

## Review Article

# The anatomical analysis of basic stance in ballet

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### Abstract

Ballet education, which starts at a young age, is a long and arduous process. Intense physical work is required starting from the early stages through the entirety of a professional dancing career. During this process, uniformed incorrect executions of dance moves and moving techniques may result in various injuries of students who are in developing ages, and also may cause their dance life to end prematurely. In order to develop and execute anatomically and technically correct, and aesthetically flawless exercise movements during class sessions, a basic stance is required. This stance or posture improves body awareness and control in students, and further ensures that the necessary foundations for ballet training and technique are laid correctly. The objective of this article is to explain how basic stance is a prerequisite through out the entire course of ballet education. In basic stance the location of bones, directions of joints and functions of muscles drastically differ from a simple standing position. Also, parts of the body must harmoniously align with each other. Because of these body related factors, various anatomical data have been analyzed and many different sources on anatomical topics have been thoroughly researched and subsequently distilled into this article. While dancing, incorporating an ideal basic stance enables all organs in the body to function properly and minimizes injury risks on the skeletal and muscular systems. As a result, free expressions increase and movement performances are brought up to peak levels. And most importantly the fundamental skill for continuing a dancing career in a healthy fashion is achieved through the understanding of basic stance.

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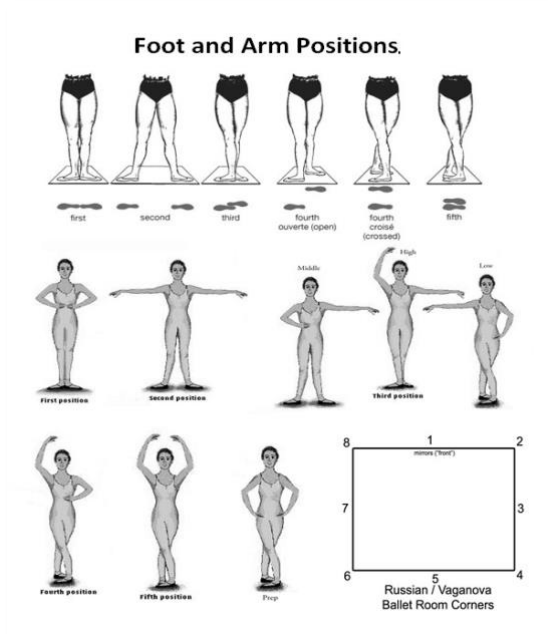
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### Introduction

A professional performance of classical ballet is only possible with an academic ballet education which begins at a young age and lasts for years. All movements in the curriculum of education are learned in a planned order. In order for these movements to be performed anatomically, technically and aesthetically correct, first of all, a proper posture is required. In order to maintain classical ballet education in a healthy fashion, achieving the proper attitude at the beginning of ballet education ought to be the first learning objective. For this reason, correct posture should be mentioned before introducing the more basic foot and arm positions to the student. If information about correct posture is given after the basic positions, this makes it difficult to achieve proper coordination and balance. As a result, the body must be correctly aligned first and foremost in training sessions.

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**Figure 1.**

*The Five Basic Positions of Ballet. (<https://www.atimetodance2015.com/printouts.html>)*

The basic posture can be defined as the most efficient position of the body while performing ballet movements. Thus, different parts of the body are placed in harmony with each other, minimizing tensions, which possibly could occur on the muscles and ligaments. Correct posture ensures that the bones and joints are aligned optimally with the help of muscles, so that the performances can be performed at the maximum level.

The students who can control their bodies in the best way and possess good body calibration during lessons also form the basis for a healthy dance career. Physical expressions are performed more comfortably, accurately and safely in ballet movements that are performed with a awareness of basic posture. At the same time, technical and artistic dancing qualities will increase with correct posture.



**Figure 2.**

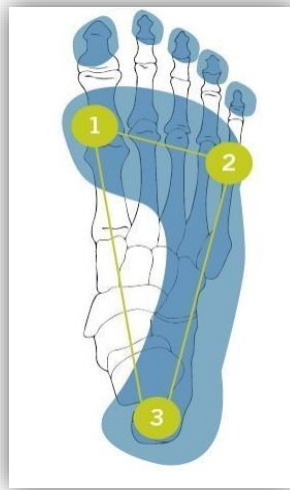
*Correct standing (Dance Medicine in Practice, p.48)*

In basic posture, the position of the bones in each part of the body, the direction of mobile joints and the function of muscles are different. This is exactly why it is necessary to work specially to create an awareness for all parts of the body (feet, legs, hips, pelvis, body, shoulders, arms and head) (Frege, 2018, p. 143). In this study, the basic

posture has been analyzed in detail, starting from the feet, in sections, and it is explained in simple language so that it can also be beneficial for those who have just started ballet training. Due to the change in the positions in different methods, it is foreseen that the focus of the study will be scattered, and an analysis will not be made on the basic positions in this study.

### Weight Distribution in Basic Stance

The feet, which is incorporated in many exercises within the program of academic ballet education, is an important part of basic posture necessary for the development of proper ballet technique. Body weight is evenly distributed over 3 points on the foot to ensure correct weight placement in classical ballet. These three points are the first and fifth toes, and the heel, each bearing 1/3 of the body weight. Anatomically speaking, the head of the first and fifth metatarsal (comb bone) and calcaneus (heel bone). Thus, the body weight should naturally lean forward when the feet are positioned parallel with each other.



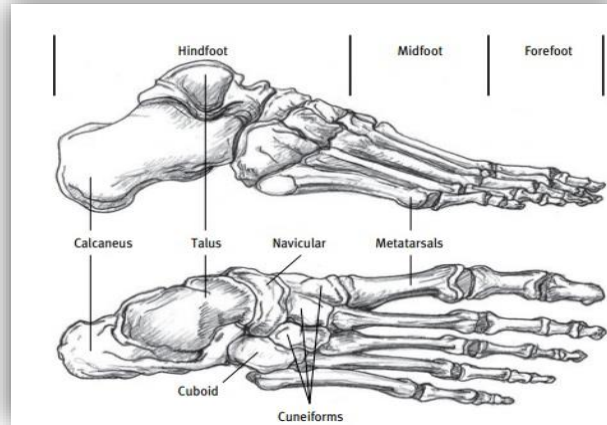
**Figure 3.**

*Weight distribution (<https://cbphysicaltherapy.com/toe-box-wide-enough-simple-test-ensure-running-success/>)*

Proper weight distribution also affects the upright position of the pelvis and muscles which serve the external rotation of the leg. Leaving the body weight behind can disrupt the balance of the body in movements while working at the maximum level and prevent the adductors (inner thigh muscles), which is also called internal muscles in ballet. At the same time, when the body weight of students is left lagging behind, the feet cannot get enough power from the ground, and weakens the dynamics of movements such as petit allegro (Vural, 1994). Therefore, in basic posture, correct weight distribution on the feet is an important factor to be considered for balance and correct muscle work. At the same time, it will not be possible for a dancer whose center of balance is flawed to dance in harmony with his/her partner.

### Foot and Ankle Joint

Structurally, the foot consists of 26 bones and is divided into three sections. These sections are; phalanx with 14 bones (front part), metatarsal (middle part) with 5 bones, and tarsal (back part) with 7 bones (Clippinger, 2007, p. 298). In the feet, which carry the human skeleton and form the part of the body that touches the ground in basic posture, the sole of the feet should be in equal contact with the ground in order to provide strength and balance. For this, while keeping the toes relaxed, unbent and flat on the ground; The heel bone (calcaneus) at the back should stand in a vertical plane (Simmel, 2009, P. 141). In this way, the feet that carry all the weight can be aligned correctly and can continue to work in a healthy manner during ballet sessions. From this point of view, it is of great importance that students and dancers choose the right working shoes that suit their individual foot structures.



**Figure 4.**

*The Foot Skeleton From Three Sides (Dance Medicine in Practise, p. 124)*

The ankle joint (*articulatio talocruralis*), which plays an active role in almost all classical ballet movements, is located between the anklebone (talus) and the ends of the lower leg bones (tibia and fibula), providing the connection between the leg and the foot. It is a hinge-type joint that serves the mobility of the foot in dorsiflexion (pulling the foot up from the toes) and plantar flexion (pulling the foot down from the toes) (Kugler, 2021, p. 142). For this reason, the point movements of the foot, *relevé* and *flex* performed in ballet lessons are performed at the ankle level with the help of calf muscles. This joint must be vertically aligned in basic stance for balance and the proper transfer of weight towards the feet.

When there is not enough awareness on the feet in ballet lessons, students may experience inversion (soles of the foot facing inward) or eversion (sole of the foot facing outward) due to incorrect positioning of body weight. If the external rotation of the leg is forced only from the feet and not from the hips, it is clearly seen that eversion increases in ballet lessons.

This situation can cause injuries such as ankle sprains or tendonitis in the surrounding ligaments, especially on point or in descent during jumps. With proper foot alignment, the Achilles tendon will form a straight line when viewed from behind. The calf muscles in the lower part of the leg have the task of stabilizing the ankle joint during this alignment and initiating its contact with the ground.



**Figure 5.**

*Inversion and Eversion (<http://www.tedavihareketleri.com/ayak-bilegi-burkulmasi>)*

### **Knee Joint**

In ballet classes, significant importance is always given to the exact execution of all movements related to leg stability, mobility and flexibility. In ballet movements that defy gravity and are constantly repeated, the healthy functioning and aesthetic appearance of the legs is mostly possible through correct alignment.

The bone axis of the leg consists of the thigh bones (femur) and lower leg bones (tibia and fibula). The joint between these two bones, which is used for stability and mobility of the leg is called the knee joint (*articulatio genus*). It is protected by the kneecap (patella) and ligaments and provides the connection between the hip and foot.

Straight and taut knees create the aesthetically ideal leg line in basic posture. For this, the midline of the kneecap should form a line with the metatarsal bone (middle part of the foot). That is, the knee joint should be located just above the ankle joint and above the midline of the foot in parallel or turn out position of the leg. If the students force the turn out of the leg from the feet and knees, and not from the hips, alignment is lost and the movements are performed incorrectly. For example, students can have demi-plié made and check how their knees and feet are aligned. In such misalignments, knees will drop forward.



**Figure 6.**

*a- The Dancer Executes the Demi-plié with Proper Turn-out in the Hips, b- The Dancer Executes the Same Move Compensating Improper Turn-out of the Hips by Greater Flexion of the Knees*

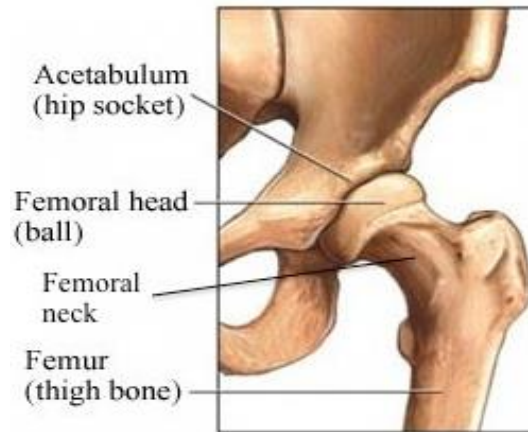
([https://www.scienceofmotion.com/documents/the\\_meaning\\_of\\_life.html](https://www.scienceofmotion.com/documents/the_meaning_of_life.html) )

The correct alignment of the legs in basic stance is carried out with the help of muscles located in the thigh. For this reason, trainers need to pay special attention to the terminology used in lessons for anatomical positioning in order to activate the muscles correctly. Advice such as “lock the knees” or “push back the knees” overworks the M. quadriceps femoris muscle, which is a combination of four different muscles located on the front of the thigh. This will especially reduce the stability of the joint in students with excessive hyperextension of the knee (the knee going back more than normal and causing pain). In addition, if the legs cannot be straightened correctly, over time it will cause problems on the knees. Therefore, recommendations such as stretching or pulling the knees upwards instead of pushing them back in lessons guide the correct use of muscles by actively working the hamstring muscles, M. quadriceps femoris and the deep external rotator muscles in the hip joint (Edel Quin, 2015, P. 104).

### **Hip Joint and Pelvis**

In ballet training, it is possible to raise the legs to high angles in all directions and to have a good external rotation (turnout) with the correct alignment of the hip joint and pelvis. In this way, the legs can be isolated from the upper body and work more freely and accurately.

The joint that allows the leg to work independently by isolating it from the pelvis is called the hip joint. The special shape of the hip joint, with one end in the form of a ball (caput femoris) and the other end in the form of a socket (acetabulum), gives the thigh great mobility. It is one of the most important joints for ballet dancers. The external rotation of the leg (en dehors / turnout), which is a prerequisite for all movements in ballet, is carried out with the help of deep external rotator muscles in the hip joint and adductors located in the inside of the thighs. Thus, this rotation is initiated by the deep external rotators in the hip joint and is supported by the internal muscles (Simmel, 2009).



**Figure 7.**

*Function of Ball and Socket Joint. (<https://thehealthydancer.blogspot.com/2012/06/how-to-increase-turnout-safely.html?m=1>)*

In basic stance, the hips ought to be kept straight. The hip bones should be kept in line with each other horizontally and vertically in line with the knee joints. Therefore, the hip bones should be pointing forward. For a correct basic posture, the ballet student needs a body center that can be well controlled. The position of the pelvis, located between the legs and the spine, affects the posture and movement performance of both the lower and upper parts of the body. A well-aligned pelvis therefore creates the development of a strong body center. The components of the bone structure in the pelvis are the coccyx (os sacrum) and the two hip bones (os coxae) that make up the pelvic ring. The hip bone is composed of three different bones in itself. These; ischium, ilium and pubis bones (Faller & Schünke, 2012).

In basic stance, the pelvis should be straight and the seat bones (ischium) should be facing downward. For this posture, it is necessary to lengthen the lower part of the spine. Most of the thigh muscles, as well as the abdominal and back muscles, are attached to the pelvis and serve this posture by being correctly activated. A vertical and centered body axis is a prerequisite for correct pelvis posture and body balance. Therefore, with the correct vertical axis of the body, the weight distribution can be transferred equally to both hip joints (Simmel, 2009, p. 78).

### Spine

A healthy spine is very important not just for dancing, but also for our daily lives during the span of our life time. The correct alignment of the spine, which supports the entire weight of the head, shoulders and rib cage, not only allows the technique to be developed more accurately, but also makes the upper body of the dancers look more elegant and aesthetic.

The spine, which extends from the head to the tailbone and provides mobility and stability to the body with the help of muscles, consists of 33 small bones called vertebrae. The spine, which appears as a whole, is anatomically divided into 5 sections. These are;

- Neck vertebrae (cervical vertebrae) consisting of 7 vertebrae
- Thoracic vertebrae (thoracic vertebrae) consisting of 12 vertebrae
- Lumbar vertebrae (lumbar vertebrae) consisting of 5 vertebrae
- Coccyx vertebrae (sacral vertebrae) consisting of 5 vertebrae
- Tailbone (coccyx) consisting of 4 vertebrae.

In adults, only the upper 24 vertebrae are operable, as the sacrum and tailbone fuse into a single bone over time (Clippinger, 2007, p. 72).

Anatomically, the spine appears as a straight column from the back and shows a double S-shaped structure when viewed from the side. This natural curvature allows the body to absorb shock and allow the spine to move through a wide range of motions. However, the intensity of this curvature may differ in each person. Especially in dancers, spinal curvatures above normal can lead to an inefficient posture and back problems due to overloading over time.

In classes, instructors should never strive to manipulate the spine into a more straight posture through wrong exercises. Instead, they should help students find the healthiest positions for the spine. For this, first of all, it is a prerequisite to maintain the straight and correct posture of the pelvis. Then, the vertebrae should be adjusted to a slightly separated and upward extending posture. In order to correctly position the spine, when viewed from the

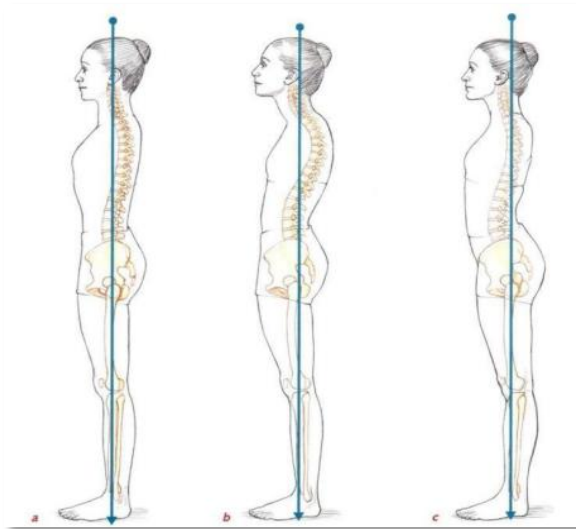
side, the ears should be above the shoulders and the shoulders should form an imaginary vertical line with the pelvis. Thus, while having an extended spine position, the natural curvature required by students and dancers for healthy dancing is preserved (Foley, 2014).

The amount of strength needed to support and maintain a correct alignment of the spine is derived from the abdominal and back muscles. When the abdominal muscles in the front of the torso work actively, it maintains the ideal “neutral” position of the pelvis and provides extension for the lower vertebrae. This prevents the lower back from cupping (lordosis) a problem which we sometimes see in children. At the same time, the active work of this muscle pulls the ribs down and supports a correct alignment for the rib cage.

While the abdominal muscles work, the deep back muscles at the back also serve to stabilize the spine by extending it. To summarize, in a correct basic posture, both the abdominal and back muscles should work actively together. Therefore, it can be observed that balance, turns and jumps exhibit a more accurate and rapid development during lessons.

### The Rib Cage

The body has twelve pairs of ribs that extend forward from the side of the thoracic vertebrae. The first ten ribs attach to the sternum and form the rib cage. The lower ribs (eleventh and twelfth ribs) do not attach to the breastbone; these are called “free ribs”. Correct positioning of the thorax protects the organs and ensures their healthy functioning.



**Figure 8.**

*a- The Ideal Spine, b- Excessive Spinal Curvature and Posture Disorder Caused by Cervical Lordosis, c- Excessive Spinal Curvature and Posture Disorder Caused by Lumbar Lordosis (Profesyonel Bale Dansçılarındaki Aşırı Kullanımdan Kaynaklanan Sakatlıklar ve Nedenleri, p.89)*

In basic stance and during the execution of ballet movements, the rib cage should be gathered forward and towards the center (pelvis); that is, it should be positioned directly above the pelvis, without being pulled out. The sternum, which is attached to the upper ten ribs and the shoulders, should be kept slightly upright and open while in this position. This way, an aesthetic appearance is created in the upper body while the organs continue to be properly protected.

In this type of rib cage alignment, attention should also be paid to breathing. As the student inhales, the ribs expand and the abdominal muscles lengthen. On the contrary, when exhaling, the ribs return to its normal position and the abdominal muscles shorten (Haas, 2010, p. 35). Sometimes students tend to improperly hold their breath while they concentrate too much on their body movements. This reduces the amount of oxygen which goes into the blood stream to nourish muscles. Causing them to get tired much earlier in the subsequent movements and therefore lowering their physical condition. When attention is paid to breathing properly along with a correct basic posture, both the body's health is preserved and the quality of the dance performance is significantly increased through more fluent movements.

### The Shoulder Girdle

Correct alignment of the shoulder girdle allows students maximum range of motion and the desired artistic expression to be executed fully and comfortably. In principle, the shoulder girdle consists of the collarbones (clavicle), shoulder blades (scapula), breastbone (sternum) and upper arm bone (humerus).

The collarbones are two S-shaped, slightly spiral bones that are clearly visible above the skin; the inner ends attach to the sternum, and the outer ends to the top of the shoulder. The horizontal position of the collarbones ensures the correct alignment of the shoulder blades on the back. Therefore, it should be left open and wide in basic stance. This also gives the student a more confident stance (Haas, 2010).

The shoulder blades are broad, flat and triangular. They lie behind the upper body and flanks the ribs. The shoulder blades move with almost every movement of the shoulder joints and the help of muscles. The position of the shoulder blades is important, because due to their positioning the shoulders do not fall forward and the back is straightened during lessons. Due to this fact, the shoulder blades should never be brought close to each other. This will only cause the chest to be lifted upwards and out, causing the upper body to be misaligned. While executing a correct basic stance, the shoulder blades should be pulled down and outward. The M. trapezius muscle in the back has a pivotal role in order to correctly position the shoulder blades in basic stance. This way, the shoulder blades are stabilized on the ribs in a flat and wide position, allowing the shoulder joints to move more easily in dance.

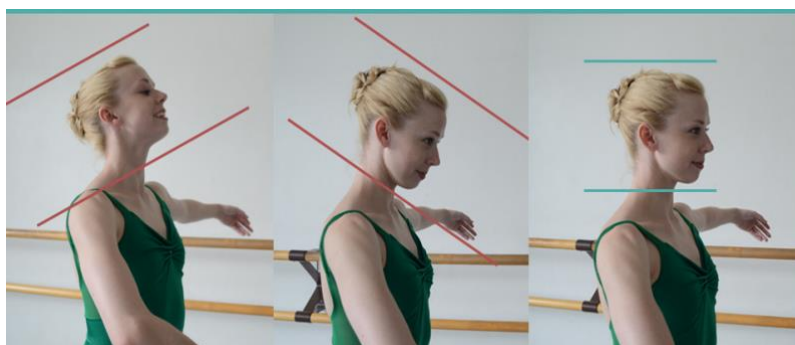
Relaxing the shoulders without excessive tension during ballet classes promotes an aesthetic body posture, ease of movements and good feelings for the student. Tensions in the upper body and lower body are interrelated. Due to this, having the shoulders excessively tense may negatively affect the mobility of other parts of the body (Franklin, 2004, p. 76).

The shoulder joint is the link between the collarbone and scapula and consists of the upper arm bone (humerus), shoulder socket, and scapula. Students should be able to use their arms without hindering their balance and without adding tension on the back. In order to achieve this, in basic posture, the shoulder joints should be kept “down, open and relaxed” and at the same height, having an imaginary horizontal line pass between them. Hence, with the correct positioning of the joint, the upper arm bone (humerus) becomes isolated from the body, allowing the arms to work more comfortably and aesthetically in ballet.

Shoulder movements are also indispensable for a student or dancer while expressing their idiosyncrasies in their ballet movements. For example, properly aligned shoulders in *épaulement* poses indicate that students are confident, while lowering or raising the shoulders may reflect an expression of nervousness or insecurity (Kay, 2010). Thus, educators ought to frequently remind how to correctly execute a basic posture for the shoulders during ballet sessions.

### The Head

The head is one of the heaviest parts of the body and is supported by the cervical vertebrae. Therefore, the cervical vertebrae should always be upright and “tall” to best support this weight. At the same time, the lower jaw should be parallel to the ground. In basic stance, the position of the head is extremely important and should remain semi-“neutral”, meaning, straight; because correctly positioning the head is very important for balancing the whole body. All movements of the head are controlled by the eyes so that the glance direction and the head itself are precisely coordinated and aligned.



**Figure 10.**

*Correct Placement of Head.* (<https://balletbub.com/ballet-technique-tip/keep-chin-level-easier-spotting/>)



## Conclusion

By bringing together all the components mentioned in general so far in a coordinated way, the right basic stance can be achieved. Incorporating the anatomical principles mentioned in this paper is one of the main goals that should be achieved at the beginning of classical ballet training. Through these rules the body can achieve an optimum alignment with gravity. This acquisition enables students to have a well-controlled body center and lays the foundation for the correct implementation of all movements in ballet technique. At the same time, it ensures that all organs in the body are undisrupted from their natural working positions while dancing and minimizes unwanted and detrimental loads that could negatively affect the musculoskeletal system. In summary, with the correct anatomical knowledge of basic posture in classical ballet, students are able to continue their ballet education and careers in a more aesthetically pleasing and more sustainable way for the long term with minimum injuries and deformations.

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