

Vocal Training and Practice Methods: A Glimpse on the South Indian Carnatic Music

Raghavi Janaswamy, Saraswathi K. Vasudev

Abstract—Music is one of the supreme arts of expressions, next to the speech itself. Its evolution over centuries has paved the way with a variety of training protocols and performing methods. Indian classical music is one of the most elaborate and refined systems with immense emphasis on the voice culture related to range, breath control, quality of the tone, flexibility and diction. Several exercises namely saraliswaram, jantawsaram, dhatuswaram, upper stayi swaram, alamkaras and varnams lay the required foundation to gain the voice culture and deeper understanding on the voice development and further on to the intricacies of the raga system. This article narrates a few of the Carnatic music training methods with an emphasis on the advanced practice methods for articulating the vocal skills, continuity in the voice, ability to produce gamakams, command in the multiple speeds of rendering with reasonable volume. The creativity on these exercises and their impact on the voice production are discussed. The articulation of the outlined conscious practice methods and vocal exercises bestow the optimum use of the natural human vocal system to not only enhance the signing quality but also to gain health benefits.

Keywords—Carnatic music, Saraliswaram, Varnam, Vocal training.

I. INTRODUCTION

VOICE training (VT) for the vocal music and likewise fingering practice for the instrumental playing are essential for empowering music. Such training goes along side of learning the intricacies of music. Indeed, VT is one of the major factors that fine-tune singers. Particularly, the voice is coached in a way that a singer would be able to produce a particular song with ease and perfection. Such an acquirement hones the individual's abilities with sustaining music notes, desired speed of rendering and ability to switch between speeds effortlessly and rendering the musical expression, also known as bhava or emotion of the song. The VT focuses on developing proper posture [1] and vocal function. VT improves, certainly, the respiratory system functionality and plays a seminal role in voice cultivation, intonation and pleasant singing [2].

A. Human Voice System

The common components of any musical instrument are sound generator, vibrator and resonator. Humans use their anatomical body parts, however, that are normally used for speaking, breathing, chewing and swallowing. Among them,

R. J. is with the Department of Music and Fine Arts, Sri Padmavati Mahila Visvavidyalayam, Tirupati, India (corresponding author, phone: +1-765-409-0641; e-mail: raghaj@gmail.com).

S. V. is with the Department of Music and Fine Arts, Sri Padmavati Mahila Visvavidyalayam, Tirupati, India (e-mail: saraswathi.vasudev@gmail.com).

'vocal cords' play a central role. They essentially serve as a vibrator. The sound produced in vocal cords gets amplified in the throat and later in the mouth and nasal cavity by resonance (Fig. 1). Quoting Bell "The upper part of the larynx, together with the pharynx, [...] and mouth, constitutes a passage-way, or tube, of variable size and shape, through which the vibrating current of air is passed. It is here that the voice is moulded, so to speak, on its way to the ear, and the shape of the passage-way largely determines the quality or timbre of the voice" [3]. During this process, the mouth, teeth, tongue, lips and palate give an added opportunity for the human voice in producing more refined music. These additional articulators do not exist in instruments, which are advantageous, undeniably, for humans but require fine-tuning, via training, in order to produce the desired acoustic characteristics and melodically interesting sounds (music) to be enjoyed and appreciated by the listeners.

B. Vocal Cords & Larynx

The vocal cords regulate air flow into lungs and support the sound production. Their protection to the airway from choking on material in the throat could not be discounted as well. They are located in the larynx (also known as the vocal box). The larynx is on top of the windpipe through which air passes to and from the lungs. It is suspended in the neck by strap muscles, which are capable of elevating or lowering the larynx. The inside of the larynx is lined with mucous membrane tissue. The gap between two vocal cords is called as glottis. The vocal cords could be opened and closed, tensed and held together closely via ligaments and muscles. During breathing out, air flows through glottis and causes vocal cords to vibrate and in-turn generate tones. In association with tongue and mouth movements, a series of sounds with variable volume and pitch could be produced, resulting in an orchestrated audible speaking and singing. During childhood, vocal cords would be equally long for boys and girls. However, with time, they grow longer and lower the voice, and males with larger larynx than females gain a deeper voice [4], [5].

C. Respiratory System and Diaphragm

The respiratory system is a biological network composed of organs and tissues such as airways, lungs and blood vessels. It helps breath and moves oxygen throughout the body and clears out carbon dioxide. The process of breathing includes the trachea, lungs, diaphragm, ribcage, and associated abdominal muscles [6], [7]. The respiratory system provides the required air pressure to vibrate the vocal cords and produce sound. The diaphragm is a flat muscle that separates

the chest cavity and abdominal cavity. Its movement is regulated by inhalation and exhalation while air expels from lungs [8]. During singing, the ribcage stays open while the abdominal muscles move on. This enables the diaphragm to support the sustenance of longer phrases with suitable pitch control.

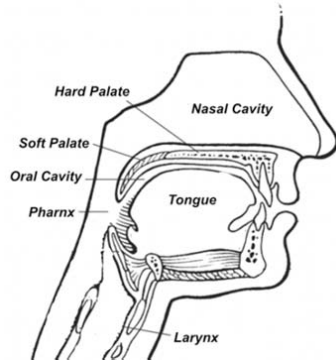


Fig. 1 Human voice system [9]

D. Vocal Registers

These are series of consecutive pitches with similar tone quality. They include:

- Chest (lower register)
- One middle (throat)
- Upper octave (head)

There is one even high register popularly known as false voice. The study experimented on subharmonic frequencies of the vocal folds during the chest–falsetto transitions concluded that the resonances of the vocal tract are not required for the production of chest–falsetto jumps [10]. Musicians are preferred to have a more natural voice that gets toned with consistent and conscientious practice. Carnatic music methods emphasize on using chest registers. As alluded by Ratnakara, sound could as well emanate as a combination of prana (life energy) and air [11]. It further stresses that the soul inspires the mind that in-turn activates fire in the body. The fire simulates the air and together onsets the sound that traverses upwards in the body from navel to throat and gets delivered through the voice registers. Generally, sound originates from the chest, then proceeds to the sound produced from the head and then closes at the sound from the throat. Strong sound arises from the throat, less strong from the head and artificial from mouth. These intricacies play a decisive role in song rendering.

E. Practice Methods of Carnatic Music

Carnatic music is rich in its highly organized musical structure, which has evolved over the centuries. The ancient musicologists like Bharata, Saragadeva and Matanaga [11] have conducted experiments and formulated the 22 srutis that could be distinguished by the human ear. They further framed several patterns of notes that assist to develop the flexibility, range, and quality of sound from the human voice system. The very first step of VT is to identify and fix the sruti or adhara shadjamam for a particular learner, and begin with this

fundamental note. The system offers basic practice content to most advanced masterpieces from a gamut of composers. Carnataka Sangeetha pitamaha Purandara Dasa laid out the details of the learning system in a more systematic way. Basically, there are two major branches:

1. **Abhyasa ganam (Precomposed music):** Practicing verses and music compositions from vageyakaras like Ramadasa, Annamayya, Puradandara Dasa, Carnatic trinity - Tyagaraja, Muttuswamy Dikshitar and Syama Sastry, Swati Tirunal, Mysore Vasudevacharya, Naraya Teerdha, Veena Kuppayyar and Pattam Subrahmanya Iyer, to name a few along with those composed by many predecessors since the 6th century as well as from the modern contributors such as Mangalampalli Balamurali Krishna.
2. **Manodharma Sangeetham (Improvised music):** Improvisation takes place dynamically, during the live performance, in the form of Raga alapana (exploring the raga nuances), Neraval (lyrical exploration), Swara kalpana (permutations and combinations of swara patterns adhering to the raga along with tala and emotion of the song) and Ragam-Tanam-Pallavi of compositions.

This article discusses the vocal training patterns for vowel pronunciation, breath control and range with an emphasis on the practice methods including basic level of exercises to advanced varnam compositions. The Abhyasa-gana framework by the Saint Purandara dasa, the father of Indian Carnatic music, was taken as the reference system. The intricacies of few varnams are used as the examples [12], [13].

II. MASTERING THE VOICE

The classical music system laid a very organized methodology on developing the voice that differentiates a singer vs. non-singer voice. In fact, among the in-depth research analyses in this field of science, the study on the characterization of singers' voices reveals that the cepstral measures are high among the singers' voices in comparison to non-singers [14]. As discussed above, Abhyasa gana is a pre-composed music. It includes the initial simple practice verses to complex varnams and kritis. The initial practice exercises emphasize on singing the basic sapta swaras at right frequency level in reference to the fundamental note (adhara shadjamam). These sapta swaras are Shadjamam (S), Rishabham (R), Gandharam (G), Madhyamam (M), Panchamam (P) and Nishadam (N). The practice starts and ends with the notes 'S' – 'P' – 'S'. Each swara would be held for 4 or 8 akshara kalas. Resting on these swara allows the voice to blend with sruti and notes are to be rendered in sruti. Singing the same notes with 'A' vowel sound offers proficiency and greater mobility as well as voice flexibility.

A. Techniques

A few general techniques that aid to enhance the sound quality are outlined below.

Good posture: It is about keeping the spine and head straight, and the chest to be comfortably high along with legs crossed. This process allows the maximum lung capacity and

releases any possible tension in the body. It further renders strength for longer durations of undaunted performance.

Breath control: Deep inhalation and exhalation along with avoiding the shallow breathing need to be practiced. One practical way of attaining these attributes could be through 'pranayama' – a formal practice of controlling the breath. The timing, duration and frequency of every breath and hold enable the focus and readiness of the body.

Pronunciation: Good diction based on articulating the vowels and consonants in alignment with the music is a major factor for proper voice production. It is the responsibility of the singer to pronounce clearly the words in the musical compositions. In this regard, lips and tongue play a major role. Fig. 2 highlights the diction of the sapta swaras (7 notes) and the posture of the tongue inside the mouth and lips.

- S – Tip of the tongue touches at the center of the inner front top teeth
- R – Tongue touches the palate little above the gum line of top teeth
- G – Center of the tongue touches the lower mid region of the palate
- M – Inner lips together
- P – Outer lips together
- D – Between tip and middle of the tongue, touches gum just above the inner front top teeth
- N – Touch of the tongue tip just below the mid area of the palate

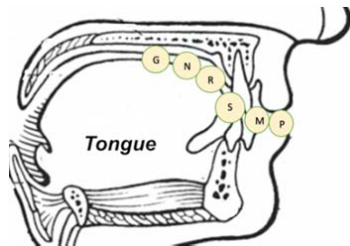


Fig. 2 Tongue on the palate for sapta swara diction [9]

B. Rigor of the Practice

- Practice of vowel sounds especially 'A' karam rehearsal is recommended for quality of voice.
- Strive for volume without strain: Employing the deep breathing facilitates enlarged throat and flexibility of vocal cords without constraints in the pharynx. It further helps to improve on the loudness without straining the voice.
- Practice across the octaves (vocal registers): The gliding of notes between the octave provides uniform voice and clarity on notes. The descending patterns could be of more use in accomplishing smoothness in vocal as well instrumental practice, as described in Fig. 3.

ns gr mg pm l dp nd l sn rs II

Fig. 3 Vocal register practice method

C. Practice Methods

1. Sarali-Janta-Dhatu swara: These basic music verses are learnt in the ragam 'Mayamalava gowla'. The swaras (notes) have to be learnt with correct pitch. These exercises have to be sung in vowel sounds 'a', 'e', 'i', 'o', 'u' and with additional anuswara 'm' sound. In this set, the most important one is the 'a' or akara swara. This sound should emanate from the navel. The first speed to be rendered slowly so that higher speeds could be performed with precision. During janta swara, stressing on the second swara is needed. Such a practice enforces the right amount of pressure by tongue on the palate.

A sample verse in Adi tala with an 8-beat cycle is as shown in Fig. 4.

S R G M I P M I G R II
 S R G M I P D I N S II
 S N D P I M P I D N II
 S N D P I M G I R S II

Fig. 4 Sarali swaram practice method

Fig. 5 highlights a sample verse for Janta swara.

SS RR GG MM I RR GG I MM PP II
 GG MM PP DD I MM PP I DD NN II
 PP DD NN SS I SS NN I DD PP II
 NN DD PP MM I DD PP I MM GG II

Fig. 5 Jantaswara practice method

The sarali swaras and janta swaras are to be practiced systematically at multiple speeds and various ragas including melakarta ragams and janya ragams.

Advantages:

- Better understanding of the notes and swara frequencies for other ragam's.
 - Expertise in forming the note combinations with janya ragas wherein not all the seven notes a.k.a. sapta swaras are present.
 - Increased vocal range and enhanced lung capacity.
 - Good diction by following the pronunciation methods.
2. Alamkaram: There are seven basic alamkarams with different tala combinations such as Dhruva, Matya, Rupaka, Jhampa, Tripura, Ata and Eka. The example in Fig. 6 highlights the Chaturasra Jati Dhruva Talam in a sampurna ragam.

Chaturasra Jaati DHRUVA TALAM Alankaram
 14 02 14 14
 4 + 2 + 4 + 4 = 14 beats

S R G M I G R I S R G R I S R G M II
 R G M P I M G I R G M G I R G M P II

Fig. 6 Alamkaram practice method I

The practice methods need to include changing the jati of the laghu. They could as well be rendered in Tisra Jati Dhruva Talam as narrated in Fig. 7.

ACKNOWLEDGMENT

We thank the faculty in the Department of Music and Fine Arts for their invaluable critique.

REFERENCES

- [1] B. M.W. Arboleda, and A. L. Frederick, "Considerations for maintenance of postural alignment for voice production," *J. Voice*, vol. 22, no. 1, pp. 90-99, Jan. 2008.
- [2] A. P. Mendes, W. S. Brown, C. Sapienza, and H. B. Rothman, "Effects of vocal training on respiratory kinematics during singing tasks," *Folia Phoniatr Logop*, vol. 58, no. 5, pp. 363-377, Jan. 2006.
- [3] A. G. Bell, *The Mechanism of Speech*, Funk and Wagnalls, New York/London, 1911, pp.18.
- [4] T.F. M. Dilworth, "The nerves of the human larynx," *J. Anat.*, vol. 56, no. 1, pp. 48-52, Oct. 1921.
- [5] C. T. Sasaki (2006) "Anatomy and development and physiology of the larynx," in Part 1 Oral cavity, pharynx and esophagus, R. Goyal, R. Shaker R, Eds, Nature Publishing Group, 2006, GI Motility online.
- [6] G. Polgar, and T. R. Weng, "The functional development of the respiratory system," *Am. Rev. Respir. Dis.*, vol. 120, no. 3, pp. 625-695, Sep. 1979.
- [7] C. R. Taylor, and E. R. Weibel, "Design of the mammalian respiratory system. I. Problem and strategy," *Respir. Physiol.*, vol. 44, no. 1, pp. 1-10, Apr. 1981.
- [8] L. D. Pengelly, A. M. Alderson, and J. Milic-Emili, "Mechanics of the diaphragm", *J. Appl. Physiol.*, vol. 30, no. 6, pp. 797-805, Jun. 1971.
- [9] M. Norris, and D. R. Seigfried, *Anatomy & Physiology for Dummies*, Wiley Publishing, Inc. New Jersey, 2011, pp. 246.
- [10] J. G. Svec, H. K. Scuttle, and D. G. Miller, "On pitch jumps between chest and falsetto registers in voice: Data from living and excised human larynges", *J. Acoust. Soc. Am.*, vol. 106, no.3, pp.1523-1551, Sep. 1999.
- [11] R. K. Shringy, *Sangita-Ratnakara of Sarangadeva: Sanskrit Text and English Translation with Comments and Notes*, Delhi-Varanasi-Patna: Motilal Banarsidass, 1978.
- [12] A. S. P. Iyer, *Ganamrutha Bodhini*, Ganamrutha Prachuram, India, 2014.
- [13] A. S. P. Iyer, *Ganamrutha Varna Malika*, Ganamrutha Prachuram, India, 2001.
- [14] R. K. Balasubramaniam, A. Shastry, M. Singh, S. J. Bhat, "Cepstral characteristics of voice in indian female classical carnatic singers," *J. Voice*, vol. 29, no. 6, pp. 693-695, Nov. 2015.
- [15] P. N. Juslin, and D. Vastfjall, "Emotional responses to music: The need to consider underlying mechanisms," *Behav. Brain Sci.*, vol. 31, no. 5, pp. 559-621, Oct. 2008.
- [16] J. Schulkin, and G. Raglan, "The evolution of music and human social capability", *Front. Neurosci.*, vol. 8, article 292, Sep. 2014.
- [17] P. N. Juslin, "What does music express? Basic emotions and beyond", *Front. Psychol.*, vol. 4, article 596, Sep. 2013.