IN PURSUIT OF PAIN-FREE PIANO PLAYING

by

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Piano playing is an athletic activity, and to ignore that fact is to invite the possibility for injury. These injuries can have serious personal and professional consequences. This paper will survey causes, symptoms, and treatment relevant to injuries specific to the neck, shoulders, and upper back, and ways that piano teachers can help students recognize, prevent, and rehabilitate from said injuries.

“Musicians are particularly prone to work-related musculoskeletal disorders, regardless of whether the musicians are professional or amateur, and the disorders tend to be long-term.”

Therefore, if a change in this is to occur, it may require a shift in the mindset of musicians in regard to how they understand and use their bodies. The perception of the pianist as an athlete may appear, at least superficially, to be somewhat of a stretch, since we remain seated, and only occasionally break a sweat when performing. However, there are several areas of commonality which should be thoughtfully considered.

If the musician begins to perceive of him or herself in terms of being a special type of “athlete,” general fitness begins to take on a new level of importance and priority. Davies and Mangion’s 2002 study showed that, “musicians with high symptom rates in the previous year demonstrated a significantly lower health status. Whether this was a cause or an effect of musculoskeletal problems is undetermined; however, the exhaustion and lack of fitness cited may be relevant.”

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for musculoskeletal disorders, and regular exercise has been suggested to have protective benefits.”

Another comparable area is that like many athletic pursuits, piano performance is by nature a repetitive motion activity, and often takes place in circumstances (even under the most positive of contexts) that involve a fair amount of psychological stress. It involves many thousands of hours over a lifetime of training and requires the performer to routinely engage in muscle activity that often gets very close to (or even exceeds) their current natural abilities.

Musicians and athletes are similar to each other (while being different from the general population) in their reaction to an injury when it occurs. Persons who are employed in a more normal working environment will often adjust their activity, nursing an injured limb back to optimal function with some type of exercise each day. “Athletes are not like this. They desperately miss their particular sport, and pursue regaining the ability to perform it with almost fanatical determination.” This can work in the pianists’ favor if they are actively seeking ways to facilitate restoration and overall healthful playing, as opposed to playing through pain.

There are two stages of life during which pianists report injuries severe enough to stop them playing at some point in their careers. These peaks occur at the first and fourth year at college, and in the over-forty age group. A pianist can often play for years without having any problems, yet later, in middle age, they develop an injury. This is not necessarily because he or she has changed the way they play, rather it is in their body’s ability to withstand the strain. “Slight bad habits that were previously compensated for and tolerated by the young body now

\[3\] Ibid., 160.
can become problematic. But now, the musician knows no other way to play and is too busy to seek help until pain forces a complete stop.”

This is partly due to the physiological consequence of aging, which can begin by age thirty.

The problems which occur in college are two-fold. In year one, there is typically a sudden increase in playing time for the piano major, often from just one or two hours a day up to eight or more. In the fourth year, there are often competitions, auditions and juries to be gotten through, and then the sudden prospect of knowing a living must be made, and unfortunately, these issues are frequently ignored. To once again compare the pianist to the athlete, the college-level pianist trains (practices and rehearses) at least as much as does the student athlete.

“Chronic injury rates for . . . musicians . . . were similar to the fifty-percent point prevalence rate for university athletes, and two studies on instrumentalists have reported that about fifteen percent of those with a performance-related musculoskeletal disorder still had persistent symptoms one year after initial presentation.”

Comprehending basic physiology of the playing apparatus is the first step toward understanding injury and its prevention. The playing apparatus is not limited to the hand, but starts at the head and extends to the fingers. Therefore, according to Thomas Mark, “a teaching method based on finger movements isolated from supporting movements in the rest of the body is not harmless. It is dangerous.” He goes on to give the following analogy:

Saying that we play the piano with our fingers is like saying that we run with our feet. The fingers move when we play the piano and they are the only parts that touch the ground. But a runner who tried to improve his running by keeping his legs motionless and doing foot exercises would be ridiculous. He is similar to the pianist who keeps his arms motionless and exercises his fingers, although what the pianist does has the sanction

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7 Andrews, 6.
8 Paull, 111.
9 Andrews, 6.
11 Mark, 3.
of tradition. We play the piano just as we run; by complex coordinated movements of our whole bodies.\textsuperscript{12}

Pianists are told from their very first lessons that they must, “sit up straight,” which is rightfully, if not fully, understood to mean that they must not slouch, but that is only scratching the surface. It may not even be internalized as anything of much more import than a mother’s instruction on how to sit in church, or at most, a piano teacher’s excessive criticism. In reality, the skeletal structure demands correct posture in order to maintain proper function and keep injury at bay. The head rests more or less level on the top vertebra of the spine. “The top two vertebrae have special structural modifications to permit easy movement of the skull up and down (nodding) and side to side (shaking the head) without disturbing the balance.”\textsuperscript{13} Because the weight of the head is similar to that of a bowling ball (around ten pounds), a good analogy for students is to imagine a length of pipe about ten inches long with a bowling ball attached to one end. It is easy to hold the bowling ball up when the pipe is upright with the ball balanced on top. When the pipe is tilted forty-five degrees, they can imagine how much more the hand must work to keep the ball from falling further. This is how much work is required by the neck muscles when the head is tilted.\textsuperscript{14} Pianists seldom give thought to this, and can function without pain or obvious tension for some time, however, eventually the body may begin to rebel. Often it takes an outside observer (teacher) or a video camera to discover whether or not the head is balanced over the spine, because the neck muscles are strong and mostly do their work unnoticed. This is seen not only in students who seem to slump naturally, but can be observed in a different way when pianists begin to need glasses in order to read the music on the rack. There can be a thrusting forward of the head to see the music, or a tilting of the chin to accommodate reading

\textsuperscript{12} Ibid.
\textsuperscript{13} Ibid., 38.
\textsuperscript{14} Ibid., 40.
through the bottom half of bifocal glasses. Anything that causes the head to be out of alignment causes tense neck muscles, which then generate tension elsewhere in the body.\textsuperscript{15} “When the neck muscles are free, the head can tilt and turn while remaining balanced.”\textsuperscript{16}

Directly connected to the neck is the shoulder, a complex structure designed for flexibility and mobility which can be put into approximately 16,000 different positions.\textsuperscript{17} However, the shoulder is vulnerable because of its very pliability, and is dependent on muscle balance for its health.\textsuperscript{18} The muscles of the neck and shoulder must function as a cohesive unit. “Pain can come from inefficient use of the body—poor habits of movement. Almost all pain experienced by musicians falls in this category. Pain caused by poor habits of movement is relieved by discovering and correcting those habits.”\textsuperscript{19} Therefore, it is incumbent upon pianists to come to a solid comprehension of the neck and shoulder injuries to which they are prone if they are to avoid them, or to rehabilitate in the case of pain. There are three major groups of muscles in the shoulder, the first of which are the trapezius muscles, which are the two large triangular muscles covering the upper back, top of shoulder, and back of the neck. This is the pair of muscles that are used when shrugging the shoulders, helping to raise the arms overhead, and moving the shoulder blades. Because pianists may unconsciously hold their shoulders up when playing, the trapezius muscles are often a site of tension and discomfort.\textsuperscript{20}

The rotator cuff is made up of muscles and tendons which are attached to the shoulder blades and the top of the humerus (arm bone), and the rotator cuff muscles wrap around the shoulder. They help hold the humerus bone in the shoulder socket and provide strength and

\textsuperscript{15} Ibid.
\textsuperscript{16} Ibid.
\textsuperscript{18} Ibid.
\textsuperscript{19} Mark, 1.
\textsuperscript{20} Horvath, 41.
stability. These muscles participate in upper arm movements, moving arm and shoulder blade together, turning the arm inward or outward, or to help turn upper arms so that the palm is up or down. The third major muscle group is the deltoid, covering the outside and top of the shoulder. This is the group that allows the arm to raise out to the side or up in front of the body.

Because of the structure of the head/neck/shoulder area, it is imperative for the pianist to maintain postural equilibrium in order to move with freedom and accuracy. “Responses that are largely automatic will work when conditions are right and will not work, or only work poorly, when they are unsatisfactory.” There are several areas of possible dysfunction in this vicinity, and their effects on the pianist can range from mild to severe. The primary cause of injury dysfunction in the musculoskeletal system occurs when there is imbalance, weakness or tightness in the muscles. “Injury, overload, or perceived injury leads to a reflex muscle spasm, which normally releases after the threat to the muscle is removed, or as the injury heals. . . However, in the case of myofascial dysfunction, when the musician does not properly address the underlying cause of the injury, or does not allow proper healing, this protective spasm does not subside; rather it persists in the form of a tight band.”

Overuse or overexertion of physical activity beyond the capabilities of the performer’s body (part) despite the body being in perfect alignment can be another contributor to injury. “Overuse is the term applied when any tissue, bone, joints or soft tissue such as muscle, ligaments or tendons, are stressed beyond their anatomical or physiological limit.” In musicians, overuse is typically the outcome of several contributing factors, which can include

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21 Ibid., 41-42.
22 Ibid., 42.
23 Andrews, 45.
24 Ibid.
25 Horvath, 11.
playing with *excessive* force or repetition, playing *too long* at a high level of intensity, with poor technique or ergonomically improper posture. Muscles that are overused have exhausted their endurance capacity. Horvath points out that, “When they are fatigued, muscles become less efficient and less responsive; thus a demanding activity requires more force, resulting in more fatigue and tension.”\(^{26}\) Not everyone who practices for long periods of time, or at high levels of intensity, will sustain an injury, since many pianists play without tension or exhaustion, and with perfect alignment and technique.

Muscles are not the only problem in this equation. Tendons are highly susceptible to overuse injuries. Because they are not tremendously elastic, overuse or harsh rotation or stretching can cause microscopic tears.\(^ {27}\) Tendons are surrounded by protective sheaths filled with lubricant, and these sheaths pass through narrow tunnels. When the tendon is overused or abused in some way, the lubricant diminishes, allowing friction to occur between the tendon and its sheath. The result of this is inflammation and edema; the tendon feels sore, it is often warm and swollen. Movement can become limited, and if this is allowed to occur repeatedly, fibrous tissues may form, thickening the tendon sheath.\(^ {28}\)

Sprains and strains are one category of overuse injuries, and they may require many weeks of recovery, possibly becoming chronic if not allowed to sufficiently heal. “These occur when minute tears and inflammation occur in tissues and they are brought about by overexertion or sudden excessive force.”\(^ {29}\) A strain refers to the muscle-tendon unit. Tendons attach a muscle to a bone and transfer movement from the muscle to the bone. When a tendon is injured it is called a strain, and the tendon is vulnerable to the formation of scar tissue. This scar tissue can result in chronic muscle tension or a shortening of the muscle. When there is physical stress

\(^ {26}\) Ibid.
\(^ {27}\) Ibid., 39.
\(^ {28}\) Ibid.
\(^ {29}\) Ibid., 11.
on the tendon, it may become inflamed, causing a sudden onset of the condition known as tendonitis.\textsuperscript{30} Sprains refer to a tear in the ligament (the rope-like fibers attaching bone to bone) due to repetitive tasks or an overstretching of the ligament. The consequent joint instability may become permanent.\textsuperscript{31}

Another injury common to the shoulder is bursitis, which can occur when the arm is held in front of the body for extended periods of time (such as when playing the piano) especially if not properly warmed-up. Bursitis pain radiates down the upper arm, and may cause restricted movement, especially movements involving lifting the arm. Bursa are the fluid-filled sacs that cushion movement of ligaments and tendons, and they make smooth motion possible by reducing friction between ligaments and bones. Whenever the arm is held at shoulder level or out from the body for long periods of time, the rotator cuff and bursa in the shoulder joint are compacted. This can cause irritation or swelling in the bursa. Inflammation can also occur over time if the pianist does not warm up before playing.\textsuperscript{32}

Shoulder Impingement Syndrome occurs when the supra spinatus tendon (a small tendon that has no extra room in its tunnel for any swelling) becomes inflamed and swollen, causing pain all over the deltoid area. If the pianist ignores this pain and continues to play, the pain worsens and may spread down the arm as far as the wrist.\textsuperscript{33} This can lead to frozen shoulder, or adhesive capsulitis, which is a term for severe loss of motion in the shoulder. This inflammation may prevent normal movement, not only in playing the piano, but also for normal every day functions. It can lead to the formation of adhesions, (sticky bands which may grow around the shoulder joint, or scar tissue. When the shoulder is hurt, the pianist may unknowingly compensate by using other parts of the body to do the work normally done by the shoulder.  

\textsuperscript{30} Ibid.  
\textsuperscript{31} Ibid.  
\textsuperscript{32} Ibid., 42.  
\textsuperscript{33} Paull, 78.
unused shoulder may become stiff, and suddenly there may be a loss of movement of the shoulder. In order to free the joint of the resultant adhesions, mobilization exercise must be included in the treatment plan, and the healing process is generally long-term and painful.

“Some of the risk factors which contribute to the disorders are overstraining, individual playing techniques, practice time, playing intensity, posture, and individual factors. Stress at work has also proven to be a risk factor in the music profession.” In *Predictors of Pain* and *Muscle Management for Musicians*, both sets of authors agreed that situations preceding serious problems or recurrences included heavy workloads or practice sessions, stress, strenuous repertoire, exhaustion/poor health, practicing under pressure, too few breaks, a change in technique, psychological tension, or they may be playing when overtired or run down.

“Frequently musicians have a typical sports attitude of no pain, no gain, but in contrast to sports people, there is usually no back-up trainer once they leave college and no incentive to seek help because they know that the [general practitioner] may well not understand musicians’ problems. There is no reintegration into playing after injury, only to normal standards of use.”

Pianists spend so much time and effort concentrating on the actions of their hands and fingers that they may be completely unaware of the tension or movement in the neck and back. The information is being sent to the brain through the sense receptors of the kinesthetic sense, but there is a lack of consciousness of the information since it is being ignored in favor of the action of the body parts most closely aligned with the keyboard. As a result, the information cannot function as feedback, to which the response should be a release of the back and neck muscles. They are tensed and fixed, but the player does not realize it. The playing is less good

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34 Horvath, 43.
35 Ibid.
36 Fjellman-Wiklund, Sundelin, and Brulin, 3.
37 Davies and Mangione, 156; Andrews, 10-11.
38 Andrews, 10-11.
than it could be, but the pianist is not cognizant of that, either. Even if the shortcomings in playing are heard, the pianist will not identify the cause as upper body tension and will probably try to improve playing by continuing to concentrate on the action of the fingers, thus making matters worse. The practice has devolved into a “practice of compensations—things that are necessary only because the quality of movement is poor. Many pianists spend most of their time practicing compensations.”

Psychological stress is another contributing factor for pain and overall chronically poor health. For example, the pianist gets into a situation that causes psychological stress, which could be a recital, a lesson, or even just practice. The cause of the stress is not the issue; the response is the same, although the amount of severity may vary. Those responses include:

- Increased muscular tension in areas that often include the neck and shoulders
- Decreased circulation in the extremities (fight or flight phenomena) which can result in fingers feeling “cold” or “stiff”
- Exacerbation of very old habits such as raising the shoulders, flattening the finger joints or the knuckles/bridge of the hand, playing on the side of the hand, etc.
- Attempt to use more finger motion than arm weight in order to “control” the notes

Then, stress can become “associated with performance, and fear of performance starts the stress spiral off again on its downward way. This way of being is then defended and defensive tension builds up in the muscles, causing poor posture. Poor posture as a habit squashes internal organs, compromising their function and giving a predisposition to acute disease—which, untreated, becomes chronic disease.”

Posture must begin with correct balance of the head over the spine. Imbalance in this area not only causes neck muscles to tense, it generates compensations elsewhere in the body. These compensations cannot be eliminated unless the underlying cause, namely imbalance of the head, is corrected. Therefore, it is imperative for the pianist to develop a freely balanced head

39 Mark, 9.
40 Andrews, 11.
and release tension in the neck in order to recover overall balance and freedom of motion throughout the body. 41 This tension in the neck is a particularly serious issue for pianists for two significant reasons. “First, some neck muscles attach to parts of the arm structure, and therefore, tense neck muscles inhibit the use of the arms. Second, the nerves that supply our arms branch off the spinal column in the neck region. Tense muscles in the neck can put pressure on those nerves, impairing the nerve supply to our arms and hands.” 42 “Chronically tense muscles restrict circulation, they constrict any nerves that pass through or underneath, and they constrict capillaries that supply nutrients and extract waste products. This creates an oxygen shortage and waste buildup, irritating the nerves and causing further muscular contraction.” 43

“Keyboard players have a high rate of shoulder injuries. Watch drooping shoulders. Forward slouching is a problem with some pianists, but the opposite extreme—leaning backwards or over-arching the back—can be just as detrimental.” 44 “Typically, they fix or set their collarbones and shoulder blades when they play, which involves tension. But they are not aware of the tension as they play, because they are not aware of their upper torso at all—until pain compels attention.” 45 Additionally, there is a rotational release at the shoulder joint which is crucial for the pianist. Many people, when standing, have their palms facing their legs and their thumbs toward the front of their bodies, and will believe that this is the proper way for their arms to hang. Thomas Mark explains that:

“When the arms hang freely in balance, the palms face backwards. Turning the palms toward the legs requires a rotation of the upper arm away from neutral. The motion occurs at the shoulder joint and is accomplished by tensing muscles in the upper torso. Releasing that muscular tension allows the shoulder joint to rotate back to neutral

41 Mark, 41.
42 Ibid.
43 Andrews, 14.
44 Horvath, 45.
45 Mark, 7.
and facilitates bringing the hands to the keyboard. If the tension is not released, then there will be tension in the shoulders underlying the playing of every note.\(^{46}\)

Correct positioning at the piano can play a large role in achieving correct balance and posture, creating tension-free playing. Bench height and position that can feel “right” to the player may be simply a matter of habit, and should be evaluated by being viewed by a teacher or a video of oneself. “Ergonomic problems are seen as crucial predictors of musculoskeletal symptoms in the general workforce, and there is a growing body of literature applying ergonomic analysis to musicians’ issues.”\(^{47}\) If the bench is too high, the angle of the elbow to the wrist is compromised, and if it is too low, there is a tendency to raise the shoulders to compensate. When the bench is too far forward or back, the pianist must lean, changing the center of gravity, and creating undue tension to maintain balance.

While overall physical fitness and playing without tension are essential for musicians desiring to avoid pain and injury over a lifetime of playing, there are also emotional and spiritual factors which can detract from healthful work at the keyboard. “Stage fright is perhaps the most common reason for muscles feeling weak and incapable or tight as a drum and immovable when playing to an audience.”\(^{48}\) While stage fright is most often at its most intense state immediately prior to going on stage, there can be a “long ‘pre-burn’ of panic and equally long ‘after-burn’ of self-castigation, especially if you are the perfectionist most musicians are trained to be.”\(^{49}\) Stage fright can range from mild “butterflies” to a full-blown panic attack, but when the physical result is tension when playing, then the musical performance and the physical health can both be compromised. When experiencing stage fright, it is important to realize that the reaction is normal, although the symptoms may be exaggerated.

\(^{46}\) Ibid., 79.  
\(^{47}\) Davies, 159.  
\(^{48}\) Andrews, 223.  
\(^{49}\) Ibid., 224-225.
The next step is to evaluate which aspects of performance trigger reactions of fear with its attendant physical manifestations, and what removable stressors there are in your life. For the pianist, as for other musicians, the work environment itself is very demanding. It is also an environment in which he or she may have “little control over factors that can affect health, such as poor physical working environment and financial cutbacks.” Other situations included “nerves and performance anxiety, lack of practice time, competition from other players, insufficient work, and job insecurity.” For college-level students, preparing for auditions, juries and recitals means long hours spent in practice rooms (sometimes on less than desirable instruments) with the stress of deadlines and competition. For teachers, especially private ones, financial insecurity may be the result of economic factors outside their own influence, such as the inability of parents to pay for lessons due to their own job losses or decreased economic statuses. For performers, there is the stress of having enough paid performances to make a living wage, plus the physical problems involved in travel, exhaustion, playing in cold rooms, and on unfamiliar instruments. Studies have shown that “highly stressed individuals may exhibit more muscular tension while playing, or vice-versa. Another theory is that muscle tension may be a pathway from stress to pain.”

“Studies specifically examining musicians have shown an association between perceived occupational stress and the prevalence of musculoskeletal as well as other health problems. Additionally, musicians may be more likely to somatize (to express psychological conflicts through physical symptoms) physical distress than the general population.” The conclusion that should be drawn for pianists is that stress, whether perceived or real, is very often an

50 Ibid., 228.
51 Fjellman-Wiklund, Sundelin, and Brulin, 3.
52 Davies, 160.
53 Ibid., 163.
54 Ibid., 160.
underlying factor, and cannot be ignored. The mindset of “practicing through pain” or dismissing stress lightly can lead to severe or lifelong problems. The Davies and Mangion study showed “current stress as significant not only for frequent pain/symptoms in the previous year, but also for the playing lifetime, again supporting the notion of problematic factors forming a background throughout the whole career.”

At the appearance of pain, the pianist must begin to thoughtfully analyze the situation from every aspect, including posture, schedule, lifestyle, approach, muscle imbalances or weakness, daily activities, and, of course, technique and practice habits. All of the factors must be considered in order to accurately determine which factors precipitated the injury, or the risk of re-injuring oneself becomes probable. Pianists must evaluate their own situations to determine what resources are necessary and available to them without delay. “Evaluating the seriousness of an injury early in its onset is important to insuring proper care and treatment and in minimizing the chances of prolonged or permanent damage.”

There are several methods of diagnosing the problem, including self-diagnosis, diagnosis with the assistance of the pedagogue, medical intervention, or biofeedback. A scale that is clinically used to grade worker’s injuries can be translated to musician’s injuries in the following way:

<table>
<thead>
<tr>
<th>Grade I</th>
<th>Pain occurs after playing, but the musician can still perform normally.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade II</td>
<td>Pain occurs during playing, but the musician’s performance is not restricted.</td>
</tr>
<tr>
<td>Grade III</td>
<td>Pain occurs during playing and the musician has to alter the playing position or curtail performance.</td>
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<tr>
<td>Grade IV</td>
<td>Pain occurs as soon as the musician attempts to play and is too severe to continue.</td>
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<tr>
<td>Grade V</td>
<td>Pain is continuous, during all activities of daily living. Playing is out of the question.</td>
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35 Ibid., 163.
36 Horvath, 149.
Grade I injuries generally respond to education and ergonomic advice. Grades II through V usually need some physiotherapy treatment as well. The short-term goal is to give rapidly effective, localized treatment to the injury and the long-term goal is to prevent recurrence of that or any other injury by teaching the musician all they need to know so they will not require further treatment.\textsuperscript{58}

The analysis of self should include not only a rating of the pain, but a determination whether there are things that can be seen by an outside observer that could be the predictor of the pain. At this point, the musician would be well-advised to take a video of him or herself playing to determine whether there is an ergonomic issue which could be addressed. This could also be the point at which the teacher is brought into the situation.

While piano teachers are not trained as physicians, they nonetheless must play an indispensible role in the maintenance, and sometimes improvement of their students’ health. Pedagogues should seek to provide a learning environment that is not only motivational, but supportive and non-threatening, with a constant desire for students to feel a growing sense of independence and openness of communication with the teacher. If these things are in place, students will be more comfortable confiding in their teachers any difficulty they may encounter which could adversely impact their time at the piano, including any injuries. Assisting students in finding a timely resolution to any problem prevents it from becoming chronic and possibly preventing a future of healthful, pain-free piano playing.\textsuperscript{59}

When the student shares pain issues, it is up to the teacher to further assess the situation by queries. Examples of questions to ask the student should include:

- Do you think your injury is due to a non-playing related activity, or is it due to playing-related overuse or misuse?
- Have you engaged in any different kind of physical activity prior to the beginning of the pain?

\textsuperscript{58} Paull, 9.
\textsuperscript{59} Kropff, 188.
• Since the onset of these symptoms, have you done anything to address this problem, such as ice the area or take an over-the-counter anti-inflammatory medication?
• Have you altered your practice routine?
• Do you notice it more when playing specific literature? Can you relate it to a specific passage in your piece?
• How soon does the pain begin after you start practicing? Does it go away when you stop playing?60

By asking these or other pertinent questions, the pedagogue is better able to determine how best to proceed in order to recovery, and to prevent a recurrence of the pain. Additionally, this type of discussion requires reflection on the part of students, and will better enable them to monitor and analyze themselves in the future, when they are on their own. It also empowers the student to take charge of their own physical well-being, understanding that playing their instrument for a lifetime requires healthful playing, and pain can be a predictor of a larger problem in the future if it is not addressed.

If the pianist makes the decision, whether alone or with a teacher, that outside intervention may be indicated, then thoughtfulness regarding the type of professional is the next step. There are a number of practitioners from which to choose, including:

• Family practitioner/internal medicine: These are usually the first line of interaction with a medical professional. They are most likely to be able to diagnose the most common ailments such as tendinitis or bursitis. They can prescribe anti-inflammatories and muscle relaxants.
• Orthopedic specialist: These are medical doctors with specialties in the musculoskeletal system. They often work in conjunction with physical therapists. They can perform surgery, give injections, prescribe medication, etc.
• Chiropractor: They specialize in musculoskeletal alignment, but do not prescribe medication or perform surgery.
• Physical therapist: One generally does not see a physical therapist until having been referred by one of the above doctors. There are some who specialize in hand/arm/shoulder rehabilitation.
• Others: Massage therapist, acupuncturist. These involve alternative forms of treatment, and are considered non-invasive.

60 Kropff, 186.
Because most physicians and other practitioners have little, if any, experience with musicians’ injuries, they are working at a disadvantage with diagnosis and treatment. They do not typically have the opportunity to observe the pianist at the instrument, and so they are reliant upon either their patient, or the pianist’s teacher, to help identify the underlying cause of the injury in order to facilitate a long-term solution for the pain.

There are some clinics which may utilize biofeedback when diagnosing the underlying issue causing pain. Biofeedback is a physiological control technique incorporating the use of monitoring devices that display information about the operation of a bodily function, including some that are not normally consciously controlled. Biofeedback can assist a person in learning to control a particular function or movement consciously. During sEMG (Surface Electromyography), electrodes are put on certain muscles while the pianist plays the instrument. Electrical impulses are generated when a muscle contracts, and these are measured during an sEMG. It is similar in function to an EKG which measures heart muscle activity. As the player relaxes, the lines will soften and become less angular.61

Dr. Kathleen Riley, a pianist, pedagogue and expert in the field of retraining injured musicians, developed the ProformaVision system of utilizing a MIDI keyboard in conjunction with sEMG and video cameras to provide an in-depth way of monitoring every motion (even at rest) made at the keyboard. During a demonstration of this equipment at the Wellness Symposium (which I attended) in June 2012, Dr. Riley had participants play something they already knew on a digital keyboard after electrodes had been placed on the back of the neck, shoulders, and forearms. A video camera placed on each side of the participant also recorded the excerpt. Then she played back the piano roll along with the sEMG graph, which are timed exactly together. This system allowed her to pinpoint times of significant tension and go to that

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61 Horvath, 149.
exact spot with the piano roll and the video, enabling everyone to see the exact position of the hand, arm, and shoulders during the time of tension. Dr. Riley instructed each participant to sit quietly, with arms relaxed in the lap, prior to playing anything. Several had marked shoulder tension even when they responded that they felt relaxed. Once each had finally released the tension so that there were no “blips” on the sEMG, she would ask them to raise their hands and place them on the keyboard. It took most of them several tries before they could lift their hands without tensing their shoulder muscles. This portion of the Wellness Symposium offered a vivid picture of the benefits of sEMG, not just for diagnosis, but for the demonstrable efficacy of retraining using the system. It is a tool that allows the teacher to more specifically know what is actually going on, and it can be used to provide objective data to members of the medical community. 62

Successful treatment of any injury will require several things to happen. First, and of paramount importance, is cessation of the original action that caused the injury. Unfortunately, according to the 2006 study cited by Bragge, et al., this can be hindered due to the “culture of silence” that can cause pianists to make poor choices regarding their own physical or emotional health, leading to the idea of “playing through pain.” 63 In this study of college/conservatory students, it was found that “57% of students experiencing performance-related pain did not report their pain to their teachers, and only 21% were seeking medical help, compared to 40% in another group of non-music college students with pain relating to daily activities.” 64 This is partly due to “denial of the problem and adherence to the idea that pain was a normal

64 Ibid.
consequence of playing a musical instrument.” Without acknowledging the pain, the pianist stands little hope of regaining healthy, pain-free playing for the long-term. The body must be allowed to heal and any inflammation must be reduced, in order for the pain to be minimized. This may happen with nothing more than rest or over-the-counter anti-inflammatories. It may require intervention such as cortisone injections, acupuncture, massage, or in severe cases, actual surgery.

If the pain is due to stress caused by performance anxiety, a physician may prescribe beta blockers, however, these are controversial in both the musical and medical communities. Many musicians believe that the use of beta blockers ignores the real problem. However, if the prescription is properly made, and the patient is monitored, such medications are considered safe by many doctors, and they can work well for some people. “But nervous performers should take note, among other numerous caveats, that some beta blockers are contraindicated for individuals with certain pre-existing conditions, such as diabetes, asthma and other medical illnesses.”

Aside from the immediate medical risks, emotional dependency can become problematic. Beta blockers should be used only temporarily while other alternatives to medication are being explored.

Physical therapy is frequently prescribed by the physician, and working with a therapist who is trained to deal with musician’s injuries is always going to be the best course, although this is not always readily available. Therefore, it is incumbent upon the pianist, and possibly the teacher, to make certain that the therapist has a complete understanding of the way the pianist is using the body. “Licensed physical or occupational therapists provide therapeutic modalities that will help the student recover more quickly and also strengthen the injured area to avoid future

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65 Ibid.
66 Horvath, 7.
67 Ibid., 72.
These therapies may include icing the injured area, exercises to strengthen and release tension, and considering ergonomic changes to be made. Working with the teacher can help in verifying the underlying cause of the injury and to make a plan for the student’s resumption of pain-free playing.

If the pianist decides to go the alternative route, either before or after trying orthodox medicine, some may choose to use one or several of the options available. A combination of chiropractic care, acupuncture, and myofascial release with a qualified therapist may be utilized not only during the healing process, but for a maintenance program, as well. Passive treatments such as these may offer short-term or momentary pain relief, which is certainly better than nothing. However, “these treatments often result in an unhealthy long-term dependency, as they cannot provide a cure for an injury caused by muscle imbalance and overwork. Continuing to play [when injured] takes great determination, and the injury is almost guaranteed to get worse. Pain decreases the strength of muscles, so they become less and less able to do the work that is required to hold joints in the correct position, thereby increasing muscle imbalance.”

After an injury has occurred, the responsibility of the teacher is to help the student design a strategy to return to regular practicing. “The first priority must be helping the student recover and eventually return to normal activity.” This typically involves starting back with very short practice periods. According to Gail Berenson, a contributor to A Symposium for Pianists and Teachers, “Continuous practice time during the initial recovery process should be limited to a maximum of fifteen minutes, with the possibility of repeating that time period two or three times, spaced throughout the day, as the recovery process progresses and if no pain reoccurs. It is

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68 Kropff, 187.
69 Ibid.
71 Paull, 78.
72 Kropff, 186.
crucial to make certain that the student increases his or her practice time gradually, and stops
immediately there is any pain or excessive fatigue.” 73 When pianists remember to consider
themselves athletes, then they should also apply a “commonly recognized rule of sports which is
equally applicable to pianists in these situations—one cannot increase training in time or
intensity by more than ten percent per week.” 74

There are a myriad of ways that pianists can give themselves a chance to maintain a state
of optimal wellness. If a pianist becomes injured, retraining, while the least glamorous and most
unpleasant of all the activities, becomes mandatory. It may be a simple act of rebuilding
stamina, or it may involve a total reworking of technique, but according to Thomas Mark, a
“permanent cure requires identifying and removing the cause of the injury.” 75 He continues,
“The person must learn to play the piano using non-stressful movements to perform the tasks that
were formerly performed with stressful movements.” 76 Looking for the cause of injury, while
necessary, can be a source of fear for the pianist. “[Misuse] is the area musicians typically fear
most. We are loath to admit we might have faulty technique or that we learned “wrong,” or that
bad habits have crept into our playing. But just as the outstanding athletes of our day sustain
injury on occasion, even if they are doing everything ‘right,’ we can face injury despite our
talent. The best defense is awareness.” 77 This much awareness often requires an outside eye,
whether the eye belongs to a colleague, a teacher, or a video camera for self-analysis. Then the
retraining can begin.

“When a keyboard-related injury has occurred, it is likely that bad habits (both pianistic
and medical) have already set in, and may have become relatively fixed and hard to remove. In

73 Ibid., 187.
74 Ibid., 223.
75 Mark, 147.
76 Ibid.
77 Horvath, 24.
these cases, a pianist requires de-training to extinguish these bad habits and then they must embark on proper re-training.”78 Ideally, recovery can and should be complete if the treatment is adequate and comprehensive, requiring only the shortest period of time possible away from the keyboard. “From a strictly medical standpoint, extended time away from the keyboard is usually not necessary, and recommendations to stop playing may be paradoxically damaging to the pianist from a physical, psychological, and spiritual standpoint.”79 This can be confusing to pianists if the medical practitioner is advising cessation of the activity that caused the problem, and playing the piano is what is considered to be the cause. However, it is not simply playing that is the cause, it is incorrect playing, and if the pianist can eliminate the bad habit that caused the pain, he or she should resume playing as soon as possible.

Retraining should also be considered prior to an actual injury, if the pianist does an honest evaluation of his or her own playing. Horvath adds specific practice guidelines to the regular routine of warming up before practice, piano warm-ups, stretches, and cooling down. She recommends taking a minimum ten-minute break per hour of practice time. Additionally, after a particularly difficult passage, it is beneficial to lower the arms, letting them hang loosely at the sides for a few seconds. The importance of increasing the practice load gradually and varying the repertoire is critical. In addition to yoga, stretching, and the Alexander Technique, the author recommends swimming and massage as preventative activities. Other recommendations by Horvath include taking one day off per week and being easier on the self when under duress or overtired, because the body is more tense and at risk for injury when under stress. Last, she advises practicing away from the instrument, which not only allows physical rest, it is helpful for memorization and performance anxiety.80

78 Kropff, 162.
79 Ibid.
80 Horvath, 189.
Warming-up, cooling-down and stretching should all be incorporated into regular piano practice routines. The Medical Program for Performing Artists at the Rehabilitation Institute of Chicago makes the following recommendations for pianists: Warming up, Warm-up exercises, Cooling Down, Cool-down exercises.81 “One of the misconceptions is that stretching is a warm-up, and it’s not . . . you need to increase your core temperature so that all your muscles and tendons are being profused (sic) with blood. Whatever you do to increase your body temperature is helpful whether it’s jogging in place, or getting on a stationary bike for a couple of minutes. After warming up, then stretch. This will decrease any potential overuse injuries.”82 “Musicians think of warming up as something they do when they start playing their instruments, but athletes begin their training sessions by warming up before they stretch and perform their sport. Playing is our sport, and it is important for us as athletes to warm up and stretch before playing.”83

In “Playing (Less)Hurt,” the Horvath gives the following reasons for warming up:

- Increases cellular metabolism. Warming up and the increase in both blood and lymphatic circulation enhance cellular metabolism. Warming up does this by removing waste products from the cell, increasing the amount of oxygen and nutrients that come to the cell and increasing enzymatic activity within the cell.
- Loosens fascia and tendons. When fascia and tendons are exposed to the heat produced by warming-up, they and the structures that surround them become more pliable.
- Aids the joints to move with greater ease. As bones start to move within a joint, synovial fluid is secreted. Synovial fluid is an extremely slippery fluid that allows the bones to slide on each other with greater ease and help reduce the “creaky” feeling we sometimes feel in our joints as we start to move.84

After warming the body and warm-up exercises, stretching the muscles should be done. The goals of stretching are multi-faceted. For one thing, stretching muscles can relieve pain, and can usually be done gently with all areas, including injured ones. It can also correct muscle

81 Kropff, 219-220.
82 Horvath, 99.
83 Paull, 139.
84 Horvath, 95.
imbalances by lengthening overactive muscles and strengthening under-active ones. Stretching helps to minimize loose joints, by improving strength and proprioception, and it can help to correct misuse on the instrument. Stretching must be done correctly, or it becomes the cause of injury. Horvath gives the following advice:

- Don’t bounce.
- Never stretch to the point of pain. Pain reduces endurance, and causes shortening in the muscles, requiring increased efforts. If a stretch begins to hurt, you are overstretching.
- Use slow, gentle, steady pressure.
- Keep breathing.
- Relax as you hold the stretch for ten to thirty seconds.

Stretches for the neck, spine, shoulder, in addition to the hips and legs (areas that are often overlooked even in pianists who make some efforts to include stretching in their daily regimens) should be included. It is important to note that after strenuous activity, such as practicing the piano, some type of cooling down exercises and stretches should be performed to avoid athletic muscle aches, just as sprinters will continue to jog or walk for awhile after their race, followed by stretching.

Proper body alignment is imperative for maintaining wellness, and yoga and the Alexander Technique both assist the pianist in proper alignment, with the added benefits of helping in other ways, as well. They are both known to combat stress of all types, including performance anxiety, and to increase strength, energy and flexibility, enabling the pianist to play with greater relaxation and focus. Both yoga and the Alexander Technique encourage followers to be more aware of their bodies and their healthy overall function, including mental and breath focus. Yoga can bring a “concentrated mind for performance, and an awareness of the body to

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85 Ibid., 100.
86 Ibid., 99.
87 Paull, 111.
allow for proper posture and ease of movement, strengthening the mind-body connection . . . It will help prevent overuse injuries and help heal injuries that are already present.”

Alexander discovered what he called “primary control,” which is the mechanism involving the poise of the head and neck and their relationship to the spine, believing that this regulates the use of the whole self. While the spine is central to the body’s support, the pianist must cultivate awareness of the shoulder. If the pianist is to avoid becoming one of the many with shoulder injuries, the recognition of this lengthened spine should assist the pianist in avoiding the problems of drooping shoulders, forward slouching, leaning backwards or over-arching the back, which can each contribute to shoulder issues. Even though the movements of the actual shoulder blade and the collarbone are small, they are vital, and if the pianist holds these joints fixed, they can become a source of pain. The shoulder joint is sometimes perceived as a fixed place from which the arm moves, but thinking of it this way can precipitate tension. Because it is a joint, it is not inherently fixed, unless the back and chest muscles are tense and holding it set.

The practices of the Alexander Technique and yoga can become a regular part of the pianist’s daily life, thus ensuring that they become natural, and easily called upon in times of stress, such as a performance. Because both of these also advocate “awareness” and a non-judgmental state of being, enabling the pianist to avoid becoming overly self-critical, yet remain “in the moment” and capable of effective performance. If the pianist has been practicing yoga regularly, then doing yoga prior to a performance can greatly reduce anxiety and enhance your performance.

In fact, yoga participants in one study experienced statistically significant

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88 Mia Olson, Musician’s Yoga (Boston, MA: Berklee Press, 2009), ix.
90 Mark, 65.
91 Ibid., 68.
92 Olson, xiv.
improvements compared to the control group in both self-reported performance anxiety in solo
settings and in mood.93

Healthy, strong bodies are better able to withstand the physical and psychological
pressures placed on pianists. The pursuit of total health should include aerobic exercise, and
some form of strengthening and flexibility exercises. “An untoned body is more injury-prone by
being less resilient and by failing to provide the needed support for the muscles more
immediately involved in performing. Overall physical conditioning is of the utmost importance
to prevent injury,” writes Dr. Alice Brandfonbrener, founder of the Medical Program for
Performing Artists at the Chicago Rehabilitation Institute.94 “Muscles that are tight and weak are
at greater risk than strong and flexible muscles. Physical conditioning, flexibility, endurance,
muscle balance, body alignment and strength—all are factors.”95 When muscles are out of shape
and become fatigued, this fatigue can lead to chronic pain. “Fatigue and the resulting reduced
blood flow can eventually lead to microscopic tears in the muscle and build-up of scar tissue.”96

Becoming self-aware, not just of the use of the body, but that of the mind, particularly to
guard against performance anxiety and thus tension, will assist in lifelong wellness for the
pianist. For those who pursue yoga, there is often the inclusion of meditation, or it can be
worked on separately. While there are different forms of meditation, including visualization, the
more the pianist practices it, the more the self can be separated from the chatter of the mind.97
“Practicing yoga prior to a performance can greatly reduce anxiety and enhance your
performance.”98

Anxiety in Conservatory Students,” Medical Problems of Performing Artists 27, no. 3 (September 2012): 123.
94 Horvath, 87-88.
95 Horvath, 23.
96 Ibid.
97 Olson, 35.
98 Ibid., xiv.
Since elite pianists, including pedagogues, identify so strongly with being a pianist, it is vital that care is taken to become fully informed as to the potential risks involved in playing the piano. Remembering that playing the piano is an athletic activity can help pianists to understand that they can continue to play the piano over a lifetime, even though it involves repetition, stress, stamina, and testing the limits of one’s body. However, the majority of injuries come from an excessive amount of tension in the wrong places at the wrong times. Having adequate knowledge of the injury process, and how to avoid it with good technical and lifestyle practices, can support the pianist in the quest for maintenance of their professional outlook.

Bibliography


