Classifying SOVTEs

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This article expands on previous classification systems for semioccluded vocal tract exercises (SOVTEs). It organizes SOVTEs into three categories based on the occlusion type. Each category is then subdivided by whether vowellike shapes are possible during occlusion and whether the velopharyngeal port is open or closed. The article references Maxfield and his colleagues' 2015 study that measured intraoral pressures across thirteen SOVTEs in both singers and nonsingers. Maxfield's ranking is presented in a table format using the current author's classification scheme. This system may help singers and voice teachers select appropriate SOVTEs based on occlusion type, articulatory features, and pressure levels.

Semioccluded vocal tract exercises (SOVTEs) have been explored in several recent articles in the *Journal of Singing*. Recently, Brian Manternach reviewed the literature on vocal tract shaping as a result of using SOVTEs and proposed that SOVTE postures can be used to advantageously "reset" vocal tract shaping.[1] In 2021, Kelley Hijleh and Cory Pinto summarized decades of research on SOVTEs, discussing intraoral pressure, phonation threshold pressure, laryngeal positioning, subglottic pressure, intensity and timbral changes, vocal fold contact, acoustic interactions, transferring SOVTE voice production to normal phonation, and epilaryngeal narrowing as a result of SOVTE production.[2] Previously, the author contributed several articles on SOVTEs to the literature, including two that proposed a classification system for different types of postures.[3] This article builds on the author's prior classification system, greatly expanding it and displaying it in a table format for ease of use.

The expanded classification system continues to organize SOVTEs into three broad categories according to the type of occlusion featured in the exercise posture: *constant*, *oscillatory*, or *transitory*. Within these three categories, however, the postures are subdivided according to (a) the ability to do vowellike shaping of the vocal tract during the semiocclusion, and (b) whether the velopharyngeal port is open or closed.

The three broad categories can be described as follows:

- *Constant* SOVTEs are those semioccluded postures that can be maintained consistently for several seconds without any appreciable change in vocal tract shape. Examples of these postures and all other categories can be found in table 1. These have also been described by Andrade and his colleagues as "steady" postures with only a single source of vibration (the vocal folds).[4]
- *Oscillatory* SOVTEs are postures in which there exists a regular cycle of pressures being built up behind an occlusion and then released. This cycle of pressure changes is similar to pressure oscillations at the glottis, although at a much lower frequency. Andrade and his colleagues describe these as

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TABLE 1. Categorization of common semioccluded vocal tract postures.[a]

Type	Definition	Examples	Ability to do vowellike vocal tract shapes during SOVT?	Velopharyngeal port open or closed?
Sustained semiocclusion	Semioccluded postures that can be maintained consistently for several seconds without any appreciable change in vocal tract shape.	a. singing vowels into a straw or tube b. sustained phonation of voiced fricatives /v/, /z/, /ð/, /ʒ/ c. sustained phonation of nasals /m/, /n/, /ŋ/ d. bilabial fricative w/ finger against lips e. singing with a cup over one's mouth (small hole in the bottom of the cup) f. manually occluded vocal tract posture (hand over mouth while phonating a vowel)	a. Yes b. Perhaps during /v/; tongue position limits vowel formation during others c. Perhaps during /m/; tongue position limits vowel formation on others d. Yes e. Yes f. Yes	a. Typically closed b. Typically closed c. Open, by definition d. Typically closed e. Typically closed f. Open
Oscillatory semiocclusion	Postures where a regular cycle of pressures are built up behind an occlusion, then released; the cycle of pressure changes is like that occurring at the glottal level, although at a much lower frequency.	g. lip buzz/trill h. raspberry i. rolled /r/ or /ʀ/ j. singing vowels into a straw where one end is submerged in water k. oscillatory positive expiratory pressure devices (e.g., Acapella)	g. Yes h. Limited to variants of /æ/ and /a/ i. No—tongue position and oscillation limits vowel formation j. Yes k. Yes	Typically closed for all; difficult to generate the necessary oral pressure with velum down
Transitory semiocclusion or occlusion	Postures that are very short in duration; can feature a brief complete occlusion of the vocal tract.	l. semivowels /j/ and /w/ m. voiced plosives /b/, /g/, /d/	l. They are vowel postures m. No	g. Either is possible; ideally, closed h. Closed

[a] Revision of a table previously published in Nix and Simpson, "Semi-Occluded Vocal Tract Postures and Their Application in the Singing Voice Studio."

"fluctuating" postures with two sources of vibration (the vocal folds plus a downstream articulatory structure or occluding object).[5]

- *Transitory* SOVTEs are those postures that are very short in duration; they may feature a brief complete occlusion of the vocal tract and include both the semi-vowels /j/ and /w/ and the voiced plosives /b/, /d/, and /g/.

Within each of the three larger divisions, the expanded classification system sorts SOVTEs according to the ability to do vowellike shaping of the vocal tract during semiocclusion. For example, during straw phonation (a constant occlusion SOVTE), one can form an /i/-like vocal tract shape, with the tongue arched upward toward the hard palate quite far forward in the mouth; other vowels are also possible. During an extended tongue trill (on /r/ or /ʀ/, an oscillatory SOVTE), however, a vowellike shaping is not possible due to the use of the tongue as a second source of vibration.

Also, within the three large divisions, the classification system sorts SOVTEs according to the status of

TABLE 2. Ranking of thirteen SOVT postures according to intraoral pressure from highest to lowest (based on data from Maxfield et al.) categorized using the author's classification system.[a]

Intraoral Pressure Ranking	SOVT posture	Type of semiocclusion	Ability to do vowellike vocal tract shapes during SOVT?	Velopharyngeal port open or closed?
1	Straw in water (5 mm diameter, 36 cm long, 7 cm in water)	Oscillatory	Yes	Closed
2	Raspberry	Oscillatory	Only approximations of /æ/ and /a/	Closed
3	Small straw (3.5 mm diameter, 14.1 cm long)	Constant	Yes	Closed
4	Lip trill	Oscillatory	Yes	Closed
5	/v/	Constant	Perhaps	Closed
6	/β/	Constant	Perhaps	Closed
7	Tongue trill /r/ or /ʀ/	Oscillatory	No	Closed
8	/ʒ/	Constant	No	Closed
9	/z/	Constant	No	Closed
10	Large straw (6 mm diameter, 19.5 cm long)	Constant	Yes	Closed
11	/u/	Constant	Only one	Closed
12	/n/	Constant	No	Open
13	/m/	Constant	Perhaps	Open

[a]Maxfield et al., "Intraoral Pressures Produced by Thirteen Semi-Occluded Vocal Tract Gestures."

the velopharyngeal port—open, with the soft palate lowered, or closed, with the soft palate elevated. During humming with an /m/ (a constant occlusion SOVTE), the velopharyngeal port is open and the soft palate is lowered, while during a voiced plosive /b/ (a transitory occlusion SOVTE), the velopharyngeal port is closed and the soft palate is elevated.

In 2015, Maxfield and his colleagues studied intraoral pressure during SOVTE production in twenty subjects.[6] Ten were male and ten were female; five of each gender were singers and five were nonsingers. They tested thirteen different SOVTE postures. While there were differences in pressures between male and female subjects and between singers and nonsingers, the overall ranking of intraoral pressures from highest to lowest was quite consistent. Table 2 provides the ranking found by Maxfield and his colleagues with the studied postures categorized according to the author's classification system.[7]

In sum, SOVTEs can be organized according to the type of occlusion, whether vowellike postures can be performed during the occlusion, whether the velum is elevated or lowered, and according to the intraoral pressure behind the point of occlusion. With this information, a singer or teacher can choose the appropriate exercise for the situation at hand. Interested readers are encouraged to seek out Lynn Maxfield and Kari Ragan's presentation, "Grasping at Straws: A Systematic Approach for Choosing the Winning SOVTE," in the NATS Live Learning Center.[8] This archived presentation occurred on June 30, 2024, at the biennial national conference in Knoxville, and the authors offered it again on August 2, 2025, at the Eleventh International Congress of Voice Teachers (ICVT 11) in Toronto.[9]

NOTES

1. Brian Manternach, "Using Semi-Occluded Vocal Tract Exercises as a Vocal Tract 'Reset,'" *Journal of Singing* 80, no. 5 (2024): 579–83, https://doi.org/10.53830/sing.00046.
2. Kelley Hijleh and Cory Pinto, "Realizing the Benefits of SOVTEs: A Reflection on the Research," *Journal of Singing* 77, no. 3 (2021): 333–44.

3. John Nix and C. Blake Simpson, "Semi-Occluded Vocal Tract Postures and Their Application in the Singing Voice Studio," Journal of Singing 64, no. 3 (2008): 339–42; John Nix, "Closing Your Mouth to 'Open' Your Sound," Journal of Singing 73, no. 1 (2016): 35–41.
4. Pedro Amarante Andrade, Gary Wood, Philippa Ratcliffe, Ruth Epstein, Anne Pijper, and Jan G. Svec, "Electroglottographic Study of Seven Semi-Occluded Exercises: LaxVox, Straw, Lip-Trill, Tongue-Trill, Humming, Hand-over-Mouth, and Tongue-Trill Combined with Hand-over-Mouth," *Journal of Voice* 28, no. 5 (2014): 593–94, http://doi.org/10.1016/j.jvoice.2013.11.004.
5. Andrade et. al, "Electroglottographic Study of Seven Semi-Occluded Exercises."
6. Lynn Maxfield, Ingo Titze, Eric Hunter, and Mara Kapsner-Smith, "Intraoral Pressures Produced by Thirteen Semi-Occluded Vocal Tract Gestures," *Logopedics Phoniatrics Vocology* 40, no. 2 (2015): 86–92, doi:10.3109/14015439.2014.913074.
7. Maxfield et al., "Intraoral Pressures Produced by Thirteen Semi-Occluded Vocal Tract Gestures," 89.
8. NATS Live Learning Center, accessed July 29, 2025, https://nats.sclivelearningcenter.com.
9. Lynn Maxfield and Kari Ragan, "Grasping at Straws: A Systematic Approach for Choosing the Winning SOVTE," breakout session at the at the fifty-eighth National Conference of the National Association of Teachers of Singing (NATS), Knoxville, TN, June 28–July 2, 2024; Lynn Maxfield and Kari Ragan, "Grasping at Straws: A Systematic Approach for Choosing the Winning SOVTE," breakout session at the eleventh International Congress of Voice Teachers (ICVT 11), Toronto, Canada, July 31–August 3, 2025.

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