

**BMPF 7013**

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**Reimagining the Alexander Technique through Biotensegrity:  
The Principles of Non-Doing and Directing**

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## **Component 1 (Portfolio)**

### **1. Introduction & Rationale**

The use of somatic and body-centred approaches to teaching the voice is growing and becoming commonplace in the voice studio (Nelly, 2016). As a freelance private voice and movement teacher, I have also observed this development within my teaching practice and from the interests of my students. Specifically, over the last twelve years, the influence of the Alexander Technique (AT) has continued to grow in my teaching practice. It has been the pedagogical glue that connects all other tools and practices that I implement. As a result, I began to focus on studying the theoretical underpinnings of AT and other somatic practices. This is intended to enhance rigor in my work when developing new practices and expanding on existing ones. For clarification, AT is an integrative somatic approach to movement education that allows a singer to rediscover and expand choice in their habitual thought and movement patterns (Kinsey, Glover, and Wadehul, 2021). Thus, encouraging singers to move away from “reactive personal habits and habitual limitations” (Jones and Glover, 2014), to develop greater ease when executing target actions like breath, (stage) movement, and voicing (Alcantara, 2013). In a previous independent study (Bautista, 2023), I began to reflect on the counterintuitive sensations my students and I felt when integrating AT into a voice lesson. For example, a student-reported sensation of the head floating up and out of the torso, as the shoulder girdle releases during inhalation. This was framed within a conventional biomechanical understanding of human movement (Thurston, 1999) and led me to begin questioning biomechanical models used in the field of voice pedagogy. As a result, this provides the drive for this current study. In this section, I will first introduce the conventional biomechanical paradigm within the field of voice pedagogy and AT. Second, I will discuss the significance of connective tissues in human movement. Third, introduce tensegrity and biotensegrity as an alternative biomechanical paradigm to set the stage for reimagining AT concepts that are used in the voice studio, which will become the central focus of this study in component 2.

#### **1.1 Research questions:**

- 1) How do the AT principles of non-doing and directing align or diverge from the principles of biotensegrity?
- 2) What are the pedagogical implications for singers?

## 1.2 Preliminary Literature

The current understanding of singer anatomy and physiology primarily exists within the classical biomechanical paradigm (e.g., Steinhauer, Klimek, and Estill, 2017; Sadolin, 2021). This conceptualises singer movement (e.g., posture, breath, and phonation) as linear muscle relationships (agonist vs. antagonist muscle groups) that act directly upon bones to move the body (Dimon, 2018; Friedlander, 2018). As a result, voice training primarily consists of developing isolated control of individual structures that are considered relevant to voice production (Steinhauer, Klimek, and Estill, 2017; Jones, 2017; Reid, 2022). This reductionist model may provide a practical lens to understand and explain localised movement; however, it struggles to consider globalized motor coordination or function (Turvey and Fonseca, 2014), in addition to non-linear relationships within and through other body systems (Scarr, 2021; Meyers, 2021). Non-linearity and globalised coordination are considered central principles of AT (Alcantara, 2013), and bridging this gap may be possible through the exploration of other biomechanical paradigms.

Similarly, AT has historically operated within a classical biomechanical paradigm in its approach (Dimon, 2013). This may be problematic because this paradigm seems to defy the technique's underlying principal intentions or so-called "directions," which are qualitative statements used, often during hands-on work, when disrupting and inhibiting habitual patterns (Alcantara, 2013; pg. 61). They are as follows:

*"Let the neck be free,  
To let the head go forward and up,  
To let the back lengthen and widen,  
All together, one after the other"* (Alcantara, 2013; pg. 61).

This classical biomechanical paradigm is primarily based on linear Newtonian principles (Thurston, 1999), whereby the head and neck relationship could be conceptualised as a stack of bricks (Levin, 2011). With that in mind, a consistent, linear, and perpendicular downward force (gravity) would then be required to maintain its stability. This, in turn, vertically compresses the skull and cervical spine — theoretically rendering the body static and gravity-dependent. Consequently, letting the neck be free, to let it go forward and up, is a direction that, within this paradigm, should be impossible. This seems to highlight a potential incompatibility between AT and classical biomechanics (Lowell de Solórzano, 2021). A longitudinal quantitative study by Cacciatore *et al.* (2011) indirectly demonstrates that general postural tone (GPT) in AT teachers differed significantly from that of their control subjects, who were not trained in AT. They reported that GPT in AT teachers had greater GPT variability, with low muscular effort. In contrast, the control group demonstrated lower GPT variability with high muscular effort. These results indicate a dynamic, non-linear redistribution of muscular effort through the entire musculoskeletal system. However, they are incongruent with the Newtonian principles upon which classical biomechanics

has been built. Furthermore, the study was unable to explain the physiological basis of these changes, nor did it consider the potential limitations of the biomechanical paradigm within which it was operating.

Incorporating the fascial system into models of human movement may provide a clearer picture. The fascial system “consists of the three-dimensional continuum of soft, collagen containing, loose and dense fibrous connective tissues that permeate the body ... surrounds, interweaves, between, and interpenetrates all organs, muscles, bones, and nerve fibres, endowing the body with structure, and providing an environment that enables all body systems to operate in an integrated manner” (Bordoni, Mahabadi and Varacallo, 2020, p. 12). Due to the continuity and significant presence of the fascial system, it seems misguided to neglect the mechanical behaviour of these tissues as they relate to human movement. One such paradigm that centres the behaviour and continuity of these tissues is Biotensegrity (Turvey and Fonseca, 2014; Levin and Scarr, 2021).

Biotensegrity is based on the engineering principles of structural tensegrity (Scarr, 2021). According to Pugh (1976, p. 3), “a tensegrity system is established when a set of discontinuous compressive components interact with a set of continuous tensile components to define a stable volume in space.” Stephen Levin (2020) translated these principles to biological structure and movement, suggesting that bones are held within the tensional network of the fascial system. In contrast to classical biomechanics, this conceptual frame, then, seems to produce a body that is independent of gravity, yet still maintains structural stability. As a result, supporting a more dynamic relationship rather than a static or ideal position, which is advantageous in the high performance singing (Allen, 2020).

In the fields of dance (Roses-Thema, 2020), and somatic movement practices (Lowell de Solórzano, 2021; Meyers, 2021), interest in biotensegrity has also grown. However, research into its application to the field of voice pedagogy in conjunction with AT is still an emerging topic. As of writing this article, voice pedagogy literature that is directly related to tensegrity or biotensegrity is limited to commentary (e.g., Sussuma, 2019; Mossmann, 2024), and is equally scarce in tier-one grey literature (Adams, 2017; Allen, 2020; Lowell de Solórzano, 2021; Meyers, 2021). There is plenty of peer-reviewed and grey literature on the integration of AT into voice pedagogy. However, I was unable to find additional preliminary literature that connects these topics to tensegrity or biotensegrity. Therefore, my task is to lean into the multidisciplinary nature of voice pedagogy and draw insights from practitioners of other practice-based fields already operating within the tensegrity paradigm. To accomplish this task, first, I will undertake a hybrid conceptual-narrative review (Webster and Watson, 2002), drawing on some characteristics of systematic scoping reviews (Peters *et al.*, 2015), for data collection, and the integrative review (Cronin and George, 2020) for data analysis and synthesis. This independent study will evaluate the principles of tensegrity and biotensegrity, as they currently appear in tertiary fields, and explore what the AT principles of *non-doing* and *directing* could look like within biotensegrity.

## **2. Programme of Study**

### **2.1 AIMS:**

- Reframe and explore the AT concepts of *non-doing* and *directing* within the biotensegrity paradigm.
- Investigate the potential impacts of this paradigm shift in related pedagogical approaches and their potential outcomes.
- Integrate findings into current practice and consider new pedagogical approaches to embodied voice training.

### **2.2 OBJECTIVES:**

- Develop a methodology that is appropriate for this study.
- Conduct a literature review based on the developed methodology.
- Identify current key themes and debates in Tensegrity and Biotensegrity research that have significant relevance to AT and singer training.
- Identify tertiary fields and current practices that have adopted this paradigm.

### **2.3 LEARNING OUTCOMES:**

- Develop a stronger academic voice.
- Strengthen the ability to effectively and critically synthesis across disciplinary boundaries.

## **3. Literature Review Methodology**

The primary intent of this study is to explore the principles of biotensegrity and how AT principles could function and be taught within this paradigm, with the larger goal of eventually contributing to or developing a biotensegrity-informed voice pedagogy model. However, through my initial reading of the literature, a central research problem in connecting biotensegrity, AT, and voice pedagogy is its fragmented nature. Specifically, for this independent study, ontological and epistemological differences between these fields present challenges in data collection, analysis, and synthesis (Whittemore and Knafl, 2005). Moreover, methodological inconsistencies in the literature make it challenging to evaluate quality of sources. Therefore, a literature review methodology that can address these differences, while encouraging the construction of disciplinary bridges, seems necessary. This section will first discuss the methodological underpinnings of this study and then discuss the specific actions that were taken.

### 3.1 Methodological Framework

A pragmatic approach was necessary to design and execute this review, due to the limitations of this independent study (e.g., time constraints and available resources) (Morgen, 2007; Gray, 2018). As a result, elements of various literature review styles have been combined. First, a conceptual approach serves as the umbrella for this study (Hulland, 2020), as biotensegrity is still in the process of theoretical development (Bordoni and , 2019) and its applications remain hypothetical (Meyers, 2021). The review was primarily aimed at defining biotensegrity concepts, and evaluate approaches from other relevant fields into AT, to build common ground (Jaakkola, 2020), and “create an agenda for future research” (Hulland, 2020; p. 30). Second, Cronin and George’s (2020) integrative review framework was chosen as the primary method for analysis and synthesis for this study. Third, elements of a scoping systematic review were utilised for more rigorous data collection and organisation (Grant and Booth, 2009; Peters *et. al.*, 2015; Snyder, 2019). This hybrid review framework seems appropriate for this study, as it aims to reconcile research challenges like those mentioned above, while also considering the limitations of this independent study.

In reviewing literature, Cronin and George (2020) define two main intentions: adjudication and redirection. Adjudication (which primarily occurs in systematic reviews or meta-analyses) attempts to take a stance on a topic, with the goal of verification, to produce definitive answers. However, this is impossible when the body of literature is still emerging or fragmented, like in this current study. This is because there is insufficient consensus to reconcile or compare findings, thus making adjudication impractical and inappropriate. Redirection, in contrast, proposes a change in a field’s perspective on the topic by “asking different questions, rather than finding answers” (p. 173). That means the goal of redirection is to synthesize knowledge across disciplines, generating new insights and suggesting new avenues of research. As a result, redirection provides a valuable approach towards reframing the use of AT in singer movement through the lens of biotensegrity.

To address the challenge of synthesising a fragmented body of literature, I followed the steps laid out by Cronin and George (2020) towards defining each community of practice and appropriately synthesising findings from each of them. For clarification, communities of practice (an academic or practical field), such as biomechanics, somatics, and the performing arts, often utilise varying paradigms, terminology, and methodology (Cronin and George, 2020). This often creates difficulty in analysis because data is not uniform, and conclusions would be difficult to make (Snyder, 2019). After defining disciplinary boundaries, they suggest abstracting major themes, or “primary findings” (p. 180), from each community of practice separately, before identifying and juxtaposing themes across disciplines that converge, diverge, or are disconnected. This attempts to position findings above paradigmatic boundaries, thus resulting in more uniform data.

Elements of a scoping systematic review were necessary to sample these fragmented bodies of literature (Peters *et al.*, 2015; Snyder, 2019). This was necessary because integrative reviews are typically exhaustive, often also including grey literature (Whittemore and Knafl, 2005), and would not fit within the time constraints of this project. Moreover, integrating a rigorous method for sampling these disparate bodies of literature reduces the risk of error and author bias by creating a transparent algorithm for extracting sources from the literature (Grant and Booth, 2009; Winter, 2022). The resulting process would create a representative map of the current knowledge and application of biotensegrity (ex, from other disciplines already operating within this paradigm) to initiate the process of cross-pollination with AT and voice pedagogy. Thus, potentially uncovering new insights — aligning with the aims of the study.

### **3.2 Data Collection**

In my previous study (Bautista, 2023), I had already begun initial reading into the topic of biotensegrity for singers. Utilising this initial overview, I began the data collection process through the use of a “citation pearl growing strategy” (Schlosser *et al.*, 2006; Boell and Cecez-Kecmanovic, 2010) to define which communities of practices are relevant to the study, as well as defining key search terms. Through this initial search, two communities of practice, that already have a body of literature within the biotensegrity paradigm, were found relevant to AT and voice pedagogy. They are the fields of dance and somatics. This was achieved through manual searching of core texts from the previous study (Bautista, 2023), and backward and forward chaining citations (Dervos and Klimis, 2008), explicitly identifying the disciplines mentioned. Previous voice pedagogy literature has already demonstrated the benefits of incorporating insights from these other disciplines (Friedlander, 2018; Allen, 2020; Leborgne & Rosenberg, 2021), thereby further justifying this methodological decision.

Upon defining these communities of practice, I began testing search terms in Google Scholar and the UWTSD Library Database, using key terms and authors found in my preliminary reading and previous study. These terms were developed iteratively and tested for efficacy (Kosztzán, Csizmadia, and Katona, 2021). After developing a robust list of relevant keywords and databases commonly used within these communities of practice, I began a more detailed search.

Following the three-step method outlined by Peters *et al.* (2015), I conducted a more comprehensive literature search. Because relevant key terms had already been tested and established (step 1), I proceeded directly to step 2. Boolean filters (Scells *et al.*, 2020) were adopted as individual search terms (such as ‘biotensegrity’ or ‘alexander technique’ or ‘fascia’) did not yield findings that directly addressed the research question. For example, ‘Alexander Technique AND Biotensegrity OR Tensegrity;’ and ‘Sport Science AND Biotensegrity.’ However, it became clear that searching through multiple communities of practice would produce an unwieldy amount of data for this project's scope, and inclusion and exclusion criteria for each community

of practice needed to be developed. This was because this paradigm's emergence and use occurred at different times. To rein in the scope of the literature search, I had to define the search date range for each community of practice to avoid missing any essential literature. In the tables below, I have included the community-of-practice-specific and shared inclusion/exclusion criteria.

### 3.3 CoP Specific Inclusion Criteria

| Community of Practice (Cronin and George, 2020) | Inclusion Criteria                                                                     | Rationale                                                   |
|-------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Biotensegrity</b>                            | Published since 2002                                                                   | Emergence of Stephen Levin's Model of Biotensegrity         |
|                                                 | Specific discussion on human movement                                                  | Relevance to research question                              |
| <b>Human Movement Science</b>                   | Published since 1980                                                                   | Emergence of biomechanical tensegrity research              |
| <b>Dance</b>                                    | Published since 1995                                                                   | Emergence of tensegrity in dance pedagogy                   |
|                                                 | Explicitly discussing AT principles to dance training or performance                   | Relevance to research question                              |
| <b>Somatics (including AT)</b>                  | Published since 1990                                                                   | Emergence of somatic practices considering fascial networks |
|                                                 | Addresses biotensegrity principals or AT applications in the performing arts OR sports | Relevance to research question                              |
| <b>Voice Pedagogy</b>                           | Published since 2020                                                                   | Emergence of biotensegrity in voice pedagogy                |

### 3.4 Shared Inclusion/Exclusion Criteria

| Inclusion Criteria                                                                        | Rationale                                                                                                         |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Literature in English                                                                     | Time constraints                                                                                                  |
| Journal/Peer-Reviewed Literature                                                          | To maintain a high standard of rigorous and quality studies included in this review.                              |
| Tier 1 Grey Literature (Adams, 2017)                                                      | To maintain a high standard of rigorous and quality literature, when peer-reviewed literature has been exhausted. |
| Exclusion Criteria                                                                        |                                                                                                                   |
| Non-Human Population Studies                                                              | Relevance to research question                                                                                    |
| Literature that is purely anatomical, surgical in nature, OR rehabilitative applications. | Relevance to research question                                                                                    |
| Articles with a focus on Engineering or Technology                                        | Relevance to research question                                                                                    |

After establishing inclusion criteria, articles were screened by title and abstract to assess relevance to this study. A total of 283 articles were found from the peer-reviewed literature (at the title and abstract level), with 47 sources meeting the full inclusion criteria at the end of the search. However, the peer-reviewed literature was primarily within sports science and theoretical biotensegrity research, with very few articles in the other applied communities of practice. For example, the search term 'Dance AND Biotensegrity OR Fascia' produced only two relevant peer-reviewed articles. This also highlights a literature gap of pedagogical applications of dance in voice pedagogy.

To achieve a balanced representation, I began to explore the grey literature. Using the taxonomy of grey literature provided by Adams (2017), I could filter the results further only to include tier-one grey literature, which attempted to ensure only high-quality resources were included. By forward chaining the peer-reviewed literature (Boell and Cecez-Kecmanovic, 2010), relevant essential texts from each community of practice began to emerge. Then, I initiated another round of backward chaining (Peters *et al.*, 2015). This was to understand how these texts (primarily pedagogical texts) connect to the established peer-reviewed literature, and to measure the quality of the source (Adams, 2017). Finally, a round of backward and forward chaining (step 3), at the level of already extracted literature, to ensure data saturation (Peters *et al.*, 2015).

### **3.5 Data Analysis and Synthesis**

To analyse the literature for this review, a combination of deductive and inductive coding was used. This was done to address the interdisciplinary nature of the literature data collected. Deductive coding was used to ensure alignment with foundational theories and maintain a clear focus on the review's conceptual aims. These deductive codes were informed by Levin and Scarr's (2021) biotensegrity principles, and anatomical frameworks used in AT (Dimon, 2011), and core AT principles such as 'non-doing' and 'direction' (Alcantara, 2013). However, considering the differences between each community of practice, it was also essential to allow unexpected themes to emerge. According to Cronin and George (2020), combining both approaches is a form of holistic triangulation and becomes the mechanism for bridging communities of practice. Triangulation, in this study, is a means to support findings by using multiple data sources from other fields (Carter *et al.*, 2014), to gain a more systematically comprehensive understanding of this topic (Meydan and Akkaş, 2024), and to mitigate bias (Denzin, 2012). To clarify, major themes were separately established between the theoretical biotensegrity literature and the applied (e.g., dance, somatic, AT) biotensegrity-related literature. This established a firm theoretical foundation for understanding how biotensegrity is used and practiced. Next, codes were developed separately, within each community of practice's data set, before developing a superset of codes that bridges each subset together (Cronin and George, 2020).

## 4. Critical Reflection

Drawing primarily upon Schön's (1983) reflective model of reflection ON action, to consider the why and how of my process in this module, I also draw upon aspects of rhizomatic writing into this reflection (Fox, 2023), and reflexive thematic analysis (Braun and Clarke, 2022). Rhizomatic writing draws upon the work of Deleuze and Guattari, utilising the metaphor of a rhizome, to provide a non-linear structure to critical reflection, acknowledging that knowledge creation is often a messy, dynamic, and an iterative process (Fox, 2023). Rather than a linear narrative, I have chosen to illustrate my process as a dynamic web of challenges, decisions, and insights (themes) that have shaped my research project. Then, I will briefly reflect on how these individual themes interact and relate with one another. Thus, exposing lateral connections and bringing underlying analytic structures to the foreground.

Closely following Fox (2023), a rhizomatic web is built upon nodes, (similar to themes) established iteratively and often spontaneously, resulting from free-associative thinking. Each node is a significant concept, event, or line of thought, that have emerged from my research journal. They provide a snapshot into my learning experience. Due to the limited word count, only selected nodes will be presented, and then their connections to one another will be explored. However, because reflection is an iterative process (Schön, 1983), this reflection illuminates just one entry point into my experience with this research process.

### 4.1 Selected Nodes

- Embracing my own Process
- Embodying the Research Question
- Embracing Complexity

### 4.2 Embracing My Own Process

While undertaking an integrative synthesis of multiple pre-paradigmatic disciplines (Kuhn, 1962), it became clear that an essential component of this study was a critical reflection of my own ontological and epistemological positions. The development of my professional practice as a voice teacher, turned integrative somatic practitioner for singers, is situated within philosophical tensions. Specifically, the heavy leaning towards dualistic positivism in voice pedagogy and voice science and holistic pluralistic in dance and somatics practices. For example, the development and adoption of an evidence-based practice (Ragan, 2018), and the emerging field of vocology (Howell, 2025), specifically at the intersection of anatomy and vocal acoustics (e.g., Bozemann, 2022; Steinhauer, Mary McDonald Klimek and Estill, 2017) strive toward generalizable models that are transferable for pedagogical use. In contrast, dance and somatic-movement practices included in this study, engage with the embodied subjective experience of the individual, and allowing for pluralities to exist (Dimon, 2024; Lowell de Solórzano, 2021; Roses-Thema, 2020;

Franklin, 2017). Moreover, the cartesian dualism that favours the cognitive over the somatic experience may be limiting what knowledge is acceptable in current voice research. As a result, synthesis becomes difficult because these philosophical stances are generally opposed (Cronin and George, 2020). Making analytical decisions, then, became more of an exercise in both professional and personal self-discovery, as axiological stances began to appear as well.

What this showed me in my own process was a desire to remain within positivism, to legitimise my interests and work within the field voice pedagogy research. The literature gathered for this study (anatomy, movement, and physiology), is primarily positivistic — even within qualitative studies. As a result, I began to wonder if it was necessary to remain within positivism to contribute to the field and profession. I discovered that my interest lies in the plurality of the bodily experience, and how to explore it. Precisely at this moment, I began to understand the problematic bridge between theory and practice: positivistic theoretical models may not reflect the embodied phenomenological experience of a singer in the studio.

Coming to this understanding, it was still unclear if pragmatism (Shusterman, 2016) is the solution, if positivism still strongly influences my decision making. It became frustrating to not having a philosophical anchor. Thus, in future research, I have decided to seek out lines of inquiry that allow me to continue to build theoretical bridges that contribute to a more philosophically cohesive academic discipline and pedagogic practice. My underlying research question becomes: what is it that holds an interdisciplinary field like voice pedagogy together?

#### 4.3 Embodying The Research Question

Living and the practice of embodying the research question provided rich insights that may not have been apparent in a purely cognitive process. It started to become clear that in order to see past the prescribed conceptual maps, that govern how I — and my students — use our bodies and engage with the world, I had to focus more on my own process and reflect my own experience of my body. For example, Roses-Thema (2020) describes ways of embodying tensegrity through cultural and social lenses rather than physiological. Specifically, the idea of constructing a dancer's body through embodied cultural aesthetics. Taking this idea freed me from the abstraction of anatomy and physiology to my direct experience of engaging with society and the physical world, to indirectly encounter and engage with anatomical maps. This profoundly impacts on my practice, that purely thinking through an embodied question will provide an incomplete answer.

Throughout this study, I began attending various dance classes that incorporate a biotensegrity approach to develop a felt experience of Roses-Thema's ideas, as well as becoming aware of how dance teachers communicate movement. Specifically, I regularly took a contemporary dance class at Tanzfabrik Berlin where no mirrors were available to use as visual feedback. This resulted in a stronger use of demonstration and imagery from the teacher. Instead of micromanaging the

body, by controlling isolated structures, these dancers embodied each movement in their own way. I felt this myself. This resulted in more questions: how can these approaches benefit singers, and do we need more biofeedback or do we just need more expressive pedagogic language? For example, the focus was on creating the conditions for the movement to emerge, rather than teaching the movement. Thus, indirectly aligning with the theories explored in this study. Moving forward, I will incorporate a practical and embodied component to my independent research, as I explore and experience more theories across disciplinary boundaries.

This may include:

- Seeking out practitioners that align with my research and work with them first-hand.
- Invest more time to personally explore and integrate exercises in the literature.
- Attend conferences and presentations in the field of somatics.

#### 4.4 Embracing Complexity

The interdisciplinary nature of my topic seems to have wide reaching implications, which many are probably unknown because methodology still needs to be developed to understand its complexity. Through this study, I have begun to look into the work of Donella Meadows (2008), to begin to grasp this complexity through dynamic systems theory. This exploration, while still in its initial stages, provides a intriguing lens towards comprehending the intersections of somatic practice, embodied cognition, neuroscience, motor learning, and voice pedagogy — all of which are fields that I navigate within my own practice. This is significant, because in my own study, one of the major challenges was critically appraising the diverse literature, and effectively synthesising them. Gaining more knowledge of how these disciplines affect each other seems essential when working this way. Moreover, my positionality as a researcher investigating embodied experience added another layer of complexity. Along with the theoretical complexity, my own biases need to remain under scrutiny. Reflecting on the studies by Michalak *et al.* (2021) and Cabe (2018), the state of my own fascial system can affect my perception and cognition. Thus, along with social, cultural, and cognitive biases may be affecting the interpretation and synthesis of my data. Moving forward, developing a more comprehensive understanding of complexity and dynamic systems for embodied research in addition to researcher positionality may better support my work in integrative and transdisciplinary voice research.

## Conclusion

This study has only fed my interest into integrative transdisciplinary voice pedagogy research. Throughout this study, my own positions have been questioned, especially as the complexity has increased. By crossing disciplinary boundaries, a light was shined on gaps in my knowledge, practice, and the voice pedagogy field at large. These three nodes are their own dynamic system, each feeding into one another. Key relationships:

- Learning to embrace my embodied knowledge and process has challenged my philosophical positions in research (node 1 and 2).
- Embracing complexity rather than shying away demands more academic rigour, which only serves to create better knowledge (node 1 and 3)
- Centring the body in my research process has opened up more lines of inquiry, requiring me to more rigorously question my positionally (node 2 and 3).

## Component 2

### Written Assignment

#### 1. Introduction

The Alexander Technique (AT) has long been a foundational element in many voice teaching studios (Nelly, 2016). This technique, with its potential to significantly enhance vocal production (Alcantara, 2013), has been attributed to facilitating greater ease and efficiency in body alignment, breathing, and phonation (Allen, 2020). A systematic review by Woodman and Moore (2011) demonstrates its efficacy; however, the study was not specific to singer populations. Nevertheless, its results warrant further research. Central to the technique are the principles of Non-Doing (also known as the principle of inhibition) and Directions or Directing (Alcantara, 2013). Alcantara defines Non-Doing as a deliberate approach to inhibiting interference with the body's natural organisation and Directing as guiding movement through intention rather than forceful effort. These principles challenge traditional vocal pedagogy approaches, which seem to prioritise isolated control and effort (e.g., Sadolin, 2021; Steinhauer, Mary McDonald Klimek and Estill, 2017) and static postural correction (Allen, 2020; Friedlander, 2018). Considering these AT concepts, it could be proposed that effortless singer movement and vocal coordination emerge simply by allowing the body's innate capacity for self-organisation to unfold.

Due to its conceptual alignment with AT principles, Biotensegrity may provide a helpful lens towards furthering AT concepts and application. Emerging from fields of human movement and fascial science (Levin, 2017), biotensegrity proposes a novel conceptualisation of the body as a non-linear and integrated system of continuous tension and discontinuous compression, by reconsidering the impact of the connective tissues in human movement (Cabel, 2019). Thus, emphasising adaptability and ease through mechanical redundancy, global coordination, and resiliency (Scarr, 2021). This seems to align with AT's core aims as described above. However, integrating *non-doing* and *directing* with biotensegrity, for application in voice pedagogy, remains under-explored, highlighting the need for further research.

This integrative-style conceptual review addresses this gap by critically examining how Non-Doing and Directing can be reinterpreted through biotensegrity and discusses implications for voice pedagogy. To achieve this aim, this review first synthesises conceptual perspectives across disciplinary boundaries to comprehensively understand the fragmented literature and the research question. Specifically, the fields of dance/movement science and somatics will be explored, as they have already begun to operate within this paradigm, in addition to epistemological tensions they introduce to the research question (Waldas, 2021; Roses-Thema, 2020) Lastly, it discusses potential practical and theoretical implications for voice pedagogues and researchers.

## 2. Conceptual Background

The following section will define the key concepts and theories relevant to this review to provide a clear foundation for thematic synthesis within a well-defined conceptual framework. First, the AT principles of non-doing and directing will be discussed. Second, the foundational elements of the biotensegrity paradigm as applied in human movement science. Theoretical intersections will also be evaluated. These elements will provide the necessary ground for the critical analysis that this review aims to deliver.

### 2.1 The Alexander Technique: Non-Doing and Directing

AT is a form of psycho-physical education that can support a singer in observing and changing habitual patterns (Jones and Clover, 2014), to restore “efficient use and functioning” of the body (Rosenburg, 2008). Developed by the actor and orator, Frederick Matthias Alexander (Alexander), in the early 19th century (Cole, 2016), the technique is founded upon the concept and use of *self* through the Primary Control (Alcantara, 2013). This concept provides the physiological rationale for the method (Dimon, 2011). Primary Control suggests that the spatial relationship of the head, neck, and back, and the use of that relationship, plays an essential role in the overall organisation of human movement (Woods, Glover and Woodman, 2020). Specifically, it plays a role in organising and distributing the general resting muscle tone of the body, maintaining posture, and refining proprioception; however, the exact physiological mechanisms that explain primary control are still inconclusive (Cacciatore, Johnson, and Cohen, 2020). To achieve/restore the technique’s ideal spatial relationship of the head, neck, and back, a certified AT teacher guides their client/student through haptic and verbal instruction in inhibiting compensatory movement patterns that disrupt the Primary Control (Dimon, 2015). This is achieved through AT’s pedagogical principles of Non-Doing and Directing.

“If you stop doing the wrong thing, the right thing will do itself” (Alexander, 2019).

The Non-Doing principle is grounded in an understanding that the body naturally gravitates toward balanced structural organisation and efficient movement (Alcantara, 2013). In practice, it is a process of interrupting a habitual psycho-physical response to stimuli (Klein, Bayard, and Wolf, 2014); specifically, the preparatory impulse that initiates physical movement, like coming to standing from a chair, or initiating a breath (Wadephul et al., 2021). This is achieved by increasing the space between stimulus and response (Cacciatore, Johnson, and Cohen, 2020). As a result, suspending habitual patterns and allowing movement to emerge and self-organise through the primary control.

“There is no such thing as a right position, but there is such a thing as a right direction”  
(Alexander, 2019).

The principle of Direction or Directing takes action in the space between stimulus and response. Intention is at the core of this principle, which prioritises the indirect process of allowing the body to self-organise movement (Dimon, 2011). This could be understood as being moved, rather than actively moving. In an AT lesson, directions are given, such as “let the neck be free ... to let the head come forward and up” through physical touch or verbal instruction (Alcantara, 2013: p. 61). The focus remains on the process of the movement rather than the conclusion of a target action. Directing consciously through the primary control, thus, encourages and maintains a state of adaptability and readiness, which is very relevant to vocal performance (Nelson and Blades, 2018). Thus, training a singer to consciously act from choice rather than unconscious habit. However, much of the AT literature still operates within a classical biomechanical paradigm (Qin *et al.*, 2024), which may contradict these underlying principles.

## *2.2 Biotensegrity: A Systems Paradigm*

Biotensegrity is an emerging paradigm that proposes an alternative conceptualisation of human physiology and movement. This challenges the dominating biomechanical paradigm, which describes the human body as a collection of gravity-dependent (Lowell de Solórzano, 2021), isolated parts (Thurston, 1999), with muscles linearly acting on bone to create movement in space (Scarr, 2020). In other words, continuous compression of the bones (e.g., the spine modelled as a stack of bricks) and discontinuous tension of the muscles (e.g., levers).

In contrast, Biotensegrity is founded upon foundational principles of structural tensegrity (see: Scarr, 2021), where adaptability and stability within a structural system are established through a dynamic, gravity-independent (Lowell de Solórzano, 2021), prestressed network of continuous tension and discontinuous compression (Turvey and Fonseca, 2014). To illustrate, Dimon (2024) uses the analogy of a tent, where stability of the entire structure is only achieved through sufficient tension of the tent’s fabric. In the human body, this translates to muscles and connective tissues (e.g., muscles, tendons, ligaments, and the fascial system) forming a continuous tensional net, with bones simply behaving as isolated compression struts, while enabling dynamic stability and efficient force distribution for movement through the entire fascial system (Levin, de Solórzano and Scarr, 2017). In dance and somatic movement education, biotensegrity is already gaining recognition as a means of conceptually mapping the body (potentially altering the body schema) to aid in developing sustainable and expressive movement (Lowell de Solórzano, 2021). Thus, potentially offers singers and voice pedagogues a starting practical point for experimenting within this paradigm.

## 2.3 Theoretical Intersections

Based on these foundational concepts, areas of convergence and divergence between the AT and Biotensegrity appear. AT and biotensegrity both prioritise adaptability and holistic coordination, challenging reductionist models of posture and movement. However, they are grounded upon differing theories. AT is an experiential pedagogical approach that restores efficient and sustainable movement patterns through intention and inhibition (Cole, 2016). In contrast, biotensegrity provides a conceptual framework for structural adaptability and dynamic movement through pre-stressed tensional compression systems (Turvey and Fonseca, 2014). These differences highlight the contrasting functions they may provide to a singer and voice teacher. The following tables summarize theoretical intersection as well as potential incompatibilities.

### Theoretical Intersections

| Intersection                                           | Alexander Technique                                                                                                                                                                                                                                                                                                              | Biotensegrity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Philosophical alignment: Holism over Reductionism      | AT conceptualizes the human as a psycho-physical organism (Woods, Glover and Woodman, 2020), modelling the body and mind as a unified dynamic system (Kinsey, Glover and Wadephul, 2021). As a result, its pedagogical approach maintains that meaningful change requires addressing the entire system (Alcantara, 2013).        | Due to the significant presence of fascial tissues (Adstrum, 2015) across various systems of the body (Sharkey, 2021; Meyers, 2021), it is suggested that movement in one part of the tensional network of the fascial system affects the entire organism (Turvey and Fonseca, 2014; Dimon, 2011). Therefore, a holistic dynamic systems approach would be most useful in conceptualising human movement.                                                                                                                    |
| Emergent Self-Organisation of Motor Behaviour (Theory) | Through the principles of non-doing and directing, the body's movement emerges through the Primary Control (Dimon, 2024). Thus, AT favours systemic coordination over isolated movement because the Primary Control is considered the unifying organisational mechanism of human movement (Cacciatore, Johnson and Cohen, 2020). | In challenging reductionist models of physiology and considering the mechanical impact of connective tissues in human movement, non-linear structural relationships emerge (e.g., closed-kinetic-chains and long-range myofascial lines) (Lowell de Solórzano, 2021; Meyers, 2021). This non-linearity appears to demonstrate redundancy in the system, suggesting that the body prefers dynamic and adaptive organisation rather than a singular pathway to achieve a target action (Levin, de Solórzano, and Scarr, 2017). |

## Potential Issues and Incompatibility

| Issue                         | Alexander Technique                                                                                                                                                                                                                                                                                                                                                                                                                          | Biotensegrity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function and Purpose          | AT is an experiential pedagogical process that aims to develop conscious control of oneself, physically, psychologically, and mentally through its principles (Heirich, 2011). Furthermore, AT often takes an exploratory and heuristic approach in practice (Gelb, 2013), exploring the subjective experience of habitual movement (Kinsey, Glover and Wadephul, 2021), while operating within an embodied pragmatic paradigm (Cole, 2016). | Biotensegrity is primarily a positivist physiological model that explains the mechanics of biological movement, based on the principles of structural tensegrity (Scarr, 2021).                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Evidence Base and Methodology | There are many studies that provide empirical evidence on the efficacy of AT in both educational and therapeutic applications (Qin <i>et al.</i> , 2024; Becker <i>et al.</i> , 2018; Klein, Bayard and Wolf, 2014; Woodman and Moore, 2011). However, since many of these researchers are also AT teachers, and there is a risk of confirmation bias when interpreting results.                                                             | The current state of biotensegrity is primarily theoretical (Turvey and Fonseca, 2014). This is due to several factors: 1) ongoing changes to the definition of fascial tissue and the potential mechanical impacts of liquid tissues (Bordoni and Lagana, 2019). 2) methodological procedures still need to be developed when studying the mechanical properties of living tissues, as cadaver tissue may not accurately represent behaviour of living tissue (van der Wal, 2009). 3) the complexity of modelling such a non-linear system still needs to be addressed (Levin, de Solórzano and Scarr, 2017; Meyers, 2014). |

One primary concern may be the lack of empirical evidence to substantiate the use of biotensegrity in AT as a biomechanical model. While a systematic review by Wilke *et al.* (2016) suggests the existence of long-range myofascial lines, significantly contributing to its validity, more research across disciplinary lines will be necessary to encourage alternative models that challenge biotensegrity. Furthermore, due to its relatively recent development (Levin and Scarr, 2021), compared to AT (Cole, 2016), co-citations generally revolve around a small body of key authors and may lack enough critical voices to remain objective.

Alternatively, applying biotensegrity as a pedagogic metaphor, rather than a complete paradigm, may still be helpful. Current integration of Biotensegrity into AT and other educational, somatic, and movement practices is primarily used in this manner (Dimon, 2024; Franklin, 2022; Roses-Thema, 2020). This will be discussed in further detail in the following section. Lastly, considering the rise and positive impact of motor-learning (Crocco and Meyer, 2021), and mental imagery approaches to voice training (De Lillis, 2020; Bainbridge Cohen, Geller and Dean, 2015), further research and application of this paradigm in this way may provide new insights between physiology and a singers subjective experience. Thus, providing a conceptual bridge that aligns more closely with the pedagogical principles of AT.

### **3. Thematic Synthesis**

Now that a conceptual and theoretical foundation has been established for this review, the following sections will synthesise the principles of Non-Doing and Directing with biotensegrity. Following Cronin and George's (2020) framework for integrative thematic synthesis, two communities of practice were identified and included in this study: dance and somatics. These fields have already begun integrating biotensegrity into their practices; therefore, drawing from these communities seemed necessary to understand how it could be used in voice pedagogy. While the study started with two deductive themes — the principles of Non-Doing and Directing — recognising emergent themes in the selected literature was necessary to ensure valuable insights were not overlooked. A total of three major themes and two emergent sub-themes have been identified and will be discussed:

#### **3.1 Non-Doing (Deductive) & The Internal Landscape (Emergent Sub-Theme)**

#### **3.2 Directing (Deductive) & Intentional Movement (Emergent Sub-Theme)**

#### **3.3 Embodied Imagery (Emergent)**

##### **3.1.1 Non-Doing & Adaptive Structural Coordination**

Considering the principle of Non-Doing as returning to alignment with the body's structural design, increasing the space between stimulus and response, draws AT closer to the biotensegrity model. Dimon (2024), one of the pioneers integrating biotensegrity with AT, explains non-doing as poised readiness, where muscular effort becomes more evenly distributed throughout the human movement system. This seems to align with the behaviour of the fascial system's prestressed tensional networks (Turvey and Fonseca, 2014; Cabe, 2018), and behaviour of closed kinetic-chains (Levin, de Solórzano and Scarr, 2017). An EMG study by Thurmer *et al.* (2017) grounds this assertion, which aligns with Cacciatore, Johnson, and Cohen's (2020) hypotheses, by confirming measurable changes in muscle fibre activation and tension distribution in instrumental musicians after receiving AT lessons. Critically, this study investigated only a small population of instrumentalists ( $n=7$ ), and its results may not fully translate to singers. A more specific study on

singer populations may provide more targeted insights. Moreover, adjusting this methodology for studying more dynamic movements (e.g., breath) and effects on phonation would make its results more relevant. Nevertheless, this provides an explanatory anatomical foundation for adaptive coordination and mechanical redundancy, which is desired in AT, allowing a singer to execute a target action simply through emergent self-organisation.

Cacciatore, Johnson, and Cohen (2020) present a model of the neurophysical processes that may describe how AT potentially changes movement quality, tension distribution, and proprioception. At the centre of this model are two non-linear factors: General Postural Tone and Body Schema. In this model, these two factors are intermediaries of executive function for motor acts, emotional regulation, and pain. This further aligns with Turvey and Fonesca (2014), not only because they explain the mechanical behavior of the fascial system but also because they bring the transmission quality of sensory and motor information (through the fascial system) from the brain into question (Kelty-Stephen *et al.*, 2021; Reed and Ziat, 2018). Addressing habitual movement and compensatory tension with this in consideration may also support the body in returning to a balanced proprioceptive state, potentially affecting the approximation and execution of a motor skill. Thus, non-linear motor and proprioceptive pathways, like those that emerge in the AT position of mechanical advantage (Alcantara, 2013), begin to have a theoretical and empirical foundation. For example, a teacher recognising these non-linear relationships could address maladaptive postural strategies in the feet to address tongue tension (Meyers, 2014), by observing how local habitual patterns affect perception of the entire system. This may provide a foundation for novel diagnostic procedures in the voice studio. However, further methodological research will be required to appraise and evaluate these models. Although the model still needs further development, this could have significant implications in motor-learning research for singers, especially at the intersection of somatics and neuroscience, as body-schema and general postural tone are under-explored variables in this field (Crocco and Meyer, 2021).

### 3.1.2 Non-Doing and the Internal Landscape

Despite the significant contributions positivist research has made to understanding biotensegrity and vocal anatomy, the subjective experience of movement often seems to be overlooked, which is essential to embodied pedagogical approaches to the voice. Roses-Thema (2020) challenges the dualistic and positivist position by suggesting a phenomenological approach recognizing the plurality of bodily experience and knowing. While valuable, phenomenological accounts are difficult to validate or translate into empirical studies. They argue that engaging in exploratory embodied processes may allow one to discover, develop, and modify one's inner somatic landscape, body schema, or structural—felt—map of one's body. Dancers do this to develop more adaptive movement strategies (Waldas, 2021). For example, the Roses-Thema (2020) suggests that differences between the conceptual bodies within a ballet genre are internalised when dancing historically informed dances (e.g., the classical French style versus the classical

Italian style). This implies the ability for a dancer to *create* conceptual bodies (multiple embodied selves) that become primed to self-organise genre-specific target actions. Thus, emphasising a need to get out of one's way, to focus on developing an adaptive internal experience, transforming movement into an act of becoming rather than doing. Becoming, then, creates a space to let go of habit (non-doing), while simultaneously facilitating the concept of a biotensegral body to be internalised. Following Cacciatore, Johnson, and Cohen's (2020) neurophysiological model of AT, getting acquainted with and altering one's body schema towards a tensegral body seems to be a crucial step in aligning biotensegrity to the experience of being in a non-doing state.

Utilising the tools and processes of deep listening to the body, from the fields of dance and somatics, may help further facilitate this process. Bonnie Bainbridge Cohen (2012), the dancer and creator of Body-Mind-Centering (BMC), an experiential approach teaching anatomy, describes the body as having multiple minds or intelligences that inhabit the body (see Hartley, 1995, p. 124). These minds are grounded in Developmental Movement Patterns (DMP). They are patterns that unfold as in a person over time, suggesting that individual cells have their innate movement patterns that scaffold into entire body systems, and then the whole organism (Hartley, 1995). Similarly, biotensegrity is also founded upon the idea of a scaleable (tensegrity) structure that scaffolds from the micro (cellular) to the macro (the whole organism) (Kelty-Stephen *et al.*, 2021; Levin, 2020; Ingber, 1998).

These parallels provide a point of entry into biotensegral non-doing. By acknowledging the intelligences of the various body systems, the space between stimulus and response becomes richer, because the focus is moved towards being more of a curious observer of the body schema, bypassing habit, and relating to the body rather than acting upon it. Caetano (2015; p. 218) calls this type of listening pre-movement. Pre-movement refers to the phenomenological organisational priming of the body for action — to embody tensegral principles — similar to AT's poised-readiness of Dimon (2024). This priming has already been demonstrated in Thurman's (2017) study. Despite the similarities, pre-movement may be a more helpful term for singers, as it seems to facilitate a process of aligning with fascial pretension, where a state of non-doing could be interpreted as simply an interruption rather than a dynamic readiness. This usage may provide better clarity when defining and practicing the concept of non-doing.

In practice, this creates another dimension of diagnosing and tailoring movement strategies. For example, guiding a singer through somatic explorations of their pre-movement (tensional priming of the fascial system) to locate unconscious strategies hindering free movement of the ribcage and diaphragm could contribute significantly to breath pedagogy. Utilising already established AT protocols may help facilitate this further by incorporating haptic and verbal cues to sense their fascia pre-tension and patterning. Thus, the focus is moved from prescribed vocal exercises to a dynamic and holistic awareness of movement. However, further empirical research (e.g., phenomenological) will need to be developed to ground these assertions further.

### 3.2.1 Directing & Intentional Movement

When directing is combined with the structural principles of biotensegrity, a complex relationship between tensegrity dynamics and embodied cognition emerges. Dimon (2024, p. 57) states that “directing is a form of thinking” rather than acting. That means, when the body is in a state of non-doing, directing is simply sending conscious intentions through the body to execute an action. To clarify, conscious intention is the mindful and deliberate choice to do something (Dimon, 2024). This aligns with biotensegrity’s concept of the fascial system being a prestressed tensional system (Cabel, 2018), noting that movement self-organizes when tension is distributed evenly through the body (Lowell de Solórzano, 2021). However, this traditionally only considers the mechanical impacts of bone, fascia, and muscle, and risks falling back into reductionism (Meyers, 2021; Levin, 2020; Wilke *et al.*, 2016). Bordoni *et al.* (2018) cautions that ignoring the mechanical behaviour of the fluids, tissues, and organs provides an incomplete picture of the organisation of human movement and urges more research on methodological approaches to study this dynamic system.

Considering the bodily intelligence of the other systems, as described in BMC (Hartley, 1995), may provide a practical approach to integrating a more complete picture into the principle of directing. By learning to embody the body's other systems and sending directions to the entire body, a singer can direct more deliberately and precisely. However, it is crucial to consider that AT and BMC are theoretical approaches supported primarily by practitioner knowledge. Further empirical studies and the development of more targeted mixed methodologies will be required to be fully validated. Despite the lack of evidence, explorative exercises already exist within BMC that claim to cultivate the awareness of these other systems (Cohen, 2012). They could easily be applied in an AT or voice lesson, that may better facilitate embodied self-discovery and holistic integration.

### 3.3.1 Embodied Imagery

Dance and movement education has long used mental imagery and metaphor as an essential tool to communicate the complexities of executing a target action. When evaluating the dance and somatic approaches discussed in this paper, embodied imagery became a central theme that connects them. Mental imagery or imagery is “a self-generated cognitive process of creating and using images and metaphors in the mind — including envisioning motor tasks — with or without overt physical execution” (Abraham *et al.*, 2020). This is not foreign to voice pedagogy (Connable, 2006); however, drawing from these other communities of practice may support new understanding in transmitting biotensegrity-informed AT principles to singers.

Buchanan (2014; p. 200) asserts:

Conscious representations of the musculoskeletal system will influence motor learning and planning and will have downstream effects on the cortical maps in the executive areas of the primary motor cortex. Therefore, the details of the body map can influence cortical representation along the entire chain of information flow, from planning through execution.

That suggests that the representations (cognitive habits) a singer creates in their brain will affect the perception and execution of a target action. Buchanan suggests that Body-Mapping can facilitate a more accurate representation through its imagery processes. Body-Mapping is a somatic approach that teaches singers and musicians anatomy and physiology on a cognitive level and integrates that knowledge experientially, specifically musculoskeletal dynamics (Buchanan, 2014). However, it excludes the mechanical properties of the fascial system, which have already been discussed in a previous section to impact movement and perception (Bordoni, 2019). In a qualitative study of both instrumental and vocal musicians (n=22), it was reported that Body-Mapping enhanced their performance by developing “more accurate body-maps,” reporting more physical and mental ease in performance, more confidence, and improved technique (Buchanan and Hays, 2014). When considering the neurophysiological model of AT by Cacciatore, Johnson, and Cohen (2020), this approach, while not far removed from AT, may provide a practical method of modifying the body schema, which sits at the center of their model.

This process is similar to the process of embodiment in BMC. Cohen (2012) describes the process as visualisation and somatisation. According to Cohen (2012), visualisation is a process of using imagery to increase awareness in a region of the body, and somatisation is a process of using movement, touch, and position to integrate the awareness of that imagery. This demonstrates relevance in applying BMC embodiment principles in AT singer training. Thus, synthesising Body-Mapping with BMC may effectively reconcile the exclusion of the fascial system, due to their similar approaches.

However, larger mixed-method studies may be necessary, as the participant experiences may be unique to that population, and the use of imagery was unclear and not a precisely outlined process. Moreover, quantitative procedures, such as biofeedback (e.g., spectrogram analysis or EMG) studies, may provide more depth to the population’s self-reported experiences, because this study did not consider the impact of a participant’s sensory motor amnesia, unconscious habits, or fascial health. Despite the lack of empirical evidence on the efficacy of Body-Mapping (Buchanan, 2014) and BMC’s embodiment process (Cohen, 2012), these approaches provide an embodiment process that can be further developed. This may assist in helping a singer explore and include the fascial system into their awareness, and experience the principle of directing more holistically.

Using Franklin's (2022) taxonomy of imagery may facilitate a more accessible process of using imagery to transmit AT and biotensegrity principles in teaching. Franklin (2022) describes five types of imagery: biological, metaphorical, sensory, motivational, and narrative imagery. Using this taxonomy may provide a useful orientation in developing a process for implementing intentional imagery and metaphor that bridges biotensegrity with AT, for example, creating more precise and multimodal cues that align closer to a singer's internal somatic landscape and perceptual habits, to get them into a non-doing state. However, De Lillis (2020) cautions that using imagery may result in inconsistent and unpredictable results, turning a voice lesson into a guessing game. Nevertheless, this could be addressed by changing the learning environment from the hierarchical transmission of knowledge from master to student, to facilitating a collaborative and more exploratory, constraint-based, and non-linear learning environment (Mossmann, 2024) similar to BMC (Hartley, 1995), AT (Dimon, 2024), and contemporary motor learning approaches (Crocco and Meyer, 2021). Applied to the studio, this puts the singer at the center of the lesson, and provides them with more agency, as their subjective experience would be honored by allowing them to develop their unique collection of embodied imagery.

### **Limitations**

This study is intended as a preliminary integration of these communities of practice, and an initial reimagining of AT through Biotensegrity. Two limitations were identified: 1) due to time constraints and resources, a more comprehensive literature search (which is often necessary for an integrative review) was not possible; although, this level 7 independent study provides a necessary launch pad for future inquiry. 2) Researcher positionality may result in bias, however, reflexivity practices were undertaken to maintain rigor (Winter, 2022)

### **Conclusion**

The integrative nature of this review aimed at synthesising five communities of practice: dance, somatics, AT, biotensegrity/human movement science, and voice pedagogy. By taking an integrative approach to synthesis, it was possible to reconcile the fragmented nature of each community of practice and draw conceptual bridges to bring them together. Specifically, to conceptualise the principles of non-doing and directing through biotensegrity, and discuss potential application for singers. What this review has concluded and contributed to the voice pedagogy field:

1) There is supporting theoretical and empirical evidence for the biotensegrity model to augment and potentially improve AT practices and their outcomes. For example, providing practices that may alter the body schema is a central mechanism in the neurophysiological model of AT (Cacciatore, Johnson, and Cohen, 2020).

2) Exploring these other communities of practice illuminated new lines of inquiry in AT and somatic voice research. Integrating BMC and the Franklin Method into AT may provide practical tools that incorporate not only the musculoskeletal system into AT practice;

instead, it aims to consider the movement contribution of all bodily systems (Hartley, 1995).

3) Embodied imagery was a unifying theme in applying biotensegrity-informed AT principles. Exploring the internal somatic landscapes and their mechanisms within singers may provide further insights into a more adaptive approach to using imagery and provide a singer with more personal agency.

4) Epistemological tensions must be addressed to effectively integrate somatic and movement-based approaches and methods into voice pedagogy and vocology.

5) Procedures for appraising somatic practitioner experiences and training approaches need to be developed, as embodied knowledge is still difficult to access within siloed communities of practice.

Much of the research literature is conceptual and still requires a more substantial empirical foundation (Bordoni, 2019), which will underpin practitioner experiences. Mix-method studies that bridge anatomy with the subjective experience may require further cross-disciplinary collaboration, such as combining clinical ECG and EMG studies paired with phenomenological inquiry. Furthermore, epistemological tensions between somatic practice and biotensegrity research still need to be addressed, and further methodological development is recommended for targeted research in voice pedagogy. This is especially relevant to study the fascial system's potential impact on perception and motor learning.

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