



International Journal of Physical Education, Sports and Health

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2016; 3(5): 73-75
© 2016 IJPESH
www.kheljournal.com
Received: 15-07-2016
Accepted: 16-08-2016

Sanam Mainali

Affiliated to Dayananda Sagar
College of Physiotherapy
Shavige Malleshwara Hills,
K-S lay out Bangalore, India

Jimshad TU

Affiliated to Dayananda Sagar
College of Physiotherapy
Shavige Malleshwara Hills,
K-S lay out Bangalore, India

Anil T John

Affiliated to Dayananda Sagar
College of Physiotherapy
Shavige Malleshwara Hills,
K-S lay out Bangalore, India

Effect of aerobic exercise on walking capacity in subjects with parkinsonism- literature review

Sanam Mainali, Jimshad TU and Anil T John

Abstract

Background Parkinson disease is a neurological syndrome usually resulting from deficiency of neurotransmitter dopamine as the consequence of degenerative, vascular or inflammatory changes in the basal ganglia. Aerobic exercise is physical exercise of low to high intensity that depends primarily on the aerobic energy-generating process. Objective of the study was to review the effect of aerobic exercise on walking capacity in subject with Parkinson disease. Methods. Total of 7 articles reviewed, which supports aerobic exercise and walking capacity and conclusion made on the basis of results reviewed. Conclusion. Thus based on the various results achieved in the previous studies, this literature review concluded that the aerobic exercises can be a great way to improve walking capacity in patients with Parkinsonism.

Keywords: Aerobic exercise, Parkinsonism, walking capacity

1. Introduction

Parkinson disease is a neurological syndrome usually resulting from deficiency of neurotransmitter dopamine as the consequence of degenerative, vascular or inflammatory changes in the basal ganglia; characterized by rhythmic muscular tremors, rigidity of movement, festination, droopy posture and masklike faces.^[1] PD is the second most commonly occurring disorder after Alzheimer's. PD affects around 16.1 million people worldwide and this number is expected to double by 2050.^[2] When it comes to India, the Parsi community in Mumbai has the highest incidence of PD where it affects around 328 out of 100,000 despite living in India, with one of the lowest incidence of PD (70/100,000).^[3] General treatment includes Medications, Surgical procedures, Gene therapy, Speech therapy, Dietary considerations, Psychotherapy and Physical therapy. Patients who suffer with PD will have rigidity and tremors, because of rigidity muscle fibers will go for maximum shortening, which will give an impact on walking parameters. As muscles are made with both slow twitch and fast twitch fibers, both aerobic and anaerobic activity is necessary to get energy, thus when you train aerobic activity, oxidative capacity of the cells will improve which can give an positive effect on walking capacity so this literature review will help to explore the maximum supportive evidence that aerobic exercise can improve walking capacity in subject with parkinsonism. Aerobic exercise (also known as cardio) is physical exercise of low to high intensity that depends primarily on the aerobic energy-generating process.^[4] Aerobic literally means "relating to, involving, or requiring free oxygen", and refers to the use of oxygen to adequately meet energy demands during exercise via aerobic metabolism. Improves muscle health Exercise encourages the development of microscopic blood vessels that provide sufficient quantities of oxygen in the muscles and keep away from the muscles metabolic wastes such as lactic acid.^[5] This process can reduce the discomfort felt by those suffering from chronic muscle pain and back pain. Objective of this study: to review the effect of aerobic exercise on walking capacity in subject with Parkinson disease.

2. Methods

7 articles are reviewed on the basis of level of evidence, with the aim of co-relating aerobic exercises and walking capacity in patients with Parkinsonism. The main aim of this review is to study the effect of aerobic exercise on walking capacity in patients with PD. many studies

Correspondence

Sanam Mainali

Affiliated to Dayananda Sagar
College of Physiotherapy
Shavige Malleshwara Hills,
K-S lay out Bangalore, India

Have found a significant improvement in walking capacity after aerobic exercise.

- A. An Evidence Based Exercise Regimen for Patients with Mild to Moderate Parkinson’s Disease (Sanjay Salgado *et al-* 2013) In a randomized clinical trial, 121 patients with mild to moderate PD who underwent 16 weeks of aerobic endurance exercise (utilizing a treadmill, bicycle, or elliptical trainer) improved overall function, balance, and movement efficiency.^[6]
- B. Effects of treadmill training on walking economy in PD (Elisa Pelosin *et al-* 2009) Ten patients with idiopathic PD underwent treadmill training (30 m ins, three times a week for 4 weeks). Walking performance (timed up and go, 6 min walk and 10 min walking tests) and metabolic function were evaluated before and after training for 30 days. After 30 days, the result showed that the treadmill training successfully improved walking capacity.^[7]
- C. Pilot safety and feasibility study of treadmill aerobic exercise in Parkinson disease with gait impairment (Frank M. Patterson *et al-* 2008) Eight patients of PD were taken for the research purpose and were subjected to TM-AEX (treadmill aerobic exercise) training at their comfortable walking speed for 10 to 20 min. This study demonstrated that TM-AEX is feasible in selected PD subjects with gait impairment. Among the subjects who participated, the intervention improved their walking speed, home ambulation, peak ambulatory workload capacity, and UPDRS scores.^[8]
- D. Treadmill Walking as an External Pacemaker to Improve Gait Rhythm and Stability in PD (Frenkel Toledo *et al -* 2005) 36 patients (Hoehn and Yahr scale 2-2.5) were compared to 30 controls. Subjects walked three times for 2 minutes each i.e. walking on a treadmill, walking on a level ground (unassisted) and walking on a level ground (with walker). after the session, the result indicated that during treadmill walking, PD subjects are able to walk with a less variable and more stable gait.^[9]

- E. Immediate Effects of Speed-Dependent Treadmill Training on Gait Parameters in Early PD (Pohl M. *et al-* 2003): Seventeen patients with early PD (Hoehn and Yahr stages I through III) and gait disturbances were randomly assigned to varying sequences of the different interventions over 4 consecutive days. It was observed that main disturbances of gait in PD, namely, speed and stride length, can be improved through a single intervention of structured speed-dependent treadmill training or limited progressive treadmill training, but not through conventional gait training and the control intervention.^[10]
- F. Aerobic Exercise Intervention Improves Aerobic Capacity and Movement Initiation in PD patients (John *et al -* 2002) Among 8 PD patients, 4 completed the aerobic exercise intervention for 16 weeks. The result concluded that aerobic exercise improves the aerobic capacity and decreases the movement initiation and performance time in patients with PD.^[11]
- G. Treadmill Training with Body Weight Support: its Effects on PD (Ichiro Miyai *et al -*1999) Ten patients (5 men, 5 women) with Hoehn and Yahr stage 2.5 or 3 parkinsonism were enrolled and were subjected to body-weight–supported treadmill training (BWSTT) and conventional physical therapy (PT). After the 8 weeks session, it was found that treadmill training with body weight support is effective especially in patients with moderate gait difficulty whose gait speed is more than 8 seconds per 10 meters and whose number of steps was more than 15 per 10-meter walk.^[12]

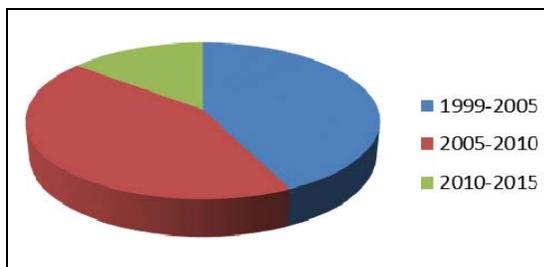
3. Results & Discussion

3.1 Results

All the seven articles are explained in tabular form with author, year of publication, aim of study and study interpretation.

Author	Year	Aim	Interpretation
Sanjay Salgado <i>et al</i>	2013	Treadmill training	improvement in ambulation speed, number of steps, and short-step gait
Elisa Pelosin <i>et al</i>	2009	Treadmill exercise	Improves walking performance and reduces energy expenditure while walking
Frank M. Patterson <i>et al</i>	2008	Treadmill and aerobic exercise	improved their walking speed, home ambulation, peak ambulatory workload capacity, and UPDRS scores
Frenkel Toledo <i>et al</i>	2005	Treadmill walking and gait improvement	Enhance gait rhythmicity and reduce gait variability
Marcus Pohl <i>et al</i>	2003	STT, LTT, CGT, control intervention.	STT and LTT improved gait parameters
John <i>et al</i>	2002	Aerobic exercise and movement initiation	Reduces movement initiation time and improves performance
Ichiro Miyai <i>et al</i>	1999	BWSTT	Aerobic exercise improves the comfort level of walking

3.1.1 Reviewed articles (year published)



3.2 Discussion

In this study total of seven articles are reviewed to find out aerobic training and walking capacity in PD patients. All of the reviewed studies were experimental based where certain

number of PD patients was taken and aerobic exercise intervention was made. Patients were introduced to treadmill training as well as BWSTT and the measuring scale of progress was mainly UPDRS. After few days of aerobic training it was observed that aerobic exercise had a positive impact on PD patients, their walking capacity improved significantly, decreased movement initiation time, improved their walking speed, home ambulation, peak ambulatory workload capacity, enhanced gait rhythmicity and reduced gait variability.

4. Conclusion

Supportive evidence from the literature review this study concludes that the aerobic exercises can be a great way to improve different parameters of walking in patients with Parkinsonism.

5. References

1. <http://medical-dictionary.thefreedictionary.com/parkinsonism>
2. Sinziana Mazilu, Alberto Calatroni, Eran Gazit, Anat Mirelman, Jeffrey M, Hausdorff Gerhard Troester. Prediction of Freezing of Gait in Parkinson's from Physiological Wearables: An Exploratory Study, 2015.
3. Balamurugan N, Vivekanandan M. Parkinson's Disease: Medical Management
4. https://en.wikipedia.org/wiki/Aerobic_exercise
5. The 20 benefits of aerobic exercise Alex Chris, 2012.
6. Sanjay Salgado, Nori Williams, Rima Kotian, Miran Salgado. An Evidence Based Exercise Regimen for Patients with Mild to Moderate Parkinson's disease, 2013.
7. Elisa Pelosin, Emanuela Faelli, Francesco Lofrano, Laura Avanzino, Lucio Marinello, marco Bove, *et al.* Effects of treadmill training on walking economy in PD 2009.
8. Skidmore Frank M, Patterson Shawna L, Shulman Lisa M, Sorkin John D, Macko Richard F. Pilot safety and feasibility study of treadmill aerobic exercise in Parkinson disease with gait impairment, 2008.
9. Frenkel Toledo, Giladi N, Peretz C, Herman T, Gruendlinger L, Hausdorff JM. Treadmill Walking as an External Pacemaker to Improve Gait Rhythm and Stability in PD. 2005.
10. Pohl M, Rockstroh G, Rückriem S, Mrass G, Mehrholz J. Immediate Effects of Speed-Dependent Treadmill Training on Gait Parameters in Early PD, 2003.
11. Bergen John L, Toole Tonya, Elliott III, Robert G, Wallace Brian, Robinson Keith *et al.* Aerobic Exercise Intervention Improves Aerobic Capacity and Movement Initiation in PD patients, 2002.
12. Ichiro Miyai, Yasuyuki Fujimoto, Yoshishige Ueda, Hiroshi Yamamoto, Sonoko Nozaki, Toshio Saito *et al.* Treadmill Training with Body Weight Support: its Effects on PD, 1999.