

BMPF 7003: Working and Learning: An Introduction to Work-Based Higher Education

**Bringing Belting into the studio:
Research and Popular Pedagogy**

Assessment component 1

1. Teacher background

My aim as a teacher is to support my students in exploring their voices while learning skills to protect their vocal health. I hold an M.A. in Music with English, and a Level 4 CET in Education and Training. I mostly work with young adults and adults, many of whom sing in styles that require belting. While I have experience as a singer in popular and choral styles, I have had very little consistent vocal tuition; apart from a two year period working sporadically with Judith Mok in a *Bel Canto* framework. While I learned to cultivate a light belt with her, I am conscious of my own lack of training in a musical theatre style. My aim with this assignment is to create a firm understanding of how belting is achieved physiologically (insofar as that is possible) and how it can be taught with a view to fusing scientific information with best practice in the singing studio.

2. Belting

Belting is a type of singing where the chest quality is carried beyond its normal range. It is said to sound “bright” (Le Borgne, 2009, Roll, 2014, Perta et al, 2020), with forward placement (LeBorgne et al. 2009, Roll, 2014, Saunders Barton in Hoch 2018). There is a consensus among some teachers that the traditional belt sound extends up to C5 or D5 (Roll, 2014, McCoy in Hoch, 2018), with contemporary or high belt going beyond C5 (Roll, 2014). Owing to its acoustic properties, it is often perceived as loud (Yanagisawa and Estill 1989, LeBorgne, 2009, Sundberg and Thalén, 2010, Perta et al. 2020). Belting has previously been accused of being inherently unhealthy (Estill, 1988), but with great numbers of specialist teachers (such as the contributors of Roll (2014,2016) Hoch, 2018

and Rosenberg and LeBorgne, 2021) and studies reporting healthy use of the technique by professionals (LoVetri et al., 1999, [Guzmán, 2021](#)), it seems that this is an outdated assumption. Certainly, the demand for non-classical working singers to be able to produce it consistently is high (Green et al., 2013).

As with any technique, if we wish to teach in an evidence-based manner, it is important to investigate what the literature can and cannot conclusively say about that technique. Such an investigation will necessarily be subject to the limitations of what can be said about vocal production in general, irrespective of the desired sound. It is important to bear in mind that even the most fundamental elements of vocal production cannot still be said to be conclusive (Roll, 2014, Chapman, 2017). It is equally important to remember that the manner in which this information is applied in the singing studio cannot always be rigidly scientific in tone, as we must “enable singers to cope with the kinaesthetic and aural sensations they have” as they sing (Chapman, 2017, p.72). For this reason, the discussion will be parsed out into two sections: what information can be gleaned from existing research, and what pedagogical models exist to elicit belting.

2.2 The Research: key concepts, concerns, and conclusions

According to my understanding, some of the key areas in the literature with respect to belting seem to be Vocal fold configuration, Laryngeal position, Closed Quotient, sub glottal pressure, proximity to speech, Resonance (including the role of the epiglottis, pharynx and soft palate), and Breathing.

Vocal fold configuration

It is thought that in belting in the traditional range the thyroarytenoid muscles are dominant (up to B4, C5 or D5) (Roll, 2016), and that in high or contemporary belting, the cricothyroid muscles are dominant (Sundberg, Thalen and Lovetri, 1992, Sundberg and Thalen, 2010, Herbst, Howard, Švec, 2019). It is thought by many that a mixing of vocal fold qualities is necessary to create a smooth passage between these registrations (Herbst, 2020). This is not unanimous, however, as not all studies conclude that a true mixing of registers is possible (Castellengo et al., 2004). As one master teacher points out in Roll (2014) we cannot even state conclusively what constitutes chest voice.

Laryngeal position

There is support for a high larynx when belting, as this shortening of the vocal tract lends more brilliance to the sound (Estill 1988, Yanagisawa and Estill, 1989, Sundberg et al., 1993, McCoy, 2016, Leppävuori et al., 2020), however it has been demonstrated that singers can achieve this sound with a lower larynx (Lovetri et al., 1999).

Closed Quotient

A high closed quotient (CQ) in the vocal folds of about 50% or above is thought to be present in chest voice (Roll, 2014). It has also been correlated with qualities of twang and belt (Sundberg et al, 1993, Titze et al., 2003, Sundberg and Thalén, 2010, Herbst, Howard, Švec, 2019). However, this cannot be said to be true in all cases, as Roll points out when citing Schutte and Miller (1993) (Roll, 2014).

Sub glottal pressure

In several cases, high sub glottal pressure has been found to be an active part of belting (Sundberg et al., 1993, Sundberg and Thalén 2010, Sundberg et al., 2011), and this would make sense, given that the presence of a higher CQ will affect airflow. This is not entirely true in every case, however, as Sundberg and Thalén's study in 2010 found that higher subglottal pressure was more common, but not in all cases.

Proximity to speech

In 1989, Yanagisawa and Estill defined belting as "Yelling, set to music" (Yanagisawa and Estill, 1989 p.343). LeBorgne et al. (2009) supports the idea that belting is connected to speech (and furthermore, cites prominent teacher Mary Saunders Barton in support of this). However, Estill's study in 1988 found significantly more infra hyoid engagement in belt singing than in speech, so it is unclear if the connection to speech is just a pedagogical tool, rather than a physiological reality.

Resonance

Many studies support the idea that a key aspect of belting is using the correct resonance strategy (Sundberg and Thalén, 2010, Roll, 2014, LeBorgne et al., 2009, Sabella, D., and Saunders Barton in Hoch, 2018,). This is achieved in part by the following structures:

- **The Epiglottis:** In belting, the epiglottis is lowered by the action of the aryepiglottic sphincter, creating a brighter sound synonymous with belt (Yanagisawa et al., 1989, Malde, 2013).
- **The Pharynx** - in several studies a narrow pharynx has been shown to correlate to belt sound; this too contributes to a brighter quality of sound (Titze et al., 2003, Sundberg and Thalén, 2010, Perta et. al, 2020).
- **Soft palate** - Belting has a forward placement, but this is not to be confused with nasality - the lifted soft palate prevents nasality in the sound (Perta et. al, 2020).

These strategies can result in depressing of the first fundamental, or a raising of it to the level of the second fundamental (Titze, 2016), and is responsible for an increase in volume in f2, f3, and f4 (O'Connor, 2020).

Breathing

There does not appear to be a unanimous consensus on this point. Roll's study in 2014 cites LeBorgne, Lee, Stemple, and Bush (2010) and Sundberg, Thalen, and Popeil (2011) as recommending the same kind of breathing as in classical singing (low abdominal breathing with emphasis on engagement in the ribs).

Based on the above, it appears that many aspects of vocal production pertinent to belting are still in need of further research, and few areas presented above can be said to have conclusive findings. This may be because the genres in which belting appear prize individuality of sound (Roll 2014, LoVetri, 2013). Lovetri (2012, as cited in Roll, 2014) further suggests that terminology to describe belt may need to be classified further, in the same manner that a classical soprano may be called a coloratura, lyric, or dramatic soprano. The master teachers in Roll (2014) also relate different kinds of belt to vocal Fach - such distinctions and classifications may explain the discrepancies we find in the existing literature as each participant may use different strategies to create a similar pitch or quality. In terms of pedagogy, it is fascinating and informative to see how pedagogues who have created and participated in some of the research above have shaped their models. This next section will explore a range of pedagogical models and attempt to establish some correlations between research and teaching practice.

2.3. Models of Teaching

There are many courses and books supporting teachers in the learning and teaching of belt. It makes sense to engage with some of the best known models and pedagogues to identify current ways of thinking about and teaching this technique. To this end, I will compare several teaching models, and how they interact with the research in the previous section. Hoch (2018) cites Voiceworks™ (Lisa Popeil), Somatic Voicework™ or SVW™ (Jeanette3), Estill Voice Training or EVT (based on the work of Jo Estill), and Complete Vocal Technique or CVT (Catherine Sadolin) as reputable models to explore. To this I will also add “BelCanto-CanBelto” by Mary Saunders Barton (Berg, 2011), and the qualitative studies of master teachers by Roll (2014, 2016). A table with summaries of each model is available in Appendix 1.

Key technical concerns in the pedagogical models

Several common areas emerge when comparing these models in terms of technical instruction: Breathing, Registration, Resonance, and Exercises.

Breathing:

Popeil (OfficialNATS, 2017), Sadolin (Complete Vocal Institute, 2022a), Saunders Barton (Saunders Barton, 2021) and the Master teachers (Roll 2014, 2016) all use *appoggio* breathing in their teaching. LoVetri is said not agree, allowing students to “find what is operable for them”, yet some of the methods ascribed to Somatic Voicework™ seem to contradict this, such as the maintenance of an expanded ribcage during singing, and the intentional use of the lower abdominal muscles to support the sound (White, 2017). Estill is said to eschew a low, large breath when belting (Salsbury, 2014). This divide seems to mimic what appears in the research literature (see previous section with respect to breathing and sub glottal pressure), with no general consensus emerging, but *appoggio* does appear to be the most common.

Registration:

Developing, balancing and mastering the conscious use of different registers (which I understand primarily to mean chest voice, head voice and a variety of degrees of mixing those qualities) appear to me to be a cornerstone of teaching belting in these models. A table that summarises the registration strategies of these models can be found in Appendix 2.

Just as the research in the previous section about vocal fold configuration was divided, the presentation of vocal fold configuration is varied across these models. Each model, however, does have some form of structure for discussing and developing the skill of moving between them at will. It seems to me that Popeil, LoVetri, Saunders Barton and the Master teachers in Roll (2014, 2016) present these qualities as a spectrum of possibilities with cricothyroid dominance (head voice) on one end of the spectrum and thyroarytenoid dominance (chest voice) on the other. Based on my current understanding, I cannot say whether Sadolin or Estill utilise a similar binary in their process. However, much of the language and vocal work in all of these models have a common goal: to help singers balance and move intentionally through different vocal fold configurations.

Closed quotient, although relevant to vocal register (as per the research in the previous section), does not seem to be used directly as a teaching tool in these models. Popeil alludes to using a “clapping” motion to convey closed quotient in belting a presentation in 2017 (OfficialNATS, 2017), but this is the only time she has suggested a method of presenting this concept to a student to my knowledge (Popeil, 2007, Popeil, 2017, Hoch, 2018, Rosenberg and LeBorgne, 2021, Popeil 2010b).

Laryngeal position is said to be high in belting qualities in Popeil’s model (OfficialNATS, 2017) and in Estill’s “recipe” for belt (Salsbury, 2014). Lovetri and Saunders Barton do not seem to reference laryngeal height, and two Master teachers in Roll (2014, 2016) specify that they believe the larynx to be higher than in classical singing, but not very high up in the throat, and they do not seem to discuss this during lessons (Roll, 2014). I have not seen laryngeal height mentioned in Sadolin’s descriptions of “Edge”. At least two of the teachers above have participated in research that measured laryngeal height (Yanagisawa and Estill, 1989, LoVetri et al., 1999, Lovetri, 2012); as mentioned previously the research is inconclusive at this time. It seems that speaking directly about laryngeal position is viewed differently within different models.

Resonance:

In all of the models above resonance is a key component of belt, which can be facilitated by the use of specific vowels and phrases in the singer's range; this can be seen in some cases in the information these pedagogues provide (Complete Vocal Institute, 2019), or in the exercises they recommend, many of which work to connect the singer to the ease and vowel qualities in their spoken voices (Salsbury, 2014, Roll, 2014, 2016, The Naked Vocalist, 2017, Popeil, 2017, Hoch 2018, Jones, 2016a, Jones, 2016b Saunders Barton, 2021, Rosenberg and LeBorgne, 2021). The idea of resonance as a core component is also has some support in the research literature (Sundberg and Thalén, 2010, LeBorgne et al., 2009, Sabella, D., and Saunders Barton in Hoch, 2018,).

Twang as an ingredient in the correct resonance for belt is present in the teachings of Estill, Popeil, Sadolin and Saunders Barton, but my understanding is that this is elicited through vowel work (Salsbury, 2014, Popeil, 2017, Saunders Barton, 2021), though some models look at twang as a separate quality (Salsbury, 2014, Complete Vocal Technique UK, 2020)). Twang as an important indicator of the acoustic perception of belt would seem to have some support in the research literature (Yanagisawa et al (1989), Titze et al., 2003).

The qualities of a narrowed pharynx have also been linked to belting (Titze et al., 2003, Sundberg and Thalén, 2010, Perta et. al, 2020) alongside a lifted soft palate to reduce nasality (Perta et al., 2020). The Master teachers in Roll (2014, 2016) use the oral position of open vowels to create the correct pharyngeal constriction, and there are several exercises by Popeil, Saunders Barton and LoVetri specifically citing a raised soft palate to this end (OfficialNATS, 2017, Popeil, 2017, Saunders Barton, 2021, Rosenberg and LeBorgne, 2021).

While many aspects of resonance appear to be developed through exercises and vowels, some models also use anatomical language with the student, namely Popeil and Estill (Popeil, 2010b, OfficialNATS, 2017, Salsbury, 2014, Benson, 2017, Steinhauer and McDonald-Klimek, 2019). Popeil's method seems to emphasise specific jaw and laryngeal positions to achieve the correct resonance, (Popeil, 2010b, OfficialNATS, 2017), which is

not dissimilar to Estill, who advocates for a high laryngeal position, a high tongue position, a narrowing of the aryepiglottic sphincter, a high soft palate, combined with “mid” positions of the jaw and lips to create the correct resonance (Salsbury, 2014, Benson, 2017, and Steinhauer and McDonald-Klimek, 2019).

Exercises:

It is difficult to analyse all the pedagogical models equally in terms of exercises, as access to their resources varies, particularly in the case of Sadolin and Estill. However, some general commonalities can be noted from what is available. It seems to me that while the methods differ, at the heart of the approach is a desire to provide the student with foundational skills both physiologically and aurally to master their command of registers, and thus, belting. Where available, I have provided samples of exercises from the models in Appendix 3. I find the following approaches to be common:

- The use of speech-like exercises to draw on the singer's existing schema for vocal production seems to be a common and efficient approach in these models. Many of the key components of belt found in the research can be heard, observed, and analysed in these sounds (like sub glottal pressure, pharyngeal space, soft palate positioning, vocal fold configuration), and as such, corrected or developed.
- My understanding is that building stability and strength in both head and chest voice is a vital component of the process of safe belting in many of the models above, and this means working from both the chest voice up, and from the head voice down to allow a mix to emerge.
- Understanding which vowels work best for a particular type of vocal production seems to be a common theme - many aspects of the resonance required for belting can be elicited systematically and consistently in a way the student can apply independently.

These common points are extremely useful to me, and will form the basis of my strategy for application using this information.

2.2.3 Summary of key findings and conclusion

Many of the teachers behind the models I have analysed are involved in researching the voice themselves, so it seems that where the research for a specific physiological point is not directly discussed with the student (like closed quotient), it is still understood and considered by the teacher, perhaps even imparted to more advanced students (as stated by LoVetri in *The Naked Vocalist*, 2017). The difficulty in obtaining resources to form a clear picture of how students (not teachers) progress through these models means that many aspects of their approach to applying research in lessons is still unclear to me.

To return to Chapman (2017), a teaching model must convey instructions that will elicit and label specific movements and sensations in the body. Scientific information is an important underpinning for this, but in and of itself it may not engender correct physical movement for belting. Thus, points of confluence and deviation emerge from the teaching models with respect to the best methods to teach belt. I intend to use the methods these models hold in common as I support my students in learning this skill.

3) Application and Development

Based on the common areas identified above, I have created a plan for applying my learning in lessons. These activities focus on the common points I have identified above. The initial application of this learning is to create resources for my singing studio for inclusion in my teaching plans for the coming summer term.

Application plan

	Vowels	Speech-like exercises	Exercises for exploring registers
Activity	Create a vowel chart for reference in lessons and planning for which vowels correspond to belt qualities.	Create or adapt 3 exercises to incorporate speech based exercises into my practice, for use in the coming term.	Create, adapt or select 4 exercises to explore register, for use in the coming term.

Method	Compile a chart of vowel sounds and print copies for my studio.	Consider what 3 aspects of belt I would like to convey, and what vowels and text might suit this purpose. Write these out as a resource to bring to my sessions.	Consider what experiences of register might be most effective to elicit, combining this with effective vowels. Write these out as a resource to bring to my sessions.
Planned application	I will keep these nearby when teaching if new exercises need to be created. I will also use the chart immediately to create new exercises for use in my teaching.	For immediate application with students after Easter, adapting as necessary.	For immediate application with students after Easter, adapting as necessary.
Measure of Success	Printed out charts, new exercises ready for students after easter.	- Less strain in the singer's upper chest register (with regular practice and attendance in lessons). - Singers reporting the use of speech like strategies in their practice outside of lessons. - Monitor development by filming lessons (with consent)	- Increased confidence in singers to identify different qualities and areas of resonance in their voices. I - Increased ease or thoughtful decision making when approaching repertoire (in and outside of sessions, with regular attendance and practice) - Monitor development by filming lessons (with consent)

Timeframe	Deadline: Monday 25th of April 2022	1 week for the creation of exercises	1 week for the creation of exercises
		Deadline: 30th of April Use throughout Summer term. Review on July 15th 2022	Deadline: 7th of May Use throughout Summer term. Review July 15th 2022

My expectation is that these activities will be a starting point for informed experimentation; When I review the effectiveness of the exercises I have created in July, I can begin to prepare for the coming term in Autumn, beginning a new cycle of inclusion and creation of new exercises each academic term.

2. Assessment Component Two

2a) Reflection

Reflecting on the process of researching this topic.

To facilitate reflection, theoretical models of reflective practice have been useful in framing the process as not simply introspective, but dynamic, interactive and mindful of the teacher's context societally and politically (Bolton, 2018). Using the work of Schön (as presented in Warwick, 2007, Finlay, 2008 and Bolton, 2018), I will use the concept of "Reflecting on Practice" to attempt to cultivate an objective view of the work, and also "theories in use" to foster a clear understanding of what tacit, subconscious information informs my practice, all toward developing my "Reflecting in Practice" - or the tools that are

instinctively available to me as I work (Schön, 1983,1987 as cited in Warwick, 2007 and Bolton, 2018).

The decision to research belting was made in the context of my work as a teacher, and as a singer. The choice was informed by interpersonal and professional commitments and goals - I wish to help my students belt safely and effectively, and I would like my understanding of that process to be as thorough as possible. I believe several aspects of the culture surrounding singing teaching impacted my approach, namely the tension surrounding who should and shouldn't be allowed to teach. Singing teachers experience the broader cultural pressures of both underinvestment in education and in the arts, and this heightens the pressure to "legitimise" our field both in terms of science and education. Within this environment, some people scapegoat those they perceive to be "bad teachers"; I have seen this used to justify mean-spirited criticisms of their colleagues on social media, sometimes as a form of social currency, and sometimes as a click-bait attempt to attract clients. I admit that I am fearful of experiencing such criticism - especially as a teacher working in CCM styles, which still garner less respect than their classical counterparts. Within this context, choosing this essay topic was also a choice to arm myself with knowledge from peer reviewed journals and respected teaching models to deflect or avoid criticism, and to validate my own right to teach, while simultaneously improving my skillset.

Personally, the academic nature of the assignment was not intimidating to me, but I felt a significant sense of urgency to become as deeply acquainted with as many aspects of the technique as possible, as quickly as possible. I believe this anxiety may be rooted in a belief that my teaching and singing are inadequate, because I have not experienced long-term mentorship as a singer myself, or as a teacher. I believe this feeling was also informed by experience with past teachers who only taught repertoire and not vocal technique. This increases the internal pressure to avoid becoming a "bad teacher", reinforced by the cultural nuances above. I believe all of these factors affected my approach to the topic; I was not brave enough to pick just one aspect of belt to focus on; I felt I needed as much knowledge as possible to validate and enhance my teaching practice in addition to satisfying the criteria of academic writing at this level. I believe I did achieve my objective in this assignment; I have learned a great deal. At the same time, my insecurity may have caused me to generate more work than was necessary to complete the assignment to a good standard. Perhaps this newfound awareness of this internal dynamic

will inform my “Reflecting-in-Practice” when choosing future topics (Warwick, 2007, Finlay, 2008, Bolton, 2018).

I began my research with peer-reviewed papers. Many aspects of belt, alongside the scientific language for its analysis, were almost entirely new to me. Early in the process I had to stop frequently to seek out other sources so I could understand what I was reading, but over time my knowledge of the relevant terminology became more secure. While I may not have found material I could use conclusively, I learned so much about belting. My concept of twang and closed quotient are in much sharper focus, and my vocabulary and understanding of the vocal folds themselves and resonance in the fold tract are much deeper and detailed than before. This served me well when it came to analysing pedagogical models.

In researching teaching models for belt, I was disheartened by the difficulty of accessing clear, meaningful information about them and how they work. Official resources are prohibitively expensive. Without access to the university library and its affiliated research hubs, it would have been difficult for me to find any credible sources for several of the models (which does not bode well for those who wish to improve their knowledge without significant economic means to do so, a common concern with music education within a western capitalist framework). This necessitated a move from sources that were primarily papers in journals, to other kinds of sources like short YouTube videos, blog posts, and webinars. This piecemeal reconstruction of the models has likely led to some inaccuracies and misconceptions on my part, but it was a useful process. I discovered many common principles not only across the models, but within my own practice. Despite the challenges I faced, I have gained a huge number of resources to draw on when teaching belt. I will be drawing on a range of exercises that I have noted during my research in addition to those cited in Appendix 3.

Researching belt has been challenging in terms of the scope and level of research required to understand it, and of my “theories in use” as a teacher both with respect to my view of myself, and where my learning fits with my existing process (Schön cited in Bolton, 2018). I began this assignment assuming my teaching was poor, but the research has challenged this belief directly, as many aspects of my approach are supported by the pedagogical models and the research literature about belt. I can see now that my concept

of self is impacting on how I view my teaching, and it creates an exaggerated concern that I will inflict a poor rate of progress onto my students. I had suspected that more knowledge would help to alleviate this concern, but I did not realise it could occur in a manner that reflected positively on my teaching. I believe this learning will strengthen my “reflection in practice”, and that this impact will grow as I continue to apply what I have learned.

I have plenty of areas for development that relate to belt, ranging from continued experimentation in practice, to simply listening more to the styles I teach (OfficialNATS, 2017). I also feel that there are several areas deserving of more serious study in order to continue to improve the tools available to me as I develop my skills and understanding of belt (“Reflection in Practice”, Schön cited in in Warwick, 2007 and Bolton, 2018).

2b) Personal Learning and Development Plan

1. Develop my understanding of vocal acoustics	To compliment my ongoing practice with belt, I hope to develop an understanding of vocal acoustics. I will read work by Ingo Titze or Kenneth Bozeman and use of the resources on the MA library as research materials. Commencing: 4th May 2022 Deadline: BMPF7005: Module 2, 21st July, 2022
2. Explore the impact of supervision on my teaching practice	Invite a suitable mentor proficient in belt to observe select lessons with my students to assess any improvements in my teaching and in student experience. Research into planning strategies will be included in this work. Commencing: 19th September, 2022 Deadline: BMPF7008: Module 3 16th January, 2023

3. Research muscular development in sports science and assess its relevance for teaching belt.	I am interested in how belting relates to the development and maintenance of muscle through the lens of muscular development in sports science. This may have some interaction with existing research about belt in ageing voices. Commencing: 20th of January 2023, Deadline: BMPF7013: Module 4, 6th June 2021
4. Research: Young singers and their opinions of vocal technique.	I am curious about how young singers who are not in singing lessons perceive singing and vocal technique. This information could have very interesting implications for my own teaching of belt, but also to help teachers of singing gain an understanding of the barriers to accessing technique. Commencing: 21st June, 2023 Deadline: BMPF7013: Module, 7th November 2023

Word count: 4807

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Appendix 1

A comparison of belt and how it is taught in a sample of models

Model and/or Pedagogue	How belt is understood in this model	How it is taught	References
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Estill Voice Training® (EVT), Jo Estill	Smooth onset, retracted false folds, Thick vocal fold configuration (Vertical Thyroid cartilage, tilted cricothyroid cartilage), Narrow AES, High larynx, High tongue, high soft palate, “mid jaw height”, Mid lips (gentle smile), Anchored head & neck, Anchored Torso.	Students first develop a strong functional understanding of the structures of the voice and their utility through 13 “Figures” in Level one of their training (which is three days long when training directly with EVT) (Estill Voice International, 2022). Belting is considered as one of six possible vocal qualities in Level 2 of the training, where the possibilities of combinations of figures are explored. Although this is a two-day course directly with EVT (Estill Voice International, 2022), In Salsbury’s curriculum of voice training for actors (2014), she leaves this quality until the third year of their training. Taking in an overly large breath is understood to apply too much sub glottal pressure on the voice to facilitate a belt in a healthy manner (Salsbury, 2014) Supervised group work is very much encouraged by this model (Benson, 2017, Steinhauer and McDonald-Klimek, (2019)). This method has its own specific vocabulary for different aspects of the voice.	Salsbury, (2014) Benson, (2017) Steinhauer and McDonald-Klimek, (2019) Estill Voice International (2022)
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Somatic Voicework™ The LoVetri Method (SVW™), Jeanie LoVetri	The chest voice being taken above the passagio.	Registration, Vowel sounds, and the optimal use of the body and breathing are central components in this model. An emphasis on a wholistic approach to the student and allowing development to occur over an extended period of time is In this model, “resonance is a byproduct of production. Registration is production”, and focusing on registration affects laryngeal position, Closed quotient, airflow, volume, and formants in the sound (The Naked Vocalist, 2017). Focusing on purity of vowel production also supports this goal. Singers are trained to sing with as little constriction as possible, but are not encouraged to directly manipulate the structures of the throat; in SVT™ this must be cultivated through exercises. Exercises given to a student should have a clear intention, based on what may be missing or in need of correction (therefore teachers must have highly developed skills in listening to and diagnosing sound). Students should be given ample time to allow their voices to explore an exercise. Teachers are guides who work with the student to support their authentic expression. In this model, “repertoire...should not be a regular part of the students development until minimum skills are acquired” (LoVetri, 2009, p.441). Any repertoire introduced should be below their skills so they can focus on artistry. The approach to the breath is flexible.	Somatic Voicework (2022) White (2017) The Naked Vocalist (2017) LoVetri (2009)
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Voiceworks ™, Lisa Popeil	Singing with a speech-like or yell-like character, or “carrying your chest voice up” (Popeil 2007,2010b).	It is difficult to determine the entire methodology of Voiceworks, but several cornerstones can be gleaned. Aligned posture and support is very important within this model to prevent pressed phonation (OfficialNATS (2017)). with the chest high, ribs out, solar plexus firmed out for the exhale, lower belly moving in and waist pushing out (during phonation). Relax on the inhale. (To my current knowledge this sounds similar to <i>appoggio</i> as presented in Chapman, 2017). Gently firming the solar plexus throughout the sung phrase is also stated in a brief video from 2010 as the “magic spot” (Popeil 2010a). This is to create enough sub glottal pressure to support the belting sound (OfficialNATS 2017). Control of registers is achieved by attempting to directly sense the vocal fold activity at the level of the larynx (with chest voice felt “in front of larynx” and head voice felt “in back of larynx”) Increasing “back muscle” feeling as one ascends, and “front muscle” feeling as one descends (Popeil, 2017). Language like “head”, “chest” and “mix” as she finds this language unhelpful in articulating nuances of mix. Gentle engagement of the masseter muscle for a “belter’s bite” to enable slight forward movement of the jaw and support “laryngeal lean’ - a movement forward of the hyoid bone she has observed in high belting, which retracts after E5 (OfficialNATS, 2017, Popeil, 2017, Rosenberg and LeBorgne, 2021). Teachers must listen to and observe singers in the styles they are teaching - observe their mouth shapes and work.	Popeil (2007) Popeil (2010a) Popeil (2010b) OfficialNATS (2017) Popeil (2017) Hoch (2018) Rosenberg and LeBorgne, (2021)
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Complete Vocal Technique, Catherine Sadolin	It is called “Edge” in this model; It is “Full metallic”, “sharper and screamier” than other modes, uses “twanged vowels”, listed as “ ‘I’ (as in sit), ‘EH’ (as in ‘stay’), ‘A’ (as in ‘and’), and ‘OE’ (as in ‘herb’)” in UK English, mostly loud, used to scream outside of singing (Complete Vocal Institute, 2019, 2022b).	Three key principles - 1. Support: Waist and solar plexus stay extended, lower abdominals draw in during singing. Reserve this for moments where singing is “difficult”. 2. Necessary Twang: A degree of engagement of the AES for clear, non-breathy tone. Does not sound “twangy”. 3. Avoiding protrusion of jaw or tightening of the lips: Jaw drops down and back, opening more for extremes of register, relaxed lips maintaining a consistent shape as much as the text allows. Four Vocal Modes - Neutral, Curbing, Overdrive and Edge, which can be engaged with on a “foundation” level or a “Density” level. Neutral is a more gentle, headvoice quality. Curbing is chest voice at a moderate volume. Overdrive is a TA dominant at a louder volume. Edge sounds TA dominant but with a very bright resonance (like a duck quack) - and this is the mode used to describe “Belting”. The philosophy of this method is to reduce learned constriction through technique to facilitate expression. Techniques taught must have the intended effect immediately (Complete Vocal Institute, 2022c). In the key text for this method, many resources are included to facilitate different types of learning and it is not dogmatic as to whether any particular resource should be used more than another (like anatomical diagrams, or imagery), however understanding of the structures of the	Complete Vocal Institute (2019) Complete Vocal Institute (2022a) Complete Vocal Institute (2022b) Complete Vocal Institute (2022c) Complete Vocal Institute (2022d)
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Bel Canto/ Can Belto, Mary Saunders Barton	Belting is a different acoustic strategy from energised speech near the spoken range.	This approach uses many speech exercises with carefully chosen vowels to facilitate belt. Belt is presented in the context of a philosophy that cross-training singers to have access to many different kinds of sounds is important. Not imposing an aesthetic on the student, and a focus on healthy function is important. Many of the exercises used in this method are dealing directly with registration (often using Mode 1 for chest voice and Mode 2 for head voice), with speech as an anchor to reduce unnecessary tension, and different scenarios are used to elicit emotion in order to provoke ease of access to a certain sound. Exercises in this method include selecting the optimal vowel sound and shaping of the mouth for the desired style - the “eh” in “dare” is ideal for a traditional belt, so “dare” will be at the top note of the exercises. A raised soft palate is encouraged, as is the inclusion and exclusion of vibrato. Accessing twang is strongly linked to the kind of vowel chosen - sometimes characterisation or imitation is added to create more twang. Breathing is in the appoggio style. This method aims to facilitate the singer to have a range of options so they they do not spend their whole career only learning about one way of performing. Qualities of sound that the student is making are frequently articulated in a neutral way; the teacher must be adept at identifying and	Berg (2011) Hoch (2018) The Voice Study Centre (2021) Rosenberg and and LeBorgne, (2021)
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Anonymous Master Teachers (Roll, 2014, 2016)	The language used in defining belt differed from teacher to teacher, however there was a consensus that the belt sound is a bright, focused, and clear vocal production.” (Roll, 2014, p.161)	In terms of common approaches to belting, Roll found that: • Head voice-dominant exercises were used in every lesson. • Exercises to reduce the weight of their chest voice were done in every lesson. • The teachers cited the importance of working on passaggio. • Specific vowels were used to encourage balanced registration and bright, forward placement of the sound, particularly /e/, and for higher belting, /ei/ (a in “way” /wei/ and “yay” /jei/). Open vowels were used for traditional belt, and closed vowels were used for higher belt. • All of the students interviewed reported using a mix of registers in their high belt, even though many teachers did not explicitly instruct them to do so. • The teachers teach appoggio breathing to all of their singers, with emphasis on expansion of the ribcage and the use of core muscles to energetically support the sound. “This support from the body, particularly the abdominals, protected the singers from the uncomfortable feeling of tension... The extra physical energy required for belting may be caused by the higher level of subglottal pressure required under the vocal folds to create the sound (Sundberg, Thalen, & Popeil, 2011)” (Roll, 2014, p.187). • Speech based exercises were used by female teachers only; but similar results were achieved by all teachers and their students. For most, with less experienced students, the majority of their time is spent on	Roll (2014) Roll (2016)
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Appendix 2

Some Pedagogical approaches to registration

Teacher/Model	Approach to Registration
Voiceworks™, Lisa Popeil	Popeil asks students to feel for changes in registration directly at the level of the larynx, and associates belting with a forward movement of the hyoid bone and “laryngeal lean” - the degree of this movement should be under the control of the student to change register at will (OfficialNATS, 2017, Popeil, 2017, Hoch, 2018). She does not use the terms “head voice” and “chest voice” (Popeil, 2017). Popeil believes it is possible for every note of a singer’s range to be produced either in chest or head voice (Hoch, 2018).
Estill Voice Training®, Jo Estill	Estill teaches three different levels of laryngeal height as a key component of her figures early in the process of training; she also discusses vocal fold thickness and this information appears in her “recipes” for vocal qualities, including belting, which is not defined by a specific pitch range (Salsbury, 2014, Steinhauer and McDonald-Klimek, 2019). Her “recipe” for belt includes High laryngeal position, with a tilted cricothyroid and a thick vocal fold (Salsbury, 2014).
Somatic Voicework™, Jeanie LoVetri	LoVetri maintains that the human body is not designed to have conscious control over much of the vocal tract, and so she works to elicit registration using responsive exercises that draw on speech (at least until the student is advanced) (The Naked Vocalist, 2017). LoVetri uses terminology like “head voice”, “chest voice”, “mix” and “belting” in her teaching because this is what is used in the contemporary commercial music industry, and it facilitates communication between students and professionals with different approaches (White, 2017, Herbst, Howard, Švec, 2019). She asserts that vocal fold configuration (whether in head, chest or mix) is the starting point for both breath control and resonance and generally does not seem to define belt by a specific range, but rather as the chest voice quality being carried above the passagio (White, 2017).

Complete Vocal Technique, Catherine Sadolin	Sadolin doesn't directly mention the vocal folds or laryngeal position in the overview of CVT (Complete Vocal Institute, 2022a), but strongly encourages students to develop an understanding of the physiology of the voice to support their experimentation (Complete Vocal Institute, 2022d). Laryngeal position and vocal fold configuration is sometimes difficult to ascertain from the samples of different sound qualities on this website, but it is possible to see direct discussion of vocal fold adduction in terminology like "clear" and "airy". (Complete Vocal Institute, 2022a). Sadolin posits that "edge" can be use across the male range, and in women above D5 to Eb5 (Complete Voice Institute, 2019). It seems students acquire knowledge of registration in this method through mimicking audio examples of her four modes (neutral, curbing, overdrive and edge), alongside the information about adduction and pitch ranges (Complete Vocal Institute, 2019, 2022a, 2022d).
BelCanto-CanBelto, Mary Saunders Barton	Saunders Barton does not seem to discuss laryngeal height with students, but vocal fold configuration is regularly and clearly discussed with reference to Mode 1 (chest voice) and Mode 2 (head voice), sometimes adapting different language if this is useful to the student (Voice Study Centre, 2021). Her exercises are designed to develop and facilitate different kinds of movement between these registers, often using spoken phrases to elicit the desired register (Jones, 2016a, Hoch, 2018, Rosenberg and and LeBorgne, 2021, Voice Study Centre, 2021). Saunders Barton does distinguish between traditional belt (around B4,C4,D5) and High belt (above Eb4), but mostly discusses this in terms of what kinds of vowels are appropriate for those regions, thereby strongly linking belting range to resonance (Voice Study Centre, 2021).
Anonymous Master Teachers (Roll, 2014, 2016)	This summary draws exclusively from Roll (2014, 2016). Exercises to strengthen the student's ability to move between registers were used in every class by all teachers in this study. There was an emphasis on strengthening the "head voice" and using a "light chest" voice. Laryngeal position and vocal fold configuration was mentioned by the teachers in their interviews with Roll, but never directly referenced in lessons. Two teachers believe the larynx to be in a neutral, stable position, not as low as in classical technique but not very high. Speech-based exercises were only used by two of the teachers in this study to a particular kind of registration. The general consensus among these teachers is that traditional belt is available up to C5 or D5, with high belt occurring beyond this range. Their students report high belt as a mix.

Appendix 3

Exercises used to train singers to Belt

Teacher/Model	Samples of Exercises
Voiceworks™, Lisa Popeil	- “Belter’s Bite” - a gentle engagement of the master muscles to support resonance and reduced tension. - “Slidey aa”- aimed to encourage the production of the “laryngeal lean”, which I understand as being a movement through registers sensed on the level of the larynx. - Using a “Call” sound to create sensations similar to belt - Arpeggios on “Nyah” and later, “aa” Sources: Popeil 2010b, Popeil, 2017, OfficialNATS 2017, Hoch 2018.
Estill Voice Training®, Jo Estill	- 13 “figures” - these are movements and vocal exercises that support the singer in creating a variety of sounds. - These 13 figures can be combined to create 6 separate voice qualities. Sources: Salsbury, 2014, Benson, 2017, and Steinhauer and McDonald-Klimek, 2019
Somatic Voicework™, Jeanie LoVetri	- Exercises should be designed specifically for the student by the teacher relative to their vocal need in that moment. It should be stated very clearly what the exercise is intended to do. - Sliding over a 5th or major 2nd across the singer’s range on a bright /ae/ vowel. - Building on the previous exercise, trying different vowels at the top of the slide to attune the vowels to this bright quality. - Sliding over ranges of a 5th or an octave, with the pitch beginning in the middle register. The quality of sound should be the same on the top as it is at the bottom and the vowel should not change. Sources: Jones, 2016b, White, 2017, Rosenberg and LeBorgne (2021).

Complete Vocal Technique, Catherine Sadolin	- Experimentation with the different modes to discover and understand areas of your voice, with a focus on vocal comfort. - Use of simple exercises to facilitate focus on technique - Use technically challenging sections of repertoire in lieu of exercises once you have established your technique. - Explore different scale types to prevent boredom. - “In Edge you can only use the vowels ‘I’ (as in ‘sit’), ‘EH’ (as in ‘stay’), ‘A’ (as in ‘and’) and ‘OE’ (as in ‘herb’)” (Complete Vocal Institute, 2019). Sources: Complete Vocal Institute, 2019, 2022a, 2022c, 2022d.
BelCanto-CanBelto, Mary Saunders Barton	- Taking spoken phrases and singing them on a range of patterns to recruit the ease of “high energised speech” in belting. - “Oh no you don’t!”, “Damn cat!”, “ I yearn for you” are often spoken and used on patterns that often start in the spoken range, extending up into the belting range either by a fifth or an octave. The vowels at the top can alternate between closed and open qualities to help the singer connect to a more relaxed production of belting. - Exercises are sequenced to explore the movement across registers in all directions and qualities. Sources: Hoch 2018, Rosenberg and LeBorgne, 2021, Voice Study Centre, 2021
Anonymous Master Teachers (Roll, 2014, 2016)	- Strengthen of the head voice was done in each session by every teacher, as were exercises to develop control over <i>passaggio</i>. - Descending arpeggios on “Wee”/e/ for traditional belt, and “Way” /wei/ and “Yay” /jei/ for higher belting sounds were used in almost every session - these vowels were selected for their bright, forward sounds. - Open vowels were used for traditional belt, and closed vowels were used for higher belt. - Two teachers made regular use of speech or speech-like qualities in their teaching. Sources: Roll (2014, 2016)