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PROFESSIONAL MASSAGE AND ITS IMPACT ON PSYCHOPHYSIOLOGICAL CORRELATES

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Synopsis:

This study measured the effects of massage therapy (MT) on reducing of anxiety and cortisol levels in 38 undergraduate women and 27 men, average age 20.25 years. Randomly assigned to a professional massage group (PMG, 48% of participants) and a control group, participants completed State Trait Anxiety Inventory (Spielberger, 1983), and granted a saliva sample to measure cortisol levels, before and after massage was administered. We were interested in the effects of MT on lowering state anxiety.

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Abstract

This study measured the effects of massage therapy (MT) on reducing of anxiety and cortisol levels in 38 undergraduate women and 27 men, average age 20.25 years. Randomly assigned to a professional massage group (PMG, 48% of participants) and a control group, participants completed State Trait Anxiety Inventory (Spielberger, 1983), and granted a saliva sample to measure cortisol levels, before and after massage was administered. We were interested in the effects of MT on lowering state anxiety and cortisol concentration, and used a 2(MT) X 2(Gender) X 2(Phase X S) mixed factorial design to carry out two separate analyses on these dependent variables. Results suggested that a 10-minute massage did significantly lower state anxiety $F(1, 61) = 92.11, p < .0001$ and cortisol levels $F(1, 50) = 6.44, p < .01$ in PMG. The results of this study imply that anxiety and its psychophysiological correlate cortisol can be lowered by a short session of MT with physical and mental benefits.

Keywords: massage therapy, stress, anxiety, cortisol

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Many studies suggest Massage Therapy (MT) ameliorates postpartum depression (Field, Diego, Hernandez-Reif, Schanberg & Kuhn, 2004), relieves pain (Bauer et al., 2010) and reduces anxiety and cortisol (Field et al., 1996). Several other studies suggest that a single 20-minute Swedish massage (Rapaport, Schettler, & Bresee, 2010) can lower cortisol significantly. Massage techniques vary in their type and duration making it difficult to establish a standard form of MT. The purpose of this study was to develop and establish a standard form of Swedish massage with shorter duration (10-minute) reducing anxiety and cortisol levels as induced by longer-duration therapies (Rapaport et al., 2010).

Materials and Methods

Participants. Thirty-eight women and 27 men undergraduate students, average age 20.25 years took part in this study. Sixteen women and 15 men were randomly assigned to PMG and were given MT by a licensed massage therapist; the rest (22 women and 12 men) were put in a control group (CG) who watched a video lecture for 10 minutes.

Materials. Professional Swedish Massage uses, among other procedures, *effleurage* (applying unbroken gliding movements by hands and fingers repeatedly on body contours) and *petrissage* (gentle rhythmic lifting, squeezing, and releasing of tissue, working parallel to the muscle fibers in different body areas). The massage therapist administered these two procedures on the torso and arms of each clothed participant sitting in a chair. Shoulders provided the starting position where each massage began, spreading to the back, neck, and the head. Light effleurage was applied from the base of the skull and down on the back and across the shoulders to warm the tissues and check for any obvious abnormalities or dysfunction. Next gentle petrissage was applied on the shoulders using release techniques, followed by work down each

arm, wrist and hand. Each massage session concluded at the shoulders, the starting position, lasting 10 minutes.

State Trait Anxiety Inventory (STAI). We used STAI (Spielberger, 1983) to measure state (20 items) and trait (20 items) anxieties. Both sub-scales rendered a composite score ranging from 20 to 80, with higher scores indicating higher levels of state or trait anxiety. The reliability for trait anxiety ranged from .73-.86, which was much higher than the state anxiety (.33; Spielberger, 1983). The convergent validity of STAI is high (.73 to .85) when compared to Institute for Personality & Ability Testing (IPAT), Anxiety Scale and the Taylor Manifest Anxiety Scale (Taylor, 1953).

Cortisol Measurement. We assessed cortisol in participant's saliva using hygienic saliva collection kit (Salimetrics, PA). The samples were stored in a -20 Celsius freezer, and removed three hours prior to assay. The samples were centrifuged at 1500 X (@3000 rpm) for 15 minutes (Eppendorf Centrifuge Model 5417R) and were placed into a 96-well plate (along with calibrators and controls). By means of an enzyme-linked immune absorbent assay (ELISA) based on vendor's (Salimetrics, PA) instructions, measured cortisol amounts in saliva, and read them on a micro-well plate reader within the 10 minutes recommended by the manufacturer (Shanghai Medical Supplies, SM 600 UV Absorbance Micro-Plate Reader) at 450nm (see Aardal & Holm, 1995).

Procedure & Design. The experiment was run during the daylight hours (9:00-11:00), when saliva cortisol peaks in human beings due to diurnal rhythm⁷. This insured viable quantities of cortisol measured reliably, avoiding floor effects. The experimenters excluded pregnant participants and participants with previous medical conditions and randomly assigned them to PMG and CG. All participants in the PMG were handled individually and all others together in

the control group. Each participant completed STAI, and granted a saliva sample before and after receiving massage. The participants in the CG also completed STAI and gave a saliva sample before and after a 10-minute video clip on Freudian *defense mechanisms* (<http://youtube/ov-a1mGSEMc>). A 2(MT) X 2(Gender) X 2(Phase X S) mixed factorial design for two dependent variables (state anxiety and cortisol) were statistically analyzed separately using multifactor Analysis of Variance (ANOVA) and post-hoc Tukey HSD tests.

Results

We found a significant main effect of state anxiety $F(1, 61) = 92.11, p < .000001$. State anxiety before ($M = 39.51, SE = 1.10$) the massage was significantly higher than after ($M = 32.83, SE = 1.33$) massage. This reduction in anxiety was largely due to massage given in PMG ($M = 32.83, SE = 1.33$) than CG ($M = 38.60, SE = 1.33$) and was also significant $F(1, 61) = 9.30, p < .003$. The two main effects were augmented by a significant phase X group interaction $F(1, 61) = 77.63, p < .0001$. No significant gender differences were found for state anxiety (see Figure 1) and no significant main effects and interactions were revealed for trait anxiety.

Of great interest was an overall reduction in cortisol concentration, we found a significant main effect of cortisol $F(1, 50) = 6.44, p < .01$. Cortisol concentration ($\mu\text{g/dL}$) after professional massage ($M = .30, SE = .02$) decreased compared to before massage ($M = .35, SE = .04$). Cortisol concentration significantly declined in women (.10 $\mu\text{g/dL}$) than men (.01 $\mu\text{g/dL}$) before and after massage (see Figure 2); the interaction between gender X phase was also significant $F(1, 50) = 6.75, p < .01$.

Discussion

These results suggest that a 10-minute Swedish massage with two specific techniques of *effleurage* and *petrissage* are effective in lowering state anxiety in adult women and men,

however significant reduction in cortisol levels were only observed in women and not men, we do not know why this difference could not be ascertained in men, perhaps women may have genetic and epigenetic factors different than men, and react with a differential cortisol response when under stress task (Edelman et al., 2012). Since state anxiety lowered after massage, we did some additional analyses by separating STAI items that represented mental (12 items) and physical (8 items) components of anxiety and found that composite mean scores on items that represented mental anxiety lowered significantly ($p < .0001$) in both men and women in PMG, along with composite mean scores of physical anxiety ($p < .0001$) in both genders in this group., No significant difference was observed in either gender in CG for mental and physical anxieties.

We are encouraged by these results, and propose 10 minute Swedish massage can lower anxiety and cortisol in adults, this procedure could be beneficial for students, and other professionals fatigued by daily stress. We also propose investigating other psychological and physiological measures in future studies. It would be interesting to separately measure cognitive, affective and behavioral components of anxiety after massage, and measure neurotransmitters like serotonin, dopamine, oxytocin, epinephrine and norepinephrine as physiological measures implicated in anxiety.

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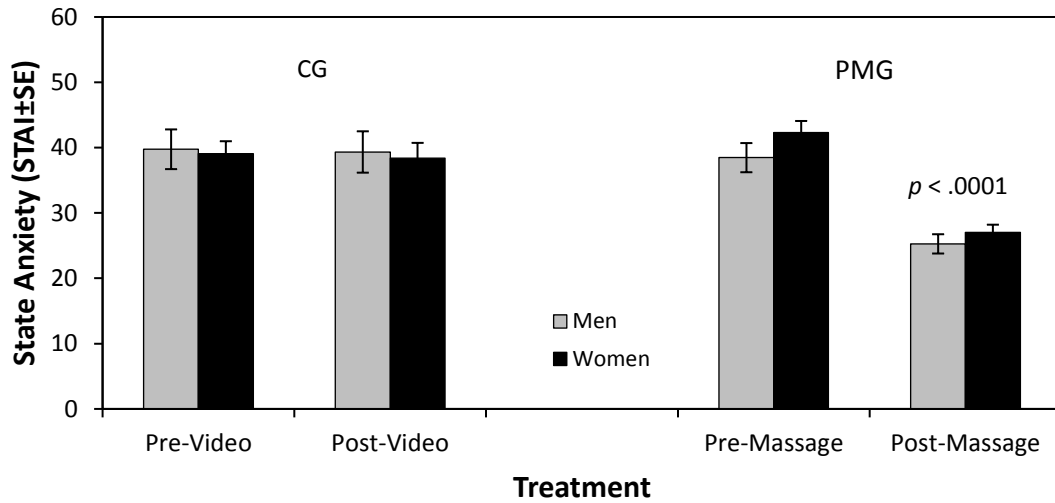


Figure 1. Shows a three-way interaction among treatment, gender and phase. State anxiety in men and women of the control group did not change before or after the video lecture; however state anxiety dramatically decreased in PMG, after massage. We found no significant gender differences.

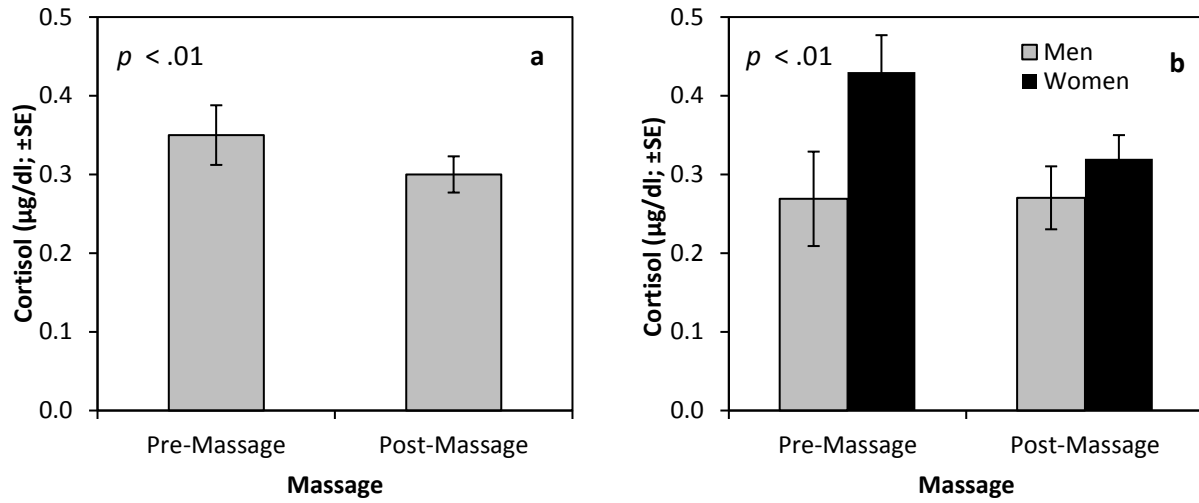


Figure 2. Panel a shows significant reduction in cortisol before and after Swedish massage. This significant reduction was largely due to women in our sample and not men (panel b).