Transgender Speech Feminization/Masculinization: Suggested Guidelines for BC Clinicians

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Copies of this manual are available for download from the Transgender Health Program website: http://www.vch.ca/transhealth. Updates and revisions will be made to the online version as necessary. For more information or to contribute updates, please contact:

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Table of Contents

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Scope

Transgender* individuals may require assistance to feminize/masculinize speech, voice, and non-verbal communication (gestures, posture, facial expressions, eye contact, etc.). Changes to the gendered aspects of communication can help reduce gender dysphoria and/or facilitate gender presentation that is consistent with the felt sense of self, resulting in improved mental health and quality of life. With all parameters of communication, the goal is to allow the outside – speech, voice, movement – to reflect what the client feels inside. While peer support resources can be highly beneficial in changing overall appearance and presentation, speech and voice modification is best assisted by a trans-competent speech professional. The clinician will provide a comprehensive evaluation, design an effective treatment program, and help prevent vocal problems that may arise from changes to habitual fundamental frequency or voice quality.

Trans-competency involves both the ability to interact in a respectful way with transgender individuals (sometimes termed *cultural competence*) and also clinical knowledge and skill specific to speech feminization/masculinization. This document is intended for speech clinicians who have already taken transgender sensitivity/awareness training or have experience working with the transgender community, and are seeking more advanced guidance on how to be clinically effective in work with transgender clients. We outline clinical protocols for conducting a trans-specific speech assessment, providing feminizing/masculinizing speech treatment, and conducting a trans-specific outcome evaluation.

Some transgender individuals seek speech services not to feminize or masculinize communication, but rather to address voice quality (e.g., hoarseness or raspiness following pitch-altering surgery), loss of singing range following changes to habitual speaking pitch range, or feelings of disconnection from the voice resulting from rapid hormonal or surgical changes. While clinicians working with transgender clients on these issues should be familiar with relevant trans-specific physical and psychosocial issues, the same clinical protocols generally used to deal with these concerns in other clients can successfully be used with transgender clients – i.e., no special trans-specific clinical protocols are needed. This document focuses on clinical protocols that are unique to speech feminization/masculinization, an area that (unless associated with vocal pathology) is considered trans-specific.

These recommendations are based on published literature specific to transgender speech (see *Transgender Speech Literature Review* at http://www.vch.ca/transhealth/resources/library) and interviews with expert clinicians. In the literature and in our discussions with clinicians we noted that decisions about practice protocols were often significantly impacted by budget constraints, the logistics of the clinical setting (e.g., university-based student clinics running from September to April), and/or protocols necessary for conscientious research (but not necessary in regular clinical practice). While there are administrative and logistical realities that need to be considered, we felt it was important to base our recommendations on what we felt to be optimal practice from a *clinical* perspective, based on the evidence currently available.

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* In these guidelines, *transgender* includes any person who: (a) has a gender identity that is different from their natal sex, and/or (b) who expresses their gender in ways that contravene societal expectations of the range of possibilities for men and women. This umbrella term includes crossdressers, drag kings/queens, transsexuals, people who are androgynous, Two-Spirit people, and people who are bi-gendered or multi-gendered, as well as people who do not identify with any labels.

More research is needed into transgender speech and for this reason some recommendations are based on current practices or theoretical rationale where the literature is inconclusive or absent. We critically need input from clinicians and researchers to develop the best protocols for helping this population. It is an exciting area and we welcome the input of our colleagues in the ongoing task of shaping best practice guidelines.

Introductory Comments

Research suggests that speech services are an important aspect of transgender care. In a recent BC-wide survey of transgender health service users (n=179), 23% reported a current need for speech therapy.[1] In studies done outside BC, feminization of communication was rated extremely important by 73% of male-to-female* (MTF) transsexual participants (n=11),[2] and as "very important" by over half of MTF transsexual respondents in another study.[3] A study of sixteen female-to-male (FTM) transsexuals found that 88% of participants considered masculinization of communication as important or more important than sex reassignment surgery.[4]

There is great variation in the extent to which speech changes are undertaken or desired by transgender individuals. Some seek maximum feminization/masculinization, while others experience relief with a more androgynous presentation. Some transgender individuals seek to develop two speech patterns (one more masculine, one more feminine) either because they identify as bi-gendered or because external pressures (family, employment, cultural community, friends, etc.) prevent living full-time in a way that is consistent with felt sense of self. Most current transgender speech protocols do not support bi-modal speech as a treatment goal, based on the belief that to effect maximal change it is necessary to have a consistent single speech pattern. Switching back and forth between two speech/voice patterns may be too difficult for some clients, and inconsistent use decreases practice opportunities to acquire the new speech/voice pattern. However, the human capacity to learn and speak more than two languages, develop a specific accent for an acting role, and develop a singing voice that is different than speaking voice suggests it may be possible to develop bi-gender speech/voice. We encourage clinicians to be open to this possibility and not to routinely exclude clients who have two speech patterns as the treatment goal. We recommend that speech services be made available to the full spectrum of the transgender community.

Speech feminization is widely recognized as a vital component of transgender care.[2,5-20] Unfortunately, speech masculinization has not been as well studied.[4,7,9,21,22] Generally, the literature surveyed assumed that testosterone always results in drop in pitch sufficient to allow FTMs to live as men.[5,7,9,10,12,21-24] However, a study of sixteen FTMs who had taken testosterone for at least one year found that 25% were sometimes perceived as female on the phone, with 31% expressing interest in therapy to further masculinize speech.[4] The speech needs of FTMs who do not take testosterone were not discussed in any of the literature surveyed.

As with other transgender care, we recommend that speech services be offered in the context of a complete approach to transgender health that includes comprehensive primary care and a coordinated approach to psychologic and social issues. Speech services must be individualized

* Published transgender speech research focuses on transsexual women, with only a few studies involving male crossdressers or female-to-male transsexuals. In this document we use "male-to-female" (MTF) broadly unless otherwise noted, to describe a spectrum of people who were assigned "male" at birth and who wish to feminize/de-masculinize their speech (including male crossdressers, transsexual women, and bi-gendered or androgynous people born male). Similarly, "female-to-male" (FTM) refers to people who were assigned "female" at birth and who wish to masculinize/de-feminize their speech. This breadth of terminology is used to promote inclusion of non-transsexual clients who may seek speech feminization/masculinization services.

based on the individual's goals, the risks/benefits of treatment options, and consideration of social and economic issues.

Responsibilities of the Speech Professional

In British Columbia, speech feminization/masculinization services are delivered primarily by speech-language pathologists (speech therapy) and laryngologists (vocal surgery). While speech professionals do not need to be experts in every realm of transgender care to work with transgender clients, it is expected that those providing speech feminization/masculinization services have a basic understanding of the processes involved in gender transition, the potential impact of testosterone on female-to-male (FTM) speech, and trans-specific psychosocial issues that shape clients' goals and treatment options. Understanding of basic sensitivity protocols such as use of preferred gender pronoun and name is essential, but is outside the scope of this project. The Transgender Health Program (Appendix A) can provide training in these areas.

To assist in greater understanding of transgender speech issues, the client's permission should be sought to share anonymized assessment data with other speech professionals. In our review of the literature we found a paucity of evidence in the area of transgender speech, particularly in clinical practice. Early clinical research reported single subject case studies;[11,25-29] more recently small group studies have reported outcomes of speech therapy[3,6,22,30] and pitch-elevating surgery,[3,23,31-35] but more research is needed to evaluate specific techniques and protocols. As with all research, it is important that transgender clients' involvement in research be fully voluntary – i.e., it is not ethical to make service contingent on agreement to be studied.

Trans-Specific Speech Assessment

The first step in transgender speech treatment is a thorough assessment to guide the development of a therapeutic evaluation and treatment plan. The following section discusses recommendations relating to establishment of therapeutic rapport, recording of client history and objectives, evaluation of speech parameters, assessment of potential for change, determination of therapeutic goals, discussion of therapeutic options, and preparation for change. The additional evaluation required prior to pitch-elevating surgery is discussed in the section on surgical treatment protocols (pages 19-20).

Building therapeutic rapport

The relationship between client and clinician begins with the first interactions. In initial sessions, the clinician is not only assessing the client, the client is also assessing the knowledge and supportiveness of the clinician. A relationship grounded in mutual respect, trust, and genuine care for the client's well-being facilitates open communication and encourages active engagement in therapy; conversely, it can be difficult to build therapeutic rapport if conflicts arise in initial sessions. Many transgender individuals have had negative experiences with ill-informed or unempathetic health professionals, and there may be wariness about entering unreservedly into a relationship around communication – which is, by its nature, highly personal.

Because the assessment process sets the stage for all future interaction, it is extremely important to make the client feel respected and safe, and to create a feeling of positive anticipation for the therapy process. Issues that speech professionals need to consider in the intake process include storage of information, privacy issues in setting appointment times, client name preference, use of

the client's preferred pronouns, and therapist bias and judgments about transgenderism as issues that speech professionals need to consider in the intake process.[12]

Recording relevant history

Client history should include information about both trans-specific concerns and also general issues that are known to impact therapeutic options and potential outcomes. While some transgender individuals are very comfortable talking about their history, others are more private. In some cases it may be appropriate to revisit sensitive questions after therapeutic rapport is well established, or to lead with general questions unrelated to trans-specific issues. As with the general population, some clients respond well to informal intake (e.g., the question "What brings you to see me?" may elicit a great deal of information), and in other cases a more structured interview process or intake form may be beneficial. Sample intake forms are included as Appendix B.

As with any client presenting for speech services, initial intake should include a general medical history, with particular attention to history of nose/throat complaints, respiratory ailments, hearing difficulties, voice disorders (including problems stemming from self-directed attempt to modify voice or heavy use of voice), or any other conditions that could impact speech.[9,22,36] To assist in coordination of care, other health professionals involved in the client's general and trans-specific care should be noted.[22,37] Clients who present with difficulty swallowing, a dysphonic voice, or other symptoms that may indicate voice disorder (e.g., vocal fatigue, loss of range, or throat discomfort) should be referred for laryngological examination.[38] All current medications (including feminizing or masculinizing hormones) should be recorded.

History of behaviours that may negatively impact speech, such as smoking (tobacco, cocaine, marijuana, etc.) and drinking alcohol should be explored.[9,36,39] Because the stigma associated with substance use makes it difficult to get accurate information about current patterns of use, it may be useful to ask if a client "has ever…" rather than asking about current behaviour at the original intake (this can be revisited as part of treatment planning). It may be useful to inquire about personal, professional, and recreational use of voice (e.g., involvement in singing/acting), both to explore any areas of concern and to determine if previous training could be tapped during therapy.

Previous attempts to feminize/masculinize speech should be investigated, including techniques used, duration of self- or professionally-directed therapy, and the client's subjective feelings about the outcome.[5,8,15,36,37] Trans-specific history should also include information about other feminization/masculinization treatments that relate directly to speech (e.g., testosterone therapy in female-to-males, facial feminization surgery in male-to-females), and any noted impact on speech following these treatments.[5,12,22,36,37] It is not necessary to inquire specifically about trans-specific treatments that are unlikely to directly impact speech; relevant areas to explore include:

- consideration of the impact of any planned surgeries on the timing of speech therapy
- any factors relating to transition that the client feels are important in terms of motivation and timing of speech therapy (e.g., wish to have speech change complete by a specific date to facilitate job change)
- any medical or psychosocial issues that the client feels may affect ability to engage in speech change (e.g., some transgender people report changes to concentration and emotional lability as a side effect of hormone regimens)

Evaluating current speech parameters associated with gender

Thoroughly assessing the client's speech gives a baseline against which to measure change and provides information about which changes would be most useful.[12,28,40] While some voice parameters can be measured objectively (e.g., fundamental frequency, speaking frequency range), many speech characteristics associated with gender cannot be objectively quantified (e.g., melody, vocal timbre). A complete clinical impression should include the clinician's objective and subjective findings, and also the client's subjective assessment.[2,6-10,14,36,40-42]

Following standard practice in a speech/voice evaluation, the clinicians we interviewed made audio recordings of the client's performance across a variety of tasks such as reading, picture description, and conversation. These recordings assisted the client and clinician in analyzing current communication patterns and in setting goals for therapy. They also served as a baseline against which to measure change and as a resource to train student speech professionals. Some clinicians videotaped the assessment session and then reviewed the tape with the client, looking at speech parameters and also non-verbal communication features such as gestures, movement, and facial expressions. However, other clinicians preferred not to use video footage as clients reported finding it intrusive and intimidating.

To gather objective data in an assessment, a computer program that measures fundamental frequency, intensity, and vowel formants is necessary. Popular programs include Kay Elemetrics CSL (Computer Speech Lab) 4300 and Dr. Speech (Tiger DRS Inc).[8,22,29,37] Free software programs that measure F_0 may be downloaded from the internet and can be useful for practice by clients who have computer access.

Client's subjective assessment

Because the client's goals for speech feminization/masculinization relate directly to both self-perception and feelings about the perceptions of others, it is important to understand the client's perspective and expectations in both of these areas.[5,7,8,22,36] This may be done through informal discussion and/or formal measures (e.g., standardized questionnaire[3,6,22]). If informal interview is the only tool used, to facilitate later assessment we recommend that the clinician use the same questions in pre- and post-evaluation (e.g., "Describe three situations in which you are not comfortable with your voice", "Can you tell me 3 specific things you would like to change about the way you speak?"). A standard speech questionnaire like the Vocal Handicap Index or Voice Symptom Scale can be modified to include trans-specific concerns (a local example is included in Appendix C; the La Trobe Communication Questionnaire[6] is an example in the published literature). It may also be informative to ask clients to rate identity, self-perceived behaviour, appearance, and speech on a masculinity/femininity and male/female scale, both to gain a clearer picture of the client's identity and also to aid in discussion of the client's feelings about possible discrepancies between gender identity and gender expression.[22]

Concern about others' perceptions often relates to *passability* – being perceived by others as a man or a woman. The desire to pass is a complex feeling that may be influenced by the client's self-defined gender, community norms, beliefs and expectations of people close to the client (friends, family, coworkers, etc.), internalization of transphobic shame/stigma, degree of social support, and experiences of mistreatment (as individuals who are visibly transgender are more vulnerable to transphobic harassment, discrimination, and violence). Because norms relating to social interactions and speech are context-dependent, it is important to know the context for speech that the client is particularly concerned about (employment, social relationships, etc.).[19,37] As the client first starts to change his/her speech, reactions of those close to the client (e.g. family, friends, coworkers, community peers) should be noted.[5,8,13,36,37] For clients concerned with passability, the reactions of

strangers are important and these should be recorded either through informal estimate or formal means (e.g. diary).

While some transgender individuals may seek speech services because they have difficulty passing on the telephone or in face-to-face communication, others are more concerned about reducing a perceived discrepancy between speech and identity. Assessing self-perception relates to the fit (or lack of fit) for the client between their current speech and their felt sense of gender – i.e., how the client feels hearing herself/himself talk. The question of how well speech fits with the client's perception of self may be easy for the client to answer right away, or it may come over time with experimentation, practice, and observation of role models. Both the literature and the clinicians we interviewed discussed the importance of a "good fit" between the speech and the client rather than attempting to conform to an external stereotype of femininity/masculinity.[7,19] Finding this good fit requires introspection on the client's part and an informed opinion about what is possible.

Clinician's evaluation

1. Pitch

Research suggests that while there are several factors that together determine attributions of gender to a speaker, fundamental frequency is primary in perception of a speaker as male or female.[2,6,41,43] While mean F_0 for non-transgender men and women overlap from 145-165 Hz,[7,8] studies of transsexual women's voices suggests that bringing F_0 into the range of overlap may not be sufficient, by itself, to shift the gender perception of listeners. For example, transsexual women with F_0 below 155-160 Hz (i.e., within the "neutral" range) are usually judged as male.[44,45] There are no comparable data on F_0 norms for FTMs.

Speech analysis software (e.g., Kay Elemetrics) can be used to measure the average speaking pitch and pitch range across several tasks.[8,22,29,37] Data should be recorded in both hertz and semitones to facilitate clinical evaluation, using one of the readily available conversion tables.[46] The visual display of a software analysis program can provide valuable information for a client about habitual and target average speaking pitches, particularly if the client is already knowledgeable about male and female speaking pitch ranges.

In addition to noting fundamental frequency and frequency range, it is useful to note if the pitch is higher (for MTFs) or lower (for FTMs) in a less complex task like reading than in spontaneous conversation. If so, the client may already be consciously or unconsciously attempting voice feminization/masculinization.

One clinical expert suggested speaking pitch is more accurately obtained by collecting data in situations familiar to the client, and also with both male and female conversational partners. While this wider baseline would be informative, achieving it may also present practical difficulties.

2. Intonation/Inflections

Intonation is also considered important in gender perception, particularly when frequency is in the "gender-neutral" range (the overlap between male and female norms).[14,19,44,45] Women tend to be more variable in intonation than men, generally using more upward glides and avoiding downward glides and level intonation patterns.[2,7,9,10,19,37,45,47]

Intonation patterns should be recorded using speech analysis software at the same time that frequency is recorded. The visual display recording can then be viewed with the client, to see patterns associated with gender (e.g., repeated and dramatic decrease in pitch at the end of a sentence is typically considered a male speech pattern, while variability in intonation is more

typically female). Abnormally exaggerated intonation shifts may be observed in some transgender women trying to mimic non-transgender women,[2] and if present these should be pointed out to the client.

It is also useful to make clinical judgments about inflections during speech. Conversation or a sample of reading can be recorded, then played back with both the client and the clinician listening to the vocal inflections. During the subsequent discussion the clinician can assess the acuity of the client's perceptions. If the client is unable to hear what the clinician perceives to be important, the clinician can then give guidance, "Listen to how your voice stays flat when you say…" or "Listen to how your voice moves around when you say that. That is what we are looking for."

3. Resonance

The term *resonance* is typically used in the speech literature to describe three distinct aspects of speech: (a) the effects of the vocal tract on the sound produced by the larynx (formant frequencies), (b) the vocal quality that corresponds to vibrations of the sound wave in various parts of the body, and/or (c) the function of the nose as a resonator. There is evidence that vowel formant frequencies, which are dependent on the size of the vocal tract (typically larger in males than females) significantly influence the perception of the speaker as male or female.[7,8,39,41,42,48] Vowel formant frequency is estimated at 20% lower in adult men than adult women.[7,8,13,41] Measuring the "corner vowels" /i/, /u/, /a/ may be useful in assessing transgender speech,[29,44] as these vowels represent the maximal range of formant frequencies in vowel productions in many (if not all) languages.[49]

The role of the other types of "resonance" is less certain. Singers often refer to "chest resonance" as the full, rich sound that is produced in lower notes and accompanied by a feeling of the voice vibrating in the chest; "head resonance" describes a brighter, forward sound that accompanies sensations of the voice ringing or resonating in the mouth, nose, sinuses, or upper part of the head. While some authors suggested that "chest resonance" is associated with male speech while "head resonance" is associated with female speech,[7,9,10,50] this is a subjective phenomenon, with no way to objectively measure or assess it. There is no empirical evidence that increasing "head resonance" or decreasing "chest resonance" increases the perception of MTF speakers as female.[8] Further study is necessary to see if using these perceptions in training voice production produces difference in vowel formant frequencies.

4. Loudness/Intensity

Vocal intensity may be measured with a sound level meter, available at low cost from Radio Shack. In North America, the meter is usually placed 30 cm from the lips; at this distance, norms are 68-76 dBA for adult males and 68-74 dBA for adult females.[51] Despite the evidence that there is little sex-mediated difference in the loudness of actual speech, it is a common societal stereotype that women tend to speak more softly than men, so some clinicians include this speech parameter in assessment and treatment planning.[5,8,9,13,43] We recommend objectively measuring intensity if the client reports it as a problem or if the clinician subjectively feels it may be an issue.

Some transgender individuals who are self-conscious about speech may adopt insufficient vocal intensity to avoid public attention, or MTFs may speak quietly to try to "soften" the voice.[8] This can result in difficulty maintaining desired speech characteristics in situations where a higher vocal intensity is needed to counter high environmental noise or to convey intensity of emotion.

5. Voice quality

Most measures of voice quality are not consistently associated with categorization of voice as masculine or feminine,[40] with the exception of “breathiness”, which is associated with female speech.[2,7,8,10,19]

Voice quality is primarily measured subjectively according to the speech professional’s acoustic impression, or recorded on perceptual rating scales (e.g., Oates and Russell Perceptual Voice Profile[37]). Jitter and shimmer data may be collected by a software acoustic analysis package to support the clinical impression, but these parameters can be hard to measure accurately, requiring a very quiet space, rigid protocols, and finely calibrated equipment.

The client should be referred for a laryngological examination if the voice is judged to be dysphonic.

6. Articulation

Subjective impression may be made about the quality of articulatory productions. It is suggested that women tend to articulate more clearly than men but in a light manner, while men tend to make harder articulatory contacts and “punch out” their words,[5,10] and that men tend to drop final phonemes (e.g., “walkin” instead of “walking”) and reduce or alter the production of some speech sounds (e.g., voiced “th”).[7,13,37]

Some clinicians reported making subjective observations about habitual lip, tongue and jaw positions, although there was no agreement about correlation with gender associations.[7,13,37,43]

7. Durational Characteristics

Several expert clinicians observed whether the client sustained voicing through speech sounds, words, and phrases, or used a more staccato speech style, where words and phrases were produced more separately. It was suggested that a longer mean duration of voicing during phrases and isolated words, and lingering on occasional vowel sounds, is considered a more feminine pattern.[5,43]

8. Language/Discourse

While there are strong social stereotypes about gender norms and language (e.g., use of slang, size modifiers, and tag questions), gender-associated norms of language and discourse are so dependent on an ever-shifting social context that findings from studies done in past decades may not be reflective of current patterns and trends.[13,19] Additionally, there is strong interplay between gendered language norms and norms relating to culture, class, and age,[52-56] so norms appropriate for one client would not be appropriate for another. If there are habits relating to modifiers, qualifiers, indirect vs. direct speaking style, etc. that the client finds discomforting or the clinician feels may contribute to perceptions that don’t fit the client’s self-image, we recommend that the clinician offer feedback in these areas, encouraging the client to weigh research findings or the clinician’s suggestions against her/his own experience.

Rather than attempting to memorize lists of qualifiers or artificially adopt set phrases, we recommend that modification of language and discourse be based on the client’s own observations of gender markers in the specific environmental context of concern to the client (e.g., work, home, cultural community, social setting). Clients with strong beliefs about “appropriate” language may benefit from clinician assistance to explore stereotype vs. actual observed behaviour of peers.

9. Non-verbal communication

Norms relating to posture, gestures, and other non-verbal aspects of communication are strongly influenced by cultural, class, and age norms. Generally, in the dominant culture of North America, maintenance of eye contact, increased smiling, nodding/inclining toward others, increased use of hand/arm gestures, and occasional touching of the listener are associated with feminine/female communication patterns.[5,10] While it is not within the typical scope of practice of a speech-language pathologist to provide a detailed assessment of non-verbal communication behaviours, anything that is striking to the clinician (or to the client) should be noted as part of the subjective evaluation.

Subjective third-party evaluation

In some cases it may be helpful to have one or more naïve listeners provide subjective impressions of a recording of the client's speech. This may be useful when clients are particularly concerned with passability, or when clients are unable to appreciate changes that have taken place (for example, one study found that MTF clients did not rate their speech as more feminine following therapy, but observers did[22]). To be considered "naïve", the listener should not be a speech clinician or student SLP, and should also not be familiar with the client's goals. If passability is the goal, the listener should rate not only femininity/masculinity but also be asked to judge whether the speaker was male or female.

Assessing potential for speech/voice change

In our discussions with expert clinicians and throughout the literature, there was the opinion that diagnostic therapy was important in setting realistic goals for speech and voice therapy. Clients vary, for example, in ability to achieve certain pitches, match a target pitch, and follow models of intonation or articulatory productions.[4,6,8,19,22,30] Using an exploratory diagnostic process helps determine how physically and psychologically easy or difficult it may be to effect change, and gives information about the sort of intervention that may be necessary in therapy. For example, if a client has difficulty matching pitches auditorily, using a visual pitch display will probably be necessary. If the pitch range appears restricted, a lower (MTF)/higher (FTM) frequency pitch target would be more appropriate, and specific exercises to increase vocal range (e.g. Stemple's vocal function exercises) should be considered. If there is a seamless transition into falsetto (MTF), some falsetto notes may be available for widening the upper range of vocal inflections.

1. Speaking pitch

There are a number of ways of exploring average speaking pitch and speaking pitch range:

- The client glissandos around in the upper (MTF) or lower (FTM) range, without moving into falsetto (MTF), then sustains a pitch and uses it to intone a word and short phrase. This is recorded and then evaluated for quality and ease of phonation. This is repeated several times throughout the range. The client is also asked to intone words and phrases in higher pitches (MTF) or lower pitches (FTM) to ensure there is room for vocal inflections.[37,50]
- An arbitrary target pitch is set by the clinician and the client matches it. Then, choosing pitches above or below that one, they decide on an initial target. It should be noted that this pitch is for practice purposes only and can be changed at any time.
- A pitch that is one fourth of an octave (as in the initial interval in *Auld Lang Syne*, or *"Here comes the bride")* above/below the habitual speaking pitch is set by the clinician and the client matches it.

- The clinician models a frequency within the lower range of female norms (MTF) or upper range of male norms (FTM) on a visual display in a computer voice analysis program, and the client produces a pitch that stays above (MTF) or below (FTM) it.
- The client says a phrase in her most feminine (MTF) or his most masculine (FTM) voice.

For MTFs with low pitch, diagnostic therapy should be done to see if facilitation techniques enable higher pitches. Using sounds that facilitate efficient vocal fold vibration (e.g. /m/, /z/, lip trilling, tongue trilling), the client phonates in a higher pitch, either randomly or matching a pitch set by the clinician. Feelings of ease (no sensation in the throat) and resonance (strong feelings of vibrating or buzzing in the front of the face) are the goals. If the client is unable to produce a higher pitch without throat sensation or fatigue, the clinician may want to start with some standard voice therapy exercises to reduce inappropriate habits; a referral to an otolaryngologist may also be indicated.

For FTMs with high pitch, it may be useful to explore facilitation techniques that give sensations of ease and resonance in the “chest” register – the lowest register of the voice.

2. Inflections

A short sentence is read by the client and examined for its inflectional variation. For those seeking to feminize speech, the goal is an inflectional pattern that is wide but still natural-sounding; for those seeking to masculinize speech, the goal is an inflectional pattern that is narrower but not “flat” sounding. If the pattern is consistent with the client’s goals relating to feminine/masculine speech norms, this is noted; if not, the clinician can model a more consistent inflectional pattern and the client can copy it. The result is played back for the client to hear the effect. This exercise gives information on the client’s ability to hear and model vocal inflections, and also gives the client feedback about how the voice may sound if a different inflectional pattern is adopted.

3. Other parameters

Changes to other parameters such as tongue carriage, articulatory productions, vocal quality, and vocal loudness can be used in diagnostic therapy, if either the client or clinician thinks they may be important to address.

Assisting the client to determine therapeutic goals

To help the client determine fully informed, considered, and achievable therapeutic goals, it is useful for the clinician to provide a synopsis of the client’s baseline speech and voice characteristics, physiologic limitations and estimated potential for change, and an informed professional opinion about the parameters that would be beneficial to address to achieve the client’s stated objective.[2,3,7,8,11,13,36] For example, if a MTF client presents with the primary concern that her voice is not perceived as female, it may be appropriate to target a higher fundamental frequency if her habitual speaking pitch is 100 Hz. If her average pitch is higher than 150 Hz, it may be more appropriate to target resonance, inflection, and other speech characteristics that are believed to have a greater influence on gender perception when pitch is above the norms for male speech.

The table on the following page summarizes aspects of speech that are associated with sex and gender attribution, and associated norms. Norms should be considered as a spectrum rather than two isolated poles, to encourage speech professionals and clients to carefully consider therapeutic goals that fit with sense of self.

Table 1: Communication Norms Associated with Sex/Gender

		Female/Feminine Norms	Male/Masculine Norms
Considered highly salient to gender attributions	**Pitch**	• mean: 196-224 Hz • range: 145 Hz-275 Hz • higher upper/lower limits of range	• mean: 107-132 Hz • range: 80 Hz -165 Hz
	Formant frequencies	• higher	• lower
	Intonation	• More variable in intonation, more upward glides	• more level intonation, more downward glides
Weaker evidence to support role in gender attributions	**Loudness**	• 68-74 dBA	• 68-76 dBA
	Breathiness	• perceived as mildly breathy • softer speech onsets	• not perceived as breathy • harder speech onsets
	Articulation	• clear, light	• forceful onsets • drop phonemes, reduced use of voiced “th”
	Duration	• longer mean duration of phrases and isolated words; lingering on vowels	• staccato speech style
	Non-verbal	gendered norms relating to eye contact, smiling, nodding/inclining toward others, hand/arm gestures (specifics depend on nature of relationship between speaker/listener)	

Assisting the client to understand therapeutic options

Some transgender individuals have sophisticated knowledge about gender-related speech parameters and therapeutic options, and come to the initial assessment with a clear direction they wish to pursue. Others have no knowledge and expect guidance from a professional. During the initial evaluation it is important to assess the individual’s knowledge of speech. Consumer education materials discussing treatment options are included as Appendix E. In all cases, care should be taken to ensure that clients understand potential benefits and risks relating to both non-surgical and surgical voice change, and recommendations to prevent vocal fatigue or voice disorder.[7,8,11,13,23,28,30,35,37,57]

Because changes to specific acoustic voice characteristics affect numerous perceptual variables, a well-rounded speech treatment plan will target “constellations of related voice characteristics rather than independent acoustic variables” (p. 99).[2] For example, raising pitch may increase laryngeal tension and vocal tract constriction, influencing shimmer, jitter, signal-to-noise ratio, and resonance (and thus subjective perceptions of voice quality). For this reason, an optimal speech therapy program should target all parameters of speech, not just those related to pitch.

Preparing for the process of speech modification

The expert clinicians interviewed for this project all agreed that speech feminization/masculinization is a long process requiring considerable work on the client’s part. While therapy outcomes cannot be predetermined, the estimated amount of daily practice time and expected duration of the course of therapy should be discussed, as should the factors that can influence the course of therapy.[6] As changing speech requires altering deeply ingrained communication habits and behaviors that can be difficult to modify, it may be useful to use the “Stages of Change” model[58,59] or other behavioral change tools to assist in anticipating and addressing barriers to implementing change.

If pitch-changing surgery is sought, there should be discussion of the parameters of speech that will still need work after surgery, as well as an estimation of the healing time involved and the time required to stabilize the new pitch.[8,18,31]

Speech Feminization/Masculinization Protocols

Non-surgical (speech therapy)

Speech therapy goals

As discussed earlier in the assessment section, we recommend that the clinician assist the client to determine therapeutic goals, recognizing that transgender individuals have diverse identities and objectives regarding feminization/masculinization and that the clinician should not be directive in promoting specific goals. The range of therapeutic goals may include any or all of the following:

1. Preparation for therapy: assessment and information

Some clients are interested primarily in a speech assessment and a professional opinion on what would be involved in changing elements of speech. Information about therapeutic options can help with decisions regarding the timing of gender transition. One program offered three to four introductory sessions that provided information about gender differences in communication, information about vocal hygiene and prevention of voice disorders, and exercises to increase flexibility of voice production.[8]

2. Enhanced observation and awareness of speech patterns of self and others

While transgender individuals are often highly skilled at observing others, practice may be needed to understand, observe, and analyze the specific components of speech.[11]

3. Changes to speech

Average speaking pitch, pitch range, inflections, formant frequency, breathiness, loudness, articulation, tongue position, language, facial expressions, and gestures may be targeted to feminize/masculinize speech.[7-11,22,26-30,32,36,50] Specific objectives relating to voice modification depend on what is feasible to produce without strain, what fits with the client's self-image, and how important passability is to the client (some clients may be comfortable with gender-neutral speech, while others will want to aim for a voice that is perceived by listeners as male or female). For clients who are concerned about "fitting in" or about passability, rather than adopting an artificial set of speech norms it is recommended that clients observe communication patterns in their social, cultural, and work environments to develop a context-specific set of norms.[7]

4. Prevention of vocal fatigue

Use of the vocal tract in non-habitual ways can cause strain. Important therapeutic goals are the maintenance of efficient and easy speech, establishing appropriate practice, and informing the client about how best to maintain vocal health.[7,8,10,13,22,28-30]

Treatment format

Traditionally, speech therapy has emphasized 1:1 work to facilitate the personalized intervention necessary to modify and monitor change in target behaviours. However, speech therapy groups (typically comprised of four to six clients) have successfully been used to work with specific populations (e.g., individuals with aphasia, people recovering from traumatic brain injury, clients with fluency disorders). Group therapy can facilitate peer support and encouragement, and reduce self-consciousness that may be experienced when the client is working alone with the therapist.

It has been our experience that both individual and group therapy are important components of transgender speech care. We recommend that both formats be made available, with the option for a client to take part in either or both depending on therapeutic needs and goals.

Components of a transgender speech therapy program that can be done well in a group include:

a) Education/information

Clients undergoing speech feminization/masculinization need to understand how the voice is produced, how physiological differences in male/female voice production system affect the voice and listener perception, physiologic and social norms relating to gender and speech, treatment options/outcomes/risks, and techniques to prevent strain associated with voice change. While some transgender individuals are extremely well-informed about speech, others have no knowledge or have been exposed to inaccurate information via the internet or peer groups.

b) Discussion

Group format is ideal for participants to share observations, insights, and practical advice. In the *Changing Keys* speech groups run in Vancouver (Appendix D), participants have commented on how useful they found these discussions.

c) Speech therapy exercises

Components of a therapy program that are the same for all individuals (ear training, relaxation exercises and basic exercises that train efficient vocal technique) can be done efficiently in a group setting. There are several advantages to this. Some individuals feel self-conscious about doing speech exercises; participating in a group has a normalizing effect. Role-playing is more easily done in a group, and the opportunity to observe others can give valuable insight into participants' own practice. Additionally, the group provides a safe setting to learn listening skills, and to practice observing speech in a way that will not be intrusive in a real-world setting.

The necessary repetition of training exercises can be done in a group as long as the therapist is able to monitor the progress of all the participants and give individual input and feedback as required. The group can be divided into pairs to give practice time in both talking and listening.

Some interventions require 1:1 work with a therapist, including:

- determining appropriate target pitch
- training target pitch if the individual has difficulty matching pitches auditorily
- significantly changing individual characteristics associated with "feminine" or "masculine" speech

- individualized, specific input on anything the individual has difficulty understanding or doing in the group setting: this applies to all exercises but is especially important in training an efficient voice that is resistant to vocal fatigue or dysphonia

Length of treatment time

Treatment time varies greatly depending on the degree of change sought, the client's vocal abilities, and psychosocial issues. There is no professional consensus on the optimal length of treatment for maximal treatment efficacy: while one study found that there was a modest correlation between the number of therapy sessions and mean pitch achieved at the end of therapy,[30] another found that client satisfaction was not related to the number of therapy sessions, and that clients tended to become frustrated and discouraged when therapy continued over a long period of time.[22] It has been our experience that treatment generally ranges from a minimum of 15 hours to a maximum of one year of weekly sessions, and that shorter, more intensive treatment times encourage motivation and accommodate changes to life circumstances more readily than prolonged treatment.

Psychosocial adjustment is an important part of changing speech. Participants may require time to get in touch with what sort of voice best matches the person within. This is by necessity a process that takes time and professional input as to what is possible. Many transgender individuals begin with the goal of having a pitch that is unrealistically high (MTF) or low (FTM); only with experimentation and practice will it become apparent that this is probably not achievable, necessary, or even desirable. Additionally, it can take time to feel that an altered voice is an authentic expression of self rather than an artificial "mask". If psychosocial issues are significantly impacting treatment, referral to a trans-competent mental health therapist or social worker may be useful.

Therapeutic techniques

We recommend that speech-language pathologists working with FTMs be clear that they are using a trial protocol, and seek client permission to record, evaluate, and publish information on the efficacy of the protocol. In an extensive review of speech literature, we did not find any published protocols for speech therapy with FTMs. It is unclear if techniques used to treat puberphonia may be effective to lower pitch in FTMs; there are no parallels for the other aspects of speech that may be targeted to masculinize speech (intonation, resonance, loudness, articulation, duration, language, facial expressions, gestures, etc.).

There are numerous published protocols for speech feminizing therapy.[5,7,9-11,19,29,36,37,50] As an example of a local protocol, Appendix D describes the *Changing Keys* program. *Changing Keys* involves individual initial and final assessment, with a mixture of group and individual therapy over the course of nine weeks.

Although treatment protocols must be flexible enough to address each client's goals, physiologic parameters, and psychosocial needs, therapy should be grounded in current knowledge of best clinical practice of speech and voice therapy. In the absence of empirical evidence testing the efficacy of specific techniques to feminize or masculinize speech, we evaluated speech therapy protocols (published in the literature or discussed in interviews with expert clinicians) on the basis of *clinical rationale* – a clearly articulated, logical, and valid reason for choosing a specific protocol or technique. On this basis, we feel the following strategies are supportable:

- *Imitation of non-transgender people observed in daily life.*[3,7,9-11,29,50]
  This input from the real world is useful in helping clients develop spontaneous speech habits that "fit" in their particular community.

- *Progressively complex practice while maintaining good voice quality*.[7,11,29,36,50]
  Integration of pitch, pitch range, and inflections is typically done in progressively complex practice (vowels, monosyllabic words, phrases, sentences; reading, answering questions, interactive dialogue). Motor learning theory suggests that, initially, simple behaviours are acquired more easily than complex ones. However, behaviours that are to be done together must be learned together.

- *Vocal flexibility exercises to maintain vocal range and voice quality.*[36]
  Vocal range and flexibility exercises are a standard part of a voice therapy protocol.

- *Motor training*.[7]
  As speech is a motor act, input is most useful when it is given at the motor-sensory level. Matching a sensory target (e.g., "Does your voice feel easy or stuck?" "In the face or in the throat?") is a more effective method of training the desired production than giving verbal instructions (e.g., "Do this with your jaw").[60]

- *Identifying and altering voice qualities when coughing, laughing, and clearing the throat*.[5,7-9]
  These vegetative and spontaneous laryngeal functions may be higher or lower in pitch than the client desires and may respond to therapeutic input.

- *Experimentation with a broad range of voice styles*.[10]
  Experimentation with a broad range of voice styles, including ones that might be considered "over the top" (far beyond what the client would actually want to use) expands the range of possibilities, and makes smaller changes – ones the client may actually use – feel less extreme.

Non-verbal communication: Facial expressions, posture, and movement

Some transgender individuals are keen observers of non-verbal behavior and are acutely attuned to gendered norms relating to non-verbal communication. Others may seek assistance from a speech therapist. While recognizing that non-verbal communication is extremely important, some speech-language pathologists feel unqualified to offer input; others may feel more comfortable doing so. Depending on an individual clinician's expertise in this area and the client's financial resources, options can include:

- *Focus on strengthening the client's observational skills.*
  Experimentation and observation are more useful than learning and following rigid patterns of behaviour.

- *Offer general feedback on the client's self-defined parameters for change.*
  Based on observation of community peers, the client can identify desired parameters for change, practice these changes in the therapy session, and receive subjective feedback from the clinician. Parameters for change may include smiling, eye contact, facial expressions, posture, and gestures while speaking and listening. Feedback depends on the desired goal (e.g., did the client smile more/less? when?) and also the clinician's subjective sense of whether the change seemed appropriate.

- *Offer general feedback about social conventions relating to masculine/feminine expressions and movement.*
  The client should be informed of the culturally-specific nature of non-verbal communication norms and the limits of the clinician's expertise in this area. It can be helpful to discuss the

difference between stereotypes/norms and observed behavior and also the clinican's input in light of the client's own experience and perspective.

- *Refer to peer support resources.*
  While the level of knowledge about non-verbal communication varies greatly among peer support providers, peer support (1:1 or group) may offer experiential insights and an arena for practice. As peer knowledge often has strong currency, it can be important to remind clients to weigh the suggestions of peers against their own experience.

- *Refer to a trans-competent clinician who has training in non-verbal communication.*
  At present this is only an option for clients who are financially privileged and able to travel, as there are no funded, locally available workshops. Sandy Hirsch, a private consultant who directs the "Give Voice" program, offers workshops for transgender women in Seattle (http://www.givevoice.com/authenticity.shtml). Movement coaches in theatre training programs may be able to assist in finding or developing local resources.

Habituation

As with any speech therapy, habituation and generalization of feminized/masculinized communication is both challenging and necessary. There is a huge gap between being able to maintain a pitch change on a prolonged vowel in a clinical setting and sustaining changes throughout speech in everyday life, particularly when making offhand remarks in casual conversation (when self-monitoring may not be as vigilant) or when the client is under stress or fatigued.[19] Strategies to promote carryover into everyday life may include:

- practicing words that are typically part of daily conversation (e.g., hi, bye, yes, no)
- in clinical practice of conversational speech, focus on situations/topics related to the client's life, and role plays suggested by client to match real-life situations that pose the most difficulty (e.g., job interview, coffee shop[11,61])
- experimenting with emotional intensity by practicing sentences expressing joy, sorrow, irritation, anger, etc.
- practicing outside the clinic setting (including telephone and in-person)

Follow-up Sessions

A small study (n=10) found that a longer treatment time for MTF transsexuals was correlated significantly with stable elevation of pitch over time.[30] In view of this observation, follow up sessions after the initial treatment has finished, or facilitated support groups for ongoing practice, may be important in maintaining change. Clinically supervised followup also provides an excellent opportunity to gather much-needed data about the effectiveness of a program over time.

1. Followup sessions (group/individual)

There is not yet any empirical evidence regarding the optimum frequency for followup sessions, the optimum content, or the criteria for termination. In the absence of data, we suggest that refresher sessions be initially offered three months after treatment and then at 4-6 month intervals, or as the clinician and client deem appropriate.

Followup sessions should include a discussion of successes, problems, strategies, and difficulties the client has experienced since the end of therapy; a review of the core exercises of the program (to ensure the client is practicing correctly and to determine if the exercises are still appropriate); and time to address any concerns that have arisen since the end of treatment. Ideally, followup would

include re-evaluation of the same parameters measured in the pre-treatment assessment, both to assess the maintenance of the desired changes and also to evaluate the effectiveness of refresher sessions.

If the initial therapy was provided in a group setting, a group setting is a natural forum for refresher sessions. As with group format for initial therapy, group format for refresher work offers valuable opportunities for clients to compare experiences. In our experience this can be most useful and encouraging, especially for those in the early stages of gender transition. Individualized followup may be more appropriate than group format if the client has numerous concerns or unusual concerns that require individual attention, or if the client feels uncomfortable in a group setting.

2. Client-run speech support groups

Self-help groups are commonly organized for people who are living with speech and language disorders such as aphasia and stuttering. They may also be useful for transgender individuals who have completed clinical treatment and are seeking peer support to maintain or strengthen speech changes. Client-run speech groups can provide motivation to maintain practice, a forum to practice and to share ideas and concerns, and an opportunity to socialize and do specific role-playing. Client-run groups can also foster the client's sense of ownership and control of speech and voice production, rather than feeling dependent on the therapist.

In any self-help group there is a danger that an individual may inappropriately assume a professional clinical role. In a speech group, this could be circumvented by providing group facilitation training to members, having the speech-language pathologist as guest visitor from time to time, and by having self-help sessions along with therapist-run refresher sessions.

Modification to improve accessibility and utility to clients with access barriers

The transgender community is tremendously diverse, and protocols must be flexible enough to address diversity of service needs and issues relating to access. In the transgender speech literature reviewed for this project, there was little discussion of modification to address the needs of clients who have difficulty accessing the typical setting or format of speech service – including individuals who have speech, hearing, cognitive, or learning disabilities; are not highly fluent in English or are not literate; or are geographically isolated or cannot leave a residential facility (prison, long-term care, etc.). Without empirical evidence to guide practice, we offer the following suggestions based on our experience providing services to a diverse range of transgender clients.

Individuals who are physically unable to attend speech therapy or are awaiting speech therapy services could benefit from an information package available through the mail or internet. This kind of "distance program" is currently under development at La Trobe University in Australia.

Such a distance learning program could include information on the mechanics of speech and voice production, gendered aspects of speech and voice, tips on observing and listening to conversations of men and women in the client's own community, evaluation of commercial speech training programs available on the internet, and phonosurgery risks and benefits – similar to the factsheets in Appendix E. Clients could use telephone or email to consult with a clinician, on the understanding that the clinician would not be able to give input on specific therapy issues (it is not possible to do actual speech therapy at a distance, as therapy requires a comprehensive evaluation, regular monitoring of the client's performance and specific training input). Video hookup connecting a rural health unit with an urban speech program may be feasible both to train rural practitioners and to provide some level of service to geographically isolated clients.

For individuals who do not speak English, an information package could be translated into a variety of languages. Providing speech service in another language is not possible unless the clinician speaks the client's language well, as subtleties of inflections, inflectional range, word stress, and semantic and syntactic choices require a thorough knowledge of the language; the only direct therapeutic input that could perhaps be given would be in changing the average speaking pitch. SLPs who are multilingual could be supported to take trans-specific training, perhaps working in consultation with a more trans-experienced clinician to provide service in the client's primary language. If the client is partially fluent in English, wishes speech therapy in English, and will be speaking English in everyday life, therapy delivered in English can be beneficial as the client has the opportunity of learning more feminine/masculine patterns of speech as she/he acquires the language. For individuals who are only partially fluent in English the therapeutic process will likely be longer and will require much more 1:1 input.

Transgender clients with speech or hearing disabilities who are able to attend speech therapy sessions may find great benefit from using visual input during speech therapy. This has been used with good success with other populations (e.g., using palotography and ultrasound to work with phonological disorders in people who are hard of hearing). For transgender clients, there are a number of software programs that record fundamental frequency and allow the creation of a "model wave". The clinician could record a desired average speaking pitch or an intonation pattern and the client could then use the visual input to copy it; alternatively, the clinician could record the lowest (MTF) / highest (FTM) desirable frequency and the client could use the visual input to keep the speaking pitch above (MTF) or below (FTM) this line.

If a client has cognitive or learning disabilities, depending on the nature of the disability it may be useful to include a loved one or care aid in the therapeutic process. This person could help the client establish a regular practice schedule and give input to the exercises, under the guidance of the speech-language pathologist. A different format may be useful for the client who has difficulty processing the information necessary to change speech habits. Rather than using an approach that requires introspection (e.g., "How does that sound? Am I feeling my voice in my face?"), the clinician may be more directive in determining which exercises would be most useful and could be done appropriately by the client; the clinician and client together would draw up a practice schedule, and the client would simply practise the motor movements outlined. Individualized attention is likely more effective than group work to provide the client with more intensive input. To be successful, this kind of format would require regular clinical intervention and support outside the therapy room.

Self-guided speech feminization

There are a variety of videos, websites, and other materials available for self-guided speech feminization. We cannot comment on the efficacy of these materials, but we are concerned that (a) many are not produced by speech professionals, and (b) there are risks associated with attempting to change voice without professional assistance. Speech feminization/masculinization involves substantial changes in habitual production and so has the potential to cause a voice disorder or aggravate an existing one. We strongly recommend that anyone seeking to feminize or masculinize speech first be assessed by a speech-language pathologist, that a speech clinician be involved in monitoring progress, and that a speech clinician be consulted if there are any symptoms of vocal fatigue or negative changes to vocal quality. Additionally, we recommend that consumers be cautious of any materials promoting a rigid set of speech norms, as speech is too individually and culturally driven to be guided solely by a set of generic rules. Consumer education materials relating to self-guided speech change are included in Appendix E.

Surgical (pitch-elevating surgery)

Surgical techniques to elevate pitch are based on the physiological components of pitch:[35]

$$F_0 = 1/2 \text{ vibrating length of vocal folds} \times \sqrt{\left(\frac{\text{Mean vocal fold tension}}{\text{Vocal fold density}} \right)}$$

Fundamental frequency can thus be raised by shortening the folds, decreasing the total mass of the folds, or by increasing the tension of the folds.[17,23,62] Surgical techniques to achieve this include anterior commissure advancement, creation of an anterior vocal web, cricothyroid approximation, induction of scarring along the vocal folds, or vocal fold reduction (by intracordal steroid injection, laser evaporation of the vocal fold, or composite reduction/reconstruction of the vocal fold).[3,7,17,18,23,24,31,32,35,62-66] Consumer information on all techniques is included in Appendix E. To date, we feel that cricothyroid approximation is the only method that has been assessed with sufficient rigor to be considered a viable treatment option.[3,7,18,22,23,31,32,34]

Thyroid chondroplasty may be done at the same time as vocal surgery to reduce the laryngeal prominence (Adam's apple).[17,18,31,32,35,63] As this is a cosmetic procedure that does not affect the voice, it is not included in this review (for further information, see *Guidelines for Facial Feminization Surgery*).

Risk-benefit ratio

There is a paucity of outcome data for pitch-elevating surgery, particularly longitudinal data to monitor outcomes over time. In general, professional opinion is mixed about voice surgery, with some clinicians stating that it is not a viable treatment option, [5,67] and others recommending that voice surgery be considered a treatment of last resort for MTFs who have not experienced satisfactory increase in pitch following speech therapy.[7,31,63,68] Certainly the reported negative effects (compromised voice quality, diminished vocal loudness, adverse impact on swallowing or breathing, sore throat, wound infection, and scarring) and variable outcomes are a concern.[7,8,18,23,24,31,32,57,63,65,67,68]

However, some proponents of voice surgery suggest that surgery can protect the voice from damage caused by strain to elevate pitch through non-surgical means.[18,23,32,65] Given this, while there are clear risks of vocal surgery and the decision to pursue vocal surgery should be carefully considered, we feel the decision about risk-benefit ratio and preferred technique is best left to the patient, with input from both a trans-experienced surgeon and a trans-experienced speech-language pathologist.

Pre-surgical assessment

In addition to the standard screening done prior to any surgery (assessing for risks relating to anesthesia, infection, etc.), assessment prior to pitch-elevating surgery should include anatomical and functional assessment of the larynx, subjective auditory assessment by both a speech-language pathologist and the surgeon, and computer recording and analysis of pitch range.[18,23] Care should be taken to ensure the patient understands the risks and anticipated outcome of the technique that will be used.

After finding that some subjects have strained and unnaturally elevated voices following surgery, attributed to habitually speaking at an artificially elevated pitch for sustained periods of time prior to surgery, one surgical group reported testing for ability to phonate at a pitch within the masculine range as part of preoperative consultation. Clients who are unable to do this were felt to have the

equivalent of a muscle tension dysphonia, and were referred for preoperative voice therapy to recover the ability to produce relaxed phonation.[23]

Estrogen is associated with risk for deep vein thrombosis and pulmonary embolism. If the patient will be immobilized for a prolonged period during or following surgery, consultation with the prescribing physician is necessary to discuss the advisability of tapering estrogen use before surgery.

Smoking increases the risk of complications from anesthetic and impairs healing, and there is evidence that smoking following voice surgery can negatively impact on voice quality and pitch.[31] Patients should be informed of the risks associated with smoking and of smoking cessation resources, and strongly encouraged to not smoke prior to or immediately following surgery.

Post-surgical care

Post-surgical care depends on the specific surgical technique employed. The surgeon should review aftercare instructions with the patient as part of informed consent prior to surgery. The surgeon should also be accessible for questions relating to post-operative complications. The patient's local primary care provider should consult with the surgeon to determine appropriate followup.

In the literature reviewed voice surgery was typically performed as an inpatient procedure, with hospital monitoring for subcutaneous emphysema and infection for at least 24-48 hours after transfer from post-anesthetic care.[31] Followup evaluation by the surgeon (or post-operative care coordinator if the surgeon is outside BC) is recommended at one week, four weeks, twelve weeks, and six months after surgery to monitor healing and recovery. Immediately following surgery, temporarily decreased pitch, diminished voice quality, and edema were commonly reported, with spontaneous recovery in most cases. Less common complications that required medical intervention included mild emphysema, neck abscess, negative response to the sutures/plates used in cricothyroid approximation (requiring removal of the material), and loosening of the sutures used in cricothyroid approximation (requiring further surgery).[18,31]

For most techniques, it is recommended that patients not use the voice at all for one to seven days after surgery, and then use the voice cautiously until any discomfort (e.g., due to postoperative edema) has passed.[18,32,64] For the more invasive combined thyroid cartilage and vocal fold reduction, two weeks vocal rest is suggested.[35] Following cricothyroid approximation, steam inhalation may be recommended to hydrate and lubricate the vocal cords, to promote healing.[32]

Speech therapy is recommended following surgery to help the patient adapt to and stabilize the new voice.[18,31] If pitch-elevating surgery was performed before other components of speech had been satisfactorily altered, resonance, articulation, and other components may also need to be addressed via speech therapy.[8,18]

Outcome Evaluation

Evaluation is a continuous process in speech care, with various informal and formal methods that may be used to determine progress and shape the direction of future treatment.[11,22,29] We recommend that, at minimum, the baseline assessment be repeated immediately following the end of therapy, and post-treatment data compared to pre-treatment findings. If the client is agreeable to long-term followup, given the paucity of long-term data it would be ideal for the client to be re-evaluated six months, one year, five, and ten years after treatment (for transient clients this degree of followup may not be possible, but even data at 6 and 12 months would be a significant contribution to the field).

In addition to re-evaluating objective and subjective impressions of speech (as per the initial assessment), we recommend that clients be invited to evaluate satisfaction with the outcome of treatment.[6,22,26,29,36,50] Several trans-specific studies found a discrepancy between subjective satisfaction and objective/subjective changes to voice, with some clients pleased with the outcome despite minimal objective change, and others perceiving less change than that reported by naïve listeners.[22,26,30,44] This raises the question of what is considered a "successful" intervention. Some authors interpreted the findings as evidence that clients cannot accurately judge "successful" voice change;[26] others felt that discrepancy between subjective satisfaction and objective changes to voice may have stemmed from increased passability in other dimensions (e.g., from hormones or electrolysis), a good working relationship with the clinician, or satisfaction with the availability/cost of the service.[30] It is also possible that client goals shifted over time or that clients' goals for speech did not center on pitch or passability (the typical measures employed for evaluation). At the beginning of this document we suggested that the primary goal of speech feminization/masculinization is to decrease discrepancy between speech and the client's sense of self; it is, we think, highly relevant to ask about client feelings about "fit" between speech and identity, even if the client did not explicitly state this as an objective at the start of treatment.[22] Another relevant measure might be the client's report of being able to use the desired speech consistently in the settings that were identified as the targets at the outset of therapy.[36,50]

We also encourage clinicians to invite clients to evaluate the quality of service provided. In some cases the clients may be very satisfied with the clinician's performance despite minimal changes to speech; whatever the outcome, clients may have constructive critical feedback to offer the clinician regarding the ability to relate information clearly and accurately, sensitivity and respect in communication, overall familiarity with transgender concerns, efficient coordination with other clinicians, accessibility of treatment, etc.

If long-term followup is feasible, in addition to the standard re-evaluation of speech it may be useful to inquire about clients' continuation of therapeutic exercises, and symptoms of vocal fatigue.[22,30] One long-term study found that after speech therapy had ended, three out of five participants attempted further change through techniques learned from the internet or in books.[22] It may be useful to offer consumer education regarding risk prevention and/or ongoing monitoring to clients who are interested in pursuing techniques outside a professional setting.

Summary of Recommendations

Purpose of transgender speech treatment

1. Transgender speech services should be offered in the context of a complete approach to transgender health that includes comprehensive primary care and a coordinated approach to psychological and social issues.

2. The primary goal of speech feminization/masculinization is to change speech so the client's speech more closely approximates the client's sense of self.

3. Feminizing/masculinizing speech involves non-habitual use of the voice producing mechanism. To prevent the possibility of vocal damage, professional evaluation and assistance are essential.

4. Self-guided speech change without professional supervision is not recommended. Clients intending to pursue self-guided speech change should be encouraged to, at minimum, have an initial professional assessment and then to consult with their primary care provider if they develop symptoms of vocal fatigue or negative changes to vocal quality. Self-help speech groups should have appropriate clinical support.

Clinical competence

5. Speech professionals working with transgender individuals must have a basic understanding of transgender health (including hormonal and surgical feminization/masculinization) and trans-specific psychosocial issues, and must be familiar with basic sensitivity protocols such as use of preferred gender pronoun and name.

6. Transgender individuals who are seeking speech services for reasons other than speech feminization/masculinization can be treated by trans-sensitive speech professionals, using standard speech protocols. Speech feminization/masculinization requires additional clinical expertise and special clinical protocols.

Client inclusion/exclusion

7. Speech services should be available to the full spectrum of the transgender community, including male-to-female (MTF) and female-to-male (FTM) transsexuals, crossdressers, bi-gendered people, androgynous people, and others who desire to feminize/masculinize their speech.

8. Need for speech services should not be evaluated based on hormonal use, pursuit of sex reassignment surgery, or length/percentage of time cross-living.

9. Services should be adapted as needed to fit a client's individual needs, including accommodation relating to hearing/speech disability, mental illness, cognitive disability, learning disability, physical disability, geographic isolation, or incarceration.

Treatment decisions

10. The client is responsible for treatment decisions, supported by the clinician's informed professional opinion, assessment data, and any loved ones the client wishes to be involved.

11. To support fully informed treatment decisions, clients should be fully informed of potential risks and benefits associated with treatment options, the estimated duration of treatment, and the factors that can influence the outcome/duration of treatment.

12. Existing protocols for speech feminization with individuals in the MTF spectrum should be reviewed and considered in developing an individualized treatment plan for speech feminization. As there are no established protocols for speech masculinization with people in the FTM spectrum, FTMs seeking this service should be informed the protocol is a trial.

13. While modification of existing protocols is encouraged, all treatment plans (including those using new or experimental techniques) are expected to be based on a clearly articulated, logical, and valid clinical rationale. Departure from existing protocols should be explained as such to the client as part of fully informed consent, and should be documented in detail to facilitate evaluation.

Assessment

14. Assessment prior to speech feminization/masculinization should include:

    - general medical history
    - subjective and objective evaluation of current speech, including pitch, intonation, vowel formant frequencies, loudness, voice quality, articulation, semantic and syntactic choices, discourse habits, and non-verbal communication (facial expressions, gestures, etc.)
    - potential for change
    - knowledge regarding treatment options for speech feminization/masculinization
    - psychosocial issues that may impact on speech, voice, or treatment

15. As there is evidence that pitch changes tend to degrade over time, periodic re-evaluation is recommended following treatment, with further clinical assistance as needed.

Speech therapy

16. Speech therapy should be individualized based on the individual's goals, the risks/benefits of treatment options, and consideration of social and economic issues.

17. Rather than adopting a rigid and artificial set of speech norms, it is recommended that clients be assisted to develop an individualized and context-specific set of norms based on communication patterns in the client's social, cultural, work, and home environments.

18. It is clinically optimal to be able to offer both individual sessions and group treatment, with the proportion of time in each format depending on the client's therapeutic needs and goals.

19. Therapeutic techniques may include:

    - imitation of non-transgender people observed in daily life
    - progressively complex practice integrating changes to pitch range, average conversational pitch, and inflections, while maintaining good voice quality
    - vocal flexibility exercises
    - motor training to modify speech output towards the desired goals
    - maintaining desired voice pitch when coughing, laughing, and clearing the throat

Pitch-Elevating Surgery

20. As there is no professional consensus regarding the effectiveness and risk/benefit ratio of pitch-elevating surgery, care should be taken to ensure that clients are fully informed of potential risks, post-operative care requirements, and possible outcomes (including decreased pitch).

21. Assessment by a voice surgeon and speech-language pathologist is recommended prior to surgery.

22. Prior to surgery, the surgeon should discuss aftercare instructions with the patient and provide written aftercare instructions.

23. If surgery is to be performed outside BC, the surgeon should consult with the patient's primary care provider to coordinate appropriate peri- and postoperative care, as well as long-term followup. If the client is taking estrogen, it is necessary to consult with the prescribing physician to discuss tapering of estrogen prior to and immediately following surgery to prevent potentially fatal blood clots.

24. Speech therapy should be offered following surgery to help the patient adapt to and stabilize the new voice.

Outcome Evaluation

25. Outcomes should be rigorously evaluated.

26. At minimum, the baseline assessment should be repeated immediately following the end of therapy. Ideally, re-evaluation would take place at six months, one year, five years, and ten years after treatment.

27. Evaluation should include client satisfaction with the treatment outcome and with the quality of care provided, as well as perceptual and objective measures of speech/voice change.

28. Informal or formal sharing of outcome data with colleagues must only be done if the client has provided fully informed and voluntary written consent.

Research

29. There is a paucity of data relating to speech feminization/masculinization. Further research in this area is strongly recommended.

30. To ensure that participation in research is voluntary, services should not be offered solely as part of a research protocol.

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Appendices

Appendix A: BC transgender resources

Appendix B: Sample trans-inclusive speech intake form

Appendix C: Sample self-report transgender speech questionnaire

Appendix D: The *Changing Keys* program

Appendix E: Consumer education materials relating to speech feminization/ masculinization

- E1: How the Voice Works
- E2: Gender and Speech
- E3: Changing Speech: Making Treatment Decisions
- E4: Taking Care of Your Voice