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Effects of Novel Compression Exercise Technology on Glycohemoglobin Levels and Weight in Type II Diabetics

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Abstract:

The most potent lifestyle intervention for treatment of Type II Diabetes (T2D) is consistent exercise. However, for many patients with the condition, other comorbidities such as osteoarthritis, hypertension, and high body mass indexes prevent them from being able to exercise intensively and consistently enough to experience optimal metabolic benefits. Recent research has supported the use of compression exercise in physically limited populations and demonstrated physiologic responses at lower intensities (10-20% one repetition maximum vs. 70% for hypertrophic response in conventional resistance exercise). The combination of compression technology with core cooling further lowers the exertional requirements and has been used in cardiopulmonary rehabilitation populations to provide a safe and reliable exercise intervention.

Compression exercise has also been shown to significantly increase muscle hypertrophy, with a greater growth in type II fibers (higher expressers of GLUT4). Therefore, this technology could directly address basal metabolism through increasing muscle protein turnover, increasing glucose storage in skeletal muscle mass, and improving glycemic control. This capacity to attenuate the insulin response combined with the accessibility of the platform suggests a clinical implication for diabetes management.

PURPOSE: To establish safe use of cooled compressive exercise in Type II Diabetics and to examine the effect of 6 months of training on biometabolic markers, especially Glycohemoglobin levels and weight.

METHODS: Thirty Type II Diabetics agreed to 3 training sessions a week for 6 months. Biometabolic markers via blood draw were analyzed at 0, 3, and 6 months.

RESULTS: Midpoint data from 16 participants at 0 and 3 months were analyzed with a two-tailed T-test, revealing significant differences in Glycohemoglobin and weight. There was an 8% average decrease in Glycohemoglobin levels (8.5 ± 2.2 vs. 7.8 ± 1.8 mg/dl, $p = 0.002$) and an average weight loss of 3.6 lbs (211 ± 50 vs. 208 ± 48 lbs, $p = 0.032$).

CONCLUSION: The preliminary results of this study suggest exercise with compression and cooling contributes to a reduction in biometabolic markers of diabetes. This intervention has promise in contributing to effective management of T2D with a low physical burden.

Author Disclosure Information:

C. Wernecke: Salary; Vasper Systems.

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Effects of Cooled Blood Flow Restriction Exercise Technology on Glycohemoglobin Levels and Weight in Type II Diabetics

Chloe Wernecke and Richard Henderson

Abstract— The most potent lifestyle intervention for treatment of Type II Diabetes is consistent exercise. However, for many patients with the condition, other comorbidities such as osteoarthritis, hypertension, and high body mass indexes prevent them from being able to exercise intensively and consistently enough to experience optimal metabolic benefits. Recent research has supported the use of compression exercise in physically limited populations and demonstrated physiologic responses at lower intensities (10-20% one repetition maximum vs. 70% for hypertrophic response in conventional resistance exercise). The combination of compression technology with core cooling further lowers the exertional requirements and has been used in cardiopulmonary rehabilitation populations to provide a safe and reliable exercise intervention. Compression exercise has also been shown to significantly increase muscle hypertrophy, with a greater growth in type II fibers (higher expressers of GLUT4). Therefore, this technology could directly address basal metabolism through increasing muscle protein turnover, increasing glucose storage in skeletal muscle mass, and improving glycemic control. This capacity to attenuate the insulin response combined with the accessibility of the platform suggests a clinical implication for diabetes management.

The purpose of this study is to establish safe use of cooled compressive exercise in Type II Diabetics and to examine the effect of 3 months of training on biometabolic markers, especially Glycohemoglobin levels and weight.

Sixteen Type II Diabetics agreed to 3 cooled compressed exercise training sessions a week for 3 months. Biometabolic markers via blood draw were analyzed at baseline and 3 months.

The data was analyzed with a two-tailed T-test, revealing significant differences in Glycohemoglobin and weight. There was an 8% average decrease in Glycohemoglobin levels (8.5 ± 2.2 vs. 7.8 ± 1.8 mg/dl, $p = 0.002$) and an average weight loss of 6.05% (211 ± 50 vs. 208 ± 48 lbs, $p = 0.032$).

The preliminary results of this study suggest exercise with compression and cooling contributes to a reduction in biometabolic markers of diabetes. These results suggest this intervention has promise in contributing to effective management of Type II Diabetes especially as an accessible platform with a low physical burden. Further investigations are ongoing and include adding participants to 60 total subjects, broadening the scope to a six-month intervention with a 3 month follow-up period, collecting information on medication and health care system use, and assessing quality of life.

Keywords— *blood flow restriction, glycohemoglobin, metabolism, type II diabetes.*

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