

# The Profile of People with Parkinson's Disease Included in Community Boxing Exercise Programs †

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**Abstract:** Exercise is widely recommended for people with Parkinson (PD). Boxing is a popular mode of training. However, including individuals with less favorable profiles may have a negative impact on participation. We performed a systematic review to study the patient characteristics that were included in boxing exercise programs research and reflect on the possible inclusion criteria that professionals can use for boxing exercise programs. Indications for the best profiles were limited due to the small number of studies. Boxing programs should include people with the diagnosis of PD in earlier stages, independently ambulatory, and without current severe musculoskeletal or cardiovascular conditions.

**Keywords:** Parkinson's disease; community exercise; boxing; profiles



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## 1. Introduction

Growing evidence underscores the benefit of exercise programs in individuals with Parkinson PD as a long-term cost-effective and accessible care for ongoing exercise. Several types of community programs are being used [1–3]. Boxing is one of the most popular programs. However, including individuals with less favorable profiles may have a negative impact on the participation [4]. We performed a systematic review to study the patient characteristics that were included in boxing exercise programs and reflection on what type of patients should participate.

## 2. Materials and Methods

We reviewed the clinical characteristics of the people with PD included in boxing exercise programs. We performed a systematic literature in the databases PubMed, Medline, and the Cochrane library using the following keywords: “Parkinson disease” AND “boxing”. We included all studies regarding exercise boxing programs with people diagnosed with PD.

## 3. Results and Discussion

Three studies were found. Of these, two were both led by Combs. Several inclusion criteria in research studies were identified (Table 1).

**Table 1.** Summary of characteristics of participants in studies regarding community-based boxing programs Parkinson's disease.

Study & Study Design	Average Age (years)	Time since Diagnosis (months)	Hoehn & Yahr Score	Other Inclusion Criteria
Combs, 2011 [1] Case Series N = 6 M: 6, F: 0	60.17 years (10.26)	28.67 (24.34)	2.17 (1.33)	(1) Complete informed consent form; (2) At least 21 years; (3) Able to ambulate; (4) Able to follow 3-step verbal commands; (5) Self-transportation; (6) No other preexisting neurological conditions other than PD; (7) No musculoskeletal or cardiovascular conditions; (8) Brain surgery or deep brain stimulator; (9) Current pregnancy.
Combs, 2013 [2] RCT n = 31 (Intervention = 17, Control = 14) M: 21 F: 10	Boxing 68.0 years (31.0) Exercise 66.5 years (28.0)	Boxing group 41.5 (182.0) Control group 50.0 (99.0)	Boxing group 2.0 (3.0) Control group 2.0 (3.0)	Similar to previous study (same authors).
Domingos, 2019 [3] Acceptability	Not reported	Not reported	Not reported	(1) Complete informed consent form; (2) Accept supported by a volunteer if at risk of falls according to screening tests.

RCT = Randomised controlled trial; M, male; F, female. The most favourable characteristics for patients to be included in boxing programs may include younger aged participants with shorter disease duration and in earlier stages of the disease. Exclusion due to cognitive impairment was not reported in neither of the studies.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Combs, S.A.; Diehl, M.D.; Staples, W.H.; Conn, L.; Davis, K.; Lewis, N.; Schaneman, K. Boxing training for patients with Parkinson disease: A case series. *Phys. Ther.* **2011**, *91*, 132–142. [[CrossRef](#)] [[PubMed](#)]
2. Combs, S.A.; Diehl, M.D.; Chrzastowski, C.; Didrick, N.; McCoin, B.; Mox, N.; Staples, W.H.; Wayman, J. Community-based group exercise for persons with Parkinson disease: A randomized controlled trial. *NRE* **2013**, *32*, 117–124. [[CrossRef](#)] [[PubMed](#)]
3. Domingos, J.; Radder, D.; Riggare, S.; Godinho, G.; Dean, J.; Graziano, M.; Vries, N.M.; Ferreira, J.; Bloem, B. Implementation of a Community-Based Exercise Program for Parkinson Patients: Using Boxing as an Example. *JPD* **2019**, *9*, 615–623. [[CrossRef](#)] [[PubMed](#)]
4. Domingos, J.; Dean, J.; Godinho, C.; Melo, F. Proliferation of community exercise programs with limited evidence and expertise: Safety implications. *Mov. Disord.* **2018**, *33*, 1365–1366. [[CrossRef](#)] [[PubMed](#)]