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Movement Analysis Of A Box Jump

This project is for educational purposes only.

Introduction

The purpose of the project is to analyze the movements in a box jump by using course content and literature.The movement demonstrated in this project was the box jump onto a 12 inch platform. According to McArdle, Katch and Katch (2015), the box jump has two phases. Phase one is the starting position with feet being shoulder width apart . Then the subject must flex ankles, knees, and hips and thrust vigorously forward and upward to land with both feet on the box. In stage 2, the subject will Jump onto the box. After landing, explode upward as high and as far forward as possible.

According to Fusch et al. (2002), the box jump is composed of two stages. Stage 1 is considered the take off stage, this is when the subject jumps off with two feet shoulder width apart. The subject will then begin stage 2 which is jumping onto the box and landing with both knees slightly bent.The athletic position is defined as the position taken prior to performing an athletic task (National Academy of Sports Medicine) Knee flexion is defined as the bending of the knee (McArdle, Katch & Katch, 2015). Plantar flexion or ankle extension is defined as the extension of the ankle (Oatis, 2004) The tools used from dartfish to demonstrate were the angle tool, the line tool and the zoom shadow tool.

Athletic Position

The Athletic position is the starting position most athletes use before starting a movement or skill. According to the National Academy of Sports Medicine, when the knees are bent slightly, the athletic position is achieved. Also when feet are shoulder width apart, it suggests that the shoulders are over the feet, which also incorporates the athletic position. In the clip the subjects knees are slightly bent creating an angle Abdominal muscles should be engaged in order to create more stability for the spine.

As seen in Figure 1, the subject has their knees bent and their shoulders over their hips but not over their toes.

The subject uses their arms in the athletic position to generate power in their jump.

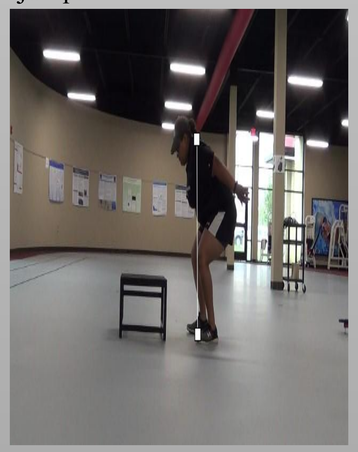

Figure 1. *Subject in athletic position prior to jump.*

Knee flexion

According to Butcher, M., & Bertram, J. (2004), knee flexion can be defined as the bending movement of the knee joint. This causes a decrease of the angle between the bone of the knee joint. Knee flexion prior to jumping involves the muscles of the legs and a stretch in tendons. There is also an extension in the head, torso and legs. Force is transferred from the skeleton to the ground. The picture also shows the arms accelerating backwards in order to increase momentum for the jump.

As seen in Figure 2, the subject does a good job presenting knee flexion.

The subjects knees are bent at 90 degrees. This will allow the subject to generate force during the jump.

Figure 2. *Knee flexion prior to the subject entering the flight phase.*

Plantar Flexion

According to Oatis (2004), plantar flexion is the movement in which pointing of the toes occur. Plantar flexion requires several muscles to be activated from your ankle, foot and leg. According to Fukutani, Misaki and Isaka (2017), full plantar flexion increases the torque, or force, of the muscles involved in the jump. This allows for the subject to jump higher because more force is being excreted into the ground.

As seen in Figure 3, performing plantar flexion means the extension of the ankles.

This allows the subject to gain more height in their jump based on the speed of the plantar flexion.

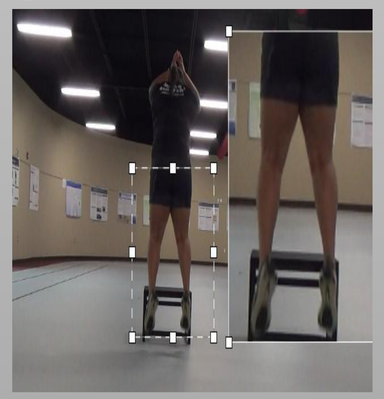

Figure 3. *The subject performs plantar flexion during the flight phase of the box jump.*

Athletic Landing

The athletic landing is the landing onto the box in the athletic position. There is no set definition for the athletic position. However, for Figure 4, the athletic position will be defined as knees bent and hips in line with the feet. According to the National Academy of Sports Medicine, the athletic position consists of the hips in line with the toes.

As seen in Figure 4, the subject lands in the athletic position with their knees properly bent to maintain balance.

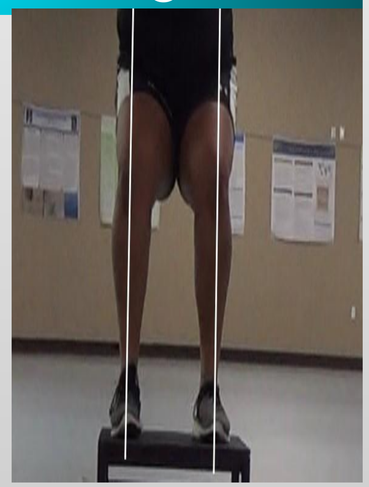

Figure 4. *Subject lands on box in athletic position.*

Conclusion

According to Etoyner, et al. (2013), subjects who perform the box-jump as part of plyometric training, increase their performance in other sports and performance environments. Box jumps have been shown to increase maximal power output, improve the rate of force development, enhance loading mechanics for movements such as jumping, landing, and dynamic strength and power.

The box jump can be implemented into programs that involve plyometric strength and balance. Teaching athletes the proper form and alignment of lower extremities during a jump task can reduced the risk of injury (Etnoyer and authors, 2013). A box jump also will improve the torque behind plantar flexion (Etnoyer, et al., 2013)

References

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