

Benefits of Buerger-Allen Exercises for Diabetic people: A Mini-Review

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ABSTRACT

Diabetics suffer from serious micro- and macrovascular complications of the disease with negative effects on blood flow and lower extremity sensation. Drug therapy alone might be insufficient to prevent or treat these health problems, and patients may need complementary therapy. Exercise therapy is an essential part of the treatment plan for diabetes mellitus and can complement drug treatment. Buerger-Allen exercises have recently become an evidence-based form of exercise to improve peripheral blood flow in diabetics. This short report briefly mentions the clinical benefits of Buerger-Allen exercises.

Keywords: *Buerger-Allen Exercise, Diabetes Mellitus, Clinical Benefits*

Introduction

Patients with diabetes mellitus, particularly those with poor glycemic control, often have impaired blood flow in the lower extremities and an increased risk of foot ulcers, gangrene, or amputations. Buerger-Allen exercise can improve peripheral blood flow in patients with diabetes mellitus (Thakur *et al.*, 2022). The Buerger-Allen exercise was first described by Leo Buerger in 1926 and later modified by Arthur Allen in 1930 (Chang *et al.*, 2015). Buerger-Allen exercises are active postural exercises in which gravity alternately deflates and fills blood vessels to increase blood flow to the lower limbs (John and Rathiga, 2015). The Buerger-Allen exercise includes several stages as follows: (a) The patient lies supine with the leg raised 45 and 60 using a pillow and performs ankle motion for 3 minutes or until the feet become pale; (b) Then, the patient sits on the edge of the bed with his/her feet dangling over and performs dorsiflexion and plantar flexion and moves legs in and out for 3 minutes; (c) Finally, the patient lies supine, covered with a blanket, for 3 minutes (Trisnawati *et al.*, 2020). The entire cycle can be repeated 3 to 6 times per session and each session can be repeated 3 times per day (Trisnawati *et al.*, 2020). Impaired blood flow in the lower extremities can be identified by measuring the ankle-brachial index (ABI), a standard non-invasive method of assessing blood flow to the lower

extremities, which is the ratio of the higher of the two systolic blood pressures of either dorsalis pedis artery or posterior tibial artery, and the higher of the two systolic blood pressure values of the upper extremities (Rac-Albu *et al.*, 2014). A circulatory disorder can be identified with an ABI value below 0.90 and a severe circulatory disorder can be identified with an ABI value below 0.4 (Rac-Albu *et al.*, 2014). However, in patients with diabetes and those on dialysis, the ABI may be an invalid method due to the presence of arterial calcification, and in such case, the toe-arm index should be used instead.

Discussion

The clinical benefits of Buerger-Allen exercises can be listed as follows: (a) A reduction in the risk of neuropathy in diabetics (Widia and Hidayat, 2021); (b) a reduction in symptoms of peripheral neuropathy in patients with diabetes mellitus (Radhika *et al.*, 2020); (c) An increased ankle-brachial index (ABI) in diabetics (Zahran *et al.*, 2018); (d) a reduction in capillary filling time in the lower extremities of diabetics (El Sayed *et al.*, 2021); (e) improvements in peripheral pulse, temperature and skin color in patients with type 2 diabetes mellitus (El Sayed *et al.*, 2021); (f) an increase in peripheral blood flow in patients with diabetic foot ulceration as evidenced by increased skin perfusion pressure (Chang *et al.*, 2016); (g) an improvement in wound status in diabetics with foot ulcers (Lin *et al.*, 2018); (h) Elevated peripheral oxyhemoglobin, required for proper healing in patients with diabetic foot ulcers (Chen *et al.*, 2017). The mechanism of Buerger-Allen exercises involves the use of gravity to alternately empty and fill the columns of blood through the blood vessels of the lower extremity (Chang *et al.*, 2015). Benefits of Buerger-Allen exercises can include ease of use and learnability, safety, no cost, suitability for home care programs, less physical stress, and time efficiency.

Conclusion

Buerger-Allen exercises have numerous advantages and benefits and may be of clinical importance for diabetics who have impaired blood flow to the lower extremities and/or peripheral neuropathy. Clinicians and other health care professionals who deal with people with diabetes may consider implementing Buerger-Allen exercises into the treatment plan for diabetes mellitus.

Conflict of Interest

The authors declare no conflict of interest

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