

## About Vocal Fold Thinning



Ingo R. Titze

This column is devoted to a question addressed to me by Steven B. Glade. I thought it was an interesting question (with some explanations offered), so I reprint it here in its entirety with his permission.

As an undergraduate, I studied choral direction with Howard Swan at Occidental College for three full years (including summer semesters). So I've lived with some treasured ideas about what beautiful choral singing is and some ideas about individual voice improvement.

I was taught that a great choir sound differs from a mediocre choir sound because the better choir excites more overtones (using that term generically to include harmonics) above the fundamental. I've preached that to the choirs I've directed, dwelling on choral values designed to excite overtones.

I was taught that 95 percent of a beautiful individual voice depends on thinning the vocal fold, because a thinned

fold is more flexible and can take on more complex shapes and patterns during note production, yielding more overtones. The remaining 5 percent (involving positioning of resonance chambers and structures) is not unimportant, but pales beside the necessity of thinned folds. Vocal folds thin naturally after several weeks of proper singing. Excluding many postmenopausal women and a few others who have issues that prevent thinning, take a student, have [him or her] lie on the floor, have [him or her] gently press down the lower spinal arch to flatten it somewhat (for superior breath support), and sing through the entire range for twenty minutes, once a day, for three weeks, and twenty-five minutes twice a day for another three to six weeks, and—boom!—a day comes (quite suddenly) when the teacher and the student hardly know where that glorious new voice is coming from. It's coming from thinner folds that are vibrating in more complex shapes and patterns.

I've seen this happen with individual singers (who have been instructed by others—I am not a voice teacher or vocal coach). And I've used these principles to re-shape the sounds of several choirs. My experience tells me that Dr. Swan wasn't talking nonsense.

Do thinned vocal folds factor into your analysis of the beautiful singing voice?

First, I agree with you that exciting overtones that are mutually reinforced by singers is an important aspect of some choral singing. But it requires primarily vibrato-free singing; otherwise the multiple harmonics of one voice cannot consistently line up with those of another voice. It is particularly exciting to a listener to hear a specific harmonic of one voice reinforced by a different harmonic of another voice. The reinforcement

often sounds like a high-pitched pure tone superimposed on the combined sound of the choir.

What you refer to as "vocal fold thinning" is probably more of a register mixing, or register equalization. Although the vocal folds do get thinner (in bulk) as they get longer at higher pitches, there is no fundamental argument that this bulk thinning (about 30 percent) in and of itself has any major effect on pitch or sound quality. However, the sound "thins" by having less vocal fold collision at the bottom of the folds. This is accomplished by reducing the thyroarytenoid (TA) muscle relative to the cricothyroid (CT) activity. Adduction of the bottom of the vocal fold is regulated by TA contraction; hence, less TA activity produces vibration primarily at the top edge of the vocal folds. Because there is less collision, the excitation of higher harmonics is reduced and the voice is "thinned out" perceptually.

How does this relate to achieving overtones in a choral ensemble? Perhaps by "thinning" the sound, better control is obtained over a few harmonics that can carefully be lined up. Also, the singer's formant (vocal ring) is downplayed with fewer harmonics. A strong vocal ring can mask the perception of flute-like overtones.

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