



Science for Singers

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

Keeping It Moist

Some years ago our family had a guest living with us. She was an oboist working on her DMA at the University of Iowa. What my children and I remember most about her is her daily routine of wetting reeds. She would spend hours walking around with a reed in her mouth, trying to keep it moist and pliable for the concert or rehearsal in the evening. So much seemed to depend on the physical properties of this double reed system, the sound-producing part of her oboe.

I remember thinking how glad I was that my vocal folds were deeply embedded in my throat, where it's always moist and humid. But is it always moist enough? This is a question that has been asked by vocologists for many years. Research is now underway to determine the extent to which humidification of the air we breathe and increased hydration of our bodies can improve "ease" of phonation (Verdolini-Marston, Titze & Druker, 1990; Verdolini, Titze & Fennell, 1994; Verdolini-Marston, Sandage & Titze, 1994). But as we are trying to wet our vocal folds, is the rest of our body happy? Should we move to tropical climates where we can enjoy a perpetual steam bath or retreat to the desert where our clothes don't stick to our skin?

It is obvious that our bodies adjust to both climates, but the problem is in transition. Production of adequate surface (skin) moisture by various secretory glands and by the circulatory system takes time to reach a new equilibrium. Informal studies suggest one to three days. Meanwhile, the skin is either too wet or too dry. Too wet is a comfort problem, whereas too dry can be a vocal problem. Vocalists who move around a lot between wet and dry climates must take the one to three day adjustment period into account. During this time, some assistance can be obtained with portable humidification systems. An excellent summary of the pros and cons of such systems was published in *Wellness Letters* (1992). It is worth restating here:

Portable Humidifiers: Is Moist Air Good For You?

When winter comes and the heat goes on, relative humidity falls in most homes, sometimes to levels that mimic the desert. Lips may chap, skin may roughen, noses bleed, and throats get scratchy - and thus people resort to portable humidifiers. A proper level of moisture in the air - 30% to 50% is what the U.S. Consumer Product Safety Commission (CPSC) recommends - can make you feel more comfortable and may have beneficial effects on furniture and plants. But is there any truth to the idea that a room humidifier keeps people from getting colds or eases a cough and sore throat?

The health effects of dry air have remained controversial - after all, people live perfectly healthy lives in the desert. Plane cabins are notoriously dry, and there's evidence that flight attendants have more colds than others (though there might be other facts involved besides dry air). In 1986, as reported in *Environmental Health Perspectives*, a review of all relevant studies led researchers to conclude that low relative humidity might cause eye irritations, but they found no evidence that it had any direct effects on health. However, they cited evidence that microbes are more "infective" - that is, likely to cause illness - in very dry conditions. At least one small study has suggested that dry air might impede the action of nasal cilia, the small hairs that help clear the respiratory tract of bacteria and viruses. And some people may

be more affected by dry air than others. Thus a humidifier might be worth trying if *your indoor air is very dry*.

There's no controversy, however, about the ill effects of high humidity. Relative humidity above 60% promotes the growth of airborne fungi, bacteria, molds, and other allergens and may also favor the survival of some viruses.

Furthermore, any humidifier that isn't kept clean - and studies show that most owners don't clean them often enough - can be a source of air pollution.

Steam, Cool-Mist, Ultrasonic

Some people swear by an old-fashioned pan of water on the radiator, but it won't really add much moisture to the air. Large humidifier units attached to your central heating system may work well but are very expensive, as well as impractical for apartments and some dwellings. If you decide to use a room humidifier, four basic types are available in tabletop or free-standing models - but each has drawbacks.

* *Evaporative humidifier* create mist by means of a moving belt in a reservoir. They are not likely to contaminate the air if kept clean. Drawback: hard to clean. But there are newer, better models (see below).

* *Steamers or vaporizers* turn water into vapor by heating it; "warm mist" models are an update that mixes the steam with cool air. Drawbacks: units are usually small, noisy, and use a lot of electricity. There's also a danger of burns or electrical shock.

* *Cool-mist humidifiers* create a mist mechanically by "impelling" water against a screen or other surface. Drawback: they emit bacteria and molds.

* *Ultrasonic humidifiers* use high-frequency vibrations to turn water into mist. These are now waning in popularity. Drawbacks: they emit very fine mineral particles that show up as white dust on furniture. Using a demineralization cartridge or distilled water will correct this - but most people don't. The particles can get deep into the lungs and then into the bloodstream, as well as cause respiratory problems and allergic reactions in sensitive people. The units may also emit whatever pollutants are present in tap water, such as lead or radon, as well as microbes. Ultrasonics are hard to clean.

Prices vary: small vaporizers or steamers can cost less than \$25, warm-mist tabletop models under \$100, ultrasonics from \$75 to \$500.

A New Choice

A redesign of the older evaporative humidifier is the "wicking" humidifier. The CPSC has not yet tested this type, but overall it seems the best. First, it has a filter that's designed to trap mineral dust - an advantage over ultrasonics. Second, it's less likely than other types to emit bacteria and molds, particularly if you add an antibacterial treatment to the water and replace the filter or wick as recommended. Third, it is easier to clean than the older models. Tabletop and freestanding models range in price from about \$50 to \$200.

Keep It Clean

1. Whatever you choose, the most important thing is to keep your humidifier scrupulously clean. Change the water in a portable every day - that's the advice of the CPSC. Once the unit gets dirty, it's hard to get it really clean again, especially if mineral deposits have built up. Wash the tank thoroughly according to the manufacturer's instructions. Any standing water (even a pan on the radiator) can quickly become

contaminated by mold and bacteria. Vinegar or hydrogen peroxide will kill mold; chlorine bleach kills bacteria.

2. Because humidity should be kept within the 30%-to-50% range, it might also be worthwhile to invest in a gadget to measure moisture. Known as hygrometers, they can be bought at hardware stores or ordered by mail.

The CPSC and the American Lung Association have prepared an informative new brochure, *Biological Pollutants in Your Home*, which discusses indoor humidity and tells how to correct problems. To get your free copy, send a postcard to CPSC, Washington DC 20207. A brochure called *Humidifier Safety Alert* is also available.

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