A Striking Concept

BY DR. DARIN WORKMAN

In my work with injuries suffered by drummers and percussionists, I have discovered a tendency for joint pain to develop somewhere in the shoulder, elbow, wrist, or hands. Most of these problems have a simple cause—and a simple solution.

The cause: shock waves produced from the stick striking the instrument, which travel up the arm and through the joints, causing damage to the joint and tendons (and sometimes bones).

The solution: minimize the shock of the attack and allow the vibration to escape before going through the body.

HOW WE ARE MADE

You need to know some basic information about how your hands and arms are constructed in order to really understand what causes this injury to occur. Bones are made of material similar to eggshells. They carry vibration well, but they do not absorb it. The vibration does the most damage where one bone ends and another begins—at the joint. Ligaments (threadlike fibers) connect one bone to another at a joint. When a vibration travels down a bone, it empties into the joint, rattling the ligaments and bones and causing irritation.

Muscles pull in order to bring one bone close to another—usually by moving a joint. Muscle fibers are wrapped in a cellophane-like material called tendon. Each end of the tendon is fastened to a different bone, allowing the muscle to shorten and bring the bones closer together. Movement occurs when the muscle on one side of a joint pulls two bones together, and the muscle on the other side of the joint lengthens to allow that movement to happen.

Most injuries occur from damage to bones, muscles, tendons, and/or ligaments (aka "soft tissue"). There are a number of ways this can happen, but I will address only the type of injury that comes from shock waves damaging the joint and its soft tissues.

I have treated numerous drummers with this problem. When this happens, you usually feel pain in the joint the next day. As the condition continues to worsen, you feel pain closer and closer to the time you stop playing. Eventually, it hurts to play, and the pain disables you. This particular ligament pain is identifiable because it hurts with or without movement.

To further complicate things, the body attempts to stop the painful movement by locking the muscles that move the joint. You experience this pain when you start to move your arm or use the muscles. Now you have two pains: one from the damaged ligaments and joint, and the other from the sore muscles acting to protect the joint.

None of this pain is going to stop until you do something to reverse it.

CAUSE OF THE SHOCK

Hitting a hard surface produces more vibration than hitting a soft surface, because soft materials absorb the vibration and hard materials return the vibrations. Therefore, using hard sticks/mallets or hitting hard surfaces increases the vibrations to the arms, causing pain. Some of the hard surfaces we play on include keyboards played with hard mallets, ride cymbals, and tight heads (such as most marching heads).

Of late, sticks have been developed that absorb vibration. One that I have found effective, and have read research studies on, is the E-Mite stick. It greatly reduces vibration to the body, but it is not as lively as wood sticks. Shock-reducing sticks are especially helpful if you are already injured. Playing on hard surfaces and/or using hard sticks requires less effort and decreases muscle fatigue in the arms. This in itself prevents injury (but that's another article for another time). You have to decide which is more important to you.

There are two facts I must mention. First, the body can handle great amounts of stress without injury if given adequate amounts of rest in order to recuperate. That is why a doctor often tells you to "just stop playing and it will heal." That's usually a safe thing to say. However, doctors who understand drumming injuries can usually work with you to heal the injury with little or no decrease in playing time. They will guide you in correcting your technique, enabling you to play without inflaming the injury as it heals.

Second, a fatal mistake is having the "more pain/more gain" attitude. If you think you are going play your way through an injury with no lasting damage, you are sorely mistaken. You won't have to look far to find those who have fallen prey to this myth and lost the use of their musical gift. I treat many of them. For some there is hope; for some there is none.

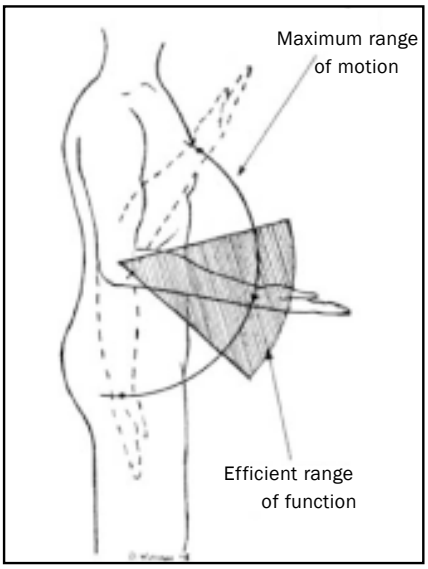
PLAYING THE INSTRUMENT

The answer to preventing or curing this type of injury comes down to technique. We cannot always choose what kinds of sticks to use or surfaces to play on. As musicians, we do whatever it takes to make the proper music. The only thing we can really control is how we set up the instrument, how we strike the instrument, and how we hold the sticks or mallets. Let's discuss ways to save ourselves pain by doing all of these things properly.

No matter what instrument you play, the arms should move within their neutral range of motion while you are playing. This means that the arm is not positioned in its extreme ranges, but halfway between them. The illustration on the next page shows the neutral range of motion for the elbow. Apply this idea to the shoulder, elbow, wrist, and fingers.

The neutral position for the shoulder, elbow, and wrist are all shown in this illustration. If this seems easy to achieve, it is because the neutral position is also the most natural and comfortable position. In this position, the arm has the most control, coordination, power, and endurance. It is the most comfortable position for the arm to be in.

To find the natural playing position for the wrist and hand, simply drop your hand to your side. Shake the wrist and hand and let it hang relaxed. Now, without changing the position of the hand or fingers, just bend at the elbow, bringing your hand up. It should look like a dome,



with a slight gap between the thumb and first finger.

MATCHED GRIP

When using matched grip, the stick should be held at its "nodal point" in the gap between the thumb and first finger. The nodal point is the "sweet spot" on the stick where the least vibration occurs. If you divide the stick into three equal segments, the nodal point is close to either dividing line. You will have to fine tune the hand position to make it the most comfortable while playing. Holding your fulcrum at this point transfers the least vibration into your body.

The fingers should be used to control and power the stick. Remember not to hold the fingers on the stick constantly or rigidly. The fingers are used merely to flip the stick, let it go through its motion, strike the instrument, then return to the fingers. The fingers should not still be pushing the stick when it hits the instrument. If they do, the vibration will travel into the fingers and up the arm. This shock will worsen if you use more fingers and/or a tighter grip.

TRADITIONAL GRIP

Finding the natural position for left-hand traditional grip uses the same method as matched grip, but this time place the nodal point of the stick on the skin separating the thumb and the first finger, with the stick extending between the second and third fingers.

The traditional-grip wrist position and motion varies slightly from the matched grip. The traditional-grip motion is more of a rotation than the matched grip motion. Rotation uses less and smaller muscles, giving the stroke less power and endurance.

When swinging the stick, the power comes from your thumb at the fulcrum. As with matched grip, the fingers help guide the stick. If you use them to push the stick, it will put pressure on the finger joints in ways they were not designed for, causing damage to them.

Once again, the fingers and thumb should not still be pushing the stick when it hits the instrument, or vibratory damage will occur. In addition, it will overwork the muscles to have them pushing the stick until it abruptly ends its movement by striking the drum.

The key to using traditional grip is the positioning of the drum. You must position it at an angle, putting the stick parallel to the drum while the hand is in the neutral position. Remember that the traditional grip was designed to put the

body in a more relaxed position while playing a drum that was hanging at an angle from a sling while marching. So, in order to get the greatest advantage from traditional grip, you should tilt the drum.

THE SHOCKING CONCEPT

The vibration created by striking a percussion instrument should travel through the stick and into the air, where it is heard as sound. The stick should bounce off the surface, allowing both the stick and the instrument to vibrate freely. This technique gives the best sound and the least irritation to the musician and instrument.

Try an experiment with this concept (you have to do it to understand). Strike a tom-tom properly, allowing both the stick and head to vibrate. (This can also be done with a marimba or other percussion instrument.) Notice the "ring" from the instrument. Now try the same thing, but hold the stick tightly and don't let it bounce off of the surface. You should notice a dramatic difference. The head won't ring, and the pitch will swoop quickly and die. This happens because the shock and vibration went through the stick and into your arm instead of through the instrument to create sound.

Occasionally the music will require you to deviate from proper technique to create a specific sound (e.g., a rimshot or "dead stroke"). This is all right, but it should not be the norm, or you will cause damage over time.

STRIKING ANGLE

Another important consideration is the angle at which the stick hits the instrument. The stick should strike the instrument close to parallel, as shown in the photographs. This allows the stick the most freedom to bounce off the surface—giving the most uninhibited vibration from the instrument (producing the best sound) and the stick (reducing injury).

Many musicians increase the angle of the stick in relation to the drum by raising the hand and pointing the tip of the stick down toward the instrument. The more you increase the angle, the less bounce you will get, because the stick begins to dig into the drum rather than bounce off it. Again, this action transfers the vibration to the stick and up the arm, causing damage over time.

ALLOWING SHOCK TO ESCAPE

Drunk drivers often escape injury in an auto accident. This is believed to result because they are so relaxed that the shock doesn't affect them as much as it affects one who is not so relaxed. It is usually better to go with a shock than to resist it.

From this analogy, it is easy to understand how holding the stick loosely allows the shock to escape without affecting the body. Let's discuss ways to use the stick that allows shock to escape.

Once the stick strikes the drum, it should be free to bounce back to its original position. This has more to do with timing than strength. The process is similar to dribbling a basketball or using a yo-yo. Flip the stick to strike the instrument, and allow it to rebound back to your hand. Timing is required to know when the stick is ready to be flipped again.

Single-stroke roll exercises are excellent for developing this timing. Through hours of repetition, this timing and reaction becomes automatic. While the stick goes through its motion, try to stay out of its way and allow it to do the work. The goal is to use as little energy as possible to achieve the desired sound. This conserves your power, control, coordination, and endurance. As your energy depletes, so will your ability to play well.

AVOIDING INJURY

An important element in avoiding injury through proper technique is finding a good teacher. You will regret the consequences if you don't.

The simple solution to preventing the most common injuries I have seen among percussionist/drummer patients under my care is basic movements done correctly. If you compromise these movements to any degree, your playing will suffer to that same degree.

Most importantly, listen carefully to what your body is telling you. Pain is your body's way of alerting you that something is wrong. When you feel pain, find out what is causing the problem and solve it. The longer the pain lasts, the more damage it will do, much the same as driving an overheated car.

MENDING THE PROBLEM

Even if you have let a problem go too far, it's not too late to work on it. The healing process can begin at any point, but it is most effective the earlier you

start. Resolve that you will do whatever it takes to cure the problem, find the right person to help you, and begin the process. A wise and informed teacher and/or physician can usually help you recover quickly.

Many injuries will not require you to stop playing! It is my belief that getting back in the saddle as soon as possible is extremely important when working with musicians and athletes. It is an integral part of the healing process. Once an injury heals properly, it will not recur unless you repeat the action that caused it in the first place. Therefore, you don't need to play cautiously if you have corrected the flawed technique that caused the injury.

However, injuries are like scratches on a record. Each time the needle goes through the scratch, the groove gets deeper. Likewise, the more times an injury recurs, the longer it will take to recover each time.

CONCLUSION

I am not trying to tell anyone how to play; that is each person's decision. Anyone can disagree with my ideas about technique, but no one can ignore the fact that this is the way the body is meant to move. Forcing it to operate in a different way may cause injury.

It doesn't take an expert to understand how to get the most from your body. It just takes a little common sense and a lot of paying attention to what your body is saying. Like a car, if you wear it out, the body will give you more trouble with the passing of time. It's a "pay me now or pay me later" relationship.

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