

Gender Preference in the Sexual Attractions, Fantasies, and Relationships of Voluntarily Castrated Men



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ABSTRACT

Introduction: Some men seek castration outside a clear medical need. This study explored how their sexuality changed after castration.

Aim: To explore changes in preferred gender(s) of sexual attraction, fantasy, and relationships in voluntarily castrated men with or without gonadal hormone therapy.

Methods: A questionnaire was posted at <http://www.eunuch.org> that yielded data on men who had been voluntarily castrated physically (n = 198) or chemically (n = 96).

Main Outcome Measures: Respondents were asked to report retrospectively on their sexuality, including their sexual activity and which gender(s) they were sexually attracted to, fantasized about, or had sexual relations with 6 months to 1 year before and after castration.

Results: A substantial proportion of men remained sexually active after castration; 37% had sex at least several times per week. Most respondents did not report a change in preferred gender(s) of attraction (65%, n = 181), fantasies (62%, n = 169), or sexual relationships (66%, n = 163), although approximately 20% to 30% of respondents did report such changes and 8% to 11% became non-sexual after castration. Respondents who were attracted to and fantasized about “only men” or who had sexual relationship with “only women” before castration were the least likely to report a change subsequent to castration. Respondents who were taking neither supplemental testosterone nor estrogen were more likely to report (i) becoming attracted to no one, (ii) fantasizing about no one, and (iii) becoming sexually inactive.

Conclusion: Sexual changes in voluntarily castrated men vary and can be influenced by various factors including the use of supplemental testosterone or estrogen therapy.

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INTRODUCTION

Some genetic men choose to be chemically or surgically castrated for reasons outside clear medical indications.^{1,2} Some of these individuals might identify as male-to-female transsexuals, but many seek the effects of emasculation without any desire for feminization.^{1,3}

Our research group previously explored factors that contribute to extreme castration ideation in this population,^{4,5} personality changes after castration,⁶ and some side effects of voluntary genital ablation.⁷ However, how voluntary androgen deprivation affects male sexuality has been minimally investigated.

Concerning its impact on sexuality, it is well known that castration leads to a general decrease in sexual desire and activity (for review, see Weinberger et al⁸). Nevertheless, some

castrated men remain sexually active despite being deprived of testosterone.^{9,10} This has been reported for a proportion of patients with prostate cancer on androgen-deprivation therapy^{10–12} and male-to-female transsexuals.¹³ Preservation of sexual interest in individuals who are surgically castrated appears to be enhanced by testosterone replacement therapy or high-dose estrogen treatment.^{7,9} Brett et al⁷ noted that some 22% of respondents in their study of voluntarily castrated men claimed to experience a change in their sexual orientation after castration. For this reason, we expanded our study to explore how sexual attraction, fantasies, and relationships change after castration.

AIMS

We investigated how castration affects sexual attraction, fantasy, and relationships of men who voluntarily elected that treatment. We specifically examined (i) how the age at castration influences sexual activity after castration, (ii) whether gender preference in sexual attraction, fantasy, and relationship changes after castration, and (iii) how hormonal supplementation after castration might affect sexual activity and gender preference in this population. We hypothesized that men castrated at a younger age and those taking supplemental gonadal hormones would be more sexually active than those castrated at an older age and not receiving any hormone replacement. We also hypothesized that a substantial proportion of castrated men would experience a change in the gender of the individuals of interest in their sexual attraction, fantasy, and relationships.

METHODS

We posted a survey on the Eunuch Archive Web site (<http://www.eunuch.org>, an online community interested in “testicles, testosterone, castration, eunuchs and related topics”) for 4 months in late 2008. The survey was approved by all members of the Eunuch Archive Steering Committee. Although the survey was hosted on the Survey Monkey site, the only solicitation for participation was through the Eunuch Archive, where a brief description of the survey and of its intent was posted. Registered members and unregistered readers of the Eunuch Archive were encouraged to participate.

There were more than 3,000 respondents to the survey, and more details on the methods have been described by Vale et al.⁵ Included were respondents who had obtained physical or chemical castration, who desired or actively sought castration (self-described “wannabes”), or who claimed that they were “just interested” enough in the topic of castration to complete the survey. For this study, we used the subset of data from this sample that included only men who reported being voluntarily castrated chemically or physically. If participants were chemically castrated before receiving surgical castration, as is common in this population, they were expected to respond regarding their first instance of androgen deprivation.

Fifty-five (1.78%) of the 3,091 initial respondents to the survey (including those seeking castration and those “just

interested” in the subject, who were not included in this study) were removed based on inaccuracies or inconsistencies in their data (eg, current age—asked for at the start of the survey—did not match the year of birth reported at the end of the survey) or because they were a minor (<18 years old).

This study received institutional review board approval from Dalhousie University (Halifax, Nova Scotia, Canada). On the first page of the survey, participants were provided with information about the study and then directed to a consent form. If participants indicated that they consented to the study, they could progress to the rest of the survey. All responses were anonymous; however, some respondents did volunteer contact information. No compensation was provided for participation.

Survey Structure

In the full survey, respondents were presented with more than 200 questions concerning their gender identity, sexual orientation, sexual history, medical history, personality profile, and general demographic parameters (eg, age, education level, country of residence, etc). Some responses led to requests for further details. The questions were in a multiple-choice or open-ended format. Respondents were free to skip any question they felt uncomfortable answering, which is apparent in the slight variation of sample sizes across questions. Respondents who did not include answers to the pre- and post-castration questions were excluded from analysis.

Based on a modified (shortened) version of the Klein Sexual Orientation Grid,¹⁴ respondents were asked to report retrospectively about three dimensions of their sexuality approximately 6 to 12 months before and after their castration: (i) who they were attracted to, (ii) who they had sexual fantasies about, and (iii) who they had sexual relationships with. Choices for each of the three dimensions of sexuality included only men; mostly men; only women; mostly women; only eunuchs; mostly eunuchs; men and women equally; men, women, eunuchs, and others; and no one (referred to as “non-sexual” in this article).

Respondents also were asked about their frequency of sexual activity (solitary or with a partner) 6 to 12 months before and similarly 6 to 12 months after voluntary castration. Response choices included several times a day, approximately daily, several times per week, once a week or less, and never or almost never (Table 1).

Many physically castrated individuals take exogenous hormones after voluntary castration to counteract bothersome or serious side effects of gonadal hormone deprivation, such as hot flashes or osteoporosis. For this reason, we asked the physically castrated individuals to report their current level of exogenous hormone use. Choices included full replacement levels of testosterone, low-dose testosterone, low-dose estrogen, high-dose estrogen, or no hormones of any kind.

Data Analysis Plan

Statistical analyses were performed using SPSS 22.0 (IBM Corp., Armonk, NY, USA). Age differences between subgroups

Table 1. Average Age at Castration and Current Age for Respondents with Various Frequencies of Sexual Activity (Solitary, eg, Masturbation or with a Partner) After Castration

Current frequency of sexual activity	Respondents, n	Average age at castration (y)	Average current age (y)
Several times per day	13	39.7	50.5
Approximately daily	35	40.5	49.0
Several times per week	52	40.3	46.7
Once a week or less	99	43.6	48.6
Never or almost never	68	47.4*	53.9*
Overall average		43.4	49.7

* $P < 0.05$; significantly different from all other groups in the same column.

(chemically vs physically castrated) were compared using independent-sample t-tests. Differences in current age and age at time of castration were compared with current frequency of sexual activity using Kruskal-Wallis test, followed by Dunn post hoc test if significance was reached.

The number and percentage of respondents who reported a change or no change in the preferred gender(s) of sexual attraction, sexual fantasy, and/or sexual relationships were tabulated, as were the number and percentage of those who reported becoming non-sexual. A “change” was considered when one’s gender preference(s) differed after from before castration (except if they preferred “no one” after castration), whereas “no change” was recorded when the pre- and post-castration gender preference(s) was the same. Respondents were considered to “change to non-sexual” when they preferred “no one” after castration but had preferences before castration.

A subset of these data was analyzed for changes in the numbers of gender preference(s) (increase or decrease) after castration for sexual attraction, fantasy, and relationships. This sub-analysis included those who preferred one gender before castration (ie, only men, only women, and only eunuchs) to multiple genders after castration (ie, mostly men; mostly women; mostly eunuchs; men and women equally; and men, women, eunuchs, and others).

The χ^2 tests were used to assess any significant differences between pre- and post-castration gender preference(s) and for the use of supplementary hormones, frequency of sexual activity after castration, or change in gender preference(s). For post hoc tests, standardized residual methods¹⁵ with Bonferroni corrections were used if significance was reached ($P < .05$). For the data in Table 2, tests of the 27 comparisons were conducted using Bonferroni adjusted α levels of 0.00185 per test (0.05/27) to control for potential type I errors. For data in Table 3, tests of the 94 comparisons were conducted using Bonferroni adjusted α levels of 0.000531 per test (0.05/94). For data in Tables 4 and 5, the 25 a priori hypotheses were tested using Bonferroni adjusted α levels of 0.002 per test (0.05/25).

Table 2. Reported Changes in Gender Preference in Sexual Attraction, Fantasy, and Relationships After Voluntary Chemical or Physical Castration

Preferred gender(s) before castration	Total	Change	No change	Change to non-sexual
Attraction				
Only men	54	6	46*	2
Mostly men	28	14	11	3
Equally men and women	31	16*	13	2
Mostly women	43	13	26	4
Only men	87	16	62	9
Mostly eunuchs	2	0	2	0
Only eunuchs	2	1	1	0
Mixture of men, women, eunuchs, and others	24	5	17	2
No one	8	5	3	0
Total, n (%)	279 (100)	76 (27.2)	181 (64.9)	22 (7.9)
		$\chi^2_{16,279} = 39.0, P < 0.05$		
Fantasy				
Only men	59	9	49*	1
Mostly men	31	14	14	3
Equally men and women	29	11	17	1
Mostly women	29	12	15	2
Only men	70	16	45	9
Mostly eunuchs	9	4	4	1
Only eunuchs	4	2	2	0
Mixture of men, women, eunuchs, and others	33	9	21	3
No one	8	5	2	1
Total, n (%)	272 (100)	82 (30.1)	169 (62.1)	21 (7.7)
		$\chi^2_{16,272} = 29.0, P < 0.05$		
Relationships				
Only men	16	9	7	0
Mostly men	20	12*	7	1
Equally men and women	28	10	11	7
Mostly women	83	13	70*	0
Only men	0	0	0	0
Mostly eunuchs	1	0	1	0
Only eunuchs	8	0	8	0
Mixture of men, women, eunuchs, and others	21	6	15	0
No one	56	7	44	5
Total, n (%)	233 (100)	57 (24.5)	163 (70.0)	13 (5.6)
		$\chi^2_{14,233} = 66.9, P < 0.05$		

* $P < 0.001$; significantly different from the expected frequencies.

Table 3. Reported Changes in Gender Preference for Sexual Attraction, Fantasy, and Relationship Organized by the Use of Hormone Replacement Therapy After Voluntary Physical Castration

Use of hormone replacement therapy	Total	Change	No change	Change to non-sexual
Attraction				
No hormones	52	13	29	10*
Low-dose testosterone	32	8	23	1
Full replacement levels of testosterone	63	11	51	1
High-dose estrogen	21	7	14	0
Low-dose estrogen	15	7	6	2
Total, n (%)	183 (100)	46 (25.1)	123 (67.2)	14 (7.6)
$\chi^2_{8,183} = 24.5, P < 0.05$				
Fantasy				
No hormones	50	15	26	9*
Low-dose testosterone	30	8	21	1
Full replacement levels of testosterone	62	17	44	1
High-dose estrogen	21	10	11	0
Low-dose estrogen	15	7	7	1
Total, n (%)	178 (100)	57 (32.0)	109 (61.2)	12 (6.7)
$\chi^2_{8,178} = 19.9, P < 0.05$				
Relationships				
No hormones	31	9	19	3
Low-dose testosterone	29	9	19	1
Full replacement levels of testosterone	59	11	46	2
High-dose estrogen	20	6	14	0
Low-dose estrogen	12	5	7	0
Total, n (%)	151 (100)	40 (26.5)	105 (69.5)	6 (4)
$\chi^2_{8,151} = 7.8, P > 0.05$				

* $P < 0.0005$; significantly different from expected frequencies.

MAIN OUTCOME MEASURES

The survey asked participants to report retrospectively about their sexuality at approximately 6 to 12 months before and after their castration, which included (i) their current age and age at castration, (ii) their frequency of sexual activity (solitary or with a partner), (iii) who they were attracted to, (iv) who they had sexual fantasies about, (v) who they had sexual relationships with, and (vi) use of hormone therapy.

RESULTS

Sample Demographics

In total, 294 voluntarily castrated men completed the relevant questions on the survey. Of that number, 198 reported being physically castrated and 96 reported being chemically castrated. Most respondents (78%, $n = 213$) resided in the United States or Canada, and the rest resided mostly in the United Kingdom or continental Europe. More than half the respondents

Table 4. Relationship Between Use of Hormone Replacement Therapy and Frequency of Sexual Activity

Frequency of sexual activity	Hormone replacement therapy					
	Total	No hormones of any kind	Low-dose testosterone	Full replacement levels of testosterone	High-dose estrogen	Low-dose estrogen
Several times per day	13	1	2	8	2	0
Approximately daily	24	1	3	16*	3	1
Several times per week	45	9	8	18	7	3
Once a week or less	58	16	13	18	7	4
Never, or almost never	44	28*	5	3	2	6
Total, n (%)	184 (100)	55 (29.8)	31 (16.8)	63 (34.2)	21 (11.4)	14 (7.6)
$\chi^2_{16,184} = 54.7, P < 0.05$						

* $P < 0.002$; significantly different from the expected frequencies.

Table 5. Reported Changes in Frequency of Sexual Activity in Relation to Use of Hormone Replacement Therapy

Changes in frequency of sexual activity	Hormone replacement therapy					
	Total	No hormones of any kind	Low-dose testosterone	Full replacement levels of testosterone	High-dose estrogen	Low-dose estrogen
Decrease to non-sexual	33	21*	4	2*	2	4
Other decrease	74	20	14	27	9	4
No change	62	13	10	28	7	4
Increase	14	0	3	6	3	2
Total, n (%)	183 (100)	54 (29.5)	31 (16.9)	63 (34.4)	21 (11.5)	14 (7.7)
	$\chi^2_{12,183} = 34.1, P < 0.05$					

* $P < 0.002$; significantly different from the expected frequencies.

(54%, $n = 159$) reported a current gender identity (ie, their gender identity after voluntary castration) of “eunuch, third gender, or other.” The remaining respondents reported their current gender identity as male (34%, $n = 100$) or female (12%, $n = 35$). In general, respondents were well educated, with a large proportion (49%, $n = 143$) holding at least a university-level degree.

The average age of all respondents at the time of the survey was 49.5 ± 12.7 years ($n = 279$). The average age for the physical eunuchs was 49.7 ± 12.8 years ($n = 188$) and that for the chemical eunuchs was 49.1 ± 12.5 years ($n = 91$). The chemical eunuchs reported obtaining castration at a significantly older age ($P < .05$).

Significant differences were found in average ages at castration and current ages ($P < .05$ for all comparisons) when categorized by current frequency of sexual activity (Table 1). Those who reported that they “never or almost never” engaged in sexual activity after castration were significantly older, and castrated at a significantly older age, than those who reported engaging in sexual activity more frequently ($P < .05$ for all comparisons). Furthermore, among physical eunuchs who “never or almost never” engaged in sexual activity after castration, some were on supplemental hormones (Table 4). However, we found no significant difference in current ages when the data were divided according to hormone use.

Changes in Preferred Gender(s) of Sexual Attraction, Fantasy, and Relationships

The percentages of respondents who reported a change, no change, or change to non-sexual for their preferred genders in sexual attraction, fantasy, and relationships are presented in Table 2. The proportion of respondents who reported no change in preferred gender(s) was similar across the three domains of attraction (65%, $n = 181$), fantasy (62%, $n = 169$), and relationships (70%, $n = 163$). Although most individuals did not report a change in preferred gender(s), notable proportions did report a change to whom their sexual attraction, fantasy, and relationship after castration were focused on. Specifically, 76 participants (27%) reported a change in the area of sexual attraction, 82 (30%) in sexual fantasy, and 57 (25%) in sexual relationships. Among these, 63% (29 of 46), who were attracted

to a single gender before castration, became attracted to more genders, and 59% (30 of 51) fantasized about more genders after castration. In contrast, 44% (17 of 39) who had sexual relationships with more than one gender before castration had sexual relationships with fewer gender(s) after castration. A small portion of individuals also claimed to have changed to being non-sexual after castration; that is, 22 (8%) became attracted to no one, 21 (8%) fantasized about no one, and 27 (11%) had sexual relationships with no one.

There was a significant association between gender preference(s) and change in sexual attraction ($\chi^2_{16,279} = 39.0, P < .05$) and fantasy ($\chi^2_{16,272} = 29.0, P < .05$; Table 2). Subsequent post hoc analyses using the standardized residual method showed that few survey respondents who preferred only men before castration reported a change in whom they were attracted to (46 of 54, $P < .001$; Table 2) and fantasized about (49 of 59, $P < .001$). There also was an association between the gender preference(s) and change in sexual relationship ($\chi^2_{14,233} = 66.9, P < .05$). Specifically, most participants with a preferred gender of “mostly women” who did not report a change in gender(s) they had sexual relationships with (70 of 83, $P < .001$). Although not significant, five of eight respondents who were non-sexual before castration reported a change in attraction and fantasy, and 7 of 56 reported a change in relationships, thus indicating additional preferred gender(s) after castration (Table 2).

Supplementary Hormones and Changes in Preferred Gender(s) of Sexual Attraction, Fantasy, and Relationships in Physically Castrated Individuals

Most voluntarily castrated men reported no change in sexual attraction (67%), sexual fantasy (61.2%), and sexual relationship (69.5%) after castration, regardless of hormone use (Table 3). However, regardless of supplementary hormone use, a small percentage reported a change in sexual attraction (25.1%), sexual fantasy (32.0%), and sexual relationship (26.5%) after castration.

The use of hormone therapy in physically castrated respondents was associated with change in sexual attraction ($\chi^2_{8,183} = 24.5, P < .05$) and fantasy ($\chi^2_{8,178} = 19.9, P < .05$) but not in sexual relationship (Table 3). A significant number of

physically castrated respondents who indicated that they were taking no hormones reporting no preferred gender(s) of attraction or fantasy after castration ($P < .05$ for the two comparisons; Table 3). Although not significant, as one might expect, respondents who were taking replacement levels of testosterone also reported the greatest percentage of “no change” in preferred gender(s) of attraction (51 of 63) and fantasy (44 of 62) after castration.

Supplementary Hormones and Changes in Frequency of Sexual Activity in Physically Castrated Individuals

Frequency of sexual activity (solitary or with a partner) after castration was associated with supplementary hormone use in physically castrated respondents ($\chi^2_{16,184} = 54.7$, $P < .05$; Table 4). There was a significant number of physically castrated respondents without any supplementary hormones who reported never or almost never engaging in sexual activity (28 of 44, $P < .002$). In addition, there was a significant number of individuals taking replacement levels of testosterone who reported engaging in sexual activity daily after castration (16 of 24, $P < .002$).

There was a significant association between supplementary hormone use and changes in frequency of sexual activity ($\chi^2_{12,183} = 34.1$, $P < .05$; Table 5), with a group of participants who were not taking any supplementary hormones indicating that they changed to being non-sexual after castration ($P < .002$). Conversely, few participants who were taking replacement levels of testosterone changed to being non-sexual after castration ($P < .002$).

DISCUSSION

There are several main findings from our study: (i) substantial proportions of men remained sexually active despite being castrated (37% had sex at least several times per week); (ii) most voluntarily castrated men did not report a change in preferred gender(s) for sexual attraction, fantasy, and relationships but a substantial portion (~20%–30%) did report some change, and a small portion (~8–11%) reported becoming non-sexual after castration in at least one sexual domain; and (iii) a large portion of participants who did not use any supplementary hormones become attracted to no one, fantasized about no one, and “never or almost never” engaged in sexual activity. These results suggest that men could experience different sexual changes after castration, which also might be influenced by the use of supplementary hormone therapy.

Changes in Frequency of Sexual Activity After Castration

Our finding that, for most men, the frequency of sexual activity decreases after castration has been reported in various populations including castrated sex offenders¹⁶ and patients with prostate cancer who are on androgen-deprivation therapy.¹⁷

However, our data also indicate that some men remain sexually active after castration, even those without supplemental hormone therapy, as has been reported in accounts of the sexuality of eunuchs in history,^{18–20} patients with prostate cancer,²¹ and some sexual offenders.²² Various factors can influence how sexual one is after castration, including the age at castration, current age, and use of supplemental gonadal hormones. Other factors not explored in this study, such as overall health, relationship status (ie, availability of potential partners), and motivation for seeking castration (ie, desire for celibacy), also are likely to play a role.

Indeed, we found that those who were older or castrated at an older age were more likely to “never or almost never” engage in any sexual activity than those who were younger or castrated at a younger age. This difference could be related to conditions unrelated to castration, because aging in general has been associated with a decrease in sexual function and activity,^{23,24} which can be attributed to non-hormonal factors including psychogenic, vascular, and neurologic factors. Large population-based studies on sexuality throughout the lifespan also have found frequency of sexual activity to decrease as men age.^{25,26} For example, 39.7% of men 57 to 64 years old reported engaging in sexual activity at least once per week.²⁶ Thus, those who are castrated at an older age might already have been engaging in sexual activity less frequently than those castrated at a younger age. In addition, our data showed that physical eunuchs who “never or almost never” engaged in sexual activity were more likely to avoid the use of supplementary hormones.

How sexual one is before castration also can influence post-castration sexual activity. Experiments with rodents have suggested that pre-castration sexual behavior contributes to how sexual one is after castration, with or without supplementary hormone treatment.^{27–29} In other words, male rats that are highly sexual before castration would be more likely to maintain sexual activity after castration than those who are less sexually active before castration. One study of a patient with prostate cancer has suggested that this might be valid for humans.³⁰ In that study, a man who was hypersexual before castration continued having coitus a few times per week some 30 months after castration.

Changes in Preferred Gender(s) of Sexual Attraction, Fantasy, and Relationships

Although most respondents (~62%–70%) in our study did not report any change in preferred gender(s) for sexual attraction, fantasy, and relationship subsequent to voluntary castration, a portion (~20%–30%) claimed to experience some changes, and approximately 8% to 11% became non-sexual, reporting having no attraction to, fantasies about, and/or sexual relationships with anyone. It is important to note that our data refute the idea that castration might “cure” homosexuality, a suggestion that has surfaced multiple times in western civilization.^{31,32} As van Anders³³ stated in her recent article, “shifts in sexual

orientations might and do occur but cannot be imposed by selves or others.” In addition, the shifts reported in this article only pertain to one’s sexual attraction, fantasies, and relationships. They do not necessarily reflect respondents’ sexual orientations and/or identities.

The changes in preferred gender(s) that we documented in some of our androgen-deprived participants are likely due to the multifactorial effect of hormone status and sociocultural milieu. Notably, such factors also can contribute to the flexibility of female sexuality, which appears to have greater fluidity over the lifespan than that of eugonadal men.^{34–36} However, it remains to be determined how similar or different are the factors that contribute to the fluidity of female sexuality to those of castrated men who experience a shift in gender preference(s).

What is clear from our data is that castration for humans or being deprived of androgen will not always lead to a complete loss of one’s sexuality. In fact, in the present study, only approximately 8% to 10% of respondents reported such a global and complete shift to being non-sexual (ie, being attracted to, fantasizing about, and having sexual relations with no one), although most participants in our survey reported no change or a decrease in their sexual activity. Interestingly, some initially non-sexual individuals *developed* sexual attraction and/or fantasies after castration regardless of their hormone status. However, this was not found to be the case for sexual relationships.

Use of Supplemental Hormones and Changes in Preferred Gender(s) of Sexual Attraction, Fantasy, and Relationships in Physically Castrated Individuals

Our data indicate that the use of supplemental testosterone or estrogen does not significantly influence gender preference(s) within sexual attraction, fantasy, and relationships for individuals who are voluntarily castrated. However, a small percentage of our respondents reported experiencing a shift in their preferred gender(s) for these domains. The biological explanation for this shift is not fully understood. Older studies on sexual offenders found that hormonal treatments can decrease sexual desire and sexual activity,^{37,38} but we are not aware of any study that has explored possible shifts in gender preferences for sexual attraction, fantasy, or relationships. A recent study on healthy men also has indicated that short-term androgen deprivation (by leuprolide acetate injection) decreases all domains of sexual functioning, but the researchers did not report (or evidently explore) changes in preferred genders for sexual attraction, fantasy, or relationships.³⁹

Supplementary Hormones and Changes in Frequency of Sexual Activity in Physically Castrated Individuals

The present data show that gonadal hormone supplementation of testosterone or estrogen helps retain sexual activity in voluntarily castrated men. This is consistent with the fact that various brain centers that control male sexual behaviors express androgen receptors and estrogen receptors.⁴⁰ Testosterone supplementation

improves sexual desire of voluntarily castrated men, consistent with previous research in hypogonadal men^{41,42} and androgen-deprived patients with prostate cancer.⁴³ Furthermore, patients with prostate cancer who are on intermittent androgen-deprivation therapy experience a recovery in sexual desire when their testosterone levels start to recover after stopping androgen-depriving drugs.^{44,45}

Data from our study support the suggestion drawn from animal studies that the use of minimal and transitional estrogen supplementation provides for androgen-deprived men some protection against full suppression of sexual activity. This finding is further supported by research indicating that estrogen treatment can help increase sexual interest above the castrate level in other human populations.^{9,10} For example, in two small studies on patients with prostate cancer, more patients who were taking high-dose estrogen to suppress testosterone remained sexually active than those who were surgically castrated.^{30,46} In addition, many male-to-female transsexuals who receive estrogen therapy are sexually active.^{13,47}

Limitations

There are some limitations to our study. Because of the stigma of castration, modern-day voluntarily castrated individuals are not conspicuous in our society or “out” and easily accessible. Being emasculated (ie, castrated) is typically considered shameful in the western world.^{48–50} As a result, to collect an adequate amount of data on voluntarily castrated men, we had to rely on an anonymous online survey.

The anonymity and online approach that we used meant that we could not collect physiologic data, such as measuring plasma hormone levels, to verify the self-reported hormone use of the participants in our study. Furthermore, all respondents reported retrospectively on their sexual attraction, fantasies, and relationships 6 to 12 months before their castrations. It would be ideal if we could have obtained data from men before and after castration in a prospective longitudinal fashion. However, because most voluntary castrations (other than as part of sex-reassignment surgery for male-to-female transsexuals) are done outside the medical system,^{51,52} it would be ethically and logistically challenging to collect such data.

In addition, these data come from a much larger survey investigating many different aspects of castration. Thus, we had to compromise the amount of information we could collect from our respondents related to sexuality and did not use validated questionnaires to assess sexual function. Specifically, future research should include measurements of relationship status and overall health status. Furthermore, we did not assess themes within the sexual fantasy of this population. We will consider including this topic in our next survey.

CONCLUSION

Our study affirms that androgen deprivation by castrations does not cause complete disappearance of sexual interest or activity for some men. Various factors can contribute to the maintenance of sexual activity after castration, such as age at

castration, pre-castration sexual function, and the use of supplemental gonadal hormones. Respondents in our study were more likely to retain sexual activity after castration if they were on testosterone or estrogen therapy.

We also found that most men who were voluntarily deprived of androgen did not experience a change in the preferred gender(s) to whom they were sexually attracted, fantasized about, or had sexual relations with after castration. However, approximately 20% to 30% did experience some changes and approximately 8% to 10% became overall non-sexual. Factors that contribute to changes in gender preferences in the face of androgen suppression are not yet known. However, those who are on testosterone or estrogen therapy are less likely to become non-sexual than those who do not receive hormone supplementation.

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