

Acute Impact of a Pectoral Myofascial Release on Pre-Motor Reaction Time of Pectoralis Major and Trapezius.

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Summary

Pectoral myofascial release is a common therapeutic intervention to elongate shortened pectorals associated with rounded shoulders and optimize the onset of excitation of scapular stabilizer muscles. The current study found that, when performing a reaching task, the middle trapezius pre-motor reaction time (pmRT) was shorter during MFR compared to a soft-touch control treatment (CON). In contrast, there was a significant decrease in pectoralis major pmRT from PRE to POST CON.

Introduction

Forward shoulder posture (FSP) is a common postural deviation that alters scapular kinematics and increases the risk of shoulder pain [1,2]. Correcting scapular position is essential to restoring normal shoulder motion. While pectoral myofascial release [MFR] does not alter excitation of the scapular stabilizers during repeated pointing [3], it is unknown if the onset of muscle excitation is altered following MFR. The current study defined the impact of 4-minutes of MFR to the pectoral fascia of individuals with FSP on pectoralis major (PEC) and upper (UT), middle (MT) and lower (LT) trapezius excitation onset (pre-motor reaction time; pmRT) during a reaching task compared to a soft-touch treatment (control; CON).

Methods

Fifty-nine right-handed participants ($n=59$, 30 female, 27 ± 9 years) with FSP, but asymptomatic shoulders, had muscle excitation of their right PEC, UT, MT, and LT measured during a reaching task using bipolar electromyography before (PRE) and after (POST) 4-minutes of MFR or CON to the right pectoral fascia in counterbalanced random order. Participants sat at a height-adjustable workstation and reached to touch one of five randomly appearing targets on a touch screen. pmRT was defined as the first sample within 1s of target appearance that exceeded 2 standard deviations from the mean voltage taken during quiet sitting. A 2-way treatment*time repeated measures ANOVA was conducted on pmRT of each muscle. Post-hoc Tukey's HSD was conducted on significant interactions. Significance was set at $p<.05$.

Results and Discussion

Table 1. Mean (standard deviation) of pre-motor reaction time (pmRT) of pectoralis major (PEC), and upper (UT), middle (MT), and lower trapezius (LT) during a reaching task before (PRE) and after (POST) a 4-minute pectoral myofascial release (MFR) or control (CON) * $p<.05$

	PRE CON	POST CON	PRE MFR	POST MFR	F	p	n ² _p
PEC*	227 (39)	214 (44)	219 (37)	220 (37)	5.409	.024*	.094
UT	191 (67)	189 (59)	198 (55)	195 (50)	.00574	.940	0
MT*	231 (43)	231 (41)	219 (46)	225 (31)	.0288	.866	.001
LT	235 (62)	247 (36)	240 (41)	240 (51)	1.6469	.209	.049

There were no significant interactions for pmRT of UT, MT, or LT, and no significant main effects for PEC, UT, or LT. There was a significant 2-way interaction on PEC pmRT, $F(1, 52)= 5.409$, $p=.024$, $\eta^2=.094$; main effects were not significant ($p>.05$). Tukey's HSD was 9.9ms, indicating a significant decrease in pmRT from PRE (227 ± 39 ms) to POST (214 ± 44 ms; $\Delta=13$ ms) CON, but not from PRE (219 ± 37 ms) to POST (220 ± 37 ms; $\Delta=1$ ms) MFR. A 4-minute CON treatment to the pectoral fascia decreased PEC pmRT, while MFR did not alter PEC pmRT. This finding was unexpected and inconsistent with previous reports demonstrating that MFR decreases pmRT [4, 5]. It is possible that both MFR and CON affect the relative muscle activation used to initiate the reaching movements, however the resulting changes in muscle activation appear to differ.

There was a main effect of treatment on MT pmRT, $F(1, 52)= 5.615$, $p=.022$, $\eta^2=.118$, with CON (233 ± 5 ms) pmRT being longer than MFR (223 ± 5 ms; $\Delta=10$ ms). The observed differences between MFR and CON suggest future work should explore the impact of MFR and soft-touch treatments on motor control at the level of the muscle versus changes associated with attentional awareness.

Conclusions

Four-minutes of soft-touch (CON) to the pectoral fascia decreased pmRT of the PEC, while MFR resulted in a shorter pmRT of MT. However, neither MFR nor CON affected the onset of muscle excitation timing of UT or LT.

Acknowledgments

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References

- [1] Nijs, J et al. (2007). *J Manip Phys Ther*, **30**:69-75.
- [2] Ludewig, PM et al. (2009). *JOSPT* **39**:90-104.
- [3] Bohunicky, S et al. (2024). *J Man Manip Ther*, **32**:495-505.
- [4] Kuruma, H et al. (2013). *J Phys Ther Sci*, **25**: 169-171.
- [5] Sawamura, S, et al. (2020). *J Bod Mov Ther*, **24**: 245-250.