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### The Benefits of Static Stretching on Health: A Systematic Review

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# The Benefits of Static Stretching on Health: A Systematic Review

By Semir Mašić, Denis Čaušević, Nedim Čović, Seth Spicer, Ahmed Gawash

## Abstract

- Static stretching exercises (SS) have well-established positive effects on physical fitness and rehabilitation, but their effects on general health, muscle function, flexibility, and daily activities are less understood.
- The articles found that the effect of SS, regardless of the protocol used or whether it is active or passive, has a positive effect on the health status of the subjects.
- SS is an effective and safe method for improving flexibility and ROM, preventing muscle atrophy, enhancing physical functioning, and improving quality of life with minimal risk of injury.

## Introduction

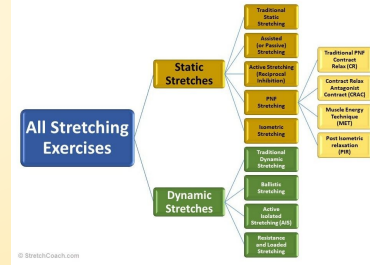
- The quality of human movement depends on the range of motion (ROM) available in synovial joints, which can be limited by joints and muscles.
- Insufficient physical activity can lead to a decrease in muscle function, endangering ROM and consequent joint health.
- Stiffness, as a result of reduced activity, limits ROM and can create muscle imbalances.
- Limited mobility or reduction in flexibility can increase the incidence of injuries, especially musculotendinous strains.
- To maintain body mobility, regular physical activity is necessary, and stretching exercises, in particular, can be examined further.
- There are several different stretching techniques, including static stretching exercises (SS), dynamic stretching (DS), and proprioceptive neuromuscular facilitation (PNF).

## Discussion

- The results of the included studies show that the effect of SS, regardless of whether it is active or passive, is mainly positively reflected in the health status of the subjects.
- Improvements in ROM according to Bandy & Sanders (2001) can be explained by the fact that in the SS there is a high possibility of increasing the number of sarcomeres in series (muscle length) due to prolonged exposure to stresses that occur at a certain degree of stretching, which is constant (Medeiros et al., 2016).
- Gartley & Prosser (2011) found that fewer warehouse loaders and delivery drivers were present during a 90-day stretching program, suggesting that even a short SS protocol can positively affect the health status of workers working in specified or similar jobs.
- Aje et al. (2018) suggest that an effective and affordable stretching program can be a feasible clinical intervention in a factory work environment, reducing work-related musculoskeletal disorders (WMSD) over a 60-day period compared to the same period last year.
- Rattes et al. (2018) found that stretching respiratory muscles (RMS) could trigger an acute increase in respiratory volume and hemiparetic enlargement of the chest in patients after a stroke with hemiparesis of the right side.
- Stretching exercises may be recommended when women cannot adhere to other forms of exercise, as pregnant women adhere better to the PSE regimen than other forms of activity in the second and third trimesters.
- Physiotherapists are known to apply various exercises to maintain muscle strength.






## Conclusion

- SS exercises have a positive impact on the health status of various groups of people
- SS exercises show potential benefits on human health regardless of stretching parameters used
- SS exercises are adaptable to individual constraints, relatively simple to perform, and require low level of strain
- SS exercises can serve as a simple and effective tool to improve and maintain health and increase satisfaction during activities of daily living.

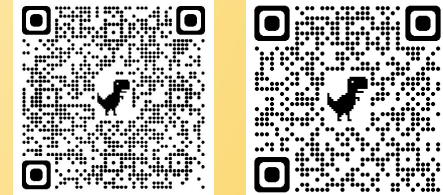


**Static stretching** is used to stretch muscles while the body is at rest. It is composed of various techniques that gradually lengthen a muscle to an elongated position (to the point of discomfort), which are held for a period of 15 seconds to two minutes. For example, a static hamstring stretch as seen below:

**Dynamic stretching** on the other hand uses movement or momentum of the limb or trunk to move the muscle between its extremes of range. It is a controlled movement and should not be vigorous or bouncy at the end of range. For example, a dynamic hamstring leg swing as seen below:

	Static stretching (SS)	Dynamic stretching (DS)
	<ol style="list-style-type: none"> <li>1. Grasp ankle gently pull your heel up and back until you feel the stretch in the front of your thigh.</li> <li>2. Tighten your stomach muscles to prevent your stomach from sagging outward and keep your knees close together.</li> <li>3. Hold stretch at PICO for 30 seconds, switch leg and repeat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Grasp ankle gently pull your heel up and back until you feel the stretch in the front of your thigh.</li> <li>2. Tighten your stomach muscles to prevent your stomach from sagging outward and keep your knees close together.</li> <li>3. Add a secondary pulling/lugging motion (pull foot across your body back before releasing the ankle and switching legs).</li> <li>4. Repeat for 30 seconds per leg, an up-down motion.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Lie on back and lift knee up, keeping knees straight as far as possible and feet maintaining dorsiflexion.</li> <li>2. Grasp behind thigh near knee with both hands and pull knee close to chest.</li> <li>3. Hold stretch at PICO for 30 seconds, switch leg and repeat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lie on back and lift knee up, keeping knees straight as far as possible and feet maintaining dorsiflexion.</li> <li>2. Grasp behind thigh near knee with both hands and pull knee close to chest.</li> <li>3. Add a secondary pulling/lugging motion before releasing leg.</li> <li>4. Repeat with opposite leg, 30 seconds per leg.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Stand with hand on hip and with one leg approximately leg length in front of the other, with the forward leg slightly bent at the knee and rear leg maximally extended.</li> <li>2. Slowly lunge forward by bending forward leg.</li> <li>3. With chest high, straighten hip of rear leg by pushing hips forward.</li> <li>4. Hold stretch at PICO for 30 seconds, repeat with opposite side.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stand with hand on hip and with one leg approximately leg length in front of the other, with the forward leg slightly bent at the knee and rear leg maximally extended.</li> <li>2. Slowly lunge forward by bending forward leg.</li> <li>3. With chest high, straighten hip of rear leg by pushing hips forward.</li> <li>4. Hold stretch at PICO for about a second before returning to starting position.</li> <li>5. Repeat for 30 seconds per leg.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Stand with feet facing forward and slightly more than shoulder width apart.</li> <li>2. Lean to one side by dropping one knee, causing the muscles of the other leg to go into tension.</li> <li>3. Hold stretch at PICO for 30 seconds, switch leg and repeat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stand with feet facing forward and slightly more than shoulder width apart.</li> <li>2. Lean to one side by dropping one knee, causing the muscles of the other leg to go into tension.</li> <li>3. Pause and hold the stretch position at PICO for about a second before leaning to the other side.</li> <li>4. Repeat for 30 seconds per side.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Standing on one leg, grasp below the knee of the other leg and pull it as close to your chest as possible.</li> <li>2. Hold stretch at PICO for 30 seconds, switch leg and repeat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Standing on one leg, grasp below the knee of the other leg and pull it as close to your chest as possible.</li> <li>2. Add a secondary lugging motion before releasing and switching legs.</li> <li>3. Repeat for 30 seconds per leg.</li> </ol>

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