“The Whole Process is a Dance in Itself”: Physical Therapy for Professional and Student Dancers

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Dancers and their bodies are under constant stress, and their lifestyles are conducive to injury. In fact, annual injury rates among classical ballet companies average 67% to 95% (Bronner, Shaw, Sheyi Ojofeitimi, and Donald Rose). For company dancers, more often than not, pain becomes a part of their profession. Rehearsing the same movements for forty or more hours every week increases if not guarantees pain and injury. James Ady of the Pennsylvania Ballet Company was diagnosed with a stress fracture to his L3 vertebrae, “but Ady kept on leaping- even though he knew he was injured- until he couldn’t walk” (Nickenig). This exemplifies how not only the dancing, but the mentality of dancers, and the culture in which they live and work can lead to injury; therefore, it is the responsibility of dance medicine specialists to differentiate between pain and injury, and treat the individual as appropriate. The dance medicine field is just more than twenty years old as the International Association for Dance Medicine and Science was founded in 1990 (Dunn). Even with the creation of this specialty field, “dancers represent a medically under-served occupational group at high risk for work related musculoskeletal disorders” (Bronner, Shaw, Sheyi Ojofeitimi, Jon Spriggs). Physical therapy has been cited as an effective means of reducing pain, and at times preventing injuries. Using both traditional and newer, more unique therapy methods, physical therapists have been able to manage pain, injuries, and ongoing conditions in both professional and student dancers. Physical therapists must be aware of contributing factors to injury, and then identify and utilize the most effective

treatment methods to help dancers return to optimal performance levels. Finally, the challenges of treating this specialized population of athletes, and injury prevention can be discussed.

While many specific injury diagnoses befall dancers, there are three major categories of injury which are most common. Primarily, overuse injuries encompass the most cases in the dance world around 60-76% (Bronner, Shaw, Sheyi Ojofeitimi, Donald Rose). These occur from constant stresses due to repeated movements or choreography, which result in micro-injury. Over time "if the amount of micro-injury exceeds the rate of healing," an overuse injury- usually a stress fracture or tendinitis- occurs (Sephton). The body is not allowed enough time to heal itself before further stresses are put on it. Another important factor to consider in overuse injuries is fatigue. A 2001 study revealed that "90% of dancers reported fatigue at time of injury," with "80% [reporting] high intensity dance activity," and "67% [at the] middle to end of [the] season/semester" (Liederbach "Epidemiology of Injuries"). Each of these statistics emphasizes critical injury factors: injury usually occurs with fatigue, at a high-intensity activity level, at the end of the performance season. And these factors are ever-present in the lives of serious student, and professional dancers. In a state of fatigue, studies have proven that neural feedback, muscular control, and joint stability are compromised (Liederbach "Epidemiology of Injuries"). Consequently, a dancer's proprioception, or sense of their limbs in space, is hindered, along with their balance, alignment, and stability. This can be critical, in performance, or even a dance class where repetitive movements are performed, or hundreds of jumps are executed. Exercise dependence is another factor which contributes considerably to fatigue, and has had the most substantial effect on professional, female dancers. With an emphasis on a specific, slender body type and weight, especially in classical ballet, dancers feel the need to exercise excessively in addition to their dance-based physical activity (even above reasonable levels of cross-training).

For example, a 2005 study found “amenorrheic women dancers exercised 12 hours more per week than eumenorrheic women in the same company and 21 hours more per week than men in the same company” (Liederbach "Epidemiology of Injuries”). This puts a susceptible population at additional injury risk. These dancers increase the stresses put on their body by over-exercising, thereby increasing their risk of injury to reach the ideal standards in the ballet community.

The most dramatic type of injury often recognized by popular culture is the acute or contact injury. Whether a dancer lands a jump incorrectly, falls, or missteps, these onetime errors can lead to costly injuries such as serious sprains, tears, dislocations, and fractures. One such fracture is called the “Dancer’s Fracture” which occurs along the 5th metatarsal when the dancer lands a jump on an inverted foot. During partner work, or in catching themselves from a fall, dancers may also dislocate their shoulder. Acute injuries can also include meniscal, medial collateral ligament (MCL), or anterior cruciate ligament (ACL) tears, which occur when a dancer lands a jump, or performs “sudden twisting, turning, or stopping movements” (“Common Dance Injuries”). The more severe and complete tears will impede motion immediately through pain and swelling. These knee injuries especially are seen more in modern dancers, those who complete more floor work, or students with underdeveloped landing technique (Nickenig). This landing technique also plays a role in ankle sprains, which are the most common ankle injury in dancers. Ankle sprains often occur laterally in dancers after landing a jump incorrectly, landing on a prop, or on a partner’s foot. An audible popping sound may be heard, and reactions between dancers will vary. Acute injuries can be accompanied by inflammation and pain almost immediately. Depending on the degree of injury, a dancer may or may not be able to walk. The causal factors cited for acute injuries include “working close to the limits of strength, a slight loss of balance, a lapse in concentration” and other associated conditions (“Common Dance

Injuries"). Fatigue plays a significant role in these injuries as well, for during a state of fatigue, technique may be overlooked causing the malalignment or fall which leads to injury.

Finally, while they may be seen more in younger dancers, "misuse injuries are brought on by bad technique or repeated stress on an anatomically unfit body part" (Olsen). Similar to overuse injuries, misuse injuries occur over time. However misuse injuries can be more dangerous if a dancer is not aware of their inaccuracy or muscle weakness. Forced turnout is one example of a tendency which can lead to a misuse injury. Dancers strive for perfect 180 degree turnout which is the ideal of classical ballet. However, very few bodies are anatomically built to execute such rotation. Compensation by dancers is done by varying their body alignment, putting undo pressure on sensitive areas, and leading to if not eventually causing injury. To illustrate, dancers may use the "bottom-up" method to achieve perfect turnout. This consists of a dancer placing their feet in perfect turnout while the knees are in plié, or bent, and then straightening their knees resulting in undo torsion stress. Over time, this can impair the stabilizing structures of the knee and increase the dancer's injury risk. Another dance myth is that stretching will improve turnout; therefore, dancers will consistently perform stretches such as the "frog stretch" to increase the degree of turnout in their hips. Unfortunately, sitting in these stretches for extended periods- any amount of time over sixty seconds- will only stretch the ligaments and structures holding the hip joint in place (Heflin). As with the "bottom-up" turnout method, compromising these structures will make the dancer more susceptible to a misuse injury. Understanding these definitions and injury categories prepares therapists to effectively treat their dancer patients.

Treatment of dancers is slightly more complex than that of an average therapy recipient as their profession demands more of their bodies. Dancers may also be constantly active, and

there may be no clear “off-season” for recovery from injury. Whether it is making up for training inadequacies, muscle imbalances, malalignments, etc., physical therapists are among the most suitable professionals to effectively treat dancers. A major principle of physical therapy is treating the entire person, and not simply the injured body part. For that reason, work hardening is an essential part of any dancer’s rehabilitation program. Work hardening encompasses the physical and mental aspects of the injured individual and addresses “‘vocational and psychological preparedness to return to work’” which is important for dancers (Liederbach, “General Considerations”). A physical therapist will want to consider the many different aspects of a dancer’s life, including their “fueling status, menstrual status [in female dancers], fatigue status, emotional status, [and] social status” (Liederbach, Dilgen). Should there be discrepancies in any of these areas, the physical therapist should refer the dancer to the appropriate medical professional. The therapist should also make every effort to integrate dance movements into the rehabilitation program as therapeutic exercise. Seeing the direct correlation between exercises performed in therapy and their dance equivalent will be encouraging to the dancer, and help them transition back to dance. As such, there will be four distinct stages between injury and the return to performance for dancers. First, the restricted stage immediately follows injury and concerns rest and swelling reduction. If able, dancers may attempt limited weight bearing exercises such as a floor barrè class, and should keep up with any new choreography they must learn while restricting themselves to safe movement. The restoration stage follows as the therapist works to return the dancer to pre-injury levels of strength and range of motion. Dancers at this point may be able to increase their activity level with ample safeguards in place such as padding and taping (Liederbach “General Considerations”). In the third, reacquisition stage, the goal is to increase strength above the level at which injury occurred. This would require the dancer to be challenged

through exercise modifications such as increased speed, closed eyes, or unilateral support (Liederbach “General Considerations”). By this point the dancer can return to their appropriate-level class, and limit their activity as necessary. Refinement is the final stage as the therapist progresses the exercise modifications even further. The dancer is no longer restricted, and is expected to safely warm up and execute movement conscious of injury prevention. Different dancers with varying levels of injury and skill will understandably pass through these phases at their individual rate, and it is the responsibility of their physical therapist to accurately identify their status and set new goals.

Given all the progress which has been made in the dance medicine field in the past 23 years, there is a bright outlook for dancers and their therapists in combating injury in the future. In fact, it is more common now that dance companies have medical professionals, including physical therapists, on staff and on site, and this seems to have a tremendous, positive impact on the dancers. In one case, a team of medical professionals was made available to a “ballet company of 70 dancers, [and] this resulted in a decrease of annual injuries from 94% to 75% and savings in excess of $1.4 million over a 5-year period” (Bronner, Dhaw, Sheyi Ohofeitimi, Donald Rose). New medical advances are constantly being made, as in the case of one dancer, diagnosed with chronic patellar dislocation and deficits in knee flexion. Her therapy included “myofascial release, mobilization techniques, massage, and neuromuscular reeducation of movement patterns” (Willis). And when these methods were still inadequate, the dancer was prescribed a Dynasplint System brace to be worn each night which helped her regain a significant amount of knee flexion, and allowed her enough movement to return to performance (Willis). New studies are discovering inventive therapy methods, techniques, and tools which are helping dancers recover from, and avoid future injury.

Even with effective and inventive new therapy methods, often the challenge in dance medicine is dancers admitting to their injuries, and then submitting to treatment- these preliminary steps can be more challenging than the therapy itself. A body of informed physical therapists will be critical to attenuating dancers' hesitancy. First, therapists must understand that most if not all dancers are unwilling to completely stop dancing during physical therapy treatment. Dancers are concerned they may lose their role, job, respect, technique, and in essence, their entire lifestyle and livelihood. Furthermore, if dancers are forced to stop dancing completely, it is estimated to take a dancer two weeks to recover for every week of practice lost (Sephton). As dance medicine is a relatively new field, dancers fear their physician or therapist will not understand the dancers' goals and needs. Dancers may also believe that their specific concerns, as described above, will not be acknowledged. If these issues are not addressed, dancers are more likely to question their specific diagnosis and treatment, and less likely to follow through with rehabilitation (Kelman). However, in a study which measured the communication between dancers and medical professionals, dancers indicated through surveys that they received the best, quality advice from physical therapists- more so than family physicians or sports medicine physicians (Lai). This highlights the ability of physical therapists to effectively communicate with dancers, and improve their treatment outlook. Also, dancers indicated that they would be more willing to learn basic human anatomy, and adjust their dance technique over a period of time (mainly until their injury was healed), but very few reacted well to permanently altering their dance technique or decreasing their training (Lai). Such findings remind medical professionals to be reasonable, and talk to the dancer regularly about treatment exercises, their intensity, frequency, effectiveness, and the likelihood that the dancer will honestly follow their program and restrictions given their current performance level. What is

most important for dancers is knowing they can and should seek the help of a medical professional, and they do not have to be afraid of doing so. A mutual understanding and respect between a dancer and their physical therapist will be the greatest advantage to both parties in a rehabilitation experience. If change is inspired across the spectrum of dancers and medical professionals, significant improvements concerning dancers' health can be made, and all can benefit from injury treatment and prevention.

Prevention is a major factor in reducing dance injuries and it can come in many forms. Generally, physical therapists can prescribe strengthening exercises, and monitor dancers for alignment issues or dangerous technique patterns. Correcting muscle imbalances can be a simple yet very effective method of injury prevention as dancers frequently strengthen select muscle groups such as the ankle plantar-flexors, but neglect the appropriate antagonist muscle groups, the dorsiflexors. Education on the part of the dancers and dance instructors/choreographers is also essential. As one group of researchers described, "We must go into their arena: the dance studio, dance department, and theatre, to develop an ongoing dialogue with dancers, choreographers, artistic directors, and dance educators to prevent and reduce injury" (Bronner, Shaw, Sheyi Ojofeitimi, Jon Spriggs). Dance instructors already watch for malalignments themselves, and choreographers can be warned about the dangers of certain movements and techniques, or the repetitive nature of said movements. Dancers themselves can be encouraged to perform and execute technique as their body allows. As previously discussed, dance injuries can occur when a dancer tries to force their body into certain movements or positions such as turnout in ballet. Dance in general, and ballet especially will often require differently structured bodies to achieve the same positions (Liederbach, "Epidemiology of Injuries"). The informed dancer and teacher will emphasize the individual approach, whereby each dancer can reach their maximum

potential without injury. Even simple prevention approaches such as these can significantly help a dancer.

A professional dancer's career is often too short, and some student dancers may never begin their career due to injury. Professor and researcher Dr. Steven Wainwright comments, "'Dancers' attitudes to pain are embodied, and they epitomize the connections between the individual (dancer) and the (ballet) institution. Being a dancer requires a stoic attitude to pain—indeed, injury, pain, and suffering were seen as playing a central role in the development of artistic sensitivity'" (Lai). Certainly most dancers feel as though pain and injury are a part of the profession, but with the growth of the dance medicine field, and the integration of dance medicine specialists, including physical therapists, pain and injury no longer *have* to be a part of dance culture. A dancer should no longer have to focus on their potential for injury as they will be equipped with the tools they need to address, or prevent injury. Specialists who are fully aware of the mental and physical pressures dancers experience, as well as the dance vernacular, are more likely to successfully treat dancers; and dancers are more likely to utilize and accept their services. And as physical therapists learn more about the specifics of dance technique and injuries, specialized therapies, and supplemental methods, each element may be incorporated into a more effective and efficient rehabilitation program. These programs will help the patients continue to do what they live for, and what all others love watching them do- dance.

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