Evidence-based Commissioning Collaboration

Gender reassignment surgery

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Date completed:	December 2005
Expiry date:	

Publication information

Trent Research and Development Support Unit is a collaborative venture between the Universities of Leicester, Nottingham and Sheffield. Members of staff in the Sheffield Unit, based in the School of Health and Related Research (ScHARR), have been engaged in reviewing the effectiveness and cost-effectiveness of health care interventions in support of the National Institute for Health and Clinical Excellence (NICE).

In order to share expertise on this work, we have set up a wider collaboration, InterTASC, with units in other regions. These are Southampton Health Technology Assessment Centre, University of Southampton; Aberdeen Health Technology Assessment Group, University of Aberdeen; Liverpool Reviews & Implementation Group, University of Liverpool; Peninsular Technology Assessment Group, University of Exeter; NHS Centre for Reviews and Dissemination, University of York; and West Midlands Health Technology Assessment Collaboration, University of Birmingham.

The Evidence-based Commissioning Collaboration (EBCC) is made up of four commissioning consortia - The North East Yorkshire & North Lincolnshire Primary Care Organisation (NEYNL), The North Derbyshire, South Yorkshire & Bassetlaw Commissioning Consortium (NORCOM), The Trent Commissioning Consortium (TrentCOM) and The West Yorkshire Primary Care Organisation (WYPCO) - which, on behalf of PCTs in their areas, are working with the School of Health and Related Research (ScHARR). ScHARR is based in the University of Sheffield and houses the northern arm of the Trent Research and Development Support Unit.

The objective of the Collaboration is to share research knowledge about the effectiveness and cost-effectiveness of service interventions to inform the commissioning process. These will usually be interventions which are not likely to be addressed by NICE in the near future. The main principle on which the arrangement is based acknowledges that PCTs have continually to review evidence on particular technologies in order to determine their commissioning priorities. Since different PCTs will be looking at the same issues, there are clear benefits and economies of scale through the avoidance of duplication of evidence reviews.

The choice of topics is determined collectively by the PCTs through their commissioning Consortia.

ScHARR will provide the capacity which the PCTs lack in evidence retrieval and assessment/review and in economic analysis.

As part of the process, a presentation of research evidence will usually be made to a workshop of the Collaboration on particular interventions. Clinicians and DPHs from the PCTs represented will be invited to take part in the discussions.

Contributions

Richard Richards (Director of Public Health, Newark & Sherwood PCT) conceived the review; Paul Sutcliffe (Research Fellow, ScHARR), Simon Dixon (Senior Lecturer, ScHARR), Richard Richards, Sarah Sahman (Assistant Director of Specialised Commissioning, TrentCOM) designed the review; Paul Sutcliffe coordinated the review.

Paul Sutcliffe and Simon Dixon developed the search strategy; Anna Wilkinson (Information Officer, ScHARR) and Paul Sutcliffe undertook searches, Paul Sutcliffe screened the search results; organised the retrieval of papers; screened retrieved papers against inclusion criteria; appraised the quality of papers; abstracted data from papers; and provided additional data about the papers.

Simon Dixon wrote the executive summary. Paul Sutcliffe wrote the background section. Paul Sutcliffe and Simon Dixon wrote the section concerning patient numbers in each of the four consortia. Paul Sutcliffe performed the clinical effectiveness review on the studies. Paul Sutcliffe and Simon Dixon wrote the discussion section.

Tim Terry (Consultant Urologist, Leicester General Hospital & Leicester Nuffield), Sue Wardle (Director of Contract Monitoring, Sheffield Care Trust), Joanne Walkingshaw (Clinical Team Manager, Leeds MHT), Carrie Wollerton (Senior Commissioning Manager, Selby & York PCT), Kevan Wylie (Consultant in Sexual Medicine & Psychosexual Therapy, Royal Hallamshire Hospital, Sheffield) provided useful information concerning patient numbers; Shirley Brook (Commissioning Manager, WYPCO), Kim Cox (Specialised Services Commissioning Manager, NORCOM), Brian Ferguson (Consultant Psychiatrist, Stonebridge Clinic, Nottingham), Deenesh Khoosal (Consultant Psychiatrist, Leicester General Hospital), Andy Pryor (Practice Manager, St John and St Elizabeth Hospital), Sarah Sahman (Assistant Director of Specialised Commissioning, TrentCOM), Tim Terry, and Kevan Wylie provided a clinical and policy/consumer perspective on the topic.

All responsibility for the contents of the report remains with the authors.

The authors also wish to thank Andrea Shippam and Pat Holmes for their help in preparing and formatting the report.

Conflicts of Interest

Source of funding:
This report was commissioned by the Evidence-based Commissioning Collaboration.

Relationship of reviewer(s) with sponsor
None

Contents

Executive Summary

Aims and objectives

The study aimed to identify the number of patients currently receiving treatment for gender identity dysphoria/gender reassignment within the EBCC region, and to assess the evidence associated with key points on the treatment pathways.

The objectives of the study were to:

- Identify a patient treatment pathway that described care across the EBCC region.
- Provide confirmation of patient numbers treated on the pathway of care in the four consortia in terms of the overall number, and for patients requesting either MTF or FTM.
- Provide detailed literature searches to obtain evidence for the effectiveness of treatment at each stage on the treatment pathway for both MTF and FTM.
- Summarise the previous reviews concerning the effectiveness of gender reassignment surgery (GRS).
- Summarise the literature concerning individual core surgical procedures for both MTF and FTM.

Pathway of care and patient numbers

Treatment pathways were identified for the four consortia and a consolidated pathway constructed that allowed patient numbers to be set against different stages. The consolidated pathway was made up of 16 stages.

A simpler set of stages was necessary in order that patient numbers from each of the four consortia could be compared; this consisted of waiting list, referral, assessment, treatment, reassessment, referral for surgery, surgery and post surgery. Four hundred and forty patients were identified across the region (151 NORCOM, 118 TrentCOM, 82 WYPCO, 36 NEYNL and the remainder unidentified).

One hundred and seventy four patients across NORCOM, WYPCO and NEYNL are currently on the waiting list for referral. No patients in TrentCOM are waiting as the Stonebridge Centre guarantees an appointment within a set period; however, as a result they have a much larger proportion of patients in assessment.

One hundred and sixty nine patients were identified as receiving MTF treatment (40 NORCOM, 91 TrentCOM, 30 WYPCO, 8 NEYNL). Forty-four patients were identified as receiving FTM treatment (7 NORCOM, 27 TrentCOM, 8 WYPCO, 2 NEYNL). Information is not available on the position of the remaining patients 227 patients identified within the region.

Literature searches of evidence around key decision points

Ten systematic literature searches were undertaken around 10 key questions identified by commissioners. Searches were undertaken in five electronic databases (ASSIA, Cochrane Library [Wiley Online], Embase [Ovid Online], Medline [Ovid Online], Medline in Process [Ovid Online], Psycinfo) providing coverage of the biomedical, grey literature and current research. The publication lists, current research registers, and health services research related organisations were consulted via the World Wide Web (WWW). Keyword searching of the WWW was undertaken using the Google search engine. In addition, reference lists were searched for cross-references, and

abstracts from conference proceedings and meetings were checked.

The literature searches identified:
- For referral/assessment/diagnosis (MTF) 179 articles.
- For real life experience/endocrine therapy (MTF) 261 articles.
- For sex reassignment surgery (MTF) 170 articles.
- For post surgery/reconstructive surgery (MTF) 53 articles.
- For non-specific terms associated with topic (MTF) of 786 articles.
- For referral/assessment/diagnosis (FTM) 89 articles.
- For real life experience/endocrine therapy (FTM) 120 articles.
- For sex reassignment surgery (FTM) 75 articles.
- For post surgery/reconstructive surgery (FTM) 33 articles.
- For non-specific terms associated with topic (FTM) 319 articles.

Review of GRS effectiveness reviews

A comprehensive summary of six earlier reviews was provided which together encapsulate an estimated 172 individual studies. All reviews commented on the poor quality of the research evidence available; no randomised controlled trials (RCTs) were available. Only one controlled study was identified, which compared 20 patients having immediate surgery with 20 patients awaiting surgery for penectomy, orchidectomy and the construction of a neo-vagina.

The remaining studies reflect lower grades of evidence, and had further problems in their design such as selected patient groups, retrospective analysis and losses to follow-up. Conclusions from the reviews are understandably tentative, but highlight improvements in patients across most studies, although 10-15% of transsexuals who undergo GRS having poor outcomes.

Among the problems identified in the design of the studies were:
- An estimated 172 studies were included across the six reviews.
- Failure in many studies to collect data prospectively.
- GRS may benefit carefully assessed/selected transsexuals.
- High rates of improvement reported following GRS.
- Lack of RCTs.
- Lack of standardised selection criteria in studies.
- Lack of studies using a control group.
- Lack of validated outcome measures.
- Mainly cohort studies and case-series are reported.
- More rigorous study designs are needed.
- Poor quality of evidence.
- Poor study design.
- Problems with loss to follow-up.
- Only one controlled study reported (Mate-Kole, Freschi, & Robin, 1990[1]).
- Question the validity of effectiveness of GRS from evidence available.
- Involves various combinations of operations for both MTF and FTM making it difficult disentangle the effectiveness of individual surgical procedures.

Several of the reviews called for the need for better quality studies. References for all the studies included within these reviews have been considered in this report, and the majority are summarised in the Appendices.

Review of effectiveness of individual procedures for MTF transsexuals
Reviews of the following surgical procedures for MTF transsexuals were undertaken; clitoroplasty, labiaplasty, orchiectomy, penectomy and vaginoplasty.

There was a clear lack of randomised controlled evidence or studies which included a control group comparison. There was no evidence found concerning the effectiveness of labiaplasty and only one study concerning penectomy and one study concerning orchidectomy procedures. A large amount of evidence is available reporting vaginoplasty and clitoroplasty procedures. Some complications have been reported. All the studies report, to various degrees, satisfactory outcomes in terms of being able to have penetrative sexual intercourse and achieving sexual fulfilment.

Review of effectiveness of individual procedures for FTM transsexuals
Reviews of the following surgical procedures for FTM transsexuals were undertaken; hysterectomy, mastectomy, metoidoplasty, phalloplasty, salpingo-oophorectomy, scrotoplasty / placement of testicular prostheses, urethroplasty and vaginectomy.

The majority of studies report good satisfactory outcomes with few complications for each of the individual procedures. Many of the outcomes for these procedures relate to the ability to perform penetrative sexual intercourse and to be able to achieve orgasm. Another key factor requested by many patients is the ability to void whilst standing. Some of the procedures are frequently completed along with other procedures, making it difficult to assess the effectiveness of each procedure alone. Furthermore, the assessment of effectiveness is also confounded by the lack of controlled evidence, unclear outcome measures, and a reliance on case series and case studies.

Discussion
As well as the fundamental design of the studies, several other issues regarding the interpretation of the evidence are worth consideration. Firstly, all the reviews, and many of the individual studies within them examine different types of GRS. The Mate-Kole study, for example, is essentially an evaluation of three surgical techniques. Clearly, trying to reach a robust conclusion about GRS as a whole is not possible when the combination of techniques varies across studies. Secondly, the patient populations within, and across studies, are heterogeneous and we have little idea about the referral, diagnosis, assessment and selection process that precede inclusion within the studies. Consequently, Brown concludes that a lengthy differential diagnosis and a specialised approach to interviewing gender dysphoric patients are needed. Thirdly, the choice of outcome measures varies across studies, with very little use of validated health related quality of life measures. This complicates further our ability to draw conclusions, and also limits the commissioners' ability to identify studies that use outcomes that are relevant to their role.

No published evidence on cost-effectiveness is available, nor its derivation possible. Best and Stein speculate that some cost offsets are possible following surgery due to the reduced need for psychiatric and hormonal treatment, but no evidence is available for this. The lack of generic quality of life measures means that measures of cost-

effectiveness that can be used to assess value for money relative to other health care interventions are not possible.

We extended the earlier reports by providing a detailed summary of each of the core surgical procedures being used for both MTF and FTM transsexuals. To this end, 78 published papers (42 MTF and 36 FTM) were summarised across 13 different surgical techniques (5 MTF and 8 FTM). Once again, the evidence identified is of poor quality with no RCTs or any studies with a control group. Despite this, the majority of studies report good satisfactory outcomes with few complications for each of the individual procedures. Within each study area, there appears to be some consensus on outcome measures, however, these are very specific to the client population and surgical procedures, for example, ability to achieve orgasm in the case of clitoroplasty or depth of neo-vagina in the case of vaginoplasty.

When trying to consider all of the evidence together, there is a dilemma regarding its interpretation. Reviews of heterogeneous patient groups and interventions clearly give the greatest depth of evidence, but give little in the way of specific information that is of use to purchasers (Table 6). In contrast, studies of individual techniques have more limited evidence base but allow us to focus on specific clinical questions with more consistent reporting (Tables 7-18). But these provide information on purchasing decisions that are less realistic, as some procedures are unlikely to be purchased in isolation. In between these extremes, are a set of studies that investigate various combinations of multiple procedures (Appendix 2), but matching these studies to the activity of different providers and patients, is extremely complex.

Despite these difficulties in *interpretation* of review evidence and its relevance to specific commissioning decisions, the *conclusion* about the strength of evidence regarding GRS appears clear. Little robust evidence exists. There is a need for good quality controlled trials based on clearly defined diagnosis and assessment criteria.

Although the present report was not able to review the evidence at each stage on the treatment pathways for GID, several stages on the pathway are attracting considerable research interest. In particular, there are many studies investigating the use of hormone therapy and non-core procedures such as voice therapy in transsexual patients. These should be given consideration in future reports.

Conclusions

We have confirmed the findings from previous reviews that the evidence to support GRS has several limitations in terms of: a) lack of controlled studies; b) evidence is not collected data prospectively; c) high loss to follow up; and d) lack of validated assessment measures. We have extended these findings from previous reviews by providing a summary of the evidence available for each of the "core" procedures for MTF and FTM transsexuals. In the majority of studies a large number of transsexual people experience a successful outcome in terms of subjective well-being, cosmesis and sexual function. Like the conclusions made in previous reviews the magnitude of benefit and harm cannot be reliably estimated accurately using the current available evidence. It has been recognised in previous reviews of GRS that many studies do not use or report the rigorous treatment pathway which a patient would have to go through in the UK. It is important to consider whether the evidence which is available provides a reliable representation of the likely success of surgery found in the UK.

Abbreviations

GID	Gender Identity Disorder
GRS	Genital reconstruction surgery
HBIGDA	Harry Benjamin International Gender Dysphoria Association
HBSOC	Harry Benjamin Standards of Care
RCTs	Randomised Controlled Trials
RLE	Real Life Experience
QOL	Quality of Life

Definition of terms

Chest surgery, chest reconstruction surgery: Goal of chest surgery is to create a contoured, male-looking chest. There are two basic procedures: Double incision/Bilateral mastectomy; and Keyhole/Peri-areolar incision.
Female-to-male transsexual (FTM): Person born in a female body but whose gender identity is male.
Gender dysphoria: Also body dysphoria. The state of discomfort felt by transsexuals and some transgender people caused by the incongruity between one's physical sex and one's gender-identity.
Gender identity: Person's internal self-awareness of being male or female, masculine or feminine, or something in-between.
Gender Identity Disorder (GID): Condition identified by psychologists and medical doctors wherein a person who has been assigned one gender at birth identifies as belonging to another gender.
Genital reconstruction surgery (GRS): Sometimes also referred to as "genital reassignment surgery."
Harry Benjamin International Gender Dysphoria Association (HBIGDA): A professional organization devoted to the understanding and treatment of GIDs.
Harry Benjamin Standards of Care (HBSOC): The most widespread set of standards and guidelines used by professionals for the medical and mental health treatment of transsexuals.
Hysterectomy: The surgical removal of the uterus.
Metaoidioplasty: alternate spelling for "metoidioplasty". This involves the surgical process of using the clitoris in a more phallic or penis-like manner.
Oophorectomy: The surgical removal of one or both ovaries.
Phalloplasty: A type of genital reconstruction surgery in which a phallus/penis is constructed from an individual's own donor tissue that has been shaped and grafted into place.
Real Life Experience (RLE): A period of time in which a transsexual person is required to live full time in the role of the sex they identify with before the medical community will begin the medical gender reassignment process.
Transgender: Broadly speaking, transgender people are individuals whose gender expression and/or gender identity differs from conventional expectations based on the physical sex they were born into.
Transsexual: An individual whose gender identity does not match the sex that was assigned to them at birth.

Terminology was extracted from:
http://web.mit.edu/hudson/www/terminology.html

1. Aims

The study aimed to identify the number of patients currently receiving treatment for gender identity dysphoria/gender reassignment within the EBCC region, and to assess the evidence associated with key points on the treatment pathways.

The objectives of the study were to:

- Identify a patient treatment pathway that described care across the EBCC region.
- Provide confirmation of patient numbers treated on the pathway of care in the four consortia in terms of the overall number, and for patients requesting either MTF or FTM.
- Provide detailed literature searches to obtain evidence for the effectiveness of treatment at each stage on the treatment pathway for both MTF and FTM.
- Summarise the previous reviews concerning the effectiveness of gender reassignment surgery.
- Summarise the literature concerning individual core surgical procedures for both MTF and FTM.

2. Background

Gender reassignment surgery (GRS) has become an increasingly common practice. A transsexual is a person with the external genitalia and secondary sexual characteristics of one sex, but whose personal identification and psychosocial configuration is that of the opposite sex. Transsexuals have a desire to live and be accepted as a member of the opposite sex and suffer from a constant feeling of psychological discomfort related to their anatomical sex. One method which attempts to resolve this discomfort is GRS. Through GRS a person's external sexual characteristics are altered to resemble those of the opposite sex.

Transsexualism is usually classified according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) or the International Classification of Diseases code (ICD-10). The DSM-IV (1994[2]) states that for a person to be diagnosed with Gender Identity Disorder (GID) they must show strong persistent cross-gender identification (not merely a desire for any perceived cultural advantages of being the other sex). In adolescents and adults, the disturbance is manifested by symptoms such as: a frequent passing as the other sex; stated desire to be the other sex and to live or be treated as the other sex; the conviction that he or she has the typical feelings and reactions of the other sex. Furthermore, disturbance can be manifested by a preoccupation with removing primary and secondary sex characteristics (e.g., request for hormones, surgery, or other procedures to physically alter sexual characteristics to simulate the other sex) or belief that they were born the wrong sex. Further categorisation has been made on the basis of age (i.e., GID of childhood, adolescence, or adulthood). Those persons not meeting these criteria tend to be termed GID Not Otherwise Specified.

Transsexualism is a heterogeneous condition. Some transsexuals have recognised their gender dysphoria since childhoods (primary transsexualism), while for some, the need for reassignment does not become realised until later in life (secondary transsexualism).

The aim of this report is to provide information on current services, patient numbers and GRS and should inform the planning of NHS service provision, to the benefit of GID patients.

2.1 Transsexualism and Gender Reassignment Surgery

The process by which a person comes to receive GRS is complex and occurs over a series of stages. A transsexual is generally seen by a psychologist (e.g. mental health professional, clinical psychologist) or psychiatrist who diagnoses GID. A medical consultant may go on to prescribe the patient with hormones. Hormone replacement therapy (HRT) can be divided into two parts: a) transitional (the first 2 years, higher doses to change the body); and b) maintenance (lower doses, but for a longer period of time). In general the transsexual is required to live and work, full time, in the new gender role for two years to obtain real-life experience. After successful completion of this stage, the transsexual is examined by a second professional to confirm the diagnosis, and only then can they be assigned for genital surgery. It is important to recognise that this pathway is not universal. This will be discussed later in the report.

2.2 Prevalence

There are variable figures being reported concerning the prevalence of transsexualism and the number of patients undergoing GRS. The DSM-IV (1994[2]) states that, "Data from smaller countries in Europe with access to total population statistics and referral suggest that roughly 1:30,000 adult males and 1:100,000 adult females seek sex-reassignment surgery." Other reports present different numbers of prevalence.

Only a small amount of routine data is available in the UK which may be used to estimate the prevalence of transsexualism (Best & Stein, 1998[3]). The Scottish Needs Assessment Programme (2001[4]) estimated the prevalence of transsexualism in Scotland, through sending questionnaire to relevant professional in Scotland and to transsexual self help groups. The study found that 300 transsexuals were receiving treatment in Scotland and the prevalence was 8:100,000. MTF patients outnumbered FTM patients by about 4:1. It should be noted that some believe the prevalence of transsexualism in the UK to be considerably higher than reported in many published research. For example, Kelly (2001[5]) estimated the prevalence of MTF GRS in UK to be 1:3,750.

The reported prevalence of transsexualism has been found to vary throughout the world. Van Kesteren (1996[6]) found the prevalence of transsexualism in The Netherlands to be 1:11,900 (MTF) and 1:30,400 (FTM). More recently, Conway (2001[7]) estimated that at least one out of every 2,500 persons born male in the US has already undergone GRS to become female. This estimate of 1:2,500 is considerably higher than the 1:30,000 often quoted by the medical community.

Tsoi (1988[8]) found prevalence levels of 1:2900 for MTF and 1:8300 FTM patients in Singapore. Bakker, Van-Kesteren, Gooren, and Bezemer (1993[9]) in a study conducted in The Netherlands estimated the prevalence of MTF transsexualism (diagnosed transsexuals who were receiving hormonal treatment) to be 1:11,900, and a prevalence of FTM transsexualism to be 1:30,000. However, less evidence is available concerning the number of patients who go on to request surgery. A Swedish study suggested that the number of individuals requesting gender reassignment is 0.17 per 100,000 (Landen, Walinder, & Lundstrom, 1996[10]).

Horton (2004[11]) reported on the prevalence of GRS in the US. It was estimated that about 1 in 3000 US residents have had or will have GRS at some time during their lifetime. Since GRS is only completed on adults, we can divide the annual number of surgeries (1237) into the number of eligible US adults age 18-64 (174 million). This tells us that 1 in 140,000 US residents have GRS each year. Since each of us has 47 years to have GRS, and the GRS could happen in any one of those years, dividing yields 2996, or about 1 in 3000. Overall, approximately 20% of MTF transsexuals who transition will have GRS and about 80% of FTMs who transition have surgery. Therefore, about 27% of all those who transition have GRS, so about 1 in 800 US residents have GID severe enough to transition. Approximately, 1 in 2300, or .17%, of males has GRS, and 5 times that many, or .1%, have transitioned. Similarly, 1 in 4300, or 0.009% of females have SRS, and slightly more, 0.01%, have transitioned.

The Hospital Episode Statistics register reports the number of admitted patients in the UK with episodes defined by the ICD10 code of F64 (Transsexualism). The statistics provided ranged from 180 patients in 1998/99 to 352 patients in 2003/04. It should be

recognised that this figure relates to only NHS treated patients.

2.3 Cost effectiveness

In attempting to evaluate the costs of surgery (i.e., MTF: orchidectomy, penectomy, vaginoplasty, labiaplasty; or FTM: mastectomy, hysterectomy, metoidioplasty, phalloplasty), it is important to recognise the mental health (therapy), hormones (pharmaceuticals), doctors visits to support hormones, that are needed, in addition to surgery. Each of the individual points on the pathway is considered to be part of the overall package of treatment. Furthermore, other more cosmetic procedures may be required such as: electrolysis; speech therapy; breast augmentation surgery; facial surgery; voice surgery. The bulk of the cost is in the HRT maintenance, after transition and surgery.

Recent research by Horton (see draft on http://www.redace.com/thbref.html) attempted to estimate the total cost of the medical health care needed by transsexuals who change their gender. The research study was undertaken from 2001 through 2004 and aimed to measure the frequency and cost of sex reassignment surgeries, and to project the total cost of Transgender Health Benefits (THBs) for the employees of large companies. Surveys were sent to all surgeons who perform GRS and related surgeries on US residents, asking how many surgeries were performed in the year 2001, and how much they cost. Both MTF and FTM data were collected. It was reported that 1230 US transsexuals had their primary GRS in 2001. The average MTF cost was about $11,000, and the average FTM surgery was about $17,900. MTF surgeries outnumbered FTM surgeries 800 to 430, leading to an average combined cost for GRS of $13,000. The annual cost per insured US resident for GRS was $.11. Combined with the cost for hormones, doctor's office visits, and therapy, the total annual cost per insured for all THBs was $.64.

The average cost for a MTF surgery is $11,000. Adding in a cost of about $1000 for therapy, $1500 for hormones, and $500 for doctors visits and lab tests, the cost to transition averages about $14,000 over a two year transition period. Transsexual women might request penectomy and vaginoplasty. This procedure costs from $10,000 to $15,000. Transsexual men might request bilateral mastectomy and hysterectomy. In some cases they also elect phalloplasty (construction of a penis) which costs from £40,000 to £45,000 and MTF penectomy costs around £9,000. University Hospitals Leicester offer MTF surgery (regardless of which vaginoplasty technique is used) costing £9,500 (2003 cost).

2.4 Current service provision

The Harry Benjamin International Gender Dysphoria Association (HBIGBA; 2001[12]) provided the minimum standards of care for people applying for hormonal or GRS.

Within the UK, there is geographical variation in the provision of services. Some health authorities do not routinely fund surgical reassignment procedures, while others have imposed a limit on the number of procedures that they will fund per year. Where this is the case, patients may approach private centres both in the UK and abroad.

Surgery attempts to reconcile an individual's core identity and physical characteristics and should not be considered a cosmetic intervention. GRS is a major procedure, and potential candidates must be carefully assessed prior to acceptance for surgery.

2.5 Introduction to agreed process

The present report involved three phases of work which were undertaken between May and December 2005.

Phase 1:

In order to generate a set of 'key issues for commissioners' the EBCC Steering Group on the 23rd May requested the development of an e-mail forum. The forum was developed with the sole purpose of producing a long, then short list, of key issues. It was composed of 7 people: 1 clinician; 3 Directors of Public Health, 1 Head of Collaborative Services and 2 Specialised Commissioning Managers who have an interest in the topic. At the EBCC Steering Group meeting on the 4th July 2005, the results of the e-mail forum were discussed, and a set of key issues for commissioners related to the proposed Gender Reassignment Review were decided.

The key issues raised were:

a) Diagnosis of patients.
b) Description of the treatment pathway.
c) Identify key decision points on the treatment pathway.
d) Clinical and cost effectiveness of treatment options at key decision points.
e) Quality of life outcome in patients.

Phase 2:

A preliminary report detailing key issues a), b), and c) was discussed at the Steering Group Meeting on the 19th September 2005. The main aim of the preliminary report was to develop an understanding of the current treatment policies being used within each consortium and identify the key decision points on the treatment pathways.

The objectives of Phase 2 were to provide:

a) A summary and discussion on the treatment pathways being used.
b) A draft consolidated treatment pathway diagram.
c) The number of patients in each consortium who are receiving treatment at a specific stage on the consolidated pathway.
d) A link to the Harry Benjamin Standards of Care (HBSoC) for GIDs.
e) A basis for identifying the key decision points for commissioners.

A consolidated pathway was provided which highlighted similarities between the existing pathways and allowed a simple comparison of patient numbers. It was not intended to represent a 'universal' pathway to be adopted by the four consortia. We also reported on the HBSoC as an international benchmark to compare the consortia's treatment pathways (via the consolidated pathway). Finally, we extended our analysis to show one possible set of key points, as a prompt for discussion.

Phase 3:

In preparation for the workshop on the 12th December 2005 the following work has been conducted:

a) Confirmation of patient numbers treated on the pathway of care in the four

consortia in terms of the overall number, and for patients requesting either MTF or FTM.

b) A detailed literature searches to obtain evidence for the effectiveness of treatment at each stage on the treatment pathway for both MTF and FTM.

c) Summarised the previous reviews concerning the effectiveness of GRS.

d) Summarised the literature concerning individual core surgical procedures for both MTF and FTM.

e) Evaluated the levels of evidence available in terms of study design.

f) Discussed the limitations of evidence: quality and outcomes.

3. A consolidated summary of the main stages of assessment based on the information provided by the four consortia

Each consortium provided information concerning the stages of care and assessment for patients being treated for GIDs. These pathways of care have been consolidated to provide a summary of the main stages of assessment (see Table 1).

Table 1: A consolidated summary of the main stages of assessment

Stage 1	Patient visits GP
Stage 2	Referral to gender dysphoria service is made and patient is placed on waiting list
Stage 3	Referral by GP and consultant sector psychiatrist for a mental health screen
Stage 4	Seen by psychiatrist for mental health assessment*
Stage 5	Accepted on to a waiting list*
Stage 6	Seen by designated medical consultant for gender dysphoria
Stage 7	Assessment by team member up to six sessions over 3 to 6 months* • Begin two year assessment period with gender clinic • Visit clinic technician for psychometric testing • Visit medical psychotherapist & nurse therapist on alternative six weeks • Referred to speech therapist for preliminary assessment • Referred to style/colour counsellor for preliminary assessment
Stage 8	Review* • After a minimum of six months there is a repeat of psychometric testing • Each patient is assessed by the multi-disciplinary gender panel (which meets every six months) as to whether he or she is suitable to begin hormone therapy and enter the 'Real Life Experience'
Stage 9	Referral to endocrine clinic for hormone treatment*
Stage 10	Real Life Experience • 'Real Life Experience' chart completed over next 12 to 18 months - includes living in chosen role, change of name and documents, hormone prescription and review of effects, speech and stylist sessions and peer group attendance
Stage 11	Additional time limited exploration for a maximum of one year
Stage 12	Endocrine reassignment therapy (up to 18 months)
Stage 13	Patient re-assessed by the gender panel after the two year programme and if appropriate, a second psychiatric opinion sought*
Stage 14	Referral to a surgical consultant for opinion for sex reassignment surgery and put on waiting list for surgery if accepted • It should be noted that many patients seeking FTM surgical procedures often have hysterectomy and mastectomy at earlier stages by local clinicians*
Stage 15	Surgical reassignment
Stage 16	Post operative care maximum one year then discharge

NB. Time period between Stage 7 and Stage 15 is approximately three years
* Not applicable to patients attending Stonebridge Centre (see additional table)

3.1 Variations to the consolidated treatment pathway

Differences in treatment pathways across commissioning consortium have been found. In one gender centre (Stonebridge Centre: TrentCOM) the early assessment stage differs significantly from any other centre. This is an important consideration and needs to be acknowledged.

Stonebridge Centre:
Stage 4: Not applicable, since patients are referred by GP or some other source (e.g., HIV clinic).
Stage 5: No waiting list is used. Patients are seen within 6 months of referral.
Stage 7 and 8: Patients start a systematic assessment which is referred to as the network meeting. These involve a minimum of 3 sessions. This is not private. Patients receive homework and are required to bring a second party with them to a session (e.g., partner, work colleague). This method of assessment is not used elsewhere in the country. It requires a senior clinician and a consultant psychotherapist, who work together. If the two professionals agree the patient is appropriate to continue treatment, the patient commences the real life experience stage.
Stage 9: Patients are not referred to the endocrine clinic for hormone treatment. They receive guidance prescriptions at the Centre.
Stage 13: Patient is not reassessed by a gender panel; however, their diagnosis is reconfirmed at the centre.
Stage 14: Only in exceptional circumstances are surgical procedures completed at earlier stages in patients attending the Centre.

The important difference noted in the above treatment pathway being used at the Stonebridge Centre is the preferred spread or sharing of responsibility by forming teams. This type of team approach to the indication for GRS in transsexuals has been found to considerably improve the post-operative outcome of gender reassignment (de Roche, Rauchfleisch, Noelpp, Dittmann, Ermer, Stieglitz, Staub, Meier, Gasser, & Lüscher, 2004[13]). The Stonebridge Centre uses a systematic and detailed observation early in the treatment pathway. This procedure seems to fit the proposed need for objectivity and scientific practice when working with gender identity disordered (GID) patients (see Bower, 2001[14]). Although the Harry Benjamin Standard's of Care (2001[12]) has been reported to be used by each of the commissioning consortia, one must recognise that research has shown that differences in adherence to these standards of care in Europe have been questioned (Petersen & Dickey, 1995[15]).

Concerns have been expressed by the EBCC steering group about the diagnosis of patients seeking GRS. GID patient's progress through a complex care pathway, before the opportunity to undergo surgery becomes an option. Some concern has been raised as to the subjective nature of diagnosis. Murray (1998[16]) claims the diagnosis process is subjective, relating to clinicians experiences, thoughts, feelings, and impulses. Bower (2001[14]) further recognises that, in the case of the GID patient, diagnosis is problematic because patients wish to present their symptomatology in an impressive and favourable manner. Patients are often well prepared through background reading and can obtain additional information from support groups and postoperative patients. Bower critically evaluated the DSM-IV classification of the GID. Although the DSM-IV classification of the GID was found to be adequate, it nevertheless had several shortcomings which could affect a precise diagnosis. Other

research by Cole, O'Boyle, Emory, and Meyer (1997[17]) examined retrospectively the comorbidity between gender dysphoria and major psychopathology, evaluating the 435 gender dysphoric individuals (318 male and 117 female). This study provided support for the use of the DSM-IV classification in finding that transsexualism usually required an isolated diagnosis and was not part of any general psychopathological disorder.

4. Patient numbers from each PCT/Consortia

We have evaluated the number of patients known to be currently receiving treatment for both MTF and FTM in each consortium (see Tables 2-4). Although some consortia provided detailed information about patients, we have chosen to report only those details considered important for members of the steering group (e.g., funding consortia, referred PCT, treatment stage and biological sex). Several clinicians and professions working in the area of gender reassignment provided the estimated number of patients seen each year in their clinic or consortium. These patients were not reported in the tables, due to the lack of clarity and the possible duplication of patients.

It is also important to recognise that some patients do not comply with treatment protocols and have to repeat stages, and some patients choose not to fully complete their treatment. We have not been able to provide details of how long patients take to complete each stage. It should be noted that these figures were correct at the time of being given this information (July/August 2005).

Table 2: Overall number of existing patients receiving treatment for GID

Stage	**NORCOM**	**TrentCOM**	**WYPCO**	**NEYNL**
Waiting list	104	0[$]	44	26
Referral	11	0	1	0
Assessment	3	42	10	2
Treatment	14	41	8	2
Reassessment	1	0	8	2
Referral for surgery	4	12	4	1
Surgery	4	0	1	0
Post surgery	9	6	6	3
Unknown	1	17‡	0	0
Total number of patients identified	151	118	82	36
Additional patients	18[*]	0	35[†#]	0
Overall number of patients identified	440			

[*] 18 patients (16 MTF and 2 FTM) attending Porterbrook clinic who are not NORCOM

[‡] 4 patients had been discharged (1 from TrentCOM, 1 from unknown consortia, 1 from outside four consortia, 1 from NEYNL); 2 patients did not have their consortium listed; 2 patients were from NEYNL; 1 patient was NORCOM; 8 patients were from outside four consortia

[†] 12 patients (10 MTF and 2 FTM) attending the LMH service which have unknown contract (i.e. which consortium is providing the contract)

[#] 23 patients attending the LMH service from outside the WYPCO area

[$] Stonebridge Centre do not have a waiting list, all patients are guaranteed an appointment within a set period.

Table 3: Number of patients receiving Male-to-Female treatment for GID

Stage	NORCOM	TrentCOM	WYPCO	NEYNL
Waiting list	?	0	?	?
Referral	11	0	1	0
Assessment	3	36	7	2
Treatment	14	30	8	2
Reassessment	1	0	3	2
Referral for surgery	2	7	4	0
Surgery	2	0	1	0
Post surgery	7	5	6	2
Unknown	0	13*	0	0
Total number of patients identified	40	91	30	8

* 3 patients had been discharged (1 from unknown consortia, 1 from outside four consortia, 1 from NEYNL); 2 patients did not have their consortium listed; 2 additional patients were from NEYNL; 1 patient was NORCOM; 5 patients were from outside four consortia

? Unknown

Table 4: Number of patients receiving Female-to Male treatment for GID

Stage	NORCOM	TrentCOM	WYPCO	NEYNL
Waiting list	?	0	?	?
Referral	0	0	0	0
Assessment	0	6	3	0
Treatment	0	11	0	0
Reassessment	0	0	5	0
Referral for surgery	2	5	0	1
Surgery	2	0	0	0
Post surgery	2	1	0	1
Unknown	1	4*	0	0
Total number of patients identified	7	27	8	2

* 1 patient had been discharged and 3 patients were from outside four consortia

? Unknown

It should be noted that the number of MTF and FTM patients on the waiting lists and unknown patients was not available from several consortia. This explains the discrepancy in the overall total number of patients in Table 2 and that reported in Tables 3 and 4. Overall, a larger number of MTF transsexual patients were identified in comparison to FTM transsexual patients across the four consortia.

4.1 Evidence of clinical effectiveness

4.2 Methods for reviewing effectiveness

The search strategy used to identify studies for the review of clinical effectiveness is reported in this section, according to the explicit Quality Standards agreed by InterTASC.

Search strategy

The aim of the search was to provide a comprehensive retrieval of as many RCTs concerned with:

- The surgical treatment for persons undergoing gender reassignment.
- Individual surgical treatment for Male-to Female (MTF) and Female-to-Male transsexuals (FTM).

Should RCTs not be available, levels of evidence will be obtained in line with the hierarchy presented by NHS Centre for Reviews and Dissemination group recommendations (2001[18]).

The objectives of this section were to:

- Summarise the evidence concerning the effectiveness for the core surgical procedures used for MTF and FTM transsexuals.

4.3 Literature searches

Before conducting the literature reviews it was essential that we carefully extracted the key decision points from the treatment pathway to provide a complete assessment of the literature.

Earlier in the report we provided a 16 stage treatment protocol. We identified decision points of referral, decision making, and the resources/treatments that become available for consideration at these different points. These decision making points, and their associated resource consequences, represent possible research questions. Even with this approach, several alternative formulations are possible; one possible formulation is given below (Figure 1). It represents a simplification of the consolidated pathway into six phases of treatment, with associated resources, and helped us refine our searches for both MTF and FTM.

Figure 1: Decision making points and their associated resources: one possible formulation

1. Initial referral process
- GP

2. Assessment process
- Assessment/diagnosis
- Local sector psychiatrist
- Counselling services
- Mental health screening
- Counselling and psychiatry

3. Treatment process
- Real Life Experience
- Hormone treatment
- Electrolysis
- Speech therapy
- Ongoing assessment

4. Reassessment
- Second diagnosis

5. Gender reassignment surgery
- Core surgical procedures offered
- Non-core surgical procedures offered

6. Post surgery process (where appropriate)
- Care of post-operative patients
- Follow-up consultations
- Other surgical procedures
- Hormone treatment

Note: these decision points are not exhaustive and should not represent a point for policy decision.

4.4 Individual searches:

Due to an initial uncertainty surrounding which decision points required detailed consideration, the reviewers chose to undertake a thorough and comprehensive literature search on several key areas. These are clearly reported in Figure 2.

a) Sources searched

Ten systematic literature searches were undertaken around 10 key questions identified by commissioners. Searches were undertaken in five electronic databases (ASSIA, Cochrane Library [Wiley Online], Embase [Ovid Online], Medline [Ovid Online], Medline in Process [Ovid Online], Psycinfo) providing coverage of the biomedical, grey literature and current research. The publication lists, current research registers, and health services research related organisations were consulted via the World Wide Web (WWW). Keyword searching of the WWW was undertaken using the Google search engine. In addition, reference lists were searched for cross-references, and abstracts from conference proceedings and meetings were checked.

All sources searched are provided in Appendix 1.

b) Keyword strategies
Sensitive keyword strategies using free-text and, where available, thesaurus terms were developed to search the electronic databases. Keyword strategies for all electronic databases and each of the 10 searches are provided in Appendix 1.

c) Search restrictions
Date limits to publications from 1980 onwards were used on the databases. Language restrictions were not used on any database, although due to time limitations only relevant studies published in English were reported. All searches were undertaken in August/September 2005. The review was started in July 2005 and completed in December 2005.

4.4.1 Inclusion and exclusion criteria
One reviewer independently screened all titles and abstracts. Full paper manuscripts of any titles/abstracts that were considered relevant by the reviewer were obtained where possible. In the majority of cases, due to time restrictions the reviewer relied on abstracts. The relevance of each study was assessed according to the criteria set out below. Any uncertainty was discussed with a second reviewer and resolved by discussion.

Studies were excluded if they involved:
- Published before 1980 onwards.
- Include patients below 18 years.
- Included non-humans (e.g., animals).
- Articles not published in English language.

4.4.2 Data extraction strategy
Data relating to both study design and quality were extracted by one reviewer into a standardised data extraction form and independently checked for accuracy by a second. Any discrepancies were resolved through consensus. Where multiple publications of the same study were identified, data were extracted and reported as a single study.

4.4.3 Quality assessment strategy
A full quality assessment was not completed due to time limitations. The level of evidence was assessed, based on NHS Centre for Reviews and Dissemination group recommendations (2001[18]). Individual studies were assessed by one reviewer and independently checked for agreement by a second. Disagreements were resolved through consensus. Included studies were assessed for level of evidence and methodological details without any bias towards the results of the study, and there was no blinding of authorship. Had a full quality assessment been undertaken it should be noted that all the included studies would have been rated poorly, due to the lack of concealment of allocation, completeness of follow up and blinding.

Figure 2: Ten searches undertaken in this review

Search 1: Referral/assessment/diagnosis (MTF)
The overall search produced 207 references. After the removal of duplicates a total of 179 relevant articles remained.

Search 2: Real life experience/endocrine therapy (MTF)
The overall search produced 394 references. After the removal of duplicates a total of 261 relevant articles remained.

Search 3: Sex reassignment surgery (MTF)
The overall search produced 252 references. After the removal of duplicates a total of 170 relevant articles remained.

Search 4: Post surgery/reconstructive surgery (MTF)
The overall search produced 65 references. After the removal of duplicates a total of 53 relevant articles remained.

Search 5: Non-specific terms associated with topic (MTF)
The overall search produced 1119 references. After the removal of duplicates a total of 786 relevant articles remained.

Search 6: Referral/assessment/diagnosis (FTM)
The overall search produced 116 references. After the removal of duplicates a total of 89 relevant articles remained.

Search 7: Real life experience/endocrine therapy (FTM)
The overall search produced 206 references. After the removal of duplicates a total of 120 relevant articles remained.

Search 8: Sex reassignment surgery (FTM)
The overall search produced 116 references. After the removal of duplicates a total of 75 relevant articles remained.

Search 9: Post surgery/reconstructive surgery (FTM)
The overall search produced 42 references. After the removal of duplicates a total of 33 relevant articles remained.

Search 10: Non-specific terms associated with topic (FTM)
The overall search produced 516 references. After the removal of duplicates a total of 319 relevant articles remained.

Overall, on removing duplicates there were 1041 references identified. An additional 76 references were found from previous reviews and hand searching the literature. A total of 1117 references were entered into a database for assessment of quality. It should be noted that an assessment of each reference was not completed within the time constraints, therefore it is anticipated that not all the references found will be relevant to the topic of gender reassignment. Furthermore, the relevance of each reference will depend on the participants, intervention, comparators and outcomes in question.

5. Review

It is important to note the scale of this work. The literature search was very comprehensive. Ten separate searches were undertaken to provide the requested evidence and literature at each treatment stage for both MTF and FTM. A summary of the search strategies and keywords are provided in Appendix 1.

Due to the time limitations it was not possible to review all the literature at each stage on the pathway of care. Following consultations with the lead DPH, the present report focused on the effectiveness of surgical procedures used for both MTF and FTM transsexuals.

We will begin by reporting the previous reviews examining the effectiveness of GRS. We will then extract the key papers from each review and attempt to summarise them in terms of each of the core surgical procedures for MTF and FTM. We will summarise any additional studies found for the comprehensive literature searches conducted. We will aim, were possible, to quantify the level of evidence using the NHS Centre for Reviews and Dissemination (2001[18]; see Table 5).

Whittaker, Black, Wylie, and Cox (2005[19]) identified those surgical procedures which might be considered as Core and Non-Core (i.e., those surgical procedures routinely commissioned as part of a programme of treatment for patients with Gender Dysphoria and those which are not, respectively).

Core surgical procedures identified for MTF transsexuals include:

- Clitoroplasty
- Labiaplasty
- Orchiectomy
- Penectomy
- Vaginoplasty

Core surgical procedures identified for FTM transsexuals include:

- Hysterectomy
- Mastectomy
- Metoidoplasty
- Phalloplasty
- Salpingo-oophorectomy
- Scrotoplasty / placement of testicular prostheses
- Urethroplasty
- Vaginectomy

Non-core surgical procedures identified for MTF and/or FTM include:

- Blepharoplasty / face-lift
- Breast augmentation in trans women
- Hair removal/provision of wigs or hair pieces
- Lipoplasty
- Thyroid chondroplasty / rhinoplasty / other facial bone reduction

Core non-surgical interventions identified for MTF and/or FTM include:

- Diagnostic assessment

- Hormone therapy
- Pre and post operative support from a District Nurse with a specialist knowledge of sex reassignment
- Psychotherapy during all stages of active progression, including Real Life Experience
- Support and advice on style
- Voice skills therapy

Whittaker et al. (2005[19]) point out that the list of non-core procedures is not exhaustive.

Table 5: Hierarchy of study designs for questions about effectiveness of healthcare interventions

Description of the design	Levels assigned to evidence based on soundness of design
Experimental study A comparative study* in which the use of different interventions among participants is allocated by the researcher. • **Randomized controlled trial (with concealed allocation)** Random allocation of participants to an intervention and a control (e.g. placebo or usual care) group, with follow-up to examine differences in outcomes between the two groups. Randomization (with concealment of allocation sequence from caregivers) avoids bias because both known and unknown determinants of outcome, apart from the intervention, are usually equally distributed between, the two groups of participants.	**I**
• **Experimental study without randomization** (sometimes erroneously called quasi-experimental or quasi-randomized or pseudo randomized studies) A study in which the allocation of participants to different interventions is managed by the researcher but the method of allocation falls short of genuine randomization, e.g. alternate or even-odd allocation. Such methods fail to conceal the allocation sequence from caregivers. **Observational study with control group** A comparative study* in which the use of different interventions among participants is not allocated by the researcher (it is merely observed). • **Cohort study** Follow-up of participants who receive an intervention (that is not allocated by the researcher) to examine the difference in outcomes compared to a control group, e.g. participants receiving no care. • **Case-control studies** Comparison of intervention rates between participants with the outcome (cases) and those without the outcome (controls).	**II**[$]
Observational study without control groups • **Cross-sectional study** Examination of the relationship between outcomes and other variables of interest (including interventions) as they exist in a relevant population at one particular time. • **Before-and-after study** Comparison of outcomes in study participants before and after an intervention. • **Case series** Description of a number of cases of an intervention and their outcomes.	**III**
Case reports **Pathophysiological studies or bench research**	**IV**
Expert opinion or consensus	**V**

* A comparative study assesses the effect of an intervention using comparison groups.
$ In Level II evidence, experimental studies without randomization (and allocation concealment) are considered better than cohort studies, which in turn are considered better-than case-control studies

Above table was adapted from NHS Centre for Reviews and Dissemination (2001[18])

5.1 Effectiveness of Gender Reassignment Surgery

5.2 Review articles

Six reviews examined the clinical effectiveness of GRS. Six reviewed evidence in MTF patients (Aggressive Research Intelligence Facility, 2004[20]; Best and Stein, 1998[3]; Brown, 1990[21]; Day, 2002[22]; Lundstrom, Pauly, & Walinder, 1984[23]; Pfäfflin & Junge, 1998[24]) and three reviewed evidence in FTM patients (Day, 2002[22]; Lundstrom, Pauly, & Walinder, 1984[23]; Pfäfflin & Junge, 1998[24]). Of these, only three were considered to be systematic reviews (Aggressive Research Intelligence Facility, 2004[20]; Best & Stein, 1998[3]; Day, 2002[22]). Two recent unpublished reports provided a brief summary of some of the reviews (Paul & Thompson, 2005[25]; Whittaker, Black, Wylie, & Cox, 2005[19]). A summary of the main points raised in each review will be summarised in Table 6. In addition to these reviews which evaluate clinical evidence there are a large number of narrative reviews assessing individual GRS procedures.

Table 6: Summary of the main points in reviews concerning GRS

Review	Main points
Aggressive Research Intelligence Facility (2004[20]) N = 7	• Cohort studies flawed due to use of selected patients, retrospective analysis and loss to follow up. • Identified further cohort studies and case-series since 1997 (e.g. Lawrence, 2003[26]). • Majority of studies lack a control group. One study (Mate-Kole, Freschi, & Robin, 1990[1]) compared outcomes in 20 patients having immediate surgery with 20 patients awaiting surgery. • Many published studies conclude the effects of GRS are beneficial, but some do not (e.g. Meyer & Reter, 1979[27]). • More rigorous designs needed with control group, randomly assigned, and blind independent assessment of outcomes. • No RCTs or controlled trials to the end of June 2004, found mainly cohort studies and case-series. • Previous reviews identified the benefits of GRS to carefully selected individuals and were concerned about the quality of evidence on effectiveness. • Reported at least 30 research assessments of the effects of GRS. • Some patients receiving GRS express concerns that available research is misleading (Williams, 1987[28]). • Systematic reviews (Best & Stein, 1998[3]; Day, 2002[22]). • Unable to determine effects of GRS from available evidence.
Best & Stein (1998[3]) N = 12	• Cannot rely on the published studies to provide valid estimates of benefit and harm. • High rates of improvement reported, over 80% in many studies, should be interpreted in light of methodological limitations. • Lack of high quality controlled trials. • Lack of standardised selection criteria in studies. • Majority of published studies concerning the effectiveness of GRS have not collected data prospectively. • Majority of the studies reported had poor design, lacked validated outcome measures and had many losses to follow up. • No attempt to summarise the results in terms of QALYs. • No comparable alternative to GRS exists for those eligible for GRS. • Only one prospective controlled study, numerous case series, and one cross-sectional study documented. • Some MTF transsexuals experience successful outcomes following GRS (e.g. cosmetic appearance, subjective well-being, and sexual function.), but some had dissatisfaction, regret, and postoperative complications. • GRS costs in the region of £9,600 (ECR prices). Following successful surgery the need for psychiatric and hormonal treatment may be reduced, thereby resulting in savings of up to £950 per patient per year.
Brown (1990[21]) N = 31	• GRS is a viable option for a distinct minority of patients, most of whom are carefully selected transsexuals who meet numerous pre-selection criteria. • Lack of large prospective controlled studies of treatments for

	gender dysphoria, such as GRS and psychotherapy. • Lengthy differential diagnosis and a specialized approach to interviewing gender dysphoric patients are needed. • Many nontranssexual patients with other psychiatric disorders present to psychiatrists requesting treatment (e.g. hormones, GRS, and other cosmetic surgical procedures).
Day (2002[22]) N = 10	• Cannot identify who GRS benefits from evidence available. • GRS may benefit carefully assessed/selected transsexuals. • Poor evidence to prove efficacy of GRS for specific subgroups. • Poor quality of evidence, methodological weaknesses. • Recognised the heterogeneity of transsexual population. • Limited evidence that early rather than delayed GRS benefits transsexuals who have undergone rigorous assessment.
Lundstrom, Pauly, & Walinder (1984[23]) N = 35 (including three reviews)	• Evaluated three reviews (Lundstrom, 1981[29]; Pauly, 1981[30]; Lothstein, 1982[31]) about outcome of GRS in transsexuals. • Importance differential diagnosis when evaluating gender dysphoric patients for GRS. • 10-15% of transsexuals who undergo GRS have poor outcomes. • Similar number of failures in MTF and FTM patients. • Older age when first requesting GRS may be regarded as a risk factor for poor outcome. • Satisfactory outcome seemed dependent on good cosmetic and functional result from surgery. • Personal and social instability appeared to correlate with unsatisfactory results. • Secondary transsexuals had higher frequency of unsatisfactory results compared to primary transsexuals.
Pfäfflin & Junge (1998[24]) N = 77	• Includes >75 individual studies and eight published reviews. • Almost all follow-up studies produced desired effects. • Most important effect for patients was reduced suffering and increased subjective satisfaction. • Most desired changes concerned: partnership, sexual experience, mental stability and socio-economic functioning. • Desired changes were slightly better in MTF than FTM. • Many early studies reported frequent and sometimes severe complications with the surgical procedure. • Suicide attempts were above average before and at the start of treatment, but frequency decreased during/following treatment. • Suicides were very rare. • Seven factors influenced the results of treatment: 1) continuing contact with a research program/treatment facility; 2) living in the other gender role; 3) hormone treatment; 4) counselling, psychiatric and/or psychotherapeutic treatment; 5) surgical sex reassigning procedures; 6) their quality; and 7) the legal recognition of the gender change by name and legal sex change.

GRS = Gender Reassignment Surgery, sometimes referred to as Sex Reassignment Surgery
N = Estimated number of studies included in the review
? = Unable to obtain reference.

5.2.1 Summary of reviews

The Aggressive Research Intelligence Facility (2004[20]) presented an updated review of a previous review written in 1997. The authors concluded that the degree of uncertainty about any of the effects of gender reassignment is such that it is impossible to make a judgement about whether the procedure is clinically effective. No RCTs or controlled trials to the end of June 2004 were found, the majority of studies reported were cohort studies and case-series. The authors raised concerns about the quality of evidence and lack of controlled studies.

Best and Stein (1998[3]) published a DEC report by the Wessex Institute. The paper reviewed one prospective controlled study, numerous case studies and one cross-sectional study on GRS in MTF patients. The authors reported the evidence to support GRS is limited since the majority of studies were non-controlled and had not collected data prospectively. The reliability of evidence was questioned due to the lack of validated assessment measures and losses to follow up. The authors recognise that many transsexuals experience positive outcomes, but the actual magnitude of benefit and harm cannot be estimated accurately using current evidence. The importance of appropriate selection of patients for surgery was recognised, and the authors consider how representative the patients were in these studies to those patients who go through a rigorous pathway of care before being considered for surgery in the UK. The authors recognise the lack of high quality controlled studies in this area. Finally, some forms of GRS were noted to be relatively cheap procedures. The authors speculated that if surgery was found to be effective, the need for psychiatric and hormonal treatment may be reduced, resulting in a reduction in costs to the NHS.

Brown (1990[21]) presented a general review of clinical approaches to gender dysphoria. The main conclusion of this report concerning clinical effectiveness is that long-term, prospective studies of outcome with random assignment to treatment modalities, both alone and in combination, are lacking and needed.

Day (2002[22]) reported a Tech Brief review carried out in New Zealand which aimed to identify subgroups of transsexual people for whom evidence of effectiveness of GRS exists. The review included one retrospective cohort study, one prospective controlled study, one systematic review, and seven quasi-experimental studies. The author concluded that more research is needed to improve the evidence base identifying the subgroups of transsexuals who are most likely to benefit from surgery.

Lundstrom, Pauly, and Walinder (1984[23]) evaluated three reviews (Lundstrom, 1981[29]; Pauly, 1981[30]; Lothstein, 1982[31]). The authors reported that a small percentage (10%) of MTF and FTM patients have unsatisfactory outcomes following GRS. The differences in favourable outcomes between MTF and FTM are not statistically significant. Older age increased the risk of poor outcome. The literature suggests that a satisfactory outcome to some extent is dependent on a good cosmetic and functional result from surgery, but this relationship is complex and can be influenced by other factors. Supportive psychological therapy was encouraged, since personal and social instability appeared to be correlated with unsatisfactory results. Secondary transsexuals had a higher frequency of unsatisfactory results compared to primary transsexuals. Differential diagnosis when evaluating gender dysphoric patients for GRS was considered an important future consideration. The authors conclude that GRS is a treatment of choice for carefully evaluated, genuine, primary

transsexuals. The authors do not recommend GRS for secondary gender dysphoric patients and conservative recommendations for those with unstable history and patients over 30 years of age.

Pfäfflin and Junge (1998[24]) provided a comprehensive review of follow-up studies from 1961 to 1991. The most important effect for patients appeared to the reduced suffering and increased subjective satisfaction. Most desired changes concerned: partnership, sexual experience, mental stability and socio-economic functioning. These desired changes were slightly better in MTF than FTM. Overall, almost all follow-up studies produced desired effects, but a greater occurrence of complications following GRS were reported in the earlier studies.

In conclusion, there appears to be several key points raised in the reported reviews:

- An estimated 172 studies were included across the six reviews.
- Failure in many studies to collect data prospectively.
- GRS may benefit carefully assessed/selected transsexuals.
- High rates of improvement reported following GRS.
- Lack of RCTs.
- Lack of standardised selection criteria in studies.
- Lack of studies using a control group.
- Lack of validated outcome measures.
- Mainly cohort studies and case-series are reported.
- More rigorous study designs are needed.
- Poor quality of evidence.
- Poor study design.
- Problems with loss to follow-up.
- Only one controlled study reported (Mate-Kole, Freschi, & Robin, 1990[1]).
- Question the validity of effectiveness of GRS from evidence available.
- Involves various combinations of operations for both MTF and FTM making it difficult disentangle the effectiveness of individual surgical procedures.

5.3 Core surgical procedures

Within this section we aim to focus on reviewing the literature concerning the core surgical procedures for MTF and FTM transsexuals.

The reviews presented in Section 5.2 reported a large number of studies that examined the effectiveness of GRS. The difficulty in interpreting the effectiveness of GRS is that many of the studies involved the follow-up of patients after the completion of a number of procedures. For example in the only controlled study reported in the literature (Mate-Kole, Freschi, & Robin, 1990[1]) patients were included following a single-stage operation involving penectomy, orchidectomy and the construction of a neo-vagina. This presents difficulties when attempting to interpret the benefits of individual procedures. A summary of many of these studies reported in previous reviews are detailed in Appendix 2. In addition a list of references examining GRS between the dates 1961 and 1991 (extracted from Pfäfflin & Junge, 1998[24]) are provided in Appendix 3. These listings provide commissioners with a useful set of references that have been included within many of the reviews. More recently, Smith, Stephanie, Van Goozen, Kuiper, and Cohen-Kettenis (2005[32]) examined the outcomes and predictors of a variety of surgical treatment for MTF and FTM transsexuals. This study reinforced previous findings about the effectiveness of GRS.

The present review aims to evaluate the effectiveness of individual surgical procedures. The majority of these studies have not been included in any previous reviews as they tend to be case studies or case series.

5.4 Review of core surgical procedures for MTF transsexuals

This section reviews each of the core surgical procedures outlined above for MTF transsexuals.

5.4.1 Clitoroplasty/Neoclitoris

In this section we will present the studies found concerning the effectiveness of clitoroplasy/neocliteris formation surgical technique. The neoclitoris is often sculptured during the actual one-stage vaginoplasty (Hage, Karim, Bloem, Suliman, & van Alphen, 1994[33]). Although, clitoris sculpturing can also be completed in subsequent procedures in patients where the glans has not been used for this purpose. Therefore there are several techniques. There are only a limited number of references concerning neoclitoroplasty; one review and six case series. A summary of these studies are provided in Table 7.

A useful review of the literature concerning the sculpturing of the neoclitoris in vaginoplasty for MTF transsexuals was provided by Hage, Karim, Bloem, Suliman, and van Alphen (1994[33]). It was considered that an important goal of vaginoplasty for many transsexuals is the shaping of an aesthetically appealing female perineum. This requires cosmetic considerations for the creation of a clitoris-like structure ventral to the urethral orifice. The paper provided a useful review of the limited references on neoclitoroplasty within the literature of vaginoplasty. From the authors experience the neoclitoris is often sculptured into its resulting appearance during the actual vaginoplasty. This can involve a free composite graft of the tip of the penile glans to cover the shortened dorsal neurovascular bundle. The authors conclude that from an assessment of the literature and from experience that this technique results in few complications and provides successful results, in terms of function and cosmetic appearance. They consider the transpositioning of glans on the long dorsal neurovascular pedicle to be a procedure with high risks.

Fang, Chen, and Ma (1992[34]) reported a method for clitoroplasty in MTF transsexuals. The present paper discussed the findings of nine MTF primary transsexuals. Since 1988, the dorsal portion of the glans penis with the dorsal neurovascular pedicle has being used for clitoroplasty. Overall it was found that all neoclitorides survived well, with good preservation of light touch and sexual sensation. There was found to be no urine leakage. In the six patients who were followed-up, each reported sexual satisfaction.

In a more recent case series by Giraldo, Esteva, Bergero, Cano, Gonzalez, Salinas, Rivada, Lara, Soriguer, and Andalusia Gender Team (2004[35]) they described a new method for reconstruction of the neoclitoris in MTF transsexuals, the corona glans clitoroplasty. It was reported that over the last decade the pedicled island neurovascular flap of the glans penis has been the standard procedure for clitoroplasty in intersex anomalies and in MTF genital GRS. The majority of literature focusing on genitoperineal reconstructions has used the island neurovascular flap of the dorsal shaft of the penis, including a variable-sized dorsal chip of the glans penis as the distal and functional portion of the flap. The new method for reconstruction of the

neoclitoris is based on a modification of the original pedicled island neurovascular flap of the glans penis. This method includes a bifid dorsolateral coronal flap which is designed in the shape of an open lotus flower or a bull's horns. Also the semicircular preputial flap is retained, attached to the bifid coronal flap of the glans. This is thought to improve the cosmetic appearance of the vestibulum and avoid growth of hair around the neoclitoris. Furthermore, a small dorsal flap of the spongiomucosa urethra designed in the shape of a pencil tip is then added to improve the cosmetic appearance of the vestibulum between the neoclitoris and the urethral neomeatus. Since 1999, the authors have performed more than 30 genital GRS in MTF transsexuals, of whom 16 underwent their technique of corona glans clitoroplasty. The authors describe and discuss the anatomic basis and clinical implications of this technique and consider the cosmetic and potential functional advantages.

Several studies have evaluated the long-term outcomes of clitoroplasty. Hage and Karim (1996[36]) reported the sensate pedicled neoclitoroplasty technique used in 60 MTF transsexuals. It was claimed that the results of vaginoplasty by inversion of penile and scrotal skin in MTF transsexuals is generally satisfying. In general, cosmetic and functional considerations determine the construction of a neoclitoris ventral to the urethral orifice. In this paper, the long-term results in the first 60 patients using a pedicled sensate neoclitoroplasty technique are reported. The technique used has previously been found to safe and provides satisfying cosmetic and functional results in the majority of patients.

Krege, Bex, Lummen, and Rubben (2001[37]) discuss the functional and psychosocial long-term follow-up results of 66 patients who had undergone a new technique which should result in a normal appearing introitus, a vaginoplasty allowing for sexual intercourse and a sensitive clitoris. The technique attempts to preserve the neurovascular bundle and transforms the glans into a clitoris. The phallic cylinder is used as a vagina and labia is formed from the scrotal folds. The study found the major complications occurred in nine of the 66 patients (14%); these included severe wound infections in six patients, necrosis of the glans in three patients, a rectal lesion in three patients, and necrosis of the distal urethra in only one patient. More minor complications occurred in 24 (36%) patients. Ten patients who had a small amount of penile skin had the phallic cylinder augmented with a free-skin mesh graft. In three of patients an ileal augmentation was constructed because scarring occurred at the suture line between the penile skin and the augmented graft. Thirty one patients completed a long-term follow-up questionnaire about the functional and psychosocial outcomes of surgery. More than 90% of the patients were satisfied with the cosmetic result and capacity for orgasm; 58% reported having sexual intercourse. The authors concluded that MTF surgery can achieve excellent cosmetic and functional results. It was important to recognise that none of the patients regretted their decision to undergo surgery.

Rehman and Melman (1999[38]) describe 10 patients undergoing GRS who had a neoclitoris fashioned from the glans penis. From 1980 to 1995, 57 MTF gender surgeries were performed at the author’s university. In the last 10 such patients undergoing GRS a neoclitoris was developed. The neoclitoris is placed through a buttonhole in the newly constructed introitus. Minimal bleeding was found from the bundle intraoperatively. Overall in 8 of 10 patients the neoclitoris remained intact

postoperatively with good sensation to touch, vibration and light pressure (e.g. sexual sensation). The cosmetic and functional appearance was that of a normal clitoris, and patients were satisfied. It was noted that two patients were not satisfied with the results because of necrosis of the neoclitoris. The authors concluded that this technique has excellent functional and cosmetic results in the majority of patients. Preservation of the vibratory, tactile and somatic sensation provides better functional outcome of GRS for many patients.

Rubin (1993[39]) reported 13 MTF transsexuals who had undergone a modified technique in which the urethra and glans penis were preserved and the glans transposed to the introitus of the neovagina in order to produce a "pseudoclitoris". Overall, the younger a patient was when they received GRS, the better the result. The authors stated that orchiectomy should be done when the diagnosis of male transsexualism is verified. It was shown that it is possible to preserve glans penis and use it as the pseudoclitoris with preservation of corpus spongiosum urethrae. It was concluded that this new technique provided: equal results to other techniques; more normal anatomical appearance of constructed vulva; and more intense sexual sensation.

Table 7: Summary of main studies investigating the clitoroplasty / neoclitoris techniques

Study	Type	Summary of findings
Fang et al. (1992[34])	Design: Case series Surgical procedure: Clitoroplasty Level of Evidence: III	• Nine MTF primary transsexuals. • All neoclitorides remained intact. • Follow-up of six patients reported sexual satisfaction.
Giraldo et al. (2004[35])	Design: Case series Surgical procedure: Corona glans clitoroplasty Level of Evidence: III	• Authors performed >30 GRS in MTF; 16 had corona glans clitoroplasty. • Discuss the anatomic basis and clinical implications of this technique and consider the cosmetic and potential functional advantages.
Hage and Karim (1996[36])	Design: Case series Surgical procedure: Vaginoplasty and neoclitoroplasty Level of Evidence: III	• Sensate pedicled neoclitoroplasty technique used in 60 MTF transsexuals. • Follow-up: 47/60 able to reach orgasm; 37/59 had intravaginal penetration. • Satisfying cosmetic and functional results in the majority of patients.
Hage et al. (1994[33])	Design: Review Surgical procedure: Vaginoplasty and clitoroplasty Level of Evidence: NA	• Cosmetic considerations demand the creation of a clitoris in vaginoplasty. • Eicher's technique using a free composite graft from tip of glands presents few complications and more acceptable results.
Krege et al. (2001[37])	Design: Case series Surgical procedure: Vaginoplasty and clitoroplasty Level of Evidence: III	• 66 patients underwent GRS. • Complication: major (9/66; 14%), minor (24/66; 36%). • Follow-up: 90% satisfied with cosmetic result and achieve orgasm; 58% have sexual intercourse.
Rehman and Melman (1999[38])	Design: Case series Surgical procedure: Clitoroplasty	• 10 patients had neoclitoris fashioned from the glans penis. • In 8 of 10 patients the neoclitoris remained intact;

	Level of Evidence: III	good sensation to touch, vibration and light pressure (e.g. sexual sensation). • Two patients developed necrosis of the neoclitoris.
Rubin (1993[39])	Design: Case series Surgical procedure: Pseudoclitoris construction and orchiectomy Level of Evidence: III	• Reports 13 MTF transsexuals. • Younger patient at GRS, the better the result. • Orchiectomy should be done when the diagnosis of male transsexualism is verified. • Possible to preserve glans penis and use it as the pseudoclitoris with preservation of corpus spongiosum urethrae. • Technique provided: equal results to other techniques; more normal anatomical appearance of constructed vulva; and more intense sexual sensation.

Note: level of evidence is based on NHS Centre for Reviews and Dissemination group recommendations (2001[18]).

5.4.2 Labiaplasty

This procedure involves the creation or reshaping of the labia. No relevant literature was found concerning the effectiveness of labiaplasty surgery in MTF transsexuals

5.4.3 Orchidectomy

This procedure is also called gonadectomy and is commonly known as castration. A bilateral orchiectomy involves the removal of both testicles. Only one additional study was found concerning the use of orchidectomy techniques for MTF transsexuals. A summary of this study is provided in Table 8. Hage, Karim, and van Diest (2001[40]) reported four MTF transsexual cases that had been spared a testis during vaginoplasty surgery. The consideration of retaining at least one testis relates to testosterone and its metabolite dihydrotestosterone that are the libido hormones for males, vital to sex drive and sexual function. It is recognised that the fear of loss of libido and orgasm is the main reason to retain at least one testis in MTF transsexuals during vaginoplasty. The authors concluded that although there are many reasons for castration, they advise that bilateral orchidectomy be performed in the course of GRS for MTF transsexuals.

Table 8: Summary of main studies investigating the orchidectomy technique

Study	Type	Summary of findings
Hage et al. (2001[40])	Design: Case studies Surgical procedure: Testis sparing and bilateral orchidectomy Level of Evidence: IV	• Four MTF transsexuals. • Recommend that bilateral orchidectomy be performed in the course of GRS for MTF transsexuals.
Rubin (1993[39])	Design: Case series Surgical procedure: Pseudoclitoris construction and orchiectomy Level of Evidence: III	• See earlier summary in Section 5.4.1

Note: level of evidence is based on NHS Centre for Reviews and Dissemination group recommendations (2001[18]).

5.4.4 Penectomy

Penectomy is the complete removal of the penis. Only one study was found which related to the penectomy procedure. Hirsch, Lubetsky, Goldman, Agarwal, and Melman (1993[41]) studied the pathological specimens obtained from 24 impotent men who underwent proximal penile vein ligation and six potent men who underwent total penectomy as part of MTF transsexual surgery to determine if a relationship exists between venous pathology and surgical outcome. The amount of vein wall thickness was quantified for each patient. The follow-up ranged from 7 to 19 months (mean = 11 months). Within 6 months of the procedure 10 patients (41%) achieved rigid erections while 14 (59%) did not. Although no preoperative index could predict operative success, in the 10 patients with successful outcome histological examination of the excised vein segments revealed normal venous architecture with minimal vein wall thickness. In contrast, in the 14 patients who had ligation failed there was reduced vein wall thickness and sclerosis. In contrast, the vein segments found in the six potent patients were considerably thicker, equivalent to the 10 patients with postoperative erections. The authors conclude that there appears to be a correlation between vein wall thickness and the prognosis of patients who undergo venous ligation surgery for erectile dysfunction. A summary of this study is provided in Table 9. Clearly further research is needed to determine the effectiveness of the penectomy techniques in MTF transsexuals.

Table 9: Summary of main studies investigating the penectomy technique

Study	Type	Summary of findings
Hirsch et al. (1993[41])	Design: Case series Surgical procedure: Proximal penile vein ligation and penectomy Level of Evidence: III	• Six MTF transsexuals had total penectomy; 24 had proximal penile vein ligation. • Correlation between vein wall thickness and patients who had venous ligation surgery for erectile dysfunction.

Note: level of evidence is based on NHS Centre for Reviews and Dissemination group recommendations (2001[18]).

5.4.5 Vaginoplasty/Neovagina

A vaginoplasty procedure involves the creation or reshaping of the vagina. The most common vaginoplasty technique performed on MTF transsexuals uses tissue from the existing genitalia to create the vagina; this is frequently referred to in the literature as the penile inversion technique. In some patients a lack of tissue may require additional skin grafts to be taken from the buttocks/hip area. Other patients may have a two-stage procedure which requires labiaplasty surgery to be undertaken on a separate occasion. Alternatively, a more complicated technique uses a segment of the colon (colovaginoplasty). A large amount of relevant literature concerning the effectiveness of the vaginoplasty procedure was found; three reviews, 15 case studies, and 14 case series. In addition there were three papers which were relevant but were not obtained in time for the full details to be reported. A summary of all the studies are provided in Table 10.

Two reviews have been published that concern the effectiveness of the vaginoplasty procedure in MTF transsexuals. The first, was a rapid review by the Alberta Heritage Foundation for Medical Research (1997[42]). The review aimed to identify the criteria for this type of surgery. Harry Benjamin standards of care were considered an appropriate framework. The evidence concerning the effectiveness of vaginoplasty appeared to show that despite a lack of standardised outcome measures, a high proportion of patients benefit from this type of surgery. A second review concerning the sculpturing of the neoclitoris in vaginoplasty for MTF transsexuals was reported by Hage, Karim, Bloem, Suliman, and van Alphen (1994[33,33]). This review was reported earlier in Section 5.4.1.

Blanchard, Clemmensen, and Steiner (1983[43]) investigated the gender reorientation and psychosocial adjustment of MTF transsexuals. They examined 55 MTF transsexuals (mean age 27.9 yrs) in terms of the associations between psychological and social adjustment, and gender reorientation. They investigated three gender reorientation factors: vaginoplasty, exogenous female hormones, and social feminization. These gender reorientation factors plus age were used as predictor variables in multiple regression analyses. Five stepwise regression analyses were conducted, one for each of five criterion factors (involvement with a male partner, tension, depression, the MMPI Lie scale, and cohabitation with a male partner). There was a significant positive correlation between cohabitation with a male partner and vaginoplasty. A significant negative correlation was found between tension and

social feminization, depression and social feminization. The results suggest that gender reorientation is associated with better psychological and social adjustment in MTF transsexuals.

Blanchard, Legault, and Lindsay (1987[44]) discussed the outcomes of vaginoplasty in MTF transsexuals. This paper was not obtained, and the full details can not be provided.

Bodsworth, Price, and Davies (1994[45]) described a case of asymptomatic gonococcal infection of the surgically constructed vagina of a MTF transsexual prostitute. The authors concluded that although the stratified squamous epithelium lining the neovagina is generally resistant to infection with Neisseria gonorrhoeae, this diagnosis should be considered in this population, particularly in transsexual patients working in the sex industry.

Cova, Mosconi, Liguori, Bucci, Trombetta, Belgrano, and Pozzi-Mucelli (2003[46]) investigated the value of magnetic resonance imaging (MRI) in the evaluation of GRS in ten MTF transsexuals. Each patient had undergone GRS with inversion of combined penile and scrotal skin flaps for vaginoplasty. Several parameters were evaluated using MRI: neovaginal inclination in the sagittal plane, neovaginal depth, thickness of the rectovaginal septum, presence of remnants of the corpus spongiosum and corpora cavernosa. The MRI showed that an average neovaginal depth was 7.9 cm (range = 5-10 cm). In four patients, the neovagina had a correct oblique inclination in the sagittal plane, no inclination in five, and an incorrect inclination in one. It was noted that in seven patients, the MRI showed remnants of the corpora cavernosa and/or of the corpus spongiosum. In three patients, no remnants were detected. The mean thickness of the rectovaginal septum was 4 mm (range = 3-6 mm). The authors concluded that MRI provided a detailed assessment of the pelvic anatomy after genital surgery and may help surgeons to adopt the most correct surgical approach.

Frederick and Leach (2004[47]) evaluated the use of abdominal sacral colpopexy for the repair of neovaginal prolapse in MTF transsexuals. The authors state that several procedures have been used to increase the psychosocial well-being and enhance body acceptance of MTF transsexuals: penectomy, bilateral orchiectomy, and penoscrotal flap vaginoplasty. In focussing on the incidence of neovaginal prolapses, less research has been conducted due to it being relatively rare. The paper documents two patients of neovaginal prolapse that were successfully treated with abdominal sacral colpopexy.

Freundt, Toolenaar, Huikeshoven, Jeekel, and Drogendijk (1993[48]) investigated the long-term psychosexual and psychosocial performance of 19 MTF transsexual patients with a sigmoid neovagina. All the patients had undergone surgery to create a neovagina using a sigmoid segment. The studies involved an evaluation of each patient using a standardised gynecologic examination and a structured interview. The anatomic result was good in 18 patients, although a number of reoperative procedures had been required. There was found to be a good or satisfactory sexual adjustment in 12 out of 19 patients. Of the 19 patients, 16 reported that they could achieve an orgasm. The social adjustment was good or satisfactory in 16 patients. The authors concluded that the creation of a sigmoid neovagina resulted in a long-term

anatomically satisfactory situation, in both patients with vaginal dysgenesis and MTF transsexuals. It appears that in the majority of patients sexual and social adjustment is good or satisfactory.

Freundt, Toolenaar, Jeekel, Drogendijk, and Huikeshoven (1994[49]) reported a prolapse of a sigmoid neovagina, created in patients with congenital vaginal aplasia or male transsexualism. The MTF transsexual developed a prolapse three years following surgery to create a sigmoid neovagina. Following suspension of the neovagina to a Cooper ligament, the prolapse recurred. Repeated surgery found the neovagina was successfully suspended to the sacral promontory. It was concluded that prolapse of an artificially created vagina is a rare occurrence. Both abdominal and vaginal approaches might be necessary to restore the neovagina without affecting its function.

Fugate, Apodaca, and Hibbert (2000[50]) presented the case of a 49-year-old, MTF transsexual attending the gynaecology clinic for her annual gynaecological examination. The paper recognises the importance of treating transsexuals like other female gynaecological patients, while care is taken not to overlook underlying or pre-existing medical conditions, including conditions unique to the prior and new genders. The patient had notable surgically constructed female external genitalia and a neovagina. The rectal exam was normal and failed to demonstrate any prostate pathology. The authors concluded that experienced gynaecologist should become familiar with transsexualism, the surgical complications and reconstructive surgery involved.

Hage and Karim (1996[36]) reported the sensate pedicled neoclitoroplasty technique used in 60 MTF transsexuals. It was claimed that the results of vaginoplasty by inversion of penile and scrotal skin in MTF transsexuals is mostly satisfactory. In general, cosmetic and functional considerations determine the construction of a neoclitoris ventral to the urethral orifice. In this paper, the authors describe the long-term results in the first 60 patients using a pedicled sensate neoclitoroplasty technique. The technique used has previously been found to be safe and provides satisfying cosmetic and functional results in the majority of patients.

Hage and Karim (1998[51]) begin by reviewing the use of alterative vaginoplasty techniques when inversion of combined penile and scrotal skin flaps for vaginoplasty in MTF transsexuals has become impossible or unsuccessful in terms of functional results. A colocolpopoiesis involves major surgery and can produce poor long-term outcomes. Alternatively the Abbe-McIndoe vaginoplasty uses split-thickness skin grafts but may not provide positive results in the scarred area in particular after complications of skin flap inversion surgery. Since the thicker skin grafts show fewer tendencies to shrink, the use of a full-thickness skin graft has been promoted for vaginoplasty in females. In this paper, the authors report a technique of successful secondary vaginoplasty which applies full-thickness skin grafts in six MTF transsexuals. It was reported that in those patients with adequate groin and abdominal skin to spare, a miniabdominoplasty allows for acceptable donor site scarring combined with improvement of the abdominal skin surplus. In those patients who have fairly flat-tummies, the conventional abdominoplasty can allow for sufficient skin to be obtained to ensure a positive secondary vaginoplasty. Finally, the authors state that abdominoplastic vaginoplasty might provide a useful alternative when a

laparotomy is not acceptable or should be avoided in secondary circumstances.

Hage, Chami, and Edgerton (1998[52]) documented the conversion procedure of the 'kangaroo pouch' neovagina to a skin inversion vaginoplasty in two MTF transsexuals. The two MTF transsexuals requested correction of the neovaginal axis and genital cosmesis after having undergone a procedure involving the inversion of the penile skin flap inside the scrotum only. The paper reported the technique applied to correct the undesired outcome of this procedure. The authors conclude that the modified kangaroo-pouch neovaginoplasty should not be used with transsexuals. However, it is stated that in cases where the technique has already been applied, the kangaroo pouch may readily be changed to a proper penile skin inversion vaginoplasty.

Hage, Goedkoop, Karim, and Kanhai (2000[53]) investigated the secondary corrections of the vulva in 86 MTF transsexuals. During the period from 1980 to 1998, the authors report 390 MTF transsexuals underwent vaginoplasty by inversion of the penile skin and a triangular perineoscrotal flap. It was acknowledged that minor modifications to the surgical procedure were made during this time, but the basic surgical technique remained the same. In 86 of the 390 patients (22%), secondary corrections of the vulva were considered appropriate. Overall there were 130 corrections performed in these 86 patients. The authors conducted 26 secondary corrective procedures in 19 patients that had received their treatment in a different hospital. Sixty-nine bilateral Z-plasties were performed to centre the labia when the ventral part of the labia majora remained separated by a large margin. Introital widening by five-flap advance merit was used in 40 patients in whom a dorsal skin fold obstructed the introitus. The use of the triangular perineoscrotal flap favours the vaginal and introital width, but its base should be next to the anal ring to stop such a skin fold. Furthermore, secondary construction of the labia minora was conducted in 27 patients, and a skin reduction of the labia majora was performed in 20 patients. It was concluded that there has not been a satisfactory method developed for primary construction of the labia minora. It was also stated that due to the likelihood that the appearance of vulva will change over the first year following surgery, secondary vulvar corrections are not advised during this period.

Hage, Karim, and Bloemena (1996[54]) reported that following vaginoplasty and vulvoplasty in MTF transsexuals, a mass can develop in one of the major labia in a small number of patients. Between the periods of 1989 to 1994, the authors treated seven patients with such masses. The paper discusses a series of case reports to show some of the differential diagnoses of this adverse outcome. The funiculus or even testicular rest in itself also may represent the mass. Intralabial urethral fistula is also another cause for swelling. The authors noted that in an exceptional case a swelling representing a cyst of prostatic origin was observed. It was recognised that in all cases the mass could be removed.

Hage, Karim, and van Diest (2001[40]) reported four MTF transsexual cases that had been spared a testis during vaginoplasty surgery. The consideration of retaining at least one testis relates to testosterone and its metabolite dihydrotestosterone are the libido hormones for the male, vital to sex drive and sexual function. It is recognised that the fear of loss of libido and orgasm is the main reason to retain at least one testis in MTF transsexuals during vaginoplasty. The authors concluded that although there are many reasons for castration, we advise that bilateral orchidectomy be performed

in the course of GRS for MTF transsexuals.

Harder, Erni, and Banic (2002[55]) reported a case of a MTF transsexual who had squamous cell carcinoma of the penile skin in their neovagina 20 years after GRS. The authors question whether it may be assumed that the heterotopic penile skin is at an increased risk of developing HPV-induced squamous cell carcinoma, in particular when there is a history of venereal warts.

Jarrar, Wolff and Weidner (1996[56]) investigated the long-term outcome of GRS in MTF transsexuals. The study focuses on the cosmetic and functional acceptability of the neovagina and on the social and psychological status in 37 MTF transsexuals who had an average post-surgical follow-up of 7.5 years. A total of 169 patients had requested GRS. In 58 cases the diagnosis "transsexualism" was supported by two psychosomatic and psychiatric expert opinions. The authors conducted 52 operations in two stages (average age = 29 years; range = 18-40). The depth of the neovagina was around 12 cm. No complications such as rectal or urethral fistulas were reported. However, one patient developed a vaginal stenosis after a reoperation. Three patients were not satisfied with the depth of their vaginas (6 to 9 cm). It was found that the psychosocial status of patients after surgery was good and continued to improve.

Karim, Hage, and Cuesta (1996[57]) described the rectosigmoid neocolpopoiesis technique and the results of colocolpopoiesis in seven MTF transsexuals. The authors recognise that penile skin inversion is the method of choice for vaginoplasty for many MTF transsexuals. It is reported that rectosigmoid neocolpopoiesis should be considered only when penile skin inversion is no longer possible or has resulted in poor functional results.

Karim, Hage, Bouman, de Ruyter, and van Kesteren (1995[58]) evaluated the changes in pre-, intra-, and post-operative care to prevent possible adverse complications of vaginoplasty surgery in MTF transsexuals. During the period of 1980 to 1992, surgery involving the penile and scrotal skin inversion technique was performed on 200 MTF transsexuals (range = 18 to 71 years). A small number of complications were found in 32 patients, and neovaginal obliteration was encountered only twice. The authors claim that the discontinuation of hormonal treatment could prevent venous thrombosis complications. Preoperative rectal rinse and antibiotics might prevent rectovaginal fistulae. Also it was suggested that a soft and pliable intravaginal tampon may prevent sloughing of the inverted skin. Finally, intermittent daily neovaginal dilatation may successfully ensure neovaginal depth and width. The authors concluded that this was superior to a long-term continuous intravaginal stent.

Kim, Park, Lee, Park, Kim, and Kim (2003[59]) examined the long-term results of patients who had undergone rectosigmoid vaginoplasty. The authors claim that many methods have been developed for vaginoplasty, including the inverted penile skin flap, full-thickness skin graft, and split-thickness skin graft. However, these techniques do not always produce satisfactory outcomes especially in cases of poor lubrication, reconstructed vaginal stenosis, and inadequate vaginal length. The authors report that the sigmoid colon, small intestine, and ascending colon can be used in the intestinal flap method. Alternatively, a loop of rectosigmoid can be isolated, closed at one end, and brought down on its vascular pedicle as a neovagina and then anastomosed to the perineum. The current paper reports on the outcome of

vaginoplasty using the rectosigmoid when performed in 36 patients (28 MTF transsexuals, three with cervical cancer, and five with congenital vaginal atresia). Postoperative results (follow-up = 1 to 10 years) were determined through physical examination and interview about the patient's functional status and satisfaction during sexual intercourse. The study found a mean depth and width of the vaginal cavity of 12.5 cm and 3.9 cm, respectively. Excessive mucosal discharge (8.3%) and malodor (8.3%) was seen in a small number of patients. In terms of sexual intercourse satisfaction, all patients who had partners were able to have sexual intercourse; some used lubricants (2.8%) and dilators before intercourse (5.6%) for more than a year postoperatively. During sexual intercourse, the majority of patients reached orgasm (88.9%). The cosmetic and functional results of rectosigmoid vaginoplasty were also considered to be excellent. Overall the authors claim there are several advantages of rectosigmoid vaginoplasty: (1) rare contraction of the reconstructed vagina, (2) vaginal width and depth maintained without long-term vaginal stent, (3) spontaneous mucus production facilitating sexual intercourse, (4) avoidance of the malodor frequently accompanying skin graft, and (5) texture and appearance similar to that of the natural vagina. This study demonstrated rectosigmoid vaginoplasty appears to be a good choice for transsexual patients who have short vaginal length after cervical cancer surgery, undergone penectomy and orchiectomy, have unfavourable previous vaginoplasty, and those with congenital vaginal atresia.

Krege, Bex, Lummen, and Rubben (2001[37]) discussed the functional and psychosocial long-term follow-up results of 66 patients who had undergone a new techniques which should result in a normal appearing introitus, a vaginoplasty allowing for sexual intercourse, and a sensitive clitoris. The technique attempts to preserve the neurovascular bundle and transforms the glans into a clitoris. The phallic cylinder is used as a vagina and labia is formed from the scrotal folds. The study found that major complications occurred in nine of the 66 patients (14%); these included severe wound infections in six patients, necrosis of the glans in three patients, a rectal lesion in three patients, and necrosis of the distal urethra in only one patient. More minor complications occurred in 24 (36%) patients. Ten patients who had a small amount of penile skin had the phallic cylinder augmented with a free-skin mesh graft. In three of patients an ileal augmentation was constructed because scarring occurred at the suture line between the penile skin and the augmented graft. Thirty-one patients completed a long-term follow-up questionnaire about the functional and psychosocial outcomes of surgery. More than 90% of the patients were satisfied with the cosmetic result and capacity for orgasm; 58% reported having sexual intercourse. The authors concluded that MTF surgery can achieve excellent cosmetic and functional results. It was important to recognise that none of the patients regretted their decision to undergo surgery.

Liguori, Trombetta, Bucci, De Seta, De Santo, Siracusano, and Belgrano (2004[60]) presented a rare case of condylomata acuminata arising from the transplanted skin of a neovagina in a MTF transsexual. The neovagina had been constructed using a penile and a scrotal skin flap. A microscopic examination and DNA hybridization revealed condylomata acuminata due to human papillomavirus type 16, 31, and 33 infection.

Liguori, Trombetta, Bucci, Salame, Bortul, Siracusano, and Belgrano (2005[61]) investigated the laparoscopic mobilization of neovagina to assist secondary ileal

vaginoplasty in MTF transsexuals. The paper describes three cases of successful laparoscopically assisted vaginal reconstruction using an ileal segment in patients with complete neovaginal stenosis. The authors evaluated five MTF transsexual patients who needed laparoscopic-assisted vaginal replacement for complete neovaginal stenosis after GRS. The patients had complete laparoscopic vaginal isolation and mobilization, laparoscopic-assisted vaginal anastomosis and external configuration of the vagina. The authors report that no intraoperative complications occurred, and laparotomy conversion was not required. The average length of the neovagina at the first postoperative consultation was 13 cm. During a mean follow-up of 14 months, all patients reported they were sexually active and completely satisfied with the operation. In conclusion the results provide support for the use of laparoscopic perineal neovagina construction by ileal colpoplasty. The cosmetic, functional, and anatomic results were very positive. The isolated ileal segments gave excellent tissue for vaginal replacement, producing excellent patient satisfaction and reduced morbidity.

Liguori, Trombetta, Buttazzi, and Belgrano (2001[62]) discussed the case of a 39-year-old MTF transsexual who experienced and acute peritonitis due to introital stenosis and perforation of a bowel neovagina. Stenosis of the neovagina is believed to be a late postoperative complication of MTF GRS due to a lack of frequent sexual intercourse or fail to perform vaginal dilation. The authors concluded that an inflatable silicon vaginal stent should be used all day for one month. Furthermore this procedure should be maintained for 3 months overnight or until sexual function becomes frequent.

Loverro, Bettocchi, Battaglia, Cormio, Selvaggi, Di Tonno, and Selvaggi (2002[63]) provided a discussion of the repair of vaginal prolapse following penoscrotal flap vaginoplasty in a MTF transsexual. The authors claim that penis and testicle amputation, vaginoplasty, and clitoroplasty are surgical procedures that can help MTF transsexuals to accept their bodies and can promote psychosocial well-being. The present paper describes a successful correction of prolapse of the neovagina with abdominovaginal sacropexy in a MTF transsexual who had undergone penoscrotal flap vaginoplasty. The vaginal sacropexy was successful, and provided a good functional and cosmetic outcome.

Maas, Eijsbouts, Hage, and Cuesta (1999[64]) discussed the use of a laparoscopic rectosigmoid colpopoiesis in terms of the benefit for transsexual patients. It was claimed that when inversion of the combined penile and scrotal skin flaps for vaginoplasty in MTF transsexuals has not led to good functional results, rectosigmoid colpopoiesis can provide an alternative option to an unclear problem. However, open colocolpopoiesis involves a considerable amount of surgery, and can be associated with extensive scarring of the abdomen, hospitalisation, substantial morbidity, short- and long-term unfavourable results. The paper discusses the application of a laparoscopically assisted approach and a total laparoscopic rectosigmoid colpopoiesis. This procedure has been performed safely. The authors conclude that their patients benefited from this procedure, and advocate a total or partial laparoscopic technique if secondary rectosigmoid colpopoiesis is indicated in MTF transsexuals.

Perovic (1993[65]) provided a discussion of new operative techniques used with MTF transsexuals. This paper was not obtained, and the full details can not be provided.

Perovic, Stanojevic, and Djordjevic (2000[66]) evaluated the results of a one-stage vaginoplasty in MTF transsexuals using penile skin and a urethral flap. The technique reported was based on penile disassembly and all penile components for vaginoplasty. The neovagina consisted of two parts: a pedicled island tube skin flap created from the penile skin, and a long vascularized urethral flap. The tube consists of skin and the urethral flap, is inverted, and forms the neovagina. The urethral flap is embedded into the skin tube. The new vagina is inserted into the perineal cavity between the urethra, rectum and bladder. The neovagina is fixed to the sacrospinous ligament. The labia minora and majora are formed from remaining penile and scrotal skin. The present paper used this new method with 89 patients (mean age = 28 years; range 18-56). The mean follow-up was 4.6 (range = 0.25-6) years. Overall the procedure produced good cosmetic and functional results in 77 of the 89 patients (87%). The neovagina was found to produce satisfactory depth and width in most patients. Only one major complication resulted, a rectovaginal fistula caused by intraoperative injury to the rectum. The authors concluded this technique produces a vagina with more normal anatomical and physiological characteristics than other methods, as all the penile components are used (except for the corpora cavernosa) to form almost normal external female genitalia. Therefore, it appears that vaginoplasty using pedicled penile skin with a urethral flap is an acceptable alternative to other methods of vaginoplasty in MTF GRS.

Stein, Tiefer, and Melman (1990[67]) provided a discussion of the follow-up observations of operated MTF transsexuals. This paper was not obtained, and the full details can not be provided.

Selvaggi, Ceulemans, De Cuypere, VanLanduyt, Blondeel, Hamdi, Bowman, and Monstrey (2005[68]) provided a general overview on the etiolopathogenesis and standards of care of GID. Furthermore, this review provided a useful discussion of use and development of the penile-scrotal skin flap technique for vaginoplasty in MTF transsexuals. It also discusses other techniques (e.g., rectosigmoid flap, local flaps, and isolated grafts) in terms of secondary considerations. The review recognises that as more vaginoplasty techniques are being refined, greater emphasis is being placed on aesthetic outcomes by surgeons and patients. The authors claim that surgical treatment is never perfect and revision surgery is frequently required and almost all patients will require lubrication during sexual intercourse, and pregnancy is not possible.

Toolenaar, Freundt, Huikeshoven, Drogendijk, Jeekel, and Chadha-Ajwani (1993[69]) investigated the occurrence of diversion colitis in MTF patients with a sigmoid neovagina. To investigate the occurrence of diversion colitis in these sigmoid-neovaginas they studied biopsy specimens from 13 patients. Most of the patients complained of discharge and slight blood loss from their sigmoid-neovagina. The microscopic examination of the specimens showed lymphocytic infiltration in all patients. There was also found to be an acute inflammatory infiltrate in the lamina propria in four patients. The authors concluded that diversion colitis can also occur in a sigmoid neovagina.

Trombetta, Liguori, Bucci, Salame, Garaffa, Cova, and Belgrano (2004[70]) investigated the role of magnetic resonance imaging (MRI) in the evaluation of the results of GRS in MTF transsexual patients. Ten patients (median = 28 years; range =

21-47) had undergone GRS using an inversion of combined penile and scrotal skin flaps for vaginoplasty. The patients were examined with MRI after their surgery. MRI was performed within 2 weeks after the operation in six patients and after 1 year in the other four. The average neovaginal depth was 7.9 cm (range 6-10 cm). In four patients, the MRI showed cavernosal rests, and in two there were remnants of the corpus spongiosus. In addition, another patient showed an abnormal anterior inclination of the neovagina. Overall, no major complications were found and the use of MRI provided useful information on possible complications.

Van Engeland, Hage, van Diest, and Karim (2000[71]) reported three patients in whom complicated, long-term problems subsequent to vaginoplasty led to total colpectomy in one case of neovaginal overgrowth of condylomata acuminata, and in two cases of colitis in rectosigmoid transplants used for neovaginoplasties. The cases showed that before inversion of penile skin, in cases in which the genital skin has condylomata, the risk of condylomata overgrowth might be expected. The authors concluded that rectosigmoid vaginoplasty may result in therapy-resistant colitis, which can also lead to colpectomy.

Wedler, Meuli-Simmen, Guggenheim, Schneller-Gustafsson, and Kunzi (2004[72]) reported the use of a laparoscopic technique for secondary vaginoplasty in MTF transsexuals using a modified vascularized pedicled sigmoid. This paper focuses on the laparoscopic technique, its benefits and potential complications. During the period between 1995 and 2002, 53 primary GRS in MTF transsexuals were performed by the authors. The objective of this procedure was to replicate the female external and part of the internal genitalia both aesthetically and functionally. In 11 of the 53 patients, a secondary vaginal lengthening had to be performed due to a short neovagina. This was demonstrated using a pedicled sigmoid segment, with an open approach in two patients and using a laparoscopic method in the remaining nine. Where a primary vaginoplasty combining inversion of the penile and scrotal skin flaps produces unsatisfactory functional results, a secondary vaginoplasty using the pedicled sigmoid represents a suitable method to obtain functional improvement.

Table 10: Summary of main studies investigating the vaginoplasty / neovagina technique

Study	Type	Summary of findings
Alberta Heritage Foundation for Medical Research (1997[42])	Design: Review Surgical procedure: Vaginoplasty Level of Evidence: NA	• Between 77 and 80% of MTF and FTM receive surgical and/or hormonal treatment. • Evidence in favour of the effectiveness of GRS was provided by Mate-Kole, Freschi, and Robin (1990[1]). • Harry Benjamin standards of care (HBSC) represent an appropriate framework, but lack of adherence in some clinics. • Lack of standardized selection criteria and infrequent use of standardized outcome measures raise questions about the validity of many conclusions from follow-up studies. • Most FTM transsexuals request GRS between 20 and 25 years, seldom in middle age, whereas most MTF request GRS between 25 and 30 years and middle aged patients are not rare. • No single model of treatment of transsexualism. • Suitable outcome measure might be subjective satisfaction. • Vaginoplasty is one of a number of approaches to manage gender dysphoria in FTM transsexuals.
Blanchard et al. (1983[43])	Design: Case series Surgical procedure: Vaginoplasty Level of Evidence:	• 55 MTF transsexuals. • Three gender reorientation factors: vaginoplasty, exogenous female hormones, and social feminization. • These factors plus age

	III	were used as predictor variables in multiple regression analyses. • Five stepwise regression analyses were conducted. • Significant positive correlation between cohabitation with a male partner and vaginoplasty. • Significant negative correlation between tension and social feminization, depression and social feminization. • Results suggest that gender reorientation is associated with better psychological and social adjustment in MTF transsexuals.
Blanchard et al. (1987[44])	Design: III Surgical procedure: Vaginoplasty Level of Evidence: Case series	• Vaginoplasty outcomes in MTF transsexuals.
Bodsworth et al. (1994[45])	Design: Case study Surgical procedure: Vaginoplasty Level of Evidence: IV	• Case of asymptomatic gonococcal infection of the surgically constructed vagina of a MTF transsexual prostitute. • Stratified squamous epithelium lining the neovagina is not always resistant to infection with neisseria gonorrhoeae.
Cova et al. (2003[46])	Design: Case series Surgical procedure: Vaginoplasty and MRI Level of Evidence: III	• Investigated value of MRI in the evaluation of sex-reassignment GRS in ten MTF transsexuals. • Each had undergone inversion of combined penile and scrotal skin flaps for vaginoplasty. • The MRI showed that an average neovaginal depth was 7.9 cm (range = 5-10 cm).

		• MRI provided a detailed assessment of pelvic anatomy after GRS.
Frederick and Leach (2004[47])	Design: Case studies Surgical procedure: Abdominal sacral colpopexy for neovaginal prolapse Level of Evidence: IV	• The paper documents two patients of neovaginal prolapse that were successfully treated with abdominal sacral colpopexy.
Freundt et al. (1993[48])	Design: Case series Surgical procedure: Vaginoplasty and sigmoid neovagina Level of Evidence: III	• Long-term outcomes of 19 MTF transsexual patients with sigmoid neovagina. • Evaluation using standardised gynecologic examination and structured interview. • Anatomic result was good in 18 patients. • Good or satisfactory sexual adjustment in 12 out of 19 patients. • 16 reported that they could achieve an organism. • Majority of patients had good or satisfactory sexual and social adjustment.
Freundt et al. (1994[49])	Design: Case study Surgical procedure: Vaginoplasty Level of Evidence: IV	• Reported a prolapse of a sigmoid neovagina, created in patients with congenital vaginal aplasia or male transsexualism. • It was concluded that prolapse of an artificially created vagina is a rare occurrence.
Fugate et al. (2000[50])	Design: Case study Surgical procedure: Vaginoplasty Level of Evidence: IV	• Case of a MTF transsexual attending the gynaecology clinic for annual gynaecological exam. • Gynaecologists should become familiar with transsexualism, the surgical complications and reconstructive surgery involved.
Hage and Karim (1996[36])	Design: Case series	• Vaginoplasty by inversion of penile and scrotal skin

	Surgical procedure: Vaginoplasty and neoclitoroplasty Level of Evidence: III	in MTF transsexuals is generally satisfactory. • Long-term results in 60 patients using pedicled sensate neoclitoroplasty. • Found safe, satisfying cosmetic and functional results.
Hage and Karim (1998[51])	Design: Case studies/expert comment Surgical procedure: Alterative vaginoplasty Level of Evidence: V	• Reviews use of alterative vaginoplasty techniques. • Abdominoplastic vaginoplasty provides a useful alternative when a laparotomy is not acceptable.
Hage et al. (1998[52])	Design: Case studies Surgical procedure: Alterative vaginoplasty Level of Evidence: IV	• Documented the conversion procedure of the 'kangaroo pouch' neovagina to a skin inversion vaginoplasty in two MTF transsexuals. • The authors conclude that the modified kangaroo-pouch neovaginoplasty should not be used with transsexuals.
Hage et al. (2000[53])	Design: Case series Surgical procedure: Vaginoplasty and corrections of vulva Level of Evidence: III	• 390 MTF transsexuals underwent vaginoplasty by inversion of the penile skin and a triangular perineoscrotal flap. • Secondary corrections of the vulva in 86 MTF transsexuals. • 130 corrections performed in these 86 patients. • The use of the triangular perineoscrotal flap favours the vaginal and introital width, but its base should be next to the anal ring to stop such a skin fold • Not been a satisfactory method developed for primary construction of the labia minora.
Hage et al. (1996[54])	Design: Case studies	• Reported that following vaginoplasty and vulvoplasty in MTF

	Surgical procedure: Vaginoplasty and vulvoplasty Level of Evidence: IV	transsexuals, a mass can develop in one of the major labia in a small number of patients.
Hage et al. (2001[40])	Design: Case series Surgical procedure: Vaginoplasty, testis sparing and bilateral orchidectomy Level of Evidence: III	• See earlier summary in Section 5.4.3.
Hage et al. (1994[33])	Design: Review Surgical procedure: Vaginoplasty and clitoroplasty Level of Evidence: NA	• Cosmetic considerations demand the creation of a clitoris in vaginoplasty. • Eicher's technique using a free composite graft from tip of glands presents few complications and more acceptable results.
Harder et al. (2002[55])	Design: Case study Surgical procedure: Neovagina Level of Evidence: IV	• A MTF transsexual who had squamous cell carcinoma of the penile skin in their neovagina 20 years after GRS.
Jarrar et al. (1996[56])	Design: Case series Surgical procedure: Vaginoplasty and neovagina Level of Evidence: III	• 37 MTF transsexuals with post-surgical follow-up of 7.5 years. • 52 operations in two stages (average age = 29 years; range = 18-40). • Depth of the neovagina was around 12 cm. • One patient developed a vaginal stenosis after a reoperation. • Three patients were not satisfied with the depth of their vaginas. • Psychosocial status of patients after surgery was good and improves.
Karim et al. (1996[57])	Design: Case studies	• Describe the rectosigmoid neocolpopoiesis technique

	Surgical procedure: Vaginoplasty and colocolpopoiesis Level of Evidence: IV	and the results of colocolpopoiesis in seven MTF transsexuals. • Rectosigmoid neocolpopoiesis should be considered only when penile skin inversion is no longer possible.
Karim et al. (1995[58])	Design: Case series Surgical procedure: Vaginoplasty and neovagina Level of Evidence: III	• Evaluated changes in pre-, intra-, and postoperative care to prevent possible adverse complications of vaginoplasty surgery in MTF transsexuals. • Sample of 200 MTF transsexuals. • 32 complications • Preoperative rectal rinse and antibiotics might prevent rectovaginal fistulae. • Intermittent daily neovaginal dilatation may successfully ensure neovaginal depth and width; this was superior to a long-term continuous intravaginal stent.
Kim et al. (2003[59])	Design: Case series Surgical procedure: Rectosigmoid vaginoplasty Level of Evidence: III	• Long-term outcome of vaginoplasty using the rectosigmoid when performed in 36 patients • Physical examination and interview about the patient's functional status and satisfaction during sexual intercourse. • Depth and width of the vaginal cavity of 12.5 cm and 3.9 cm, respectively. • All patients who had partners were able to have sexual intercourse. • During sexual intercourse, the majority of patients reached orgasm (88.9%). • Good cosmetic/functional results of rectosigmoid vaginoplasty.
Krege et al. (2001[37])	Design:	• Long-term follow-up

	Case series Surgical procedure: Vaginoplasty Level of Evidence: III	results of 66 patients had • Major complications occurred in nine of the 66 patients (14%). • Minor complications occurred in 24 (36%) patients. • Thirty one patients completed a long-term follow-up questionnaire about the functional and psychosocial outcomes of surgery. • 90% of the patients were satisfied with the cosmetic result and capacity for orgasm • 58% reported having sexual intercourse. • None of the patients regretted their decision to undergo surgery.
Liguori et al. (2004[60])	Design: Case study Surgical procedure: Vaginoplasty Level of Evidence: IV	• Case of condylomata acuminata from transplanted skin of neovagina. • Neovagina constructed using a penile and a scrotal skin flap.
Liguori et al. (2005[61])	Design: Case studies Surgical procedure: Vaginoplasty and neovaginal stenosis. Level of Evidence: IV	• Five MTF transsexual patients who needed laparoscopic-assisted vaginal replacement for complete neovaginal stenosis after GRS. • No complications. • Average length of neovagina at postoperative consultation was 13 cm. • Follow-up: all patients reported being sexually active completely satisfied with results.
Liguori et al. (2001[62])	Design: Case study Surgical procedure: Bowel neovagina and vaginal stents	• Case of a 39-year-old MTF transsexual who experienced and acute peritonitis due to introital stenosis and perforation of a bowel neovagina.

	Level of Evidence: IV	• An inflatable silicon vaginal stent should be used all day for one month and maintained for 3 months overnight.
Loverro et al. (2002[63])	Design: Case study Surgical procedure: Penoscrotal flap vaginoplasty Level of Evidence: IV	• Describes a successful correction of prolapse of the neovagina with abdominovaginal sacropexy in a MTF transsexual who had undergone penoscrotal flap vaginoplasty. • Vaginal sacropexy was successful, and provided a good functional and cosmetic outcome.
Maas et al. (1999[64])	Design: Case studies/expert opinion Surgical procedure: Laparoscopic rectosigmoid colpopoiesis and vaginoplasty Level of Evidence: V	• Rectosigmoid colpopoiesis has been performed safely. • Patients can benefit from this procedure, and advocate a total or partial laparoscopic technique if secondary rectosigmoid colpopoiesis is indicated in MTF transsexuals.
Perovic (1993[65])	Design: Case series Surgical procedure: Vaginoplasty Level of Evidence: III	• Discussion of new operative techniques used with MTF transsexuals.
Perovic et al. (2000[66])	Design: Case series Surgical procedure: Vaginoplasty Level of Evidence: III	• Evaluated results of a one-stage vaginoplasty in MTF transsexuals using penile skin and urethral flap. • 89 patients; mean follow-up was 4.6. • Good cosmetic and functional results in 77 of the 89 patients (87%). • The neovagina was found to produce satisfactory depth and width in most patients. • One major complication. • Vaginoplasty using pedicled penile skin with a

		urethral flap is an acceptable alternative to other methods of vaginoplasty.
Selvaggi et al. (2005[68])	Design: Review Surgical procedure: Vaginoplasty Level of Evidence: NA	• Described recent etiological pathogenetic theories and actual guidelines on the treatment of GID in MTF transsexuals with focus on vaginoplasty procedures.
Stein et al. (1990[67])	Design: Case series Surgical procedure: Vaginoplasty Level of Evidence: III	• Provided a discussion of the follow-up observations of operated MTF transsexuals.
Toolenaar et al. (1993[69])	Design: Case series Surgical procedure: Vaginoplasty and sigmoid neovagina Level of Evidence: III	• Occurrence of diversion colitis in MTF patients with a sigmoid neovagina. • Studied biopsy specimens from 13 patients. • Microscopic examination of the specimens showed lymphocytic infiltration in all patients. • Diversion colitis can occur in a sigmoid neovagina.
Trombetta et al. (2004[70])	Design: Case series Surgical procedure: Vaginoplasty and MRI Level of Evidence: III	• Discuss role of magnetic resonance imaging (MRI) in the evaluation of the results of GRS in MTF transsexual patients. • Ten patients had an inversion of combined penile and scrotal skin flaps for vaginoplasty. • Patients examined with MRI after their surgery. • Average neovaginal depth was 7.9 cm. • No major complications. • MRI was useful to determine complications.
Van Engeland et al. (2000[71])	Design: Case studies	• Three patients had long-term problems subsequent to vaginoplasty.

	Surgical procedure: Vaginoplasty and colpectomy Level of Evidence: IV	• Rectosigmoid vaginoplasty can result in therapy-resistant colitis, resulting in colpectomy.
Wedler et al. (2004[72])	Design: Case series Surgical procedure: Vaginoplasty Level of Evidence: III	• Laparoscopic technique for secondary vaginoplasty in MTF transsexuals using a modified vascularized pedicled sigmoid. • In 11 of the 53 patients, a secondary vaginal lengthening performed due to a short neovagina. • A secondary vaginoplasty using the pedicled sigmoid represents a suitable method to obtain functional improvement.

Note: level of evidence is based on NHS Centre for Reviews and Dissemination group recommendations (2001[18]).

5.4.6 Conclusions

This section has provided evidence concerning the effectiveness of a variety of surgical procedures used for MTF transsexuals. A total of 42 published papers were evaluated (15 case studies, 21 case series, 3 reviews, 3 unknown). The level of evidence ranged between III and V (see NHS Centre for Reviews and Dissemination group recommendations, 2001[18]). There was a clear lack of randomised controlled evidence or studies which included a control group comparison. There was no evidence found concerning the effectiveness of labiaplasty, and only one study concerning penectomy and one study concerning orchidectomy procedures. A large amount of evidence is available reporting vaginoplasty and clitoroplasty procedures. Some complications have been reported. All the studies report, to various degrees, satisfactory outcomes in terms of being able to have penetrative sexual intercourse and achieving sexual fulfilment.

5.5 Review of core surgical procedures for FTM transsexuals

This section reviews each of the core surgical procedures outlined for FTM transsexuals.

5.5.1 Hysterectomy

This procedure involved the surgical removal of the uterus. A total hysterectomy is the removal of the entire uterus and the cervix. Three studies were found concerning the use of hysterectomy techniques for FTM transsexuals. These involved one case series, one case study and one study was not obtained. A summary of these studies are provided in Table 11.

Chapin (1993[73]) examined the laparoscopically assisted vaginal hysterectomy in FTM transsexuals. This paper was not obtained, and the full details can not be provided.

Ergeneli, Hakan, Ozcan, and Erdogan (1999[74]) reported the use of vaginectomy and laparoscopically assisted vaginal hysterectomy as adjunctive surgery for FTM transsexual GRS. This study examines the experience with this type of surgery at Baskent University Hospital, Ankara, Turkey, from the gynaecologists' perspective. Eight patients underwent laparoscopically assisted vaginal hysterectomy, bilateral salpingo-oophorectomy and total vaginectomy, followed by phallic construction. Patients were followed up for 9 to 30 months post-surgery. It was found that the average operative time for total vaginectomy and laparoscopically assisted vaginal hysterectomy and bilateral salpingo-oophorectomy was 2 hours and 20 minutes. The estimated average blood loss was 250 ml. Other than one bladder perforation, which was repaired immediately and healed uneventfully, no other operative or postoperative complications linked to the gynaecologic surgery were found. It was concluded that laparoscopy seems to be useful in FTM transsexual GRS in allowing the preservation of structures vital for phallic construction, such as inferior epigastric vessels and the rectus abdominis muscle. However, the authors acknowledge that the application of vaginectomy requires further long-term follow-up studies of transsexuals who have undergone colpocleisis.

Hage, Dekker, Karim, Verheijen, and Bloemena (2000[75]) reported two cases of ovarian cancer in FTM transsexuals. The authors suggest the long-term exposure to increased levels of endogenous and exogenous androgens is hypothesized to constitute an additional risk factor in transsexuals as it has been associated with ovarian epithelian cancer. It was suggested that simultaneous salpingo-oophorectomy should be performed in FTM transsexuals undergoing hysterectomy as part of the course of gender-confirming therapy.

Table 11: Summary of main studies investigating the hysterectomy technique

Study	Type	Summary of findings
Chapin (1993[73])	Design: ? Surgical procedure: Vaginal hysterectomy Level of Evidence: ?	• Laparoscopically assisted vaginal hysterectomy in FTM transsexuals.
Ergeneli et al. (1999[74])	Design: Case series Surgical procedure: Vaginal hysterectomy, bilateral salpingo-oophorectomy, vaginectomy, and phallic construction. Level of Evidence: III	• Eight patients followed up for 9 to 30 months post-surgery. • Only one complication. • Laparoscopy seems to be useful in FTM transsexual surgery in allowing the preservation of structures vital for phallic construction, such as inferior epigastric vessels and the rectus abdominis muscle. • Need long-term follow-up studies of transsexuals who have undergone colpocleisis.
Hage et al. (2000[75])	Design: Case study Surgical procedure: Hysterectomy, and salpingo-oophorectomy Level of Evidence: IV	• Two cases of ovarian cancer in FTM transsexuals. • Simultaneous salpingo-oophorectomy should be performed in FTM transsexuals undergoing hysterectomy as part of the course of gender-confirming therapy.

? This paper was not obtained, and the full details can not be provided.

5.5.2 Mastectomy

The mastectomy procedure involves the surgical removal of the entire breast(s). Three studies were found which discussed the use of this procedure with FTM transsexuals. One was a case study and the remaining two were case series. A summary of these studies are provided in Table 12.

Burcombe, Makris, Pittam, and Finer (2003[76]) provided a case study of a FTM transsexual who developed breast cancer 10 years after cosmetic bilateral subcutaneous mastectomy and nipple reimplantation. The authors discuss the complex hormonal pathways involved and the implications for women undergoing prophylactic mastectomy because of a high risk of familial breast cancer.

Colic and Colic (2000[77]) provided details of breast reduction or amputation in FTM surgery. Over a 2-year period, 17 patients (12 FTM & 5 extreme gynecomastias) had surgery using a circumareolar approach for subcutaneous mastectomy. The procedure involves the nipple-areola complex being left on a very wide deepithelialized dermal pedicle, and the ultimate closure of the wound is performed using a round-block technique followed by numerous fine sutures to limit wrinkling. The technique appears to result in naturally flat masculine breasts, leaving sufficient dermal vascularization for the nipple-areola complex which is of the considerable importance to many patients. Overall, the authors report that all the patients were very satisfied with the result especially because reduction in scarring. It should be noted that two areolar necroses occurred due to perforation of the thin vascular dermal pedicle.

Hage and Bloem (1995[78]) reported the results of chest wall contouring for FTM transsexuals in order to achieve a male chest configuration. At the Academic Hospital of the Free University (Amsterdam, The Netherlands), one of three techniques is used for a subcutaneous mastectomy. The present paper discusses the experiences with 70 patients operated on before April 1993. For breasts with minimal to moderate skin redundancy, a concentric periareolar de-epithelialization technique, in combination with a subcutaneous mastectomy by a transareolar approach, is frequently used. For larger breasts this method is extended by skin excision laterally and medially to the nipple-areolar complex. In some circumstances it is necessary to use a free transplantation of the nipple-areolar complex graft in combination with fusiform skin excisions, resulting in a scar passing under the grafted areola.

Table 12: Summary of main studies investigating the mastectomy technique

Study	Type	Summary of findings
Burcombe et al. (2003[76])	Design: Case study Surgical procedure: Mastectomy and nipple reimplantation Level of Evidence: IV	• FTM transsexual who developed breast cancer 10 years after cosmetic bilateral subcutaneous mastectomy and nipple reimplantation.
Colic and Colic (2000[77])	Design: Case series Surgical procedure: Breast reduction Level of Evidence: III	• Breast reduction or amputation in FTM surgery. • 17 patients (12 FTM and 5 extreme gynecomastias) had circumareolar subcutaneous mastectomy. • All were very satisfied with result especially reduction in scarring. • Two areolar necroses occurred due to perforation of the thin vascular dermal pedicle.
Hage and Bloem (1995[78])	Design: Case series Surgical procedure: Subcutaneous mastectomy and Chest wall contouring Level of Evidence: III	• FTM transsexuals aiming to achieve a male chest configuration. • 70 patients operated on before April 1993. • Discuss use of different procedures depending on size of breast.

5.5.3 Metaidoioplasty or Metoidioplasty

A metaidoioplasty procedure uses the clitoris, overdeveloped by hormonal treatment, to construct a microphallus. Only one study was found which provided evidence concerning the effectiveness of the metaidoioplasty. A summary of this study is provided in Table 13. Hage (1996[79]) evaluated an alternative procedure to the phalloplasty technique in FTM transsexuals. The various techniques for phalloplasty in FTM transsexuals produce extensive scarring of the donor area. Metaidoioplasty does not leave any scars outside the genital area. The present report documents the findings from 32 FTM transsexuals. The author concluded that metaidoioplasty results in a very small phallus which in most patients is not capable of sexual penetration. Despite this, it is considered to be an appropriate method where the clitoris seems large enough to provide a phallus and satisfies the patient.

Table 13: Summary of main studies investigating the metaidoioplasty technique

Study	Type	Summary of findings
Hage (1996[79])	Design: Case series Surgical procedure: Vaginal hysterectomy Level of Evidence: III	• 32 FTM transsexuals. • Metaidoioplasty results in a very small phallus which in most patients is not capable of sexual penetration. • Used when clitoris is large enough to provide a phallus and can satisfy patient.

5.5.4 Phalloplasty

This technically demanding surgical procedure involves the construction of a penis in FTM transsexuals. The large number of references reporting the use of various phalloplasty techniques have been summarised in this section. The Alberta Heritage Foundation for Medical Research (1996[80]) provided the only review of phalloplasty in FTM transsexuals. There appears to be limited data on outcome measures, including social integration, patient satisfaction and physiological function. Phalloplasty appears to be a highly specialised procedure, requiring surgical expertise, counselling, careful patient selection, and follow-up. A total of 24 studies concerning the effectiveness of the phalloplasty were reported; 1 cohort study, 13 case series and 10 case studies**.** A summary of these studies are provided in Table 14.

A series of case studies and case series have been reported concerning phalloplasty and penile construction. Akoz and Kargi (2002[81]) investigated the use of phalloplasty in a 21-year-old FTM transsexual using a double-pedicle composite groin flap technique. The procedure used both deep and superficial circumflex iliac vessels in the pedicle to provide greater-vascularized extended skin and bone in the flap. Two stages were used to prefabricate a neourethra before transfer of the flap. The reconstruction of the penis in an appropriate size and stiffness without vascular compromise was successfully obtained. Overall, it was concluded that good operative results were produced.

Barrett (1998[82]) investigated the psychological and social function before and after phalloplasty in 23 FTM transsexuals accepted for phalloplasty compared to 40 who had undergone surgery. The Bem Sex Role Inventory and Social Role Performance Schedule (SRPS), General Health Questionnaire (GHQ), and Symptom Checklist 90 (SCL-90), were used. In addition, a questionnaire investigating the satisfaction with cosmetic appearance, relationship, urinary function, sexual function and practice was used. Finally, a semi-structured interview documenting the amount of alcohol, cigarette and drug was given. Overall, significant differences were found between the populations. Higher depression ratings on the GHQ were found in the post-operative compared to pre-operative group. There was increased satisfaction with genital appearance post-operatively. There was less satisfaction with relationships but this was non-significant. The authors report that transsexuals accepted for phalloplasty had very good psychological health. There is a likely further improvement after

phalloplasty. Depression was frequently found among transsexuals, and this might relate to the quality of relationships.

Bettocchi, Ralph, and Pryor (2005[83]) described a novel pedicled pubic phalloplasty procedure for FTM gender dysphoria patients to study the results and complications. The study involved 85 FTM transsexual patients who had undergone phalloplasty using the suprapubic abdominal wall flap that was tubed to form the phallus, and which incorporated the neourethra made from a pedicled tube of labial skin. The complete neourethral reconstruction was in one stage in 32 patients and in two stages in 48; five patients did not wish to have the neourethra fashioned. The cosmetic appearance of the phallus was considered good in 68% of the patients. The major complications (in 60 patients) were related to the neourethra (75%) with stricture formation (64%), and/or fistulae (55%) predominating. This complication rate was significantly reduced when the neourethra was created in two stages ($p < 0.001$). Sexual intercourse was possible with no prosthesis in 16 patients. It was concluded that the pubic phalloplasty provides an acceptable neophallus without disfiguring the donor skin site. The main complications appeared to result from creating the neourethra, but these might be reduced by the two-stage procedure.

Cavadas and Landin (2005[84]) reported a case of a FTM transsexual with recalcitrant urethral stricture after microvascular phalloplasty. The authors evaluated the treatment of urethral stricture with a tubulized flap from the labia minora. Urethral strictures can be found after microvascular phalloplasty in FTM transsexuals, and commonly appear secondary to vascular complications or technical problems. The patient had one unsuccessful attempt at direct repair and a failed grafting procedure. However, a tubulized island flap from the remnants of the labia minora was successfully used to reconstruct the urethral stenosis.

Chivers and Bailey (2000[85]) investigated the sexual orientation of FTM transsexuals by comparing homosexual and non-homosexual types. It was found that compared to non-homosexual FTMs, homosexual FTMs reported greater desire for phalloplasty, greater childhood gender nonconformity, were more sexually assertive, experienced greater sexual rather than emotional jealousy, preferred more feminine partners, had more sexual partners, and had a greater interest in visual sexual stimuli. Homosexual and nonhomosexual FTMs did not differ in their overall desire for adult gender identity, masculinizing body modifications, or importance of attractiveness, partner social status, or youth. The study shows that FTMs are a heterogeneous group and have varying opinion on their preference for genital surgery.

Fang, Kao, Ma, and Lin (1998[86]) evaluated the experiences of FTM transsexuals following glans sculpting procedures during phalloplasty. It has been documented that an aesthetically appealing neophallus with urethral meatus at its tip is an important goal of phalloplasty in FTM transsexuals. The authors documented 20 cases of FTM transsexuals who had received sculpting of glans in four different ways. These patients were photographed and then scored by independent surgical and non-surgical assessors. It was found that the Norfolk procedure created a more normal neoglans assessed by patients themselves and by the assessors. The split-thickness skin graft was considered to produce a more normal-looking coronal sulcus than the full-thickness skin graft used in the Norfolk procedure.

Fisch, Wammack, Ahlers, Sennerich, Muller, and Hohenfellner (1993[87]) evaluated the osseous fixation of a penile prosthesis after transsexual phalloplasty in a single patient who had undergone FTM GRS and subsequent phalloplasty by means of a free latissimus dorsi muscle graft with pudendal nerve coaptation 10 years ago. The study evaluated whether the primary implantation of a penile prosthesis during one-stage surgical phalloplasty was more beneficial in comparison to a secondary implantation. The authors concluded that phalloplasty should involve a one-stage surgical procedure in the development of a neourethra, restoration of tactile and erogenous sensibility, and implantation of a penile prosthesis. It was considered that this procedure may have greater aesthetic value.

Gilbert, Horton, Terzis, Devine, Winslow, and Devine (1987[88]) reported the findings of total phallic reconstructions in 12 patients over the past four years. Six patients underwent reconstruction following trauma, three were FTM transsexuals, and three had micropenis deformities. The reconstructions used a one-stage microsurgical tissue transfer procedure that included urethral reconstruction and coaptation of erogenous nerves.

Hage (1997[89]) examined five cases of dynaflex prosthesis in total phalloplasty. It is reported that voiding while standing is a priority for most FTM transsexuals, and hence the reluctance by many surgeons to implant a rigid prosthesis in total phalloplasty. However, promising results have been found with self-contained Dynaflex hydraulic penile implants. The author suggests implantation as a secondary procedure after the neophallus has gained sensitivity. The penile prosthesis should be covered by Dacron prosthesis to ensure optimal encapsulation and collagen growth. As the neophallus girth can not accommodate two prostheses, and because properly serviceable crus penis is lacking in FTM transsexuals, the author suggests fixation of the one cylinder to the pubic symphysis. For insertion, the neoscrotal approach appears to be more successful. The author maintains that combining neourethra and rigidity prosthesis in one neophallus remains difficult.

Hage and Winters (1996[90]) reported a case study of a 32-year-old FTM transsexual who had a radial forearm-flap sensate free-flap phalloplasty. The salvage of a 'free flap' phalloplasty by distal arteriovenous fistula was used. An arteriovenous loop was created by end-to-side anastomosis of the left greater saphenous vein to the femoral artery at the level of the femoral triangle. On the first day following surgery, the neophallus showed signs of impaired circulation, and a recent thrombus was removed from the venous pedicle. A distal fistula between the radial artery and a superficial vein was created. Due to the long-term adverse problems of arteriovenous fistulas, the authors do not consider this method to be routinely used, but in cases where vascular patency of the venous graft is not adequate, an adjunctive arteriovenous fistula created distally may salvage the flap.

Hage, Bouman, and Bloem (1993[91]) examined the preconstruction of the pars pendulans urethrae for phalloplasty in FTM transsexuals. It was reported that a major goal of phallic construction in FTM transsexuals is the creation of a competent neourethra that allows patients to void while standing. In patients in whom the authors applied a microsurgical free-flap techniques for phalloplasty, the pars pendulans was usually created the Chinese way (n = 8). However, if the pedicled abdominal or inguinal skin flaps was used, a skin-lined urethral tube to be

incorporated in the phallus should already exist in the donor area of the flap (n = 25). The authors reported that from 1971-1991, such a preconstruction of the pars pendulans urethrae has been used in 25 FTM transsexuals with the Snyder's technique. This has been successful in all but uneventful in 17 patients. If voiding while standing is the main goal of surgery this procedure seems to be the most appropriate.

Hage, Bouman, and Bloem (1993[92]) examined the construction of the fixed part of the neourethra in 53 patients FTM transsexuals. An important consideration for many FTM transsexuals is the creation of a competent neourethra to allow the transsexual to void while standing. The authors report that the construction of the fixed part of the urethra up to the level of the clitoris was completed using an anterior vaginal flap in 46 patients. Serious complications such as vesicovaginal and urethrovaginal fistulas and urinary incontinence were encountered. Subsequently, the risks have been reduced. Formation of urethrocutaneous fistula at the level of the female external urethral orifice can be prevented using this flap. The issue of neourethral urine residue has still to be resolved.

Hage, Bouman, de Graaf, and Bloem (1993[93]) reported on the construction of the neophallus in FTM transsexuals. There was 31 phalloplasties performed in 28 patients. The operative techniques and results of the use of the superficial inferior epigastric pedicled skin flap, rectus abdominis myocutaneous pedicled flap and radial forearm free flap for phalloplasty were reported. They found that in terms of functional and cosmetic outcomes, the microsurgical free flap phalloplasty techniques lead to the best results. In the patients with free flap phalloplasty, tactile sensitivity recurred in the neophallus. The authors consider the use of an infraumbilical flap to be a technique with fewer indications, but they state the technique should not be used with obese patients. The rectus abdominis myocutaneous pedicled flap procedure was considered a reliable technique. They furthermore stated that the primary connection of the pars pendulans urethrae and pars fixa often leads to formation of fistulas at the level of the anastomosis. Overall, this study showed that genital GRS in FTM transsexuals is unlikely to be achieved in one stage of treatment and this should be made emphasised before any surgery is conducted.

Hage, Bout, Bloem, and Megens (1993[94]) documented the requests by patients undergoing phalloplasty in FTM transsexuals. To obtain patient opinions a questionnaire was sent to 200 patients of whom 150 returned their questionnaires. It was reported that of the 79 patients (52%) who seek phalloplasty the following requests were made as to their external genitalia: a scrotum (96%), a glans (92%), rigidity (86%), and an aesthetically appealing look either while wearing a tight swim suit (91%), or being nude (81%). All except one patient wanted to be able to void in a standing position. In addition minimal disfigurement and no functional loss in the donor area were two other goals of phalloplasty.

Hage, de Graaf, Van den, and Bloem (1993[95]) reported on a phallic construction in a FTM transsexual using a lateral upper arm sensate free flap and a bladder mucosa graft. Meatal stenosis, postoperative bladder spasms, and an intraurethral valve were encountered. The cosmetic result of the phalloplasty was shown to be satisfactory, however scarring of the upper arm donor site required camouflage. The reported findings show the actual phalloplasty described was a one-stage microsurgical

procedure, but the construction of a phallus which meets all the patients' requirements still requires more than one stage.

Jarolim (2000[96]) described the techniques and outcomes of genital and urethral reconstructive surgery during gender conversion as part of the treatment of transsexuals. From 1992 to 1999, 82 patients were surgically converted after previous sexual and hormonal therapy. For MTF transsexuals, the technique of penile skin inversion was used 29 times and sigmoidocolpoplasty five times. In FTM transsexuals, 28 meta-idoioplasties and seven neophalloplasties were performed using the groin skin-flap technique, with 42 breast reductions were conducted. For the FTM patients depending on the technique used in the reverse conversion, the patient maintained the ability to attain orgasm, and in many cases had a satisfactory appearance of the neopenis, with the potential to void while standing. The authors concluded that the morphological proportions of each patient vary considerably and result in individually different physical outcomes.

Khouri, Young, Casoli, and Jage (1998[97]) presented a 5-year follow-up of patients who underwent total penile reconstruction with a prefabricated lateral arm free flap technique. The authors treated three FTM transsexuals and a man with penile amputation with a two-stage technique of total penile reconstruction. During the first stage of treatment the neourethra is constructed as a tubed skin graft incorporated in the territory of the lateral arm flap. In the period between three and six months after initial surgery the lateral arm flap is transformed into a penis structure, and an inflatable prosthesis is incorporated and the construction is transferred to the pubis with vascular, urethral and nerve repairs. In addition to the two surgical procedures required to construct the penis, the patients required an average of three revisions. There were no postoperative complications after the first year. All four patients were able to void in the standing position and did not have any free of fistulas or strictures. The inflatable prosthesis allowed them to perform penetration during sexual intercourse and all reconstructed penises had erogenous and tactile sensibility. There was found to be a high patient satisfaction with the reconstructed penis. It was concluded that in using the prefabricated lateral arm free flap technique it appears possible to achieve a fully functional penis with stable long-term results and excellent patient satisfaction.

Lief and Hubschman (1993[98]) examined 14 MTF and nine FTM postoperative transsexuals. The relationship of orgasm to sexual and general satisfaction was investigated with a questionnaire. Orgastic ability was reduced in the MTF group and increased in the FTM group. Although there was a decline in orgasms in the MTF group, satisfaction with sexual activity and the results of surgery were high in both groups. The overall satisfaction with surgery was 86%. The frequency of sexual activity increased in both groups. It was noted that a phalloplasty was not a critical factor in orgasm or in sexual satisfaction. It was concluded that it is possible to change one's body image and sexual identity and be sexually satisfied despite inadequate sexual functioning.

Noordanus and Hage (1993[99]) reports on a 28-year-old FTM transsexual who after three weeks surgery involving radial forearm free flap phalloplasty, presented with ischaemia of the neophallus. A salvage procedure commenced seven hours after the onset of ischemia. Thrombectomy of the arterial pedicle did not provide venous

return of the arterial inflow. Perfusion of the flap with streptokinase appeared to restore venous return. Six months after this salvage procedure, the surgery appears to have been successful and tactile sensibility has returned.

Rachlin (1999[100]) investigated the factors which influence a transsexuals decision when considering FTM genital reconstructive surgery. Twenty seven patients (21-50 years) were given a questionnaire which explored demographics and surgical decision-making. The most important sources influencing their decision were contact with other FTMs and information from within the FTM community. Lack of money and inadequate medical technology presented most difficulties when implementing their choice. The results indicate the considerable influence of peer support services and community. The findings also challenge the expectation that FTMs will request phalloplasty.

Rohrmann and Jakse (2003[101]) reported the continued importance of the construction of a neourethra to achieve the goal of voiding while standing. However urethral fistula and stricture formation occur in a significant percentage of patients. The study described 25 patients with primary female transsexualism that underwent phalloplasty with a free radial forearm flap, vaginectomy and urethroplasty in a one-stage procedure. In nine patients flaps of the labia minora (five patients) or the 'urethral plate' (four patients) were used. In 16 of patients the fixed part of the neourethra ('bulbar urethra') was constructed from a vaginal flap. In 14 (58%) patients the fistulas and/or strictures occurred in the newly constructed urethra. In 11 (69%) of 16 patients, in whom the 'bulbar urethra' was constructed from a vaginal flap, fistulas and/or stricture formation occurred. Furthermore, it was found that fistulas and/or strictures occurred in three of five patients with labia minora flaps and none of the four patients with the urethral plate procedure. Repair of fistula and strictures was performed by primary closure of fistulas, staged urethroplasty with local pedicle flaps or distant tissue grafts using buccal mucosa. It was concluded that one-stage total phalloplasty and urethroplasty was associated with a significant rate of fistulas and strictures, but it was noted that these complications can be corrected by the techniques used in modern urethral surgery.

Santanelli and Scuderi (2000[102]) documented the use of neophalloplasty in FTM transsexuals with the island tensor fasciae latae flap procedure. The authors reported that in recent years there have been significant improvements in free tissue transfer and microvascular technique. There appear to have been many free flap procedures developed with the goal of an aesthetically acceptable neophallus of adequate bulk that enables urination in a standing position and sexual intercourse, with minimal functional and aesthetic donor-site defects. The most suitable method of choice for penile reconstruction appears to be microsurgical free tissue transfer, although it does not always provide all patient goals. In fact, complete urethroplasty, penile rigidity, and donor-site disfigurement remain challenges, thus making this operation a difficult in plastic procedure. The use a long tensor fasciae latae neurovascular island flap as a donor source for neophalloplasty has been of significant interest. The authors report that since 1991, they have performed five neophalloplasties using this procedure with FTM transsexuals. The healing was uneventful in four cases and there was a marginal necrosis of the flap because of poor venous drainage in one patient. The island tensor fasciae latae appears to provide a safe and sensate flap for phalloplastic procedure and results in a less visible donor scar.

Santi, Adami, Berrino, Galli, Muggianu, and Vesely (1992[103]) evaluated the use of neophalloplasty when undertaken with a rectus abdominis muscle flap and a radial forearm free flap. The study provides a description of a method for constructing a neopenis in FTM transsexual patients consisted of inferior transposition of a rectus abdominis island muscle flap with resurfacing using a radial forearm free flap. The authors report that excellent internal support and a natural looking appearance can be achieved. This method was considered to be more effective than any other previously used for neophalloplasty.

Zielinski (1999[104]) reported a one-stage procedure for neophallus construction using a lateral groin flap in FTM transsexuals. Between 1991 and 1997, a total of 127 FTM transsexuals underwent surgery in the Department of Plastic Surgery of the Medical University of Lodz using the lateral groin flap method. There were good results reported in 96 patients (75.6%). However, necrosis of the distal part of the flap or other adverse complications occurred in 20 patients (20.5%). In five patients the flap was completely lost. The authors also noted that phalloplasty in combination with urethra was undertaken in five FTM transsexuals. In addition it was noted that in 47 patients the constructed penis was stiffened with the use of three types of prostheses.

Table 14: Summary of main studies investigating the phalloplasty technique

Study	Type	Summary of findings
Akoz and Kargi (2002[81])	Design: Case study Surgical procedure: Phalloplasty Level of Evidence: IV	• Phalloplasty in 21-year-old FTM transsexual using double-pedicle composite groin flap technique. • Good operative results were produced.
Alberta Heritage Foundation for Medical Research (1996[80])	Design: Review Surgical procedure: Phalloplasty Level of Evidence: NA	• Preoperative factors indicating a favourable outcome include: preoperative application of psychotherapy; successful adaptation in the desired role for at least one year convincing physical appearance and behaviour; reasonable degree of mental and emotional stability shown in life history with no psychosis; sufficient understanding of the limitations and consequences of surgery (Green & Fleming, 1990[105]). • Being able to void in the standing position was the most important goal made by patients undergoing phalloplasty (see Hage, Bout, Bloem, & Megens, 1993[94]). • Lack of control groups, standardized outcome instruments, and rating criteria question conclusions of many follow-up studies.
Barrett (1998[82])	Design: Cohort Study Surgical procedure: Phalloplasty Level of Evidence: III	• 23 FTM transsexuals accepted for phalloplasty compared to 40 who had undergone surgery. • Overall, significant differences were found between the populations. • Higher depression ratings on the GHQ were found in

		the post-operative group. • Increased satisfaction with genital appearance post-operatively. • Less satisfaction with relationships but this was non-significant.
Bettocchi et al. (2005[83])	Design: Case series Surgical procedure: Phalloplasty Level of Evidence: III	• 85 FTM transsexuals who had phalloplasty. • Cosmetic appearance of phallus was good in 68%. • Major complications in 60 patients. • Complication rate was significantly reduced when the neourethra was created in two stages ($p < 0.001$).
Cavadas and Landin (2005[84])	Design: Case study Surgical procedure: Microvascular phalloplasty Level of Evidence: IV	• FTM transsexual with recalcitrant urethral stricture. • Tubulized island flap from remnants of labia minora successfully reconstructed urethral stenosis.
Chivers and Bailey (2000[85])	Design: Case series Surgical procedure: Phalloplasty Level of Evidence: III	• Not reporting effectiveness of phalloplasty. • Compared to non-homosexual FTMs, homosexual FTMs reported greater desire for phalloplasty. • FTMs are heterogeneous group; varying opinion on preference for GRS.
Fang et al. (1998[86])	Design: Case series Surgical procedure: Phalloplasty and glans sculpting procedures Level of Evidence: III	• 20 cases of FTM transsexuals who had received sculpting of glans in four different ways. • Patients were photographed and then scored by independent surgical and non-surgical assessors. • Norfolk procedure created a more normal neoglans. • Split-thickness skin graft gave more normal-looking

		coronal sulcus than full-thickness skin graft.
Fisch et al. (1993[87])	Design: Case study Surgical procedure: Phalloplasty and penile prosthesis Level of Evidence: IV	• Evaluated osseous fixation of a penile prosthesis after phalloplasty. • Phalloplasty as a one-stage surgical procedure may have greater aesthetic value.
Gilbert et al. (1987[88])	Design: Case studies Surgical procedure: Phalloplasty and phallic reconstructions Level of Evidence: IV	• Six patients had reconstruction following trauma: three were FTM transsexuals, and three had micropenis deformities. • One-stage microsurgical tissue transfer procedure.
Hage (1997[89])	Design: Case study Surgical procedure: Phalloplasty and penile prosthesis Level of Evidence: IV	• Five cases of dynaflex prosthesis in total phalloplasty. • Voiding while standing is a priority for most FTM transsexuals, • Promising results found with self-contained Dynaflex hydraulic penile implants. • Suggest implantation as secondary procedure after neophallus gains sensitivity.
Hage and Winters (1996[90])	Design: Case study Surgical procedure: Phalloplasty Level of Evidence: IV	• FTM transsexual had a radial forearm-flap sensate free-flap phalloplasty. • Where vascular patency of venous graft is not adequate, an adjunctive arteriovenous fistula created distally may salvage the flap.
Hage et al. (1993[91])	Design: Case series Surgical procedure: Phalloplasty Level of Evidence:	• Preconstruction of pars pendulans urethrae was used in 25 FTMs with Snyder's technique. • Successful in all but uneventful in 17 patients. • If voiding while standing

	III	is main goal of surgery procedure seems most appropriate.
Hage et al. (1993[92])	Design: Case series Surgical procedure: Phalloplasty and penal construction Level of Evidence: III	• Construction of fixed part of urethra up to level of clitoris was completed using an anterior vaginal flap in 46 patients. • Serious complications were encountered.
Hage et al. (1993[93])	Design: Case series Surgical procedure: Phalloplasty and neophallus construction Level of Evidence: III	• 31 phalloplasties performed in 28 patients. • Microsurgical free flap phalloplasty techniques lead to the best results. • In the patients with free flap phalloplasty, tactile sensitivity recurred in the neophallus. • GRS in FTM transsexuals is unlikely to be achieved in one stage of treatment.
Hage et al. (1993[94])	Design: Case series Surgical procedure: Phalloplasty Level of Evidence: III	• 79 patients (52%) who seek phalloplasty request: a scrotum (96%), a glans (92%), rigidity (86%), and an aesthetically appealing look either while wearing a tight swim suit (91%) or being nude (81%). • All except one patient wanted to be able to void in a standing position.
Hage et al. (1993[95])	Design: Case study Surgical procedure: Phalloplasty and phallic construction Level of Evidence: IV	• Phallic construction using a lateral upper arm sensate free flap and a bladder mucosa graft. • Meatal stenosis, postoperative bladder spasms, and an intraurethral valve were encountered. • Cosmetic result was satisfactory, but scarring of the upper arm.
Jarolim (2000[96])	Design: Case series	• Seven neophalloplasties were performed using the groin skin-flap technique.

	Surgical procedure: Phalloplasty and urethral reconstruction Level of Evidence: III	• Many cases had satisfactory appearance of neopenis, with potential to void while standing.
Khouri et al. (1998[97])	Design: Case series Surgical procedure: Phalloplasty and penile reconstruction Level of Evidence: III	• Five year follow-up of penile reconstruction patients. • Four patients were able to void in the standing position and free of fistulas or strictures. • All perform penetration during sexual intercourse and had erogenous and tactile sensibility. • The prefabricated lateral arm free flap technique can achieve fully functional penis and excellent patient satisfaction.
Lief and Hubschman (1993[98])	Design: Case series Surgical procedure: Phalloplasty Level of Evidence: III	• 14 MTF and nine FTM postoperative transsexuals. • Phalloplasty was not a critical factor in orgasm or in sexual satisfaction.
Noordanus and Hage (1993[99])	Design: Case study Surgical procedure: Phalloplasty Level of Evidence: IV	• FTM transsexual who after three weeks surgery involving radial forearm free flap phalloplasty, presented with ischaemia of the neophallus. • Six months after salvage procedure, surgery appears to be successful and tactile sensibility returned.
Rachlin (1999[100])	Design: Case series Surgical procedure: Phalloplasty Level of Evidence: III	• Not reporting effectiveness of phalloplasty. • 27 patients completed a questionnaire exploring surgical decision-making. • Considerable influence of peer support services and community.

		• Findings challenge the expectation that FTMs will request phalloplasty.
Rohrmann and Jakse (2003[101])	Design: Case series Surgical procedure: Phalloplasty, neourethra, vaginectomy, and urethroplasty Level of Evidence: III	• 25 FTM patients who underwent phalloplasty with a free radial forearm flap, vaginectomy and urethroplasty in a one-stage procedure. • One-stage total phalloplasty and urethroplasty was associated with complications.
Santanelli and Scuderi (2000[102])	Design: Case study Surgical procedure: Neophalloplasty Level of Evidence: IV	• Neophalloplasty in FTM transsexuals with the island tensor fasciae latae flap procedure. • Significant improvements in free tissue transfer and microvascular technique. • Five neophalloplasties using this procedure with FTM transsexuals. • The island tensor fasciae latae appears provides a safe and sensate flap for phalloplastic procedure and with less visible scar.
Santi et al. (1992[103])	Design: Case study Surgical procedure: Neophalloplasty Level of Evidence: IV	• Neophalloplasty with a rectus abdominis muscle flap and a radial forearm free flap. • Inferior transposition of a rectus abdominis island muscle flap with resurfacing using a radial forearm free flap method. • Excellent internal support and a natural looking appearance.
Zielinski (1999[104])	Design: Case series Surgical procedure: Phalloplasty and neophallus construction Level of Evidence: III	• 127 FTM transsexuals underwent surgery using the lateral groin flap. • Good results reported in 96 patients (75.6%). • Adverse complications occurred in 20 patients (20.5%).

5.5.5 Salpingo-oophorectomy

Salpingo-oophorectomy involves the surgical removal of a fallopian tube(s) and an ovary. This procedure is often completed when undertaking other surgical procedures. For example a FTM transsexual patient may request a total hysterectomy with bilateral salpingo-oophorectomy; this involves the removal of the fallopian tubes and ovaries in addition to the uterus and cervix. Three studies reported the use of the salpingo-oophorectomy; two case series and one case study. All involved the other surgical or androgen treatment. A summary of these studies are provided in Table 15.

Futterweit and Deligdisch (1986[106]) examined the effects of exogenously administered testosterone in a group of 19 FTM transsexuals who underwent bilateral salpingo-oophorectomy after a variable period of androgen therapy. This study did not examine the effectiveness of salpingo-oophorectomy technique, rather when it was undertaken in combination with androgen therapy. These patients were compared to 12 patients who underwent pelvic surgery for nonendocrine reasons. Five of the 19 androgen-treated FTM transsexuals had enlarged or borderline enlarged ovaries. Furthermore, they found multiple cystic follicles in 17 patients (89.5%), diffuse ovarian stromal hyperplasia in 16 patients (84.2%), collagenization of the outer cortex in 13 patients, and luteinization of stromal cells in 5 patients (26.3%). The authors concluded that increased blood levels and increased ovarian concentrations of testosterone may result in the morphological features of polycystic ovarian disease. The details of two other studies (Hakan, Ozcan, and Erdogan (1999[74]) and Hage, Dekker, Karim, Verheijen, and Bloemena (2000[75]) are provided in the hysterectomy section of this report.

Table 15: Summary of main studies investigating the Salpingo-oophorectomy technique

Study	Type	Summary of findings
Ergeneli et al. (1999[74])	Design: Case series Surgical procedure: Vaginal hysterectomy, bilateral salpingo-oophorectomy, vaginectomy, and phallic construction Level of Evidence: III	• Eight patients followed up for 9 to 30 months post-surgery. • See earlier description in Section 5.5.1.
Futterweit and Deligdisch (1986[106])	Design: Case series Surgical procedure: Bilateral salpingo-oophorectomy, pelvic surgery, and androgen treatment Level of Evidence: III	• 19 FTM transsexuals who underwent bilateral salpingo-oophorectomy after androgen therapy. • Compared to 12 patients who underwent pelvic surgery for nonendocrine reasons. • Five of the 19 androgen-treated FTM transsexuals had enlarged or borderline enlarged ovaries. • Increased ovarian concentrations of testosterone may link to morphological features of polycystic ovarian disease.
Hage et al. (2000[75])	Design: Case study Surgical procedure: Hysterectomy, and salpingo-oophorectomy Level of Evidence: IV	• Two cases of ovarian cancer in FTM transsexuals. • See earlier description Section 5.5.1.

5.5.6 Scrotoplasty/Scrotum construction

Scrotoplasty involves the creation of a scrotum. This procedure is generally accomplished by hollowing out the labia majora, inserting silicone implants, and attaching the labia to develop a single scrotal sac. Two studies were found to discuss this procedure. A summary of these studies are provided in Table 16.

Hage, Bouman, and Bloem (1993[107,107]) presents a short review of the literature concerning the genital construction in FTM transsexuals in particular to the labial region to provide a scrotum-like appearance. The authors report that in their

experience the construction of a scrotum in which testicular prostheses are implanted is generally performed in combination with lengthening of the pars fixa of the urethra. A bifid scrotum can be constructed using a V-Y advancement of the labial skin. Although implant expulsion (in 7%) and dislocation of implants (in 11%) were encountered within a sample of 50 patients, the procedure appears to be relatively straightforward. Furthermore, scarring is often small and hidden in the scrotal folds and hair.

Hage, Taets van Amerongen, and van Diest (1999[108]) evaluated the incidence of rupture of silicone gel filled testicular prosthesis. The rupture of the envelope of silicone gel filled testicular prostheses is believed to be rare. The study attempts to examine four cases treated for this complaint by the authors during the last 10 years. Three patients were FTM transsexuals and the other patient had testicular implants for Klinefelter's syndrome. It was found that rupture of silicone gel filled testicular implants may be caused by acute or chronic pressure without intraoperative needle puncture. It was found that MRI was effective in providing diagnostic accuracy and in evaluating the implant rupture.

Table 16: Summary of main studies investigating the Scrotoplasty/Scrotum construction technique

Study	Type	Summary of findings
Hage et al. (1993[107])	Design: Expert opinion / Review Surgical procedure: Construction of a scrotum Level of Evidence: V	• Short review of the literature concerning the genital construction in FTM transsexuals. • Implant expulsion (in 7%) and dislocation of implants (in 11%) were encountered within a sample of 50 patients. • Scarring is small and hidden in scrotal folds.
Hage et al. (1999[108])	Design: Case studies Surgical procedure: Testicular prosthesis. Level of Evidence: IV	• Four cases treated for rupture of silicone gel filled testicular prostheses. • Caused by acute/chronic pressure. • MRI effective for diagnosis and evaluating implant rupture.

5.5.7 Urethroplasty

Urethroplasty involves an operation to repair a defect in the walls of the urethra. Two studies were found which report the use of this procedure in FTM transsexuals (Rohrmann & Jakse, 2003[101]; Santanelli & Scuderi, 2000[102]). Each of the studies was reported earlier in this report and summarised in Table 17.

Table 17: Summary of main studies investigating the urethroplasty technique

Study	Type	Summary of findings
Rohrmann and Jakse (2003[101])	Design: Case series Surgical procedure: Phalloplasty, neourethra, vaginectomy, and urethroplasty Level of Evidence: III	• 25 FTM patients who underwent phalloplasty with a free radial forearm flap, vaginectomy and urethroplasty in a one-stage procedure. • See earlier description in Section 5.5.4.
Santanelli and Scuderi (2000[102])	Design: Case study Surgical procedure: Neophalloplasty and urethroplasty Level of Evidence: IV	• Neophalloplasty in FTM transsexuals with the island tensor fasciae latae flap procedure. • See earlier description in Section 5.5.4.

5.5.8 Vaginectomy/vaginal closure

Vaginectomy involves the surgical removal of all or part of the vagina. Two studies were found which report the use of this procedure in FTM transsexuals (Ergeneli, Hakan, Ozcan, & Erdogan, 1999[74]; Rohrmann & Jakse, 2003[101]). Each of the studies was reported earlier in this report and summarised in Table 18.

Table 18: Summary of main studies investigating the Vaginectomy/vaginal closure technique

Study	Type	Summary of findings
Rohrmann and Jakse (2003[101])	Design: Case series Surgical procedure: Phalloplasty, neourethra, vaginectomy, and urethroplasty Level of Evidence: III	• 25 FTM patients who underwent phalloplasty with a free radial forearm flap, vaginectomy and urethroplasty in a one-stage procedure. • See earlier description in phalloplasty section.
Ergeneli et al. (1999[74])	Design: Case series Surgical procedure: Vaginal hysterectomy, bilateral salpingo-oophorectomy, vaginectomy, and phallic construction Level of Evidence: III	• Eight patients followed up for 9 to 30 months post-surgery. • See earlier Section 5.5.1

5.5.9 Conclusion

In this section, we have summarised all the studies found concerning FTM surgical procedures. A total of 36 published papers were evaluated (12 case studies, 20 case series, 1 review, 1 expert opinion, 1 unknown). The majority of studies report good satisfactory outcomes with few complications for each of the individual procedures. Many of the outcomes of these procedures relate to the ability to perform penetrative sexual intercourse and to be able to achieve orgasm. Another key factor requested by many patients is the ability to void whilst standing. Some of the procedures are frequently completed along with other procedures, making it difficult to assess the effectiveness of each procedure alone. Furthermore, the assessment of effectiveness is also confounded by the lack of controlled evidence, unclear outcome measures, and a reliance on case series and case studies.

6. Discussion

The first section of the report identified the current treatment pathways for patients with GID and the number of patients currently receiving treatment in each of the four consortia. Some differences were recognised, but in general the standard of care met the requirements of the HBSOC. In considering the number of patients receiving treatment or have been referred for consideration, a total of 440 patients were identified. A greater number of MTF compared to FTM transsexual patients were receiving treatment across the consortia. Although a larger number of patients were known within the NORCOM consortium, the majority of these patients were on the waiting list. These figures are not exhaustive and should be cautiously evaluated since there may be more patients which have not been identified.

In estimating the number of patients, it is important to consider the overlap between the different consortia. Many patients travel from different parts of the country; therefore the figures do not represent those patients residing in areas within the consortium. Patients move to different PCTs to gain treatment quicker and for a cheaper cost. It has been recognised that the same patients could be on the waiting lists in different consortia; however, this could not be verified. It is important to recognise that some patients do not comply with treatment protocols and have to repeat stages, and some patients choose to complete their transformations by having surgery abroad.

The second section of the report was concerned with evaluating the effectiveness of surgical procedures for both MTF and FTM transsexuals. A comprehensive summary of the earlier reviews was provided which together encapsulate 172 individual studies. All reviews commented on the poor quality of the research evidence available; no RCTs were available. Only one controlled study was identified, which compared 20 patients having immediate surgery with 20 patients awaiting surgery for penectomy, orchidectomy and the construction of a neo-vagina. The remaining studies reflect lower grades of evidence, and had further problems in their design such as selected patient groups, retrospective analysis and losses to follow-up. Conclusions from the reviews are understandably tentative, but highlight improvements in patients across most studies, although 10-15% of transsexuals who undergo GRS having poor outcomes.

As well as the fundamental design of the studies, several other issues regarding the interpretation of the evidence are worth consideration. Firstly, all the reviews, and many of the individual studies within them examine different types of GRS. The Mate-Kole study, for example, is essentially an evaluation of three surgical techniques. Clearly, trying to reach a robust conclusion about GRS as a whole is not possible when the combination of techniques varies across studies. Secondly, the patient populations within, and across studies, are heterogeneous and we have little idea about the referral, diagnosis, assessment and selection process that precede inclusion within the studies. Consequently, Brown concludes that a lengthy differential diagnosis and a specialised approach to interviewing gender dysphoric patients are needed. Thirdly, the choice of outcome measures varies across studies, with very little use of validated health related Quality of Life (QOL) measures. This complicates further our ability to draw conclusions, and also limits the commissioners' ability to identify studies that use outcomes that are relevant to their role.

No published evidence on cost-effectiveness is available, nor it derivation possible. Best and Stein speculate that some cost offsets are possible following surgery due to the reduced need for psychiatric and hormonal treatment, but no evidence is available for this. The lack of generic quality of life measures means that measures of cost-effectiveness that can be used to assess value for money relative to other health care interventions are not possible.

We extended the earlier reports by providing a detailed summary of each of the core surgical procedures being used for both MTF and FTM transsexuals. To this end, 78 published papers (42 MTF and 36 FTM) were summarised across 13 different surgical techniques (5 MTF and 8 FTM). Once again, the evidence identified is of poor quality with no RCTs or any studies with a control group. Despite this, the majority of studies report good satisfactory outcomes with few complications for each of the individual procedures. Within each study area, there appears to be some consensus on outcome measures, however, these are very specific to the client population and surgical procedures, for example, ability to achieve orgasm in the case of clitoroplasty or depth of neo-vagina in the case of vaginoplasty.

When trying to consider all of the evidence together, there is a dilemma regarding its interpretation. Reviews of heterogeneous patient groups and interventions clearly give the greatest depth of evidence, but give little in the way of specific information that is of use to purchasers (Table 6). In contrast, studies of individual techniques have more limited evidence based but allow us to focus on specific clinical questions with more consistent reporting (Tables 7-18). But these provide information on purchasing decisions that are less realistic, as some procedures are unlikely to be purchased in isolation. In between these extremes, are a set of studies that investigate various combinations of multiple procedures (Appendix 2), but matching these studies to the activity of different providers and patients, is extremely complex.

Taking this reasoning further, some would argue that assessment of GRS in isolation is difficult to interpret as it is the final step in a longer treatment process. This is more contentious, as many patients do not reach the point of referral for surgery and many do not wish to undergo any surgery. Also, taking this argument to its extreme would require studies of the effectiveness of treatment from initial diagnosis to the end of post-surgical follow-up; such studies do not exist.

Despite these difficulties in *interpretation* of review evidence and its relevance to specific commissioning decisions, the *conclusion* about the strength of evidence regarding GRS appears clear. Little robust evidence exists.

6.1 Future research

There is a need for good quality controlled trials based on clearly defined diagnosis and assessment criteria.

An important consideration for future studies is how best to evaluate the effectiveness of a surgical procedure. One possibility is assessment of patient satisfaction and regret following surgery (see Bockting, Robinson, Benner, and Scheltema, 2004[109]; Landen, Walinder, Hambert, & Lundstrom, 1998[110]; Lawrence, 2003[26]; Smith, Van Goozen, Kuiper, & Cohen-Kettenis, 2005[32]). More importantly is the need for standardised measures to assess the outcome of surgery. One suitable method which

has received limited research is the use of QOL measures in samples before and after GRS. Rakic, Starecevic, Maric, and Kelin (1996[111]) investigated several aspects of QOL after GRS in 32 transsexuals (22 MTF, 10 FTM). Four aspects of QOL were examined: sexual activity; attitude towards the patients' own body; relationships with other people; and occupational functioning. For the majority of transsexuals, QOL were improved after surgery in terms of these aspects. All patients (100%) were satisfied with their GRS. However, only 20 patients (62%) were satisfied with how their bodies looked. In a study by Barrett (1998[82]), they used the GHQ and assessments of depression in patient groups. More controlled studies using this type of experimental design are needed to provide a better measure of surgical effectiveness.

Although the present report was not able to review the evidence at each stage on the treatment pathways for GID, several stages on the pathway are attracting considerable research interest. In particular, there are many studies investigating the use of hormone therapy and non-core procedures such as voice therapy in transsexual patients. These should be given consideration in future reports.

6.2 Conclusions

We have confirmed the findings from previous reviews that the evidence to support GRS has several limitations in terms of: a) lack of controlled studies; b) evidence has not collected data prospectively; c) high loss to follow up; and d) lack of validated assessment measures. We have extended these findings from previous reviews by providing a summary of the evidence available for each of the "core" procedures for MTF and FTM transsexuals. In the majority of studies a large number of transsexual people experience a successful outcome in terms of subjective well-being, cosmesis, and sexual function. Like the conclusions made in previous reviews the magnitude of benefit and harm cannot be reliably estimated accurately using the current available evidence. It has been recognised in previous reviews of GRS that many studies do not use or report the rigorous treatment pathway which a patient would have to go through in the UK. It is important to consider whether the evidence which is available provides a reliable representation of the likely success of surgery found in the UK.

Appendix 1. Search Strategies used in the Major Electronic Databases

Search 1

Cochrane

#1 male-to-female OR mtf in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 general practitioner in Record Title or general practitioner in Abstract in all products
#29 gp in Record Title or gp in Abstract in all products
#30 MeSH descriptor Physicians, Family explode all trees in MeSH products
#31 family physician* in Record Title or family physician* in Abstract in all products
#32 psychological service* in Record Title or psychological service* in Abstract in all products
#33 MeSH descriptor Mental Health Services explode all trees in MeSH products
#34 referral in Record Title or referral in Abstract in all products
#35 MeSH descriptor Referral and Consultation explode all trees in MeSH products
#36 waiting list* in Record Title or waiting list* in Abstract in all products
#37 MeSH descriptor Waiting Lists explode all trees in MeSH products
#38 assessment* in Record Title or assessment* in Abstract in all products
#39 psychiatrist* in Record Title or psychiatrist* in Abstract in all products

#40 psychiatrist* in Record Title or psychiatrist* in Abstract in all products
#41 MeSH descriptor Psychiatry explode all trees in MeSH products
#42 psychologist* in Record Title or psychologist* in Abstract in all products
#43 MeSH descriptor Psychology explode all trees in MeSH products
#44 counsellor* in Record Title or counsellor* in Abstract in all products
#45 MeSH descriptor Counseling explode all trees in MeSH products
#46 counselor* in Record Title or counselor* in Abstract in all products
#47 diagnosis in Record Title or diagnosis in Abstract in all products
#48 MeSH descriptor Diagnosis explode all trees in MeSH products
#49 or/#28-#48
#50 #27 AND #49 from 1980 to 2005

Embase

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/
5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.

38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 general practitioner/
43 general practitioner.ti,ab/
44 gp.ti,ab.
45 Mental Health Service/ or Psychology/
46 patient referral/
47 referral.ti,ab.
48 hospital admission/
49 waiting list$.ti,ab
50 assessment$.ti,ab
51 PSYCHIATRIST/
52 PSYCHOLOGIST/
53 psychiatrist.ti,ab.
54 psychologist.ti,ab.
55 diagnosis/
56 diagnosis.ti,ab.
57 psychological service$.ti,ab.
58 or/42-57
59 41 and 58
60 limit 59 to (human and english language and yr="1980 - 2006")

Medline

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 1 or 2
4 sex change.ti,ab.
5 sex$ reassignment.ti,ab.
6 gender reassignment.ti,ab.
7 reassignment surgery.ti,ab.
8 Transsexualism/
9 trans-sexual$.ti,ab.
10 transexual$.ti,ab.
11 transsexual$.ti,ab.
12 trans sex.ti,ab.
13 Transvestism/
14 transvestism.ti,ab.
15 transvestite$.ti,ab.
16 Gender Identity/
17 gender dysphoria.ti,ab.
18 gender dysphoric.ti,ab.
19 "Sexual and Gender Disorders"/
20 gender identity disorder$.ti,ab.
21 GID.ti,ab.
22 gender transform$.ti,ab.
23 transgender$.ti,ab.
24 trans-gender$.ti,ab.
25 cross dress$.ti,ab.

26 cross sex.ti,ab.
27 Hermaphroditism/
28 intersexuality.ti,ab.
29 gender transition.ti,ab.
30 or/4-29
31 3 and 30
32 exp Adult/
33 adult.ti,ab.
34 grown-up.ti,ab.
35 or/32-34
36 31 and 35
37 Physicians, Family/
38 general practitioner.ti,ab.
39 gp.ti,ab.
40 exp Psychology/ or Mental Health Services/
41 psychological service$.ti,ab.
42 "Referral and Consultation"/
43 referral.ti,ab.
44 Waiting Lists/
45 waiting list$.ti,ab.
46 assessment.ti,ab.
47 exp Psychiatry/
48 psychiatrist.ti,ab.
49 psychologist.ti,ab.
50 Counseling/
51 counsellor.ti,ab.
52 exp Diagnosis/
53 diagnos$.ti,ab.
54 or/37-53
55 36 and 54
56 limit 55 to (humans and english language and yr="1980 - 2005")

Psycinfo
#1 MALE-TO-FEMALE
#2 MALE-TO-FEMALE-
#3 MALE-TO-FEMALES
#4 male-to-female
#5 mtf (64 records)
#6 MTF (64 records)
#7 or1-6
#8 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#9 sex chang*
#10 sexual reassignment
#11 sex reassignment
#12 SEX-REASSIGNMENT
#13 gender reassignment
#14 GENDER-REASSIGNMENT
#15 REASSIGNMENTS
#16 reassignment surger*
#17 trans-sexual*

#18 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#19 trans sex
#20 transsexual*
#21 transexual*
#22 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#23 transvestism
#24 transvestite*
#25 gender dysphoria
#26 GENDER-DYSPHORIA
#27 gender dysphoric
#28 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#29 gender identity disorder
#30 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#31 gid
#32 GID
#33 GID-N
#34 GID-US
#35 gender transformation
#36 GENDER-TRANSFORMED
#37 gender-variant
#38 GENDER-VARIANT
#39 transgender*
#40 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#41 trans-gender*
#42 cross dresser
#43 (CROSS-DRESSER) or (CROSS-DRESSERS)
#44 cross sex
#45 CROSS-SEX
#46 intersexuality
#47 INTERSEXUALITY
#48 gender transition
#49 transition
#50 or/8-49
#51 general practitioner
#52 gp
#53 (GENERAL-PRACTITIONER) or (GENERAL-PRACTITIONERS)
#54 psychological service*
#55 (PSYCHOLOGICAL-SERVICES) or (PSYCHOLOGICAL-SERVICE)
#56 referral
#57 REFERRAL
#58 waiting list*
#59 WAITING-LIST
#60 assessment*
#61 ASSESSMENT

#62 psychiatrist*
#63 PSYCHIATRIST
#64 psychologist*
#65 PSYCHOLOGIST
#66 counsellor*
#67 COUNSELLOR
#68 diagnosis
#69 DIAGNOSIS
#70 or/#51-#69
#71 #7 AND #50
#72 #70 AND #71 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(male-to-female OR mtf)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=(general practitioner OR GP)
5 TS=psychological service*
6 TS=referral
7 TS=waiting list*
8 TS=assessment*
9 TS=psychiatrist*
10 TS=psychologist*
11 TS=counsellor
12 TS=diagnosis
13 #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4
14 #13 AND #3
Language=English; Timespan=1980-2005

Search 2

Cochrane

#1 male-to-female OR mtf in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 review in Record Title or review in Abstract in all products
#29 MeSH descriptor Therapeutics explode all trees in MeSH products
#30 treatment* in Record Title or treatment* in Abstract in all products
#31 real life experience* in Record Title or real life experience* in Abstract in all products
#32 endocrine in Record Title or endocrine in Abstract in all products
#33 hormone* in Record Title or hormone* in Abstract in all products
#34 speech therap* in Record Title or speech therap* in Abstract in all products
#35 MeSH descriptor Speech Therapy explode all trees in MeSH products
#36 or/28-35
#37 #27 AND #36

Embase

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/

5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 "Review"/
43 treatment$.ti,ab.
44 real life experience$.ti,ab.
45 endocrine.ti,ab.
46 Hormone/
47 hormone$.ti,ab.
48 speech therap$.ti,ab.
49 speech therapy/
50 review.ti,ab.
51 or/42-51
52 41 and 51
53 limit 52 to (human and english language and yr="1980 - 2006")

Medline

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 1 or 2
4 sex change.ti,ab.
5 sex$ reassignment.ti,ab.
6 gender reassignment.ti,ab.
7 reassignment surgery.ti,ab.
8 Transsexualism/
9 trans-sexual$.ti,ab.
10 transexual$.ti,ab.
11 transsexual$.ti,ab.
12 trans sex.ti,ab.
13 Transvestism/
14 transvestism.ti,ab.
15 transvestite$.ti,ab.
16 Gender Identity/
17 gender dysphoria.ti,ab.
18 gender dysphoric.ti,ab.
19 "Sexual and Gender Disorders"/
20 gender identity disorder$.ti,ab.
21 GID.ti,ab.
22 gender transform$.ti,ab.
23 transgender$.ti,ab.
24 trans-gender$.ti,ab.
25 cross dress$.ti,ab.
26 cross sex.ti,ab.
27 Hermaphroditism/
28 intersexuality.ti,ab.
29 gender transition.ti,ab.
30 or/4-29
31 3 and 30
32 exp Adult/
33 adult.ti,ab.
34 grown-up.ti,ab.
35 or/32-34
36 31 and 35
37 exp Therapeutics/
38 treatment$.ti,ab.
39 review$.ti,ab.
40 real life experience$.ti,ab.
41 endocrine$.ti,ab.
42 hormone$.ti,ab.
43 Hormones/
44 speech therap$.ti,ab.
45 Speech Therapy/
46 or/37-45
47 36 and 41
48 limit 42 to (humans and english language and yr="1980 - 2005")

PsycINFO
#1 MALE-TO-FEMALE
#2 MALE-TO-FEMALE-
#3 MALE-TO-FEMALES
#4 male-to-female
#5 mtf (64 records)
#6 MTF (64 records)
#7 or1-6
#8 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#9 sex chang*
#10 sexual reassignment
#11 sex reassignment
#12 SEX-REASSIGNMENT
#13 gender reassignment
#14 GENDER-REASSIGNMENT
#15 REASSIGNMENTS
#16 reassignment surger*
#17 trans-sexual*
#18 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#19 trans sex
#20 transsexual*
#21 transexual*
#22 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#23 transvestism
#24 transvestite*
#25 gender dysphoria
#26 GENDER-DYSPHORIA
#27 gender dysphoric
#28 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#29 gender identity disorder
#30 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#31 gid
#32 GID
#33 GID-N
#34 GID-US
#35 gender transformation
#36 GENDER-TRANSFORMED
#37 gender-variant
#38 GENDER-VARIANT (7 records)
#39 transgender*
#40 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#41 trans-gender*
#42 cross dresser
#43 (CROSS-DRESSER) or (CROSS-DRESSERS)

#44 cross sex
#45 CROSS-SEX
#46 intersexuality
#47 INTERSEXUALITY
#48 gender transition
#49 transition
#50 or/8-49
#51 7 AND 50
#52 REVIEW
#53 review*
#54 TREATMENT
#55 treatment*
#56 real life experience
#57 endocrine
#58 ENDOCRINE
#59 hormone*
#60 'Hormones-'
#61 HORMONE
#62 speech therap*
#63 (SPEECH-THERAPISTS) or (SPEECH-THERAPY)
#64 or/#52-#63
#65 #51 AND #64 and (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=VERY-OLD) or (AG=YOUNG-ADULTHOOD) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(male-to-female OR mtf)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=review*
5 TS=treatment
6 TS=real life experience*
7 TS=endocrine
8 TS=hormone*
9 TS=speech therap*
10 #9 OR #8 OR #7 OR #6 OR #5 OR #4
11 #10 AND #3
Language=English; Timespan=1980-2005

Search 3

Cochrane

#1 male-to-female OR mtf in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 reassessment in Record Title or reassessment in Abstract in all products
#29 sex reassignment surgery in Record Title or sex reassignment surgery in Abstract in all products
#30 surgical reassignment in Record Title and surgical reassignment in Abstract in all products
#31 surgery in Record Title or surgery in Abstract in all products
#32 MeSH descriptor Surgery explode all trees in MeSH products
#33 pre operative in Record Title or pre operative in Abstract in all products
#34 pre-operative in Record Title or pre-operative in Abstract in all products
#35 or/28-34
#36 #27 AND 35 1980 to 2005

Embase

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/

5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 reassess$.ti,ab.
43 sex reassignment surgery.ti,ab.
44 exp Sex Transformation/
45 surgical reassignment.ti,ab.
46 exp SURGERY/
47 surgery.ti,ab.
48 exp Preoperative Evaluation/
49 pre operative.ti,ab.
50 or/42-49
51 41 and 50
52 limit 51 to (human and english language and yr="1980 - 2006")

Medline

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 1 or 2
4 sex change.ti,ab.
5 sex$ reassignment.ti,ab.
6 gender reassignment.ti,ab.
7 reassignment surgery.ti,ab.
8 Transsexualism/
9 trans-sexual$.ti,ab.
10 transexual$.ti,ab.
11 transsexual$.ti,ab.
12 trans sex.ti,ab.
13 Transvestism/
14 transvestism.ti,ab.
15 transvestite$.ti,ab.
16 Gender Identity/
17 gender dysphoria.ti,ab.
18 gender dysphoric.ti,ab.
19 "Sexual and Gender Disorders"/
20 gender identity disorder$.ti,ab.
21 GID.ti,ab.
22 gender transform$.ti,ab.
23 transgender$.ti,ab.
24 trans-gender$.ti,ab.
25 cross dress$.ti,ab.
26 cross sex.ti,ab.
27 Hermaphroditism/
28 intersexuality.ti,ab.
29 gender transition.ti,ab.
30 or/4-29
31 3 and 30
32 exp Adult/
33 adult.ti,ab.
34 grown-up.ti,ab.
35 or/32-34
36 31 and 35
37 reassess$.ti,ab.
38 sex reassignment surgery.ti,ab.
39 surgical reassignment.ti,ab.
40 exp Surgery/
41 surgery.ti,ab.
42 exp Preoperative Care/
43 pre operative.ti,ab.
44 or/37-43
45 36 and 44
46 limit 45 to (humans and english language and yr="1980 - 2005")

Psycinfo

#1 MALE-TO-FEMALE

#2 MALE-TO-FEMALE-
#3 MALE-TO-FEMALES
#4 male-to-female
#5 mtf
#6 MTF
#7 or1-6
#8 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#9 sex chang*
#10 sexual reassignment
#11 sex reassignment
#12 SEX-REASSIGNMENT
#13 gender reassignment
#14 GENDER-REASSIGNMENT
#15 REASSIGNMENTS
#16 reassignment surger*
#17 trans-sexual*
#18 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#19 trans sex
#20 transsexual*
#21 transexual*
#22 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#23 transvestism
#24 transvestite*
#25 gender dysphoria
#26 GENDER-DYSPHORIA
#27 gender dysphoric
#28 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#29 gender identity disorder
#30 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#31 gid
#32 GID
#33 GID-N
#34 GID-US
#35 gender transformation
#36 GENDER-TRANSFORMED
#37 gender-variant
#38 GENDER-VARIANT (7 records)
#39 transgender*
#40 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#41 trans-gender*
#42 cross dresser
#43 (CROSS-DRESSER) or (CROSS-DRESSERS)
#44 cross sex
#45 CROSS-SEX

#46 intersexuality
#47 INTERSEXUALITY
#48 gender transition
#49 transition
#50 or/8-49
#51 7 AND 50
#52 reassessment
#53 (REASSESSMENTS) or (REASSESSMENT)
#54 sex reassignment surgery
#55 surgical reassignment
#56 surgery
#57 SURGERY
#58 pre operative
#59 PREOPERATIVE
#60 or/#52-#59
#61 #51 AND #60 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(male-to-female OR mtf)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=reassessment
5 TS=sex reassignment surgery
6 TS=surgical reassignment
7 TS=surgery
8 TS=(pre-operative OR pre operative)
9 #5 OR #6 OR #7 OR #8
10 #9 AND #3
Language=English; Timespan=1980-2005

Search 4

Cochrane

#1 male-to-female OR mtf in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 post operative in Record Title or post operative in Abstract in all products
#29 post-operative in Record Title or post-operative in Abstract in all products
#30 MeSH descriptor Postoperative Care explode all trees in MeSH products
#31 post surgery in Record Title or post surgery in Abstract in all products
#32 post-surgery in Record Title or post-surgery in Abstract in all products
#33 MeSH descriptor Reconstructive Surgical Procedures explode all trees in MeSH products
#34 reconstructive surgery in Record Title or reconstructive surgery in Abstract in all products
#35 or/28-34
#36 #27 AND #35 1980 to 2005

Embase

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/

5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 Postoperative Complication/ or Postoperative Pain/ or Postoperative Period/
43 post operative.ti,ab.
44 post surgery.ti,ab.
45 plastic surgery/
46 reconstructive surgery.ti,ab.
47 or/42- 46
48 41 and 47
49 limit 48 to (human and english language and yr="1980 - 2006")

Medline
1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 1 or 2

4 sex change.ti,ab.
5 sex$ reassignment.ti,ab.
6 gender reassignment.ti,ab.
7 reassignment surgery.ti,ab.
8 Transsexualism/
9 trans-sexual$.ti,ab.
10 transexual$.ti,ab.
11 transsexual$.ti,ab.
12 trans sex.ti,ab.
13 Transvestism/
14 transvestism.ti,ab.
15 transvestite$.ti,ab.
16 Gender Identity/
17 gender dysphoria.ti,ab.
18 gender dysphoric.ti,ab.
19 "Sexual and Gender Disorders"/
20 gender identity disorder$.ti,ab.
21 GID.ti,ab.
22 gender transform$.ti,ab.
23 transgender$.ti,ab.
24 trans-gender$.ti,ab.
25 cross dress$.ti,ab.
26 cross sex.ti,ab.
27 Hermaphroditism/
28 intersexuality.ti,ab.
29 gender transition.ti,ab.
30 or/4-29
31 3 and 30
32 exp Adult/
33 adult.ti,ab.
34 grown-up.ti,ab.
35 or/32-34
36 31 and 35
37 Pain, Postoperative/ or Postoperative Care/ or Postoperative Complications/
38 post operative.ti,ab.
39 post surgery.ti,ab.
40 Surgery, Plastic/ or Reconstructive Surgical Procedures/
41 reconstructive surgery.ti,ab.
42 or/ 37- 41
43 36 and 42
44 limit 44 to (humans and english language and yr="1980 - 2005")

Psycinfo
#1 MALE-TO-FEMALE
#2 MALE-TO-FEMALE-
#3 MALE-TO-FEMALES
#4 male-to-female
#5 mtf
#6 MTF
#7 or1-6

#8 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#9 sex chang*
#10 sexual reassignment
#11 sex reassignment
#12 SEX-REASSIGNMENT
#13 gender reassignment
#14 GENDER-REASSIGNMENT
#15 REASSIGNMENTS
#16 reassignment surger*
#17 trans-sexual*
#18 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#19 trans sex
#20 transsexual*
#21 transexual*
#22 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#23 transvestism
#24 transvestite*
#25 gender dysphoria
#26 GENDER-DYSPHORIA
#27 gender dysphoric
#28 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#29 gender identity disorder
#30 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#31 gid
#32 GID
#33 GID-N
#34 GID-US
#35 gender transformation
#36 GENDER-TRANSFORMED
#37 gender-variant
#38 GENDER-VARIANT
#39 transgender*
#40 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#41 trans-gender*
#42 cross dresser
#43 (CROSS-DRESSER) or (CROSS-DRESSERS)
#44 cross sex
#45 CROSS-SEX
#46 intersexuality
#47 INTERSEXUALITY
#48 gender transition
#49 transition
#50 or/8-49
#51 7 AND 50

#52 (POST-OPERATION) or (POST-OPERATIVE) or (POST-OPERATIVELY) or (POST-OPERATIVEN) or (POST-OPERATIEVE)
#53 post operative* or post-operative*
#54 (POST-SURGERY) or (POST-SURGICAL) or (POST-SURGICALLY)
#55 post surg* or post-surg*
#56 reconstructive surgery
#57 or/#52-#56
#58 #51 AND #57 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(male-to-female OR mtf)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=post operative
5 TS=post surgery
6 TS=reconstructive surgery
7 #4 OR #5 OR #6
8 #3 AND #7
Language=English; Timespan=1980-2005

Search 5

Cochrane

#1 male-to-female OR mtf in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26 from 1980 to 2005.

Embase

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/
5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.

16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 limit 41 to (human and english language and yr="1980 - 2006")

Medline

1 mtf.ti,ab.
2 male-to-female.ti,ab.
3 1 or 2
4 sex change.ti,ab.
5 sex$ reassignment.ti,ab.
6 gender reassignment.ti,ab.
7 reassignment surgery.ti,ab.
8 Transsexualism/
9 trans-sexual$.ti,ab.
10 transexual$.ti,ab.
11 transsexual$.ti,ab.
12 trans sex.ti,ab.
13 Transvestism/
14 transvestism.ti,ab.
15 transvestite$.ti,ab.
16 Gender Identity/
17 gender dysphoria.ti,ab.
18 gender dysphoric.ti,ab.
19 "Sexual and Gender Disorders"/
20 gender identity disorder$.ti,ab.
21 GID.ti,ab.

22 gender transform$.ti,ab.
23 transgender$.ti,ab.
24 trans-gender$.ti,ab.
25 cross dress$.ti,ab.
26 cross sex.ti,ab.
27 Hermaphroditism/
28 intersexuality.ti,ab.
29 gender transition.ti,ab.
30 or/4-29
31 3 and 30
32 exp Adult/
33 adult.ti,ab.
34 grown-up.ti,ab.
35 or/32-34
36 31 and 35 (humans and english language and yr="1980 - 2005")

PsycINFO
#1 MALE-TO-FEMALE
#2 MALE-TO-FEMALE-
#3 MALE-TO-FEMALES
#4 male-to-female
#5 mtf
#6 MTF
#7 or1-6
#8 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#9 sex chang*
#10 sexual reassignment
#11 sex reassignment
#12 SEX-REASSIGNMENT
#13 gender reassignment
#14 GENDER-REASSIGNMENT
#15 REASSIGNMENTS
#16 reassignment surger*
#17 trans-sexual*
#18 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#19 trans sex
#20 transsexual*
#21 transexual*
#22 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#23 transvestism
#24 transvestite*
#25 gender dysphoria
#26 GENDER-DYSPHORIA
#27 gender dysphoric
#28 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#29 gender identity disorder
#30 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#31 gid

#32 GID
#33 GID-N
#34 GID-US
#35 gender transformation
#36 GENDER-TRANSFORMED
#37 gender-variant
#38 GENDER-VARIANT (7 records)
#39 transgender*
#40 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#41 trans-gender*
#42 cross dresser
#43 (CROSS-DRESSER) or (CROSS-DRESSERS)
#44 cross sex
#45 CROSS-SEX
#46 intersexuality
#47 INTERSEXUALITY
#48 gender transition
#49 transition
#50 or/8-49
#51 7 AND 50 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(male-to-female OR mtf)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
Language=English; Timespan=1980-2005

Search 6

Cochrane

#1 female-to-male OR ftm in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 general practitioner in Record Title or general practitioner in Abstract in all products
#29 gp in Record Title or gp in Abstract in all products
#30 MeSH descriptor Physicians, Family explode all trees in MeSH products
#31 family physician* in Record Title or family physician* in Abstract in all products
#32 psychological service* in Record Title or psychological service* in Abstract in all products
#33 MeSH descriptor Mental Health Services explode all trees in MeSH products
#34 referral in Record Title or referral in Abstract in all products
#35 MeSH descriptor Referral and Consultation explode all trees in MeSH products
#36 waiting list* in Record Title or waiting list* in Abstract in all products
#37 MeSH descriptor Waiting Lists explode all trees in MeSH products
#38 assessment* in Record Title or assessment* in Abstract in all products
#39 psychiatrist* in Record Title or psychiatrist* in Abstract in all products
#40 psychiatrist* in Record Title or psychiatrist* in Abstract in all products
#41 MeSH descriptor Psychiatry explode all trees in MeSH products
#42 psychologist* in Record Title or psychologist* in Abstract in all products

#43 MeSH descriptor Psychology explode all trees in MeSH products
#44 counsellor* in Record Title or counsellor* in Abstract in all products
#45 MeSH descriptor Counseling explode all trees in MeSH products
#46 counselor* in Record Title or counselor* in Abstract in all products
#47 diagnosis in Record Title or diagnosis in Abstract in all products
#48 MeSH descriptor Diagnosis explode all trees in MeSH products
#49 or/28-48
#50 #27 AND #49 from 1980 to 2005

Embase

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/
5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39

41 36 and 40
42 general practitioner/
43 general practitioner.ti,ab/
44 gp.ti,ab.
45 Mental Health Service/ or Psychology/
46 patient referral/
47 referral.ti,ab.
48 hospital admission/
49 waiting list$.ti,ab
50 assessment$.ti,ab
51 PSYCHIATRIST/
52 PSYCHOLOGIST/
53 psychiatrist.ti,ab.
54 psychologist.ti,ab.
55 diagnosis/
56 diagnosis.ti,ab.
57 psychological service$.ti,ab.
58 or/42-57
59 41 and 58
60 limit 59 to (human and english language and yr="1980 - 2006")

Medline

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 sex change.ti,ab.
4 sex$ reassignment.ti,ab.
5 gender reassignment.ti,ab.
6 reassignment surgery.ti,ab.
7 Transsexualism/
8 trans-sexual$.ti,ab.
9 transexual$.ti,ab.
10 transsexual$.ti,ab.
11 trans sex.ti,ab.
12 Transvestism/
13 transvestism.ti,ab.
14 transvestite$.ti,ab.
15 Gender Identity/
16 gender dysphoria.ti,ab.
17 gender dysphoric.ti,ab.
18 "Sexual and Gender Disorders"/
19 gender identity disorder$.ti,ab.
20 GID.ti,ab.
21 gender transform$.ti,ab.
22 transgender$.ti,ab.
23 trans-gender$.ti,ab.
24 cross dress$.ti,ab.
25 cross sex.ti,ab.
26 Hermaphroditism/
27 intersexuality.ti,ab.
28 gender transition.ti,ab.

29 or/3-28
30 exp Adult/
31 adult.ti,ab.
32 grown-up.ti,ab.
33 or/30-32
34 1 or 2
35 29 and 34
36 33 and 35
37 Physicians, Family/
38 general practitioner.ti,ab.
39 gp.ti,ab.
40 exp Psychology/ or Mental Health Services/
41 psychological service$.ti,ab.
42 "Referral and Consultation"/
43 referral.ti,ab.
44 Waiting Lists/
45 waiting list$.ti,ab.
46 assessment.ti,ab.
47 exp Psychiatry/
48 psychiatrist.ti,ab.
49 psychologist.ti,ab.
50 Counseling/
51 counsellor.ti,ab.
52 exp Diagnosis/
53 diagnos$.ti,ab.
54 or/37-53
55 36 and 54
56 limit 55 to (humans and english language and yr="1980 - 2005")

Psycinfo
#1 female-to-male
#2 ftm
#3 (FEMALE-TO-MALE) or (FEMALE-TO-MALES)
#4 (FTM) or (FTMS) or (FTMS-A)
#5 or1-4
#6 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#7 sex chang*
#8 sexual reassignment
#9 sex reassignment
#10 SEX-REASSIGNMENT
#11 gender reassignment
#12 GENDER-REASSIGNMENT
#13 REASSIGNMENTS
#14 reassignment surger*
#15 trans-sexual*
#16 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#17 trans sex
#18 transsexual*
#19 transexual*

#20 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#21 transvestism
#22 transvestite*
#23 gender dysphoria
#24 GENDER-DYSPHORIA
#25 gender dysphoric
#26 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#27 gender identity disorder
#28 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#29 gid
#30 GID
#31 GID-N
#32 GID-US
#33 gender transformation
#34 GENDER-TRANSFORMED
#35 gender-variant
#36 GENDER-VARIANT
#37 transgender*
#38 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#39 trans-gender*
#40 cross dresser
#41 (CROSS-DRESSER) or (CROSS-DRESSERS)
#42 cross sex
#43 CROSS-SEX
#44 intersexuality
#45 INTERSEXUALITY
#46 gender transition
#47 transition
#48 or/6-47
#49 general practitioner
#50 gp
#51 (GENERAL-PRACTITIONER) or (GENERAL-PRACTITIONERS)
#52 psychological service*
#53 (PSYCHOLOGICAL-SERVICES) or (PSYCHOLOGICAL-SERVICE)
#54 referral
#55 REFERRAL
#56 waiting list*
#57 WAITING-LIST
#58 assessment*
#59 ASSESSMENT
#60 psychiatrist*
#61 PSYCHIATRIST
#62 psychologist*
#63 PSYCHOLOGIST
#64 counsellor*

#65 COUNSELLOR
#66 diagnosis
#67 DIAGNOSIS
#68 or/#49-#67
#69 #5 AND #48
#70 #68 AND #69 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(female-to-male OR ftm)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=(general practitioner OR GP)
5 TS=psychological service*
6 TS=referral
7 TS=waiting list*
8 TS=assessment*
9 TS=psychiatrist*
10 TS=psychologist*
11 TS=counsellor
12 TS=diagnosis
13 #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4
14 #13 AND #3
Language=English; Timespan=1980-2005

Search 7

Cochrane

#1 female-to-male OR ftm in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 review in Record Title or review in Abstract in all products
#29 MeSH descriptor Therapeutics explode all trees in MeSH products
#30 treatment* in Record Title or treatment* in Abstract in all products
#31 real life experience* in Record Title or real life experience* in Abstract in all products
#32 endocrine in Record Title or endocrine in Abstract in all products
#33 hormone* in Record Title or hormone* in Abstract in all products
#34 speech therap* in Record Title or speech therap* in Abstract in all products
#35 MeSH descriptor Speech Therapy explode all trees in MeSH products
#36 or/28-35
#37 #27 AND #36 1980 to 2005

Embase

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/

5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 reassess$.ti,ab.
43 sex reassignment surgery.ti,ab.
44 exp Sex Transformation/
45 surgical reassignment.ti,ab.
46 exp SURGERY/
47 surgery.ti,ab.
48 exp Preoperative Evaluation/
49 pre operative.ti,ab.
50 or/42-49
51 41 and 50
52 limit 52 to (human and english language and yr="1980 - 2006")

Medline

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 sex change.ti,ab.
4 sex$ reassignment.ti,ab.
5 gender reassignment.ti,ab.
6 reassignment surgery.ti,ab.
7 Transsexualism/
8 trans-sexual$.ti,ab.
9 transexual$.ti,ab.
10 transsexual$.ti,ab.
11 trans sex.ti,ab.
12 Transvestism/
13 transvestism.ti,ab.
14 transvestite$.ti,ab.
15 Gender Identity/
16 gender dysphoria.ti,ab.
17 gender dysphoric.ti,ab.
18 "Sexual and Gender Disorders"/
19 gender identity disorder$.ti,ab.
20 GID.ti,ab.
21 gender transform$.ti,ab.
22 transgender$.ti,ab.
23 trans-gender$.ti,ab.
24 cross dress$.ti,ab.
25 cross sex.ti,ab.
26 Hermaphroditism/
27 intersexuality.ti,ab.
28 gender transition.ti,ab.
29 or/3-28
30 exp Adult/
31 adult.ti,ab.
32 grown-up.ti,ab.
33 or/30-32
34 1 or 2
35 29 and 34
36 33 and 35
37 exp Therapeutics/
38 treatment$.ti,ab.
39 review$.ti,ab.
40 real life experience$.ti,ab.
41 endocrine$.ti,ab.
42 hormone$.ti,ab.
43 Hormones/
44 speech therap$.ti,ab.
45 Speech Therapy/
41 or/37-45
42 36 and 41
43 limit 42 to (humans and english language and yr="1980 - 2005")

Psycinfo
#1 female-to-male
#2 ftm
#3 (FEMALE-TO-MALE) or (FEMALE-TO-MALES)
#4 (FTM) or (FTMS) or (FTMS-A) (27 records)
#5 or1-4
#6 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#7 sex chang*
#8 sexual reassignment
#9 sex reassignment
#10 SEX-REASSIGNMENT
#11 gender reassignment
#12 GENDER-REASSIGNMENT
#13 REASSIGNMENTS
#14 reassignment surger*
#15 trans-sexual*
#16 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#17 trans sex
#18 transsexual*
#19 transexual*
#20 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#21 transvestism
#22 transvestite*
#23 gender dysphoria
#24 GENDER-DYSPHORIA
#25 gender dysphoric
#26 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#27 gender identity disorder
#28 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#29 gid
#30 GID
#31 GID-N
#32 GID-US
#33 gender transformation
#34 GENDER-TRANSFORMED
#35 gender-variant
#36 GENDER-VARIANT (7 records)
#37 transgender*
#38 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#39 trans-gender*
#40 cross dresser
#41 (CROSS-DRESSER) or (CROSS-DRESSERS)
#42 cross sex
#43 CROSS-SEX

#44 intersexuality
#45 INTERSEXUALITY
#46 gender transition
#47 transition
#48 or/6-47
#49 #5 AND #48
#50 REVIEW
#51 review*
#52 TREATMENT
#53 treatment*
#54 real life experience
#55 endocrine
#56 ENDOCRINE
#57 hormone*
#58 'Hormones-'
#59 HORMONE
#60 speech therap*
#61 (SPEECH-THERAPISTS) or (SPEECH-THERAPY)
#62 or/#50-#61
#65 #49 AND #62 and (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=VERY-OLD) or (AG=YOUNG-ADULTHOOD) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(female-to-male OR ftm)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=review*
5 TS=treatment
6 TS=real life experience*
7 TS=endocrine
8 TS=hormone*
9 TS=speech therap*
10 #9 OR #8 OR #7 OR #6 OR #5 OR #4
11 #10 AND #3
Language=English; Timespan=1980-2005

Search 8

Cochrane

#1 female-to-male OR ftm in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 reassessment in Record Title or reassessment in Abstract in all products
#29 sex reassignment surgery in Record Title or sex reassignment surgery in Abstract in all products
#30 surgical reassignment in Record Title and surgical reassignment in Abstract in all products
#31 surgery in Record Title or surgery in Abstract in all products
#32 MeSH descriptor Surgery explode all trees in MeSH products
#33 pre operative in Record Title or pre operative in Abstract in all products
#34 pre-operative in Record Title or pre-operative in Abstract in all products
#35 or/28-34
#36 #27 AND 35 1980 to 2005

Embase

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/

5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 reassess$.ti,ab.
43 sex reassignment surgery.ti,ab.
44 exp Sex Transformation/
45 surgical reassignment.ti,ab.
46 exp SURGERY/
47 surgery.ti,ab.
48 exp Preoperative Evaluation/
49 pre operative.ti,ab.
50 or/42-49
51 41 and 50
52 limit 51 to (human and english language and yr="1980 - 2006")

Medline

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 sex change.ti,ab.
4 sex$ reassignment.ti,ab.
5 gender reassignment.ti,ab.
6 reassignment surgery.ti,ab.
7 Transsexualism/
8 trans-sexual$.ti,ab.
9 transexual$.ti,ab.
10 transsexual$.ti,ab.
11 trans sex.ti,ab.
12 Transvestism/
13 transvestism.ti,ab.
14 transvestite$.ti,ab.
15 Gender Identity/
16 gender dysphoria.ti,ab.
17 gender dysphoric.ti,ab.
18 "Sexual and Gender Disorders"/
19 gender identity disorder$.ti,ab.
20 GID.ti,ab.
21 gender transform$.ti,ab.
22 transgender$.ti,ab.
23 trans-gender$.ti,ab.
24 cross dress$.ti,ab.
25 cross sex.ti,ab.
26 Hermaphroditism/
27 intersexuality.ti,ab.
28 gender transition.ti,ab.
29 or/3-28
30 exp Adult/
31 adult.ti,ab.
32 grown-up.ti,ab.
33 or/30-32
34 1 or 2
35 34 and 29
36 35 and 33
37 reassess$.ti,ab.
38 sex reassignment surgery.ti,ab.
39 surgical reassignment.ti,ab.
40 exp Surgery/
41 surgery.ti,ab.
42 exp Preoperative Care/
43 pre operative.ti,ab.
44 or/37-43
45 36 and 44
46 limit 45 to (humans and english language and yr="1980 - 2005")

Psycinfo

#1 female-to-male

#2 ftm
#3 (FEMALE-TO-MALE) or (FEMALE-TO-MALES)
#4 (FTM) or (FTMS) or (FTMS-A) (27 records)
#5 or1-4
#6 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#7 sex chang*
#8 sexual reassignment
#9 sex reassignment
#10 SEX-REASSIGNMENT
#11 gender reassignment
#12 GENDER-REASSIGNMENT
#13 REASSIGNMENTS
#14 reassignment surger*
#15 trans-sexual*
#16 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#17 trans sex
#18 transsexual*
#19 transexual*
#20 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#21 transvestism
#22 transvestite*
#23 gender dysphoria
#24 GENDER-DYSPHORIA
#25 gender dysphoric
#26 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#27 gender identity disorder
#28 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#29 gid
#30 GID
#31 GID-N
#32 GID-US
#33 gender transformation
#34 GENDER-TRANSFORMED
#35 gender-variant
#36 GENDER-VARIANT (7 records)
#37 transgender*
#38 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#39 trans-gender*
#40 cross dresser
#41 (CROSS-DRESSER) or (CROSS-DRESSERS)
#42 cross sex
#43 CROSS-SEX
#44 intersexuality
#45 INTERSEXUALITY

#46 gender transition
#47 transition
#48 or/6-47
#49 #5 AND #48
#50 reassessment
#51 (REASSESSMENTS) or (REASSESSMENT)
#52 sex reassignment surgery
#53 surgical reassignment
#54 surgery
#55 SURGERY
#56 pre operative
#57 PREOPERATIVE
#58 or/#50-#57
#61 #49 AND #58

SSCI
1 TS=(female-to-male OR ftm)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=reassessment
5 TS=sex reassignment surgery
6 TS=surgical reassignment
7 TS=surgery
8 TS=(pre-operative OR pre operative)
9 #4 OR #5 OR #6 OR #7 OR #8
10 #9 AND #3
Language=English; Timespan=1980-2005

Search 9

Cochrane

#1 female-to-male OR ftm in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26
#28 post operative in Record Title or post operative in Abstract in all products
#29 post-operative in Record Title or post-operative in Abstract in all products
#30 MeSH descriptor Postoperative Care explode all trees in MeSH products
#31 post surgery in Record Title or post surgery in Abstract in all products
#32 post-surgery in Record Title or post-surgery in Abstract in all products
#33 MeSH descriptor Reconstructive Surgical Procedures explode all trees in MeSH products
#34 reconstructive surgery in Record Title or reconstructive surgery in Abstract in all products
#35 or/28-34
#36 #27 AND #35 1980 to 2005

Embase

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/

5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
7 gender reassignment.ti,ab.
8 reassignment surgery.ti,ab.
9 exp Transsexualism/
10 trans-sexual$.ti,ab.
11 trans sex.ti,ab.
12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.
16 transvestite$.ti,ab.
17 exp Gender Dysphoria/
18 gender dysphoria.ti,ab.
19 gender dysphoric.ti,ab.
20 exp Gender Identity Disorder/
21 gender identity disorder.ti,ab.
22 gid.ti,ab.
23 gender transformation.ti,ab.
24 gender-variant.ti,ab.
25 transgender$.ti,ab.
26 trans-gender$.ti,ab.
27 cross dresser.ti,ab.
28 cross sex.ti,ab.
29 Hermaphroditism/
30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 Postoperative Complication/ or Postoperative Pain/ or Postoperative Period/
43 post operative.ti,ab.
44 post surgery.ti,ab.
45 plastic surgery/
46 reconstructive surgery.ti,ab.
47 or/42-46
48 41 and 47
49 limit 48 to (human and english language and yr="1980 - 2006")

Medline

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 sex change.ti,ab.

4 sex$ reassignment.ti,ab.
5 gender reassignment.ti,ab.
6 reassignment surgery.ti,ab.
7 Transsexualism/
8 trans-sexual$.ti,ab.
9 transexual$.ti,ab.
10 transsexual$.ti,ab.
11 trans sex.ti,ab.
12 Transvestism/
13 transvestism.ti,ab.
14 transvestite$.ti,ab.
15 Gender Identity/
16 gender dysphoria.ti,ab.
17 gender dysphoric.ti,ab.
18 "Sexual and Gender Disorders"/
19 gender identity disorder$.ti,ab.
20 GID.ti,ab.
21 gender transform$.ti,ab.
22 transgender$.ti,ab.
23 trans-gender$.ti,ab.
24 cross dress$.ti,ab.
25 cross sex.ti,ab.
26 Hermaphroditism/
27 intersexuality.ti,ab.
28 gender transition.ti,ab.
29 or/3-28
30 exp Adult/
31 adult.ti,ab.
32 grown-up.ti,ab.
33 or/30-32
34 1 or 2
35 34 and 29
36 35 and 33
37 Pain, Postoperative/ or Postoperative Care/ or Postoperative Complications/
38 post operative.ti,ab.
39 post surgery.ti,ab.
40 Surgery, Plastic/ or Reconstructive Surgical Procedures/
41 reconstructive surgery.ti,ab.
42 or/ 37- 41
43 36 and 42
44 limit 44 to (humans and english language and yr="1980 - 2005")

PsycINFO
#1 female-to-male
#2 ftm
#3 (FEMALE-TO-MALE) or (FEMALE-TO-MALES)
#4 (FTM) or (FTMS) or (FTMS-A) (27 records)
#5 or1-4
#6 (SEX-CHANGED) or (SEX-CHANGING) or (SEX-CHANGE)
#7 sex chang*

#8 sexual reassignment
#9 sex reassignment
#10 SEX-REASSIGNMENT
#11 gender reassignment
#12 GENDER-REASSIGNMENT
#13 REASSIGNMENTS
#14 reassignment surger*
#15 trans-sexual*
#16 (TRANS-SEXUAL) or (TRANS-SEXUALISM) or (TRANS-SEXUALLY) or (TRANS-SEXUALS)
#17 trans sex
#18 transsexual*
#19 transexual*
#20 (TRANSVESTITISM) or (TRANSVETISM) or (TRANSVETITE) or (TRANSVETITISM) or (TRANSVESTITISMUS)
#21 transvestism
#22 transvestite*
#23 gender dysphoria
#24 GENDER-DYSPHORIA
#25 gender dysphoric
#26 (GENDER-DYSPHORIC) or (GENDER-DYSPHORICS)
#27 gender identity disorder
#28 (GENDER-IDENTITY-DISORDER) or (GENDER-IDENTITY-DISORDERED)
#29 gid
#30 GID
#31 GID-N
#32 GID-US
#33 gender transformation
#34 GENDER-TRANSFORMED
#35 gender-variant
#36 GENDER-VARIANT (7 records)
#37 transgender*
#38 (TRANSGENDER) or (TRANSGENDER-IDENTIFIED) or (TRANSGENDER-SPECIFIC) or (TRANSGENDERED) or (TRANSGENDERED-WERE) or (TRANSGENDEREDNESS) or (TRANSGENDERING) or (TRANSGENDERISM) or (TRANSGENDERIST) or (TRANSGENDERISTS) or (TRANSGENDERNESS) or (TRANSGENDERS)
#39 trans-gender*
#40 cross dresser
#41 (CROSS-DRESSER) or (CROSS-DRESSERS)
#42 cross sex
#43 CROSS-SEX
#44 intersexuality
#45 INTERSEXUALITY
#46 gender transition
#47 transition
#48 or/6-47
#49 #5 AND #48
#50 (POST-OPERATION) or (POST-OPERATIVE) or (POST-OPERATIVELY) or (POST-OPERATIVEN) or (POST-OPERATIEVE)

#51 post operative* or post-operative*
#52 (POST-SURGERY) or (POST-SURGICAL) or (POST-SURGICALLY)
#53 post surg* or post-surg*
#54 reconstructive surgery
#55 or/#50-#54
#58 #49 AND #55 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

SSCI
1 TS=(female-to-male OR ftm)
2 TS=(sex change OR sex* reassignment OR gender reassignment OR reassignment surgery OR trans-sexual* OR trans sex OR transsexual* OR transexual* OR transvestism OR transvestite* OR gender dysphori* OR gender identity disorder OR gid OR gender transformation OR gender-variant OR transgender* OR trans-gender* OR cross dresser OR cross sex OR intersexuality OR gender transition OR transition)
3 #1 AND #2
4 TS=post operative
5 TS=post surgery
6 TS=reconstructive surgery
7 #4 OR #5 OR #6
8 #3 AND #7
Language=English; Timespan=1980-2005

Search 10

Cochrane

#1 female-to-male OR ftm in All Fields in all products
#2 sex change in Record Title or sex change in Abstract in all products
#3 sexual reassignment in Record Title or sexual reassignment in Abstract in all products
#4 MeSH descriptor Sexual and Gender Disorders explode all trees in MeSH products
#5 gender reassignment in Record Title or gender reassignment in Abstract in all products
#6 reassignment surgery in Record Title or reassignment surgery in Abstract in all products
#7 MeSH descriptor Transsexualism explode all trees in MeSH products
#8 trans-sexual* in Record Title or trans-sexual* in Abstract in all products
#9 trans sex in Record Title or trans sex in Abstract in all products
#10 trans sex in Record Title or trans sex in Abstract in all products
#11 transexual* in Record Title or transexual* in Abstract in all products
#12 MeSH descriptor Transvestism explode all trees in MeSH products
#13 transvestism in Record Title or transvestism in Abstract in all products
#14 transvestite* in Record Title or transvestite* in Abstract in all products
#15 MeSH descriptor Gender Identity explode all trees in MeSH products
#16 gender dysphori* in Record Title or gender dysphori* in Abstract in all products
#17 MeSH descriptor Hermaphroditism explode all trees in MeSH products
#18 gender identity disorder in Record Title or gender identity disorder in Abstract in all products
#19 gender-variant in Record Title or gender-variant in Abstract in all products
#20 transgender* in Record Title or transgender* in Abstract in all products
#21 cross dresser in Record Title or cross dresser in Abstract in all products
#22 cross sex in Record Title or cross sex in Abstract in all products
#23 intersexuality in Record Title or intersexuality in Abstract in all products
#24 gender transition in Record Title or gender transition in Abstract in all products
#25 transition in Record Title or transition in Abstract in all products
#26 OR/#2 - #25
#27 #1 AND #26 from 1980 to 2005.

Embase

1 female-to-male.ti,ab.
2 ftm.ti,ab.
3 exp sex transformation/
4 sex reassignment surgery/
5 sex$ reassignment.ti,ab.
6 sex change.ti,ab.
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12 transsexual$.ti,ab.
13 transexual$.ti,ab.
14 exp Transvestism/
15 transvestism.ti,ab.

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19 gender dysphoric.ti,ab.
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30 intersexuality.ti,ab.
31 gender transition.ti,ab.
32 transition.ti,ab.
33 or/3-32
34 1 or 2
35 33 and 34
36 Adult/
37 adult.ti,ab.
38 grown-up.ti,ab.
39 grown.ti,ab.
40 or/36-39
41 35 and 40
42 limit 41 to (human and english language and yr="1980 - 2006")

Medline

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13 transvestism.ti,ab.
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17 gender dysphoric.ti,ab.
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20 GID.ti,ab.
21 gender transform$.ti,ab.

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23 trans-gender$.ti,ab.
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27 intersexuality.ti,ab.
28 gender transition.ti,ab.
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31 adult.ti,ab.
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33 or/30-32
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35 29 and 34
36 33 and 35
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#44 intersexuality
#45 INTERSEXUALITY
#46 gender transition
#47 transition
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#49 #5 AND #48 AND (LA=ENGLISH) and ((AG=ADULTHOOD) or (AG=MIDDLE-AGE) or (AG=THIRTIES) or (AG=18-YRS-AND-OLDER) or (AG=18-29-YRS) or (AG=30-39-YRS) or (AG=40-64-YRS) or (AG=65-YRS-AND-OLDER) or (AG=85-YRS-AND-OLDER)) and (PO=HUMAN) and (PY=1980-2005)

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3 #1 AND #2
Language=English; Timespan=1980-2005

Appendix 2. Evidence concerning Gender Reassignment Surgery

Study design

Study source	Design and level of evidence	Subject sample description	Outcome measures
Beatrice (1985[112]) USA	Design: Post-test quasi-experimental Level of evidence: III	Four groups of biological males: Male heterosexual (n = 13); Transvestite (n = 13); Pre-op MTF transsexual (n = 15); Post-op MTF transsexual (n = 13) 10 subjects in each group interviewed	Psychometric testing for psychological functioning
Blanchard (1989[113]) Canada	Design: Post-test quasi-experimental Level of evidence: III	Post-operative transsexuals (MTF/FTM) with homo/heterosexual orientation (n = 111) Vaginoplasty for males and mastectomy for females Homosexual (as biological females, then FTM) n = 61 Homosexual (as biological males, then MTF) n = 36 Heterosexual (as biological males, then MTF) n = 14	Post-operative regret, demographic information on age, education, employment from self-administrated questionnaire
Cohen-Kettenis (1997[114]) Holland	Design: Non controlled study (baseline data used for comparison) Level of evidence: III	7 MTF 15 FTM Adolescent transsexual people	Gender dysphoria scale, Body image scale, Psychological functioning scale, Semi-structured interview - satisfaction, social life, relationships, sexuality, work status, occupational status Follow up : mean 2.6 years
Eldh (1997[115]) Sweden	Design: Non controlled study (no comparison with baseline) Level of evidence: III	Pre-1986: 47 MTF 25 FTM After 1986: 46 MTF 57 FTM	Medical records - complication rates, pre-op characteristics. Questionnaire - functional and cosmetic results, sexual function, social adaptation, family status, working and economic circumstances. Sent only to those attending one hospital (n=136) Follow up : mean 5.8 years
Hunt (1980[116]) USA	Design: Non controlled study (baseline data used for comparison) Level of evidence: III	17 MTF	Interview, MMPI (both before and after surgery), Hunt and Hampson standardised rating scale Mean time since surgery: 8.2 years
Kockott and Fahrner (1987[117]) Germany	Design: Post-test quasi-experimental Level of evidence: III	Of n = 80 patients, 59 interviewed Transsexuals having SR surgery (n = 32) Surgical (SU): 18 MTF and 14 FTM Transsexuals who had not had SR (N = 26) Hesitating (HP): 6 MTF, 1 FTM Unchanged wish for SR (UWS): 9 MTF, 3 FTM not wanting SR at assessment, living as initial gender (IG: 4 MTF, 3 FTM	Demographic, socioeconomic, contentment with aspired gender, gender role adaptation, psychological adjustment from questionnaire/ interview and psychometric testing

Kuiper (1988[118]) Holland	Design: Non controlled study (no comparison with baseline) Level of evidence: III	105 MTF 36 FTM	Semi-structured interviews (independent investigators), Subjective well being, self perception, integration of gender role, confidence in new gender role, body satisfaction, attitude towards surgical intervention, evaluation of therapy, suicide, Body Image scale Mean time since surgery not reported
Landen (1998[110]) Sweden	Design: Retrospective cohort Level of evidence: III	Applications for GRS MTF/FTM from pre 1972-1996 Applied for and received surgery or surgery reversal n = 218 (13 in GRS regret group; 205 in non-GRS regret group)	Prognostic factors in sex reassignment derived from medical records, Demographic data, Education, Employment, Medical history, Diagnosis-gender identity disorder
Lindemalm (1986[119]) Sweden	Design: Non controlled study (baseline data used for comparison) Level of evidence: III	15 MTF	Surgery and Sexual adjustment - outcome of surgery, strength of libido, sexual activity, number of partners, capacity for orgasm, object choice, partner relations, overall rating of sexual adjustment, Psychosocial outcome - working capacity, mental health, Semi-structured interview, Medical records, Physical examination Median follow up : 12 years (min. 6 years)
Mate-Cole (1988[120]) UK	Design: Cross-sectional, non controlled study (no comparison with baseline) Level of evidence: III	Male transsexual people Group 1 (n = 50), undergoing assessment Group 2 (n = 50), changed gender role, on waiting list for surgery Group 3 (n = 50), post-operative patients - at least 6 months after surgery	Psychoneurotic symptoms (Crown-Crisp Experiential Index), Personality characteristics (Berm Sex Role Inventory), Tested by psychologist and psychiatrist
Mate-Kole (1990[1]) UK	Design: Prospective non-randomised controlled study Level of evidence: II	Pre-operative male transsexuals approved for surgery 40 male transsexual people Evaluated after 2 years. Alternate patients on waiting list allocated to: Group 1: offered early surgery n = 20. Treated with a single stage genital surgery operation Group 2: offered routine surgery n = 20 and still on waiting list at evaluation two years later	Assessment of social, sexual activity and personal history, personality and psychoneurotic symptoms, Standard history form: personal and family medical and psychiatric history, education, work record, social and sexual relationships, onset and progress of transsexualism, Psychoneurotic symptoms (Crown-Crisp Experiential Index), includes free-floating anxiety, phobic anxiety, obsessionality, somatic anxiety, depression, and hysteria, Personality characteristics (Berm Sex Role Inventory), 20 items are stereotypically feminine and 20 are stereotypically masculine Measured at first attendance, on acceptance to waiting list, and after 2 years.
Rakic (1996[111]) Yugoslavia	Design: Non controlled study (no comparison with baseline) Level of evidence:	22 MTF 10 FTM	Self report questionnaire - body image, relationships, sexual activity, occupational functioning Follow up : mean 22 months

	III		
Ross (1989[121]) Australia	Design: Non controlled study (no comparison with baseline) Level of evidence: III	31 MTF	Psychosocial evaluation - includes economic variables, interpersonal relationships, psychopathology, sexual adjustment, additional surgery and current family reactions (Hunt and Hampson rating scale), Five point visual analogue scale to include voice, breast size/shape, genital hair growth, cosmetic appearance, urinary stream, urethral meatus, urinary incontinence, sexual satisfaction Mean time after surgery: 3.7 years (range 2-6 years)
Smith (2001[122]) Netherlands	Design: Before/after quasi-experimental Level of evidence: III	Two groups: Adolescent having GRS within 1 year of latest treatment (7 MTF and 13 FTM) Adolescents not approved for GRS due to rejection, withdrawal of request (13 MTF and 8 FTM)	Psychometric testing for psychological functioning, post-treatment evaluation, body satisfaction, gender dyphoria
Snaith (1994[123]) UK	Design: Non controlled study (no comparison with baseline) Level of evidence: III	12 MTF	Structured interview by independent assessor, Attitudes to experience and management of their gender reassignment, Social relationships, self confidence, enjoyment of leisure activities, Self-assessment scales (GHQ-28 and HAD) Mean time lapse since operation 19 months
Sorensen (1981[124]) Denmark	Design: Post-test quasi-experimental Level of evidence: III	Post-operative MTF transsexuals (n = 29) Of the 23 followed-up, 14 defined as “core group” and 9 as “non-core” group Core group symptomatology described as stable defence having pseudofeminine narcissism, stable ego strength, intact reality testing and poor genital interest	Employment, socioeconomic, post-operative satisfaction, psychological adjustment from interview questionnaire
Stein (1990[67]) USA	Design: Non controlled study (baseline data used for comparison) Level of evidence: III	22 MTF	Structured interview - economic, social, sexual, function, cosmesis, postoperative recovery, Information from records taken where unavailable for interview, Physical examination (cosmesis, complications) Follow up : range 0.4 to 3.8 years
Tsoi (1993[125]) Singapore	Design: Retrospective cohort, non controlled study (no comparison with baseline) Level of evidence: III	Post-operative transsexuals: 45 MTF 36 FTM	Semi-structured questionnaire of quality of life indicators: work, partner, cross dressing, sex organ function, satisfaction with surgery, satisfaction with new sex status Follow up : 2-5 years

Table adapted from reviews by Best and Stein (1998[3]); and Day (2002[22]).
Note: level of evidence is based on NHS Centre for Reviews and Dissemination group recommendations (2001[18]).

Results

Reference design	Results				
Beatrice (1985[112]) USA	Outcomes (Mean scores)	Male hetero-sexual	Transvestite	Pre-op Trans-sexual	Post-op Trans-sexual
	Minnesota Multiphasic Personality Inventory				
	Masculine-feminine	69.1	81.9	81.5	79.6
	Paranoia	56.2	55.6	59.6	63.0
	Schizophrenia	51.6	59.6	65.1	68.8
	$p < .003$, $p < .005$, $p < .02$ All measures showed no significant difference between groups				
Blanchard (1989[113]) Canada	Outcomes (N)	Post-operative regret (N)		P-value	
	Bio F (homosexual)	0/61			
	Bio M (homosexual)	0/36			
	Bio M (heterosexual)	4/14			
	Post-operative regret correlation with heterosexual preference	$r = 0.51$		$P < .001$	
Cohen-Kettenis (1997[114]) Holland	Mean gender dysphoria scores were found to be significantly lower post-surgery compared to pre-surgery. Significant increase in extroversion score on psychological scale post-surgery compared to pre-surgery (both MTF and FTM combined). There was 100% satisfied with their general appearance, 60% satisfied with vaginoplasty (remaining 40% not reported). None of the patients expressed feelings of regret. Results also presented for occupational status, living situation, relationships, social life (does not compare with pre-surgery situation).				
Eldh (1997[115]) Sweden	Of MTF who completed questionnaire (n = 50), 31 (62%) had no sexual identity problem, 17 out of 50 (34%) stated that their sex life was acceptable, and 28 (56%) were fully accepted by their families, friends and other people. 64/74 patients (both MTF and FTM) who responded to questionnaire were content with overall life situation while 10 were discontented. Two MTF regretted the gender reassignment and continue to live in their previous sexual appearance socially. Two MTFs committed suicide postoperatively. Complications included infection (12%), haemorrhage (10%), fistula (1%), partial necrosis (3%), vaginal stenosis (4%), prolapse of scrotal flap (4%) and long urethra (12%) - post-1986 rates. In 31 cases out of 175 (18%) surgical correction was required.				
Hunt (1980[116]) USA	The patients as a whole improved in the areas of economic adjustment, interpersonal relationships, sexual adjustment and acceptance by family E.g. mean scores for economic adjustment moved from 3.2 to 4.5 (on 6 point scale). There were no changes in levels of psychopathology as measured by criminal activity, drug use and degree of psychopathology. Little difference in MMPI scores between pre- and post-surgery scores. None of the 17 transsexual people regretted the decision to have surgery. 2 subjects had doubt about their sense of being female, but none wished to be other than female. 2 subjects attempted suicide (judged to be unrelated to surgery).				
Kockott and Fahrner (1987[117]) Germany	Outcomes (% patients)	UWS group	HP group	IG group	SU group
	Financial sufficiency				
	Heterosexual/former partners	50%	100%		
	Cross-gender identity	0%	100%		
	Sexual satisfaction		43%		
	Psychological adjustment (difficulty)	100%	17%	86%	
	Follow-up baseline				$P < .05$

		NS	NS	NS
	No employment			6%
	Financial sufficiency	33%		93%
	Content with aspired gender	50%		97%
	Gender role adaption	50%		94%
	Sexual satisfaction	42%		87%
	Significant difference at 5% level	45%		
Kuiper (1988[118]) Holland	Of MTF who had completed treatment (n = 55): 60% 'happy' or 'very happy', 2% 'very unhappy'; 56% never had doubts about sense of being a woman, 44% hardly had any doubts; 33% very satisfied with own behaviour as a woman; 4% dissatisfied with own behaviour as a women; 40% thought integration 'very good', 42% 'good', 4% 'very poor'; 87% much confidence in new gender role, 11% moderate confidence, 2% no confidence; 91% no doubts about having operation, 9% occasional but moderate doubts; 18% very satisfied with care provided, 40% satisfied, 13% dissatisfied, 13% very dissatisfied; 18% attempted suicide since therapy. Those who had completed surgery were not happier or less happy than those still in the initial phase of therapy. None of the subjects regretted decision to undergo surgery.			
Landen (1998[110]) Sweden	Outcomes	GRS regret group C.F. non-regret group		P-Value
	Predictor (logistic regression B/SE)			
	Poor family support	B = 2.4 (1.08)		P = .026
	Non-core transsexual group	B = 1.4 (0.70)		P = .046
	Conditions bordering on transvestitism and homosexuality rather than extreme transsexualism as differential diagnosis from DSM concept			
Lindemalm (1986[119]) Sweden	Patient reported outcome of surgery: 'good' (2), 'fair ' (1), 'poor' (1), 'very poor' (8). Overall rating of sexual adjustment: 1 pt deteriorated, and 3 were improved. The majority of pts (9) were judged unchanged, most of which remained as poor. Global psychological assessment: 1 had deteriorated, 4 had improved, and majority of patients (8) were judged unchanged. Repentance : 1 definite repentance, 3 signs of ambivalence about sex change or expressed repentance, 9 had no repentance			
Mate-Cole (1988[120,120]) UK	The operated group scored sig. lower on all subscales of the CCEI than both the assessment and waiting list groups, $p < 0.05$ (max difference approx. 6 points) On the femininity scale of BSRI, the assessment group scored sig. higher than those on waiting list ($p < 0.05$), but were not sig. different to postoperative group. On masculinity scale of BSRI, the assessment group scored sig. lower than both the waiting list and the operated group ($p < 0.05$).			
Mate-Kole (1990[1]) UK	At 2 year follow up, the 'early' group were significantly more active than 'routine' group in sports, visits to family, dancing, eating out and sexual activity (significance level not reported). No differences were seen in the other items of social activities surveyed - social drinking, work, cinema, club membership, church attendance etc. The 'routine' group showed a significant trend towards unemployment compared to baseline, while no difference was seen in the 'early' group. Scores on the BSRI did not change significantly in either group. Scores on CCEI increased in operated group and decreased in un-operated group - mean change between groups was stat. significant $p<0.05$ (maximum difference on subscale was 5 points).			

	Outcomes (N range) Changes in social activity over 2 year period (sport, social visits, dancing, eating out) More active Same Less active P-value (work record N) More active Same Less active P-Value	Early surgery Post-operative 15-16 2-4 2 p < .01 0 19 NS	Routine surgery: Still on WL 1-3 14-16 3-4 NS 0 14 6 p < .05	
Rakic (1996[111]) Yugoslavia	All patients were satisfied with the sex change. 50% were satisfied with the way their bodies looked, 32% were satisfied to some extent, and 18% were not satisfied. Greater proportion satisfied with interpersonal relationships (0% before surgery to 50% after). Greater proportion successful in finding sexual partners (27% before surgery to 73% after). Similar proportion had a job pre- and post- surgery (32%). Greater proportion was full time students (14% before surgery and 36% after).			
Ross (1989[121]) Australia	Psychosocial evaluation does not compare outcomes with pre-surgery status. Common problems included erectile tissue around the urethral meatus (6 pts), urethral stenosis (3 pts), incontinence (4 pts) and spraying of urine (3 pts) (Visual analogue scale). Regression analysis performed to determine predictors of postoperative psychopathology.			
Smith (2001[122]) Netherlands	Outcomes (mean score/sd) gender dysphoia T NT Body dissatisfaction primary sex features T NT Psychological functioning (Depression) T NT	Pretest 56.3 (4.6) 46.7 (13.9) 17.9 (3.0) 16.1 (5.1) 28.3 (9.8) 31.8 (15.6)	Posttest 13.8 (2.3) 31.1 (14.9) 10.2 (5.7) 13.4 (4.9) 21.6 (3.7) 35.2 (14.7)	P-Value P < .001 P = .002 P < .001 P = .004 P = .001 P = .63
Snaith (1994[123]) UK	All GHQ and HAD ratings were within range for good emotional health. Out of 11 patients, one did not record any improvement in the areas of social relationships, self confidence and enjoyment of leisure activities. All other patients had 'some improvement' or 'marked improvement'. All patients expressed a positive outlook and were relieved that surgery had been available to them			
Sorensen (1981[124]) Denmark	Post-operative outcomes (N) Economic situation Good Bad Neighbourhood acceptance: No problems Problem Surgical outcome satisfaction: Satisfaction Dissatisfaction	Core grp 12 2 11 3 13 6	Non-core grp 2 7 2 7 3 1	P-value P < .01 P < .01 P < .01

	Psychic condition:			
	Aggravated	0	4	
	Improved/Unchanged	14	5	P < .01
Stein (1990[67]) USA	Patient evaluation of cosmesis: 3 'excellent', 4 'very good', 5 'good', 1 'fair', 1 result not known. Doctor ratings were largely in agreement. Difficult to interpret outcomes of psychological interview (poorly presented in paper). 4 patients (29%) had vaginal stenosis, no instances of rectal fistula, 1 patient had spontaneous pneumothorax, and 1 patient had urethral stenosis.			
Tsoi (1993[125]) Singapore	'Better than before' or 'same as before' outcome in work/finance (96%), partner relationship (67%), sexual activity (64%), sex organ function (91%), sex status satisfaction (82%).			
	Outcomes:	Male Transsexual	Female Transsexual	P-value
	Good/satisfactory adjustment in (%) sex organ functioning	91%	39%	P < .001
	Pre-operative variables and outcomes (male transsexuals)	Good outcome	Satisfactory outcome	
	Age at onset (mean years and SD):			
	Petting	16.4 (4.2)	14.0 (2.5)	P < .05
	Cross-dressing	17.9 (3.3)	15.5 (4.7)	P < .10

Table adapted from reviews by Best and Stein (1998[3]); and Day (2002[22]).

Appendix 3: List of international follow-up studies after sex reassignment surgery between 1961-1991

Author	Total N		Op N		Follow up N		Follow up time	
	MTF	FTM	F	M	F	M	F (mean)	M (mean)
Hertz, Tillinger & Westmann (1961[126]) Sweden			2	3	2	3	8.5 (3.5-16)	6.8 (6.5-7.0)
Benjamin (1964a[127]) USA	(91)	(15)			31		5 (0.2-12)	
Benjamin (1964b[128]) USA	(108)	(17)	44		43		(0.3-12)	
Benjamin (1964c[129]) USA	(108)	(17)	44	7	43	7		
Gunn-Sechehaye (1964[130]) Switzerland	(8)		4		4			
Pauly (1965[131]) USA	(603)	(162)	94	19	37		Review	
Benjamin (1966[132]) USA	(172)		51-62	10-11	46	15	5-6 (3-13)	
Benjamin (1967[133]) USA	(242)	(28)	76	20	73		(0.3) 3	
Pomeroy (1967[134]) USA	(25)		11		8		2 (0.3-11)	
Walinder (1967[135]) Sweden	(30)	(13)	5	8	5	8	1.7	3.5
Money & Brennan (1968[136]) USA		(6)		5		5		2.2 (0.3-3.5)
Money & Primrose (1968[137]) USA	(14)		12					
Pauly (1968[138]) USA	(342)	(56)	124	24	121		Review	
Vogt (1968[139]) Norway		(>=5)		5		5		6.8 (3-13)[1]
Walser, 1968[140]) Switzerland	(8)	(6)	7	5	7	5	14.4 (0-34)	6.4 (0-14)
Fogh-Anderson (1969[141]) Denmark			11	3				
Randell (1969[142]) UK			29	6	27	6		(≥0.3)
Hoenig, Kenna & Youd (1970a[143]) UK	(60)		6	3	5	2		
Hoenig, Kenna & Youd (1970b[144] UK			6	3	5	2	0.9	

Money & Ehrhardt (1970[145]) USA	(48)	(12)	21	7	17	7	2 (0.7-14)	4 (0.9-9)
Alanko & Achté (1971[146]) Finland			5	3	4	3	2.8 (0.1-10)	2.7 (0.1-5)
Hoenig, Kenna & Youd (1971[147]) UK	(70)		6	3	5	2	5 (2-10)	1.7 (1-3)
Money (1971[148]) USA					17	7		
Jones (1972[149]) USA					17	7		
Arieff (1973[150]) USA	(33)	(7)			14	4		
Edgerton & Meyer (1973[151]) USA			10-26	4-6	13			
Gandy (1973[152]) USA	(769)		50	24	50	24		
Ihlenfeld (1973[153]) USA	(882)	(131)	242	55			~55	
Kando (1973[154]) USA			26		17		(≥2)	
Hastings (1974[155]) USA	many	100s	26		2		~5	
Laub & Fisk (1974[156]) USA	(769)		50	24	45	24	21 (< 6)	
Pauly (1974[157]) USA	(1148)	(286)		42		35	Review	
Hore et al. (1975[158]) UK	(22)		17		16		(0.5-1.5)[2]	
Walinder & Thuwe (1975[159]) Sweden	(58)	(34)	13	11	11	11	6.1 (3.5-11)	7.5 (4-16)
McKee (1976[160]) USA	(50)		7		7			
Steiner (1976[161]) Canada					7	5		
Stürup (1976[162]) Denmark	(11)		10		10		(1-19)	
Stone (1977[163]) USA	(60)				13		~2-3	
Tsoi et al. (1978[164]) Singapore	(98)	(17)	32					
Hastings & Markland (1978[165]) USA					25			
Jayaram et al. (1978[166])			40		16			

USA								
König et al. (1978[167]) Canada	(14)	(9)	6	6	6	6		
Sadoughi et al. (1978[168]) USA	(11)		9		9		0.5	
Turner et al. (1978[169]) USA			53		47		1	
Wålinder et al. (1978[170]) Sweden	~100		16	12	5			
Wyler (1978[171]) Canada	(12)	(6)	11	5	8	2	1.7 (0.2-3)	2.9 (2-2.8)
Meyer & Reter (1979[27]) USA	(100)		34		11	4	5(1-12)	
Wyler et al. (1979[172]) Canada	(12)	(6)	11	5	8	2	1.7 (0.2-3)	2.9 (2-3.8)
Hunt & Hampson (1980[116]) USA	(250)		17		17		8.2 (6.3-11)	
Lothstein (1980[173]) USA	(120)				15	6	GR I : 5.07	GR II : 1.9 (0.5-3.5)
Spengler (1980[174]) Germany	(62)	(25)			13	6	1 (0.5-2.5)	1.3 (0.7-2)
Zingg et al. (1980[175]) Canada					19			
Ball (1981[176]) Australia	(209)		30		24		≥2	
Kröhn et al. (1981[177]) Germany	(161)		24	9	18	6	4-5 (0.8-15)	
Lundström (1981[178]) Sweden	(40)		5	2			9.8 (3-15)	$\sqrt{(3\text{-}14)}^3$
Pauly (1981[179]) USA			404	131	404	138	Review	
Sörensen (1981a[124]) Denmark			29		23		6 (1-21)	
Sörensen (1981b[180]) Denmark		(30)				8		5 (1-9)
Lothstein (1982[31]) USA			596	189			Review	
Eicher (1983[181]) Germany	(95)		55	40	55	40		
Simona-Politta (1983[182]) Canada			18	7	7	5	1.1 (0-4)	5.5 (1-7)
Eicher (1984[183]) Germany	(325)		58	45	52	40	(0.3-8)	

Lundström et al. (1984[23]) Sweden			368	124	368	124	Review	
McCauley & Ehrhardt (1984[184]) USA	(41)	(19)		5		5		
Wiegand (1984[185]) Germany	(32)	(15)	25	8	18	5	2.1 (≥1)	
Blanchard et al. (1985[186]) Canada	(183)	(111)	56	47	41	38	4 (≥1)	
Kuiper (1985[187]) Netherlands	(117)	(36)			71	30		
Abramowitz (1986[188]) USA			325	112	325	112	Review	
Lindemalm et al. (1986[119]) Sweden	(40)		17		13		12 (6-25)[4]	
McEwan et al. (1986[189]) Australia			68		23		(≥1)	
Blanchard et al. (1987[44]) Canada					22		4.4 (0.5-12)	
Fahrner et al. (1987[190]) Germany	(80)		18	14	18	14	3.6	5.4
Junge (1987[191]) Germany				60		43		
Kokott & Fahrner (1988[192]) Germany	(38)	(21)						
Kuiper & Cohen-Kettenis (1988[118]) Netherlands	(179)	(54)			55	25	5.4 (0.8-15)	5.1 (1.8-13)[1]
Täschner & Wiesbeck (1988[193]) Germany	(15)	(7)	16					
Dudle (1989[194]) Canada	(85)	(35)	45	21	18	11	6.1 (3.4-10)	6.9 (3-12.2)
Herms (1989[195]) Germany			(85)	45	19			
Ross & Need (1989[121]) Australia			30		14		3.7 (3-6)	
Wiesbeck & Täschner (1989[196]) Germany					10		1.5 (0.25-5)	
Green & Fleming (1990[105]) USA			200	130	200	130	Review	
Mate-Kole et al. (1990[1]) UK	(40)		20		20		~1.8	
Pfäfflin & Junge (1990[197]) Germany			104	60	42	43	5.1 (1-21)	6.7 (1-18)
Stein et al. (1990[67])			22		14		1.8 (0.4-4)	

USA								
Eicher et al. (1991[198]) Germany			50		48		3.5 (0.5-6.8)	

[1] Since start of treatment (Vogt, 1968[139]; Kuiper & Cohen Kettenis, 1988[118])
[2] Since secondary surgery (Hore et al., 1975[158])
[3] Since denial decision (Lundström, 1981[178])
[4] Median (Lindemalm et al., 1986[199])

The table was extracted from Friedemann Pfäfflin, Astrid Junge. Sex Reassignment. Thirty Years of International Follow-up Studies After Sex Reassignment Surgery: A Comprehensive Review, 1961-1991 (Translated from German into American English by Roberta B. Jacobson and Alf B. Meier)

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