

VoiceGym

A Tool to Involve the Patient for Long Term Treatment Success

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Interdisciplinary work between orthodontists and other structural clinicians is now standard treatment protocol. The dentist or orthodontist has to listen to the cranial osteopath or chiropractor and vice versa because the Mandible is one half of the TMJ and the temporal bone the other half. The mandible and temporal bone have to work together for a functional joint. Whichever discipline diagnoses the ascending or descending compensatory patterns, different disciplines need each other.

When I joined Cranio Group in 1991 I watched face muscles, jaw ligaments, tongue position, swallow reflex and whole body posture being discussed, agonized over, and treated relative to balanced skeletal relationships while I thought “Those are exactly the muscles concerned with breathing, speech and singing”, but this information conflicted with the information I had been given during my training as a professional singer. For instance, I was taught that, for an open throat, my tongue was to be kept flat in the floor of my mouth.

Interestingly, before I was auditioned and accepted for this training I had spoken and sung in welsh, the speaking of which encourages the tongue to operate in just the position the clinicians approved of. The ‘LL’ in *Llanelly* can only be articulated correctly with the styloglossus muscle – responsible for pulling the tongue back and up into natural resting position – in major contraction. Is this the secret of the great welsh voice?

My voice had seemingly passed its best; apparently the working model I had trained it on had done it no good. I had nothing to lose.

I designed exercises to reprogramme the muscles that were used speech and singing for efficient swallowing, breathing, mandibular translation and upright, balanced posture. I stopped consulting voice specialists and textbooks on singing and speech technique and instead, exercised the voice and body together with regard for -

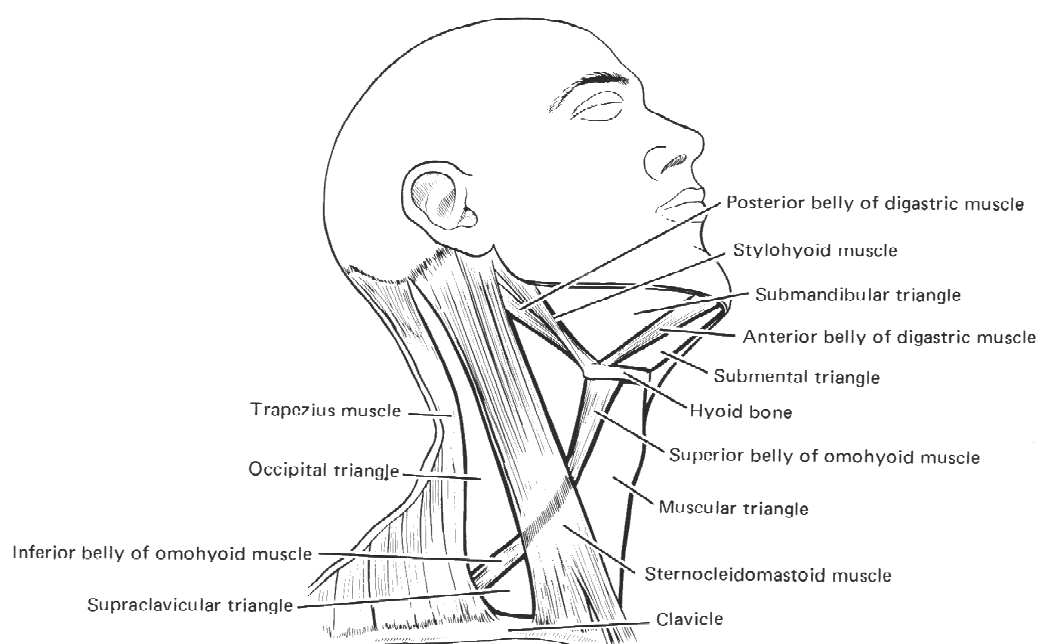
- functional anatomy, as presented by a physiotherapist,
- balance and alignment, as described by cranial chiropractors and osteopaths,
- function of face, jaw and tongue muscles, as described on Courses and writings of Jim Jecman, Brendan Stack, Gerald Smith, John Mew, Jonathon Howat and Robert Walker.

Where my Voice Training ‘belief system’ contradicted what I was doing in relation to this information I consulted at least two clinicians to discuss the difference. No structural clinician agreed with the tongue position recommended by the singing teachers as it interfered with nose- breathing. Dentists and orthodontists were spending treatment time repositioning the tongue to rest against the palate. I retrained my tongue back to the ‘articulating in welsh’ position.

Lo and behold, my voice began to improve – at aged 55. My pitch range increased and there was more resonance. Teaching and running workshops became easier because talking louder and more clearly was less of an effort. My hyoid bone dropped and I used less air to sing, most of which went in through my nose. Within a short time of working with this model I had to accept that speech, singing, swallowing and breathing are all dependant on hyoid bone position for efficiency and so are muscles that position the tongue, the shoulder girdle and the mandible. I had to accept it because the results told me so.

The whole laryngeal suspension hangs from the temporal bone of the cranium, as does the mandible. The tongue is the main speech articulator. The tongue rises from the hyoid and inserts into the mandible, one third of it being in the oral cavity and two thirds in the pharynx. This provides the skeletal stability for smaller muscles that change the angle of the tongue as it participates in swallowing, breathing, speech and singing. These are -

- Styloglossus - which pulls the tongue up and back towards each styloid process of the temporal bone.
- Omohyoid – which pulls the hyoid bone back and down towards each shoulder blade.
- Digastricus – which act as a pulley system maintaining connection between mandible, hyoid and temporal bone in any configuration of that triangle.



After Hiatt and Gartner (1987)

If my voice improved by exercising muscles concerned with swallowing, breathing, mandibular translation and upright posture, could the opposite also work?

If voices were reprogrammed for efficiency in speech and singing, using exercises based on the new belief system, would improvements occur in tongue position, breathing, jaw translation and other muscular areas that would be an aid to orthodontic treatment. In the same way that the temporal bone and the mandible linked the disciplines of skeletal structure and dentistry/orthodontics, I began to see that the position of the tongue in relation to the mandible and the hyoid bone could add the link of voice teaching to the whole treatment protocol. In a series of papers and articles, some of them in this publication, I encouraged

structural clinicians to consider the inclusion of the hyoid suspension when diagnosing problems and planning treatment.

I developed and refined the voice and whole body exercises that I used to improve my own voice and added a CD to help with motivation and enjoyment. Everything was based on rhythm, poetry and singing and exercised the muscles responsible for -

- nose breathing,
- facial muscle function,
- improved mandibular translation,
- natural tongue resting position,
- maximum airway.

Although the overall aim of the programme was always to improve the voice and posture Much of the muscle system concerned with the mouth, face, jaw and tongue is comprised of *involuntary* muscle, which is only accessible through imagination and a sense of play. While both centers of the brain are involved in all that we do, play relies on right brain dominance and the right brain is also dominant in singing and listening to music. Play had to be an important feature of the programme, both for motivation and for exercising and reprogramming relevant involuntary muscle.

The programme had been successful for *me* but it needed to be tested on others.

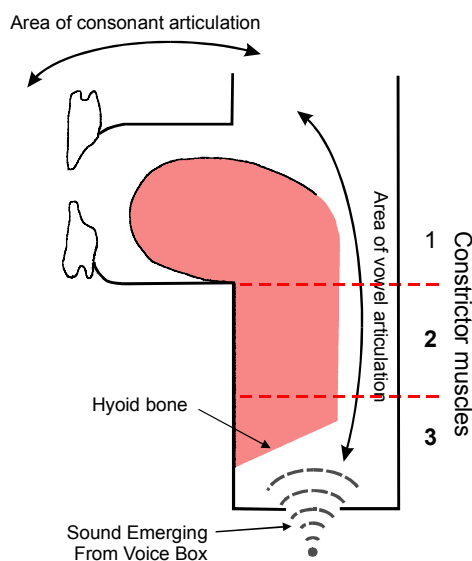
Case 1

A young male singer, whose voice became limited in pitch range and resonance after the removal of premolar teeth for crowding. Finally, at 18, he was unable to sing.

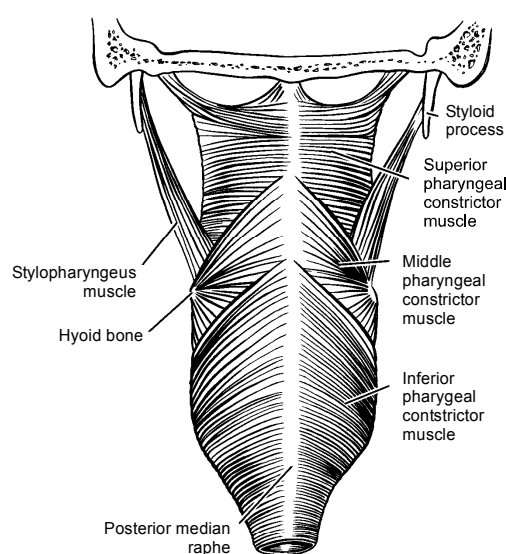
The history of this case has been reported elsewhere (Caine, 1998). The original orthodontic treatment was reversed by expansion techniques with chiropractic support and the dentition restored by bridging. The singer is now a professional tenor successfully earning his living from his voice. For the purpose of this article I shall refer only to findings relating to the exercise system - *VoiceGym*.

As the maxilla was expanded a point was arrived at where the voice failed to improve any more. The hyoid, which had been repositioning due to the stretching of the supra and infra hyoid muscles suddenly refused to go any further. When a hyoid is suspended for efficient function the voice has a balanced range of both upper and lower harmonics. The tongue was still too far forward. This voice was singing too high, not in pitch, but in operating position.

This tenor had begun singing as a treble in a church choir and his singing had been trained at roughly 8 years old on a system that uses breathing exercises to pressurize the hyoid bone from underneath and maintain a high position. This accounts for the flutelike sound of the treble voice and helps to preserve the treble voice longer into puberty. He was still over breathing and pressurizing the voice as a habit pattern, several years after the voice had changed to adult. The hyoid was being held high by breath pressure for underneath. This was solved by introducing into *VoiceGym* an exercise to drive the articulation of vowels into the third constrictor in speech and singing, as well as the first and second, accessing the swallowing pattern for articulation. Over breathing gradually stopped and the hyoid descended again, bringing lower harmonics, extended pitch and more chest resonance into the voice.



What happens, ideally, inside the three constrictors (after Caine, 2003)



Use of all three constrictors of the pharynx for articulating vowels (after Hiatt and Gartner, 1987)

Case 2

A thirteen-year-old girl, two years into expansion to correct a very difficult growth pattern with one canine erupting through the alveolar ridge. She has very large teeth fighting for space in a very narrow maxilla and the plan had originally been to extract when the teeth had finally totally erupted, at age 14+. By the time the parents were persuaded to agree to functional orthodontics instead, and had argued about the cost, the correction had become even more of a major job.



The problem that presented



Exercise from *VoiceGym* with singing to aid expansion

She sings very well, having begun at ten to learn to sing using only the voice development system I have designed. Speech and singing have been maintained functionally the same, her articulation uses the whole pharynx and her tongue rests as close to the palate as is possible with a large plastic section to her upper and lower appliances. I have encouraged her to struggle with singing songs with the appliances in place and demand clear words. This exercises all the face muscles necessary for nose-breathing and because no other system has

been taught the hyoid bone has remained stable and in good relationship with mandible and skull. The photos illustrate the kind of exercise that is maintaining the good growth pattern in her face during this protracted treatment.

The most important aspect of her treatment is that she has been totally motivated throughout this painful time. Although she sounds dreadful with the appliance in, this does not bother her because she takes the appliances out for a final sing and can hear the improvement. She has taken leading parts in pantomimes and Youth Theatre Productions, rehearsing with appliances in, to everyone's amusement –at first! Revues have mentioned her 'vocal prowess and naturally good movement' and she has just been selected as one of the final five competing for a Hampshire Youth Award Scheme. She goes into ALF appliances next week and will then sound good with those in.

Case 3

A 38 year-old female osteopath, on a treatment plan for expansion and TMJ correction to reduce shoulder and neck pain. This was supported by osteopathy and voice and body exercise. All three people concerned with her treatment agreed that she was on the edge of Physiological Adaptive Range (PAR), and she was unconfident, unmotivated, (she kept wondering why she was taking it all on) and this gave her a breathy, pale dull voice ("I hate my voice every time I hear it").

In a case like this, without the exercise programme the patient might well give up the treatment plan before completion. She loved working with the ball and stretch band ("This is my Comfort zone") - they bring an immediate improvement to voices in all cases - so she seized upon that improvement as a good sign. Eventually she began to read poetry aloud on the ball - there are poems just for reading aloud in the programme. Voice improvement then became the personal motivation for the rest of her treatment. This single-mindedness gradually changed as face, head, neck and posture improved with the treatment and her attitude to the orthodontics improved. The fun and enjoyment of the exercise programme is often a great asset to patient attitude, making life easier for everyone concerned with treatment.



Re-programming the breathing system for efficiency



Dropping the Hyoid and repositioning the tongue while reading aloud

How to use *VoiceGym*

VoiceGym can be recommended to the patient by the clinician, who might be the orthodontist or another clinician involved in the treatment plan. After that, the patient takes responsibility for the exercise programme and the clinician does not have to be directly involved. At any time the patient can email angela@voicetraining.co.uk to comment, ask questions or get help.

The patient can purchase *VoiceGym* directly from www.voicetraining.co.uk. It is best to start the exercise programme before appliances are introduced, to prevent related muscles going into spasm. This reduces any initial pain and gives the patient something to do while learning to cope with the appliances. The voice is used as a tool to exercise the whole body through simple voice and body exercises. The patient then becomes an active participating member of the treatment team.

The complete *VoiceGym* package will be couriered straight to the patient. The box contains everything for both specific and whole-body exercise. There is an A4 laminated exercise book with accompanying audio CD, a physio ball sized to the customer, a stretch band, a balance board designed by a chiropractor and a beanbag for postural work.

Beginning in March 2004 regular workshops for those working with *VoiceGym* will be held near Southampton.

***VoiceGym* Book, which can be purchased separately**

There are chapters to explain every aspect of voice and body development and maintenance. The book links voice with other clinical disciplines and is intended to prevent poor voice use, which would otherwise adversely affect good dental and skeletal development after treatment is completed. The chapters cover -

- *Simple and practical working models*
- *Development of the Voice through infancy, childhood, puberty and adult*
- *Breathing – the myths and the mischief*
- *The Importance of Tongue Position*
- *Face Muscle Function*
- *Balance and Posture*
- *Jaws and Teeth*
- *Words and Rhythm*
- *A Voice for Life*

All the chapters contain references to specific exercises in the *VoiceGym* exercise programme.

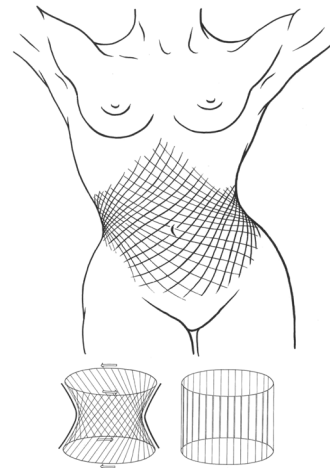
The book has a 'contacts' section with links to useful websites. It is intended to be a simple approach that can be understood on all levels of interest and so includes hand drawn anatomical models, photographs, technical diagrams and mind maps. For those with a more technical interest there is a comprehensive reference, bibliography and glossary section. The plan is to continue to develop the contents with the continued development of functional orthodontics and interdisciplinary work, to be read by clinician and patient.

The aim of *VoiceGym* is to give the patient a role in his or her own treatment. Parents can encourage children by doing the exercise programme with them. There are notes in *VoiceGym* book for adapting the material for children, and small physio balls are available.

Two pictures from VoiceGym Book



Strengthening by rotation and torque (from West Side Story)



Model of rotation and torque (after Kapandji, 1970)

Whatever will get the tongue where it needs to live, the airway extended and the face developing laterally has got to be good. There is not much singing in schools, but there is a bounty of backing tracks available to sing with your Karaoke machine. The desire to sing pop currently begins around 6 or 7, just when we are encouraging structural correction to be considered. This exercise programme gives the young patient the opportunity to sing just the way they want to – strong, confident, in tune, rhythmic and with plenty of movement. Pop idol –here I come, *ALF* and all!

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