

RESOURCE PAPER FOR DANCERS AND TEACHERS

The Importance of a Good Warm-Up: Are you warm enough to start dancing?

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DANCE EDUCATORS' COMMITTEE, 2017**

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Although an effective warm-up is generally regarded as essential before taking part in any type of dance, it is not always clear to dancers, teachers, or choreographers why it is important to warm up, what actually takes place during a warm-up, and how to warm up effectively.

1. WHY DO DANCERS NEED TO WARM UP?

A thorough warm-up prepares the body and mind to safely meet the challenges of a class, rehearsal, or performance. As the name suggests, a warm-up increases core body temperature, which prepares the muscles and joints for the demands of dancing.¹⁻⁵ A warm-up should be carried out before all dance activities and, if effective, can improve physical and psychological performance while reducing the risk of injury.^{1,2,6,7} The cardiorespiratory, muscular, and nervous systems must be engaged before technical movements can be undertaken safely and effectively; by slowly and methodically allowing the mind and body to enter a state of enhanced preparation *before* the activity begins, the dancer will be better prepared to focus on the technical and artistic demands of dancing.¹



2. WHAT HAPPENS IN THE BODY DURING A WARM-UP?

Warming up slowly prepares the body for the transition from everyday life into the challenges of higher intensities of physical activity by gradually increasing the rate of breathing, heart rate, and the efficiency of the energy producing systems.¹⁻³ A byproduct of this extra energy production is the increase in internal body temperature that gives the “warm-up” its name. Additionally, when the body begins to move, there is an increase in the energy required by the working muscles. This means a dancer will consume more

oxygen and metabolize more fuel in order to generate sufficient energy to power the muscles.^{3,4}

The muscles, bones, and nerves also must be prepared for the challenges of dancing. An effective warm-up will: increase the flow of synovial fluid (the lubricant within the joint capsules) to allow the joints to move freely; improve the elasticity of soft tissue (e.g. muscles, tendons, and ligaments) to safely increase range of movement; and increase the speed at which nerve impulses travel, thereby improving overall motor control, balance, coordination, and proprioception (perception of where the body is in space).^{1,2,4} Improvements in these areas may reduce the risk of sustaining an injury while dancing.³ The effects of the warm-up are seen in the dance sessions immediately following, but do not carry over from a long break between classes or from day to day.¹

3. HOW LONG DO THE EFFECTS OF A WARM-UP LAST?

The benefits of a warm-up will be reduced or even lost once the body returns to its resting states of heart rate, respiration, and body temperature.^{1,3,4} Warm clothing and continued movement (but not static stretching) will help keep the body's core temperature elevated. In general, the time between the end of the warm-up and the activity should be kept to a minimum so the body does not cool down. However, this is dependent on what happens directly following the warm-up (does the dancer keep moving or do they sit down and rest) and environmental elements such as the ambient temperature.⁴ Cooler temperatures and the lack of movement may cause the effects of the warm-up to dissipate more rapidly.

4. WHAT ABOUT MENTAL PREPARATION?

A warm-up is just as important for the mind as it is for the body. An effective warm-up can be a good mental transition from the concerns and pressures of everyday life into dance activities. Dance requires high levels of concentration and mental readiness; this mental preparation can start with the warm-up.^{1,2} This can help the dancer to focus, which may enhance concentration on technique and potentially reduce the risk of injury. The dancer should acknowledge any pain or discomfort or any areas of unnecessary physical tension during the warm-up. The dancer can also use imagery or mental practice during the warm-up.² It may be helpful to focus on a goal for the day such as bringing artistic quality to each exercise during the class to follow, or acknowledge their hard work in preparation for the upcoming performance.



5. WHAT IS THE ROLE OF STRETCHING DURING A WARM-UP?

Stretching on its own is not a warm-up and dancers need to make a clear distinction between the types of stretching that take place during a dynamic warm-up and the static stretching activities that take place during flexibility training.⁸

For more information about stretching and its role in flexibility training see the IADMS “Stretching for Dancers” resource paper:

<http://www.iadms.org/general/custom.asp?page=353>).⁸

The purpose of stretching within a well-structured warm-up is to mobilize joints and prepare them to safely carry out the range of motion required of the dance activity to follow.⁹ Stretching activities should only be carried out once the body’s core and muscle temperature have been raised, as warm tissues are more pliable and elastic.^{8,10} Once warm, stretching should be undertaken slowly and methodically, as rapid increases in muscle length can increase instability and reduce proprioception. Care should also be taken not to over-stretch stabilizing muscles (such as the hip adductors) as this may contribute to joint instability. This is particularly true for hypermobile dancers (those with natural tissue laxity) and dancers with existing joint instability where muscles need to provide support to protect hypermobile or unstable joints.¹¹

A warm-up is not the time to work on flexibility and it is not advisable to perform static stretching as part of a warm-up.⁸ Static stretching, defined as maintaining a stretched

position longer than 15 seconds, has been shown to impair a number of performance parameters important to dance and is detrimental to muscular strength and power.¹²⁻¹⁶ Too much time spent stretching without being warm will increase the muscle-tendon unit length and can override the body's reflexes designed to protect the muscles and joints (such as the muscle spindle stretch reflex and Golgi tendon organ).¹²⁻¹⁶ Even a short duration stretch (15-30 seconds) can lead to a decline in muscle force.¹⁷ With long sustained stretching sessions, the dancer may notice a reduction of muscle performance which may last for up to one hour.¹³ It should also be noted that additional activity between a stretching session and a performance has not been found to prevent these stretch-induced deficits.¹⁴ However, stretches held for less than 15 seconds do not appear to have a negative effect on performance.

Dynamic stretching, wherein the joints are mobilized through a full range of motion and the movement is continuous, is generally considered the best form of stretching to utilize in a warm-up.^{1,2,3,4,10} When used as part of a structured warm-up, dynamic stretches progressively take warm muscles - in a gradual, slow and controlled way - through a range of motion from full contraction to full extension without holding the stretch at any position. In addition to developing dynamic flexibility and strengthening the contracting muscles, dynamic stretching helps to keep the core body temperature elevated for the duration of the warm-up.



6. HOW TO WARM UP EFFECTIVELY?

A thorough and effective warm-up should take about 15-20 minutes to complete.² The required time is dependent on a number of factors including, but not limited to: whether the dancer has participated in any physical activity that day (is it the first class of the day

or has the dancer immediately completed another class), how warm or cold the environment is, how much space and time is available for the warm-up, and the style and intensity of dance to follow.

A warm-up generally consists of three or four sections: a gentle pulse-raising section, a joint mobilizing section, a muscle lengthening section, and sometimes a second pulse-raising section.¹⁻³ The pulse-raising sections aim to increase cardiorespiratory and metabolic rates; these are the prerequisite to all further activity. The joint mobilizing section consists of gently moving the various joints through their ranges of motion, and the purpose of the muscle lengthening section is to prepare the muscles for the demands to come through the use of dynamic stretching.^{1,2} It is also appropriate to include remedial exercises for injury prevention purposes at the end of the warm-up³, and mental skills and preparation can be included at any stage. Unfortunately, there is no magic recipe for a perfect warm-up. The most important thing to remember is that the warm-up should be specific to the type of dance activity to follow.^{1,2}



The dancer must consider the goal of the upcoming session and structure the warm-up accordingly. For instance, if the activity is a technique class the dancer will benefit most from moderate pulse-raising movements, such as brisk walking, light jogging, gentle joint mobilizations: activities that raise the body temperature prior to the start of class.^{1,2} When the dancer's body is warm, it will be better prepared to focus on technical and artistic development (rather than relying on the first few class exercises to achieve the warm-up.) On the other hand, when preparing for a rehearsal or performance, a dancer may benefit more from a technical warm-up, such as a ballet barre, or an analogous warm-up in the

style of dance to be undertaken. In both of the previous examples, gentle pulse-raising aerobic activities should be the initial focus of the warm-up, with the remaining time geared towards the specific dance session to follow. With an understanding of a few basic principles, it should be safe and easy to design a warm-up that works for the particular goals of the dancer.

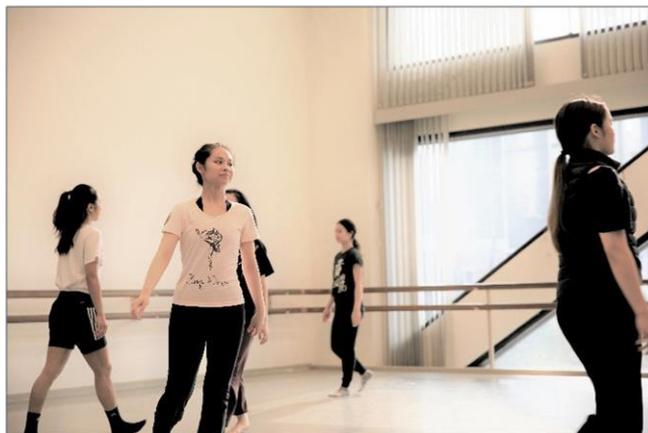


SUGGESTIONS TO CONSIDER WHEN DESIGNING A DANCE WARM-UP:

- Notice how the body is feeling; notice any areas where special attention is needed, such as overuse, injury or fatigue. Take a moment to center the body and mind.
- Introduce a gentle pulse-raising activity with continuous movement, and gradually increase the pace until breathing is faster and the heart rate has increased.
- Begin with simple, large, and full-body movements. Once the body is warm this can shift to more dance-specific movements.
- Mobilize all the joints in the body, including the spine.
- Make the warm-up activities specific to the dance style.
- Create a goal or include some positive self-talk.
- Do not neglect the upper body, especially if the dance style includes upper-body weight bearing and/or partnering work.
- Engage with other dancers – find a partner and share weight or balance against each other in some simple partnering to better connect brain and body.
- Stimulate the nervous system by incorporating quick changes in direction and stopping to balance on one leg – this will engage the proprioceptors.
- Once the body is feeling warm introduce some power movements like small jumps, followed by some bigger ones.

- Pick up the pace and progress to movement with speeds nearer those that will be used later.
- Once the muscles are warm, use dynamic stretching to take the body segments carefully through full ranges of motion. Save static stretching for the cool-down or the end of the day.
- Create a challenge by including some quick precise movements that might be similar to the dance activity to follow.
- Finally, include any necessary exercises for building strength, balance or endurance.

By the end of the warm-up the dancer should feel warm, be sweating lightly, breathing heavier than normal, and exhibit an elevated heart rate. The joints and muscles should move easily through their full range and the dancer should feel alert and ready to meet the mental and physical challenges of dancing. Without this preparation, the dancer cannot benefit from the demands of class or be fully prepared for performance.



7. CONCLUDING THOUGHTS

A thorough warm-up will engage the joints, muscles, energy systems, and mind in a systematic and dance-specific fashion, allowing the dancer to take full advantage of his or her own capabilities. By engaging in a warm-up before each dance activity, dancers will work be able to optimize the work done in class, rehearsal or performance, working safely and efficiently.

8. RECOMMENDED READING

1. Quin E, Rafferty S, Tomlinson C. *Safe Dance Practice*. Champaign, IL: Human Kinetics, 2015.
2. Wilmerding MV, Krasnow DH (eds). *Dancer Wellness*. Champaign, IL: Human Kinetics, 2017.
3. Volianitis S, Koutedakis Y, Carson R. Warm Up: A Brief Review. *Journal of Dance Medicine and Science* 2001; 5(3): 75-79.
4. Harris J, Elbourn J. *Warming up and cooling down*. Champaign, IL: Human Kinetics, 2002.
5. Ajemian R, D'Ausilio A, Moorman H, Bizzi E. Why professional athletes need a prolonged period of warm-up and other peculiarities of human motor learning. *Journal of Motor Behavior* 2010; 42(6): 381-388.
6. Fradkin A, Zazryn T, Smoliga J. Effects of warming-up on physical performance: a systematic review with meta-analysis. *Journal of Strength & Conditioning Research* 2010; 24(1): 140-148.
7. Guidetti L, Emerenziani G, Gallotta M, Baldari C. Effect of warm up on energy cost and energy sources of a ballet dance exercise. *European Journal of Applied Physiology* 2007; 99(3): 275-281.
8. Critchfield, B. *Stretching for Dancers*. IADMS Resource Paper. Available online: <http://www.iadms.org/?353>. 2011.
9. Bishop, D. Warm up II: performance changes following active warm up and how to structure the warm up. *Sports Medicine* 2003; 33(7): 483–498.
10. Morrin N, Redding E. Acute effects of warm-up stretch protocols on balance, vertical jump height, and range of motion in dancers. *Journal of Dance Medicine and Science* 2013; 17(1): 34-40.
11. Day H, Koutedakis Y, Wyon M. Hypermobility and dance: a review. *International Journal of Sports Medicine* 2011; 32(7): 485-489.
12. Kokkonen J, Nelson A, Cornwell A. Acute muscle stretching inhibits maximal strength performance. *Research Quarterly for Exercise and Sport* 1998; 69(4): 411-415.

13. Fowles J, Sale D, MacDougall J. Reduced strength after passive stretch of the human plantarflexors. *Journal of Applied Physiology* 2000; 89(3): 1179-1188.
14. Cornwell A, Nelson A, Heise G, Sidaway B. Acute effects of passive muscle stretching on vertical jump performance. *Journal of Human Movement Studies*, 2001; 40(4): 307-324.
15. Behm D, Bambury A, Cahill F, Power K. Effect of acute static stretching on force, balance, reaction time, and movement time. *Medicine and Science in Sports and Exercise* 2004; 36(8): 1397-1402.
16. Cramer J, Housh T, Weir J, Johnson G, Coburn J, Beck T. The acute effects of static stretching on peak torque, mean power output, electromyography & mechanomyography. *European Journal of Applied Physiology* 2005; 93(5-6): 530-539.
17. Brandenburg, J. Duration of stretch does not influence the degree of force loss following static stretching. *The Journal of Sports Medicine and Physical Fitness* 2006; 46(4): 526-534.

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