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## Where It Hurts

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You don't work in a factory, but if you're making a lot of jewelry you may be subject to a repetitive stress injury.

You're working on a big commission that will make your Christmas season. The hours are long but the money is worth it. Then you wake in the middle of the night with excruciating pain in your hands and wonder if your career is over. While it might not be over, it may be on hold for a while if you have developed a repetitive stress injury (RSI), such as carpal tunnel or tendonitis.

RSIs have probably been around since the beginning of the specialization of work, but they began to proliferate during the industrial age when enormous numbers of workers moved into factories and began long hours at deadeningly repetitive jobs. And while metalsmiths might not consider their work dull, Portland, Oregon, jewelry artist Kristin Mitsu Shiga is not surprised that RSIs take a toll among metalsmiths. "There's something about the personality of metalsmiths. We're obsessive compulsive, always overdoing things."

A repetitive stress injury is just what it sounds like: an injury—usually to hands, wrists, elbows or shoulders—that results from stressing a joint by doing a task—such as forging, hammering, holding, sawing, drilling, polishing—over and over and over yet again. "If you're doing one piece, and doing all the different steps, you're using your hands in different ways as you go through the process instead of soldering 100 of the same thing," says Laurel Freeman, BA, LMT, spokesperson for the American Massage Therapy Association. When you move into assembly line mode, you move into high RSI risk. Dr. Cynthia Vaughn, DC, of Austin, Texas, says it's like the difference between tapping your wrist gently on the wall once and tapping it gently on the wall about 1000 times. The first creates no injury, the second does.

Such overuse can inflame tendons—the part of the muscle that anchors the muscle to the bones. As the inflamed tendon swells within its protective sheath, nasty things happen, like trigger finger, tendonitis (also called tennis elbow), and carpal tunnel.

Carpal tunnel syndrome (CTS) is the most well-known RSI. The carpal tunnel contains tendons and the median nerve in the wrist, explains Dr. Steven Conway, DC, DACBOH, Esq., a national spokesperson for the American Chiropractic Association, who specializes in industrial injuries. If there is enough space in the tunnel, the tendons can move freely. However, if the tunnel becomes constricted, as when tendons are inflamed, pressure begins to bear on the nerve. First, you feel tingling and pain; then motor function is affected. "You notice you're dropping things and can't pick things up," says Conway.

However, you can have hand pain without swelling in the carpal tunnel. The nerve to the hand starts in the neck, and passes through the shoulder and elbow before entering the hand. Pressure on the nerve anywhere can trigger tingling or pain in the hand. (In fact, says Conway, when patients complain of hand pain, he often examines the neck first.) Also, the eight bones in the wrist, which are shaped like an arch with a keystone, can generate pain, he says, "if the keystone moves backward. The arch collapses and the joint doesn't have as much room. That can put pressure on the carpal tunnel."

Muscle fatigue in the arm can cause pain in the hand when trigger points--tiny contraction knots--develop in the injured or overworked muscle. Blood flow essentially stops in the area around the knots. "The resulting oxygen starvation and accumulation of metabolic waste products further irritates the trigger point which responds by sending out pain signals," says Conway, which you may not feel in the trigger point area but in the hand.

Oxygen deprivation in the muscles "is always bad," says Jill J. Page, OTR/L, an Industrial Rehabilitation consultant with ErgoScience, Inc., in Birmingham, Alabama. And oxygen deprivation can occur in many ways, for example, if you sit or stand in one fixed position for a long period of time. When Calgary, Alberta, jewelry artist Kari Woo got an RSI scare, both a chiropractor and massage therapist "agreed my shoulder muscles were so tight that it was creating a lack of blood flow to my forearms and fingers," she says. Sitting on a chair that is at the wrong height for you, or sitting so that your calves are pressed against the edge of the chair seat can restrict blood flow. "If you constrict blood flow in one area, you constrict it throughout the body because circulation is a closed system," says Page.

Your environment and habits can also affect the amount of oxygen in your body. Smokers are at higher risk as are jewelers who work in a fume environment. (Another good reason to get those fume hoods in place and use them.) Sleeping on your stomach, with the neck in an awkward position, also decreases the body's access to oxygen. And birth control pills, which draw down the amount of vitamin B6—which affects the creation of red blood cells--in the body, increase the risk of an RSI.

It seems obvious that muscles are fatigued by working them, but Conway explains that if we stay within 30 percent of full capacity for exertion, we can go on for a long time. But once you go outside that 30 percent, you fatigue quickly.

One way to exceed your exertion limit is working the wrong way: sitting in the wrong position, working at the wrong height, at the wrong angle, with the wrong tool or without the tool at all. You may get away with it for one job or a few, but do it over and over again, and you may have an awful moment of revelation.

Philadelphia jeweler Marjorie Simon had her revelation one Christmas when she had a short time in which to finish a commissioned necklace with more than 30 spiculum forms. By the time she managed to finish, she had pain radiating from her elbow down her arm. After talking to another artist who regularly makes hundreds of spiculum forms, without injury, Simon discovered she had been using a "poor forging technique. I was not in a good position, with the way I was using my body, and I was not working at the right height for what I was doing." It was an error that cost her three months' work.

Simon also ran afoul of a healthy working triad. "Repetition, force, posture are the three elements in setting up an RSI," says Conway. You can get away without injury if only one element of the triad is out of whack. If you have to make dozens or hundreds of the same form, the other two elements of the triad—force and posture—must be perfect. If your posture has to be poor, then you should use minimum force over very few repetitions. "One [element] can be high and the others low, but the best on the body is if all are low—low reps, low force, and perfect posture," says Conway.

Attaining perfect posture for each task may involve calling in a professional in occupational safety. The professional will come to your site, and watch you work, do some measurements and suggest ways to get in the best ergonomic position for the task. "Everyone has a different physiology," says Margot Miller, vice-president of WorkWell Systems, Inc., in Cloquet, Minnesota. "We try to get the individual in the best position, so that they're working in a relaxed and neutral body position rather than having the muscles hold you up." This may include supportive positioning that takes the strain off the body.

“You should be able to sit or stand in a position in which your circulation can progress unimpeded,” says Page. When sitting, think in right angles. Sit so that your back rests on the chair back, and your feet rest on the floor so that your knees are at 90 degrees. Short people may need to bring in a stool to achieve 90 degrees. Tall people may have to raise their benches and work stations.

RSIs do not strike everyone equally. You can be predisposed to an RSI. Some people have smaller than average carpal tunnels and so are more susceptible to CTS, says Vaughn. Maine jewelry artist Rachel Flaherty discovered that the nerve through her wrist is routed somewhat differently from average, making it more susceptible to pressure when she works. North Carolina jewelry artist Joanna Golberg had trigger finger surgery in sixth grade; she believes that scar tissue has contributed her current RSI problems. People with diabetes recover more slowly from injuries, says Conway, and as a result, will not be able to withstand as much repetition as someone without the disease.

Though arthritis is not technically an RSI, “sometimes there is arthritis in the family and the longer you do [jewelry work], the greater the likelihood that you’ll develop an RSI,” says Miller. Shiga had expected to develop arthritis because of her family history. However she was shocked when her doctor told her it was developing early because she abused her hands. “It never occurred to me that I was doing damage to my joints by being a jeweler,” says Shiga, “that [the medical] terminology of abuse is what I’ve been doing as a living.”

RSIs usually affect people over 30, but t you are never too young as both Flaherty and Golberg are painfully aware. Golberg was going to school and working for a jeweler outside classes when she developed trigger finger in four fingers. (In trigger finger, the fingers “catch” or get painfully stuck when you try to move them, because the tendon cannot unable slide smoothly within the sheath. Repetitive gripping is one of the biggest contributing factors to trigger finger, according the Mayo Clinic website.)

Flaherty’s CTS began after she finished her bachelor’s degree and went to work for someone else. “It was different from making my own work because I was doing the same thing every day,” she says. As she worked, the muscles in her hands and wrists became big enough to pinch the nerve, causing pain and numbness.

The treatment you can usually least afford when an RSI reaches screaming intensity is rest from your work for weeks or months. Because jewelers are doers, relaxing hobbies may include knitting, quilting, sewing, painting, drawing, woodworking. These have to be jettisoned along with the jewelry work, leaving a recovering jeweler with thumb-twiddling, though that may be a disallowed activity as well.

When an RSI develops, sometimes surgery is the only option, often providing immediate relief. Some jewelers have had relief from inflammation for years after a cortisone injection. (Cortisone can have side effects; some doctors limit the number of injections they prescribe. Be sure to discuss the advantages and disadvantages with your doctor.) However, other, non-invasive treatments may be just as effective, though they may take longer to realize the benefits. Golberg, for example, has had great success with acupuncture, “way over Western medicine,” she says.

Massage can relieve trigger points, move metabolic wastes, like lactic acid, into and through the lymph system so it can be released from the body, can relax and lengthen muscles that have tightened up during work, and can release an automatic physiological effect called “splinting,” in which the muscle fibers around an injured area tighten to “splint” the affected muscles.

But Freeman recommends massage, even if it’s only once a month, for preventing an injury. “Your body learns to look forward to that time, allowing the muscles, including

tendons and ligaments to open up, expand and relax.” The massage therapist to also show you self-massage techniques to use between visits.

But however effective massage is for helping prevent injury, adds Freeman, “it would do a better job if the person added some strengthening and stretching exercises to their routine.” Regular stretching and strengthening exercises “allow the muscles and the joint areas to acclimate to the work load that they do.”

Physical therapy is another treatment. It might be as simple as icing and using a resting splint—the kind you buy at the drugstore—at night. “If you need to wear one during work, it has to be made for you,” says Miller. Icing and splinting might be augmented by “some manual therapy, some massage, some stretching. We might get in deeper and give some real treatment for a short period of time.” Depending on the severity of your symptoms, a physical therapist might try to keep you working. “This is especially true if someone is working for herself, like an art jeweler,” says Miller. “We would keep her as active and as productive in her job as possible while putting some restraints on [her activities] so that we don’t lose ground by putting her back to work.” You might only work a few hours a day, with very frequent breaks for stretching and rest.

Chiropractors, acupuncturists, massage therapists, or physical therapists are trained to know their limits. A good professional will refer you to a physician or other health care professional if they know they can’t help, or if their treatment does not help you within an appropriate amount of time.

Of course, the best—and least painful, expensive or time-consuming—treatment is prevention. Yet most jewelers only start preventative action when the potential end of their livelihood dances before their eyes. Admittedly it’s not easy to change the way you work—how often do we try to change a habit or start an exercise program? But if it makes a difference in being able to work longer at what you love, it makes sense to give it a try.

**Vary your tasks.** “It’s made a tremendous amount of difference just varying what I’m doing,” says Flaherty. “It took some adjustment for me to work on multiple things at a time, but that has proven, for me, to be crucial to working at all.”

**Remember the work triad.** Posture, force and repetitions. Work with perfect posture for whatever task you’re doing, minimize the force needed, as much as possible, and reduce the repetitions. Only allow one part of the triad to be out of balance—and only for a short time—to avoid injury.

**Work in a body neutral position.** Body neutral, says Vaughn, means your back is straight and supported, your knees are bent at 90 degrees, not too high or low, your feet are flat on the floor, your elbows are bent at 90 degrees and the wrists are as close to level as possible.

If you work at a jeweler’s bench—or at almost any jewelry making task—you know this may be impractical. So you have to fall back to plan B, meaning....

**Practice the 20-minute rule.** No matter what you’re doing, says Conway, stop every 20 minutes and stretch for 10 or 15 seconds. When you stretch, consciously stretch in the opposite direction. If your head is forward and down, move it up and back. If your arms are up and forward, move them down and back. Take deep breaths and expand your chest. Stretch your fingers out as far as they can go to get relief from a pinch grip. Remember to take the Optivisor off and rest your eyes as well.

That’s all it takes. But remembering to stop and do it, well, that’s where the personal retraining has to take place. “It usually takes at least 30 days for adults to change their habits,” says Page. “If you can concentrate on your attempt to change, you’ll have a greater likelihood of succeeding. You have to take small steps to accomplish that. If you’re invested in being comfortable, then you’ll make the changes.”

**Move.** Here are few suggestions to get you out of your chair. Stretch while you're at it.

- Set a timer for 20 minutes and put it on the other side of the room so that you have to get up to reset it. (Annoying, but effective--if you reset it.)
- Put the coffee maker in the other room. Use a smaller cup so you have to get up to refill it more often.
- Drink a lot of water to keep you heading to the bathroom.
- Play only one CD at a time and put the player on the opposite side of the room.
- Stand up for some tasks, such as soldering.
- Play with the cat. Walk the dog. Feed the fish.

If none of these ideas work, paint a dollar sign on the top of your bench, the wall in front of it, or the bottom of your filing tray to remind you of the money it will cost you a) in lost work and, b) in medical treatment if you develop an RSI. That doesn't even count the pain.

**Use tools.** Yes, your hands are quicker to hold something but a pinch grip can create damage in your non-dominant hand. Hold work with a ring clamp or Benchmate. Use a bench top drill press rather than your fingers and your handpiece.

**Make tools more comfortable.** Buy ergonomically designed tools that fit your hands, or pad pliers or hammer handles with thermoplastic or sports racket tape.

**Think Big.** Use the largest joint available when performing any action, says Page. "Pushing a drawer shut, with your whole hand as opposed to using one or two fingers is less stressful on the tissue. Apply that principle wherever you can."

**Adjust your bench and tables to fit.** At the suggestions of a physical therapist and an occupational therapist, Flaherty, who is tall, lowered her chair, raised her bench and soldering tables as well as the tables holding her belt sander and polishing machines.

Be sure you're doing it right, though. "One of the problems with adjustable equipment, is how do you adjust it correctly to fit you," says Page. "Most people don't know. They adjust to comfort but not necessarily into a position of health."

**Hire help.** If you get a big order or a commission that requires the manufacture of many identical pieces, get enough of a down payment so you can hire help with the sawing, polishing, beading or whatever. Be aware of the health of your helper though. You don't want to pay disability for someone who develops an RSI while working for you.

**Think outside the bench.** Shiga's injuries coupled with arthritis have stopped her from earning her living primarily through jewelry making. She now teaches or does other arts-related work. "I save the work-making for shows I care about or issues and techniques I want to work out," she says.

**Take care of yourself.** "Doing something that's good for you is like buying an insurance policy," says Freeman. Integrate whatever practice helps you relax and helps stretch your muscles. Simon does yoga and swims. Golberg stretches her hands during her work day. Make a regular walk or exercise date with a friend. (Friends are more difficult to stand up than a class.) Make use of massage therapists, acupuncturists, chiropractors. And while hobbies are wonderful, be sure they're not aggravating the problem as things, like knitting, can.

**Enhance your oxygen uptake.** Anything that interferes with your body's ability to absorb oxygen, affects the ability of your muscles to recover from fatigue. Be sure your work space is vented—with downdraft ventilation that pulls soldering and other fumes away from your face. Talk to your health care practitioner about other ways to enhance oxygen absorption and muscle recovery time, including vitamin supplements.

**Practice good habits.** Develop the work habits that let you get enough rest at night, eat right, exercise and relax. And don't feel guilty about it.

**Buy disability insurance,** says Woo, just in case. "Don't expect so much of yourself that your health suffers."

**Wear wrist supports.** Several jewelers continue to wear wrist supports at night even though their RSI flare up has passed. Before buying or using a support, talk to your health care professional, as the wrong support can create its own problems.

**Talk to professionals.** Ask other jewelers for their suggestions. If colleagues can't help, hire an occupational therapist to examine your site and your specific working situation, *and follow his or her instructions!*

**Listen to the pain.** "You ignore the symptoms [like tingling and twinges] at your peril," says Simon. "If I have pain, I stop. I won't try to work through something any more. That's a recipe for the bigger injury."

"A twinge here and there, that's normal," says Page. "But the moment you have consistently repeating symptoms, be aware. It's easier to catch it on the front end and solve it with changing your position and taking rest breaks and looking at the work station, before you're into a full RSI situation."

Caring for your health and paying close attention to your hands, wrists, neck, shoulders, and back is not something to think about later, after this job or when you're older. It's something to **do** something about now, today. Because a great number of metalsmiths are like Joanna Golberg, who says, "Making jewelry is not just my job, but what makes me happy. It keeps me personally fulfilled."