Hyperboloid exercise increases mandibular range of motion in individuals with temporomandibular dysfunction: randomized, blinded clinical trial

O exercício hiperboloide aumenta a amplitude de movimento mandibular em indivíduos com disfunção temporomandibular: ensaio clínico randomizado e cego

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1 INTRODUCTION

Temporomandibular dysfunction (TMD) is a comprehensive term characterized by a set of clinical changes that may involve muscle dysfunction and disc displacements, related to the temporomandibular joint (TMJ) and other associated structures 1,2. Several studies have supported the use of physiotherapeutic resources in the treatment of this

pathology, with emphasis on manual therapies 2. However, it is necessary to prove other clinical measures, commonly used in individuals with TMD, such as proprioceptive exercises and the use of hyperboloid, which is a device that also helps in proprioception 2,3. The aim of the present study was to evaluate and compare the effects of proprioceptive treatment with hyperboloid associated with tongue-on-palate exercise versus proprioceptive treatment with hyperboloid on joint mobility in individuals with TMD.

2 METHODOLOGY

- The study was approved by the Research Ethics Committee of Uninove (CAAE:13991413.4.0000.5511) and registered at ClinicalTrials.gov (NCT02021357). The sample was calculated through a pilot study, using the mean difference (6.0mm*3.5) between the pre and post 12 treatment sessions.
- The estimated number for each group was 9 individuals. Considering losses, 20% more were recruited for each group, therefore, 22 individuals diagnosed with TMD were randomly distributed into 3 groups: G1 (hyperboloid associated with tongue-in-palate exercise) and G2 (hyperboloid) and G3 (control).
- The treatment protocols were applied during 12 sessions and the subjects were assessed at two time points: before the first treatment session and after the last session.

Figure 1 - Hyperboloid.

Source: https://www.ortocentrosaude.com.br/hiperboloide-instrumento-de-mastigacao-

Table 1 - Protocol performed by groups G1 and G2, with a 1-minute interval between each exercise. In addition, G1 performed 15 repetitions of the mouth opening exercise with tongue on palate after each interval.

Exercise (6 repetitions each)
Squeezing between incisors
Pinching between the first molars on the right
Pinching between the first molars on the left
Protrusive median squeeze
Retrusive median tightening.
Lateral median squeeze to the right
Lateral median squeeze to the left
Sliding to the right
Sliding to the left

3 RESULTS AND DISCUSSION

There was a significant gain in range of motion in both groups, i.e., the mean range of motion of group 1 pre-treatment was 31.04mm±7.18 and post-treatment increased to 39.39mm±8.81, while in group 2 the mean range of motion pre-treatment was 36.32mm±10.91 and post-treatment increased to 44.25mm±8.76, with no significant difference between them. However, in both groups there was a clinically important difference in the outcome studied.

Table 2 - Mandibular opening (MAD) of the groups before and after the interventions.

Outcome	Group	Pre	Post
Mandibular ADM[SEP](mm)	G1	31.04mm±7.18	39.39mm±8.81
	G2	36.32mm±10.91	44.25mm±8.76
	G3	32.78mm±5.96	33.32mm±6.94

* Significant difference between pre and post values

4 CONCLUSION

There was no difference between the groups. In both treatment groups, there was a clinically important increase in mandibular range of motion in TMD patients. The application of proprioceptive exercises with hyperboloid in TMD treatments brings satisfactory results when the goal is to improve mandibular range of motion.

FINANCIAL SUPPORT

Nove de Julho University and CAPES (No. 88887.822658/202300).

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