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Importance of primary deep stabilizing muscles of dancers: an interactive workshop for Estonian dance school Danza's competitive adult team

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Abstract

Dancing, especially professional and competitive, requests expertise in executing advanced techniques and lays extreme physical demands on the body. Safe dance practice requires an ability to identify risk, not with the intention of reducing the activity, but rather to apply interceding strategies that enable the activity to take place in safe and effective manner. Knowledge and application of physical and psychological components result in increased dancer well-being through reducing risk, promoting enhanced performance and ultimately prolonging dance participation.

Compiled theory of this thesis prospected to support competitive dancers' intensive training regimen with an interactive workshop event by raising motivation and an awareness of understanding oneself body functioning as a dancer more profoundly through promoting functional body awareness, enhancing knowledge about the basic anatomy and the deep muscle activation.

The thesis is based on a practice-based methodology which is supported by the evidence based theoretical background. The implementation of practical section of the thesis was the workshop which can be considered as a pilot project. In order to evaluate the project importance and outcome written feedback by the participants was inquired.

According to the received feedback from the participants of the workshop the thesis has been serving valuable purpose and has closely met its aim and objectives. Majority of the respondents have rated the held workshop as relevant and essential educational event for them to develop further in the competitive dance careers. Respondents evaluated the workshop content to be understandable and interesting due to the using of visual aids and practical example rich content. Moreover, the feedback reflected the importance of creating more educational events for the population of dancers in the field of mental health and common injuries of dancers.

It can be concluded that providing education about anatomy and functional body awareness to dancers and dance teachers is an important topic to address. For future interaction more similar events could be held and the scope of content of the workshop developed even further.

Key words

Workshop, dance, thoracopelvic canister anatomy, deep abdominal activation, transversus abdominis, pelvic floor, diaphragm, multifidus

CONTENTS

1 INTRODUCTION

Body is an instrument through an art of dance can be mediated. Unquestionably, the quality of this art is relying on the competences and bodily attainments that dancers hold. Relevant aptitudes of an advanced dancer are solidly progressed strength, mobility, skillful coordination, greatly developed kinesthetics awareness and control over a weight and balance in motion. Hereupon, a good dancer possesses characteristics of a highly evolved awareness of space, a potent sense of rhythm and understanding of music (Mackrell 2019).

Truly understanding the movement requires dancer to develop an awareness of basic anatomy and muscular balance. More effective and safe body movement is enhanced by learning fundamental movement principals to acquire optimal muscular equilibrium. Dance teacher, professional dancer, competitive dancer or an ambitious dance student must learn to understand body movement groundworks and completeness to develop peak functional awareness (Haas 2018, 1-2). Safe dance practice requires an ability to identify risk, not with the intention of reducing the activity, but rather to apply interceding strategies that enable the activity to take place in safe and effective manner. Knowledge and application of physical and psychological components result in increased dancer well-being through reducing risk, promoting enhanced performance and ultimately prolonging dance participation (Quin, Rafferty & Tomlinson 2015, xvii).

Fairly commonly, dancers experience tightness or strain at some point in their lives, for an instance, in the hip flexor region where the pelvis connects to the upper thighs. Deficiency of core control appears to increase load on the surrounding joints, bones and ligaments, thus has been related to injury risk on lower extremities and the low back (Gam 2015). Physical therapist, Amanda Blackmon, from Atlanta Ballet has commented that while there are a multitude of causes for dancers' pains, often an overlooked culprit is the dysfunction in the pelvic floor muscles (Thompson 2019). Moreover, diaphragm and high-quality breathing skills are marginal to stability. Regrettably, frequently dancers are vague about exact techniques how to breathe (Haas 2018, 63).

According to dance experts experience its known that dancers quite often acquire injuries on above mentioned parts of the body. Supporting dancers to become aware of the anatomy and introducing core control activities into studio practice could also perform a key component on injury prevention and in turn enhance movement efficiency (Gam 2015).

This thesis was requested by the Estonian dance school Danza's lead teacher. The interactive workshop was based on the compiled theory of this thesis and relied to serve as a contribution event of overall increase of the Danza Dance School's competitive dance group's consciousness and curiosity growth of a knowledge of anatomy, in particular focusing in the deep structures activation to support building up improved performance quality and safer group and individual practice.

2 AIM AND OBJECTIVES

The main aim of this thesis is to educate Estonian dance school Danza's competitive dancers about basic anatomy and deep muscle activation of the core to enhance the dancers' performance and functional body awareness.

Objectives of this thesis are:

To carry out an educative interactive workshop about the basics of core muscles and to teach in practice deep abdominal activation techniques for an Estonian dance school Danza’s advanced competitive dancers. Likewise, during the workshop to demonstrate movement or/and dance elements in correlation with specific core muscle action.

To analyze an outcome of an implemented workshop project by collecting written feedback.

3 DANCE EXPOUNDED

"When I dance

I dance for me,
Silent vibrations from within
Rhythm of the unseen,
I dance for me.
My steps follow their direction,
My heartbeat echoes their sound.
Some say I dance weird: they call me possessed.
If I dance raw, if I dance pure,
If I dance whirlwind, if I dance the spirits within,
No matter what they say,
I know I dance me.
I dance for me."
(Chukwuemeka 2001)

3.1 What is dance?

Dance can be defined as the movement of the body in a rhythmic way, usually to the music and within a given space, for the mission of conveying an idea, imagination or a feeling, liberating energy, or solely taking bliss in the movement itself. Critics have debated the matter of abstraction and expression extensively in relation to theatre dance, as well on the presumption that dance is a serious art form (Mackrell 2019).

Accordingly, self-expression and physical exemption may be understood as the two basic grounds for dance. However, dance takes a vast variety of forms, from simple spontaneous action to formalized art or a social muster. Attitudes to dance both as an art form and as a social activity have been, in fact, diverse spectacularly throughout history. In several cultures dance has been or is still treated with great respect due to the religious significance. The ancient Greeks, for instance, took dance very gravely, both as an inalienable part of their drama, which had strong political and social relevance, and as part of education. Aristotle believed that dance was needful for *"purging*

the young soul of unseemly emotions and preparing for the worthy enjoyment of leisure" (Mackrell 2019).

Within this comprehensive spectrum of forms, dance grants as a figure of very distinct and broad functions, including the religious, the military, and the social aspects (Mackrell 2019). Moreover, dance is a vibrant visual art composed of momentary scenes created by balance, strength, and grace (Haas 2018, 1).

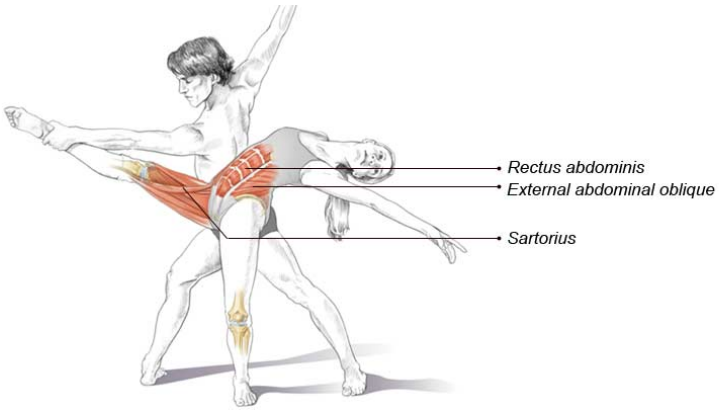
3.2 Dancer in motion

Definition of motion is understood as any physical movement or the change in the position of an object over time. Nevertheless, dancer in motion, is multitude further than simply physical conversions in position (Haas 2018, 1).

Dancers bodies are instruments through which the art is created. Therefore, the quality of this art is fatally dependent on the physical attributes and competences that dancers possess. In fact, dancers do have to perform and take complex forms of motion and frequently stay in extreme positions. Having an advanced strength, mobility, great coordination, a highly developed kinesthetics awareness, control over a weight and balance in motion are important abilities of an advanced dancer. An evolved awareness of space, a strong perception of rhythm, and a comprehension of music, furthermore, are characteristics of a good dancer. Notably in dramatic dance, the dancer must be able to target movement clearly and execute its expressive qualities intelligible to the attendance (Mackrell 2019).

In order to understand movement, dancer must develop an understanding of basic anatomy and muscular balance. Studying basic movement principles to retain healthy muscular balance allows dancer to move oneself body both effectively and safely. To give an insight, for example in bodywork, fixed points are mover's joints, the levers are the bones and the exertion are provided by muscle contractions. Reckon, for an instance, a jazz layout position, which is illustrated in the picture 1. On the picture, the fixed point is the right hip joint, the lever is the femur and effort are ensured by contraction of the hip flexors. In the event of a professional dancer or an ambitious dance student,

one must learn to understand motion foundations and complexity to develop peak functional awareness (Haas 2018, 1-2).



Picture 1. Jazz layout position (Haas 2018, 2)

Intelligibly, the articulation style and movement projection vary individually from dancer to dancer. Movement quality of a dancer can appear tense, sharp, energetic, aggressive or on the contrary soft, clear and fluid. Others may frame the motion exactly in time with the phrasing of the music or reversely create their movements slightly more independent from the music. There are dancers, who express themselves dramatically charged and full of vivid emotion, while some abide cool and detached by focusing more on technical perfection (Mackrell 2019).

3.3 Dancer wellness

Dancer wellness can be influenced by variety of factors such as dance environment, clothing and footwear, quality of dance training, technique and conditioning, stress coping strategies, nutrition, rest, recovery and support network. A dancer's better understanding of the grounds of dancer wellness can enhance the awareness, as well empower to take liability for own long-term artistic success and health (Wilmerding & Krasnow 2017, 1). In practice, realizing the scope of injuries has been a challenge in dance as a result of methodological faults involving the injuries and the characteristics of the evaluated individuals (Costa, Ferreira, Orsini, Silva & Felicio 2016, 66-175).

Dancing, especially professional and competitive, requests expertise in executing arduous techniques and lays drastic physical demands on the body. Naturally, dancers are at hazard for developing a variety of overuse, stress, impact, and repetitive motion

injuries. In fact, dancers are known to have a potent awareness of their bodies as well high pain tolerance (Rivera, Alexander, Nehrenz & Fields 2012). Although pain or discomfort may be present, injuries tend to be disregarded by dancers since tendency is to remain to their habitual practice, despite the fact of developing a potential progressive injury (Anderson & Hanrahan 2008; Thomas & Tarr 2009).

High expectations which are mounted upon a professional or competitive dancer contribute not only creating mental and sociocultural constraint, but to injuries which weaken livelihood and overstress the body (Thomas & Tarr 2009). Moreover, lack of ability to differentiate between performance pain and injury pain is an actual matter, since dancers' behavior is often modified in sense of interpretation determined to the pain. Number of dancers distinct "good" and "bad" pain basing it on quantity of, rather the degree or quality of the pain (Anderson & Hanrahan 2008).

3.3.1 Common musculoskeletal injuries & impairment patterns in dancers

Target group dancers, although, are not part of a ballet team, they attend classical dance sessions and their contemporary dance technique is often derived and based on ballet tradition (Danza dance school 2019). Dancers are commonly required to attend classes in ballet technique as part of the regimen, even if the purpose is not to possess a career in professional ballet (Haas 2018, 88).

Non-professional and professional ballet dancers have an exalted recurrence of musculoskeletal injuries, with the ankle being the most affected joint due to spinning and repetitive movements (Costa, Ferreira, Orsini, Silva & Felicio 2016, 66-175). It has been screened, that young dancers (age 8–9 years) are more likely to injure their ligaments and tendons. Adolescent (age 10–24 years) dancers tend to sustain a knee and soft tissue injuries as they are exposed to pubertal growth spurt, and for an instance bones grow faster than ligaments and tendons (Steinberg, Siev-Ner, Peleg, Dar, Masharawi, Zeev & Hershkovitz 2011; Website of World Health Organization 2018). Moreover, it has been screened that a dancer with prior injury is more likely to be injured compared to a dancer who have not been formerly injured (Steinberg, Siev-Ner, Peleg, Dar, Masharawi, Zeev & Hershkovitz 2011).

In a cross-sectional epidemiological study by Yin, Sugimoto, Martin and Stracciolini (200020 – 2009) it has been screened that majority of injury locations of pediatric dancers between the ages of 5-17 were to the lower extremities (knee, ankle, toe), following by hip and spine injuries. Majorly the injury types were involving joints, followed by the soft tissue, skeletal and physeal injuries. Stress reactions/stress fractures were mainly screened in the foot and toes. Over a half of instability injuries were screened to be in the shoulder, followed by the knee and ankle area. The most frequent represented diagnoses were the tendonitis/tendinopathy, PFPS (patellofemoral pain syndrome), aphophysitis (foot/toes, knee, hip, lumbar spine), ankle impingement syndrome and hip labral tear (Yin, Sugimoto, Martin & Stracciolini 2016, 348 – 355).

To conclude, data supports better therapeutic action in the intervention of injuries, such as prevention programs and physical therapy follow-ups to enhance more appropriate movements from the biomechanical point of view (Costa, Ferreira, Orsini, Silva & Felicio 2016, 66-175). Furthermore, the dancer taking charge of own's training by understanding what muscles are responsible for dance movements, it is potential to give one's mind clear images of desired achievement of dance movements. That is a tool and way to empowerment of a dancer to become an active participant of own training and artistry (Wilmerding & Krasnow 2017, 26).

3.3.2 Alignment

Deficit in pelvic tilt alignment of dancers, commonly, results in unsound technique and prejudiced performance (Ahearn, Greene & Lasner 2018, 192-202). It has been observed that the most collective alignment deviation detected among dancers is anterior pelvic tilt (allowing the tailbone to tip backward). Misalignment of pelvis is considered as an artistic flaw. Moreover, misalignment hinders proper muscle recruitment, and dancers with anterior pelvic tilt may likewise experience tight hip flexors and low back pain (Deckert 2009).

According to research, the well-aligned body causes less wear and tear on the joints and muscles, in turn transferring into fewer injuries and prolonged career. Unquestionably well-aligned body is as well aesthetically pleasing. Simple way to assess the basic

alignment is to observe oneself in profile and follow vertical imaginary plumb line in which in good alignment the line draws through the top of the head, center of the ears, bodies of central cervical vertebrae, acromia of the shoulder girdle, bodies of the central lumbar vertebrae, head of the femur, centers of the knee joints and centers of the ankle joints. Note, that often dancers stand better in first position than in fifth position of the feet. In fact, it is far more complicated to well align the body in dynamic travelling movement than in stance. The brain and the neural components of the motion have more to do with this process than whether the muscles are enough strong and flexible to support proper alignment at each joint. One tip is to work together in turns with the partner from the dance class to assess each other from the sides (Wilmerding and Krasnow 2017, 26-27).

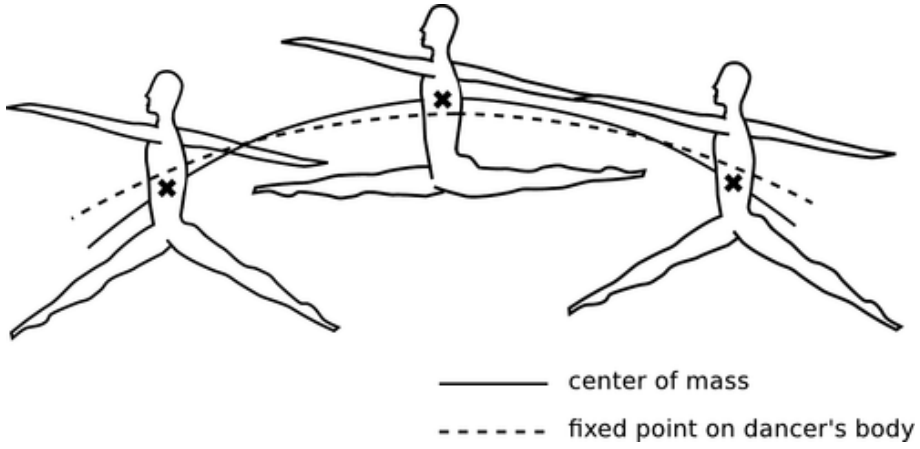
Another common observation of dancers is that they may have hyperextended knees (back of the knee is bowed) as a result of long ligaments, as well the ability to pronate and evert ("wing") the foot. Possible problem occurs in these movements in weight bearing, since excessive stress is put on the ligaments and structures of the joints. If a choreographer requests it, in non-weight bearing the gesture can be used safely. However, if the body is aligned into hyperextended knees dancer must be aware to return to neutral alignment of the joints when returning to weight-bearing (Wilmerding & Krasnow 2017, 29).

Nevertheless, it has to be reckoned that every single dancer may have unlike skeletal or muscular structure, thus recordation of addressing pelvic alignment should be personalized. Ability to obtain personal neutral alignment to avoid injury and attain ease of execution is crucial for a dancer to develop (Ahearn, Greene & Lasner 2018). The ability to locate specific anatomical reference points in order to recognize good alignment and possible deviations from it is necessary for dancers and dance leaders to learn (Quin, Rafferty & Tomlinson 2015, 25). Fortunately, most of the variations of the body's alignment can be improved and even corrected with appropriate conditioning program (Wilmerding and Krasnow 2017, 26).

3.3.3 Role of the core in dance

Each dance technique demands strong control, which key support is provided by core strength. Choreography of modern and contemporary dance techniques insist complex, creative jump combinations and locomotion designs that act challenges for the spine. Lack of ability to compact the core in relation to the spine often results in dance movement as sloppy and weak. Furthermore, unprepared pelvis and spine are exposed to greater injury risk while, for an instance, landing from unconventional jumping tread. Drastic choreography patterns require dancer body to undergo extremes, thus conditioning needs to be taken to the superior level (Haas 2018, 87-88).

In dance, movement can be separated into five phases: preparatory, ascending, flight, descending and landing. Ascending phase, commonly, recruit muscles in concentric contraction, which results in shortening the muscle. In a flight phase extreme core energy and isometric contraction (muscle fires with no change in length and no joint movement) are required, and have an expectation to appear as “lift, hold, and float” impression. In the descending phase some of the muscles lengthen, whereas still support the movement during landing, therefore eccentric muscle contraction is required. The eccentric muscle contraction, which is related to the lead of the descending stage, is relevant for depleting injuries. For an instance, some studies indicate that landing from a *grand jeté* (Picture 2) has an ability to create a force up to 12 times of a dancer's body weight. Thus, to conclude, control is essential and key role is played by the core, or as an alternative term indicated in the thesis work subsequently, thoracopelvic canister (Haas 2018, 89).

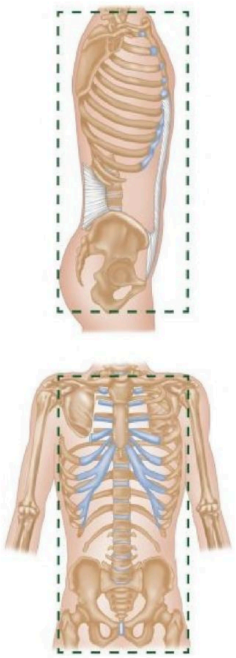


Picture 2. Trajectory of the center of mass during grand jeté jump flight (Website of the Google Sites 2012)

Formulation usage such as stability, co-contraction and bracing of the abdominals can be likewise misleading in case the action is associated as stiffening sense along the spine. It is relevant for dancers to understand no to relate the engaging of the abdominal with the word stiff. Optimal deep abdominal activation and controlled movement of the spine can be improved when correct technique and exercises are applied. Jumps will have a remarkable refinement, for an instance, due to the enhanced security along the thoracopelvic canister. Therefore, power of the hips and legs can be used to “fly” (Haas 2018, 91).

4 ANATOMY OF MUSCULOSKELETAL THORACOPELVIC REGION

The term core can be described through variety of models such as a muscular box, corset (Rickman, Ambegaonkar & Cortes 2012), trunk, torso, centre, spine stabilizers, midline (Haas 2018, 84), powerhouse or a thoracopelvic canister (TPC) (Osar & Bussard 2015, 19-20) of the body , which region is illustrated in the picture 3. In the following work, author will refer to a core as thoracopelvic canister.



Picture 3. Region of thoracopelvic canister (TPC) / Core (Osar & Bussard 2015, 23)

TPC embodies of the thoracic spine and ribcage (thorax), the lumbar spine and the pelvis. In concert, this osseous frame together with the soft tissue structures (muscles, fascia, ligaments) constructs an anatomical canister. However, distinct from a proper rigid canister an optimal function indispensability is that the core allows flexibility and mobility (Osar & Bussard 2015, 19-20).

One of the fundamental roles of the TPC by relaxing and contracting, is influencing the movement and the health of organs. Hereupon, the active structures of TPC (deep and superficial muscles) are responsible for stabilization of lumbopelvic complex in static positions and dynamic movement of the arms and legs, in order to allow more range of motion to extremities (Calais-Germain 2011, 2). Complete musculature in the human body, involving the TPC musculature, is controlled by the neural control system (nervous system) (Rickman, Ambegaonkar & Cortes 2012).

In deduction, greatly universal system is requisite for developing and sustaining optimal operation of the TPC. Functioning of the TPC depends on the coordination of three principal systems: the nervous system, the osseoligamentous system, and the myofascial system (Osar & Bussard 2015, 19).

4.1 Neural control system

The nervous system dominates every act in the human body. Proprioceptors, located in the skin, musculature, fascia, joint capsules, visual and vestibular systems, receive information which is used to ascertain the most optimal strategy for stabilization and motion (Osar & Bussard 2015, 19-20).

Child early months and years of growth are crucial for forming the neural networks demanded for posture and movement throughout the lifespan. For example, crawling, evolves the TPC and contralateral limb control that is essential for capable upright posture and gait. Apropos, by incorporating appropriate types and range of physical activity as well intellectual challenges, mankind has capability of improving at any age since human nervous system preserves neuroplastic qualities throughout lifetime (Osar & Bussard 2015, 19-20).

Nervous system (Figure 1), being the control system of human body, comprises of two primary distributions – the central nervous system (CNS) and the peripheral nervous system (PNS). CNS is made up of the brain and spinal cord, whereas PNS compile of the cranial and spinal nerves. Further subdivision of PNS branches out to somatic nervous system (SNS; controlling voluntary muscle activity) and to autonomic nervous system (ANS; largely under subconscious control and runs bodily functions that keep human alive). Nevertheless, through conscious attentiveness and specific practice it is possible to develop somewhat control over visceral, cardiac and respiratory setups. Through diaphragmatic breathing and heading towards a relaxed mental state, for an instance, human can voluntarily lower the heart and respiratory rates (Osar & Bussard 2015, 19-20).

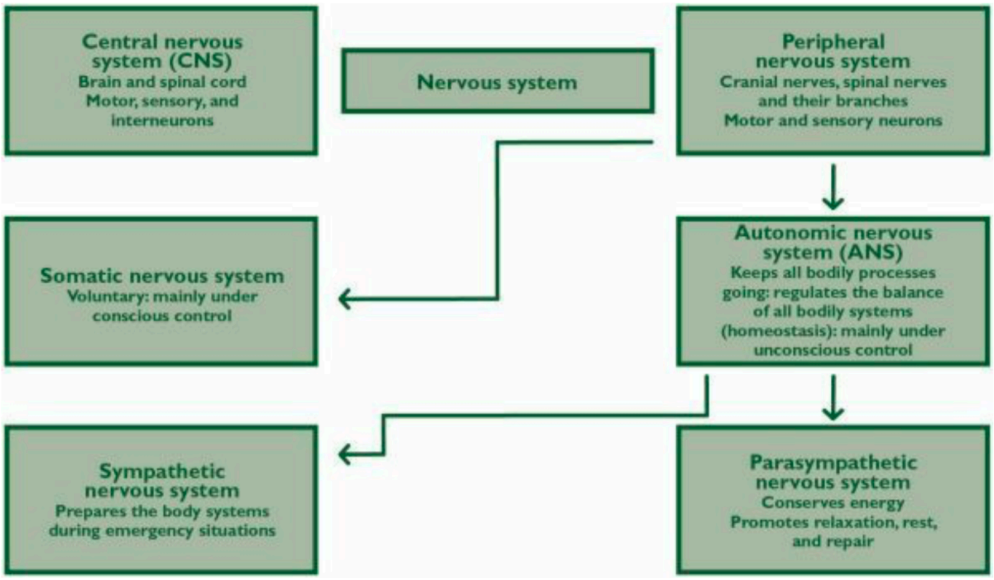


Figure 1. Division of the nervous system (Osar & Bussard 2015, 22)

Further division of the ANS are the sympathetic (fight-or-flight; accelerating the heartbeat and the breathing cycle, pumping adrenaline) and parasympathetic (rest-and-digest; relaxing the body) nervous systems. Due to modern society's often fast-paced lifestyle number of the population live a life in a sympathetic-dominant state (Osar & Bussard 2015, 21). Indeed, the sympathetic nervous system is a necessary system. Reactions to dangerous and alert situations somehow prepare the body in a condition of higher performance. A matter occurs in case of an excessive activity of sympathetic nervous system which creates cripple and unreasonable stress to an organism (Website

of Tattoo Interno 2019). An ability to exist extendedly in a parasympathetic state allows body efficiently to carry out the functions marketable to thrive (digest, repair, detoxify, reduce inflammation etc.) rather than only survive. This is an essential feature in enhancing overall health and longevity, likewise, improving posture and movement (Osar & Bussard 2015, 21).

Every single action performed affects the nervous system. Each exercise acts as an exercise in training or conditioning the nervous system. Therefore, the execution quality and an aware state while performing an exercise is as important as the exercise itself (Osar & Bussard 2015, 22).

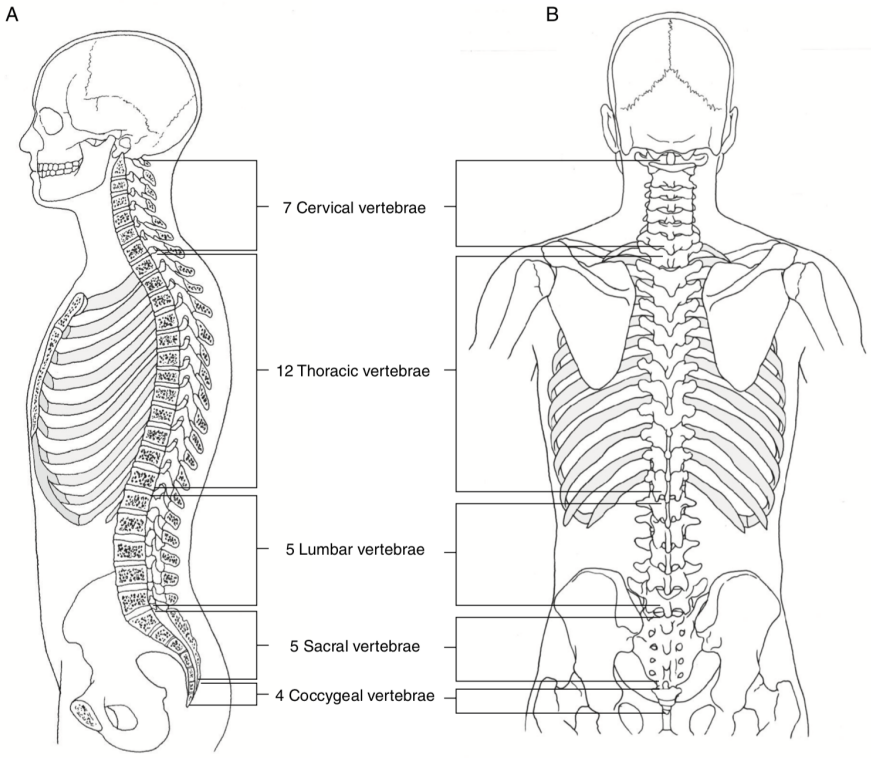
4.2 Osseoligamentous system of thoracopelvic canister

The *osseous* element refers to the bones that construct the structural framework of the body. Thoracopelvic canister is comprised of thorax (thoracic spine, ribs, sternum), lumbar spine and pelvis. Bony architecture of the human body serves as stacked frame for extension of the capacity for locomotion, levers to achieve almost infinite numbers of angles and positions, and fixed attachment points for coordinated myofascial system. Osseous structures of the TPC, additionally, encircle and guard the spinal cord and major vital organs located within the thorax, abdomen, and the pelvis (Osar & Bussard 2015, 23-24).

The *ligamentous* element refers to support system of joint stability. Two articulating bones are connected by the ligaments. Furthermore, ligaments compound fascially with the joint capsule, which offers stability and varying degrees of mobility based on the joint's specific structure and function. Nevertheless, ligaments and shape of a joint are not enough to provide the aid for optimal upright posture and movement. All joints are dependent on the support of the myofascial system through acceleration and/or deceleration of the body without establishing unwanted stresses to the joint and soft tissue structures (Osar & Bussard 2015, 25-28).

The *spine,* being the central axis of the skeletal system (Osar & Bussard 2015, 23), is composed of 33 vertebrae (7 cervical, 12 thoracic, 5 lumbar, 5 fused sacral, and 3 or 4

coccygeal) (Kisner & Colby, 409) (Picture 4). Spine embodies the spinal cord and nerve roots and articulates to three structures: the head at the occipital-atlas joint, the rib cage (12 pairs) and the pelvis at sacroiliac joint (Calais-Germain 2011, 25; Kisner & Colby 2012, 409). Observed from the profile three curves are formed (Calais-Germain 2011, 25). The special architecture of the alternating lordotic (cervical and lumbar) and kyphotic (thoracic) curvatures make it possible for the spine to operate as a functional shock absorber for upkeeping compressive forces from above (gravity and external loading) or from below (the transfer of forces up via body from contact of the foot with the ground) (Osar & Bussard 2015, 23).

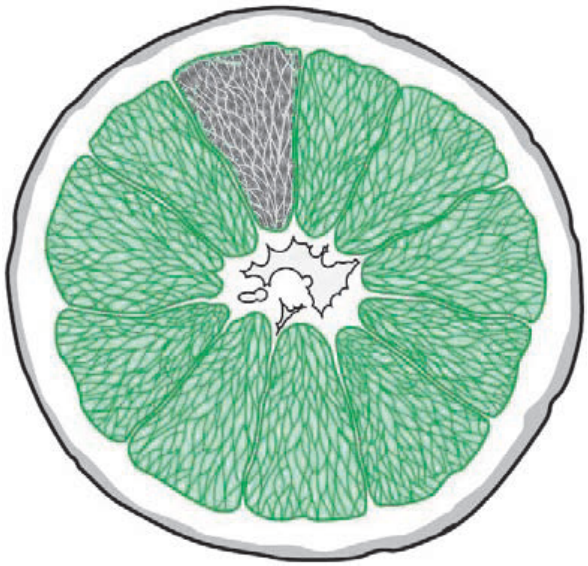


Picture 4. (A) Lateral and (B) posterior views showing the five regions of the spinal column (Levangie & Norkin 2011, 141)

Articulation of the spine is formed with its 74 joints and 23 intervertebral disks. Spine bids rigid and assured column of support for the torso, or on the other hand, flexible and mobile bond courtesy of the multiple muscles stabilizing or moving it (Calais-Germain 2011, 25).

4.3 Myofascial system of thoracopelvic canister

Fascia (Picture 5) stands for web-like structure throughout the human body. It is a connective tissue which envelops, suspends, supports and invests all the structures of the body. The interwoven and inalienable nature of the *myofascial system* (muscles + fascia) creates stability and integrity in the body via either compressive or decompressive tensile forces (Osar & Bussard 2015, 28). The myofascial chains (Picture 6) connect section of the body together to increase the amplitude of stabilization, acceleration or deceleration of the body system. In consideration of the complex setup of the fascial system, theoretically, innumerable muscular chains operate to stabilize and move the body at any given moment (Osar & Bussard 2015, 41).



Picture 5. Fascia can be imagined as the structures of orange (Pilat 2003, 19)

Picture 6. An example of the continuity of the myofascial lines/chains (Osar & Bussard 2015, 42)

TPC of myofascial system can be divided into central/segmental stabilizers and global stabilizers. A multi-layer capsule around the waistline is formed of these muscles (Sandström & Ahonen 2011, 225). Role of global (superficial) and central/segmental (deep) muscle activity of the TPC is not to only operate as principal movers, they are relevant stabilizers of the spine (Kisner & Colby 2012, 417), thus optimal core stabilization is achieved when those two systems are balanced (Osar & Bussard 2015, 31). Substantial factor, however, is that the central muscles should activate before the global stabilizers. Strong and powerful movements are caused by global stabilizers, whereas strong contraction of the global muscles may cause overstress/damage to the joint structure and discus. Therefore, support of the spine in segmental level is essential for optimal myofascial system functioning (Sandström & Ahonen 2011, 225).

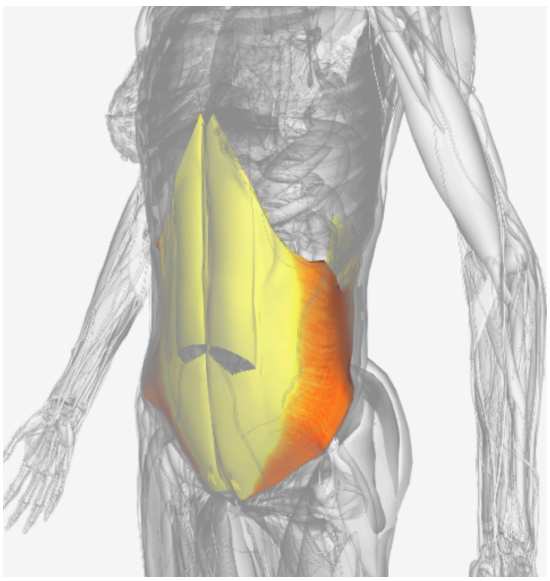
To remark, it is relevant to realize that certain muscles, such as quadratus lumborum, psoas, multifidi and erector spinae, hold properties that could position these muscles to either deep or superficial myofascial system. Denotations that deeper section's fibers of these muscles share characteristics with the deep myofascial system, while superficial section's fibers share traits of the superficial myofascial system. Consideration of those muscles belonging to one group or the other is made for simplicity (Osar & Bussard 2015, 39). Through the myofascial chains, the extremities promote to stabilization as well, so the contribution from the extremities cannot be excluded in a broader and profounder discussion of thoracopelvic function (Osar & Bussard 2015, 24).

4.3.1 Deep Myofascial system of thoracopelvic canister

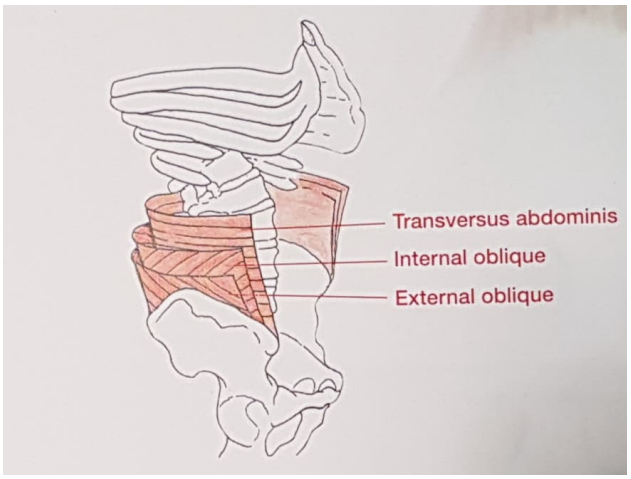
The deeper, segmental muscles have direct attachments across the vertebral segments or through the membrane structure providing dynamic support to individual segments in the spine and support maintaining each segment in a stable position, as well supporting trunk function. Deep muscles are closer to the axis of motion and contain greater percentage of type I muscle fibers (slow twitch fibers) for muscular endurance. Deep muscles of TPC are: transversus abdominis, multifidus, quadratus lumborum (deep portion), deep rotators (rotatores) (Kisner & Colby 2012, 417), pelvis diaphragm (pelvic floor muscles: levator ani and coccygeus), diaphragm (Brody & Hall 2018,

492), psoas (minor and major) (Sandström & Ahonen 2011, 226), interspinales, intertransversarii, levatores costarum (Agur & Dalley 2017, 39), gluteus minimus and medius. Gluteus minimus and medius are not often mentioned as core musculature, nevertheless, will be shortly discussed here due to their significance in aiding maintenance of a stable pelvis, which is relevant contributor to alignment and dance skills (Haas 2018, 85-86).

Transversus abdominis (TVA) (Picture 7), located one each side of the body, is the deepest of the three broad muscles found on the sides of the waist (picture 8.). Separated solely by layer of fascia, TVA is almost up against organs and viscera. Compared other abdominal muscles, TVA acts the least on the skeleton and primarily performs on the viscera. The contractile (red) fibers of the TVA run horizontally at the sides of the waist, which excludes the action of pulling on the pelvis as fibers running parallel to it. At the superior end, TVA connects to the inferior surface of the thoracic rib cage. TVA can draw the ribs closer together at the front of the body, although minimally as the muscle fibers between the ribs are rather short. Ability of TVA to direct viscera towards the thorax or pelvis works in cooperation and is fully completed by the action of other abdominal muscles. At the inferior end, attachment runs to the iliac crest of the pelvis, an area where commonly hands are placed on the hips and enlarges along the inguinal ligament of the groin. TVA muscle in contraction contributes and complements to the action of the internal oblique of supporting the lower abdomen. In practice, TVA can be contracted region by region (Calais-Germain 2011, 12-15).

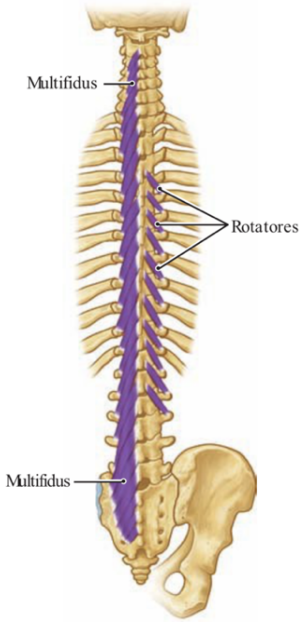


Picture 7. Transversus abdominis (Website of the Biodigital Human Platform)



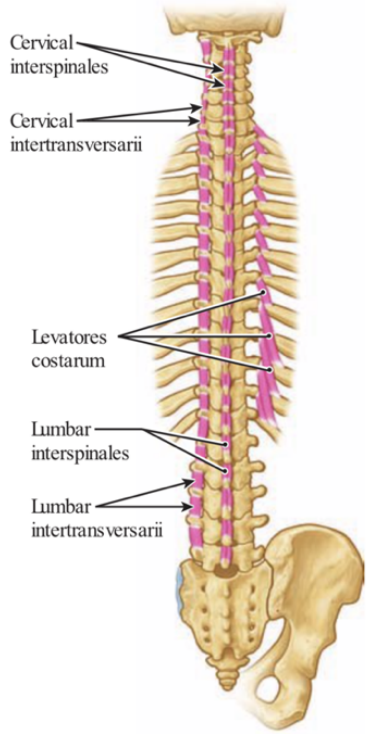
Picture 8. Three broad abdominal muscles found on the sides of the waist (Calais-Germain 2011, 9)

*Multifidus (*Picture 9*),* located one each side of the body, is extending vertebral column when acting bilaterally. Singly, operating only from one side of the body, multifidus acts as slight contralateral (side opposite to contracting muscle) rotator and slight lateral flexor of the vertebral column (Tortora and Derrickson 2017, 332). Posteriorly the multifidus forms a continuous extension from the upper end of the sacrum to the second cervical vertebra (Agur & Dalley 2017, 34). The segmental attachments of the multifidi muscle group have an ability to control motion of the spinal segments as well as increase spinal stiffness. To refer, multifidi has exalted distribution of type I fibers, as well wide capillary network, which emphasizes the muscle's role as a tonic stabilizer (Kisner & Colby 2012, 420).



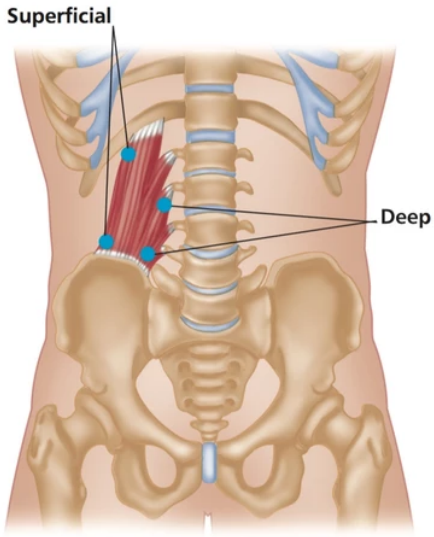
Picture 9. Multifidus muscle and rotatores muscle (Agur & Dalley 2017, 39)

Intersegmental *rotatores* (Picture 9) and *intertransversarii* (Picture 10) are rich in muscle spindles, therefore may function to perceive vertebral position and action more potent to generate torque for movement. *Rotatores* have been also potentially understood as agency of proprioception (Agur & Dalley 2017, 39). These two muscles are in place to make fine segmental adjustments to stabilize against perturbations to posture (Kisner & Colby 2012, 418). *Intertransversarii* muscle aids in lateral flexion of vertebral column. *Rotatores* muscle aid during local extension and rotary movements of vertebral column (Agur & Dalley 2017, 39).



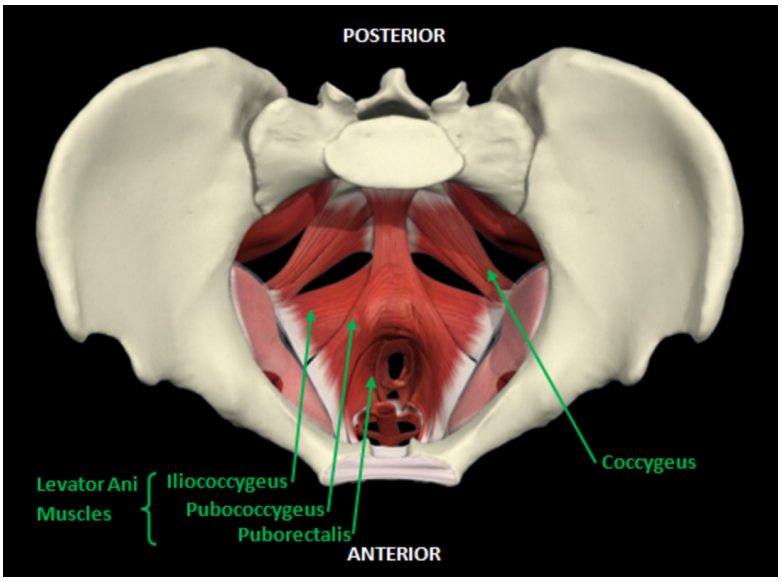
Picture 10. Muscles of Intertransversarii, interspinales and levatores costarum (Agur & Dalley 2017, 39)

Quadratus lumborum (QL) (Picture 11) primarily executes pelvic hike and lateral bend of the vertebral column. Deep muscle fibers of QL provide segmental stability to lumbar vertebrae. During inhalation the muscle functions as a stabilizer for the ribs to operate against the pull of the diaphragm, which imply that efficiency of the diaphragm is improved by the action of QL (Kisner & Colby 2012, 418).



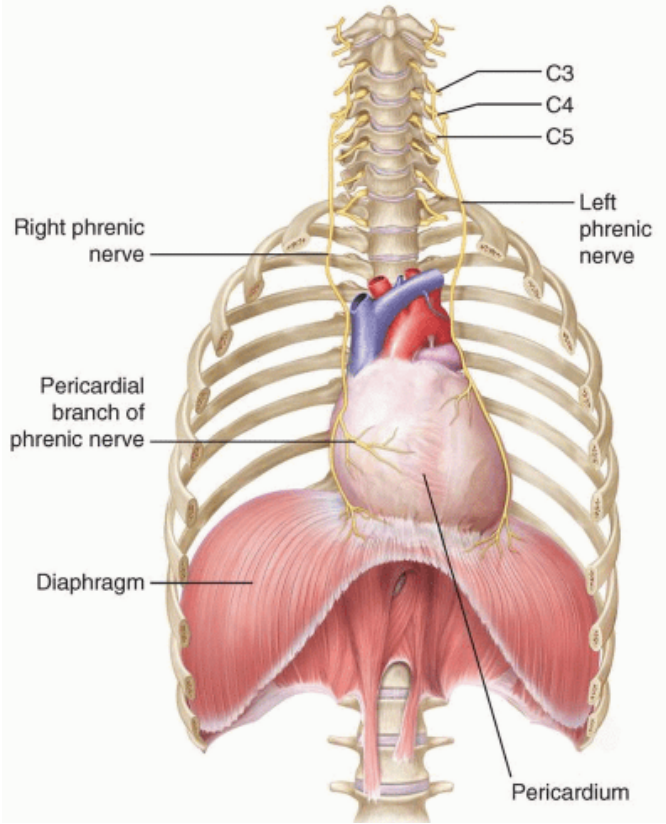
Picture 11. Quadratus lumborum muscle deep and superficial portion (Knight 2019)

Pelvis diaphragm (Picture 12), the deep layer of pelvic floor muscles (PFM), is formed in combination of *levator ani* and *coccygeus* muscles (Kisner & Colby 2012, 934). *Levator ani*, the prime mover of the pelvic floor, in fact consisting of *pubococcygeus, puborectalis, and iliococcygeus,* constitutes majority of pelvic diaphragm that aids in support of pelvic viscera and resists increases in intra-abdominal pressure. *Coccygeus*, constitutes small portion of pelvic diaphragm that supports pelvic viscera, as well flexes sacrococcygeal joints (Agur & Dalley 2017, 397). Altogether, the pelvic floor musculature forms a funnel-shaped orientation, with boney attachments to the pubic bone and the coccyx (Kisner & Colby 2012, 934). The PFM, transversus abdominis, multifidi, and diaphragm operate in cooperation to unload the spine and enhance trunk stability. The PFMs contract prior to movement to assist the abdominals stabilizing the trunk (Brody & Hall 2018, 492). To be noted, compared to male anatomy, female pelvic floor automatically has less intrinsic stability and pelvic organ support due to allowance for passage of the urethra, vagina and rectum (Kisner & Colby 2012, 934). Often dancers compensate for overworked or weak abs, back, hips and inner tights by pressing or overactivating the pelvic floor without even realizing it. Due to the close connection of these muscles, occasionally a role in low back pain, anterior hip pain and other issues in the groin/pelvis area is played by the dysfunction of the pelvic floor (Marks 2018).

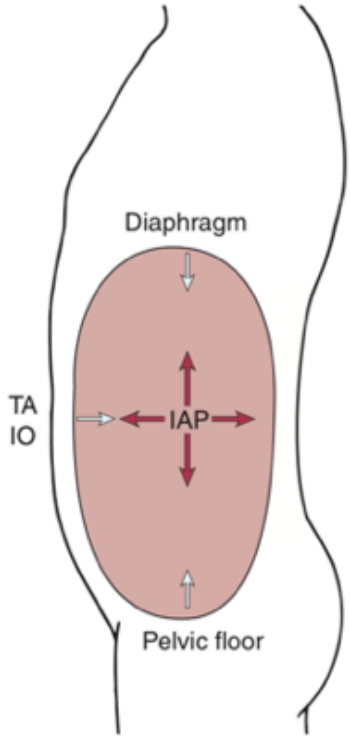


Picture 12. Pelvic floor muscles lying deep within the pelvis (Nguyen 2012)

Diaphragm (Picture 13), the principal muscle of the breathing, convex superior surface forms the floor for the thoracic cavity, and concave inferior surface forms the roof for the abdominal cavity (Tortora & Derrickson 2014, 353). The muscle is attached to the lower end of the sternum, the lowest six ribs and the spine (Haas 2018, 64). Breathing, besides the role of distribution of oxygen throughout the body, has significant function in stabilization of the body. Contraction of the diaphragm increase the volume of the thoracic cavity and contributes constantly to respiration, postural management and the development of intra-abdominal pressure (IAP). One of the most relevant strategies to withstand compressive forces placed on the spine, thorax and pelvis is developing IAP (Picture 14), as this allows the development of smooth and coordinated posture and movement (Osar & Bussard 2015, 64-65). Efficient breathing requires focused practice. The deeper the breathing in executing exercises, the more abdominal muscles will work. Inhalation should origin through the nose and followed by deep strong exhalation, which engages the deep stabilizers (Haas 2018, 89). Moreover, movements of diaphragm aid in return of venous blood passing through abdominal veins to the heart (Tortora & Derrickson 2014, 353).

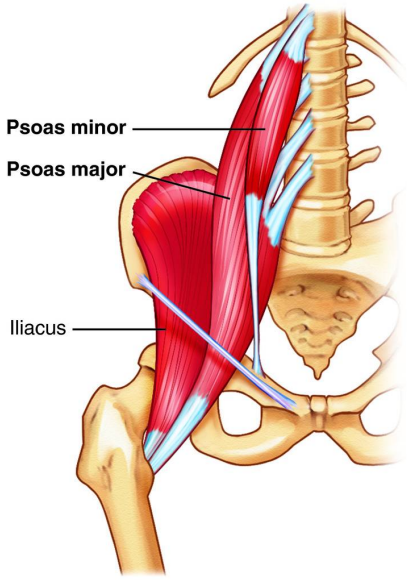


Picture 13. Diaphragm (Liszewski, Zucker, Laya, Restrepo & Lee 2019)



Picture 14. Coordinated contraction of transversus abdominis, diaphragm and pelvic floor musculature increases intraabdominal pressure, which unloads the spine and provides stability (Kisner & Colby 2012, 423)

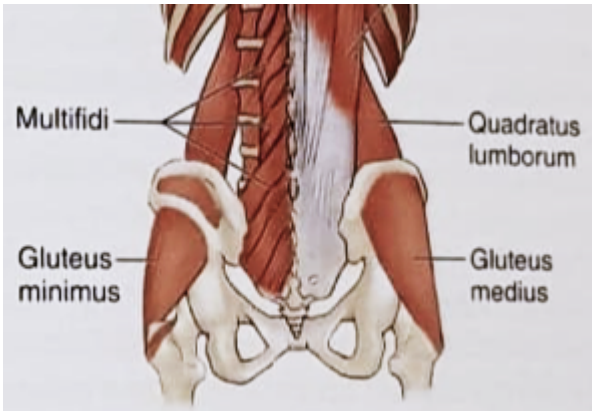
*Psoas (P*icture *15),* fundamentally, contributes to stabilization of the lumbar spine, particularly while heavy load is harnessed to the contralateral side (Kisner & Colby 2012, 419). *Psoas major*, strong deep muscle located anteriorly to the hip joint and lumbar spine, is a stabilizer of the lumbopelvic region as well a hip flexor muscle. Psoas major, uniquely, is an only muscle connecting upper body to the lower body, that means femur to the spine (Staugaard-Jones 2012, 10). Relatively strong compression is applied to lumbar vertebrae in contraction of psoas major. It is vital to have cooperation of psoas major and abdominal muscles, and simultaneous practice of those is recommended. Excessive posterior pelvic tilt caused from sitting and cueing habits as "pull your abs in", "tuck your tailbone under" or "flatten your low back" have been linked to significant fostering to psoas inhibition and a resultant loss of core stability and hip control (Osar 2014, 109). *Psoas minor* compared to psoas major has lesser role, however yet assisting as stabilizer of the pelvis in relation to the lumbar spine (Sandström & Ahonen 2011, 231), mainly operating together with psoas major. The muscle connects lumbar spine to the pelvis. In fact, psoas minor may not be even detected from everyone or is only found from one side of the body (Staugaard-Jones 2012, 10).



Picture 15. Psoas minor and psoas major muscle, Iliacus muscle. Formation of iliopsoas muscle (Website of OTT Chiropractic NW 2016)

Gluteus medius and *minimus* (Picture 16) prime actions are abduction and medial rotation of the hip joint. Moreover, the muscles keep pelvis level while opposite leg is off the ground and aids pelvis during swing phase of walking (Agur & Dalley 2017, 502). These muscles, typically, are relatively strong in modern dancers as a resultant

of comprehensive side leg lifts and parallel leg work. Ankle injuries, for an instance, have been associated with weakness in hip abductors. To strengthen the gluteus medius in abduction alike exercise, the hip must remain slightly extended and the pelvis slightly rotated forward, otherwise (if the hip is flexed) the adjoining tensor fascia latae muscle becomes the prime mover of the exercise (Kisner & Colby 2012, 170).



Picture 16. Gluteus minimus and gluteus medius muscle (Quin, Rafferty & Tomlinson 2015, 135)

4.3.2 Superficial myofascial system of thoracopelvic canister

Global myofascial system, consisting larger muscles, constructs in fact of the intermediate to superficial layers of muscles (Osar & Bussard 2015, 40). Incapability of global muscles to stabilize individual spinal segments is due to little or no direct attachment to vertebrae, thus, the reaction of those muscles is direction specific (turned on by a specific direction of movement) (Kisner & Colby 2012, 417). Superficial muscle role is to create gross stabilization and movement. Primarily, superficial muscles contain greater percentage of type II glycolytic fibers, which allow fast and strong contraction, though fatigue quickly as glycogen is consumed for energy (Osar & Bussard 2015, 40). In case not balanced optimally by the deeper myofascial system, global muscle system may create excessive compressive loading, which possibly leads to painful situation as stress is placed on inert tissues (joints, ligaments, nerves) (Kisner & Colby 2012, 417). Global muscles of TPC are: rectus abdominis, oblique externus and internus, erector spinae (spinalis, longissimus and iliocostalis), latissimus dorsi, iliocostalis lumborum (Sandström & Ahonen 2011, 226), quadratus lumborum (lateral portion),

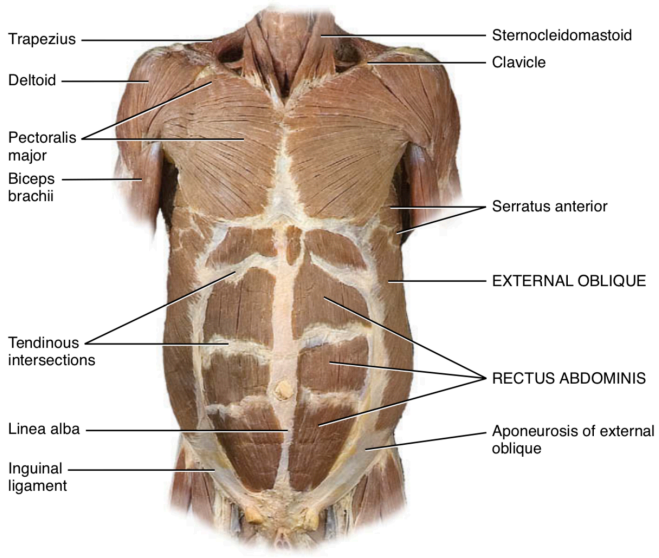
iliopsoas (Kisner & Colby 2012, 417) and intercostals (Tortora & Derrickson 2014, 353).

The *internal obliques* form the middle layer of the three broad muscles found at the side of the waist (Picture 8). At the superior end, the internal oblique muscle attached to the rim of the thoracic rib cage. At the inferior end, attachment runs to the iliac crest of the pelvis, an area where commonly hands are placed on the hips and enlarges along the inguinal ligament of the groin. Internal obliques contractile fibers are wrapping at the sides of the waist as ascending from the pelvis to the rib cage (Picture 17). Internal oblique acts on pelvis by pulling it laterally towards the ribs (side bending) or rotating it forward, meanwhile as well having an ability to inhibit the opposite directions movements. Moreover, internal oblique muscle can draw front of the rib cage downward and toward the side of the pelvis (rib cage flattens and widens), which tends to occur in an exhalation. Indirect mobilization of the spine can occur in the action of internal oblique, nevertheless the muscle is not responsible for moving the spine as there is no attachment to any vertebrae. In contraction of the longest fibers running along the inguinal ligament reinforcement of the ligament as well contribution of supporting the lower abdomen occurs. Contraction region by region is possible for internal obliques (Calais-Germain 2011, 16-18).

Picture 17. Contractile (red) fibers of the internal obliques wrap at the sides of the waist as they ascend from the pelvis to the rib cage (Calais-Germain 2011, 16)

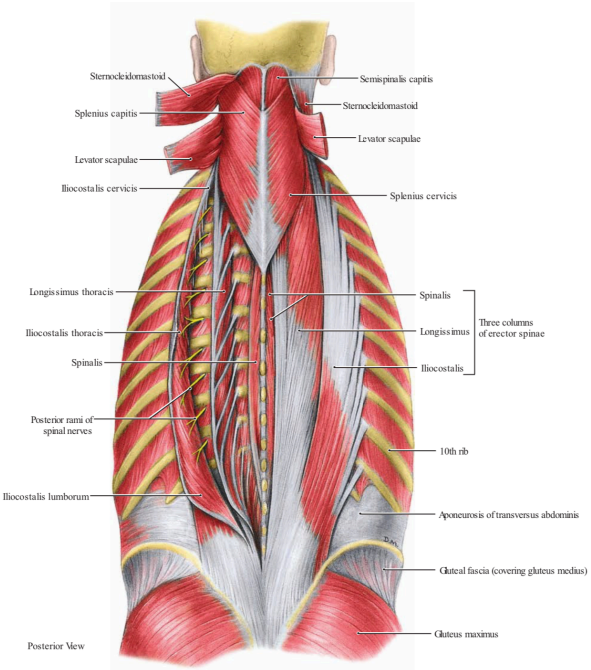
The *external obliques* form the most superficial layer of the broad muscles found at the sides of the waist (Picture 8). Superiorly the external obliques attach primarily to the sides and front of the rib cage. At the inferior end, attachment runs to the iliac crest of the pelvis, an area where commonly hands are placed on the hips and enlarges along the inguinal ligament of the groin. The external obliques contractile fibers swathe at the sides of the waist descending from the ribs to the pelvis. The muscle acts on pelvis by pulling it laterally (side bending) or rotating backward, meanwhile as well having an ability to inhibit the opposite directions movements. External oblique pulling the thoracic rib cage results in narrowing of the front ribs toward the middle of the trunk. Indirect mobilization of the spine can occur by lateral bend of rib cage/pelvis, nevertheless the muscle is not responsible for moving the spine as there is no attachment to any vertebrae. Contractile fibers of the external oblique are longest at the area of lower abdominal by stretching from the ninth and tenth rib to the inguinal ligament and contributing to the support of the lower abdomen. Contraction of the external oblique muscles are potential zone by zone (Calais-Germain 2011, 19-21).

Rectus abdominis (Picture 18), widely known as the “six-pack” (Wilmerding & Krasnow 2017), is the only muscle layer forming the front of the abdomen (Calais-Germain 2011, 6). Vertical extension of the muscle origins from pubic crest and pubic symphysis to the 5^{th}-7^{th} ribs. Prime action of the rectus abdominis is the flexion of the vertebral column (especially the lumbar portion) (Tortora & Derrickson 2017, 304), retroversion of the pelvis, as well the muscle can pull the sternum towards the pelvis. Rarely the contraction of rectus abdominis occurs along its full length: it has ability to contract uniquely below the ribs, at the level of the navel or above the pelvis (Calais-Germain 2011, 7-8). The sheaths of the other three abdominal broad muscles are forming the midline of a though fibrous band, simultaneously also the enclosure of the rectus abdominis, called *linea alba* (picture 18.), alternatively the white line (Tortora & Derrickson 2017, 306).



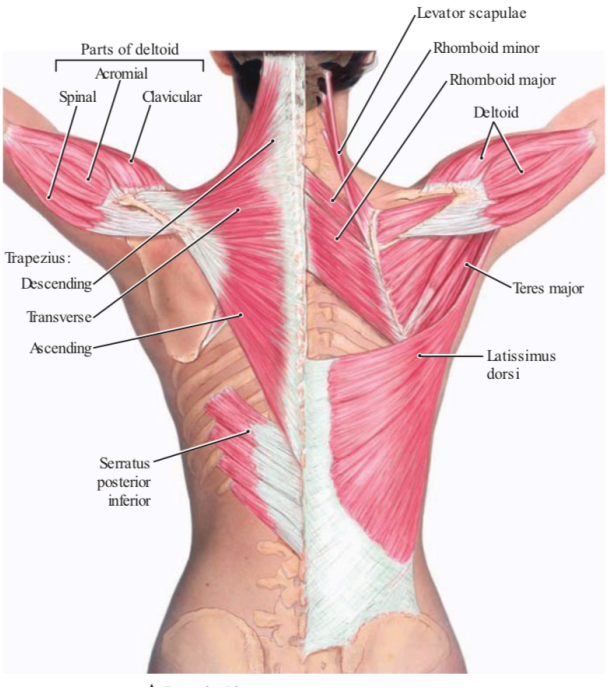
Picture 18. Anterior view of the abdominal wall; rectus abdominis and linea alba (Tortora & Derrickson 2014, 352)

Erector spinae (Picture 19), in fact rather an intermediate layer muscle, spreads into three longitudinal columns: *iliocostalis* laterally, *longissimus* in the middle and *spinalis* medially in relation to the vertebral column (Agur & Dalley 2017, 33-38). Primarily the muscle group act as trunk extensors by maintaining erect posture of the vertebral column. As a stabilizer erector spinae act as antagonist to gravity by controlling movement of trunk during forward bending operations. The global stability is provided by long guy wires of the erector spinae during external loads occurrence, which prevents the trunk from falling over (Kisner & Colby 2012, 418).



Picture 19. Three columns of erector spinae (Agur & Dalley 2017, 33)

Latissimus (widest) *dorsi* (of the back) (Picture 20), widest muscle of the body, is a vast and triangular shaped muscle located on the inferior part of the back that makes most of the posterior wall of the axilla (armpit). Latissimus dorsi extends, adducts and medially rotates shoulder joint, while its reverse muscle action is enabling vertebral column and torso to be elevated (e.g. pullup action, climbing) Often the muscle is called the "swimmer's muscle" as its several actions are used while swimming, indeed, many competitive swimmers have well-developed "lats." (Tortora & Derrickson 2014, 362-363; Agur & Dalley 2017, 10). Contraction of latissimus dorsi, serratus posterior inferior, internal oblique and transverse abdominis increases tension via angled thoracolumbar fascia, facilitating stabilizing vigor for the lumbar spine. Moreover, the "X" construction of the latissimus dorsi and contralateral gluteus maximus has the potential to support stability to the lumbosacral junction (Kisner & Colby 2012, 421).

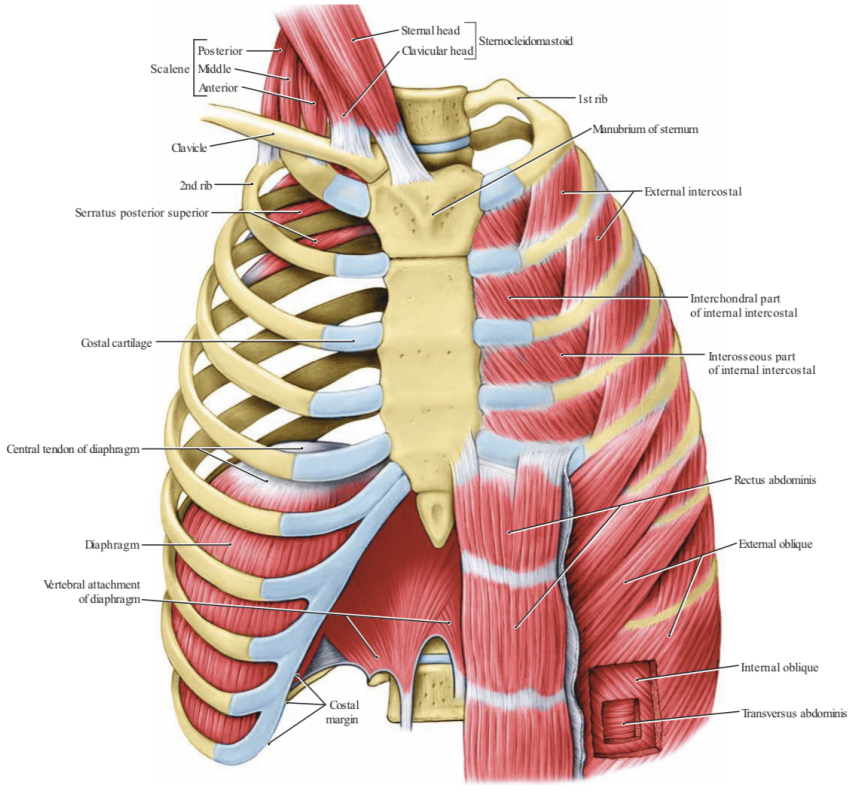


Picture 20. Posterior view of latissimus dorsi (Agur & Dalley 2017, 103)

Iliopsoas (Picture 15) is formed of two muscles called iliacus and psoas major, which share a common insertion area of lesser trochanter of femur (Tortora & Derrickson 2014, 380). Psoas major muscle have been discussed individually in above section of local stabilizers of TPC. Together the psoas major and iliacus, so the iliopsoas, is considered as the major hip flexor, however as well stabilizer of hip joint. Thus, due to the developed muscle function the dancer promotes an ability to lift the leg above the 90 degrees. Although, the weakness and tightness of the muscle could misalign the low

back and pelvis, which in turn could result in possible injuries down to the legs. For the record, diaphragm also has muscle attachments to the iliopsoas, thus aggressive sucking in of the belly not only inhibits the efficiency of the diaphragm but also iliopsoas, which can result in unwanted tension in the hip joint (Haas 2018, 66; 145-146).

Intercostals (Picture 21), another muscles participating in breathing, span the spaces between ribs (intercostal spaces). In fact, these muscles organize into three layers, yet two of them are discussed here: *external intercostals* occupying the superficial layer and *internal intercostals* occupying the intermediate layer of the intercostal spaces. During inhalation external intercostals (11 pairs) lift the ribs to aid expanding the thoracic cavity. During forced exhalation internal intercostals (11 pairs) approach the adjacent ribs together to aid reduce the size of the thoracic cavity (Tortora & Derrickson 2014, 353).



Picture 21. Internal and external intercostal muscles (Agur & Dalley 2017, 216)

5 TARGET GROUP

"Danza dance school aims to provide a spot in the competitive group for dancers who consider dance to be more than a hobby for them, who's ambitions are high, and they can't imagine themselves to be without the feeling of adrenaline rush deriving from competitions. For many years Danza dance school has shown its high level at Estonian dance competitions, as well challenged themselves in many international arenas. Our ambitions are great and in order to reach goals we are motivated to contribute our time, energy and enthusiasm to the team's development. Adults competitive team member have to be ready to train minimum 5 hours a week, consisting the attendance of choreography, ballet, dance technique, acrobatics, improvisation, as well get familiar with a variety of dance techniques/styles aiming to develop and support advanced knowledge and awareness in broader context of the dance field (Website of Danza dance school 2017)."

The target group (Picture 22) of this thesis was adults competitive dance group, who's average dance experience is 10 years. This group trains in average 11 hours a week, 5 to 6 times a week. The exact composition of this group has been training together only since September 2019, although many of the dancers inside the group have been training together up to 12 years. The group members are born between the years 2000 – 2005, meaning their age group is from 14 to 19 years old. The group's main dance style is contemporary jazz, but trainings are not limited to only that style. Weekly schedule of the dancers consists of competition choreography rehearsals, ballet, conditioning sessions, modern/contemporary dance sessions, dance technique, solo choreography rehearsals and individual rehearsals. Moreover, few of the competitive group members are also leading some hours of younger dancers' dance sessions by themselves (feedback from the workshop participants through google online survey 2020).

Picture 22. Danza dance school adults competitive team (Tõntson 2019)

6 THEORY MODEL OF FACILITATING AN INTERACTIVE WORKSHOP

An interactive workshop is distinct from a standard meeting as it seeks to induce creativity through collaborative working. Interactive workshop includes, commonly, group activities. It is said, as well, that the minimum time to implement an interactive workshop would be 2-3 hours. Moreover, another consideration is that interactive workshops can require additional time and resources to plan and deliver as activities, templates, and materials are necessary to be prepared in advance (Pavelin, Pundir & Cham 2014, 1).

To become a successful author, couch, mentor, speaker or workshop leader it is important to understand the thought process which is necessary to obtain desired results. Jack Canfield, an experienced coach from United States, has shared some essential key points to consider in order to lead an effective workshop. He calls the creation process of the speaks or workshops camp field methodology (Canfield 2017).

To start with, Canfield recommends, origin the process by imagining a building a house. To build a house one must begin with creating a blueprint, considering all the

details such as a size, amount of rooms, layout, plumbing, electricity and so forth. Accordingly, similar process is needed to be done when designing a content for the workshop or a speech (Canfield 2017).

Firstly, author should determine what is the desired outcome the creator of the workshop content wants for the attendees. Determining the purpose aids to understand who should attend the workshop, how many attendees it should include and where the workshop should be held. Certainly, an important factor is to know the audience beforehand, so that the creator could make relevant examples and stories that audience could relate to (Canfield 2017). In case participants are not chosen by the workshop author, it is still essential to find out the profiles of the attendees and examine how the background correlates with the objective(s) of the workshop (Pavelin, Pundir & Cham 2014, 1).

Clear presentation, which is also engaging and memorable for the audience has a structure which helps the workshop author to stay on track and cover throughout the key ingredients. In the beginning of the workshop, audience needs an engagement by the author clarifying the central idea of the workshop and setting the author's goal for people's experience after the event. Next, the tone of the day is necessary to be set, meaning that the author needs to express what makes him passionate about the topic that it is so important to share with the audience. Wise would be to tell a story of what made the author that committed to the particular subject by being relatively opened and transparent about it as this creates audience to connect with the creator. Further, it is always a great idea to include some humor, for an instance by telling a funny story or using visual cues. Although the topic itself might be serious, humor is considered to be one of the best ways to connect with the audience, as well create relaxed atmosphere. Moreover, introducing an ice breaker activity is commonly used to create a specific effect, either small group or entire group tasks, games or exercises could be used for that. Author should always demonstrate first before asking the audience to carry out some task (Canfield 2017).

Introducing a fundamental concept-principle that will operate and work on the authors promise is recommended as well. Subsequent to sharing the concept or principal it is relevant to construct credibility by sharing statistics, research and/or evidence-based

data to validate the workshops teachings. Stories are a great way to deliver the message as those illustrate the concept more clearly and make it relatable, as well create engagement to the workshop and long-term memory to audience. In fact, personal stories have the deepest impact. In order to appeal with all kinds of learners it is recommended to use visual aids and follow up with an interactive exercise, for an instance using a volunteer for demonstration, filling a worksheet in a group or having a group activity such as meditation or guided visualization (Canfield 2017).

For wrapping up the workshop it would be wise to lead audience to debriefing session. Debriefing could be settled by putting people to pairs, small groups or simply leading a spontaneous sharing circle in front of the group. As well, participants will get an opportunity to ask any questions. Advisable is to be impartial to the final reflections, ideas and feedback of the attendees by simply encouraging the participants input. As a final step, after the workshop itself has been reviewed, author of the workshop could get everyone to commit to one action step to get the participant closer to one's goal or closer to applying the knowledge taught during the interactive workshop. It's recommended to write it down or even do share it to the partner, that action often makes people take the action more seriously. For full closure of the workshop author could make a final group exercise and/or wrap the workshop up with a powerful story which leaves the participants motivated and inspired to develop further in the specific subject (Canfield 2017).

7 IMPLEMENTATION OF WORKSHOP

Workshop for the competitive dance group was held on 1st of February 2020 from 12.00-14.00 at Danza dance school big hall facilities. After reviewing the broad theoretical background, as well taking into consideration the 2-hour time limit to hold the interactive workshop, ultimately, author of the thesis had to decide to introduce more profoundly four of the central stabilizer muscles: transversus abdominis, pelvic floor muscles, multifidus and diaphragm. These exact four muscles were chosen as literature has shown often a cooperation link of these four deep muscles contributing to spinal

support and stability (Brody & Hall 2018, 492). Author outlined to the participants the fact that thoracopelvic canister support do not confine only with those four discussed muscles, whereas saw a reasonable starting point of learning process of one's functional anatomy and deep activation.

Along with above mentioned subjects, topic of the importance of thoracopelvic optimal function in dance, as well the difference and role of the central and global stabilizer musculature was discussed in the beginning of the workshop. Author has used a pie-chart/clock method of planning a workshop, which she has invented for herself and finds as a beneficial tool for time-management, memorizing and systemizing the content of the workshop. Every quarter of the workshop stands for 15-minutes as it would be on the clockwork. Moreover, pre-prepared flipchart, life-size skeleton, self-made muscle imitations and anatomy pictures were used throughout the workshop to use visual aiding and outline important key-aspects. Following will introduce the practical layout using the pie-chart/clock method on figures (Figures 2 and 3) and some interactive tasks used in the workshop.

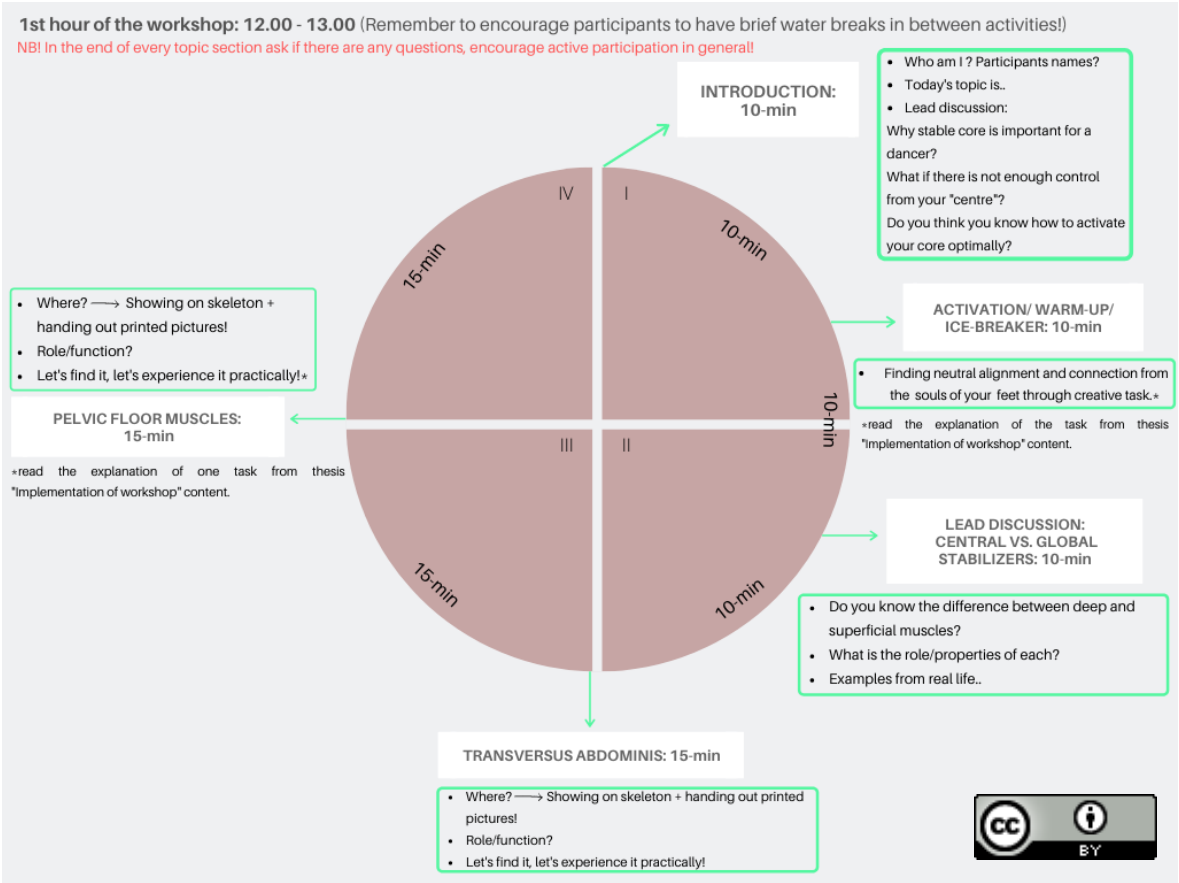


Figure 2. Layout of the first hour of the workshop

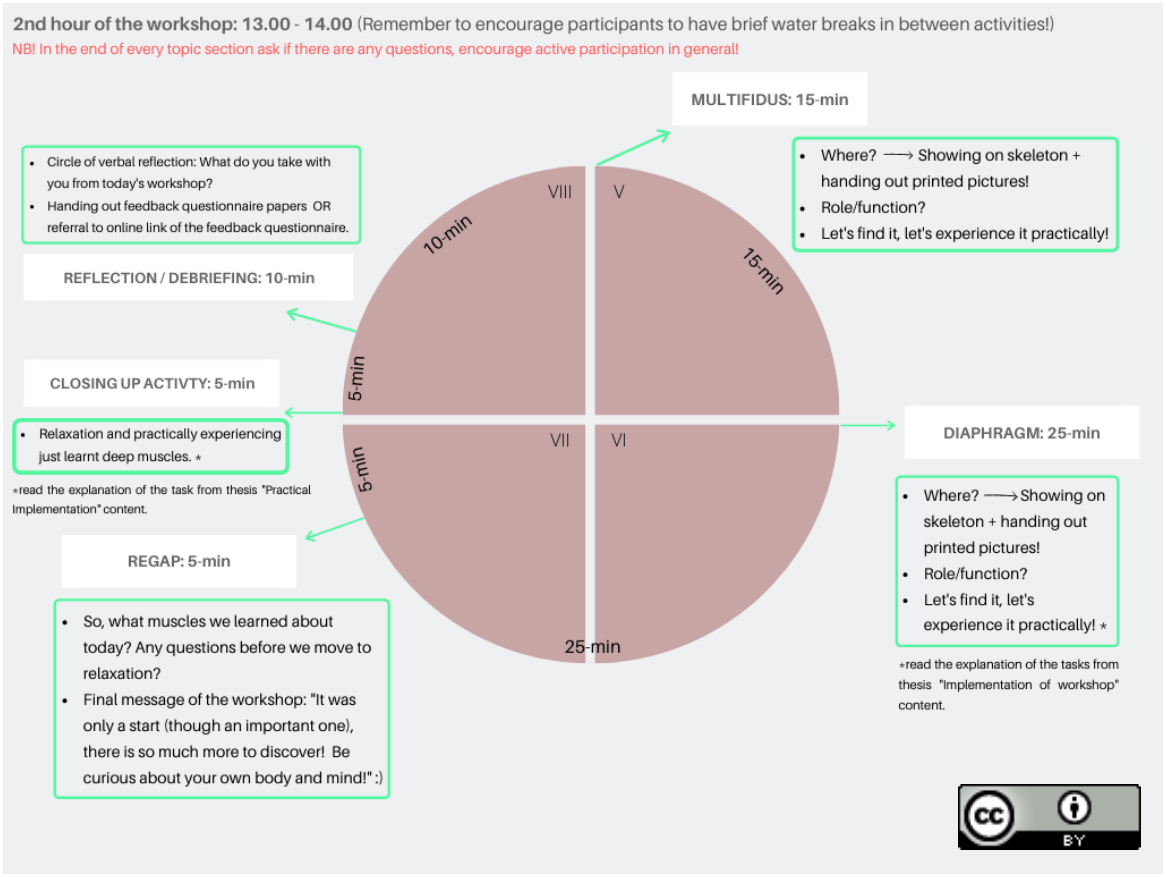


Figure 3. Layout of the second hour of the workshop

ACTIVATION/WARM-UP/ICE-BREAKER ACTIVITY:

In dancing, both dynamically and static positions, the weight in the foot should be distributed evenly in a triangle created by the first metatarsal (opposite the big toe), fifth metatarsal (opposite the baby toe) and center of the heel. In any turned-out position the equal distribution of weight should be a goal (Wilmerding & Krasnow 2017, 27). Above gave an idea and inspiration for the thesis author to create a following activity.

Although the essence of the workshop was not teaching dancers correct alignment, author of the thesis still found it to be important to lead the participants to find as neutral and as healthy alignment as possible for the rest of the workshop. For the implementation of the task the author had cut small squares of thick double-sided adhesive tape, six pieces for each participant. Beforehand, the tape pieces were stick on a glossy paper in order to handle the workshop more smoothly and avoid the need to cut

the pieces on spot. The tape was chosen to be a thick version, as the aim was to feel it under the soles of feet.

Instructions for the task were following: *Find the three "key spots" under the soles (first metatarsal, fifth metatarsal, centre of the heel) and paste stickers on those points (Pictures 23 and 24). We all stand up now on a dance floor surface and start finding equal weight distribution between those taped points under the soles, also feel equal balance on both feet. Relax your pelvis, abdominals, shoulders, neck, facial muscles and feel your spine lengthening. Find deep, steady and natural breathing. Now when you have created more centred and steady feeling, let's move around! The idea from now on is that any task I give you, simultaneously you always try to come back to finding the equal weight distribution from under the soles through the taped points. Notice if there is any tendency for your feet to turn more inwards or outwards.* Different commands were given, like:

-Walk around the entire hall spontaneously (slow motion, brisk walking, jogging, running, backwards etc.);

- Everyone "STOP" suddenly (find your connection from the taped points);

-Improvise in dancing, trying to focus on small movements and internal focus (reminding the feet connection again);

-Stand and balance on one leg;

-Softly jump and try to weight bear from one side to another.

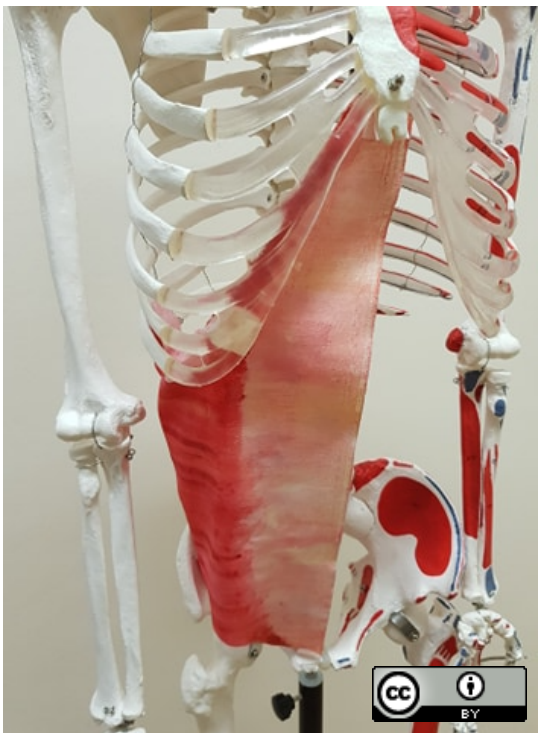
It is a creative task thus many other instructions and commands can be prepared for it. After the task execution, brief feedback of the after feeling was shared among the whole group.

Picture 23. Author of the thesis giving instructions for the activation task.

Picture 24. Competitive group's teacher demonstrating the "triangle spots" under the soles of feet.

TRANSVERSUS ABDOMINIS SECTION OF THE WORKSHOP:

In the picture 25 it can be seen the self-made imitation of transversus abdominis muscle. Author wish was to clearly indicate the anatomical area which the muscle covers, to make dancers understand the properties of transversus abdominis better. In this section briefly, likewise, three other abdominal muscle layers were discussed for better understanding of the big picture of abdominal musculature.

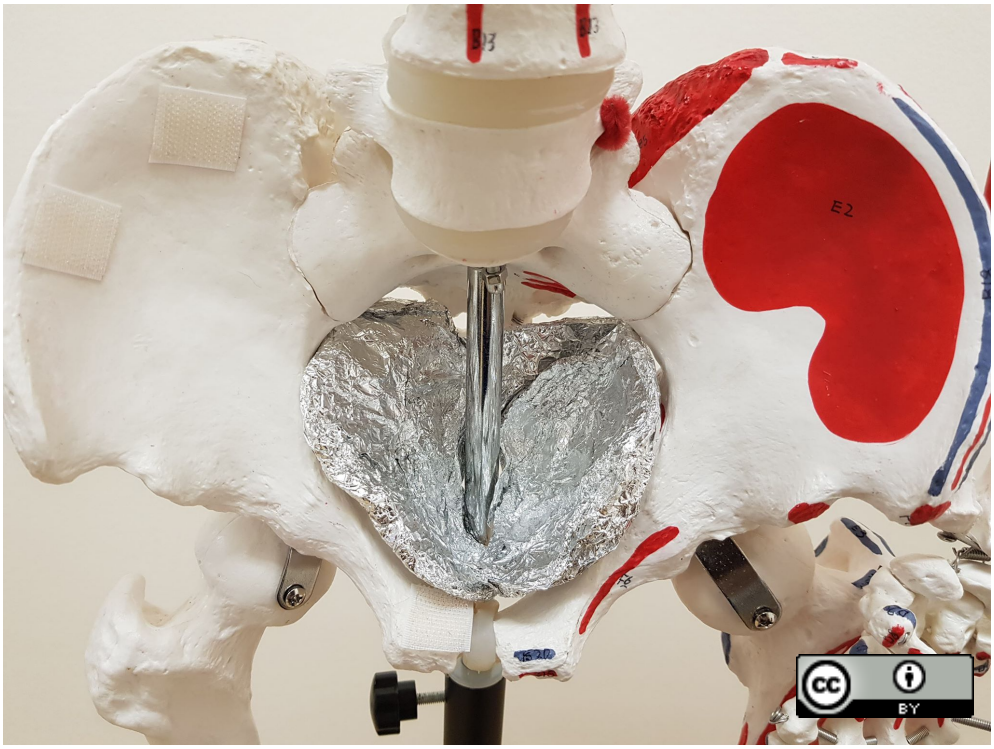


Picture 25. Self-made imitation of transversus abdominis muscle (note, anatomical faults might appear on imitation)

PELVIC FLOOR MUSCLES (Picture 26) SECTION OF THE WORKSHOP: PRACTICING DYNAMIC WORKOUT/ACTIVATION OF THE PFM

Instructions for the task were following: *To understand the pelvic bones movement, let's first look at the skeleton. When tilting your pelvis forward, the bones of the buttocks (sit bones) move apart and the tailbone backwards (also called an extension of the pelvic floor muscles. Tilting your pelvis backwards (shortening of the PFM), sit bones move towards other and the tailbone moves forward. Right? Now let's experience and practice it dynamically. Squat slightly back and find your sit bones, grip them*

and keep holding the soft grip. Now bring your pelvis forward and backwards, experiencing the movement of the pelvis, meanwhile we also work out our PFM. Another option is to grasp from the right sit bone and start turning your right foot inwards by bending the right knee and pushing your right hip backwards to the stretch (as if you were pulling the sit bone with the grasping hand). Return to the centre by pushing the right sit bone with right hand grip and repeat the sequence to the left. We keep experiencing the movement side to side. It is quite normal that now you might feel increased feeling in the pelvic floor, perhaps even a relaxed sensation in the shoulders and elongated spine (Franklin 2017).



Picture 26. Self-made imitation of pelvic floor muscles using material of foil (note, anatomical faults might appear on imitation)

MULTIFIDUS SECTION OF THE WORKSHOP:

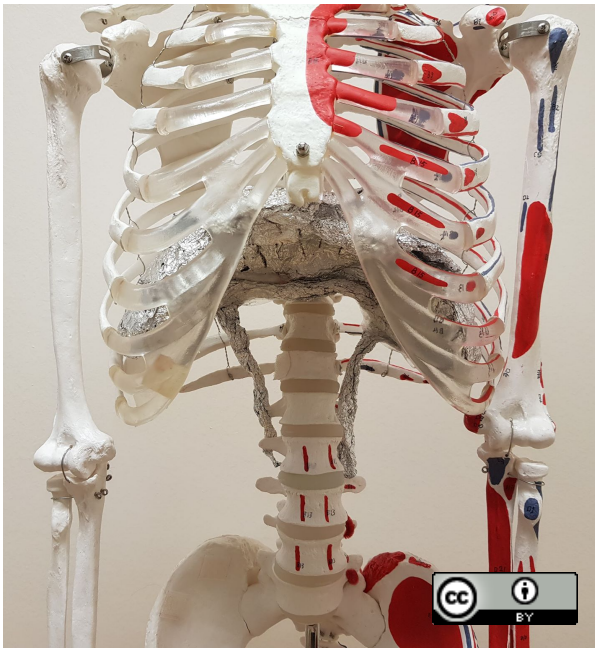
In the picture 27 it can be seen the self-made imitation of multifidus muscle. Author idea was to visualize the muscle properties by showing the close segmental attachments. This was a baseline for dancers to understand how close to the spine the muscle runs and give them idea before the practical discovering of the muscle.

Picture 27. Self-made imitation of multifidus muscle (on the left), using fabric and chenille stems (note, anatomical faults might appear on imitation)

DIAPHRAGM (Picture 28) SECTION OF THE WORKSHOP: PRACTICING DIAPHRAGM MOVEMENT

Instructions for the task were following: *Place your one palm as it would be a roof below your chest* (Picture 29)*, on the area of diaphragm, this will be featuring your diaphragm. Another hand place as it would be a floor/bowl* (Picture 29) *on the area of your pelvic floor muscles, this will be featuring your pelvic floor muscles. On inhalation move the hands downwards (this is demonstrating the diaphragm and PFM moving downwards direction). On exhalation move the hands upwards (this is demonstrating the diaphragm and PFM moving upwards). Now let's put all of this to a dynamic movement. You keep moving the hands as just instructed, inhalation is downward direction and exhalation upward direction. Let's go to a forward bend (flexion), extension, lateral flexions, rotations), breathing and hand movement continuous all the way! We are working on a natural way of deep muscle activation. Indeed, there are more challenging exercises for that, whereas simplicity is often a key learning your own body. Try the same task dynamically, but with gripped belly button. Is it easier or more difficult to do, can you breathe properly? In order for the body to optimally*

function, it needs movement, stability and breathing at the same time. Thus, gripping the belly button strongly towards the spine while dancing does not support you in finding your stability (Franklin 2015).

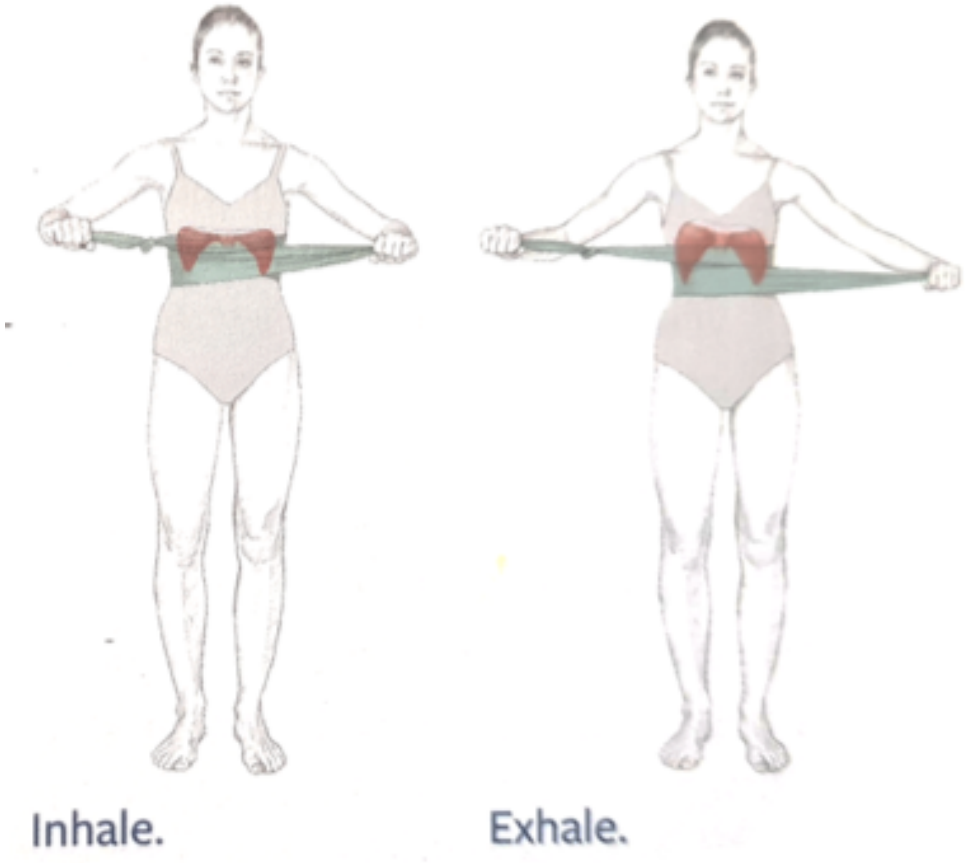


Picture 28. Self-made imitation of diaphragm muscle using material of foil (note, anatomical faults might appear on imitation)

Picture 29. Eric Franklin and his student demonstrating diaphragm and PFM movement (Franklin 2015)

DIAPHRAGM SECTION OF THE WORKSHOP: LATERAL BREATHING WITH RESISTANCE

Instructions for the task were following: *Find a good standing posture, having a stance hip distance apart.* Wr*ap the resistance band around your ribs from the back, cross it in front, holding the ends with your hands. On inhalation widen the rib cage into the resistance of the band* (Picture 30)*. On exhalation, actively pull the band to help the rib cage retract. Working with the band allows you to advance the inhalation technique to improve lung capacity. Bring your focus on deep breaths, diaphragm movement, and activation of the deep abdominals. Now let's practice it with a partner! Place your hands on the back of your partner's ribs. When the partner inhales, feel the ribs moving into your hands. On the exhalation, gently press into the ribs to assist with the returning of the ribs. Notice how the coordinated lateral breath creates light feeling in your body, it also supports you to move with fluidity and depth* (Haas 2018, 71).



Picture 30. Lateral breathing with resistance (Haas 2018, 71)

CLOSING UP ACTIVITY: BALANCING ON PARTNERS' BACKS (Sherborne 1990, 18-20)

Author of the thesis chose this task as a closing up activity of the workshop (Picture 31), which idea was inspired from a book “Developmental movement for children” by Veronica Sherborne. As author had experienced the method on herself, she believed it to be a strong technique for body-awareness and relaxation, thus decided to adjust it to the context of the workshop meant for dancers. The purpose was to have relaxation after 2-hours of information gathering, as well to give dancers a moment of silent self-reflection and create a group awareness at the same time, for experiencing and summoning just learnt topics altogether, learning body awareness of just learnt muscles. The whole group was split to halves for the execution time of the task. Soothing music was played at a background.

Instructions for the task were following: *Form a close chain being on all-fours with your peer dancers. One of you will stay out from the chain and instead lies on the belly on top of others' backs and can fully start relaxing. Start swinging your peer on top of your backs in a synchronized rhythm, it can be to the left, to the right, circular, whatever calm rhythm you find within your group. You can close your eyes, start feeling how you are supported by your deep structures. Now start summarizing yourself everything what you learned today: first experiencing the transversus abdominis, multifidi and pelvic floor support and only then build-up of the other muscles, more superficial muscles strength. Breath fully with your diaphragm, letting your belly move freely and seeking the lateral/horizontal expansion and narrowing of the rib cage. As well reminding yourself the movement of the diaphragm, in inhalation it moves downwards (contracting) and in exhalation it moves upwards (relaxing). Form a strong foundation of this feeling for yourself. As a mutual group of dancers, try to finish the swinging slowly (without any verbal guidance of each other, just “feeling” each other) and then safely putting your same hand over your peer on top, slowly sitting towards your heels as one and letting your relaxed friend softly on the floor.*

Picture 31. Closing up activity of the workshop

Picture 32. Thesis author with the Danza dance school lead teacher on the left and competitive group teacher in the middle

Picture 33. Participants of the workshop

8 FEEDBACK AND ANALYSIS OF THE WORKSHOP

Receiving and analyzing written feedback after the implementation of the workshop was one of the objectives of this thesis. Author of the thesis had prepared paper version feedback forms to hand out in the end section of the workshop. Due to the external factors, facilitator was not able to dispense the paper version feedback forms after the workshop, as the previous dance lesson in the hall where the workshop was held was occupied longer than expected, as well no buffer time afterwards was available (as another dance session of the same group had to start in the hall already). Despite that, brief yet productive verbal feedback among the group was shared and an agreement to receive the written feedback through the online survey form was made between the workshop facilitator and participants. The same day, workshop facilitator shared the online form to the Danza dance school to receive as fresh feedback as possible. Out of 15 participants, at last, 12 written feedbacks were received. Author of the thesis still

believes that those 12 people gave a convenient reflection opportunity for her as a facilitator and sees a valuable learning outcome.

As the original written feedback questionnaire language is in Estonian, content and questions of the feedback survey will be presented in the thesis at current subheading in translation to English. As well, summary of the received feedback directly after each question will be shared and analysed by the thesis author.

The beginning section of the questionnaire form consisted of brief introduction which appeared as follows (translated from Estonian):

"Lovely dancer,

I greatly appreciate your feedback that will help me to complete the analysis section of my undergraduate work. Moreover, honest feedback will give me the opportunity to develop myself in the field of (dance) physiotherapy in the future and to shape the workshop you have recently received according to your needs and wishes.

The survey is anonymous. (Thus, don't hold back!)

Sincere thanks! :)
Kai-Rin (and Aleks)

P.S: I wish you a pleasant and exciting discovery as you explore your body! I urge you to be a curious and an aware dancer!"

To be mentioned, Aleks is the skeleton which was supporting the visual aiding of the workshop and humanizing him became a mutual humour between the facilitator and participants.

Thereupon, "general information" section followed which consisted a data about year of birth, dancing experience in years, quantity and hours of the training sessions in one week, and exercise/session styles/regimen throughout one week. This data is presented in the "target group" section of this thesis.

After general information section multiple choice, as well opened form questions about the workshop itself followed. An option "other" in multiple choice questions was an opportunity for participants to include their opened/extended opinion and if desired to provide an additional comment (although, it was not compulsory to do it).

How would you rate the pace of the workshop? (options: "slow", "enough/appropriate", "fast/rapid", "other")

All the answered participants, thus 12 out of 12 responses, evaluated that the workshop pace was appropriate. No additional comments were received.

Author of the thesis, subjectively, can mostly agree and felt that the workshop pace was appropriate, thus did not felt she lead it too slowly or either too rapidly. Nevertheless, for future, time management could be still adjusted, for an instance inclusion of a buffer time for unexpected situations, as well 5-10 minutes extra time for interactive sections of the workshop (to be able to show broader variety of practical examples and have more profound debriefing).

How would you evaluate the scope of the topics covered in the workshop? (for an instance: did we talk about too many or too few muscles) (options: "little", "exactly enough", "too many topics", "other")

Eleven answered participants out of twelve evaluated the scope of the included topics as "exactly enough". One respondent also gave an additional comment as follows: "*I think for the person who came into contact with the subject first time the scope of workshop content was just enough, for a dancer who would be already knowledgeable in the subject workshop could have been opened up even more topics*." One respondent evaluated the covered topics as "little", with no further comment about it.

Subjectively, author of the thesis feels that the topic could be definitely opened up wider (considering already the fact, that the amount of the theoretical background of the thesis is greatly wider than the workshop content itself), and more profoundly, although extra time for the workshop would be appropriate in that case. Moreover,

participants profile of previous knowledge of anatomy should be available then. Majority of the participants did not have previous access and beforehand interaction about the workshop topic. After having a reflective discussion with the founder of the Danza dance school, still, a common belief that the opened topics of the workshop were already relatively "big piece to chew" for several participants, and the chosen scope of the workshop was rather an appropriate and valuable starting point to lead/support the girls to get more familiar and aware of knowing their own body functionality as a dancer.

On a scale of 0 to 10, how needed/relevant do you think received workshop for a dancer would be (0 being not at all, 10 being highly needed/relevant)? If you wish, you can clarify your choice of the scale number with your free comment in the "other" box!

Five respondents evaluated the received workshop importance to dancers as 10; five respondents rated it as 9; one rated it as 8 and one rated the importance as 7. No respondent provided additional comments about their choice. Although slight differences in opinions, overall score stayed high, and all the numbers were marked over the half of the given scale. By the data it can be concluded that the workshop is observed by the participants to be valuable and needed source of education for dancers.

Subjectively, author of the thesis believes that knowledge and education in anatomy on a functional level is crucial to learn for optimal practice, as well enhanced performance capacities. Especially for the population having intense regimen in body movement field, such as competitive dance in this case. Moreover, in the discussion with the lead teacher of the Danza dance school, she considered the implemented workshop had met its purpose, so the thesis aim and objectives were reached in her judgement. She saw the workshop event as a great contributor to push the girls to know more about their anatomy and make them understand the importance of it.

The workshop topics were explained to me … (options: "boringly", "interestingly", "complex/confusingly", "understandably", "other")

In this section, all the respondents rated the workshop explanation for them as interesting either understandable; half of the respondents marked both options (interesting and understandable) as their experience. Two further comments in addition to chosen *"interestingly"* and *"understandably"* were given such as: *"I found the topics were explained thoroughly, including relatively "scientific aspect" as well (e.g. functions, names)"* and *"I felt the topics were expounded very, very simply and well explained"*.

Author of the thesis really aimed to make the topics reachable, understandable and engaging for the participants. It can be reflected that at times it was definitely a challenge to find the approach to use, whereas trying to remind the time of author's own life correlated with participants age and possible profile as dancers (author of the thesis has been a competitive dancer by herself in history) was helpful when preparing the workshop. It is pleasing and successful to get to know from the feedback that participants considered the topics for them understandable and interesting.

What additional thoughts and questions did this workshop generate for you (keeping in mind your body's needs)? What other body and mind related topics are you still interested in as a dancer (for example, do you feel that you would like to participate workshop(s) about some specific topic)?

As a conclusion, it can be seen from the feedback that dancers mention and bring out the mental health aspect of dance field several times, as well nutrition and correct techniques to prevent and recover the injuries. Thesis author is pleased to read from the feedback that young dancer females are interested and find meaningful to address the mental health importance among the field of dance. Being a certified yoga teacher, as well having knowledge in psychosomatic physiotherapy from Bachelor studies, author of the thesis believes the current workshop could be improved further by using the support from mentioned practices. Thus, in future the collaboration with the same dance group and in general the population of dancers could be truly meaningful.

In the current opened question, 11 responses were received. Respondents shared following thoughts about their desires of knowledge increase in the field of body and mind in dance:

"So, how do I train and activate the muscles in a way that I can relieve the strain from the superficial musculature? Any stretching and other post-workout muscle recovery techniques would interest + maintaining the joints in good working order (especially three dancers' main concerns: hip, knee, ankle joint). Back School!!! By that I mean, how to keep my back health as a dancer and which are the other muscles contributing to my back health (a very complex topic that dancers and honestly also coaches have very few answers to)."

"Before the workshop, I didn't know exactly what deep muscle work means and what functions the superficial muscles have, so it was definitely new for me. Personally, I have troubles in breathing. Often, I have a disarranged breathing rhythm when I dance, I start to breathe quickly and feel excess pressure on my chest. I do not believe that I am the only person who has such moments and is not knowing exactly how breathing works during difficult moments and whether it can be improved, but it would be certainly interesting to have more advanced knowledge about it."

"At times, I don't know how to relax my muscles after they've been tense for a long time. It also seems to me that more should be talked about the dancer's mental health, because as a teenager, I sometimes feel that I look fat comparing to other dancers, and I feel insecure about it even though I train as much as others or even more."

"It is important to really become aware of my own body, feel it and respect your body, otherwise injuries can occur much more easily. I would like to attend a mental health workshop for dancers - the mental side of competition and training and dance in general."

"I wish to talk even more about how to act when a muscle is damaged or malfunctioning and practice is together with a well shown practical examples."

"As dancers often have their knees damaged or painful, I would be interested if we as dancers would be educated about our knees more, actually spines as well."

"Nutrition and stretching would be always exciting topics to learn more about!"

"How to recognize overload, when it is appropriate to rest and how much rest is needed, nutritional knowledge."

"I just feel like I would like to learn even more and profoundly, and have an opportunity to practice with a tutor / mentor the topics covered in the workshop."

"I am interested in the topic of flexibility and how to effectively develop flexibility without developing injuries."

"My interest is to know about the recovery of widespread injuries and prevention possibilities of those."

Bring out your "ahhaa" moment (I did know it, but now I understand more/better!) and "ohhoo" moment (wow, this is for sure fresh information/news for me!) from the workshop!

As a summary of the feedbacks for specific question, it can be concluded that many dancers found the entire workshop to be more like an *"ohho"* moment for, as author refers, for them. Most of the respondents pointed out that they did not know the locations of the muscles covered in the workshop and learning the diaphragm function appears to have been eye opening for the dancers. Few of the most outstanding and more profound feedbacks are introduced here below.

"I knew that deep muscles were important to every movement we make. The new information was discovering these muscle groups in practice and refute the common/well-known teaching cues (e.g. pulling the navel against the spine in order to develop strong centre)."

“There were several moments described :) But "ahhaa" moment: exercises for pelvic floor activation and stretching (front-to-back and sideway pelvic tilts); "ohhoo" moment: in the case of stress, misfunctioning and other distractions, the superficial muscles begin to compensate for the work of the deep muscles, making injuries to appear easier.”

“I knew we have a diaphragm, but I had no idea that it is so important muscle and where it is located.”

“Breathing, it was much needed reminder for myself of how to do it optimally. I feel from now on this knowledge will make my everyday life easier. Especially when dancing, I can find "more air".”

“My “ahhaa” moment was also related to the deep muscles and superficial muscles and their functions, it was a great reminder and adjustment of some previous knowledge. But the moment of “ohhoo”, so totally new information, was to get to know the transversus abdominis muscle.”

You may add in which mood/with what message you left from the workshop!

In conclusion of the received feedbacks, overall reaction and after feeling of the workshop have been entirely positive reflected by all the respondents. Subjective feeling of the thesis author shares the enthusiastic feeling with the participants and finds the whole event have been meaningful for both sides. Some dancers pointed out specifically how they feel motivated to learn more about their bodies after the workshop. Few of the more outstanding feedbacks are listed here below.

“I learned that simple (but a bit strange) exercises can help you train your deep muscles. I left in a good mood and the workshop was somehow soothing for me. :)“

“I left the workshop with the feeling and thought that I should pay more attention to my body's needs.”

"I left with an inspiration feeling and a desire to "read myself" again into some covered topics."

"I got a lot of information in a short time, there was an explosion in my head, it was useful to know how the human body and muscles function!"

"For me the workshop was very motivating and engaging. Now I have this desire to learn more about my body and anatomy."

"I left the workshop definitely in a very good mood, and really, everything was so interesting and so much to learn about."

Honest feedback of what to do differently and/or develop; what you liked/disliked is also very appreciated! Thank you!

All the respondents express their positive attitude towards the workshop and appreciation of the opportunity to have given a possibility to attend it. As future improvements suggestion to have a bigger font on the flip board and timing was brought out, in means that there could be more time in general for the whole workshop. Indeed, author can certainly agree with the time aspect feedback and feels the same way. In close correlation with the need of more time, it was brought out that it could be beneficial to create even more examples of dance elements to make the dancers to familiarize the topic as profound as possible. That comment was especially discussed by the Danza dance school lead teacher. Workshop author can again agree with that annotation. Due to the time loss aspect, some of the planned dance elements to be practiced with an aim to experience learnt muscles, had to be unfortunately, spontaneously cut off from the workshop. Some of the individual feedbacks can be read from below.

"I really liked your so-called trainer style and systematization + visualized solutions on skeleton and flipchart. Perhaps it would be good to associate knowledge even more with specific elements and movement language specific to dancers - for example, in what movement and how exactly do I use the multifidi?"

"I really liked the ratio between the practical exercises and the talking discussion/theory part. Enough information to understand and interesting exercises to teach functional body awareness even better. I can't really point out what could be different, so I guess at least for me everything worked really well."

"Personally, I liked the method of explaining anatomical placements of different muscles. As a future improvement, there could also be more workshops on various topics such as injuries."

"In my opinion, all the information was very well put together and presented. Everything was logical and understandable. Very good work and many thanks!!"

"It was very interesting, it was not too complicated, and conduction of the workshop was so well spirited, come again soon! :)"

"I really liked the workshop, even though the font size on the board was a bit small for me and I couldn't red it well."

"I liked everything, but I wish there could have been more time."

9 THESIS PROCESS AND METHODS

Thesis process, which concise schedule is demonstrated in the figure 4, started off form a discussion process with an Estonian dance school Danza's lead teacher. The discussions lead to a common agreement and decision of the thesis author creating an interactive workshop about functional awareness and deep musculature activation for Danza's dance school competitive dance group. Danza dance school lead teacher, as well competitive group facilitator, both expressed that their advanced dancers need to start building more anatomical knowledge of their bodies to support safer and aware practice. Dance school leaders believed physiotherapy student could aid and approach them towards that and both sides, the Danza dance school and the author of the thesis, saw a valuable opportunity for cooperation.

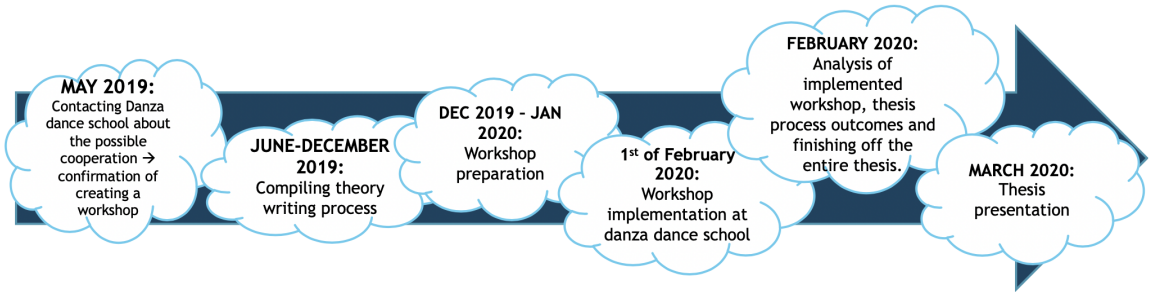


Figure 4. Thesis concise schedule

Thereupon, study plan was made and proposed for the mentoring teachers and student peers in the autumn 2019. Although author had already initiated the collection process of literature and sources about the topic during the summer 2019, after a complete acceptance of the study plan in autumn 2019 an intensive writing period of the thesis was started. Majority of the theoretical section was completed by the mid December. From December till February a constant preparation of the workshop took place, including the collection and creation of the tools needed for the visual and practical performance of the workshop.

Likewise, the workshop implementation date was agreed early enough (autumn 2019) as the author had to plan a trip from Finland to Estonia and Danza dance school accommodate the event into their intense regimen schedule. Workshop was held on Saturday, 1st of February 2020. Immediately after the workshop an online feedback form was shared to the participants. Completion of an entire thesis, practical section explanation and analysis were done throughout the February 2020.

This thesis is considered as practice-based thesis. As customarily, the practice-based thesis includes theoretical section which describes the research knowledge base, as well as the outcomes, analysis and evaluation of the practical process results. Thus, the practical section aims to focus on for an instance planning an exhibition or event, an implementation operation for some specific product/output or a project (Häme University of Applied Sciences 2018). In current work the author applied practice-based section as planning and leading an interactive workshop for dancers, basing the content of the workshop on a theoretical section compiled from evidence-based sources.

Theoretical background was collected from studies, literature and online seminars. The feedback of the workshop was collected through a *google online survey* form. The data of the feedback is anonymous thus no dancer can be linked directly to discussed feedback in the thesis. The picture exploitation for introducing and visualizing the implemented workshop are consentaneous and agreed with the entire dance team who attended the workshop and appear on the photos.

10 DISCUSSION

The whole process of the thesis has been a highly valuable learning process, both in individual and professional aspects. Concerning occupational ambitions, one of the goals of the thesis author is to work with professional dancers in her future physiotherapy profession. Author believes that having had an intense life period reading and processing information concerning dance field has gave her a beneficial foundation and an important origin point to develop further in dance rehabilitation/physiotherapy field. Taking into consideration that the thesis author is a dancer by herself, entire thesis operation has been executed on high motivation and interest, as well it has been gratifying experience.

There were no major working process deviations, therefore the time management of the thesis was rather successful from onset. Communication with the Danza dance school was smooth and respectful from both sides. Thesis author was informative about the entire process and considering the fact dance school has intense regimen, as well dance school respected author's thesis process timeframes and provided any information she requested for the thesis.

Although the thesis was not based on a literature review, the theory collection was nevertheless rather vast. Author aimed to go through variety of sources and wished to evaluate the suitability for this thesis. As well, finding practical and engaging, yet evidence based, outputs for the workshop was rather a challenge, however very educating and creative process.

As mentioned previously, due to the timing deviation, there was no possibility to hand out the paper version feedback questionnaires shortly after the workshop, which was an initial idea. In future for similar projects author would consider either longer workshop (around three hours) or progressive series of workshops (an intense weekend or two to three following weekends for an instance). Fortunately, smooth cooperation between the parties allowed author to receive participants' feedback through online questionnaire form. In fact, online form for analyzing and decomposing is more convenient instrument. Nevertheless, disadvantage of using an online form is the risk of not receiving all the participants feedbacks, which in this process also happened.

The aim was to provide participants a feedback questionnaire which would not be too long and appears respondent friendly, thus not too complex and time-consuming. Although it is often easier to answer to multiple choice questions, author did not wish to cut out the opportunity from participants to express their free opinion in case its present. Last section of the questionnaire consisted of several open form questions, although those were not all required to answer, majority still did. Author had a thought process of having all the questions formed as multiple selection questions (for both participants and analysis convenience), whereas did not find reasonable ideas and skills to express the questions clearly enough in multiple choice method.

After analyzing the feedback questionnaires, it can be decomposed that there is a lack of detailed information, such as which techniques were the most effective and which exact muscle activation/body awareness and practical exampling methods used in the workshop dancers feel they could use in their future practice. That would be beneficial information to know for the facilitator. Thus, in future author knows to also include question(s) concerning especially techniques used in the workshop to know which practical approach has been the most effective and which might require adjustments. Despite that, valuable feedback was collected. Author could see that the carefully prepared workshop was effectual and served its initial objective. Moreover, author finds meaningful to read individuals open form questions answers as those reflect unique and authentic opinions. Respondents were sincerely expressive in their feedback and shared their wishes about future learning opportunities. For an instance, it is significant to read that young female dancers address the importance to study about mental health of dancers.

One of the limitations of this thesis implementation is certainly the lack of tracking of the long-term results after the implementation of the workshop. Author hopes she was able to awake the competitive dancers' motivation and learning desire of knowing own's functional anatomy and education about optimal deep muscle activation. Indeed, the feedback reflected that the motivation was raised, but for knowing if dancers now use their muscle structures optimally for safe and enhanced practice, author should see it and follow it by herself. Perhaps even use or develop a testing pattern to evaluate the effectiveness. Although, to be mentioned, the author and the Danza school have shared a wish to continue collaboration between each other and discussed ideas about the future cooperation possibilities, though right now it is not anyhow scheduled. Despite that author genuinely believes in the possible cooperation in soon future, as individual will to develop further in the dance field as physiotherapist is strong.

Another limitation consideration is the feedback and results one-sidedness. Although the feedback has been in conclusion positive and the project well implemented, it has been tested only on one group. To understand the need and effectiveness better of such workshop, author believes different groups (also from different dance schools/companies) should be included.

Author is positively minded about the fact that two trainers were participating the workshop as well. Foundations of the dance education can be most directly passed and influenced to dance students through their trainers. Thus, author of the thesis finds it crucial for trainers to find possibilities to educate themselves about the topics of anatomy, optimal training and mental health; in general education about holistic approach of the whole dance field would be important for the ones leading students. Despite the positive fact of trainers' participation in the workshop, author can consider this topic for her as limitation of the thesis as well. For clarification, it is not possible to continuously track the methods and observe the teaching cues and approaches/didactics of dance teachers. Remains the hope that education among trainers is also developing, and quality is valued over quantity. Fortunately, thesis author can observe a positive pattern in Danza dance school where an increased focus is put on deeper education of dancers. Moreover, an external expertise in case lack of knowledge/need for more profound knowledge seem to be seek and valued by the Danza dance school facilitators.

All in all, thesis author appreciates the entire thesis process and sees a valuable improvement opportunity after receiving written feedback from the participants, Danza dance school lead teacher, brief verbal discussion with the competitive group and her own subjective reflection/feeling of the implementation. Although the whole process and outcome can be concluded very successful, there are always aspects to work on and develop further, such as time management of the workshop, even further exampling of the discussed muscles operation in dance related motion and broader content of the workshop (as the entire topic does not confine with the content introduced in the workshop). For the author the process has been highly educational - the feeling of entering the dance physiotherapy world has become more confident, theory background of deep muscle activation and thoracopelvic canister function is more profound and understood, as well practical tools/methods to be used in actual working life are available to use. Furthermore, author relies that others interested in the dance field are also able to learn from her thesis work, and hopefully use some of the provided tools from the workshop implementation section as possible inspiration and guidance in their working life. The whole experience has showed the author of the thesis that she would like to keep working on creating workshop content in the dance/body movement field and sees herself in future actively involved in such working projects.

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