Osteoporosis and Sarcopenia 7 (2021) 42–43

Contents lists available at ScienceDirect

Osteoporosis and Sarcopenia

journal homepage: http://www.elsevier.com/locate/afos

Letter to the editor

Exercises aimed to maximize lean mass and bone mineral density at the hip and lumbar spine

To the editor,

The article by Nguyen et al [1] sheds light on how lean mass, and not fat mass, is the main determinant of peak bone mineral density (BMD), and that physical activity can be used to maximize both lean mass and peak bone mass, particularly at the hip and lumbar spine. In light of these findings, this is to share what specific physical activities can be utilized for increasing lean muscle mass and BMD at the hip and lumbar spine. In particular, commonly used compound weightlifting exercises, such as the conventional squat and deadlift, place large amounts of load and tension at the hip and lumbar spine to increase both muscle mass and BMD at these specific areas [2,3], and have been shown to be effective in high-intensity progressive resistance training programs like the Lifting Intervention for Training Muscle and Osteoporosis Rehabilitation (LIFTMOR) trials [4,5]. These weight-bearing exercises are usually performed with a barbell and heavy weight plates; however, many individuals and communities may not have access to the equipment to perform them. But bodyweight exercises can be utilized as they can be performed with minimal to no equipment, such as split squats or one-leg squats and bridges to target the muscles at the hip and lumbar spine.

If individuals do not have access to weightlifting equipment to perform conventional squats on both legs with added resistance from the external weights, there are variations of squats that require much less or no external weight at all, in order to provide adequate resistance. With split squats, one leg is in front of the body and the other leg is behind the body (eg, stationary lunges), and this provides more resistance onto the front leg as it bears most of the body's weight as the back leg is used for support. In addition, a more difficult modification is the rear-leg elevated split squat (eg, Bulgarian split squat), in which the back leg in placed at a higher level to shift even more of the body's weight onto the front leg. More advanced variations, such as one-leg squats (eg, pistol squats), when one leg performs the squatting motion and the other leg does not touch the ground, provide even more resistance than split squats, and can still be safe [6].

Also, if individuals do not have access to weightlifting equipment to perform deadlifts, bridges (eg, hip bridges, back bridges) are bodyweight exercises that can be done with minimal or no external weight, and they have been shown to activate the same muscles and increase muscle mass at the abdominal region of the lumbar spine [7,8]. Additionally, bridges on unstable surfaces increase abdominal muscle activation [9] and muscle mass [10] at the lumbar spine region, and contracting the hip adductors during the bridge can further increase muscle mass at the lumbar spine region [11]. Furthermore, variations of bridges can be performed with both legs or with only one leg to increase resistance, and with knees bent or straight along with the shoulders and/or feet elevated at different levels to adjust tension and range of motion.

Thus, for promoting physical activity targeting muscles at the hip and lumbar spine, people with access to weightlifting equipment can perform conventional squat and deadlift exercises, and those who have limited access can explore the use of various bodyweight exercises, such as split squats or one-leg squats and bridges. There are numerous progressions and variations of split squat or one-leg squat and bridge exercises, and individuals can utilize the variations appropriate for their strength and fitness levels, with options to progress on to more difficult variations as their strength and fitness increases. These can be suitable exercise options to target the muscles at the hip and lumbar spine with minimal or no equipment at all, and can increase lean mass and BMD to decrease the risk of hip and vertebral fractures.

Conflicts of interest

The author declares no competing interests.

Acknowledgments

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Peer review under responsibility of The Korean Society of Osteoporosis.

https://doi.org/10.1016/j.afos.2021.03.001

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5 January 2021
Available online 18 March 2021