter is designed to provide the best answers to the following questions based on the current evidence in the literature:

- Do changes in sexual behavior, interest, or response, occur with age or menopause, or both?
- If changes occur, what are they, and what causes them?
- How do we define the changes?
- Do we treat the changes, and if so, what therapies have proven efficacy?

2. INFLUENCE OF AGE ON SEXUALITY

The most frequent measures of change in sexual function used in the literature are coital and orgasmic frequency. To understand the changes of the menopausal transition, we must first review the changes leading up to the years most commonly used to define menopause.

The Kinsey studies conducted in the 1950s were the earliest to examine the relationship between sexuality and age. In 1953, in a cross-sectional descriptive analysis, Kinsey et al. described the aging patterns of sexual activity in unmarried men and women.⁹ The frequency of orgasm reported by women remained relatively constant at 0.5 episodes per week from puberty through age 55. Men reported a constant decline from 2.3 episodes per week at age 15 to 1 episode per week at age 50. Married women and men showed similar declines in frequency, with women having lower levels of activity than men at all ages. The authors surmised that the married woman's decline might be a result of her husband's and not her own aging. Women also indicated that their sexual activity reflected whether or not they had a partner and, if they did, their partner's preferences. Their report lacks indication of a decline in a woman's sexual function secondary to age, and it was unable to determine whether a decline in function with age was due to physiologic, psychologic, or social factors.

A legitimate question to ask is whether this information obtained from two generations past applies today. The answer awaits further study. There have clearly been changes in sexual mores over the years. Nowadays, the orgasmic frequency of women may be much higher than 0.5 episodes per week. Many women experience orgasm in different ways than is classically described, and this may explain the relatively low frequency of orgasm reported in the Kinsey studies. Moreover, many women get sexual satisfaction without achieving orgasm, especially those who value intimacy and the relationship with their partner. This is often not accounted for in research studies.

Some of the earliest studies of sexuality attempted to define the factors that influenced sexual activity. In 1960, Newman and Nichols reported cross-sectional data on 250 men and women between the ages of 60 and 93.¹⁰ In the 100 persons in the single, divorced, or widowed group, only 7 percent were sexually active. In the remaining 150 persons in the married group, 54 percent were sexually active, suggesting that a socially permitted and legally approved partner significantly influenced the continuance of sexual activity. There was a gradual decline in activity through adulthood, although some level of activity persisted into late adulthood.

In 1972, Pfeiffer et al. attempted to report the various sexual behaviors in middle-aged and older both women and men.¹¹ Using a subsample from a larger longitudinal study on the determinants of adaptation in middle life (the Duke study), they showed a pattern of declining sexual activity with age in both sexes. The frequency of intercourse was lower for women than for men at all ages; however, 98 percent of the men versus 71 percent of the women were married. Both women and men attributed the choice of discontinuing sexual intercourse to the man. Only 7 percent of women reported no sexual interest. Of those who did note a decline, the sharpest increases were noted

between ages 45 and 50 and between ages 51 and 55. These findings contradicted earlier work.

In 1981, George and Weiler reported on 502 married men and women 46–71 who were followed from the original Duke cohort at 2-year intervals for 4 years.¹² Of those who attended all interviews and remained married (278), 20 percent of the total group reported a decrease in sexual activity while 5 percent reported an increase. Only a small portion of the sample ($n = 57$) were women aged 46–55 at the beginning of study. Despite the overall decrease, the authors concluded that sexual activity remained more stable over time than was previously suggested. One limitation of the Duke Study was that it obtained its sample from enrollees of an insurance company and was therefore a biased sample of middle, and upper-class healthy, employed people 55 years and older.

As evidenced by the above reports, there had been only small, descriptive reports up to the late 1970s. This led Hallstrom to recruit 800 perimenopausal Swedish women aged 46, 50, and 54 years and a premenopausal group, 38 years of age to attempt to better define changes in sexual functioning which may be related to the menopausal transition.¹³ All of the women had intact uteri and ovaries, and none were using oral contraceptives (OCs). All were cohabiting with a man. Factors assessed were sexual interest, orgasm with coitus, change in sexual interest, change in capacity for orgasm, and mean frequency of coitus—all stratified by age cohort. There was a striking decline in sexual interest, capacity for orgasm and coital frequency from age 38 to 54. Not all women reported a decrease, but the majority of the menopausal women did. The Gothenburg Women Study refuted a century-old belief that sexual interest abruptly increases during the climacteric. Although a small group reported increases in sexual interest or capacity for orgasm, the numbers were small and decreased with age.

The Danish study of Koster and Garde involved a general population sample of 474 women, all born in 1936, who were subsequently examined at the ages of 40, 45, and 51.¹⁴ Personal interviews were conducted in 1976 and 1981, and questionnaires were mailed for the last followup. Of the 51-year-old women, 59 percent reported no change in sexual desire over the study period of 11 years, 30 percent reported decreased desire, and 11 percent reported an increase. However, this was based on recall from 11 years earlier. Decrease in sexual desire correlated significantly with the woman's subjective assessment of being climacteric.

One of the more recent investigations was by Hallstrom and Samuelsson, who utilized the women in the original Swedish cross-sectional study for a prospective study on sexual desire.¹⁵ The study surveyed 497 married or cohabiting women, on two occasions, 6 years apart, about their sexual desire. They found significantly decreased sexual desire between ages 46 and 60. After the age of 50 years, none reported a strong sexual desire; 27 percent reported a decrease, and 10 percent reported an increase in desire between the interviews.

To assess what changes women complained of, Osborn et al. surveyed 436 women with a male sexual partner (94 percent married) and found 33 percent to have at least one operationally defined sexual dysfunction. (See sec. 6).¹⁶ The most frequent dysfunctions were reduced sexual interest (17 percent), vaginal dryness (17 percent), and infrequent orgasm (16 percent). Dyspareunia was described by 8 percent. Significant factors were assessed, with age emerging as the most important determinant of operationally defined dysfunction. One or more dysfunctions occurred in 49 percent of women aged 50 and older and in 21 percent of women younger than age 50.

In 1997, Barlow et al. reported on their study of 2,045 women between the ages of 55 and 85 years.¹⁷ Their aim was to describe urogenital aging

and its associated problems in older British women. The survey reported 73 percent of the women were not sexually active, with the lack of a partner being a major reason. There was decreasing sexual activity with increasing age; however, women aged 65–74 had a frequency of activity similar to the younger women studied. Dyspareunia and/or vaginal dryness were described as a severe problem by 12 percent, among which 33 percent did not seek professional advice and 36 percent used “over-the-counter” remedies. HRT was of short duration and declined with age.

2.1 Influence of Menopausal Status and Ethnicity on Sexuality

Sarrel and Whitehead were among the earliest to associate a decline in sexual activity with menopause. They interviewed 185 women attending a menopause clinic to define what issues, concerns, and dysfunctions were present.¹ More than 86 percent reported a sexual problem. Most women (121/185) reported developing their sexual problem immediately preceding and following the transition through menopause. Problems they identified included disorders of sexual desire, sexual response, and sexual behavior. Newman and Nichols also showed a decline in sexual interest with age, with an implied association with the menopause transition.¹⁰ In contrast, Pfeiffer et al. reported that, in comparison to age, menopausal status made a small contribution.¹¹

In 1996, Myers performed a meta-analysis of sexuality and menopause.¹⁸ Empirical studies performed from 1972 to 1992 that assessed sexuality and perimenopausal and postmenopausal women were collected and reviewed. A blinded review of the methodologies was performed. The findings of the analysis of viable studies indicated that hormones, both exogenous and endogenous, had some importance to perimenopausal and postmenopausal sexuality, suggesting an influence of sex hormones on menopausal sexuality.

It makes sense intuitively that there are ethnic variations in sexual function at menopause; however, few reports address this important issue. The most common complaints of naturally postmenopausal Thai women are loss of libido, orgasmic dysfunction, and dyspareunia.¹⁹ Menopausal status appeared to impact sexual function, as both sexual desire and activity decreased after menopause. Only 14 percent occasionally reached an orgasm, while the other 86 percent never had orgasm after menopause.

Although many studies suggest some relationship, albeit ill-defined, between sexuality and menopause, Cawood and Bancroft did not concur. They recruited 141 women into a survey study of the determinants of sexuality and well-being in the menopause.²⁰ They found no relationship between menopausal status and interest or frequency of sexual activity and no support for the direct role of estrogens or androgens in the sexuality of women between the ages of 40 and 60. Only 54 women in their study were menopausal. Testing for hormone levels did not significantly predict measures of sexuality, while other aspects of the sexual relationship that were predictive were sexual attitudes and measures of well-being. They also identified vaginal lubrication as an important factor in the sexuality of women of this age group.

2.2 Summary

It is difficult, if not impossible, to separate the effect of aging effects on sexual function from that of menopause. Also, the menopausal transition is a time of psychosocial as well as biological change. It appears that there is a decline in sexual function as women age, but whether these changes are due to aging, the hormonal changes of menopause, psychosocial factors or health status remains uncertain. The most frequent complaints of women were reduced sexual interest, vaginal dryness, infrequent orgasm and dyspareunia.

3. CAUSES OF DECREASED SEXUAL INTEREST

Controversy exists over whether a reduced level of sexual interest is the cause of, or is caused by, infrequent or decreasing sexual activity in women or a decline in estrogen and/or androgen levels. Adaptation theory postulates a declining interest of the husband induces a similar response in the woman. Seemingly, the most common cause of declining sexual drive in men is age. However, the Gothenburg Study¹⁵ showed no difference between the husbands of women with declining sexual interest and those with no change. In fact, a higher percentage of the women with declining interest reported that their partners' sexual interest was stronger. The same group admitted to submitting to their husbands' desire for intercourse without having desire themselves.

Zumoff et al. observed that endogenous androgens may play an important role in psychosexual functioning in the menopausal transition, during which testosterone levels are approximately 50 percent of the levels between 20 and 30 years of age.²¹ Two studies have shown a correlation between endogenous androgen levels and optimal sexual function. McCoy et al.²² evaluated 16 perimenopausal women who recorded their menstrual and sexual activity daily. Estradiol and testosterone levels showed significant declines during the menopausal transition; however, testosterone showed the most consistent association with coital frequency. Floter et al.²³ used the McCoy questionnaire to correlate the total score (for sexual enjoyment, orgasm, frequency, and vaginal state) with levels of testosterone, dehydroepiandrosterone sulfate, androstenedione, and the ratio of testosterone to SHBG (an indicator of free testosterone).²³ Androstenedione correlated with increased sexual functioning of perimenopausal women.

The most frequent complaints of women were reduced sexual interest, vaginal dryness, infrequent orgasm, and dyspareunia.

Many studies of sexual interest in premenopausal women suggest a cause-effect relationship between hormone levels and sexual function. Schiavi found a relationship between circulatory androgens and sexual desire and arousability in a large group of reproductive-aged women with regular menstrual cycles.²⁴ A higher sex drive at midcycle, during the testosterone peak, has been reported; however, it is difficult to relate these changes in sexuality to a single factor.²⁵

4. CHANGES IN SEXUAL BEHAVIOR, INTEREST, AND RESPONSE

The cross-sectional baseline study of the Melbourne Women's Midlife Health Project surveyed 1,879 women by telephone with three aims: to describe women's subjective assessment of the changes that they experienced in sexual interest and reasons for those changes; to relate changes in interest, coital frequency, and dyspareunia with menopause; and to attempt to identify those variables that are associated with change in sexual behavior.²⁶ The majority reported no change in interest (62.3 percent), while a large number (31.1 percent) reported a decline in interest associated with menopause rather than age. Only 6.6 percent of women reported an increase in sexual interest. Natural menopause was associated with decreased interest and likelihood of intercourse and an increase in dyspareunia. Hysterectomy, with or without oophorectomy, had little influence on sexual activity.

Subsequently, 354 of these women participated in a longitudinal study and reported menopausal status significantly affected vaginal dryness and dyspareunia.²⁷ There was also an effect on sexual responsiveness mediated through symptoms and well-being. Feelings for partner, sexual responsiveness, frequency of sexual activities, and libido all significantly decreased with time, while vaginal dryness/dyspareunia and partner problems increased.

Another common condition that impacts sexual functioning is urinary and fecal incontinence. In a report by Hilton, 46 percent of women reporting UI felt that it had a negative impact on their sexual functioning.²⁸

5. ANATOMIC AND PHYSIOLOGIC CHANGES ASSOCIATED WITH AGING

Masters and Johnson described how anatomic and physiologic changes associated with aging could negatively affect sexual response.²⁹ It may take a longer time to reach the excitement phase because of a reduction in the blood flow to the vagina, a reduction in engorgement of the genital organs, including the clitoris, as well as decreased amount of vaginal lubrication and a delay in time to lubrication. These factors may cause dyspareunia. The plateau phase may be prolonged as a result of reduced uterine elevation, decreased nipple erection, and vasocongestion of the breasts. Although orgasmic capacity is retained, there is a reduction in the number and intensity of vaginal contractions.

6. DEFINING SEXUAL DYSFUNCTION

Classically, the definitions of female sexual dysfunction have been modeled on the human sexual response cycle first described by Masters and Johnson^{29,30} and later enriched by Kaplan.³¹ Their work formed the basis for the diagnostic systems of both the International Statistical Classification of Diseases and Related Health Problems (ICD-10)³² and the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM IV).³³ Recently, the Sexual Function Health Council of the American Foundation for Urologic Disease convened a consensus panel to reevaluate and better define and classify female sexual dysfunction.³⁴ Retaining the categories of both systems, several changes were made in the definitions and classifications; the new format is shown

below. One of the major changes in the classification schema was to add the criterion of personal distress to the diagnosis.

1999 Consensus Classification System

Sexual Desire Disorders

Hypoactive Sexual Desire Disorder

Hypoactive sexual desire disorder (HSDD) is the persistent or recurrent deficiency (or absence) of sexual fantasies/thoughts, and/or desire for or receptivity to sexual activity, which causes personal distress. This allows for trigger of sexual desire to be secondary to the partner's initiative. If the choice is made to not be sexual, there is no disorder present.

Sexual Aversion Disorder

Sexual aversion disorder (SAD) is the persistent or recurrent phobic aversion and avoidance of sexual contact with a sexual partner, which causes personal distress. Because often this disorder is secondary to sexual or gynecologic trauma, some experts believe that it belongs in the category of phobias.

Sexual Arousal Disorders

A sexual arousal disorder is a persistent or recurrent inability to attain or maintain sufficient sexual excitement, causing personal distress, which may be expressed as a lack of subjective excitement or genital (lubrication/swelling) or other somatic responses. Goldstein and Berman theorize that the etiology in some women experiencing difficulties with vaginal engorgement or clitoral erectile insufficiency may be secondary to atherosclerosis.³⁵

Orgasmic Disorder

Orgasmic disorder is a persistent or recurrent difficulty, delay in, or absence of attaining orgasm following sufficient sexual stimulation and arousal, which causes personal distress. This disorder occurs in 20–30 percent of women, not infrequently with vaginal intercourse.

Sexual Pain Disorders

Dyspareunia

Dyspareunia is a recurrent or persistent genital pain associated with sexual intercourse. The prevalence of this disorder has been reported to affect between 10–15 percent of women.³⁶ Consideration should be given to physical causes such as endometriosis, episiotomy scarring, or skin sensitivity.

Vaginismus

Vaginismus is a recurrent or persistent involuntary spasm of the musculature of the outer third of the vagina, that interferes with vaginal penetration, which causes personal distress. Vaginismus occurs in 12–17 percent of all women in reports from the United States. However, in Asia, it is very rare to see it (Kim WW, personal communication).

Other Sexual Pain Disorders

Other sexual pain disorders are recurrent or persistent genital pain induced by noncoital sexual stimulation.

Each of the categories above has the following subtypes on the basis of the medical history, physical examination, and laboratory tests:

- a) Lifelong versus acquired.
- b) Generalized versus situational.
- c) Etiologic origin (organic, psychogenic, mixed, unknown).

Health care professionals and the lay public are encouraged to implement this new classification system in the conduct of future research, the clinical diagnosis and treatment of women with sexual dysfunction, and the education of women with these problems.

7. ASSESSING SEXUAL ACTIVITY

Clinicians should routinely ask their patients about their sexual functioning. Many elderly couples wonder if it is still possible or safe to have coitus after the menopause or how long they can enjoy sex without harming their health. Sexual history questions particularly pertinent to postmenopausal patients include the following:

- Are you satisfied with your sexual life?
- Do you have any questions about sex?
- Has there been a change in your sex drive, lubrication, or orgasm?
- Do you have any sexual problems? Would you like help with the problem or problems?
- Can you describe when the problem started, and how often it occurs?
- Have you tried anything to correct the problem? Has it worked?
- Does your partner have any sexual problems?

It is important to be alert to the possible effects of aging, illness, or medical or surgical treatment on libido and sexual responsiveness. Sexual dysfunctions may have a negative influence on a woman's self image, her physiologic response, or her partner's response. One of the most controversial issues is whether hysterectomy impacts sexual function. If done for symptoms, such as pain or bleeding, a hysterectomy can result in improved sexual functioning.³⁷ Alternatively, some women view it as causing a loss of their female identity that negatively impacts sexual functioning.^{38,39}

Possible medical causes of sexual problems include the following:

Illnesses: Any physical or emotional chronic disease—physical or emotional, including liver, renal, cardiac, anemia, hypertension, stroke, cancer, neurologic disease, colostomy, neostomy, bladder surgery, incontinence, herpes virus or HIV infection, venereal warts, and cystitis—may cause sexual dysfunction.

Medications: Hypoglycemic agents, antihypertensive drugs, vasodilator and other cardiac drugs, antineoplastic drugs, major or minor tranquilizers (depending on dose), diuretics, and antihistamines may cause sexual problems. (See table 7–2.) Some studies suggest antidepressants (including SSRIs) may reduce desire and delay orgasm.⁴⁰ Decreased libido occurs in 20 percent of patients on tricyclic antidepressants, and 30 percent have impaired orgasm.

Treatments: Major surgery (hysterectomy, mastectomy, coronary artery bypass, organ transplant), dialysis, radiotherapy, and chemotherapy may cause sexual dysfunction.

8. TREATMENT FOR SEXUAL DYSFUNCTION

Sexual function for any person at any age involves sexual thoughts, desires, feelings of arousal, potential for orgasm, and physical and mental relaxation. The treatment of sexual dysfunction is dependent adequate research showing efficacy of the treatment over another medication, a placebo or another treatment. Compared to with treatments for other mental health diagnoses, treatment for sexual dysfunction has lagged behind. The causes are multiple and include such issues as a lack of a standardized approach to therapy, the lack of control groups, and the dominance of the techniques described by Masters and Johnson.³⁰ However, one of the most probable causes for the lack of treatment options for sexual dysfunction has been the lack of research funding to study these disorders.

Behavioral and medical treatments for sexual dysfunction are reviewed below, and where evidence exists, recommendations are made as appropriate.

8.1 Behavioral Therapy for Sexual Dysfunction

A literature review of the application and outcome of sex therapy and other treatments for sexual dysfunction showed the format of effective conjoint sex therapy may be of significant benefit to couples with sexual dysfunction.⁴¹ Sarwer and Durlak con-

TABLE 7-2

Medications Associated With Adverse Effects on Female Sexual Function and Response	Abusive Drugs Associated with Abnormal Sexual Response
Antihypertensive drugs	Alcohol
Antidepressants and anxiolytics (especially SSRIs)	Narcotics
Anti-inflammatory drugs	Nicotine
Antiparkinsonian drugs	
Antiseizure drugs	
Beta-blockers	
Bromocriptine (painful clitoral tumescence)	
Cimetidine	
Digoxin	
Diuretics	
Gemfibrozil	
Gonadotropin-releasing agents	
Methyldopa	
Psychoactive drugs	
Sleeping pills	
Tranquilizers	

ducted a field trial of behavioral sex therapy for 365 married couples presenting with a range of sexual dysfunctions at an outpatient sexual dysfunction clinic of a large medical center.⁴² The number of sensate focus exercises completed in the last week of treatment was the strongest predictor of successful treatment. The results of this study confirmed that behavioral sex therapy is effective in the treatment of married couples with sexual dysfunction.

8.1.1 Anorgasmia

The approach to treatment of primary anorgasmia utilizes the techniques of sensate focus, desensitization, and/or directed masturbation exercises. The primary elements of sensate focus developed by Masters and Johnson are physical caresses coupled with nonsexual progressing to sexual touching

exercises.³⁰ The success rate was 84 percent in just over 1 year and 82 percent at 5 years. Desensitization is used when anxiety plays a major role in the dysfunction; however, it alone does not improve orgasmic capacity.⁴³ Directed masturbation exercises have had varying success in the treatment of primary anorgasmia.

Kilmann et al. investigated the differential effectiveness of various treatments for 55 couples where the woman reported secondary orgasmic dysfunction.⁴⁴ Compared with women in the control group, a significantly greater number of treated women reached or exceeded the project's 50-percent criterion for coital orgasmic functioning. However, these differences were not significant at the followup visit.

None of these studies evaluated the effects of treatment of individuals without partners and of, combining sex therapy with marital therapy and with physical methods of treatment. Thus, no evidence-based recommendations can be made.

A thorough review of behavioral therapies for sexual dysfunction is beyond the scope of this review but is available.⁴⁵

9. THE INFLUENCE OF ENDOGENOUS HORMONES AND EXOGENOUS HORMONE THERAPY FOR SEXUAL BEHAVIOR, INTEREST, AND RESPONSE

9.1 Endogenous Hormones

The influence of the sex hormones, including estrogens, androgens, and progestogens, in the menopause remains debatable.

Although estrogen and estrogen/progestin replacement therapy have been shown to be an effective treatment for vaginal atrophy, increasing vaginal lubrication, they have not been shown to consistently increase sexual desire or activity.

Two studies have shown the importance of adequate estrogen levels in maintaining genital health and vaginal lubrication and preventing insertional dyspareunia. Semmens and Wagner reported on 14 women between the ages of 51 and 70 years who had decreased vaginal pH, vaginal fluid, and vaginal blood flow, all of which improved with HRT.⁴⁶ Sarrel showed a correlation between serum estradiol levels (concentrations) and

sexual dysfunction.⁴⁷ At a level of less than 50 pg/mL, women reported vaginal dryness, increased frequency and intensity of dyspareunia, pain with penetration and deep insertion, and burning, all of which were significantly bothersome.

At the cellular level, Ginkel et al. compared the vaginal pH and microbial environment in women

before and after starting HRT.⁴⁸ With HRT, the vaginal pH became more acidic, there was an increase in superficial cells, and most importantly, there was a significant decrease in the number of anaerobes and an increase in *Lactobacillus* species in the vagina.

Similarly, in an interview survey of 52 perimenopausal women with adequate records, Cutler et al. reported women with estradiol levels below 35 pg/mL described reduced coital frequency compared with those with levels greater than 35 pg/mL.⁴⁹ Women with higher estradiol levels had no complaints related to sexual desire, response, or satisfaction.

Additionally, in observational study, 59 healthy, postmenopausal women between 60 and 70 years of age were evaluated for sexual function.⁵⁰ Two-thirds were sexually active. The sexually active group reported higher levels of sexual desire, greater sexual satisfaction, more comfort in expressing sexual preferences, and greater premenopausal sexual satisfaction than women who were not sexually active. On pelvic examination, the sexually active group had less genital atrophy than the abstinent group. Of the hormones studied, higher serum levels of free testosterone were associated with reports of increased sexual desire.

9.2 Estrogen/Hormone Replacement Therapy

Although estrogen and estrogen/progestin replacement therapy have been shown to be an effective treatment for vaginal atrophy, increasing vaginal lubrication, they have not been shown to consistently increase sexual desire or activity.

In the 1970s, three double-blind studies on the effects of HRT on sexual response reported conflicting results. Campbell found vaginal dryness was significantly decreased with estrogen treatment compared with placebo, but participants noted no change in masturbation, orgasm, and frequency of coitus or coital satisfaction.⁵¹ Previous reports by Utian⁵² and Coope et al.⁵³ failed to show improve-

ment in sexual desire in surgically and naturally menopausal women with CEEs.

Fedor-Freybergh showed significant benefit of ERT on libido, sexual activity, satisfaction, pleasurable experience, sexual fantasies, and capacity for orgasm.⁵⁴ This was corroborated in a randomized, double-blind, placebo-controlled, crossover trial of estrogen and progestin, alone and in combination, which found beneficial effects of estrogen alone or combined with the progestin on sexual desire, enjoyment, orgasmic frequency, and vaginal lubrication.⁵⁵ There were no differences between groups in coital frequency.

In a more recent study of estrogen transdermal replacement therapy in postmenopausal women, there was an improvement in patient satisfaction with frequency of sexual activity, sexual fantasies, degree of enjoyment, vaginal lubrication, and lack of pain during intercourse, without impacting frequency of orgasm or sexual arousal.⁵⁶

9.3 The Role of Androgens in Sexual Function and Estrogen/Androgen CoTherapy for HRT

The role of sex steroids, including androgens, in sexual function remains controversial. As previously discussed, sexual desire can be influenced by many factors. In addition, the decline in serum testosterone is not unique to the menopause. In a study of 33 healthy volunteers, 24-hour serum levels of testosterone decreased steadily between ages 20 and 50.²¹

Ovarian and adrenal changes associated with the menopause lead to a decline in all androgen concentrations, with androstenedione production decreased more substantially than testosterone production.⁵⁷ Postmenopausal women obtain most of their circulating estrogen from peripheral aromatization of these androgens. SHBG is an important determinant of sex steroid activity, since the unbound steroid fraction is the biologically active component. SHBG is increased by estrogens, decreasing biologically available androgen. SHBG is decreased by androgen, increasing biologically

available androgen.⁵⁸ Applying the evidence from animal studies, this may influence sexual desire at the level of the CNS.^{59,60}

Geist and Salmon, although not the first, were among the early investigators to supplement ERT with androgens.⁶¹ They studied the effects of testosterone propionate administered twice weekly at a dose of 25 mg, starting on the 12th day of the menstrual cycles for its effects on menopausal symptoms. Maintenance doses of 10 mg of either testosterone propionate or methyltestosterone monthly thereafter were also studied. They found that menopausal symptom relief was particularly helpful in women on estrogen alone with menorrhagia and in those who only had partial symptom relief with estrogen.

Shortly thereafter, Greenblatt reported on the use of androgens for hot-flush relief and an added benefit of improving libido.⁶² Again in 1950, Greenblatt and colleagues studied the safety and efficacy of multiple estrogen-androgen formulations in a prospective, double-blind, placebo-controlled, crossover study.⁶³ They reported improved well-being and libido, with better relief of hot flushes and other menopausal symptoms than either HRT or placebo. Additionally, those on estrogen-androgen reported less breast tenderness, pelvic congestion, and nausea. In 1950, Glass reinforced the benefit of testosterone on women's sexual response.⁶⁴ He reported that combination therapy with estrogen and androgen produced a "smoother transition" and "provides reassurance to the menopausal woman that she is not failing in her psychosexual life."

Sherwin and Gelfand published a case series of surgically menopausal women and confirmed earlier studies showing the role of androgens in the maintenance of sexual functioning.⁶⁵ Sexual arousal, desire, and fantasies increased in women with estrogen-androgen replacement therapy as opposed to estrogen alone. They also noted that the rates of coitus and orgasm were higher in the

estrogen-androgen group during the first two post injection weeks. Additionally, they performed a crossover study of 53 surgically menopausal women and showed that the major impact of androgen in women was on sexual motivation, not increased sexual activity. Although there has been concern about the potential of negative impact of androgens on lipids and heart disease, research has not confirmed any increase in risk secondary to the addition of androgens in HRT.^{66,67}

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Sarrel et al. reported in 1998 on 20 postmenopausal women unhappy with their estrogen/hormone replacement therapy regimen who were randomized to receive either esterified estrogens or esterified estrogens with androgen for 8 weeks.⁶⁸ They described significantly improved sexual sensation and desire after 4-8 weeks of double-blind treatment with estrogen and androgen. They showed increased SHBG in the estrogen-only group with decreased free androgens and showed the reverse in the estrogen-androgen group. This led to the explanation that improvement in sexual sensation

and desire may be related to the increased availability of endogenous or exogenous androgens.

In a pilot case series of 17 nonresponders to oral ERT, estradiol-testosterone combination implants appeared to significantly improve libido, enjoyment of sex, the ability to climax, and the initiation of sex, as examined by an analog scale, in a majority of women.⁶⁹

9.4 Other Agents

Newer hormonal agents in research trials have indicated a possible benefit in reducing vaginal dryness, which may impact sexual function. Tibolone, a preparation with weak estrogen, progesterin, and androgen activity not yet released for use, was studied in 437 women with postmenopausal complaints; they showed improvement of vaginal dryness, similar to 17 β -estradiol/norethisterone acetate, with fewer bleeding problems.⁷⁰ In an RCT of tibolone versus 17 β -estradiol, sexual frequency, satisfaction, and enjoyment were significantly improved over estradiol alone.⁷¹

Bupropion is an anti-anxiety medication which appeared to increase libido and orgasm in combination with sertraline.⁷² It may be used as an antidote in women who have sexual dysfunction while on SSRIs.^{73,74} A dose of 150 mg of trazodone daily has been reported to increase sex drive in a woman postmastectomy with low sex drive.⁷⁵ A recent small study of oral phentolamine in six postmenopausal women with female sexual arousal disorder showed self-reported improvement of vaginal lubrication and pleasurable vaginal sensations and deserves future study.⁷⁶

Although there has been much interest in the use of sildenafil (Viagra[®]) in the sexual dysfunction of women, the only published study on the efficacy of this agent for female sexual arousal disorder was not shown to improve sexual response in women receiving estrogen.

Herbal remedies for sexual dysfunction lack rigorous study. A few small trials have assessed efficacy. A drug-monitoring study investigated 12 weeks of treatment with St. John's Wort extract, one tablet three times daily (900 mg Hypericum, Kira), in 111 women from a general medical practice in Germany. Patients were between 43 and 65 years of age, and had climacteric symptoms characteristic of the premenopausal and menopausal state. The Menopause Rating Scale,⁷⁸ a self-designed questionnaire for assessing sexuality, evaluated

treatment efficacy. Sexual well-being improved after treatment with St. John's Wort extract.⁷⁹ Although there are anecdotal reports of other herbal agents, no clinical trials have been performed to date. Of interest, clinicians in Asia do not expect herbal remedies to be effective in treating a woman's sexual dysfunction, since after thousands of years of use of oriental medicine, they still could not find appropriate therapy, even for men (Kim WW, personal communication).

10. CONCLUSIONS

Multiple population-based studies imply a decrease in female sexual functioning associated with the midlife years, and there is growing evidence that this reflects hormonal changes of the menopausal transition rather than increasing age. Hormonal change is only one aspect of the many factors that impact sexual functioning. These include presence of a sexual partner, partner's age and health, length of the relationship, feelings towards the partner, level of past sexual functioning, social class, educational level, experience of physical or psychological ill health, stressors, employment, personality factors, and negative attitudes towards the menopause.

Changes in sexual behavior, interest, and response should be assessed in the office on a regular basis and a plan developed with the woman to address her needs. Therapeutic options include the use of estrogen and estrogen-androgen replacement therapy.

11. FUTURE NEEDS

As life expectancy continues to increase, the challenge for the future will be to improve the quality of aging years. Sexual health and well-being is an important part of that quality of life. Future needs are to:

- Improve understanding of the natural hormonal changes that occur with aging and menopause.
- Understand the role of endogenous estrogens and androgens in the sexuality of women.
- Develop standardized methods to measure libido in women.
- Better define the determinants of sexual health, including sexual desire and arousal, in menopausal women.
- Increase understanding of the effect of medications on female sexuality in the menopause.
- Understand the role of therapeutic hormonal and nonhormonal agents in the treatment of sexual dysfunction.
- Improve the transmission of information about sexual health to postmenopausal women.

Changes in sexual behavior, interest, and response should be assessed in the office on a regular basis and a plan developed with the woman to address her needs.

Therapeutic options include the use of estrogen and estrogen-androgen replacement therapy.

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