

Figure 2 shows that the tennis player has flexed at the hips and the knees, lowering her centre of mass and this makes the player more stable. Flexion of the hip is created by an eccentric contraction of the gluteals and flexion of the knee is created by an eccentric contraction of the quadriceps. Both muscles are increasing in length and under tension to control the downwards movement. Both these movements occur in the sagittal plane around a transverse axis.

By abducting her hips (frontal plane, sagittal axis), using gluteus minimus and medius, the player has increased the base of support between her legs, making her more stable. She has dorsi-flexed at the ankle which allows her to keep the whole of her foot on the floor, again increasing the base of support and maintaining her stability. Whilst lowering into this position, eccentric contractions have been used but once she is settled, it is likely that isometric contractions, where the muscle remains at the same length but under tension, are used to maintain the position as there is very little movement.

To prevent this position creating too much fatigue, the player uses spatial summation. Fibres are arranged in motor units where one neurone stimulates a number of fibres. Once a large enough stimulus is received, following the All or None Law, all the fibres will contract. Spatial summation allows the player to contract a certain number of motor units at a time to hold the position. The player will then rotate the motor units to prevent fatigue. When the player has to move quickly to return the serve, she will recruit as many motor units as possible to increase the force of contraction.

All fibres within a motor unit are of the same type. The most useful to the tennis player are type IIa fibres. These fibres are capable of powerful contractions to move quickly but can also withstand fatigue as they have a larger capillary density and greater myoglobin and mitochondria stores. These allow the fibres to utilise oxygen and prevent fatigue, important in a game like tennis that can last over an hour.