A Painful Melody:
Musicians and Repetitive Strain Injury

By Tamara Mitchell

Music is truly one of the joys in life. Playing an instrument allows you to express many emotions in a very personal and beautiful way. While it is an excellent form of stress management, playing an instrument is physically demanding, especially when stressful positions are required due to the design of the instrument.[1] If you play a musical instrument as a hobby, you are not subject to the same physical and emotional pressures as a professional, but that doesn't mean you can't get hurt.

Instruments are not generally designed to minimize physical strain on the body. They are designed to create a beautiful sound. But in addition to problematic design, musicians often hold awkward postures when they don't have to. Musicians abuse their bodies in various ways, forget basic ergonomic rules, eat poorly, don't exercise regularly, and fall into the same unhealthy habits as people sitting at a computer workstation. The problems encountered by musicians are really the same ones encountered in sports: technique, conditioning, overall health, equipment (instrument) design, neutral posture, and strain-free dynamic movements. Often musicians do not pay attention to their body and they are unaware of postures that cause a variety of aches, pains, spinal stiffness, restricted nerve function, constricted blood vessels, immobile joints, and unbalanced muscle tone.[2,3] Stresses to the neck vertebrae can result in problems with the spinal nerves that affect the ability of hands and arms to function normally.

Surveys of symphony orchestras found that 64% to 76% of musicians were experiencing RSI that affected their performance.[2] These high percentages don't even take into account the many musicians who have had to abandon their careers due to serious injury.[2] There is an effort to get injury-related education into every accredited music school so that prevention gets the emphasis it deserves.[4] Professional musicians rarely admit having an injury since nobody wants to hire an injured musician and musicians do not want to stop playing.[5] The pressure on professional musicians is greater than ever before. It is a stressful career requiring long hours of practice and repeated performances demanding peak performance each time. Professional musicians can have a lot of stress preparing for performances or recording sessions as well as during performances. And composing music may be fraught with deadlines or simply personal pressures to keep working beyond normal limits when inspiration strikes. Putting a career on hold due to developing strain or pain is a scary proposition also. So, the issues for professionals are much more complex than musicians who play for their own pleasure. Musicians who travel often suffer from sleep deprivation and poor nutrition.[3] Some musical environments also come with the dangers of secondhand smoke and expected consumption of alcohol, caffeine, or other drugs.[3] These are all major contributing factors to RSI.[3]

Repetitive Strain Injury (RSI) is highly likely if musicians practice and/or perform daily and they also use their hands and arms all day at work. What can you do to prevent injuries before they happen or treat them if you are experiencing problems now? Read on!

Do not play through pain! As with athletes, musicians who experience pain often continue practicing and playing, hoping that the pain will go away.[2,,3] Pain is an indication that something

is wrong. Continuing to play with pain will cause further damage.[2,3] If you notice tension or discomfort, stop and let it subside, and try to determine the source of the tension.[3] Seek advice on your technique and get professional help for the symptoms.[4,3.] All pain should be taken very seriously![4.] Medical doctors do not have a good understanding of repetitive strain injuries.[3] Your approach to healing should start with chiropractic, massage, acupuncture, and other alternative healing approaches with a practitioner experienced in treating repetitive strain injuries.[3] We have a whole webpage with recommended practitioners in the San Francisco Bay Area. If you live in another area, please seek guidance and ask questions before deciding if a practitioner is qualified to treat you! http://working-well.org/Website/ctd_resources.html

Causes of Overuse Injury

RSI occurs in musicians for several reasons: [2,3]

- misuse or inefficient use of the body
- lack of general fitness
- chronic muscle tension
- undeveloped upper-arm, shoulder and back muscles
- stress (psychological or emotional)
- fatigue
- ill-health
- playing without warming up the muscles
- insufficient rest breaks
- playing in cold environments

There are certain ways of using the body that can lead to injury much sooner. These include.[2]

- awkward or asymmetric posture
- sustained or prolonged muscle contraction
- movements that require a lot of strength or force
- fast repetitive movements
- raised arms
- deviated wrist positions
- strong gripping action with the thumb

The amount of stress on the body is a cumulative total of all of these factors, so when several risk factors are present, the potential for injury is much greater.[2] The good news is that all of these stresses can be either totally eliminated or at least minimized.[2]

Instrument Design

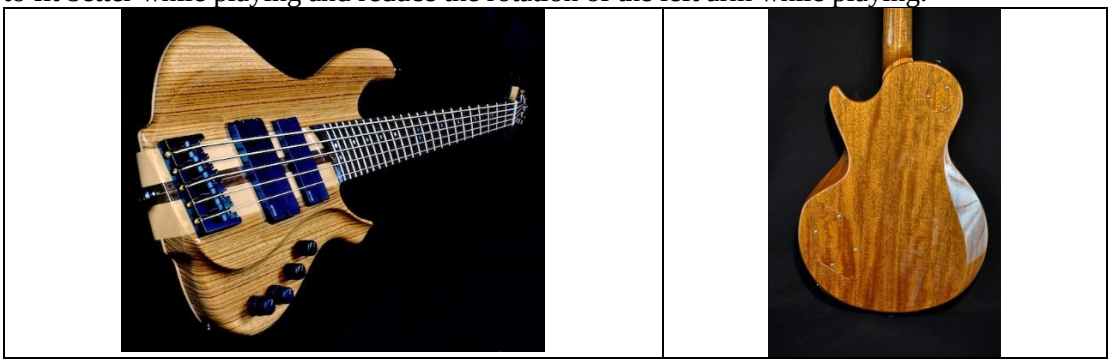
Before we discuss the reasons that musicians get hurt while playing their instrument(s), we should mention the factor of design. It is important for musicians to evaluate their instrument to determine if there are changes or modifications that could make it easier to play.[4]

Questions to consider include: Is the instrument too large or awkward for you? Standard instruments are often too large, too heavy, and with key spacing that is not appropriate for young children or smaller adults. Could you use lighter strings or reeds? Can you get tailor-made lifts or extensions, such as for keys on a flute? Can the end pin of the cello be lengthened so that you can sit more upright?[3] And, though many classical musicians my resist it, electronic instruments generally require less physical strength to play and the actual size and shape of the instrument can be created to fit the musician since the tone quality is not generated by the instrument itself.[6] The solid-body electric guitar is a better shape, has easy playing action in comparison to a classical acoustic guitar, and can produce very good acoustic sound.[6] Who knows? The musician may even

find the range of sounds available through electronics even more exciting and fun to play while reducing strain on the body. Of course, this would be difficult to implement in an entire orchestra, but a great deal of practicing could be done on an electronic instrument to reduce strain. Think about ways to transport and hold your instrument safely: Is there a strap that could help you hold it? Can you get a cart to help you transport your instrument if it's large, like a string bass?[4]

There are few designers and manufacturers who are trying to fix design problems.[4] It is certainly much easier to make modifications to electronic instruments since sound is synthesized and the instrument can take on much more creative shapes that can conform to the musician's body. Classical instruments have much less latitude since the acoustical properties of the instrument are inherent in the structure, the resonance of the wooden body of a string instrument, the hollow tubing of wind and brass instruments. Adaptive mechanisms and instrument modifications for handicapped musicians are often geared toward children, are simplistic or plastic, and are not intended for experienced and talented musicians who have lost the physical ability to play or are starting to experience symptoms of overuse. Some examples of instruments redesigned to reduce physical strain are shown below.

- Torzal guitars and bass guitars all have a 15 degree twisted neck and carved, contoured body to fit better while playing and reduce the rotation of the left arm while playing. [7]



Photos courtesy of TorzalGuitars.com

- David L. Rivinus created high end violins, violas, and 5-stringed viola pomposas that have been specifically designed to reduce chronic back pain and left hand tendinitis. An asymmetrical shaped belly, altered string angles, banking of the fingerboard, serious reduction in weight make the instruments much more user-friendly. The elongated shape apparently is great for the tone also, because the sound waves can resonate better within the longer body of the instrument.[8] Violas are much larger and heavier than violins, so cause more physical strain to the musician.[8] Although David Rivinus has retired from making these instruments, his website lists instruments as they become available from previous owners at Rivinus-Instruments.com and they may be listed in a few other places such as the American Viola Society website, "Marketplace".

Photo courtesy of http://www.rivinus-instruments.com

Cross-training

It is an excellent idea to learn more than one instrument, particularly one from a totally different family.[9] You'll still be able to create music, but you'll be using a whole different set of muscles, tendons, and nerves which will give your body a break from the overuse possible from playing only one primary instrument.[9] And if you happen to start feeling RSI developing while playing your primary instrument, you'll not be completely sidelined while you heal or take a break as long as you choose an alternate instrument that uses completely different muscles. As an added benefit, you'll gain a much greater appreciation for musicians who master the other instrument![9] It adds a different level of perception when you've tried to play another instrument and the skills you learn on the second instrument may add depth to your ability to play your primary instrument.[9]

Getting in Shape

Musicians need to be in good physical condition to avoid injury. Everybody in the world is better off health-wise if they eat properly, get plenty of sleep, stay hydrated, and have a daily habit of physical exercise that improves cardiovascular fitness, lung capacity, strength, flexibility, and balance. Musicians require a lot from their bodies with many repetitive and often awkward positions. So just as with sports, you don't play to get in shape, you get in shape so that you can play better, longer, and without injury. The Electric Web Matrix has a very excellent and in-depth list of articles on physical conditioning for musicians including web pages about tension, exercises, breathing, relaxation, Alexander Technique for musicians, and much more.[10]

We have articles that address all of these aspects of maintaining physical health:

- Nutrition: http://working-well.org/articles/pdf/NutritionNew.pdf
- Fitness and exercise: http://working-well.org/articles/pdf/Fit.pdf
- Weight control: http://working-well.org/articles/pdf/Overweight.pdf
- Hydration: http://working-well.org/articles/pdf/Hydration.pdf
- Smoking: http://working-well.org/articles/pdf/Smoking.pdf

Preparing to Play

The first principle of injury prevention is to treat your body like your most expensive possession because it enables you to play music! Before starting to practice or play, prepare your body, mind and heart for the music you are about to make.[3]

How does this preparation help to avoid injury? By preparing the body, you can warm up your muscles and increase your flexibility. By preparing your mind and heart, you can play more mindfully. You will be more relaxed and will play with ease…tensions from the outside world that create mental and emotional stress will neither interfere with your playing nor increase your risk of injury.

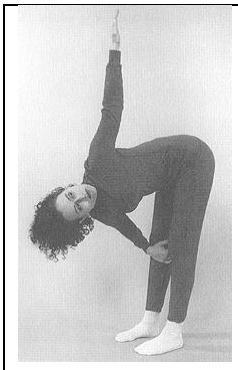
1) ***Warming up***. Starting to play while body tissues have been stationary, cold, and stiff greatly increases the likelihood of injury. Start warming up with gentle exercises such as standing with your feet shoulder width apart and swinging your arms freely from left to right in a very relaxed, loose manner.[2] Do some arm circles forward and backwards, raise your arms, bend your elbows, circler your shoulders.[2] Then move some of the smaller muscles of your hands with opening and gripping motions.[2] Finally, start doing some slow, gentle exercises on your instrument to warm up the specific tissues required for that activity (e.g., slow scales or arpeggios).[2]

Warming up really requires that you stand up and move your whole body. There are so-called warm-up exercises on YouTube for musicians, but most of them involve too much stretching. Stretching before you warm up your body can cause damage and injury, so it is important to distinguish between the warming up and stretching. This YouTube video is a general short warmup routine that takes just a few minutes to get the whole body moving and loose, blood flowing, and heart pumping. Watch it, learn it, and do it before you play anywhere.

How To Warm Up Before Exercise**:** https://youtu.be/oApwUzBmh58

2) ***Stretching.*** Stretching should be done after the body is warmed up before playing or during breaks while playing or practicing. Regular stretching exercises maintain natural flexibility of the joints and keep the muscles working smoothly.[2,3,12] Stretching allows you to let go of tension. The muscles in the back, neck, buttocks and backs of the legs tend to be cramped from daily activities.[3] Increasing spine flexibility frees the spinal cord and motor nerves that control the muscles and lead to the sense organs, so stretching can increase sensitivity to sounds and sensations, in addition to improving the ability to move the fingers, hands, joints, and muscles.[3] Breathing fully while you stretch makes space inside the body so the organs can expand and move more freely, bringing you into a more complete engagement with the music you play.[3]

Here are some examples of whole body and smaller muscle warm-ups and stretches you can use prior to playing. Start with the whole body stretches and then move to smaller and smaller muscles.

	**Standing twist** Bend forward, place you right hand loosely around the inside of your right knee. Stretch your left arm up toward the ceiling and turn your head to the left, trying to see your left hand. Repeat on the other side.[3]

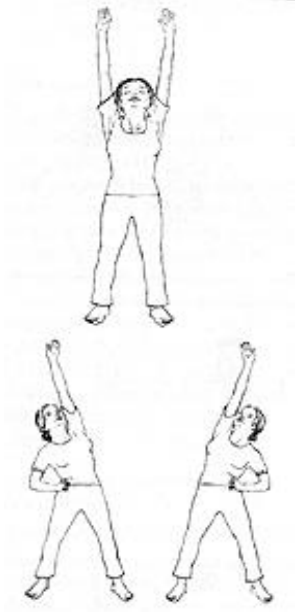
	**Neck and Shoulder Stretch** Clasp your left wrist with your right hand and hold it in back of your head. Pull your arms to the right and then to the left. Repeat with the other hand.[3]
	**Arm twist** Cross your right arm over your left at the elbow in front of your body. Move your two forearms toward each other and press your left fingers against your right palm. Close your right hand. Lift your elbows until you feel a good stretch across the upper back. Repeat with arms and hands reversed.[3]
	**Reach for the sky** First reach up with both hands, then reach up with alternating arms, bending to the right and left.[2]

Illustration courtesy of GoodRelaxation.com

Bend the neck forward as far as it will comfortably go, then back. Hold each position for a few seconds to feel the muscles release, then rest before the next stretch.[2]

Turn the head right as far as it will comfortably go, then turn the head left. Again, hold each position for a few seconds to feel the muscles release, then rest before the next stretch.[2]

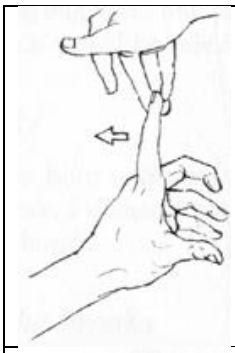
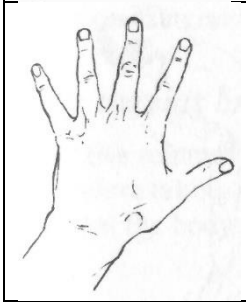
Tilt the head to the right, then to the left. Hold each position for a few seconds to feel the muscles release, then rest before the next stretch.[2]

Forearm Flexor Stretch

Place a cushion or folded towel on a table in front of you. Place your hands on the cushion with fingers relaxed, not spread apart. Straighten your arms and lean your body forward slightly without putting weight on your hands and wrists.[3]

Forearm Extensor Stretch

Extend your left arm in front of you with your elbow straight. Let your left hand drop from the wrist, place your right hand on the back of the left hand above the fingers and pull the left hand toward you to stretch out the top of the left hand. Reverse and do the same for the right hand.[3]

	**Finger Flexor Stretch** Gently bend each finger and the thumb back as far as it will go, one at a time and hold for a few seconds. Never pull back until you feel pain![2]
	**Finger Extensor Stretch** Straighten all the fingers to extend the finger joints.[2]

Illustrations courtesy of 2,3

Be informed and be willing to change

Knowledge is an extremely important weapon in your defense against injury. Though the field of Performing Arts Medicine is quite new, there is a wealth of information already available. Much of it is written for injuries specific to a specific instrument. We do not address each instrument in this article, but we give examples to raise your awareness about what you might be doing incorrectly.

If you are an experienced musician, you may feel that lessons are behind you, but it is possible that bad habits and postures have developed over the years. Taking a few lessons and being open to trying different ways of holding the instrument, finger and hand positioning, or positioning your body can help overcome unnecessary fatigue and strain.[13] If you are playing for pleasure and no longer take lessons, it's easy to forget some of the basic principles about posture, hand position, and technique. Without an observer, it's easy to slip into bad habits that cause injury. If you are self-taught, lessons are probably even more important because you may have never actually learned to play without strain.[13] Go to the teacher and explain your issues with strain. You can focus on getting help specifically for that rather than working on musical technique. Just as athletes need periodic coaching for technique, it is the same with musicians. You may be quite capable of playing any music, but if you are holding your instrument or body in a way that will cause injury, you won't be able to continue your hobby or career in music. The issue is even more important for children who are more susceptible to injury. When learning to play and instrument, children are learning habits which can either lead to a lifetime of pain or can form the basis of good posture, stress-free hand positions, and proper breathing techniques that will enable years of happy musicianship. Unlearning harmful behaviors is a lot harder than leaning good behaviors from the start. Good posture while playing trains and strengthens the muscles needed to keep the body in balance during the hours of playing and allows the lungs to fill freely.

Breathing is obviously important if you are playing an instrument that requires the force of air through the mouth, but it is also important in all musical playing to enable proper energy flow, relaxation, mindfulness, and oxygenation of the muscles and surrounding body tissues.

Please refer to the following resources to learn how to prevent and treat injuries associated with your instrument:

1) *Musicians and Injuries* for a comprehensive list of current books and articles on the many facets of musicians' injuries.[4]
2) *Medical Problems of Performing Artists: Official Journal of the Performing Arts Medical Association* for informative, online articles. [14]
3) The Chiropractic Performing Arts Network website for a holistic approach to musicians' injuries. Through this site you can learn about proper nutrition, stretches, and exercises, sign up for Dr. Jameson's free "Musician's Health & Wellness Newsletter", and order The Musician's Guide to Health and Wellness.[15]
4) Musicians' Injuries: A Guide to Their Understanding and Prevention, and The Art of Practicing: A Guide to Making Music From the Heart, two excellent books available to you in the Away-sis Library (AG331).

Learn to Relax

Mental and emotional stress causes muscle tension in the neck, shoulders, and back muscles which can put strain on the spinal joints and emerging nerves.[2] In addition to being fatiguing, muscle tension in the upper body can be the source of many problems in the arms and hands.[2] Numerous authorities are convinced that tension in the body, arms, and hands is largely to blame for injuries and disabilities among musicians.[2,3,5,16] This is closely related to proper posture and positioning of the hands and arms. Neutral posture really entails using the body in a way that requires the least amount of effort and tension. Negative emotions, depression, anxiety or frustration all contribute to holding the body, or parts of the body, in a tense and unnatural position.[3]

Relaxation is imperative to enable natural movement. Feldenkrais, Yoga, Alexander Technique, counseling, and breathing exercises are examples of effective relaxation methods.[3]

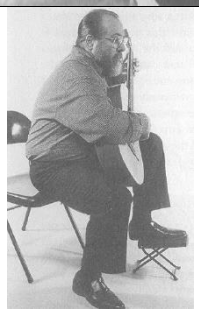
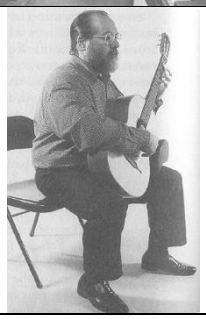
Neutral Posture

Upright posture is important while preparing to play as well as while playing. [3] Upright posture means sitting with the weight of your torso on the two bones at the base of your pelvis. Your head and body should face forward, your feet should be solidly on the floor, and your chin level. This will allow you to relax and breathe properly. An upright posture is the most stable, balanced and less stressful position. A posture which is twisted, leaning to one side or leaning forward will cause the muscles of the back and shoulders to work too hard to maintain a stable position.[2,3] To achieve a neutral position you may need to make adjustments to your environment. For example, if you use a music stand, make sure it is at eye level so you aren't slumping to see the music. If you play in an orchestra, face the conductor and keep the height of the music stand just below him or her.

In the case of playing an instrument while standing as for bass, guitar, keyboard, percussionists, etc., standing posture should be upright with the natural curves of the spine and head in a balanced upright position.[17] Too often musicians slouch over their instrument, often for hours at a time. And swinging the head and body around dramatically can also be very harmful to the spine, no matter how cool it looks.[17] It can really shorten the years you will be able to play!

Following are suggestions for the piano, guitar, and violin or viola. There are many more suggestions for other instruments in Reference 2.

Piano and Guitar

Stressful posture	Problem	Good posture	Solution
	Hunched posture with strain on neck, shoulders, and back. Arms and hands tense.		Upright posture with weight on sit bones, head aligned with shoulders, arms and shoulders relaxed.
	Bent, twisted posture cramps upper torso and arms. Foot stool throws pelvis off balance, straining lower back.		Use a cushion (apoyo) on left leg to raise the guitar. Face forward and sit upright, with both feet flat on floor.

Violin and Viola

An extensive discussion of correct posture, the means of holding the violin, and correct movements are covered in Reference 18. If you are a violin or viola player, please read this article. It also covers determination of the correct size violin for your body since the violin comes in 8 different sizes.

	 Illustrations courtesy of Reference 5
Problem: Arched back, twisted neck, tense neck muscles squeezing instrument between chin and collarbone.	**Solutions:** Lean back from ankles, face forward, support instrument on collarbone and chest, release neck muscles. Hold the instrument with scroll at mouth level. Neck strain and left shoulder muscle tension are a result of tilting and twisting the head as well as squeezing the violin or viola and raising the shoulder to keep the instrument in place. Pressure on the collarbone can be avoided by using padding. Many different styles are available, so try them to see what works best for you. Chin rests are another important modification to the

	violin or viola to customize the height, tilt, rotation, and shape to fit the musician. The Kreddle chinrest is one that is fully adjustable with two different pad shapes to fit the musician's chin the best.  Photo courtesy of Kreddle.com

Watch this excellent video to see the problem and solutions to chin rest and collar bone padding to adapt to physical differences. As discussed, if everything is adjusted properly, the musician should be able to play with virtually no need for the chin squeeze, head rotation, and shoulder lifting that cause significant problems in the neck and shoulder area. https://youtu.be/yZpxgcIPbgQ

Balanced Seating

In order for the spine to be truly balanced over the "sit bones" that places the hip joint is in its least stressful position, the seat needs to be slightly tilted forward.[2] Some chairs are designed to incorporate this tilt. For those without a chair with a tilt, place a foam wedge, a sloped cushion, or even a folded towel near the rear of the chair to provide the necessary tilt.[2] For many instruments such as the piano or the guitar, backrest and armrests are not desirable. These are good seating options for most instruments:

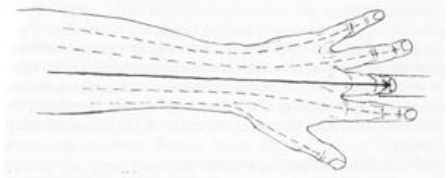
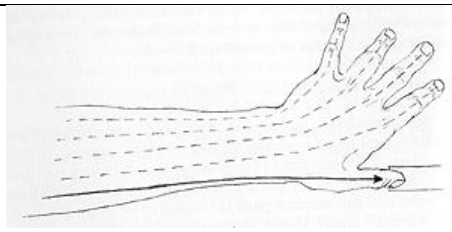
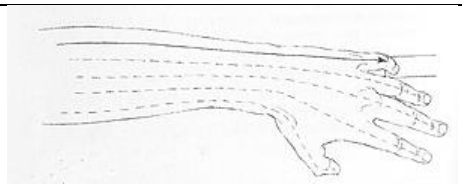
	**Office Master CLVS** • Height adjustable from 17"-24" • Forward tilt adjustment. • Fabric • Approx. $180		**Office Master WS15** • Sit/stand dual positioning • Forward tilt adjustment with grooves in seat to prevent sliding • Urethane • Approx. $168

	**Mabis Seat Mate Sloping Coccyx Cushion** • Polyurethane foam. • Machine washable fabric cover. • No slide surface • Cutout to relieve pressure on the tailbone. • $18		**Everlasting Comfort Memory Foam Wedge with cutout** • Nonslip rubber bottom • Cutout to relieve pressure on the tailbone • $26

Neutral Hand Position and Relaxing the Hands

Instrumentalists tend to grip too hard with their hands.[3] Playing with relaxed muscles improves your power and range of motion as well as endurance, speed, and control.[3]

The tendons and muscles of the forearm extend down into the hand. In order to minimize friction on these tissues, the hands and wrists should be positioned so that they are in a straight line without any unnecessary bends.[2] Adjust your hand position depending upon what fingers you are using so the tendons associated with that finger are in a straight line.

	Forearm muscles aligned with the middle finger.
	Forearm muscles aligned with the thumb.
	Forearm muscles aligned with little finger.

Illustrations and text courtesy of Reference 2

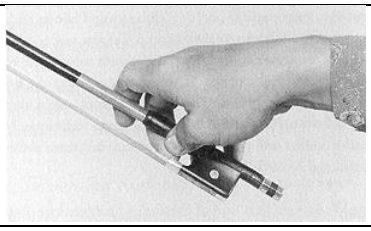
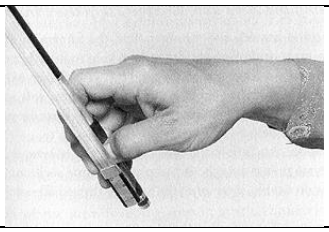
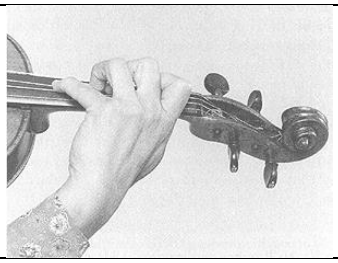
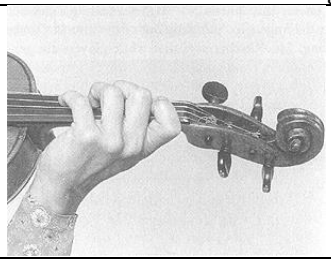
This is not news to most pianists, but for many other musicians this concept has not been adopted.[2] Rather than adjusting the forearm and hand for each note, musicians tend to maintain a fixed position that requires the fingers to work in an unnatural position. This static hand posture causes muscle fatigue and tendon stress.[2]

When more than one finger is used at one time, as in playing chords, a compromise position using the mid-point between the ideal position for each finger is recommended.[2] Priority should always be given to the comfortable positioning of the hands whenever the music permits, although occasionally the music demands awkward positions with no possible alternatives.[2] Take time to consider alternative fingering and hand positions when learning a new piece to reduce awkward and stressful motions that will be repeated many times once the piece is learned and played repeatedly.

The thumb has the flexibility to move in a circular motion, whereas the other fingers move primarily in two directions - up and down. If the musician only moves the thumb forwards and backwards and does not allow it to circulate freely from its base joint, it can become stiff, unreliable, and susceptible to strain.[2]

Joints function most efficiently in the mid-range of their potential range of motion.[2] Move each joint to determine its full range of motion and determine what the middle of that range is. The further from the midpoint the joint is moved, the more easily it will tire and the weaker it is.[2] The midpoint for the fingers is when the fingers are gently curved; the midpoint for the wrist is with the wrist straight and level.[2] This does not mean, however, that the wrists and fingers should be held rigidly in this mid-range of position. Joint movement should be flexible and fluid within the midrange of motion.[2]

The examples below illustrate some specific cases where hand and finger position can be adjusted to reduce hand and wrist strain.

Stressful and stiff	**Natural and flexible**
	
Holding the bow with the thumb flat causes bending and stiffness in the wrist, limiting movement.	By using a bent thumb, the wrist can move so that energy from the whole arm can transfer directly to the bow and onto the strings.
	
Placing the index finger on the fingerboard first requires the other fingers to awkwardly stretch into position.	By placing the little finger on the fingerboard first in a comfortable position, the other fingers find their places naturally, especially for people with small hands or short fingers.

Illustrations and information courtesy of Reference 5

		
Keeping the little finger in the hook of the trumpet and gripping the instrument too tightly requires the fingers to arch too much. The horn is pulled too tightly into the face, possibly injuring the lips.	Keeping the little finger in the hook of the trumpet and playing with flat fingers causes stiffness in the hand and arm.	By letting the little finger rest on top of the hook and easing the grip on the trumpet, the hand has flexibility and is in a natural position. Pressure on the lips is greatly reduced.

Illustrations and information courtesy of Reference 5

Many instruments, including the piano and string instruments, use hand positions that require rotation of the forearm. The figure below shows what happens to the two forearm bones, the radius and the tibia, when the palm of the hand is rotated.[5] When the forearm is rotated, the two bones form an "x".[5] The space between the two bones contains muscles, tendons, and connective tissues. This space changes shape when the forearm is rotated, but it does not close up.[5]

Use of forearm rotation can add power to many of the springing motions and trills on the piano. It relieves the small finger muscles from a lot of motion.[5] Using a more rotated forearm with the violin or other string instrument usually makes it possible for the fingers to fall where they are needed, although too much rotation is not good.[5]

The important thing to remember with forearm rotation is to use it to relieve the fingers from awkward positions and unnecessary muscular motion. Always keep the forearm muscles relaxed. If the forearm muscles are tensed in a rotated position, the space between the two bones can become restricted and cause friction in the tendons and connective tissues.[5]

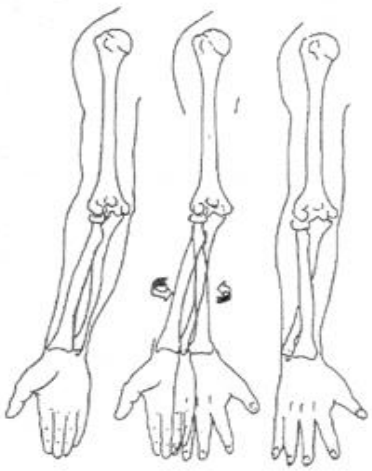


Illustration courtesy of Reference 5

Releasing Tension, Breathing, and Awareness

It is important to learn to control the amount of hand effort used to play a musical instrument.[2] Even when the rest of the body is relaxed, there is often a lot of tension in the hands while playing. To reduce unnecessary tension, fingers should operate independently so that the muscular effort of the finger being used does not result in tension in the fingers not being used.[2] (Note: The ring and little fingers are an exception to this rule. They are connected by ligament filaments so trying to isolate them can be injurious.[2])

All tension should be released once the note or chord has been played.[2] Conscious release of tension in the fingers and hand when they are not required for playing a particular note may take

practice. Try some play-relax exercises. For example, play a scale slowly, one note at a time, relaxing all fingers not involved in playing the note and relaxing the whole hand between notes.[2]

When playing most stringed instruments, the thumb is often injured because it is used in a gripping action with sustained pressure on the thumb joint.[2] Usually the thumb only needs to be resting lightly behind the instrument neck.[2] Very little effort is actually required to keep the neck stable.[2] A good exercise to demonstrate this is to play slowly while lifting the thumb away from the instrument neck on alternating notes.[2] With many wind and brass instruments, the thumb helps to support the weight of the instrument, but the musician should experiment with using less effort and less gripping, or possibly using a strap to help support the weight of the instrument.[2]

In general, when playing an instrument, there are many factors that can be modified to eliminate strain on the fingers without reducing the sound. Repositioning the arms and hands, using the weight of another body part, or using the strength of larger muscles of the arms and shoulders can reduce the force required by the small finger muscles.[2]

Breathe. Focus on your breathing for a couple of minutes.[3] Most people tend to rush their breathing or hold their breath.[3] You don't need to breathe any special way; just focus on your breathing, especially breathing out. Focusing on breathing tends to quiet your mind and make you feel more relaxed. By taking a break and doing nothing, you will feel more refreshed and your playing will become freer and smoother.[3] Obviously, there is a lot of emphasis on breathing with wind instruments or singing, but for other instruments, breathing is also critical to maintain a healthy supply of oxygen in the blood and a sense of calm.

Take Rest Breaks. Breaks are the most effective injury prevention strategy.[2, 4,3] Everyone has a different threshold at which rest is required. This threshold is lowered by fatigue, depression, or illness. 45 minutes to 1 hour is the maximum anyone should practice without taking a break; 25 to 30 minutes is often recommended.[2, 3] Take a 10 to 15 minute break, then return to playing.[3] If you feel you need more practice, it is recommended to study the music away from the instrument, which can help you learn the piece while allowing your body to rest.[2]

Avoid use of arms and hands during a break. Breaks are necessary to help your hands and arms recover from the work they have just done.[2] They will not recover if you do other activities that use the same muscles as those used to play your musical instrument. Lack of rest can cause overuse injuries.[2, 4] Home improvement projects and writing or typing can add cumulative stress to the same hand, wrist, neck, back and shoulder tissues needed to play the instrument.

Do not over practice. Every person's time limit for practicing is different. It is affected by physical conditioning, health issues, and pre-existing tissue damage and muscle tension.[2] Both the intensity of the practice as well as the time spent practicing multiply to determine the stress on the body.[3]

But don't under-practice either! Some musicians are weekend warriors. They don't play for days or weeks at a time and then pick up their instrument and play for hours in one session.[13] Try to practice at least a couple of times a week to keep your musical muscles in shape.[13] Injury happens when muscles and tendons get fatigued and this can happen easily with just occasional intense jam sessions.

Start slowly when trying a new instrument or working on a challenging piece**.** Muscles and tendons usually adapt to work they are required to do, but they need time to strengthen. Pace yourself if you are starting a new activity or restarting something after a long break. If a new piece contains strenuous chords, awkward stretches and/or difficult fast passages, the hands are suddenly being

put under more strain than usual.[2] Take time to work through difficult passages slowly and calmly. Isolate the cause of the difficulty and work out different fingering or hand/arm movements to make the passage easier.[2]

Over a period of days, time spent on the new activity can be gradually increased to allow muscles and tendons to adapt without risking muscle fatigue and injury.[2] Pacing yourself is especially important when you are preparing for a recital or concert, attending a music camp, or participating in several different music groups.[4]

Choose musical pieces that suit your physical abilities.[3] Hand size, shape, and flexibility vary a lot between people. It is risky to choose pieces that require excessive reaching with the fingers if you have small hands. People with extremely flexible hands often do not have a lot of strength, so pieces with reach are fine, but power plus reach can cause injury.[3,5] It is one thing to challenge yourself with a more difficult piece than you are used to, but it is another to choose one that may actually cause physical damage due to the requirements on your strength or reach.

Be present in body, mind, and heart. As a musician, you can understand the psychological part of preparing to play. You need to engage with the music and with your surroundings, letting go of the other things that are occupying your mind when you sit down to play.[3] Empty your mind of clutter, become aware of everything around you, and focus on the music you are about to play.[3] If you are performing, you can tune into the energy of the audience; if you are practicing, you need to feel comfortable with your surroundings.[3] Preceding any practice session or concert with warmups and stretching can definitely provide a break between "real life" and the focus and relaxation needed to play well. Expand your awareness to your body on the seat, the air, the light, the sounds around you, the ground beneath your feet, and the space around you.[3]

Relax and approach playing with ease and joy. With a composed state, you are relaxed and alert. Because you project a calm confidence and receptiveness to your environment, you will be able to accommodate to whatever is happening around you.[3] Tune into your heart. Be in touch with your longing for love, for music and for life; penetrate the heart's protective shield and all the layers of mental and emotional preoccupations.[3] These things will bring life to your music by moving the center of your focus from yourself to the emotions in the music.[3] Practicing should not be an obligation; it is connecting to the heart and mind of a great composer. Through this, we connect with and nourish ourselves.[3]

Treatment of Musicians' Injuries

The chances of recovery for many musicians are generally good if proper care is taken before disabling pain is experienced. The approach one chooses to treat an injury is a personal choice, but it is important because it will affect the outcome.

Finding the combination of treatments that works best for you is usually a matter of trial and error. Treatments that work together to facilitate the healing process will correct imbalances and weaknesses that led to the injury. Consult with a health care practitioner to determine if there is a physiological source of the problem, if damage has occurred to the body tissues, and what the course of action should be to recover from the injury.

If you choose to see a medical doctor, the treatment will likely involve injections with steroidal anti-inflammatories, splinting, and, if there is nerve entrapment, surgery.[3] If you choose to see a chiropractor in conjunction with massage therapy and/or other alternative therapies, the underlying source of the pain and weakness—muscle tension and myofascial thickening (the tissues encapsulating muscles)—will be reduced. Aligning the spine through manipulation, especially in

the neck area, can affect nerve integrity to the arms and hands.[15] Accupuncture can increase the flow of energy (chi) throughout the affected areas.

We recommend a combination of alternative therapies (e.g., Alexander technique, Feldenkrais, acupuncture or acupressure, psychological counseling, physiotherapy) because it tends to have a high success rate. Use of splints, taping, or wraps are temporary solutions to a serious problem. They can restrict circulation, cause atrophy of the muscles in the affected area through restricted use, and decrease flexibility. Steroid injections should be avoided because they have long-term health hazards and they mask pain, allowing continued overuse of the injured tissues and causing further damage.[2] In some cases these high power anti-inflammatories are necessary if other treatments have not reduced the inflammation that is causing nerve compression. In very rare cases surgery is the only option. It should be considered after all other possibilities have been tried and exhausted.[3]

Rehabilitation

How quickly you recover from injury is directly related to how long you continued to play through pain or discomfort. In cases of severe injury, complete recovery is not possible. However, if you are proactive, acknowledge that something is wrong, and come up with a plan to correct things before you are severely injured, your recovery will be much quicker and less likely to require drastic measures.[2] If an injury has continued for several months, further complications can arise such as adhesions (layers of body tissues grow together due to chronic inflammation or microtrauma), scar tissue from cumulative trauma, and atrophy of muscles no longer used.[2] The steps below outline recovery from a severe injury.[2]

- *Stage 1:* If the injury is severe, complete rest combined with regular, professional treatment is necessary at first. This stage can be extremely difficult for people who are very involved with music, since it requires putting the instrument away completely.[2] It may be wise to leave the instrument with a friend who does not live close by.[2] Depression is highly likely following the loss of the ability to make music. Counseling can help you deal with this sense of loss and facilitate your healing by developing a positive attitude.[2]

- *Stage 2:* Once chronic pain or acute symptoms have subsided, mobility can be restored through careful activities and exercises with plenty of rest between times.[2] Some everyday use of the hands is healthy during this stage, but it's important to avoid any activities that provoke pain or other symptoms.[2] Learn new ways of using the body including balanced posture, less muscular tension, and stress reduction. Continued regular treatment and guidance are essential throughout this stage.

- *Stage 3:* This is the time to slowly and carefully return to playing the instrument so as not to get re-injured. Ask an expert to analyze your technique and hand and body positions, and to recommend alternative ways of playing that are less stressful to your body.[2] Most people are not aware of their destructive habits, whether they are muscular, postural, or emotional.[2] Making adjustments to technique can be frustrating to an experienced musician because the movements and techniques must be re-learned and will feel wrong at first.[2] Starting over with new movements will take time before they feel natural.

  This stage can be very difficult to follow, because the first inclination will likely to be to rush into playing as if everything were healed.[2] Initially, start to play one minute in the morning and again for one minute in the afternoon, if no symptoms arise from the morning session. During the second day, progress to two minutes in the morning and again in the afternoon.

There will be days when the pain returns and little or no practice will be possible. If you play when you are in pain, you will quickly return to the acute stage of injury. For this reason, it is not possible to chart out a return to normal playing as if rehabilitation were a train schedule.[2]

The healing process is slow and likely to have setbacks, so it is important to be in tune with your body and follow the limitations it sets.[2] It may be helpful during this stage to explore different types of therapy, such as Feldenkrais, to reinforce neutral posture and healthy body movements and habits.[2]

In conclusion, we sincerely hope you will take time to evaluate your technical and emotional approach to playing your instrument. If you do experience problems, address them immediately by consulting a health practitioner and a musical expert to determine the source of your problems. Start working on alternatives and treatment. If you are already beyond this point and are experiencing significant limitations in your playing ability, face the fact that you should cut back or discontinue playing for a while during your healing process and do not rush back into playing as soon as the pain subsides. Healing of body tissues is a slow process and requires much patience, but it is possible.

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