EFFECTS OF ULTRASOUND AND COUPLING AGENTS ON RANGE OF MOTION OF THE GLENOHUMERAL JOINT.

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Context: Ultrasound (US) is frequently used to increase soft tissue temperature in the belief that it facilitates increases in range of motion in conjunction with stretching. In addition, some clinicians use analgesic balms (AB) as coupling agents in the belief that AB provide an additive “loosening” effect on soft tissue and thereby enhance treatment effect.

Objective: The purpose of this study was two-fold: 1) to examine the effects of US on external rotation range of motion (ROM) of the glenohumeral joint 2) to determine if AB provide an additive effect on range of motion. Design: Repeated measure design. Settings: Research Laboratory. Patients or Other Participants: Twenty uninjured subjects, (age = 19.3±1.1 yrs., height = 171.7±8.2 cm, weight= 79.2± 20.1 kg) volunteered for this study. Interventions: Active shoulder external rotation of the non-dominant shoulder was measured by a modified bubble inclinometer attached to the forearm of the subject. Subjects were stabilized at the trunk and elbow using a Kin-Com II dynamometer. Measurements were taken immediately before and after the interventions, and at 1, 3, 6, 10, 15, and 20 minutes. Data were expressed as change from the pre intervention score. Ultrasound was delivered at 3 MHz US at 1.5 W/cm² for 6 minutes over a standardized area of 2 effective radiating areas over the anterior shoulder. Subjects reported on four separate days, with at least three days between test sessions. Subjects were exposed to all four interventions with order of session randomly assigned: 1) Control = US at 0.0 intensity with standard gel, 2) US with standard gel 3) US with a 50/50 mix of gel and Biofreeze® (US+GEL+BIO), 4) US with BioFreeze®(US+BIO). We analyzed the ROM data with a repeated measure ANOVA. Alpha level was set a priori at .05. Main Outcome Measures: Active range of motion of the glenohumeral joint measured by a modified bubble inclinometer. Results: Indicated that treatment increased range of motion over time (P≤ .001). However, there was no Treatment X Time effect, (P=.084) indicating that all interventions, including control were equally effective in increasing ROM. The overall changes in ROM from pretreatment to 20 minutes were: Control 4.3±6.5, US 10.3±11.7, US/GEL+BIO 8.4±9.5 and US/BIO 5.4±7.5. Conclusion: Our results indicate that US, US/GEL+BIO, and US/BIO are no better than control for increasing ROM of the glenohumeral joint. Subjects were uninjured; therefore, extrapolation to injured subjects should be done cautiously. Word Count: 394.