EMG Comparison of Five Muscles While Walking in Skechers® Shape-ups Fitness Shoes and Skechers® Conventional Walking Shoes

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Abstract

Purpose

The purpose of this study is to evaluate peak muscle activity using electromyography (EMG) in the Erector Spinae (ES), Gastrocnemius (GM), and Vastus Medialis (VM) while walking on a level surface in the Skechers® Shape-ups (SSU) fitness shoes compared to a Skechers® brand conventional walking shoes (CWS).

Subjects

A convenience sample of twenty-three healthy female participants (mean age, 25 ± 3.18 years; height: 1.64 ± 0.11 meters; mass: 65.13 ± 8.54 kilograms) was evaluated utilizing Noraxon Wireless EMG system. All participants attended a practice session to familiarize with walking in the SSU.

Methods

All participants attended a practice session to become familiar with walking in the SSU. Participants walked to the beat of a metronome, set at 112 beats per minute, for a distance of 0.40 kilometers on a level surface. Two days later, participants returned for electrode placement on erector spinae (ES), gastrocnemius (GM), biceps femoris (BF), vastus medialis (VM), and medial head of the vastus medialis (VMS). Participants completed a lateral preference inventory screening. Results

Data show that there was a significant difference in biceps femoris muscle activity during walking on a level surface, with greater muscle activity found in conventional walking shoes (SSU 78.9 ± 32.14 vs. CWS 90.77 ± 46.27, p < 0.05). However, in the other muscles studied (ES, GM, BF, VM), no significant difference was found between the Skechers® Shape-ups and conventional walking shoes. The results for the other muscles were as follows: erector spinae (SSU 173 ± 117.2 vs. CWS 158.6 ± 102.6, p > 0.05); gastrocnemius (SSU 194.3 ± 133.4 vs. CWS 196.8 ± 152.3, p > 0.05); medial head of gastrocnemius (SSU 76.87 ± 33.16 vs. CWS 84.77 ± 52.86, p > 0.05); and vastus medialis (SSU 134.1 ± 96.07 vs. CWS 134.6 ± 102.7, p > 0.05).

Discussion/Conclusion

Walking in Skechers® Shape-ups and conventional walking shoes require similar muscle activity for four of the five muscles studied. Data show that there is a significant difference in the biceps femoris muscle activity during walking on a level surface with the conventional walking shoes. Therefore, the results of this study do not support the claims made by the Skechers® corporation regarding the benefits of their Skechers® Shape-ups shoes.

The increased BF muscle activity with the CWS is likely due to changes within the gait cycle while walking in the SSU. As a result of the SSU design, full knee extension may not be obtained secondary to the rocker bottom sole. The shoe’s construction forces midfoot contact rather than a normal heel contact typically observed with a flat-soled shoe. The lack of heel contact along with forward progression of gait could result in decreased knee extension during initial contact. If knee extension is not fully achieved, BF activity would likely be less as it acts to decelerate the leg during terminal swing.

This study was designed to evaluate claims made by Skechers® on their Shape-ups shoe regarding strengthening, toning, and firming of muscles in the back and lower limb. The results show no statistically significant difference in either shoe for the muscles studied, excluding biceps femoris in which the conventional walking shoes show greater peak muscle activation than the Skechers® Shape-ups.

Background

Fitness shoes with a rocker bottom sole, specifically the Skechers® Shape-ups, have become increasingly popular in the last few years. Manufacturers report these shoes improve posture, strengthen the back, improve blood circulation, tighten abdominal muscles, firm buttocks muscles, tone and firm thigh muscles, firm calf muscles, and reduce knee joint stress. Minimal research has been conducted about the muscle activity associated with Skechers® Shape-ups but there is sufficient evidence to support the claims of the Skechers® corporation regarding the benefits of their shoes. Skechers® shoes (both SSU and CWS) have been found in conventional walking shoes (SSU 78.9 ± 32.14 vs. CWS 90.77 ± 46.27, p < 0.05). However, in the other muscles studied (ES, GM, BF, VM), no significant difference was found between the Skechers® Shape-ups and conventional walking shoes. The results for the other muscles were as follows: erector spinae (SSU 173 ± 117.2 vs. CWS 158.6 ± 102.6, p > 0.05); gastrocnemius (SSU 194.3 ± 133.4 vs. CWS 196.8 ± 152.3, p > 0.05); medial head of gastrocnemius (SSU 76.87 ± 33.16 vs. CWS 84.77 ± 52.86, p > 0.05); and vastus medialis (SSU 134.1 ± 96.07 vs. CWS 134.6 ± 102.7, p > 0.05).

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Walking in Skechers® Shape-ups and conventional walking shoes require similar muscle activity for four of the five muscles studied. Data show that there is a significant difference in the biceps femoris muscle activity during walking on a level surface with the conventional walking shoes. Therefore, the results of this study do not support the claims made by the Skechers® corporation regarding the benefits of their Skechers® Shape-ups shoes. The increased BF muscle activity with the CWS is likely due to changes within the gait cycle while walking in the SSU. As a result of the SSU design, full knee extension may not be obtained secondary to the rocker bottom sole. The shoe’s construction forces midfoot contact rather than a normal heel contact typically observed with a flat-soled shoe. The lack of heel contact along with forward progression of gait could result in decreased knee extension during initial contact. If knee extension is not fully achieved, BF activity would likely be less as it acts to decelerate the leg during terminal swing.

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References


