HEMODYNAMIC EFFECTS OF GRASTON TECHNIQUE ON TRIGGER POINTS IN THE UPPER TRAPEZIUS IN PATIENTS WITH NECK PAIN

School of Kinesiology and Recreation
Illinois State University

Hannah Harris, ATC – Graduate Student
Noelle M. Selkow, PhD, ATC; Justin Stanek Ed.D., ATC
School of Kinesiology & Recreation
Illinois State University

Illinois State Athletic Training

BACKGROUND

- Non-specific neck pain (NS-NP) is defined as neck pain without a specific diagnosis with varying causes such as poor posture, occupational stressors, and muscular trigger points.[1]
- Poor posture such as, Forward Head Rounded Shoulders, causes the upper trapezius muscle to become tight due to sustained muscle activity.[1]
- Sustained muscle activity leads to a decrease in local oxygen blood flow causing the formation of trigger points.[2]
- Graston Technique® (GT) is a form of manual therapy that uses stainless steel instruments with beveled edges to break down tissue adhesions.[3]
- GT on trigger points has been presumed to increase local blood flow leading to tissue healing and decreased pain.[4]
- Subcutaenous hemodynamic effects from GT application have yet to be proven.

OBJECTIVE

To measure active cervical range of motion, neck pain, and subcutaneous hemodynamics of the upper trapezius following a single intervention of GT in patients with neck pain stemming from trigger points.

METHODS

Participants:

- 60 participants presenting with NS-NP and trigger point(s) in the upper trapezius muscle (39 female, 21 male)

Table 1. Participant Demographics

	Age	Sex	Height (cm)	Weight (kg)	Treatment Side
GT N=20	21.8 ± 2.9	Male = 10 Female = 10	172.6 ± 12.9	76.3 ± 14.9	Right = 14 Left = 6
IASTM Sham N=20	20.7 ± 1.6	Male = 5 Female = 15	168.5 ± 9.4	73.1 ± 16.4	Right = 13 Left = 7
Control N=20	22.2 ± 4.6	Male = 6 Female = 14	168.7 ± 9.4	73.5 ± 16.8	Right = 13 Left = 7

INTERVENTIONS

- Participants allocated into one of the following groups: GT, Sham instrument assisted soft tissue mobilization (IASTM), or control
- All participants completed the GT protocol, including: 10-minute arm bike, 5-minute treatment based on group allocation, passive lateral flexion stretch, and 3 therapeutic exercises

RESULTS

- Increased levels of oxygenated hemoglobin at superficial and deep depths in the GT and Sham groups compared to the control groups ($p \leq 0.008$).
  - No differences between GT and Sham ($p \geq .555$).
- GT showed increased right lateral flexion compared to Sham (p=.019) and control (p=.017). GT (p=.001) and Sham (p=.017) showed increased left lateral flexion compared to control.
- No differences found among groups for PPT (p=.201)

Table 2. Hemodynamics Change scores Immediate Post - Baseline

	Superficial Oxygenated	Superficial Deoxygenated	Superficial Total Hemoglobin	Deep Oxygenated	Deep Deoxygenated	Deep Total hemoglobin
GT	19.5 ± 13.5	3.0 ± 6.8	22.5 ± 18.9	17.2 ± 12.3	1.7 ± 6.2	19.3 ± 16.3
Sham	19.6 ± 16.3	3.1 ± 6.8	22.7 ± 21.8	19.8 ± 13.8	2.4 ± 6.3	22.1 ± 17.5
Control	-1.5 ± 14.2	0.3 ± 11.8	-2.2 ± 25.7	-0.5 ± 14.2	1.0 ± 13.1	0.5 ± 26.6
Effect Size GT:Control	1.52 (0.78-2.26)		1.10 (0.40-1.81)	1.61 (086-2.36)		0.86 (0.18-1.55)
Effect Size Sham:Control	1.37 (0.65-2.10)		1.05 (0.35-1.75)	1.40 (0.67-2.12)		0.97 (0.28-1.66)

Table 3. ROM (cm) and PPT (kg) scores

	GT	Sham	Control
L Lateral Flexion Baseline	9.59 ± 2.30	10.35 ± 3.09	9.84 ± 2.30
L Lateral Flexion Immediate Post	8.23 ± 2.24	9.5 ± 2.83	9.67 ± 2.21
L Lateral Flexion Post 24 hours	8.01 ± 2.50	8.89 ± 3.37	9.61 ± 2.18
R Lateral Flexion Baseline	9.18 ± 2.92	9.06 ± 2.97	9.49 ± 2.48
R Lateral Flexion Immediate Post	8.06 ± 2.61	8.81 ± 2.97	9.20 ± 2.48
R Lateral Flexion Post 24 hours	7.83 ± 2.23	8.6 ± 2.57	8.93 ± 2.58
PPT Baseline	8.23 ± 2.85	7.52 ± 1.75	7.95 ± 2.53
PPT Immediate Post	8.25 ± 2.91	7.03 ± 1.52	7.48 ± 2.52
PPT Post 24 hours	7.73 ± 3.18	6.52 ± 1.12	7.46 ± 2.34

DISCUSSION

- Following GT protocol, both GT and IASTM indicated an increase in local blood flow to the upper trapezius.
  - Consistent with previous research presumption of GT providing increased local blood flow.[3]
- Hemodynamics vary between each participant.
- GT increased right lateral flexion compared to Sham and control; whereas, GT and Sham increased left lateral flexion compared to control.
  - Concurrently, high level evidence suggests significant ROM improvements using GT and IASTM.[5]
  - Confounding factors: more participants treated on the right and all participants received a contralateral stretch.
- A single treatment of GT did not decrease neck pain.
  - However, previous research has found decreased PPT on trigger points over a 3-week treatment period.[6]
  - Petechiae and tenderness may cause an immediate increase in pain after a single treatment.[5]

CONCLUSION

- After a single intervention of GT, participants received increased blood flow to the upper trapezius and increased neck lateral flexion range of motion.
- GT proved to be an effective treatment to the upper trapezius in patients with neck pain.
- Future research is needed to establish if GT as a superior treatment to other forms of IASTM.

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