

# At Home Progressive Resistance Training for Adults with Down Syndrome – Study Materials Development

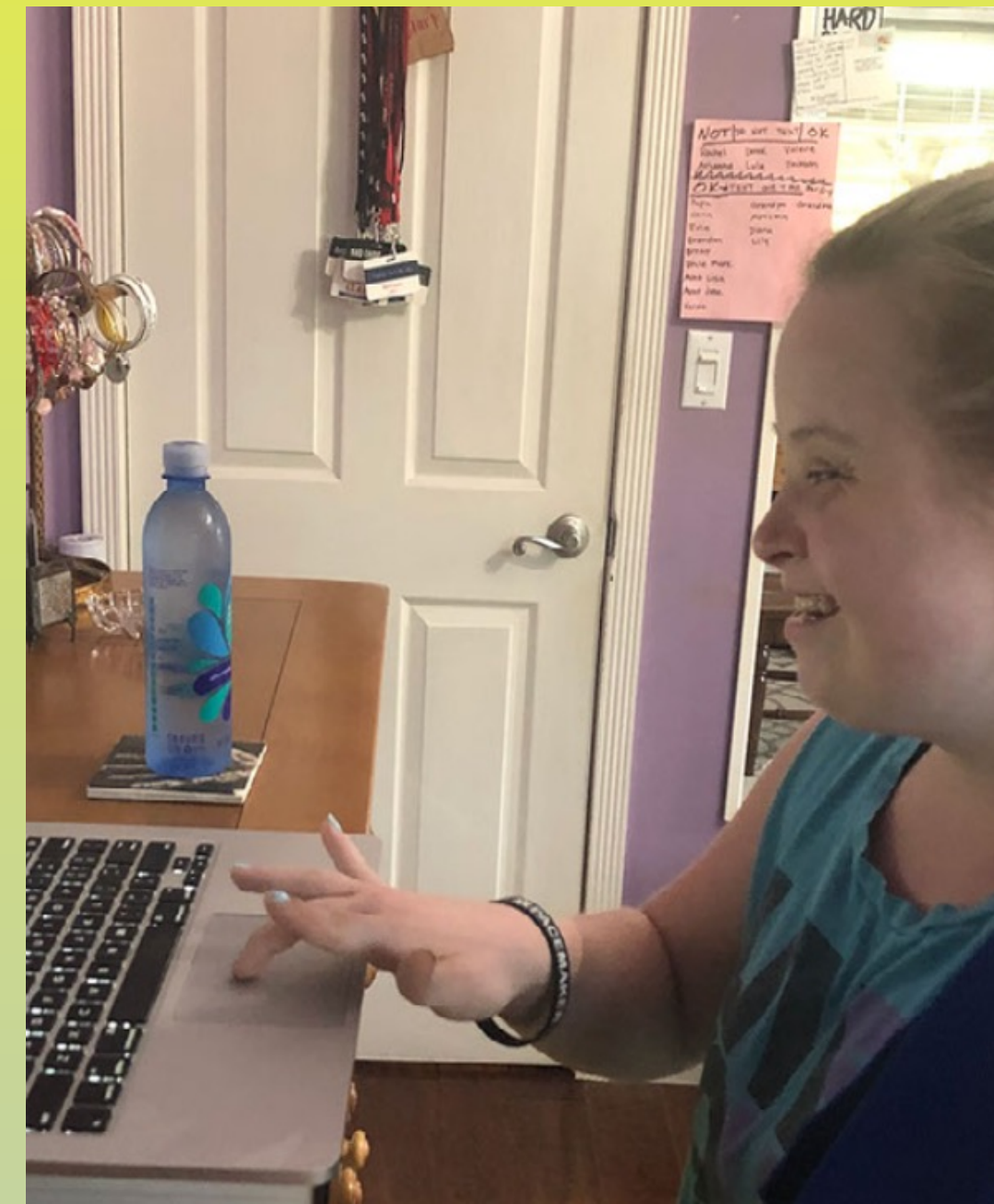
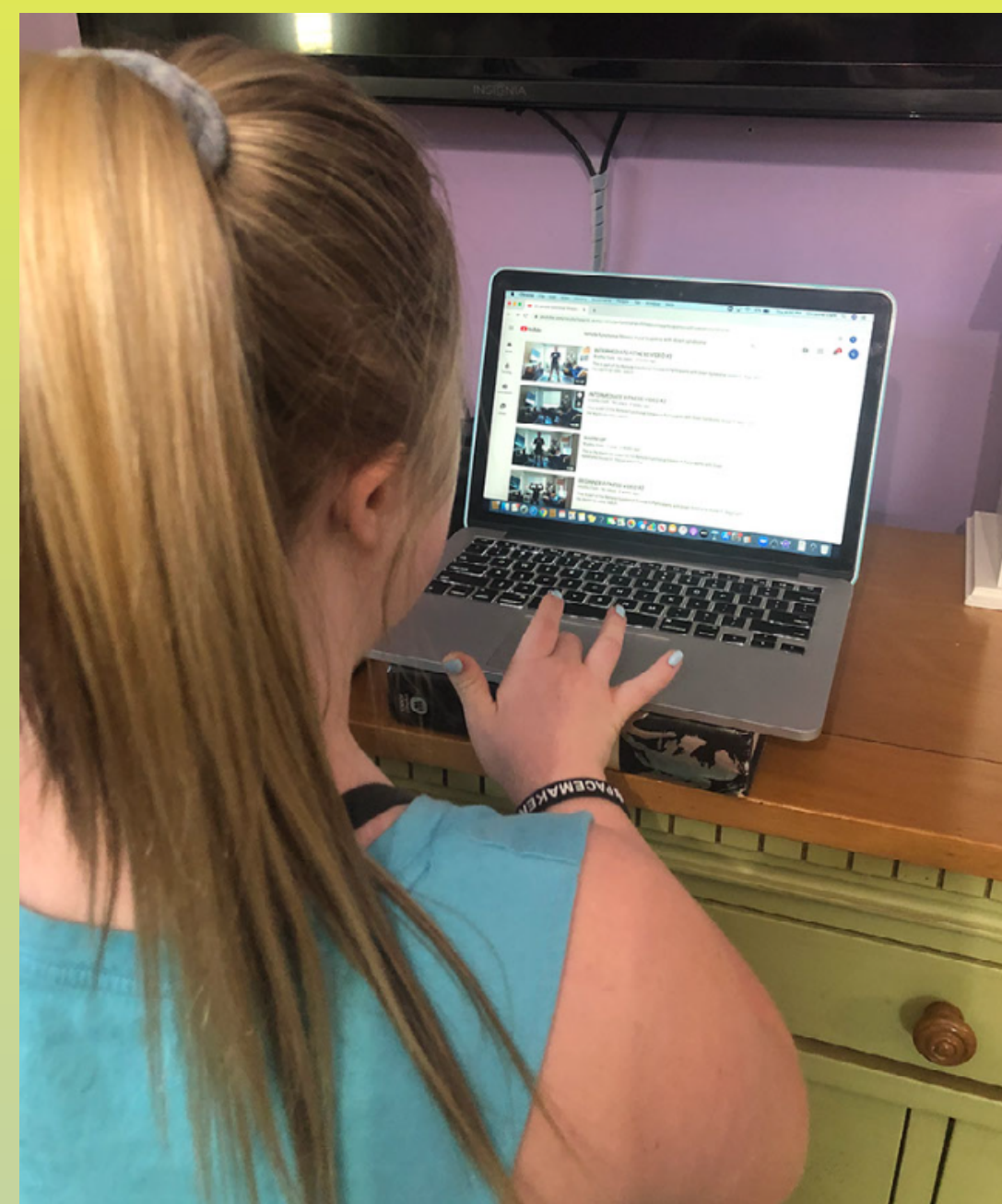
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## Introduction

- Down Syndrome (DS) is a chromosomal disorder present in 1 out of 800 live births<sup>1</sup> and presents secondary characteristics including hypotonia, obesity and poor physical fitness<sup>2</sup> that increase barriers to participation in physical activity<sup>3</sup>.
- Other barriers to physical activity for individuals with DS include transportation and lack of adequate instruction<sup>4</sup>.
- Progressive Resistance Training (PRT) has been shown to increase muscular strength and endurance, and physical function among the DS population<sup>5</sup>.
- At home interventions have been feasible for similar populations<sup>6</sup>.

## Purpose

To develop tailored exercise videos for adults with DS with the aim of increasing access to physical activity.



## Pilot Methods

- Adults with DS (n=5) consented to a 4-week at home exercise intervention following pre-recorded exercise videos, (n=2) dropped before baseline testing.
- Exercise videos included a warm-up video, an exercise routine video that was to be replayed 2-3 times, and a cool-down video hosted on YouTube.
- Videos contained a progressive resistance training routine demonstrated by a person with neurotypical development.
- Participants filled out an online Feedback Questionnaire after each exercise indicating what they completed, likes/dislikes and suggestions.
- Participants had a 'buddy' to assist with exercises, the questionnaire, and the testing done via Zoom.

## Pilot Results

- Participants showed variable muscular strength at baseline.
- 100% of participants indicated the need for continuous flowing videos.

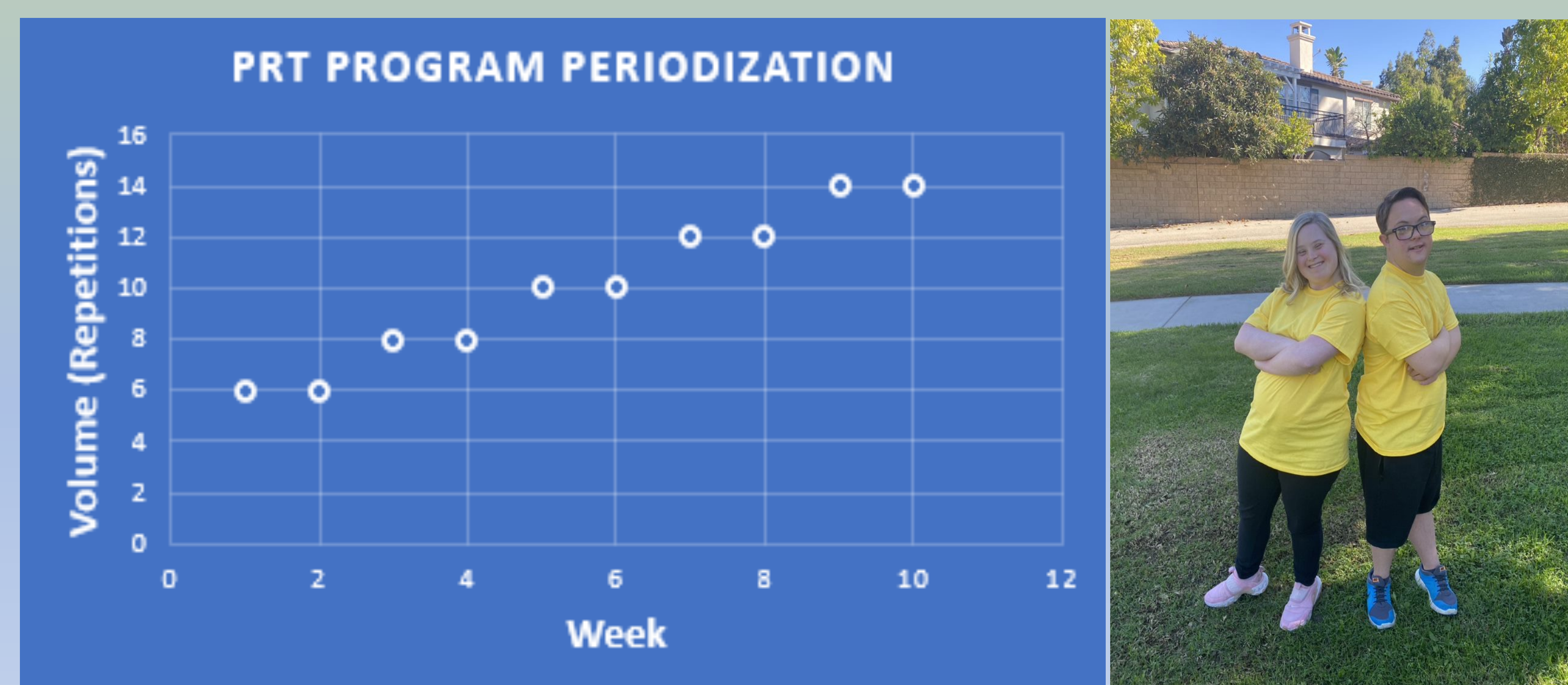
**Table 1.** Participant characteristics (N=3)

	Mean (SD)	Min-Max
Gender (M/F)	2 M, 1 F	–
Age (y)	25.66 (3.8)	23-30
Height (cm)	164.33 (30.1)	149.9-172.7
Body Mass (kg)	74.54 (13.7)	63.5-89.8
Modified Push-up (reps)	16 (8)	7-23
30-Sec Sit-to-Stand (reps)	8 (3)	6-11

## Resistance Training Program Development

- Based on results from the pilot, a 10-week PRT program for adults with DS was developed.
- Volume increased every two weeks following linear periodization.
- Program included 30 continuous flowing instructional videos (15 beginner & 15 intermediate).
- Each two-week interval included three videos for each week. Videos were 1-1.3 hours long included a warm-up (~10 min.) a main exercise routine (~40-50 min.), and a cool-down (~10 min).
- Warm-up included a brief aerobic component and full-body muscle priming with upbeat music.
- Exercise routines depicted 2-3 sets of 7-8 exercises targeting all major muscle groups using body weight and a backpack for load.

**Figure 1.** Progressive resistance training program periodization



## Program Development Cont'd

- The cool-down utilized static stretching and calm music.
- Demonstrations, scripted verbal and breathing cues were provided for all exercises.
- Regressions were provided for difficult exercises.



- Exercises went from large to small muscle groups and spaced by one minute of rest time.
- Male and females, neurotypical and with DS were demonstrators in each video.

## Conclusion

- Pilot study results informed future study intervention materials including PRT workload, the need for beginner and intermediate levels, and continuous flowing videos.
- Similar studies in populations with developmental disabilities have shown high adherence to home-based physical activity interventions<sup>6</sup>.
- At home physical activity for individuals with DS is gaining traction as other studies are underway<sup>7,8</sup>.
- Access to tailored exercises for adults with DS can be potentially increased by an online PRT program.
- Future studies should evaluate the feasibility and efficacy of this intervention strategy.

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