

Local and Widespread Hypoalgesic Effects of Neurodynamic Mobilization in Asymptomatic Subjects

Daniel Maddox PT, DPT, OCS, FAAOMPT^{a,b}, Barrett Stanley PT, DPT, OCS, FAAOMPT^b, Poonam Hurley PT, DPT, OCS, FAAOMPT^b, Fredy Solis, PT, PhD^a, Devon Thomas, SPT^a, Nicholas Najor, SPT^a

^aDepartment of Physical Therapy, Brenau University, Gainesville, GA; ^bUpstream Rehab Institute, Smyrna, GA

INTRODUCTION

- Pain is a primary reason for seeking care from physical therapists.¹
- Point prevalence of chronic widespread pain (CWP): 10.6% - 11.8%.²
- Neurodynamic mobilization (NDM) is often used clinically as an effective intervention for pain³⁻⁴ – with both local and widespread hypoalgesic mechanisms having been proposed. However, there is limited and conflicting research supporting these mechanisms.
- Efficacy and effectiveness of NDM for those with CWP warrants further investigation, but further evidence for efficacy in asymptomatic populations needs to be established.

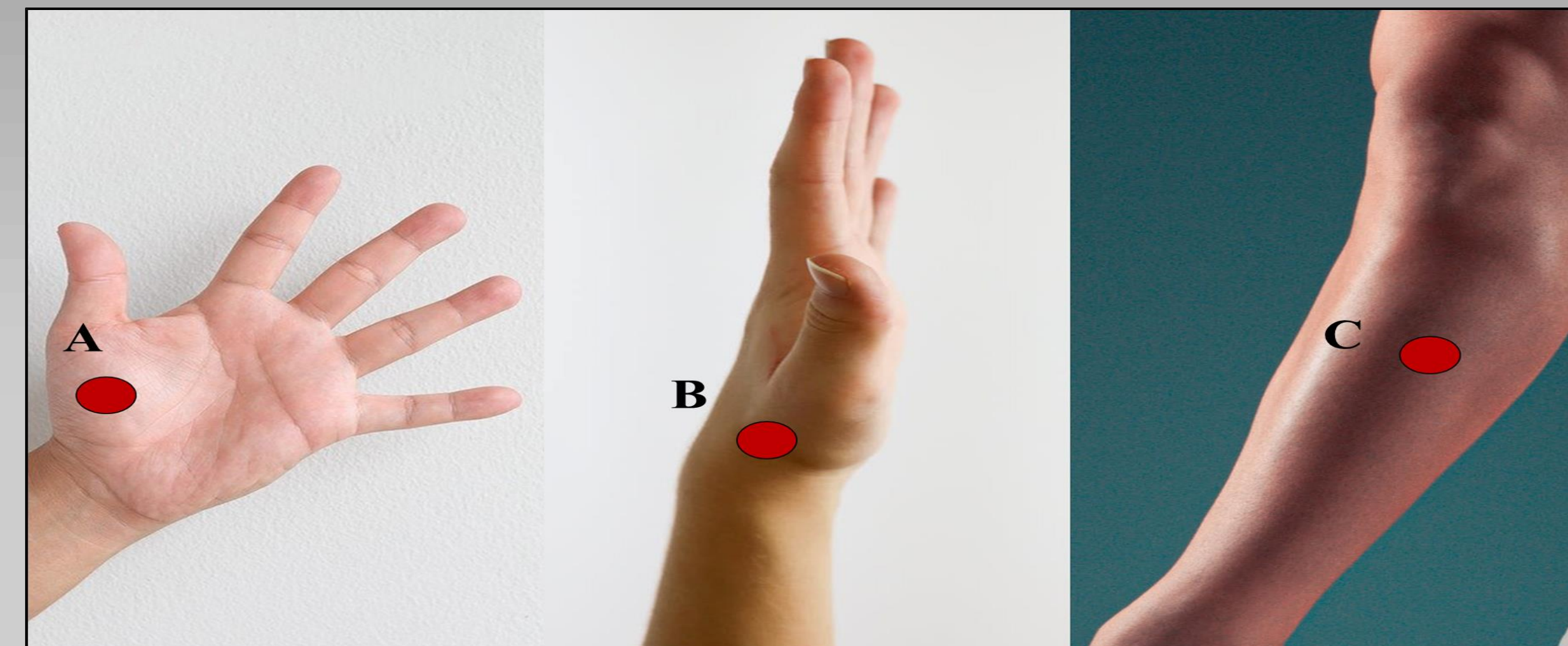
AIM and HYPOTHESES

- Aim:** To assess the immediate local and widespread hypoalgesic effects of NDM applied to the upper extremity of asymptomatic subjects.
- Subjects receiving NDM will exhibit greater changes in local and widespread QST measures compared to those receiving sham NDM.
 - Subjects receiving sliders will exhibit greater changes in local and widespread QST measures compared to those receiving tensioners.

METHODS

- Double-blind randomized controlled trial (Brenau IRB: 1208684-5)
- 60 asymptomatic subjects ages 18-65 randomized to 1 of 3 groups:
 - Slider (n=20): 2 bouts of 10 “slider” NDMs targeting the left (L) median nerve in the ULNT2 position as described by Butler³
 - Tensioner (n=20): 2 bouts of 10 “tensioner” NDMs targeting the L median nerve in the ULNT2 position as described by Butler³
 - Sham (n=20): 2 bouts of 10 sham NDMs as described previously by Beneciuk et al⁵
- Baseline quantitative sensory testing (QST) was conducted bilaterally at the points depicted in Figure 1 immediately pre-intervention by an examiner blinded to group allocation.
- QST measures included measures of pressure pain threshold (PPT), thermal pain threshold (TPT), and thermal pain tolerance (TPTol).
- Subjects received the allocated intervention - immediately followed by post-intervention testing by the same blinded examiner who conducted the baseline testing.
- Local QST measures reflect measures from the L thenar eminence (median nerve sensory field), while Widespread QST measures were calculated using the mean of the remaining 5 testing points.
- Data Analysis: Following assessment of normality via Shapiro-Wilk tests, within-group change was assessed using paired t-tests or Wilcoxon Signed Rank tests; and between-group differences in change were assessed using Kruskal-Wallis H-tests.

FIGURE 1. QST testing points (tested bilaterally)



A) Thenar Eminence B) Dorsal aspect of 1st CMC C) Tibialis Anterior

CONCLUSION / DISCUSSION

- Although statistically significant within-group changes were observed for multiple QST variables, there was no significant interaction between groups (Table 1).
- These findings suggest that in asymptomatic subjects, NDM may be no more effective than sham NDM in producing a hypoalgesic effect.
- However, one could argue that the sham NDM utilized in this study and elsewhere⁵ does result in some level of neurodynamic mobilization.
- Future studies should explore alternate methods of sham NDM and should assess for hypoalgesic effects of NDM in various symptomatic populations – such as those with local, regional, and widespread pain syndromes.

RESULTS

TABLE 1. QST Measures, with results of analyses of within-group change and between-group differences in change

	Pre (mean ± SD)	Post (mean ± SD)	Pre-Post Change (Mean, 95% conf. interval)	P Value for Within-Group Change	P Value for Between-Group Difference
LocalPPT (kgf)					.67
- Slider +	5.80 ± 1.93	5.50 ± 2.25	-0.30 (-1.08 to 0.47)	.43	
- Tensioner ++	5.87 ± 2.54	5.50 ± 2.32	-0.36 (-1.36 to 0.64)	.85	
- Sham +	4.79 ± 2.00	4.52 ± 1.77	-0.27 (-0.86 to 0.32)	.36	
WidespreadPPT (kgf)					.30
- Slider +	5.97 ± 2.02	6.75 ± 2.42	0.78 (0.14 to 1.42)	.02*	
- Tensioner +	6.74 ± 2.43	6.85 ± 2.37	0.10 (-0.38 to 0.58)	.66	
- Sham +	5.08 ± 1.35	5.39 ± 2.08	0.31 (-0.32 to 0.95)	.32	
LocalTPT (°C)					.11
- Slider +	41.76 ± 3.23	43.36 ± 3.59	1.60 (0.50 to 2.70)	.01*	
- Tensioner +	42.27 ± 3.48	44.28 ± 3.02	2.01 (0.71 to 3.30)	.004*	
- Sham +	42.00 ± 3.45	42.56 ± 2.93	0.56 (-0.71 to 1.83)	.37	
WidespreadTPT (°C)					.88
- Slider +	42.51 ± 2.88	43.94 ± 2.78	1.43 (0.73 to 2.14)	<.001*	
- Tensioner +	43.00 ± 2.92	44.34 ± 2.88	1.33 (0.64 to 2.02)	.001*	
- Sham +	41.66 ± 2.94	43.07 ± 2.57	1.41 (0.62 to 2.20)	.001*	
LocalTPTol (°C)					.51
- Slider ++	46.97 ± 3.23	48.15 ± 2.01	1.18 (0.49 to 1.87)	.001*	
- Tensioner ++	47.91 ± 2.06	48.86 ± 1.50	0.95 (0.20 to 1.69)	.004*	
- Sham +	47.46 ± 2.15	48.07 ± 2.04	0.61 (0.13 to 1.08)	.02*	
WidespreadTPTol (°C)					.34
- Slider +	47.59 ± 1.90	48.45 ± 1.45	0.86 (0.56 to 1.16)	<.001*	
- Tensioner ++	47.79 ± 1.77	48.44 ± 1.63	0.65 (0.31 to 0.98)	.001*	
- Sham +	47.06 ± 2.00	47.67 ± 1.68	0.61 (0.28 to 0.94)	.001*	

Within-group analysis via +paired t-test or ++Wilcoxon signed rank test; Between-group analysis via Kruskal-Wallis H-test

*Significant finding (p <0.05)

Reference List

1. Fruth SJ. *Fundamentals of the Physical Therapy Examination: Patient Interview and Tests & Measures*. Burlington, MA: Jones & Bartlett Learning; 2013.
2. Mansfield KE, Sim J, Jordan JL, Jordan KP. A systematic review and meta-analysis of the prevalence of chronic widespread pain in the general population. *Pain*. 2016;157(1):55-64. doi:10.1097/j.pain.0000000000000314
3. Butler DS. *Neurodynamic Techniques*. Adelaide, Australia: NOI Group 2005. NOI Group Publications; 2005.
4. Ellis RF, Hing WA. Neural mobilization: a systematic review of randomized controlled trials with an analysis of therapeutic efficacy. *J Man Manip Ther*. 2008;16(1):8-22. doi:10.1179/106698108790818594
5. Beneciuk JM, Bishop MD, George SZ. Effects of upper extremity neural mobilization on thermal pain sensitivity: a sham-controlled study in asymptomatic participants. *J Orthop Sports Phys Ther*. 2009;39(6):428-438. doi:10.2519/jospt.2009.2954