PARK-OMM: An Osteopathic Manipulative Medicine Protocol to Improve Motor Function and Balance in Parkinson Disease

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INTRODUCTION

Parkinson disease (PD) is a progressive disorder of the nervous system that affects mobility, balance, and cognition.

Tremor
Bradykinesia
Rigidity → **Postural Instability**
Gait Abnormalities[1]

Levodopa, the mainstay of treatment for PD, can be effective for these symptoms. Over time, however, PD medication loses its effectiveness and individuals experience fluctuations in motor function, dyskinesia, and dystonia.[2] Additional treatment options are needed.

Osteopathic Manipulative Medicine (OMM) is a therapy of manual forces used to diagnose and treat somatic dysfunctions, thereby improving function and restoring homeostasis. A variety of different techniques can be used to treat different areas of restriction and the treatment protocols are derived using the five models of manipulation (Figure 1).[3]

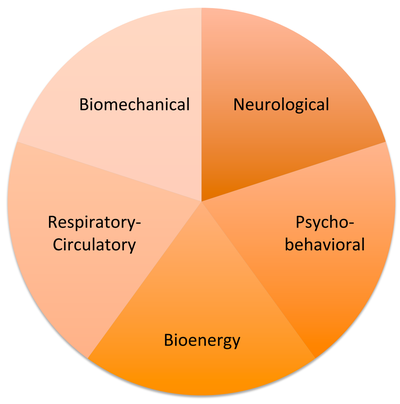


Figure 1: Five models of manipulation[4]

Previous studies have shown that OMM improves postural instability in healthy elderly subjects, balance in individuals with dizziness, and gait in PD.[5,6,7] To date, it remains unclear if repeated OMM treatments can improve motor function and balance in individuals with PD.

OBJECTIVES

The objective of this study is to evaluate the effects of a 6-week pre-defined Osteopathic Manipulative Medicine (OMM) treatment protocol (PARK-OMM) as compared to a 6-week controlled counseling period on motor function and balance in subjects with PD.

These effects were measured using the following tools:

1. Movement Disorder Society-Unified Parkinson's Disease Rating Scale (MDS-UPDRS) Part III scores:
   - Assesses motor symptoms and signs in PD.
   - Gait and balance subscales have a large impact on subjective reporting of PD symptom severity and functional impairment due to PD.[8]

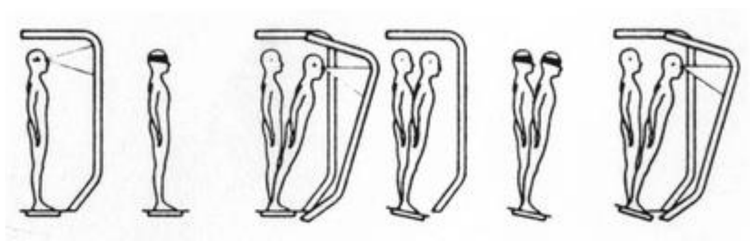


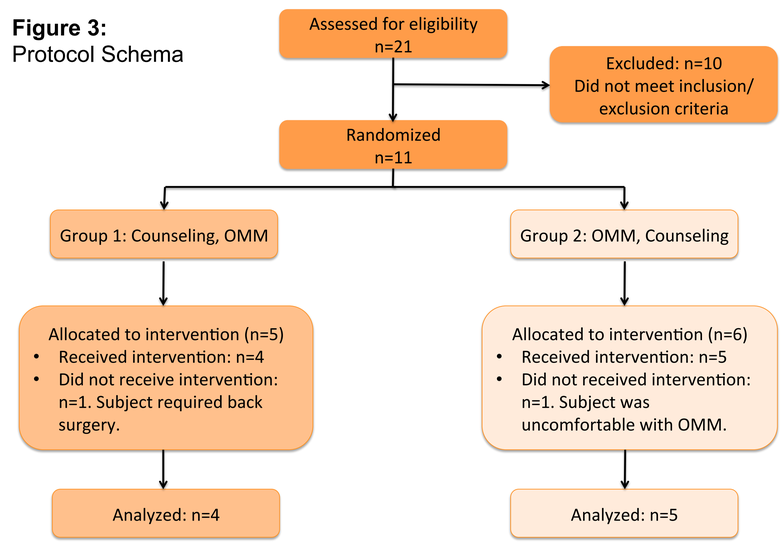
Figure 2: Six SOT conditions[9], a subject on the SOT machine

2. Neurocom Balance Master: Standard Organization Test (SOT, Figure 2)
   - Can be used to estimate postural control and balance, and to assess gait problems and risk of falling.
   - Measures three different aspects of balance and posture: somatosensory, visual, and vestibular.[10]

3. Mini-Balance Evaluation Systems Test (Mini-BESTest):
   - Measures sensory organization, anticipatory postural adjustments, postural responses, and dynamic balance.
   - A significant predictor of recurrent falls in patients with PD.[11]

METHODS

Figure 3: Protocol Schema



Design: This study was conducted in a repeated measures design with counterbalancing to control for order effect. Subjects were randomly assigned to one of two groups:

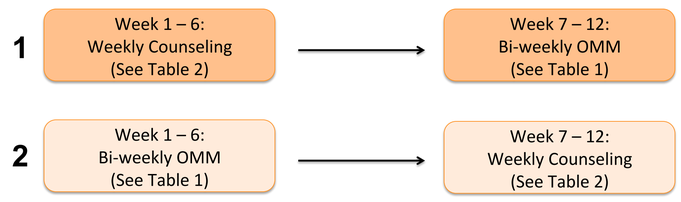


Figure 4: Outline for treatment groups 1 and 2.

Subjects: 11 subjects (age 75 ± 16) were randomized and 9 subjects completed this study.

Setting: This study was conducted at the NYIT Academic Health Care Center, approved by the NYIT-COM Institutional Review Board (BHS-975), and is registered at ClinicalTrials.gov (NCT02107638).

Outcome Measure Assessment: All measurements were performed with subjects off PD medications pre and post 6 weeks of intervention.

Inclusion Criteria:
- ≥ 40 years of age
- Diagnosis of PD by a neurologist
- One or more of the following: Part III of the MDS-UPDRS score ≥ 30, or SOT score ≤ 75, or MiniBESTest score of ≤19.[8,12,13]

Exclusion Criteria:
- History of other neurologic condition
- Unable to complete assessment tools
- Pregnancy

OMM Protocol
Suboccipital release
Compression of 4th ventricle
Articulation – cervical spine
MET* – cervical spine
Spencer's Technique bilaterally (Fig. 3A)
MET – radial head
Circumduction – wrist bilaterally
Sacro-iliac joint gapping bilaterally
MET – lower extremity adductors, psoas, hamstrings bilaterally (Fig. 3B,C)
Articulation – ankle bilaterally
MET – plantar and dorsiflexion muscles bilaterally
Articulation – thoracic, lumbar spine (Fig. 3D)
Active myofascial stretch – thoracic spine

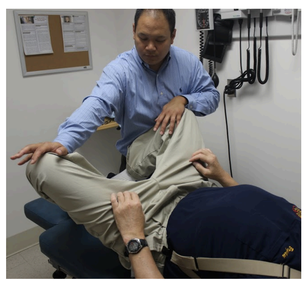
Table 1 (Above): OMM Protocol for 30-minute bi-weekly sessions, *MET: Muscle Energy Technique

Counseling Sessions
Detailed history of PD
Falls: causes and prevention
Nutrition
Mental health
Exercise prescription
PD genetics, relaxation and meditation

Table 2: Weekly 1-hour Counseling Sessions

Figure 5: OMM Techniques;
A – Circumduction of shoulder;
B,C – MET to lower extremities,
D – Articulation of thoracic spine

A


B


C


D


RESULTS

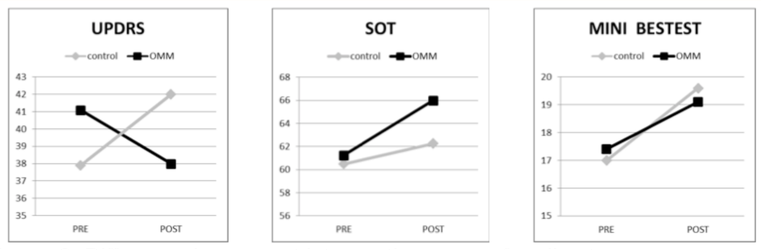


Figure 6: Difference in pre-post intervention scores for all outcome measures.

MDS-UPDRS
- There was more improvement in the MDS-UPDRS score pre- to post- OMM (-1.7± 12.3) than pre- to post- control (3.2 ± 10.7).
- The treatment effect measured by repeated measures ANOVA was large (partial η2=0.56) and was statistically significant (p=0.021).

SOT
- There was more improvement in the overall composite score of SOT from pre- to post- OMM (4.8 ±5.1) than from pre- to post- control (1.8 ± 6.0).
- The treatment effect measured by repeated measures ANOVA was medium (partial η2=0.13); however, it was not statistically significant (p=0.39).

Mini -BESTest
- Both groups showed some positive improvement pre- to post- intervention: OMM (2.1 ± 2.4), control (2.7 ± 2.7).
- The treatment effect measured by repeated measures ANOVA was small (partial η2=0.07) and it was not statistically significant (p=0.50).

Statistical significance was set at p<0.05.

	OMM	Counseling	p-value
MDS-UPDRS	-1.7± 12.3	3.2 ± 10.7	0.021*
SOT	4.8 ± 5.1	1.8 ± 6.0	0.39
Mini-BESTest	2.1 ± 2.4	2.7 ± 2.7	0.50

Table 3: Difference in pre-post intervention scores for all outcome measures.
* Statistically significant

CONCLUSION

OMM treatment bi-weekly for 6 weeks was well tolerated by our subjects. Our results from this pilot study showed improvement in motor function following 6 weeks of bi-weekly OMM treatments. There were no significant changes in balance; however, there were clinically relevant improvements after 6 weeks of OMM.

Our findings suggest that our OMM protocol may be a complementary approach to improving balance and motor function in individuals with PD. To date, this is one of the first studies investigating the long term effects of OMM on motor function and balance in PD.

A current limitation to this study is the small sample size. Also, at this time, it is uncertain if there was a reduction in the number of falls for each subject. This is an ongoing study and we hope to address these limitations through continued accrual and data collection.

Future research should further investigate the application of OMM in improving motor function and balance in PD. By doing so, we may be able to offer an additional treatment option to help improve not only balance and function, but also quality of life for individuals suffering from PD.

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