Case Study:
Pilates and the Pelvic Instability of the Hypermobile Dancer

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Abstract

Dancers are well known for their extreme physical capabilities, such as increased range of motion (ROM) of the joints compared to the general population. It is one of the elements often required for this profession, since it provides the dancers with a higher potential to respond to the choreographic and aesthetic demands. A combination of flexibility and strength is the main factor of this physical element, and the ratio between these two factors needs to be balanced in order to the functional.

In this case study, the client is a hypermobile dancer with joint instability. Therefore the ratio between strength and flexibility is not balanced and it becomes problematic specifically for the neutral position of the pelvis.

A Pilates conditioning program has been created, under the BASI Block System to assess the stability of the dancer’s pelvis in neutral and to strengthen the muscles around the specific area in order to enhance her performance potential.
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Anatomy

The pelvis is considered to be the bridge between the upper and lower body. From the top, it is directly linked to the spine through the sacrum, and from the bottom it connects to the two femur bones of the legs. In postural alignment, the pelvis can have a neutral position, which is defined from the alignment of the Anterior Superior Iliac Spines (ASISs) and the pubic symphysis (PS). These three landmarks need to be in the same horizontal plane when the client is in a supine position, and in the same vertical plane when the client is erect to achieve a neutral pelvis. The pelvis can deviate from this position towards a posterior and an anterior tilt. The posterior tilt of the pelvis is defined when the ASIS are lower than the PS when supine, and the anterior tilt is defined when the ASIS are higher than the PS when supine.

In order to correct the pelvis from any deviation to a neutral position, we need to study the anatomy of the pelvis in relation to the upper and lower body musculature that supports the pelvis. The muscles that link the pelvis and the spine are the abdominal group (rectus abdominis, external obliques, internal obliques, transversus abdominis), the back extensors (erector spinae group, deep posterior spinal group), and the lateral muscles (quadratus lumborum). The muscles that link the pelvis with the femur bone are the hip flexors (psoas major, iliacus, rectus femoris, sartorius), the hip extensors (gluteus maximus, semitendinosus, semimembranosus, bicep femoris). The above muscle groups are responsible for any deviation anteriorly and posteriorly from the neutral position. The muscle groups work in a coupling pattern to deviate the pelvis from neutral. Sufficient contraction of the hip flexors with the back extensors can correct a posterior tilt of the pelvis to a neutral position. Likewise, the
abdominals with the hip extensors can achieve a neutral position of the pelvis from an anterior tilt. Also appropriate co-contraction of these muscles can stabilize the neutral pelvic position while other movement is occurring in the body. Therefore the aim is to train the dancer to achieve a neutral pelvic position using the correct muscle-firing pattern, and Pilates can be a very useful technique to train for such a goal.

1. Abdominal group
2. Back Extensor group
3. Hip Extensor group
4. Hip Flexor group
Introduction

Dancers are a special population that needs careful attention when it comes to body conditioning. They have specific needs according to the dance genre they practice, thus the professional who is in charge of their conditioning program has to address those needs in order to achieve the long-term goals of the dancer.

Within the dance population, hypermobility is condition very often observed. Hypermobility is associated with an increased ROM, a normal ratio of translational movement and normal coupled patterns. People with hypermobile joints are also called “double-jointed” because their joints can exceed the normal range of the general population and the joint angles exceed 180°. However, some confuse hypermobility with joint instability. Joint instability is associated with increased or normal ROM, increased or aberrant translational movements and aberrant coupled movements. Even though hypermobility and joint instability can exist separately, they are often combined. Dancers who are hypermobile often deal with joint instability and that is due to their joint biomechanics. Hypermobility and joint instability needs to be dealt with, because it is associated with increased risk of joint injury, decreased proprioception acuity, and recurrent dislocations.

A balanced ratio between strength and flexibility needs to be achieved to stabilize a joint. More often we see that these two elements are not equally trained or balanced in dancers, and it is challenging to perform specific movements due to this imbalance. A specific body-conditioning program needs to address this imbalance, and train the dancer to control the joints through correct muscle engagement.
Body

Client

Our client in this case study is Morrighan. She is 24 years old, she is a professional dancer who trains daily and works in a contemporary dance company. She has been assessed from a professional physiotherapist as hypermobile. She is healthy, but deals with instability in her pelvis, which, according to her statements, hinders her performance potential. She claims that she is not in control of her pelvis during some high level technical steps in contemporary dance and she is looking for a body-conditioning program that can help her overcome her weakness. More specifically she finds challenging to control the pelvis while she flexes the hip over 90°, and when she abducts the hip in external rotation over 90°.

Body Conditioning Program - BASI Block System

The body-conditioning program for Morrighan consists of exercises that emphasize on the hip joint in relation to pelvic and spinal alignment. It is a comprehensive training program using all the Pilates studio apparatus.

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<th>Footwork (reformer)</th>
<th>Abdominals (cadillac)</th>
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<th>Spinal articulation (reformer)</th>
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<td>frog</td>
<td>long spine</td>
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<tr>
<td>chest lift</td>
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<td>spine twist supine</td>
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<td>calf raises prances</td>
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The exercises chosen for this program are based according to the muscle focus and objectives of each. Throughout the program, emphasis is given on maintaining a neutral pelvic position while exercising other body parts. More specifically, during the warm up and the abdominal work emphasis is given in maintaining neutral pelvis while the spine moves in flexion and rotation or while the hip moves in flexion. During the footwork, hip work, leg work and lateral flexion, same pelvic emphasis is given while the hip moves from flexion to extension, adduction to abduction or circumduction. In the blocks of full body integration and arm work, the pelvis is stabilized in neutral while the spine is in neutral simultaneously and movement occurs in the extremities. In the back extension block, pelvic stability is challenged balancing on a small surface while the spine moves into extension. The spinal articulation block aims to strengthen the hamstring muscles which are known to be overstretched in the dance population. Lastly, the stretches are focused on the hip joint, to identify and correct any imbalances in flexibility between both legs.

The desired results following this program and progressing to more advanced exercises are that the dancer would be able to achieve pelvic stability while the spine and the extremities are moving independently. The use of progressive resistance will increase the strength of the targeted muscles, potentially enhancing her technique and performance.
Conclusion

In this case study, we looked at a hypermobile dancer who is challenged by joint instability in the pelvis while performing advanced technical movements in contemporary dance. Her goal is to achieve a neutral pelvic position while moving the lower extremities to flexion and abduction with external rotation over 90°.

The body-conditioning program includes all the Pilates apparatus and aims to target the muscles connected to the pelvis, which are the abdominal group, the back extensors, the hip flexors, the hip extensors and the lateral muscles. Correct muscle engagement is emphasized in order to disassociate the extremities from the pelvis. Progressing further, more advanced exercises will be added to the program, challenging the dancer in terms of coordination and balance, since both elements are closely linked and used in contemporary dance.
Bibliography

Books


