



# Preventing Injuries In Guitarists - Part 2

Tendinopathies and grading return to play

Katherine Butler of London Hand Therapy offers guidance on how to take care of a guitarist's most important tools.

**M**any guitarists are diagnosed with work-related upper-limb disorders (WRULD) or what used to be called repetitive strain injury (RSI). This is usually due to overpractice, practising incorrectly or a change in the interface. If individuals are over 30 years of age, have poor nutrition, long or multiple tendons in one tendon sheath, are hypermobile (flexible), or suffer a systemic disease such as diabetes, then the likelihood of developing these conditions is increased. Also, if the musician performs repetitive movements, sustains unusual postures, places heavy loads through small joints, uses poor equipment, or has to perform in a pressured, cold or hot

environment, then the likelihood of developing tendinopathies is further increased.

It is important to note that a tendinopathy is not tendinitis and is usually a degenerative rather than inflammatory condition. These conditions can usually be assessed and treated in a non-invasive way. The technique that the individual uses to perform and practise, their schedule of practice and what other activities they perform when not at the instrument and the interface with their instrument need to be assessed, discussed and altered as necessary. Surgery is not frequently required and there are very specific indications for surgery that will be discussed in detail in another article. Local steroid injections may

have a place for very specific conditions but should not be the first treatment of choice and should only be used if absolutely necessary.

## Treatment Principles For Tendinopathies

Education about the length of time it takes to heal, ergonomic advice, activity modification, considerations about how to approach playing the guitar, electrotherapy, acupuncture, ice, strengthening, stretching, myofascial (muscular) release, soft-tissue massage, trigger point therapy, splinting, non-steroidal anti-inflammatory drugs, local steroid injections and surgery are treatments that may be

appropriate for the symptomatic guitarist. After a careful assessment and firm diagnosis are made, the appropriate treatments are discussed with the patient. These are implemented in therapy sessions and at home as part of a home exercise programme.

## Patient Education

The musician must be aware that the length of the healing process is in months rather than weeks. The key to getting better and staying better is to modify the amount of time and the way they are playing their instrument, as this may be predisposing them to the condition.

The tendinopathy or muscular strain that is rested just enough to keep playing, but presents lingering symptoms, can become a chronic condition that flares up repeatedly until adequately rehabilitated. Requirements for adequate rehabilitation include full movement in the joints that are

## Figures 1 A ,B and C Guitar Supports



A & B: Fully adjustable A-frame guitar leg support, further padded with Velfoam to decrease pressure on the supporting leg.

C: Ergoplay guitar support.

### “The use of excessive force to press down strings increases the risk of soft-tissue injury”

required to play the instrument, minimal pain levels in muscles or tendons, reasonable grip strength, good endurance rates and high levels of coordination.

### Activity Modification And Ergonomic Considerations

Some awkward postures are more than likely unavoidable when it comes to playing the guitar. However, some are related to poor instrumental ergonomics and technical difficulties.<sup>1</sup> Marked wrist deviation<sup>2</sup> and excessive fingertip loading can lead to increased tissue stresses<sup>3</sup> and elevated pressures in the wrist at the carpal tunnel.<sup>4,5</sup> The use of excessive force to press down strings increases the risk of soft-tissue injury.<sup>6</sup> Carrying heavy instruments can strain the hands, so where possible backpack-style cases should be used to decrease the strain on the arms and hands.

There are many adaptive devices, supports and cases that have been specifically designed to decrease joint strain, distribute the load of the instrument or protect the instrument and yet be lighter and more ergonomically sound. Some examples of such supports and assistive devices are the fully adjustable A-frame guitar leg support, which can be padded



further with Velfoam to decrease pressure on the leg, and the Ergoplay guitar support, which can attach to the classical guitar. Both these supports enable the musician to play with both feet on the floor, keeping the pelvis in a more neutral position (Figure 1). Silipos (silicon) sleeves can help increase awareness of pressure being placed through the thumb or fingers, and retrain awareness of the fingers and thumb in relation to the instrument (Figure 2).

Carpal tunnel syndrome (CTS) can be classified as bona fide and non-bona fide, and there are three broad categories that can be used to assist in categorisation:<sup>7</sup>

Classical or bona fide CTS – caused by increased pressure within the carpal tunnel.

Wrist flexor tenosynovitis with carpal tunnel-like symptoms.<sup>8</sup> These symptoms usually emerge following intense practice or prolonged performance. The symptoms are not present when the musician has a break from playing, is on holiday or limits playing. Examination shows boggy swelling at the wrist, and the flexor tendons are commonly

swollen, nodular and tender. Nerve conduction studies (NCS) will be normal, and provocative tests are uncomfortable but do not produce numbness in the hand. Treatment for flexor tenosynovitis of the wrist is conservative, and non-steroidal anti-inflammatory drugs (NSAIDs), with or without an injection into the carpal canal, can be of great value. If NCS

are abnormal then surgery may be indicated, but should be considered as a last resort.<sup>9</sup>

Acute positional carpal tunnel symptoms<sup>9,10</sup> can be due to positioning the wrist in flexion while playing, and thus symptoms may only occur during the act of making music. In Fig 3 you can see the amount of wrist flexion used by this guitarist in order to gain access to the lower strings; sustaining this position can lead to carpal tunnel-like symptoms and can in turn cause trauma to the median nerve if the playing position and schedule are not modified adequately.

Diabetes, thyroid disease, peripheral neuropathy, and fluid retention associated with pregnancy can be predisposing factors. CT symptoms may also be due to neck (cervical) symptoms, and thus the neck may need assessing and treating as well.

Wrist splints can be useful to decrease pressure on the median nerve at the wrist level and

Figure 2



Fig 2. Silipos digital sleeve can be useful in decreasing the pressure exerted through a finger or thumb and in retraining positioning on the instrument.

Figure 3



Fig 3. The extreme wrist flexion and finger abduction assumed by some players to access the lower strings and play certain chords on the instrument can cause acute positional CTS.

**“Splints can be useful for retraining wrist position... to retrain a more neutral position and facilitate use of larger joints like the elbow or shoulder”**

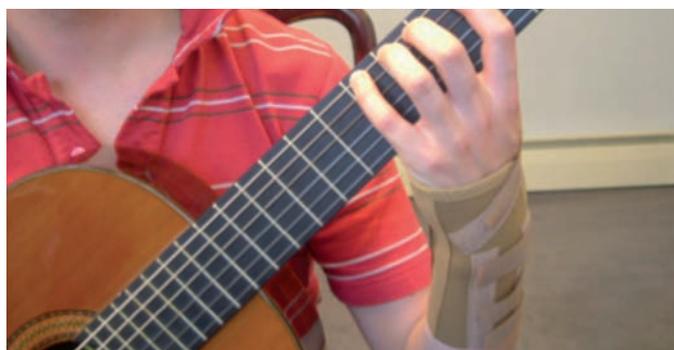
retrain wrist positioning while playing. The splint should hold the wrist in a neutral position of 0 to 5 degrees extension. Most commercial splints hyperextend the wrist considerably more than this, possibly raising the pressure in the carpal tunnel. The metal bar may need altering so the position of the wrist is neutral. The splints should be worn at night for those who complain of nocturnal or early morning pins and needles. If positional numbness occurs during the day, the splints may be worn then as well but should be removed hourly for gentle, active ROM (range of motion) exercises to prevent stiffness. Depending on the severity of the symptoms, it may be necessary to use a full-length bespoke thermoplastic resting splint, as wrist splints leave the fingers free to pinch and grip and this can lead to raised CT pressures.

Musical technique should be evaluated to minimise extremes of wrist position. Biofeedback may be used for neuromuscular re-education to reduce grip force and fingertip loading. Splints can be useful for retraining wrist position. For example, guitarists can benefit from using a wrist splint while playing to retrain a more neutral wrist position and facilitate use of larger joints like the elbow or shoulder while playing their instrument (Fig 4).

**The ‘Return To Play’ Schedule**

It is critical that the treating clinical team be fully educated in both the psychological and practical aspects of guiding their patients through the difficult and often treacherous stages of resuming full musical activities so as to avoid the despair that can accompany setbacks, treatment

**Figures 4**



**Fig 4.** Utilising a wrist splint to retrain wrist position and encourage larger movements of the elbow and shoulder when accessing the lower strings on a classical guitar.

failure or career abandonment. Musicians should be reassured that they are not going to lose their technique during the course of a few weeks or months of playing less hours and less regularly. They can put their time to good use by working on music theory, harmony, sight-reading, solfège, mental practice, silent practice, critically listening to recordings, or learning something about the business aspects of music and career promotion.

The musical patient will usually resist the recommendation to completely refrain from the instrument, and fortunately this is necessary only in extreme cases. Usually it is sufficient to reduce the intensity or time of playing, select a less taxing repertoire or take more frequent breaks. It may be necessary to cancel or postpone performance commitments, exams or auditions. If one hand is injured, one can sometimes continue to do some playing with the unaffected side.

It isn't necessary to be completely asymptomatic before beginning the 'return to play' programme. A person who is not yet ready or able to deal with the physical instrument can go through the motions of playing without the instrument and 'shadow-play'.<sup>11</sup> It is preferable that the recovering player has the endurance to shadow-play comfortably for ten minutes or so before beginning to play the actual instrument.

When the person is ready to return to the instrument, a detailed return-to-play schedule is reviewed. It is inadequate for the clinician merely to advise the player who is ready to return to playing to 'go back little by

little'. This is too vague and open to misinterpretation. The value of a written schedule is that it minimises the risk of overdoing things. Even if they believe that they can do more, players must be advised to adhere strictly to the schedule. The use of a clock or timer is more than helpful – it is critical, because the patient often fails to recognise overexertion during the musical activity. The pain can often evolve hours later.

Depending on the severity of the injury or the length of time taken away from the instrument, the musician may begin cautiously with a single two-to-three-minute period, or even less, and see how they feel later that day and the next day. It may be necessary to grade the return to play even more and to instigate miming or performing the movements required to play the instrument without even holding the instrument – for example, a guitarist moving their left hand and arm up into the

playing position and doing this three to four times per hour each hour during the waking day, to rehabilitate and 'remind' the body as to the playing position. 'Shadow playing' can be the next stage in a graded return-to-play programme. This is where, for example, the strings are not depressed on the guitar but rather the hand moves over the strings. In time, light pressure may be applied to the strings, and then half pressure, full pressure, gentle vibrato and in time full vibrato. Grading of positions played and strings played on the guitar can also be a way of increasing the difficulty and technical requirements for the playing position.

To get the musician back to their pre-injury performance level can take a long time. The graded return-to-play programme provides an outline as to how this can be achieved. A gentle encouraging approach by the treating medical professional is often necessary to keep the musician in good spirits and to facilitate a gentle pace of return to play. If the musician rushes their return to play they can cause an increase in symptoms and may revert to a lower level of playing.

A brief physical warm-up and cool-down, as illustrated in Part 1, should precede and follow playing. If there is still some pain or discomfort, the sore part may be cooled for ten minutes or so after the playing session. A cold pack can be kept in the refrigerator, as ice must not be applied directly to the skin.

The return-to-play schedule can



and should be modified to suit the individual player. In addition to the warm-up and cool-down, one should begin with slow and easy pieces and use a metronome at a medium setting and gradually work up to faster tempos. One should also gradually work down toward slower tempos, as the control required to play slowly can be very demanding as well. With time, the player gradually resumes more technically difficult material. Thus the progression is really in three dimensions: gradually increasing the duration, tempo and technical difficulty of the material.

An example of a graded return-to-play schedule is outlined below

**Figure 5 Graded Return-to-play Schedule**

Practice Sessions Per Day	Minutes of Playing
Two sessions Shadow-playing	3–5 minutes
Two sessions on instrument	3–5 minutes
Two sessions	5–10 minutes
Two sessions	15 minutes
Two sessions	20 minutes
Three sessions	15 minutes
Three sessions	20 minutes
Four sessions	20 minutes
Four sessions	30 minutes
Three sessions	45 minutes
Three sessions	60 minutes
Two sessions	90 minutes
Two sessions	120 minutes

Start with simple, slow and soft music.  
Double minutes of playing every few days.  
Drop back a level if pain is elicited.  
A five-minute break is encouraged every 20 minutes at the higher levels of playing.

in Fig 5.<sup>12</sup> If pain reappears after progressing to the next level, one should drop back one or two levels until the symptoms subside. If absolutely necessary, the player may need to stop for a day or two before resuming playing. If one encounters difficulty progressing, it may be necessary to do a 'mini' progression. To assist in decreasing disruptions to the flow of practice, the musician can record the practice session and critically review what they have practised during the break periods.

A 'Healthy Practice Habits' handout (Fig 6)<sup>13</sup> can be helpful when reintroducing a patient to their instrument after an injury or, indeed, time away for any reason. This can also be used as an educational tool to assist in preventing injuries and as a way of mapping progress. Sometimes a clock may be utilised so the musician can time their practice sessions carefully, and not overdo it by accident. After a period of not playing, musicians must return with a slow, graded progression – in duration, tempo and complexity of playing – and they may require psychological support.<sup>14</sup>

## Conclusion

Tendinopathies are common, and if treated quickly and appropriate changes are made to the interface, practice and playing levels and techniques, then there is no reason why a musician cannot return to their pre-injury level of performing, or even feel that they can exceed this level due to their increased ergonomic approach to playing. Splints can be a useful way to retrain wrist positioning, and other adaptive devices can offload strains and cumulative

## Figure 6 Good Practice Habits For Musicians

You can correct a problem without sacrificing performance.

### Early recognition:

Take the first sign of an injury seriously, but it may not be necessary to completely stop playing.

### Frequent breaks when practising:

Practise only as long as you can maintain concentration. Take a five-minute break every 20 minutes so your muscles are more responsive (ie water or stretch breaks).

### Warm up before practising:

Warm up AWAY FROM THE INSTRUMENT, such as adhering to a short fitness regime prior to playing.

Warm up AT THE INSTRUMENT with easy music, concentrating on slow perfection to find easy postures and positions (eg relax thumb if tense).

### Cool down after practising:

Cool down AT THE INSTRUMENT and AWAY FROM THE INSTRUMENT.

Stretches and icing overworked areas of the body may be necessary.

### Maximise playing time in good posture:

Adjust seat and music stand for optimal posture.

Keep wrists and thumbs in the neutral position as much as possible by using forearm rotation. Good posture onstage communicates

COMMAND and PRESENCE.

### Technical awareness:

Often the technical solution to a problem is also its musical solution.

Extreme fatigue can indicate something is wrong technically (e.g. inappropriate fingering).

Volume and resonance can be produced with muscle release and by using gravity.

### Instrument supports:

Neck straps, floor stands, customised chin rests, individualised thumb stops or keys, instrument posts, backpack-style carrying cases or wheels on instrument cases are available to minimise extraneous loading.

### Mental training:

Strive to REDUCE practice time prior to a performance and increase mental training.

Score read AWAY from the instrument to analyse and memorise the music out of the habitual posture.

Use visualisation to hear and see your performance.<sup>15</sup>

### Fitness/relaxation:

Balance relaxation with fitness activities that minimise the risk of injury and help to alleviate your particular muscle imbalances (professional advice may be required).

A strong flexible muscle resists strain better than a strong inflexible muscle.

trauma to the musician's body. If a musician has time away from their instrument, then a graded return-to-play programme is imperative. Often practice habits may need to be modified and altered in order to decrease the chance of developing another condition or a chronic recurring medical problem. With relevant adaptation of task performance and interface, the injured musician can return

to playing, often stating that they appreciate their art even more and are more aware of their bodies and the respect that they must have for their bodies when playing their instrument.

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