

## Ask the Doctor: Physical Conditioning

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Since this column began last year, your author and the Editors have received a number of letters from our members suggesting possible future topics or requesting information on health issues pertinent to double reed musicians. The topic mentioned most often was physical conditioning (also described as fitness, working out, warm-up exercises, etc). It was also a popular subject with members of the Association of Concert Bands, during a round table on health problems held at their recent convention.

Because of such interest, this issue's column will focus on physical conditioning. Obviously, space limitations don't permit detailed explanations of all the component parts of fitness. However, many well-written books on fitness, general conditioning and specific muscle exercises are available in most bookstores; readers are encouraged to consult these for further details and understanding of this broad subject.

For the purposes of this column, I have divided conditioning into three basic components: cardiovascular, respiratory and musculoskeletal. Each one is different, not only in the anatomy involved, but in its physiology, the nature and effects of the conditioning process, and the standards of fitness. Some physiologists might combine the cardiovascular and respiratory components, based on similar anatomy and functions; however, I shall keep them separate here.

### Cardiovascular conditioning

The backbone of cardiovascular conditioning is aerobic exercise, with its long sessions of continuous physical activity. These sessions force the body to maintain rapid heart and breathing rates and thus burn calories via specific metabolic pathways that require large amounts of oxygen. Improved heart muscle action and endurance are an additional positive effect of regular aerobic exercise. Most physicians, myself included, believe that this type of conditioning is beneficial to almost every one, and it has become a staple of healthy people's workouts, as well as part of many postoperative and cardiac rehabilitation programs.

Musicians obviously can benefit from general cardiovascular conditioning, and many already include it as part of their personal health maintenance routines. There is no one correct type of gen-

eral fitness program; personal desires/goals, availability of facilities, financial considerations and many other factors determine a unique program for each individual. If one can attain and maintain his/her desired level of conditioning, it seems to make very little difference whether the workouts occur in one's home (with varying types and sophistication of equipment), in a gymnasium or health club, or by striding the local streets or malls.

### What the instrumentalist requires

The remainder of this column will focus on those aspects of personal fitness that are more specific to a wind instrumentalist's special needs and more important to the music-making process.

From a physical standpoint, what is needed to play effectively, and how can these needs be met and maintained? The answers to both these questions are pertinent for two areas or body systems — respiratory and musculoskeletal. Each system will be discussed separately, although the two are closely related. I will not comment on the neurologic or artistic aspects of making music; although both are crucial to one's artistry, they are separate from the physical realm.

### Respiratory needs

The double reed musician requires (1) a rapid intake of air, in a volume adequate to play the required musical passages; and (2) precise control of exhaling the air (expiration) from the lungs, through the chest/neck/throat/embouchure, and into the reed to produce the vibration necessary for producing notes. This may seem like a simplistic explanation of making a musical sound, but the process is indeed a complex series of acts requiring strength, control, coordination and endurance (the prolonged repetition of strength or muscle action) of many muscles.

The diaphragm is the principal muscle involved in inspiration, and the *only* one used for rapid, efficient intake of large volumes of air while playing a wind instrument. By contrast, the release of air from the lungs to produce music requires the use of many other muscles, both large and small, located from the chest to the lips, and responding to the constantly changing musical demands of pitch, tempo, meter, intonation, dynamics and many other variables.

### **Musculoskeletal needs**

The musician requires: (1) sufficient body strength to carry and support/hold the instrument; (2) muscular strength and endurance to operate the keys—the performer’s joints and muscles, from the elbows outward to the fingertips, must be able to achieve precise, complicated, fast and repetitive combinations of motions; (3) the involved joints must be flexible enough to allow the required degrees of motion, and all the muscle-tendon units must be able to contract fully and permit smooth tendon gliding to facilitate these movements.

All these requirements usually cannot be met by traditional physical workouts or exercise programs, since the latter are based on a different emphasis or desired set of results. Specific methods are needed, and will be detailed in the next sections.

### **Some important information**

The exercises that follow are designed for people with basically normal muscles and joints, and with no medical conditions that would prohibit using these programs. Those musicians who have joint or muscle problems that might not allow them to participate fully, or who have other pertinent medical questions or concerns, are advised to consult their physician or other health professional for personal advice and guidance about strengthening, stretching and other similar exercises.

### **Respiratory conditioning**

(1) An exercise designed to improve diaphragm function and air intake involves taking a deep and fast (less than 1/2 second duration) inspiration, using only the diaphragm. This should be practiced while sitting or lying on one’s back, and a short, audible gasping sound should occur with each repetition. The abdomen must push forwards quickly during each inspiration; any other movements (i.e., chest, lateral abdominals, etc, indicate that the inspiration is too slow, allowing the unwanted secondary muscles of inspiration to come into play). Keep the neck and throat muscles relaxed during inspiration. Do this exercise no more often than 10 times in a minute — more frequent repetitions may produce hyperventilation, with its symptoms of dizziness, lightheadedness, and/or tingling in the tips of fingers or toes.

(2) Expiration exercises are best done while playing on one’s instrument. I have found three types to be useful. First is playing long tones with changing dynamics— *ff* > *pp* < *ff*, then *pp* < *ff* > *pp*. Second is practicing an exaggerated, long expiratory vibrato—exhaling with a continuous hu-hu-hu-hu breath accent for 8-10 seconds at a time. Third is

performing one- or two- octave slurs, both up and down, at varying speeds and dynamics.

### **Musculoskeletal conditioning**

Exercises are the most efficient way to keep one’s body ready to perform all the physical actions required to make music. Both muscular strength and joint flexibility must be achieved and maintained by these conditioning routines, and often different exercises are needed for each component.

### **Strengthening**

Most of the muscles used in playing are concentrated in the upper extremities (for holding and playing the instrument) and in the spine (for postural control). Isometric exercises are used most commonly to improve specific muscle strength; they consist of contractions of a single muscle while it maintains its original length (“tensing” the muscle without moving the adjacent joint). This is the most efficient method devised to increase muscle strength; it is employed by many, including body-builders and athletes. Bookstores carry many publications dedicated to exercise programs, but most of them deal only with large body muscles; little is written about the many small, intrinsic muscles in the hands. Those control the fine, precise motions needed to move keys or valves, or finger the proper notes on a stringed instrument. Intrinsic muscles are at least as important as the large, extrinsic ones and require specific strengthening routines of their own. Isometric or other resistive exercises, using special putty or rubber bands, are effective ways to improve the strength of this group of muscles.

### **Stretching**

People tend to lose some flexibility (tighten up) as they get older; the process is gradual, and the resulting losses of mobility seem to be especially noticeable in the morning, upon arising. Both joints and muscle-tendon units can be involved. Tight joints result from contraction of the joint capsules (the fibrous sacs enclosing the joints) and the ligaments (firm tethers that hold the bones together and dictate the direction and extent of joint motion). Some people are naturally more loose jointed than others; they are less likely to suffer from joint stiffness, but can experience tight muscles like everyone else. Stretching exercises must benefit both joints and muscles; often different types are needed for each structure.

Achieving flexibility in tight joints can involve both active muscle contractions and passive stretching actions. Because each joint requires different techniques, and since there are fewer

written references on flexibility than on strengthening, I have included a list of appropriate stretching routines that can be useful to everyone with normal musculoskeletal systems. These exercises can be done conveniently in the rehearsal or warm-up room, and while fully dressed.

All exercises must be done slowly and gently. Each joint must move far enough so that one feels a sensation of tightness in the tissue being stretched—NOT PAIN! At the point of tightness, hold the position for five seconds, then slowly release the tension and move back to the starting position. Do not stretch the same structure in the same direction several times in succession; alternate with other positions, muscles or joints during an exercise session. Stretch each structure a maximum of 3-4 times in any session.

#### *Finger joints*

1. Stretch all fingers into extension, as far as they will go.
2. Move thumbs two directions:
  - a. Backward into extension, in the same plane as the fingers.
  - b. Forward across the palm, trying to touch the pad of the thumb to that of the little finger.
3. Bend or flex the outer two joints of the fingers as far as they will go, trying to touch the fingernails to the outermost crease of the palm. After holding this maximum position for five seconds, slowly bend or flex the knuckles nearest the wrist, so that the fingers now form a fist. Then, squeeze the thumb over the clenched fingers.

#### *Wrist joints and wrist/hand/finger tendons*

1. Place palms and fingers completely flat together, using only light pressure; hold the hands about six inches in front of the neck, with the fingers pointing straight up. While holding this position, slowly lift the elbows outward until the wrists are extended about 90 degrees (a right angle) or to their maximum.
2. With the elbow completely extended, make a gentle fist. Hold the fist, then bend or flex the wrist toward the palm as far as possible without opening the fingers out of the fist.

#### *Elbows*

1. Stretching or extending has been achieved by doing the previous exercise.
2. Bend or flex the elbow slowly as far as possible; most people should be able to touch the shoulder with the same hand at maximum flexion.
3. Extend the wrist and elbow simultaneously (as in pushing open a door). When the elbow is fully extended, rotate the forearm and hand 180 degrees, so the fingers point downward.

#### *Shoulders*

These joints have the widest range of motion possible in any human joint. Both upper extremities may be moved simultaneously into all possible positions, trying to stretch the limb outward as far as possible during these movements. In addition, here are some specific stretches:

1. Bring the arms across the body, as in trying to hug one's self; reach around the body as far as possible.
2. Pull the elbows backward, as though trying to touch them behind the body.
3. Put hands behind the head; holding this position, bring elbows forward so they touch, then stretch them backward to their maximum.
4. Stretch the hands over the shoulders and reach far down the back.
5. Stretch the hands behind the back from below, trying to reach far up between the shoulder blades.

#### *Neck*

1. Bend forward to touch the chin to the chest; return to the starting position for a moment, then bend backward as though looking up to the sky.
2. While facing forward, tilt the head sideways (ear to shoulder) to the right; return to the starting position for a moment, then tilt to the left.
3. While facing forward, rotate the head as far as possible to the right; return to the starting position for a moment, then rotate to the left.

#### *Lower back (lumbar area)*

1. While sitting, slowly rotate the torso to the right side, then to the left.
2. While sitting, bend the torso sideways to the right, then to the left. Keep the buttocks firmly on the seat.
3. While sitting with legs apart, bend the body forward so that the head moves between the knees.
4. Extend the lower spine into a maximum swayback posture.

#### **Conclusions**

As with any exercise or conditioning program, I caution the reader not to expect rapid or dramatic improvement in body structure or function from the above routines; changes will be gradual, and depend on regular use of the program over long periods of time. For those seeking to maintain their flexibility and other aspects of conditioning, doing at least some of these routines each day should serve that purpose, and can be incorporated into one's daily musical warmup. ❖