

Prevent Injury to Your Hands, Wrists and Forearms

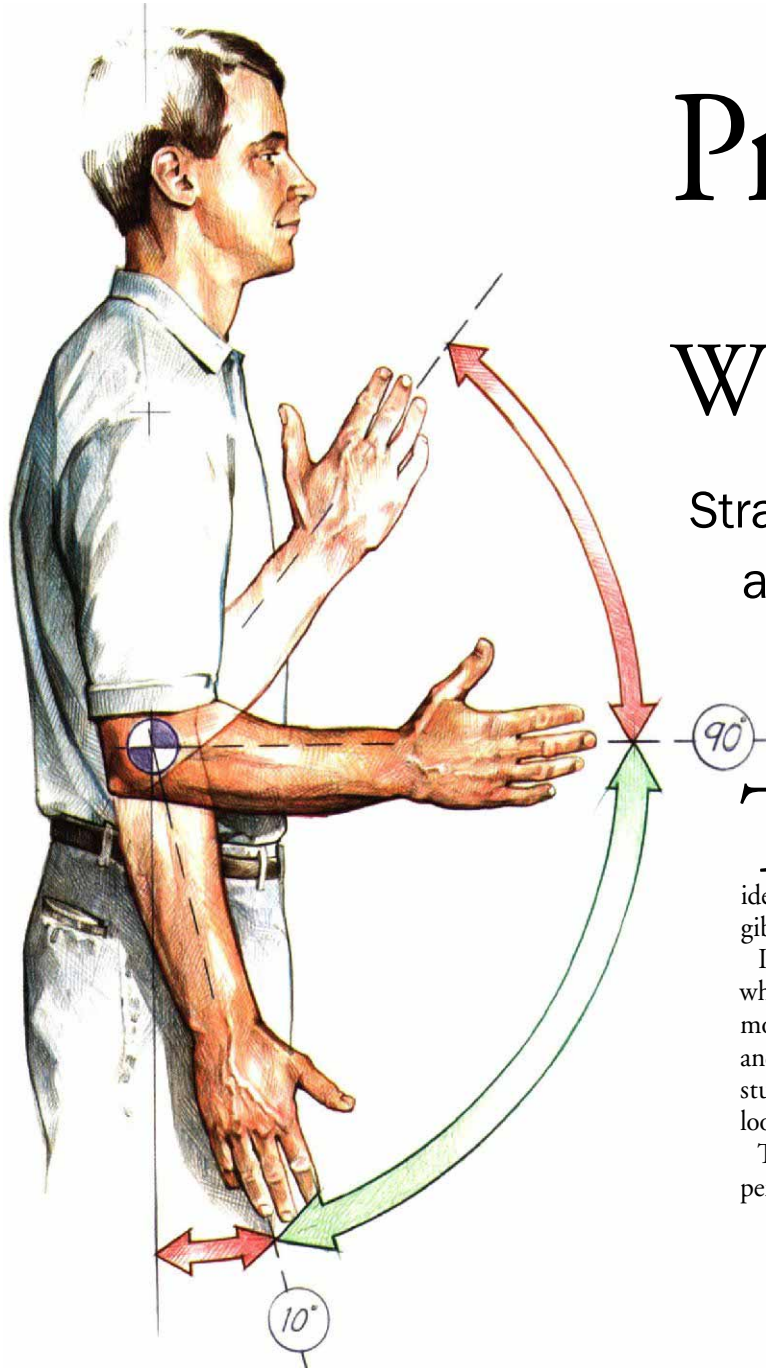
Strategies to keep you in the shop and out of the doctor's office

BY TOM LEROY

The term *handmade* is a good description of the work that most of us do in the shop. Our hands are the connection between our tools and the wood we work, enabling our ideas of detail and our notions of style to be transformed into tangible products.

I'm a physical therapist, and I recently evaluated a cabinetmaker who complained about needing a cup of coffee to get going in the morning. I made an off-the-cuff remark about caffeine's effects, and he responded in a crusty, Yankee manner, "I don't drink the stuff. I just wrap my fingers around the hot mug for 10 minutes to loosen them up."

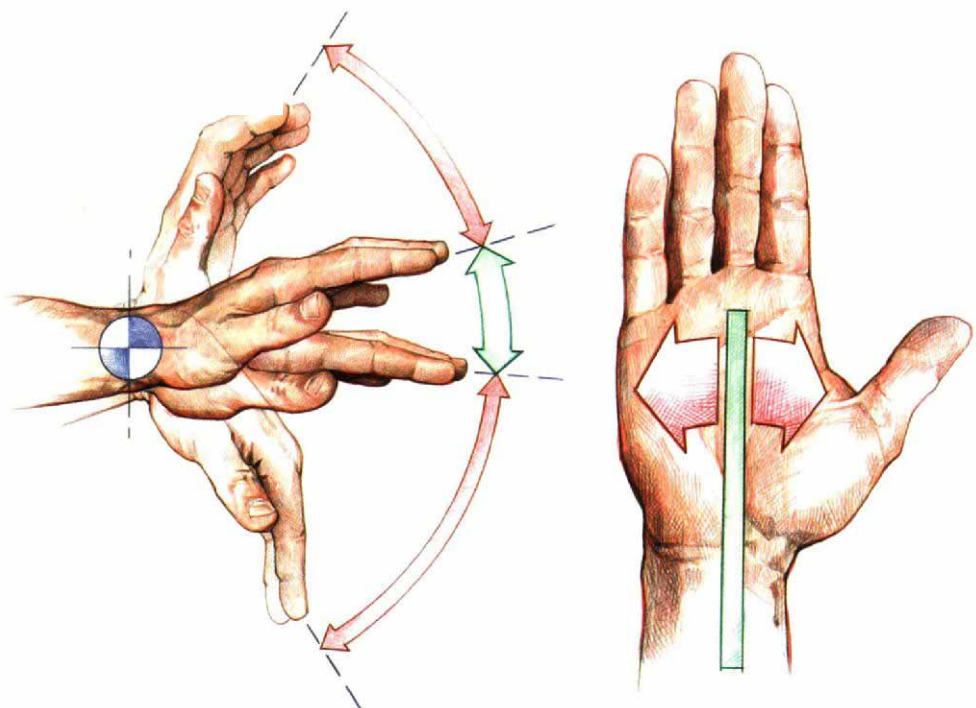
To lessen the chance that you'll develop this kind of coffee dependency, in this article I'll discuss the risk factors of hand, wrist



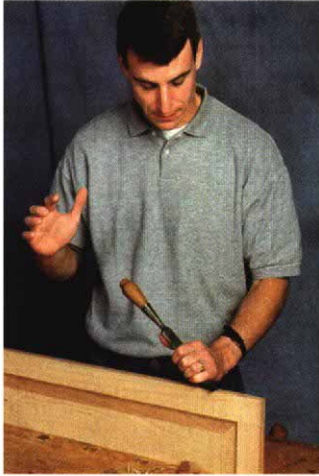
Watch the angles

Most people are careful to keep their backs straight while they lift heavy objects, but many of those same people are oblivious to maintaining healthy positions of arms and hands. Regarding the area from elbow to wrist, here are three guidelines to follow whenever possible:

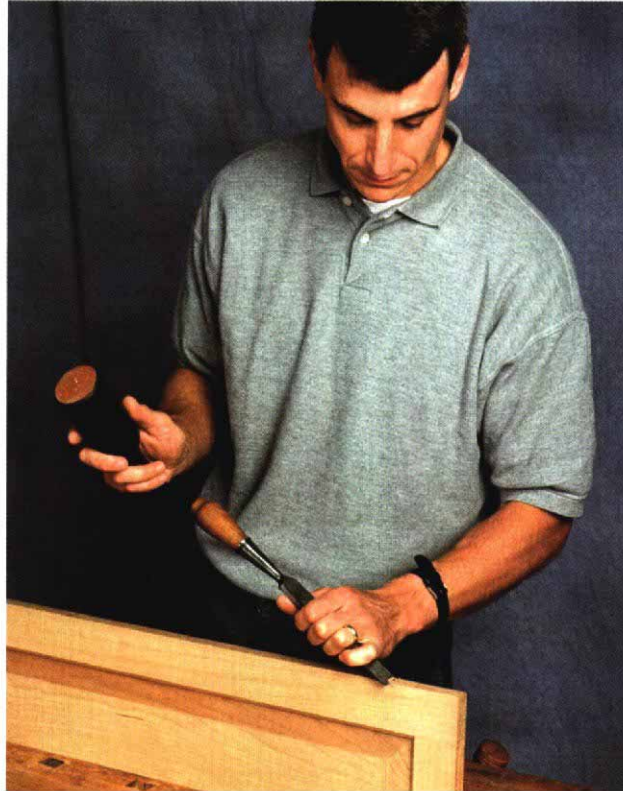
- The elbow should be bent between 10° and 90°—no more, no less (above).
- Don't bend the joint of wrist-to-hand forward or backward more than 20° (near right).
- Don't bend the hand significantly away from the midline (far right).



The hand is a precision instrument



Striking a tool with your palm is the wrong thing to do. Take the time to find a mallet or a hammer—even a block of scrapwood—to prevent a debilitating and painful injury.



and forearm injuries and suggest a few simple ways to minimize them. Hand sizes, flexibility and the tasks they perform vary significantly, so approach this information as you would a design article. Look for general principles and apply what is appropriate to your specific situation. Don't be afraid to modify your tools or your methods of work. The idea is to keep proving the old adage: "The eye of a craftsman works twice as hard as his hands."

Hands aren't hammers

Human hands are incredibly complex instruments, capable of remarkable precision, but using them as a hammer or a mallet invites injury. I cringe when I see a chisel being advanced by the strike of an open hand. Instead of hand-hammering joints, try gripping the head of a deadblow hammer or a small block of dense hardwood. These alternatives allow you to fit the joint without marring the workpiece or your hand. Another option is to use a round-headed wood mallet—there's a good reason why they've been around for so long. And remember to make a point of keeping these tools within easy reach. When the safer way is the easier way, it's a no-brainer.

Angles matter

One important but less-than-obvious detail is the position your arms assume when working wood. For example, when I use an in-line grip saw (Japanese or gent's style) and secure a board vertically in a vise, my hand is bent at the wrist, down toward the floor. This could lead to what's called an *overuse injury* if done with too much repetition. Don't get me wrong—I still use these types of saws, but I modify either my position, the angle of the saw or the orientation of the board in the vise.

Another common example involves the handles on plunge

routers. If the router grips and elbow-height are even, a vertical grip is appropriate. But when the router is above elbow height, the grips should angle toward the operator; and when the handles are below the elbow, the grips should angle away. Similarly, angling flat carving stock toward me limits the amount my wrist bends to meet the wood. This is the same principle behind a drafting table. The above examples have all involved the wrist. What follows are some guidelines to keep in mind concerning the area from elbow to wrist.

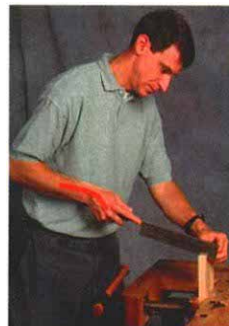
Get a grip

Our fingers have strong muscles to bend and straighten them; however, they're not supported as well in side-to-side motions. Flattening the hand and using the fingers as a featherboard to push stock against a fence can easily damage the lateral stabilizing ligaments of the fingers. Eventually, such damage can cause the fingers to sway permanently out of alignment and, in doing so, decrease their function. Save your fingers from

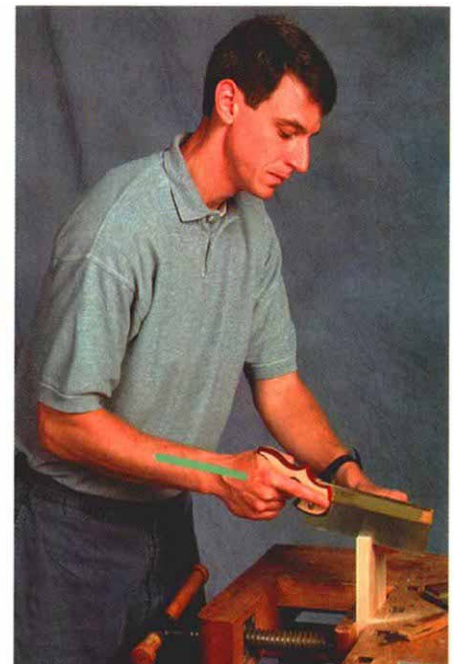
degeneration as well as amputation; use a featherboard.

Examining chisel handles can shed some light on gripping a tool. A mortising chisel is typically used in a vertical position, grasped by the nondominant hand and powered by a mallet. The handles tend to be of a larger diameter to minimize how much you have to bend your fingers. Often the handles are gently tapered to fit our conically shaped grip—wider at the index finger, narrower at the little finger. Some are elliptical in cross section, with the larger

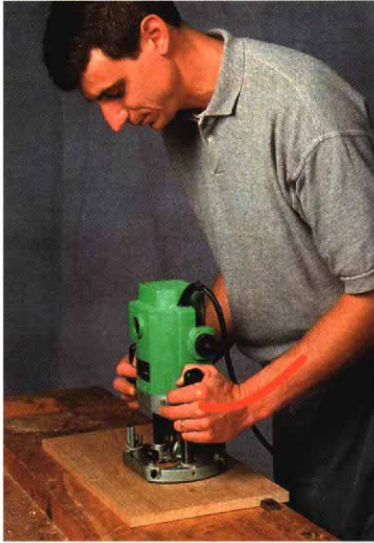
A bent wrist can lead to injury



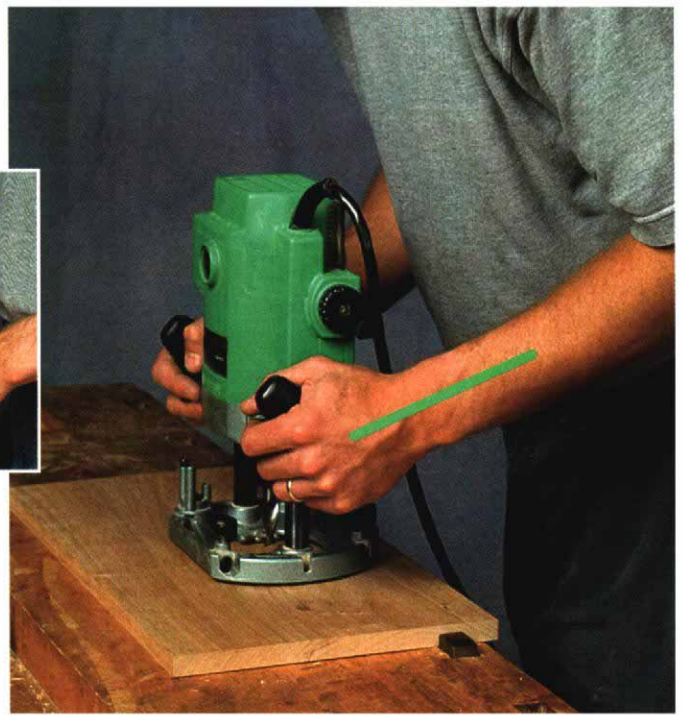
To avoid a wrist injury while using a handsaw, change the tool or the position of the workpiece. The goal is to maintain the position of your hand in a straight line with your forearm.



Angle the tool's handle when possible



Some plunge routers have adjustable handles that help you maintain a correct and comfortable grip. If you can't adjust the handles, the next best approach is to change the height of the workpiece.



diameter perpendicular to the cutting edge. This allows your hand to feel whether the tool is twisting as it's driven into the stock.

Carving chisels are used vertically, horizontally and in every position in between. More finite, precise control is required with these tools, so more often than not the handles are narrower to allow the fingers to encircle the tool fully. Some current manufacturers provide faceted handles that aid the user in turning the tool as it slices, resulting in a cleaner cut. New carving chisels often sport handles that are narrower at the top and bottom and thicker in the middle. This allows the tool to fit in the hand better, whether it's being used toward or away from the carver. I miss having a positive stop on the handle nearest the blade—a feature you don't always find in new chisels. This stop allows the fingers to register

against something and decreases the exertion needed to counteract a tool slipping within the hand's grasp. You often find this type of finger stop on older paring chisels.

Lift with less gripping

A look at bench planes illustrates the principle of grip-less lifting. When we bought our house, I discovered a wood-bodied Stanley No. 29 under the main staircase—a good tool, but the horn of the rear tote was broken off. I used it to surface a few boards and found my forearm aching. I switched to my No. 5—with its rear horn intact—and the ache went away. The horn functions as a hook so that the large muscles of the arm can lift the plane, requiring less effort from the finger muscles. Likewise, I prefer the older mushroom-style front knobs because they seem to require

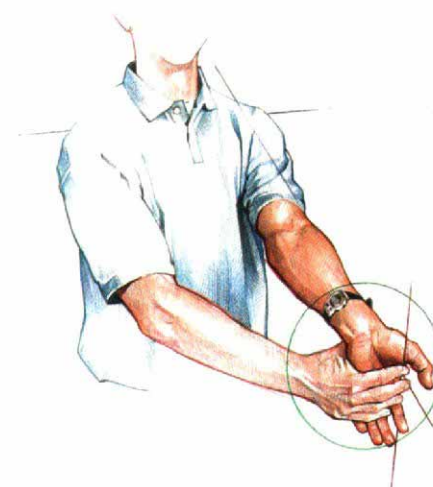
WARM-UP EXERCISES

Stretching muscles before you work, as well as during your workday, will help prevent injuries.

CHEST STRETCH

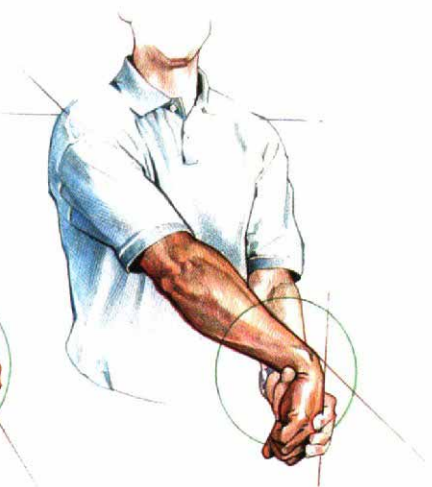
- Clasp your hands behind your back.
- Squeeze your shoulder blades together, trying to lift your hands away from your back.
- Hold for 20 seconds.

WRIST FLEXORS



With your elbow straight and palm up, gently grasp your hand with fingers straight. Bend your wrist toward the floor. Hold for 20 seconds.

WRIST EXTENSORS



With your elbow straight and thumbs down, gently curl your fingers and bend the wrist away from you. Hold for 20 seconds.



less gripping effort when repeatedly lifting a plane. This same concept applies to any tool frequently lifted. A tight-fitting O-ring rolled onto the top of a mortising-chisel handle can make a difference in preventing fatigue.

Some gloves hurt more than they help

Cold temperatures cause the blood vessels in our arms and hands to constrict, increasing the risk of developing overuse injuries. But putting on gloves to keep your hands warm is not always the best idea. Many studies show that gloves can decrease grip strength. This results in a tool more apt to slip and a muscular system less able to counter that tendency. I often suggest antivibration gloves when using tools, such as palm sanders, that generate significant vibration. However, I prefer the fingerless type, in which the palm material dampens the vibration while the fingers can maintain optimal function. Vibration, like cold, is a significant risk factor for injuries such as carpal tunnel syndrome.

A balancing act

I've been pleased to see more tool reviews discussing an important aspect of tool design—balance. A well-balanced tool allows you to concentrate on the outcome of the work the tool is performing, not on how clumsy or uncomfortable it feels in your hand. It's a sign of progress that more tools are being designed with ergonomics in mind, but be careful: Ergonomics also seems to be an overused label for marketing purposes—the equivalent of "new and improved."

Certain styles of tools can give you problems no matter how you grip them. For example, a spray gun with its fluid reservoir above the trigger is inherently more tipsy in a side-to-side motion than a spray gun with the reservoir below the trigger. This tendency to wobble requires that you use forearm muscles to counteract the twisting, which wastes energy. Similarly, drilling pilot holes and using screw lubricants make it easier to drive a screw with less force. This translates into spending less energy having to stabilize the



Where hand meets tool



On larger tool handles (left) the thumb and fingers should overlap, but fingertips should not touch the palm. These fingerless gloves (above) don't inhibit grip strength while a gel padding dampens vibration to the palms.

tool with your forearm. Another low-tech example is to substitute a brace for a screwdriver, thereby placing the work burden on larger and stronger arm muscles.

The lesson to be learned here: Work smartly with tools that fit your style. And keep in mind that *you* need to be balanced as well as your tools. See the drawings on the facing page and below for simple stretches to elongate the muscles frequently used and abused. Make an effort to stretch more frequently when you're learning a new skill or when practice hasn't yet honed your neuromuscular system. And be extra cautious when the task at hand stretches out over several hours. □

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TENDON EXERCISE



Start with your hand in the open position (left). Curl your fingers into a hook (above), then return to the open position.



Make a flat-finger fist, then return to the open position.



Make a full fist, then return to the open position. Repeat the entire exercise three to five times without holding.

