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Shaping the sound of a mixed choir through the holistic method “Voice, Body and Spirit in Balance” – through conscious appoggio and cooperation between the body and the breath

Each voice, anatomically and physiologically speaking, is an individual entity, just like each fingerprint, unique in the world. For this reason, a fully individualised approach is required to address the needs of vocal technique development, indispensable for improving the production of sound by each voice. Developing the ability to consciously refine the timbre of the voice – important for those singing in ensembles or vocal groups – is helpful to the conductor in the process of building impeccable choral sonorities and achieving consistent interpretation in accordance with the intended artistic concept. Regular exercises in vocal sound production facilitate the continuation of work. Musicians gain motivation for continuous self-development through the resulting increase in the sense of performative freedom when the stylistic and musical requirements of interpreting the repertoire are met. The following article only outlines selected aspects of the issues in question. The use of original foreign-language terminology alongside English equivalents is intended to enable readers to access relevant entries more easily in readily available foreign-language sources.

1. Outline of the main aspects of the topic

The sound of a mixed choir and its development concern amateur, academic and professional ensembles alike, and fundamentally depend on the quality of the individual vocal and personal foundations of its members. The development of voices in sections depends on achieving an even emission and, in particular, on bringing

individual vocal attributes closer together in vowel production (*Vokalausgleich*). This applies both to innate features and to those gradually acquired and revealed as a result of vocal and technical development through individual and group work with the voice. Developing vocal tone within sections increases the possibilities for balancing dynamics within the choir, determined by the typical composition of four-part harmony. The artistic need to double the saturation of chords in an 8-part choir (with high and low soprano, 1st and 2nd alto, 1st and 2nd tenor and 1st and 2nd bass) requires enhanced selectivity of self-monitoring by ear. Motivating members positively determines the choice of realistically achievable goals. The final result serves proportionally to multiply the level of the individual artistic reservoir of the whole, so gaining one's own vocal confidence should be the primary driving force for choir members. The continuous shaping of a mixed choir's sound requires the professional repeatability of results, eliminating randomness in the results obtained. Creating documentation of model solutions and patterns for high-level vocal and technical interpretation accelerates the development process of refining vocal timbres (*timbrare*) as a conscious path towards achieving the ideal, that is, permanent and flawless, sound of the entire choir.

The development of sound shaping and its measurability are based on the objectivity of self-assessment of sensations. In order to shape the conscious transformation of vocal technique, it is advisable to remain open to criticism. During the period of cooperation with a vocal pedagogue, recordings of vocal technique exercises should be used. Improving vocal technique within the choir facilitates acceptance of further changes in vocal technique. Computer visualisation of spectral analysis of the frequency of formant sounds supports the neutrality of mutual evaluation of the results. Presenting the sound spectrum on screen, with a clear assessment of the sound analysis, becomes more important when it is necessary to demonstrate the need for radical changes in the execution of a musical phrase. It facilitates a conscious choice of interpretation. Visualisation of differentiated vocal dynamics helps to unify the vowel timbres.

Visualisation of vocal sound embodied in the conductor's expressive gestures supports the clarity of suggestions for the precise release of impulses through the whole body. The clarity of their structure facilitates the development of motivation necessary for technically demanding group work. Presenting successive stages of sound development accompanying the shaping of vocal resonance in the choir accelerates acceptance of corrections. Understanding them requires the development of sustained auditory sensitivity. Intuitive freedom in the individual selection of overtones in intoning a note, together with formants supportive of resonance, ultimately rewards the effort invested.

Gaining confidence in controlling the perception of phonation through auditory stimuli of the outer ear – for an objectively indispensable assessment – requires developing the ability to correlate auditory perception selectively with the inner ear. Practical elements of the conventional principles of the Alfred Tomatis method or the effects of auditory stimulation therapy (Neuroflow) are highly inspiring for developing selectivity. In this way, one gains control over clear articulation of consonants and the choice of appropriate vowel timbres. Empirical enhancement of the audibility of the types of intoned overtones together with the resulting formants can be achieved through the use of elements of overtone singing techniques. The existing anatomical characteristics of the resonating system form the basis for correlating tongue shape with adjustments to jaw position, the size of the mouth opening and changes in width. Controlling changes in the length and shape of the vocal tract opens up further possibilities for achieving the intended final result more quickly. Developing both melodic and harmonic auditory sensitivity supports control over differences in overtone composition in both solo voices and choral groups.

Disorders of auditory perception often indicate a lack of sensorimotor sensitivity of the body. If difficulties with auditory pitch control are identified, it is possible to transform hearing by enhancing kinesiological sensations stimulated by the sound wave in the mouth. Enhancing the higher partial tones of the vocal tract resonance by increasing the intensity of the selected overtone – in order to obtain vowels with a higher F2 formant – will compensate for the above deficiency. The phenomenon of resonance in the jaw and skull bones is known from the historical account of Ludwig van Beethoven's discovery. The gradual loss of sensitivity of external hearing inspired the composer's empirical research, which enabled him to regain partial control over surrounding sounds through the vibration of a silver spoon held in his teeth and resting on the piano's soundboard. One may hypothesise that he gradually increased the sensitivity of the body's proprioception, which was undoubtedly an effective aid to improvement.

Body proprioception, understood as the organism's ability to identify movement and changes in position through deep sensory receptors, is key to heightening auditory perception and gaining control over the sounding of overtones. We are not all aware that when singing we hear ourselves only from within – primarily with the middle and inner ear. The body's fascial, muscular, cartilaginous and bony connections receive the initial frequency of the fundamental sound wave through the vibration of the laryngeal tone (*Grundton*). The ability to selectively hear the simultaneously sounding chord of harmonically resonating upper partial tones – known as aliquots or overtones – requires cognitive exercises.

Sensitivity of auditory perception, after transformation of the forms – as a structure of formants necessary for correct filtering of the reinforced timbral

effect of the resulting resonance – constitutes the second channel of intonational perception, indispensable for controlling speech and singing. The pure initiation of the fundamental frequency of tones in the larynx (inside the body) simultaneously requires correct intonation of the selected partial elements of sounds (vowels). Filtering them requires mental guidance of the sound on breath support up to its final emission outside the body – in order to achieve a subjectively perceived positive impression of homogeneous sound. Congruence between the fundamentals of the sound wave and the appropriate tuning and tonality is an indispensable requirement for achieving the intended flawlessness of noble choral sound – including in the performance of contemporary music.

Holistic pedagogical supervision (Supervisor) is a guarantee of benevolent and constructive criticism that helps singers remain on the path of continued development. Furthermore, it ensures positive results and is central to healthy, long-term change. Regular cooperation quantifies – through ongoing interaction of the whole body – the directly achieved activation of elements of vocal-technical awareness. Cyclical workshops and systematic daily training produce progress regardless of the voice's needs. A pedagogue working initially with groups of two or three achieves swift results and can immediately present the effects of successive stages along with alternatives for individual development. The impulses acquired in this way confirm the progress of the voices on the path towards the individual evolution of the sound of the groups and, consequently, of the entire choir. This process requires systematic support through analysis of the results achieved through corrections. Periodic reviews at critical stages, using audio-visual recordings for evaluation and the professional exchange of views, complete the cycle of refinement in an atmosphere of balanced diligence.

2. Elaboration of the didactic outline

Technical advances in recording and voice analysis currently enable visualisation of the development of individual resonance forms, while monitoring the levelling of sound within a voice group (vocal tuning). Over the past three decades, there has been tremendous progress in the development of specialised medical devices and phoniatic technical capabilities. Thus, new research procedures have emerged. Computer programs have provided various forms of visual control of live sound production (such as VoceVista Video, Overton Analyzer, etc.) with descriptions of spectral analyses. For the purposes of in-depth analysis of the genesis of vocal sound – in almost all styles of classical and popular music – a number of medical films have been produced, allowing observation of changes inside the bodies of singers in real time during MRI examinations. On the basis of the data

obtained – together with pedagogical and phoniatic consultations – researchers are experimenting and systematising opinions on analyses of the full spectrum of vocal sound. The daily use of various types of equipment from the field of body physiotherapy is entering vocal pedagogy. Sensorimotor cushions of the Sissel type and Pezziball-type gymnastic balls allow choir groups to carry out exercises that increase body proprioception more rapidly. This is indispensable for controlling intonation and sound and stabilising the reproducibility of vocal timbres.

We obtain **overtones with the transformed sound** of favourable formants for vocal resonance, which enables us to reinforce them specifically (the remaining dissonant ones will be relatively suppressed). By applying a suitable selection of emitted overtones to strengthen the partial resonance tones (from R1 to R5), we gain tools for practical control of intonational purity within equal temperament. At the outset, one should empirically train a selected, intonationally well-adjusted pitch of the focused sound of the fundamental tone (*Grundton*). Then, to enable clear articulation of homogeneous vowel sound, we seek a consistent correlation between the selected pitch of formant F1 and the appropriately adjusted frequency output of the component sound of formant F2 (measured in hertz). These processes can be realised intuitively through recordings analysed by trial and error (preferably under a pedagogue's guidance). Vocalisation exercises involving melodic-harmonic clusters of two, three or more vowels "o-u-ü-i-y-j-a-ä-e-é-i-ü-y-j-o-u" – essential in many languages as diphthongs – are practised for the development of sensorimotor perception of individual resonance partial tones, to support the transformation of overtone harmonisation, to achieve shifts in formant pitch necessary for obtaining a controlled balance of vocal emission.

Auditory control requires highly selective hearing. Such skills were already possessed more than 40 years ago by outstanding singers and exceptional pedagogues such as Elisabeth Schwarzkopf. Guidance from an experienced pedagogue who can identify overtones selectively and visually monitor the sound produced calms the subconscious, which over time allows the dispositions to be transferred into neuromuscular motor coordination – as epigenetic muscle memory (Muscle Memory Effect). Another element of vocal-technical development is achieving comfortable anticipatory timing of phonation as an individually controlled strategy of conscious neurological dispositions of the body.

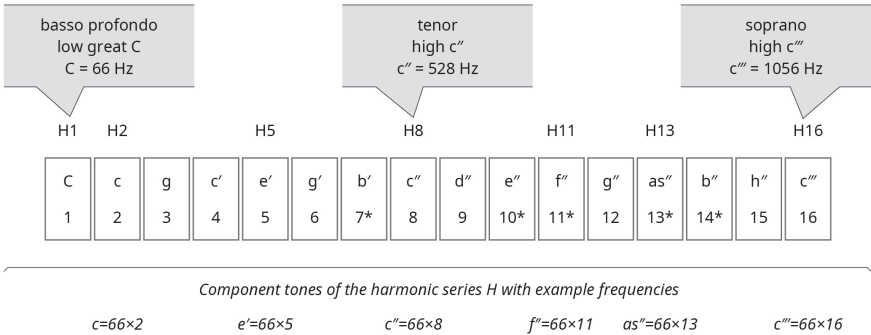
Intoning the structure of formant sound requires an intonationally unified, focused tone. When we intone a given pitch in a given key at a specific frequency in hertz (Hz), selected from the equal-tempered piano tuning with its fundamental tone corresponding to the frequency of the lowest formant F0, we automatically sing it together with the chord sounding above it, formed by the natural series of harmonic partials (*Harmonische*), known to us as overtones or harmonics. These

are understood here physically as the acoustic wave of a series of natural partials – so-called harmonics – at mathematical multiples of the fixed fundamental frequency ($n \times F_0$). Their resonance above the fundamental tone as successive overtones/harmonics is based on whole-number multiples of $n \times \text{Hz}$ of the fundamental (with $n > 1$ as $2\times$, $3\times$, $4\times$, etc.), generated in the larynx while producing the sound.

In physics, the sound spectrum is characterised by the harmonic series (*Harmonische Reihe*) of partial components (their increasing constant multiple of the fundamental frequency is pure mathematics). However, the harmonic partials are not always identical to their equivalents in equal temperament, which requires strategies of intonational correction.

To understand the topic, it is useful to note that frequency doubles between harmonics an octave apart. The intervals between the natural harmonic partials are measured as whole-number multiples of the pitch of the fundamental sound, with $n > 1$. The highest note for a coloratura soprano is f''' at 1396.91 Hz in Mozart’s Queen of the Night aria.

The spectrum of differences between voices, from the fundamental note of great C sung by a basso profondo at 66 Hz ($\times 2/\times 3$, etc.) up to the high soprano c''' at 1056 Hz, together with the acoustic structure (*Grundton C*) of the harmonic series of partials/overtones for musical comparison with equal-tempered tuning ($a' = 440 \text{ Hz}$), is presented in the table below, which illustrates their structure. Five differences should be noted here between natural tuning and equal-tempered tuning.



An interesting feature of their structure is that each interval between natural tones appears in the harmonic series only once. For this reason, five partials are marked with asterisks (e.g. H7*); they sound lower or higher than their equivalents

in equal temperament. The difference in frequency is measured in cents (in equal temperament, a “pure” semitone is 100 cents and an octave is 12 semitones, i.e. 1200 cents). These differences – if reinforced – cause harmonic tones to sound dissonant as formants!

Tensegrity combines two terms, tension and integrity, and derives from 20th-century architectural design. It denotes the self-stabilising interplay of tensile cable elements acting as elastic ties with the compression of rigid beams. The “Spodek” arena in Katowice has fascinated observers since 1971 with its suspended roof structure. The introduction of pre-stressed tendons in the structure to coordinate compressive and tensile forces – through the interplay of elastic and rigid elements – provided balanced stability in space. The practical lightness thus obtained in the interplay of elastic and rigid elements correspondingly prepares the vocal “structure” space of the body for vocal resonance.

Biotensegrity expresses the interplay of tensile forces in the body’s elastic elements (muscles, tendons) as pre-tensioned ties in the fascial system (connective tissue and internal organs) with the compression of the rigid bony skeleton – to provide stability for living organisms, not only in moments of stillness or static work. The key element is a stable body structure that allows technically light movement – with reliable stabilisation of the torso and continuous control of balance. The basis of action is freedom from fear of losing balance (*Neuroathletik*). An additional dynamic load on the musculoskeletal system and joints is consciously secured by muscle elasticity and fascial extensibility. Training the connections of tendon attachments with the three-dimensional fascial system, which accounts for around 20% of body weight, enables the overall interplay of the system. Achieving flexibility of stage movement and melodic mobility of the voice supports mental preparation for implementing breath *appoggio*.

The vocal tract naturally possesses a structure capable of producing five fundamental partial resonance tones – together with the physiological possibility of changing its form – in order to exploit differences in formant frequencies. An empirically trained correlation between changes in the tract’s dimensions enables the development of an individual vocal timbre. The need for an acoustic encounter of the emitted wave of the laryngeal overtone series is supported by a vocal strategy of selecting specific overtones for paired formant sounds. Freely increasing sonority enhances the power of register sound and the spread of vocal carrying power (resonance).

Formant tuning requires mastery of the basic causal principles governing formant alignment. Experience is gained empirically as well as in ongoing studies (MRT realtime). Observation of the functioning of internal body structures through magnetic resonance imaging, or acoustic monitoring using PC programs for the

spectral analysis of vocal sound, reveals new perspectives. Observation of possible adjustments in bodily activity simultaneously shows their influence on differences in sound spectra and on achieving a fuller or only partial impact on the spectrum of vocal timbre (*timbrare*).

Periodic presentation of recording results to singers is an essential basis for voice analysis in pursuit of a homogeneous sound across the entire ensemble, supporting motivation for further changes. The pedagogy of computer visualisation of spectral analyses and stylistic-musical variants of interpretation supports the intended flawlessness of optimal sound transformation. Correct phonetics determines the correlation of pure phoneme sounds, necessary for steering correct intonation with vowels (F1 with F2).

3. Pedagogical outline of the methodology

The methodology of developing the sound of a mixed choir requires the ability to reproduce results individually. Technological progress in vocal work offers new possibilities for recording the vocal output of a choir as well as for individual voice production exercises. Achieving neutral control of empirical differences in sound changes enables logical, causal reasoning. Stimulating the perception of bodily stimuli makes daily progress tangible, eliminating randomness in the results obtained. Analysis of audio-visual recordings of examples of noble vocal sound accelerates the creation of model patterns and solutions for high-level vocal and technical interpretation, resulting in the ideal, flawless sound of the choral ensemble.

The “Voice, Body and Spirit in Balance” method is effective thanks to individually adapted breathing exercises combining expression with visualisation of sound. Movement of the hands and torso restores freedom and, in practice, allows singers to discover mental control quickly over speech and the sound of the whole body. It accelerates mastery of the voice’s sonority as an instrument. Its foundation lies in the author’s audio-visual recordings together with the empirical discovery made in the 1980s that through bodily movement we gain access to the proprioception of breathing and its control. Further research into the first systematic spectral analyses of the voice (VoceVista), from the mid-1990s (Donald Gray Miller), confirmed the effectiveness of strategies for achieving resonant carrying power (*Sängerformant*).

The holistic didactic assumptions of the “Voice, Body and Spirit in Balance” method integrate the author’s many years of experience gained from his own studies in three traditions: the Slavic, Italian and German vocal schools. After graduating from the Vocal-Acting Department of the State Higher School of Music in Łódź in the class of Antoni Majak, the author continued his creative development

through international scholarships. He initially studied with Rina and Mario del Monaco to learn the secrets of *appoggio* in the operatic tradition of Italian *bel canto*, with its characteristic freedom of execution. These wide-ranging studies were complemented by the key experience of exploring body language and stage work in the operatic repertoire through active participation in Joachim Herz's Master Course in Opera Direction. Another phase in the development of methodology and vocal pedagogy consisted of documented (audio-video) individual discoveries and invaluable impulses together with practical experience. Their attainment, arising from the search for a deeper understanding of resonance and vocal carrying power, was essential for the professional reproducibility of artistic mastery. This was developed through three masterclasses with Elisabeth Schwarzkopf and with Birgit Nilsson (IMAS Hanover), and was later confirmed during two scholarships at the Bayerische Staatsoper with the Münchner Singschul in Josef Metternich's class.

These were later complemented by elements of the strongly contrasting precision of the German vocal school with Elisabeth Schwarzkopf. Particularly fascinating was the selectivity of her hearing, impeccable phrasing and perfect vocal line in the practical stage performance of Mozart operas. Learning how to build a vocal interpretation under her guidance in stage practice was decisive. Performing the role of Bartolo in the production of "The Marriage of Figaro", conducted by Gary Bertini and directed by Sir Peter Ustinov at Herbert von Karajan's Gesangsstudio in Salzburg, led to a long-term engagement by Rolf Liebermann at the Staatsoper in Hamburg. The insights gained from Anna Reynolds and Jean Cox through two years of work on interpreting the Wagner repertoire in Bayreuth brought this vocal development to fruition.

Years of vocal-technical and pedagogical-artistic development resulted in competition awards, including victory as the sole laureate of the Premier Grand Prix and two special prizes at the 28th Concours International de Chant in Toulouse in 1982 and the Polish Phonographic Academy's FRYDERYK 2011 Award for the recording of Roman Maciejewski's "Requiem – Missa pro Defunctis" as Album of the Year in the "Contemporary Music" category.

Alongside his vocal career, since September 1978 the author has worked intensively as a pedagogue, leading his own singing classes in Łódź, Salzburg and Kassel, continuously putting new didactic and methodological developments into practice, guided by the overriding idea of combining stage movement with acting and vocal performance.

Achieving rhythmic-vocal assurance in the use of the body's musculo-fascial system, in order to develop routine control over the release of sub-impulses during the preparatory phase of phonation, is the principal aim of vocal-technical work. The next stage in vocal development is mastering cognitive recognition processes

for coordinating the essential impulses required to produce sound, involving the work of the entire body as a musical instrument (timing). Initially, this should be done in a stress-free yet always conscious manner and, to understand the structure of movement, even analytically (BODY ↔ SPIRIT).

Achieving resonant formants for maintaining a healthy voice is possible by exciting, via the passing sound wave, free forced vibrations of the five natural resonance frequencies of the vocal tract (R1 to R5), beneficial for generating formants F1 to F5. As the frequency of selected overtones of the sound wave approaches and matches the above resonance frequencies of the vocal tract forms, the phenomenon of vocal sonorisation arises. Enhancing resonance from F1 to F5, through pairing them with the ranges R1 to R5, increases the concentration of acoustic energy that arises independently of the pitch of the fundamental tone. Transferring this energy to the whole body as vocal sonorisation is empirically possible and results from matching changes in the form and size of the vocal tract to the requirements of muscular-fascial tension (VOICE ↔ BODY).

Changing the dimensions, length and shape of the vocal tract (*Vokaltrakt*) either damps or sonorises the voice. Achieving a convergence between the pitch of a spontaneously selected harmonic/overtone and the physiologically given fluctuations in the partial frequencies of the resonances produced by a given vocal-tract configuration strengthens the stability of the vocal sound and its projection in the auditorium, shaping the appropriate vowel formants (*Vokalformant*, *Sängerformant*).

The presence of accumulations of selected overtone resonances within the vocal wave, together with the deliberate adjustment of their pitch for filtering by the vocal tract – as vocal formants, serving the subjective need to complete the sense of fullness in intonation – in addition to the pure fundamental of the laryngeal tone, is still little known. The mutual correlations of the pitches of the formants determine the completion of the sense of fullness in the perception of the twofold nature of the above intonation, thanks to the quality of the sound of pure vowels (Vocal). This applies to both the speech and singing of the singer-actor and to the voices of the entire choir.

Acquiring the ability to make adjustments in the selective hearing of overtones, in order to make planned changes to the pitches of the vocal-tract formants (F3, F4 and F5) before phonation, is the aim of an individually chosen strategy for strengthening the vocal sound (resonance), and becomes gradually possible through the brain's neuroplasticity (*Neuroplastizität*).

Reorganisation of auditory structures initiates new receptive connections (synapses). Their formation enables the further training needed to transform unified vowel sounds, which are absolutely indispensable for singers' articulation. The

full achievement of whole-body resonance is the primary objective of professional education for a healthy voice. The resulting increase in sonority – alongside carrying power – relieves the laryngeal muscles and vocal folds, allowing the voice to remain young and healthy over time.

Through continuous repetition of objective corrections, movements, impulses and their interaction with mental processes become automatic. Sharpening singers' concentration supports precision in focusing the sound. The body's perception in planning action and reaction signals and encoding them into the epigenetic memory of the muscular system are elements that support the ability to control amplification of the sound wave – in order to consistently produce a noble vocal sound (BODY ↔ SPIRIT ↔ VOICE).

Flawless transformation of sound according to register needs is the ability to choose the placement zone of focused sonority (*Stimmsitz*) for intoning a resonant base of the fundamental tone (*1 Ton-Technik*). The quality of the selection of paired emitted tones determines the congruence of the obtained formants, appropriate to the hall's acoustics in relation to the harmony and phrases of the composition (MIND).

We achieve uniformity of noble vocal sound through deliberate coordination of bodily impulses in accordance with the harmony of the melodic phrase. This requires further training of auditory sensitivity to guide the quality of the body's resonance and develop the ability to select specific vocal timbres. Supplementary exercises standardising choir members' knowledge of vocal physiology and hygiene are helpful (MIND ↔ BALANCE).

Acoustic tuning of the sound of free vocal intonation requires the ability to master kinaesthetic sensing empirically, in order to enable physiological changes in the shape of the vocal tract and the damping of dissonant tones within the chord of the natural overtone series. The correct execution of such sound production determines choral homogeneity. Furthermore, it regulates "pure" vowel intonation. Melodically pairing the resonance partials with the appropriate overtones creates the formants of the coherent harmonic structure of the four choral voices (soprano/alto/tenor/bass). Any lack of a homogeneous vocal sound requires an individual change of strategy within the groups.

The specific character of choral sonorities within chord groups, in accordance with the harmony of the melodic phrase of the composition, depends on the ability **to focus** the intoned voices (S/A/T/B). The uniformity of the conductor's gestures controlling the entire piece determines the achievement of an intonational compromise in chord consonance of melodic phrases with the composition's harmony – alongside the development of singers' selective auditory sensitivity during sectional singing.

Physiologically correct nasal inhalations – combined with enhanced perception of the musculo-fascial system – help the body intuitively achieve free sound production by using the initiation phase of support on the gradually perceived inner “air cushion” in the pelvis (*appoggio*).

The use of aerodynamic cushions in choir rehearsals demonstrates the necessity of understanding the impact of bodily exercises on the noble sound of the entire choir. The sensation of gradually regulating balanced vocal support before phonation facilitates comprehensive mastery of a conscious strategy for cooperation within the fascial system. The need to improve proprioception for modulating vocal resonance through body balance is tested using Sissel-type sensorimotor cushions. Arranging them in sets (in a 1-2-3-2-1 system) offers possibilities for individual variations in solo and group exercises to stabilise perception of whole-body balance.

Using **biotensegrity** techniques (“the body’s sound from head to toe”), we achieve flexible integration of evenly distributed fascial-muscular tensions of the skeletal system without static stiffness or blockages! Supple stabilisation of the spine as the body’s axis during phonation exercises using the alphabet from A ↔ Z supports periodic walking with active tone in the legs and feet. Fluency in counting from 1 ↔ 30 refines resonant articulation of all phonemes.

Exercises in flexible muscular interaction to change the resonance spectrum of component tone chords empirically support the shaping of new formant selection patterns. Free nasal inhalation based on conscious Italian *appoggio* (in many countries incorrectly translated as “support”!) enriches the choir by giving each voice a noble sound with carrying power. An indispensable element for sustained vocal sonority is the sensation of musculo-fascial support forms in the torso. Phases of physiologically healthy nasal inhalation and exhalation shape awareness of the breathing air cushion. Initiating its movement in the lower part of the torso and towards the pelvic floor helps minimise air consumption during the phonation of sung phrases.

Slow body movements, with coordinated **conscious inhalation and exhalation**, train gradual differentiation of dynamic effects, consolidating healthy resonance. Through the technical control of fascial tension to develop dynamic shifts in sound, from $p < mp > p$; $mp < mf > mp$; $mf < f > mf$, known as “messa di voce” and regarded as the hallmark of “italianità”, we achieve evenness of vocal emission.

The strategy of combining conscious **cooperation of the body with nasal breathing for full vocal sound** is as indispensable as controlling one’s conscious impact on the final result, requiring the ability to **correlate the work of the entire body** (Mindset). Using mental elements of the Alexander Technique enables the development of subtle sensitivity in the selective perception of one’s own voice, with control over auditory spectral differences in vocal sound analyses within the group.

Neurology has demonstrated the physiological phenomenon of evolutionary change through **brain neuroplasticity** and the formation of new connections (synapses). An increase in neural connections facilitates improved concentration and individual skills in conscious cognitive work. As early as the 2000s, scientific research at the University Clinic in Heidelberg confirmed the stimulation of new centres within the cerebral hemispheres and a transformation of auditory function. As a result of cognitive exercises, we develop greater selectivity of perception, which is essential for analysing the overtones we hear when our own voice resonates. In this way, cognitive processes provide new neuroplastic scope for adequately selecting auditory centres in both cerebral hemispheres.

Gaining control over feedback from both forms of hearing (internal and external) facilitates the choice of individual resonance strategies for consciously filling the hall with sound.

Courses are recommended that aim to transform listening habits from the left hemisphere of the brain – located in the area identified by Paul Broca for generating consonants, speech and information for mathematics, rhythm and the perception of musical intervals – to the right hemisphere. Here lies the centre responsible for analysing the timbre of sounds in speech, which perceives the specific differences in the dialectal sounds of vowels. This stimulation of selective perception of the overtone and the resonance of the sung voice, together with the overall timbre, provides information that enhances the sensitivity of full auditory perception for the production of a refined sound of pure vowels.

The multifaceted nature of these activities, together with the comprehensive effect of gradually improving the overall sound, provides choirs with the benefits of ambitious emotional control for further conscious development.

A summary of vocal technique shows that intonation of a specific note depends on the choice of overtone and the position of the second resonance tone R2 for strengthening formant F2, which acoustically activates optimal tuning to environmental needs. Uniform choral sound depends on selecting appropriate vowel timbres through mutual correlation of the constituent formants F1 and F2. Correct vowel pronunciation and overtone placement in the voices steer choral homogeneity. A lack of sensorimotor awareness when unifying the specific place of articulation for consonants during phonation (R3/F3) leads to unclear diction, compromising the final result by reducing the precision of textual communication, overall sound quality and intonation.

The causal relationship between the cognitive choice of actions immediately before phonation and their consequences during phonation has been repeatedly proven (**Mind**). The initial alignment of the body with the group geometry of mouth opening, tongue position and vocal-tract shape enables selectively enhanced perception

of overtones. Correctly chosen overtones, used to generate vocal formants, stimulate an etymologically appropriate vowel timbre, which – as a consequence of the individual vocal sound strategy – determines pure intonation of sung notes.

4. Final conclusions and suggestions for the future

The satisfaction derived from the fully natural sound of a physiologically healthy and vocally well-produced, resonant tone is the result of conscious actions and of selecting the appropriate overtones that reinforce its formants.

The disappearance of reinforced dissonant overtones results in homogeneous formants in the accompanying voice groups along the melodic line, in keeping with the work's tuning and harmonic solutions.

The synergistic effect of applying existing neurological research findings using EEG will support the symbiosis of the multifaceted forms of hearing, helping to accelerate the development of conscious vocal education.

Controlling vocal production with selectively sensitive hearing for constructing the sound spectrum guarantees balanced carrying power with flawless development of noble vocal timbre.

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Abstract

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“Voice, Body and Spirit in Balance” – through conscious appoggio
and cooperation between the body and the breath

Shaping the sound of a mixed choir requires reproducibility of results. A pedagogue presenting computer visualisations of spectral analysis of sound supports flawless stylistic and musical transformations in interpretation. The ability to intonate the sound of chords with the voice through coordination of bodily impulses in accordance with the harmony of a musical phrase requires exercises in auditory sensitivity. The holistic method “Voice, Body and Spirit in Balance” combines shared elements of the performance traditions of the Slavic, Italian and German vocal schools with the author’s 40 years of concert, opera and teaching experience in Poland, Austria and Germany. Inhaling through the nose facilitates free support of sound on the breath (*appoggio*), enabling mastery of a conscious strategy of bodily cooperation. Exercises using sensorimotor cushions in conjunction with the resonance of the voice’s harmonic components shape the carrying power of noble choral sound.

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