EDITORIAL OPEN ACCESS

Dynamic stretching during warm-up prior to running

Gali Dar

Warming up prior to running is important, preparing the body and musculoskeletal system for physical activity demands. This preparation increases the flexibility of the muscles and tendons, stimulates blood circulation to the periphery, raises body temperature and increases coordination of body movements. In addition, warming-up also increases the speed and force of muscle contraction and reduces muscle stiffness by making the contraction smoother [1, 2].

Warming-up is recommended as it improves performance and reduces the risk of injury. The main risk factors for muscle injuries are reduction in flexibility, a decrease in muscle strength and muscle imbalances. The most common injuries that can be reduced following an appropriate warm-up are lower extremity injuries such as stretching/tearing of the hamstrings, hip adductors tear, Achilles tendon injury, etc.

At present, no standard protocol for warm-up exercises exists. However, the most common warm-up technique is divided into three phases: (a) an active/dynamic warm-up (low intensity aerobic exercises), (b) stretching and (c) sport specific exercises. There are many variations of dynamic warm-up exercises such as jogging, squatting and lunging with a forward and lateral change of directions movement. Cycling is also a common dynamic warm-up exercise [1, 2].

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Received: 20 July 2015
Published: 02 November 2015

As one of the risk factors for injuries is decreased muscle flexibility, stretching during warm-up prior to running is an important and integral part of a warm-up protocol.

There are two types of stretching: static and dynamic. The main difference between them is the transition from stretching an isolated muscle group to functional stretching of a few muscle groups.

Static stretching is produced by slow and passive elongation of a single muscle group continuing to the end of its range of motion until one feels mild tension. This stretching is usually continuously performed for 20 seconds.

In contrast, dynamic stretching activates several different muscle groups, employing the momentum of the body in creating a muscular force to move the joints throughout the range of motion (Figure 1). This implies that controlled movement achieved through the active range of motion is being performed and during the activity of one muscle group, stretching of the muscles opposite to this group occurs [3, 4].

In recent years, there has been growing evidence that dynamic stretching is more effective than static and a better and safer method to prepare the athlete for physical

Figure 1: Dynamic stretching (lateral leg swing).

activity. A few studies have reported that static stretching causes strength, force, performance (jump height or power), sprint and agility impairments [5], thus, the need for a different and more effective warm-up protocol was raised since warm-up exercises that reduce the athlete's performance are impractical.

Various studies have found that after dynamic stretching, flexibility and muscle strength were higher than after static stretching as well generating a positive effect on the athlete's performance [1, 6–11]. One of the goals of warming-up prior to training is to raise the body temperature, thus preparing the body for practice. The advantage of dynamic stretching is that there is no decrease in body temperature returning to normal as usually occurs during static stretching.

Most research studies have examined the athlete's performance during various tests including vertical jump height and power [10–15] or knee extension and flexion muscle force [8, 14, 16]. Limited evidence exists in regard to the effectiveness of dynamic stretching on running performance.

Little and Williams (2006) [12] examined the effects of different modes of stretching within a pre-exercise warm-up on high-speed motor capacities (important to soccer performance). The study was conducted on eighteen professional soccer players performing a countermovement vertical jump, a stationary 10m sprint, a flying 20m sprint and agility performance after different warm-ups consisting of static stretching, dynamic stretching or no stretching. The results suggest that dynamic stretching during warm-up was most effective in preparing for subsequent high-speed performances. The dynamic stretch protocol produced significantly faster 10m sprint times than did the no-stretch protocol; the dynamic- and static-stretch protocols produced significantly faster flying 20 m sprint times than did the no-stretch protocol in addition to producing a significantly faster agility performance.

Similar results were obtained by Fletcher and Anness (2007) [17] in their research study of eighteen experienced sprinters performing a 50m sprint. The authors concluded that passive static stretching during a warm-up decreases sprint performance, despite being combined with dynamic stretches, when compared to a solely dynamic stretch approach.

In contrast, Samson et al. (2012) [15] examined various warm-up exercises and stretching protocols on 6 repetitions of 20 m sprints finding that a sport specific warm-up was more effective on sprint performance then a stretching type (dynamic vs. static). Similar results were obtained by Chaouachi et al. (2010) [13] who examined different stretching protocols on a 30 m sprint, finding no significant difference on a trained athlete's performance between stretching types.

There is a lack of studies in the literature examining the effectiveness of dynamic stretching on running distances longer then sprints. As most runners are not sprinters and regularly run longer distances, more studies should be conducted on the effectiveness of different stretching protocols on long distance runner's performances and the potential reduction in risk for injury among these runners.

Keywords: Stretching, Warm-up, Running, Sport

How to cite this article

Dar G. Dynamic stretching during warm-up prior to running. Edorium J Sports Med 2015;1:7–9.

Article ID: 100002S02GD2015

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doi:10.5348/S02-2015-2-ED-2

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Acknowledgements
I am thankful to Mrs. Phyllis Curchack Kornspan for her editorial services.

Author Contributions
Gali Dar – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor
The corresponding author is the guarantor of submission.

Conflict of Interest
Authors declare no conflict of interest.

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