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Sexuality Before and After Male-to-Female Sex Reassignment Surgery

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The sexual behaviors and attitudes of male-to-female (MtF) transsexuals have not been investigated systematically. This study presents information about sexuality before and after sex reassignment surgery (SRS), as reported by 232 MtF patients of one surgeon. Data were collected using self-administered questionnaires. The mean age of participants at time of SRS was 44 years (range, 18–70 years). Before SRS, 54% of participants had been predominantly attracted to women and 9% had been predominantly attracted to men. After SRS, these figures were 25% and 34%, respectively. Participants' median numbers of sexual partners before SRS and in the last 12 months after SRS were 6 and 1, respectively. Participants' reported number of sexual partners before SRS was similar to the number of partners reported by male participants in the National Health and Social Life Survey (NHSLS). After SRS, 32% of participants reported no sexual partners in the last 12 months, higher than reported by male or female participants in the NHSLS. Bisexual participants reported more partners before and after SRS than did other participants. 49% of participants reported hundreds of episodes or more of sexual arousal to cross-dressing or cross-gender fantasy (*autogynephilia*) before SRS; after SRS, only 3% so reported. More frequent autogynephilic arousal after SRS was correlated with more frequent masturbation, a larger number of sexual partners, and more frequent partnered sexual activity. 85% of participants experienced orgasm at least occasionally after SRS and 55% ejaculated with orgasm.

KEY WORDS: transsexualism; gender identity disorder; sex reassignment; sexual orientation; orgasm; autogynephilia.

INTRODUCTION

The sexual behaviors and attitudes of male-to-female (MtF) transsexuals before and after sex reassignment surgery (SRS) have long been of interest to sex researchers, clinicians, and MtF transsexuals themselves. One of the most important reasons MtF transsexuals undergo SRS is to acquire genitalia that will allow them to engage in sexual activity, specifically penile-vaginal intercourse, as women (Schroder & Carroll, 1999). Consequently, clinicians have sought to understand the sexological outcomes of SRS in order to inform and counsel their transsexual patients. Sexual orientation and sexual activity before SRS have often been regarded as important predictors of the success of sex reassignment (Blanchard, Steiner, Clemmensen, & Dickey, 1989; Lindemalm, Körlin, & Uddenberg, 1987; Muirhead-Allwood, Royle, & Young, 1999; Pfäfflin, 1992), and sexual orientation and partnership patterns after SRS have sometimes been seen as meaningful measures of that success (Bodlund & Kullgren, 1996; Hunt & Hampson, 1980; Lindemalm et al., 1987). These factors have provided additional impetus to the study of sexuality in MtF transsexuals. The sexual orientation of MtF transsexuals before and after SRS has also been of theoretical interest, because sexual orientation underlies most typologies of MtF transsexualism (for a review, see Blanchard, 1989a). The high seroprevalence rates of HIV in MtF transgender persons (e.g., Clements-Nolle, Marx, Guzman, & Katz, 2001) provide yet another reason for studying the sexual behaviors and attitudes of MtF transsexuals.

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Nevertheless, the pre- and post-operative sexual attitudes and behaviors of persons who have undergone MtF SRS remain incompletely understood. Most follow-up studies of MtF SRS have not sought detailed information about pre- and post-operative sexual behaviors. Sexual arousal to cross-dressing or cross-gender fantasy in persons who have undergone MtF SRS has largely been ignored. Most sexologically focused surveys of MtF transsexuals after SRS have not controlled for surgical technique, despite evidence that the physical results of SRS influence sexual outcomes (Schroder & Carroll, 1999). Nearly all follow-up studies of MtF SRS have involved fewer than 60 participants, limiting statistical power and making hypothesis testing problematic (Muirhead-Allwood et al., 1999).

Previous Studies of Sexuality in MtF Transsexuals

Information from previous studies concerning sexuality in MtF transsexuals can be grouped into six categories: (a) sexual orientation, (b) number of sexual partners, (c) frequency of sexual activity, (d) prevalence of stable partnered relationships, (e) prevalence of sexual arousal to cross-dressing or cross-gender fantasy, and (f) frequency and characteristics of orgasm after SRS.

Sexual Orientation

Throughout the 1950s and 1960s, it was assumed that nearly all MtF transsexuals would be sexually attracted to men after SRS. A few reports from the late 1960s and early 1970s described MtF transsexuals who were sexually attracted to women after SRS (Barr, Raphael, & Hennessey, 1974; Green, 1969), and by the late 1970s such reports were commonplace (Bentler, 1976; Feinbloom, Fleming, Kijewski, & Schulter, 1976). MtF transsexuals who were sexually attracted to both men and women were also reported in the 1970s (e.g., Hoenig & Kenna, 1974). A small number of MtF transsexuals, usually called *asexual* but more accurately called *analloerotic* (not sexually attracted to other persons; Blanchard, 1989a), reported little or no interest in partnered sexual activity. Accordingly, studies of sexual orientation in MtF transsexuals now typically use a four-category model (heterosexual, bisexual, homosexual, and asexual), with sexual orientation usually defined in relation to biologic sex.

Results of selected English language studies reporting the distribution of sexual orientation among MtF transsexuals before and after SRS are summarized in Table I. In general, the prevalence of exclusively homosexual attraction relative to biologic sex among MtF transsexuals before SRS appears to have decreased over time.

Table I. Distribution of Sexual Orientation in Selected Studies of MtF Transsexuals

Study	*N*	%			
		Asexual	Heterosexual	Bisexual	Homosexual
Preoperative orientation					
Hoenig and Kenna (1974)[a]	54	—	17	4	80
Bentler (1976)[a]	42	33	31	—	36
Freund, Steiner, and Chan (1982)[b]	99	—	25	—	75
Blanchard (1985)	163	7	10	21	61
Blanchard, Clemmensen, and Steiner (1987)[b]	125	—	58	—	42
Verschoor and Poortinga (1988)	168	7	24	33	37
De Cuypere, Jannes, and Rubens (1995)	22	9	27	18	45
Muirhead-Allwood, Royle, and Young (1999)	133	23	50	14	14
Schroder and Carroll (1999)	17	6	18	53	24
Postoperative orientation					
Bentler (1976)[a]	42	2	2	—	95
Sørensen and Hertoft (1980)[a]	29	7	21	—	72
Martin (1988)	56	5	9	39	46
Muirhead-Allwood, Royle, and Young (1999)	86	14	24	21	41
Rehman, Lazer, Benet, Schaefer, and Melman (1999)[a]	28	—	11	14	75
Schroder and Carroll (1999)	17	0	18	35	48

Note. All studies used a four-category model of sexual orientation unless otherwise noted. Categories were defined relative to respondents' biologic sex. Because of rounding, row percentage totals may not equal 100%.

[a]Three-category model of sexual orientation.

[b]Two-category model of sexual orientation.

Sexual orientation is often considered to be a fundamental and unchangeable aspect of personality in biologic males (Harry, 1984; Pillard & Bailey, 1995); however, studies that have compared sexual orientation before and after SRS have demonstrated a shift toward preference for male partners following SRS (Bentler, 1976; Muirhead-Allwood et al., 1999; Schroder & Carroll, 1999). Changes in partner preference after SRS have sometimes been interpreted as reflecting erotic interest in the validation provided by male partners, rather than development of a genuine preference for the male somatotype (Blanchard, 1989b; Freund, 1985). Daskalos (1998) described changes in sexual orientation in a small group of pre- and post-operative MtF transsexuals, but it is not clear whether his informants' self-reports reflected changes in somatotypic preference (Lawrence, 1999). In a study that used neo-vaginal photoplethysmography to study patterns of sexual arousal in MtF transsexuals after SRS, Lawrence, Latty, Chivers, and Bailey (2005) demonstrated that reported changes in sexual orientation after SRS can be inconsistent with observed patterns of physiological arousal.

Number of Sexual Partners

Many MtF transsexuals report having had multiple sexual partners both before and after SRS, while a small number report having had no partners. In a study by Bentler (1976), 42 MtF transsexuals reported a mean of about nine male sexual partners after SRS. Rakic, Starcevic, Maric, and Kellin (1996) found that, among 22 MtF transsexuals attracted exclusively to men, 27% reported no partners after SRS, 23% reported one partner, and 50% reported multiple partners. Chew, Tham, and Ratnam (1997) studied 153 preoperative MtF transsexuals in Singapore; 10% reported no sexual partners, 18% reported one partner, 21% reported two to three partners, 13% reported four to six partners, and 37% reported seven or more partners. Kirk (1997) found that among 100 MtF transsexuals who had undergone SRS an average of 6 years earlier, 46% reported having had no sexual partners after SRS.

Frequency of Sexual Activity

MtF transsexualism was described as a hyposexual condition in some early reports (Person & Ovesey, 1974a, 1974b; Pomeroy, 1969). Masturbation appears to be infrequent in most MtF transsexuals receiving feminizing hormone therapy, both before and after SRS. Hoenig and Kenna (1974) found that, of 54 preoperative MtF transsexuals, 19% masturbated "a great deal," 48% masturbated "moderately," and 24% masturbated little or not at all; for 9%, the frequency of masturbation was unknown. Most of the 42 MtF transsexuals studied by Bentler (1976) masturbated only occasionally or not at all. Kwan, Van Maasdam, and Davidson (1985) reported that 8 preoperative MtF transsexuals receiving estrogen therapy masturbated about once per week on average. Martin (1988) found the following frequencies of masturbation among 64 postoperative MtF transsexuals: 14% never, 41% less than once per month, 25% one to three times per month, and 19% once or more per week. Schroder and Carroll (1999) surveyed 17 postoperative MtF transsexuals; 41% never masturbated, 35% did so once per month or less, and 24% masturbated once per week or more frequently. Rehman, Lazer, Benet, Schaefer, and Melman (1999) found that only 29% of 28 postoperative MtF transsexuals reported engaging in any noncoital sexual activities such as masturbation, use of vibrators, or oral sex.

Bentler (1976) reported that his 42 MtF informants had engaged in coitus a mean of about 12 times following SRS. Blanchard, Legault, and Lindsay (1987) found that, among 14 MtF transsexuals who were homosexual relative to biologic sex, median frequency of coitus after SRS was 2.7 times per month. Martin (1988) reported these frequencies of coitus among 58 MtF transsexuals after SRS: 24% never, 38% less than once per month, 12% one to three times per month, and 26% once or more per week. For manual-genital contact with female partners, the most common sexual activity with female partners, Martin's informants reported these frequencies: 59% never, 22% less than once per month, 2% one to three times per month, and 17% once per week or more frequently.

Prevalence of Stable Partnered Relationships

Roughly half of MtF transsexuals engage in long-term sexual or romantic partnerships after SRS. Freundt, Toolenaar, Huikeshoven, Jeekel, and Drogendijk (1993) reported that 4 of their 10 MtF SRS patients had a "steady sexual partner." Eldh, Berg, and Gustafsson (1997) found that among 40 MtF transsexuals, 58% were either married or lived in a "steady relationship" with a partner after SRS. Muirhead-Allwood et al. (1999) noted that 55% of 138 MtF transsexuals were in a "stable relationship" with a partner after SRS. Schroder and Carroll (1999) reported that 35% of 17 MtF transsexuals had a "steady sexual partner" after SRS. Docter and Fleming (2001) found that, of 58 pre- and post-operative MtF transsexuals, 27% reported no usual sex partner. Lewins (2002) noted that

partnered relationships were more common among MtF transsexuals who sought female partners: In his survey, 71% of 17 informants who identified as lesbian were in a stable relationship, compared to only 27% of 26 informants who were sexually attracted to men.

Prevalence of Sexual Arousal to Cross-Dressing or Cross-Gender Fantasy

Table II summarizes selected English language reports concerning the prevalence of a history of erotic cross-dressing in MtF transsexuals. Some MtF transsexuals report that sexual arousal to cross-dressing is not just a past phenomenon: In a study by Doorn, Poortinga, and Verschoor (1994), 15% of 103 early-onset transsexuals and 18% of 52 late-onset transsexuals stated that cross-dressing was currently sexually arousing, at least to some extent. Blanchard (1989a) introduced the term *autogynephilia* (the propensity to be sexually aroused by the thought or image of oneself as female) to describe sexual arousal to cross-dressing or to cross-gender ideation or imagery in which cross-dressing did not occur or did not play a central role. Autogynephilic fantasies have been reported after SRS (Schroder & Carroll, 1999), but the prevalence of autogynephilic arousal in postoperative MtF transsexuals is unknown.

Table II. Percentage of MtF Transsexuals Reporting Some History of Sexual Arousal to Cross-dressing in Selected Studies

Study	*N*	% Reporting arousal to cross-dressing
Hoenig and Kenna (1974)	54	83
Bentler (1976)	42	30[a]
Buhrich and McConaghy (1978)	29	17
Hellman, Green, Gray, and Williams (1981)	42	40
Freund, Steiner, and Chan (1982)	99	42[b]
Blanchard (1985)	163	37[c]
Blanchard, Clemmensen, and Steiner (1987)	125	52[d]
Leavitt and Berger (1990)	81[e]	36
Doorn, Poortinga, and Verschoor (1994)	155	31[f]
Schroder and Carroll (1999)	17	35
Docter and Fleming (2001)	58	25

[a] Includes 23% of 15 persons categorized as homosexual relative to biologic sex.
[b] Includes 30% of 74 persons categorized as homosexual relative to biologic sex.
[c] Includes 15% of 100 persons categorized as homosexual relative to biologic sex.
[d] Includes 10% of 52 persons categorized as homosexual relative to biologic sex.
[e] All described as sexually attracted to men.
[f] Includes 26% of 103 persons categorized as "early-onset" transsexuals.

Autogynephilia has usually been interpreted as a manifestation of underlying gynephilia (sexual attraction to women), with the feminized self rather than another person serving as the "erotic target" (Blanchard, 1991, 1992; Freund & Blanchard, 1993). Blanchard (1985, 1989b) demonstrated that, among gender dysphoric males who had not undergone SRS, individuals who were heterosexual, bisexual, or asexual (analloerotic) relative to biologic sex were significantly more likely to give a history of autogynephilic arousal than those who were homosexual relative to biologic sex. However, autogynephilia has been reported in 10–36% of MtF transsexuals whom investigators have classified as homosexual relative to biologic sex, as the notes to Table II indicate. Little is known about the characteristics of homosexual transsexuals who report experiencing autogynephilic arousal.

Blanchard (1989b) distinguished between *core autogynephilia*, the "simple, unelaborated, and contextless fantasy of being a woman" (p. 619), and *autogynephilic interpersonal fantasy*, "the sexual fantasy of being admired, in the female persona, by another person" (p. 619). He found that, among gender dysphoric males who had not undergone SRS, bisexual persons reported the highest levels of autogynephilic interpersonal fantasy (Blanchard, 1989b), and that among nonhomosexual transsexuals, sexual attraction to men (i.e., bisexuality) was associated with autogynephilic interpersonal fantasy but not with core autogynephilia (Blanchard, 1992). These observations suggest that autogynephilia–or a component of it, autogynephilic interpersonal fantasy–might be associated with the expression of interpersonal sexuality among MtF transsexuals generally and among bisexual MtF transsexuals in particular. However, the relationship between autogynephilia and interpersonal sexuality has not been studied in MtF transsexuals who have undergone SRS.

Frequency and Characteristics of Orgasm After SRS

Table III presents data from selected English-language studies concerning the ability of MtF transsexuals to achieve orgasm following SRS. Typically, 60–90% of MtF transsexuals report this capability. Blanchard et al. (1987) and Green (1998) suggested that self-reports may overestimate the ability of MtF transsexuals to achieve physiological orgasm after SRS; they proposed that release of fluid from the urethral meatus (i.e., ejaculation) would be one reliable indication that physiological orgasm had occurred.

Table III. Reported Frequency of Orgasm and Ejaculation with Orgasm After SRS in Selected Studies of MtF Transsexuals

Study	*N*	% Orgasmic	% Ejaculate
Bentler (1976)	42	67[a]	65
Lindemalm, Körlin, and Uddenberg (1986)	13	46	15
McEwen, Ceber, and Daws (1986)	23	83	—
Blanchard, Legault, and Lindsay (1987)	22	82	41
Martin (1988)	56	63	—
Ross and Need (1989)	14	85	50
Stein, Tiefer, and Melman (1990)	10	80	—
Eldh (1993)	20	100	—
Freundt, Toolenaar, Huikeshoven, Jeekel, and Drogendijk (1993)	10	70	—
Lief and Hubschman (1993)	14	29[b]	—
Rubin (1993)	13	92	—
van Noort and Nicolai (1993)	22	82	—
Hage and Karim (1996)	59	80	—
Rakic, Starcevic, Maric, and Kellin (1996)	16	63[b]	—
Muirhead-Allwood, Royle, and Young (1999)	131	67	—
Rehman, Lazer, Benet, Schaefer, and Melman (1999)	28	79	—
Rehman and Melman (1999)	10	90	—
Schroder and Carroll (1999)	17	66	30
Perovic, Stanojevic, and Djordjevic (2000)	89	82	—
Krege, Bex, Lümmen, and Rübben (2001)	31	87	—

Note. Percentages denote respondents who reported any experience of orgasm or ejaculation with orgasm after SRS.
[a]Minimum figure.
[b]With coitus.

Several studies provide information about the frequency or quality of orgasm after MtF SRS. Bentler (1976) noted that 67% of 42 MtF respondents said that orgasms experienced as a woman were more pleasing than those experienced as a man. Martin (1988) found that among 64 MtF transsexuals, 18% were always orgasmic with masturbation, 23% were usually orgasmic, 8% were sometimes orgasmic, 13% were seldom orgasmic, and 37% were never orgasmic after SRS. Stein, Tiefer, and Melman (1990) studied 10 MtF transsexuals after SRS; 2 were usually orgasmic, 6 were seldom orgasmic, and 2 were never orgasmic. Schroder and Carroll (1999) found in a post-SRS study of 17 MtF transsexuals that 36% were usually orgasmic with masturbation, 18% were sometimes orgasmic, and 6% were rarely orgasmic. Rehman et al. (1999) reported that among 28 MtF transsexuals, 54% were regularly orgasmic, 25% were infrequently orgasmic, and 21% were never orgasmic after SRS; 50% reported that their orgasms were more intense and of better quality.

Objectives and Hypotheses

This report provides information about the sexual behaviors and attitudes of the postoperative MtF SRS patients of one surgeon, obtained as part of a surgical follow-up survey conducted in 2001. Although the overall objectives of the survey's sexuality-focused questions were descriptive, four hypotheses were formulated, based on the results of previous investigations:

1. Participants will report an overall shift toward male partner preference after SRS.
2. The number of sexual partners reported by participants before and after SRS will more closely approximate population norms for men than population norms for women.
3. Participants reporting sexual orientation toward women after SRS will be more likely to report having been in a stable partnered or romantic relationship after SRS than participants reporting sexual orientation toward men after SRS.
4. Participants categorized as asexual, heterosexual, or bisexual relative to biologic sex before SRS will report more episodes of autogynephilic arousal before SRS than will participants categorized as homosexual relative to anatomic sex before SRS.

METHOD

Participants

Survey participants were MtF transsexuals who had undergone SRS between May 1994 and March 2000 with Toby Meltzer, M.D., a surgeon practicing in Portland, Oregon. All participants had undergone SRS using a consistent surgical technique, consisting of penile-inversion vaginoplasty and clitoroplasty using a portion of the glans penis on a dorsal neurovascular pedicle. The technique was similar to that described by Fang, Chen, and Ma (1992). Participants were surveyed in April 2001 using a mailed, self-administered questionnaire, which they returned anonymously. The recruitment of participants and survey method have been described elsewhere (Lawrence, 2003).

Participants returned a total of 232 valid questionnaires, representing 32% of patients estimated to have undergone SRS during the period studied and 65% of patients believed to have received a questionnaire. The participants' mean age at time of SRS was 44 years ($SD = 9$ years; range, 18–70 years) and their mean age at time of survey completion was 47 years ($SD = 9$ years; range, 19–72 years).

Measures

The survey questionnaire contained 41 items relevant to the present study. Participants reported the year in which they underwent SRS; their age at time of SRS; the age at which they first wished to be the other sex or to change sex; the duration of their real-life experience in the desired gender role prior to SRS (in months); whether they had been married to a woman before SRS (*yes* or *no*) and, if so, whether they still lived with that person (*yes* or *no*); whether they had been a biologic parent (*yes* or *no*); whether they were currently in a "stable romantic or partnered relationship" (as interpreted by the participant; *yes* or *no*); whether they had been in such a relationship at any time after undergoing SRS (*yes* or *no*); and whether these relationships, if any, had started before SRS (both *yes* or *no*).

Participants reported their number of "sexual partners" (as interpreted by the participant) before SRS, after SRS, and in the past 12 months, in each of four possible partner categories: male partners (not transgendered), female partners (not transgendered), male-to-female transgendered partners, and female-to-male transgendered partners. They reported the number of "episodes of sexual activity" (as interpreted by the participant) in which they had engaged in the past 12 months, in each of five categories: with masturbation, with male partners (not transgendered), with female partners (not transgendered), with male-to-female transgendered partners, and with female-to-male transgendered partners.

Participants rated their sexual attraction to men and women before and after SRS (each on a 7-point Kinsey scale [Kinsey, Pomeroy, & Martin, 1948], from *exclusively attracted to females* [Kinsey 0] to *exclusively attracted to males* [Kinsey 6], with the additional option of *little or no sexual attraction to males or females* [Kinsey X]), and their sexual experience with male and female partners before and after SRS (each on a 7-point Kinsey scale, from *exclusively with female partners* [Kinsey 0] to *exclusively with male partners* [Kinsey 6], with the additional option of *no sexual experience with either male or female partners* [Kinsey X]); for the latter question, participants were instructed to regard transgendered partners as belonging to the sex as which they presented. Participants rated their feelings of childhood femininity or masculinity prior to age eight and their belief about how feminine or masculine they probably appeared to others prior to age eight (each on a 5-point scale from *very feminine* to *very masculine*), and how frequently they had experienced sexual arousal to wearing women's clothing or to the thought or image of themselves as women (i.e., autogynephilia), both before and after SRS (each on a 5-point scale from *never* to *hundreds of times or more*, with the additional option of *don't know or not applicable*).

Participants reported how often they were able to achieve orgasm with masturbation after SRS (5-point scale from *never* to *almost always*, with the additional option of *don't know or not applicable*); how similar the orgasms they experienced after SRS were to those they had experienced while living as a man (5-point scale from *entirely different* to *almost identical*, with the additional option of *don't know or not applicable*); how pleasurable the orgasms they experienced after SRS were, compared to those they had experienced while living as a man (5-point scale from *much less pleasurable* to *much more pleasurable*, with the additional option of *don't know or not applicable*); and how often they ejaculated ("released fluid") with orgasm after SRS (5-point scale from *never* to *almost always*, with the additional option of *don't know or not applicable*).

Data Analysis

Not all participants answered all questions; participants with missing values were excluded from analyses, so *N*s vary across data tables and comparisons. The alpha level for rejecting null hypotheses was set at .05. Because the primary intentions of the study were descriptive and exploratory, no adjustments were made for multiple comparisons. Pre- and post-SRS comparisons of categorical data involving three or more categories (e.g., sexual orientation) were examined using the Stuart-Maxwell test of marginal homogeneity (Sheskin, 2004).

RESULTS

Sexual Orientation Before and After SRS

Table IV summarizes participants' self-reported sexual attraction to and sexual experience with males and females before and after SRS. To facilitate comparison with earlier studies that used four-category models of sexual orientation, participants were assigned to one of four categories relative to biologic sex by considering

Table IV. Participants' Reported Sexual Attraction and Experience Before and After SRS

	Sexual attraction				Sexual experience			
	Before SRS		After SRS		Before SRS		After SRS	
Attraction or experience	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)
Neither males nor females	27	(12)	21	(9)	12	(5)	54	(24)
Females exclusively	59	(26)	21	(9)	103	(46)	44	(19)
Females primarily, males incidentally	64	(28)	36	(16)	58	(26)	16	(7)
Females mostly, but also males	32	(14)	16	(7)	23	(10)	7	(3)
Females and males about equally	17	(7)	26	(11)	4	(2)	12	(5)
Males mostly, but also females	7	(3)	30	(13)	7	(3)	6	(3)
Males primarily, females incidentally	10	(4)	41	(18)	9	(4)	14	(6)
Males exclusively	11	(5)	36	(16)	10	(4)	73	(32)

those who reported no attraction to or no sexual experience with other persons to be asexual, those who reported exclusive or almost exclusive attraction to or experience with female partners to be heterosexual, those who reported exclusive or almost exclusive attraction to or experience with male partners to be homosexual, and the remainder to be bisexual. On the basis of reported sexual attraction, the participants were categorized as 54% heterosexual, 25% bisexual, 9% homosexual, and 12% asexual before SRS, and 25% heterosexual, 32% bisexual, 34% homosexual, and 9% asexual after SRS, $\chi^2(3, N = 226) = 72.9,\ p < .0001$ by Stuart-Maxwell test. On the basis of reported experience, the participants were categorized as 72% heterosexual, 15% bisexual, 8% homosexual, and 5% asexual before SRS, and 26% heterosexual, 12% bisexual, 38% homosexual, and 24% asexual after SRS, $\chi^2(3, N = 223) = 107.4,\ p < .0001$ by Stuart-Maxwell test.

The magnitude of changes in participants' Kinsey scale ratings for sexual attraction and experience following SRS are summarized in Table V. There was a shift toward a preference for male partners after SRS, both for changes in sexual attraction and for changes in sexual experience (both $p < .001$ by Wilcoxon signed-rank test). Three percent of participants reported a shift from exclusive attraction to female partners before SRS to exclusive attraction to male partners after SRS and 15% reported a shift from exclusive experience with female partners before SRS to exclusive experience with male partners after SRS, both representing 6-point changes in Kinsey scale ratings.

Sexual Orientation Toward Women Before SRS and Toward Men After SRS

Several participants reported that they were exclusively or almost exclusively sexually oriented toward women before SRS and exclusively or almost exclusively sexually oriented toward men after SRS. The opposite pattern, exclusive or almost exclusive orientation toward men before SRS and toward women after SRS, was never observed.

Table VI presents comparison data for persons who reported a marked change in their pattern of sexual attraction following SRS and for persons who reported that their pattern of attraction remained constant or nearly so. Group F/M ($n = 30$) consisted of persons who were exclusively or almost exclusively attracted to females before SRS and exclusively or almost exclusively attracted to males after SRS. Comparison group F/F ($n = 50$) consisted of persons who were exclusively or almost exclusively attracted to females both before and after SRS; comparison group M/M ($n = 17$) consisted

Table V. Participants' Change in Reported Sexual Orientation After SRS

	Attraction[a]		Experience[b]	
Shift toward males	*n*	(%)	*n*	(%)
+6 levels	6	(3)	25	(15)
+5 levels	15	(8)	23	(14)
+4 levels	16	(9)	8	(5)
+3 levels	18	(10)	11	(7)
+2 levels	23	(12)	13	(8)
+1 level	34	(18)	22	(14)
No change	62	(33)	38	(23)
−1 level	11	(6)	15	(9)
−2 levels	2	(1)	6	(4)
−3 levels	0	(0)	1	(1)

Note. Positive shifts denote an increased preference for male partners, negative shifts denote an increased preference for female partners.

[a]Excludes participants who reported little or no sexual attraction to other persons either before or after SRS ($N = 187$).

[b]Excludes participants who reported no sexual experience with other persons either before or after SRS ($N = 162$).

Table VI. Characteristics of Participants Whose Reported Pattern of Sexual Attraction Changed Markedly or Remained Stable After SRS

Participant characteristic	Attraction before SRS/Attraction after SRS		
	F/M[a] ($n = 30$)	F/F[b] ($n = 50$)	M/M[c] ($n = 17$)
Mean age at SRS (*SD*)	45 (8.4)	44 (9.1)	34 (9.2)***
Mean age at first wish to change sex (*SD*)	9.8 (9.1)	8.0 (6.0)	6.3 (3.4)
Mean age at living full-time in female role (*SD*)	42 (11.3)	42 (9.6)	28 (8.8)***
Mean duration of real-life experience before SRS, in months (*SD*)	21 (18)	21 (18)	63 (63)**
Mean number of female sexual partners before SRS (*SD*)	12 (16)	15 (21)	0.3 (0.8)**
Mean number of male sexual partners before SRS (*SD*)	0.7 (1.3)	0.8 (1.8)	6.6 (8.8)***
Very or somewhat feminine as a child, in own opinion	41%	45%	76%*
Very or somewhat feminine as a child, in others' probable opinion	21%	24%	76%***
Autogynephilic arousal hundred of times or more before SRS	52%	58%	18%*
Married to a woman before SRS	70%	74%	12%***
Biologic parent before SRS	53%	42%	6%***
Mean number of female sexual partners after SRS (*SD*)	0 (0)	1.5 (2.6)**	0.4 (0.9)*
Mean number of female sexual partners after SRS in last year (*SD*)	0 (0)	1.0 (1.7)**	0.3 (0.8)
Mean episodes of sexual behavior with female partners after SRS in last year (*SD*)	0 (0)	21 (48)*	0.1 (0.5)
Mean number of male sexual partners after SRS (*SD*)	2.9 (3.1)	0.7 (1.6)****	6.9 (10.7)
Mean number of male sexual partners after SRS in last year (*SD*)	1.9 (2.3)	0.4 (1.5)***	2.9 (3.9)
Mean episodes of sexual behavior with male partners after SRS in last year (*SD*)	30 (63)	1 (4)**	67 (128)
More than one male sexual partner after SRS	60%	16%	65%
In stable partnered relationship after SRS, at any time	40%	74%**	71%*
In stable partnered relationship after SRS, at time of survey	27%	62%**	29%

Note. p values are for comparisons with group F/M, and are from t-tests for continuous variables and from Fisher's exact test for dichotomous variables. All p values are two-tailed.

* $p < .05$; ** $p < .01$; *** $p < .001$; **** $p < .0001$.

[a] Exclusively or almost exclusively attracted to females before SRS, exclusively or almost exclusively attracted to males after SRS.

[b] Exclusively or almost exclusively attracted to females before and after SRS.

[c] Exclusively or almost exclusively attracted to males before and after SRS.

of persons who were exclusively or almost exclusively attracted to males both before and after SRS. Based on characteristics before SRS, group F/M was statistically indistinguishable from group F/F for all characteristics examined, and was different from group M/M for nearly all characteristics examined. After SRS, however, almost the reverse was true: Group F/M was different from group F/F for all characteristics examined, but was statistically indistinguishable from group M/M for every characteristic except prevalence of stable partnered relationships. There were nonsignificant trends toward fewer male partners and less frequent sexual activity following SRS in group F/M vs. group M/M.

Comparisons were also made based on participants' reported sexual experience, using both Kinsey-scale ratings and the number of sexual partners participants reported. The results were similar, and only data based on the latter approach are presented. Table VII displays comparison data for persons who reported a marked change in their pattern of sexual partnering following SRS and for persons who reported that their pattern of sexual partnering remained constant. In this table, group F/M ($n = 28$) consisted of persons who reported at least one female sexual partner but no male partners before SRS, and at least one male sexual partner but no female sexual partners after SRS. Comparison group F/F ($n = 23$) consisted of persons who reported at least one female sexual partner but no male sexual partners both before and after SRS, while comparison group M/M ($n = 11$) consisted of persons who reported at least one male sexual partner but no female sexual partners both before and after SRS. These comparisons produced results similar to those based on sexual attraction: Group F/M was again statistically different from group M/M for most preoperative characteristics. However, it was also different from group F/F in some ways: Its members were younger

Table VII. Characteristics of Participants Whose Reported Pattern of Sexual Partnering Changed Markedly or Remained Stable After SRS

Participant characteristic	Partners before SRS/Partners after SRS		
	F/M[a] ($n = 28$)	F/F[b] ($n = 23$)	M/M[c] ($n = 11$)
Mean age at SRS (*SD*)	43 (7.7)	47 (6.8)	38 (7.7)
Mean age at first wish to change sex (*SD*)	6.4 (2.7)	7.9 (9.7)	8.0 (5.9)
Mean age at living full-time in female role (*SD*)	39 (10.1)	45 (6.9)*	30 (8.3)*
Mean duration of real-life experience before SRS, in months (*SD*)	25 (24)	21 (14)	72 (72)**
Mean number of female sexual partners before SRS (*SD*)	9.6 (17)	7.2 (14)	
Very or somewhat feminine as a child, in own opinion	57%	45%	82%
Very or somewhat feminine as a child, in others' probable opinion	25%	36%	78%**
Autogynephilic arousal hundred of times or more before SRS	29%	39%	27%
Married to a woman before SRS	75%	96%*	9%**
Biologic parent before SRS	57%	39%	9%**
Mean number of male sexual partners after SRS (*SD*)	2.8 (2.8)		8.4 (12.2)*
Mean number of male sexual partners after SRS in last year (*SD*)	1.7 (2.0)		2.1 (2.7)
Mean episodes of sexual behavior with male partners after SRS in last year (*SD*)	31 (64)		26 (20)
More than one male sexual partner after SRS	50%		82%
In stable partnered relationship after SRS, at any time	71%	86%	64%
In stable partnered relationship after SRS, at time of survey	43%	83%**	36%

Note. p values are for comparisons with group F/M, and are from t-tests for continuous variables and from Fisher's exact test for dichotomous variables. All p values are two-tailed.

*$p < .05$; **$p < .01$.

[a]Exclusively female partners before SRS, exclusively male partners after SRS.

[b]Exclusively female partners before and after SRS.

[c]Exclusively male partners before and after SRS.

at the time of gender transition and were less likely to have been married. For comparisons after SRS, group F/M was similar to group M/M for all characteristics examined except reported number of male partners, which was significantly smaller in group F/M. Half the members of group F/M reported only one male partner after SRS.

Number of Sexual Partners Before SRS

Table VIII summarizes the number of sexual partners before SRS reported by participants and also provides comparison data for number of sexual partners since age 18 reported by a national probability sample of US adults, ages 18–59, from the National Health and Social Life Survey (NHSLS; Laumann, Gagnon, Michael, & Michaels, 1994). The mean ages of the men and women surveyed in the NHSLS were 36.0 years ($SD = 10.8$ years) and 36.8 years ($SD = 11.0$ years), respectively.

Overall, 87% of participants reported having had one or more female partners before SRS, 47% reported one or more male partners before SRS, and 41% reported both male and female partners. Twenty-two percent of participants reported having had one or more male-to-female transgendered partners before SRS, but only 2% reported one or more FtM transgendered partners.

Because partnership patterns were expected to vary with sexual orientation (Muirhead-Allwood et al., 1999), participants were divided into four groups, based on their sexual partnership history with nontransgendered partners before SRS: those reporting female partners but no male partners, the heterosexual group relative to biologic sex ($n = 105$); those reporting both male and female partners, the bisexual group ($n = 92$); those reporting male partners but no female partners, the homosexual group relative to biologic sex ($n = 15$); and those reporting no female or male partners, the asexual or analloerotic group ($n = 15$).

Participants whose partnership pattern was heterosexual relative to biologic sex before SRS reported a significantly smaller median number of female partners before SRS than did participants whose partnership pattern was bisexual, 4 vs. 7 ($p = .0004$ by median test), and also a significantly smaller median number of total partners, 4 vs. 12 ($p < .0001$ by median test). Participants whose partnership pattern was bisexual before SRS reported about the same median number of male partners before SRS as did participants whose partnership pattern was homosexual, 3 vs. 5 ($p = .24$ by median

Table VIII. Participants' Reported Number of Sexual Partners Before SRS, with National Health and Social Life Survey (NHSLS) Comparison Groups

	Number of partners												
	0		1		2–4		5–10		11–20		21+		
Participants reporting	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	*Mdn*
Female partners, no male partners ($N = 105$)													
Female partners			24	(23)	37	(35)	28	(27)	5	(5)	11	(10)	4
MtF[a] partners	96	(91)	7	(6)	2	(2)	0	(0)	0	(0)	0	(0)	0
FtM[b] partners	105	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
Female and male partners ($N = 92$)													
Female partners			3	(3)	24	(26)	34	(37)	18	(20)	13	(14)	7
Male partners			30	(33)	32	(35)	20	(22)	8	(9)	2	(2)	3
MtF partners	57	(62)	21	(23)	12	(13)	1	(7)	0	(0)	1	(1)	0
FtM partners	87	(95)	4	(4)	1	(1)	0	(0)	0	(0)	0	(0)	0
Male partners, no female partners ($N = 15$)													
Male partners			1	(7)	6	(40)	6	(40)	1	(7)	1	(7)	5
MtF partners	12	(80)	1	(7)	1	(7)	1	(7)	0	(0)	0	(0)	0
FtM partners	15	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
No male or female partners ($N = 15$)													
MtF partners	13	(87)	1	(7)	0	(0)	1	(7)	0	(0)	0	(0)	0
FtM partners	15	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
All participants ($N = 227$)													
All partners	13	(6)	24	(11)	52	(23)	64	(28)	39	(17)	35	(15)	6
NHSLS women[c]		(3)		(32)		(36)		(20)		(6)		(3)	2
NHSLS men[c]		(3)		(20)		(21)		(23)		(16)		(17)	6

[a] Male-to-female transgendered.
[b] Female-to-male transgendered.
[c] Participants in a national probability survey of US adults, ages 18–59, reporting number of sexual partners since age 18; from Laumann, Gagnon, Michael, and Michaels (1994, pp. 179–180).

test), but a significantly larger median number of total partners, 12 vs. 5, ($p = .017$ by median test). Thirty (33%) of 92 of bisexual participants reported having had only one male partner before SRS, vs. only 1 (7%) of 15 homosexual participants ($p = .06$ by Fisher's exact test, two-tailed). Bisexual participants reported having had MtF transgendered partners before SRS more often than did members of any other group (38% did so) and they accounted for all five instances of persons reporting FtM transgendered partners before SRS.

Participants whose partnership pattern was homosexual relative to biologic sex before SRS reported a median of five male partners and a mean of eight male partners before SRS. Participants whose partnership pattern was asexual or analloerotic before SRS (i.e., who reported no nontransgendered male or female partners) usually reported having had no transgendered partners, either. Only 14% of asexual participants reported one or more MtF transgendered partners, and none reported any FtM transgendered partners.

Year of surgery was not significantly correlated with number of sexual partners before SRS for any partner category or with total number of partners before SRS. Age was significantly correlated with number of female sexual partners before SRS, $r(224) = .13$, $p = .05$, but not with number of partners before SRS in any other partner category, nor with total number of partners before SRS.

The participants' median number of partners before SRS was 6, identical to the median number of partners since age 18 reported by the NHSLS men and higher than the median of 2 partners since age 18 reported by the NHSLS women. Thirty-two percent of participants reported more than 10 partners before SRS, nearly identical to the percentage of NHSLS men reporting more than 10 partners since age 18, 33%, and substantially greater than the percentage of NHSLS women so reporting, 9%. Because the transsexual participants were older on average than the NHSLS men and women, they would have had more years to accumulate sexual partners. If the transsexual participants' ages had more closely matched those of the NHSLS men and women, the median number of partners they reported and the percentage reporting more than 10 partners might have been lower and might have more closely approximated those of the NHSLS women. To test this possibility, the transsexual

participants were divided into two groups, based on age at time of SRS. The younger group, participants ages 18–43 at time of SRS ($n = 108$), reported a median of 8 partners before SRS, and 34% reported more than 10 partners before SRS. The older group, participants ages 44-70 at time of SRS ($n = 121$), reported a median of 5 partners before SRS, and 30% reported more than 10 partners before SRS.

Number of Sexual Partners After SRS

Participants' reports concerning their number of sexual partners for the entire period following SRS, a median of 3 years, are summarized in Table IX. Participants were again divided into four groups, now based on their partnership history with nontransgendered partners after SRS, and again relative to biologic sex: a heterosexual group ($n = 40$), a bisexual group ($n = 41$), a homosexual group ($n = 81$), and an asexual group ($n = 66$). Fifty-two participants (23%) reported having had no sexual partners in any category, including transgendered partners, since undergoing SRS.

Participants' reports concerning their number of sexual partners after SRS in the last 12 months are summarized in Table X, along with comparison data from the NHSLS. Participants were again divided into four groups, now based on their partnership history with nontransgendered partners for the last 12 months, and again relative to biologic sex: a heterosexual group ($n = 39$), a bisexual group ($n = 23$), a homosexual group ($n = 76$), and an asexual group ($n = 89$). Participants reported a median of one partner in the previous 12 months, the same as the NHSLS men and women. However, transsexual participants displayed greater variability in their reported number of sexual partners than did the NHSLS men and women. Among the transsexual participants, 32% reported no sexual partners in the previous 12 months, versus only 10% of the NHSLS men and only 14% of the NHSLS women. However, 10% of the transsexual participants reported five or more partners in the previous 12 months, versus only 5% of the NHSLS men and only 2% of the NHSLS women. Multiple-partner experience was especially common among bisexual participants, who reported a median of five partners in the last 12 months, vs. a median of one partner for the heterosexual and homosexual participants and a median of zero partners for the asexual participants ($p < .0001$ by median test for all three comparisons, bisexual group vs. heterosexual, homosexual, and asexual groups).

Year of surgery was significantly correlated with number of male sexual partners in the last 12 months, $r(225) = .14$, $p = .04$, and with total number of partners in the last 12 months, $r(225) = .15$, $p = .03$.

Table IX. Participants' Reported Number of Sexual Partners After SRS

	Number of partners								
	0		1		2–4		5+		
Participants reporting	n	(%)	n	(%)	n	(%)	n	(%)	*Mdn*
Female partners, no male partners ($N = 40$)									
Female partners			33	(82)	7	(18)	0	(0)	1
MtF[a] partners	32	(80)	6	(15)	1	(3)	1	(3)	0
FtM[b] partners	40	(100)	0	(0)	0	(0)	0	(0)	0
Female and male partners ($N = 41$)									
Female partners			15	(37)	22	(54)	4	(10)	2
Male partners			12	(22)	21	(57)	8	(22)	3
MtF partners	28	(68)	7	(17)	5	(12)	1	(2)	0
FtM partners	39	(95)	2	(5)	0	(0)	0	(0)	0
Male partners, no female partners ($N = 81$)									
Male partners			32	(40)	32	(40)	17	(21)	2
MtF partners	67	(83)	13	(16)	1	(1)	0	(0)	0
FtM partners	79	(98)	1	(1)	1	(1)	0	(0)	0
No male or female partners ($N = 66$)									
MtF partners	52	(79)	12	(18)	2	(3)	0	(0)	0
FtM partners	66	(100)	0	(0)	0	(0)	0	(0)	0
All participants ($N = 228$)									
All partners	52	(23)	64	(28)	67	(29)	45	(20)	1

[a] Male-to-female transgendered.
[b] Female-to-male transgendered.

Table X. Participants' Reported Number of Sexual Partners After SRS in Last 12 Months, with National Health and Social Life Survey (NHSLS) Comparison Groups

	Number of partners								
	0		1		2–4		5+		
Participants reporting	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*Mdn*
Female partners, no male partners ($N = 39$)									
Female partners			37	(95)	2	(5)	0	(0)	1
MtF[a] partners	35	(90)	3	(8)	1	(2)	0	(0)	0
FtM[b] partners	39	(100)	0	(0)	0	(0)	0	(0)	0
Female and male partners ($N = 23$)									
Female partners			10	(43)	10	(43)	3	(13)	2
Male partners			5	(22)	13	(57)	5	(22)	3
MtF partners	21	(91)	2	(9)	0	(0)	0	(0)	0
FtM partners	23	(100)	0	(0)	0	(0)	0	(0)	0
Male partners, no female partners ($N = 76$)									
Male partners			44	(58)	24	(32)	8	(11)	1
MtF partners	68	(89)	7	(9)	1	(1)	0	(0)	0
FtM partners	75	(99)	0	(0)	1	(1)	0	(0)	0
No male or female partners ($N = 89$)									
MtF partners	74	(83)	14	(16)	1	(1)	0	(0)	0
FtM partners	88	(99)	1	(1)	0	(0)	0	(0)	0
All participants ($N = 227$)									
All partners	73	(32)	89	(39)	43	(19)	22	(10)	1
NHSLS women[c]		(14)		(75)		(10)		(2)	1
NHSLS men[c]		(10)		(67)		(18)		(5)	1

[a] Male-to-female transgendered.
[b] Female-to-male transgendered.
[c] Participants in a national probability survey of US adults, ages 18–59, reporting number of sexual partners in last 12 months; from Laumann et al. (1994, p. 177).

Correlations between year of surgery and number of partners in the last 12 months were nonsignificant for other partner categories. Age was significantly correlated with total number of partners in the last 12 months, $r(225) = -.15$, $p = .02$, but correlations between age and number of partners in the last 12 months were nonsignificant for the four specific partner categories.

Frequency of Sexual Activity After SRS

Participants reported the number of episodes of sexual activity they had engaged in after SRS in the last 12 months, in five categories: with nontransgendered male partners, with nontransgendered female partners, with MtF transgendered partners, with FtM transgendered partners, and with masturbation. These results are summarized in Table XI. Participants were again divided into four groups, based on their reported sexual activity with nontransgendered partners in the last 12 months, again relative to biologic sex: a heterosexual group ($n = 38$), a bisexual group ($n = 23$), a homosexual group ($n = 77$), and an asexual group ($n = 86$).

The median frequency of partnered sexual activity in the last 12 months was 15 times per year in the heterosexual group, 16 times per year in the bisexual group, 12 times per year in the homosexual group, and 0 times per year in the asexual group. The median frequency of masturbation in the last 12 months varied between 10 and 15 times per year in the first three groups, but was only 6 times per year in the asexual group ($p = .03$ by median test, asexual group vs. other groups combined).

Year of surgery was not significantly correlated with number of episodes of sexual activity in the last 12 months with masturbation, number of episodes in the last 12 months with any specific category of partner, or number of episodes in the last 12 months with all partners combined. Age was significantly correlated with number of episodes of sexual activity in the last 12 months with masturbation, $r(221) = -.19$, $p = .004$; with number of episodes in the last 12 months with male partners, $r(221) = -.22$, $p = .0008$; and with number of episodes in the last 12 months with all partners combined, $r(221) =$

Table XI. Participants' Reported Number of Episodes of Sexual Activity After SRS in Last 12 Months

	Number of episodes												
	0		1–4		5–10		11–20		21–50		50+		
Participants reporting	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*Mdn*
Female but no male partners ($N = 38$)													
With female partners			8	(21)	5	(13)	8	(21)	9	(24)	8	(21)	15
With MtF[a] partners	35	(92)	1	(3)	0	(0)	1	(3)	0	(0)	1	(3)	0
With FtM[b] partners	38	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
With masturbation	5	(13)	9	(24)	6	(16)	5	(13)	10	(26)	3	(8)	10
Female and male partners ($N = 23$)													
With female partners			10	(43)	4	(17)	3	(13)	4	(17)	2	(9)	6
With male partners			6	(26)	7	(30)	6	(26)	1	(4)	3	(13)	10
With MtF partners	21	(91)	1	(4)	0	(0)	0	(0)	0	(0)	1	(4)	0
With FtM partners	23	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
With masturbation	1	(4)	1	(4)	8	(35)	4	(17)	3	(13)	6	(26)	15
Male but no female partners ($N = 77$)													
With male partners			20	(26)	16	(21)	17	(22)	9	(12)	15	(19)	12
With MtF partners	69	(80)	6	(8)	1	(1)	1	(1)	0	(0)	0	(0)	0
With FtM partners	76	(99)	0	(0)	1	(1)	0	(0)	0	(0)	0	(0)	0
With masturbation	10	(13)	11	(14)	17	(22)	13	(17)	15	(19)	11	(14)	12
No male or female partners ($N = 86$)													
With MtF partners	71	(83)	2	(2)	5	(6)	2	(2)	5	(6)	1	(1)	0
With FtM partners	85	(99)	0	(0)	0	(0)	0	(0)	0	(0)	1	(1)	0
With masturbation	21	(24)	18	(21)	16	(19)	12	(14)	13	(15)	6	(7)	6
All participants ($N = 224$)													
With all partners	70	(31)	29	(11)	30	(13)	33	(15)	31	(14)	31	(14)	8
With masturbation	37	(17)	39	(17)	47	(21)	34	(15)	41	(18)	26	(12)	10

[a] Male-to-female transgendered.
[b] Female-to-male transgendered.

$-.20$, $p = .003$. Age was not significantly correlated with number of episodes of sexual activity in the last 12 months with other specific categories of partners.

Prevalence of Stable Partnerships After SRS

One hundred thirty-two participants, 62% of those answering, had been in a stable romantic or partnered relationship at some time since undergoing SRS, and for 65, 47% of those answering, the relationship had begun before SRS. One hundred three participants, 45% of those answering, were in a stable romantic or partnered relationship at the time of survey completion, and for 47, 47% of those answering, the relationship had begun before SRS, a minimum of one year earlier. Among the 153 participants who had been married to a woman before SRS, 17 (11%) still lived with their spouse or ex-spouse. Such relationships comprised 30% of all cases in which a partnered or romantic relationship that had begun before SRS continued until the time of survey completion. The mean age of participants who been in a stable partnered relationship at any time after SRS was 42 years, vs. 46 years for those who had not, $t(224) = 3.3$, $p < .001$.

Persons reporting at least one female sexual partner but no male sexual partners after SRS reported the highest percentage of stable partnered relationships at any time after SRS, 90%; they were followed by those reporting at least one female and one male sexual partner, 80%; those reporting at least one male but no female sexual partners, 69%; and those reporting no nontransgendered male or female sexual partners after SRS, 26%. The group with no nontransgendered male or female sexual partners was significantly different from each of the other three groups ($p < .0001$ by Fisher's exact test, two-tailed, for each comparison). The group with only female sexual partners reported a significantly higher percentage of stable partnered relationships than did the group with only male sexual partners ($p = .01$ by Fisher's exact test, one-tailed). Other between-group comparisons were nonsignificant. Participants reporting any female sexual partners after SRS (the heterosexual and bisexual groups combined) reported a significantly higher percentage of stable partnered relationships at any time after SRS than

did the group reporting only male partners after SRS ($p = .013$ by Fisher's exact test, one-tailed).

Prevalence of Autogynephilic Arousal Before and After SRS

Participants' reports of their experience of autogynephilic arousal before and after SRS are summarized in Table XII. Significantly fewer episodes of autogynephilic arousal were reported after SRS than before SRS, $\chi^2(4, N = 202) = 120.6$, $p < .0001$ by Stuart-Maxwell test. Frequencies of autogynephilic arousal before and after SRS were highly correlated, $r_s(202) = .45$, $p < .0001$. Age was not significantly correlated with frequency of autogynephilic arousal before or after SRS, $r_s(213) = .06$, $p = .37$ and $r_s(207) = .10$, $p = .14$, respectively. Frequency of autogynephilic arousal after SRS was significantly correlated with year of surgery, $r_s(207) = -.17$, $p = .012$.

To examine the relationship between sexual orientation and autogynephilia, participants were divided into four groups based on their pattern of partnership with male and female sexual partners before SRS, as in Table VIII. Of 100 participants reporting female partners but no male partners before SRS, the heterosexual group, 87 (87%) reported some history of autogynephilic arousal; the median and modal number of episodes heterosexual participants reported were both "hundreds of episodes or more." Of 89 participants reporting both male and female partners before SRS, the bisexual group, 83 (93%) reported some history of autogynephilic arousal; the median and modal number of episodes bisexual participants reported were both "hundreds of episodes or more." Of 15 participants reporting male partners but no female partners before SRS, the homosexual group, 6 (40%) reported some history of autogynephilic arousal; the median and modal number of episodes homosexual participants reported were both "never." Of 10 participants reporting no nontransgendered female or male partners before SRS, the asexual group, 8 (80%) reported some history of autogynephilic arousal; the median frequency asexual participants reported was between "dozens of episodes" and "a dozen episodes or less," and the modal frequency they reported was "hundreds of episodes or more." The heterosexual and bisexual groups reported autogynephilic arousal significantly more frequently than did the homosexual group ($p = .0002$ and $p < .0001$, respectively, by Fisher's exact test, one-tailed); other between-group comparisons were nonsignificant, but the comparison between the asexual and homosexual groups approached significance, $p = .058$ by Fisher's exact test, one-tailed. The heterosexual and bisexual groups reported significantly higher median levels of autogynephilic arousal than did the homosexual group (both $p = .004$ by median test); other between-group median comparisons were nonsignificant, but the comparison between the asexual and homosexual groups again approached significance, $p = .053$ by median test.

As noted above, 6 participants classified as homosexual based on their pattern of sexual partnering before SRS reported experiencing autogynephilic arousal before SRS. Two of these participants, both of whom reported "hundreds of episodes or more" of autogynephilic arousal before SRS, had been married to women and had been biologic parents before SRS, suggesting that their reports of no female sexual partners before SRS were inaccurate. Two other homosexual participants, both of whom also reported "hundreds of episodes or more" of autogynephilic arousal, had not been married and had not been biologic parents; one, age 33 at time of SRS, reported only one male partner before SRS; the other, age 44 at time of SRS, reported multiple male partners before SRS. The remaining 2 homosexual participants, both ages 38, reported autogynephilic arousal only "once or twice" before SRS; both reported multiple male partners before SRS and one also reported MtF transgendered partners.

Seven other participants who were classified as homosexual based on their self-reported pattern of sexual attraction before SRS but not on the basis of their pattern of sexual partnering before SRS also reported autogynephilic sexual arousal before SRS. Four of these 7 participants had been married, and 2 of these 4 had been biologic parents; only 1 reported any male sexual partners before SRS. Of the remaining 3 participants, 2 reported no sexual partners before SRS, and 1 reported multiple male, female, and MtF transgendered partners before SRS.

Associations between frequency of autogynephilic arousal before and after SRS and several measures of

Table XII. Participants' Reported Experience of Autogynephilic Arousal Before and After SRS

Frequency of autogynephilic arousal	Before SRS[a]		After SRS[a]	
	n	(%)	*n*	(%)
Never	30	(14)	117	(56)
Once or twice	21	(10)	28	(13)
A dozen times or less	30	(14)	26	(12)
Dozens of times	29	(13)	31	(15)
Hundreds of times or more	106	(49)	7	(3)

[a] $N = 216$.
[b] $N = 209$.

Table XIII. Spearman Rank-Order Correlations Between Frequency of Autogynephilic Arousal and Sexuality Measures

Correlation	r_s
Between frequency of autogynephilia before SRS and:	
Number of male partners before SRS	−.06
Number of female partners before SRS	.22**
Number of MtF partners before SRS	.14*
Number of FtM partners before SRS	−.01
Total number of partners before SRS	.10
Between frequency of autogynephilia after SRS and:	
Number of male partners after SRS	.07
Number of female partners after SRS	.14*
Number of MtF partners after SRS	.00
Number of FtM partners after SRS	−.03
Total number of partners after SRS	.13
Number of male partners after SRS in last 12 months	.07
Number of female partners after SRS in last 12 months	.20**
Number of MtF partners after SRS in last 12 months	.00
Number of FtM partners after SRS in last 12 months	−.02
Total number of partners after SRS in last 12 months	.16*
Number of episodes of sexual activity with male partners in last 12 months	.09
Number of episodes of sexual activity with female partners in last 12 months	.21**
Number of episodes of sexual activity with MtF partners in last 12 months	.01
Number of episodes of sexual activity with FtM partners in last 12 months	−.02
Total number of episodes of sexual activity with all partners in last 12 months	.22**
Number of episodes of masturbation in last 12 months	.29***

*$p < .05$; **$p < .01$; ***$p < .0001$.

sexual activity are summarized in Table XIII. Frequency of autogynephilic arousal before SRS was significantly and positively correlated with number of female sexual partners and number of MtF sexual partners before SRS. Frequency of autogynephilic arousal after SRS was significantly and positively correlated with number of female sexual partners after SRS, number of female sexual partners and number of total sexual partners in the last 12 months, number of episodes of sexual activity with female partners and with all sexual partners in the last 12 months, and number of episodes of masturbation in the last 12 months.

Participants who reported hundreds of episodes or more of autogynephilic arousal after SRS were especially sexually active. Only 7 participants so reported, but their median number of sexual partners after SRS was significantly higher than that of participants reporting fewer or no episodes of autogynephilic arousal (6 vs. 1, $p = .04$ by median test), as was their median number of sexual partners in the last 12 months (4 vs. 1, $p = .01$ by median test), and their median number of episodes of masturbation in the last 12 months (45 vs. 10, $p = .008$ by median test).

Frequency and Characteristics of Orgasm After SRS

The frequency with which participants were able to achieve orgasm with masturbation after SRS and the characteristics of their postoperative orgasms are summarized in Table XIV. About 85% of participants who responded to questions about orgasm were orgasmic in some manner after SRS. Only 11% of participants thought that orgasm after SRS was "very similar" or "almost identical" to orgasms experienced before SRS, but 67% found orgasm after SRS to be as pleasurable or more pleasurable than before SRS. Over half of participants

Table XIV. Participants' Reported Experience of Orgasm After SRS

	n	(%)[a]
Able to achieve orgasm with masturbation? ($N = 227$)		
Almost always	82	(36)
More than half the time	27	(12)
Less than half the time	33	(15)
Rarely	34	(15)
Never	41	(18)
Don't know or not applicable	10	(4)
Orgasms similar to those before SRS? ($N = 217$)		
Almost identical	4	(2)
Very similar	19	(9)
Somewhat similar	53	(24)
Only slightly similar	52	(24)
Entirely different	57	(26)
Don't know or not applicable	32	(15)
Orgasms as pleasurable as before SRS? ($N = 218$)		
Much more pleasurable	65	(30)
Somewhat more pleasurable	45	(21)
About as pleasurable	35	(16)
Somewhat less pleasurable	35	(16)
Much less pleasurable	8	(2)
Don't know or not applicable	30	(14)
Ejaculate (release fluid) with orgasm? ($N = 217$)		
Almost always	52	(24)
More than half the time	22	(10)
Less than half the time	17	(8)
Rarely	29	(13)
Never	40	(18)
Don't know or not applicable	57	(26)

[a]Of those responding to a question.

(55%) responding reported that they sometimes ejaculated with orgasm.

DISCUSSION

The aims of this study were to describe the sexual behaviors and attitudes of a group of MtF transsexuals operated on by one surgeon using a consistent technique and to test specific hypotheses concerning their sexual attitudes, behaviors, and partnership patterns. The study's descriptive data come from the largest single-surgeon follow-up survey of MtF SRS yet published ($N = 232$). They demonstrate, among other things, the sexual diversity of contemporary MtF transsexuals, a diversity that stands in sharp contrast to the findings of some early reports. The study's descriptive data may be of particular interest to clinicians who counsel MtF transsexual patients and to MtF transsexuals themselves.

Study participants included a larger percentage of persons who were heterosexual relative to biologic sex before SRS and a smaller percentage who were homosexual relative to biologic sex after SRS than in any of the studies listed in Table I. This may in part reflect the demographics of patients who are able to afford the services of a relatively expensive private surgeon (for a discussion, see Lawrence, 2003), but it is also consistent with the general trend seen in Table I: It appears to be increasingly common for persons who undergo MtF SRS to have been exclusively or almost exclusively attracted to women before SRS and not to be exclusively attracted to men after SRS.

It was hypothesized that, as in some previous studies, participants would report a shift in sexual attraction and sexual behavior favoring male partners after SRS. This hypothesis was confirmed, but the median shifts reported were small for both attraction and behavior, only about one unit in Kinsey scale rating. A few participants reported that their sexual orientation changed markedly: They were exclusively or almost exclusively sexually oriented toward women before SRS and exclusively or almost exclusively sexually oriented toward men after SRS. These participants were virtually indistinguishable from participants who were exclusively or almost exclusively sexually oriented toward women both before and after SRS, based on the preoperative characteristics examined in this study. Participants whose sexual orientation changed markedly were also nearly indistinguishable from participants who were exclusively or almost exclusively sexually oriented toward men both before and after SRS, based on the postoperative characteristics examined in the study; number of male partners after SRS was the most important exception. For some participants whose sexual orientation changed markedly, choosing a male partner after SRS may have reflected experimentation rather than commitment: Half of those who reported only female partners before SRS and only male partners after SRS reported having had only one male partner after SRS. Otherwise, the variables examined in this survey do not suggest any hypotheses to explain why some MtF transsexuals report marked changes in sexual orientation after SRS while others do not.

It was hypothesized that the number of sexual partners reported by participants before SRS would more closely approximate population norms for men than population norms for women and this hypothesis was confirmed: The distribution of number of sexual partners before SRS reported by survey participants corresponded closely to the distribution of number of partners since age 18 reported by the NHSLS men (Laumann et al., 1994), and was notably higher than reported by the NHSLS women. Although the survey participants were older on average than the NHSLS men and women, and thus had had more time to accumulate partners, this did not account for the observed distribution of number of partners, because younger survey participants reported more partners than did older participants.

Survey participants in the homosexual group reported a smaller number of partners before SRS than the number of lifetime partners reported by a group of gay men studied by Stokes, Vanable, and McKirnan (1997). The homosexual transsexual participants reported a mean of only 8 male sexual partners before SRS, vs. about 37 lifetime male sexual partners for the gay men, even though mean age of the homosexual transsexual participants was 36 years, vs. only 25 years for the gay men. This difference could reflect less interest by the homosexual transsexual participants in multiple male sexual partners. However, the 11 participants with at least one male partner both before and after SRS, group M/M in Table VII, reported a mean of 8.4 male partners in the period following SRS, about three years on average, which does not suggest disinterest in multiple male sexual partners. Perhaps homosexual transsexuals who have not undergone SRS simply have greater difficulty finding interested male partners than do gay men.

It was also hypothesized that the number of sexual partners reported by participants after SRS would more closely approximate population norms for men than population norms for women. This hypothesis was only partly confirmed: Interest in multiple partners more closely approximated the male pattern, with 29% of transsexual participants reporting multiple sexual partners in the last 12 months, vs. 23.4% of the NHSLS men

and only 11.7% of the NHSLS women (Laumann et al., 1994). However, 32% of transsexual participants reported no sexual partners in the last 12 months, which more closely approximated the percentage of NHSLS women so reporting (13.6%) than the percentage of NHSLS men so reporting (9.9%).

Survey participants engaged in partnered sexual activity less frequently than the NHSLS comparison groups, a median of eight episodes per year for participants vs. a median frequency of "a few times per month" (Laumann et al., 1994, p. 88) for the NHSLS men and women. Only 13% of participants engaged in partnered sexual activity once per week or more frequently, while 37.2% of NHSLS men and 33.0% of NHSLS women engaged in partnered sexual activity "two to three times a week" (Laumann et al., 1994, p. 88) or more frequently. Even in the bisexual group, the most sexually active of the four participant groups, only 23% engaged in partnered sexual activity as often as once a week. However, participants were more likely to have engaged in masturbation in the last 12 months than were members of the NHSLS comparison groups: 83% of participants had done so, compared to 63% of NHSLS men and only 42% of NHSLS women (Laumann et al., 1994).

Although 45% of participants were in a stable romantic or partnered relationship at the time of survey completion, this is substantially less than the rate of partnership among participants in the NHSLS: Sixty-five percent of NHSLS men and 68% of NHSLS women lived with a partner in a marriage or cohabiting relationship (Gagnon, Giami, Michaels, & de Columby, 2001), and these figures undoubtedly omitted some persons who were in romantic or partnered relationships but who did not cohabit. The relatively low prevalence of partnered relationships among participants and the large percentages of participants reporting no sexual partners and no partnered sexual activity in the last 12 months suggest that many MtF transsexuals have difficulty finding regular partners after SRS. It was hypothesized that participants who reported sexual orientation toward women after SRS would be more likely to have been in stable partnered or romantic relationships after SRS than participants who reported sexual orientation toward men after SRS, and this hypothesis was confirmed.

Autogynephilic arousal was reported frequently before SRS but much less frequently afterwards. Because transgendered males tend to underreport sexual arousal to cross-dressing and cross-gender fantasy (Blanchard, Racansky, & Steiner, 1986), the frequencies reported by participants should probably be regarded as minimum estimates. It is possible that participants reported fewer episodes of autogynephilic arousal after SRS than before SRS in part because they had had only a median of 3 years after SRS in which to accumulate such experience, versus a median of 44 years before SRS. If participants had been surveyed after a longer time had passed since completion of SRS, they might have reported more episodes of autogynephilic arousal after SRS. The significant negative correlation between year of surgery and frequency of autogynephilic arousal after SRS is consistent with this hypothesis.

The decline in frequency of autogynephilic arousal after SRS might suggest that such arousal was of little practical importance, but a closer look suggests otherwise: Frequency of autogynephilic arousal after SRS was significantly correlated with number of female sexual partners and total number of sexual partners after SRS, with frequency of sexual activity with female partners and with all partners after SRS, and with frequency of masturbation after SRS.

It was hypothesized that participants categorized as asexual, heterosexual, or bisexual relative to biologic sex before SRS would report more episodes of autogynephilic arousal before SRS than would participants categorized as homosexual relative to anatomic sex. This hypothesis was confirmed for heterosexual and bisexual participants; for the small group of asexual participants, comparisons with homosexual participants approached but did not quite achieve statistical significance.

Several previous studies (Bentler, 1976; Blanchard, 1985; Blanchard, Clemmensen, et al., 1987; Freund, Steiner, & Chan, 1982; Leavitt & Berger, 1990) have reported a history of autogynephilic arousal in persons described as homosexual relative to anatomic sex, an unexpected finding if autogynephilia is theorized to be a variant form of gynephilia. Blanchard (1985) suggested that some ostensibly homosexual transsexuals who reported autogynephilic arousal were probably not genuinely homosexual but had misrepresented their sexual orientation. The results of the present study support his explanation, at least in part: Most of the persons who reported autogynephilic arousal before SRS and who were characterized as homosexual on the basis their reported pattern of sexual partnering or their reported pattern of sexual attraction before SRS were arguably either bisexual (having been married to women or having had multiple female sexual partners before SRS), or asexual (having had no sexual partners before SRS). Only 4 participants who had never been married to women and who reported only male sexual partners before SRS reported any autogynephilic arousal before SRS, and 2 of these 4 reported only one or two episodes.

Eighty-five percent of participants reported that they were able to achieve orgasm after SRS, which is

consistent with the results of the studies summarized in Table III. The rate of anorgasmia experienced by participants appears comparable to that experienced by natal women: Laumann et al. (1994) found that 24% of natal women reported that over the last year there had been a period of several months or more during which they had been unable to achieve orgasm. Although it is impossible to know whether the orgasms reported by participants represent physiological orgasms, the large percentages of participants who reported that their orgasms were either entirely different or only slightly similar to the orgasms they experienced while living as men might lead to skepticism. On the other hand, 55% of participants reported that they sometimes ejaculated with orgasm; this probably represents a minimum estimate of the percentage able to achieve physiological orgasm after SRS. Since three quarters of participants described their orgasms after SRS as being at least as pleasurable as those they experienced before SRS, whether or not these orgasms were physiological may not have been especially consequential for the persons who experienced them.

Limitations and Generalizability

Because only 32% of eligible persons returned survey questionnaires, participants may not have constituted a representative sample of all those who underwent SRS with Meltzer during the study period. However, participant characteristics from high response rate and low response rate years were extremely similar, suggesting that biases related to response rate were likely to have been small (for a detailed discussion, see Lawrence, 2003). Participants also may not have constituted a representative sample of postoperative MtF transsexuals in the US, in part because the cost of SRS with the study's surgeon was higher than with many other surgeons.

Retrospective self-report information concerning sexuality is subject to many types of errors and biases. Reports of sexual activity based on recall often differ substantially from data based on daily diary entries, even for recall intervals of only a few weeks (Berk, Abramson, & Okami, 1995). Persons who report large numbers of sexual partners or many episodes of sexual activity typically use estimation rather than specific enumeration to obtain the figures they report (Wiederman, 2002), which limits the accuracy of such reports. Participants in the present survey were probably not exceptional in this respect; however, because the tendency to estimate large numbers is a general one, comparisons to reference groups such as the NHSLS men and women may still be meaningful.

Although the data provided by the participants was collected anonymously, socially desirable responding can influence self-report data about some aspects of sexuality, even under conditions of anonymity (Meston, Heiman, Trapnell, & Paulhus, 1998). For example, Meston et al. found that impression management, the deliberate component of socially desirable responding, was significantly correlated with women's responses to questions about the number of partners they had had and other measures of sociosexuality. It is possible, then, that despite the use of an anonymous questionnaire, impression management may have biased participants' self-reports concerning their numbers of sexual partners and frequency of sexual activity.

Women report fewer sexual partners and less frequent sexual activity than men, in part because sociosexuality is less socially acceptable in women (Baumeister & Tice, 2001). In general, MtF transsexuals want to portray themselves as typically feminine (Blanchard, Clemmensen, & Steiner, 1985), and to the extent that participants were aware of these sex differences, they might have been expected to have biased their reports toward a more typically feminine presentation. Bias of this kind has previously been described in relation to self-reports of autogynephilic arousal (Blanchard et al., 1985). Participants did report less frequent sexual activity after SRS than either the NHSLS men or women, but their reported number of sexual partners before SRS more closely approximated male than female norms, as did the distribution of number of sexual partners in the previous 12 months among those participants who reported any partners. Also, after SRS, a larger percentage of participants reported masturbation than did either the NHSLS men or women. The most parsimonious explanation of these observations is that socially desirable responding probably did not greatly affect participants' self-reports concerning their numbers of sexual partners and frequency of sexual behavior.

Suggestions for Further Research

Changes in sexual orientation are commonly reported after SRS and were observed in the present study but remain incompletely understood. Additional physiological studies of sexual arousal in postoperative MtF transsexuals would be helpful in clarifying the meaning of these reports. Changes in sexual orientation after SRS may reflect the social or sexual validation provided by male partners and may be related to the interpersonal dimension of autogynephilia. However, existing measures that address these issues, such as the

nine Androallure items in the Cross-Gender Questionnaire (Docter & Fleming, 1992, 2001) and the Autogynephilic Interpersonal Fantasy Scale (Blanchard, 1989b), are not well suited for use with postoperative MtF transsexuals. Development and application of more sophisticated measures of the meaning and value of male social and sexual attention for MtF transsexuals might improve our understanding of reported changes in sexual orientation after MtF SRS.

In the present study, autogynephilic arousal was correlated with several measures of sexual behavior, both before and after SRS. However, the global measure of autogynephilia used in the study did not distinguish between core autogynephilia and autogynephilic interpersonal arousal or fantasy. These distinct components of autogynephilia appear to differ in their relationship to some dimensions of sexual behavior. For example, Blanchard (1992) found that, in nonhomosexual transsexuals, autogynephilic interpersonal fantasy was associated with sexual attraction to men but core autogynephilia was not. Moreover, autogynephilia typically coexists with but sometimes competes with alloerotic (other-focused) gynephilia (Blanchard, 1992). Measurement of the separate components of autogynephilic arousal and the alloerotic gynephilia that often accompanies them could contribute to a more detailed understanding of the relationship between autogynephilia and sexual behavior before and after MtF SRS.

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