

Conducting and Taekwondo— Distinct Arts, Parallel Disciplines: The Physical Realm

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In her essay “The Parallels of Fine Arts and Martial Arts Training,” Regina Keane eloquently and passionately expresses an inexorable link between the two seemingly incongruous disciplines. The distinctions between these arts are quite clear: One is an art that depends on the simultaneous cooperation of potentially thousands of people in the creation and appreciation of visual art, music, or theater. The other is based on the idea of two or more opponents working counter to each other in matches, battles, or drills. Based on personal experiences, however, Keane determines that the great artists of either discipline have had several experiences in common, including the necessity of repetitive exercises, the importance of communication, the unattainable pursuit of perfection, and the fact that both artists

train rigorously with the long-term goal of freeing ourselves of the chains of training. Just as the actor commits the script to memory and the musician commits the musical manuscript to memory, the aspiring martial artist sets on a path to no longer rifle through his rolodex of techniques when presented with real-time conflict.¹

Keane’s personally driven analysis of the links between these disparate disciplines is one of only a

very few articles connecting the two activities, and it is indicative of the subjective nature of such studies. One blog, for example, argues that the similarities between music and aikido stem from the fact that they both unfold “in real-time and [have] an uncertain outcome, depending on the quality of the performance.”² Gail Wright Lee, a taekwondo instructor from Herndon, VA, describes how after years of study as a classical musician, she discovered taekwondo, and was able to see in the latter, the “grace, power and beauty” of the former.³ Only sporadically does a concrete study arise, as in Teri Tom’s article on the use of rhythm to disrupt predictable sparring patterns.⁴

Despite the paucity of literature on the subject, a clear connection exists between fine arts and martial arts. That association is particularly strong between the orchestra, opera, or choral conductor and the taekwondo practitioner. There is an intangible ‘feeling’ that a conductor gets when entering the dojang that much of the training relates to his or her musical studies. That feeling can be objectively substantiated with a study of the individual disciplines’ instructional texts, and can be divided (albeit with substantial overlap) into three categories: the intellectual (including analysis of musical and taekwondo forms, research of the ever-evolving practice of each art, and understanding of the way the arts’ histories inform their current practices); the spiritual and psychological (including overcoming performance anxiety, handling conflict, and building confidence); and the physical.

This study will begin the process of exposing the most visible and tangible connection between the two arts: the physical similarities. This topic can be broken

down into five further subdivisions: 1) stance, 2) technique, 3) simplicity of movement, 4) power, and 5) misuse and overuse injuries. These offer preliminary information that might help conductors understand the benefits of the martial arts, particularly taekwondo, as a distinct yet parallel activity which could inform their lifelong musical studies.

Stance—The Foundation for Both Arts

As with any physical endeavor, maintaining optimal stance is key to achieving the desired physical results. It comes as no surprise, therefore, that the writings in both taekwondo and conducting insist on adherence to specific guidelines on basic body positioning. What is particularly remarkable, however, is the fact that the stances of the two arts are actually quite similar.

Although taekwondo has several stances, this study will focus on the standard front fighting stance, as it is the main one used during sparring, that “real time” activity mentioned above by Keane and Dooley. According to Yeon Hwan Park and Tom Seabourne, the correct fighting stance is:

From the ready stance, turn both feet 45 degrees to the right and step back with your right foot. Your feet should be shoulder width apart with your weight equally distributed. Stay light on the balls of your feet to use either foot as a weapon. Stand slightly sideways to your opponent to make less of your body a target. Remain relaxed but focused. Hold your chin down and your elbows close to your body with your hands up, like a boxer does. From the fighting stance..., you can attack and defend with either hand or foot at any time.⁵ (See Example 1)

Master conducting teacher Gunther Schuller describes the optimal conducting position as follows:

The conductor should adopt an easy but erect posture, with the heels close together but not touching...The elbows should be held near the sides...The knees should never bend noticeably.⁶

John Koshak, in *The Conductor's Role: Preparation for Individual Study, Rehearsal and Performance*, adds, "The placement of the feet must be in a natural stance that allows easy, free, and relaxed movements."⁷ Although the two disciplines' descriptions certainly have their differences, mainly the sideways positioning of the taekwondo student, two important items stand out, not only for their visible similarities, but also for their functional reasoning. (See Example 1 below)



Example 1: Stances: Fighting and Conducting

First, in both disciplines, the feet and legs are positioned for ease of movement and balance. Both practitioners must stay upright, despite some fairly active movement, and legs too close together or too far apart will throw off the center of gravity. In addition, although there appears to be a discrepancy between the bouncing on the balls of the feet in taekwondo and the minimal knee movement of conducting, the ultimate reasoning for each instruction is the same. Bouncing in taekwondo allows the student more flexibility in terms of mobility. In conducting, bouncing of the knees is often an indication of tension and misplaced energy. If one stands as musician injury specialist John Kella suggests, with feet “shoulder-width apart, then [only periodically] slightly bending the knees,”⁸ one can dissipate this tension, creating the desired result of “a relaxed and unrestricted body position.”⁹

The elbow placement offers a second association between the two stances. In both cases, the elbows must stay down, close to the sides. This position is not meant to constrict movement, but rather to free up the practitioner for faster and suppler use of the arm to punch, block, cue, or phrase. According to Park and Park, proper elbow and arm position “allows quick hand motion in all directions while providing good protection at the same time.”¹⁰ In *The Art of Conducting*, Michael Bowles elaborates on this concept:

Elbows held away from the sides tend to take the gesture out of the line of sight or else restrict the arc of movement of the forearm and the point of the baton, ...[and this position] can produce a

pumping movement that looks ugly and is needlessly distracting to both players and audience. A certain tidiness and simplicity of movement are the hallmark of the professional in most activities. A conductor always looks untidy and amateurish if he holds his elbows out.¹¹

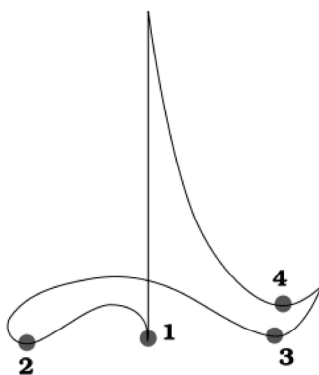
The stance, therefore, becomes one not only of function, but also of appearance. Perhaps this is a lesson to be learned when fighting an opponent. A strong, confident-looking stance, relaxed yet able to move in any direction, will create an advantage from the onset, without a strike ever being thrown.

Technique—More than the Point of Impact

Out of all the musical arts, conducting offers the most visible link to taekwondo. Leading an orchestra or chorus, like participating in a sparring match, is a full body endeavor, requiring more use of large scale muscles than, for example, a piccolo player, who depends on the smaller muscles of just the hands. Superficially, the similarity would appear to end at the level of general movement, and not venture into specific technique. After all, only on rare occasions might a conductor wish to make physical contact with one of his or her musicians. There is, however, an invisible point of impact for this non-contact art: the ictus, or the exact location in the gesture where the beat is to occur. Regardless of variations in individual style, the ictus ideally falls on the same horizontal plane for each beat, giving the ensemble members some consistency. In addition, certain traditional patterns have developed over the years,

creating a standard on which all musicians should be able to depend. In order for the musicians to play together, each ictus needs to be clear, consistent, and easy to see.

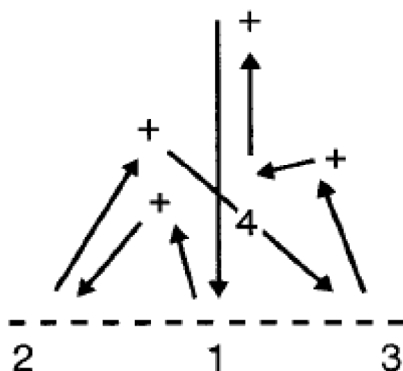
True clarity of beat, however, lies not in the moment the hand or baton connects with the invisible ictus. Rather, it is in the approach to and retraction from that point. Each gesture needs to begin in one place (usually in an opposite corner of the conducting field from the ictus), move to the moment of metrical impact with a certain type of acceleration, and then move quickly away (or rebound) from that location to the next. In addition, each bit of information given by the conductor needs to be prepared one beat in advance in order for the ensemble to react in time. Example 2 below shows a standard conducting diagram for 4/4 time (four beats per measure). Notice, the ictus are all close to the same plane, and there is motion after each ictus leading to the next.



Example 2: Standard Beat Pattern for 4/4 time.¹²

A more precise version of the 4/4 beat pattern, is found below in Example 3. It indicates the point where

the approach begins (the “+” sign), the ictus (the number), and the direction of the rebound (the arrow moving away from each number), which then leads to the next point of departure (the next “+”). Also demonstrated in this alternate diagram is the fact that the beat, like a bouncing ball, accelerates towards the ictus (the bold arrows) and then slows down in the rebound until the next “+” sign (the arrows with dashed lines).



Example 3: Standard Beat Pattern for 4/4 with clear points of departure and rebounds.

According to Max Rudolf, in his standard-setting *The Grammar of Conducting: A Practical Study of Modern Baton Technique*, each type of music has its own acceleration speed and rebound characteristics. In staccato (or short and detached) passages, for example, each beat is a “click,” implying a fast rebound,¹³ whereas in more connected music, the acceleration and rebound are less severe, creating a smoother pass through the point of ictus and a slightly more rounded pattern than those in Examples 1 and 2.¹⁴ Never, however,

should the motion stop. Not even in a fermata (a note held out at the discretion of the conductor) does the gesture remain on the point of the beat. Except in rare circumstances, the conductor must move away from the ictus in order to communicate how to play the duration of the beat and when to expect the next beat.

Here, taekwondo, more so than other martial arts, offers a particularly appropriate comparison. Each strike begins with a chamber, accelerates towards the point of impact and then quickly retracts. This maximizes power, especially when mass is constant. Explaining the meaning behind the equation $F=ma$ (force = mass \times acceleration), a writer for the Central Ohio Martial Arts Association argues,

force is a product of mass and acceleration. To increase force, either a martial artist has to increase his mass or his acceleration. It is possible to put more of his mass into play, but generally the mass remains constant (with the exception of weapons). It is easier to increase acceleration.¹⁵

Acceleration starts from the chamber, which will be further discussed below in the section on power. The rebound from the strike, however, is equally as important as the approach. As Park and Park explain,

Tae Kwon Do emphasizes the quick retraction of the striking limb (arm and leg) following the delivery of an attack, as opposed to Japanese Karate-do, for example, in which the limb remains more rigidly extended for a brief time following the blow. ... [With retraction, one can] deliver multiple strikes with great speed.¹⁶

In sparring, the practitioner needs to be able to reset quickly in order to deliver multiple strikes. By rebounding, the arm or leg is moved quickly back into position and made ready for the next accelerated action to take place.

Although flawed in that it does not teach the importance of acceleration towards the ictus, the following suggestion from *The Method Behind the Music* website does offer useful imagery for the conducting rebound:

Get a big rubber band and loop it around your middle finger. Pull the band back to your elbow and conduct down beats with one hand. Feel the rubber band pulling your finger back as you flick downwards. Try to remember this feeling and copy it without the rubber band.¹⁷

Olympic gold medalist and 10-year Korean national team member Je Gyoung Kim used a comparable metaphor for his students at the 2006 University of California at Berkeley Marital Arts Camp, describing the retraction of a roundhouse kick as the snap of a rubber band.¹⁸

Of course, while the outcomes of each discipline's gestures are naturally different, they are grounded in the same ultimate concept: the beat or strike. Most importantly, although each is the most important part of the gesture, neither technique exists on its own. Without the proper surrounding movement, including acceleration and rebound, the beat (and therefore tempo) will be unclear and the punch will have no consequence.

Simplicity of Movement

Related to the topic of technique is the idea that in both arts, simple is better. Minimalism of gesture allows for freedom of movement, consistent stability, general efficiency of motion, and clarity of mind. Park and Park express this concept in the following way:

The approach of Tae Kwon Do is direct and uncomplicated. Its very strength derived from its seeming simplicity. The techniques themselves are geared for practical efficiency.¹⁹

In fact, further substantiating this view is the fact that

strictly speaking, there are no new techniques to be learned once a practitioner has reached the level of black belt. Advanced practicing in Tae Kwon Do mainly consists of perfecting the basic techniques and learning to apply them in new ways.²⁰

The same could be said of conducting. The basic conducting patterns and the concept of acceleration and rebound are applied to every piece at every stage in the conductor's development. Regardless of whether the music is a simple exercise in an introductory conducting text or a full scale ballet by Igor Stravinsky, the conductor must apply the basics. In fact, as the music becomes increasingly difficult, it is even more important that the fundamentals are applied without superfluous complicated gestures. In a piece with changing meters, complex rhythms, and thick instrumentation, the orchestra relies on well-executed simplicity on the conductor's part to stay together and let the musical expression unfold. Michael Bowles

clearly and objectively articulates the issue as one of common sense:

Unnecessarily large and flamboyant gestures dissipate that reserve of power so often needed to press the players through a musical climax or that extra control needed to help them through an unusually tricky piece of musical texture...It simply means that in conducting, as in all art work, economy in the use of means is a leading characteristic.²¹

In both disciplines, however, the literature on this particular topic is not always so level-headed. In fact, at times it becomes heated and even amusing. Using polite but pointed language, for example, Park and Park make a strong statement supporting taekwondo over other martial arts:

The techniques of some other martial arts systems provide elaborate, esoteric means of dealing with particular types of attack. The problem with this approach is that if the defender misreads the attack, or if the attack is unorthodox, the defense may prove to be ineffective. Tae Kwon Do avoids this problem by developing sound, general techniques.²²

Blame it on the fiery temperament of musicians, but thoughts on showy conductors are even worse. Robert Schumann said

Conducting...remains a distraction for the listener, and can only be condoned as a necessary evil. But should cases arise when this necessary evil is necessary then one should not force such buffoonery upon the public....Every motion of the conductor is exposed to

the public eye. If the gestures are merely affected, distorted or unnecessary then the individual occupying the conductor's stand is irksome.²³

Felix Weingartner described conducting as

by no means beautiful in itself, and the black dress-coated figure with the baton wielding arm can easily become ludicrous if the arm gesticulates wildly instead of leading the men, and the body also twists and curves in uncontrollable motion.²⁴

Gunther Schuller speaks of "eliciting from the orchestra with the most appropriate minimum of conductorial...gestures, a maximum of accurate acoustical results."²⁵ In the footnotes, however, he hides what is perhaps one of the most biting criticisms of the legendary Leonard Bernstein's flamboyant technique:

Fritz Reiner...once put it similarly in an interview: "...the best conducting technique is that which achieves the maximum musical result with the minimum of effort." One wishes that Leonard Bernstein, Reiner's pupil, but later one of the world's most histrionic and exhibitionistic conductors, would have taken his teacher's advice to heart.²⁶

All of these arguments for simplicity, however, do not decry the use of more complicated techniques or even the occasional showmanship. A top level practitioner of either art may be able to find efficiency and function in even the most flamboyant technique—a jumping spin-hook kick or a conductor's exaggerated cut-off. The problem lies in

the imitation of the physicality of these techniques by the less experienced. This often results in awkward falls in the dojo and messy playing in the orchestra, and, as Schumann ranted, can be a sign of “vanity and self-importance.”²⁷

Producing Power

One additional element of physical technique both disciplines must learn is power. Of course, much of what generates power is psychological—for example, overcoming the intimidation of the opponent or ensemble. That intangible element, however, is out of the scope of the current study. Rather, the corporeal element of strength will be investigated as an outcome of well-executed technique, and not a result of brute force.

In taekwondo, power is necessary to make the greatest effect when striking an opponent. For the conductor, power helps express music that is loud or accented or both. Regardless of the size or stature of the practitioner, power is possible, because it mostly relies on technique, including starting with a well-balanced and relaxed stance, monitoring the speed of the delivery of a technique and subsequent retraction, and keeping the movement simple, making efficient use of the body.

Regarding the importance of stance for strength, Park and Park argue, “If a student works very hard to perfect his punching and kicking techniques but cannot support those techniques with a proper stance, he will never be able to generate power.”²⁸ They continue by explaining that “the power delivered by a

Tae Kwon Do punch depends greatly on the correctness of form when that punch is delivered.”²⁹ The question then becomes, what aspect of the form is so vital in attaining strength? One of the keys lies in the hip rotation, which is only possible if the student can easily shift his or her weight between the two legs.³⁰ The second secret to a mighty strike lies in the motion of the striking limb itself. It must, as previously mentioned, begin in a chamber position, accelerate towards the target, and then quickly retract. In a discussion of the side kick, for example, Terry Brumley offers the following description:

The knee-to-the-chest theory (of chambering) is based on a slingshot. Pull it halfway back and the rock travels half of its flying potential. Don't blame it on the rock—it just wasn't pulled back as far as it should have been. A full-chambered side kick is almost as fast as a half-chambered side kick but twice as powerful.³¹

The same chamber concept works with the punch, in which the fist begins at the belt, and then proceeds from there with a twist and natural quickening towards the target.³² For Park and Seabourne, the important thing to remember is that the muscles must relax “until the moment of impact. Relaxed muscles allow you to move faster and expend less energy.”³³

For the conductor, this final admonition could not be more appropriate. The temptation in loud, accented music is to tense the muscles with forced bravado. This makes the conductor feel strong, perhaps because the muscles are more easily sensed in this condition. This tautness of frame, however, produces the opposite result: a conductor with little control and

even less authority. In addition, the ensembles often subconsciously mimic the conductor's tension, creating out of tune playing, rigid bow arms, and tight vocal mechanisms. The best way to create weight and emphasis in the beat, as in taekwondo, is to maintain a strong stance and take advantage of the speed variation inherent in the approach and rebound from the ictus. Max Rudolf, for example, warns the conductor of a common bad habit in eliciting a marcato (or accented) note. "Conductors sometimes try to get this result [a loud marcato] by hesitating just before the accent, a procedure that often fails in its purpose because the players do not coordinate properly. The method given above [preparing the accent with a quick acceleration] is an aggressive one in the sense that it actually carries the players into the accented count."³⁴ In addition, to become louder, "enlarge the size of your beat. Make your gestures about a third larger than those used for piano."³⁵ Not only does the greater dimension of the motion mirror the greater amount of sound in the music, but it also gives the conductor more space to accelerate in a relaxed manner towards the ictus, similar to the concept of a chamber in a powerful kick.

Injuries

It comes as no surprise to see the word "injury" in an article on taekwondo. In any contact sport, one would expect bruises, broken bones, or concussions. One, however, rarely pairs "injury" and "conducting." After all, studies show that conductors live longer and healthier lives than their instrument-playing

colleagues.³⁶ Of course, a few occurrences of combat-related injuries in conductors do exist, but they are all unfortunate self-inflicted accidents. James Levine, for example, fell off of the podium after a performance of Beethoven's Ninth Symphony and had to cancel several performances due to a torn rotator cuff. Jean Baptiste-Lully, who lived when the art still consisted of beating a large staff on the ground to keep time, accidentally thrust the stick into his foot and subsequently died of gangrene. Since these incidences are more than rare, the current study will focus on the second category of injuries that both taekwondoists and conductors receive: those received through misuse and/or overuse.

According to John Koshak, "The physical activity of the conductor on the podium can be very strenuous and may cause injury to the hands, arms, or shoulders."³⁷ Although not as prevalent as for instrumentalists and vocalists, misuse and overuse problems do arise in conductors. Ricardo Chailly, for example, had to bow out of several concerts because of repetitive stress shoulder pain, and Seiji Ozawa threw out his back while leading an orchestra. In his article "Medicine in the Service of Music: Health and Injury on the Podium," John J. Kella, describes the types of injuries possible, and divides their causes into ten categories, with several cures, as outlined below in Table 1.

**Table 1: Overuse and Misuse Injuries in Conductors:
General Types, Specific Causes, and Possible Cures³⁸**

Injury Types

Carpal Tunnel Syndrome

Focal Dystonia

Repetitive Stress Disorder

Sprain

Strain

Tendinitis

Tenosynovitis

Specific Causes

Elevated shoulders

Excessive baton gripping

Excessive elbow extension

Excessive gestural muscle tension

Excessive wrist extension

Head forward (out of alignment)

Locking knees

Lower back twisted

Repetitive motion

Vocal overuse

Possible Cure/Treatment

Altering conducting style

Body awareness training (Yoga or Alexander technique)

Keeping in Shape

Mental practice

Physical therapy

Stretching

Warm-up/warm-down

Table 2: Overuse and Misuse Injuries in Taekwondo Practitioners: General Types, Specific Causes, and Possible Cures³⁹

Injury Types

Bursitis

Carpal Tunnel Syndrome

Focal Dystonia

Repetitive Stress Disorder

Sprain

Strain

Tendinitis

Tenosynovitis

Specific Causes

Achilles Tendonitis

Excessive elbow extension

Excessive muscle tension

Knee Strain

Plantar Faciitis

Pulled muscles (groin, hamstring)

Vocal overuse

Possible Cure/Treatment

Altering kicking/punching technique

Body awareness training (Yoga or Alexander technique)

Keeping in Shape (no 'Weekend Warrior')

Mental practice

Physical therapy/Sports Physician

Stretching

Warm-up/warm-down

Solutions to such injuries include stretching, rest, “re-evaluation of conducting style,”⁴⁰ physical therapy, and, as Herbert von Karajan would suggest, reducing tension in the body by remembering to breathe.⁴¹ Koshak recommends a series of gestural-inspired warm-ups and warm-downs and releasing a “too tight grip on the baton;”⁴² while Malva Freymuth advocates “mental practice and imagery” to limit repetitive practice and reduce injury.⁴³ James Levine espouses the importance of conducting on a consistent basis to keep in shape.⁴⁴ Many advocate that external disciplines such as yoga and the Alexander Technique not only keep the body generally healthy, but also teach the practitioner how to listen to his or her body and thus make wise decisions about movement, tension, and rest. Violinist and conductor Yehudi Menuhin studied with Yogi BKS Iyengar, writing the forward to his book, and even conducting a concert in *shirshasana*, or headstand. He claimed that yoga relieved his “suffering from a variety of aches and pains common to many musicians.”⁴⁵ The Alexander Technique, a “method that works to change (movement) habits in our everyday activities,...teaches the use of the appropriate amount of effort for a particular activity,” helping a “person discover a new balance in the body by releasing unnecessary tension.”⁴⁶ According to Judith Leibowitz and Bill Connington, it can “teach musicians how to leave the body free.”⁴⁷ A free body translates into fewer injuries, better technique, and greater power.

In taekwondo, the overuse and misuse injuries are quite similar. Although conducting will mostly likely never result in a pulled hamstring, the general

categories of non-combat related injuries remain similar. Sprains and strains are the most common, but tendonitis, tenosynitis, focal dystonia also surface. And, while the specific causes vary slightly, the cures bear much resemblance to those listed in Table 1. (See Table 1, p. 300, and Table 2, p. 301 above)

In the taekwondo literature, recommended treatment for such ailments is strikingly similar to that of conducting. Lawrence Kane and Kris Wilder suggest warming-up, stretching, visiting a sports physician, monitoring technique, resting, and practicing on a consistent basis (i.e. avoiding the “weekend warrior” method).⁴⁸ In her book *the Martial Artists Book of Yoga*, Lily Chou argues that a parallel study of yoga will help the martial artist to enhance flexibility, strength, alignment, balance, body awareness and control, breath control, and focus—all contributors to a healthy use of the body.⁴⁹ Even Alexander Technique, a practice normally only associated with actors and musicians, could be a route for the taekwondoist who needs to alter the use of his or her body for healthier and more efficient motion. Alexander instructor Gregory Seele outlines one example in which knowledge of the technique could aid in the proper and well-aligned execution of a front stance:

When employed in the front leaning stance, the energy and weight will be up, off and centered over the legs allowing for more mobility and power to come from our center, an important principle in most martial art disciplines. There will be less downward pressure on the lower back, hip joints and knees reducing the risk of strain and injury. There will be an integrated balance and fluidity available

to all our techniques. Most importantly, however, we will learn to pay attention to our overall coordination or use, so that patterns of repetitive misuse will not persist to a point of self-inflicted pain and injury which would rob us of the benefits and joy of these wonderful martial disciplines.⁵⁰

Conclusion

Of course, there are noticeable distinctions between the arts of taekwondo and conducting, particularly in the physical realm. The conductor's stance faces the ensemble, purposefully exposing the front of the body for better communication, while taekwondo fighting stance intentionally turns to the side. Conducting requires no actual physical contact with other people, although the intangible contact with the ictus, or point of the beat, offers a credible analogy to the tangible contact of a punch or kick. Taekwondo relies mostly on the feet, while conducting uses the arms. Still, however, the motions between the points of contact are approached in the same way. The taekwondoist needs power to strike hard, while the conductor's strength is for expressive purposes. In both cases, however, power is only achieved through relaxed perfection of technique. Finally, because of the nature of the sport, taekwondo practitioners incur a set of combat-related injuries not often associated with a musical maestro. Still, however, the two activities share a list of related misuse and overuse ailments that can be treated through like means.

These physical correlations, especially when paired with the intellectual and psychological and spiritual

similarities, offer a unique and objective interpretation of the intangible sensation that the two arts lead comparable lives. In addition, with the parallel instructional material found in both disciplines, it becomes clear that taekwondo and conducting have much to learn from each other.

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Endnotes

- ¹ Keane.
- ² Dooley.
- ³ Lee.
- ⁴ Tom, pp. 40-42.
- ⁵ Park and Seabourne, p. 42.
- ⁶ Schuller, p. 97.
- ⁷ Koshak, p. 4.
- ⁸ Kella, p. 11.
- ⁹ Koshak, p. 4.
- ¹⁰ Park, Park, and Gerrard, p. 22.
- ¹¹ Park, Park, and Gerrard, p. 91.
- ¹² Conducting.
- ¹³ Rudolf, p. 21.
- ¹⁴ Rudolf, p. 27.
- ¹⁵ Central Ohio Martial Arts.
- ¹⁶ Park, Park, and Gerrard, p. 21.
- ¹⁷ Hollis, et al.
- ¹⁸ Je Gyoung Kim, private class instruction, University of California at Berkeley Martial Arts Camp, 2006.
- ¹⁹ Park, Park, and Gerrard, p. 20.
- ²⁰ Park, Park and Gerrard, p. 21.
- ²¹ Bowles, p. 87.
- ²² Park, Park, and Gerrard, p. 20.
- ²³ Schumann, pp. 61 & 64.
- ²⁴ Weingartner, p. 115.
- ²⁵ Schuller, p. 9.
- ²⁶ Schuller, p. 9.
- ²⁷ Schumann, p. 62.
- ²⁸ Schumann, p. 21.

- ²⁹ Park, Park, and Gerrard, p. 37.
- ³⁰ Park, Park, and Gerrard, p. 42.
- ³¹ Brumley, p. 92.
- ³² Park, Park, and Gerrard, p. 37.
- ³³ Park and Seabourne, p. 45.
- ³⁴ Rudolf, p. 196.
- ³⁵ Rudolf, p. 12.
- ³⁶ Kella, p. 2.
- ³⁷ Koshak, p. 24.
- ³⁸ Kella, pp. 1-8.
- ³⁹ In addition to the references given directly in the text, information in this table gleaned from the following sources:
Ng.
Martial Arts – Preventing Injury
Lawler, pp. 219-225.
- ⁴⁰ Kella, p. 6.
- ⁴¹ Kella, p. 4.
- ⁴² Koshak, p. 24.
- ⁴³ Freymuth.
- ⁴⁴ Kella, p. 4.
- ⁴⁵ Iyengar, p. 12.
- ⁴⁶ Alfred Flechas as quoted in “Complete Guide to the Alexander Technique.”
- ⁴⁷ Leibowitz et al, p. 90.
- ⁴⁸ Kane and Wilder, pp. 167 and 183-184.
- ⁴⁹ Chou and Rothacher, pp. 13-16.
- ⁵⁰ Seele.