A randomized controlled trial is currently being conducted at NRH and the University of Miami to quantify the effects of 6 months of robotic weight-supported treadmill training (RBWSTT) on selected measures of fitness in persons with a spinal cord injury (SCI).

The hypothesis is that long-term Lokomat® ambulation training will result in a cardiovascular training effect defined by a decreased oxygen consumption, heart rate, and respiratory exchange ratio at a matched sub-peak workload.

METHODS

Individuals with C4 to T12 AIS C or D SCI who are less than 6 months post-injury are being recruited.

The control group receives usual rehabilitative care and the exercise group receives additional Lokomat® training for one hour, three times a week, for 6 months.

The Lokomat® training protocol includes initial training speed of 1.9 km/hr, progressing to 3.2 km/hr, and body-weight support and robot assistance are decreased as tolerated per training session to increase the workload. During the training sessions, participants walking in the Lokomat® are encouraged to actively move their legs.

Changes in metabolic responses are assessed for both groups by a sub-maximal Lokomat® walk test (Figure 1). Outcome measures are collected at baseline, 3 months, and 6 months. Reported measures include peak VO2 and heart rate. Exercise trends were determined through mean percent change.

RESULTS

Currently 9 participants have completed this study (5 intervention and 4 control). Age range of 24-59 years, with an average age of 44.1 years.

Comparison of baseline to 6-month follow-up data:

- Both groups have a 5.1% increase in peak VO2.
- The training group demonstrates an 18% decrease in resting heart rate and a 36% decrease in peak heart rate.
- The usual care group demonstrates only an 8.4% decrease in resting heart rate and a 1.4% decrease in peak heart rate.

CONCLUSION

The 6-month test data shows a dramatic decrease in resting and peak heart rates, and a small decrease in RER at peak exercise for the training group. These interim results demonstrate a trend towards a cardiovascular adaptation after 72 sessions of Lokomat® training.

REFERENCES


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