

## INTERSEX AND GENDER IDENTITY

# The Pattern of Sexual Interest of Female-to-Male Transsexual Persons With Gender Identity Disorder Does Not Resemble That of Biological Men: An Eye-Tracking Study



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## ABSTRACT

**Introduction:** Very little has been elucidated about sexual interest in female-to-male (FtM) transsexual persons.

**Aims:** To investigate the sexual interest of FtM transsexual persons vs that of men using an eye-tracking system.

**Methods:** The study included 15 men and 13 FtM transsexual subjects who viewed three sexual videos (clip 1: sexy clothed young woman kissing the region of the male genitals covered by underwear; clip 2: naked actor and actress kissing and touching each other; and clip 3: heterosexual intercourse between a naked actor and actress) in which several regions were designated for eye-gaze analysis in each frame. The designation of each region was not visible to the participants.

**Main Outcome Measures:** Visual attention was measured across each designated region according to gaze duration.

**Results:** For clip 1, there was a statistically significant sex difference in the viewing pattern between men and FtM transsexual subjects. Longest gaze time was for the eyes of the actress in men, whereas it was for non-human regions in FtM transsexual subjects. For clip 2, there also was a statistically significant sex difference. Longest gaze time was for the face of the actress in men, whereas it was for non-human regions in FtM transsexual subjects, and there was a significant difference between regions with longest gaze time. The most apparent difference was in the gaze time for the body of the actor: the percentage of time spent gazing at the body of the actor was 8.35% in FtM transsexual subjects, whereas it was only 0.03% in men. For clip 3, there were no statistically significant differences in viewing patterns between men and FtM transsexual subjects, although longest gaze time was for the face of the actress in men, whereas it was for non-human regions in FtM transsexual subjects.

**Conclusion:** We suggest that the characteristics of sexual interest of FtM transsexual persons are not the same as those of biological men. **Tsujimura A, Kiuchi H, Soda T, et al. The Pattern of Sexual Interest of Female-to-Male Transsexual Persons With Gender Identity Disorder Does Not Resemble That of Biological Men: An Eye-Tracking Study. Sex Med 2017;5:e169–e174.**

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**Key Words:** Sexual Interest; Sexual Video; Eye Tracking; Female-to-Male

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## INTRODUCTION

Sexual function is an important aspect of well-being and quality of life for men, women, and people with gender identity disorder (GID). GID is strongly characterized by cross-gender identification with a feeling of discomfort with the person's anatomic sex and the gender role associated with the person's anatomic sex. The diagnosis is based on the person's description of incongruence between gender identity and phenotype and its assessment by mental health professionals. The most recent

epidemiologic study and review of GID reports showed prevalences ranging from 1:11,900 to 1:45,000 for male-to-female (MtF) transsexual persons and 1:30,400 to 1:200,000 for female-to-male (FtM) transsexual persons.<sup>1</sup> In the field of sexual function, very little has been elucidated concerning the sexual interest of people with GID. In general, several experiments have shown that there are many factors involved in sexual interest induced by the viewing of sexual video clips, the most striking factor of which in reporting sexual interest has been gender.<sup>2–4</sup> For MtF individuals, an interesting study recently showed that there are two distinct subtypes of sexual interest in MtF individuals: homosexual MtF individuals are exclusively sexually attracted to men, whereas non-homosexual MtF individuals might be sexually attracted to women, to women and men, or to persons of neither sex.<sup>5</sup> That study using several questionnaires indicated that sexual interest in MtF individuals is not always equivalent to that of biological women. However, sexual interest in FtM individuals has not been investigated scientifically. Transsexualism in genetic women has been believed to occur predominantly in homosexual women. It is unclear whether FtM individuals are always sexually attracted to women, although their surface appearance and personality are quite masculine because of testosterone replacement treatment. Indeed, it was previously reported that 1 of every 72 FtM individuals was attracted to men and not to women.<sup>6</sup> However, the sexual interest of FtM individuals diagnosed medically has not been fully investigated. A previous study reported an interesting finding of sexual life in that homosexual FtM individuals (attracted to women) showed a significantly greater interest in visual sexual stimuli than non-homosexual FtM individuals (attracted to men).<sup>7</sup> The status before or after sexual reassignment surgery (SRS) should be related to sexual activity in FtM individuals. Before SRS, half the people with GID perceived their sexual life as poor or unsatisfying or very poor of very unsatisfying, and there was no significant difference between FtM and MtF individuals.<sup>8</sup> However, in a previous study, most FtM individuals reported an increase in sexual desire, although more than 60% of MtF individuals reported a decrease in sexual desire after the operation.<sup>9</sup> An increase in the frequency of masturbation after testosterone replacement treatment and SRS also was reported by FtM individuals.<sup>9,10</sup>

We recently conducted a study of a new eye-tracking system in which eye positions of subjects are recorded automatically while viewing sexual videos to evaluate which regions of the video are of interest to the subjects.<sup>11,12</sup> This method is ideal because sexual interest can be evaluated quantitatively and non-invasively. After using this system, we reported that a sex difference existed in visual attention to a sexual video: men viewed the opposite sex for longer periods than women, and women viewed the same sex for longer periods than men.<sup>11</sup> We also found that the gaze time for non-human regions was significantly longer for women than for men.<sup>11</sup> However, no study of sexual interest has been conducted in FtM individuals with the eye-tracking system.

## AIMS

The purpose of the present study was to compare the sexual interest of FtM individuals with that of heterosexual men by using our eye-tracking system and sexual videos.

## METHODS

### Participants

Fifteen healthy, heterosexual men (mean age =  $36.1 \pm 1.1$  years) and 13 FtM individuals (mean age =  $33.2 \pm 2.5$  years) participated in this study. All participants were Japanese. All participants were recruited from our personal acquaintances by personal communication. They underwent a screening interview regarding sexual activity by one physician (A.T.). All FtM subjects had received testosterone replacement therapy consisting of testosterone enanthate 250 mg injected every second week. The treatment period was  $6.8 \pm 1.9$  months, and the serum testosterone level at nadir was  $191.9 \pm 30.3$  ng/mL. Although none of the participants had undergone SRS, they were diagnosed as being FtM persons by mental health professionals.

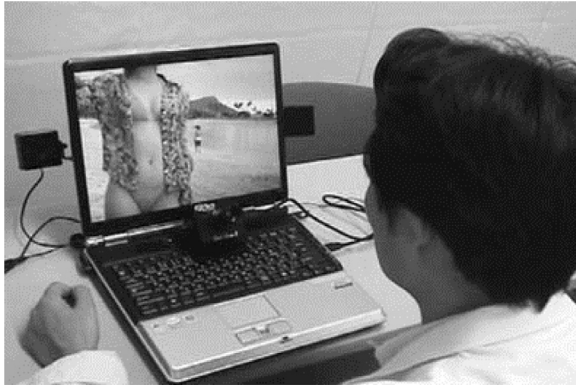
### Procedure and Sexual Stimuli

Our methodology was published previously.<sup>11,12</sup> Briefly, the participants viewed audiovisual material in the form of three different sexually explicit video clips.

In each clip, because a region can be arbitrarily designated frame by frame on a static image, different sexually related and sexually unrelated regions can be designated. Each of the video clips used in this study was 4 minutes long, and we used an arbitrarily selected part of each clip, which was 40 seconds in length, to analyze the participants' regions of interest on the screen. Because we designated regions in 40 static images per second, the total number of designated regions included 1,600 static images. We developed a system that uses software to automatically add a point whenever a participant's line of sight lies within a designated region during the 1,600 checks, and thus the software can divulge in what regions the participant's eyes were focused on for 40 seconds. This system enables quantization of the regions in which the participants show interest when viewing video clips.

The designation of each region was not visible to the participants. They remained uninformed to the contents of each video clip, to their lines of sight being analyzed as they were watching the video clips, or to which parts were designated as regions of interest.

Eye movements of the participants were measured with the Quick Glance 2 Eye Tracker System (Eye Tech Digital Systems, Mesa, AZ, USA). The system consists of EyeTech TM2 software installed on a laptop computer, two infrared lights mounted on each side of the monitor, and a camera placed on the keyboard. To prepare for testing, each participant was positioned in front of the laptop computer, and the participant's position was calibrated to the position of the laptop screen based on 16 calibration points. If the calibration data proved inadequate, then repeated



**Figure 1.** Quick Glance 2 Eye Tracker System (EyeTech Digital Systems) with laptop computer.

calibration was automatically required. After successful calibration, the participants were requested to view the prepared clip on the laptop screen with no additional tasks required. Participants viewed the clips in private, and their eye positions were recorded (Figure 1). These data indicated what the subject was viewing relative to gaze-point coordinates on the screen surface.

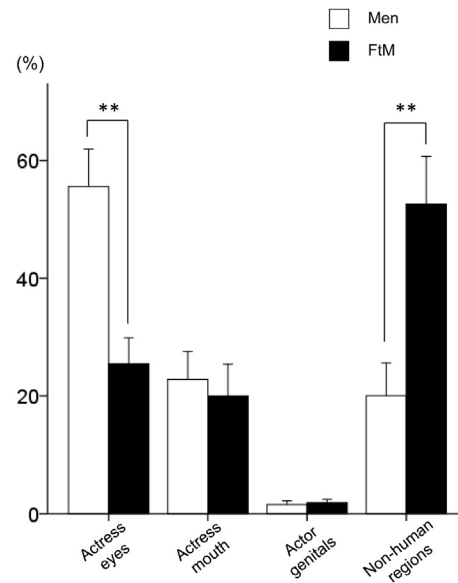
The content of the first clip (clip 1) was of a sexy clothed young woman kissing the region of the male genitals covered by underwear. For this clip, several regions, such as the actress' eyes and mouth, the actor's genitals, and non-human regions, including a table, chair, floor and window, were designated in each frame by QG Eye Tracking Software (Nihon Binary, Tokyo, Japan). The content of the second clip (clip 2) was of a naked actor and actress kissing and touching each other. The third clip (clip 3) featured heterosexual intercourse between a naked actor and actress. For these latter two clips, several sexual and non-sexual regions, such as the actress' face and body, the actor's face, body, genitals, and non-human regions, were designated. The procedures were approved by the regional ethics committee of the Osaka University Graduate School of Medicine (Osaka, Japan).

### Data Analysis

All data are presented as mean  $\pm$  SD. Statistical analysis was performed by two independent variables (sex: men, FtM) by several dependent variables (region: actress eyes, actress mouth, actor genitals, actress face, actor face, actress body, actor body, non-human) using repeated analysis of variance for the comparison between men and FtM individuals to decrease type I error to investigate the effect of gender. Additional analysis of simple effects was conducted between the men and the FtM subjects in each region of each clip by the Mann-Whitney test. A  $P$  value less than .05 was considered statistically significant.

### MAIN OUTCOME MEASURES

Total gaze time for each designated region was taken as an indication of visual attention, and the gaze time for each

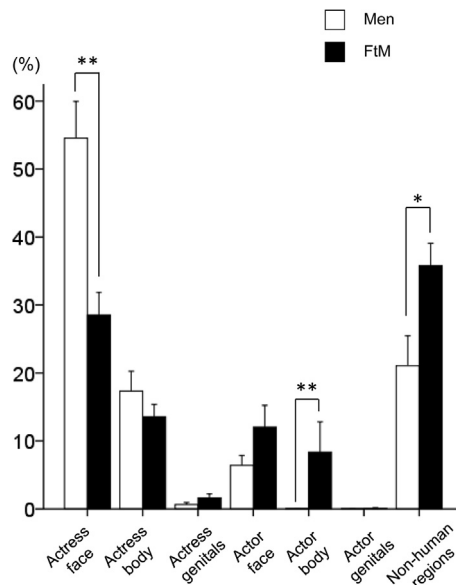


**Figure 2.** Comparison between men and FtM transsexual persons regarding sexual interest for clip 1, in which a sexy clothed young woman kisses the region of the male genitals covered by underwear. A statistically significant sex difference in viewing patterns exists between the men and FtM subjects (\*\* $P < 0.01$ ). Non-human regions include the table, chair, floor, window, and other items. FtM = female-to-male.

designated region relative to total viewing time was calculated and compared between the men and the FtM subjects.

### RESULTS

In response to direct questioning of the participants, all FtM subjects in the present study were attracted to men and not to women. For clip 1, there was a statistically significant sex difference in the viewing pattern between men and FtM individuals by two-way repeated analysis of variance ( $P < .01$ ; Figure 2). Interestingly, the longest gaze time was for the eyes of the actress in men, whereas it was for non-human regions in FtM subjects. The percentage of gaze time for the eyes of the actress in the men was similar to that for non-human regions in the FtM subjects, and the percentage of gaze time for the eyes of the actress in the FtM subjects was similar to that for non-human regions in the men. The gaze time for the eyes of the actress was significantly shorter for the FtM subjects than for the men ( $P < .01$ ), whereas the gaze time for non-human regions was significantly longer among the FtM individuals than that among the men ( $P < .01$ ). For clip 2, there also was a statistically significant sex difference in the viewing pattern between the men and FtM subjects ( $P < .01$ ; Figure 3). As with the results of clip 1, the longest gaze time was for the face of the actress in the men, whereas it was for non-human regions in the FtM subjects. There was a significant difference in the regions with longest gaze time (face of the actress,  $P < .01$ ; non-human regions,  $P < .05$ ). The most apparent difference was in the gaze time for the body of the actor ( $P < .01$ ): the percentage of gaze time for the body of the actor

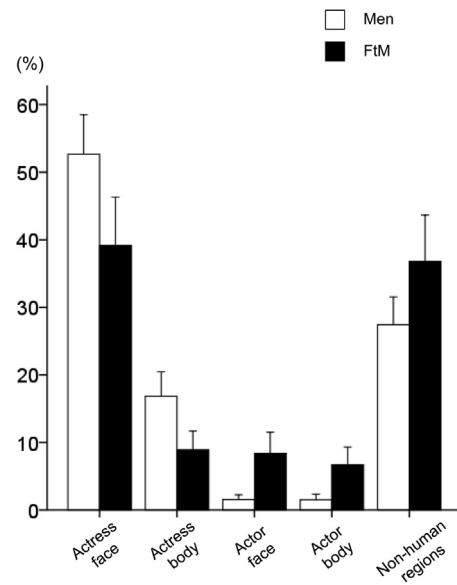


**Figure 3.** Comparison between men and FtM transsexual persons regarding sexual interest for clip 2, in which a naked actor and actress are kissing and touching each other. A statistically significant sex difference in viewing patterns exists between the men and FtM subjects ( $*P < .05$ ;  $**P < .01$ ). Non-human regions include the table, chair, floor, window, and other items. FtM = female-to-male.

was 8.35% in the FtM subjects, whereas it was only 0.03% in the men. The gaze time for the face of the actor showed the same tendency, but the difference did not reach statistical significance. A comparison of gaze times between the men and FtM subjects for clip 3 is shown in Figure 4. For clip 3, there were no statistically significant differences in viewing patterns between the men and the FtM subjects, although the longest gaze time was for the face of the actress in men, whereas it was for non-human regions in the FtM subjects.

## DISCUSSION

Sexual activity and response are very complicated and highly individual. Sexual interest can be affected by several factors including social environment, upbringing and education, personality characterization, and gender. Our previous eye-tracking study showed that men and women pay attention to different regions when presented with the same sexual stimuli: men are more interested in women than are women, and women are more interested in men than are men.<sup>11</sup> Furthermore, women prefer romantic words, images, and films, whereas men are more attracted to explicit sexual acts, nude bodies, and physical gratification.<sup>3,13</sup> Although these findings seem to be generally rational, the essential cause of the difference remains less well defined. It remains unclear whether these differences are a result of a congenital or an acquired factor. This question encouraged us to investigate the sexual interest of FtM persons because they are very masculine but female in anatomic sex. However, the findings regarding sexual desire in FtM persons are very limited because data from validated questionnaires on sexual desire in



**Figure 4.** Comparison between men and FtM transsexual persons regarding sexual interest for clip 3, which features heterosexual intercourse between a naked actor and actress. No statistically significant sex difference in viewing patterns was found between the men and FtM persons. Non-human regions include the table, chair, floor, window, and other items. FtM = female-to-male.

FtM persons are non-existent.<sup>14</sup> The sexual interest of FtM individuals is much less understood. It was reported that more symptoms of high sexual desire were observed in FtM individuals, whereas MtF persons reported more symptoms of low sexual desire.<sup>9</sup> Furthermore, FtM persons were more frequently involved in a romantic relationship compared with MtF persons.<sup>9</sup> It was reported that FtM persons are a more homogeneous group in gender dysphoria onset and sexual orientation compared with MtF persons.<sup>5</sup> An interesting study reported that most FtM persons were bisexual, and 30% reported sex with non-transgender men only in the prior 3 months.<sup>15</sup> In a recent large-scale study of 605 “self-identified” FtM persons, more than half these subjects reported sexual attraction to men and women.<sup>16</sup> In the present study, we considered that the comparison between men and FtM individuals using our eye-tracking methodology would provide a useful clue to understanding the characteristics of sexual interest of FtM individuals.

We first clarified that a difference in sexual interest exists between men and FtM persons. For clip 1, the gaze time for the eyes of the actress was significantly shorter in the FtM individuals than in the men. Conversely, the gaze time for non-human regions was significantly longer in the FtM subjects than in the men. These findings might indicate that FtM persons subconsciously viewed human regions such as the eyes and mouth of the actress with less attention than did men because they were less interested in the sexual presentation than were men. SRS was closely associated with sexual desire in FtM persons in previous studies; FtM persons appear to have adequate sexual functioning and high rates of sexual satisfaction after SRS.<sup>14</sup> The low sexual

desire of our FtM participants at the stage before SRS might be associated with the lower interest in sexual presentation reported by the FtM persons than by the men. This tendency also was found for clip 2; the gaze time for the face of the actress was significantly shorter in the FtM subjects than in the men, whereas the gaze time for non-human regions was significantly longer in the FtM subjects than in the men. Particularly in clip 2, the most interesting finding was that the FtM subjects were attentive to the male body, whereas the men allocated no attention to the comparably larger male body. Furthermore, we found that there were no statistically significant differences between the men and FtM subjects in the viewing pattern in clip 3 showing heterosexual intercourse. Compared with the men, the characteristics of FtM subjects, which were low interest in sexual presentation in the non-intercourse clips with the relatively low sexual stimuli (clips 1 and 2), high interest in the male body (clip 2), and no difference in viewing pattern in the clip with high sexual stimuli (clip 3), were similar to those of women compared with men in our previous study.<sup>11</sup> When we tried to compare the FtM subjects and women using raw data of the FtM subjects in the present study with those of the women in the previous study,<sup>11</sup> no statistically significant differences were found for any clip (data not shown). Thus, we speculated that although FtM persons are characterized strongly by male identification with a feeling of discomfort with women, their characteristics of sexual interest might be closer to those of biological women than to those of men. This was an unexpected result at first because it was recently reported that FtM persons primarily reflect the psychopathologic profile of biological men rather than that of biological women as measured by the Symptom Check List-90—Revisited instrument.<sup>17</sup> However, if the pattern of sexual interest of FtM individuals closely resembles that of biological women, as our results show, sexual interest might be regulated by a congenital factor. Further study with more reliable evaluation tools at a larger scale would be necessary to clarify this speculation. In addition, our methodology using an eye-tracking system might be useful to further subdivide FtM persons from the point of view of sexual attraction in the future.

There are several limitations to the present study other than its small sample. First, it is impossible to clarify the reasons for the attention that our eye-tracking system detected. We understand that the possibility cannot be denied that FtM subjects viewed the male body with high attention because they longingly wanted to gain the muscular body presented in the clip. It was speculated that the longing for a male body might be strong because our FtM subjects were at the stage before SRS. The results might have been different had we recruited only FtM subjects after genital reconstruction. The second limitation is the lack of evaluation of the personality characteristics of our subjects. It was reported that subjects with GID have more psychopathologic distress than healthy control subjects.<sup>17</sup> We previously reported that even the normal variation of personality characteristics is associated with sexual interest in men by using the specified

questionnaire used in personality tests worldwide.<sup>12</sup> Thus, the degree of masculinity in our subjects might have affected our results. We suggest that this is only a pilot study that should be repeated with a larger sample and more accurate methodology.

## CONCLUSIONS

We found a clear difference between men and FtM individuals in visual attention when viewing sexual videos. Although several limitations exist, this is the first report, to our knowledge, to investigate the sexual interest of FtM persons quantitatively. In this preliminary study, our findings suggest that the characteristics of sexual interest of FtM persons are not the same as those of biological men, although further study is necessary.

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