

Synthesis Matrix

Dance Styles

Classical ballet, neo-classical (modern), contemporary, revue dance, musical theater dance (article #1)

Modern, Mexican folkloric, Spanish dance (article #6)

Classical ballet, jazz/contemporary, street dance, tap/folk dance (article #7)

Hip hop, tap, musical theater, jazz, folk, ethnic, modern, classical ballet (article #8)

Injury: "Dance medicine is the art and science of preventing, alleviating, and/or curing disease and injuries in the dance profession. It is a discipline that investigates the how of dance movement and the causes of injuries, and it promotes the care, prevention, and rehabilitation of dance injuries (National Dance Association [NDA], 2002). " (Hernandez) (Article #4)

Injury Definition/ Dance Medicine Definition

Dance medicine includes the neuromotor, physiological, and biomechanical aspects of dance. Also includes psychological issues, nutrition, body therapies, dance somatics (article #4)

"As per the IADMS guidelines the definition of a recordable injury was 'an anatomic tissue-level impairment as diagnosed by a licensed health-care practitioner that results in full time loss of activity for one or more days beyond the day of onset. "Activity" means participation in a class, rehearsal or performance.'" (Ekegren) (Article #5)

"...dance injury was considered any pain or musculoskeletal condition resulting from training and competition sufficient to alter the dancer's normal training routine in terms of form, duration, intensity or frequency"(Soares) (Article #7)

Types

-the further from classical ballet the more traumatic the injury to the head, neck, and upper extremity, but the less traumatic the lower extremity injuries

- Other injuries include muscle injuries, bone injuries, sprains, contusions, pulled muscles (article #1)

-Overuse can cause stress on the feet, legs, hips, and back

-Peroneal tendonitis common in ballet dancers, strained tendons on the outside of lower leg

-Patellar tendinitis common in modern dancers, jumper's knee (article #3)

-52.4% of injuries were sprains, strains, or both.

-58.1% of injuries were of lower extremities.(article #4)

- Joints and ligaments (46%), muscle, tendon, and myofascial (30%), fractures and bone stress injuries (19%), other tissues (5%)

Causes

- Jumps lead to pulled muscles and sprains (article #1)

- Fatigue, overuse, low fitness, insufficient warm up, specific muscle weakness, dance floors (unsprung) (article #2)

- overuse
- Commonly, quadriceps are stronger than hamstrings which should actually be fairly equal in strength (article #3)

-“Dance involves the entire musculoskeletal system of the body, and the precise and advanced techniques required for mastery of dance can frequently cause injuries (Berardi, 2001).” (Hernandez)
-accidents and overuse

Other Factors

Time of Injury/Setting in which it occurred

-most common time for injuries to occur, within the first three hours of “work”
-This can be connected to a lack of a proper warm up, or a lack of proper precautions.

-Classical ballet, injuries were most common during rehearsal. For work with many performances per week, the injuries occurred during performance (article #1)

Severity of injury

-Small injuries can turn into more severe ones because of lack of treatment, dancers tend to have high pain tolerances and usually avoid the doctor

-Lack of understanding of one's injury (article #2)

Likelihood of injury

After effects of injury

-Average time out due to an injury for a ballet dancer is 10.5 days, which is a long time for dance (article #4)

-Average days lost due to injuries was 7 days
-Lower extremity and bone injuries required longer recovery times (article #5)

77% of injuries involved lower extremities, 60% of which involved the lumbar spine, 16% involved the trunk, 3% involved the head and neck, other 3% involved upper extremities, 64% of which involved the shoulder
-Out of the 77% of lower extremity injuries, 33% involved the ankle, 22% involved the shin and calf, 20% involved the foot, 13% involved the knee, 10% involved the hip and groin, and 2% involved the thigh (article #5)

-Lower extremity (most frequent injury location 70.47%)
-Most frequent: strain, sprain, back pain, and patellofemoral pain (article #6)

- Foot/ankle injuries were most common in classical ballet
-Thigh/leg injuries were most common in jazz/contemporary dance
-Knee was most common in tap/folk dance (article #7)

- Hip injuries: "snapping hip", labral tears, piriformis syndrome, ischiogluteal syndrome
-Lower leg and knee injuries: chondromalacia patellae (softening of cartilage under surface of patella), shin splints, infrapatellar tendonitis, plica syndrome or medial capsular strain, ligamentous injuries, meniscal injuries, stress fractures
-Ankle injuries: sprain, bony impingement syndromes, Achilles tendonitis, tendon ruptures

dance on inadequate floors, take no breaks (no off season), dance on existing injuries
-Out of 113,084 children (ages 3-19) treated for dance related injuries, 55% of those injuries were caused by classical dance styles (ballet, jazz, tap, modern)
-44.8% of injuries were caused by falls (article #4)

- Overuse (72% of the injuries)
-Traumatic injury (28% of the injuries) (article #5)

- 29% of lower extremity injuries were caused because of overuse
-Muscle imbalance, bad techniques, bad movements, bad posture
-Inadequate studio floors, dance footwear or lack thereof, bad technique
-Physical constraints, inadequate recovery time after injury, lack of early detection and treatment (article #6)

- Dynamic overload which refers to a load that surpasses the tissues physical and structural capacity, excessive use (most common), impact, inadequate warm-up

-76% of the study participants sustained a recordable injury throughout the season (article #5)

-4 injuries per student in modern dance
-2 injuries per student in Mexican folkloric and spanish dance (article #6)

-95% of dancers are affected by injury (article #7)

unions, sesamoid lesions, toenail disorders, claw toes and hammertoes, soft and hard corns
-Back injuries: disk herniation, spondylolysis (stress fracture), spondylolisthesis (article #8)

and weight were associated with a higher rate of injury

- Acute incidences, overuse
-Acute incidences can be caused by incorrect performance which can be caused by tiredness, muscle fatigue, or loss of balance
-Overuse injuries arise from repetitive microtrauma to bone or soft tissue structures
-Muscle strength imbalances and tendon imbalances (hypermobility such as hyperextension)
-Age, footwear, dance floors, improper technique (article #8)

- Teachers and clinicians closely monitor dancers to avoid overuse injuries
-Educate dancers on the importance of recovery time to avoid injury reoccurrence (article #5)

- Implementing prevention programs in dance companies and educating teachers and dancers on factors that cause injury
-Incorporating medical facilities in a dance company can reduce the incidence of injuries from 95% to 75% along with reducing the associated cost of treatment
-Teachers correcting the improper techniques, movement, and postures will help dancers avoid injuries, which means teachers must be educated with proper knowledge of techniques, movements, and postures (article #6)

Prevention

-Teach dancers about: anatomical makeup of joints, stretching, rehab techniques, adequate warm up, cardiovascular fitness, environmental factors, weight management, overtraining, management of minor injuries, specific overuse injuries (tendonitis and stress fractures) (article #2)

-“If you have never been sidelined by injury, a balanced musculature and awareness of your body can keep you healthy.” (Plastino)
-Include exercises that stretch and strengthen underdeveloped muscles in daily class
-Visit a fitness center to get evaluated for weaknesses, and design an exercise plan to strengthen those muscles

-“K-12 dance educators, private dance studio instructors, nonprofessional and professional company directors, and university dance educators may not all be trained in injury prevention, modern conditioning methodologies, nutrition, treatment, and rehabilitation, or may not understand the signs of injury, which is critical for preventing additional and/or debilitating injuries(International Association of Dance Medicine and Science [IADMS], www.iadms.org; NDA, 2002).” (Hernandez)

- Specific exercises and low impact aerobic activities will help avoid injuries, abdominal work such as sit ups will protect the dancer's back
- Pilates, which integrates a lot of anatomy and physiology, is a great strengthening and stretching tool while also correcting the dancer's postural alignment. Both mat and reformer use almost all muscle groups in a safe and controlled way
- Proper warmup and cool down, awareness of posture and alignment while dancing along with while walking and standing, carry dance bags/backpacks effectively, perform consistent strengthening and stretching exercises, perform specific relief exercises to areas of tension, perform daily abdominal strengthening exercises, have a medical professional familiar with dance and the dance profession to go to if an injury does occur, seek medical advice at the first sign of an injury, try not to push through pain, RICE (rest, ice, compression, elevation), perform proper rehabilitation and complete such rehabilitation after an injury before returning to dance, avoid nondance jobs that require hours of standing or walking (article #3)

After analyzing my research thus far, I have found a great deal of information about causes and types of dance injuries, as well as the other factors involved in dance injuries. I have also found a suitable amount of information on the definition of an injury and the styles of dance associated with dance injuries. I need to conduct more research on the prevention of injuries, specifically on how kinesiology and knowledge of human anatomy and physiology can be helpful in preventing injuries.

- “A dance injury is defined as a problem that restricts participation for more than one day and requires medical attention (Roberts et al., 2013; Solomon, Minton, & Solomon, 1990).” (Hernandez)
- Properly warming up the body and proper education of dance and dance injury prevention by education providers
- “Clinical studies have examined injury rehabilitation and recommended movement reeducation and using proper guidelines to prevent injuries. Rehabilitative techniques based on scientific movement principles make the continuation and longevity of dance activity possible (Hagins, 2002; NDA, 2002).” (Hernandez)
- In order to create dancers of whom will train and rehearse efficiently and safely, their educators must be able to provide them with the proper information to do so. These educators must be knowledgeable of biomechanics, anatomy, kinesiology, dance exercise physiology, nutrition, exercise science, injury recognition, and injury prevention in order to properly train dancers on how to train and rehearse while keeping their bodies safe.
- Many university dance programs do not have medical professionals on staff like other athletic programs do. There is an association though that aims to changing this, The National Association of Schools of Dance. It has 77 accredited institutional members. The accrediting process includes education on basic information about maintenance of musculoskeletal health and injury prevention for dance majors and faculty and staff. There must be medical personnel on staff along with access to medical services. The NASD educates dancers and staff in order to better dancers' health and lengthen their careers
- When acquiring a dance degree, most programs include courses on dance medicine, but there is no consistency in the education dance educators receive (article #4)