



KEEPING YOUR JOINTS FLEXIBLE THROUGHOUT LIFE

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YOUNG REVIEWERS:



AYIXIA

AGE: 12



MILO

AGE: 10

People are built to move. To survive, not so long ago, we had to search for food every day as hunters or gatherers. In modern times, however, our way of life has changed drastically. We can buy our food at the supermarket and many people can do their work at a desk. As a result, we move less and sit for several hours every day. This is called a sedentary lifestyle. Sedentary activities can lead to a dramatic decrease in flexibility in the joints. To overcome those challenges, we can do a variety of activities such as performing sports that require the full range of motion of our joints, as well as doing stretch training, foam rolling, or resistance training.

USE IT OR LOSE IT!

As a young child, it is possible to do a deep squat for hours while playing with toys. But have you ever wondered why most older people, such as your grandparents, cannot do such movements easily, and sometimes even have problems walking? One explanation is a loss

JOINT FLEXIBILITY

The range of movement your joints can achieve. Joint flexibility can be restricted due to your muscles, tendons, and bones.

SEDENTARY

If you do most of your activities sitting down.

of **joint flexibility** as we age [1]. Older people cannot run as fast as younger people and they may even need an elevator to get up to higher floors in a building. The proverb “use it or lose it” describes one possible reason for loss of flexibility as we age. As kids, we frequently use the flexibility of all of our joints when we run around to play, climb trees, or do our favorite sports such as soccer, football, tennis, and others. Additionally, as children, we have the urge to move our bodies. It is quite hard to just sit still, right? That is in our genes, since the people who lived thousands of years ago had to move all day to find food, for example. Nowadays, however, we can go to the supermarket to buy food and most of us do not even have to walk, since we can take a bus or go by car. Another major problem in our society is that the majority of adults and children sit around 8 h a day, on average, during their daily tasks [2]. I bet you have to sit all day long when you are in school. However, we are not built to sit—we are built to move like the hunters and gatherers we evolved from.

SIT LESS AND MOVE MORE!

Since people are not built to live **sedentary** lives, our first recommendation is to avoid sitting all day. While doing your homework, you might try using a standing desk. This allows you to have your muscles in a more natural position, rather than in the shortened position they are in while you are sitting. Additionally, try to reduce the time you spend seated in your free time, and instead do sports that require the whole range of motion of the joints. If you swim with the crawling technique, for example, you have to fully extend your arm so that you can catch as much water as possible to move yourself forward. Consequently, swimming frequently increases your flexibility, especially in your upper body. Other fun sports that require the full range of motion are climbing, gymnastics, or ballet dancing.

FREQUENT FLEXIBILITY WORKOUTS

Our second recommendation is to include frequent flexibility training in your daily schedule, to increase your flexibility. The word “frequent” is the key to success. We recommend performing at least 3 flexibility workouts per week to develop or at least maintain your flexibility level. Now we will tell you about the three most efficient approaches for increasing flexibility in the long run, namely stretch training, foam rolling, and resistance training. You do not have to stick to one approach. Instead of performing one approach 3 times a week, it would be even better if you performed each of the 3 approaches once a week.

Stretch Training

Performing frequent stretch training is a very good way to improve flexibility. During stretching, you flex (bend) or extend (straighten) your

STATIC STRETCHING

Hold your joint and muscle in a slightly stretched position for a certain amount of time.

Figure 1

Static stretching exercises for the leg and shoulder muscles.

joints to a position where you feel a gentle stretch in your muscles. You can hold that position for about 2 min. There is no need to stretch until you feel discomfort or pain, since a gentle stretch does the job [3]. If you want to stretch your front thigh muscle, for example, bring one heel up to your buttocks with the support of one hand. Try to keep your trunk upright while standing on the other leg, using your other hand to support your balance if necessary (Figure 1). You should also stretch other muscles, such as the back thigh, calf muscles, and shoulder muscles, as also seen in Figure 1. This technique is called **static stretching**, since you do not move while you are performing the stretching exercise. Static stretching is the easiest stretching technique as well as one of the best ways to increase flexibility.



Figure 1

Foam Rolling

A second approach to increase flexibility in the long term is performing frequent foam rolling. For foam rolling, you need a foam roller that looks like a cylinder and is made of a firm material. You can roll the foam roller over your muscles, which puts pressure on them. You should roll only soft tissues such as muscles; avoid rolling on bones. If you want to roll your front thigh muscle, for example, place the foam roller below you while lying on your stomach. Your elbows and the non-rolled leg should be on the ground. Move your body up and down on the foam roller to roll over the entire front thigh muscle, from the knee to the hip, which should take about 4 s (Figure 2). Keep rolling for about 2 min. As with stretching, a gentle pressure will do the trick [4]. Foam rolling exercises for other leg muscles are shown in Figure 2.

Resistance Training

Similar to stretching and foam rolling, resistance (weight) training can also improve your flexibility in the long term. However, resistance training must be performed throughout the whole range of motion of a joint to really increase flexibility [5]. That means if you do a squat, for example, you should stop only when your buttocks are at your heels (Figure 3). To start with resistance training, it is recommended

Figure 2

Foam rolling exercises of the leg muscles.

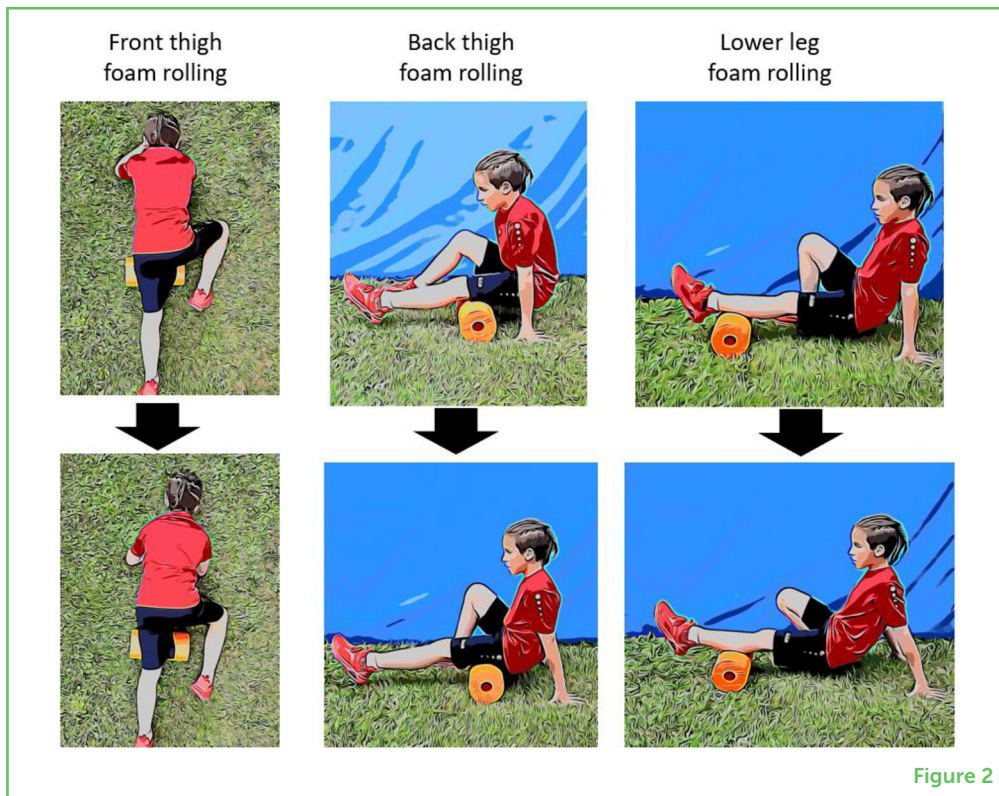


Figure 2

Figure 3

Resistance training exercises that require full range of motion of the joints. Please note that you can do the squat and deadlift exercise even without weight. If you do use weights, please start with low weights! If you cannot perform 15 push-ups, start with your knees down on the floor instead.

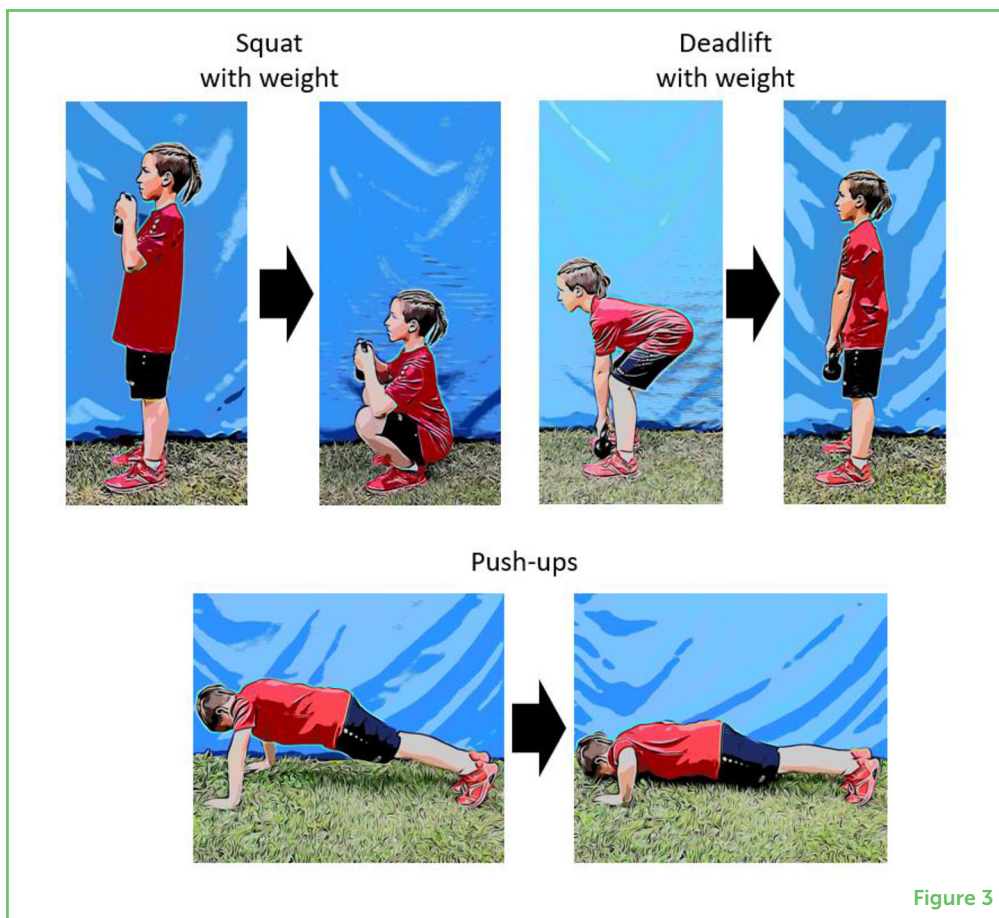


Figure 3

to perform 15–25 repetitions for each exercise. After a short break of 60–90s, the same exercise with 15–25 repetitions should be done for 2 more rounds. It should be challenging to perform these exercises, however, you do not have to do it until you cannot do it anymore. If it is too easy, we recommend using light weights. Two other resistance training exercises are shown in [Figure 3](#). If you are performing these exercises for the first time, it is recommended that you have an experienced coach by your side to check the movement. Although resistance training is the most challenging compared to stretching and foam rolling, you will also increase your strength using this approach.

Please note that you can perform stretch training and foam rolling every day to improve your flexibility. Regarding resistance training, it is recommended to have at least one rest day before repeating resistance training of the same muscle groups. All the exercises presented are likely to improve your flexibility, as well as that of your younger or older siblings and your teachers, parents, and coaches.

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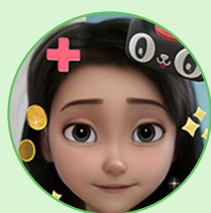
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YOUNG REVIEWERS



AYIXIA, AGE: 12

Ayixia is a very highly creative individual with an inquisitive mind. She loves dancing, reading, and swimming. She is also a good cook for different foods. During her free time she enjoys playing with her friends. She loves to travel around. She currently lives with her parents and little brother in northwest China.



MILO, AGE: 10

My name is Milo, I am 10 years old. I am a huge fan of science especially health science since I was 4 years old. Looking forward to gaining more knowledge in health science in the next couple of years and more importantly sharing such knowledge in several ways to the public. I am also a young researcher of the universe. Microscope and telescope are both my favorites.

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DAVID GEORGE BEHM

Dr. Behm has worked at Memorial University of Newfoundland since 1995, teaching more than 18 courses. His research interests are diverse, with over 370 articles exploring neuromuscular responses to stretching, resistance training, balance, fatigue, foam rolling, and other topics. David has authored a book called *The Science and Physiology of Flexibility and Stretching: Implications and Applications in Sport Performance and Health*. He has received a number of university, national, and international awards. Dr. Behm has been interviewed on the internet, radio, newspapers, magazines, and television. He attempts to bridge the gap between his athletic background and his research.