Woodworking Injuries

A hand surgeon looks at how accidents happen

by Dr. E. Jeff Justis

Wood-workers relish the feel of a tenon sliding into its mortise, and the smooth texture of a newly finished piece of furniture. Our fingertips are so sensitive that we can feel blemishes and flaws in our woodwork that are too slight to be perceived by the eye. Where would we be without these sophisticated sensors? Human evolution is, in part, the result of our early manipulation of our environment with our hands, and this is perhaps at the root of the creative impulses that make woodworking so satisfying.

It's no wonder, then, that people who have severely injured a hand or lost a limb often have emotional difficulty adjusting to their impairment. In fact, sometimes psychiatric care must supplement physical therapy. As a woodworker and a hand surgeon who has seen too many injuries, I am vividly aware of the risk in using power tools. I've also come to realize that virtually all injuries are preventable.

I have treated many patients with hand injuries inflicted by woodworking tools. Surprisingly, about one-third of all accident victims seen in hospital emergency rooms have an injury to the arm or hand. A 1964 study in England found that woodworking tools are responsible for most industrial injuries. Even so, research has not been done on the question of which tools are the most dangerous; hospitals don't generally obtain such information, and medical personnel don't always know the differences among various tools. A medical report may attribute an injury to a handsaw when in fact the injured patient was using a portable circular saw. I've never been injured by my tablesaw or my portable circular saw, but my own experience as a surgeon dearly suggests that circular saws account for the majority of serious hand injuries among woodworkers. I routinely discuss the mechanism of injury with patients, and I have concluded that there are three major causes of serious injuries from a power tool: inattention through repetition, an unanticipated happening, and inexperience or overconfidence. Many accidents involve some combination of the three, not to mention bad judgment brought on by fatigue.

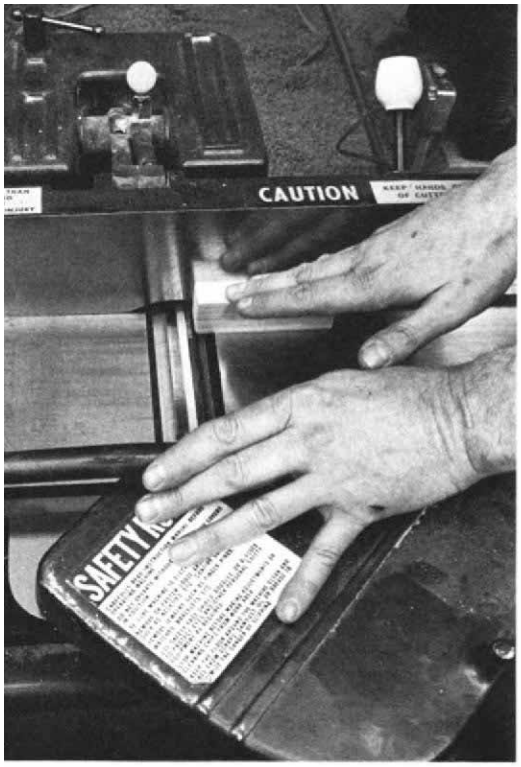
Inattention through repetition—A woodworker performing a number of repetitive cuts, such as a series of crosscuts to length, may become dangerously inattentive. The whine of the machine and the repetitious physical movement can lull the worker in an almost hypnotic way. A tragic example comes to mind: A cabinetmaker with 20 years of experience in a local shop was making repetitive cuts with a radial-arm saw, using his left hand to feed the stock and his right to pull the saw through. In an instant, his right hand moved too fast for his left, and the saw passed over his hand, severing all four fingers of his left hand just above the knuckles but sparing his thumb. Although his ability was permanently impaired, the man was able to resume woodworking by, as he put it, "doing the best I can under the circumstances, but I never realized how important my left hand was until this happened." Another patient, who severed his thumb just beyond the base joint in a similar accident, told me afterward that he had never been aware of how much he used his left thumb, especially when trying to hold work against the miter gauge of a tablesaw or the fence of a radial-arm saw.

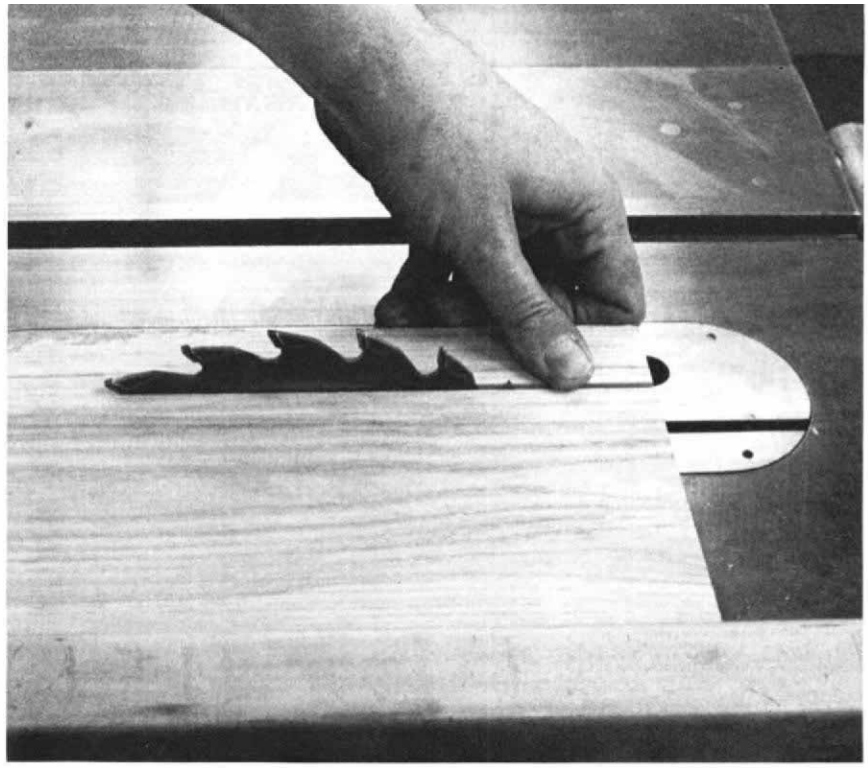
Interestingly, a 1975 study of 1,071 hand-injury patients showed that although 90% of them were right-handed, their injuries were nearly evenly divided between right and left hands. In virtually every case, the fingers bore the brunt of the injury. Inattention through repetition seems most likely to occur in the production shop, but all woodworkers must avoid being complacent when working with machines. It pays to pause deliberately after every couple of repeat operations to refocus on the task and to carry on with full awareness—a habit that can be acquired.

An unanticipated happening—Power cutting tools operate at high speeds. When something goes afoul, it occurs quickly and surprisingly. Kickbacks caused by binding are a common unanticipated event that can quickly draw fingers into a blade. Putting the fingers too near the blade can result in unpleasant surprises. One patient of mine recently reached with his left hand beyond the sawblade to catch a waste strip. The strip began to slide backward, and as he attempted to catch it, he caught his thumb on the sawblade. Fortunately, the blade was set just above the level of the board and his thumb wasn't severed. But a tendon and two nerves were cut, and although he has regained motion, sensation in his thumb will never be the same. Many of us forget that the regenerative capacity of the human body is limited. Any cut into the sub-dermal layer, no matter how well healed and painless, leaves a scar that is not normal tissue. Thus, a hand that suffers a major injury cannot be fully restored. Even a small cut, on the wrist for example, can result in a nerve injury that is the functional equivalent of an amputation.

Many times an unanticipated event will occur through inexperience, poor planning or a lack of understanding of how tools and machines work. For example, it should be obvious that trying to shape a small piece without a guard or a jig can end in disaster. Jointers can mangle fingers when the operator attempts to machine a small piece. Similarly, failure to anticipate the "breaking through" of the bandsaw blade can result in an injured finger. As a youngster, I recall slicing through the pulp of my left thumb with a scroll saw when the blade passed quickly through a soft spot in the puzzle I was making. My attention was so focused on guiding the saw accurately that I failed to anticipate its moving through the wood so fast. The same can happen with hand tools, particularly sharp edge-cutting tools such as chisels and planes. A cut

E. Jeff Justis is a hand surgeon in Memphis, Tenn.





A quick way to lose fingers is by passing small pieces over the jointer, above left. Don't machine stock shorter than 12 in., use a push stick and leave the cutterhead guard in place. Some tablesaw operators hold their thumbs near the blade during a rip, as in the photo above. AM unanticipated kickback can pull the thumb into the spinning blade. The drill press, left, seems like a benign tool. But when haste wins out over safety, it can do considerable damage in short order. Always clamp the stock being drilled. Bandsawing small pieces is risky enough, but in the photo at right the operator will be in for a painful surprise when the blade breaks through the stock and into his finger.

from a sharp chisel is less traumatic than a severed finger, but both are painful. Yet with attention and care, both injuries can be avoided.

Inexperience or over-confidence—Some general accident studies show that the greatest incidence of injury occurs at two extremes of experience: the rank novice and the highly expert. I've seen many young patients who had summer jobs requiring the use of radial-arm saws, jointers or tablesaws. Within days of beginning work, they sustained serious hand injuries. One young man was using a tablesaw under pressure from his supervisor to keep his speed up while ripping boards. When a board jammed between fence and blade, it pulled his hand into the blade. His index finger was so mangled that it had to be amputated. Fortunately, with reconstructive surgery, he regained acceptable use of his middle finger and hand. Not surprisingly, however, his enthusiasm for woodworking and tools was forever diminished. In his case, the combination of inexperience, repetitive motion and an unanticipated event had tragic results.

At the other end of the scale, a high school shop teacher with 20 years of experience had grown so accustomed to using his tablesaw that he thought nothing of making routine passes with his thumb just millimeters away from the blade. A sudden grabbing of the wood pulled his right thumb into the blade, instantly severing the tip of that digit. Experience, though a good teacher, can lead us to believe we know more than we do, and the subsequent risks we are willing to take can cost us dearly. Even seemingly harmless tools such as the drill press can do grievous damage if they are misused or treated with less respect than they deserve.

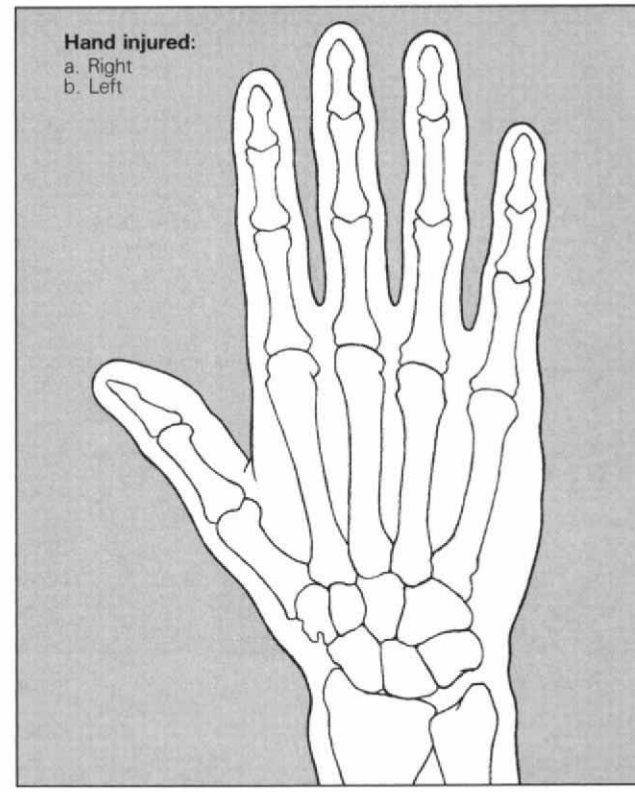
The experiences I've described here, no matter how grisly, can teach us important lessons about safety. You can't avoid repetitive operations when using machinery—particularly in production shops. But you can be alert to the hypnotic effect of this type of activity and you can teach yourself to be constantly vigilant. Keep fresh by breaking up a long routine of cutting or machining with another, less redundant operation. And never work around machines when you are tired or under the influence of alcohol or drugs that might make you drowsy.

By definition, the unanticipated happening can't be predicted. Using common sense and a bit of ingenuity, however, will ensure that your hands are out of the way when such events do occur. Build jigs and fixtures to keep the wood under control and your hands well away from cutters and blades. Don't alter or ignore the machinery's own built-in safety devices. And keep the workshop liberally supplied with push sticks—it's far better to have them or a project chewed up than to lose one of your fingers. Push sticks can be made by the dozens and projects can be started over, but damage to the hands may be irreparable, and lost function is an impairment to be carried forever. *(continued next page)*

SURVEY OF HAND INJURIES

Cuts, scrapes and scratches are an inevitable part of using tools. Fortunately, few woodworkers have suffered permanently impairing hand injuries, yet all too frequently we hear horror stories describing the most gruesome accidents and maimings involving power tools. Little is known about which tools pose the greatest risks and why. If we are able to answer those questions, which we hope to do with the survey printed below, we may learn where the greatest dangers exist and so be better able to avoid them.

We would like to hear from woodworkers who have had a serious injury involving the loss of fingers or parts of fingers, or hand wounds that required care at a hospital or doctor's office. To participate, tear out or photocopy this page, answer the questions and mail it to us in the postage-paid envelope that's bound into the back of this magazine. Please write "injury survey" in bold letters on the outside of the envelope. Results of the survey will be published in a future issue of *Fine Woodworking.* If our questions don't fit your case, please include the information on a separate sheet. □



1. Which tool caused the injury?

Stationary power tools
a. Tablesaw
b. Radial-arm saw
c. Bandsaw
d. Jointer
e. Planer
f. Shaper
g. Sander
h. Drill press
i. Other _____

Portable power tools
j. Circular saw
k. Saber saw
l. Chainsaw
m. Hand drill
n. Router
o. Grinder
p. Other _____

Hand tools
q. Hammer
r. Hatchet
s. Saw
t. Chisel
u. Gouge
v. Plane
w. Knife
x. Other _____

2. Describe your injury and mark its location on diagram.

_____

_____

_____

3. Did the injury require surgery?

a. No
b. Yes If so, by whom?
c. Physician
d. General surgeon
e. Orthopedic surgeon
f. Plastic surgeon
g. Hand surgeon
h. Other _____

4. Did you need a hospital stay?

a. No b. Yes c. How long? _____

5. How long were you unable to do woodworking because of your injury?

a. Less than a week
b. One to three weeks
c. One to three months
d. Four to six months
e. More than six months
f. Permanently disabled

6. What do you think was the likely reason for your injury?

a. Inattention due to repetition
b. Inexperience with the tool
c. Fault in the tool
d. Unanticipated event
e. Removal of safety device
f. Other _____

7. Which tool do you consider the most dangerous and why? What might be done to make it less so? (Attach a separate sheet.)

8. What time of day did the injury occur?

a. 6 a.m. to noon
b. Noon to 3 p.m.
c. 3 to 7 p.m.
d. 7 p.m. to midnight
e. Midnight to 6 a.m.

9. How long had you been working when it occurred?

a. Under an hour
b. One to two hours
c. Three to five hours
d. Six to nine hours
e. Ten hours or more

10. At the time of your injury, how much woodworking experience did you have?

a. Under one year
b. One to four years
c. Five to nine years
d. Ten to nineteen years
e. Twenty years or more

11. What type of woodworking did you do most often?

a. Boatbuilding
b. Carpentry
c. Cabinetmaking
d. Musical instrument making
e. Sculpture
f. Furniture repair
g. Millwork
h. Woodturning
i. Carving
j. Furnituremaking
k. Miniatures
l. Other _____

12. Were you a professional (earning 50% or more of your income from woodworking) or an amateur woodworker?

a. Professional b. Amateur c. Other _____

13. What year did the accident occur? _____

14. How old were you at the time? _____

15. How old are you now? _____

16. Are you: a. right-handed b. left-handed c. both?

Name _____

Address _____

City _____ **State** _____ **Zip** _____