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Transgender Surgery in Denmark From 1994 to 2015: 20-Year Follow-Up Study

Dogu Aydin, MD, Liv Johanne Buk, MD, Søren Partoft, MD, Christian Bonde, MD, Michael Vestergaard Thomsen, MD, and Tina Tos, MD

ABSTRACT

Introduction: Gender dysphoria is a mismatch between a person's biological sex and gender identity. The best treatment is believed to be hormonal therapy and gender-confirming surgery that will transition the individual toward the desired gender. Treatment in Denmark is covered by public health care, and gender-confirming surgery in Denmark is centralized at a single-center with few specialized plastic surgeons conducting top surgery (mastectomy or breast augmentation) and bottom surgery (vaginoplasty or phalloplasty and metoidioplasty).

Aims: To report the first nationwide single-center review on transsexual patients in Denmark undergoing gender-confirming surgery performed by a single surgical team and to assess whether age at time of gender-confirming surgery decreased during a 20-year period.

Methods: Electronic patient databases were used to identify patients diagnosed with gender identity disorders from January 1994 through March 2015. Patients were excluded from the study if they were pseudohermaphrodites or if their gender was not reported.

Main Outcome Measures: Gender distribution, age trends, and surgeries performed for Danish patients who underwent gender-confirming surgery.

Results: One hundred fifty-eight patients referred for gender-confirming surgery were included. Fifty-five cases (35%) were male-to-female (MtF) and 103 (65%) were female-to-male (FtM). In total, 126 gender-confirming surgeries were performed. For FtM cases, top surgery (mastectomy) was conducted in 62 patients and bottom surgery (phalloplasty and metoidioplasty) was conducted in 17 patients. For MtF cases, 45 underwent bottom surgery (vaginoplasty), 2 of whom received breast augmentation. The FtM:MtF ratio of the referred patients was 1.9:1. The median age at the time of surgery decreased from 40 to 27 years during the 20-year period.

Conclusion: Gender-confirming surgery was performed on 65 FtM and 40 MtF cases at our hospital, and 21 transsexuals underwent surgery abroad. Mastectomy was performed in 62 FtM and bottom surgery in 17 FtM cases. Vaginoplasty was performed in 45 MtF and breast augmentation in 2 MtF cases. There was a significant decrease in age at the time of gender-confirming surgery during the course of the study period.

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Key Words: Gender Dysphoria; Transsex; Gender Identity; Gender Variation; Gender-Confirming Surgery; Bottom Surgery; Top Surgery

INTRODUCTION

Patients with gender dysphoria (GD) harbor an unalterable conviction that they were born in the wrong body, and this causes them considerable psychological suffering from early youth.¹ Although the exact etiology of GD is not fully understood, the general opinion leans toward biological variance.^{2–7} Pioneers of GD agree that sexuality and gender are not

limited to the two categories of female and male. Rather, a spectrum of gender variance exists, ranging from hetero- to homosexuals and bi- and transsexuals.^{7,8} For these persons, surgery is imperative to achieving a successful gender transition, and surgery plays a pivotal role in relieving their psychological discomfort.^{7,8} As noted by Edgerton⁹ in 1983, “transsexualism is a severe and pathologic condition that is undesirable for both the patient and society ... and nonsurgical treatment continues to be expensive, time-consuming, and enormously disappointing.” For to the criteria guiding these surgical interventions, it is universally recommended to adhere to the Standards of Care of the World Professional Association of Transgender Health.¹⁰ According to the *International Classification of Diseases, 10th Revision (ICD-10)*, the following three criteria must be met

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before an individual can be diagnosed with transsexualism: (i) the person has the desire to live and be accepted as a member of the opposite sex; (ii) this desire is usually accompanied by a sense of discomfort with or inappropriateness of one's anatomic sex; and (iii) a wish to have surgery and/or hormonal treatment to make one's body as congruent as possible with one's preferred sex.¹¹

In Denmark, people who have GD are initially observed and examined at the Sexological Clinic, which has a highly specialized team of psychologists and psychiatrists. When the diagnosis and indication for surgery are confirmed, the patient is offered hormonal therapy. Female gonadectomy is performed at the department of gynecology, and male gonadectomy and gender-confirming surgery are conducted at the department of plastic surgery. The treatment is coordinated by a team of health care providers from the three departments that form part of Copenhagen University Hospital, Rigshospitalet. Patients can bypass the public health care system and undergo gender-confirming surgery elsewhere (in the private sector or abroad). However, it is our opinion that transsexuals who desire gender-confirming surgery typically present to the Sexological Clinic and the department of plastic surgery because all costs and expenses are defrayed by the public Danish health care system.

The two major gender-confirming surgeries in female-to-male (FtM) transsexual patients are subcutaneous mastectomy, often combined with a hysterectomy or ovariectomy, and actual genital transformation consisting of vaginectomy, reconstruction of the fixed part of the urethra (if isolated, metoidioplasty), scrotoplasty, and phalloplasty. At a later stage, a testes prostheses and/or penile erectile prosthesis can be inserted, depending on the type of reconstruction. The male-to-female (MtF) transsexual patients are offered gonadectomy. Vaginoplasty is creation of the vagina, also referred to as neovagina construction. A common vaginoplasty technique (the penile inversion technique) performed on MtF transsexuals uses tissue from the existing genitalia to construct the vagina. The glans penis is used to create a neoclitoris and the remaining skin from the penis and scrotum is inverted to construct a neovagina. In some patients who have insufficient tissue to create a neovagina, additional skin grafts might be obtained from the buttocks and hip area. Other patients might need a two-stage procedure involving labioplasty surgery. An alternative technique, referred to as colo-vaginoplasty, uses a segment of the colon to create a neovagina. This technique has significant drawbacks, namely the stricture tendency of the suture line between the gut and skin and unpleasant secretion. Furthermore, any operation involving the colon entails a risk of serious, life-threatening complications. For these reasons, we have chosen not to use the latter method. As a consequence of hormonal therapy, MtF transsexual patients often develop acceptable breast tissue. In the publicly financed health care systems of Scandinavian countries, MtF transsexuals seeking breast augmentation must present with adequate deviation from the normal breast (compared with biological women).

AIMS

The aim of this retrospective study was to provide a single-center review on transsexual individuals in Denmark undergoing gender-confirming surgery performed by a single surgical team. The study reports on gender distribution, age trends, and types of surgery performed for Danish patients who undergo gender-confirming surgery.

METHODS

Data Collection

We searched the electronic database for patients registered with *ICD-10* diagnosis code F64 (gender identity disorders). The search included all patients referred to Copenhagen University Hospital, Rigshospitalet, from January 1994 through March 2015. One hundred eighty-four cases were identified. Patients were excluded if they were pseudohermaphrodites or if their gender was not stated.

The following parameters were recorded: gender (MtF, FtM), age (years), date of surgery, type of surgery (vaginoplasty, metoidioplasty, phalloplasty), and in which country the surgery was performed.

The decision to operate was made by two specialized plastic surgeons at Rigshospitalet. The decision to perform surgery was made according to our standard criteria: approval from the Sexological Clinic, non-smoking, and normal body weight (body mass index < 25 kg/m²). Furthermore, any patient comorbidity was assessed thoroughly, as was the patient's ability to understand the intervention and its effects.

This study was approved by the institutional review committee and needed no ethical approval from the local ethical committee.

Statistical Analysis

The primary end point was to establish gender distribution, number of patients referred for gender-confirming surgery, number of patients undergoing gender-confirming surgery, and types of surgery performed. The secondary end point was to assess age trends in patients undergoing gender-confirming surgery. Linear logistic regression analysis (SPSS Statistics 20 for Mac; IBM Corp, Armonk, NY, USA) was used to determine an association between age and time of gender-confirming surgery.

MAIN OUTCOME MEASURES

The study investigated gender distribution, age trends, and types of surgery performed for Danish patients who underwent gender-confirming surgery.

RESULTS

One hundred eighty-four patients were referred from January 1994 through March 2015. Twenty-six patients were excluded

(23 being duplicates, 2 hermaphrodites, and in 1 case the patient's gender was unknown). Thus, 158 patients referred for gender-confirming surgery from January 1994 through March 2015 were included in the study. Fifty-five (35%) were MtF and 103 (65%) were FtM transsexual patients, yielding a sex ratio of 1.9:1. In total, 126 transsexuals underwent gender-confirming surgery (6.3 surgeries per year). FtM bottom surgeries were conducted in 17 patients (0.8 surgeries per year), and FtM top surgeries were performed in 62 patients (3 surgeries per year). MtF bottom surgeries were performed in 45 patients (2.1 surgeries per year), and MtF top surgeries were conducted in 2 patients (0.1 surgeries per year; see flow chart in Figure 1).

We found a significant decrease in age in transsexuals undergoing gender-confirming surgery (top and bottom surgery; $n = 125$, $R = 0.321$, $R^2 = 0.103$, $b = -0.321$, $P < .001$; Figure 2). The median age at the time of surgery decreased from 40 years in 1994 to 27 years in 2015. The median age at the time of surgery for the full 20-year period was 28 years (range = 18–66 years).

Female-to-Male Patients (n = 103)

Top surgery was performed in 62 FtM patients in the form of mastectomy; 51 of these procedures were conducted at Rigshospitalet and the remaining 11 were performed abroad. An additional 10 patients were anticipating mastectomy, 3 were not interested in mastectomy, 2 were not approved for surgery because of overweight, and 26 patients had missing data.

Bottom surgery was performed in 17 FtM patients: 10 underwent metoidioplasty (abroad = 2), 5 underwent phalloplasty, and 2 underwent metoidioplasty and phalloplasty (abroad = 1). The five phalloplasties consisted of three radialis flaps, one anterolateral thigh flap, and one thoracodorsal artery perforator flap. An additional 10 patients were anticipating bottom surgery, and 8 patients were not offered bottom surgery

because they anticipated mastectomy. Five patients opted for surgery abroad. Twenty-three were considering bottom surgery, and 24 were not interested in bottom surgery. Seven patients were not approved for surgery and data were missing for nine cases (Figure 1).

The age at the time of mastectomy decreased from 32 years in 1994 to 27 years in 2015 ($n = 62$). The median age was 25 years (range = 18–55 years). The age at the time of bottom surgery increased from 33 years in 1995 to 36 years in 2013 ($n = 16$). The median age was 34.5 (range = 25–56 years).

Male-to-Female Patients (n = 55)

Forty-five patients underwent vaginoplasty; 38 of these were conducted at Rigshospitalet. Two MtF transsexuals received breast augmentation with implants at Rigshospitalet. Three patients were anticipating vaginoplasty, one of whom opted for surgery abroad. One patient was not interested in bottom surgery. Data were missing for six patients (Figure 1).

The age at the time of vaginoplasty decreased from 41 years in 1994 to 35 years in 2015 ($n = 45$). The median age was 36 years (range = 19–66 years). Only two patients underwent breast augmentation at 47 and 24 years of age, respectively; these surgeries were performed in 2005.

DISCUSSION

We report the first nationwide follow-up on transsexual patients who underwent gender-confirming surgery in Denmark. From 1994 to 2015, 65 FtM and 40 MtF transsexuals underwent gender-confirming surgery in our hospital, and 21 transsexuals underwent surgery abroad. An additional 28 transsexuals were anticipating surgery. On average, only two FtM gender-confirming surgeries are conducted in Denmark every third year (0.7 per year). Therefore, patient-support organizations have

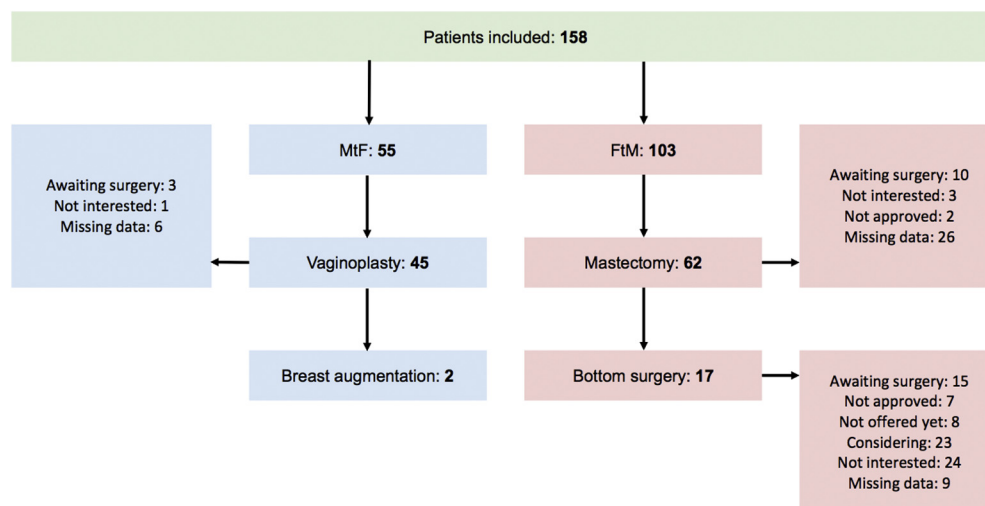


Figure 1. Overview of gender-confirming surgery. The flow chart illustrates the gender distribution of patients undergoing gender-confirming surgery. FtM = female-to-male; MtF = male-to-female.

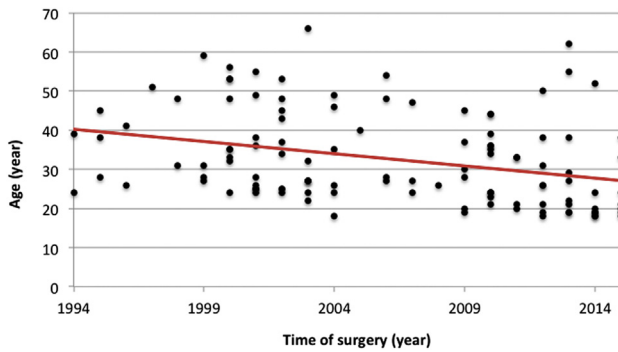


Figure 2. Patient age at the time of gender-confirming surgery (top and bottom surgery). The graph presents patient age (years) at time (year) of gender-confirming surgery (top and bottom surgery). A significant decrease in age of transsexuals undergoing gender-confirming surgery was found ($n = 125$, $R = 0.321$, $R^2 = 0.103$, $b = -0.321$, $P < .001$).

requested that patients should have the option of having gender-confirming surgery conducted abroad at a more experienced center. In response, the Danish health care system has given FtM transsexuals the option to undergo gender-confirming surgery abroad and have the costs defrayed by the public health care system.

In present study, we found a significant decrease in age at the time of gender-confirming surgery from 1994 to 2015. It is our opinion that the decrease in age in transsexuals who undergo gender-confirming surgery is associated with a greater tolerance and approval from society toward individuals with GD. Over time, seeking treatment for GD has become more acceptable. Several studies have advocated early assessment,^{12–21} which in turn leads to earlier referrals and therefore surgery at a younger age. In the past decade, several case reports have reported on endocrinologic and surgical treatment of transsexual adolescents at even younger ages, sometimes in the preteen or prepubertal age ranges.^{12,13} We find that the age issue is characterized by a delicate balance between ethical and professional concerns. Teens with GD have a tendency to feel ashamed of their sex and suffer from low self-esteem, depression, anxiety, drug abuse, self-injurious behavior, and a desire to leave school altogether. One study has advocated early treatment to avoid the risk of prolonging GD and thus hasten improvement in quality of life and spare the sufferer from the pubescent development of the “wrong” secondary sex characteristics.¹⁴ Research has shown that transsexuals with more social, psychological, intra- and interpersonal problems and lack of social support are more likely to injure their own body tissue intentionally without suicidal intent by cutting, burning, and hitting themselves (non-suicidal self-injury).¹⁵ Similar studies have found a greater risk of suicidal and mental health problems in lesbians, gays, bisexuals, and transsexuals.^{16–18}

Early hormonal treatment might make procedures such as breast reduction in FtM patients and maxillofacial surgery in MtF patients unnecessary or less invasive. Thus, “not doing

anything is doing harm.”¹⁴ A follow-up study has reported an unfavorable postoperative outcome in transsexuals starting gender-confirming surgery late rather than early.^{19,20} One study of MtF transsexuals has associated older age at the time of assessment with greater postoperative regrets.²¹

Conversely, several studies have argued against early treatment mainly because our knowledge about GD in adolescence is limited. One study has associated non-suicidal self-injury in transsexuals with a younger age, being a male transsexual, and reporting more psychological symptoms.¹⁵ Another study has suggested that hormonal suppression could prevent the spontaneous development of a stable and established gender identity, which sometimes matures through the occurrence of a gender crisis.²² This is supported by other studies showing that symptoms of GD at prepubertal ages decrease or even disappear in a substantial percentage of children (estimates range from 80% to 95%).^{23,24} However, GD continuing into early puberty has been shown to be highly persistent.²⁵ At the Amsterdam Gender Identity Clinic for Adolescents, all patients diagnosed with GD and approved for gender-confirming surgery completed diagnosis and treatment without any regrets.^{26–28} In addition, patients younger than 18 years who were not approved for gender-confirming surgery owing to serious psychiatric comorbidity, extremely adverse living circumstances, or their combination remained insistent in their wish for gender-confirming surgery.^{26–28}

Many physiologic changes occur during puberty, and hindrance of puberty comes with a potential risk of permanent sequelae. Studies have shown that this delay can be avoided by starting cross-sex steroid hormone treatment²⁹ just as in children with delayed puberty who are treated similarly with sex steroids beyond the normal age of puberty.³⁰

We found that transition surgery in Denmark has changed toward younger ages over time. The transsexuals’ self-perception of gender also is changing. Bottom surgery is no longer a prerequisite for transsexuals to feel “man enough.”^{31,32} Yerke and Mitchell³¹ found that current vs previous FtM transsexual patients seek bottom surgery less often, use a greater variety of terms to label their gender identity, and more often identify themselves as being attracted to people in more than one gender category. In contrast, having a flat chest without breasts is imperative for FtM patients to feel “man enough.” Top surgery alleviates the burden of hiding the chest and gives joy when perceived as male by others in a wider range of settings, such as at the beach and in the locker room.³¹ These trends suggest that the circumstances in which transsexuals experience themselves also are shaped by the sociocultural period in which they transition and not purely by anatomic and/or biological origin alone.³² However, this is biased by the fact that transsexuals expressing doubt about any steps in the transition might have been deemed ineligible and excluded from treatment by medical and mental health “gatekeepers.”^{33,34} Thus, the transsexuals might have felt forced to follow the whole treatment and been unable to make

choices relating to their own individual preferences and needs. Another aspect that has to be considered is the high costs and frequently unsatisfying results of these surgeries that might propel transsexuals toward a decision not to choose surgery.³¹

Previously, transsexuals risked termination of gender-confirming surgery if they did not have the “correct” sexual orientation. To persuade medical and mental health “gatekeepers” of their GD and desire to transition, they had to show “manly” intentions by having a sexual orientation toward the “correct” gender. Thus, an FtM with a sexual orientation toward men was not “manly” enough for surgery at one point of our cultural history.³³ The understanding of gender identity and sexual orientation also is changing in society (perhaps for some transsexuals, too); we have become less simplistic and stereotypic. Gender queerness and intra- and intersexual orientations are not as tabooed as previously and are more accepted in society.³² Currently, for health professionals who serve as gatekeepers, a bisexual or same-gender sexual orientation is no longer considered a contraindication for gender-confirming surgery.³⁵

The sex ratio in our sample was 1.9:1 (FtM:MtF). This ratio is in line with findings from Belgium,³⁶ the Netherlands,³⁷ Germany,³⁸ and Spain³⁹ but in contrast to recent findings from Norway⁴⁰ and Sweden.⁴¹ Also, for comparison, in the only two large-scale Danish studies^{42,43} from 1982 (n = 37) and 2008 (n = 108) on transsexuals with permission to undergo gender-confirming surgery, the sex ratio of MtF:FtM was 3.6:1 and 1.16:1, respectively. This indicates that, over time, a change has occurred in the ratio of transsexuals who had permission to undergo gender-confirming surgery, with an increase in the number of assigned FtM transsexuals in Denmark. Future studies will show if the same trend is observed in other countries. We have no reason to believe that there has been an accumulation of MtF cases in recent years, which has only recently been decreased. Owing to the decrease in the number of MtF cases, one could speculate as to the existence of a restraint on permissions to undergo gender-confirming surgery for MtF patients. If so, these MtF patients might have undergone private treatment abroad.

The present study has several strengths and limitations. The retrospective design is among the limitations because bias in data recording, selection, and analysis could occur. Moreover, confounding variables might go unrecognized because of inadequate knowledge of how they interrelate with the outcome of interest. The small number of participants and large number of dropouts is another limitation. However, the fact that this was a single-center study and that the same surgeons assessed, operated on, and managed the patients is among the strengths. All transsexuals referred for gender-confirming surgery in Denmark are centralized at this single center, which makes the study representative for gender-confirmation surgery in Denmark. Because data regarding gender-confirming surgery in Denmark were recorded without knowledge of this study, no tendency to influence the outcome was present.

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