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## TECHNIQUES OF MASSAGE THERAPY IN MYOGENOUS TEMPOROMANDIBULAR DISORDER: A RANDOMIZED PLACEBO-CONTROLLED TRIAL.

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### INTRODUCTION

The Temporomandibular Disorder (TMD) is a multifactorial origin disease of the masticatory system, characterized by pain in the masticatory muscles, temporomandibular joint (TMJ) and less in associated structures [1].

Massage is one of the oldest therapeutic modalities. However there are no scientific studies that assess different massage techniques effects in TMD. Similarly, literature describes a few randomized controlled trials (RCTs) involving massage therapy [2,3].

The aim of this randomized placebo-controlled blinded trial was to evaluate the effect of intra-oral and extra-oral massage techniques, when applied combined or isolated, on pain intensity, electromyographic activity, range of mouth opening and TMD severity degree.

### METHODS

Subjects of this clinical trial were 40 women with myogenic TMD (RDC/TMD), mean age of  $24.97 \pm 4.92$  years. They were divided into five groups: G1 (n=10) combined massage (extra-oral and intra-oral techniques); G2 (n=10): intra-oral massage; G3 (n=10): extra-oral massage; G4 (n=5): control group; and G5 (n=5): placebo (extra-oral massage with light pressure).

The massage treatment consisted of ten sessions (1<sup>st</sup> to 10<sup>th</sup> days) performed twice a week. The G4 subjects were evaluated in the same period, without receive any treatment. It was measured: pain intensity using a Visual Analogue Scale (VAS), surface electromyography (EMG) of masticatory muscles, range of mouth opening (RMO) and Fonseca's Questionnaire for TMD severity degree.

The percentage pain relief was calculated using VAS values in the end of the study, 24-48 hours after last session (11<sup>th</sup> day), in relation to 1<sup>st</sup> day, previously treatment. The EMG, RMO and Fonseca's Questionnaire were applied on 1<sup>st</sup>, 5<sup>th</sup> and 11<sup>th</sup> days.

For EMG record, the conditioned module of signal ADS 1200 (Lynx Electronic Technology Ltd.) with 8 channels and gain adjust from 1 to 16000 times, where a band-pass

filter of 20-500 Hz and a sampling frequency of 2000 Hz for each channels were calibrated.

The EMG signs were obtained during 5 seconds in two conditions: Mandibular rest position (RP) and Maximal dental clenching (MDC). For DC the Parafilm M® material was used. A pre-amplifier with a twentyfold gain was coupled to bipolar Ag/AgCl electrodes that were attached on muscle belly (masseter, anterior temporal and suprahyoid) after function test, according [4]. The reference electrode was attached to the volunteers' sternum bone.

The EMG signal processing was performed on software AqDAnalysis 7. To MB collection the average of three chewing cycles, determined by lottery was considered. The comparison of mean values of Root Mean Square (RMS) was performed between evaluated periods.

The analysis of variance was performed for each measurement, using GLIMMIX procedure (9.2 SAS Institute Inc.), and Student t test was used for multiple means comparisons, and 5% ( $p < 0,05$ ) significance level was considered.

### RESULTS AND DISCUSSION

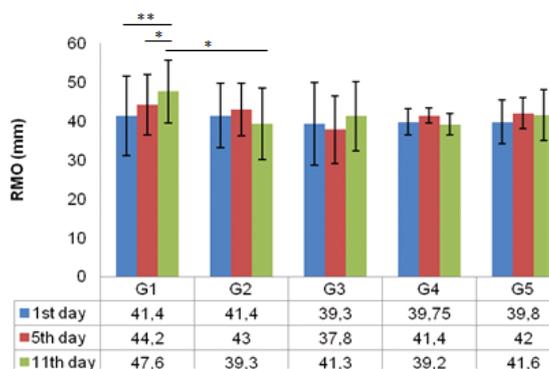
According to obtained results, combined massage (G1) showed higher percentage pain relief values for all evaluated sites. The control group (G4) showed negative percentage pain relief values for all evaluated sites, what indicates increased pain at the end of the study (Table 1). Others studies also found TMD pain intensity relieving after massagetherapy treatment [5,6].

**Table 1.** Percentage pain relief (%) for all evaluated sites of each group.

Group	Right TMJ (%)	Left TMJ (%)	Right MM (%)	Left MM (%)
G1	96,23	98,52	87,08	79,95
G2	66,58	72,35	61,38	67,86
G3	43,97	27,08	62,89	51,54
G4	-61,33	-208,70	-45,79	-103,52
G5	59,42	69,29	75,42	72,38

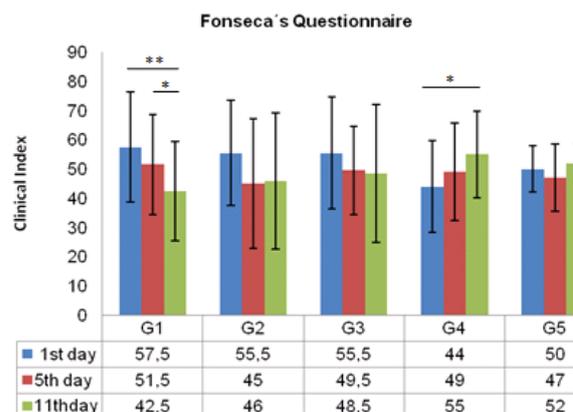
The EMG results revealed that, during RP, the activity of the left masseter was greater in G4 ( $p=0,005$ ) and G5 ( $p=0,001$ ) than in the treated groups. And during MDC, the G2 and G5 showed increased activity for all studied muscles ( $p=0,038$ ). But no EMG changes were observed along the study, similarly others studies [7,8]. An initial EMG examination may be suggested in the subjects' evaluation for sample standardization.

The RMO with combined massage treatment were significantly higher in 5<sup>th</sup> day ( $p=0,046$ ) and 11<sup>th</sup> day ( $p<0,001$ ). Furthermore, combined massage values were statistically higher than intra-oral massage on 11<sup>th</sup> day ( $p=0,02$ ) (Figure 1). Similarly, other studies showed increased range of motion after treatment with massage therapy [1,9].



**Figure 1.** RMO values on 1st, 5th and 11th days for all groups. \* $p<0,05$ . \*\* $p<0,01$ .

The Clinical Index of Fonseca's Questionnaire values decrease from 11th day as compared to 1st day ( $p=0,0002$ ) and 5th day ( $p=0,015$ ) with combined massage, and from 11th day relation to 1st day with intra-oral massage ( $p=0,012$ ). In addition, a different behavior was observed for G4, since 11th day values were higher than 1st day ( $p=0,037$ ) (Figure 2). This results indicates that treatment with combined massage and intra-oral massage provides TMD signs and symptoms improvement.



**Figure 2.** Clinical Index of Fonseca's Questionnaire values on 1<sup>st</sup>, 5<sup>th</sup> and 11<sup>th</sup> days for all groups. \* $p<0,05$ . \*\* $p<0,01$ .

## CONCLUSIONS

Among massage therapy techniques assessed, combined massage provided greater effectiveness on pain relieving and TMD symptoms, as well as increased range of mouth opening.

## ACKNOWLEDGEMENTS

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