**ATHLETES AND THE ARTS**

**Dance Medicine**

**Clay Miller, MD, MFA**

**Performing Arts Medicine, Boston University Medical School**

Clay Miller <[cmiller@sportsmednorth.com](mailto:cmiller@sportsmednorth.com)>

**Injury Prevention Requires:**

* Adequate Nutrition:
  + The lean body mass that is desired aesthetically can lead to eating disorders and female athlete triad in dancers.
* Adequate Psychological health:
  + Performance anxiety and psychosocial stressors of perfecting the art form of dance can potentially affect both students and professionals.
* Adequate Physique:
  + Musculoskeletal injuries in dance most often occur due to the overuse of the body.
  + Overuse injuries occur due to poor dance technique, inadequate strength, and inadequate flexibility
* Adequate Extrinsic Factors:
  + Appropriate studio space, floors, footwear, and temperature can affect the physical health of dancers.
* Adequate Access to Health Care Providers:
  + Dancers and teachers at all levels of training would need appropriate avenues to obtain medical care.

# Dance Educator’s Role

Dance teachers and educators are responsible for teaching dance technique. They must also become involved in injury prevention by looking at the dancer as a whole, not just as a vessel for choreography. Dance educators/teachers must:

1. Promote good nutritional practices.
2. Promote proper technique so that students work within their individual anatomical capabilities, rather than cheating to achieve a certain aesthetic (i.e. 180 degrees of turnout).
3. Recognize psychological problems.
4. Ensure use of proper dance space, floors and footwear, studio temperature.
5. Establish a referral base to send dancers when medical and psychological problems are identified.

# Guidelines for Dance Teachers

The following guidelines are recommended to help the teacher encourage the dance student to develop healthy practices in the skills of dance.

1. Provide proper floor and dance space for all classes at all levels. Sprung or floating floors, appropriate surfacing to prevent slipping, 100 square feet of unobstructed space per dancer, 15 ft ceiling height, mirrors, barres, acoustical balance, appropriate lighting and ventilation are recommended.
2. Arrange classes/rehearsals to teach students how to properly warm-up and cool down and allow adequate breaks for physical recovery. Part of the warm-up should include aerobic movement, which will help warm-up the muscles prior to dance movement. Prolonged stretches >30 sec after class should be done for all muscles. Ice can be placed on sore areas for at least 15 – 20 minutes. Alternatively, for muscles a 5 min ice massage can be used.
3. Proper footwear may help prevent injuries. The jazz sneaker provides more cushioning for jump landings and may help prevent shin splints. Socks should not been worn for fear of slipping. Pointe shoes should fit the size, width, and flexibility of the foot.
4. Injury management. Muscle soreness that goes away after 10 minutes is likely benign. Pain lasting longer may be indicative of an injury. Sharp pain or persistent pain may indicate a serious injury and may warrant rest and medical attention or referral to a performing arts medicine specialist.
5. Promote proper nutrition and eating habits (i.e. 1500 mg calcium with 1000 U Vit. D). Avoid excessive focus on body habitus.
6. Advise proper ballet technique by avoiding the following: pronation of feet, forcing turn-out, keeping heels on the floor in plié, gripping the floor with the toes, hyperextension of the back (sway back), tucking the pelvis under.
7. Educate students to avoid recreational activities that may cause additional stress to the body.
8. Recognize when psychological counseling for stress management is needed and establish a good referral source within the community. Also, teach psychological techniques such as imagery to enhance performance.
9. Require high quality of teaching and dance educational materials for students to learn from in the different fields of dance.
10. Develop a referral base and database of information on dancer’s physical, nutritional, and psychological health.
11. Students often initially seek the teacher’s advice on many health related issues, including injuries. Teachers should advise students that resources are available through performing arts medicine specialists.

# References

1. Garrick JG, Requa RK: Ballet Injuries. An analysis of epidemiology and financial outcomes. AM J Sport Med 21(4): 586-90, 1993.
2. Hamilton WG, Hamilton LH, Marshall P, et al: A profile of the musculoskeletal characteristics of elite professional ballet dancers. Am J Sport Med 20(3): 267-273, 1992.
3. Miller CD, Moa G: A Retrospective Epidemiological Study of Injuries Sustained at a Performing Arts School and the Treatment Outcomes. Med Probl of Perform Artists, 13(3): 120-24, Sept. 1998.
4. Hamilton, L.H., (1997, February) Dancers' health survey, part II. From   
   injury to peak performance, Dance Magazine, 60-65.
5. Robson B.E., Gitev M., Health and Health-Related Problems of Art   
   Students, Med Probl Perform Art 8:136-140,1993.
6. Solomon R, Micheli LJ, et al: The cost of injuries in a professional ballet company: A five year study. Med Probl Perform Artists 1999: 14:164-169.
7. Bronner S, Ojofeitimi S, Rose D: Injuries in a modern dance company: Effect of comprehensive management on injury incidence and time loss. AM J Sport Med 2003: 31(3) 365-69.
8. Quirk R: Ballet injuries: The Australian experience. Clin Sport Med 1983: 2(3): 584.
9. Washington EL: Musculoskeletal injuries in theatrical dancers: Site, frequency and severity. Am J Sport Med 1978: 6(2): 80-3.
10. Hamilton LH, Hamilton WG: Occupational stress in classical ballet dancers: The impact in different cultures. Med Probl Perform Artists 1994: 9(2): 35-38.
11. Solomon RL, Trepman E, Micheli LJ: Foot morphology and injury patterns in ballet and modern dancers. Kin Med Dance 1990: 12(1): 20-40.
12. Werter R: Dance floors: A causative factor in dance injuries. J Am Pod Med Ass 1985: 75(7): 355-58.
13. Garrick JG, Requa RK: The relationship between age and sex and ballet injuries. Med Probl Perform Artists 1999: 12(3): 79-82.
14. Young-Eun Noh, Morris T: Designing research-based interventions for the prevention of injury in dance. Med Probl Perform Artists 2004: 19(2): 82-89.
15. Mainwaring L, Kerr G, Krasnow D: Psychological Correlated of Dance Injuries. Med Probl Perform Artists 1993: 8(1): 3-6.
16. Hamilton, L.H., (1997, February) Dancers' health survey, part II. From   
    injury to peak performance, Dance Magazine, 60-65.
17. Henderson J, Brown SE, Price S, et al: Foot pressures during a common ballet jump in standing and supine positions. Med Probl Perform Artists 1993: 8(4): 123-31.
18. Miller CD, Bengtson K: Performing Arts Medicine, Physical Medicine and Rehabilitation: The Complete Approach. Blackwell Science, Chapter 96, Nov. 1999.
19. Weiss D, Shah S: A Profile of the Demographics and Training Characteristics of Professional Modern Dancers. Journal of Dance Medicine and Science 2008.
20. Shah S, Weiss D et al. Survey of Injuries among Professional Modern Dancer: Incidence, Risk Factors, and Management. Podium Presentation. PAMA 25th Annual Symposium on Medical Problems of Musicians and Dancers. June 22, 2007.