

Sexual Dysfunctions in Women

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women's sexuality, orgasm, desire, arousal, sexual pain

Abstract

In this article, we summarize the definition, etiology, assessment, and treatment of sexual dysfunctions in women. Although the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV-TR) is our guiding framework for classifying and defining women's sexual dysfunctions, we draw special attention to recent discussion in the literature criticizing the DSM-IV-TR diagnostic criteria and their underlying assumptions. Our review of clinical research on sexual dysfunction summarizes psychosocial and biomedical management approaches, with a critical examination of the empirical support for commonly prescribed therapies and limitations of recent clinical trials.

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INTRODUCTION

In the past decade, a number of pivotal events in the field of women's sexuality have increased our knowledge of psychological contributors to female sexual dysfunction. One of these events was the publication of *The Social Organization of Sexuality* by Laumann et al. (1994), which presented the results of the National Health and Social Life Survey (NHSLs) of 1410 men and 1749 women aged 18 to 59 years who were given comprehensive interviews about their sexuality. Based on the survey, it was reported that a shocking 43% of women in America experience sexual concerns. This report evoked criticisms for labeling what was defined as sexual "problems" in the survey interviews as sexual "dysfunctions" in the results, with the concern being that the high-prevalence statistic would contribute to the medicalization of women's sexuality and lead to overprescribing drugs to treat psychological issues (e.g., Bancroft 2002a, Tiefer 1996). Although this is a valid concern for

women with sexual problems that are not clinically diagnosable, on the opposite end of the spectrum is the percentage of women in that figure who would meet clinical diagnosis for sexual dysfunction. For those women, the NHSLs proved beneficial in spreading the word about women's sexual concerns. The increased discourse and awareness of the extent of women's sexual dysfunctions has undoubtedly helped many women with sexual concerns feel more comfortable talking about their sexual concerns and, perhaps, justified and/or motivated them to seek help. Clinicians in the field of sexuality are now, more than ever, faced with the challenge of effectively diagnosing the many women who present with sexual dysfunctions and offering them the best available treatment options.

The *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV-TR; Am. Psychol. Assoc. 2000), classifies sexual dysfunctions into disorders of desire (e.g., affecting thoughts about sex or motivation to engage in sexual activity), arousal (affecting psychological and physiological excitement in response to sexual stimulation), orgasm (delayed, diminished, or absent "peak" intensity of sexual pleasure or sensation), and pain (i.e., genital or pelvic pain occurring before, during, or after sexual activity). In the past decade, three International Consensus Conferences gathered experts in the field of women's sexuality for discussion of the definition and classification of female sexual dysfunctions. The most recent of these consisted of four meetings during 2002 and 2003, and was composed of an international, multidisciplinary group of 13 experts from five countries. The result of these consensus conferences was the glaring realization that the DSM-IV-TR and the *International Statistical Classification of Disease and Related Health Problems* (ICD10) definitions of female sexual dysfunction are unsatisfactory. As noted in the conference publication (Basson et al. 2003), this stems in part from the problematic conceptualization of women's sexual response cycle. That is, the DSM-IV-TR and ICD10 definitions of women's

NHSLs: National Health and Social Life Survey (see Laumann et al. 1994)

sexual dysfunction are based on a model more characteristic of men than of women (Masters & Johnson 1966, Kaplan 1979), with the assumed sequential stages of desire, arousal, and orgasm. The panel challenged several assumptions underlying the DSM-IV-TR and ICD10 definitions of women's sexual dysfunctions and provided a revised classification system (Basson et al. 2003), which is discussed below in this article. Hopefully, the revised definitions will aid future research on women's sexual dysfunctions by better delineating the clinical realities of women's sexuality and by helping clinicians to minimize inappropriate classification and pathologizing of women.

Undeniably, the introduction of sildenafil (Viagra) in 1998 for male erectile disorder, and the subsequent investigation of vasodilator drugs for women's sexual dysfunction, has had an enormous impact on psychological research on women's sexuality. Two findings that emerged from the many clinical trials of sildenafil and similar drugs in women warrant mention here. First is the finding of a substantial placebo effect of up to about 40% in women with sexual problems (e.g., Basson et al. 2002), and second is the finding that these drugs often increased physiological sexual arousal in women without showing a comparable increase in psychological sexual arousal (Basson et al. 2002, Laan et al. 2002). The former of these findings points to the powerful influence that factors such as expectancies for improvement, enrolling in a study about sexuality, talking to a professional about sexual concerns, and/or monitoring sexual responses can have on women's sexual response. Future research is now needed to parse the potential contribution of each of these nonspecific factors to improved sexual functioning and explore how these beneficial elements might be applied in therapeutic settings. The second finding, which we note in the pharmacological treatment of female sexual arousal disorder (FSAD) section in this article, is the lack of a clinically meaningful drug influence on psychological sexual arousal in women, despite increases in

genital engorgement with vasodilator drugs. This finding, which contrasts the high correspondence between self-report and physiological sexual arousal with vasodilator drug use in men, highlights the limitations of applying a male template to study women's sexual concerns.

In this article, we review current conceptualizations and treatments of the major sexual dysfunctions in women, with a focus on recent empirical and theoretical advances. In particular, we refer to the results of recent epidemiological and clinical studies and to the recommendations of the consensus panel on the classification of women's sexual dysfunctions (Basson et al. 2003).

FEMALE SEXUAL DESIRE AND AROUSAL DISORDERS

Definitions and Epidemiology

Hypoactive sexual desire disorder (HSDD) is defined in the DSM-IV-TR as persistent or recurrent deficient (or absent) sexual fantasies and desire for sexual activity that causes marked distress or interpersonal difficulty. The clinical judgment is made taking into consideration factors that affect sexual functioning, such as age and the context of the person's life. The disorder is subtyped into lifelong versus acquired and generalized versus situational.

A primary criticism of the DSM-IV-TR definition of HSDD made by the consensus panel is the characterization of sexual fantasies as being a primary trigger for sexual behavior. Although engaging in sexual fantasy may be characteristic of women in new relationships, research suggests that spontaneous sexual thoughts or fantasies occur far less frequently among sexually healthy women in longer-term relationships (e.g., Cawood & Bancroft 1996). Moreover, women report a wide range of triggers or cues leading to sexual interactions that are not addressed in the DSM-IV-TR criteria, such as the desire to experience tenderness/appreciation for and

FSAD: female sexual arousal disorder

HSDD: hypoactive sexual desire disorder

by the partner, and the need to feel desirable. As noted above, the DSM-IV-TR criteria are based on early models of sexual response outlined by Masters & Johnson (1966) and amended by Kaplan (1979) in which desire is assumed to precede arousal and orgasm in a linear, sequential manner. Clinical experience indicates, however, that oftentimes arousal precedes desire in women. For example, a woman may not necessarily feel a desire to engage in sexual activity but, if approached, she may be “receptive” to sexual activity and, once engaged, she may then experience a desire for further sexual activity. To address these issues, the consensus panel suggested HSDD be defined as absent or diminished feelings of sexual interest or desire, absent sexual thoughts or fantasies, and a lack of responsive desire (i.e., unwilling or uninterested in engaging in sexual activity when approached). Motivations for attempting to become sexually aroused are scarce or absent. The lack of interest is considered to be beyond a normative lessening with life cycle and relationship duration.

Distinguished from a passive lack of sexual thoughts and/or behaviors is an aversion to sexual situations that is marked by anxiety or disgust, suggesting a phobia-like reaction to sexual behavior. The DSM-IV-TR differentiates this pattern of behavior from HSDD and terms it “sexual aversion disorder,” defined as the “persistent or recurrent extreme aversion to, and avoidance of, all (or almost all) genital sexual contact with a sexual partner,” causing distress or interpersonal difficulty. The disorder is further categorized by course (lifelong versus acquired) and specificity (situational versus generalized) of symptoms. Under the current definition of the disorder, a woman who engages in sexual activity in spite of anxiety or disgust (e.g., to satisfy a sexual partner) would not meet the avoidance criterion for sexual aversion disorder. The international consensus panel suggested a definition of the disorder (Basson et al. 2003) that emphasizes the appraisal of sexual contact rather than behavior as the hallmark feature of the disorder:

“extreme anxiety and/or disgust at the anticipation of or attempt to have any sexual activity.” Although sexual aversion disorder is generally not considered rare, surveys of sexual problems seldom assess for symptoms of sexual aversion, and prevalence estimates are not available.

Female sexual arousal disorder (FSAD) is defined in the DSM-IV-TR as a persistent or recurrent inability to attain or to maintain until completion of sexual activity an adequate genital lubrication–swelling response of sexual excitement that causes marked distress or interpersonal difficulty. As with HSDD, FSAD is subtyped into lifelong versus acquired and generalized versus situational. The DSM-IV-TR definition of FSAD focuses exclusively on a genital response when, in fact, women’s sexual arousal includes various components including sexual excitement, a sense of being sexually awakened, and other physiological changes such as breast/nipple sensations (Basson et al. 2003). Moreover, vaginal lubrication appears to be an immediate “reflexive” response to any sexual stimuli—whether desired and enjoyed or not, and it does not always correlate closely with a woman’s subjective experience of feeling “sexually turned on.” For these reasons, the international consensus panel suggested the following three subtypes of FSAD (Basson et al. 2003):

1. Subjective sexual arousal disorder, which refers to the absence of or markedly diminished feelings of sexual arousal (sexual excitement and sexual pleasure) from any type of sexual stimulation. Vaginal lubrication or other signs of physical response still occur.
2. Genital sexual arousal disorder, which is often seen in women with autonomic nerve damage and in some estrogen-deficient women, refers to absent or impaired genital sexual arousal (e.g., minimal vulval swelling or vaginal lubrication from any type of sexual stimulation and reduced sexual sensations from caressing genitalia). Subjective sexual

excitement still occurs from nongenital sexual stimuli.

3. Combined genital and subjective arousal disorder, which is the most common clinical presentation and is usually comorbid with lack of sexual interest.

In addition to these three FSAD subtypes, the consensus committee also suggested including what they termed “persistent sexual arousal disorder.” Often seen by clinicians conducting sex therapy, this previously undefined syndrome consists of spontaneous, intrusive, and unwanted genital arousal in the absence of sexual interest and desire. Any awareness of subjective arousal is typically, but not invariably, unpleasant. The arousal is unrelieved by one or more orgasms and the feelings of arousal persist for hours or days (Basson et al. 2003).

Desire concerns are the most frequently reported sexual complaint among women. Based on findings from a large national survey, Laumann et al. (1999) reported 31% of U.S. women experienced a lack of interest in sex for at least several months during the prior year. Findings from a clinic-based study indicated a 29% lifetime prevalence rate of low sexual desire in women. Difficulties with lubrication have been noted in 8%–15% of all women and 21%–31% of sexually active women (for review, see Lewis et al. 2004). The incidence is higher among women of perior postmenopausal years, with one study reporting that 44% of postmenopausal women experience persistent or recurrent lubrication problems (Rosen et al. 1993).

HSDD and FSAD often present together, and FSAD rarely presents alone. With regard to the latter, several theorists have suggested that the majority of female sexual difficulties reflect disruptions in sexual arousal. Orgasm is impossible without arousal, and a lack of arousal commonly leads to a lack of desire simply because sexual activity is not enjoyable or reinforcing. Even sexual pain disorders may be intricately linked to a lack of sufficient

sexual arousal. Intercourse without lubrication can be painful, and repeated intercourse without arousal may cause vulvar infections, chronic irritation, and may even lead to secondary vaginismus, fear of sex, or the avoidance of sexual activity altogether.

Etiologic Factors

Biological factors. Several lines of evidence point to a link between women’s sexual desire and levels of sex steroid hormones, particularly androgens and estrogens. In women, these hormones are produced in the adrenal glands and ovaries via two metabolic pathways. Disorders of ovarian function and of the hypothalamic-pituitary-adrenal axis interfere with these processes and have been associated with reduced sexual desire and problems with sexual arousal (for review, see Guay & Spark 2006). Sexual problems have also been described in connection to menopause, during which decreased ovarian function results in lower estrogen production. Recent epidemiological studies indicate that “surgical menopause” induced by oophorectomy (surgical removal of the ovaries) is a more prominent risk factor for HSDD than is natural menopause, particularly among younger cohorts (Dennerstein et al. 2006, Leiblum et al. 2006).

It is well established that estrogen is necessary to maintain the structure and function of vaginal tissue. Estrogen deficiencies may result in genital arousal problems related to reduced vaginal lubrication and atrophy of vaginal tissue. Androgens have been implicated more commonly in the maintenance of sexual desire and mood, although there is some physiological evidence that androgens also enhance the function of vaginal tissue. However, there is controversy about the relative importance of androgens among the many other factors contributing to women’s sexual desire. Past research findings suggest substantial individual differences in responsiveness to androgens (for review, see Bancroft 2002b). Further complicating the picture is

the fact that androgens are aromatized to estrogens in the body, and treatment with estrogen can suppress the production of androgens. The bioavailability of both estrogens and androgens is affected by levels of sex hormone-binding globulin, which itself can be affected by hormonal treatment (Basson et al. 2005, Guay & Spark 2006). Thus, sexual function disturbances related to sex hormone levels can be endogenous or iatrogenic.

Individual differences in hormonal profiles and responsiveness to androgen treatment complicate the development of clinical recommendations for androgen supplementation. Despite widespread clinical interest in androgen treatment, studies have not established a broadly generalizable relationship between endogenous androgens and sexual function. Among mid-life women, two longitudinal studies (Dennerstein et al. 2006, Gerber et al. 2005) and a cross-sectional study (Santoro et al. 2005) have found no meaningful relationship between testosterone levels and sexual function. On the other hand, Guay et al. (2004) reported significantly lower levels of adrenal androgens among premenopausal women with sexual complaints compared to those with no sexual complaints. Given individual differences in endocrine physiology, as well as the fact that hormones are but one of many influences on sexual function, further studies using relatively large sample sizes are necessary to draw general conclusions about the relationship of androgens and other sex hormones to women's desire and arousal.

Problems with sexual desire and arousal are associated with several types of pharmacological treatments that affect various neurotransmitter and hormone levels. Some of the most commonly cited classes of drugs believed to impair sexual desire and arousal include serotonergic drugs (e.g., selective serotonin reuptake inhibitors, or SSRIs), some antiadrenergic drugs (e.g., beta-blockers), and selective estrogen receptor modulators. In addition to prescription drug side effects, other iatrogenic sexual side effects, many associated with cancer treatment (e.g., radical hysterectomy, radi-

ation therapy), may cause substantial impairment (for a discussion of sexuality and cancer, see Krychman et al. 2006).

The influence of general health status on sexual desire and arousability is often overlooked in theoretical discussions but is worthy of mention. Fatigue, pain, and mood disturbance caused by chronic illness can contribute to substantial declines in sexual function. In a large population-based study of postmenopausal women, low sexual desire was associated with poorer health on all but one of the domains of the widely used SF-36 health status measure (Leiblum et al. 2006). Physical activity also appears to play a role in sexual function (Dennerstein & Lehert 2004, Gerber et al. 2005) and should be more carefully investigated as a predictor of sexual well-being.

Psychological factors. Beliefs and attitudes about sexuality acquired over the course of sexual development can influence sexual desire and sexual response across the life span. Women who internalize passive gender roles or negative attitudes toward sexuality may be at greater risk of experiencing sexual problems (Nobre & Pinto-Gouveia 2006, Sanchez et al. 2005). Among lesbian and bisexual women, internalized homophobia may negatively affect intimacy between partners (Otis et al. 2006). Women with a history of sexual mistreatment may associate sexual activity with punishment, shame, guilt, and loss, and may be hesitant to enter into relationships (van Berlo & Ensink 2000).

Mood and anxiety disorders have been associated with sexual desire and arousal difficulties and should be ruled out prior to sexuality-focused treatment. Anxiety that is relatively specific to sexual concerns plays an important role in the etiology of sexual arousal problems. Barlow (1986) proposed that the cognitive distraction of performance anxiety directs attention from sexual to nonsexual cues, interfering with arousal. Whereas in men performance anxiety usually pertains to attaining and maintaining an

erection, in women “performance” concerns may be directed at other attributes such as perceived sexual attractiveness. Consistent with this view, studies of women indicate that self-consciousness about body image and sexual desirability predict sexual esteem, sexual assertiveness, and sexual function (Dove & Wiederman 2000, Wiederman 2000).

Although factors within the individual woman may contribute to sexual desire and arousal difficulties, it is valuable to conceptualize these problems in the context of the relationship with the sexual partner. The clinician should always consider the possibility that a woman’s lack of enthusiasm for sex is a perfectly normal reaction to problems such as poor sexual knowledge or skill on the part of her partner, a highly restricted sexual repertoire, or a lack of sexual activities that are stimulating and pleasurable to the woman. A more extreme, though not uncommon, scenario is when sexual problems develop concomitantly with sexual problems in the partner. Although previous research has identified partner sexual dysfunction as a frequent reason that women avoid sexual activity, the influence of the partner’s sexual problems has received relatively little study until recently. Women involved with men who have premature ejaculation or erectile dysfunction are at increased risk for sexual desire and arousal problems. Interestingly, Goldstein et al. (2005) reported that pharmacologic treatment of male erectile dysfunction was associated with improved sexual desire, arousal, and satisfaction among their female partners.

Problems of sexual desire are often conceptualized as “desire discrepancies” between sexual partners to avoid pathologizing the partner who desires sex less often. Whereas individual-centered models of sexual desire may attribute between-partner differences to factors such as personality, hormone levels, and other components of each partner’s “innate” sexual drive, systemic theories focus on the function of desire differences in maintaining the power and emotional balance of the relationship. Schnarch (1991) points out

the vulnerability inherent in openly desiring a partner, which may be too anxiety provoking if a perceived threat to the relationship or loss of power is at stake.

Feminist perspectives on low sexual desire among women in heterosexual relationships place the couple dynamic in a larger sociocultural context wherein men’s desires are valued and women’s desires are either minimized or denied (Richgels 1992). Wanting to be desired, to be the object of men’s sexual attraction, is culturally reinforced, and deviations from male-centric sexual scripts are socially rejected. In this context, the very notion of a mere desire discrepancy between partners becomes suspect. Hare-Mustin (1991) argues that the pretense of gender parity in the relationship “transform[s] inequality into personality differences or into men’s and women’s different essential natures.” Applied to sexuality, a forced categorization of innate high (normal) and low (pathological) sexual desire is a simplification that obfuscates the considerably thornier issues of gender inequality. Careful assessment may reveal maladaptive gender roles that maintain sexual problems even within ostensibly egalitarian relationships.

Assessment

Comprehensive assessment of women’s sexual dysfunction includes a detailed clinical interview to gather information on the presenting problem, on the woman’s sexual and relationship history, her psychosocial history, and her medical history. **Table 1** presents an overview of the types of questions that should be included in the interview for all sexual disorders (expanded upon and adapted from Basson et al. 2004, Brandenburg & Schwenkhagen 2006, Perelman 2006). Questions pertaining to the assessment of specific disorders are mentioned separately in the text.

When HSDD is suspected, further questioning about the context of the problem should focus on situations or cues that might have stimulated the woman’s interest in sex in

Table 1 General psychosocial and sexual assessment

| I. Presenting problem | |
|--|---|
| a. Nature of the problem | Description of the difficulty in the woman's words Other or secondary sexual problems Past history of sexual problems |
| b. Degree of distress | What do the symptoms mean for her? What has her reaction been? How has the problem affected the sexual relationship? |
| c. Lifelong versus acquired | When was the onset? What is her belief about the cause(s) of the change? What has the progression been since the onset? |
| d. Situational versus generalized | How has it been with other partners? How is it when she is alone? Does she experience the difficulty all the time or only under certain circumstances? Are there any situations or contexts in which the problem <i>does not</i> occur? |
| e. Frequency | How often does the problem occur? Has the frequency of the problem changed over time? |
| f. Partner sexual problems or concerns | |
| g. Partner reaction | How has the partner responded to the problem? What does the partner think the cause of the problem is? |
| h. History of treatment | What prior treatments (including self-help) has she attempted? What was the outcome? |
| II. Sexual and relationship history | |
| a. Sexual history | First sexual experiences Family attitudes toward sex History of sexual violence or trauma |
| b. Relationship history | What have past relationships been like? Nature and duration of current relationship Marital/cohabitation status History of partner abuse/violence |
| c. Psychosocial history | Cultural, religious, family-of-origin, and/or societal beliefs or values that may influence sexual function Work/finance Children Other life stressors |
| III. Health history | |
| a. Psychological/psychiatric history | Mood and anxiety disorders Psychotic disorders Eating disorders and body image disturbance Substance use |
| b. Medical history | Sexually transmitted infections (e.g., human immunodeficiency virus) Cancer (esp. breast cancer and gynecological cancers) Disease or surgery of the reproductive organs Neurological disorders (e.g., multiple sclerosis) Endocrine disorders (e.g., diabetes, hypothyroidism, hyperprolactinemia) History of spinal cord or traumatic brain injury |
| c. Current medication use | |

the past. If a woman endorses certain “turn-ons,” it is useful to determine whether these cues or fantasies are absent from her life, fail to interest her any longer, or have been self-censored because they are unacceptable to her

for some reason. A candid discussion of the woman's attraction to and feelings toward her partner are useful as well. Frequency of sexual activity in and of itself should not be considered indicative of a sexual desire problem (or

lack thereof), as the desire for sex is only one of a multitude of factors informing the choice to be sexual.

Assessment of arousal problems should focus both on the mental and genital components of the woman's sexual arousal, for example:

1. How mentally excited does she become in various sexual situations: when alone (e.g., reading erotica), when stimulating her partner, and when her partner stimulates her?
2. Does she experience genital sensations (e.g., tingling, swelling, pulsing)?
3. Is genital lubrication completely absent, is it inadequate, or does it disappear?

In addition to the clinical interview, a number of validated measures have been published that may serve as adjuncts for understanding the level of sexual functioning the woman is experiencing and for monitoring treatment changes. These include the Brief Index of Sexual Functioning for Women (Taylor et al. 1994), the Changes in Sexual Functioning Questionnaire (Clayton et al. 1997), the Derogatis Interview for Sexual Functioning (Derogatis 1979), the Female Sexual Function Index (Rosen et al. 2000), the Cues for Desire Scale (McCall & Meston 2006), and the Sexual Satisfaction Scale (Meston & Trapnell 2005) (for review of validated measures, see Meston & Derogatis 2002). Questionnaires that specifically address relationship issues include the Dyadic Adjustment Scale (Spanier 1976), the Relationship Beliefs Scale (Fletcher & Kininmonth 1992), and the Locke-Wallace Marital Adjustment Test (Locke & Wallace 1959).

It is generally recommended that the woman be referred for a full general physical examination for all complaints of sexual function (for detail, see Stewart 2006). In addition to ruling out or identifying various medical factors, the exam serves to educate women about their anatomy and what is normal or problematic. If a hormonal problem is suspected, assays for prolactin, total testosterone,

free testosterone, sex hormone-binding globulin, dihydroepiandrosterone, estrogens, and cortisol may be warranted to rule out endocrine disorders. Although diagnostic laboratories routinely provide reference values for these hormones, there is controversy as to what differentiates "normal," "low," and "deficient" hormonal states (Guay & Spark 2006). Hormone deficiencies are defined primarily by symptoms rather than specific quantitative cutoff points (e.g., Bachmann et al. 2002).

Treatment

Psychological. The psychological treatment literature focuses primarily on HSDD, with little apparent work directed specifically at FSAD. However, the sex therapy techniques pioneered by Masters & Johnson (1970) remain in widespread use among clinicians treating all types of sexual disorders. At the core of traditional Masters & Johnson's sex therapy is an emphasis on sexuality education, partner communication skills, and sensate focus exercises. Cognitive-behavioral techniques may be useful when traditional sex therapy and education alone are not effective or appropriate. Studies of cognitive-behavioral treatments for HSDD have, in fact, included traditional sex therapy components such as sensate focus. These therapies are distinguished in large part by cognitive techniques used to challenge beliefs that undermine sexual desire and arousal, such as unrealistic expectations of performance, self-consciousness, and even the notion that one is innately dysfunctional. Evidence from the relatively few systematic trials of psychotherapy for HSDD show varying levels of efficacy for both traditional sex therapy and cognitive-behavioral therapy (for review, see Brotto 2006). Limitations of the psychological treatment literature include heterogeneity of treatment methods, limiting the comparability of studies, and experimental designs that preclude the analysis of separable treatment components. Evidence to support the efficacy of psychodynamic, systemic, and other types

of treatment is at the level of clinical case reports. Well-defined manualized treatment protocols and rigorous experimental designs are needed to conduct large, replicable clinical trials.

Medical. The U.S. Food and Drug Administration (FDA) approved the EROS clitoral therapy device (Urometrics, St. Paul, MN) for use in women with FSAD following a noncontrolled study showing that the device, which increases vasocongestion through suction, increased vaginal lubrication, sensation, orgasm, and overall sexual satisfaction (Billups et al. 2001).

A series of recent studies have focused largely on the efficacy of transdermal testosterone among surgically menopausal women who are receiving concomitant estrogen therapy (e.g., Buster et al. 2005, Simon et al. 2005). These studies have found statistically significant improvement in primary and/or secondary outcome endpoints relative to placebo. However, the size of the effects and the nature of the endpoints themselves invite scrutiny. In one study, efficacy was declared on the basis of an average difference of about one “sexually satisfying activity” per four weeks between active treatment and placebo groups (Simon et al. 2005). Although this difference was statistically significant, the clinical meaningfulness of this and similar results is highly questionable (see Althof et al. 2005 for a discussion of regulatory influences on clinical trial endpoints in pharmaceutical trials). To date, transdermal testosterone has failed to appear on the market in light of concerns about long-term safety and treatment effects that are difficult to interpret as indicators of clinical utility.

Relatively few clinical trials have investigated the efficacy of nonhormonal pharmacological treatments specific to HSDD, although drug development efforts continue to target low sexual desire. Two compounds showing initial evidence of efficacy are mentioned here. Bupropion, sometimes used to counteract sexual dysfunction secondary

to SSRI treatment, caused a modest improvement in sexual interest and arousal among nondepressed premenopausal women (Segraves et al. 2001) and among premenopausal women complaining of low sexual desire (Segraves et al. 2004). Results of a double-blind, crossover, placebo-controlled trial of apomorphine also suggested some clinical benefit associated with daily use in premenopausal women with HSDD and FSAD (Caruso et al. 2004). Although further study is required to understand the effects of these drugs, their central dopaminergic activity (bupropion as a reuptake inhibitor and apomorphine as an agonist) appears to be key. Animal models (e.g., Pfaus et al. 1995) and human genetic research (Ben Zion et al. 2006) implicate central dopamine pathways in regulating sexual motivation and reinforcement of sexual behavior.

To date, there are no FDA-approved pharmacological treatments for sexual arousal disorders. Most commonly, FSAD treatments involve the administration of topical lubricants that help to mask the impairment in vaginal lubrication associated with FSAD, but are ineffective in enhancing genital/clitoral blood flow or genital sensations that often accompany FSAD. Since the enormous success of using phosphodiesterase inhibitors (sildenafil, tadalafil, vardenafil) for treating male erectile dysfunction, a number of pharmaceutical companies have examined whether these and similar vasodilator drugs may also be effective for treating women’s arousal concerns. Many of these drugs involve adrenergic and/or nitric oxide systems. Sexual stimulation leads to nitric oxide production that in turn stimulates the release of guanylate cyclase. Guanylate cyclase converts guanosine triphosphate to cGMP, and cGMP produces relaxation of the smooth muscles of the penile arteries and corpus cavernosum, resulting in increased blood flow into the penis. Drugs such as sildenafil inhibit the metabolism of cGMP, thus prolonging its action. Some evidence suggests that a comparable event may occur in women. Nitric oxide is produced in clitoral

tissue and, with the exception that the clitoris does not contain a subalbuginea layer (which contributes to the rigidity of the penis), the anatomy of the clitoris is similar to that of the penis.

Results from a limited number of placebo-controlled studies suggest that phosphodiesterase inhibitors may be effective for treating difficulties with perceptions of physical sensations and physiological aspects of FSAD (e.g., improved genital sensation, vaginal lubrication, satisfaction with intercourse, clitoral sensitivity), particularly among postmenopausal women with FSAD (e.g., Basson & Brotto 2003, Berman et al. 2003). Among premenopausal women with FSAD, one placebo-controlled study indicated increased self-reported sexual arousal, orgasm, sexual fantasy, intercourse, and enjoyment of sexual activity with sildenafil (Caruso et al. 2001). Findings from comparable studies also suggest that vasodilator drugs can enhance blood flow into women's genital tissue and perceptions of genital responses. However, more often than not, sexual interest and psychological arousal are not comparably enhanced (Basson & Brotto 2003, Basson et al. 2002, Kaplan et al. 1999, Laan et al. 2002). This suggests that women may be estimating their degree of sexual arousal according to standards other than genital cues. That is, for women, external stimulus information such as relationship satisfaction, mood state, and sexual scenarios may play a more important role in assessing feelings of sexual desire and arousal than do internal physiological cues. If this is the case, drugs that target increasing vasocongestion are likely to be most effective in women with genital sexual arousal disorder whose primary complaint is decreased genital responding, experienced as decreases in lubrication and/or feelings of vaginal fullness or engorgement. This would most likely be women who are postmenopausal, who have undergone oophorectomy, or who suffer from arterial vascular problems. If a drug increases vaginal engorgement to the extent that it is detected and labeled as a "sexual feeling," for

some women this may also enhance feelings of more general, psychological arousal.

FEMALE ORGASMIC DISORDER

Definitions and Epidemiology

The DSM-IV-TR defines female orgasmic disorder (FOD) as the persistent or recurrent delay in, or absence of, orgasm following a normal sexual excitement phase. As with HSDD, to meet criteria for FOD, the disturbance must cause marked distress or interpersonal difficulty. The diagnosis of FOD should be based on the clinician's judgment that the woman's orgasmic capacity is less than would be reasonable for her age, sexual experience, and the adequacy of sexual stimulation she receives. The DSM-IV-TR subtypes FOD as lifelong versus acquired and generalized versus situational. Although not stated in the DSM-IV-TR, the clinical consensus is that a woman who can obtain orgasm during intercourse with manual stimulation but not intercourse alone would not meet criteria for clinical diagnosis unless she is distressed by the frequency of her sexual response.

Most studies refer to orgasm problems in women as either "primary orgasmic dysfunction" or "secondary orgasmic dysfunction." In general, the term "primary orgasmic dysfunction" is used to describe women who report never having experienced orgasm under any circumstances, including masturbation. According to the DSM-IV-TR, this would refer to those women who meet criteria for lifelong and generalized FOD. Secondary orgasmic dysfunction relates to women who meet criteria for situational and/or acquired FOD. By definition, this encompasses a heterogeneous group of women with orgasm difficulties. For example, it could include women who were once orgasmic but are now so only infrequently; women who are only able to obtain orgasm in certain contexts, by engaging in certain types of sexual activity, or with certain partners. This lack of specificity in the definition of secondary orgasmic

FOD: female orgasmic disorder

dysfunction often makes interpretation of outcome studies using this definition somewhat limited.

Also confusing in the literature, and for the clinician trying to determine diagnoses, is the fact that the definition of orgasm itself is often vague. A recent article cataloguing definitions of orgasm included more than 25 comprehensive definitions written by different authors (see Mah & Binik 2001). The following definition of female orgasm was derived by the committee on female orgasm, presented at the International Consultation on Urological Diseases in Official Relationship with the World Health Organization, Paris, 2003:

An orgasm in the human female is a variable, transient peak sensation of intense pleasure, creating an altered state of consciousness, usually accompanied by involuntary, rhythmic contractions of the pelvic, striated circumvaginal musculature often with concomitant uterine and anal contractions and myotonia that resolves the sexually-induced vasocongestion (sometimes only partially), usually with an induction of well-being and contentment (Meston et al. 2004, p. 785).

Based on findings from the NHSLs (Laumann et al. 1994), orgasmic problems are the second most frequently reported sexual problems in U.S. women, with 24% of women reporting a lack of orgasm in the past year for at least several months or more. This percentage is comparable to clinic-based data. Orgasmic problems were noted by 29% of 329 healthy women (ages 18–73) who attended an outpatient gynecological clinic (Rosen et al. 1993) and by 23% of 104 women (18–65+) attending a U.K. general practice clinic (Read et al. 1997).

Etiologic Factors

Biological. Orgasms can be induced via erotic stimulation of a variety of genital

and nongenital sites including the clitoris, vagina, other areas of the vulva, and the breasts/nipples, or via mental imagery, fantasy, or hypnosis. Consciousness is not an essential requirement for orgasm, given orgasms have been noted to occur during sleep. Cases of “spontaneous orgasm” have occasionally been described in the psychiatric literature where no obvious sexual stimulus can be ascertained (Polatin & Douglas 1953). Certain psychotropic drugs have infrequently been reported to induce spontaneous orgasms in women. Compared with preorgasm levels of sexual arousal, the brain areas activated during orgasm in women include the paraventricular nucleus of the hypothalamus, the periaqueductal gray of the midbrain, the hippocampus, and the cerebellum.

Although there is no known biological cause of FOD, a number of medical conditions lead to orgasm difficulties in women, and side effects of a number of pharmacological treatments include impairments in orgasm function. The worst drug offenders appear to be those that increase serotonergic activity (e.g., antidepressants; paroxetine, fluoxetine, sertraline) or decrease dopaminergic activity (e.g., antipsychotics). The degree to which the former of these influences orgasm appears to be dependent upon which serotonin receptor subtype they activate/inhibit. For example, the antidepressant nefazodone has been reported to produce fewer sexual side effects in women (Feiger et al. 1996) than many of the earlier generation of SSRIs. Nefazodone increases serotonin activity in general while simultaneously inhibiting serotonin activity at the serotonin₂ receptor, which may possibly lead to an increase in dopamine and norepinephrine, neurotransmitters reported to facilitate sexual behavior.

Given that, under most circumstances, a certain level of sexual arousal is necessary for orgasm to occur, any of the factors described above that inhibit arousal can also impair orgasm. Women with spinal cord injuries in the sacral region of the spinal cord, which

interferes with the sacral reflex arc, show difficulty attaining orgasm (Sipski et al. 2001). Data from human and animal studies led Whipple et al. (1996) to suggest that the vagus nerve connecting the cervix to the brain is key in maintaining the ability of patients with spinal cord injuries to experience orgasm. Women with spinal cord injuries at the mid-thoracic area and below were able to achieve orgasm 52% of the time in a laboratory study, compared with 100% in healthy controls (Sipski et al. 1995).

Psychological. Age, education, religion, personality, and relationship issues are the psychosocial factors most commonly discussed in relation to female orgasmic ability. Laumann et al. (1994) reported the youngest group of women (18–24 years) surveyed showed rates of orgasm lower than those of the older groups for both orgasm with a partner and orgasm during masturbation. This may be explained in terms of age differences in sexual experience. Substantial differences were also noted between education level and ability to attain orgasm during masturbation, but not with a partner. Approximately 87% of women with an advanced degree reported “always” or “usually” attaining orgasm during masturbation compared with 42% of women with a high school education. These findings were explained as the better-educated women having more liberal views on sexuality and being more likely to seek pleasure as a goal of sexual activity.

A negative relation between high religiosity and orgasmic ability in women is frequently reported in the clinical literature. Possibly, the more religious a person, the more likely they are to experience guilt during sexual activity. Feasibly, guilt could impair orgasm via a number of cognitive mechanisms, in particular distraction processes. A relation between improved orgasmic ability and decreased sexual guilt has also been reported (Sholty et al. 1984). Laumann et al. (1994) reported a substantially higher proportion (79%) of women with no religious

affiliation reported being orgasmic during masturbation compared with religious groups (53%–67%).

Relationship factors such as marital satisfaction and adjustment, happiness, and stability have been related to orgasm consistency, quality, and satisfaction in women (for review, see Mah & Binik 2001). These findings are correlational in nature. Clearly, a satisfying marital relationship is not necessary for orgasm, particularly given that rates of orgasm consistency in women are higher during masturbation than with a partner (Laumann et al. 1994). A satisfying marital relationship most likely promotes orgasmic function via increased communication regarding sexually pleasurable activity, decreased anxiety, and enhancement of the subjective and emotional qualities of orgasm (Mah & Binik 2001). In an extensive investigation of background and personality variables and women’s orgasm, Fisher (1973) found few significant associations.

Assessment

General psychological and sexual assessment questions are listed in **Table 1**. Additional specific questions pertaining to FOD include:

1. Is orgasm absent, delayed, or of reduced intensity?
2. What is the woman’s frequency of masturbation?
3. How often does she experience sexual fantasy?

Treatment

Psychological. Directed masturbation (DM) has been shown to be an empirically valid, efficacious treatment for women diagnosed with primary anorgasmia (for review, see Meston et al. 2004). This treatment uses cognitive behavioral therapy techniques to educate a woman about her body and the sensations she is able to elicit while manually stimulating herself. DM involves several stages that build upon one another. First, the woman engages in a visual exploration

DM: directed masturbation

of her body, using a mirror and educational material depicting female genital anatomy. Following visual and manual identification of the sensitive genital areas that elicit pleasure, the woman is instructed to apply targeted manual stimulation to these regions. The use of topical lubricants, vibrators, and erotic videotapes are often incorporated into the exercises. Once the woman is able to attain orgasm alone, her partner is usually included in the sessions in order to desensitize her to displaying arousal and orgasm in his presence, and to educate the partner on how to provide her with effective stimulation (for a detailed guide to DM, please refer to Heiman & LoPiccolo 1988).

Allowing a woman to explore her body on her own is beneficial because it eliminates several factors that may be barriers to orgasm, including anxiety that may be associated with the presence of a partner. The amount and intensity of sexual stimulation is directly under the woman's control and therefore she is not reliant upon her partner's knowledge or her ability to communicate her needs to her partner. A number of studies report DM is highly successful for treating primary anorgasmia in a variety of treatment modalities including group, individual, couples therapy, and self-directed masturbation training (bibliotherapy) (for review, see Meston 2006). Using therapist DM training, Heinrich (1976) reported a 100% success rate for treating primary anorgasmia at two-month follow-up. The study was a controlled comparison of therapist-directed group masturbation training, bibliotherapy, and wait-list control.

Few controlled studies have examined the exclusive effects of DM for treating secondary anorgasmia. Fichen et al. (1983) compared minimal therapist contact bibliotherapy with a variety of techniques including DM and found no change in orgasmic ability. For women with secondary anorgasmia who are averse to touching their genitals, DM may be beneficial. If, however, the woman is able to attain orgasm alone through masturbation but not with her partner, issues relating to communi-

cation, anxiety reduction, trust, and ensuring the woman is receiving adequate stimulation either via direct manual stimulation or engaging in intercourse using positions designed to maximize clitoral stimulation may prove more beneficial.

Anxiety reduction techniques such as systematic desensitization and sensate focus are often used to treat orgasm difficulties, usually in combination with other techniques such as sexual techniques training, DM, sex education, communication training, bibliotherapy, and Kegel exercises. Across studies, women have reported decreases in sexual anxiety and, occasionally, increases in frequency of sexual intercourse and sexual satisfaction with systematic desensitization, but substantial improvements in orgasmic ability have not been noted (Meston et al. 2004). Similarly, of the few controlled studies that have included sensate focus as a treatment component, none have reported notable increases in orgasmic ability. These findings suggest that, in most cases, anxiety does not appear to play a causal role in FOD, and anxiety reduction techniques are best suited for anorgasmic women only when sexual anxiety is coexistent.

Other behavioral techniques used to treat FOD that warrant mention include sex education, communication training, and Kegel exercises. Communication training could enhance orgasmic ability by teaching individuals to better express their sexual needs to their partner. Kegel exercises (Kegel 1952), designed to strengthen the pubococcygeous muscle, could feasibly facilitate orgasm by increasing vascularity to the genitals, thus enhancing arousal, or by helping the woman become more aware and comfortable with her genitals. Although the independent contribution of these techniques for treating FOD has not been adequately assessed, an extensive review of the literature suggests these techniques may serve as beneficial adjuncts to therapy (Meston et al. 2004).

Medical. To date, no pharmacological treatments for FOD have been found to be more

effective than placebo (for a review of pharmacological treatments, see Meston et al. 2004). There is a high incidence of adverse sexual side effects, including inhibited or delayed orgasm, noted with antidepressant treatment. If the patient is taking selective serotonin reuptake inhibitors and the orgasmic difficulties seem to coincide with the onset of the drug treatment, clinicians may recommend a change in prescription to an antidepressant that also affects dopamine and norepinephrine levels. These include bupropion, nefazodone, and moclobemide.

SEXUAL PAIN DISORDERS

Definitions and Epidemiology

The DSM-IV-TR identifies two sexual pain disorders, vaginismus and dyspareunia. Under the DSM-IV-TR definition, the key criterion for the diagnosis of vaginismus is a persistent or recurrent involuntary spasm of the outer third of the vagina that interferes with sexual intercourse. Two particular aspects of this definition are worthy of comment and scrutiny. First, it is clear that contraction of the pelvic floor musculature can prevent vaginal penetration, but recent empirical work has demonstrated that vaginal spasms are neither sensitive nor specific to women who report difficulty with vaginal penetration (Reissing et al. 2004). Furthermore, although vaginismus is classified as a pain disorder and appears to be associated with genital pain in most cases (ter Kuile et al. 2005), the DSM-IV-TR diagnostic criteria do not specify that pain must be present to receive the diagnosis. These criticisms were noted in the report of the most recent international consensus conference on female sexual dysfunction classification (Basson et al. 2003), which recommended a revised definition of vaginismus as follows:

Persistent difficulties to allow vaginal entry of a penis, a finger, and/or any object, despite the woman's expressed wish to do so.

There is a variable involuntary pelvic muscle contraction, (phobic) avoidance and anticipation/fear/experience of pain. Structural or other physical abnormalities must be ruled out/addressed.

In contrast to the DSM-IV-TR criteria, the proposed definition of vaginismus does not specify a muscle spasm localized exclusively to the vagina. The definition also emphasizes features of the disorder that suggest etiological mechanisms similar to those of anxiety disorders.

Dyspareunia is a broad term used to describe genital pain associated with sexual activity that causes distress or interpersonal difficulty. Though not a formal aspect of the definition, dyspareunia is typically described as either superficial (e.g., associated with the vulva and/or vaginal entrance) or deep (perceived in the abdomen or internal organs, often associated with penile thrusting); most cases fall into the former category. The DSM-IV-TR distinguishes dyspareunia from genital pain caused "exclusively" by vaginismus, lack of lubrication, or a medical condition. In practice, this criterion may be limiting and difficult to establish, as the cause of genital pain is not always implicated exclusively in its maintenance. Accordingly, the international consensus committee recommended a more inclusive revision of the definition as follows: "Persistent or recurrent pain with attempted or complete vaginal entry and/or penile vaginal intercourse" (Basson et al. 2003). Some researchers have further argued that vaginismus and dyspareunia overlap in clinical presentation to the extent that it is questionable to regard them as distinct disorders (de Kruiff et al. 2000, Reissing et al. 1999).

Because many epidemiological studies exclude questions about vaginismus, the prevalence of the disorder is not well established, though it is estimated to be between 1% and 6% (Lewis et al. 2004). More data are available on the epidemiology of dyspareunia, although estimates vary depending on geographical location and setting (Weijmar Schultz et al.

VVS: vulvar
vestibulitis syndrome

2005). In one of the largest prevalence surveys to date, Laumann et al. (1999) reported that approximately 16% of American women reported persistent or recurrent sexual pain in the past year, with older age associated with a lower likelihood of sexual pain. These results are consistent with those of a large epidemiological survey conducted in France in which 5% of women endorsed sexual intercourse pain “often” and 19% endorsed intercourse pain “some of the time” (cited in Binik et al. 1999). In a community-based survey of 303 women, 12% reported a chronic history of pain provoked by *any* genital contact (Harlow et al. 2001).

Etiology

Biological. Although vaginal spasm does not appear to be a reliable indicator of vaginismus, increased pelvic muscle tone and greater muscle weakness may distinguish sexual pain conditions with and without vaginal penetration difficulties (Reissing et al. 2004). Genital pain may result from a variety of medical conditions and anatomical variations that should be ruled out by medical examination. Superficial pain may be a symptom of dermatological disorders affecting the external genitalia, vaginal atrophy, anatomical variations, urinary tract infections, injury, and other diseases and infections of the vulva. Deep pain may result from uterine fibroids, endometriosis, urinary disease, and ovarian disease, among other conditions (for review, see Weijmar Schultz et al. 2005).

Clinical observation and research suggests that the majority of women with superficial dyspareunia show a reliable symptom pattern that includes sensitivity to touch and pressure of the vulvar vestibule, a region of the female external genitalia that includes the tissues surrounding the vaginal and urethral openings. There is erythema in the sensitive region, and touch or pressure evokes a sharp, burning pain (Pukall et al. 2005). Known as vulvar vestibulitis syndrome (VVS), this disorder is considered separate from other pain syn-

dromes of the vulva not attributable to infection, injury, etc. The etiology of VVS is uncertain, but several lines of research support evidence of a physiological sensitivity of the vulvar vestibule. Women with VVS often have a history of yeast infections and may have had significant hormonal events in adolescence, including early onset of menstruation and early use of oral contraceptives (Pukall et al. 2005). Vulvodynia is diagnosed when pain is not specific to the vulvar vestibule and is not attributable to other identifiable pathology. Less is known about the etiology of this disorder.

Regardless of origin, pain may persist after its initial provocation via a number of mechanisms, including psychological and neurological changes. When conceptualized as a pain disorder rather than a sexual disorder (Binik et al. 1999), sexual pain shares many etiological similarities with chronic low back pain and other chronic pain syndromes. To attempt to isolate psychogenic and physiological components of chronic pain maintenance is a dubious exercise, as they are integral to one another. Sensitization of peripheral and central nervous pathways governing pain is thought to accompany psychological reactions that exacerbate the experience of pain (Weijmar Schultz et al. 2005).

Psychological. Elevated rates of comorbid anxiety disorders and higher trait anxiety have been found across subtypes of sexual pain disorders. Studies of women with dyspareunia and VVS also suggest greater erotophobia and negative attitudes toward sexuality in these populations (Weijmar Schultz et al. 2005). However, not all women with sex-related anxiety experience sexual pain, and the mechanisms by which anxiety contributes to the onset of a pain disorder are not well understood. Preliminary evidence implicates anxiety as a potentially important maintaining factor in sexual pain. Payne et al. (2005) found that women with VVS reported hypervigilance for sexual pain. Other research suggests that women with VVS catastrophize

intercourse-related pain, but not pain in general (Pukall et al. 2002).

Research to date has not clearly identified a psychological “profile” associated with sexual pain disorders, and the direction of causality between sexual pain and psychological symptoms is likely to be complex. In addition to anxiety symptoms and erotophobia, studies have reported increased depressive symptoms, hostility, and psychotic features, albeit somewhat inconsistently, across the sexual pain disorders (for review of psychological features associated with sexual pain disorders, see Weijmar Schultz et al. 2005). Although a history of sexual trauma is commonly suspected as an etiological factor in the sexual pain disorders, sexual trauma has been linked only to vaginismus in the empirical literature, and the data to support this association are inconsistent (Weijmar Schultz et al. 2005).

Not surprisingly, sexual pain conditions are frequently associated with other sexual problems, notably sexual arousal difficulties. Genital changes during sexual arousal include increased vaginal lubrication and elevation of the uterus. When these changes do not occur, coitus may result in friction, tearing, and overstimulation of internal genital structures, leading to pain. Some theorists have speculated that a lack of genital sexual arousal is a key etiological factor in sexual pain conditions. Over time, reduced sexual arousal and fear of pain are thought to become conditioned responses to sexual situations. Although laboratory studies suggest no essential impairment of genital arousal responses associated with sexual pain disorders, whether sexual pain is a conditioned response has yet to be established empirically.

Assessment

In all cases of persistent sexual pain, a cooperative multidisciplinary assessment is warranted to take into account the array of possible medical and psychophysiological factors that contribute to the development, maintenance, or experience of pain. Assessment of genital pain

by a physician and, ideally, a physical therapist will inform the diagnosis and course of treatment. In addition to a general psychosocial and sexual history, the psychological assessment should ascertain the following:

1. The location, quality, intensity, and duration of the pain.
2. The circumstances in which pain is noticeable, including both sexual and nonsexual situations.
3. The woman’s perception of muscle tension in sexual and nonsexual situations.
4. Changes the woman (and her partner) have made to sexual activity to limit or control pain.
5. The degree to which the woman experiences sexual arousal in sexual situations, both with regard to subjective excitement and to genital sensations and lubrication.
6. The woman’s motivation for and expectations of treatment, especially for therapies that involve direct contact with the genitals.

Treatment

Psychological. Recent investigations have supported the efficacy of cognitive-behavioral therapy (CBT) for sexual pain syndromes in women. Cognitive interventions for sexual pain disorders typically focus on alleviating anxiety (e.g., decatastrophizing pain) and normalizing alternative forms of sexual activity (e.g., nonpenetrative sex) to enhance sexual pleasure. Bergeron et al. (2001) found that eight sessions of group CBT for VVS was associated with significantly reduced genital pain from pre- to post-treatment, with 39% of women endorsing great improvement or complete pain relief at the six-month follow-up interval. Ter Kuile and Weijnenborg (2006) also reported reduced genital pain associated with a 12-session trial of group CBT for women with VVS. The CBT interventions in these studies comprised sexuality education, identifying and correcting maladaptive cognitions, and systematic desensitization exercises

CBT:
cognitive-behavioral
therapy

designed to facilitate vaginal penetration over time in a gradual manner. The additive benefit of any of these given components to treatment outcomes has yet to be studied.

The use of systematic desensitization has a relatively long history in the treatment of sexual pain disorders, particularly vaginismus, but has surprisingly little empirical support. In the context of sex therapy, systematic desensitization exercises are assigned for homework and entail relaxation coupled with gradual habituation to vaginal touch and penetration, usually beginning with the woman's fingers or artificial devices specifically designed for this purpose. Although a recent clinical trial of CBT for lifelong vaginismus included systematic desensitization as a treatment component (ter Kuile et al. 2006), the efficacy of systematic desensitization alone is unclear.

Psychophysiological. Glazer et al. (1995), observing a relationship between VVS and abnormal responding of the pelvic floor musculature (see also White et al. 1997), developed a novel treatment approach using electromyography combined with visual feedback provided by an electronic instrument. The treatment is designed to reduce hyper-tonicity and increase the strength and stability of the pelvic floor. Since the development of this treatment, biofeedback has been incorporated successfully into several clinical trials. Women receiving treatment are trained to use the electromyography sensor and biofeedback device in the clinic and then asked to complete a standard pelvic floor training protocol at home twice per day. The protocol consists of pelvic floor contraction exercises of various durations (e.g., short contractions versus long "endurance" contractions, all performed at maximum intensity) separated by prescribed rest periods. Clinical trial data indicate that the pelvic floor training approach significantly reduces VVS pain and may occasionally eliminate it altogether (Bergeron et al. 2001, Glazer et al. 1995, McKay et al. 2001). However, treatment success rates in these trials have varied considerably, and fur-

ther study is needed to assess the acceptability and effectiveness of this treatment on a broad scale.

Collaboration with a physical therapist can enhance psychophysiological treatment with hands-on techniques informed by expertise on the muscular and connective tissue of the pelvic floor. For example, a physical therapist can incorporate specific massage and stretching techniques to correct muscle tone and improve mobilization, prescribe exercises for the pelvic floor and nearby muscle groups, and strengthen the pelvic floor by means of electrical stimulation (Rosenbaum 2005).

Medical/surgical. Topical anesthetics and other medications are sometimes used to alleviate genital pain in the short term, but no evidence supports the use of topical treatments in long-term management of sexual pain disorders. Likewise, limited data are available to support the use of antidepressants and anti-convulsants for pain relief (Weijmar Schultz et al. 2005). When clients do not respond to psychosocial and physical therapies, surgical treatment may be considered. In studies of women with VVS, removal of vulvar vestibular tissue has been shown to significantly reduce or completely alleviate genital pain among the majority of recipients (Goldstein & Goldstein 2006). As surgery does entail some degree of risk, surgical treatment should be considered an alternative after less invasive therapies have failed.

The selection of appropriate criteria by which to judge the success of any sexual pain disorder treatment is complicated. Because many women with sexual pain disorders are unable to experience genital contact or penetration, investigators have rated treatment efficacy in part by the proportion of women who are able to resume (or initiate) sexual activity by the end of treatment. However, being *able* to have sex does not mean that discomfort is no longer present, nor that sex is necessarily enjoyable. Thus, in evaluating any treatment outcome, it is vital to consider improvements in self-reported genital pain as

well as improvements in sexual function (e.g., sexual desire and arousal).

CONCLUSION

Spurred by the profitability of sildenafil (Viagra) and similar treatments for male erectile disorder, an unprecedented influx of industry-sponsored grants promoted basic and clinical research on women's sexual function in the late 1990s and into this decade. Although recent studies have yielded important insights into women's sexual function, the clinical utility of biomedical treatments for women's sexual problems is limited. At present, it seems unlikely that medical therapies provided without substantial education and counseling will successfully address the most common sexual concerns that women face. Although the literature describes

several well-articulated psychosocial theories of women's sexual dysfunction, translating theory to practice is problematic. Manualized treatment protocols lend themselves well to clinical investigation but are relatively uncommon in sex therapy. Evaluating the psychological treatment literature is also difficult because of the multicomponent, multimodal nature of many treatments. Few studies have attempted to evaluate the efficacy of separate treatment components.

Rather than adopting or eschewing an exclusively medical or psychosocial model of sexuality, trends in the recent clinical literature point to an increasingly nuanced view of women's sexual problems. Translating the prominently touted "biopsychosocial" viewpoint into empirical hypotheses and assessable treatment methods, however, remains a considerable challenge.

SUMMARY POINTS

1. Existing conceptualizations of women's sexual function are based largely on a model that proposes discrete, sequential phases of sexual response. Recent work questions the utility of this model for explaining women's sexual experiences and clinical presentation.
2. Assessment of women's sexual problems should reflect a biopsychosocial perspective, taking into account cultural, developmental, psychosocial, and health-related contexts.
3. Medical treatments for women's sexual dysfunction have largely failed to outperform placebo treatment but may be useful in specific clinical subgroups.
4. Despite widespread clinical acceptance in many cases, few psychosocial treatments for women's sexual dysfunction are empirically supported. Little is known about which treatment components are most effective.

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