



Science for Singers

A SERIES OF VOICE RESEARCH COLUMNS BY INGO R. TITZE, PhD

Lip and Tongue Trills - What Do They Do For Us?

Lip and tongue trills are common as vocal warm-ups. We see them more and more as a standard tool for loosening up the orofacial muscles and for getting the sensations of vibration established in the front of the mouth and in the lips. As I ask singing teachers and the theatre coaches (let's call them vocologists, collectively) about the benefit of these exercises, there usually emerges an answer like this: "It's easy on the vocal folds, but gets the respiratory system going full steam."

There is scientific validity in this. Let's look at the pressure-flow events that take place in a lip or tongue trill while voicing occurs. First, we recognize that there are two sources of vibration in this trill, one in the larynx and one in the front of the mouth, feeding from the same airstream. The fact that they are feeding (gaining their vibratory energy) from the same airstream is significant. It's a concept of sharing a common energy source. If the lip trill absorbs too much energy, the vocal folds don't get enough to vibrate; alternately, if the vocal folds absorb too much, the lips won't get enough to vibrate.

In terms of this energy balance, we know that the aerodynamic power available for this dual vibration is the lung pressure multiplied by the mean airflow produced (power = pressure x airflow). The main airflow is the same at the glottis as at the lips; otherwise, our cheeks or neck would bulge out. The only difference, then, between the power that is given to the two vibrators is the relative amount of pressure dropped across each of them. If the lung pressure is constant, then more pressure across one means less pressure across the other; we "rob Peter to pay Paul", so to speak. This is because physical law dictates that the pressure across the lips plus the pressure across the vocal folds must equal the lung pressure.

Quite naturally, the vocalist learns how to budget the pressures appropriately to keep both the lips and the vocal folds vibrating. At warm-up, the exploration involves learning what minimum pressure is needed for the lips, especially as the pitch is raised.

Therein lies the skill and the value of the exercise. It is known that the phonation threshold pressure (the minimum pressure required to establish phonation) increases with increasing pitch. Unless the lung pressure is raised, the lips will cease to vibrate at higher pitches because the vocal folds will automatically require more pressure. This forces the vocalist to raise the lung pressure, thereby taxing the respiratory system more. The thoracic and abdominal muscles assume the load and build up their capability before full lung pressure is applied to the vocal folds, as in the ensuing open vowel sounds in practice. Thus, we have a way of immediately establishing the hierarchy of voice production: respiration first, phonation second, articulation third. This hierarchy is hopefully maintained throughout the warm-up.

What seems a little mysterious to me at this point is what the lip or tongue trill does to warm up the orofacial tissues. Is the idea to move tissue around passively, without the specific contraction of tongue, lip, or jaw muscles; or is the idea to contract specific muscles selectively to get the articulatory processes going? Perhaps someone can write in to enlighten me on this.

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