# Warm-up in Physical Training: Everything You Need to Know

Written and edited by: Dr. Yigal Pinchas

"Warm-up" is a term that prepares all body systems for strenuous physical activity and serves as mental preparation. Warm-up is the "preparatory phase" or "awakening phase" of the training unit, reducing risk factors for microscopic tears and inflammation in movement system components. Warm-up has two main characteristics: aerobic activity and stretching. Aerobic activity raises body temperature (hence the name warm-up) and heart rate. Stretching exercises improve joint range of motion and prepare the muscular and skeletal system for anticipated training effort. The emphasis in stretching exercises is on increasing joint range of motion, causing surrounding muscles to stretch. During and after stretching, the diameter of blood vessels entering and exiting the stretched muscle increases. This change allows better blood supply and faster waste removal[1].

The benefits of warm-up can be summarized in the following metrics:

1. Increased blood flow: Warm-up increases blood flow to muscles, improving oxygen and nutrient supply, allowing muscles to work better.

2. Raising muscle temperature: Warm-up increases muscle temperature, improving flexibility, increasing range of motion, and reducing the risk of muscle tears.

3. Improved coordination and reaction time: Dynamic exercises during warm-up (like jumps or light running) activate the nervous system and prepare the body for intensive efforts, improving reaction speed and coordination.

4. Reducing mental stress: Warm-up also allows for "mental warming" where the athlete prepares themselves for effort, focuses on goals and objectives, thus entering activity with a sense of readiness and calm.

Recommended warm-up exercises include light running, dynamic flexibility exercises, moderate strength exercises, and movements that simulate the specific sport[2].

Warm-up is typically divided into two styles according to the training program's purpose:

**General Warm-up**

About half an hour activity, including twenty minutes of moderate aerobic activity and about ten minutes of stretching. General warm-up suits various sports and can combine aerobic and anaerobic activity: The aerobic activity has no special emphasis on effort factors (pace, incline, resistance, etc.). In anaerobic activity, general warm-up

can also include low-dose strength exercises for resistance training, or resistance training in various ways (static, dynamic).

**Specific Warm-up**

Activity time varies according to training nature and purpose – between ten minutes to 40 minutes. Specific warm-up has unique characteristics that help focus on specific training program goals. For example, when the trainee is a bodybuilder aiming to increase muscle mass, aerobic activity duration will be reduced to ten minutes at low intensity, emphasizing stretches for relevant muscle groups. Some combine lightweight lifting at low effort as part of training graduality and preparation for the training phase.

Many trainees are aware of the importance of stretching exercises but don't know when and how to perform them. Stretches can be performed before aerobic activity, but their effectiveness will be reduced. Usually, stretching exercises are performed after the trainee has raised their temperature and heart rate, and their metabolism has increased. In this state, they are more prepared to improve joint range of motion and stretch soft tissues and muscle tissues. When muscle temperature rises, it becomes more elastic, its mechanical efficiency increases, and neural conduction improves. About 20 different stretching exercises are recommended for different muscle groups. The order of stretching exercises, from head to feet or vice versa, is not significant as long as all muscle groups are stretched. Multiple sets of stretches should be performed for each muscle group, emphasizing those muscle groups that will be loaded during training[3].

*In static warm-up*, various stretching exercises should be performed gently, at a slow pace, with an average hold of about ten seconds in each position.

*Dynamic warm-up* includes limb swings, and its purpose is to "awaken" the trainee. Such warm-up is common before competitive or vigorous activity.

*It's important to note* that there is confusion between stretching exercises as part of the warm-up and preparation phase versus stretching exercises for improving flexibility component. Flexibility is defined as the ability to perform an action with significant (optimal) range of motion in any joint. Only stretching exercises at significant effort levels from 90% to 100% of the joint's maximum range improve (generate) the flexibility component! Stretching exercises at moderate or low effort levels less than 80% of maximum range are considered stretching exercises within elastic flexibility range and do not contribute to developing plastic flexibility!

However, opponents of warm-up note that in nature, animals don't perform warm-up before running or jumping, and many athletes in the distant past didn't perform warm-

up yet still achieved accomplishments. Also, the body can quickly adapt to effort without needing preliminary warm-up.

There are articles indicating that warm-up doesn't always significantly improve performance or prevent injuries. For example, a “review in the British Journal of Sports Medicine”[4] found that certain types of warm-up, like low-intensity dynamic warm-up, don't consistently affect strength, flexibility, and performance measures. Other studies argue that the effect depends on warm-up characteristics and activity type – where high-intensity warm-up may be beneficial, while light warm-up may be less effective for significant performance improvement or injury prevention. The articles provide insights about warm-up effects on upper body and performance but emphasize there's no clear evidence for warm-up effects on preventing upper body injuries.

A study published in the “Journal of Strength and Conditioning Research”[5] found that static stretches before activity might actually reduce strength and athletic performance and that there's no conclusive evidence that warm-up reduces injuries.

From my experience (40 years) in training and instruction, I note that prolonged and intense warm-up can waste energy that could be used for the training itself and cause early fatigue. External factors affecting warm-up should be considered, including hot weather load conditions.

Therefore, one should calculate the duration and intensity of training so it won't harm the workout, avoid long static stretches before activity, and perform specific warm-up according to training program goals. This way, we'll ensure that warm-up following these guidelines, if not beneficial, will certainly not harm.

In conclusion, **enjoy your warm-up training**.

Bibliography

1. Yigal, P. (2024). *Be Your Own Personal Trainer: The Ultimate Science-Based Fitness Guide to Maximizing Gym Workouts and Minimizing Injuries* .Amazon (Book 3 of 3: Fitness Training & Exercise Excellence).
2. Yigal, P. (2024). *Start With Stretching: Practical Tools to Help You Maximize Your Flexibility, Stay in Motion, and Prevent Injuries*. Amazon (Fitness Training & Exercise Excellence Book 2).

3. Yigal, P. (2024). *Holistic Fitness Training: The Science-Based, Mindful Exercising Guide to a Healthy and Active Lifestyle*. Amazon (Book 1 of 3: Fitness Training & Exercise Excellence).

4. J. Matt McCrary, Bronwen J. Ackermann, Mark Halaki.(2015). A Systematic Review of the Effects of Upper Body Warm-Up on Performance and Injury. *British Journal of Sports Medicine. Vol 49,* Page 935-942. England: BMJ Publishing Group.

5. Taylor, Kristie-Lee; Sheppard, Jeremy M ; Lee, Hamilton ; Plummer, Norma.(2009). Negative effect of static stretching restored when combined with a sport specific warm-up component. *Journal of science and medicine in sport, -11,* Vol.12 (6), p.657-661. Australia: Elsevier Ltd.