Learning to be a professional singer

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Summary

Learning to become a professional musician requires the development of interdependent neuromuscular, cognitive, creative, aesthetic, expressive and emotional competences. It usually requires a great deal of commitment and self-organisation skills, certain personality traits and a share of luck. These requirements hold also for singers, who, in addition, need to face the unique requirements of possessing a “hidden instrument”, which is particularly sensitive to changes in both internal and external milieu. Naturally, teaching singing and becoming a professional singer is particularly endeavour.

This chapter presents an attempt to explore these challenges, shedding light on interdisciplinary research in three main domains: (i) **building the singing instrument**, addressing different pedagogical approaches of voice production and vocal technique; (ii) **learning voice care**, discussing protective strategies and conditions that may impair normal development and function of the singing voice; and (iii) **integrating key factors** for a successful transition from student to professional. Suggestions to improve the current classical singer’s education are also presented.

I – Building the singing instrument

(i) Singing pedagogy

> *"Why should the teacher of singing need any new information? After all, great singers have existed for hundreds of years, and the vocal instrument has not undergone any major change. (...)To contend seriously for the respect of informed minds, they must be based on factual, although perhaps as yet incomplete, information".* (in R. Miller, 1996, pp. 225)

Vocal pedagogy plays an important role in the development of a professional singer; it constitutes the mean to integrate knowledge on efficient vocal production, musicianship and expressive communication. Successful vocal pedagogy has always involved the assistance of fine teachers and the student's ability to interconnect this knowledge (Miller, 1986). However, nowadays both teachers and students face additional pedagogical challenges: quite exceptional attributes are expected from a professional singer, as orchestras and concert halls increased, and audiences expect outstanding live performances using the quality of recordings as a reference (Howard, 1999). The result is that there has been a need to integrate interdisciplinary knowledge into vocal pedagogy, such as anatomy and physiology, medicine, psychology, acoustics, bioengineer and technology development, leading to great advances in teaching of singing over the past 30 years.

a. The evolution of teachers' attributes

Teaching singing was first developed to assist solo singers in the performance of the new monody and opera (Callaghan, 1998). At those times, singers learnt their profession based on teacher's own experiences as performers. In this orally transmitted master-apprentice teaching/learning model, imitation was the main mean of learning; not surprisingly, students looked for a teacher who was an excellent performer. Nowadays, both teachers and students recognise that great singers are not always good teachers and vice-versa, so students care less with the performance qualifications of a teacher (Miller, 1996). Nowadays it is common knowledge that a competent singing teacher should possess a good ear, and a fundamental understanding of anatomy, physiology and acoustics

related to normal voice function (Collins, 2001; Harrison, 2003; Welch and Sundberg, 2002). Prior to ask vocal production modification to a student, the teacher needs to diagnose malfunctions and possible strategies to effectively correct them, based on the physiological and acoustical underlying phenomena (Miller, 1996). Excellent musicianship, sense of aesthetics, performance experience, and inspiring personality are also solicited attributes (Teachout, 1997). This corroborates students' believes of beneficial **attributes in a singing teacher**: (i) observing, interpreting and understanding particular elements involved in voice production; (ii) an analytical ear to disentangle the complexity of singing; (iii) well-informed guidance to modify less correct neuromuscular behaviours; (iv) use of varied and up-to-date pedagogical tools; and (v) the ability to encourage and educate by sharing and discussing information rather than intimidating and using a masterful dominance approach (Collins, 2001; Ostrow, 2002; Welch et al., 2005).

b. The evolution of pedagogical tools

The current available teaching tools are essentially: (i) vocal and postural imitation of the teacher; (ii) the use of mirrors, charts and models; (iii) verbal communication; and (iv) real-time feedback (Welch et al., 2005). A combination of these methods should constitute the best approach in teaching, as each method has its own advantage and disadvantage. **Imitation** has the benefit of allowing the integration of sensorial meaningful stimuli by the student. He/she can then create the necessary neural patterns to reproduce the same stimuli even when these are absent. Disadvantages of this method include the possibility of the student's internal perceptions of the model be misleading (Welch et al., 2005). In addition, the model-imitation type of teaching may induce vocal faults, as the student might imitate less efficient voice production (Nair, 1999). The use of a **mirror** constitutes another teaching aid used to increase neuromuscular awareness with students who possess low kinaesthetic sensibility; however, its feedback is limited and not immediate (Nair, 1999). **Verbal feedback,** using metaphors to explain vocal function and musical meaning based on previous experienced kinaesthetic and aural sensations, is still the most common teaching practice. Nevertheless, this tool may offer some disadvantages: (i) the vocabulary used may be rather idiosyncratic and

confusing; (ii) singing teachers often disagree on terminology; (iii) metaphors used might mislead the underlying physiological and acoustical vocal function (Callaghan, 1998). The result of applying this teaching tool is that several attempts are made by the student before achieving the correct vocal/ musical gesture (Welch et al., 2005). Repetition consumes time in a lesson, which is already limited taking into account that different performance elements need to be addressed (e.g. stylistic interpretation, text intelligibility, and affective and effective communication skills) and increase the risk of vocal abuse. The multiple translations of sound quality into words, and the mismatch between the produced sound and the perception of how it was produced by both teacher and student, offer additional difficulties in the singing studio (Entwistle and Smith, 2002). It would therefore be highly beneficial if clear and objective scientific language is used as verbal feedback to teach singing function (whereas poetic and imaginative language could be applied to teach artistic communication). Singing pedagogues like Garcia (Garcia, 1847), Vennard (Vennard, 1967), Burgin (Burgin, 1973), Monahan (Monahan, 1978) and Miller (Miller, 1977; Miller, 1986), strongly believed that scientific knowledge of the voice is essential to a singing teacher. However, it seems that nowadays some teaching models still use inadequate verbal feedback, lacking scientific background. Indeed, from evaluating voice pedagogy at tertiary Australian universities, singing teachers were found to be unfamiliar with voice physiology and acoustics, producing misconception explanations (Callaghan, 1998). There are several reasons for which this should not be the current situation. On the one hand, both scientists and singing teachers often jointly discuss research findings and their applicability to efficient teaching and singing. Well attended scientific international meetings have proliferated, such as: (i) the Annual Symposium Care of the Professional voice (initiated and run over the past 40 years by the Voice Foundation); (ii) the World Voice Conference; (iii) the Pan European Voice Conference; and (iv) the International Voice Symposium in Salzburg. Vocal pedagogy and research outcomes have been discussed also in workshops organized by voice associations all over the world, such as: (i) the European Voice Teachers Association (EVTA); (ii) the National Association of Teachers of Singing (NATS, in USA); (iii) the British Voice Association (BVA); and (iv) the Association of Teachers of Singing (AOTOS) in the UK. Summer

courses are also available in Europe and in the USA. Examples of such successful initiatives are the *Function of the Singing Voice*, organised by Johan Sundberg at KTH in Sweden, *and the Summer Vocology Institute,* organised by Ingo Titze at the National Centre for Voice and Speech in USA. On the other hand, the technological development occurred over the past 30 years, transformed vocal pedagogy into an interdisciplinary model of artistic education. A set of different computer hardware and software (in some cases freeware), and other educational tools to assist informed teaching is available, allowing: (i) the visualisation of breathing patterns applied in singing (Thomasson, 2003); (ii) larynx real-time images during singing (Larson et al., 1995); non-invasive methods of displaying vocal folds vibratory behaviours during phonation (Baken, 1992; Howard, 1995); (iii) assessment of vocal load and fatigue (Titze et al., 2007); (iv) modelling the vocal tract and articulatory settings during singing (Echternach et al., 2010; Echternach et al., 2008); and (v) real-time display of voice acoustical characteristics (Callaghan et al., 2001; Welch et al., 2005). This r**eal-time feedback** is the most recent developed teaching tool and has been found to improve the teaching/learning process based on repetition. As the student receives quantitative feedback during his/her vocal behaviour, subsequent responses are almost immediately influenced, leading to the completion of more learning cycles (Howard et al., 2004). "(...) *Anything that can assist the learning process in the provision of more robust, less ambiguous and easily understandable feedback to both teacher and student would seem to be worthwhile*." (in Welch et al., 2005: 227). Real-time feedback also contributes to promote attention, interest and emotional expressivity in performance (Juslin et al., 2004) and assists in the development of a musical identity (Hargreaves et al., 2002). Useful examples of real-time feedback software are: *Wavesurfer*, *Madde* (Svante Granqvist), *Overtone analyser* (Sygyt software), *VoceVista* (Don Miller), *SpeechStudio* (Adrian Fourcin, Laryngograph®), *Sing & See* (University of Sydney), and *SINGAD system* (Howard and Welch, 1993; Welch et al., 1989). Literature on effective use of technology in the singing studio is also available (see for example (Miller, 2008a; Nair, 1999)).

(ii) Vocal technique

> *"The stage forms the artist, but ruins the singer. And I, by profession, am a singer. To be a singer you need a technical knowledge which you cannot have at 20, 22, or even 25. Technique is the basis of everything. You cannot be a singer if you are not first a vocal technician, and you cannot be a good artist unless you are also a good singer." - Alfredo Kraus (Opera, January, 1975, pp. 19)*

A beautiful natural sound is an important asset for becoming a professional singer; however, it is not by it-self sufficient to guarantee the consistency expected in a professional career (Vurma and Ross, 2004). This is achieved through conscious and systematic practice, i.e. vocal technique (Miller, 1996). The singer requires the fine tuning of different muscle groups, involved in: ***breathing*** (the power engine responsible for the vibration of the vocal folds), ***phonation*** (primary sound generated by the vibration of the vocal folds) and ***resonance*** (the modification and amplification of the primary sound) (Sundberg, 1987). Discussing vocal technique, although necessary and important, would lead to an extensive chapter section. Thus, it is here presented an attempt to summarise key elements in developing vocal technique (some still under investigation and thus presenting controversial results), namely: (i) breathing patterns leading to "*vocal support*"; (ii) body posture and how this affects vocal production; (iii) subglottal pressure, airflow velocity and volume at the glottis and their relation with different vocal dynamics; (iv) tension and extension of the vocal folds; (v) amount of resistance to open the glottis (abduction and adduction forces) and phonation types; (vi) shaping of the vocal tract to achieve the intended voice quality (vocal resonance strategies) and efficient voice production; (vii) vocal registers; (viii) intonation; (ix) vibrato; (x) legato; (xi) staccato; (xii) coloratura; (xiii) text intelligibility; and (xiv) voice classification and choice of repertoire. Detailed explanations of these elements can be found in various literature, such as: (a) books by vocal pedagogues, such as William Vennard, Richard Miller, Barbara Dosher, Scott McCoy, Janice Chapman and Maribeth Dayme (Chapman, 2006; Dayme, 2005; Dosher, 1994; McCoy, 2004; Miller, 1986; Miller, 1993a; Miller, 1993b; Miller, 1996; Miller, 2000; Miller, 2004; Miller, 2008b; Vennard, 1967); (b) scientific books by researchers and health care providers (see for example (Benninger and Murry, 2008; Sataloff, 2006b; Sundberg, 1987; Thurman and Welch, 2000; Titze, 2000)); and (c) research

articles in journals, such as *Journal of Singing*, *Folia Phoniatrica et Logopaedica, Journal of Voice*, *Logopedics Phoniatrics Vocology*, *Research Studies in Music Education*, *Psychology of Music*, *British Journal of Psychology*, and *Journal of interdisciplinary music studies*.

Vocal technique can be developed through guided learning, but it also depends on the quality and time spent with self-oriented practicing. The teacher has an important role in establishing efficient practice strategies, as his/her ability to provide efficient solutions to a specific difficulty shown during the lesson has a profound influence on the student's approach during the practice session (Driskell et al., 1994). Optimal studying practices may include:

1. **Efficient practicing time**, which requires a structured plan of the session, with specific guidelines for the development of different vocal and musical competences and a plan of the practicing section, distributing practice during the day - shorter practice sessions, in which there is a increased level of task difficulty, assist the development of proficiency over a long period of time and encourage higher motivation levels (Barry and Hallam, 2002). For a singer, the planning of shorter studying sessions is also important to reduce the risk of developing vocal abuse (Dayme, 2005).
2. **Mental practice**, which involves analytical study of the repertoire (i.e. identification of sections, harmony, and repeated patterns) and mental visualization of the movements required to sing the repertoire (Lehmann et al., 2007) - it activates the same areas of the cerebral cortex as those involved in actual playing/singing (Driskell et al., 1994), thus potentially reducing the risk of vocal abuse by repetition; it also seems to develop kinaesthetic neuromuscular memory, resulting in laryngeal adjustments in response to pre-planning and to auditory feedback (Driskell et al., 1994; Larson et al., 1995). Mental practice can also involve s**hadowing practice**, used to increase the student's awareness of one single aspect of vocal performance at a time, as the singer does not produce vocal sounds but only the required movements to produce those imaginary sounds.
3. **Self-evaluation of learning and practicing**, i.e. the recognition of strengths and weaknesses, awareness of task difficulty, strategies to improve, and the

ability to set objective goals for each practice session (Jørgenson, 2004; McPherson and Schubert, 2004).

4. **Memorising the repertoire** - it is a requisite to sing operatic roles; it enhances communication with the audience (Hallam, 1995). Singers memorise more effectively if both words and melody are memorised together (Gingsborg, 2000).

5. **Automatising learnt neuromotor skills**(Jørgenson, 2004). Skilful singing involves a fine coordination between air pressure and different degrees of muscle tension and extension, occurring at several body parts simultaneously at a high speed. The voluntary control of oropharyngeal, intercostals, abdominal and external laryngeal muscles to achieve the desired voice quality is achieved through the repetition of prephonatory gestures, which are monitored by the quality of the associated sound produced, using both kinaesthetic and auditory feedback loops (Larson et al., 1995; Mürbe et al., 2002). Consciousness repetition of these gestures lead to their automatisation, which is required to all musicians to develop consistency and development of proficiency (Jørgenson, 2004).

6. L**earning the correct pronunciation of the text** - As music and words are both key elements in vocal musical, training phonetic settings required by the language of the lyrics are equally important as practicing the melodic contour, phrasing, rhythm, intonation and vocal sound quality (Kayes and Fisher, 2002). It would be ideal if singing students also learn the grammar and vocabulary of these languages, so that they become capable of translating and interpreting the text (Kagen, 1950). One should bear in mind that, associated with a professional career, there is the need to work with musicians from different nationalities and even live in different countries. Thus, the ideal scenario would be that music schools could offer language classes; when not possible, the student should acquire these competences elsewhere, extra-curriculum.

(iv) Musicianship, interpretation and expressive communication

> *"The only reason for developing a stable vocal technique is to be able to communicate sound and emotion to the listener. It is true that beautiful sound, in and of itself, can be emotive. But beautiful vocalism*

> *separated from the artistic imagination is not sufficient for dramatic and textual communication."* (in R. Miller, 1996, pp. 152)

Expressive performance has been regarded, by both teachers and their students, as one of the most important characteristics of a successful performance (Laukka, 2004). Students who are higher achievers refer to their performances as being engaging, appealing, charming, committed and presenting a depth feeling of the music they interpreted (Coimbra and Davidson, 2004). Research has suggested that varying the inherent structure of the music using a rule system based on the cognitive representation of the hierarchical structure by the performer may enhance expressivity (Juslin, 2003). This includes phrasing, sharpening contrasts in terms of time duration and intonation, exaggerating articulation on repeated notes or important lyrics, and creating tonal tensions (Friberg et al., 2006). Discrete emotions can be conveyed using combinations of different acoustic musical properties, as there is a connection between the emotional psychological content of the piece, the performer's body, vocal tract movements and voice quality (Sundberg, 1982). For example, tenderness can be expressed using slow tempo, low vocal intensity, round voice, avoiding hard vocal attacks, reducing contrasts between long and short notes and singing with vibrato (Juslin, 2001). According to the multi-dimensional theoretical model proposed by Juslin (2003) (GERMS), other important aspects of expressive communication include: (i) random variability; (ii) the violation of musical expectations or the delayed of expected resolutions; and (iii) producing motion patterns in music which resemble human movements (Friberg and Sundberg, 1999).

II – Learning voice care

> *"Voice is a capital in the bank...sing on your interest and your voice will last."* (Lauritz Melchior, cited in I. Titze, 2010, pp. 52)

Unlike other musical instruments, the voice cannot be replaced if ruined; thus, vocal health and longevity are of outmost importance to a singer (Titze, 1992). To have a healthy voice, singers should be regarded, and regard themselves,

as “vocal athletes” (Schlömicher-Thier and Weikert, 2006). Following a healthy life-style is half-way to maintain physical and mental well-being, and thus vocal health (Dayme, 2005). Other equally important factors include healthy vocal practices and awareness of protective vocal behaviours.

(i) Physical and mental well-being

> *“Every voice has a shelf life, and one has to be extremely carefully of anything that might end a career mysteriously and prematurely. Caring for a voice includes paying attention to aspects of physical health, the environment, mental fortitude, and, above all, a solid technique.”* (in R. Fleming, 2004, pp. 142)

Literature concerning strategies to promote healthy living habits is diverse; so this section provides a summary of basic guidelines for achieving physical and mental well-being, namely: (i) **acquiring good sleeping habits**, as during sleep the body restores itself; (ii) **follow an excellent nutrition**, rich in fibres, vitamins, proteins, low saturated fats. When a singer has poor nutritional habits or an unbalanced life-style, situations such as the development of gastric reflux may appear and impact negatively on vocal health as they constitute one of the most common causes of vocal disorders (Merati, 2006). Some food supplements can also be a good choice, especially during times of the year when the immune system may need a boost (Dayme, 2005).; (iii) making sure that **hydration levels** are kept high during the day, especially previous to a practicing session or a performance; (iv) **refrain from alcohol**, **caffeine** and **smoking**; elevated quantities of alcohol cause vasodilatation of the capillaries of the mucosa of the vocal folds; the diuretic effects of caffeine cause dryness of the vocal folds mucosa; nicotine causes erythema, oedema and inflammation of the vocal tract impairing vocal performance (Sataloff, 1987); (v) **avoid the exposure to environmental irritants** (pollution and allergens), as these may cause hoarseness, throat clearing and vocal fatigue; (vi) consult an ear-nose-throat (ENT) specialist when voice quality has changed, and prevailed for more than a week (Sataloff, 1995); (vii) **create coping strategies** to deal with stress and anxiety commonly associated with an agitated life-style, and with constant exposure to evaluation and criticism. Although it might take several years until

one has developed resilience, it is important to develop the ability of knowing when to accept criticism and when to ignore it. Thus, singers, like other musicians, should: seek for support amongst family members, colleagues and teachers; learn relaxation techniques; practice sports; and balance working time with leisure time. Sometimes it is necessary to work as much on vocal competences as on **self-attitude** towards anxiety and doubtful thoughts (Connoly and Williamon, 2004); (viii) being aware of **pharmacological agents with a potential negative impact on the voice** (Sataloff, 1987). Medication which cause vocal problems due to vocal dryness include: **antihistamines** - prescribed to treat allergies (expectorants, mucolytics and wetting agents normally counteract these adverse effects); **decongestants; oral inhalers** – the effects are according to dose and individual response to the medication; **antitussive medications** containing codeine and antihistamines; **systemic corticosteroids** - potent anti-inflammatory drugs used to treat acute inflammatory laryngitis; **antibiotics** - when taken without following the physician's advice can lead to the progression of a curable infection); **antihypertensives** (normally prescribed to reduce high blood pressure); **treatments for reflux laryngitis**, namely antacids and **H2-blockers**. Proton pump inhibitors (**PPIs)** are most effective in treating reflux and seem not to cause vocal side effects. Other solutions to avoid or reduce acid reflux involve avoid eating heavy meals, especially 4 to 5 hours before going to bed, as well as consuming food that can increase acid production (e.g. tea and coffee) (Sataloff, 2006a); **psychotropic drugs,** i.e. **sleeping aids** and **treatments for motion sickness; tranquilizers** and **anxiolytics,** which besides laryngeal dryness possess side effects such as sleepiness and drowsiness which equally impair the performance; **antidepressants**; **antipsychotics; diuretics** - usually recommended to manage premenstrual and menstrual fluid retention, and to reduce "high blood pressure", its use is associated with a dehydrating effect and an increase in the viscosity of laryngeal secretions. Other medications which should be avoided by vocalists are: **inhaled cortiscosteroids** - indicated to treat asthma, they can cause dysphonia, and hoarseness; other alternatives such as leukotriene inhibitors, should be recommended to vocalists (Alessi and Crummey, 2006); **pain-relief drugs** (analgesics) - used to reduce the sensation of pain, they should not be taken before a performance as pain informs on

symptoms of voice abuse; (iii) **aspirin** and **ibuprofen** can predispose to mucosal haemorrhages, especially when vocal folds disorders exist due to vocal effort and abuse; **hormone medication containing androgens** significantly changes the extensibility of the connective tissue and water retention in the mucosa of the vocal folds; **oral combined contraceptives** may have side effects such as vocal fold oedema, depending on dose and properties of their progestogen component (Amir et al., 2003; Lã et al., 2007; Lã et al., 2011; Van Lierde et al., 2006); **hormone replacement therapy (HRT)** - controversial effects were found, depending on dose, progestogen component and duration of treatment (Laureano et al., 2006; Lindholm et al., 1997; Meurer et al., 2004; Schneider et al., 2007); **thyroid treatments** may lead to xerostomia; for hypothyroidism they seem to restore vocal function (Alessi and Crummey, 2006).

(ii) Awareness of protective vocal behaviours

a. Refrain from singing

> *"We never know if singing on a cold or a throat infection will be our last performance, so prudence is rewarded with a future".* (in R. Fleming, 2004, pp. 139)

Decisions on whether to sing or not under non optimal conditions often depend on the singer's voice and singing abilities. There are those who cannot sing with a simple cold, and others who have learnt to use diction, modifying the style, or giving emphasis to interpretation to be able to give an acceptable performance (Davies and Jahn, 1999). Conditions for which singing is contraindicated involve: (i) **acute laryngitis**, i.e. inflammation of the larynx with red and swollen vocal folds. If the singer does not refrain from performing, serious long term vocal problems may be developed; (ii) **vocal fold haemorrhage**. Singing may aggravate the haemorrhage, leading to, for example, vocal polyps; (iii) ***laryngopathia menstrualis***, i.e. prevelance of microvarices and swelling of the vocal folds associated with premenstrual and menstrual phases of the menstrual cycle. Singing under these conditions may lead to vocal haemorrhage and subsequent associated vocal problems. For this reason, in the past there were the "respect days", three days in the singer's contracts in

which the singer could refrain from performing if symptoms of *laringopathia menstrualis* were present (Abitbol et al., 1999).

b. What to expect from an ear-nose-throat specialist

> *"The voice doctor has to be aware of the possible causes that can put the singer's voice at risk and damage a singing career. (...) to know the heavy demands made on the singer in respect of physical and psychological strain, artistic sensibility, individuality, and empathy for the greatest possible expressive capacity and interpretation".* (in J. Schlömicher-Thier and M. Weikert, 2006, pp. 140)

Another important protective strategy would be **to know what to expect from a laryngologist or ear-nose-throat (ENT) specialist**. Because of the demands of this profession, almost every singer visits an ENT specialist at least one time in life. The quality of this visit is of outmost importance for the quality of the outcome (Schlömicher-Thier and Weikert, 2006). The singer should look for an ENT whose patients are majority singers, who demonstrates sympathy and availability, who takes a detailed patient history, keeps records of the singer's larynx in normal conditions, and who is willing to explain what is going on with the singer's voice. The ideal scenario would be that music schools establish an agreement with an ENT specialist; singing students can be followed up by the same health-care specialised team and efficient treatment provided at accessible prices (Davies and Jahn, 1999).

c. Healthy vocal practices

> *"A big component of longevity is choosing repertoire wisely. The most difficult word for a singer to learn is no – no to too much, too soon, too heavy, too dramatic, too mature, and to an orchestra that's too loud. (...) One of the best ways to ensure stamina is not to sing too heavily, for adding weight to a particular long section will only lead to fatigue."* (in R. Fleming, 2004, pp. 146; pp. 150)

Acquiring **healthy vocal practices** is an important aspect of protective vocal behaviours. These include:

1. **Daily vocal hygiene regime**. Practicing **vocal warm-ups**, at isolated times of a day or prior to a practicing session, have been perceived as essential to maintain and develop a healthy vocal technique (Elliot et al., 1995). Approximately half of singers (54%) report to practice 5 to 10 minutes of warm-up exercises, which include: (i) exercises to correct body posture; (ii) exercises to facilitate certain desirable breathing patterns; and (iii) scales, arpeggios and staccatos, at different frequencies, phonation types and dynamics (Elliot et al., 1997; Gish et al., 2010). Several studies hypothesised that the practice of this type of exercises (not to the point of exhaustion), prevent vocal fold injury by engender many important aspects involved in phonation, such as: (i) decreased viscosity resistance of the vocalis muscle as a consequence of increased muscle temperature (Elliot et al., 1997); (ii) increased oxygen delivered rate to the muscles and increased nerve conduction rate (Bishop, 2003); (iii) loss of water content in the vocal fold's mucosa and increased water intake in the muscle, a protecting effect for the vocal folds during a high frequency vibration mode (Motel et al., 2003); (iv) facilitated coordination between Psub, vocal fold's longitudinal tension and glottal adduction (Elliot et al., 1995); and (v) increased periodicity of vocal fold vibration (Amir et al., 2005). Practicing exercises using a **semi-occluded vocal tract** (e.g. tube phonation, humming, lip trills, raspberries, tongue trills and bilabial fricatives) have also been pointed out as highly beneficial, not only for warming-up, but also for cooling down; they seem to facilitate vocal efficiency by raising the mean supraglottal and intraglottal pressures, thus enhancing the source-tract interaction (Tizte, 2006).

2. **Vocal stamina**. Like an athlete, singers should regularly practice exercises which facilitate strengthening of laryngeal musculature and promote efficient vocal fold vibration (Schlömicher-Thier and Weikert, 2006). Examples of these exercises are "isometric" exercises (e.g. *messa di voce*), which work maximum muscle group contraction without motion for a short period of time (Stark, 1975). This type of exercises have seem to facilitate coordination of vocal fold vibrations, tone focus and respiratory support (Sabol et al., 1995). Singers also should practice "isotonic" exercises (e.g. florid scales), which promote slow changes in muscle length, and "calisthenic - type exercises", which involve short muscle contraction (Sabol et al., 1995).

3. **Protective strategies** to reduce the risks to which they are exposed as a consequence of their career demands. For example, frequent travelling, especially on airplanes, may lead to vocal problems, as singers are exposed to high levels of noise and poor humidification. To decrease negative effects of these conditions, singers can: (i) reduce talking; (ii) sleep during the trip; (iii) avoid caffeine, alcohol and sugary drinks intake (as these act as diuretics and increase dehydration); (iv) drink plenty of water; (v) use a saline nasal spray; (vi) for long flights, wear a moistened mask; and (vii) avoid travelling with head colds as dysfunctions of the Eustachian tube may result in hearing loss (Davies and Jahn, 1999).

4. **Choose repertoire wisely**. This plays a major role in the development of a future long lasting professional career (Flemming, 2004; Miller, 1996). The responsibility of singing the most suitable repertoire is shared by both teachers and students. Some singers, specially the younger ones, may feel an urge to accept leading operatic roles, sometimes too early in their vocal development and a step too big for their current vocal stamina (Flemming, 2004). However, singing inappropriate repertoire may slow down vocal developmental, student's learning efficacy, and cause vocal damage (Ralston, 1999).

The most appropriate repertoire should take into account individual voice classification, i.e. the individual laryngeal characteristics, age and maturity. A clear relationship between predicted vocal fold length and voice classification exists: sopranos possess the smallest anterior-posterior subglottic-tracheal diameter yielded mean vocal fold length, followed by mezzo-sopranos, altos, tenors, baritones and basses (Roers et al., 2009a; Roers et al., 2009b). Thus, in assisting the choice of repertoire, teachers should be aware of: singer's voice classification; singer's vocal and musical capabilities/difficulties; technical demands of the repertoire; repertoire which could constitute an achievable challenge, according to the singer's current technical development; relevance of matching repertoire with student's vocal and personal characteristics (Jarvis, 1987); and available guiding literature, including books by Coffin (Coffin, 1960), Espina (Espina, 1977) and Kagen (Kagen, 1968), although, none of these books grade the repertoire's difficulty (which may be related to the inexistence of well-defined criteria) (Ralston, 1999). Indeed, there has been a high variability in assessing repertoire's difficulty among universities and across

countries. *The Ralston Repertoire Difficulty Index* (RRDI) grades the difficulty of the repertoire (1 – 3 = "easy": 4 – 6 = "moderate," and 7 – 9 = "difficult") based on seven features (i.e. range, tessitura, rhythm, phrasing, melodic line, harmonic foundations and pronunciation). The author applied this instrument only to five randomly selected songs (Ralston, 1999), consequently, RRDI should not be considered as an universal manner of grading repertoire's difficulty.

III – Integrating key factors for a successful transition

> *"There are so many things that go into making a singer – not just natural talent and hard work but tenacity, resilience, and luck.(...) what a singer needs more than anything else to get a career going is one brave impresario who is willing to take a chance and put his or her stamp of approval on her"* (in R. Fleming, 2004, pp. 16; pp. 81)

Looking at how famous singers have started their careers, one finds **winning important competitions** and **efficient managers** as common denominators. Thus, music schools/colleges/universities should provide courses on career management and on how to prepare a singing audition/competition. In addition, it is of utmost importance that educational institutions often invite managers to listen to students, establishing a supportive net for young singers, based on bridging the school with the professional world. The success of an audition much depends on the ability of: using the tools of trade in the best possible manner; passing a clear image of the singer's character and professionalism; conveying the expressive meaning imbedded in the music; interacting with other musicians involved in the performance; communicating with the members of the panel; and being completely engaged and focussed on the performance (Kayes and Fisher, 2002).

Possessing **personality traits,** which fit pursuing a stressful and demanding career, is another essential requisite for success. For example, musicians who possess a combination of perfectionism, introversion and neuroticism have shown propensity to maladaptive anxiety behaviours, such as self-handicapping

and social phobia (Lehmann et al., 2007). Research suggest the following personality traits as best suiting a professional musician's career: (i) a combination of introversion and independence, to provide the self-sufficiency to overcome difficult tasks associated with high achievement; (ii) sensitivity combined with independence, to facilitate creativity, artistry and self-perception; (iii) self-confidence; (iv) perseverance; (v) enjoyment of music; (vi) high musical expectations; and (vii) communication and organizational skills (Creech et al., 2008; Lehmann et al., 2007).

To be better prepared to engage in a professional life it is also essential to have as much performance opportunities and positive experiences as possible. Thus, **learning to become better prepared for a performance** should be part of school/colleges/universities curricula. For example, courses teaching: the training of mental skills (e.g. mental image of a successful performance); the building of a pre-performance routine; discuss performance expectations; the organizational skills needed to prepare a concert programme and to create a portfolio (Connoly and Williamon, 2004). Educational institutions should also provide the opportunity for the students to organize performances prior to auditions/competitions to friends, family and colleagues (Connoly and Williamon, 2004).

In order to fulfil audiences' expectations and keep their interest, professional singers need to **keep improving** their performing skills (Flemming, 2004). There are several strategies that professional singers may use, including: keep working with coaches, conductors, singing teachers and other experienced musicians. As the voice is a "hidden instrument", an expert listener's feedback provides important perspectives to continuous career development (Miller, 1996).

As everything in life, **luck** is determinant in becoming a professional singer. The luck for performance opportunities and involvement on peer networks was pointed out as a contributing factor for a successful transition from a student to a professional level by portfolio career musicians (Creech et al., 2008).

If one wish to summarise the key elements contributing to become a professional singer, today's singer true richness dwell on integrated networking of scientific-based evidence, experience, natural curiosity, persistence and passion to use the voice as exceedingly way of artistic communication.

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