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Teaching young voices safely

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An investigation of some current research into the impact on young singers of intensive training and the possible outcomes of ineffective or incorrect vocal practice.

Many children sing to a high level of performance both in traditional choral settings as well as in Musical Theatre. There is some debate surrounding the nature of their training; to what extent should they be taught singing technique and what is a suitable workload for young voices? On the one hand, there is an argument that singing is a natural process and children will do this to the best of their ability if they are left unencumbered by technical information which stems, after all, from an adult model. On the other hand, we can look at the way in which children are trained in other physical skills such as sports and dance; the accepted practice in these fields, often based on research, may give some insight into suitable vocal training for young voices.

Background information

Firstly, in order to understand the nature of 'safe' singing, it may help to look primarily at the results of poor voice use. It is generally the case that unhealthy practice will result in loss of stamina or physical injury. It may also result in inefficient behaviour or bad habits; these may prevent the individual from achieving their optimum performance. In a voice, over-use or misuse will initially result in vocal fold oedema. The nature of the collision of the vocal folds, known as *vocal loading*, may result in soreness and swelling (Artkoski, Tommila, & Laukkanen, 2002; Titze, 1994). There are three main factors which can increase vocal loading:

- amount of use, or the number of vocal fold collisions in a set time. This is dependent on the amount of time spent vocalising and the average pitch of the vocalisations (higher pitches require more frequent vocal fold collisions).
- intensity of use, or vocal loudness, this includes voice use against a high level of background noise
- voice use while under emotional strain

If a singer has been in a situation of high vocal loading, the resulting oedema will result in an alteration to the vocal quality. This may be heard as breathiness, harshness, hoarseness or creak (a sound similar to a creaky door); if these symptoms are severe enough, the voice can be defined as *dysphonic*. If the singer continues to use the voice in this situation, the longer-term outcomes may be pathological disorders of the vocal folds.

When observing children's voices, there may be evidence of dysphonia which is unrelated to singing behaviour. Voice disorders are common among school-age children (Sederholm, 1995). Most of these cases are never referred for clinical treatment, which would imply that they nearly all get better in time, presumably because the child is growing and so use and function are continually altering.

Evidence for the effects of vocal training - the first study

In order to understand further the implications of intensive training on the vocal health of young voices, we can look at the results of an occupational health study into professional boy choristers in a London Cathedral (Williams, 2010). It should be pointed out that this research is only on boy singers. This does not mean to suggest that girls cannot train to sing at such a high standard, or that girls' voices are not as worthy of study. It is a particular cultural artefact that the professional cathedral choirs in the UK, which require children to perform at the highest levels of performance, mostly have only male singers. It is not appropriate for this paper to comment on whether this use of boys alone is socially fair or artistically justified. The concern of this study was to assess the voice use of the professional child classical singers in the UK who have the highest levels of vocal loading.

The singers selected may be subject to the highest levels of vocal loading for the following reasons:

- They have a high level of voice use required to meet rigorous professional standards.
- They perform for more hours per week, or more weeks per year than any other choir using children's voices.
- They perform in a large reverberant building, requiring a high vocal intensity level to fill the acoustic.
- They have other, high-level academic and musical expectations to fulfil.
- They are influenced by the legacy of commercially recorded repertoire, and may have greater pressure to achieve higher standards more often.

There were four groups of boys compared:

- 1 Choristers in a boarding school (central London cathedral)
- 2 Choristers in a provincial cathedral, non-boarding
- 3 Non-choristers in a boarding school
- 3 Non-choristers in a non-boarding school

Perceptual assessments of recordings of their voices were carried out by a team of expert judges. The resulting distribution of vocal health assessments are shown in the figure below.

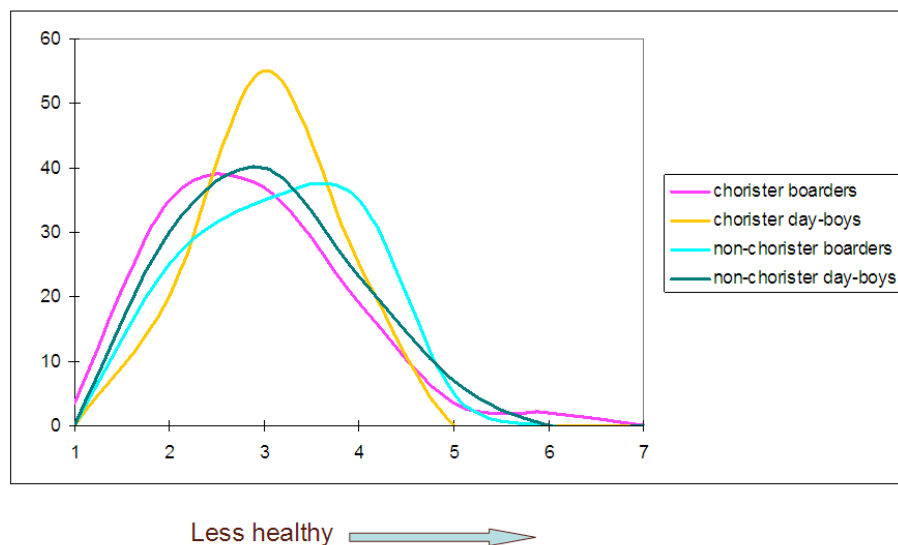


Figure 1: Level of perceived dysphonia in the four groups of boys

From these results it can be observed that the most intensively trained choristers were in fact the healthiest group of all. Statistical evaluation showed their voices to be significantly healthier than any of the other groups.

Conclusion to the first study

Intensively trained boy choristers, despite high levels of vocal loading, have healthier voices than their non-chorister counterparts. Choristers probably employ self-regulatory caution with their voice use at all times in order to ensure that they do not exceed certain levels of vocal fatigue. They may also athletically condition their voices to cope with the high vocal loading.

Other reasons for problems in children's voices

It is unlikely, taking into consideration the results of this study, that intensive singing training will cause vocal damage. We know, however, that a significant percentage of children have dysphonic voices, presumably this is primarily due to playground use and personality type. We also know that many adult singers have deeply entrenched vocal habits which may not engender efficient vocal production. It could be suggested that bad vocal habits left unchecked in childhood will persist into adult singing and can take years to unlearn.

Teaching effective vocal technique to children

Again, there is scanty evidence for the effectiveness of teaching vocal technique to children, so a look at sport research can provide some clues. The conclusions from publications on sport and gymnastic training is that technique is essential to prevent injury (Cram, 2001). We also know that performance outcome will increase in line with physiological arousal, unless cognitive anxiety levels are high, in which case there is a dramatic fall in performance outcome beyond a critical point (Hardy & Fazey, 1987).

As singing is a physically learned skill, it could be suggested that learning technique is also essential for this activity, especially if high performance outcomes are expected.

Bad vocal habits: what are they and how do they arise?

Common habitual problems in singers of any age may be:

- inefficient breathing technique
- jaw tension
- tongue root tension
- articulatory weaknesses
- inefficient vocal fold closure (breathiness)
- postural misalignment
- laryngeal muscle tension or constriction

Some bad habits are acquired through incorrect advice, the singer may have been asked to sing with a yawning sensation, for example. This will raise the soft palate and lower the larynx, which are both advantageous for vocal production, but the gesture will involve the tongue root pressing onto the top of the larynx, inhibiting movement and resulting in a hooty tone which is often flat in pitch. Most bad habits are fallen into as a result of neglect, the teacher either isn't aware of effective vocal pedagogy, or is not confident to apply it to younger singers. Some issues will arise from singing inappropriate repertoire, if the vocal line is too sustained on high pitches, or requires a full, loud tone, it may encourage laryngeal constriction and muscular imbalance in the young voice

Some vocal patterns evident in adult singers are as a result of having sung the wrong vocal part in choirs; in boys, this is normally from staying too high for too long. Boys who sing soprano when their voices are unchanged may be tempted to continue to sing in the soprano part after their voice has begun to lower, if they are still able to reach the high pitches. It is not uncommon for experienced boy sopranos to maintain their high range into falsetto singing, when their speaking pitch may have dropped several tones.

Evidence for the implications of falsetto singing during adolescent voice change – the second study

There is anecdotal evidence to suggest that boys who continue to sing in their falsetto voice, instead of dropping gently into tenor or baritone singing, may engender certain compensatory vocal behaviours. These will include: high larynx position and pharyngeal constriction as a result of continually straining for high pitches and less effective vocal fold closure, arising from falsetto phonation. We know from medical research that muscles grow in length before strength (Malina, Bouchard, & Bar-Or, 2004). The muscles of the adolescent male larynx are growing faster than any other muscle, the male larynx increases in size by 65% in about two years. This suggests that, while muscles are growing rapidly, their strength and coordination may be compromised, and that activities should be less demanding of intense muscle use. Falsetto singing requires relatively small muscles to work in extreme and unrelenting contraction for the duration of the vocal line. This may possibly be compromising the healthy development of the adult voice

In order to investigate this, a study was made of several trained singers entering puberty. Electroglottogram data can show the duration of each vocal fold closure, it can also show the level of efficiency of the initial snap together of the vocal folds.



Figure 2: Boy C at the age of ten years and nine months, treble singing. Blue line = vocal fold cycles of the word 'sweet' on a C5 (one octave above middle C). Red line = speed of vocal fold closure (a taller line denotes a faster closure)

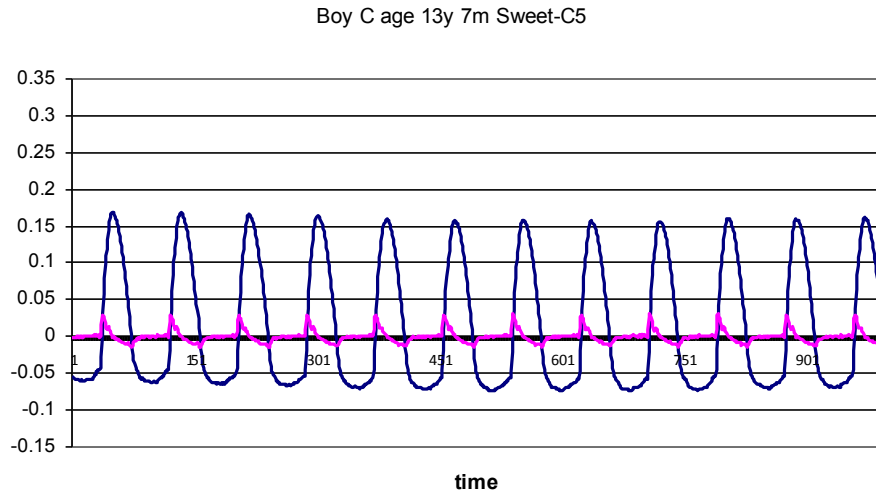


Figure 3: Boy C at the age of thirteen years and seven months, falsetto singing. Blue line = vocal fold cycles of the word 'sweet' on a C5 (one octave above middle C). Red line = speed of vocal fold closure (a taller line denotes a faster closure)

Figures two and three show the changes over time of Boy C, by the age of the second recording, his speaking voice was one of a developing baritone but he was continuing to sing soprano in his choir. There are two main changes to see: firstly, the vocal fold closure is longer for each cycle in the second recording; secondly, the efficiency of vocal fold closure is greater in the first recording. This would suggest an efficient, ringing tone in the treble singing and a pressed, dampened tone in the falsetto singing. When the long term average spectrum is observed in figure four, it shows an upper frequency boost in the treble voice which is missing in the falsetto voice.

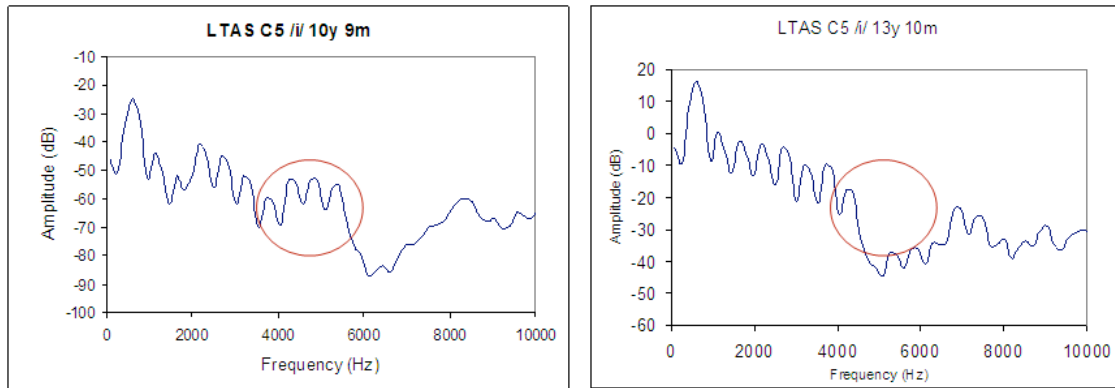


Figure 4: The Long Term Average Spectrum of the |i| vowel in the word ‘sweet’, sung by boy C at the two ages specified on the graph. The red circle shows the upper frequency boost in the treble voice which is missing in the falsetto voice.

Conclusion to the second study

Although there is no evidence to show that voices can be physically damaged through the acquisition of inefficient habits of singing, there is evidence to show that these habits may inhibit future development. It is suggested that a thorough and appropriate grounding in vocal technique is essential for any singer of any age, who wishes to sing at a high level of performance. With the right guidance, children can learn habits of vocal efficiency and physical economy. These will not only enable them to maximise their current situation, but will also provide a foundation for accomplished adult singing.

Useful Reading

Publications available to download on www.jenevorawilliams.com

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