

Triple jump phase



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Montrail Brooks Dr. Livingston AES 364 Muscular Analysis Introduction Block starts was create first created to help the grounds keeper take better care of the running surface with was made of clay or cinder. Starting blocks has came a long way from being a single holes dug in the ground to the high tech, lightweight, but yet expensive running aid their now. To properly observe and describe the breakdown of the hop, skip, and jump phases, while determining the muscles that cause these movements.

The triple jump, referred to as the hop, skip and jump, is a track and field event similar to the long jump. The only difference between the two is that the hop, skip, and jump involve a hop and a step, whereas the long jump involves just a jump. In the first phase of the triple jump, the competitor builds momentum by sprinting down the runway, planting their lead foot at the marked board, and “ hops” into the air, cycling one leg around into phase two.

After completing the cycle, the lead foot strikes the ground again initiating the “ skip”, where the opposite leg is brought up and the body goes into the bounding position. Finally as the body is coming out of the bounding position, the opposite leg hits the ground in order to propel or “ jump” the body forwards, aiming for distance rather than height, into the pit. [pic] The phases In the triple jump, there are three joints that aid in movement of the hip, the knee, and the ankle. Together the three joints allow optimum distance and proper stability for the jumper.

The hip, which holds the femur and pelvis, allows the jumper to extend as his foot strikes the board. While keeping the knee in flexion, he pushes off into the cycling pattern. In the skip phase, the hip will remain in a flexed position

as the trail leg goes into extension. When in the jump phase, the hip allows the leg to go from an extended position, to a partial flexed position. The knee, which hold the fibula, tibia, femur, and patella, just like the hip is a very important part of the triple jump process.

In the initial “ hop” phase, the knee extends, but quickly switches to flexion throughout the cycling pattern. During the “ skip” phase the knee will remain in flexion, while extending the opposite leg. Following the second phase, the lead leg switches to the trail leg, which remains in flexion for the final “ jump”. Finally, the ankle is made up of three separate joints: the talocrucal joint, inferior tibiofibular joint, and subtalar joint. These joints, just like in the kinetic chain, are where the power originates from.

In the “ hop” phase, the ankle of the lead leg will remain dorsi flexed, and the trail leg will be slightly plantar flexed, but will quickly draw up into the dorsiflexion. As the jumper enters into the “ skip” phase the ankle will remain dorsiflex, while the trail leg switches to the front. This will allow the trail leg to go dorsiflex, and the lead leg to deliver a powerful push-off into plantarflexion. [pic] The muscles and their functions in the Hop, Skip, and Jump phase.

The muscles involved in the triple jump are the quads: rectus femoris (allow hip concentric flexion and knee eccentric extension), vastus lateralis, medialis, and intermedius (helps the knee eccentric extend); the hamstring muscles: semimembranosus, semitendiosus, and biceps femoris (allows the jumper to extend the hip and normally pair with the help of the eccentric gluteus maximus); and finally, the lower leg muscles: concentric tibialis anterior, the concentric extensor digitorum longus (which provide the ankle

with the ability to perform dorsiflexion), the peroneus longus, soleus, and gastrocnemius (which allow eccentric plantarflexion for that last jump push-off). The main stabilizer, the gluteus medius, acts as a front plane stabilizer and restricts the leg from turning in vargus or valgum, allowing the leg to plant. Conclusion An important factor in determining the power and momentum developed in the sprint start is the angle of the front leg in the set position.

Most literature accepts that an angle close to 90 degrees is the ideal angle in this position. It allows the knee extensors to work best at the correct time for maximum power and momentum to be developed. An angle in excess of 90 degrees may allow a faster leg speed out of the blocks but will not develop the same power and momentum. Borzov (1980) in his investigations into an optimal starting position varies a little, with a suggested ideal front leg angle of 100 degrees. Opinions on rear leg angle vary between 110 degrees and 135 degrees. Tellez & Doolittle (1984) suggest an optimal angle of about 135 degrees for the rear leg because it allows the lever to move more quickly and allows greater impulse from a static position.

They also suggest that an early body velocity provided by the rear leg drive past the front leg is a better mechanical position to accelerate through a more prolonged application of force. Conclusion An important factor in determining the power and momentum developed in the sprint start is the angle of the front leg in the set position. Most literature accepts that an angle close to 90 degrees is the ideal angle in this position. It allows the knee extensors to work best at the correct time for maximum power and momentum to be developed. An angle in excess of 90 degrees may allow a

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Reference: Track and Field News Presents: Technique and Drills for the Long Jump and Triple Jump. Gary Derks. Fundamental Aspect of the Triple Jump for Dummies By: Fritz Spence and Gerald Masterson, PH. D.