

# Voice

## Background

Speech, specifically the sound qualities of one's voice, is often a factor that influences how people present themselves and their identifications, but it is only one of many considerations for communicating gender (Azul, 2015; Azul & Hancock, 2020). Throughout this chapter "voice and communication" is used as a phrase encompassing the transmission of any message in any modality (e.g., speech, gesture, electronic mail). While a binary understanding of gender has dominated the research literature in this area, the person-centered approach recommended in this chapter implies a broadly inclusive view of gender identification (e.g., transfeminine, transmasculine, gender-fluid, nonbinary).

This chapter is intended to provide guidance for healthcare professionals (HP) to support all transgender and gender diverse (TGD) individuals who are experiencing challenges or distress regarding their communication practices. Not every TGD individual has this experience or wants professional support for their voice and communication, but those who do often encounter barriers in accessing care. A survey of TGD people in Germany reported 13% of gender diverse (GD) people assigned female at birth (AFAB) and 24% of people assigned male at birth (AMAB) plan to have voice therapy, while 37% of people AMAB plan to have voice surgery. The percentage of people who had already undergone the interventions is much lower, with the exception of 51% of GD people AMAB who had been able to access voice therapy (Eyssel et al., 2017). Similar patterns were reported by a survey of TGD people in Aotearoa/New Zealand where 31% of those surveyed wanted voice therapy but had not yet accessed it, and 13% wanted voice surgery. Only 6% had participated in voice therapy and less than 2% had undergone voice surgery (Veale et al., 2019). Access to voice training is usually higher than access to voice surgery, although a survey of a small sample of TGD people accessing gender-related health services in Turkey found 0% had voice therapy and 9% had undergone voice surgery (Oguz et al., 2021). In a large survey of TGD people in the United States, the majority of TGD people AMAB were considering or wanting voice therapy or surgery; only 11% had been in voice therapy, and 1% had undergone voice surgery (James et al., 2016). These low percentages of accessed care were even lower for the nonbinary people AMAB than for transgender women. Care for groups of TGD people further marginalized in their societies, such as people of marginalized race/ethnicity, experience discrimination and limited access to care at even greater rates (Cruz, 2014; Xavier et al., 2005). It is notable that in Sweden all individuals are offered support for their voice and communication when a diagnosis of gender dysphoria has been confirmed (Södersten et al., 2015). Although the percentages vary by country and TGD subpopulation, the statistics support the concern that TGD people are not able to access voice and communication services when and how they desire.

According to studies in the United States (Hancock & Downs, 2021; Kennedy & Thibeault, 2020), Turkey (Oguz et al., 2021), and Aotearoa/New Zealand (Veale et al., 2019), lack of accurate information about options for voice and communication services among TGD people is a significant and ubiquitous barrier to care. Additionally, cultural competence of providers is only slowly improving (Hancock & Haskin, 2015; Jakomin et al., 2020; Matthews et al., 2020; Sawyer et al., 2014). Research is needed to identify specific barriers to voice and communication services and to develop effective means for eliminating them. Preliminary work in this area (Hancock & Downs, 2021) has identified a potentially useful access-to-care theoretical framework that could be applied (Levesque, 2013).

The overall purposes of voice and communication support for GD people are:

- To educate clients about the factors (speaker, listener, professional practices, external material, biophysiological, and sociocultural) that influence functional voice and communication practices and the communication of the speaker's identity.
- To enable clients to communicate their sense of sociocultural belonging (e.g., in terms of gender) in everyday encounters in a manner that matches the client's desired self-presentation and that allows for functional voice production which does not harm the voice production mechanism.
- To support clients with developing the capacity to assertively negotiate desired forms of address and referral from others (e.g., names, pronouns, titles), and—in collaboration with mental health providers—to respond to misattributions in a skillful manner that contributes to increasing and maintaining the client's wellbeing.

Voice and communication services are offered as part of a complete and coordinated approach to health, including support for medical, psychological, and social needs (e.g., Södersten et al., 2015); however, there are no prerequisites (e.g., hormone use, pursuit of surgeries, or duration living in a gender role).

Intervention plans are developed as the person seeking the services and the voice and communication specialist (e.g., speech-language pathologist, speech therapist) discuss goals and intervention approaches by exploring reasonable expectations for benefits as well as potential risks or limitations (these are summarized below). Gender is constructed in communicative interactions and therefore not entirely under the speaker's or clinician's control. The client and clinician work together to develop goals that address practices and factors that a speaker can reasonably expect to influence (Azul & Hancock, 2020). Unalterable practices and forces (e.g., listener's beliefs about gender expression, Hancock & Pool, 2017) are acknowledged and helpful responses to these unalterable factors can be developed (e.g., the client changing their responses to misattributions).

Regarding surgery, two types of laryngeal surgeries are relevant for TGD populations: those for raising voice pitch (e.g., Glottoplasty, cricothyroid approximation (CTA); techniques for vocal fold shortening) (Anderson, 2007, 2014; Brown, 2000, Casado, 2017; Geneid, 2015; Gross, 1999; Kelly, 2018; Kanagalingam, 2005; Kim, 2017; Kocak, 2010; Kunachak, 2000; Mastronikolis, 2013; Matai, 2003; Meister, 2017; Mora, 2018, Neumann, 2004; Orloff, 2006; Pickuth, 2000; Remacle, 2011; Thomas, 2013; Tschan, 2016; Van Borsel, 2008; Wagner, 2003; Yang, 2002; Mastronikolis et al., 2013; Wendler, 1990) and for lowering voice pitch (e.g., thyroplasty type III, vocal fold injection augmentation) (Bultynck et al, 2020; Isshiki et al., 1983; Kojima, et al. 2008; Webb et al., 2021). Reported acoustic benefits of pitch-raising surgery are limited to increased voice pitch (average frequency ( $f_0$ )) and increased Min  $f_0$  (the lowest frequency in physiological voice range). Subjective ratings show general satisfaction with voice postsurgery although individuals who are interested in more comprehensive changes to vocal self-presentation may need to engage in behavioral interventions with a voice and communication specialist in addition to laryngeal surgery (Kelly et al., 2018). Furthermore, potential harms of pitch-raising surgery would be assessed and treated in voice therapy by a voice and communication specialist. Reported harms of pitch-raising surgery include voice problems such as dysphonia, weak voice, restricted speaking voice range especially upper range (lowered Max  $f_0$ , in the physiological voice range), hoarseness, vocal instability, and lowering of frequency values over time (see Kelly et al., 2018; Song & Jiang, 2017). Research on pitch-lowering surgeries is limited. However, studies including eight people AFAB who elected to undergo thyroplasty type III after continued dissatisfaction with hormone treatment

(Bultynck et al., 2020) and one person who received injection augmentation after testosterone therapy and voice training (Webb et al., 2020), reported statistically significant lowering of fundamental frequency, perceived as pitch.

Estrogen treatment in TGD people AMAB has not been associated with measurable voice changes (Mészáros et al., 2005), while testosterone treatment in TGD people AFAB has been found to result in both desired and undesired changes in gender- and function-related aspects of voice production (Azul, 2015; Azul et al., 2017; Azul et al., 2018; Azul & Neuschaefer-Rube, 2019; Azul et al., 2020; Cosyns et al., 2014; Damrose, 2008; Deuster et al., 2016a, Deuster, et al. 2016b, Hancock et al., 2017, Irwig et al., 2017; Nygren et al., 2015; Van Borsel et al., 2000; Yanagi et al., 2015; Ziegler et al., 2018). Desired changes associated with testosterone treatment include lowered voice pitch, increased male attributions to voice, and increased satisfaction with voice. Reported harms of testosterone treatment include lack of or insufficient lowering of voice pitch, dysphonia, weak voice, restricted singing pitch range, and vocal instability.

WORLD PROFESSIONAL ASSOCIATION FOR TRANSGENDER HEALTH

### Summary of Recommendations

Statement 1: We recommend voice and communication specialists assess current and desired vocal and communication function of transgender and gender diverse people and develop appropriate intervention plans for those dissatisfied with their voice and communication.

Statement 2: We recommend voice and communication specialists working with transgender and gender diverse people receive specific education to develop expertise in supporting vocal functioning, communication, and wellbeing in this population.

Statement 3: We recommend health professionals in trans health working with transgender and gender diverse people who are dissatisfied with their voice or communication refer them to voice and communication specialists (e.g., speech-language pathologist, speech therapist) for assessment and training.

Statement 4: We recommend health professionals in trans health refer transgender and gender diverse people undergoing voice surgery to a specialist in voice and communication behavioral training prior to surgery.

Statement 5: We recommend health professionals in trans health inform transgender and gender diverse people commencing testosterone therapy of the potential and variable effects of this treatment on voice and communication.

All these recommendation statements are based on a background literature available in English, consensus of the writing group, and approval via the Delphi process, as well as a favorable risk-benefit ratio of providing professional support through changes in voice and communication.

Statement 1:

**We recommend voice and communication specialists assess current and desired vocal**

**and communication function of transgender and gender diverse people and develop appropriate intervention plans for those dissatisfied with their voice and communication.**

Voice specialists support the individual by assessing their voice and communication function in relation to vocal demand, presentation of sociocultural positionings including gender, attributions received from others, and how these relate to the individual's wishes and wellbeing.

Assessment measures and intervention targets may vary in nature (e.g., perceptual, acoustic, aerodynamic) according to their purpose (Davies et al., 2015, Leyns et al. 2021; Oates & Dacakis, 1983). For example, laryngeal visualization is used when individuals present with a concomitant voice complaint or voice disorder (e.g., muscle tension dysphonia) (Palmer et al., 2012) or experience voice difficulties secondary to medical gender-affirming interventions, such as hormones or laryngeal surgery to change voice pitch (Azul et al., 2017).

There is some empirical evidence that behavioral voice support for TGD people AMAB is effective with regard to achieving the targeted voice changes and client satisfaction with voice support from voice and communication specialists (e.g., speech-language pathologists, speech therapists) (Oates, 2019). Seven studies prior to 2020 provide empirical evidence for the effectiveness of voice training, though it is somewhat weak (Carew et al., 2007; Dacakis, 2000; Gelfer & Tice, 2013; Hancock & Garabedian, 2013; Hancock et al., 2011; McNeill et al., 2008; Mészáros et al., 2005). Voice training methods across these seven studies were similar and indicated voice training can be effective at increasing average fundamental frequency (average pitch), fundamental frequency range (pitch range), sound pressure level (vocal intensity), satisfaction with voice, self-perception and listener perception of vocal femininity, voice-related quality of life, and social and vocational participation. Weaknesses of the identified studies include lack of randomized controlled trials evaluating voice training, small sample sizes, inadequate long-term follow-up, and lack of control of confounding variables. In 2021, another systematic review of the effects of behavioral speech therapy for TGD people AMAB reached similar conclusions and called for studies using RCT designs, well-described therapy programs, and long-term follow-up data (Leyns et al. 2021).

Until recently, there was almost no evidence supporting the effectiveness of voice training with TGD people AFAB. There is, however, some promising though weak evidence of effectiveness from a case study (Buckley et al., 2020) and one uncontrolled prospective study of group voice training that included 10 participants (Mills et al., 2019). There is high quality evidence demonstrating that TGD people AFAB are not always satisfied with the vocal outcomes of testosterone therapy, and that many experience difficulties such as inadequate pitch lowering, compromised voice quality, vocal endurance, pitch range, and flexibility (Azul, 2015; Azul, 2016; Azul et al., 2017; Azul et al., 2018, Cosyns et al., 2014, Nygren et al., 2015, Ziegler et al., 2018).

Statement 2:

**We recommend voice and communication specialists working with transgender and gender diverse people receive specific education to develop expertise in supporting vocal functioning, communication, and wellbeing in this population.**

Academic and licensing credentials of specialists in voice or communication training (e.g., speech-language pathologists, speech therapists, singing voice teachers, voice coaches) vary by location but typically do not specify criteria for working with specific populations. Standard curricula for these professions often do not include specific or adequate training for working with TGD populations (Jakomin et al., 2020, Matthews et al., 2020). General knowledge and skills related to the vocal mechanism and interpersonal communication are foundational but

insufficient for conducting culturally-responsive, person-centered care for TGD people (Hancock, 2017, Russell & Abrams, 2019). Professionals in this area must be respectful of and attentive to gender diversity and other aspects of a client's identifications that can take a variety of forms and imply a range of different support needs (Azul, 2015). At minimum, voice and communication specialists working with TGD people will also have a basic understanding of transgender health, including hormonal and surgical treatments and trans-specific psychosocial issues. The specialist's understanding of contemporary, transdisciplinary theories of the practices and forces through which gender and other aspects of sociocultural positioning are produced in social encounters (see Azul & Hancock, 2020) can assist the client's decisions and progress toward communication goals.

Statement 3:

**We recommend healthcare professionals in trans health working with transgender and gender diverse people who are dissatisfied with their voice or communication consider refer them to voice and communication specialists (e.g., speech-language pathologist, speech therapist) for assessment and training.**

A voice and communication specialist is able to support the client's exploration of goals and intervention options, conduct the appropriate assessments to inform the client's choice, and provide direction for behavioral training or medical interventions. A HP may be considered a specialist in voice or communication intervention if they possess knowledge of evidence-based assessments and the currently available evidence regarding expected effects of behavioral voice training, hormone treatment, and the different types of laryngeal surgery on clients' voice organs (e.g., vocal folds) and voices. A HP knowledgeable of the relevant principles of voice physiology and acoustics can continuously evaluate and monitor vocal function during interventions and document outcomes. This knowledge also can be used to guide the client's use of instrumentation or software (e.g., pitch-measuring programs).

There is evidence specialists provide support in such a way that a client's satisfaction with voice and communication can be achieved, thereby reducing gender dysphoria and improving communication-related quality of life (Azul, 2016; Block, 2017; Deuster, Di Vincenzo, et al., 2016; Hancock, 2017; Hancock et al., 2011; Hardy et al., 2013; Kelly, 2018; McNamara, 2007; McNeill et al., 2008; Owen & Hancock, 2010; Pasricha et al., 2008; Söderpalm et al., 2004, Watt et al., 2018). There are a variety of ways to address a person's dissatisfaction with voice or communication, including direct interventions on the vocal mechanism via behavioral, surgical, or hormonal means as well as more indirect approaches related to interpersonal communication exchanges (e.g., requesting appropriate forms of address) and self-perception (e.g., mindfulness, self-compassion). The impact of direct interventions is relatively more established, while indirect approaches are increasingly recognized as integral to best clinical practice and are particularly important in cases in which client's initial auditory-perceptual or acoustic goals are not achievable via direct intervention (Azul & Hancock, 2020, Hancock & Siegfriedt, 2020).

Statement 4:

**We recommend healthcare professionals in trans health refer transgender and gender diverse people undergoing voice surgery to a specialist in voice and communication behavioral training prior to surgery.**

The number and quality of research studies evaluating pitch-lowering surgeries are currently insufficient, particularly with regard to outcomes with and without other interventions (i.e.,

testosterone) (Bultynck et al., 2020). There are more techniques and studies of pitch-raising surgeries, but the quality of the evidence is still low. Outcomes from pitch-raising surgeries have been compared to outcomes from having no surgery (Anderson, 2007; Anderson, 2014; Brown et al., 2000; Geneid et al., 2015; Gross, 1999; Kim, 2017; Kocak et al., 2010; Kunachak et al., 2000; Matai et al., 2003; Meister et al., 2017; Neumann & Welzel, 2004; Orloff et al., 2006; Pickuth et al., 2000; Remacle et al., 2011; Thomas & Macmillan, 2013; Tschan et al., 2016; Van Borsel et al., 2008; Yang et al., 2002), another type of surgical technique (Mora, 2018), voice therapy alone (Kanagalingam, 2005; Mastronikolis, 2013; Wagner, 2003), and surgery in conjunction with voice therapy (Casado, 2017; Kelly, 2018).

In the 11 studies reporting whether participants had voice training prior to pitch-raising surgery, most participants had prior voice training but remained dissatisfied with voice and sought surgical intervention. Thus, most studies of surgical outcomes reflect the combined effects of training and surgical intervention. Attributes predicting which clients will pursue surgery after training are unknown.

For most types of laryngeal surgery, voice therapy is recommended both prior to surgery to ensure preparation of the vocal mechanism for the surgical intervention and post-surgery to ensure a return to functional voice production (Branski et al., 2006, Park et al., 2021). A trial of voice therapy prior to surgery is also recommended because there are indications that certain measures improve with therapy but not with pitch-raising surgery (e.g., factors relevant to intonation and naturalness, such as maximum  $f_0$  pitch in speech range, Kelly et al 2018).

Statement 5:

**We recommend healthcare professionals in trans health inform transgender and gender diverse people commencing testosterone therapy of the potential and variable effects of this treatment on voice and communication.**

The historical understanding that voice professionals do not need to lend their expertise to TGD people AFAB because testosterone treatment leads to desired voice changes for everyone has been disproven (e.g., Azul, 2015; Azul et al., 2017; Azul et al., 2018; Bultynck, et al. 2017; Van Borsel et al., 2000; Ziegler et al., 2018; Nygren et al., 2015). The research on the effects of testosterone treatment on voice and communication of TGD people AFAB points to diverse and unpredictable effects on individual clients. A recent meta-analysis of 19 studies examining effects of at least 1 year of testosterone therapy estimated 21% of participants did not achieve cisgender male normative frequencies, 21% reported incomplete voice-gender congruence and voice problems, and 16% were not completely satisfied with their voice (Ziegler, 2018). Healthcare professionals working in trans health need to provide TGD people who wish to be treated with testosterone with accurate informational counseling prior to commencing testosterone treatment to enable the development of realistic expectations and to avoid disappointment regarding the impact of hormone treatment on their voice and communication.

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