

THE EFFECTS OF 2-WEEKS OF SENSORY TARGETED ANKLE REHABILITATION STRATEGIES ON SINGLE LIMB CENTER OF PRESSURE VELOCITY IN THOSE WITH CHRONIC ANKLE INSTABILITY



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INTRODUCTION

- Up to 75% of individuals who sprain their ankle subsequently develop chronic ankle instability (CAI); characterized by life-long residual symptoms,⁵ recurrent injury,⁶ and decreased physical activity.⁷
- Traditional rehabilitation strategies for this condition focus on motor pathway impairments (i.e. strength, coordination) with very little emphasis on the potential to intervene through sensory pathways.
- However, it has been demonstrated that the sensorimotor system dynamically shifts reliance on various sensory inputs depending on the demands placed on the system.²
- Sensory-targeted ankle rehabilitation strategies (STARS), such as triceps surae stretching, plantar massage, or ankle joint mobilization, that target sensory pathways may have beneficial effects on objective measures of sensorimotor in those with CAI.
- However, we do not yet understand the unique contributions of different STARS interventions.

PURPOSE

- To evaluate the effects of 2-weeks of sensory-targeted rehabilitation strategies (STARS) on center of pressure velocity (COPV) outcomes in those with CAI.

METHODS

- 61 individuals with self-reported CAI were randomly assigned to four different STARS groups.
- CAI was defined as a history of at least 1 ankle sprain with 2 episodes of giving way in the last 6 months, <90% on the Foot and Ankle Ability Measure (FAAM) and <80% on the FAAM-Sport (FAAM-S) Scale.
- [ClinicalTrials.gov Identifier: NCT01541657](https://clinicaltrials.gov/ct2/show/study/NCT01541657)



Biodynamics Research Laboratory at
UNC Charlotte

METHODS

Table 1: Group demographics and self-reported disability levels.

Group	Age (years)	Height (cm)	Weight (kg)	# of Sprains	Giving Way (last 3 months)	FAAM (%)	FAAM-S (%)
Control (n=15)	23.5±5.0	169.2±5.4	73.1±7.4	4.5±3.0	6.0±4.9	81.8±9.4	63.6±14.3
Joint Mobs (n=16)	23.9±6.9	171.9±7.7	78.5±18.3	4.5±3.5	4.9±3.9	80.0±10.9	62.3±12.7
Massage (n=15)	22.6±2.9	173.7±6.8	76.5±14.0	4.6±3.4	5.7±5.3	74.5±12.4	60.2±13.8
Calf Stretch (n=15)	22.5±2.7	175.4±13.9	73.9±16.6	6.4±4.1	10.2±18.4	75.2±13.9	61.4±16.6

- All patients were tested prior to group allocation. Group allocation was prepared independently and placed in a sealed envelope opened after baseline testing.
- Following baseline testing, patients received 6, 5-minute treatments of their respective STARS over a 2-week period. Post-testing was done within 72-hours of the final treatment.



- Control:** 5 minutes of quiet resting in a seated position.
- Joint Mobilization:** Two 2-minute bouts of Grade 3 Anterior-to-Posterior Mobilizations.
- Massage:** Two 2-minute bouts of plantar massage that combined petrissage and effleurage.
- Stretching:** Six 30-second stretches in max dorsiflexion with slight knee flexion.
- Primary outcomes included weight-bearing Center of Pressure Velocity in the medio-lateral (COPV-ML) and antero-posterior (COPV-AP) were calculated as cm/s.
 - SLB:** Three, 10-second trials of single limb stance on a force plate with eyes closed were performed by the participants with their hands on their hips. The three trial average for COPV-ML and COPV-AP was used for further analysis. Failed trials were repeated.
- Post to pre change scores (Δ) of the 3 STARS groups were compared to the CON using independent sample t-tests and Hedge's g effect sizes (ES) with 95% confidence intervals (CI).

RESULTS

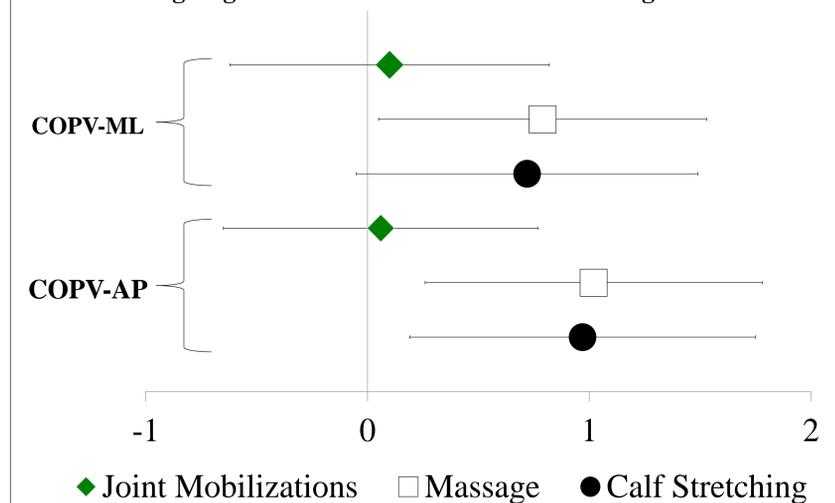
- Group change scores & standard deviations can be seen in Table 2. Effect sizes with 95% confidence intervals can be seen in Figure 4.

Table 2: Change Scores & Standard Deviations.

Group	COPV-ML (CM/s)	COPV-AP (cm/s)
Control	-0.83±1.41	-0.78±1.07
Joint Mobilization	-1.04±2.06	-0.92±2.51
Massage	0.55±1.69*	0.63±1.40*
Stretching	0.36±1.59	0.13±0.55*

* Indicates a statistically significant difference ($p \leq 0.02$) from the control group.

Hedge's g Effect Size with 95% CIs for Change Scores



CONCLUSIONS

- Two-weeks of brief plantar massage and calf stretching treatments resulted in improvements in COPV during single limb stance.
- However, only plantar massage improved COPV in both directions.
- The results suggest that targeting plantar surface sensory receptors via plantar massage enhances postural control outcomes for those with CAI.

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