

Budapest Contemporary Dance Academy

Dancer BA

Warm-up for dancers

THESIS

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Table of contents

MOTIVATION	3
INTRODUCTION	4
1. THEORETICAL MEANING OF WARM-UP	7
1.1 WHAT'S HAPPENINGS IN THE BODY DURING WARM-UP?	7
1.2 WHAT ARE THE SECTIONS AND STAGES OF A WARM-UP?	8
1.3 WHAT DOES WARM-UP DO TO OUR MIND?	10
2. PRINCIPLES OF WARM-UP	11
2.1 ANATOMY BASES	13
2.2 THE ROLE OF STRETCHING IN THE WARM-UP	16
2.3 GENERAL WARM UP FOLLOWED BY SPECIFIC WARM UP. IMPORTANT TIPS OF WARM-UP	20
3. DEALING WITH INJURIES. PREVENTION OF DANCE INJURIES	22
3.1 CAUSES OF INJURY	22
3.2 TYPES OF INJURIES	24
3.3 COMMON DANCE INJURIES	27
3.4 GOOD PAIN AND BAD PAIN. MUSCLE SORENESS.	28
4. COOLING DOWN	35
5. MY WARM-UP STRATEGY	39
CONCLUSION	52
SOURCES OF INFORMATION	54

Motivation

I've been dancing since I was 8 years old. My dance routine changes and transforms every day. Various techniques I work with require the involvement of different body states and mindsets. I started being aware that my dance routine does not start with dancing itself, but with a process, preparation to it – warm up. While I was thinking about warm-up, various questions came up. How much time do I devote to this process? How can I describe it? How do I do this process every day? What is the benefit of the process? Broadly speaking, it was difficult to answer all these questions. I simply became aware I have to dig into it, to get answers, to explore and determine what is warm-up in general and what approach suits me the best.

Introduction

My thesis is based on my personal experience and knowledge that I've collected through the years of being a student at Budapest Contemporary Dance Academy (BCDA). Firstly, every day, before starting the first morning class there is half an hour of obligatory warm-up time, which offers personal preparation for a student to start class properly. Obviously, at that moment I knew that warm-up it is important. In my head, there were generally accepted concepts of what I was doing every day. What I noticed is that "my daily warm-up routine" is quite monotonous, almost the same every day. I analyzed and found out that sometimes warm-up sets me up for the right wave, but there are other times when I do basic things without knowing what my body needs. As a result, the second approach didn't prepare me for the future work on the classes and rehearsals. This observation made me dig deeper into this topic. I started searching, trying out, discovering what my daily warm-up could be and what affect it has on my body.

Secondly, being a second-year student, I came across an opportunity to be a part of a public performance *When you brush a form clean, it becomes truly what it is* at Trafó House of Contemporary Arts and MU Theater in Budapest. At that time, I have realized how important it is to properly prepare myself to the condition where I am able to tune to space and people who I perform with. I had received memorable warm-up principles from my teachers before the major performance on the stage. The most outstanding ones were from Zsuzsa Rózsavölgyi, Luca Kancsó, Tamás Bakó and Tijen Lawton. For example, Luca Kancso gave our group a warm-up for the performance *When you brush a form clean, it becomes truly what it is*. This performance required strength, speed, sharpness, stamina, strong female energy and group work from the dancers. Luca made very intense, space filling warm-up with contact elements. The intensity of movement and exercises properly prepared our muscles, our group caught common rhythm and pulse. During the contact tasks we set up the connection between each other, we filled all the space around us and thereby got adapted to it. In my opinion, the intensity of the warm-up exercise, concentration, and total immersion creates a strong community, prepares us for further performance.

Therefore, I have decided to work on this thesis using principles my teachers have shared with me and which I will disclose in more detail later on.

Through the years of dancing I have observed and spoke with many dancers, who didn't find warm-up an important part of a dance routine. Moreover, many educational institutions do not present warm-up as an important part of a dance routine. For example, I spent one semester as an Erasmus student in the Escola Superior de Dança in Lisbon, where I have noticed my classmates and other dancers do not devote time and importance to their personal warm-up. It might happen that a teacher is the one who conducts a warm-up before the lesson begins. However, the teacher is not obliged to follow this ideology. Many times, the lesson or rehearsal starts immediately due to the fact that the teacher relies on the independent preparation of the dancer. A very important observation that I want to highlight is that those dancers who don't pay attention to the warm-up, might get dizzy, have less concentration and awareness in the body. As a result, they receive further small and large injuries and sprains.

Scientifically proven, the right warm-up prepares us for heavy loads and prevents us from injuries. I believe this is one of the most important daily routines that helps us stay healthy, improve ourselves and help achieve our goals.

This observation became one of the main focuses in my thesis, forming a statement: I will research the process of warm-up and its influences on the dancers' body. My paper consists of a theoretical part, in which I will describe the existing knowledge and theories about the warm-up, supported by certain practices related to my work. Then I will include my personal experiences with warm-up. Step by step, I will build my structures and variations of a warm-up based on the factors and principles above. My aim is to validate different points of this experience as well as to collect my observation for a further use. I would like to point out I do not want to make a historical overview of warm-up but I want to highlight the warm-up itself. Based on the previous statement I divided my work into 6 main focuses:

1. What is the warm-up?
2. What is an effective warm-up? Anatomy bases for dancers.
3. Types of injuries and methods for preventing them.
4. What is the cooling down? The importance of cooling down.
5. My own observation and findings of warm-up.

In the core part of my thesis I will present each of this focus and the surrounding topic.

For many dancers, “warm-up” is just sitting on the floor and stretching their legs in different directions. This is not the right strategy. Passive stretching doesn’t serve as a warm-up for joints and if you do just a passive stretching as a warm-up, you only increase the risk of injury. This approach negatively affects our strength, endurance, balance, and energy. It does not prepare us for further processes of dancing.

I believe dancing is structured not only from the physical part but mental as well. This means warm-up has to be constructed to prepare a dancer for physical and mental activities. The main goal for me is to find my own approach for “warm-up” which I will use in the future as a dancer, choreographer, teacher and I will be able to share the importance of a “beneficial” warm-up with others.

Keywords: Warm-up, Daily routine, Preparation, Body-mind awareness, Practice, Effectiveness of warm-up, Cooling down, Relaxation, Injuries.

1. Theoretical meaning of warm-up

To improve the work process, rehearsals, performance and to avoid injuries, there is a key phrase “Warm-up”. The name itself already gives us definition. Warm-up increases our body temperature. It helps our mind and body slowly and methodically enter a state of enhanced training, which allows dancers to be better prepared and focused on the technical and artistic requirements of their work.

1.1 What’s happenings in the body during warm-up?

During the warm-up process, our body undergoes changes that prepare it for upcoming physical work. If a dancer neglects the warm-up, those changes take place during the implementation of the main activity, reducing its effectiveness. In addition, high physical activity without a preliminary warm-up extremely increases the risk of injury.

According to Quin E., Rafferty S., and Tomlinson C., here is what actually happens in the body during the warm-up:

- Optimal excitability of the central nervous system is created, which increases the quality of its work.
- During the exercise, the nervous system sends executive commands to the muscles, processes information from the muscles and internal organs, provides coordination between the organs. As a result of the warm-up, neuromuscular interaction improves, the reaction rate increases, the accuracy, and coordination of movements enhances, the flow of learning processes for new motor skills is facilitated.
- The speed and intensity of metabolism increases, the rate of decomposition of chemicals increases. An increase in the rate of decomposition of substances causes the temperature to rise in the body (hence the concept of *Warm-up Muscles*).
- The activity of the circulatory and respiratory organs increases.
- The elasticity of muscles and ligaments increases, which reduces the risk of injury.¹

¹ Quin E, Rafferty S, Tomlinson C., (2015) *Safe Dance Practice*. Champaign, IL: Human Kinetics, p. 55

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.

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.

1.2 What are the sections and stages of a warm-up?

According to the International Association of Dance Medicine and Science, a smart warm-up 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 section².

Relying on various sources and my experience, here I would add additional sections: development of strength and balance; specific self needs and needs for the upcoming work process (for example, minimal movement patterns or recovering after injury).

² Surgenor B. and Kozai. A., (2017) *Are You Warm Enough to Start Dancing?*
Available at: <https://www.iadms.org/blogpost/1177934/272128/Are-You-Warm-Enough-to-Start-Dancing>
(accessed: 13.04.2020)

Initial pulse-raiser	Increase the heart rate and body temperature Low-intensity movement to stimulate the CV (cardio vascular) system
Mobilize joints	General mobility but not to full joint range of motion All major joints to be used in the session
Lengthen muscles	Gentle dynamic/short static lengthening of large muscles Not full extension or to maximum ROM (range of motion)
Building strength and balance	Preparation for filling in the space, finding self-consciousness Proprioception development
Self-specific needs and preparation	Introductory minimal style-specific movement patterns Mental preparation and focus

Section development of strength and balance. I found this section an important part of my daily warm-up. Since balance development helps me not only improve the quality of my dance but also contributes to the development of my proprioception.

Proprioception is the medical term that describes the ability to sense the orientation of your body in your environment. It allows you to move quickly and freely without having to consciously think about where you are in space or in your environment. Proprioception is a constant feedback loop within your nervous system, telling your brain what position you are in and what forces are acting upon your body at any given point in time³.

In dance life, space where we practice, rehearse and perform often changes. It is very important to keep improving the skill of adaptation. Exercise for balance is useful for dancers to feel themselves and fill in space.

While working with balance, we can prepare for further activities, making our bodies stronger and more stable in various unusual shapes, which are constantly found and embodied in dance.

The specific self needs section is required for the upcoming work process. Based on the physical and mental state of the dance each dancer pays attention to adding several exercises/practices that come from his individual needs (for example, recovery from injuries and illnesses, fatigue

³ Cluett J., (2019) *An Overview of Proprioception*

Available at: <https://www.verywellhealth.com/proprioception-2696141?print> (accessed: 13.04.2020)

levels and other goals). Further, depending on the specifics of the upcoming work, gradually introduce introductory minimal style-specific movement patterns, as a mental setting and an entry into the workflow. Compliance with these sections should be phased. Moving smoothly from the first stage of “a gentle pulse-raising section” to the last stage.

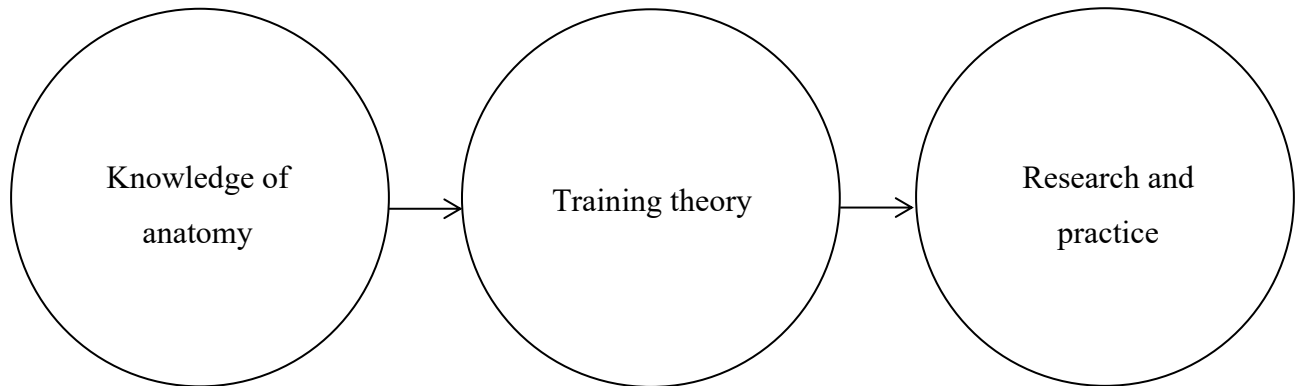
1.3 What does warm-up do to our mind?

Dance requires high levels of physical and mental readiness. To begin with, warm-up increases the state of concentration and focus. By focusing on and doing the movements with purpose, you activate your ability to eliminate distractions and focus on the task ahead. Second, this is an excellent time to put the concerns of your life behind you and tune into your goals. A warm-up routine is a good transition from the concerns and pressures of everyday life into dance activities.

My own observation leads me to the fact, sometimes unnecessary “at this moment” thoughts from the outside distract me and do not help. It’s not an easy task to cope with emotions, mood and personal situations. We can use warm-up as an opportunity to put our personal pressures behind using our imagery and mental practice (for example, meditation, breathing exercises). By following these directions, we can achieve personal awareness which may enhance concentration on technique and potentially reduce the risk of injury.

2. Principles of warm-up

What information we need to know about our body before we begin to create and practice an individual approach of warm-up.



We received basic information about anatomy at school. Accordingly, each person has a figurative idea of the human body and what it consists of. Moreover, we want our body to work like a clock, but not everyone pays attention to the features of the body, its reaction to various factors.

This encouraged me to observe, where I got knowledge about anatomy and how much attention was paid to this topic during my dance life. From an early age, studying at the same time in a dance group and later in a dance secondary school, I can conclude that knowledge about this topic was not fully provided in the curriculum. Due to physical loads of dance training, this situation seems illogical to me nowadays. Most of the explanations were on how to do movements or exercise, but it wasn't explained why and what is happening at the moment of movement.

The theme of my thesis reveals the importance of warm-up in the dancer's daily routine.

Certainly, this process is based on knowledge of anatomy. Another observation of mine leads me to the point, that general warm-up was carried out according to common basic standards with the same structure for each lesson. As a result, in childhood, this process seemed boring and I had a feeling to go through it as soon as possible to begin learning the dance itself. Following the comments of my colleagues, many dancers had this feeling. After a while, my vision of the warm-up became clearer. It consisted of a quick basic exercise to raise my body

temperature, without relying on individual features, further activities, and other factors. As a result, sometimes the warm-up worked, sometimes not. Was this process always productive? Nobody knows. Definitely, this kind of strategy is extremely unstable.

In the last 4 years, physical activity only increased and my horizons concerning contemporary dance have expanded, going through various classes and people in the dance field.

For example, a great experience and the expansion of thinking about the field of anatomy and kinesiology was given to me by Zsuzsa Rózsavölgyi. We studied the structure and functions of the body, its features, the importance of working with fascia in theory and in practice, including various exercises for different muscle groups and joint mobility. The exercises carried different directions: muscle activation, joint mobility, stretching, injury prevention, specific exercises to relieve muscle tension, etc. This made me think about the development of the body as a whole and to keep on searching for the right individual approach to each activity in the dance life.

The more a dancer knows about his body and its features, the more he goes deeper into self-consciousness, the smarter and more productive his development will go. By studying theory, we open up possibilities for our mind and body, further translating them into practice. With such knowledge, we can clearly assess our personal abilities and weaknesses, working safely with them, and preventing the risk of injury. In my opinion, this knowledge provides the dancer with more freedom in movement and in everyday life. And also, he can make his daily routines, such as warm-up useful, safe and not boring in connection with many individual factors and various variations of exercises and practices.

Dancers must be trained with sensitivity to the individuals' anatomy. In section 2.1, 2.2, 2.3, we will review the information that a dancer needs to know in order to make an own analysis of the body. This process helped me to create my individual strategy in the last chapter "My research, strategy of the warm".

2.1 Anatomy bases

A brief overview of the Skeletal System and Muscle System

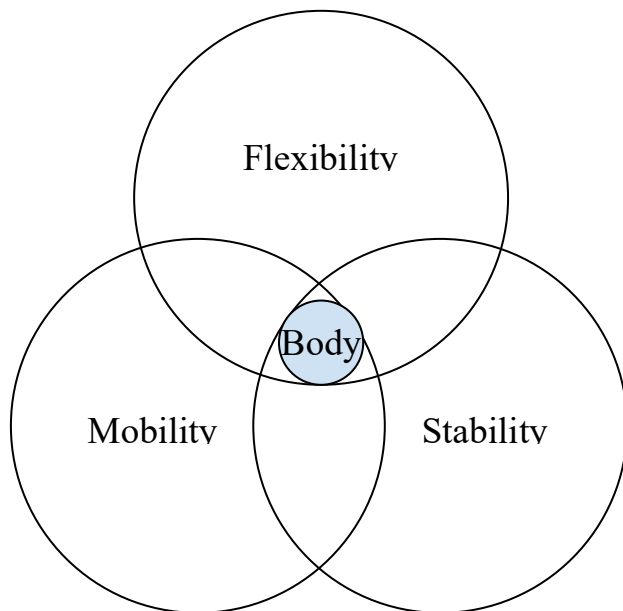
After studying books such as *Dance Kinesiology* by Sally Sevey Fitt and *Dance Medicine in Practice* by Liane Simmel (Anatomy injury prevention training), I identified useful information for myself that helped me understand the anatomy. These materials helped me in the research of my approach to warm-up, dance, and movement in the human body as a whole. Studying information, examining pictures of a skeletal system and muscle system, the imagination turns on. In each exercise of warm-up, I represent one or another group of muscles and joints, it's giving me a stable point of how it works. At a subconscious level, the information studied does its job.

The skeleton is an architectural pillar for the human body. Bone tissue is “soft” at birth and it hardens with the increasing age of the skeleton. The skeleton provides only the potential for human movement. It is the muscular system that provides the strength necessary for movement. There is potential for movement because the skeleton consists of a complex series of bones that are articulated (connected) with each other in the joints. In other words, the movement potential is a direct result of the presence of joints. In addition, the relative range of motion at each given joint, in particular, is a function of the bone structure at the junction point. At every joint connection, movement is somehow limited. In some joints, the main limitation of movement is provided by the bone structure itself. At other joints, movement is mainly limited by the ligamentous structure supporting the bone joints. In other joints, the main restriction is muscular. Each joint has a combination of these three limitations: bone, ligamentous, and muscle, but one type of restriction may prevail. Each person is individually different in their mobility in the joints. Some people seem to have very loose mobility in the joints, while others seem to have weaker mobility. The difference in mobility lies primarily in the ligamentous structure. The difference usually lies in the actual length and relative density - or a combination of both ligaments surrounding and supporting the joint. Ligaments are the connective tissue that connects bone to bone. The ligaments are malleable, but they are also very stiff and inextensible. After lengthening the ligament, the joint that it supports no longer has its original stability. Therefore, it is so important to strengthen the muscles and joints “activate them” after stretching, for more effective training and safety.

The nature of muscles is that they can only produce force in one direction. Muscles can only pull, but not push. Yet the possible joint actions are generally two-directional: flexion-extension, inward rotation and outward rotation, and so on. Because muscles are limited to the pulling action, there are opposing sets of muscles called agonists and antagonists for each joint action.

There are three general types of muscle tissue in the human body: cardiac muscle, smooth muscle, and striated muscle. Each of these types of muscles performs a specific role in a human functioning. Cardiac muscle tissue is particularly adapted to the demands on the muscles of the heart. Smooth muscle is particularly adapted to the demands of the viscera. Striated muscle is adapted to the demand for voluntary movement.

Likewise, I can express myself, our body includes flexibility, stability, and mobility.



Flexibility is the absolute range of motion in a joint or system of joints, and the length of muscle that crosses the joint involved. It directly correlates with range of motion and mobility, but does not directly correlate with strength, balance, and coordination. The range of motion is the distance and direction the joint can move, while mobility is the ability to move without restriction.

Though flexibility and mobility sound similar, they are not interchangeable. Mobility within a joint is the degree to which the area where two bones meet (known as an articulation) is allowed to move before restricted by the surrounding tissue such as tendons, muscle, and ligaments. Think of mobility as the range of uninhibited motion around the joint.

A good level of mobility allows a person to perform movements without restriction, while a person with good flexibility may not have the strength, coordination, or balance to execute the same movement. Good flexibility does not always denote good mobility.

Mobility relates to movement while stability relates to control. Stability is defined as the ability to maintain control of joint movement or position by coordinating actions of surrounding tissues and the neuromuscular system. Joint stability depends largely on the shape, size, and arrangement of the articular surfaces (the surfaces on joints and cartilage where the bone makes contact with another bone), the surrounding ligaments, and the tone of the surrounding muscle. Injuries including ligament tears and sprains can often lead to stability issues in the joint.

As Sally Savey Fitt states, the muscular system provides the power for both movements through space and the maintenance of a given position in space. All controlled movement is a constant “tug of war” with gravity. Stabilization of a position in space is as vital to human movement potential as the production of movement through an arc in space. Stabilization may be against the gravity or it may be against the pull of other muscles, but regardless of the source of the opposing action, stabilization is critical to effective human movement⁴. This statement shows us the basic function of the muscular system. If we consider this statement as an interaction with a warm-up, we can highlight that in this process the dancer controls and prepares muscles and joints for further loads. We stretch and activate our muscles to improve stability in the body, interact with gravity and adapt the body in space. Emphasizing that mobility, stability, and flexibility, the dancer uses in the most unusual manifestations in the dance. Where the dancer creates amazing actions and forms that very often seem impossible to the human body.

Every day we spend an endless amount of thought and microanalysis of what is happening around us. Applying anatomy in the subject of my thesis - we analyze our body, its capabilities

⁴ Sevey Fitt S. (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, p. 103

and limits, as well as individual characteristics, working with them. In this case, this work can be called a smart approach, ranging from small routines “like warm-up” to intense rehearsals and performances.

2.2 The role of stretching in the warm-up

The role of stretching plays a big role in the life of a dancer. The question that took my attention is what role does this process play in a warm-up and cooling down? In my introduction, I already touched out that often dancers’ “warm-up” is sitting on the floor, just staying in different positions of stretching for a long time.

I had an unsuccessful experience with this approach, because after many times of a “warm-up” I did not feel completely ready for the following activities. Often, I only got a feeling of relaxation. Further, at the upcoming rehearsals, I had discomfort in the joints, because without enough rotational movements, without temperature increase and exercises my body was not prepared. The first few times of a passive warm-up, I didn’t notice big changes. But if we look at this situation from outside - a minimum of three warm-ups per week were passive for one month. Personally, my experience has proven that this method does not work. It leads to inefficiency, a drop-in energy, drowsiness, discomfort in the muscles and joints.

During cooling down passive stretching had an opposite effect. It helped me recover better after heavy loads. Furthermore, it works as a good meditation, transition to other rehearsals or a calm end of the day.

Discussing this topic with my colleagues, we came up with a few opinions. The differences that they noted were such as the individual characteristics of each person, mobility in the joints, type of muscle, etc. Perhaps, dancers, who by nature have good mobility, flexibility and stability can cope more easily with training. With this statement, I can’t fully agree. The human body has many features, and when we are lucky with one factor, we need to work on others. For example, if the dancer has extra mobility in the joints, this gives him a certain freedom of movement, such a necessary feeling in the dance. On the other side, with great mobility of the joints, you need to strengthen them daily by training and exercise for injury prevention (such as dislocations, sprains). Everything leads to the fact that no matter what natural abilities were given to a dancer, there is always something to work on.

During my informational searches on the topic of my thesis, I found an article which accurately describes the paragraphs above.

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. 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. 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. 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. 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. 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. 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). Even a short duration stretch (13-30 seconds) can lead to a decline in muscle force. With long sustained stretching sessions, the dancer may notice a reduction of 3 muscle performance which may last for up to one hour. 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. However, stretches held for less than 15 seconds do not appear to have a negative effect on performance.

According to Surgenor B. and Kozai. A., **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. When used as a 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 keep the core body temperature elevated for the duration of the warm-up⁵.

There are several different techniques for stretching muscles including ballistic, dynamic, static and Proprioceptive Neuromuscular Facilitation (PNF). Each type of stretch has advantages and disadvantages, as described in the scientific literature. They are all effective at increasing range of motion; however, some of them are better than others, either for effectiveness, or to reduce the risk of injury. Often, it depends on the dancer's physique and upcoming activities and goals. The dancer should be careful when choosing the type of stretching, taking into account all factors.

As Critchfield B. states, **ballistic stretch** consists of repetitive bouncing or using the swinging momentum of the trunk or limb, to provide a stretch force. The end position of the stretch is not held. Dance involves many ballistic movements. For example, a grand battement involves a ballistic stretch of the hamstrings. Similarly, swinging the trunk toward the front of the thighs and then bouncing to touch the floor is also ballistic stretching of the hamstrings.

Ballistic stretching can increase flexibility in the short-term. However, the problem with ballistic stretching is that it is not well controlled, so it is easy to exceed the extensibility limit of the soft tissue. These movements should only be performed when the dancer is well warmed up or they could potentially cause an injury to muscle tissue, tendon or muscle connective tissue.

A dynamic stretch is often confused with ballistic stretch; however, there are some important distinguishing factors. A dynamic stretch is a controlled stretching exercise that uses dance-specific movements to prepare the body for activity. These stretches emphasize the movement requirements of rehearsals, classes, and performances. As an example of dynamic stretching, a controlled développé to the front or side dynamically stretches the hamstrings as it reaches maximal height. Advantages of dynamic stretching are: it promotes dynamic flexibility; it involves multiple joints; it replicates movement patterns that are required during dancing; it provides neuromuscular training to improve coordination; it strengthens the contracting muscle,

⁵ Surgenor B. and Kozai. A.. (2017) *The Importance of a Good Warm-Up: Are you warm enough to start dancing?* Available at: https://cdn.ymaws.com/www.iadms.org/resource/resmgr/resource_papers/warm-up-importance.pdf (accessed: 12.04.2020)

and it keeps the core body temperature elevated so that muscles and surrounding tissues remain pliable⁶.

Dynamic stretching is not as effective as static stretching for producing long-term gains in muscle length and flexibility, but it serves a purpose in getting the body ready for activity. Dynamic stretching should be performed only after a proper warm-up (elevated body core temperature indicated by a light sweat). Dynamic stretching should start slowly and gradually increase in the speed and power of the movement.

Critchfield B. also claims, that **static stretch** involves elongating the muscle to its tolerance. Once in the stretch position, remain in that position for 30 seconds, then relax. Each stretch should be repeated three to four times⁷. Static stretches should never create a sharp or painful feeling. As one relaxes into the stretch, there may be a very slight lengthening of the muscle (stress-relaxation), but there is no rapid limb movement as in ballistic stretch. The stretching force is often created by gravity acting on the body, but the force can be generated by another external force such as a wall, the floor, the barre or a friend. This force is applied in a slow and steady manner, and it is important to continue regular breathing throughout the stretch. Static stretching is gentler than ballistic or dynamic methods, so it is less likely to cause muscle, tendon or muscle connective tissue tears or strains. It is recommended that the stretch be held for 30 seconds. It provides sufficient time for the muscle to relax, but probably not enough time to produce permanent connective tissue lengthening. There are short-term gains in flexibility and decreases in muscle resistance to stretch when using a 30-second static stretch, but these adaptations disappear quickly (within one hour). If the stretch is used consistently, flexibility gains can be maintained.

According to Critchfield B., **prolonged stretch** is very similar to static stretch, in that the stretch is held without moving. However, it is held for a significantly longer period of time, several minutes instead of seconds⁸. These stretches are used by medical professionals for very specific and serious medical pathologies and are not appropriate for dancers. They elongate anatomical

⁶ Critchfield B., (2012) *Stretching for Dancers*

Available at: https://cdn.ymaws.com/www.iadms.org/resource/resmgr/resource_papers/stretching.pdf (accessed: 10.04.2020)

⁷ Critchfield B., (2012) *Stretching for Dancers*

Available at: https://cdn.ymaws.com/www.iadms.org/resource/resmgr/resource_papers/stretching.pdf (accessed: 25.03.2020)

⁸ Critchfield B., (2012) *Stretching for Dancers*

Available at: https://cdn.ymaws.com/www.iadms.org/resource/resmgr/resource_papers/stretching.pdf (accessed: 10.04.2020)

structures that are supposed to stabilize the joints, i.e. ligaments and joint capsules. Dancers frequently use these stretches (either intentionally or unintentionally) when they sit on the floor between classes or while doing homework, maintaining their legs in various stretch positions for long periods of time. For example, lying forward while in the second position for extended periods places undue compression of the hip labrum, potentially contributing to future injury.

According to Critchfield B., Proprioceptive Neuromuscular Facilitation (PNF) PNF techniques were developed by physical therapists in the 1950s to treat patients who were weakened by diseases such as polio ⁹. These techniques have now been modified (straight planes versus diagonals) for use in athletes and dancers. There are many types of PNF stretching techniques; each technique has three phases with variations on contracting and relaxing opposite muscle groups. PNF techniques are effective for producing short-term increases in flexibility.¹⁰ However, it takes some skill and creativity to perform them correctly. As they do present risk of injury, they should only be undertaken under the guidance of a health-care professional.

How to stretch “properly” is difficult to say. Every stretching method has its own advantages and disadvantages. The time and desired goal of stretching determine the most effective stretching method. Dancers should work out their own stretching program to their individual needs. In the warm-up, stretching is only part of the process. Certainly, one of the main ones. But also, you need to consider other components of the warm-up and carry it out step by step.

2.3 General warm up followed by specific warm up. Important tips of warm-up

The warm-up process always follows the same basic principles, but the duration and intensity depend on various factors. According to Simmel L., the following guidelines should be considered when the dancer designs an individual program:

- The duration of the warm-up increases with age. Warm-up should become longer and more attentive over time. Children usually need less time to warm up than adults. Despite this, young

⁹ Critchfield B., (2012) *Stretching for Dancers*

Available at: https://cdn.ymaws.com/www.iadms.org/resource/resmgr/resource_papers/stretching.pdf (accessed: 10.04.2020)

¹⁰ Critchfield B., (2012) *Stretching for Dancers*

Available at: https://cdn.ymaws.com/www.iadms.org/resource/resmgr/resource_papers/stretching.pdf (accessed: 10.04.2020)

dancers should be prepared for a warm-up. Importantly, warm-up will improve their performance and reduce the risk of injury. Since the warm-up is an integral part of all the dancer's activities and this gives the best opportunity for dancers to learn how to pay attention to their bodies from an early age, understanding the importance of all processes for their profession.

- Duration and intensity of the warm-up depends on the physical and technical level of the dancer. The higher a dancer's physical level, the more intense the warm up should be. This is because the warm-up should prepare the dancers for the subsequent loads, which will be more intense in the case of a well-trained dancer than for a beginner.
- Body temperature increases over the course of the day, generally reaching each peak at about 3 p.m. For these reasons, the warm-up should be longer in the early morning than in the late afternoon or evening.
- The weathers have an impact. If it's colder and wetter, the longer the body needs to achieve its ideal working temperature. According to this effect, the duration of warm-up has to change¹¹.

¹¹ Simmel L., (2014) *Dance Medicine in Practice: Anatomy, Injury Prevention, Training* Great Britain: TJ International Ltd., Padstow, Cornwall p. 226

3. Dealing with injuries. Prevention of Dance Injuries

For many dancers, physical complaints are part of everyday life. But only one-third will actually lead to a break from dance training; the rest is tolerated, ignored, or just considered to be a normal part of the dancer's life: dancers and pain often seem to be closely linked. However, acute injuries are relatively rare in dance. Approximately two-thirds of all dance injuries result from chronic overuse: pain with a slow onset that increases gradually. According to Simmel L., chronic overuse is not only uncomfortable and often showing prolonged healing, but it also increases the risk of acute injuries¹².

One way or another, the dancers are faced with physical injuries throughout their life. In my observation, I haven't seen a single dancer who during his or her entire dance career hasn't had a single injury. It is very important to fulfill our energy maximum for the prevention of injuries, for this it is also important to get acquainted with the basic information: about the causes of injuries, types of injuries, about good pain and bad pain, etc. Since dancing "cold" is one of the major reasons for the appearance of injuries, I decided to delve deeper into the topic and present it in more detail. Moreover, to reveal the topic of how we can prevent injuries. By having this knowledge, we analyze our actions and movements more specifically. In my experience, from warm-up to other high activities, this information helps me focus on exercises, analyze and work on weaker parts of my body to prevent injuries. Knowing about good pain and bad pain helps a dancer to listen to his or her body. Prepare it smartly, looking at the physical condition of the body at the moment.

3.1 Causes of injury

In my opinion, the primary cause of injury is ignorance. Ignoring misalignments can lead to chronic aches and pains due to muscular imbalance. Dancing on a hard surface can lead to shin splints or stress fractures. Dancing when one is out of the shape can lead to a warranty of injuries. Dancing in excessive heat without paying attention to dehydration and the depletion of body salts can lead to muscle spasms and more serious consequences. Poor health habits (for

¹² Simmel L., (2014) *Dance Medicine in Practice: Anatomy, Injury Prevention, Training* Great Britain: TJ International Ltd., Padstow, Cornwall p. 201

example, unbalanced eating habits, lack of sleep or use of drugs) can lead to injury. Trying to perform a combination that is beyond one's ability often leads to injury. Ignoring one's own fatigue warning signals increases the likelihood of injury. Maintaining a bodyweight that is higher than ideal puts extra stress on weight-bearing joints. Being underweight for dancers is just as serious as being overweight, for the body is less able to fight off disease and heal itself. Dancing when one is under a high level of emotional or psychological stress can reduce concentration and increase the chance of injury. Dancing without proper preparatory conditioning (warm up-strength-endurance) often leads to injury.

According to Liebenson C., there is a few predisposing factors can increase the likelihood of injury if not addressed or maintained with proper exercises and therapy:

- Genetic factors (e.g., scoliosis, hypermobility syndrome, pes planus, angulation of femoral head, and leg length discrepancy)
- Intrinsic physiological factors (e.g., muscle imbalance, faulty movement patterns, and poor nutrition)
- Extrinsic factors (e.g., duration of training, volume of training, quality of training, training equipment/costumes, floor type, and choreography)

Some biomechanical causes of injuries prevalent among dancers can be due to:

- Increased pronation forces caused by the high degree of turnout demanded in some forms of dance.
- Increased torque in the knee and hip to accommodate the required range of motion utilized in various dance forms, especially with the extremity loaded.
- Generally increased flexibility among dancers, coupled with the poor intrinsic muscular control and/or fatigue, which may lead to the overload of the spinal column. Inadequate flexibility can also be a factor¹³.

¹³ Liebenson C., (2015) *Functional Training Handbook*. China: Wolters Kluwer, p. 169

3.2 Types of injuries

I've been studying anatomical books such as *Safe Dance Practice* by Edel Quinn, Sonia Rafferty, Charlotte Tomlinson; *Dance Kinesiology* by Sally Sevey Fitt; *Dance Anatomy* by Jacques Green Haas. I identified some useful concepts of injuries types and the warm-up process that I'd like to reveal below. By understanding the types of injuries, it's much easier to analyze what kind of injury you may have. It also gives you an idea how to deal with it and is it enough to have just self-care and to do specific stretching and exercises during the warm-up and cooling down. If it doesn't work the dancer should visit a doctor.

Basically, the classification of injuries falls into two categories: traumatic or acute injuries and chronic injuries. Traumatic injuries happen suddenly and often involve a fall or other sudden accident. Chronic conditions are those which recur over time and are more usually due to misalignment, overuse, poor training habits, or compensation for performance errors. Traumatic injuries include such conditions as fractures, sprains, strains, bruises and contusions, concussions, cuts, lacerations and punctures, dislocations and subluxations, and other results of accidents. Through my observation and experience, I will reveal more detail about the most common conditions. Sevey Fitt S., provides a detailed description of each injury type below:

Fractures

All fractures are a destruction of the structural integrity of bone tissue caused by the application of force. A fracture may be classified as simple or compound, or a green stick, spiral, or stress. The only way to conclusively rule out the possibility of a fracture is x-ray, and even then it is difficult to identify some greenstick fractures and stress fractures. The bone scan is more reliable for identifying stress fractures than the x-ray). Clearly, whenever there is any possibility of a fracture, the dancer should see a physician¹⁴.

Sprains

A sprain is a consequence of the over-movement of a joint that results in injury to connective tissue (ligaments, cartilage, tendons) and injury to surrounding soft tissue (blood vessels, muscle tissue, and nerves). Common locations for sprains include the ankle /tarsus region, the

¹⁴ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, p. 303

knee, and the low back. Improper mechanics and misalignment are the most common causes of sprains. Depending on the severity of the sprain, it may require total or partial immobilization. It is wise to have severe sprain x-rayed to rule out the possibility of fracture¹⁵.

Strain

The term strain is limited to injury of the soft tissue and the term is most usually related to muscle tears. A strain often accompanies a sprain because over-movement of a joint frequently result in muscle tears. It is also possible to incur a strain when antagonist's muscles are powerfully and simultaneously contracted. Tears to the hamstring muscles are perhaps the most frequent strains, followed closely by the strains of the groin. The pain resulting from a relatively minor strain can often be relieved with gentle stretching, but severe strains should be examined by a doctor¹⁶.

Dislocations and subluxations

These are the injuries that result in the loss of joint integrity. If the bones of the joint return to the normal position after joint integrity is distributed, it is called a subluxation. If the bones remain disarticulated, it is a true dislocation. These injuries are very painful and are accompanied by strains and sprains of surrounding tissue. In addition, the muscles around the joint will often spasm. It takes training and knowledge to relocate a joint and amateurs should not try. The injured dancer should see a physician immediately. The first few days after a dislocation or subluxation are critical. Any movement of the joint can result in reinjury because of the injury to all of the surrounding tissue around the joint. Rest and immobilization of the injured joint should be judiciously observed¹⁷.

Several traumatic injuries have occurred in my life, such as sprains and tears of ligaments. The first time I got a strong strain happened at a sports dance competition in 2006. Sprain took place in my leg in the biceps femoris muscle. The schedule for the competition didn't match, so dancers didn't know when will be their turn on the stage? In such conditions, I warmed up and cooled down because of the long waiting between performances. The situation was repeated several times. Due to long breaks, warm-ups, and then long expectations, I only felt tired and

¹⁵ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, p. 303

¹⁶ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, p. 303

¹⁷ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, p. 304

each time the warm-up went more difficult. When the moment came to our turn on the stage, which happened quite unexpectedly, the muscles were not ready for the load and stress. As a result, during the dance, I got a strong sprain in the leg, which later led to a long recovery. About 8 years of my dance life (from 7 to 15 years), I took part in competitions, from the simplest championships to the championships of Ukraine and Europe. I would like to note that a large number of these events often do not follow the schedule. In my opinion, this adversely affects the state of the dancers. Before entering the stage, a dancer must be prepared from the physical and mental side. Preparation is an important part that needs our attention, energy, and strength. If this important process is interrupted, adding stress and adrenaline to the body, all these factors can negatively affect the state and performance of the dancer. In this situation, injuries may occur.

Chronic Conditions

Inflammation

Inflammation of tissue in areas of high stress is common in chronic conditions. Misalignment, inadequate conditioning, and muscular imbalance are the most common causes of chronic conditions such as tendinitis, bursitis, myositis, and fasciitis¹⁸.

Tendonitis

The inflammation of the tendon and the tendon sheath is called tendonitis. With tendonitis, the dancer will experience the pain on the contraction of the muscle, tenderness of the area of the tendon crepitus (creaking and crunching in the area of the tendon of movement of the joint). Ice and rest are the first lines of defense of tendonitis. Mild stretching of the muscle may also relieve some of the pain, at least in very early stages of the conditions¹⁹.

Bursitis

Bursae are the ball bearings of the body. They are fluid-filled sacs located at the point of high friction in the body. Undue stress at a given area may cause an irritation of the bursa, resulting in an inflamed condition and tenderness. Often there is the sensation of a hot spot and swelling may be quite localized. For example, doing a lot of knee work (in a kneeling position) may cause an inflammation of the bursae of the knee²⁰.

¹⁸ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, p. 304

¹⁹ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, pp. 304-305

²⁰ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, pp. 304-305

Myositis and fasciitis

Both are conditions of the generalized inflammation, one an inflammation of muscle tissue (myositis), and the other an inflammation of the fascia. Both of these conditions result in generalized soreness and spasm in a broad area surrounding the inflamed tissue. Sometimes a massage is an effective approach to reduce the muscle spasm, but it should be accompanied by the standard treatment for all inflammation: application of cold. The dancer experiencing either of these conditions should carefully analyze his or her alignment, for it is very likely that there is major misalignment contributing to the condition²¹.

My example of chronic pain is back pain. Initially, I always had an over-flexible spine. Due to the strong mobility of the back, frequent displacement of the vertebrae and pinched nerves are possible. Periodically, I have this problem. In such cases, visits to osteopaths and massage therapists work great.

Also, the best way for me to keep my back in good condition is to help me with my training regimen and individual exercises that I use in the warm-up. Focus on activation and muscle strengthening, stretching for the spine. If I regularly perform this routine, I do not feel any discomfort in the back. My observations show that as soon as I stop doing exercises, the back immediately makes itself felt. In this situation, regularity is important.

3.3 Common dance injuries

Three Johns Hopkins experts, sports medicine specialist Raj Deu, M.D., and performing arts physical therapists Andrea Lasner and Amanda Greene, provided us with information about typical dancers injuries.

A few studies that looked into dance injuries found that injuries from an overload of your joints and muscles (overuse injuries) are the most common in dancers. The majority of these overuse injuries involve an ankle, leg, foot or lower back. Some common dance injuries are:

²¹ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, pp. 304-305

Hip injuries: snapping hip syndrome, hip impingement, labral tears, hip flexor tendonitis, hip bursitis, and sacroiliac.

Joint dysfunction foot and ankle injuries: Achilles tendonitis, trigger toe, and ankle impingement.

Knee injuries: patellofemoral pain syndrome Stress fractures: metatarsals, tibia, sesamoids and lumbar spine. Dancers are also likely to develop arthritis in the knee, hip, ankle, and foot.

Generally, dancers have a much lower rate of anterior cruciate ligament (ACL) injuries than other athletes. One explanation could be that dance training involves much more intense jumping from an earlier age than other sports, which helps improve muscle control²².

3.4 Good pain and bad pain. Muscle soreness.

Do you think pain is normal in dance?

About 80% of the dancers I asked this question said yes. The age of the dancers was from fifteen years and above. In classes, very often I observe a situation where dancers warn teachers about muscle soreness or high pain in certain parts of the body. Also, in the circle of dancers, in our conversations, the theme of muscle soreness “who has pain and where is it painful” and methods of dealing with this pain usually slip. As a result of these conversations, one main idea can be singled out: “the feeling of pain is normal for us.” At first, I was alarmed that we had an idea of normalizing the pain. Sometimes a dancer works through the pain to not interrupt the creative process, especially when you are a part of the troop. Yet it’s important to understand the difference between soreness, which allows you to “keep calm and carry on”, or soreness, where you need to pay special attention.

Without adequate recovery time from soreness, the body won't be as efficient as possible, explains Jenna M. Calo, a physical therapist at Body Dynamics, Inc., in Virginia. *This can lead*

²² Deu R., Greene A., Lasner A., (2020) *Common Dance Injuries and Prevention Tips*

Available at: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/sports-injuries/common-dance-injuries-and-prevention-tips> (accessed: 27.03.2020)

*to compensations, which then lead to overuse injuries, fatigue and decreased performance ability*²³.

Soreness is one of nature's defense mechanisms, adds Susan Kinney, physical therapist and owner of on-site clinics at Boston Ballet School and other conservatories. *It's a signal that you need to rest or slow down*²⁴.

Pain is the way the body makes us pay attention to something wrong. This is a direct signal that tells us that you need to listen to your body now. If you start to force yourself to ignore the pain, endure or weaken it, without giving time eliminating the cause, you will no longer have access to this important information that the body releases. Pain performs an important function. Let's find out, what is the meaning of muscle soreness, how to distinguish good pain from bad pain.

At the earliest, muscle soreness can be felt within a couple of hours after unusual or particularly intense training. The muscle swell becomes stiff, hard, sensitive to pressure, and sometimes even feel weak. The pain reaches its climax after between one and three days and can last for up to a week, depending on the intensity.

Among the dancers, it is well known that some discomfort and pain sensation is part of our activity and is often a sign of the success of muscle development from classes and strength training. In order to increase muscle strength, the muscle must experience a slight increase in stress compared to what it experienced, and this stress is usually perceived as a “burn” in the muscles during activity. This light burn is what we call good pain and is the basis of the popular phrase: “No pain, no gain.”

According to Ferguson H., pain from muscles that have been worked in a day or two before (often described as “good pain”) is generally good to push through. This type of muscle ache is called Delayed Onset Muscle Soreness (DOMS). It usually warms up with exercise and settles

²³ Kay Ph. L., (2014) *Your body: when is sore too sore?*

Available at: https://www.dancemagazine.com/your_body_when_is_sore_too_sore-2306928899.html
(accessed: 01.04.2020)

²⁴ Kay Ph. L., (2014) *Your body: when is sore too sore?*

Available at: https://www.dancemagazine.com/your_body_when_is_sore_too_sore-2306928899.html
(accessed: 01.04.2020)

over 3-5 days. It usually occurs at the beginning of the term after holidays or when we are learning new skills and using muscles in a different way. Pain that does not ease after 3-5 days or gets worse throughout a class should not be ignored. This sort of pain usually happens when something has crossed the line and is harmful ²⁵.

Fatigue after a good, intense workout is also a sign that the exercise goes beyond the physiology of the dancer, but it should also not be excessive. This fatigue should leave the person somewhat excited, but not too exhausted. Fatigue, which lasts several days, means that the physiology of a person has been completed to excessive challenges, which means that muscles and energy stores are not replenished efficiently. Chronic fatigue after excessive physical exertion suggests that a person may be overtrained. If fatigue continues after appropriate rest, this may be a sign of other medical problems, and you should consult a doctor.

Muscle soreness can be caused by:

- * Physical activity following a long break
- * Unfamiliar movement, particularly eccentric movement
- * Particularly intense physical or psychological strain (examinations, competitions, performances)

Muscles, tendons, ligaments, cartilage, and body bones are living structures that respond to physical activity only gradually. If they take stress too quickly, they cannot respond effectively and may start to work incorrectly. The cause of the failure can be too much stress, too rapid accumulation of excessive stress over time. When this happens, each of these tissues reacts differently. This can lead to severe pain. If the muscle is over-trained, the muscle can become very painful for movement and touch and can even swell. In severe cases, the muscle can be damaged to such an extent that the muscle begins to develop irreversible damage.

Periodically, I experienced prolonged muscle soreness after a long break or after learning new skills/movements that I did not know before. In the first rehearsals and training sessions, I feel a great surge of energy and inspiration. During all these activities, I do my best, spending energy

²⁵ Ferguson H., (2019) Dancing Through Pain

Available at: <http://mdmdance.squarespace.com/dancing-through-pain> (accessed: 01.04.2020)

up to the limits. Mentally, I already realized that probably in the next few days I would get very sore muscles. Surprisingly, most often I did not respond to this feeling and continued to work at full strength, as it was giving me an enjoyable sensation and enthusiasm. I didn't let the process stop. As a result, I got almost unbearable muscle pain and weakness in the body. Recovery from this approach took at least a week. There were a lot of recovery methods - from warm creams and cold showers/baths, adding longer warm-ups and cooling downs, other load distribution and power saving on the classes.

By studying the information from anatomy and kinesiology, I moderately enter the regimen differently after long breaks and pay special attention to new practices. For example, after long breaks (at least five days), during the first week, I reduce all loads by 50% and gradually increase the load every day. This allows me to smoothly return to the mode, without much stress for the body.

What can we do to relieve soreness?

The best way to avoid muscle soreness is to have a light muscle sore regularly. This is because for several weeks similar stress cannot provoke new muscle soreness in the same region. One should take this with a pinch of salt, however. There is no doubt that a constant build-upon training schedule, with a slow increase in activity, is the best way to strengthen muscles and avoid sore muscles.

Enhancing circulation following the training helps to minimize the reactions to the microtears. Warm-up and cool down, careful stretching, alternative between a cold and hot shower, a hot bath, going to a sauna or putting arnica on the affected area are helpful methods. Deep massage is not recommended as it can increase the mechanical damage. Gently dynamic work improves circulation, decreases muscle tension and thus speeds up recovery. Hence, one should also train "the day after", albeit with reduced intensity.

A useful approach for the proper analysis of the body, I found in the book "Dance Kinesiology" Sally Sevey Fitt.

Three steps can be useful to reduce muscle soreness.

1. Identify the sore muscle by analysis and exploration:

- Where does it hurt?
- What muscles are located in that area?
- What action causes pain?
- What muscles perform that action or are stretched by that action?
- Is the pain a “stretch” pain or a “contraction” pain?

From the answers to these questions identify the sore muscle.

2. Identify the joint actions performed by the sore muscle.

3. Do a gentle long sustained stretch of the muscle by assuming a position opposite to the joint action performed by the muscle and releasing it into the stretch for at least one minute.²⁶

There are a few things you should look for when evaluating how much your pain is bothering you. First, the pain should not last long after training. Pain that begins to negatively affect your physical results is not normal. Pain that does not go away with rest is not normal. Pain that begins to affect your function outside of sports, such as walking or sleeping, is not normal. Pain that is constant or intensifies over time and does not go away is not normal. Pain that does not improve with treatment can be troubling. Pain requiring an increase in the amount of pain medication is not normal, and you should consult your doctor. The pain that starts to wake you from sleep also causes anxiety, especially if it intensifies over time. Another symptom that may indicate a more serious problem is the development of weakness. Fever, chills, or heavy sweating at night are not the norm, and you should seek help immediately.

What can we do to reach our potential and prevent injuries in the warm-up?

The most important reason for doing a warm-up is to prevent injury during exercise, keeping the muscles warm will prevent acute injuries such as hamstring strains and will stave off overuse injuries by allowing the body to prepare steadily and safely.

Based on the main stages of warm-up, such as gentle pulse-raising section, a joint mobilizing section, a muscle lengthening section, development of strength and balance and a self-specific

²⁶ Sevey Fitt S., (1988) *Dance Kinesiology*. New York: Simon and Schuster Macmillan, pp. 302-303

needs and needs for the upcoming work process, I would note a few of my findings for effective injury prevention and our development, which must be considered:

* It is important to pay attention not only to the big sections of joints and muscles (with the sections with which we are accustomed to working most) but also to small sections, as they also perform a big function in our body.

* Exercises for muscle activation and strength help us physically be more prepared for further loads. These exercises strengthen our muscles and joints, giving us good stability and mobility of the body in the upcoming activities. This practice develops confidence in the actions of our body, we gain self-control. In this way, we prevent possible injuries by making stronger muscles and joints.

* In order to avoid a lot of stress from stretch-dependent movements (such as a grand battement or a deep plie), you need to do short stretching exercises for different muscle groups, which should not last long and turn into a passive stretch. Since there are many qualities of movement in the dance, from smoothness to sharpness, after stretching and lengthening the muscles during warm-up, we prevent the stress that can occur in further movements.

* Exercises to work with balance and center, working with space in the warm-up positively affect our stability and proprioception. This is especially used in contemporary dance (floorwork with different tricks, handstands, grounded positions, turnings, and unusual body positions), where stability in the legs, control of the center and core is very important. Also, proprioception gives us consciousness in space, preventing us from colliding with objects and dancers who are in the same studio, since in this situation there is the possibility of collision and possible injuries. These skills help avoid injury in the future.

* Working on our weaknesses and our own needs for warm-up (for example, if the dancer has a weak ankle joint and he knows it and pays special attention to it, such as muscle strengthening and stretching or severe muscle soreness after previous loads), the dancer's body also develops and gives him self-awareness, which also cannot be noted as a fact of preventing injuries.

* It is very important to work out the muscles in a balance exercises during warm-up in order to avoid muscle imbalance. Muscle imbalance is when one side of the opposing muscles is

stronger than the other when this happens a muscle imbalance occurs. For instance, if you regularly use the muscles on one side more than the other, they get stronger, shorter and tighter in comparison to the other side where the muscles get weaker, longer and looser. This compensation leads to an overload of a certain group of muscles and joints, as a result of which pain may appear in this part of the body. In the future, with constant muscle imbalance, injuries are possible. Unless the dancer is aware of how the muscular system works, there is potential for muscular imbalances to occur.

Eat well and stay hydrated before, during and after class.

- * Get enough rest and avoid overtraining.
- * Do cross-training exercises to build strength and endurance in all parts of your body. Always wear proper shoes and attire.
- * Always warm-up before training or performances.
- * Lead a healthy lifestyle and get to know your body.

4. Cooling down

The main theme of my thesis is warm-up - preparation for the dancer's activity. The reason why I pay attention to cooling down (the smart ending of activity) in this section is that cooling can be considered as a conclusion of warm-up and often this conclusion is called "warm-down". This process requires less time and the information that I collected of warm-up also helps us warm down, which is the correct transition from one activity to another (letting the dancer switch to the next tasks and stay warm), or an effective end of the working day. From these statements, I can conclude that this is a unified process, which means that warm down is also very important from the physical and mental side. Warm-up and warm-down have common factors, such as: preparing for the next rehearsal/class, preventing soreness in muscles and injuries, and setting up a mental state of the dancer. But their purpose of destination is different, in the literal sense, warm-up raises the temperature in the body, and cooling down reduces it to its normal state. In my opinion, if you follow this single process completely, the dancer's work efficiency will increase. Let's delve into the features of cooling and use the information correctly.

Theoretical meaning and benefits of cooling down

A cool-down provides the body with a smooth transition from exercise back to a steady state of rest. The main point of cooling down is recuperation and cooling down exercises shouldn't put additional stress on the body. A proper cool-down lasts between five and 15 minutes. Cooling down is essential to the rapid regeneration of the body and mind. Specific cool down with exercise and stretching speeds up the elimination of metabolic waste products. These things support dancers when it comes to getting back to dance this or the following day.

Cooling down - Warm down

- It returns the heart rate to normal. Most forms of exercise cause your heart rate to increase. Cardiovascular exercise, also called aerobic exercise, can increase your heart rate substantially. At the end of your workout, you want your heart rate to return to normal slowly. This helps you to avoid lightheadedness or a feeling of faintness.
- Gradually slows breathing. When your heart rate increases with exercise, your breathing becomes deeper as well. This is a sign that you are working hard and burning more calories with exercise. A cool-down allows your breath to gradually return to the same rhythm you had had before you started your workout.
- Prevention of injuries and muscle soreness.
- Psychological reflection, analysis of the state of mind and body, relaxation. During the cooling down we can do: a reflection on class activity, address points of concern and difficulty, notice areas that need further attention. Psychologically finish the class before starting another activity.

From my own experience, I rarely see dancers doing warm down. I want to note that a large number of situations when cooling down was performed is when the teacher conducts it at the end of the class. Some teachers remind us of the importance of this process, but not all dancers observe it. My unsuccessful experience, which I found over the past year, was just a sharp stoppage of movement. When you work with full amplitude and dynamics in the dance, the lesson ends and instead of slowly normalize the heart rate, I “fell” into a static stretch, after which I often got dizziness.

Since the beginning of the school year at Escola Superior de Dança in Lisbon, while working on my thesis, I have been researching the meaning of warm-up/down and looking for an approach that suits me. The more regularly I followed the regime of my daily routine, the more profound were the consequences when this regime was violated. In most cases, this was expressed in muscle soreness and lack of energy during class or rehearsal. In terms of performances, I remember very well how hard the dancers worked and warm-up for the

performance, individually or as a group, but at the expense of warm down, the maximum that I saw was a static stretch, which was extremely rare.

After my observations, I found impressive statistics in the book “Dance Medicine in Practice” by Liane Simmel that fits my topic: Dancers who cool down after training reduce their risk of injury. Although this has been clearly shown of studies, almost 60 percent of dancers go home after training without having done any cool down at all, a percentage which rises to over 80 percent after performances²⁷.

Principles of cooling down

Useful principles and tips on cooling practice I found in the book “Dance Medicine in Practice” by Liane Simmel.

Cooling down for dancers:

1. Keeping the increased circulation rate and smoothly slow it down (five minutes): gentle running, swinging, mobilizing the joints.
2. Relaxation of the muscle: stretching, short static or contact-relax stretching of the most important muscles, three to five repetition each.
3. Mental relaxation supports recovery, such as short meditation and breathing section. Also, passive relaxation methods are supportive, e.g. warm shower, baths, massages, sauna or steam room.

²⁷Simmel L., (2014) *Dance Medicine in Practice: Anatomy, Injury Prevention, Training* Great Britain: TJ International Ltd., Padstow, Cornwall p. 227

Tips for cooling down:

The optimal length depends on various factors:

- The dancer's physical condition determines the length of the cool down. The fitter the dancer, the longer the cool-down, as winding the body down from a high level of activity takes time.
- The length of the cool-down varies, depending on the time of day. A shorter cool down is necessary in the morning than in the evening as the body has not yet moved into top gear at this time.
- Warmer temperatures make a longer, but less intensive cool-down advisable.

My conclusion leads to the statement that cooling down is an essential part of my training routine, firstly helping me handle tiredness, a smart transition between activities or finishing a day and avoid injury. A cool-down should be fluid and controlled, starting to slow you down, and be focused on bringing your body back to 'factory settings.'

5. My warm-up strategy

From the beginning of the new academic year at Escola Superior de Dança in Lisbon, I began studying the topic of warm-up. I wanted to develop a simple and comfortable exercise strategy for myself. Its goals are health care and injury prevention, preparation for heavy loads, self-discipline, the study of self-awareness and physical capabilities. In my opinion, in the warm-up, exercises and movements should not be extremely difficult, they should be simple and should contain focused tasks and useful properties.

I started with questions:

What are my weekly classes and rehearsal schedule like?

During the first semester, my schedule included a standard set of technical classes - classic dance 3 times a week and 3 times a week contemporary dance. Besides, there were Composition and Dance Repertoire classes. Rehearsals were usually held after a long lunch break. In total, two technical classes are held in the morning, and at the afternoon there was a rehearsal for staging a performance or a class according to composition or repertoire.

What parts of the day are warm-up and warm down? How long will my warm-up be?

For me, the longest and most important warm-up should take place in the morning - right before the start of the first class and the second warm-up should take place in the afternoon before rehearsals. The duration of the first warm-up I ranged from 30 to 50 minutes, and the duration of the second warm-up was 15-20 minutes. I also decided to take a warm-down time between classes lasting 5 minutes and after the last activity of the day another one for 15 minutes.

Where do I get the exercises and what practices I use to warm up?

The exercises and practices mainly come from my dance teachers at BCDA, Escola Superior de Dança, yoga classes and books such as *Dance Anatomy* by Jacqui Haas, *Stretching Anatomy* by Arnold G. Nelson and Jouko Kokkonen, *Stretching Exercises Encyclopedia* by Óscar Morán and Isabel Arechabala, *Dance Medicine in Practice* by Liane Simmel.

I also take inspiration from martial arts. I managed to attend several Kung Fu classes, and in my opinion, dancers can take a lot of new and useful things from it, not only for warm-up but

also for modern dance. Martial arts are based on body control, work with the center and a sense of natural movement.

I want to mention a few books that I found useful for my warm-up: *The Harvard Medical School Guide to Tai Chi: 12 Weeks to a Healthy Body, Strong Heart, and Sharp Mind* by Peter Wayne, *The Martial Artists Book of Yoga* by Lily Chou.

Also, on the Internet, there is a lot of theoretical information and video content, where I find interesting exercises for myself and gradually integrate them into my warm-up.

What are my weaknesses in the body and what should I pay attention to?

Weaknesses for me are a hyper stretched back and weak unstable feet. Displacement and pain periodically occur in the back, which means that in the warm-up I need to stretch it and strengthen the core and back muscles. Also, in order to develop stability in the feet, I need to add specific exercises for small muscle groups in the feet, adding exercises with balance.

Based on the answers to the questions, the structure of my warm-up plan was built. The first scheme is a long warm-up (up to 50 minutes), and the second one is shorter (up to 20 minutes). Further, these two schemes lead to a small warm-up completion scheme.

Long warm-up - 30-50 minutes

Section	Duration	Type of exercise
Concentration	5-10 minutes	Meditation / soft massage / brushing the body
Pulse raising	5-10 minutes	Running, jogging, jumping, shaking, soft, improvisation, yoga practice “Sun Salutation”
Joint mobilizing	5 minutes	Movements with joint rotations. Exercises for isolation in different parts of the body. Improvisation with a focus on soft joints
Lengthening/stretching	5-10 minutes	Exercises for big and small muscle groups

Strength and balance	5-10 minutes	Basic exercises from workouts, yoga, ballet, pilates, martial arts with a focus on muscle activation, strength and balance
Self-specific needs & Preparation	5-10 minutes	Exercise or practice to the weakest points of the body, analyzing the statement of the body at the moment; movement patterns for the upcoming activity

Short warm-up - 15-20 minutes

Section	Duration	Type of exercise
Concentration	5 minutes	Soft massage / brushing the body
Pulse raising	5 minutes	Running, jogging, jumping, shaking, soft, improvisation, yoga practice "Sun Salutation"
Lengthening/stretching	5 minutes	Exercises for big and small muscle groups
Preparation	5 minutes	Preparation movement patterns for the upcoming activity

Warm down - 10-15 minutes

Section	Duration	Type of exercise
Stabilization to the normal state	5 minutes	Lower the heart rate with soft walking, jogging.
Stretching	5 minutes	Stretching exercises with those groups of muscle which work the most
Relaxation/Recovery	5 minutes	Meditation in a comfortable position with deep breathing

And so, following the plan above, I write down a certain program of exercises for myself every morning before entering the studio or every evening, preparing for the next day. I usually plan

an exercise plan for the first two days, according to which I follow the rest of the week. Based on the physical and mental states, I can adjust something within a week, but the structure remains the same. This allows me to study the exercises more, work deeper with them. Moreover, this method helps me be more disciplined and save time.

Example of long warm-up

Step by step guide

1. Soft massage and quick clapping touches your body for 10 minutes.

Tips: firstly, do massage for the feet - gently pressing on each point along the foot line, easily twisting the joints of the fingers in different directions and smoothly scrolling the ankle with your hands. Stand up. Do easy squeeze touches from your head to the feet. Places that you feel are tenser, stop a little longer at this place and make the touch a little stronger. The last step is to do a light clapping with your hands. Passing the entire length of the arms starting from the palm, smoothly moving to the chest and going down to the feet. Be careful with sensitive parts of the body, they're different for each person (for example, breast and lower abdomen for women).

2. Raising the blood pressure. Light jogging which goes to running on the spot or by the perimeter in a studio (if there's a possibility to have bigger space), duration 5 to 10 minutes.

Tips: start with a light jogging for the first three minutes, gradually accelerating to an intensely comfortable speed, after you feel that it is getting warmer and the temperature rises to the first sweat, slowly go jogging, gradually find an ending position.

3. Mobilizing the joints. Do "soft joints" improvisation for 5 minutes.

Tips: try to relax and concentrate on releasing the tension in the joints, imagine the water which never stops flowing. Start on the spot, moving with circular movement from your head, going to the shoulder joints- elbows- wrists and fingers; transition with circular movements to the lower body from hips-knees-feet and toes. When you go through all the points on the spot, you can start moving in space. Have a clear focus on how the joints are moving now, how many of them you are using at one action, pay attention to the tense zones if there are any.

4. Lengthening/Stretching. Go through stretching poses with big and small muscle groups, staying in one position - a maximum of 15 seconds.

- In standing position, let your head tilt to the right side, and then move it a few more degrees down with help of the right hand, repeat for the left side.

- In the standing position, allow the head to fall gently forward in flexion, with the aid of both hands placed on top of each other in the occipital region of the head. Then make a gentle transition to the “arch” position, allow the head to open gently backward in extension. Don’t let the shoulders come to your ears, pull down the scapula. Don’t stand in one position too long, it should be continuous movement, 5 counts head falls down, five counts head opening to the “arch position”.
- The palms should be flexed at approximately 90 degrees up, performing it “on yourself direction” by holding one finger with the other hand, and extending it individually. The stretch is maintained for a few seconds, and then one moves on to the next finger. Turn wrists at approximately 90 degrees down, stretch each finger “inside” with the help of the opposite arm. One simply has to hold on to each finger individually with the opposite hand and produce a deep but gentle flexion. This is the best way to warm-up small groups of muscles.
- The wide parallel second position in the legs, soft knees and long spine, both arms are long and open to the sides. Exhale, at the same time do a deep pli  , make your arms extend going from the side forward to the first position of the arms, allow your head gently go down. Next, start moving from your palms wildly to the sides, your head rolling up. Going through the original position, extend straight arms across to the back. Head is long and straight, shoulders gently pushing down. Feel the stretching in your shoulders and neck. Slowly repeat 4-5 times, 8 counts front 8 counts back.
- Standing in a natural position, knees are soft, not straight and from the top of your head roll down, stay a few seconds in this position and then extend your knees. Make across with your right leg to the left leg, repeat for the opposite side. Come to two legs, make a slow roll up to the standing position. Make sure in each position you stay a maximum of 15 seconds, the transition between positions should be gentle.
- Inspired by yoga practice. Starting from a standing position, crouch down without lifting the bottoms of the feet off the ground until the hips get close to the ground, feel your weight between your legs. Make a transition to the dog position. Do a Cat-Cow stretch, from a quadruped starting position (on your hands and knees), contract the abdomen in order to curve the spine and from that position, relax and press the torso down in order to create the opposite curvature. Take a deep breath and extend the abdomen, then exhale to contract it. Repeat it four times with 4 counts to the one side. From this position go to the downward dog position. Extend from your arms and heels, your tailbone goes up. Check that the distance between your hands and feet is correct by coming forward to a plank position. The distance between the hands and feet should be the same in these two poses. Stay 15 seconds, feel the stretching in your long

back, hamstrings, Achilles and calf muscles. The head is a continuation of the back. The deeper you want to stretch, the more you need to push through your upper body muscles and the more you work on isometric strength. Then go to the child position for 20 seconds to relax. Repeat the downward dog position with each leg up.

- From a downward dog position, step a big lunge on your right foot, bring the body forward. The knee of the back leg is extended and the majority of the body weight is now supported by the front leg. The front knee must remain right above the foot and should never go in front of the foot. Lower the weight of the trunk vertically (bring the pelvis toward the floor) to increase the stretch. Stay 15 seconds. If your front leg is right, open the right arm towards the ceiling, try to open, elongate and reach the line in both arms. Head following the right arm. Stay in each position 10-15 seconds and switch the side.
- From a sitting position on your knees, lift your pelvis perpendicular to the floor and stretch your right leg forward. The hips look straight, hands are supported by the sides on the floor and the right toe on the right leg is flexed. The spine is straight and the head is a continuation of the back. Stretch forward a little on the right leg, trying to keep your back straight and go even lower, holding the position for another 15 seconds. Switch the side.
- Sitting on the floor, with a straight back, cross one leg over the other and raise it, bringing it closer to the trunk, like a “hug.” The leg on the ground remains extended. Take the working leg with the opposite arm, grabbing the heel. Extend the knee and make a twist with the upper part of the body, creating the long spine and line in the arms. Stay 5-15 second, switch the side.
- Sitting on the floor, with both legs together at the front and the knees completely extended, your upper part of the body leaning towards your legs. The hip is flexed until you feel the tension on the back of the thigh, in the ischiotibial muscles. Preferably, the spine should be straight and head as an extension of the back. Stay 10-15 seconds.
- Sitting on the floor, open the legs in your maximum ability, in abduction with the knees always extended and the heels resting on the ground. The spine is long. Go with your arms in the middle between your legs through the floor, arms are straight. Stay 10 seconds and come back to the starting point. Lay down forward with your maximum stretch on the left leg, in direction “half circle” go as long as you can by stepping with your arms to the right leg, come back to the starting point. Start a movement to the other side. From right to the left. Repeat 2-3 times.
- Twines. First go into a deep lunge, then with your back foot begin to slowly move backward, sliding your toes and gradually transfer the body weight to it. Make sure that the knee of the back leg is fully straightened, point the sock towards you. Slowly groin down closer to the floor. Do not bring to severe pain, a feeling of slight discomfort is acceptable, but no more. Hold this

position first for a few seconds, after it goes lower and stays 15 seconds more. Switch to the other leg.

Tips: All exercises should be calm and gentle, floating from one to another. You should pay attention that it's not static stretching. Don't stay in one position longer than 15-20 seconds.

5. Strength and balance.

- Starting from a standing position. Stretch your arms shoulder-width apart, crouch down slowly (during 25 seconds) without lifting the bottoms of the feet off the ground until the hip gets close to the ground. Stand up with the same duration. Repeat 4 times.

Tips: Keep your neck and shoulders relaxed. While doing the exercise, try to extend your spine all the way from the tailbone to the top.

- Begin in the plank position, face down with your forearms (palms on the floor) and toes on the floor. Your elbows are directly under your shoulders and your forearms are facing forward. Your head is relaxed and you should be looking at the floor. Navel pulling to the spine, buttocks and hamstrings are activated. Stay for 20 seconds. From this position, stretch your right hand forward parallel to the floor, slowly draw a straight hand through the entire right side "drawing a semicircle", at the end the hand should be along the body. Put your hand in the starting position and repeat the movement on the left side. Do it 3 times for each side.

Tips: Control your spine alignment, observe where is your weight, what is the difference when you're lifting one arm off the floor, how does it feel to balance in the "3 points" position?

- Handstand from squatting position. From the squatting position gently force your arm in front of you and shift the weight to the arms, in the way that you can lift your legs. Try to release the legs and have a feeling that they're long and light. Hips strive to reach shoulder level. Don't lift the legs higher than 90 degrees. When you go to a handstand, the top of the head should be released and parallel to the floor. Try to catch a balance and come back to the starting point. Next, do the same handstand but when you come back to put your legs to the right side keeping the hands in the same position all the time. Come back through the handstand to the middle to the "starting position". Repeat to the left side. Do 3 times for each side.

Tips: Keep your abs tight and push through your shoulders, feel all fingers on the floor. All the time hands are on the floor. Release your legs from your hips, it will create a movement of inertia and momentum. Observe what is the difference when you're going to the handstand from the middle and from the side.

- The balance on the one leg. For this exercise, you need one sock. Shift weight to the right leg, lift the left leg. The left leg is free and can move in any direction. Imagine six points around

your standing foot in order that your free leg could reach the point. Throw your sock to the first destination, grab it with your left leg toes, draw a circle in the air from front to the maximum point behind the back (you can bend your knee). When the left leg will reach the end behind the back, take your sock and throw it to the second destination and go the same way. Pass through all 6 points and switch to another leg.

Tips: Both knees should be soft, not extend and tight. While you're working on one side, don't put your working leg on the floor between destinations. Try to find a balance in each position, even if you're faltering, your goal is to be on one leg all the time. Your arms can help to find a balance. See the mechanical organic movement of arms. If you worked it out, try this exercise with eyes closed.

- Short improvisation exercise. Start from the second wide parallel position. Your center is low and grounded. Hips are free and the spine is long, your focus is open. Have a shifting moment, switching one leg to another, come back to the starting point. Find your own variations of movement how you transfer one leg to another, find a balance and momentum. At the same time have open eyes, observe what is around you, make different levels of eyes point. Feel how is the balance connected to your eyes' focus.

6. Specific self-needs exercise for the spine and feet.

- Lay down on your stomach, stretch your arms to the sides perpendicular to the body. Lift your arm and head for 2 centimeters from the floor, squeeze your buttocks. Top of the head reaches forward, arms stretch out to the sides, palms are facing the floor. Keeping arms parallel to the floor transfer them up, in a position where both arms parallel to each other, go the same way back so that the arms are along the body. Abdomen is active, navel pulling to the spine (lower back protection). 8 counts front 8 countbacks, repeat 4 times.

Tips: Control the distance between arms and floor, your arms shouldn't be higher than your shoulders, distance is 2-3 centimeters.

- Stand next to the wall. The right side of your body should touch the wall. Step a little bit forward with your left leg and leave your heel on the floor. While standing that way, push the wall with your ball (inner part of the foot). Feel a reaction and tension of the inner muscle of the foot, hold eight counts and release. You can increase the pressure force gradually but not too much. Switch the side. Repeat 6 times.

Tips: Action of pushing should be gentle and shouldn't cause any discomfort, you should feel how the internal muscles of the foot are activated. If you don't feel how the muscle works, that means that the other parts of the body are working. Pay attention to the fact that only one foot should work, other parts of the body are not involved.

- Take a small combination or movement patterns of the upcoming work. (Contemporary/ballet/other rehearsal).

Tips: Don't take straight difficult parts from the upcoming class. It's not a goal. The goal is to remind your body and mind what you will do, where you should concentrate more.

Example of a short warm up

Step by step guide

1. Rubbing the body with palms, quick fingertips touches massage for the face.
 - Start rubbing your palms intensively until you feel warm. With one hand go to rub your hands in turn, reaching to the shoulders. With two hands, do intense friction from the shoulders to the heels.

Tips: Rubbing should be intensive with light touching of palms. Touch should not be strong with strong pressure. This massage should give a sensation of warm blood.

- Do the quick gentle touches with your fingertips from the top of your head to the neck. Repeat 2 times.

Tips: Be careful with your eyes, if it's more comfortable you can close them.

2. Raising the temperature. In the natural standing position, soft your knees, relax your hands and have a feeling of dropped and light tailbone. Your head and shoulders are soft. Start to shake gently, it's like a short demi plié which goes up and down, bouncing in endless motion. If you count on a 10-point speed scale, firstly raise the speed from 1-5 level for 2 minutes. After two minutes, make your heels slightly begin to rise from the ground, about 1-3 centimeters. Feel the natural not overextended relevé in your feet. Do the relevé 15 times and find a way to rise up to the soft jumps, do the jumps 15 times. Return back to shaking state on straight feet, gradually reduce speed from 5 to 1, for 2 minutes. Repeat two times.

Tips: While you are shaking, let the feet rest completely on the ground, feel the center in the middle between your legs. When you go to relevé don't exaggerate and deliberately, relevé should occur organically through mechanics and inertia from each bouncing upward movement. It gives a light and natural feeling in the body. The same sensation should occur in jumping, releasing your feet. Feel how you go up for jumps by inertia from bouncing movement, passing through toes, toe pads, all point to the heels. You can do it with open and closed eyes.

3. Stretching. Go through stretching poses by 15-20 seconds.

- Take a standing position. Interlock hands on the back of the head near the crown. Lightly pull the head straight down and try to touch the chin to the chest. Stay 15 seconds. Next, interlock hands and place the palms on the forehead. Gently pull the head back with light resistance so that the nose points straight up to the ceiling. Stay 15 seconds. After, place your right hand on the back of the head near the crown. Pull the head down toward the right and try to touch the chin as close as possible to the right shoulder. Repeat to the left. On each side stay 15 seconds.
- Take a sitting position on the floor with straight legs. Put your palm on the floor, 30 cm behind your back. Keep them straight and start sliding forward with your hips. Reach the position when you feel a gentle stretch of your forearms and shoulders and stay there for 15 seconds.
- In the sitting position on the floor, bring both legs together at the front and the knees completely extended, the hip is flexed until you feel the tension on the back of the thigh, in the ischiotibial muscles. Elongate the spine and the top of your head have a sensation of reaching the toes. Stay 15-20 seconds.
- Bend your knees while lying on the back in a T-position. Exhale and bring your knees to your chest, going gently up and feeling each vertebra, extend your legs back and over your head to lift your hips up. Continue extending your legs until your toes reach the floor, using your upper back as the base so as not to flatten your neck. Stay 20 seconds and come back slowly to the starting position.
- Take a sitting position on the floor with consistent extended legs in front. The spine is long, the top of the head reaching the ceiling. Bend your right knee and step your right foot over your left leg. Put your right hand on the floor, fingers pointing outward, for support. Bend your left elbow and turn to the right, placing the back of your arm against your right knee. Breathe out as you twist, pressing your arm into your leg and looking over your right shoulder. With each inhale raise up from the top of your head. Stay 15 seconds and switch sides.
- Start in a high plank position, the body is parallel to the floor, palms under your shoulders and keep the belly tight. Step with your right foot front, right knee come under your chest. Put your right arm on your right knee while your left arm is still on the floor. Extend your left knee and stay 15 seconds. Switch sides.
- Natural standing position. Cross your fingers and raise them up above your head, arms fully extended. At the same time, squeeze your buttocks and tighten your abs, pull your shoulders down. Stay 10 seconds, then release the body and drop down the arms. Repeat 3 times.

Tips: all exercises should be gentle and smooth, with no sharp movements. The pain, while you are stretching, should be light and not strong. Stay maximum of 20 seconds in each position.

4. Take a small combination or movement patterns in the upcoming work.

For example, combinations from the rehearsal

Tips: The goal is to remind your body and mind what you will do, where you should concentrate more.

Example of a cool down

Step by step guide

1. Stabilize your heart rate to the normal state. If you had an intensive class, take 3-5 minute to go for a walk in the space or to do light jogging on the spot. Calmly find an ending to spot.

Tips: While you are stabilizing your body, think over what you do in the class or rehearsal, have a brief view of what you've done.

2. Stretching.

- Take a standing position, extend the arms forward with the fingers interlocked and the palms facing outward and forward. Curve your back at the same time that you “push” forward with the palms of your hands. Feel the stretch in the upper back and shoulder blades. Stay 15 seconds.
- From standing position, do a roll down from the top of your head passing slowly through each vertebra. While your knees are soft, go down to reach the floor with your hands and hang on for 15 seconds, try to release all your muscles. From this position go to the plank position, palms should be under your shoulders, then do a slow push down. Put your hips and toes on the ground, push your upper body upward, while looking straight ahead. Stay 15 seconds and lay down on the floor. Repeat the last stretch 2 times.
- Lie on your back, legs are straight and arms are along the body. Bend your right leg at the knee and lift it toward you. Grab the right knee with your hands and pull it towards your pelvis. Both feet are flexed. Hold for 15 seconds. Further, take the heel of the right foot with your right hand and align it at a level of 90 degrees (raise your chest if it's hard for you to reach 90 degrees), hold for 15 seconds and pull the right foot a little more towards you and hold for another 15 seconds. Bend the right leg at the knee and twist it out to the right side to the floor, 90 degrees or higher. Stay for 15 seconds and pull the switch to another side.
- From a sitting position on your knees, lift your pelvis perpendicular to the floor and stretch your right leg forward. The hips look straight, hands are supported by the sides on the floor and the right toe on the right leg is flexed. The spine is straight and the head is a continuation of the back. Stretch forward a little on the right leg, trying to keep your back straight and go even lower, holding the position for another 15 seconds. Switch the side.

Tips: Each transition and each pose should be done slowly and gently. Observe your breathing, each stretch step supported by a deep exhale. Don't forget that your muscles are warm after previous activity, pay attention and feel where is your limit in stretching, where you can go a little bit further or where to have to be more careful.

3. Relaxation/Recovery.

Take any comfortable position for you in space. Close your eyes. First 1-2 minutes make a brief analysis of how your body feels and how is your mental state. Next, try to drop out all thoughts, release all your body parts, say "thank you" for the work that you've done, rest for 3-4 minutes. Open your eyes. Finish.

To better understand the whole warm-up process I created three videos to help. Check them via the links below:

Long warm up

<https://youtu.be/2uGFtVZhq7A>

Short warm up

https://youtu.be/Kctjkm_d-m0

Cool down

<https://youtu.be/bbVYkMOHP74>

My strategy is to implement the knowledge about the body and its capabilities, the experience that I received from teachers and other dancers. The most important step in this strategy is to correctly ask yourself the right questions based on your goals and desires. After receiving the answers, sort out all the information that I collected on the shelves and make a step-by-step plan.

Understanding the warm-up sections, I was able to distribute my answers to each of the sections. The knowledge of anatomy, kinesiology, injury prevention, etc., helped me understand how this or that exercise works and at what stage it is better to apply it.

As I mentioned above, I draw up a plan for the first two days of the week, according to which I follow the rest of the week. Making adjustments, changing certain exercises based on my physical and mental state. This rule gives me a little freedom in this daily routine. All these

gave me the first positive results, the first - I began to work with my body more consciously, and the second - it improved my self-discipline.

In my opinion, the basic routine things that we do every day should be as comfortable as possible. For me, the idea of building a comfortable warm-up is to have a structured action plan, but at the same time, there should be some freedom, the ability to change or add things.

Conclusion

The main goal of my thesis was to develop my own warm-up approach and figure out why it's so important for a dancer. In order to do a common routine of the dancer – warm-up, you need to know a lot of information and new things that I've learned have radically changed my attitude to this process for the better. The first conclusion is that the life of an artist is constant research, it's a deep understanding of basics and pursuing new information. I started writing this thesis with a set of questions and I believe this would be reasonable to briefly go through all of them in the conclusion. This will help highlight my main takeaways from the study.

What is the warm-up? The first chapter fully reveals this topic. This is not just a temperature increase in the body. An explanation of what happens during the warm-up in the body and mind, what sections are and what functions they are responsible for, give a wide answer and "introduce us closer to the warm-up process". Already at this stage, I realized that everything is not so simple as it seems at first glance. This was followed by the question, so what kind of warm-up can we call effective? Are there any features and principles? Of course, there are, and this question opens my second chapter. In my thesis, one of the main principles of warm-up is to study anatomy, the basics that a dancer needs to know (for example, work of the Skeletal System and Muscle System, etc.). Knowledge of anatomy - Training theory - Research and practice, this scheme was created by me and I found it the safest and most effective to use. It helped me to better understand what muscles are involved into the warm-up, how joints work, how the body reacts to the different conditions. With this knowledge, you're gaining confidence and awareness of what you are doing at the moment. Also, in this chapter, the topic of stretching (its types) and interesting tips for warm-up is revealed.

Dealing with injuries and prevention of them. I paid much attention to this chapter. Since dancing "cold" is one of the major reasons for the injuries' appearance, it is important to know about the types of injuries, their causes, about good and bad pain and most importantly about prevention of it. This information helped me to focus on exercises, analyze and work on weaker parts of my body to prevent injuries. During the school year 2019-2020, I had no health complications (sprains, any injuries, dislocations, etc.). Only muscle soreness, which was easier to deal with by giving time and attention to the weaker body parts.

Cooling down. You may be surprised to see this chapter in my work. Since the main theme of my work is a warm-up. Yet, cooling down can be considered as a conclusion of warm-up and often this conclusion is called “warm-down”. Moreover, for effective work, it is important to understand their convergence and differences in order to not confuse the goals of these two practices and use them correctly.

We came to the final chapter, which describes my workout strategy. The main goal for me was to find my own approach for “warm-up” which I will use in the future as a dancer, choreographer, teacher and I will be able to share the importance of a “beneficial” warmup with others. To achieve this goal, my strategy consisted of questions posed to myself and generally accepted sections, in which I added two sections that I consider necessary - a section of strength and balance and self-specific needs. In the last two sections, I sometimes allowed myself to change something or add exercises, based on my current state. Thereby, it was easier for me to follow the rules and in the end, my discipline developed. Compliance with warm-up and discipline positively affected my well-being and readiness for classes, rehearsals, and performances.

I want to highlight that the information that I learned while working on my thesis, literally helped me listen to my body and to be more serious about my business. I believe that it is extremely important to teach beginner dancers the basics of warm-up. Include this as an obligation in the educational process and provide all the conditions for this. Thus, a useful habit will be formed, which can be not only helpful but also an interesting occupation. Our daily routine and habits shape us every day.

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