



Effective Unloading Squat Training for Improved Running with Rhythmic Music

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Abstract

Our rehabilitation research group has been teaching various patients, sportsmen, and related people, and recently presented squat exercises without loading to the music. The reason includes large reaction power obtained from the ground. Concerning continuous unloading squat training, important factors are adequate posture, weight, and reflexes. We developed effective unloading squat training accompanied with rhythmic music, in which reggae music is recommended for its clear afterbeats. There are three important tips for successful and satisfactory operation of the exercise, which are relaxed standing, hip joint movement, and neck stretch. This method will be hopefully used for clinical practice.

Keywords: Unloading squat training, Reggae music, Stretch reflex, Running, Reaction power, Intra-abdominal pressure (IAP).

Introduction

The world is now in a challenging situation, and proper continuation of exercise would be important for maintaining health and immunity for disease prevention (1). In the field of orthopedic and rehabilitation, the phrase “Exercise is Medicine” has been known (2). As a matter of fact, the American College of Sports Medicine (ACSM) has recommended physical activity for all occasions (3).

Our rehabilitation research group has been teaching various patients, sportsmen, and related people. The most important matter is that everyone has a happy life. Among them, each person is involved in sports and exercise. Our role is to help them perform the exercise safely, enjoyably, and effectively (4). We have taught various tips for health in the workshop to people of all ages (5). Especially, we have been involved in Masters’ athletes how to run fast with preventing injuries (6). There are some beneficial basic points such as biaxial running, forward-leaning, and flat landing (7). It is also important to understand and train the flexibility and overall relationships of the head, chest, and pelvic lines (8). Among them, we have recently presented squat exercises without loading to the rhythmic reggae music (9). By learning the tips, one can run fast with safety manner, instead of running with power. The reason includes large reaction power obtained from the ground. Consequently, we will introduce current exercise information associated with effective unloading squat training accompanied with music.

Concerning continuous unloading squat training, the running form of a first-class athlete is completed by combining three elements of posture, weight, and reflexes (10). In order to learn three elements together, we have developed squat training that utilizes the rhythm of the afterbeat.

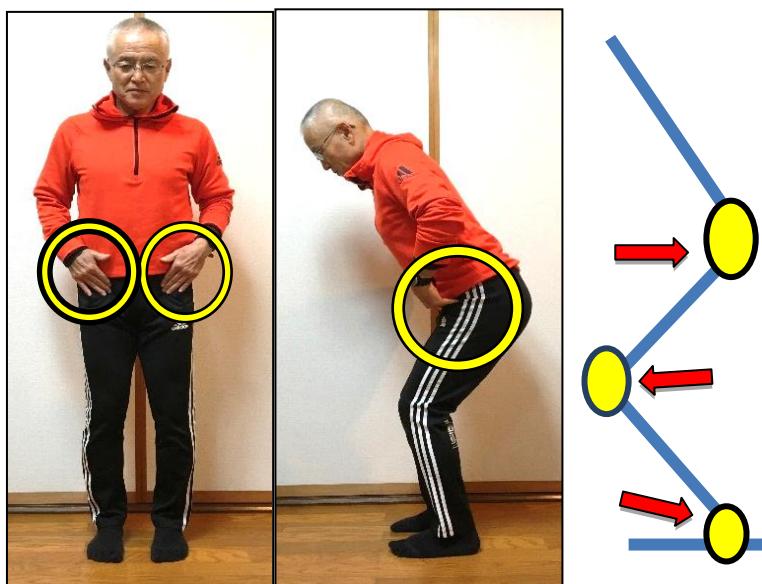
The aim of the practice and crucial points would be as follows: i) to obtain the position, posture, and movement that cause a stretch reflex in the Achilles tendon, calf, and hamstrings, and connect to natural running without relying on force (11). ii) to acquire the movement of the whole body in a timely manner and connect it to a relaxed and rhythmic run. iii) to place one’s consciousness on the hips and hamstrings and repeat squats training (12). Consequently, the consciousness and physical sensation of the center of gravity are deepened, and the feeling of ground contacts such as balance and timing will be improved.

There are three important tips for successful operation, which are i) relaxed standing, ii) hip joint movement, iii) neck stretch.

The first is relaxed standing. Both feet are upright straight so that the middle fingers are parallel. Be conscious of placing the center of gravity on the una position just below the tibia (5). Then, the center of gravity of the body is supported by the skeleton. When the body maintains this posture, the muscle tension of the extra muscles is almost eliminated, so that the squat movement can be performed smoothly (13). If the center of gravity is on the toes, the muscles become tense. In this situation, the joints of three legs (ankle, knee, hip joint) will be fixed with tension. When the posture becomes with the center of gravity lowered, the kneecap and toe should be aligned so that they face the same direction. This posture is a crucial matter to prevent physical injury. The three joints of the legs should not be tense and should be loosened to some extent.

The second is hip joint movement. The flexion and extension movement of the hip joint is caused by the extension reflex of the hamstrings (14). It is a recommended method to hold the front of the hip joint with the fingertips of both hands (Figure 1). Then, it is possible to feel no tension and sharp movement in the hip joint. This situation means instant weight removal and successive elastic power like a spring-like rubber ball. A trainee can feel the abruptly decreased weight in the hip joint and knee (15).

Figure 1: The movement of hip joint, knee and ankle for unloading squat training.



By continuing this practice, everyone can perceive the minute feeling of smooth movement of the hip joint. Successively, start squat practice from slow movements in a relaxed state without tension. This is the tip for a series of practice methods.

After one can acquire this awareness feeling, one can develop the consciousness of making "creases" for three joints including hip joint, knee, and ankle. By doing so, one can get a moderate feeling of no tension and turn back at the moment. As a result, a large repulsive force can be instantly received from the ground. This is the rebound power of the natural fall of the bodyweight without tension.

The third is neck stretch. The human structure seems to have three spheres, which are the head, chest, and pelvis (8). The three chains and the degree of rotation in the front-back direction show important relationships associated with all movements. For example, in the case of a squat posture, it is recommended to lower the sight direction a little slightly from the horizontal level, rotate the head slightly forward, and extend the neck muscles. The reason is that the chain of the body can cause adequate tension on the abdominal muscles and hamstrings (16). This position allows the pelvis to be fixed and move while maintaining intra-abdominal pressure (IAP) and holding the pelvis for a so-called up-right position (17,18).

Here are some beneficial tips for posture. As to the direction of the viewpoint, it is advisable to perform squats while looking at one point diagonally below the front. In contrast, if you look upwards or take a posture that stretches your chest, your neck and back become tense. Therefore, to avoid this posture would be necessary. It is important not to put pressure on the chest muscles, and then the neck, chest, and back will not show the strain.

If the above squat movement is possible, the hip joint, knee joint, and ankle joint can use sufficient reaction power from the ground. Then, it can be applied to jumps and dashes on either both feet or one foot, which can contribute to improving physical and running ability (19).

In conclusion, the practice of squatting accompanied by reggae music is really fun. Moreover, one can learn the useful points to run easily and efficiently. In our seminars for masters' athletes, a participant presented

his impression, such as "I feel like I was able to use the hamstrings for the first time, and I can run fast so easily without any power."

For Masters athletics and sports enthusiasts from young to elderly, it is important to run using "gravity and reaction power" without using much force (20). The reason is that if one can learn this safe driving method, one can continue to run for many years without injury. As our mission, we would like to introduce "Reggae Squat" widely in various opportunities in the future.

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