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## *Unhappy amateurs* by Cameron Reid

Club players are far more injury-prone than professionals. Cameron Reid explains why, and how to reduce the casualty rates

Does this sport schedule sound familiar? Two matches a weekend: a Saturday game, played at 'top' standard and, hard on its heels, a Sunday morning 'knock-about'. Training on a Tuesday or Wednesday night - assuming there's no midweek game. A league fixture schedule of about 40 games a season - plus tournaments on top.

What I describe could almost pass for a professional sports team schedule, but it is a standard pattern for amateur clubs in many countries. Unlike professionals, their training and play are part-time activities, shoe-horned in between work, family and social life. This is the regular experience of millions of amateur hockey, rugby, football and similar team sports enthusiasts. And because amateur sport has little or no expert player support, many of these dedicated players end up sitting on the touchline of the game they love, felled by injury for days, weeks or even months.

I have previously discussed how sports support professionals might take up the challenge of providing match-day and team practice first-aid support in the role of 'team trainer' (BPD@home Issue 9). In this follow-up article, I look at how the role can be expanded in the areas of injury rehab and fitness conditioning.

No doubt there are still some (coaches and players alike) who believe that amateur sport doesn't need programmes for injury prevention, medical support or fitness conditioning. And these days, the keen amateur will seek information

and advice from all manner of sources, with predictably variable outcomes.

Prevention is the key to avoiding injury but how should this be done at amateur club level? In the 1980s, when I was first asked to 'help with injuries' at a football club, it meant exactly that: treating injuries, rather than preventing them. The assumption was that injury was inevitable, given the nature of the game. We now know this is not true. We also know that it is a combination of underlying fitness conditioning and sport-specific training that makes the difference.

### **Official: amateurs get injured**

Some of the most useful and interesting research I have found in this area is the work of Jiri Dvorak, looking at injury risks and prevention among football players<sup>(1-3)</sup>. Dr Dvorak is a world expert in sports medicine and now the chief medical officer for FIFA, football's world governing body.

Working from his clinic in Zurich, he studied both the professional and amateur games. He asked a range of participants what they thought were the important interventions to reduce football injuries.

These were the answers he got<sup>(1)</sup>:

#### **Trainer/coach perspective:**

- Structured training sessions
- Appropriate warming up
- Appropriate game/training relationship
- Reduction of physical overload

#### **Medical perspective:**

- Adequate rehabilitation
- Sufficient recovery time
- Sufficient regard for complaints
- Regular taping of ankle joints

#### **Player perspective:**

- Improvement of performance (flexibility, sports skills,

endurance)

- Improvement of reaction (sharpness)
- Improvement of lifestyle habits (smoking, alcohol, nutrition)
- Fair play

#### **Others:**

- Reduction in foul play
- Observance of rules
- Improvement in rules of the game

The researchers concluded that an interdisciplinary approach to prevention was best (see Figure 1). These days, this is often the set-up in professional clubs.

However, Dvorak's approach does not translate very well to the amateur context, where clubs do not have the luxury of medical support staff. Often, the team coach doubles as club therapist (trainer) on match days, offering pitch-side support. And where personnel have to take on two roles, it can setup conflicts of interest, with messy and unsatisfactory results. I have treated players who have returned to play too early: because they were pain-free and had no outward signs of injury, they were considered match-fit.

While there is no neat solution, you can try to mitigate the problems of this set-up. One way is to educate your management. Make it clear that you can't make an important decision about a player if you don't have all the facts. Organise a 'toolbox talk' on a particular type of injury - perhaps one that has affected a player recently, or been in Medical support staff the news. Talk about the onset, the injury itself and how you rehabilitate it. You need all managers, all coaches and some senior players (e.g. team captains) to attend.

It also helps sometimes to send a player to an experienced therapist outside the club. This therapist can give a more objective view, away from the pressure to play players before they are really ready.

You should aim to meet with players and coach, plus any other training staff at the club, to explain what is involved in a multi-disciplinary approach and to establish protocols for dealing with individual player deficits and injuries. Individual weaknesses should be corrected with the cooperation of the player, under guidance from the coach and, if relevant, trainer and physiotherapist. Ideally, game preparation becomes a multifactorial affair, optimising both performance and injury reduction.

- poor pitch conditions (e.g. waterlogged, icy, muddy)
- inadequate equipment (e.g. shin guards, footwear, lack of ankle taping)
- foul play.

In a similar study<sup>(3)</sup>, the authors measured the incidence of injury per thousand hours of playing exposure (training and match play) in professional and amateur clubs. In general, they found that the higher the standard of player, the fewer injuries were sustained. Across different age ranges 14-16, 16-18 and adults), amateur clubs had a higher incidence of injury probably because of inadequate access to medical and training expertise. For amateurs, the temptation to take part in play despite having an injury is high, and the likelihood of this being picked up by staff is low.

Annasson, in a more recent study<sup>(4)</sup>, backed up this finding, again consistently identifying previous injury as the most important risk factor for injury. Previously injured players had a four- to seven-fold increased risk for the top four injury types (in descending order of frequency) :

- hamstring strain
- groin (adductor) strain
- ankle sprain
- knee sprain.

These studies reinforce the need for amateur clubs to have adequate supervision for players and proper protocols for return to play after injury. Hagglund et al wrote a paper<sup>(5)</sup> looking at how amateur clubs make

decisions about when a player is fit enough to return to play. In that study, he developed a rehabilitation protocol designed to help team coaches and players make the all-important decision. Although Hagglund's programme was developed for ankle strain injuries, it can readily be used for the other common injuries listed above. Over time you may even decide to refine the assessments for each injury type - that's your call. One variation I would recommend, in the sprint section (point 8 on the protocol): add in sprints, not in straight lines but around cones. The player should also be able to stop quickly from a sprint, to assess eccentric strength. In many cases it is the control of deceleration (eccentric control) that is poor, and this is often the moment when injury occurs.

The programme is triggered once an injured player can walk without limp or pain. They undertake steps 1 to 8 of the protocol as a single-session assessment, to judge their fitness to return to play.

If, after the assessment drills, there is no pain or swelling in reaction, the player can progress on to the requisite number of team training sessions. If, for instance, the player had a mild injury that allowed them to walk without a limp and pain within one to three days, then a successful assessment session followed by one pain-free training session should be sufficient preparation for a return to match play.



Figure 1

### Main injury risks

Dvorak's work also distinguishes between person-specific and environmental injury risks<sup>(2)</sup>.

In the player-related category he identifies the following major pointers towards injury:

- previous injury at same site
- joint instability (e.g. knee, ankle, back)
- youth: younger players (aged 14 to 18) sustain more acute joint strains, contusions and spinal pain
- ageing: older players (40+) incur muscle strains, ligament ruptures and
- meniscal tears.

Environmental factors include:

- playing on after sustaining injury
- inadequate treatment on the field of play
- short rehabilitation programmes
- playing excessive games
- poor training planning

If they get a reaction and it prevents them from training, then they don't train: they have treatment. When they can walk and move about normally, they perform the protocol again, until they can make it through the sequence with no problems.

The evidence all points in the same direction: amateur sports clubs need to run a balanced conditioning programme alongside a rehabilitation/return-to-play club strategy. The rest of this article will look at the main components that a conditioning regime should cover.

### **Warm up properly** *'Warm up to play; don't play to warm up'*

The function of the warm-up is to prepare the players' bodies for physical activity. It bridges normal daily activity and training/play. It incorporates skill movements (e.g. slalom runs), which help to wake up the neuromuscular system, especially after a day in the office, and which prepare the nervous system for more complex movements. Football, hockey and rugby all require flexibility, strength, fine movements, endurance and rapid changes of direction. The warm-up should prepare for these activities in relevant ways.

Start with general movements, gradually adding more sport-specific activities such as ball work in football, stick skills in hockey or handling in rugby. Warm-ups before training should reflect the planned training session. If you are concentrating on speed work, the warm-up should reflect that. Below is a sample warm-up I have used in football training.

### **A: General all-round dynamic introduction to the session**

#### **B: Conditioning drills**

1. Jumping jacks
2. High knees
3. Heels to gluteals (butt kickers)
4. Sumo squat (squat down with feet apart and pointing outwards, hands behind head, elbows outward)
5. Good mornings (stand with feet shoulder-width apart and flex forward from hips, keeping back straight, look ahead, arms straight out to each side)
6. Lunge and twist to left and right
7. Lunge forwards, elbow to instep
8. Lateral lunge
9. Walking hamstring stretch (left leg forward, stretch and touch left shin/foot, then walk forward and repeat on right)

#### **C: Skills drills**

Get players into pairs or threes in a marked-out 2cm square. Players jog, throwing balls to each other. On receiving the ball, they perform various drills, to the commands:

1. Pass ball round waist
2. Skip, while holding ball and rotating upper body in opposite direction to leading leg (if leading leg is left, rotate rightwards, then switch)
3. 'Wood chop' with ball, to produce trunk rotations
4. Lunge with back straight, passing ball under legs
5. High knee skipping forwards and backwards, with ball passed underneath legs on the high knee
6. Heel flicks
7. Leg swings, bent leg, forwards and back, keeping the ball held out in front, with increasing range of motion
8. Leg swings out to the side, with increasing range of motion.

Next, in pairs...

9. Perform 10 side foot volleys to each leg
10. Face partner, who throws the ball up; jump forwards to head it, repeat with jumps backwards, right and left
11. Move around the square, passing the ball to each other; use inside and outside foot turns to change direction.

Next, all players...

12. Keeping on the move, sprint at the whistle, to the edges of the square
13. Lie down, and at the whistle get up and sprint to the edge of the square
14. Backwards running, carioca running (run with torso twists).

**D: Cardio drills**

Place two teams at adjacent corners of the square and use the square as a market for relay races: sideways, forwards, backwards and carioca running.

**E: Warm-down stretch**

Stretch all muscle groups while warm. Gains in body temperature from the warm-up will last for 15 minutes, so ensure you time pre-match warm-ups accurately.

**Conditioning training**

Your conditioning programme needs to cover key fitness components of:

- cardiovascular work (both aerobic and anaerobic exercises)
- strength, including core work
- relevant skills.

**Cardio**

Heart-rate monitoring is a good and cheap way to check whether team players are training hard enough and gaining from the cardio sessions. With a bit of organisation and a willing team, it is not difficult to collect player heart-rate details, at rest and immediately after cardio work. Work out each player's maximum heart rate (HRmax) according to any of the established simple formulae, and from there you can set the intensity of training and get the players to check their heart rate response.

Table 1 (on p5) gives general guidelines for various training intensities based on Bagnall J<sup>(6)</sup>. Note: this is not for sport-specific drills.

**Strength**

The body must be able to produce force (concentric strength or acceleration power) and to reduce force (eccentric strength or deceleration). The body is a linked system, all parts

working together to produce efficient and injury-free movement. Even in 'lower-body' sports, e.g. football, a strong core is essential for players to get the most out of their leg strength and avoid injury.

For the trainer, the key point is to train movements, not individual muscles, and be as sport-specific as possible. Exercises such as lunges are great, but just getting the team to do forward stepping lunges is not sufficient for running sports requiring strong and confident multi-directional movement, such as hockey, rugby or football. In addition to forward lunges, therefore, get the players to stand in the centre of an imaginary clock-face and perform lunges around the clock in all directions.

A favourite hamstring-strengthener of mine is to lunge forwards at different angles, using the clock-face, and combine this with throwing the ball forwards (overhead throw-in or rugby pass) each time the player lunges. In hockey, the movement could involve holding the stick above the head, lunging forward, and bringing the stick down to the ground in front of the leading foot. The arm action increases body momentum and makes the lead hamstring work harder. If a player has a rich repertoire of motor skills to draw from, they will be less prone to injury. Incorporating core work will be much more useful to the players than pure weight training. Examples of some simple but tough core routines are:

**The plank**

- Lie face down, propped up on forearms and toe tips of shoes
- Keeping gaze down, draw in abdominal muscles, tighten gluteals, and raise body, parallel to ground
- Hold still, breathing normally and ensuring the lower back does not sink into a collapsed arch, then lower down under smooth control
- Perform three to five reps, starting with 10-second holds and working up to one minute hold per repetition

*Tip: make this exercise harder and more functional by raising one leg off the ground and drawing it up towards the abdomen/chest. Then rotate/adduct the flexed thigh under your body and then abduct/rotate it outwards as far as you can. Straighten leg and assume the 'plank' position.*

**Side plank**

- Lie on side, looking straight ahead
- Tighten gluteals, draw in abdominals
- Place lower elbow under shoulder joint and raise body up off floor until only the forearm and ankle (or shoe edge) are touching the ground
- Hold still, keeping a straight body line from head to toe and with no forwards or backward lean
- Perform three to five reps, starting with 10-second holds and working up slowly to one minute per repetition.

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*"Ideally, game preparation becomes a multifactorial affair, optimising both performance and injury reduction."*

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	<b>Anaerobic training</b>		<b>Aerobic training</b>
	Explosive sprints	Speed endurance	
Duration	2 to 10 sec	30 to 90 sec	15 to 30 mins
Reps	2 to 10	2 to 10	2-min intervals
Intensity of effort (% of HRmax)	100	95	75 to 85
Rest	5 x duration of drill	1 x duration of drill	1 x work duration (i.e. 2 min 'active rest' recovery jogs)

### Two-player resisted plank

- Players work in pairs. One performs a plank while the other stands over them and pushes the sides of the body and legs in random places, for a 10 to 30-second hold. This adds instability to the exercise, which is resisted by the player.
- Swap positions and repeat.
- Repeat using side plank.

### Conclusion

Your role as team trainer/therapist is not only for treatment purposes. Recreational athletes need medical support just as professionals do. There are several priorities:

- The development of a relationship between coaches, trainers and even the involved GP, based on understanding and respect for each other's skills
- Education and communication is vital for the 'working team' (coach, manager, trainer/therapist), so everyone understands the injury and the problems caused by injury.
- Ensuring a safe return to training and competition, by monitoring progress, stopping a return to full competition too soon.

It may all sound daunting, but if you are organised, have a good team around you and are enthusiastic, you will get a lot out of your involvement.

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### *Upcoming workshops*

*4-5 September 2010*

*Advanced Soft Tissue & Articulation Techniques for Massage Therapists with Cameron Reid London £210*

*6-7 November 2010*

*Advanced Soft Tissue & Articulation Techniques for Massage Therapists with Cameron Reid Edinburgh £210*

*12-13 March 2011*

*Understanding and Assessing Sports Injuries with Cameron Reid London £210*

*21-22 May 2011*

*Understanding and Assessing Sports Injuries with Cameron Reid Edinburgh £210*

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## *Making music – a real pain in the neck* by Willie Fourie (Nat Dip PT)

### **Introduction**

Work-related musculoskeletal disorders cause pain, disability and loss of employment for workers in many professions. Evidence that musicians are also vulnerable to painful musculoskeletal conditions is increasing. Musicians have known this for centuries, but they dare not talk to anybody about this and therefore health problems of musicians remain under-recognised and under-researched.

Compounding the problem, musicians are slow in recognising and admitting injuries as they tend to believe that “more is better” as an accepted practice for mastering an instrument. Pain is further mistakenly accepted as natural in music-making leading to reluctance amongst musicians to seek timely medical help. Reluctance may be aggravated by a fear of losing their hard earned reputations, or even losing their jobs.

Playing through pain or accepting pain as a normal component of making music is a cause of grave concern and unintentionally contribute to injuries – some even severe enough to prematurely end a promising career. The economic effects of Playing Related Musculoskeletal Disorders (PRMDs) are significant, especially since most musicians are self employed and do not qualify for workers’ compensation benefits. Musicians may have to hold several jobs to make ends meet and a PRMD can affect the ability to earn a living adversely from any job, musical or otherwise.

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*“If you are working on a computer by day and being a professional musician by night and over weekends you may double the risk of sustaining a playing related injury.”*

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People suffering from Repetitive Strain Injuries (RSI) in the computer workforce point out that the average typist typing at a good 60 words per minute, strikes the keys about 18,000 times per hour. This translates to five keystrokes per second or fifteen every three seconds! Wow!! To put the risks of playing a musical instrument into perspective, consider this: The size of the computer keyboard equals only about thirteen notes on a normal piano keyboard. As calculated by Dr. Frank Wilson, a prominent neurologist, many musicians are able to execute 38 notes in three seconds. That is more than twice as many keystrokes as those at a computer and amounts to about 45,600 strokes per hour!! If you are working on a computer by day and being a professional musician by night and over weekends, you may double the risk of sustaining a playing related injury.

### **Musicians hurt – that is a fact. But how common are RSIs amongst musicians really?**

A survey in the early 1980s by the International Conference of Symphony and Opera Musicians (ICSOM) among about 4000 members [symphony and opera musicians] from 48 American orchestras found that 76% of the musicians reported a medical problem severe enough to influence playing. Of these, 36% reported up to four serious conditions that influenced playing (Brandfonbrener 1997)!

Bejjani (1996) from the New Jersey Medical School, Newark, set the prevalence of playing-related musculoskeletal problems as high as 80%! The studies he reviewed show that alarming high numbers of musicians experience problems during their careers. In a survey amongst 117 piano students 62% complained of musculoskeletal problems in one area and 14% had pain in 3 or more areas. Another study found a 77.5% presence of upper extremity problems severe enough to significantly impair performance. A review of the literature published in the Canadian Medical Association Journal agrees that the prevalence of injuries range between 39% and 87% in adult musicians (Zaza 1998). An Irish study found that 25.8% of their music students suffered from a painful injury during an academic year (Shields 2000).

### **Repetitive Strain Injuries (RSI) or Playing Related Musculoskeletal Disorders (PRMD) – table 1**

“Pain, weakness, numbness, tingling, or other symptoms that interfere with (their) ability to play (their) instrument at the level (they) are accustomed to.” (Zaza and Farewell 1997).

“Repetitive strain injury” is not a diagnosis. It could rather be seen as an umbrella term for a number of related upper-quadrant disorders of the hands, arms, shoulders, neck, and back (Keller 1998). These injuries can further be described as a painful condition brought about by prolonged, hard or repetitive use of a limb. Use is usually excessive for the individual affected and stresses the tissues beyond anatomical and physiological limits. An injured musician frequently complains of pain that may involve the entire upper extremity, including the neck, upper back, and shoulders (MacKinnon 1994). Musicians themselves report their loss of facility in playing in terms of loss of speed, loss of control of major motions, loss of control of fine motions, loss of power (*forte*), loss of finger span or any combination of the above (Caldron et al 1986).

Injuries do not only present as generalised complaints. Symptoms that are specific to disorders associated with RSI include tendonitis in the wrist, myositis (muscle strain) of the forearm muscles, trigger finger, tennis elbow, ganglion, shoulder tendonitis, cervical spondylosis, carpal tunnel syndrome, thoracic outlet syndrome, and other nerve entrapments syndromes (Warrington 2002).

Injury patterns are instrument specific with certain complaints more frequent among particular categories of instruments. In general terms, we find that neck and back problems are common in most string instrument players. Cellists and harpists present with the highest incidence of lower back pain, possibly due to the weight of the instrument they have to carry or move around while pianists and harpists are highest on the list for neck aches (Bejjani 1996). Among keyboard players the wrist, finger extensors and small hand muscles are the most vulnerable to injury. In a survey in eight Irish music schools, wrist and finger injuries among keyboard players were responsible for 50% of the reported injuries (Shields 2000).

<i>Synonymous terms for injuries associated with repetitive movements include:</i>	
<b>RSI</b>	<b>R</b> epetitive <b>S</b> train <b>I</b> njury. (United Kingdom, Canada)
<b>WRULD</b>	<b>W</b> ork- <b>R</b> elated <b>U</b> pper <b>L</b> imb <b>D</b> isorder (United Kingdom)
<b>NSAP</b>	<b>N</b> on- <b>S</b> pecific <b>A</b> rm <b>P</b> ain
<b>RMD</b>	<b>R</b> epetitive <b>M</b> otion <b>D</b> isorder
<b>CTD</b>	<b>C</b> umulative <b>T</b> rauma <b>D</b> isorder (USA)
<b>OOS</b>	<b>O</b> ccupational <b>O</b> veruse <b>S</b> yndrome (Australia, New Zealand)
<b>OCBD</b>	<b>O</b> ccupational <b>C</b> ervico <b>B</b> rachial <b>D</b> isorder (Japan)
<b>PRMD</b>	<b>P</b> laying- <b>R</b> elated <b>M</b> usculoskeletal <b>D</b> isorder (Musicians)

**Table 1.** Terms for injuries. PRMD is the term most commonly used for music-related injuries

### **Aetiology and predisposing factors**

According to Shields (2000) the risk of playing a specific instrument is determined by several factors. These could be either **intrinsic** (normally referring to the genetics of the musician) or **extrinsic** factors (the environment in which training is done, and the musician’s training methods). Extrinsic factors may include the number of repetitive movements required when playing the instrument, playing posture, the resistance against which force must be applied, whether the instrument must be supported while it is played and the size and weight of the instrument.

### **Anatomy of the hand:**

This is a problem the musician may have been born with. It is an *intrinsic* factor. Descriptions of variations in muscles and tendons are often neglected in anatomical literature. As many as 50% of hands do not show the “standard” pattern that we would normally see in a textbook! This is highly significant for those who must carry out skilled movements that lie close to the limit of what is physically possible. Regardless of the degree of training, not all musicians are capable of the same finger movements!

### **Instrument played:**

The type of instrument played may predispose the musician to developing a playing related injury. Based on careful records collected over 14 years at the University of Rochester health clinic in New York, instruments were classified as **low**, **medium** or **high** risk according to injury rates per instrument. All the brass instruments showed low injury rates, while the woodwinds fell into the high level of the low risk group and the lower levels of the medium risk group. Percussion, organ and bowed string instruments all fell in the medium risk group. Three instruments were high-risk instruments – the guitar, the harp and the piano (Covey 1999).

**Gender:**

Several studies report that females are more susceptible to developing injuries than males (Zetterberg 1998; Pak 2001; Castleman 2002). Some explanations mention differences in hand size and joint laxity or hyper mobility. (Brandfonbrener 1997a)

**Technique:**

A musician's technique and posture are important factors in determining a tendency to injury (Brandfonbrener 1997b; Castleman, 2002). A number of playing techniques peculiar to the piano have been cited as causing pain. These include double octaves, chords, playing fortissimo, trills or arpeggios. In the Irish study 73% of their respondents reported that they experienced pain when executing at least one of these techniques, most of them while playing double octaves. Many pianists felt that the pain was due to the small size of their hands. All but one of the respondents was female (Shields 2000; Sakai 2002). This is cause for concern because experiencing pain when playing may already signify the presence of a grade I repetitive strain injury (see table 1).

**Practice habits:**

A direct relationship exists between the number of hours a musician plays or practices and the danger of developing an injury (O'Neill 2001; Castleman 2002). The Irish study found that 36% of the respondents who practiced seven days a week sustained a playing related injury. It was noted that 24% of those who practiced up to three hours a day had sustained a playing related injury compared with 44% of those who practiced between 3.5 and 7 hours a day (Shields 2000).

An explanation for the relationship between playing time and injury may be that the blood supply to the forearm muscles starts to slow down after around ninety minutes of continuous hand and finger movements. This is similar to a compartment syndrome (shin splints) occurring in the lower legs of athletes. With prolonged use pressure within a muscle compartment rises, leading to reduced microcirculation within the muscles and reduced nerve

conduction due to nerve endings not receiving sufficient oxygen for sustained optimum nerve conduction.

**Stress and anxiety:**

Stress and anxiety affects our posture and muscles according to specific patterns. These patterns are fairly universal; whether it originates from performance anxiety, work pressure, the traffic, financial problems, watching television or an important audition or exam coming up. Increased muscle tension becomes a problem for musicians since optimum performance on a musical instrument requires a precise and correct balance between the degree of tension and relaxation in the muscles. Stress interferes with proper 'use'. Playing under tension — for whatever reason — involves using more muscles than is usually needed to get the job done, or using the correct muscles in a state of greater tension than is necessary. Co-contractions usually inhibit the smooth performance of rapid, repetitive motions and must be minimized or eliminated. Holding down more than one job to make ends meet causes extra stress. Very often, the second job involves computer or other repetitive work, adding to the total number of repetitions the limb has to perform during a normal day and then pushing working structures beyond its safe physiological limit for that specific person.

**The role of posture:**

Posture and proper body alignment is dynamic and depends upon the balance between the 206 bones of the skeletal framework and the effort of the muscles, tendons and ligaments (myofascia) to counter the pull of gravity. All the parts of this continuous structure (the body) stay in equilibrium by the way the entire structure distributes and balances mechanical stresses. The effortless balance in the distribution of mechanical forces signifies good dynamic posture. Minimal muscular effort is then needed to maintain balance. Should tension increase in one part of the body, compensatory changes in tension will result in other parts of the body.

Most people modulate between the two inefficient postural extremes of

the military 'strain' and the poking chin 'slouch' in an attempt to win the fight against gravity. The former posture has too much tension and the latter not enough. Apart from day-to-day poor postural use, further sources of abnormal postures in musicians exist. These may include bad playing habits, fatigue, the position of the music stand, your position in the orchestra in relation to the conductor, being far or near sighted, seating, and how crowded the orchestra pit is. Maintaining or repeating poor postural habits over prolonged periods of time may serve as trigger for developing PRMD's.

Abnormal postures and poor postural habits may have three major consequences:

1. **Particular positions of the extremities may create direct increased pressure around peripheral nerves at various entrapment points chronic nerve compression the end result.** Examples in the forearm are: increased pressure and tension on the median nerve in the carpal tunnel when the wrist deviates from neutral. Increased and sustained elbow flexion increases the pull on the ulnar nerve. Forearm pronation compresses the radial sensory nerve between the tendons of the brachioradialis and the extensor carpi radialis longus muscles.
2. **Abnormal postures can result in a set of muscles being maintained and used in shortened positions.** Maintained tension in tight muscles may become painful. A common fault is the typical 'poking chin' posture. This posture is usually accompanied by rounding (protraction) of the shoulders, internal rotation of the arms and increased curvature of the spine. In these postures the scalene, sternocleidomastoid, pectoralis minor and the pronator teres muscles are the most vulnerable. Several instrument-specific shortening patterns of other muscles may be identified, e.g. violinists and flutists.

3. **Abnormal postures may result in some muscles being underused and subsequently weakened.** Weakness in one group of muscles will result in a compensatory overuse of a second or antagonistic group of muscles, establishing a cycle of muscle imbalance. An example of this pattern is the rounded shoulders where shortening of the serratus anterior and pectoralis minor muscle may lead to lengthening of the middle and lower trapezius muscle resulting in an abducted resting position of the shoulder blades. Working at a mechanical disadvantage, they may now become weakened. With weakness in these two muscles other scapular muscles tend to compensate and become overused. The rhomboids, upper trapezius, levator scapulae, scalene and sternocleidomastoid muscles are used as accessory muscles to elevate the shoulders and arms, resulting in their hypertrophy.

### Treatment and management

There is only one effective treatment: **do not allow the injury to happen!** The exceptional co-ordination and skill needed to make music is almost impossible to restore after a serious injury, even if treated well by the best hand surgeons and physiotherapists in the world. When disaster strikes and you **do** develop an injury, the first and most important thing is not to accept “no pain, no gain” as an excuse to play through your pain. There are effective ways of leading the injured musician onto the road to recovery.

### Evaluation

Before considering treatment options, an accurate diagnosis is paramount. A full evaluation of all the painful sites, nerve entrapment sites, posture (both passive and dynamic), range of active and passive movements, and muscle strength should always precede management and treatment.

### Patient education

Without a clear understanding of the problem, the predisposing factors and habits, exacerbating and relieving factors, the injured musician may be unable to control and decrease symptoms and may not fully participate in the treatment and rehabilitation process. Education should include:

- Background on the pathophysiology of muscle overuse and nerve compression.
- The grading of overuse injuries – table 2.
- Risky playing positions and habits.
- Less efficient and more efficient postural habits and positions.
- The influence of activities of daily living at work, leisure, home and sleep on contributing to an injury.
- Lifestyle. The negative impact of obesity, smoking, breast hypertrophy, and lack of general physical conditioning (or fitness).
- Healthy lifestyle and practice habits.

<i>Grade</i>	<i>Description</i>
<b>0</b>	No Pain.
<b>1</b>	Pain while playing, or for a short period after playing.
<b>2</b>	Pain that persists for a longer period after playing.
<b>3</b>	Pain that progresses while playing and requires the practice session to be shortened, but resolves between sessions.
<b>4</b>	Pain that progresses while playing and does not totally resolve between sessions.
<b>5</b>	Continuous pain that markedly reduces or prevents playing.

**Table 2. Grading System for Severity of Injury** (Hoppmann, 1998)

### Treatment

Every individual injury will be different. Treatment guidelines can therefore only be suggested. The primary goal of therapy is the restoration of function through the correction of muscle imbalances. After a comprehensive evaluation, treatment starts with the control of pain. Rest and treatment modalities like warmth, ice, ultrasound and electrical stimulation may be of great help to alleviate and control the initial acutely painful areas. Local dysfunction is also addressed during this phase.

With pain and local dysfunction under control, the second treatment phase can start. This is the long, protracted process of restoring normal tissue flexibility and gliding between structures as well as addressing muscle length and strength of the upper quarter. The process of restoring muscle length and normal range of motion progresses from central to peripheral, and proximal to distal. Treatment therefore starts with the central structures in the neck and shoulders before progressing to the peripheral structures. Massage, stretching and mobilising treatment modalities are the treatments of choice. Manual treatment techniques should be augmented by a well structured home program of stretching and mobilising exercises for the head, neck, shoulder, arms, and hands.

### Some warning signs indicating that trouble is on its way:

**Pain:** Sustained or chronic pain of any kind is a sign that something is wrong. It can be burning, aching or shooting. Pain may be restricted over small sites or diffuse over a larger area, making it difficult to pin-point. ***Never dismiss pain as unimportant!***

**Fatigue or lack of endurance:** If you find yourself getting worn-out easily, or notice that you cannot practice as long as you once could, ***take it seriously.***

**Stiffness:** You may experience difficulty opening and closing your hands, and ascribe it to 'early morning stiffness'. ***This condition is not normal.***

**Weakness in the hands and forearms:** This might first be noticed in other daily activities such as hanging the washing, or carrying your shopping bags or your instrument. ***Pay attention to the messages that your body is sending.***

**Tingling, numbness, or loss of sensation:** Your arms and/or hand may feel like they are 'falling asleep'. ***This should be investigated.***

**Heaviness:** Do your arms feel like a 'dead weight'?

**Clumsiness:** If you have to start holding your coffee mug with two hands or have to concentrate more to grip objects, ***you likely have a serious injury.***

**Lack of control of co-ordination:** A feeling that your fingers aren't doing what you want them to or that you have lost control over them is unpleasant and ***a signal for you to pay attention.***

**Cold hands:** An injury may cause limited blood flow to your hands. ***Have it investigated.***

**Heightened awareness:** Just being vaguely aware or hyper-aware of a body part can be a clue that something is wrong. "My hands never feel normal!" ***Your body may be trying to warn you that something is amiss by drawing your attention to specific limbs.***

**Hypersensitivity:** Pain should not come from light touch or stroking. Heightened sensitivity after minimal use of your hands or arms may indicate impending problems and ***need to be tended to.***

**Frequent self massage:** If a pupil is constantly rubbing an area over the neck, shoulders, wrist, hand or forearm or shaking out her hands because they have gone numb, this could very well indicate a RSI.

(Modified from: Repetitive Strain Injury — A Computer User's Guide by Emil Pascarelli and Deborah Quilter)

After restoration of tissue flexibility and balance, strengthening exercises for the weakened neck, shoulder blade, arm and hand muscles are introduced. Endurance and fine coordination of movements are increased until a full practice and playing routine can be established. With the help of an experienced music teacher it is also advisable to correct any faulty or strained playing techniques that may either have led to the injury, or developed as a consequence of the injury.

### Better posture

When these steps are taken, postural and positional correction will become of real value. One of the reasons for poor posture is the avoidance of pain associated with stretching of tight and tender muscle structures. Correction of faulty postures and maintenance of correct posture are essential to successful management and prevention of injuries.

### Improved fitness

Following an aerobic conditioning program is important because many musicians are in a poor aerobic condition, and their postures of 'thoracic flexion' and 'head forward' contribute to further restriction of chest expansion during breathing. They should be taught improved diaphragmatic breathing and encouraged to follow some type of aerobic conditioning program. Care should be given to head and trunk positions to avoid excessive cervical extension or head-forward postures.

With mild to moderate injuries (grades 1, 2 or 3 injuries), one may be able to continue playing through recovery — provided

technique is modified (if at fault), practice time reduced, posture or other unhealthy habits are modified, and treatment and physiotherapy adhered to if prescribed. Remember, severe injuries (grades 4 and 5) may take many months to recover and may require complete rest and occasionally surgery. Some injuries may prematurely end a promising career as professional musician. **Do not let injuries go unattended.**

### Finally

It may take a musician up to 20 years of diligent commitment and practice to reach a concert or soloist level of playing. After many hours of committed practice even a minor injury could have far reaching consequences for a promising career. Musicians hurt, that is a fact. Diagnosis and treatment may be a long, frustrating and protracted road to travel. For the treating therapist, knowledge of the nature of the injury, the playing of a musical instrument and the world of the professional musician is important. The road travelled with a hurting musician is one of commitment and ultimate reward.

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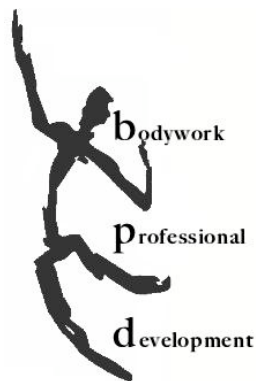
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- 25/26 Sep ~ Understanding our Connective Tissue System: Shoulder Girdle ~ Willie Fourie
- 2/3 Oct ~ Postural Assessment and Correction ~ Graham Blakeley
- 17 Oct ~ Shaw Method: Fundamentals & Butterfly workshop ~ Roger Golten
- 20/21 Nov ~ Fascial Release Work Around the Thorax with special emphasis on dealing with Idiopathic Scoliosis ~ Robert Schleip
- 19/20 Feb ~ Neuromuscular Re-education ~ Dr Peter Levy
- 5/6 Mar ~ Biotensegrity: Principles and Clinical Application ~ Stephen Levin & Daniele-Claude Martin
- 12/13 Mar ~ Understanding and Assessing Sports Injuries ~ Cameron Reid
- 19-21 Mar ~ Integrative Fascial Release (IFR) Foundations ~ Steven Goldstein
- 2-4 Apr ~ Integrative Fascial Release (IFR) Intermediate ~ Steven Goldstein
- 7-12 Apr ~ CORE Myofascial Therapy Certification (6-days) ~ George Kousaleos
- 30 Apr/1 May ~ Treatment Plans for Common Complaints & Injuries in a Bodywork Practice using Deep Tissue Massage & Myofascial Release ~ Art Riggs

### **Brighton**

- 13/14 Nov ~ Soft Tissue Work – Formulating a Treatment Plan Through An Understanding of Injury Mechanics ~ Jerry Powell

### **Edinburgh**

- 11/12 Sep ~ Integrative Fully Body Deep Tissue Massage ~ Art Riggs
- 2/3 Oct ~ Understanding our Connective Tissue System: Lower Limb ~ Willie Fourie
- 29/30 Jan ~ Postural Assessment and Correction ~ Graham Blakeley
- 26/27 Mar ~ Fibromyalgia: Clinical Approaches for Manual Therapists ~ Steven Goldstein
- 21/22 May ~ Understanding and Assessing Sports Injuries ~ Cameron Reid
- 14-19 Jul ~ CORE Myofascial Therapy Certification (6-days) ~ G. Kousaleos

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