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Short Communication

Therapeutic effect of the Goblet squat

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Abstract

The goblet squat is a popular exercise among personal trainers, strength coaches, physical therapists, and chiropractors. Its popularity exists due to the ease of implementation and execution of the exercise. The goblet squats primary use has expanded past the regular gym-goer to become a therapeutic exercise for individuals during the rehabilitation process. Therapeutically the goblet squat serves a full-body movement with a focus on the hips, knees, ankles, and core muscles. The broad scope of the goblet squat makes it a sufficient rehab tool because progressing people to full body exercise vs. isolation exercise provides better overall physical outcomes for health and fitness during the rehabilitation process. Recuperation of the individual muscle can take place while strengthening of surrounding musculature and entire body takes place, thereby building stronger, more mentally, and physically robust patients.

Introduction/History

Initially named the "goblet squat" by renowned strength coach Dan John, [1] the exercise got its name due to the way the individual holds the dumbbell or kettlebell, like a vertical goblet. The purpose of this exercise was to find a way in which new gym-goers could learn the movement and correct biomechanics before performing a more complex barbell squat. Many individuals, whether rehab patients or fitness clients, often find it challenging to navigate a full squat motion due to injury, ergonomics, or even previous injury. One of the reasons behind this is multifactorial but many times blamed on the modern western lifestyle in which many people sit more than they ever have before in history. The goblet squat also forces a more upright torso posture when compared to the back squat; this is due to the load being carried in front of the person instead of on the back and shoulders. From a therapeutic standpoint, the goblet squat is more quadricep dominant when compared to the back squat for these same reasons; this makes it an excellent tool for rehab patients needing to focus on quadricep development, such as patients with ACL tears. Even with the goblet squat being used as a teaching tool, it can also be incorporated into a rehabilitation program for individuals with knee, low back, and in some cases, ankle pain.

Movement biomechanics and possible limitations

The squat movement pattern is one of the most primal and critically relevant movements that can predict physical activity levels, the potential of injury, as well as level of sports performance. This is due to the squat affecting 3 of the most used joints in the body, which include the hip, knee, and ankle. The hips allow for thigh flexion, thigh extension, abduction, adduction, as well as internal and external rotation. These movements are performed by numerous musculatures to allow for a full range of motion and fluidity. The musculature used for the hip flexion includes an iliopsoas group consisting of the iliac and psoas major and having the quadriceps femoris to assist. Hip extension muscle is mainly the gluteus maximus, but muscle that assists with this, as well as assists in abduction and rotation, are the glute med and minimus. For hip adduction, it includes the adductor brevis, magnus, longus, as well as the gracilis and pectineus. Lastly, for the lateral rotators of the hip, it consists of the obturator internus and externus, quadratus femoris, piriformis, and the inferior and superior gemelli. These muscles need to be working at full capacity for specific functional movements to be even possible. The everyday functional movements used by everyone include sitting and standing, lunges, and being able to pick up items from ground level safely and effectively. Some limiting factors for movement of the hip include osteoarthritis, slipped capital epiphysis, Paget's disease, avascular necrosis, and more.

The knee's primary movements that most individuals know about are flexion and extension. Although this is true, these movements are not the only ones. The knee truly has six-movement

options due to it being a modified hinge joint. Three of them are translation, which consists of anterior-posterior, medial-lateral, and inferior-superior. The other three movements are rotational, which consists of flexion-extension, internal-external rotation, and adduction and abduction. For simplicity's sake, let us focus on the flexion and extension. The primary musculature used for knee extension is the quadriceps femoris, which is a group of muscles, including the rectus femoris, vastus medialis, vastus lateralis, and vastus intermedius. The primary movers for flexion is again a group of muscles commonly known as the hamstrings. This group consists of semitendinosus, semimembranosus, and the biceps femoris. Lastly, we have one more muscle that is used primarily to "unlock the knee" and to allow for full flexion, which is the popliteus. These muscles, as you can see, are as seen previously, are associated with the hip as well, and help cause the same function movement; but when pertaining to the knee, there is a different focus. While before, in the hip, the focus is more proximal movements; this time, the focus is more distally. For example, when sitting to standing, the focus is to unlock the knee using the popliteus and sit. Then when the time to stand, the quadriceps are used to control the movement to allow for the extension of the knee instead of assisting the hip to flex. Limiting factors for the movement of the knee consist of osteochondritis dessicans, osteoarthritis, fracture, muscular tendon rupture, pseudogout, neurogenic arthropathy, and Osgood Schlatter's.

Another primary biomechanical movement needed to squat is the ankle. This is because if an individual has decreased dorsiflexion, then it will make it even more difficult to reach full depth in a squat. The range of motion in the ankle, even though much more limited, that the knee and hip are just as important and include dorsiflexion, plantarflexion, inversion, and eversion. The musculature used for primary dorsiflexion includes the anterior tibialis, extensor digitorum longus, and extensor hallicus longus and peroneus tertius. The primary plantar flexors consist of the gastrocnemius, the soleus, flexor hallicus longus, flexor digitorum longus, peroneus longus, peroneus brevis, and tibialis posterior. For inversion, the muscles used are the tibialis anterior and posterior, flexor and extensor hallicus longus, and flexor digitorum longus. Lastly, for eversion, the ankle uses peroneus longus, brevis, and peroneus tertius. When there is a dysfunction in any of these motions, some of the causes of this dysfunction include muscular, tendon, or ligamentous rupture, gout, fracture, benign or malignant tumor, osteoarthritis, or rheumatoid arthritis.

Clinic Application

The goblet squat serves as a variation of the front squat being as the weight is carried in front of the body vs behand the head. This is important for many reasons but mostly because of the demand to maintain a vertical torso throughout the exercise. The vertical torso surprisingly is the single factors that makes the goblet squat a quality therapy over the back squat as it changes the mechanics of the low back, hips, and ankles. Patients with low back pain will benefit greatly for the vertical torso established by the goblet squat. The subject's ability to maintain a neurtral vertical spine is reinforced by the anterior carriage of the weight. This When it comes to the hips, the vertical torso helps reduce the demand for anterior pelvic tilting during the exercise. The anterior pelvic tilt has been implicated numerous times as one of the culprits behind femoral acetabular impingement noted with hip pain in squatters [2,3]. By maintaining a vertical torso, the practitioner can decrease the need to anteriorly pelvis tilt, thereby reducing aberrant motion in the low back and femoral acetabular joint likely the culprit behind increased wear and tear [2,3].

A normal healthy hip has a range of motion of 80-90° flexion, 30° extension, 40° internal rotation, 50° external rotation, 50° abduction, and 30° adduction [4]. The goblet squat begins with the hips in neutral. As the subject descends, the knees begin to travel out into a natural varus position. This creates medial femoral head rotation at the hip joint. Subjects suffering from decreased internal hip rotation will find the deeper parts of the goblet squat challenging. Coaching these people through the movement and allowing them to breathe and train into the stretch will provide increased mobility and stability around the dysfunctional range of motion [5-7]. Ankle dorsiflexion is a restriction that can be an overall clinical presentation that adds to patient's movement dysfunctions. As stated earlier, the goblet squat requires a more vertical torso than a traditional back squat. Due to this position, the goblet squat also demands a higher level of ankle dorsiflexion as the knees travel farther over the toes during the decent. This position allows the subject to locate and train into restricted ankle ranges of motion. Over time the joints recognize the new demand for a range of motion, and new degrees of ankle dorsiflexion can be discovered.

Conclusion

The goblet squat is a simple and effective exercise for strengthening the lower body while helping increase the hip range of motion and stability. The front-loaded mechanics of this particular squat variation can provide pain relief for those who complain of knee pain during squatting. Overall, the goblet squat can be used in a clinical setting for various complaints while providing endless scalability for patients and athletes alike.

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