

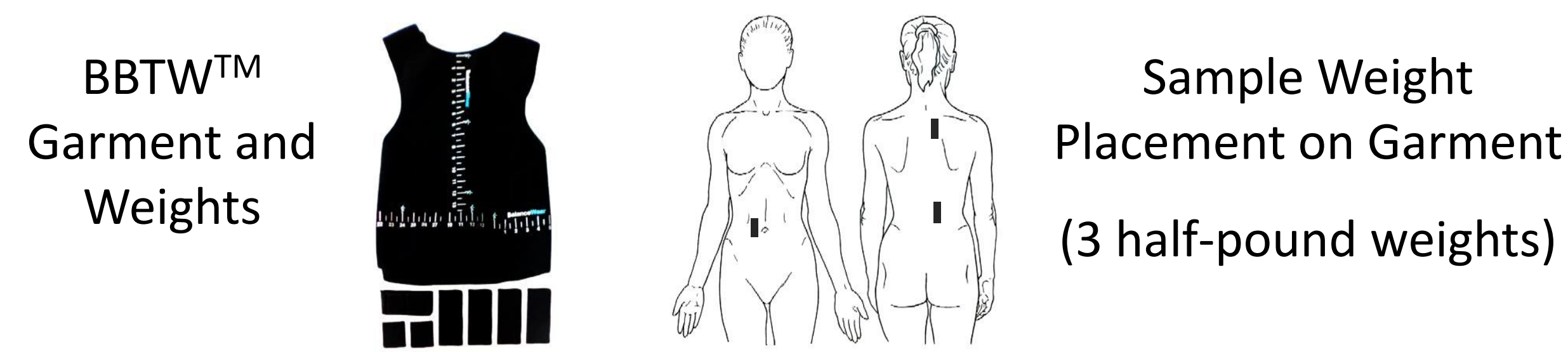
NOT JUST AN ORTHOTIC DEVICE: USE OF TORSO-WEIGHTING CAN IMPROVE MOTOR ABILITY TESTED WITH WEIGHTS OFF IN PILOT TEST OF PEOPLE WITH MULTIPLE SCLEROSIS

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Background

- Impaired balance and gait are two key problems in people with multiple sclerosis (MS).
- Torso-weighting has shown improvements in balance and mobility in people with MS during same session testing, but daily use of torso-weighting has not yet been examined.



Objective

- Investigate the effects of daily use of torso-weights using the Balance-Based Torso-Weighting (BBTW) method over multiple weeks; differentiate orthotic versus therapeutic effects.

Methods

Subjects:

- 5 adults with MS (Table 1) were tested at 4 visits.

Procedures:

Visits included *clinical testing* (always performed without weighting garment):

-Sensory Organization Test (SOT),

-6 Minute Walk Test (6MWT),

-gait velocity (recorded on an instrumented gait mat during the first 26 feet of the 6MWT)

- Visit 1, clinical testing, measured for a BalanceWear garment
- Visit 2 (4-5 weeks later), clinical testing, torso-weighting procedure, randomized to wear torso-weights (TW) or shape weights (SW) on garment, 2 hours daily at home
- Visit 3, 2-4 weeks later, clinical testing, torso-weighting, garment weighted with the other condition (SW or TW) to wear 2 hours daily at home
- Visit 4, 2-4 weeks later, repeat clinical testing

Participants and researchers performing testing were blinded to weighting condition between visits (TW versus SW)



Results

Table 1: Participant Demographic Data

Participant ID	Age	Sex	Patient-Determined Disease Steps	Type of MS
P01	32	F	2	Relapsing
P02	35	M	4	Relapsing
P03	49	F	3	Progressive
P04	61	F	5	Progressive
P05	75	F	5	Progressive

Average (SD) Change in the SOT, 6MWT, Gait Velocity with Three Weighting Conditions

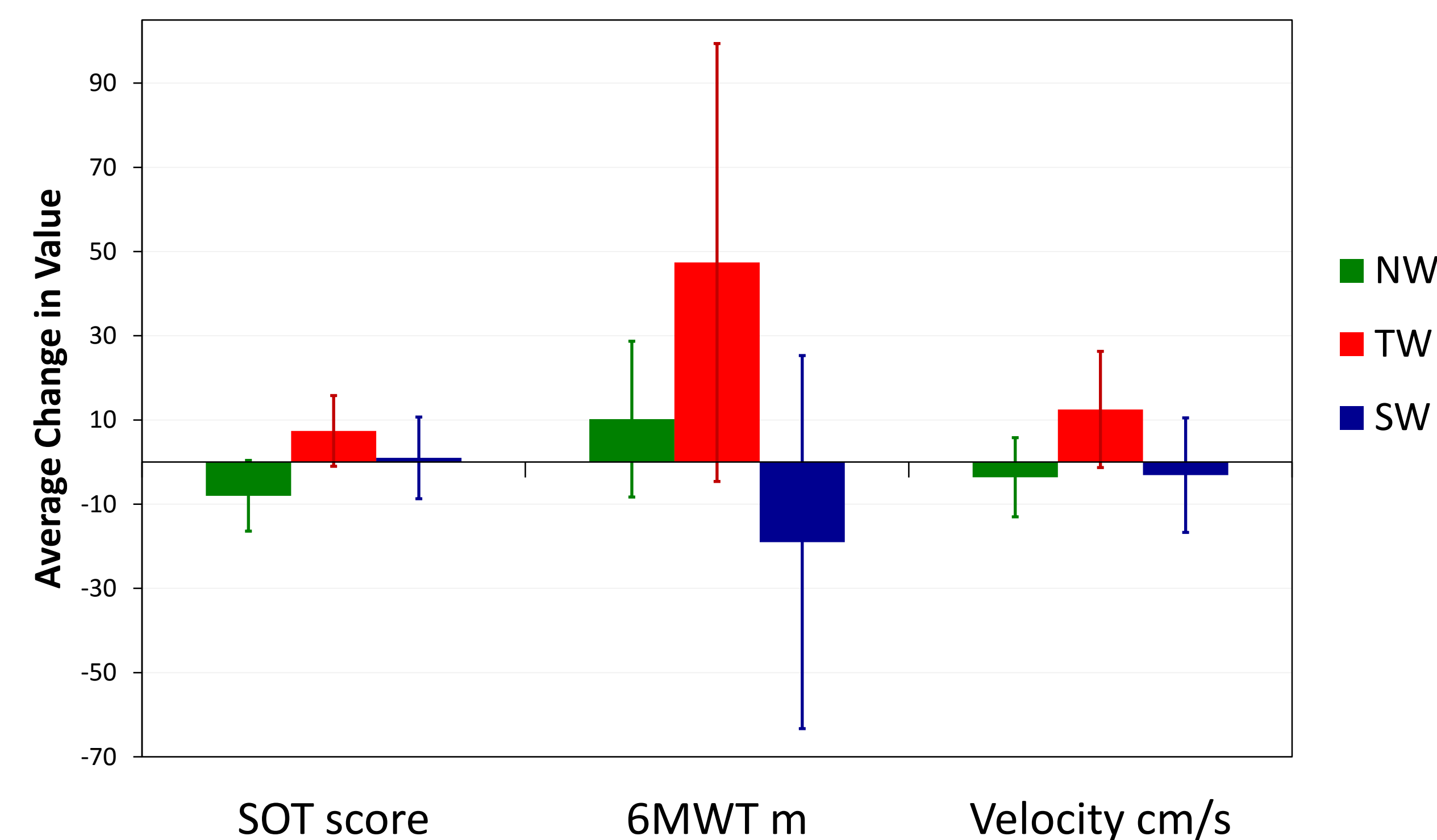


Figure 1: Average increases were 7.4 points or 14% for the Sensory Organization Test, 47.4 meters or 16.6% for the 6-minute Walk Test, and 12.5 cm/sec or 15% for gait velocity. NW=no weight, TW=torso weight, SW=shape weight

- Average performance for each variable improved after two weeks with TW.
- Average performance for each variable decreased or stayed the same with NW or SW.
- Effect sizes were large (0.7 to 0.9).
- Participants reported no falls during TW. Falls occurred in both NW and SW periods.

Gait Velocity

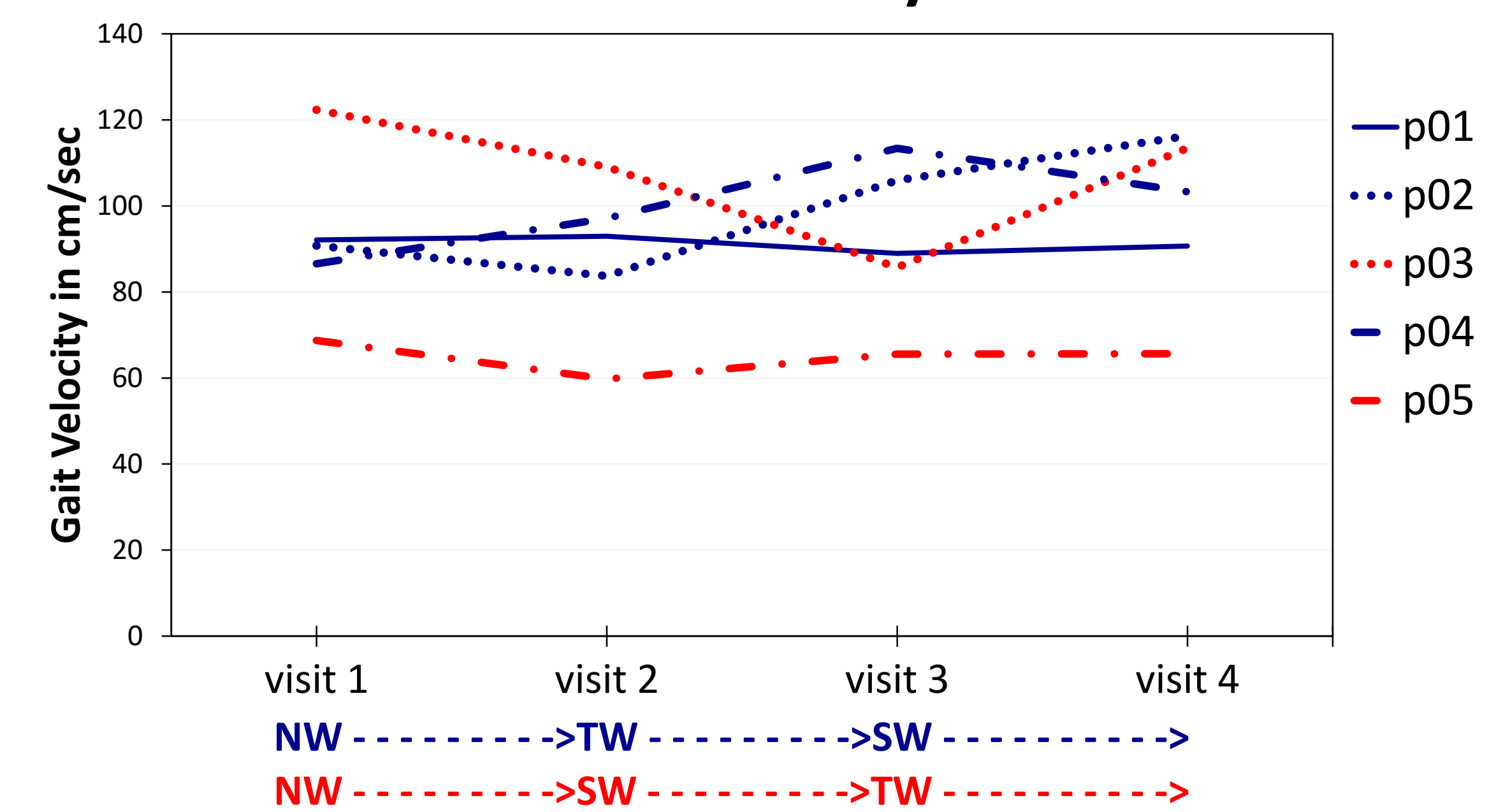


Figure 2: All participants wore no weights (NW) for the first period. Three participants had torso weights (TW) for the second period; two had shape weights (SW) for that period. Groups switched for the third period.

Discussion

- Strategic torso-weighting does not just act as an orthotic device, supporting function when donned. Improvement noted with weights doffed implies that motor learning may occur during a period of regular use.
- Further research is warranted. The large effect size indicates that this study would have .80 power with a sample size of 8 people.

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