Rhythmic Auditory Stimulation For Improved Gait in Parkinson's Disease

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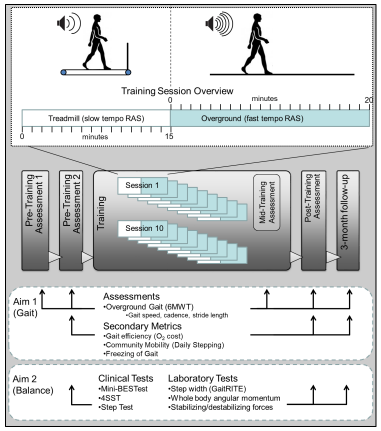
Introduction

- Individuals with Parkinson's disease demonstrate slow gait speed and shorter stride lengths[1,2]
- Pharmacologic management can improve disease symptoms
  - is ineffective at improving gait deficits[4,5]
- Impaired automaticity of gait contributes to episodes of freezing of gait and increased risk of falls[3]
- Intensive gait training is often utilized as an adjunct to pharmacologic management[6]
  - Cues for increased automaticity
    - Treadmill provides external cues that can improve gait automaticity[8]
      - Overground walking represents typical daily context
    - Rhythmic auditory stimulation (RAS) can improve gait speed, stride length and cadence[2]
      - Literature proposes faster frequencies (sources)
        - Would produce shorter strides on a treadmill
      - RAS also has the potential to improve static and dynamic balance[8]

Purpose

the purpose of this case series was to describe the use of a novel pairing of both big, slow movements (obtained with *slow* tempo RAS on a *treadmill*) followed by high-intensity rapid movements (obtained during *fast* tempo RAS during *overground walking*) during gait training for individuals with PD

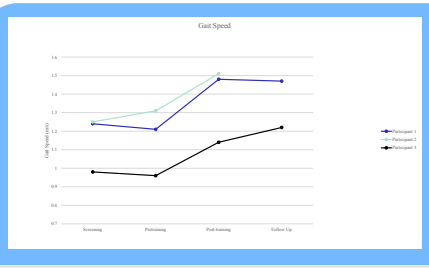
Methods

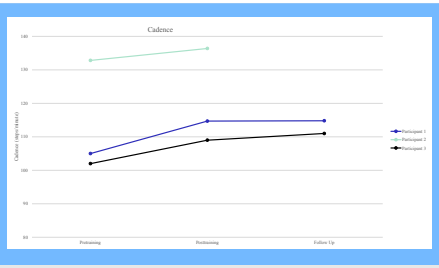


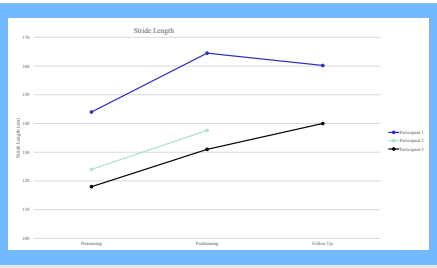
Participants			
	Age	Gender	H&Y Stage
Participant 1	72	Male	2
Participant 2	66	Female	2
Participant 3	75	Female	2

- Training occurred ~3x/week for 6 weeks.
- Metronome frequency
  - Treadmill: 85% of participants self-selected cadence
  - Overground: 115% of participants self-selected cadence

Results







Balance Measures

	Participant 1			Participant 2		Participant 3		
	Pretraining	Posttraining	Follow Up	Pretraining	Posttraining	Pretraining	Posttraining	Follow Up
Mini-BESTest	27	27	28	25	28	19	22	23
Step Test (reps)	25	38	37	41	52	30	28	24
4 Square Step Test	11.9	7.9	7.2	6.4	5.1	11.1	11.1	9.3
Freezing of Gait	7	4	4	3	2	10	10	9

Discussion

- A combined treadmill and overground gait training program utilizing RAS is a feasible intervention for individuals with PD
  - Capable of improving both spatial and temporal gait parameters
    - RAS used on treadmill and overground led to large improvements in gait speed and stride length
    - Changes in cadence were observed with training but were not as large as other parameters
- No substantial improvements in balance were observed
  - Further research is warranted

References

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