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Module 1

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Using the Pilates Method in the Voice Studio for Singers with Lordosis

Introduction

The posture of the human body can and often does affect our ability to perform (Peultier-Celli *et al.*, 2022). In the voice studio, proper posture is emphasized, but often without the necessary nuance. Each body is different, and most do not live in an ideal posture every moment of their lives. There are several common postural defects including but not limited to the following: kyphosis, lordosis, sway back, and flat back (Postural and Jaworski, 2019). In this paper I aim to discuss how lordosis affects singing and whether the Pilates method can be used to assist singers towards accessing more neutral alignment.

I have been performing and singing on stage for about 17 years. I trained as a classical vocalist at the conservatory level and have mostly worked in musical theatre. It has always felt strange to me that my voice lessons over the years really emphasized standing or sitting tall, but that performing required singing many different postures. I also am a comprehensively certified Pilates instructor and voice teacher. As an instructor, I am interested in meeting my students where they are. Postural assessments are a great place to start in the Pilates studio, so why not the voice studio as well? Where do we go from there? Does it help the singer to learn about their attractor state of postural alignment (Estill *et al.*, 2010)? I see hyper lordosis show up in many overachieving singers who are trying their best to have "good" posture, which is why I am interested in investigating use of the Pilates method to help singers achieve more neutral posture in the vocal studio and in their everyday lives.

What is lordosis?

Hyper lumbar lordosis (see Fig. 1) is characterized by an excessive degree of curvature in the lumbar spine (Been and Kalichman, 2014). One's center of gravity can be altered due to the increased curve in the low back and the way the pelvis angles forward, therefore affecting one's balance and gait (see Figure 1). As with any abnormal posture, bone deformities can develop, and the muscles may also begin to not function properly leading to weakness and vulnerability to injury. Some studies have found that more women than men experience lordosis (Been and Kalichman, 2014; Hay et al., 2015). There have been other studies which find no correlation to gender, but it is worth noting that pregnancy generally leads to greater

degrees of lumbar lordosis as the fetus grows and the center of gravity shifts. Interestingly, in a study investigating the effects of high heels on lower back pain, wearing heels was found to decrease lumbar lordosis (Baaklini et al., 2017). There are some correlations to race as well, however the severity of lordosis has been found to be neither sex nor race independent (Hay et al., 2015).

There are many ways to measure the lordotic and kyphotic angles of the spine. Zanguie *et al.* (2023) found from the available research that there are ten non-invasive methods for reliably and accurately measuring. Still the parameters for diagnosing or identifying excessive lumbar lordosis are fully agreed upon.

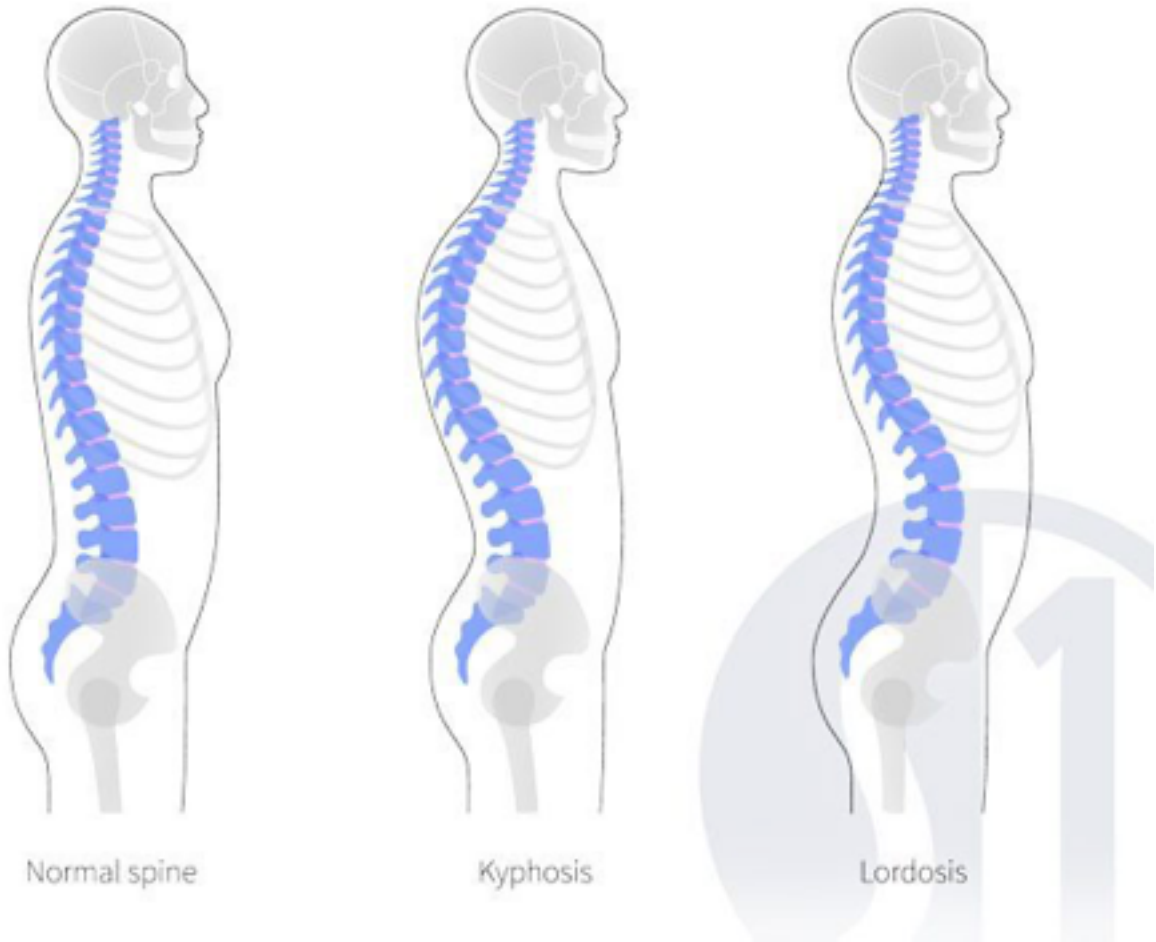

Fig. 1. *Different Spinal Postures* (SpineOne, n.d.)

How can lordosis affect singing?

The literature shows that “normal and ideal upright posture” is best for singing (Caçador and Paço, 2018). We can identify this posture by drawing an imaginary line anterior to the spine, which travels from the ankle joint, up through the center of the knee joint (slightly anterior), slightly posterior of the hip joint, through the most anterior point of the shoulder joint, and through the mastoid (Caçador and Paço, 2018). Breath support for singing requires great deal of coordination in the body (McCarther, 2014). The research shows that optimal posture is preferred for singing with healthy, easeful support (Peultier-Celli *et al.*, 2022). Maintaining optimal posture while singing requires constant adaptation in response to “cognitive loads, stress, respiratory coordination, and articulation” (Castillo-Allendes *et al.*, 2022). Many singers have postural disorders, and these can occur organically and/or be related to emotions (Peultier-Celli et al., 2022). Hyper lumbar lordosis can disrupt the singer’s breath support. In particular, anterior pelvic tilt will disrupt the descent of the pelvic floor and thus the function of the diaphragm (McCarther, 2014; Hodges, Sapsford and Pengel, 2007). Working to address one’s body awareness and the strength of one’s postural muscles seems a worthy endeavor for any vocalist.

What is Pilates?

The Pilates method was created by Joseph Pilates. He began developing this method in the 1920s, and continued refining until he died in 1967 (Wells, Kolt and Bialocerkowski, 2012). Based on the literature, Pilates can be described as “a mind—body exercise approach requiring core stability, strength, and flexibility, and attention to muscle control, posture, and breathing” (Wells, Kolt and Bialocerkowski, 2012). Today, there are two broad categories of what is considered Pilates: classical Pilates which tries to maintain the exact movements, strategies, and techniques originated by Joseph Pilates and contemporary which draws upon the original method and builds continuously upon it (McNeill, 2011). It is a form of exercise which can be performed with or without equipment or apparatus. There are various pieces of specialized machinery which are used by Pilates practitioners including but not limited to the reformer, high chair, low chair, Cadillac, foot corrector, ped-o-pull, guillotine, barrel, and spine corrector (McNeill, 2011).

Pilates has become increasingly popular since it began over a century ago, with the greatest amount of growth in the last 30 years (Wells, Kolt and Bialocerkowski, 2012). Many medical practitioners and physical therapists refer their patients to Pilates for self-maintenance during or post rehab (Gracey *et al.*, 2015). In 2000, a lawsuit concluded with the removal of trademark restrictions on the term Pilates, which led to increase in accessibility and variability in what is considered "Pilates" (Anderson *et al.*, 2019). It is difficult to identify what is and is not Pilates, however Joseph Pilates' book Return to Life is certainly a reference for what most certainly are 34 pilates exercises (Pilates, 1945).

Unfortunately, this book only includes a "how to" for the traditional/classical mat repertoire. Still, it is one of our only publications containing any of Joseph Pilates's exercises directly from the man himself. Most Pilates exercises have been passed down through the teachings of his protégés Mary Bowen, Ron Fletcher, Eve Gentry, Kathy Grant, Romana Kryzanowska, Lolita san Miguel, and Carola Trier (Taylor Alpers, Taylor Segel and Gentry, 2002). Rael Isacowitz and Karen Clippinger published a valuable text in 2011 called Pilates Anatomy. The book shares 46 pilates mat exercises (including the 34 from Return to Life) accompanied by thorough directions, anatomy descriptions, and illustrations.

Today there are numerous Pilates training programs exist where you can become a certified Pilates teacher, choosing a comprehensive certification or a single level certification or single apparatus certification (Wells, Kolt and Bialocerkowski, 2012). Already certified teachers in the United States can gain additional certification through the National Pilates Certification Program through an exam which follows the National Commission for Certifying Agencies (NCCA) standards and reflects the current Pilates practices (Anderson *et al.*, 2019). Even still, with no laws or licensure requirements, Pilates is a largely unregulated industry in the United States. More research is needed to even define what is Pilates exercise and how it is meant to be applied (Wells, Kolt and Bialocerkowski, 2012).

Applying Pilates to Improve Lumbar Lordosis:

Hyper lumbar lordosis has many correlations including weakened abdominals (Been and Kalichman, 2014). Pilates exercises have been found to help strengthen these muscles and improve one's alignment. A 10-week study found "Pilates exercise had a significant effect

on improving spine abnormalities, with a mean improvement of 10.79 degrees in the lumbar region and 13.68 degrees in the thoracic area of female college students (Ahmadi *et al.*, 2021)." This study conducted two 90 min sessions a week and found improvement in postural alignment and the strength of the spinal muscles and abdominal muscles. Pilates breathing requires 3D expansion of the ribs while keeping contraction of the abdominals. Even this breathing method alone has been found to improve posture and alignment (Kim, 2019). One of the muscles most frequently cued in Pilates is the transverse abdominus. In singing, the transverse abdominus plays a key role in the support (Salomoni, van den Hoorn, Hodges, 2016). Pilates has been proven to improve the strength and endurance of this muscle and others (Kloubec, 2010). Interestingly, the transverse abdominis is an important muscle for improving lumbar lordosis (Been and Kalichman, 2014; Ahmadi *et al.*, 2021) and for singing (MacDonald *et al.*, 2012).

Kim's 2019 three-week study tracked the effects of 3D-pilates breathing on spine abnormalities. They found a bi-weekly, 20 min protocol to be effective for improvement of kyphosis, trunk imbalance, pelvic tilt, and lateral deviation but not for lumbar lordosis. However, if the breathing protocol they described did not involve pilates movements, and I wonder one or two exercises from the pilates repertoire were added to this study whether there would have been improvement in the lordotic angle as well.

Ahmadi's 2021 article is especially exciting for considering pilates for voice students with excessive lumbar lordosis. 15 Students attended bi-weekly sessions involving 15 min of warming-up, 60 min of Pilates Corrective Exercises, and a 15 min cooldown. The lordotic curves were measured using the touch method which has been proven an accurate technique, which Salisbury and Porter (1989) and Zanguie et al. (2023) agree is a reliable method. You can see in Table 1, each week the participants practiced 9-11 exercises for either 12 reps of 30 s in 2-3 sets. Some of these were repeated each week. The names of the exercises refer to Isacowitz's terminology published 2011 in his thorough Pilates Anatomy book. I will refer to exercises using the same terminology, though it should be noted there are often multiple names for the same exercise (Isacowitz and Clippinger, 2011).

Table 1

Weeks	Deformities	Exercises	Set and repetition
Week 1 & 2	Lordosis	One-leg stretch	3 set and 30 s
		Spine stretch	3 set and 30 s
		Rolling back	2 set and 10 repetition
		Chest lift	2 set and 10 repetition
		Leg lift side	2 set and 10 repetition
	Kyphosis	Cat stretch	3 set and 30 s
		Down ward dog stretch	3 set and 30 s
		Pelvic curl	2 set and 12 repetition
		Back extension prone	2 set and 10 repetition
Week 3 and 4	Lordosis	Double-leg stretch	3 set and 30 s
		Rolling back	2 set and 12 repetition
		Spine twist supine	2 set and 12 repetition
		Chest lift with rotation	2 set and 12 repetition
		One-leg circle	2 set and 12 repetition
	Kyphosis	Down ward dog stretch	3 set and 30 s
		Back extension prone progression	2 set and 12 repetition
		Leg pull front	2 set and 12 repetition
		Shoulder bridge	2 set and 12 repetition
		Saw	2 set and 12 repetition
Week 5 and 6	Lordosis	Double-leg stretch variation	4 set and 35 s
		Seal	2 set and12 repetition
		Roll-up	2 set and12 repetition
		Neck pull	2 set and12 repetition
	Kyphosis	Boomerang stretch	4 set and 35 s
		Shoulder bridge progression	2 set and 12 repetition
		Leg pull front progression	2 set and 12 repetition
		One-leg kick	2 set and 12 repetition
		Swimming	2 set and 12 repetition
Week 7 and 8	Lordosis	Crab stretch	4 set and 35 s
		Rollover with legs	3 set and 10 repetition
		Spread	3 set and 10 repetition
		Hundred	3 set and 10 repetition
		Crisscross	3 set and 10 repetition
		Teaser	3 set and 10 repetition
	Kyphosis	Boomerang modification stretch	4 set and 35 s
		Leg pull	3 set and 10 repetition
		Double kick	3 set and 10 repetition
		Shoulder bridge progression	3 set and 10 repetition
Week 9 and 10	Lordosis	Crab variation stretch	3 set and 12 repetition
		Hundred modification	3 set and 12 repetition
		Teaser variation	3 set and 12 repetition
		Crisscross progression	3 set and 12 repetition
		Jackknife modification	3 set and 12 repetition
		Bicycle variation	3 set and 12 repetition
		Corkscrew	3 set and 12 repetition
	Kyphosis	Boomerang variation	4 set and 35 s
		Side bend	3 set and 12 repetition
		Rocking	3 set and 12 repetition
		Swan dive	3 set and 12 repetition

(Ahmadi *et al.*, 2021)

Bringing Pilates into the Voice Studio

Voice students come to their lessons to sing, however, if voice instructors are not addressing posture, we are not setting our students up for the utmost success. Not every singer has hyper lumbar lordosis, and excessive lordosis may not negatively impact everyone who has it. Certainly, a voice instructor should never diagnose or label a student with a spine condition of any kind. Singing instructors should be mindful of this when considering incorporating pilates into a lesson.

We should also keep in mind there are many Pilates certification programs you can go through to become a Pilates instructor, however, many Pilates exercises can be found in publications available to the public such as Joseph Pilates's books, *The Everything Pilates Book* (Taylor Alpers, Taylor Segel and Gentry, 2002) and *Pilates Anatomy* (Isacowitz and Clippinger, 2011). Still voice instructors should consider what is within their scope of practice and what may be better handled by a Pilates professional. Pilates instructors are trained to work with individuals of varying abilities, with injuries, and conditions (Alpers, Segel, Gentry, 2002). Many physical therapists will send their patients to Pilates for self-management and maintenance, but acute and chronic conditions should be addressed by a medical professional, not a Pilates instructor nor a voice professional (Gracey *et al.*, 2015).

While there are at least ten noninvasive methods of measuring lordosis (Zanguie *et al.,* 2023), a voice teacher who wanted to identify the degree of lordosis of a student would need very sophisticated equipment and training. There may be rare occasions when a voice student comes to a lesson having been diagnosed by a medical professional with excessive lumbar lordosis. I will be discussing methods for using the pilates method for singers experiencing lordosis from a qualitative lens. I propose presenting information on lordosis, sway back, and other common postures in a neutral way so that a singer might self-identify if they end up sensing they are hitting walls because of a less optimal posture. The teacher can inquire as to whether an individual student feels their posture is ever hindering their singing, and if so they can proceed with exercises to attempt to address the issue.

Suggested Strategy

One way a teacher could teach their students about different postures is through use of a diagram like Fig. 1. The students could then be taught postural awareness of the pelvis by

finding their anterior superior iliac spine (ASIS) with the heel of their hands and the pubis bone with their finger tips (McCarther, 2014). The student can do this standing or lying down (Taylor Alpers, Taylor Segel and Gentry, 2002). If the hands lie vertically or horizontally respectively, the pelvis is neutral. If the ASIS are further forward or higher than the pubis, this can be a sign of excessive lordosis (McCarther, 2014).

If someone is experiencing hyper lumbar lordosis, there can be many possible causes. Even within the pilates repertoire, we could address several of those possibilities. I will propose exercises that emphasize spine flexion and activation of the abdominals (Ahmadi *et al.*, 2021). These exercises can be quick, simple, and require minimal effort from the student (Isacowitz and Clippinger, 2011). After learning these exercises the voice teacher and student should test if there is improvement in a chosen area, for example less unnecessary tensions, ease of airflow, improvement in vocal range. Perceived improvement may indicate these were valuable steps towards the student's optimal posture. It may take time to have lasting effect. Ahmadi's successful study involved 1800 h of pilates practice (Ahmadi *et al.,* 2023). Overtime, the student can choose to add to their routine systematically or return to these exercises when they notice signs that the lordosis of their lumbar spine increasing.

The exercises I propose come from the corrective exercises from Ahmadi's study meant primarily for improving the lumbar lordosis. I've outlined how to use these two exercises in the voice studio setting and included directions from Isacowitz's text for clarity. These steps can be found in the Appendix. Both of these exercises involve forward flexion of the spine, which may help someone with perceived excessive lumbar lordosis to find a more optimal posture. If improvement is perceived, the student may want to pursue additional exercises to release tension in the low back and increase strength in the abdominals to further support their singing endeavors. If these exercises are beneficial to a students' singing, that could be for reasons other than improved lordosis. More research will be needed to determine whether alignment, muscle activation, or other factors from the pilates exercises have been the cause of such improvement.

Conclusion

If we are teaching our vocalists how to sing from a holistic approach, voice instructors will address things such as posture abnormalities. Lumbar lordosis is a common deviation from optimal posture (Chun *et al.*, 2017). Hyper lordosis does not serve the singer in their pursuit of learning to sing well. While the Pilates Method has been shown to improve lumbar lordosis, more research is needed to define how the Pilates exercise library should be utilized in the voice studio. A voice teacher might be tempted to label or diagnose a student, but this is not within the scope of practice. Educating a student on ideal posture for singing is the voice instructor's job and responsibility. If a teacher believes the singer needs to be seen by a medical practitioner for anything, they can offer that suggestion or provide references. Pilates with a good instructor can be beneficial to anyone seeking to build better body awareness, strength, flexibility and balance (Alpers, Segel, Gentry, 2002). It is especially helpful to those with postural and spinal difficulties. (Gracey *et al.,* 2015). There may be cases where referring a singer to a Pilates practitioner may be valuable, but more research is needed. If we can appropriately address misalignment with our students, it can benefit them their whole life long helping them to catch these abnormalities and prevent pain, degeneration, and injuries.

Critical Reflection:

Reflecting on my time working on this assignment has been helpful in informing how and where I'd like to focus my studies going forward (Driscoll 2007). When we began the Formative Assignment and Module 1, I knew my calendar would be overwhelmed with responsibilities outside of my studies with the VSC. I decided with Kerri Obert to choose a topic within a subject I already had quite a bit of familiarity. I do not regret this decision in the slightest. It made the assignments doable and helped me gain clarity for setting new goals for my studies. It was not a surprise to me that there are not many peer reviewed pilates based articles, and it was a simple solution to turn to my own bookshelves of pilates text books (Pilates, 1945; Taylor Alpers *et al.,* 2002; Isacowitz *et al., 2011*). However, this necessitated my paper to be largely focused on acknowledging the lack of literature and the difficulty of ethically bringing pilates into the voice studio.

When researching lumbar lordosis, a lack of literature was not an issue. Rather, my eyes were opened to the many ways to measure the lordotic curve (Zanguie *et al.,* 2023) and

the differing opinions in what is considered excessive (Chun *et al.*, 2017). My research sparked other questions and interests. Since the research does not agree on what is excessive lordosis, whether it is a cause of back pain (Chun *et al.*, 2017; Pan, 2020), nor whether it negatively affects singing, my next step would be to focus on back pain, the muscles involved in singing, and whether pilates could be used to alleviate back pain experienced while singing. Going forward though, I would like to spend my time researching in areas I know less about in hopes that I can broaden my understanding in the field of voice pedagogy. There are plenty of other topics I am interested in especially within the field of psychology.

The benefit of self-paced study is autonomy, and the pitfall is lack of connection (Field, 2001). Because of my work commitments and the time difference, I have found it near to impossible to attend live zooms with my fellow students, which has made the process lonely at times. I'd like to facilitate more connection with fellow singers and voice instructors as I continue in hopes of better learning and increased fulfillment (Field, 2001). One dream that I have is to create a podcast where I might share some of the things I am learning. Each episode would cover a topic or research paper that a guest and I would discuss together. I have a few colleagues who are already interested in this proposed side project. The other possible benefit I am motivated by is an increase in exposure as a researcher and an educator, which may help with gaining more students and potential job searches.

Appendix A

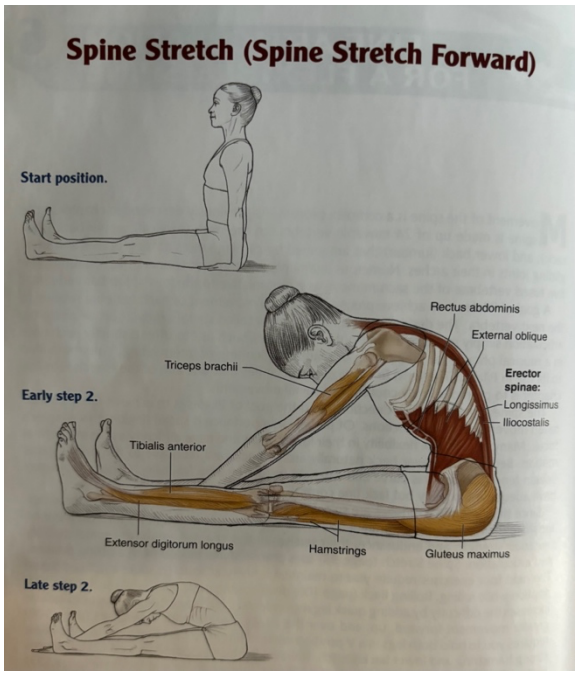

Fig. 2 (Isacowitz *et al.,* 2011)

1. On an [I] ("ee") have the student vocalize an ascending five note major scale (do re mi fa sol) holding the top note as long as possible. Agree upon a key for the student (ideally one that reflects the range where the student perceives difficulty which may be related to their posture).
2. Ask the student to sense how the vocalization feels.
3. Invite the student to sit on the floor on a yoga mat or as comfortable.

   <u>Spine Stretch</u>

   4. Start position. Sit with the trunk upright. Knees are straight, legs slightly wider than shoulder-width apart, and feet flexed (ankle-foot dorsiflexion). Hold the arms straight by your sides with your palms on the mat.

   5. Exhale. Draw the abdominal wall in as your head and upper spine roll down and your arms reach forward. See the main muscle illustration. Glide your hands across the mat on the insides of your legs as shown.

   6. Inhale. Roll the spine back up, returning to the start position. Repeat the sequence five times. (Isacowitz *et al.,* 2011)
7. Finally repeat the vocalism from step 1 and have the student self-assess.
8. If the student finds the exercise beneficial, they may consider adding the exercise to their warmups when practicing on their own for a week and reassess.

Exercise 2:

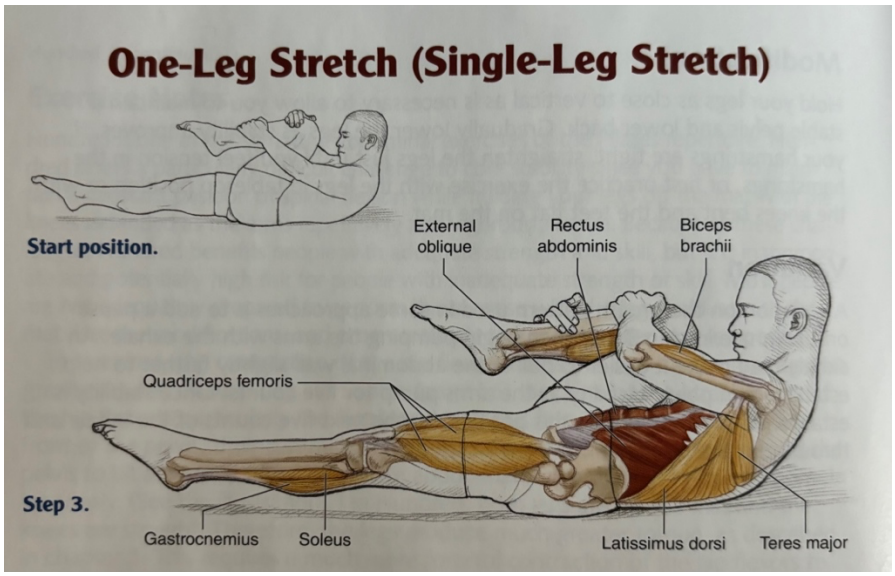

Fig. 3 (Isacowitz et al., 2011)

1. On an [I] ("ee") have the student vocalize an ascending five note major scale (do re mi fa sol) holding the top note as long as possible. Agree upon a key for the student (ideally one that reflects the range where the student perceives difficulty which may be related to their posture).
2. Ask the student to sense how the vocalization feels.
3. Invite the student to lie on the floor on a yoga mat or as comfortable.

   <u>One-Leg Stretch</u>

   4. Start position. Lie supine with the head and scapulae off the mat in Chest Lift (page 54) position and one knee pulled into your chest. The hand on the side of the bent knee holds the shin just above the ankle. The other arm is bent with the hand on the knee. The straight leg is at a height at which the lower back can maintain contact with the mat. Both feet are gently pointed.
   5. Inhale. Begin to bend the outstretched leg and straighten the bent leg.
   6. Exhale. Complete the switch, using an exhale as the leg fully straightens and the hands switch to the other knee as shown in the main muscle illustration. The hand on the side of the bent knee grasps the shin near the ankle, and the other hand holds the knee that is pulled toward the chest. Repeat the sequence 5 times on each leg for a total of 10 times, completing each switch. of the legs with an exhale. (Isacowitz *et al.,* 2011)
7. Finally repeat the vocalism from step 1 and have the student self-assess.

8. If the student finds the exercise beneficial, they may consider adding the exercise to their warmups when practicing on their own for a week and reassess.

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Personal Development Plan

Goal	How	Timeline	Notes
Focus Studies in Other Areas of Interest	-Begin watching 2 courses a month from canvas studio library -Read 2 recently published articles on areas of interest per month	4 Months (end October 1)	-Core Vocal Pedagogy -Evolution of Singing -Motivational Interviewing -Coaching and Mentoring -Voice and Emotion -Psychology of the Performer -Neuroscience and Pedagogy -Education Learning Theory -Pop MT Classical
Start a Podcast	-Determine ideal audience, mission, topics of interest, dream guests -Learn how to create and put out podcast episodes -Create social media and landing pages -Outline first 3 episodes	Launch June 1	-Topics could overlap with courses in canvas and articles for goal 1
Foster Personal Vocal Practice	-Find Contemporary Voice Teacher -Take 2 Lessons a Month at least -Practice 2hrs a week at least	4 Months (end October 1)	-Update professional audition book for Fall 2024 audition season