

CADTH Reference List

Gender-Affirming Voice Therapy and Surgery for Gender Dysphoria

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Key Messages

- Four systematic reviews and 9 nonrandomized studies were identified regarding the clinical effectiveness of gender-affirming voice therapy or surgery for people with gender dysphoria.
- No evidence-based guidelines were identified regarding the use of gender-affirming voice therapy or surgery for people with gender dysphoria

Research Questions

1. What is the clinical effectiveness of gender-affirming voice therapy or surgery for people with gender dysphoria?
2. What are the evidence-based guidelines regarding the use of gender-affirming voice therapy or surgery for people with gender dysphoria?

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, PsycInfo, the Cochrane Database of Systematic Reviews, the international HTA database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were voice therapy and transgender people and gender dysphoria. No filters were applied to limit the retrieval by study type. When possible, retrieval was limited to the human population. The search was also limited to English-language documents published between January 1, 2016, and November 9, 2021. Internet links were provided, if available.

Selection Criteria and Summary Methods

One reviewer screened the literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information available in the abstracts of selected publications. Open-access, full-text versions of evidence-based guidelines were reviewed when abstracts were not available, and relevant recommendations were summarized.

Results

Four systematic reviews¹⁻⁴ (3 with meta-analyses)¹⁻³ and 9 nonrandomized studies⁵⁻¹³ were identified regarding the clinical effectiveness of gender-affirming voice therapy or surgery for

Table 1: Selection Criteria

Criteria	Description
Population	People with gender dysphoria
Intervention	Gender-affirming voice therapy or surgery
Comparator	No treatment with gender-affirming voice therapy or surgery
Outcomes	Q1: Clinical effectiveness (e.g., quality of life, severity of symptoms [e.g., anxiety symptoms, depressive symptoms], patient satisfaction, safety [e.g., adverse events]) Q2: Recommendations regarding best practices (e.g., recommended treatment protocols, strategies to mitigate harms and adverse events)
Study designs	Health technology assessments, systematic reviews and meta-analyses, randomized controlled trials, nonrandomized studies, evidence-based guidelines

Q = question.

people with gender dysphoria. No health technology assessments or randomized controlled trials were identified that examined the clinical effectiveness of gender-affirming voice therapy or surgery for people with gender dysphoria compared with people with gender dysphoria who did not undergo gender-affirming voice therapy or surgery. Additionally, no evidence-based guidelines were identified regarding the use of gender-affirming voice therapy or surgery for people with gender dysphoria.

Additional references of potential interest that did not meet the inclusion criteria are provided in Appendix 1.

Overall Summary of Findings

Although this summary retained some of the original terms used in the identified publications, we acknowledge that the terms “feminization,” “feminizing,” or “femininity” found in the literature may not be all encompassing because there may be individuals who want these procedures for reasons other than “to appear more feminine.”

Four systematic reviews¹⁻⁴ (3 with meta-analyses)¹⁻³ and 9 nonrandomized studies⁵⁻¹³ were identified regarding the clinical effectiveness of gender-affirming voice therapy or surgery for people with gender dysphoria. Although the types of surgeries that were evaluated varied between systematic reviews, all observed an increase in fundamental frequency (F0) after intervention in transgender women.¹⁻⁴ Authors of 1 systematic review found that glottoplasty increased F0 and decreased maximum phonation time, frequency range, and grade of dysphonia in transgender women.¹ Another review concluded that endoscopic shortening provided the greatest increase in pitch in transgender women of the surgical interventions evaluated.² The same review found that voice therapy also increased F0.²

Five nonrandomized studies observed an increase in F0 after gender-affirming voice surgery in transgender women, but its effect on other evaluated acoustic variables (i.e., maximum phonation time, frequency range, jitter) varied across the studies.^{5,7,8,11,13} Additionally, 4 studies reported improved self-reported voice feminization after surgery.^{5,7,11,13} Improvement in voice-related quality of life after Wendler glottoplasty in transgender women was observed in

another study.⁵ Authors of a retrospective cohort study observed improved Voice Handicap Index and Transsexual Voice Questionnaire scores after glottoplasty in transgender women.⁸ Another study found that transgender women who completed speech therapy reported lower social anxiety compared with transgender women planning to undergo the intervention.⁹

Two nonrandomized studies evaluated the impact of gender-affirming voice therapy or surgery in transgender men.^{6,12} One of these studies concluded that laryngeal thyroidectomy type III is an effective method to lower F0 in transgender men,⁶ whereas the other observed decreased F0 in transgender men within 6 months of testosterone therapy.¹² Finally, authors of a prospective study found that hormone therapy improved self-perception of voice in transgender men and transgender women.¹⁰ Detailed summaries of included systematic reviews and nonrandomized studies are provided in Table 2.

No evidence-based guidelines were found regarding the use of gender-affirming voice therapy or surgery for people with gender dysphoria; therefore, no summary can be provided.

Table 2: Summary of Included Studies

First author (year)	Population	Intervention and comparator	Relevant outcomes	Author's conclusions
Systematic reviews				
Aires (2020) ¹	Transgender women 13 studies N = 566	Intervention: Endoscopic glottoplasty Comparator: NA	Changes in F0, MPT, frequency range, GRBAS (grade of dysphonia)	Glottoplasty is effective in increasing fundamental frequency, but the procedure slightly decreased MPT, frequency range, and GRBAS after intervention.
Nolan (2019) ²	Transgender women 17 studies	Intervention: Voice therapy and phonosurgery (i.e., laser reduction glottoplasty, cricothyroid approximation, and endoscopic shortening) Comparator: NA	Changes in F0	Voice therapy and phonosurgery increased F0 after the intervention. Further, endoscopic shortening provided the greatest increase in vocal pitch.
Schwarz (2017) ³	Transgender women 5 studies	Intervention: Surgical procedure (i.e., laryngoplasty with or without thyrohyoid approximation, Wendler glottoplasty, cricothyroid approximation, laser glottoplasty reduction, vocal fold shortening, retrodisplacement of anterior commissure) Comparator: NA	Changes in F0	A small number of retrospective cohorts and prospective studies revealed a F0 increase after the intervention.
Van Damme (2017) ⁴	Transgender women 20 studies	Intervention: Voice surgery (i.e., cricothyroid approximation, anterior glottal web formation, other surgery types or combination of surgical techniques) Comparator: NA	Changes in F0	A rise in postoperative F0 was identified.

First author (year)	Population	Intervention and comparator	Relevant outcomes	Author's conclusions
Nonrandomized studies				
Aires (2021) ⁵	Transgender women N = 7	Intervention: Wendler glottoplasty Comparator: Presurgical measurements	Changes in F0, formant frequency, MPT, frequency range, jitter and shimmer, voice-related quality (TVQ), and voice-related quality of life (self-perceived femininity of voice after the intervention)	Glottoplasty increased F0 but did not significantly change MPT, formant frequencies, frequency range, jitter, shimmer, and GRBAS after the intervention. Additionally, voice-related quality of life and mean self-perceived femininity of voice improved after surgery.
Bultynck (2021) ⁶	Transgender men unsatisfied with gender-affirming hormone therapy N = 8	Intervention: Isshiki thyroplasty type III Comparator: Presurgical measurement	Changes in F0	Isshiki thyroplasty type III is an effective method to lower F0 in transgender men.
Nuyen (2021) ⁷	Transgender women N = 162	Intervention: Laryngoplasty Comparator: Presurgical measurements	Changes in mean speaking F0, lowest F0 and highest F0, in addition to MPT and self-assessment of vocal femininity	Laryngoplasty increased mean speaking F0 and lowest F0, but no significant difference in highest F0 or MPT was observed. Self-assessment of vocal femininity also significantly improved after the intervention.
Yilmaz (2021) ⁸	Transgender women N = 28	Intervention: Glottoplasty Comparator: Presurgical measurements	Changes in VHI and TVQ and acoustic analysis (F0, jitter, shimmer, noise to harmonic ratio) after surgery	VHI and TVQ scores significantly improved after the intervention. Additionally, F0, mean jitter, mean shimmer, and mean noise to harmonic ratio increased significantly after surgery.
Butler (2019) ⁹	Transgender and gender-nonconforming people N = 715	Intervention: Speech therapy Comparator: Transgender and gender-nonconforming people who were planning to undergo speech therapy	Social anxiety (Trans Health Survey)	Transgender women who completed speech therapy reported lower social anxiety compared with those planning to undergo the intervention.

First author (year)	Population	Intervention and comparator	Relevant outcomes	Author's conclusions
Bultynck (2017) ¹⁰	Transgender men and transgender women N = 183	Intervention: Cross-sex hormone therapy Comparator: Pretherapy measurements	Changes in TVQ 3 to 12 months after therapy	For transgender men, gender identity score and anxiety and avoidance scores improved 0 to 3 months, 0 to 12 months, and 3 to 2 months after therapy. For transgender women, gender identity score improved 0 to 3 months, while anxiety and avoidance, gender identity, and voice quality scores improved from 0 to 12 months.
Casado (2017) ¹¹	Transgender women N = 18	Intervention: Wendler glottoplasty Comparator: Presurgical measurements	Changes in F0, MPT, TSEQ, and perceptual assessment of voice after the intervention (VAS and Hirano-GRBAS)	Significant increase in vocal tone and feminization of voice, including increase in F0 12 months after surgery. No increase in MPT. Self-reported satisfaction and feminization of voice in all participants improved after the intervention.
Irwig (2017) ¹²	Transgender men N = 7	Intervention: Testosterone therapy Comparator: Pretherapy measurements	Changes in F0 within 3, 6, 9, and 12 months of therapy	All participants reached a cisgender mean F0 within 6 months of the intervention, and 4 continued to experience a decrease after 6 months.
Casado (2016) ¹³	Transgender women N = 10	Intervention: Wendler's anterior synechiae and voice therapy treatment Comparator: Presurgical and pretherapy measurements	Changes in fundamental frequency, MPT, TSEQ, and perceptual voice assessment after the intervention	All participants experienced a significant increase in F0 after intervention and significant improvement in self-reported satisfaction and degree of voice feminization was observed. No improvement in MPT was found.

F0 = fundamental frequency; GRBAS = grade, roughness, breathiness, asthenia, strain; MPT = maximum phonation time; NA = not applicable; TSEQ = transgender self-assessment questionnaire; TVQ = Transsexual Voice Questionnaire; VAS = visual analogue scale; VHI = Voice Handicap Index.

References

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-Analyses

1. Aires MM, Marinho CB, Souza CSC. Effect of endoscopic glottoplasty on acoustic measures and quality of voice: a systematic review and meta-analysis. *J Voice*. 2020;S0892-1997(20)30420-3. [PubMed](#)
2. Nolan IT, Morrison SD, Arowojolu O, et al. The role of voice therapy and phonosurgery in transgender vocal feminization. *J Craniofac Surg*. 2019;30(5):1368-1375. [PubMed](#)
3. Schwarz K, Fontanari AMV, Schneider MA, et al. Laryngeal surgical treatment in transgender women: a systematic review and meta-analysis. *Laryngoscope*. 2017;127(11):2596-2603. [PubMed](#)
4. Van Damme S, Cosyns M, Deman S, Van den Eede Z, Van Borsel J. The effectiveness of pitch-raising surgery in male-to-female transsexuals: a systematic review. *J Voice*. 2017;31(2):244.e1-244.e5. [PubMed](#)

Randomized Controlled Trials

No literature identified.

Nonrandomized Studies

5. Aires MM, de Vasconcelos D, Lucena JA, Gomes AOC, Moraes BT. Effect of Wendler glottoplasty on voice and quality of life of transgender women. *Bras Otorrinolaringol*. 2021;S1808-8694(21)00134-8. [PubMed](#)
6. Bultynck C, Cosyns M, T'Sjoen G, Van Borsel J, Bonte K. Thyroplasty type III to lower the vocal pitch in trans men. *Otolaryngol Head Neck Surg*. 2021;164(1):157-159. [PubMed](#)
7. Nuyen BA, Qian ZJ, Campbell RD, Erickson-DiRenzo E, Thomas J, Sung CK. Feminization laryngoplasty: 17-year review on long-term outcomes, safety, and technique. *Otolaryngol Head Neck Surg*. 2021;1945998211036870. [PubMed](#)
8. Yilmaz T, Ozer F, Aydinli FE. Laser reduction glottoplasty for voice feminization: experience on 28 patients. *Ann Otol Rhinol Laryngol*. 2021;130(9):1057-1063. [PubMed](#)
9. Butler RM, Horenstein A, Gitlin M, et al. Social anxiety among transgender and gender nonconforming individuals: the role of gender-affirming medical interventions. *J Abnorm Psychol*. 2019;128(1):25-31. [PubMed](#)
10. Bultynck C, Pas C, Defreyne J, Cosyns M, den Heijer M, T'Sjoen G. Self-perception of voice in transgender persons during cross-sex hormone therapy. *Laryngoscope*. 2017;127(12):2796-2804. [PubMed](#)
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12. Irwig MS, Childs K, Hancock AB. Effects of testosterone on the transgender male voice. *Andrology*. 2017;5(1):107-112. [PubMed](#)
13. Casado JC, O'Connor C, Angulo MS, Adrian JA. Wendler glottoplasty and voice-therapy in male-to-female transsexuals: results in pre and post-surgery assessment. *Acta Otorrinolaringol Esp*. 2016;67(2):83-92. [PubMed](#)

Guidelines and Recommendations

No literature identified.

Appendix 1: References of Potential Interest

Note that this appendix has not been copy-edited.

Systematic Reviews and Meta-Analyses

Unclear Comparator

14. Ziegler A, Henke T, Wiedrick J, Helou LB. Effectiveness of testosterone therapy for masculinizing voice in transgender patients: a meta-analytic review. *Int J Transgend.* 2018;19(1):25-45.

Alternative Comparator

15. Leon-Gambetta C, Huttner R, Matyas A. Voice feminization: voice therapy vs surgical intervention: a systematic review. *Communication Sciences and Disorders: Systematic Review Publications.* 2019;5. <https://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1009&context=csdms>. Accessed 2021 Nov 15.
16. Song TE, Jiang N. Transgender phonosurgery: a systematic review and meta-analysis. *Otolaryngol Head Neck Surg.* 2017;156(5):803-808. [PubMed](#)

Nonrandomized Studies

Alternative Comparator

17. Hodges-Simeon CR, Grail GPO, Albert G, et al. Testosterone therapy masculinizes speech and gender presentation in transgender men. *Sci Rep.* 2021;11(1):3494. [PubMed](#)
18. Quinn S, Oates J, Dacakis G. The experiences of trans and gender diverse clients in an Intensive Voice Training Program: a mixed-methodological study. *J Voice.* 2021:S0892-1997(21)00019-9. [PubMed](#)
19. Kelly V, Hertegard S, Eriksson J, Nygren U, Sodersten M. Effects of gender-confirming pitch-raising surgery in transgender women a long-term follow-up study of acoustic and patient-reported data. *J Voice.* 2019;33(5):781-791. [PubMed](#)
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Unclear Comparator

22. Mills M, Stoneham G, Davies S. Toward a protocol for transmasculine voice: a service evaluation of the Voice and Communication Therapy Group Program, including long-term follow-up for trans men at the London Gender Identity Clinic. *Transgend Health.* 2019;4(1):143-151. [PubMed](#)

Alternative Population

23. Meister J, Hagen R, Shehata-Dieler W, Kuhn H, Kraus F, Kleinsasser N. Pitch elevation in male-to-female transgender persons-the Wurzburg approach. *J Voice.* 2017;31(2):244.e7-244.e15. [PubMed](#)
24. Yilmaz T, Kuscu O, Sozen T, Suslu AE. Anterior glottic web formation for voice feminization: experience of 27 patients. *J Voice.* 2017;31(6):757-762. [PubMed](#)

Guidelines and Recommendations

Methods Not Specified

25. Telfer MM, Tollit MA, Pace CC, Pang KC. Australian standards of care and treatment guidelines for transgender and gender diverse children and adolescents. *Med J Aust.* 2018;209(3):132-136. [PubMed](#)

Alternative Methodology

26. Guidelines for the primary and gender-affirming care of transgender and gender nonbinary people San Francisco (CA): Center of Excellence for Transgender Health; 2016. <https://transcare.ucsf.edu/sites/transcare.ucsf.edu/files/Transgender-PGACG-6-17-16.pdf>. Accessed 2021 Nov 15.
See: 34. Transgender Voice and Communication: Vocal Health and Considerations (p. 161)

Additional References

27. Voice and communication therapy for the transgender/gender diverse client: a comprehensive clinical guide. San Diego (CA): Plural Publishing Inc.; 2019. https://www.pluralpublishing.com/application/files/2615/4707/7445/media_vcttgd3e_SamplePages.pdf. Accessed 2021 Nov 15.