

**The Singing Voice During the First Two Years of
Testosterone Therapy:
Working with the Trans or Gender Queer Voice**

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Abstract

In order to better serve singers who identify as trans men or gender queer, voice teachers must understand the vocal effects of hormone replacement therapy, specifically that of testosterone therapy. Testosterone therapy is the only type of hormone replacement therapy that permanently changes the voice and eventually results in a full octave drop or more of a person's spoken fundamental frequency. Due to such a dramatic shift, the voice change process can be turbulent.

This dissertation is designed to educate both cis gender voice teachers and trans and gender queer singers on the process of vocal change during the first two years of testosterone therapy because the most vocal change occurs within the first two years. In addition to information on what to expect during the first two years of testosterone therapy, this dissertation also discusses language surrounding trans issues, the effects of different types of chest binders on the singing voice and it evaluates each form of testosterone therapy in regard to their effect on the voice.

Statement of Purpose

I decided to write my pedagogy dissertation on working with trans and gender queer voices after attending the lecture by Laverne Cox in Mackey Auditorium in the spring of 2017. Laverne Cox, an actress and trans activist, said that evening: “When a trans woman gets called a man, that is an act of violence.” Upon hearing her say that, I realized how incredibly gendered the language is that we use in singing. This issue came up during the recent Colorado/Wyoming chapter auditions of the National Association of Teachers of Singing, held in Denver during April of 2017. The biggest question of the lunch hour was: in which voice category do we put trans gender people? After that, I realized it was absolutely essential to do more research on working with trans gender and gender queer singers. The singing profession must be more inclusive, and this work needs to be done *now*. Since this research is so new, some of my resources are non-traditional, including YouTube videos and blogs. This information is so necessary that there is already a large Do-It-Yourself community of trans men and gender queer people tracking their vocal change on testosterone. I hope that my research encourages others to pursue research in this subject, as there is still a lot to be done. This paper is largely a collection and synthesis of multiple anecdotes and sources, which should not be considered the “last say” on trans and gender queer singers undergoing testosterone treatment. I would also like to acknowledge that I am writing this paper from the perspective of an American, cis gender voice teacher trained primarily in the *bel canto* singing style.

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Glossary

- Androgen*—a male sex hormone or a hormone that produces masculinizing effects, includes testosterone
- AFAB*—a person assigned female at birth
- AMAB*—a person assigned male at birth
- Biological sex*—sex assigned at birth based on genitalia, female/male
- Bottom surgery*—sex-reassignment/affirmation surgery
- Chest binding/Binding*—the compression of chest tissue for the purpose of masculine gender expression among people assigned a female sex at birth, particularly trans gender and gender queer individuals¹, conducted with either a commercial binder, sports bra(s), layering of t-shirts or more hazardous materials such as duct tape and ace bandages to be discussed later in this paper
- Chest Voice*—vocal register in which the vocal folds vibrate both vertically and horizontally, thyroarytenoid muscle is engaged but cricothyroid muscle is not engaged
- Cis*—a prefix derived from chemistry to describe two atoms or groups of atoms that are on the same side of a plane²; this is the gender identity of most people
- Cis female/woman*—a person who identifies with having been assigned female at birth³
- Cis gender*—a person who identifies with the gender assigned at birth⁴, the gender identity of the majority of people⁵
- Cis male/man*—a person who identifies with being assigned male at birth⁶
- Fach*—applies to the German *Fach* system which categorizes voices by voice type, vocal timbre and tessitura
- Falsetto*—vocal register in which the vocal folds exclusively vibrate horizontally, cricothyroid muscle is engaged in order to elongate and tense the vocal folds
- Female-To-Male (FTM)*—a person who was assigned female at birth that identifies as male
- Gender binary*—male/female
- Gender dysphoria (GD)*—the distress accompanying the juxtaposition between a person's assigned gender at birth and their gender identity⁷
- Gender expression*—how a person chooses to express their gender identity
- Gender fluid*—a person whose gender identity is on the gender continuum, can be synonymous with gender queer, trans gender, gender non-conforming and

¹ Sarah Peitzmeier et al, “Health Impact of Chest Binding Among Transgender Adults: A Community-engaged, Cross-sectional Study”, *Culture, Health & Sexuality: An International Journal for Research, Intervention and Care* 19.1 (2016): 64.

² Lessley, 9.

³ Rachel Inselman, “Hormone Replacement Therapy for Transgender Singers”, Unpublished Conference Paper, *International Congress of Teachers of Singing*, Stockholm, 2017.

⁴ Inselman, “HRT for Trans Singers”.

⁵ Lessley, 9.

⁶ Inselman, “HRT for Trans Singers”.

⁷ Meriggiola, 597.

- non-binary depending on the person's preference of term
- Gender identity*—a person's personal, internal sense of being male, female, some of both, or neither⁸
- Gender incongruence*—when a person's biological sex or gender assigned at birth does not match their gender identity
- Gender queer*—a person whose gender identity differs from their gender assigned at birth⁹, can be synonymous with trans gender, gender fluid, gender non-conforming, and non-binary depending on the person's preference of term
- Gender non-conforming*—synonymous with Gender queer, used most often by cis gender medical professionals, pejorative because it assumes one should conform to something
- Gender Variant*—see Gender queer, more of a “prescriptive” term used by cis gender medical professionals
- Hormone Replacement Therapy (HRT)*—the use of hormones to establish the phenotype of the desired gender
- Male-To-Female (MTF)*—see trans woman
- Non-binary*—a person whose internal sense of self/gender experience or identity is not exclusively woman/female or man/male¹⁰, a person whose gender identity is along the gender continuum, can be synonymous with gender fluid, gender non-conforming, and gender queer depending on the person's preference of term, pejorative because it defines a person by what they are not rather than by what they are
- Sex-reassignment Surgery (SRS)*—the use of surgery to establish the phenotype of the desired gender, better alternatives include Gender Confirmation Surgery (GCS) or Gender Affirmation Surgery (GAS), includes both “Bottom” and “Top” surgery
- Testosterone (T)*—a steroid which chemically resembles cholesterol compounds and has an androgenic effect, a protein-building effect and an effect on the pituitary gland¹¹
- Top surgery*—mastectomy for AFAB gender queer people, breast implant for AMAB gender queer people
- Trans gender*—see Gender Queer
- Trans person*—see Gender Queer

⁸ “Guide to Being a Trans Ally”, Straight for Equality, <https://bolt.straightforequality.org/files/Straight%20for%20Equality%20Publications/2.guide-to-being-a-trans-ally.pdf>, 18 Sept 2017.

⁹ Rachel Agron, Kelly Meghan Kelly, “Transgender Voice Therapy: Evidence-Based Practice & Clinical Application”, Clinical Document, November 12, 2015, 3:00-4:30pm.

¹⁰ Alex Kapitan, “The Radical Copyeditor’s Style Guide for Writing About Transgender People”, 31 Aug 2017 Radical Copy Editor, <https://radicalcopyeditor.com/2017/08/31/transgender-style-guide/>, 18 Sept 2017.

¹¹ Moya Andrews, Anne Summers, *Voice Therapy for Adolescents* (Boston: Little, Brown, 1988), 9.

Trans sexual—a person who medically transitions to the phenotype of their desired gender through hormone therapy and/or surgery¹², pejorative term that is largely outdated

Trans man—see Female-To-Male, there is a difference between “transman” and “trans man” because being trans is a separate identity from being a man

Trans woman—a person who was assigned male at birth but identifies as female

Trans vestite—a person who dresses outside of the gender binary, used most often to refer to cis men in drag otherwise known as drag queens, can also apply to drag kings

¹² Meriggiola, 597.

Introduction

In the social shift from the perception of a gender binary to a greater understanding of a gender continuum within European and American cultures, the discipline of singing finds itself in a period of rapid evolution. This shift has brought about the emergence of new voices: those of trans gender and gender queer people. As vocal professionals, it is the job of voice teachers to understand how to work with *every* voice. The topic of this dissertation is rooted in this necessity.

Because trans and gender queer people are now finding themselves recognized within institutional health care systems in most “Western” societies, hormone replacement therapy (HRT), gender affirmation surgery (GAS), and speech feminization/masculinization are becoming more accessible. As a result of the increasing accessibility of trans gender health services, new challenges are arising within the discipline of vocal health. One of these vocal health challenges is singing during hormone replacement therapy.

Hormone replacement therapy (HRT) is the injection of hormones that allow the recipient to obtain the phenotype of their gender identity. The most common recipients of HRT are people who are assigned female at birth and identify as trans or gender queer, and people assigned male at birth who identify as trans or gender queer. This paper, as demonstrated by the title, will focus on the vocal transition initiated by testosterone treatment, or the type of HRT undergone by trans masculine and gender queer people assigned female at birth. This paper is intended as a guide for AFAB singers newly embarking upon testosterone treatment and their voice teachers.

Trans History In Brief

The purpose of this section is to educate cis gender voice teachers in the nuances of the language surrounding trans gender people and the necessity for HRT in some individuals.

The adjective “trans gender” is a term that refers to any person who is gender variant, or a person whose gender identity does not fit within the gender they were assigned at birth.¹³ Gender is not equivalent to biological sex. Biological sex, which is believed to ultimately be a social construct as well, is often determined by one’s genitalia, resulting in an assignment of either female or male at birth.¹⁴ Gender is one’s outward expression of identity. Those who are trans gender are considered to be on the gender spectrum, which, to put it reductively, is the space between or outside of the traditional male/female gender binary that includes a number of subcategories, or people who prefer not to identify with any categories at all. Because the term trans gender includes a number of subcategories, it is a blanket term that has been used for the collective outliers of the gender binary since the 1990s.¹⁵

Because the term trans gender is still very new within the English lexicon, the collective to which it refers expands and contracts depending on the context in which it is situated, and it is sometimes not the preferred term for the people whom it is designed to categorize.¹⁶ While this section is meant to supply the cis gender teacher with terms and definitions surrounding gender variant categories, it is also necessary to acknowledge that

¹³ David Valentine, *Imagining Transgender: An Ethnography of a Category* (Durham: Duke University Press, 2007), 32.

¹⁴ Emerald Lessley, *Teaching Transgender Singers* (DMA Dissertation, University of Washington, 2017), 8.

¹⁵ *Ibid.*, 35.

¹⁶ Valentine, *Imagining Transgender*, 14, 21.

the language surrounding gender variance is rapidly evolving because the people for whom this language is designed are finally gaining institutional legitimacy and personhood.¹⁷ Therefore, those looking to educate themselves on the rapidly changing language surrounding gender must pursue independent research, and be prepared to frequently ask questions and be corrected by trans gender and gender queer people.

The adjective trans gender assumes that the gender binary exists; that male and female are objective categories. Sociologist and gynecologist Myra Hird asserts that the binary assumes that:

1. There are only two genders.
2. Gender is invariant.
3. Genitals are the essential sign of gender.
4. Exceptions to two genders are a joke or pathology.
5. There are no transfers between genders.
6. Everyone must be classified as one of the two genders.
7. The male/female dichotomy is natural.
8. Gender membership is natural.¹⁸

In order to delve deeper, let us return to basics: according to modern-day psychology, sex is the biological or anatomical breakdown of an individual and gender is the identity that individuals acquire from their anatomical sex.¹⁹ Thus, if one has a penis, then one automatically identifies as a male, and if one has a vagina, then one automatically identifies as a female. This logic was considered objective by the psychological and medical professions up until the last decade, which is why being trans gender was originally considered a pathology.²⁰

¹⁷ Alex Kapitan, “The Radical Copyeditor’s Style Guide for Writing About Transgender People”, 31 Aug 2017, Radical Copy Editor.

<https://radicalcopyeditor.com/2017/08/31/transgender-style-guide/>, 18 Sept 2017.

¹⁸ Myra Hird, “For A Sociology of Transsexualism”, *Sociology* 36.3 (2002): 588.

¹⁹ *Ibid.*, 580.

²⁰ *Ibid.*, 579.

When being trans gender was considered pathological, it was referred to as trans sexualism. It is still a common misconception by cis gender people that these two terms—trans gender and trans sexual—are interchangeable. Trans gender and trans sexual became two separate terms when people began to choose partial medical transition or to not medically transition at all despite gender variance.²¹ A “trans sexual” is now defined in the medical profession as a trans gender person who is seeking hormonal and/or surgical treatment in order to align their sexual characteristics with their gender identity.²² It is important to note, however, that not every person who considers themselves a trans sexual seeks medical transition, and not every person who seeks medical transition considers themselves a trans sexual.²³ In fact, many post-operative trans sexual people no longer consider themselves trans sexual, as being “trans” anything is a self-diagnosis.²⁴ Additionally, the term trans sexual is now seen as outdated and has been used as a slur by trans phobic people. Therefore, the adjective “trans sexual” will only be utilized a few more times in this section in order to provide clarity about the historical development of trans gender language. It is discouraged for one to refer to a person identifying as trans as a trans sexual.

Another element of confusion can arise in the use of the word “sex”. It is important to remember that the terms trans gender and trans sexual are dealing with the

²¹ Tony Zandvliet, “Transgender Issues in Therapy”. *Issues in Therapy with Lesbian, Gay, Bisexual and Transgender Clients* (Buckingham: Open University Press, 2000), 177.

²² Jamison Green, *Becoming A Visible Man* (Nashville: Vanderbilt University Press, 2004), 14.

²³ *Ibid.*, 14.

²⁴ Jason Cromwell, *Transmen and FTMs: Identities, Bodies, Genders and Sexualities* (Urbana: University Illinois Press, 1999), 20, 25.

issue of gender, which is a distinctly different identity than one's sexuality.²⁵ Though trans gender and trans sexual are not the same thing, a trans sexual person is part of the collective that is trans gender people because a trans sexual person is gender variant. Other people who theoretically fit within the trans gender category are trans men and trans women. Other scholarship suggests that trans vestites are also included within the umbrella of the term trans gender.²⁶ However, not all scholarship is in agreement with this association, as many people who perform as drag queens live as cis men, or men who identify with their assigned male sex. An alternative to the term trans gender or gender variant is gender queer, which less controversially includes all categories of people above.²⁷ Yet another alternative to the terms trans gender, gender variant, and gender queer is the term non-binary.²⁸ The use of one of these terms versus the next is largely based on personal preference and context. It is due to increasing acceptance, visibility and the institutionalization of trans gender people that more trans gender people are acquiring the courage to make themselves visible and outwardly define the language with which they refer to themselves.²⁹

It is important to assert that in addition to "trans sexual", calling a person "a transgender" or "transgendered" is also pejorative. As established earlier, "trans" is an adjective. A trans person, trans man, or trans woman is a person first. Trans people who identify as trans men or trans women may also be referred to simply as men and women

²⁵ Valentine, 4.

²⁶ Ibid., 38.

²⁷ Zandvliet, 179.

²⁸ Maria Meriggiola, Giulia Gava, "Endocrine Care for Transpeople Part I: A Review of Cross-Sex Hormonal Treatments, Outcomes and Adverse Effects in Transmen", *Clinical Endocrinology* 83 (2015): 598.

²⁹ Zandvliet, 178.

because they identity within the gender binary categories. For the purpose of this paper, I will continue to refer to trans men as trans men rather than simply as men for the sake of avoiding confusion on the topic of testosterone treatment.

Within the life of a trans gender person, the choice to undergo medical transition is not a simple one. For some, it is absolutely necessary that their body match their gender identity, because “...it is where we live and through it we communicate to others. The reaction our bodies receive from others affects how we interact.”³⁰ Our appearance or phenotype establishes the way we interact with other people, the way we are treated, and the way we treat ourselves. Many trans gender individuals experience gender dysphoria prior to realizing their gender identity. Gender dysphoria (GD) is the distress accompanying the juxtaposition between a person’s assigned gender at birth and their gender identity.³¹ Typically, gender dysphoria is the most severe during the onset of puberty, but trans people may begin experiencing GD in early childhood.³² GD can cause significant distress as exhibited by the staggering attempted suicide rate among trans gender individuals; 41% of all trans individuals attempt suicide as compared to 4.6% of the general population. Worse yet, 60% of trans individuals whose healthcare needs are refused attempt suicide.³³ In order to ease the psychological distress of GD, some trans and gender queer people choose to undergo medical transition.

The goal of medical transition is to improve the life of trans people by allowing them to acquire the phenotypic features of the gender with which they identify.³⁴

³⁰ Green, 95.

³¹ Meriggiola, 597.

³² Lessley, *Teaching Transgender Singers*, 14.

³³ Lessley, 15.

³⁴ Meriggiola, 597.

However, medical transition is unattainable for many trans gender people despite emotional necessity. Due to continued prejudice, and in addition to high rates of depression, many trans gender people “disproportionately experience high rates of... social isolation, economic marginalization, and unmet healthcare needs.”³⁵ Many trans people who desire medical transition do not transition due to lack of financial means, or because a medical transition might negatively affect their family or work life. For others, medical transition is not required in order to be content as a trans person. The decision to medically transition is a personal one, and individuals who choose not to undergo some or any medical transition are no less trans for not doing so.

The type of medical transition that a trans person chooses to undergo is dependent upon how they perceive themselves. The primary goals of HRT are to replace the endogenous or biologically produced hormones with the hormones associated with one’s gender identity thereby reducing the secondary sex characteristics of one’s assigned gender with that of one’s identified gender.³⁶ Therefore, if a person perceives themselves as more masculine than their assigned birth, as in trans men or gender queer AFAB people, then they may choose to medically transition through androgen/testosterone therapy. If a person perceives themselves as more feminine than their assigned birth, as in trans women or gender queer AMAB people, then their HRT is regimented with estrogen. This paper will deal the singing voice of trans men, trans masculine and gender queer AFAB people undergoing testosterone therapy.

³⁵ Rand Dadasovich et al., “Testosterone and Sexual Risk Among Transmen: A Mixed Methods Exploratory Study”, *Culture, Health & Sexuality* 19.2 (2017): 257.

³⁶ Lessley, 23.

An important point to reiterate within this section is that being trans anything, gender fluid, gender queer, or non-binary is a self-affirming label, and one term that might fit for one person may not be the term of choice for another person, even though the term with which they do not identify may nonetheless apply in certain contexts.³⁷ The fluidity of gender categorization also extends to pronouns: she, he, they, zi, etc. It is essential to know the pronouns that a person uses because the proper use of pronouns shows respect, support, and validates personhood.³⁸ For a full guide to pronouns, see the Gender Neutral Pronoun Blog.³⁹

Language

As demonstrated in the previous section, there is a lot of new language associated with trans people and trans issues because “Western” society is only just now allowing people on the gender spectrum agency over their personhood. Examining the language surrounding singing, one might notice that it is historically steeped in the gender binary. Voice type is often explicitly or inexplicitly associated with a gender: soprano, mezzo-soprano, male soprano, alto, contralto, countertenor, tenor, baritone, bass. Vocal pedagogy often refers to the larynx in association with males/men and females/women. Pants roles aside, opera and musical theater generally only contain characters within the gender binary. The exceptions are new opera works *As One* with music by Laura Kaminsky, *Three Way* by Robert Paterson, and *Dame Not Lady* with music and lyrics by

³⁷ Cromwell, 25.

³⁸ Loraine Sims, “Teaching Lucas: A Transgender Student’s Journey from Soprano to Tenor”. *Journal of Singing* 73.4 (2017), 373.

³⁹ “The Need for a Gender-Neutral Pronoun”, Gender Neutral Pronoun Blog, 24 Jan 2010, <https://genderneutralpronoun.wordpress.com/tag/genderqueer/>, 28 Sept 2017.

Selena Wellington. Even most repertoire outside of opera and musical theater references the gender binary.

This leaves us with a few questions: How do we teach voice without reinforcing the gender binary? How do we create inclusion in singing competitions? How do we create inclusion in choirs? Let us grapple with the latter question first. The GALA choruses' guide to "Creating Choirs that Welcome Trans* & Gender-Queer Singers" is a great resource with which to begin thinking about language within choirs, but it does not necessarily address the adjustment of choral part designations.⁴⁰ In Butterfly Music Transgender Choir, the second trans gender choir in the world, artistic director Sandi Hammond handles choral part designations by referring to the different sections as "trans upper, trans middle, trans lower".⁴¹ However, it is not necessarily helpful or desired to single-out trans people with trans voice labels.⁴² Therefore, in a choir of trans and cis gender individuals, one might simply opt for upper, middle and lower voices. These voice-type labels can also be appropriate for group voice classes. Then, once working with individuals, one can simply work without addressing gender specifics since every voice is different even if the individual identifies within the gender binary. A simpler solution than creating new labels is to divorce gender from voice type labels altogether. It could be as simple as announcing at the beginning of a choir or voice class that voice

⁴⁰ "Creating Choirs that Welcome Trans* & Gender-Queer Singers", GALA Choruses, May 2015, <http://galachoruses.org/sites/default/files/Creating-Choirs-that-Welcome-Trans-Singers.pdf>, 28 Sept 2017.

⁴¹ Paulette Beete, "Art Talk with Sandi Hammond of the Butterfly Music Transgender Choir", Art Talk Blog, *National Endowment for the Arts*, 22 June 2016, <https://www.arts.gov/art-works/2016/art-talk-sandi-hammond-butterfly-music-transgender-chorus>, 28 Sept 2017.

⁴² Eli Conley, Telephone Interview, October 9th, 2017.

type labels have nothing to do with gender but are a way of identifying where your vocal range most comfortably sits on a given day.⁴³ Within these given traditional voice types, every singer should also have the freedom to switch which voice part they are singing depending on how their voice is feeling on a particular day. In trans-inclusive choirs, this is already a common practice.

In terms of singing competitions, there are no documented solutions yet. This is not an issue within top tier competitions in which everyone is competing in the same category, but competitions like the annual auditions run by the National Association for Teachers of Singing, which still uses the gender binary to create categories. While inclusion of trans singers was a common topic of discussion at the NATS competitions in 2017, new competition category names were not devised. The NATS competition does, however, simultaneously categorize by age. Though the “male” larynx typically undergoes more change during puberty, making clean adduction more difficult for the adolescent “male” larynx than for the adolescent “female” larynx at certain ages, the solution may be to create categories solely around age. Coupled with making categories based on age, judging score sheets should weigh grades more heavily based on artistry and musicianship. Conversely, perhaps adduction and vocal clarity should be weighted less heavily as part of a singing competition grade for young singers since they are largely based on genetic luck as to how quickly the larynx matures and stabilizes.

When instructing a vocal pedagogy class, language becomes more difficult because physiology is even more heavily tied to biological sex and the gender binary. A good first step to take is “hedging all generalizations” in order to account for experiences

⁴³ Eli Conley, Telephone Interview, October 9th, 2017.

outside of the gender binary or what society accepts as the norm.⁴⁴ This involves using words like “most, often and typically” in sentences that would otherwise be generalizations. For example, one would change the sentence “Women do not experience complete closure of the vocal folds until their larynx has fully matured” to “*Most* women do not experience complete closure of the vocal folds...” A better solution than avoiding generalization through filler words is to be more specific. If we take the same example as above and make it more specific, it would read as: “*People assigned female at birth who have not undergone testosterone therapy* do not experience complete closure of the vocal folds until their larynx has fully matured”.⁴⁵ While this may seem like a mouthful or wordy, it is actually more factually accurate than the original statement, as not all people who identify, are perceived as, or express themselves as women have had the pubescent experience of incomplete adduction until adulthood because not all women have the same anatomy.

Above all else, it is essential that a voice teacher use the correct pronouns for their students. Pronouns are not preferred. They are mandatory. A voice teacher must ask for a student’s pronouns on their intake worksheet/questionnaire, or respectfully ask in person. As indicated earlier, using the correct pronouns validates an individual’s personhood. A healthy teacher/student relationship cannot be developed without mutual respect. In addition to using the correct pronouns, under the circumstance in which the teacher knew their trans student prior to their social, and/or legal, and/or medical transition, it is

⁴⁴ Lal Zimman, “Transgender Language Reform: Some Challenges and Strategies for Promoting Trans-affirming, Gender-Inclusive Language”, *Journal of Language and Discrimination* 1.1 (2017): 99.

⁴⁵ Zimman, 100.

essential that the teacher call them by their chosen name. For more information on the complexities of changing one's legal name and gender, see the National Center for Transgender Equality's "ID Documents Center" webpage.⁴⁶

Laryngeal Development During AFAB/AMAB Puberty

In order to understand how testosterone therapy affects the larynx, this section will first address changes in the larynx, the lungs and the face during biological "male" and biological "female" puberty. In doing so, language implying the gender binary will be employed for the purpose of demonstrating trends in the growth of the larynx in people assigned the male sex at birth versus people assigned the female sex at birth. When discussing the "male" and "female" larynx, I will use quotations in order to signify that gender assigned at birth and gender identity are indeed spectrums, and that these categories are generalizations. The purpose of this section is to debunk the myth that the transition of the larynx of a trans or gender queer person on testosterone is the same as the transition of adolescent "males" during puberty, though there are some common vocal changes between biological "male puberty" and testosterone therapy for AFAB people and vocal exercises used with pubescent "males" can also be helpful for trans or gender queer people on testosterone.

The larynx, which is also often affectionately referred to as the "voice box", consists of one bone, five cartilages and numerous muscles. The parts of the larynx that will be referred to most often in this paper are the vocal folds, otherwise known as the

⁴⁶ "ID Documents Center", National Center for Transgender Equality, transequality.org/documents, 7 Feb 2017.

vocal cords or thyroarytenoid muscles, and the thyroid cartilage, whose horn manifests exteriorly as the Adam's apple. During the first twenty years of the human life, the larynx undergoes dramatic changes. The length of the vocal folds in the "male" larynx increases .7 mm/yr to a maximum of 16mm, while the "female" vocal folds lengthen by .4 mm/yr with a maximum of 10mm.⁴⁷ In addition to an increase in length, the "male" vocal folds increase in thickness.

Cartilage growth in the larynx during puberty results in the creation of the Adam's apple and the overall average vertical diameter of 44mm and circumference of 136mm in the "male" larynx versus an average vertical diameter of 36mm and circumference of 112mm in the "female" larynx.⁴⁸ "Male" puberty also results in the development of larger lungs, an increase in the circumference and length of the chest cavity, and an increase in neck length and width, allowing the larynx to descend and the pharyngeal tube to lengthen and widen.⁴⁹ The pharyngeal tube or pharynx is the space from the top of the larynx to the soft palate to the base of the skull.⁵⁰ It is considered a resonance cavity or a resonator along with the mouth, meaning it is a space in which the human voice vibrates prior to exiting the mouth thereby altering the quality of the sound.

Acoustic changes in the "male" voice are due to all of the factors above: facial development (the enlargement of the pharynx and mouth, or the resonators), the increased circumference of the chest wall and lungs (which increases respiratory capacity), the

⁴⁷ "Voice Changes Throughout Life", *National Center for Voice and Speech*, <http://www.ncvs.org/ncvs/tutorials/voiceprod/tutorial/changes.html>, 4 Sept 2017.

⁴⁸ Contansis, "The Changing FTM Voice".

⁴⁹ Andrews, "Gender Presentation", 4, 12.

⁵⁰ Barbara Doscher, *The Functional Unity of the Singing Voice* (London: The Scarecrow Press, Inc., 1994), 109.

lengthening of the vocal folds (which are a result of the descent and growth of the larynx), and the thickening of the vocal folds vertically and horizontally due to collagen accumulation.⁵¹ The acoustic changes in the voice, including a change in vocal quality or timbre, and a lowered fundamental frequency, are largely a result of the thickening and lengthening of the vocal folds, laryngeal growth and resonator growth.⁵² This manifests in what is stereotypically characterized as the low, husky, booming “male” voice. It is because of the presence of testosterone combined with growth hormone that the “male” larynx grows faster and larger than the “female” larynx.⁵³ In fact, the vocal folds of the “male” larynx undergo twice the growth at three times the speed than in the “female” larynx.⁵⁴

Testosterone Therapy & Laryngeal Development

Testosterone therapy is generally utilized in order to “induce and maintain virilization and testosterone levels within the normal male range”⁵⁵, which is 300-1000mg/day.⁵⁶ For people who are gender queer and do not identify as men, testosterone is ingested in lower doses to maintain a lower daily average. In addition to increasing testosterone levels, testosterone therapy reduces estrogen levels.⁵⁷ To further reduce estrogen levels, a person may choose to inject gonadotropic-releasing hormone analogues or depot

⁵¹ Andrews, “Gender Presentation”, 5.

⁵² “Voice Changes Throughout Life”.

⁵³ Ibid.

⁵⁴ Brian Petty, “The Vocal Instrument: How it Works and How to Take Care of It”, Unpublished Conference Paper, *Transgender Voices Festival*, Minneapolis-Saint Paul, 24 April 2004.

⁵⁵ Nygren, 4.

⁵⁶ Lessley, 24.

⁵⁷ Ibid.

medroxyprogesterone.⁵⁸ The effects of these estrogen-reducing hormones are not considered in this document. This document also does not take into account the effects on the voice of having estrogen and progesterone producers removed, or the effects of the removal of this tissue in combination with testosterone therapy.

When undergoing testosterone therapy, the originally “female” larynx experiences some similar changes to that of a “male” during puberty, namely that of the thickening of the vocal folds both vertically and horizontally due to collagen accumulation.⁵⁹ However, the vocal folds do not become as thick as average “male” vocal folds.⁶⁰ The “female” larynx undergoing testosterone therapy does not or only minimally experiences lengthening of the vocal folds because the laryngeal cartilage grows minimally or not at all.⁶¹ This is likely because of ossification, or the process by which cartilage becomes more rigid and eventually turns to bone starting at age twenty.⁶² Incidentally, testosterone is also known to lead to early ossification.⁶³ The absence of cartilage growth during testosterone therapy may also be due to the use of testosterone without growth hormone, as it is the combination of these two hormones that results in cartilage development during “male” puberty.⁶⁴

⁵⁸ Lessley, 24.

⁵⁹ Ulrika Nygren, *Effects of Increased Levels of Androgens on Voice and Vocal Folds in Women with Congenital Adrenal Hyperplasia and Female-to-Male Transsexual Persons*, PhD Dissertation, Karolinska Institutet, Stockholm, 2014, 25.

⁶⁰ *Ibid.*, 21.

⁶¹ Constansis, “The Changing FTM Voice”.

⁶² Jon Ashby, Charles Nelson, Austin King, “Effects of Testosterone Replacement on a Male Professional Singer”, *Journal of Voice* 15.4 (Dec 2001): 554.

⁶³ Constansis, “The Changing FTM Voice”.

⁶⁴ Ashby, 554.

While there is no scientific proof as yet that testosterone therapy changes the facial structure/pharynx or results in growth of the laryngeal cartilage, facial structure, pharynx, chest cavity and lungs, anecdotal evidence suggests that the facial bone structure changes and the Adam's apple becomes more prominent during testosterone therapy⁶⁵. Therefore, there is a potential for cartilage growth in the larynx and pharynx during testosterone therapy in the trans and gender queer recipient, and consequentially some lengthening of the vocal folds. These anecdotal accounts tend to be more common among younger testosterone therapy recipients, probably because the cartilage throughout the body is more flexible the younger you are due to the cartilage aging process of ossification. Whether the recipient of testosterone therapy experiences some cartilage growth or none at all, the slight growth of or absence of cartilaginous growth coupled with vocal fold thickening results in a subtly unique vocal timbre. The fundamental frequency of the speaking voice will often drop to within the cis gender male speaking range, but the voices of recipients of testosterone therapy are often slightly less deep or leaner than the average cis male voice as a result. The vocal effects of testosterone therapy are permanent. The voice will not go back to its original sound if testosterone therapy is ever stopped. The *fach* or voice type of a singer before testosterone therapy has no effect on where the voice will stabilize through testosterone therapy.

Testosterone therapy for people assigned female at birth is often referred to as a second puberty, and rightfully so. The bodily changes that occur during testosterone therapy are just as variable as those of biological puberty. People who experience biological male puberty report similar vocal changes as those reported above in people on

⁶⁵ Constansis, "The Changing FTM Voice".

testosterone therapy. However, this second puberty is greatly expedited compared to biological male puberty. A hormonal shift that normally takes around three years in the AMAB pubertal person is expedited to one year or even six months. During “male” puberty, the enlargement of the larynx and lengthening of the vocal folds usually occurs during the latter half of puberty, whereas trans and gender queer people on testosterone experience vocal fold thickening within the first three months.⁶⁶ This expedition can cause more vocal fold inflammation and difficulty negotiating the new voice because the body does not have as much time to adjust to muscle growth. In order to lessen vocal inflammation and negotiation, it is recommended that a trans or gender queer person who is a professional voice user considering testosterone therapy take a more gradual and consistent approach, if it is emotionally available to them. Taking a gradual and consistent approach means beginning with a low initial dosage of testosterone that is administered at a constant or consistent rate and increasing the dosage incrementally based on vocal comfortability, thus working up to the average testosterone level of AMAB people rather than immediately starting with 300-1000mg/day.

The meaning of a gradual or consistent approach toward testosterone therapy in order to more smoothly negotiate vocal change is determined on a case by case basis. If a person has more androgen receptors, then a gradual or consistent approach to testosterone therapy will mean taking a lower initial dose than a person who has fewer androgen receptors because the body of a person with more androgen receptors will react more quickly to testosterone therapy. In order to obtain a gradual or consistent approach, a trans or gender queer person undergoing testosterone therapy for the first time would

⁶⁶ Andrews, “Gender Presentation”, 5.

begin with a small initial dose. During the first several weeks of beginning testosterone therapy on a low dose, the recipient would diligently track their vocal change with a vocal professional and increase their dosage incrementally based on their vocal experiences and comfortability.

Singing Voice Transition Timeline on Testosterone

Just as the voice change in pubescent “males” is variable and shows few linear trends, the vocal changes of trans and gender queer people on testosterone do not demonstrate any consistencies. By and large, the vocal changes observed during the first two years on testosterone are non-linear. Since the body is a volatile instrument, anything is possible on a given day, and, though this chart tracks up to two years on testosterone, changes may occur beyond year two. Vocal change is natural during the aging process for any person due to the process of ossification. Nonetheless, the chart below shows the possibilities for vocal change on a monthly basis during the first two years on testosterone according to anecdotal documentation so that a voice teacher of a trans or gender queer singer, and trans or gender queer singers themselves can account for the possibilities. These vocal change observations do not have a testosterone administration control. Each of the people whose voice observations are recorded here was using a different testosterone therapy regiment than the next. The majority of the testosterone therapy voice experiences taken into account to create this chart were from trans men, but the experiences of some gender queer or non-binary people were included as well. This chart does not account for genetic variation, or the number of androgen receptors of each recipient. It also does not necessarily account for people who are undergoing gradual and

consistent approaches to testosterone therapy, as recommended above. The majority of the people whose experiences contributed to this chart did not pursue a gradual or consistent testosterone therapy regiment. Should a person undergo testosterone therapy through gradual and consistent means, it is assumed that they would have similar vocal experiences to those listed below. However, those experiences may not be as dramatic or severe, they would be drawn out over a slightly longer period of time and there would be time for the recipient to consciously adjust their laryngeal musculature to the changes that they are experiencing.

Week 1	<ul style="list-style-type: none"> • tightness in the voiceⁱ • necessity to “reach” for the higher notesⁱⁱ
Week 2	<ul style="list-style-type: none"> • at two weeks it may be possible to sing lower than ever beforeⁱⁱⁱ
Month 1	<ul style="list-style-type: none"> • voice feels scratchy and hoarse due to inflammation^{iv} • constant need to clear throat^v • voice beginning to drop/vocal folds thickening^{vi} • highest notes in the singing voice are lost^{vii} • fundamental frequency of speaking voice begins to drop^{viii} • difficulty controlling pitch, register changes and phonation breaks^{ix}
Month 2	<ul style="list-style-type: none"> • no change in fundamental frequency of voice^x • lowered voice^{xi} • development of a falsetto but unstable^{xii} • difficulty producing a clear singing tone^{xiii} • lowest sung pitch drops a third^{xiv} • mix between chest and head voices is no longer present^{xv} • highest sung pitch raises a whole tone^{xvi} • lower passaggio (B3-E4) is noisy, breathy and strained in chest voice^{xvii}
Month 3	<ul style="list-style-type: none"> • beginning of voice deepening process^{xviii} • potentially largest voice drop period^{xix} • speaking voice dropped a third^{xx} • potential use of chest voice up to A4 → transition to tenor voice type^{xxi} • everything above E5 was unavailable or too “noisy”^{xxii} • “female” head voice is still present^{xxiii} • unstable middle range^{xxiv} • cracking becomes frequent^{xxv} • may experience laryngitis^{xxvi} • “sounded like I had a cold”^{xxvii}

	<ul style="list-style-type: none"> • start losing some of higher register notes^{xxviii}
Month 4	<ul style="list-style-type: none"> • little overall change^{xxix} • potentially largest voice drop period^{xxx} • head voice turning more into pure falsetto^{xxxi} • falsetto is weak and hollow^{xxxii} • may experience laryngitis^{xxxiii} • may start losing some of higher register notes^{xxxiv}
Month 5	<ul style="list-style-type: none"> • ability to sing in falsetto but still unstable, especially around the passaggio (B3/C4)^{xxxv} • unease in transitioning between chest voice and falsetto^{xxxvi} • speaking voice dropped an octave^{xxxvii} • upper falsetto is still weak and turns over into an even lighter production at G4^{xxxviii} • chest voice is strong up to F4^{xxxix} • may start losing some of higher register notes^{xl} • difficulty registering and producing pitches in the bass clef
Month 6	<ul style="list-style-type: none"> • falsetto still weak and of two qualities^{xli} • fundamental frequency of the speaking voice and control of the voice stabilize^{xlii} • lower singing range may begin developing and cracking may become less frequent^{xliii} • adam's apple becomes more prominent^{xliv} • begin gaining low notes and losing high notes^{xlv} • breaking and cracking become more frequent and loss of notes in the passaggio^{xlvi}
Month 7	<ul style="list-style-type: none"> • mixed register decreases^{xlvii} • larynx becomes wider^{xlviii} • breaking and cracking become more frequent and loss of notes in the passaggio^{xlix}
Month 8	<ul style="list-style-type: none"> • total voice break^l • breaking and cracking become more frequent and loss of notes in the passaggio^{li}
Month 9	<ul style="list-style-type: none"> • bass/baritone range potential but weak^{lii} • no mixed range^{liii} • break into falsetto around C4 but falsetto is strong/flexible^{liv} • breaking and cracking become more frequent and loss of notes in the passaggio^{lv}
Month 10	<ul style="list-style-type: none"> • vocal stamina improvement after consistent practice^{lvi} • varied dynamics possible again^{lvii} • breaking and cracking become more frequent and loss of notes in the passaggio^{lviii}
Month 11	<ul style="list-style-type: none"> • face appears more square (change of resonators)^{lix}
Month 12	<ul style="list-style-type: none"> • beginning of range stability as tenor, baritone or bass^{lx} • light head voice still relatively present^{lxi}
2 Years	<ul style="list-style-type: none"> • maximum deepening of voice^{lxii} • range settled but still general vocal change due to aging process^{lxiii} • vocal fatigue no longer present^{lxiv}

Figure 2: Vocal Transition Process of Trans and Gender Queer AFAB People on Testosterone

In addition to the changes recorded during specific periods of time during the first year on HRT, general trends are observed. Barbara Doscher, prominent voice teacher and author of *The Functional Unity of the Singing Voice* published in 1994, noted that at the same time that testosterone therapy irreversibly thickens the vocal folds, it can also make them uneven and alter the connective tissue of the vocal ligaments so that blending registers is more difficult.⁶⁷ Audiologist Jon Ashby, who observed testosterone's effect on a single cis male singer with hypogonadism, posits that phonation breaks were likely the cause of the lack of significant cartilage growth, in which case the vocal folds have limited ability to stretch or lengthen.⁶⁸ He went on to propose that the minimal growth in the laryngeal cartilage may be due to the "absence of appropriately timed growth hormone working in synchrony with testosterone".⁶⁹

The lack of ability to stretch the vocal folds, or the thickening coupled with the absence of cartilaginous growth and vocal fold lengthening, may result in what Constansis refers to as "entrapment". Entrapment is the encasing of thickened vocal folds within an already established laryngeal structure resulting in a highly pressurized, weak and permanently hoarse sound that lacks the "right" harmonics.⁷⁰ Constansis' research found entrapment more common in testosterone therapy recipients above the age of forty⁷¹, which is not the only case of testosterone therapy resulting in divergent effects depending on age. In two individuals above the age of fifty, Constansis witnessed testosterone therapy causing permanent hoarseness, lack of control and quality, and

⁶⁷ Doscher, 227.

⁶⁸ Ashby, 556.

⁶⁹ Ibid.

⁷⁰ Constansis, "The Changing FTM Voice".

⁷¹ Ibid.

limited power. In these instances, the singing voice was no longer “adequate” and the larynx did not descend properly.⁷² Entrapment may also be equivalent to hyper-functional voice use, or extra-laryngeal tension and over-adduction of the vocal folds. It is common for AFAB people undergoing testosterone therapy to “develop hyper-functional voice production” in order to “force out” lower notes of the emerging lower range due to timbral differences between the cis gender male voice and the AFAB voice on testosterone.⁷³ Hyperfunction involves the use of muscle rather than air to produce sound, eventually resulting in dysphonia or vocal injury due to extreme muscular tension.

Testosterone therapy recipient, informal researcher and web personality Joshua Riverdale reported that there is anecdotal evidence of persistent hoarseness and weakness in the voice regardless of age.⁷⁴ Similar to biological “male” puberty, this persistent hoarseness and weakness regardless of age is likely due to testosterone’s tendency to enflame the vocal folds.⁷⁵ Some individuals do not experience any lowering of the voice, which reinforces the variability of voice change by testosterone no matter the assigned gender at birth or the age of the individual.⁷⁶ While this evidence is foreboding for AFAB people undergoing testosterone therapy, anecdotal evidence received by both Riverdale and the author of this paper reinforces that cartilage growth and vocal fold lengthening are possible. This means that entrapment is not necessarily common and, judging by Constansis’ findings, potentially dependent upon age and degree of ossification.

⁷² Constansis, “The Changing FTM Voice”.

⁷³ Anita Kozan, *Voice and Communication Therapy for the Transgender/Transsexual Client*, San Diego: Plural Publishing, Inc., 2012, 432.

⁷⁴ Joshua Riverdale, “Testosterone and the Trans Male Singing Voice”, *Trans Guys*, <http://transguys.com/features/testosterone-ftm-singing>, 4 Sept 2017.

⁷⁵ Lessley, 25.

⁷⁶ Riverdale.

Just as there is no scientific proof that the laryngeal cartilage grows with testosterone therapy, there is also no scientific proof that the cartilage above the larynx grows with testosterone therapy. Therefore, the vocal tract (pharynx and mouth) of AFAB people undergoing testosterone therapy does not change. A lack of any cartilaginous growth coupled with vocal fold thickening results in a unique vocal timbre, as stated earlier. While speech masculinization techniques can help round resonance for those who would like to have a vocal timbre closer to cis gender male voices, some timbral differences will always be present.⁷⁷

Other general trends of vocal sensation during the first two years of testosterone therapy include:

- pitch breaks in the speaking voice as well as the singing voice⁷⁸
- cracking within the voice for the first one to two years⁷⁹
- quickness to fatigue within the first one to two years⁸⁰
- initial shrinking of range to regaining the bottom to regaining the top within the first one to two years⁸¹
- the creation of two separate voices—a limited soprano range and a true tenor/baritone range⁸²
- more complete closure at the posterior end of the vocal folds⁸³
- difficulty matching pitch or hearing pitch for an extended period of time⁸⁴

In some instances, it can take up to six years for the voice to regain full stability on testosterone, but there are points during the process of vocal transition in which the voice is stable for a period of time.⁸⁵ It is important to remember that even though the myth that

⁷⁷ Lessley, 26.

⁷⁸ Ashby, 555.

⁷⁹ Tough Tough Skin, “TTS vlog 1”.

⁸⁰ Ibid.

⁸¹ Tough Tough Skin, “TTS vlog 1”.

⁸² Ibid.

⁸³ Sims, “Teaching Lucas”, 373.

⁸⁴ Tough Tough Skin, “TTS vlog 2”.

⁸⁵ Ibid.

a singing voice is not possible after undergoing testosterone therapy as an AFAB person has been debunked, the resulting voice will never completely resemble that of a typical cis gender tenor, baritone or bass.⁸⁶ Often, the tessitura of a gender variant tenor or baritone will be 1.5 whole steps lower than the cis gender voice type equivalent, and the voice may never be as powerful.⁸⁷ What is most important in working with the transitioning voice of a trans or gender queer person is being extremely compassionate to individual needs.

For aural reference on specific cases in which testosterone therapy resulted in stable singing voices, below is a list of successful trans and gender queer singers and their websites or videos. For more references to trans and gender queer vocalists, see the JD Doyle Archives⁸⁸, Queer Music Heritage⁸⁹ and the article “Forging a New Path: Transgender Singers in Popular Music” by Nancy Bos in the *Journal of Singing*⁹⁰.

Alexander James Adams: <https://alexanderjamesadams1.bandcamp.com/>

Eli Conley: www.eliconley.com

Holden Madagame: <http://holdenmadagame.com/>

Joe Stevens of Coyote Grace: <https://www.youtube.com/user/coyotegrace>

Joshua Klipp: <http://klipptones.com/>

Joshua Riverdale: <https://youtu.be/hgEspq6Q3Yg?list=PLB1AAF43F171E10D5>

K.B. Boyce: <https://www.reverbNation.com/kbtuffnstuff/songs>

⁸⁶ Constansis, “The FTM Singing Voice”.

⁸⁷ Ibid.

⁸⁸ The JD Doyle Archives, <http://www.jddoylearchives.org/>, 8 Nov 2017.

⁸⁹ Queer Music Heritage, <http://queermusicheritage.com/index2.html>, 8 Nov 2017.

⁹⁰ Nancy Bos, “Forging a New Path: Transgender Singers in Popular Music”, *Journal of Singing* 73.4 (2017): 421.

Liminal Adam: https://www.youtube.com/watch?v=a_i3AHiGsOc

Lucas Silveira: <http://www.thecliks.com/>

Simon de Voil: <https://simondevoil.com/>

Radford Bishop: <https://www.last.fm/music/Tough+Tough+Skin>

Rae Larson: <https://www.youtube.com/watch?v=i78ry4LHJRY>

River Gordon: <https://youtu.be/hgEspq6Q3Yg?list=PLB1AAF43F171E10D5>

Stormmiguel Flores: <http://www.stormflorez.com/>

Types of Testosterone Therapy & Their Effects on the Voice

This section will begin with the basics of testosterone therapy options followed by an assessment of each option and how they apply to the voice. The application of the effects of each form of administration of testosterone therapy to the voice will take into account the earlier suggestion that a gradual and consistent approach will ease vocal mutation distress. The chart below is an accumulation of information derived from Trans Care British Columbia⁹¹, and the “Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline” by Hembree et al⁹², unless otherwise specified. This information is intended for trans and gender queer AFAB singers considering undergoing testosterone therapy, and voice teachers who may be asked to help a trans gender singer consider which course of treatment to undergo.

Note that a person who chooses to undergo testosterone therapy usually intends to stay on

⁹¹ “Masculinizing Hormones”, Transgender Health Information Program, Trans Care British Columbia, <http://transhealth.phsa.ca/>.

⁹² Wylie Hembree et al, “Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline”, *Journal of Clinical Endocrinology and Metabolism* 102.11 (Nov 2017): 1-35.

testosterone for an indefinite period of time, most likely for the rest of their lives. The information below does not necessarily apply to gender queer people who do not plan to undergo testosterone therapy indefinitely.

Type	Frequency/Dosage	Cost	Pros	Cons
Testosterone Injection (Parenteral Testosterone: testosterone cypionate or enanthate)	intramuscular injected once every 1-4 weeks, 100-250 mg ^{lxv}	\$10/week	widely available/most common ^{lxvi}	may lead to highs/lows in energy and mood between doses (exacerbated with biweekly injections), testosterone cypionate is usually faster acting but causes more acne ^{lxvii} , vocal changes not always consistent from time of administration to end of shot cycle ^{lxviii}
Testosterone Injection (Parenteral Testosterone: testosterone undecanoate, common prescription is Nebido)	intramuscular injected every 6-14 weeks, 1,000mg ^{lxix}		long-lasting, testosterone levels more stable compared to other injection compounds ^{lxx}	may lead to highs/lows in energy and mood between doses, huge initial dosage, mild pain around injection site 1-6 hours after injection ^{lxxi} , mostly used in Europe, chemical structure almost identical to bio-testosterone ^{lxxii}
Mixed Testosterone Injection (Testosterone propionate, phenylpropionate, isocaproate, and decanoate)	injected once every three weeks, 250 mg ^{lxxiii}			generates supra-physiological testosterone levels soon after injection with significant decline a few days before next administration, more unpredictable, generates more mood changes ^{lxxiv}
Testosterone Patch (Transdermal Testosterone: Androderm)	patch worn every day on upper arm, back, thigh, or stomach, 2.5-7.5 mg/day ^{lxxv}	\$130/month	hormone administered at constant rate eliminating highs/lows in energy and mood	expensive and some people have skin reaction to adhesive
Testosterone Gel (Transdermal Testosterone: AndroGel or compounded)	gel/cream applied to skin at same time each day, 50-100mg/day ^{lxxvi}	\$130/month	hormone administered at constant rate eliminating highs/lows in energy and mood and mimic normal physiological male circadian rhythm	expensive and difficult not to expose intimate partners to the hormone through contact with the gel, may cause excessive increase in hemoglobin or hematocrit ^{lxxix}

testosterone gel/cream) 1.6%			of testosterone ^{lxxvii} , testosterone concentrations can be unpredictable ^{lxxviii}	
Testosterone Pill (testosterone undecanoate)	pill taken 1-3 times daily, 40-240mg/day ^{lxxx}	\$130/month	hormone administered at constant rate eliminating highs/lows in energy and mood	expensive, less effective at stopping menstrual cycle, felt to be less safe, can cause heart burn as well as other stomach problems and liver damage, most of hormone is lost during digestive process ^{lxxxix} , inconsistent testosterone serum levels ^{lxxxii} , Rextoro pill was recalled for safety ^{lxxxiii}
Testosterone Pellet (Testopel)	2-6 pellets implanted subcutaneously every 3-6 months, each pellet contains 75 mg ^{lxxxiv}		long-lasting, hormone administered at constant rate eliminating highs/lows in energy and mood, oldest treatment ^{lxxxv}	may cause excessive increase in hemoglobin or hematocrit ^{lxxxvi}
Methyl Testosterone			available online	primitive version of testosterone therapy, off the market due to hepatotoxicity and cardiotoxicity ^{lxxxvii}

Figure 1: Testosterone Therapy Options

Testosterone therapy is generally not begun before 16 years of age.⁹³ In most of the United States, consultation with a therapist is required in order to gain permission to begin testosterone therapy⁹⁴, and the blood may be monitored for up to three months prior to receiving treatment.⁹⁵ However, some clinics, including those in Denver, Colorado, where this dissertation is being written, now accept informed consent waivers in lieu of a

⁹³ Meriggiola, 597.

⁹⁴ Selena Wellington, Personal Interview, 8 Sept 2017.

⁹⁵ Valentine, 7.

therapist consultation.⁹⁶ Diligent medical supervision is required during all forms of hormonal replacement therapy, as there are a number of potential side effects⁹⁷, the worst being spikes in hemoglobin and/or hematocrit (red blood cell count).⁹⁸ A spike in hemoglobin or hematocrit necessitate an immediate change of dosage even if testosterone levels are normal.⁹⁹ After the first year of testosterone therapy, supervision may be reduced to one or two office visits per year.¹⁰⁰

According to voice therapist Moya Andrews, the negative side effects of testosterone—acne, mood swings, energy highs and lows, unstable testosterone serum levels—are directly proportional to dosage and length of treatment.¹⁰¹ While further evidence has proven that negative side effects may correlate with dosage, anecdotal evidence suggests that length of treatment does not necessarily affect the amount of or frequency of negative side effects.¹⁰² The voice is also affected by any change in hormonal regime.¹⁰³ Since negative side effects are influenced by dosage, it is important to note that, while there are international variations, most people undergoing testosterone therapy are either recommended to begin with or choose to begin with the highest recommended dosage.¹⁰⁴ The highest recommended dosage of testosterone administered at one time is through injection.

⁹⁶ Selena Wellington Interview.

⁹⁷ Andrews, “Gender Presentation”, 9

⁹⁸ Meriggiola, 599.

⁹⁹ Ibid.

¹⁰⁰ Ibid., 597.

¹⁰¹ Andrews, “Gender Presentation”, 9.

¹⁰² Sam Bullington, Personal Interview, 7 Sept 2017.

¹⁰³ Constansis, “The FTM Singing Voice”.

¹⁰⁴ Constansis, “The Changing FTM Voice”.

Testosterone injection is the most popular of testosterone therapies because it is the cheapest and most convenient in that it does not require daily administration on the part of the recipient. It is also popular because, due to a larger initial dosage, it often results in a lowered speaking voice and the development of the “male” phenotype quicker than lower initial dosage alternatives, which is desirable for trans men who want to “pass” as men as soon as possible. A common side effect of injection is intense fluctuation in mood and energy. This side effect is exacerbated if injections are more spread out. In other words, people who receive biweekly injections experience more intense mood and energy fluctuation than people who receive weekly injections. Since testosterone injections are administered weekly, biweekly, or less, and absorbed quickly, vocal changes are not always consistent from the time of administration until the end of the injection cycle. This is because, depending on rate of digestion, testosterone levels are not the same from the beginning of the injection cycle to the end.

Though injection is the most common and inexpensive form of testosterone therapy, it can also be the most stressful on the voice. Depending on a person’s rate of digestion, and because of the high dosage at the start of every injection cycle, this form of testosterone therapy can cause the vocal folds to thicken more rapidly. Rapid vocal change causes more inflammation than gradual vocal change. Because testosterone levels are not necessarily steady through each injection cycle, vocal changes are not always consistent from the time of administration until the end of the injection cycle, which can cause more difficulty gaining progress in negotiating smooth passage through any breaks and cracks, or in creating cleaner resonance during singing. Injection can also be stressful

on the voice because fluctuations in mood and energy affect the body's ability to efficiently use air to produce clean resonance.

The testosterone patch, while expensive, differs from injection in that it can come in much smaller doses, which are administered through the skin at a constant rate. The consistent administration means that mood and energy fluctuation are lessened. Because the patch comes with a daily dose, a smaller daily dose could still be equivalent to or larger than the weekly dose by injection. Therefore, the testosterone patch may still not be a gradual hormone transition depending on the daily dosage, but the consistency at which it is administered allows for less vocal variability from day to day. A person looking for a quick drop in speaking pitch range would enjoy this form of testosterone therapy, but a person looking to preserve their singing voice would only find this form of administration beneficial if the daily dose is quite low compared to their body's androgen receptor count.

Testosterone gel behaves similarly to the testosterone patch in that it is administered at a consistent, daily rate by the recipient, which is beneficial to the singing voice. It generally is prescribed in larger daily doses than the patch, however, and testosterone concentrations can be unpredictable. Because of the variable testosterone concentrations and higher daily doses, the testosterone gel is potentially one of the least gradual means of testosterone therapy. Therefore, it is useful for a quick speaking voice transition, but not useful in preserving the singing voice.

The testosterone pill is also administered at a consistent, daily rate by the recipient. It is available in low daily doses, and much of the hormone is lost during the digestive process, making it one of the most gradual means of testosterone therapy.

Heartburn or acid reflux is a potential side effect, which can cause additional inflammation to the laryngeal tissue. Whether a singer or a non-singer, if a recipient experiences acid reflux on this form of testosterone administration, the additional inflammation would be frustrating to manage even during everyday speech. Aside from acid reflux, the pill allows a more gradual transition, which is beneficial to the singing voice, but not a quick speaking voice transition.

The testosterone pellet is a gradual alternative to injection because the body does not absorb the pellet as quickly as injection and it requires just as little work on the recipient's part. Even though the pellet is administered less frequently than the injection, the body absorbs the testosterone at a consistent, daily rate. If inserted in low doses more often, the pellet may result in a gradual, consistent singing voice transition.

Some recipients of testosterone therapy also choose to take testosterone through a combination of means, such as 100mg per week in injection form combined with 40mg daily in pill form. Combinations such as these can be helpful in maintaining steadier testosterone levels during the injection cycle, which prevents dramatic mood, energy, and voice fluctuations. Whatever means of administration a person chooses for testosterone therapy, the effects on the voice vary by individual, as is the case with the addition of any hormone to the body. Again, it is advised that AFAB recipients of testosterone therapy monitor their vocal change through a written journal or audio log of their voice doing the same vocal exercises or saying the same phrases every day in order to bring awareness to vocal changes throughout testosterone therapy. If a recipient of testosterone therapy is particularly concerned about maintaining their singing voice, the course of therapy can hopefully be tweaked.

Vocal Health and Exercises

During “male” puberty, experts have attempted to characterize the different general periods of vocal transition. These periods of transition include up to three periods of mutation.¹⁰⁵ While science-based evidence has not yet delineated the different periods in the changing voice of an AFAB person on testosterone, it is useful to characterize portions of the vocal transition as periods of heavy mutation and periods of relative stability in order to understand how to negotiate the first year of testosterone therapy in terms of vocal health. According to the vocal transition timeline chart, the first period of heavy mutation is at three months with a potential significant drop in fundamental frequency of the voice and instability. The second period of heavy mutation is at five months when the separation between different registers becomes more established and difficult to manage, and at which point the voice has potentially dropped an octave.

The first period of relative stability is at six months because there is potential for some stability in the spoken fundamental frequency and control of the voice, plus a brief period of less cracking and breaking. The third period of heavy mutation is just before year one when the resonators are still potentially changing. The second period of relative stability is at one year when the spoken fundamental frequency is beginning to stabilize, vocal stamina improves and vocal control begins to return. These periods of mutation are periods during which mild vocal exercises should be done¹⁰⁶, and open vowels¹⁰⁷ and

¹⁰⁵ David Friddle, “Changing Bodies, Changing Voices: A Brief Survey of the Literature and Methods of Working with Adolescent Changing Voices”, *Choral Journal* 46.6 (2005): 35.

¹⁰⁶ Constansis, “The Changing FTM Voice”.

¹⁰⁷ *Ibid.*

loud singing should be avoided.¹⁰⁸ Any repertoire sung at this point in the vocal transition should be made to fit the voice, not the other way around.¹⁰⁹ This is not a healthy period to challenge or stretch the voice, but it is still crucial to continue to sing throughout the process of vocal change.¹¹⁰

During heavy mutational periods, trans and gender queer people should adhere to the following list of healthy vocal habits:

- avoid medications that have a drying effect on the throat, i.e. anti-histamines¹¹¹
- use steam inhalation devices such as a humidifier¹¹²
- avoid throat sprays, as they make it more difficult to notice vocal discomfort¹¹³
- be respectful of your vocal range¹¹⁴
- avoid clearing the throat or coughing¹¹⁵
- avoid loud voice production or speaking in the presence of loud noises¹¹⁶
- drink a lot of water (6-8 glasses per day)¹¹⁷
- use non-verbal “attention getters” like clapping, waving, hand signals¹¹⁸
- lip-sync during events at which unison singing or cheering is occurring¹¹⁹
- use proper body alignment throughout daily life
- attempt the release of any extra muscular tension, particularly in the neck, shoulders, jaw and tongue¹²⁰
- avoid speaking during periods of illness¹²¹
- avoid smoking¹²²

¹⁰⁸ Friddle, 43.

¹⁰⁹ *Ibid.*, 40.

¹¹⁰ Eli Conley, “Transgender Men, Testosterone and Singing – Some Advice”, Blog Post, 11 Feb 2013, EliConley.com, <http://www.eliconley.com/blog/transgender-men-testosterone-and-singing-some-advice>, 8 Oct 2017.

¹¹¹ Anita Kozan, “Healthy Voice Production Techniques”, Unpublished Conference Paper, *Transgender Voices Festival*, 24 April 2004: 5.

¹¹² Petty.

¹¹³ Kozan, 5.

¹¹⁴ *Ibid.*

¹¹⁵ *Ibid.*

¹¹⁶ *Ibid.*

¹¹⁷ Petty.

¹¹⁸ Andrews, “Gender Presentation”, 46.

¹¹⁹ *Ibid.*

¹²⁰ *Ibid.*

¹²¹ *Ibid.*

¹²² *Ibid.*

- avoid alcohol and caffeine¹²³
- when feeling any kind of vocal fatigue, avoid voice use all together¹²⁴
- use sufficient breath support when speaking¹²⁵
- respond to yes-or-no questions by nodding rather than speaking
- do vocal warm-ups every day¹²⁶
- do vocal cool-downs every evening¹²⁷
- limit the amount of milk you drink so as to keep mucous from thickening and causing further vocal fold inflammation¹²⁸

An AFAB singer on testosterone may simultaneously be obtaining speech masculinization training from a speech specialist. This includes monitoring pitch, resonance, and speech patterns, and practicing diaphragmatic breathing.¹²⁹ Relevant to singing are resonance and diaphragmatic breathing. This breathing practice is addressed in the exercises below. Masculinizing speech resonance practices often “focus on lowering the jaw and the base-of-the-tongue (BOT)” and aiming for a “bigger” or “heavier” sound.¹³⁰ These resonance practices do not coincide with, and in fact are detrimental to, singing because they encourage a tense tongue and jaw, and sustained depression of the larynx. For efficient singing, one needs a released tongue and jaw, and laryngeal flexibility. The reason for this gap in technique between speaking and singing with a “masculine” voice is because a speech specialist is guiding the voice toward good functionality while a voice teacher is guiding the voice toward refined efficiency.¹³¹ A

¹²³ Petty.

¹²⁴ Andrews, “Gender Presentation”, 46.

¹²⁵ *Ibid.*

¹²⁶ Kozan, 5.

¹²⁷ Petty.

¹²⁸ Kozan, 5.

¹²⁹ Christie Block, “Making a Case for Transmasculine Voice and Communication Training”, *Perspectives of the ASHA Special Interest Groups 2.1* (2017): 36.

¹³⁰ *Ibid.*

¹³¹ William Sauerland Interview, 29 Oct 2017.

resonance practice beneficial to both speaking and singing with a “masculine” voice is maintaining an open throat through a released jaw and released and forward tongue because it will result in what is a fuller, rounder, and more comfortable sound that will not result in fatigue. These principles should be modified if the AFAB singer desires an androgynous voice rather than a masculine voice.

When performing the exercises below, it should be observed that the respiratory muscles are used efficiently and the necessary muscles released so as to allow expansion within the ribs, lower back and abdomen rather than a rise in the shoulders.¹³² The voluntary muscles of inspiration/inhalation are the external intercostal muscles and the quadratus-lumborum, and the voluntary muscles of expiration/exhalation are the internal intercostal muscles and the abdominal muscles.¹³³ Note that the diaphragm is an involuntary muscle and that inhalation can only occur when the air pressure inside of the lungs is less than the air pressure outside of the body.¹³⁴ All vocal exercises below can be performed in an ascending or descending sequence at a comfortable volume and should begin in a comfortable middle range. It is important to lift the soft palate during inhalation, the soft palate being a voluntary muscle. The soft palate is the section of the roof of the mouth that feels soft to the touch prior to the entrance to the nasal cavity. One can practice being aware of raising the soft palate by snorting during inhalation, breathing as if surprised, breathing as if biting into an apple, or anticipating a yawn. All of the exercises below can be used both for warm-up and warm-down. It is also important to

¹³² Petty.

¹³³ Doscher, 8-15.

¹³⁴ Ibid., 8.

maintain an open throat during both inhalation and phonation, thereby releasing the tongue and jaw.

The pitched exercises below are all written in D major for clarity. When transposing the exercise, it should be kept within the major scale. These exercises are written in the treble clef because music reading fluency is more common in the treble clef, but they are meant to be conducted starting in the octave between C3 and C4, or wherever is most comfortable for the singer on any given day. During heavy mutational periods, exercises no larger than a fifth should be attempted. If exercises that span a fifth are particularly difficult or uncomfortable, stick to exercises that span a third.

Breathing & Speaking Exercises

These exercises are for the gender queer singer beginning testosterone therapy because they reinforce diaphragmatic breathing and healthy speaking technique. Practicing and being mindful of diaphragmatic breathing during vocal change is important because it is tempting to use musculature to produce sound rather than use air to produce sound during periods of vocal change, or vocal inflammation. Use of musculature to produce sound results in hyperfunction and fatigue, whereas use of diaphragmatic breathing to produce sound does not. It is important to reinforce healthy speaking technique during vocal change because the way we speak translates to the way we sing. If we speak with too much musculature and a lack of air flow, then we will also sing with too much musculature and a lack of air.

Exercise 1

Lie on your back with knees up, exhale completely, then allow the stomach to experience a “klunk” sensation as you inhale and the air displaces the organs in the lower abdomen. This should be done 3x slowly and 3x quickly. Take note of the volume of each breath. Audible breaths could mean that the vocal folds are not completely relaxed. Lying down with knees bent allows release in the lower back muscles. The “klunk” sensation indicates a release of the abdominal muscles in order to allow displacement of the viscera during inhalation. This exercise is meant to be done three times slowly followed by three times quickly so that the action of releasing the abdominal wall becomes more immediate and intuitive over time.

Exercise 2

Lie on your back with knees up, exhale completely, inhale silently with expansion in the lower back and abdomen, exhale as if through a straw, inhale low, exhale on a hiss, inhale low, exhale while vibrating the lips. Repeat this exercise while sitting and then while standing. If experiencing light-headedness at any point during this exercise, take a break and breathe normally. This exercise increases breath use efficiency, allowing the singer to eventually create longer phrases. It is to be done lying down then sitting then standing so as to bring awareness to areas of breath expansion in each position. Lying down is the position in which it is easiest to feel breath expansion as a bodily sensation, whereas standing up is the position in which it is most difficult to feel breath expansion as a bodily sensation.

Exercise 3

Exhale completely, inhale feeling low expansion with an open throat, yawn/sigh these syllables at a comfortable, mid-range pitch with a breath in between each: “ha, hey, high, who”¹³⁵. With the aspirate consonant /h/, this exercise incorporates diaphragmatic breathing into speaking. Each of these words uses a single syllable and a pure consonant so as to gradually progress toward bringing diaphragmatic breathing into speech.

Exercise 4

Exhale completely, inhale feeling low expansion with an open throat, say three of these words in a row: “hip, hope, him, hand, heat, haste, happy, heavy, hurricane”. Repeat for the remaining words. These words use mixed vowels, an additional consonant, and/or multiple syllables so as to gradually progress toward bringing diaphragmatic breathing into speech.

Exercise 5

Exhale completely, inhale feeling low expansion with an open throat, slowly speak the numbers 1-12 breathing every three numbers. This exercise begins to build the habit of breathing in the middle of a spoken phrase so as to use air to produce speech.

¹³⁵ Kozan, 7.

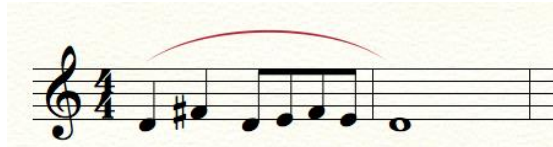
Exercise 6

Exhale completely, inhale feeling low expansion with an open throat, speak a sentence beginning with an /h/, like “Heat helps relax our muscles,” “Hot weather comes in July,” “Home is a great place to relax,” “Happiness comes to us all.”¹³⁶ With the aspirate consonant /h/, this exercise incorporates diaphragmatic breathing into speaking full sentences.

Breath Flow Exercises

These exercises incorporate diaphragmatic breathing into singing. “Breath Flow” is the efficient use of air. Rather than using air quickly at the beginning of a phrase and running out by the end, these exercises encourage continuous air flow through the entirety of a phrase.

Exercise 1



This exercise should be sung through a straw either descending or ascending by half-step¹³⁷. It begins with a glissando so as to more easily bring breath flow to the scalar half of the exercise. This exercise is to be conducted through a straw because a straw elongates the vocal tract allowing for more positive air pressure above the vocal folds which in turn results in a gentler adduction of the vocal folds. It only spans the range of a third in order to gradually warm-up changing laryngeal tissue to larger ranges.

Exercise 2



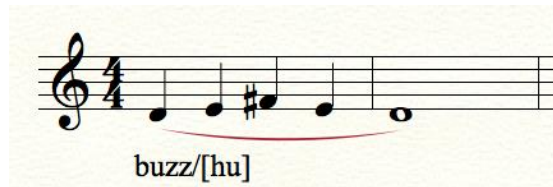
If the previous exercise is conducted descending by half-step, then this exercise should be done ascending by half-step within a comfortable range, or visa versa. The buzz should either be a lip buzz or a raspberry (tongue buzz). This exercise brings the breath

¹³⁶ Kozan, 7

¹³⁷ Ibid.

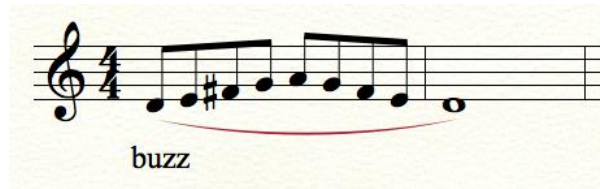
flow of a buzz to the gentle, semi-occluded vowel [u] with a slightly larger range and with the use of some agility.

Exercise 3



If the previous exercise is conducted descending by half-step, then this exercise should be done ascending by half-step within a comfortable range, or visa versa. The buzz should be a lip buzz or a raspberry. After breath flow within the buzz is consistent, this exercise should be conducted on [hu] within a comfortable range. This exercise brings the breath flow of a buzz to a slower, legato phrase using an aspirate consonant and a semi-occluded vowel.

Exercise 4

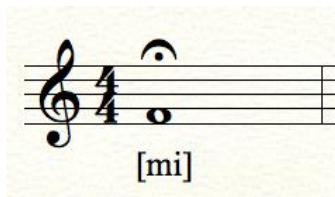


This exercise can be conducted both ascending or descending by half-step. The buzz should be a lip buzz or raspberry. After breath flow within the buzz is consistent, this exercise should be conducted on the word “you”. With the word “you”, this exercise incorporates the [i] vowel to the semi-occluded [u], which encourages clean resonance.

Easy Vocal Function & Resonance Exercises

On these exercises, one should still be conscious of taking a breath with low expansion and maintaining an open throat. By incorporating voiced consonants and a diverse array of vowels in the middle voice, these “easy vocal function” exercises encourage clean resonance in a gentle, gradual manner.

Exercise 1



Sustain the word “me” on F3 (F below middle C) for as long as possible¹³⁸ at the quietest volume comfortably possible. This exercise can be conducted both ascending or descending by half-step within the middle voice. It utilizes the voiced consonant [m] and the occluded vowel [i] to encourage clean resonance in the middle voice.

Exercise 2

Slowly glide from the lowest note to the highest note of your current vocal range through a straw. This is called a “siren” because it sounds like the alarm of a siren. The purpose of this exercise is to encourage laryngeal flexibility.

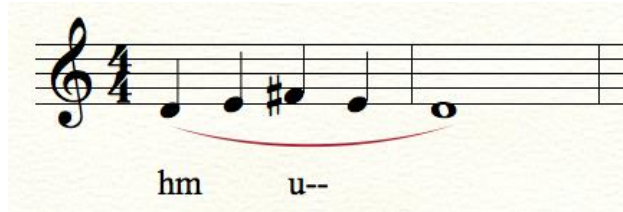
Exercise 3



This exercise can be conducted both ascending or descending by half-step within the middle voice. This exercise utilizes voiced consonants with all of the pure vowels on a single note encouraging clean resonance in the middle voice. The final held note is on the semi-occluded [u] vowel in order to prevent hyperfunctional voice use.

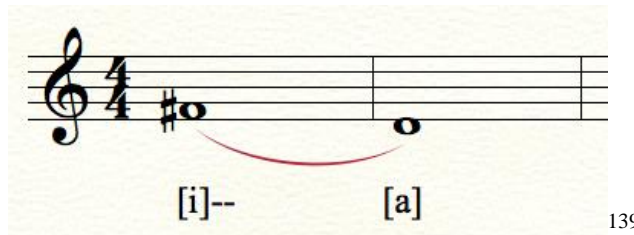
¹³⁸ Joseph Stemple, *Stemple Vocal Function Exercises* (Dayton: St. Elizabeth Hospital).

Exercise 4



This exercise can be conducted both ascending or descending by half-step. Moving from a resonance exercise on a single note with multiple vowels to an exercise on multiple notes with a single vowel is a gradual step on the path to clean resonance within a wider range. This exercise uses “hmu”—an aspirate consonant to a voiced, nasal consonant to a semi-occluded vowel—to ensure that resonance is produced with breath flow and not musculature.

Exercise 5



This exercise can be conducted both ascending or descending by half-step within a comfortable range. It utilizes the resonant-rich vowel of [i] through a glissando to the open vowel [a], which encourages the use of resonance, breath flow and tongue release in open vowels within a gentle range.

Exercise 6



This exercise can be conducted both ascending or descending by half-step within a comfortable range. Here, the voiced, nasal consonant /n/ is used with all of the pure vowels in an exercise that requires more agility and a larger range than those previous. Attention should be given to releasing the jaw and using only the tongue to articulate /n/.

¹³⁹ Joseph Stemple, *Stemple Vocal Function Exercises* (Dayton: St. Elizabeth Hospital).

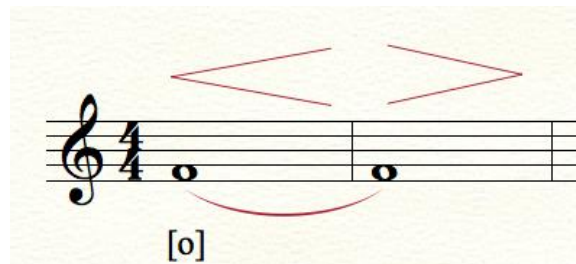
¹⁴⁰ Kozan, 8.

Exercise 7



This exercise can be conducted both ascending or descending by half-step within a comfortable range. It is essentially a descending scale and may require particular attention to speeding up the air and lifting the soft palate if conducted ascending by half step. The [i] vowel should not be too spread or horizontal, but more in line with the [u] vowel. The initial /th/ encourages a released and forward tongue position while the use of [u] to [i] on each note ensures that the [i] vowel is not hyperfunctional.

Exercise 8



This exercise can be conducted both ascending or descending by half-step within a comfortable range. This exercise should begin at the quietest comfortable volume possible and crescendo to the loudest comfortable volume possible. This exercise is not appropriate for mutational periods because volume experimentation is not productive while the vocal folds are enflamed or the voice is hoarse.¹⁴¹

¹⁴¹ Sims, "Teaching Lucas", 373.

Flexibility & Agility Exercises

The following exercises encourage laryngeal flexibility coupled with diaphragmatic breathing and breath flow through the use of larger ranges and agility.

Exercise 1

Yodeling with an [u] on the top octave and [a] on the bottom with an intentional crack between falsetto and chest voice at a mezzo-piano to mezzo-forte volume. This exercise can be conducted descending or ascending by half-step as long as the upper octave is always in falsetto and the lower octave is always in chest voice. It is not to be attempted during a mutation period because an octave range may not be comfortable or the two registers not equally accessible during vocal fold inflammation. This exercise can also be attempted with [u] on the fifth scale degree and [a] on the first scale degree as long as the gap between registers is present.

Exercise 2

142

This exercise can be conducted both ascending or descending by half-step within a comfortable range. It utilizes a different intervallic pattern to encourage laryngeal flexibility. Attention should be given to speeding up the air and lifting the soft palate if conducted ascending by half step. The initial /th/ is again used to encourage a released, forward tongue. Two closed vowels are used for clean resonance.

Exercise 3

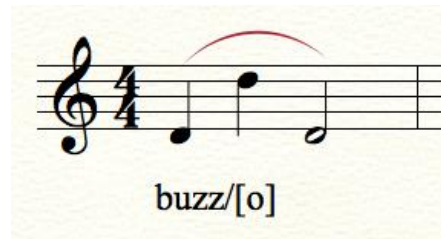
143

This exercise can be conducted both ascending or descending by half-step within a comfortable range. It utilizes breath flow in a slower legato phrase on open vowels.

¹⁴² Sims, "Teaching Lucas", 373.

¹⁴³ Ibid.

Exercise 4



This exercise can be conducted both ascending or descending by half-step within a comfortable range. It is not appropriate for mutation periods because an octave glissando may not be comfortably accessible with vocal fold inflammation.¹⁴⁴ It is designed to bring breath flow to a larger range.

Exercise 5



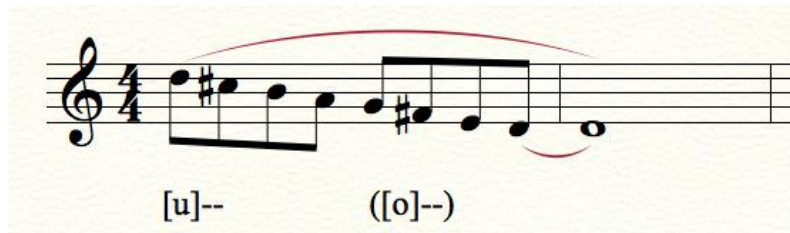
This exercise can be conducted both ascending or descending by half-step within a comfortable range. It is not appropriate for mutational periods because it requires breath flow that is only possible without severe inflammation in order to create a longer phrase. It is also difficult to span the large range of this exercise with the agility necessary with vocal fold inflammation. Taking a breath in the middle of the exercise should be done as needed. For more advanced singers, this exercise should be sung in one breath.

¹⁴⁴ Sims, "Teaching Lucas", 373.

Falsetto Exercises

It is essential to isolate the falsetto in vocal exercises so as to become comfortable with a new type of vocal function, encourage the use of the cricothyroid muscle, and bring diaphragmatic breathing and breath flow to this new vocal register.

Exercise 1



This exercise begins in falsetto. It can be conducted either descending or ascending by half-step as long as it continues to begin in falsetto. The exercise itself can be broken down as needed. If a mutational period does not allow for a full octave descent, then this exercise should be done as a five-note descending scale. During a mutational period, this exercise should only be done on [u]. After the voice has settled, the singer should attempt to switch to an [o] on the fourth during the descent, at which point the singer should crack into chest voice. The break into chest voice from falsetto in this exercise should be intentionally disjunct or jagged.

Vowel Modification Exercises & Finding the Mixed Voice

These exercises are taken from Berton Coffin's *Overtone of Bel Canto*. They rely heavily on fluency with the International Phonetic Alphabet (IPA). It is highly recommended that these be conducted with a voice teacher who is familiar with the Berton Coffin exercises. Since these exercises use advanced technique, including a large range, nuance of voice register use and a wide array of vowels, they are not appropriate for use during mutational periods.

Exercise 1

The diagram illustrates Exercise 1. At the top, a piano keyboard is shown with keys numbered 4 to 19. Above the keyboard, three lines represent the vocal range, with the vowel 'e' on the first line, 'v' on the second, and 'e' on the third, ending with 'U' on the far right. Below the keyboard is a musical staff in bass clef with a key signature of three sharps (F#, C#, G#). The notes are G4, A4, B4, C5, B4, A4, G4, with the numbers 4, C, U, C, 4 written above them. Below the staff is a vowel chart with an upward-pointing arrow on the left. The chart has five rows of IPA symbols with superscript numbers indicating the level of mouth. The symbols are: Row 5: e⁷, v⁶, e⁷, v⁶, e⁷; Row 6: ø⁸, e⁷, ø⁸, e⁷, ø⁸; Row 7: ε⁹, ə¹, ε⁹, ə¹, ε⁹; Row 8: œ¹⁰, y², œ¹⁰, y², œ¹⁰; Row 9: ʌ¹¹, ɪ³, ʌ¹¹, ɪ³, ʌ¹¹; Row 10: ʊ¹², e⁴, ʊ¹², e⁴, ʊ¹². To the right of the chart is a diagram of the vocal tract, showing the mouth opening and closing.

Figure 3: Berton Coffin's *Overtone of Bel Canto* Page 145

The numbers at the beginning of each line indicate that the exercise is ascending by semitone. The superscript numbers next to each IPA sign indicate the level of mouth

opening, but they are case specific so they should be largely ignored. The sign ʊ^8 indicates a bright [o] vowel as in the word “jovial” with the lips either drawn back or neutral.¹⁴⁵ The symbol y^{12} indicates a bright “awe” vowel as in the word “joy”.¹⁴⁶ All other IPA used is standard. The symbols above the staff—4, C, U—refer to a mode of “male” chest voice, chest voice and upper register respectively. They should be disregarded, as correct implementation of the IPA will facilitate these registers automatically.

Exercise 2

The diagram illustrates Exercise 2, showing a piano keyboard with keys numbered 7 to 28. Above the keyboard, a vocal staff shows notes corresponding to the keys. An arrow labeled "Bite" points to the 23rd key. Below the keyboard, a table lists IPA symbols for each key number. An upward-pointing arrow is on the left of the table, and a diamond shape is on the right.

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
F	U	F	U	F	X	U	X	F	X	U												
					i'																	
					i'																	
					y^2																	
					y^2																	
					u^3																	
					u^3																	
					I^4																	
					I^4																	
					e^5																	
					e^5																	
					e^6																	
					e^6																	
					e^7																	
					e^7																	

Figure 4: Berton Coffin’s *Overtone of Bel Canto* Page 146

This exercise is also conducted ascending by semitone. The symbol u^3 indicates an [u] with the lips either drawn back or neutral, making it a bright [u].¹⁴⁷ The symbol (\u02e4)^7 indicates a rounded or closed schwa, as if saying the word “fun” with the lips puckered.¹⁴⁸ The symbols above the staff—F, U and X—indicate falsetto, upper register and mixed voice respectively.

¹⁴⁵ Berton Coffin, *Overtone of Bel Canto*, 1st Edition. Lanham (Maryland: The Scarecrow Press, Inc., 1980), 3.

¹⁴⁶ Ibid.

¹⁴⁷ Coffin, 3.

¹⁴⁸ Ibid.

Exercise 3

The diagram shows a piano keyboard with keys numbered 10 to 25. Above the keyboard, a solid line with a '4' indicates a four-note interval, and a dashed line with 'œ' and 'X' indicates a specific interval. Below the keyboard, a bass clef staff shows notes corresponding to the keyboard, with articulation marks 'X', 'U', 'C', and '3' above them.

↓	23	œ ⁸	∪ ¹³	œ ⁸	∪ ¹³	œ ⁸	∪ ¹³
	22	∪ ⁷	œ ¹²	∪ ⁷	œ	∪	œ ¹²
	21	ø ⁶	∩ ¹¹	ø ⁶	∩	ø	∩ ¹¹
	20	o ⁵	œ ¹⁰	o ⁵	œ	o	œ ¹⁰
	19	I ⁴	(∧) ⁹	I ⁴	(∧)	I	(∧) ⁹
	18	u ³	œ ⁸	u ³	œ	u	œ ⁸
	17	ə ²	e ⁷	ə ²	e	ə	e ⁷
	16	ø ⁶	a ¹³	ø ⁶	a ¹³	ø ⁶	a ¹³
	15	∪ ⁵	œ ¹²	∪ ⁵	œ	∪	œ ¹²
	14	∪ ⁴	∩ ¹¹	∪ ⁴	∩	∪	∩ ¹¹
13	I ³	∧ ¹⁰	I ³	∧	I	∧ ¹⁰	

Figure 5: Berton Coffin's *Overtone of Bel Canto* Page 151

This exercise descends by semitone. All of the symbols have been explained in the two previous exercises.

*Techniques to Decrease Laryngeal Tension*¹⁴⁹

- Phonating while chewing
- Phonation that imitates a sigh or yawn
- Body movements while phonating: head rolls, shoulder rolls, head alternating looking from shoulder to shoulder
- Speech movements while phonating: Blow out on “who”, hum, use an /h/ before any vowel, contrast [i] with [a]
- Visualize relaxing images during phonation

*Techniques to Increase Laryngeal Tension*¹⁵⁰

- Push or pull while phonating
- Sudden body movements while phonating
- Visualize squeezed, constricted images during phonation
- Phonate in imitation of strong emotional states: anger, ecstasy, joy

One may notice in perusing these vocal exercises that they are exercises that promote healthy vocal production in any circumstance. Important general tips for using these exercises overlap with the healthy vocal habits list: respect your vocal range, sing at a comfortable volume, use plenty of air, and do not proceed beyond fatigue. Fifteen minutes of vocalizing per day is sufficient if instability is high. The specialty exercises lie within the *Vowel Modification Exercises & Finding the Mixed Voice* section. While undergoing testosterone therapy, the voice transitions to a tenor, baritone or bass range, in which case vowels should modify closed when approaching the passaggio or the switch to falsetto; vowels like [i], [e], [y], [o], [u], [ø] and [œ] should be utilized from Bb3-F#4.¹⁵¹ When constructing additional exercises as a teacher of a trans or gender queer student on testosterone, it is useful to construct exercises that leave the initial pitch choice

¹⁴⁹ Coffin., 136.

¹⁵⁰ Andrews, *Voice Therapy for Adolescents*, 135.

¹⁵¹ Doscher, 185.

up to the student, particularly for the start of each lesson.¹⁵² As stated earlier, the *fach* of the singer before testosterone therapy has no effect on where the voice will stabilize through testosterone therapy. During this period of vocal change, the location of the *passaggi* may change rapidly. It is important to assess and identify ranges and registers that are particularly unstable on a lesson by lesson basis and be sensitive to address but not over-utilize those areas of the voice.

Repertoire

As stated earlier, all repertoire must be easily transposable to fit the voice on any given day. For easy access to transposable scores, download the “Music Notes” application or subscribe to 8notes.com. It is best to have a few songs whose range is no more than a sixth for heavy mutational periods. It is also crucial that one be creatively flexible with the music in order for it to fit the voice for the state it is in on any given day. For example, if a trans or gender queer singer loves a particular song but portions of the melody are too low or too high, then why not edit the melody?¹⁵³

Since language is heavily steeped in the gender binary, so are song lyrics and roles in musical theater and opera. When choosing repertoire, one of the best approaches is to ask a trans or gender queer student to make a mix CD or Spotify playlist with songs they would like to sing and/or they would feel comfortable singing.

¹⁵² Patrick Freer, “Choral Warm-Ups for Changing Adolescent Voices”, *Music Educators Journal* 95.3 (2009): 58.

¹⁵³ Conley Interview.

Surgery and Chest Binding

Before concluding, it is essential to address surgery and chest binding. A trans or gender queer AFAB person may elect to undergo “top” surgery (mastectomy) and/or “bottom” surgery (gender affirmation surgery/GAS). These surgical procedures do not affect the larynx directly, but post-operative pain, particularly following a mastectomy, may result in difficulty with body alignment and breathing until fully recovered. People who choose not to have surgery, may instead choose to chest bind, otherwise simply known as “binding”.

Chest binding is “the compression of chest tissue for masculine gender expression among people assigned a female sex at birth, particularly trans gender and gender queer individuals.”¹⁵⁴ For many trans gender and gender queer individuals, chest binding is a necessity for mental well-being in order to cope with gender dysphoria.¹⁵⁵ Though chest binding is universally beneficial for mental health, it almost always results in long-term negative physical health effects, the most common of which are back pain, overheating, chest pain, shortness of breath, itching, body alignment issues and shoulder pain.¹⁵⁶ In the only existing clinical study on trans gender practitioners of chest binding, more than half reported wearing a binder every day of the week.¹⁵⁷ The most common methods of binding include commercial binders, sports bras, layering shirts, layering sports bras, and

¹⁵⁴ Sarah Peitzmeier et al, “Health Impact of Chest Binding Among Transgender Adults: A Community-engaged, Cross-sectional Study”, *Culture, Health & Sexuality: An International Journal for Research, Intervention and Care* 19.1 (2016): 64.

¹⁵⁵ *Ibid.*, 65.

¹⁵⁶ Anonymous, “Chest Binding Has Positive Mental Effect”, *The Nation’s Health* 47.1 (2017): 20.

¹⁵⁷ Peitzmeier, 68.

using elastic or other bandages.¹⁵⁸ As one may deduce through the common long-term negative health effects and the region of the body that a chest binder compresses, chest binding is detrimental to singing because it restricts rib expansion (thereby restricting lung capacity), can result in body alignment difficulty and can cause pain, and therefore tension, in parts of the body it is necessary to release during singing, including the shoulders, chest and back.

General health recommendations for chest binding include limiting the hours of binding to 8-10 hours per day¹⁵⁹, and taking “off” days if emotionally possible.¹⁶⁰ One should never DIY or Do-It-Yourself, as ace bandages and duct tape can be life-threatening.¹⁶¹ When purchasing a commercial binder, one should know one’s chest measurements and never purchase a binder that is a smaller size than one’s measurements. When wearing a binder, one must listen to one’s body and remove the binder if experiencing any pain or discomfort.¹⁶² For singers, sports bras, compression bras, or shirt layering are the best binding options. Upon removing a commercial binder or several layers of sports or compression bras, one should “cough hard a few times to loosen any fluid that has built up in your lungs.”¹⁶³ Executing the breathing exercises above is also recommended upon binder removal. After taking into account all of the health risks of even safe chest binding, a cis gender singing teacher should continue to

¹⁵⁸ Peitzmeier, 68.

¹⁵⁹ Meg Zulch, “7 Things You Should Know Before Buying Your First Chest Binder”, Bustle.com, 23 Feb 2016, <https://www.bustle.com/articles/138935-7-things-you-should-know-before-buying-your-first-chest-binder>, 6 Nov 2017.

¹⁶⁰ Peitzmeier, 71.

¹⁶¹ Zulch.

¹⁶² Ibid.

¹⁶³ Ibid.

remember that the emotional well-being of a student is of the utmost importance. Therefore, a student should not be asked to remove a chest binder in order to sing. Instead, the teacher must help facilitate breath technique and released body alignment while wearing the binder.

Teachers of trans and gender queer AFAB singers, whether they are binding or not, should be aware that there is a common postural tendency toward downward pull. Downward pull refers to the Alexander Technique term in which a person is collapsing the chest and bringing the head and neck forward, otherwise known as slouching. Downward pull in trans and gender queer AFAB singers is a result of habitually attempting to hide the chest tissue. If the student is comfortable with and emotionally capable of realigning into a more released and upright body, this alignment issue should be addressed.

Conclusion

Even though testosterone therapy for the trans or gender queer AFAB singer will inevitably result in a difficult vocal transition, the singing voice will always be there. Hopefully this paper offers insight into what can be done to preserve the singing voice in the healthiest way possible during the period incurring the most vocal change: the first two years of testosterone therapy. Those who are taking testosterone and would like to preserve their singing voice, and have the financial means, should seek out a voice teacher who is a specialist in working with pubescent “males” and/or a teacher who is empathetic and diligent in teaching to an individual’s needs. Teachers of trans and gender queer students **MUST** be advocates, remain steadfast in using the student’s pronouns, and

create a safe space in studio, in class and in performance spaces over which the teacher has control.¹⁶⁴ A student's pronouns are not preferred; they are mandatory. Building therapeutic rapport is essential for great teaching.¹⁶⁵ A voice teacher is not, however, a substitute for a speech therapist or a psychologist.

In regard to the trans or gender queer voice, there are many areas of exploration yet untouched: the vocal effects of the removal of estrogen and progesterone producing tissue, the vocal effects of the removal of estrogen and progesterone producing tissue in combination with testosterone therapy, the effects of testosterone therapy on the voices of people with more androgen receptors versus fewer androgen receptors, the effects of testosterone therapy on the voice depending on dosage or means of administration with the use of a control, the vocal effects of partial or temporary testosterone therapy, the singing voice of people who have undergone a laryngoplasty, voice change on estrogen therapy for trans and gender queer people, the making of a trans female or gender queer feminine voice without hormone replacement therapy, the scientific effects of a chest binder on the breathing mechanism, repertoire for trans and gender queer solo singers, the effects of facial feminization on the voice—just to name a few. I hope that this dissertation inspires others to pursue research on the voice as it pertains to trans and gender queer people because this research is needed immediately.

¹⁶⁴ Sims, "Teaching Lucas", 374.

¹⁶⁵ Shelagh Davies, Joshua Goldberg, "Transgender Speech Feminization/Masculinization: Suggested Guidelines for BC Clinicians", Vancouver Coastal Health (January, 2006).

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Research Interview Notes

Kathe Perez, Denver Speech Therapist Specializing in Masculinization/Feminization, April 28th, 2017

- went to CU Boulder
- worked with Sataloff
- Nick Pitera—cisgender male singer from LA with developed falsetto singing Disney female songs—samples as teaching material?--> changing shape and transfiguration of vocal tract--
<https://www.youtube.com/channel/UCOOJhf0pM4reAZOqMpMWVYQ>
- Amadhia.com—transgender female—can hit C6!-- <http://www.amadhia.com/>

Gender differences in how we sing

1. pitch
2. laryngeal configuration

How do we take a transgender body and make it sound feminine?

- Need fairly high laryngeal position so decrease depth and dimension of vocal tract

How do we safely do that?

- encourage a high laryngeal position, but how to do that without making them tense and hoarse?
- larynx will never change
- habituate high laryngeal sound
- transwoman goes down as low to F3 with high laryngeal position
- get transwoman to create very bright sound like in musical theater!--> hyper feminine tone
- step away from what do cisgender women do because they are not the role model since they don't have the same bodies

Experiment vocal tract length/shape and what the differences are at different pitches with acoustic instruments!

Nina Lamont “Singing in the Rain”

Pavero batti—Ingo Titze

Brad Story—acoustic breakdown of F1/F2

How can transgender people exist on the operatic stage?

Transgender men

- some can sing down to A2 but doesn't have physicality in vocal tract to get close to a good sounding tenor? still sounding like a female alto? has to be physicality—smaller shoulders, smaller jaw, smaller neck
- need to create manipulations to create the tone we want
- play around with techniques → constant lower laryngeal position
- find how you can mimic people make

*Even with hormones, testosterone is not a growth hormone because still small larynx and “peewee herman” sound because thick folds in small space

*No change in the vocal folds with estrogen—Jean Abitbol—Voice Foundation

*What are the structures that create appropriate resonance? Physical size of course, but hormones can affect the shape of a face—how much does that affect the voice? What are the effects in young transitioning females in estrogen, and what does the effect on

changes of the face have to do with the sound of their voice? How does facialsurgery or angioplasty change the voice?

*James Thomas (entdoc.net)—otolaryngologist in Portland, OR who is only MD doing vocal fold surgery for feminization (laryngoplasty—stitching larynx higher and attaching to hyoid bone—REAL PROMISE, doesn't cause swallowing problem) and vocal fold stretch which might be bad because patients are hoarse and limited pitch range and don't necessarily have C5 even

<http://www.medscape.com/viewarticle/827713>

<http://www.teni.ie/attachments/9ea50d6e-1148-4c26-be0d-9def980047db.PDF>

<http://www.revelandriot.com/resources/trans-health/>

https://apps.carleton.edu/campus/gsc/assets/hormones_MTF.pdf

Sandi Hammond, Founder of Butterfly Music Transgender Chorus, May 15th, 2017

Why did you begin your butterfly choir?

- had a lot more masculine-identified than female but also a lot of gender fluid or non-binary
- had a lot of trans females that could not achieve a higher voice register (not above A4)
- how would countertenor training apply to trans women?
- countertenors do not present in the binary necessarily
- why are some men able to achieve falsetto and others not?

Categories

- trans women who had a male puberty against their will (so male vocal mechanism but don't want it)
- younger trans population that can have hormone preventors so do not go through puberty → trans women who oppressed male puberty
- trans men who go on testosterone and give up treble singing and voice changes
- trans men that were scared to go on hormones because were experienced in treble singing and didn't want to lose it
- gender fluid and non-binary people tend to be younger because first generation that has ever been able to express that so many identified as female at birth, presented very masculine but were not on testosterone → presenting in a masculine way without testosterone and often wishing to sing in a lower register anyone but would bottom out at (E3 and push) → if this person is so dysphoric about their gender and need to sing in a new and different way, then should you prevent them from using bad technique after warning them once even though it's what they need maybe even if they need it instead of feeling suicidal?

Learned from Kathe → cisgender male puberty bumps up pharynx (resonator) and vocal folds thicken and

- trans men needed microphones for solos but were never loud and had more reedy sound
- rejected sop/alto/tenor/bass for trans upper, trans middle and trans lower
- trans women didn't score above A4 → very middle choir so baritone to low alto
- used a lot of Bulgarian songs because fell in the middle voice and had interesting nasal quality

- people allowed to jump octaves whenever or even switch sections depending on how they were feeling especially dysphoric one day
- choir was about to sing where you need and want to sing psychologically more than musicality so people didn't quit and got what they needed → accommodating whatever it took so that they would keep singing
- probably ideal to team up with a music therapist or psychologist or both when working with a trans singer
- would map everyone's range for them!--> individual vocal assessment for each singer to look at range and ask what they love about singing, do you read music... → almost all of the trans men (30+ people) with this ran out of range at A2 and top out around D4/E4/F4 → quantifying range for trans men needs to be published and how to achieve resonance in their lower register!!
- trans women → some got worse in the choir because voice would become tired often and compete with other trans women
- vocal function exercises—empowering them about basic principles of vocal function—lip trills, glissandi, no big jumps, half steps, basics of breath support
- trans women did exercises that brought sound forward and up—nasal exercises (meow meow)
- for people finding masculine sound would take it too far back in resonance when they went low and a lot spoke with glottal fry
- publish a paper about trans male range and resonance with Kathe and Anita??
- non-binary group needed to feel that they could move between sections and redefine range and things shifted in their lives—repertoire implications??—some of these people sang in a six-note range because they couldn't get below E3 and didn't want to use head voice
- trans women who still preferred to sing in anatomically appropriate range—baritones/basses and didn't care (usually younger because our generation has more freedom)
- younger trans women who could sing high and achieved great countertenor range and other trans women were jealous and frustrated
- had a lot more masculine-leaning non-binary than female but still had both and would identify how they're feeling day to day (I'm feeling femme)
- a trans woman in her 60s will have different needs than someone in their 20s
- most of the singers are not economically privileged enough to take lessons
- slow is the way to go in transitioning your singing voice during hormones

Dr. Anita Kozan → trans voices published article (Minnesota) with phd in speech pathology

- working very gently (not big volume)
- expanding the range through glissandi and working with half/whole step stretch at a time
- taking a very personal/whole person approach → around gender as much as music so different context
- working on your singing voice helps you with your speaking voice!! → so singing useful in a clinical way especially with breathing techniques

Trans man named Alexandros Constansos → learned a lot about the trans male singing voice and discovered that those who continued singing while on testosterone fared much better than those who stopped and picked it up again!!

- published a study of his own transition as a singer → when you dose testosterone quickly then it's much more difficult to transition singing voice than when you go on the lowest dose
- lowest dose made it much easier to maintain technique
- radical musicology website

Danielle Steele—full soprano voice and choir director at IU Earwin College

- trans women came to her wanting to be in women's choir and some wanted to achieve soprano/alto ranges and has been working with them for 4-5 years

Josh Palkki

- darling of music ed world on LGBTQ and trans singers

Danielle Steele, High School Choir Director, June 9th, 2017

Are all of the trans singers you've worked with so far male to female?

- yes → one MTF for three years

Have any of the trans singers you've worked with undergone a hormone transition?

- yes, they have been in hormone transition for 2.5 years so entered choir non-hormones

What are their vocal ranges roughly? What voice parts do they sing?

- no proof that hormone transition affects voice for MTF
- their range was initially a baritone but it has been years since they've used it
- initially alto 2 and then alto 1
- was alto 1 in concert choir first
- moved to soprano 2 and she bloomed but at first sound was really tight and over-produced but more work with mental and physical relaxation techniques the larger and more lush it has become

Do any of them take voice lessons as well?

- singer took voice class for multiple semesters and worked extensively with Danielle one on one multiple times

Which resources have you consulted to help you integrate their voices into the choir?

- Australian researcher Georgia Dacakis from Melbourne developed trans voice questionnaire → voice and communication therapy for the transgender client
- did lots of one on one check-ins with trans students
- easiest is FTM singers because hormones do affect voice
- fewer MTF people sing because of self-consciousness with the voice but might benefit from taking lessons from countertenor teacher

What kinds of warm-ups have you integrated into your choir's routine to help accommodate the trans singers, if any?

- Danielle's personal background is with yoga so would use linked movement and breath vinyasa practice with singers and postures that would make them more supported and aware singers
- also uses seated meditation after vinyasa
- Danielle believes in structured, methodical vocal technique

- exercises she uses are Titze, Stemple exercises and speech therapy exercises → vocal therapy phonation exercises as well as slide and pitch matching exercises are helpful → slow and methodical
- begin with slides to a third and then fourth and then fifth → work on control of the voice in a very small space
- works upward first and then back down to comfortable range
- encourages students to use the entirety of the voice that they have access to and her hope is that if they want to sing and have the gift then she can help them become comfortable with the voice they have in their body

Other questions to consider:

1. Have they been using their voice?
2. What is their relationship to their voice?
3. To their family?
4. To their voice on a specific day?

William (Billy) Sauerland, Columbia Phd Student in Choral Studies, August 14th, 2017

- counter tenor professional singer!

Where are you doing your research/observations?

- doing case studies in various cities across the country
- looking at process more than technique

What is the age range of the individuals?

- four case studies on experience of transgender singer and the teacher in the applied studio
- possible that one case study will be more focused on nuanced vocal technique
- maybe another case study will be on beginning voice modification or singing as a form of voice therapy
- socio-ecology: what is their individual experience and their interaction/rapport
- is it more student-centered? teacher-centered? joint problem solving?
- 18+

What is the experience level of the singers you have been observing?

- beginners to more experienced and classically focused
- analyzing through portraiture

Would you be willing to send me your bibliography so far? Or even the literature review portion of your dissertation?

- taught trans singers for 7 years while singing with Chanticleer
- lived in SF, moved to London, moved back to SF
- was working with Lesbian & Gay Chorus of SF
- tenor approached him with adduction issues but strong falsetto/head voice
- this tenor went through transition at 40 because of testosterone
- what do we call different registers for a trans singer who's singing a different voice type on hormones?
- let them sing a different voice type if they're not taking hormones?
- most of his students were trans men all adults that had taken testosterone
- all of these students were hobby choir singers
 - o often found there was raspiness/breathiness in sound

- used a lot of exercises that connected the voice to consistent breath flow so voice-fricative consonances (v, z, th), lip buzzes, tongue trills, trying to release breath
- often times there was a bit of over-pressurization in trying to pitch the voice low (partly confidence based) because that is probably what they were doing before their voice changed or maybe there was too much muscle in the larynx for the size of the larynx

Rachel Inselman, Voice Professor at University of Minnesota Duluth, August 22, 2017

Transgender students

- undergraduate age/sophomore
- one year
- Caiden
- auditioned as a soprano and got accepted into music department but didn't end up coming to department that fall and instead started in theater
- switched out of theater after end of freshman year to music
- re-auditioned
- started taking hormone therapy around December of freshman year and she started working with him in May
- voice wasn't settled yet—range was small, voice was cracking
- found repertoire in octave+ range in a general area
- might be a tenor after that but didn't want to label it
- settled into lyric baritone
- family/finances/loans fell through after first year so they worked together for free
- he wanted to go to UMD for music and psychology and then transfer to twin cities campus for music therapy degree

Getting through transition period FTM

- when you're working with a new student, you kind of treat everyone the same—work with what their range is and invest in what they do well and expand
- working in falsetto and work on head placement and slowly crack out of it to see where does the voice change
- when you're dealing with a smaller range and dealing with holes then good to sing scalar exercises so that they aren't cracking all the time and don't lift the larynx
- find out where the tricky spots are and slowly work on that
- so used to singing with chin up and the guitar so a lot of it was basic stuff that wasn't very different

Observation

- wearing binders for FTM and waste trainers for MTF → going to affect breathing and posture and internal organs
- sometimes mental health is more important than physical health → probably depression involved, possibly family/friends that don't understand, confusion all their life and they don't get a chance to make the decision to transition until they leave the home and have the opportunity to start fresh so teachers may be the first people that are there for them
- MUST know how to address them with pronouns/etc.

- there is information about what the best kind of binder is→ you have to do research, they're getting better and it's an internet purchase
- the worst thing an FTM could do is wear an ace bandage because it tightens every time it moves and it can be very dangerous
- for binders make sure you get the right fit and NEVER wear it all the time (no more than 8 hours a day) and should ease into it slowly and if they notice anything hurts then they have to use common sense but sometimes that doesn't matter because they NEED it in order to mentally go out in public in a healthy way
- important for them to have a support system of doctors that understand because they're getting a lot better at the dosage of hormone therapy because boy has so many years to deal with the hormones but therapy is a lot quicker
- everybody's body and chemistry make up is different and there are different types of hormone therapy and different way to administer it (shots/pills/patches)
- one person who went from MTF was so depressed during hormone therapy of two years trying to figure out the dosage until finally she discovered the pellet (put under the skin) and life completely got better and changed for this person→ maybe you just have to find the right kind—person had a couple attempts at suicide during this time, let them know that there are options
- some of the hormone therapy side effects is EXTREME acne
- Caiden found with hormone therapy that he found less so he felt like his emotions were bottled up because when female crying was a way to release tension

Brian Kremer

Liz Jackson, ton of transgender teaching

Erik Peregrine, transgender singer in twin cities and teaches a transgender choir

How do you grapple with voice labels in your choir?

Loraine Sims, lsims@lsu.edu

Nancy Bos,

Joshua Palkii

Sam Bullington, Former CU Women & Gender Studies Professor, Founder of Phoenix Trans Choir, September 7, 2017

- now helps/teaches with INVEST department→ CU Engage
- writing a book about Transgender Areas
- uses he/him pronouns
- singing is like the world of spiritual empowerment
- the voice is simultaneously private and public
- founded Phoenix choir for transgender persons and allies in the great Denver/Boulder area
- refers to voices as melody and harmony or higher and lower
- "Harmony is beautiful *because* of contrast!"
- has been on testosterone for ten years
- only testosterone type when transitioning was shots
- started as tenor one and is now bass one
- after a year and a half of taking testosterone he experienced a nine month period in which he couldn't tell if he was matching pitch or in the correct octave

- dosage of injections was .25mg?
- never wanted to be a man but wanted to look masculine
- “Diagnosing Difference” Documentary
- Phoenix is two years old

Selena Wellington, Composer & Musician, September 8th, 2017

- began testosterone in March (on it 6-7 months)
- using injection → began with .5 every other week which is average for trans men but they are not a trans man and are instead on the spectrum but not identifying as male so switched to .3 and now down to .1 weekly
- goes to Boulder Valley Women’s Health Clinic → most people in Boulder go there for HRT
- had to get a letter from therapist but in Denver they now do informed consent waiver
- feels like they have a chest voice, head voice and falsetto
- after one month voice felt scratchy and kept having to clear throat, voice also dropped
- by month two they had a falsetto but it was unstable and kept cracking
- at 5/6 months they could sing in falsetto but cracked a lot around break and can’t switch easily
- thinks that their voice is on its way to being a baritone because they can sing with tenors now
- it is harder to lead vocal warm-ups because of cracking and inconsistency in voice
- within three months of using testosterone voice had dropped about a third
- after 5/6 months voice had dropped an octave
- they don’t bind every day and usually just wear sports bras but their binder has compression only on the chest
- they get weird knots in their back when they use the binder
- they feel like their face bone structure is changing by becoming more square but they assume that it is due to genetics because a friend of theirs on testosterone actually experienced their face becoming more narrow
- wish they had a brother to compare their transition to
- one of their biggest questions: is they stop taking testosterone since they have no intention of passing as a man, will they have cracks in their voice for life?

Liz Jackson, Owner & Voice Instructor at The Voice Lab, September 14th, 2017

Book with Brian Kremer

- got connected two years ago through mutual friend
- at Voice Lab there are a lot of trans and non-binary students
- submitted a proposal to Plural Publishing
- Christie Block—speech pathology and specializing in trans masculine voice in NYC
- Jean Abitbol—has lots of research on estrogen and voice
- Voice Lab has been around for three years
- first trans student in trans man in mid 40s and met as a referral
- “cultural competency”

- Chicago has a vibrant queer community so reached out to the newspaper when began doing this research
- Voice Lab has 100-120 students more than half are trans/non-binary and all of the teachers work with them
- the DIY community is so strong because access to voice care is so hard
- talk to endocrinologists: Boulder Valley Women's Clinic
- Sandi Hirsch & Richard—co-author of Voice Therapy for Transgender Clients
- Eli Conley—trans man who is a voice teacher—could give ideas about what needs to be talked about

Evan Johnson, Lab Manager, September 27th, 2017

- has been singing in choir since age 4 or 5 → began with church choir
- middle school was the “peak” years of choir → was singing in choir 12 hours per week
- was in church choir in high school and one year of school choir
- was not regularly singing in choir during college except for one year
- joined an LGBTQA choir in Minnesota in 2007 and was in that choir until moving to Boulder in 2015
- was always an Alto 2 until made an Alto 1 in the choir in Minnesota
- Minnesota choir was only a good choir for trans people on paper
- started T in 2012 and took one summer off just
- moved to Boulder in December of 2015
- the voice dropped significantly within two months but noticeable voice change began on day 2 or 3 of T
- made a Tenor 2 after voice dropped
- didn't understand where voice was at first and later realized that Tenor 2 was too high
- didn't feel comfortable practicing with his new voice for a long time
- couldn't control his new voice and didn't like it for a while
- only felt like he had control of his voice after moving to Boulder and joining the Phoenix trans choir
- started T with 300mg/weekly injections until Boulder and then switch to Axiron topical gel at 60mg/day
- experienced the gel as having much higher effective dose and so is now taking about 45 mg/day
- lost head voice around the same time that he started the T gel
- finds sliding exercises much easier than scalar
- had to learn how to shout again
- recognizes that there is a specific FTM vocal quality
- prior to taking T his testosterone levels were high for a “female” because he had polycystic ovary syndrome
- recommends the GALA guidelines for working with trans singers
- Lindsay Deaton

Christie Block, NYC Speech Therapist Specializing in Masculinization/Feminization, September 28th, 2017

- the word transitioning → NO
- it's a myth that trans men don't need or want voice help
- trans men don't have as easy access to voice care because people think T is enough
- sometimes people have dysphonia from T
- check out Dr. Block's speech pathology world article
- world professional association for transgender health
- David Azul literature review
- Ulrika Nygren 2014 dissertation "Affects of Increased Levels of Androgen on Voice and Vocal Folds in Women with Congenital Adrenal Hyperplasia and Female to Male Transsexual Persons"
- Vica Papp 2011 "Speaker Gender"
- Richard Adler's Voice and Communication Therapy for the Transgender Client
- John Van Borsel at Gent University → masculinizing surgery
- Endocrin Guidelines for Transgender People 200i Journal of Critical Endocrinology "Androgen Treatment of Transsexual Persons" Hembree

Do you do speech therapy as well as voice therapy for transgender and non-binary people?

- not two different things
- masculine voice training for speaking voice is a type of voice therapy
- helps with vocal rehab but does not do singing lessons

How do you see masculinizing voice patterns being applicable to singing?

- ask Sandi Hammond
- nasal consonants to help avoid tension in speaking?
- open aural resonance for tongue placement and resonance
- lots of yawn work
- with T you really have to navigate how much power you need and how much air you need when there's increased vocal fold mass so breath support and breath control
- understanding what kind of repertoire and range would work for them
- need to get rid of labels!!
- in general same basic techniques and tweaking to find your own style and using it to build a repertoire and figuring out repertoire

What do you see as the most helpful things to think about when training transgender and non-binary masculine voices?

Do you have any go-to exercises?

- daily vocal warm-ups and lip trills
- resonance work and pitch are most common
- yawn stretching and posture
- vertical jaw articulation and open throat sound
- in her article there are a couple exercises → Exercises for Voice Therapy by Allison Behrman

Dr. Ruth Weinberg, Boulder Valley Women's Health Medical Director, September 28th, 2017

- basic/usual dose is intramuscular injection at 100mg or .5cc every two weeks (200mg/cc or ½ of a millileter) cc=millileter or measure of fluid → testosterone cypionate → acne is main side effect and sometimes irritability and blood pressure is high if overdosing
- Androgel (in pump or packets) 50-80mg/day or Androderm → less absorbed because through skin and different form of testosterone
- testosterone enanthate is considered the same as testosterone cypionate and is almost never prescribed
- testosterone taken generally for their entire life after beginning
- deepening of the voice within 3-6 months and max within 1-2 years
- Endocrine Society, Clinical Practice Guideline—Endocrine Treatment of Gender Dysphoric/Gender Incongruent Persons: Endocrine Society Clinical Practice Guideline
- World Professional Association for Transgender Health

Eli Conley, Voice Teacher, October 9th, 2017

Background

- originally trained in a classical context as high, lyric soprano
- voice dropped to high tenor range after a few years on testosterone
- has always been singing and got into musical theater age 8
- did classical children's choirs for 8-10 years
- was training to be an opera singer in high school
- realized around age 16 that he didn't identify as female
- went to Oberlin College but not Conservatory, took private voice lessons with undergrad voice majors and participated in Conservatory early music choir & ensembles
- began taking T in 2006 at age 20
- sang in a choir through first two years of vocal transition on T and just switched voice parts when it was necessary

How do you feel about voice-type labels in choirs?

- high (soprano, mezzo), middle (alto, tenor), low (baritone, bass)
- doesn't want there to be a "trans" voice part → voice part is not wedded to gender!
- place people on a part based on where their voice is happiest and has nothing to do with gender, be open to people exploring parts

What were for you the periods of the most vocal transition?

- depends on dosage but usually between 3-6 months is when you see some vocal change, might sound like you have a cold or are hoarse at first and start losing some higher register notes
- 6 months-1 year is when voice starting breaking/cracking and where notes will disappear in middle of voice or get wobbly/shakey or difficult to sing through the passaggio
- year 1 and 2 things start to settle down but are still changing
- 2 years is when the range settles where they will generally be

What vocal exercises did you find particularly helpful during the first year on testosterone?

Is saying “on testosterone” okay?

- say testosterone instead of T if outside the community
- taking testosterone or on testosterone

What exercises have worked really well for you when working with people with entrapment?

- has been training in Somatic Voicework—The LoVetri Method™ over last few years → based on registration, first getting chest and head register comfortable and isolated from each other, then smoothing transitions and balance the registers to help create a coordinated mix in the middle → register first approach and trying to be as concrete as possible in understanding functional exercises and what the student is actually doing with their throat when they sing
- lots of octave/fifth slides down from head register and keeping things right and bringing light chest register up on bright vowels, working with [i,ae] in mix
- during voice change it was important to figure out where voice was at each week and finding comfort there → arpeggios, singing gently through passaggio and work on register transitions as everything was moving and shifting and keeping access to head, chest, mix

What repertoire?

- let students bring in their own music or ask them to make you a mix CD or spotify playlist so you can listen and assess what would be a good fit, pulling from what they like singing
- can alter the melody and key if they need to
- with one student, these songs worked well/artists: Green Day, Hedwig, Panic at the Disco, Newsies (altering melodies in lower range)
- something that doesn't have notes in the passaggio
- try to give at least two options each time

Mari Valverde—trans woman choral composer

Sebastien, Phoenix Choir Member, October 10th, 2017

- hobby choir singer
- sirens are difficult
- began taking testosterone in April 2015
- during first year of testosterone voice dropped three months in and again at six and a huge drop at eight months and pitch continues to drop

William Sauerland, October 29th, 2017

How to deal with entrapment?

- entrapment may be more of a product of taking testosterone at a later age
- entrapment not a great word → pathologizes and not necessarily consistent with experience of every trans person who takes testosterone
- probably people assigned female at birth who have larger larynx and wouldn't have trouble with entrapment after taking testosterone
- overpressurization is instead caused by emotional response of trying to sound like a man causing them to push more so want people to discover lower voice that

isn't pushed → closed vowels on descending scales because easier to find resonance so [i] or [u]

- not only trying to depressurize but find more resonance in their sound because when a person pushes it's coming from wanting their voices to sound bigger
- in working with trans men he finds that raspiness or breathiness is more common which may be related to larynx because smaller as compared to thickness of vocal folds or maybe it is caused by vocal change during two years
- need to acknowledge bias of bel canto tradition in teaching

Masculinizing Technique—resonance using increasing throat space by lowering jaw and depressing back of tongue?

- need for independency between tongue and jaw
- open throat space helpful for every student especially upon inhalation and maintaining it during phonation
- speech therapy is working from pathology to good functionality while singing teacher is working from good functionality to refined efficiency for the purpose of making art so not necessarily aligned in practice

Chart Endnotes

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