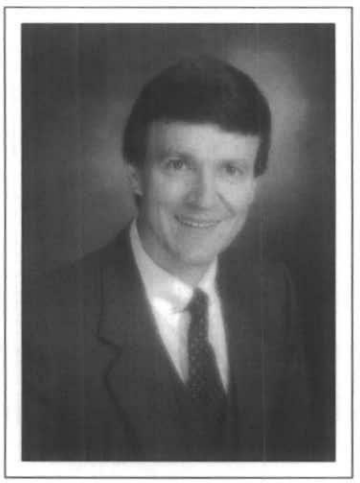
A Comparison of Breath Management Strategies in Classical and Nonclassical Singers: Part 1



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INTRODUCTION:

Experience has shown us that classical and nonclassical singers use different breath management strategies during singing. Although these strategies can be observed in the chest and abdominal wall movement of singers, it has been difficult to quantify the movements and discern their importance to the management of breath in singing. Recently, several new studies have given us additional insight regarding breath management in singing. Thomasson and Sundberg (1997) examined the breathing dynamics of classically trained singers, and Hoit, Jenks, Watson, and Cleveland (1996) considered the breathing habits of country singers. The purpose of the present article is to examine the results of these recent studies and determine how the new findings may affect our pedagogical approach to various singing styles.

Before we discuss the new findings, we must have an understanding of the mechanics of the breathing system and the forces that create the pressures necessary to generate the vocal sound.

Mechanics of Breath Management

Three forces are at work on the breathing system at all times. These forces are:

1. Gravity,
2. Elastic recoil of the breathing system (lungs and ribcage), and
3. Muscle action.

The following is an examination of the action of the three forces.

Gravity

Gravity is an important force in breathing. The downward pull it exerts on the body depends on the posture of the singer. For instance, it exerts a different influence on the rib cage of a singer who is lying down from that exerted on a singer who is sitting or standing. Because we live under constant gravitational pull, we have little notice of its effect, but, in the standing position, gravity would, theoretically, be antagonistic to inhalation and assist with exhalation.

Elastic Recoil

The dimensions of the lungs and the rib cage are greatly influenced by elastic recoil. To understand elastic recoil, it is helpful to think in the action of a spring. For instance, once a spring is stretched and then released, it will quickly recoil back to its original position. Likewise, when it is squeezed, it will again recoil, but this time in the opposite direction by expanding to its original position. The rib cage and lungs operate in a similar way to this springlike action. Once the rib cage and lungs are expanded, they will recoil to their at-rest position, and when they are "contracted," they will expand back to their resting point. This resting point is called the resting expiratory level, or the REL, and the contracting and expanding forces, which are entirely passive, are exhalatory at lung volumes above REL, and inhalatory at volumes below the REL. At the REL, the forces are neither inspiratory nor expiratory, but are at rest and equal.

It may be instructive to the singer to experience the REL from both the expanded and contracted rib cage positions. To experience the REL from the expanded rib cage position, take a deep breath and "let it go." Once you "let it go," the rib cage will relax, automatically, to the resting position, and the volume of

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breath will be expelled to a position approximating the REL. Note, as you exhale, that the rib cage tends to collapse rather quickly at first, but slows down as you continue to exhale. This is because the force of exhalation is much greater at a point of the full breath, where the "spring" is stretched the most, but gets weaker as you exhale. As you approach REL, the recoil slows even more.

To discover the REL from the contracted position, exhale as much air as possible from your lungs and then "let go." Because the rib cage is contracted, the rib cage will now spring back in the opposite direction and expand, automatically, to the REL, drawing in air while it expands. Again, note that the force to expand the rib cage is greater at the point of full contraction, but slows as you approach REL. It is important to remember that these forces are described under the condition of normal posture. A twisted torso or otherwise malalignment of the spine can impede the expansion/contraction capacity of the breathing system, so, as mentioned before, posture can have tremendous impact on the recoil forces of the breathing system.

It is interesting to know that, on average, the REL occurs at approximately forty percent of the full breathing capacity. However, the location of the REL can vary up to thirty percent depending on the singer.

Muscle

Muscle action gives us the ability to control the forces of gravity and elastic recoil, and decrease or increase the lung pressures necessary to generate and maintain the desired sound. The degree of muscle effort and the direction of that effort depends on the influence of elastic recoil and gravity, as well as the task requirements. For instance, because the recoil forces are very strong when one takes a full breath, inhalatory muscle effort can be used to counteract the strong recoil forces and release the breath more gradually, if desired. Once the breath is used and the rib cage is less expanded, the inhalatory muscle forces may be unnecessary and exhalatory forces must be recruited to continue the coordination for appropriate breath flow.

More complicated tasks create different requirements on the system. For example, if a high pitch with loudness is required immediately after a full breath, exhalatory muscle effort may be combined with the passive forces of elastic recoil and gravity to create the amount of breath pressure necessary to produce the desired sound. It is easy to see that different conditions, that is, changes in pitch and/or loudness, require alterations in the degree and/or direction of muscle action. Add to these conditions the passive variation of elastic recoil, body postures, and gravitational pull, and the singer has much to coordinate in the singing process.

Techniques of breath management vary among singers, even those who are trained in the same singing style. For example, research indicates that some singers employ the diaphragm when they sing and others do not. For those who use the diaphragm, which is a muscle of inhalation, in contraction expands the dimensions of the lower rib cage and thereby increases the overall lung volume capacity. On the other hand, the abdominal muscles, which are muscles of exhalation, contract antagonistically to the diaphragm.

With this familiarity with the mechanics of the breathing system, we need to see what research is discovering about the operation of the breath management system during different singing styles. In the next issue, we will look at several parameters of breath management and see how they differ in classical and country singers. In addition, we will consider the ramifications of these breath management strategies on voice pedagogy.

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