

Effect of Exercise and Custom-Made Flexible Orthotics on Blood Pressure and Heart Rate Variability

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The hypothesis for the study was that exercise and custom-made orthotics have a positive impact on the heart rate variability (HRV) and blood pressure (BP). The null hypothesis was that exercise and custom-made flexible orthotics would not induce positive changes in HRV and BP during the study period.

METHODS

This study was reviewed and approved by the Institutional Review Board of Logan College of Chiropractic. All subjects were randomized into control and experimental groups by a randomization table. Both groups had the same exercise program and only the experimental group wore custom-made flexible orthotics. The exercise effects were compared before and after the training. Each subject must be a Ping-Pong club member for the last 5 years and be an active member in the club. The subject must also play no less than twice a week or no less than 6 hours a week. Heart rate variability was measured using Biocom's Heart Rhythm Scanner for HRV data collection. Blood pressure was determined by using Biopac blood pressure measurement equipment. Foot Leveler's custom-made flexible orthotics were factory-fitted to tennis shoes for the study. The study lasted 5 months with one data collection per month except for

the 4th month. The baseline HRV and BP were recorded before the warm-up period. When one player had played with two other players in a nonstop fashion, the data were collected again immediately after the second game. No rest was allowed for this data collection in order to detect the peak heart rate and blood pressure changes. The third data collection of HRV and BP was at the end of the playing period.

RESULTS

Thirteen Ping-Pong players (10 males, 6 in the experimental group, 3 dropped out) were recruited from a local sports club. They agreed to participate in the study without compensation. The average age of the participants was 44 ± 16 years. The blood pressure in the experimental group was significantly decreased after the 5-month study period. Significant blood pressure decrease was observed in the experimental group before, during, and after each exercise session. The blood pressure did not change significantly in each exercise session in the control group. The heart rate was significantly increased immediately after exercise and remained at higher level after the 20-minute rest at the end of each day's exercise session. The average resting heart rate (baseline HR before each data collection) decreased from 69.7 ± 1.708

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to 66.8 ± 4.480 ($p < .05$) in the experimental group, but increased from 69.7 ± 1.708 to 90.7 ± 2.808 ($p > .05$) in the control group. The total power reflecting the total autonomic activity was significantly decreased immediately after exercise and after the 20-minute rest period at the end of the exercise session in both the control and experimental groups.

CONCLUSION

This study demonstrated the potential benefit of combining exercise with orthotics to improve cardiovascular health in recreational athletes.