Pain-Free Woodworking

Perfect wood, a dream shop and all of the tools in the world won't help your woodworking if you're hurt

BY THOMAS P. LEROY

How many times has this happened to you: You're bent over for only two minutes, reaching under your router table to make that final depth adjustment. When you try to stand up—yeow!—it feels like someone has stuck a chisel in your back. It's not just age; it can be a sign of cumulative trauma. Pain is a warning. Your back has just told you that the position you've worked in is a no-no. Keep it up, and someday the pain might not go away so fast.

I'm both a physical therapist and a member of the Guild of New Hampshire Woodworkers. Fellow members frequently tell me about aching backs, stiff necks and sore shoulders. These injuries don't necessarily result from one specific incident, but rather they are often caused by prolonged overuse or misuse of your body. They are the proverbial piling on of straws that break the camel's back. These injuries can happen to any body part, and they can range in seriousness from a small annoyance that decreases your enjoyment of woodworking to a debilitation that keeps you away from your workbench for long periods of time. Cumulative is the key word here. (The advice that I give in this article has to be somewhat general. If you have specific, intense injuries, you should consult your doctor.)

Get in neutral before you gear up

To get a good idea of how you can prevent cumulative trauma to your body while working, you will need to be comfortable with a few general concepts. First, each joint—a joint is where two or more bones meet—has a neutral position. This position exists roughly at the midway point between the joint's extremes of motion. When a joint is in neutral, it is in its least-stressed position. Think of a balanced seesaw, with the plank horizontal, and you have a simplified paradigm of a joint in neutral. Turn your head as far to the right as you can and then to the left. The neutral position for your neck in this plane of motion is facing straight ahead, midway between the extremes.

The farther a joint is out of neutral, the more stress there is on the joint surfaces, the surrounding muscles and their tendons. The more time spent out of neutral also increases the load on these structures. Stress and load cause fatigue and, possibly, pain. These facts lead us to the second concept: To decrease the factors that can lead to cumulative trauma injuries (read pain), you must spend more time closer to your neutral positions.

Often, mere awareness of proper work positions is not enough. Your overused muscles can get tight during a day in the shop. This creates a situation much like twist in a board that pulls it out of a true plane. Tightened muscles can pull joints farther out of neutral and make it difficult, if not impossible, to modify how you work. For a simple stretching program that targets some of the major muscle groups of the shoulders, neck and back, see the story and photos on pp. 76-77.

Your head weighs 15 lbs.

When you work wood, the primary function of the neck is to position your eyes so that you can use your hands. A problem arises because your eyes are encased in your head, which weighs about 15 lbs. The neutral position of the neck is ear hole over the shoulder. If you were to hold 15 lbs. in your hand close to your body and then hold your arm in front of you, you would quickly realize the greater effort needed to maintain the second position.

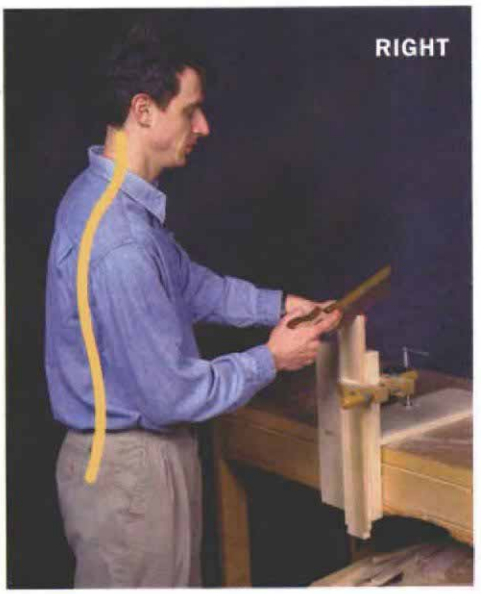
Now I'm the first to realize that woodworkers won't be walking around shops with books balanced on the tops of their heads. I merely want you to lessen the stress on your neck whenever possible by staying closer to the neutral position. Some early warning signs of too much nonneutral head-holding are fatigue in neck muscles, headaches centered around the base of your skull or neck stiffness, especially in the morning. Because nerves pass through your neck, staying closer to neutral will also help protect your arms.

Would you try to thread a needle while holding it at waist level? I doubt it. Remember: Head position is intimately linked to vision. Dimly lit areas or lighting that casts shadows across work surfaces cause you to bring your eyes closer to the work and your neck farther out of neutral. Mobile task lighting is a simple, inexpensive solution to this problem. Also, you can either lower your body toward the work or raise your work off the bench (see the photos on the facing page).

Because the neck and shoulder blades have some muscles in common, arm position can be another factor that leads to a forward head position. The more you reach away from your body—such as when spraying or hand-applying finish deep in a cabinet—the tendency increases to have your head forward from neutral.

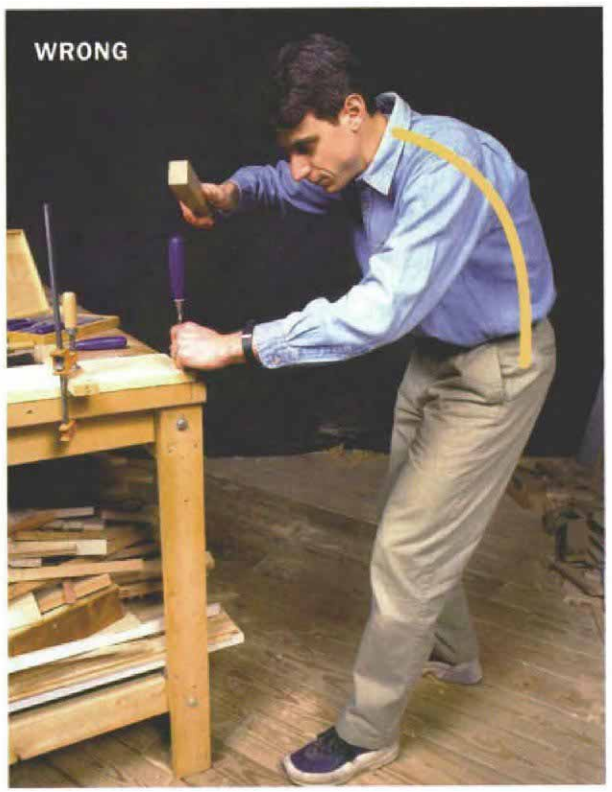
Tipping your head too far back so that you can look up is painful, too. And if you have just started to use bifocals, be cau-

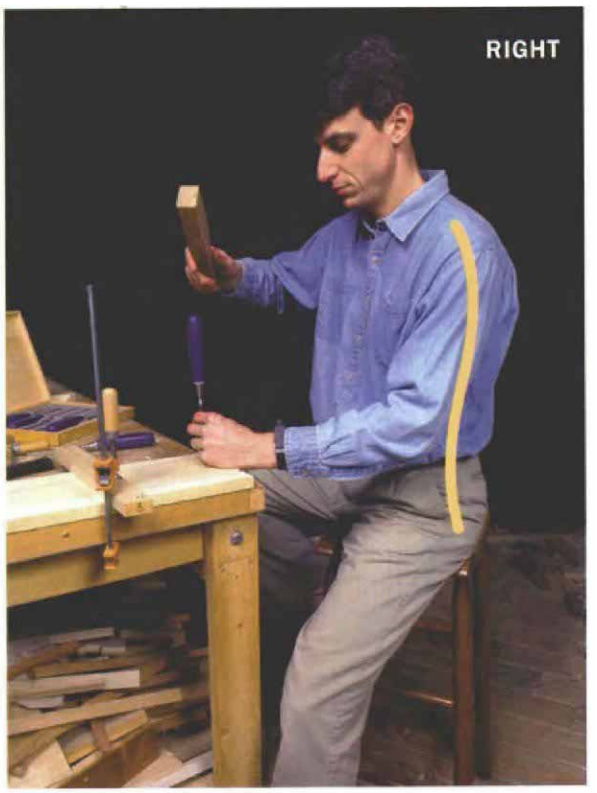
Raise the work...



Cutting dovetails can be a pain in the neck. *Canting your head forward to get your eyes closer to your work puts tremendous strain on your neck muscles (left), leading to headaches and muscle pain. For backsaw cutting, the author made a jig that raises his work off the bench (right), enabling him to stand straighter with his neck closer to neutral.*

... or *lower your body*





Have a seat. *Don't bend forward to get a closer look at your work. This position (left) puts a lot of stress on your back and neck. It's better to sit on a stool to bring your head and eyes closer to the work at hand. Sitting also allows your back and neck to remain in their neutral positions.*

tious about working with your head tipped back for prolonged periods of time.

The rotator cuff is the shoulder's weak link

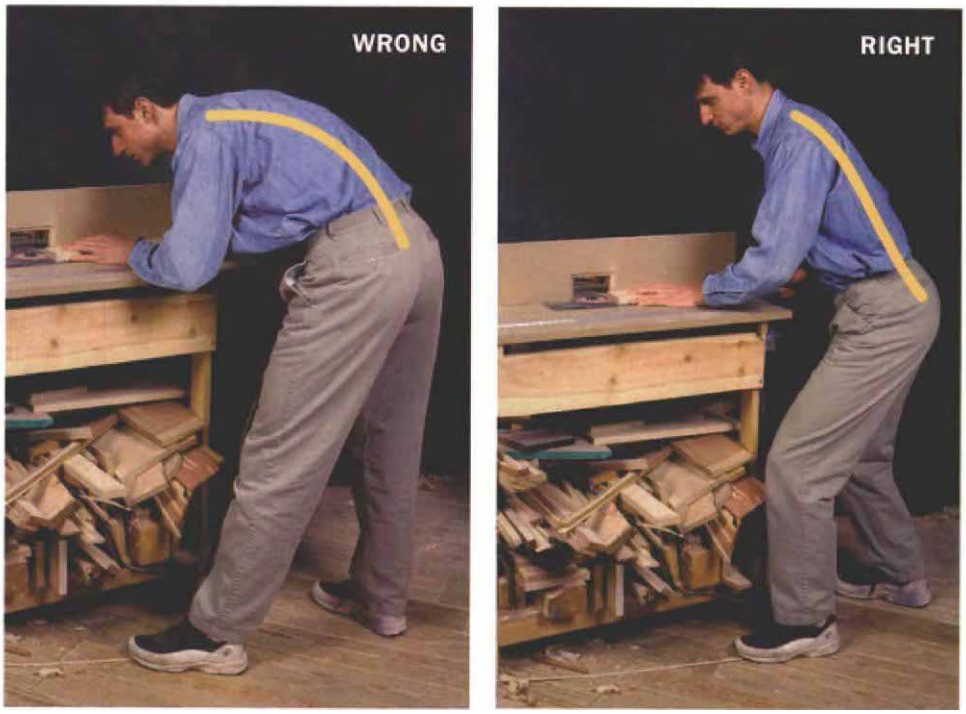
Your shoulders function to place your arms and hands where they are needed and provide force to move an object in your hands, be it a 4x8 sheet of plywood or a cabinet scraper. The amazing trait of the shoulder is its mobility and range of motion. Compared to the hip, the shoulder is almost infinitely more mobile; think of all of the places you can put your hands that you can't put your feet.

To be able to move as it does, the shoulder sacrifices stability; it is one of the joints most frequently dislocated. This makes the muscles that surround the shoulder responsible not only for moving the joint but also for keeping the bones aligned properly. The rotator cuff—a term referring to four specific muscles—assists in the precise control needed to keep this most mobile of joints working properly. For the rotator cuff to function best, correct position of the shoulder blade is important.

Let's look at how common woodworking tasks can cause problems. Activities that involve using your hands close together—

Photos: Michael Pekovich

Bend *your knees, not your back*



Stand up straight, and you'll feel great. *Bending over a router table for long periods of time can lead to an aching back. Bend at the waist and bend your knees to get closer to your work, but keep your back in neutral.*

planing, scraping, routing, lathe work—can lead to tight chest muscles. This tightness tends to cause the shoulder blades to round forward, which in turn makes the rotator cuffs less efficient. You now have a situation in which every instance of lifting an arm causes a little damage, especially if heavy weight is involved or the hand is significantly above shoulder level. This example of cumulative trauma illustrates the importance of stretching muscles that our activities tend to make tight.

Careful planning of your shop can decrease the wear and tear on the shoulders and their muscles. Any heavy object—a jointer plane, a router—should be stored below shoulder level. Lighter objects can be kept higher, but I try to avoid placing frequently used objects above eye level no matter how little they weigh.

Also, be cautious about how much time you spend with your arms overhead. This can lead to the rotator-cuff tendons rubbing against bone spurs. Finishing a tall piece or installing overhead ductwork for a dust-collection system are both examples of situations in which you should raise yourself up to the level of the task, just as I talked about in the neck section.

The lower back is the body's keystone

Your lower back works as a stable base from which your arms and legs move and generate force. As in the neck, the neutral position is important. When viewed from the side, your back in neutral should have a slight curvature—convexity facing forward. It's helpful to envision two extremes: The Pink Panther has a flat back with no curve, and Donald Duck's back has excessive curve, rump feathers sticking out in the air. As is the case with most joints, the lower back's neutral position is roughly in the middle of the two. It's not just a matter of posture; you can incline your body far forward and still keep your back in neutral by hinging at the hips like a waiter's bow.

One of the most important concepts for long-term back safety is proper work-surface height. Different tasks require different heights. No one magical percentage of your inseam exists to determine what is best. Instead you must choose a height that keeps

Stretch it out

Less than five minutes—that's how long these exercises take to stretch and loosen up your muscles. That's less time than it takes to sharpen a chisel. You wouldn't think of starting work with a dull chisel, and you shouldn't think of starting work with tight muscles.

Hold each of these stretches for 15 seconds (except where noted), and do each one for three repetitions. Remember that you're stretching, not really pushing or pulling. And never bounce your way into a stretch. Slow and easy. You'll feel your tight muscles, and as you hold the stretch, you'll feel them loosen a little. You can do these exercises any time during the day if you start to feel stiffness or pain. You'll feel better and, possibly, be able to work a longer day.

Shoulder stretch. *This stretch will loosen your chest muscles. Place your hands on both sides of a doorway, a little above shoulder level. Step into the doorway with one foot. Shift your weight onto the forward foot, leaning into the doorway, keeping your back straight. Hold for 15 seconds. Repeat two more times.*

Hamstring stretch. *Place your heel on a low stool. While keeping your knee and your back straight, lean forward at the hips. You'll feel the muscles in the back of your thigh stretch. Hold for 15 seconds. Now do the same thing with your other leg. Repeat two more times for each leg.*

you as close to neutral as possible while being able to work comfortably. Keep in mind that machine and bench manufacturers try to find a height that's fairly suitable for most people. That leaves some of us having to raise the working heights, while others must lower their heights.

Just as in the shoulder and neck, a lower-back concern is spending too much time toward the extremes. Pain is a sign that you are overtaxing your lower back. An insidious cause of the opposite extreme—bending back for too long—can occur with prolonged standing. Once your trunk muscles fatigue, the hips often sway forward to gain stability by leaning against the bench or a countertop. To maintain balance the upper back leans back, which exaggerates the lower back's normal curvature. This can also happen when you're working on a ladder.

Additional suggestions don't require the modification of machinery or the building of jigs. A cluttered shop increases the chance that you'll bend improperly—flex with twist—or reach excessively. Also, pay attention your feet. They should point in the direction your center of gravity is moving. Woodworkers often do this reflexively when hand-planing or ripping a board on the tablesaw. This allows us to shift weight from the back foot to the front and use the large muscles of the leg to do the work. When standing for long periods of time, it is common to shift more weight on one foot than on another. This is okay as long as you don't bend the unweighted knee so much as to allow that side of your pelvis to drop (see the photos above).

To conclude, become aware of how you move and position yourself. Whenever possible, try to stay closer to those neutral positions. It may seem awkward at first, but you should relearn correct positions if you want to avoid pain. Also, the old cliche about variety being the spice of life applies; even while doing the same activity, try to introduce some variability. Be creative; build a jig or modify a task, get a comfortable stool. And if you start to hurt, take a little break and stretch. The body you save will be your own. □

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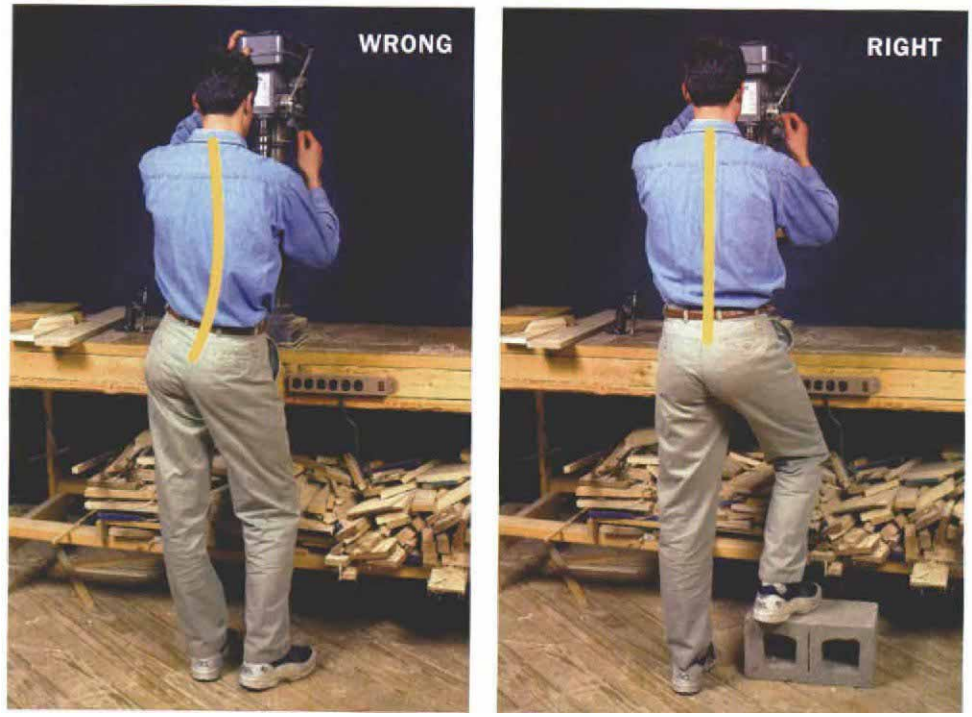
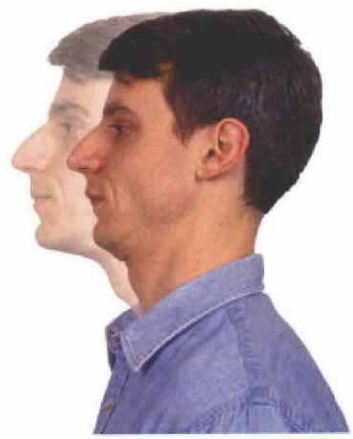
Keep *your belt parallel to the floor*



Don't cant your hips. *If you stand at a bench for a long time, fatigue will make you cant your hips, leading to back pain. Try standing with one foot on something. When your belt is parallel to the floor, it's a good sign that your hips are straight.*

Neck side stretch. *Rest your right hand behind your back to keep your shoulder down. With your left hand on top of your head, tilt your head toward the left. Make sure your neck is straight, not canted forward or backward. Hold for 15 seconds. Now do the same thing to the right. Repeat two more times in each direction.*

Standing back stretch. *This is an excellent stretch after being bent forward for a long time. Keeping your knees straight, bend backward at the waist. Hold for five to 10 seconds. Repeat two more times.*



Backward neck stretch. *Without tipping your head, bring your head straight back so that your ears are directly over your shoulders. Hold for 15 seconds. Repeat two more times.*