Hypnorelaxation as treatment for myofascial pain disorder: A comparative study

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Background. Hypnorelaxation has a potentially beneficial effect in the treatment of masticatory myofascial pain disorders (MPD). However, there are no data regarding the efficacy of hypnorelaxation in the treatment of MPD compared with other accepted modes of treatment (such as occlusal appliance) or with the mere effect of time.
Objective and subjects. The purpose of the present study was to evaluate the effectiveness of hypnorelaxation in the treatment of MPD compared with the use of occlusal appliance and/or to minimal treatment. The study population consisted of 40 female patients with myofascial pain who were allocated to 1 of 3 possible treatment groups: (1) hypnorelaxation (n = 15), (2) occlusal appliance (n = 15), and (3) minimal treatment group (n = 10).
Results. Both active treatment modes (hypnorelaxation and occlusal appliance) were more effective than minimal treatment regarding alleviating muscular sensitivity to palpation. However, only hypnorelaxation (but not occlusal appliance) was significantly more effective than minimal treatment with regard to the patient's subjective report of pain on the Visual Analog Scale.
Conclusion. Hypnorelaxation is an effective mode of treatment in MPD, especially with regard to some of the subjective pain parameters.
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Myofascial pain disorder (MPD) is defined as a regional, dull, aching pain accompanied by the presence of localized trigger points in the muscles that produces a characteristic pattern of regional referred pain on provocation.[1] Most MPD patients have tenderness of the elevator muscles during palpation, with approximately 40% of these patients reporting pain on chewing.[1,2] However, only 30% of patients with confirmed bruxism have significant myalgia.[3]

The pathogenesis of MPD is not yet fully understood. Hyperalgesia due to changes in the central nervous system (including the sympathetic nervous system) can cause pain.[4] It is well known that different psychological or emotional states can alter muscle tone.[1] It has been hypothesized that myofascial symptoms are associated with psychosocial factors and emotional stress problems.[5-7]

Because the etiology of MPD is somewhat obscure, there is actually no treatment that represents the gold standard in this respect. Rather, a multidisciplinary approach is accepted, which includes patient education and self-care, cognitive behavioral intervention, relaxation training, pharmacologic therapy, physical therapy, and occlusal appliance therapy.[8-10]

Occlusal appliance therapy is the most largely studied and well-documented treatment for MPD, with an efficacy rate of about 70% to 90%.[11-14] Hypnosis and hypnorelaxation have been suggested to be as effective in the treatment of chronic pain conditions[15] and to be a logical treatment option for MPD and bruxism.[16] Its use as a treatment modality for MPD or bruxism is described in several clinical case reports[16-22] and in clinical studies that show the efficacy of hypnosis in treating nocturnal bruxism and temporomandibular disorders (TMD).[16,23] However, these studies do not report comparative data to other accepted and well-documented modes of treatment (eg, occlusal appliance); therefore, their conclusions should be taken cautiously. Furthermore, these studies do not consider the fluctuating nature of the disturbance, as suggested in the literature,[24] and sufficient evidence as to the efficacy of hypnorelaxation as a treatment mode for MPD is not provided.

The purpose of this study was to evaluate the effectiveness of hypnorelaxation in the treatment of MPD compared with the use of an occlusal appliance and to minimal treatment with no active involvement.

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SUBJECTS AND MATERIAL

Population

The study population consisted of 40 female patients referred for treatment at the Clinic for Temporomandibular Disorders, School of Dental Medicine, Tel Aviv University, Israel. Inclusion criteria were frequent facial pain for at least 6 months' duration, no history of facial or cervical injury, no pain or limitation of movement at the cervical area, and no history of general neurologic disturbances, hormonal diseases, neoplasm, or psychiatric diseases. Age ranged between 16 and 49 years, with a mean of 30.25 years (standard error of the mean [SEM], 1.48).

Before treatment, all patients were diagnosed as having MPD, according to the research diagnostic criteria for temporomandibular disorders (RDC/TMD).[2] Diagnosis included clinical signs and symptoms (Axis I), as well as pain-related disability and psychological status (Axis II) before treatment, according to the RDC/TMD.

Axis I characteristics

Self-reported symptoms.

1. Mean severity of pain during the week previous to the examination on a visual analog scale (VAS) of 100 mm, marked as present pain (PresP).
2. Worst pain experienced during the last 6 months on VAS, marked as maximal pain (MaxP).

Clinical signs. A single expert faculty member (A.G.) whose hand pressure was calibrated in previous studies recorded the clinical signs, as follows:

1. Sensitivity to manual palpation of the superficial masticatory muscles (origin and insertion of the masseter and the anterior and middle portions of the temporalis muscles). Results were estimated as none, mild, moderate, or severe pain (0 to 3 points, respectively). After clinical evaluation, an arithmetical mean was calculated for each masticatory muscle separately and for both the masseter and temporalis muscles together (mean superficial masticatory sensitivity). The codes were MS, mean masseter sensitivity to palpation; TS, mean temporalis sensitivity to palpation; and SMS, mean superficial masticatory sensitivity to palpation.
2. Range of mouth opening (in millimeters). The intrinsic distance was measured in active (voluntary) maximal mouth opening (AMO) and in passive (assisted) maximal opening (PMO) by applying finger pressure to extend the opening to its maximal capacity.

After the evaluation, the end-feel (the difference between AMO and PMO) was calculated and coded as DAP.

Axis II characteristics

The Axis II characteristics were evaluated through self-reported questionnaires included in the RDC/TMD. The following variables were calculated:

1. Depression and vegetative symptoms level (Dep) on a scale of 0 to 4 (ranging from 0, not at all, to 4, extremely). On the basis of their responses, patients were scored as normal, moderately depressed, or severely depressed, according to the index of the RDC/TMD.
2. Somatization (Som) and nonpain somatization (NPSom). The former represented nonspecific physical symptoms, including pain items, and the latter represented nonspecific physical symptoms with pain items excluded. Som and NPSom were recorded on scales of 0 to 4 (ranging from 0, not at all, to 4, extremely). On the basis of their responses, patients were scored on 1 of the following categories: normal, moderate, or severe according to the index of the RDC/TMD.
3. Chronic pain severity (CPS) was scored according to the RDC/TMD on a scale of 0 to 4 (0, no TMD pain in the prior 6 months; grades 1 to 2, low disability; grades 3 to 4, high disability).

Treatment

Patients were informed of their condition and received an explanation about the fluctuating nature of their disorder and about the possibility that in some cases the mere cessation of diurnal habits (parafunctions) is sufficient to solve the problem. Patients were advised about their diet and received recommendations concerning increased awareness of their parafunctions. Treatment protocol included 5 sessions during a period of 49 days (S0, S1, S2, S3, and S4, as specified later).

All patients gave their informed consent to participate in the study at the initial session (S0). Patients were allocated to 1 of the 3 possible age-matched treatment groups in a proportion of 4:4:3 according to an age-matched protocol. The initial allocation of patients to the different study groups was 16 in the hypnosis (Hyp) group, 16 in the occlusal splint (OA) group, and 12 in the minimal treatment (MT) group. At the next session (S1, actual treatment) several patients (Hyp, n = 1; OA, n = 1; MT, n = 2) had reconsidered their consent and were excluded from the study.

Group 1: Hyp (n = 15; age range, 21 to 49 years; mean, 31.0 years). The purpose of treatment was to teach the patients to perform progressive muscle relaxation and self-hypnosis to control muscular and emotional tension. The technique was directed specifically to relaxation of the facial musculature and was carried out by a senior faculty member (E.W.) licensed in the field of medical hypnosis from the Ministry of Health, State of Israel.

Group 2: OA (n = 15; age range, 16 to 45 years; mean, 30.9 years). Patients received occlusal appliances adjusted by expert clinicians of the Department of Occlusion and Behavioral Sciences. The splints were full-coverage, hard acrylic appliances constructed to fit the maxillary arch. The occlusal appliances were adjusted to fulfill the static and dynamic rules of occlusion and included simultaneous occlusal contacts on all opposing supporting cusps and construction of anterior and lateral canine guidance.[12]

Group 3: MT (n = 10; age range, 22 to 42 years; mean, 28.1 years) Treatment protocol included 5 sessions with a senior faculty member (E.W.). During each session the patient's situation was discussed, and recommendations were given concerning parafunctional activities, diet, and so on. No further active treatment was provided to this group. Explanations and support were similar to those provided to groups 1 and 2 during their active treatment.

Treatment protocol

Session 0 (S0): Initial session. All patients underwent an admission protocol that included clinical evaluation and completing the RDC/TMD questionnaire, as described above. Patients signed an informed consent form and were then allocated to 1 of the treatment groups. Further treatment was carried out according to the specific protocol of each group.

GROUP 1 (Hyp)

1. Explanation about medical condition, the fluctuating nature of the disorder, the planned treatment protocol, and recommendations concerning parafunctional activities, diet, and so forth.
2. Completing a questionnaire concerning patient's attitude toward hypnosis.

GROUP 2 (OA)

1. Explanation about medical condition, the fluctuating nature of the disorder, the planned treatment protocol, and recommendations concerning parafunctional activities, diet, and so forth.
2. Alginate impression and occlusal bite registration.

GROUP 3 (MT). Explanation about medical condition, the fluctuating nature of the disorder, the planned treatment protocol, and recommendations concerning parafunctional activities, diet, and so on.

Session 1 (S1), day 7. **GROUP 1 (HYP).** Patients were instructed on how to induce relaxation and self-hypnosis. They were requested to perform the procedure 3 times a day (morning, evening, and night just before sleep).

GROUP 2 (OA). Adaptation and adjustment of the occlusal appliance. Patients were instructed to wear the appliance during sleep.

GROUP 3 (MT). Report about patient's condition and support (no active treatment).

Session 2 (S2), day 21. **GROUP 1 (HYP).** Patients discussed their experience with the hypnotic procedure. A full hypnosis session was performed and recorded. An individual relaxation audiotape containing suggestions preferred by the patient was prepared. All tapes included the posthypnotic suggestion "muscles will be relaxed and painless." Patients were instructed to use the tape as an aid for relaxation and self-hypnosis twice a day. Because the tape ended with wakening suggestions, patients were instructed not to use the tape at night but to practice a self-hypnotic procedure that will lead to sleep.

GROUP 2 (OA). Report about patient's condition and occlusal readjustment of appliance.

GROUP 3 (MT). Report about patient's condition (no active treatment).

Session 3 (S3), day 35. **GROUP 1 (HYP).** Patients reported their condition and discussed their needs with the operator. The individual relaxation audiotape was adjusted according to the patient's needs. A full hypnosis session was carried out.

GROUP 2 (OA). Patients reported their condition and discussed their needs with the operator. Occlusal readjustment of the appliance was performed as needed.

GROUP 3 (MT). Report about patient's condition (no active treatment).

Session 4 (S4), day 49. **GROUPS 1, 2, AND 3.**

1. All patients were requested to complete questionnaires referring to the following parameters: mean severity of pain during the week before end of treatment on VAS (present pain at S4, PresP4) and worst pain experienced during the treatment period on VAS (maximal pain at S4, MaxP4).
2. All patients were clinically evaluated by the same clinician who performed initial evaluations at S0 (A.G.). The clinician was blinded regarding the patient's group (Hyp, OA, or MT). All clinical variables examined at the beginning of the study (S0) were rechecked as follows: sensitivity to manual palpation of the masticatory muscles (MS4, TS4, SMS4) and range of mouth-opening in millimeters (AMO4, PMO4, DAP4).

Analysis of variance (ANOVA) followed by Tukey studentized range method for multiple comparisons was used to analyze differences between study groups (Hyp, OA, and MT).

RESULTS

Groups compared at baseline (S0)

No significant differences were found among the 3 study groups at baseline with respect to age, sex (all patients were female), or any of the Axis I or Axis II characteristics, according to the RDC/TMD (Tables I and II).

Table I. Patient signs and symptoms before treatment (S0)

	Hyp	*OA*	*MT*
PresP	60.8 ± 4.6	63.07 ± 6.2	53.1 ± 6.7
MaxP	73.8 ± 5.0	78.2 ± 4.9	73.4 ± 6.8
AMO	45.4 ± 1.6	40.0 ± 2.5	46.4 ± 1.1
PMO	49.8 ± 1.7	46.53 ± 1.9	50.50 ± 1.2
DAP	4.20 ± 0.63	6.53 ± 1.1	4.10 ± 0.57
MS	2.1 ± 0.1	2.32 ± 0.1	2.07 ± 0.2
TS	1.87 ± 0.2	1.47 ± 0.2	1.35 ± 0.2
SMS	1.98 ± 0.14	1.89 ± 0.1	1.71 ± 0.17

No significant differences were apparent between groups in any of the reported parameters. Data are expressed as mean ± SEM.
Hyp, Hypnosis; *OA,* occlusal appliance; *MT,* minimal treatment; *PresP,* present pain; *MaxP,* maximal pain; *AMO,* active (voluntary) maximal mouth opening; *PMO,* passive (assisted) maximal mouth opening; *DAP,* difference between AMO and PMO; *MS,* mean masseter sensitivity to palpation; *TS,* mean temporalis sensitivity to palpation; *SMS,* mean superficial masticatory sensitivity to palpation.

Table II. Patient Axis II characteristics before treatment (S0)

	Hyp	*OA*	*MT*
Dep	0.69 ± 0.11	0.55 ± 0.09	0.80 ± 0.16
Som	0.73 ± 0.10	0.81 ± 0.14	0.93 ± 0.25
NPSom	0.74 ± 0.13	0.64 ± 0.16	0.67 ± 0.21
CPS	1.87 ± 0.19	1.93 ± 0.12	1.80 ± 0.13

No significant differences were apparent between groups in any of the reported parameters. Data are expressed as mean ± SEM.
Dep, Depression; *Som,* somatization; *NPSom,* nonpain somatization; *CPS,* chronic pain severity.

The subjective report of pain (PresP, MaxP) presented by patients was rather high, and there was also a relatively high muscle sensitivity to palpation. AMO and PMO were within the normal range.

All patients were scored as having moderate depression and moderate measure of nonspecific symptoms. Patient mean score of graded CPS was 1.87 (SEM, 0.09), meaning that most patients (77.5%) had interferences with activities specifically related to mandibular function (grade 2, low disability–high intensity).

Effect of treatment

To evaluate the effect of treatment in each group, a difference (Δ) was calculated, which represented the change that occurred in the relevant variable posttreatment compared with pretreatment (Table III).

ANOVA showed significant differences among groups with regard to the following variables: ΔPresP ($P < .05$), ΔMaxP ($P < .05$), ΔMS ($P < .0001$), and ΔSMS ($P < .005$). Both active treatment modes (hypnorelaxation and occlusal appliance) were more effective than minimal treatment with regard to masseter sensitivity (ΔMS, Hyp vs MT, $P < .01$; OA vs MT, $P < .05$) and superficial mean muscle sensitivity to palpation (ΔSMS, Hyp vs MT, $P < .01$; OA vs MT, $P < .05$), according to Tukey studentized range method for multiple comparisons. The grade of significance of hypnorelaxation was greater than that of occlusal appliance in this respect (significance level of 1% vs 5%, accordingly).

Only hypnorelaxation (but not occlusal appliance) was significantly more effective than minimal treatment with regard to present pain (ΔPresP) and maximal pain (ΔMaxP) (Hyp vs MT, $P < .01$ for both comparisons).

No significant differences between groups were apparent with regard to sensitivity to palpation of the temporalis and to the range of mouth opening (ΔTS, ΔAMO, ΔPMO, ΔDAP).

DISCUSSION

The literature on the effect of hypnorelaxation on masticatory orofacial pain is scarce and mostly anecdotal.[16-21,25] Several clinicians have described the role of hypnosis in the treatment of bruxism and TMD,[22,26] but the literature lacks controlled comparative studies that evaluate the effect of hypnosis compared to other accepted modes of treatment (eg, occlusal appliance) or to the mere effect of time.

In a relatively rare study, Okeson et al[27] compared the efficacy of occlusal appliance therapy with that of the hypnorelaxation procedure and found the latter to be relatively ineffective. In their study, the hypnotic procedure was not performed by trained therapists but with the use of only a recorded tape, without supplying patients with formal training in relaxation or further instruction. The authors' main self-criticism of the study was that relaxation training should be rendered by a trained health professional during more frequent sessions for longer periods to be effective.

Recently, Simon and Lewis[23] reported that medical hypnosis can be effective in the treatment of TMD in terms of reducing both symptoms and medical use. However, because there was no separate control group, the study should be considered as an open trial and conclusions should be drawn accordingly.

In the present study, the efficacy of 2 active treatment modalities for MPD (hypnorelaxation and occlusal appliance) was compared to minimal treatment during a similar time period. Both active methods were more effective than time combined with mere information and emotional support (minimal treatment) in alleviating muscle sensitivity to palpation in MPD. Apparently, the reduced muscle sensitivity to palpation was due to the treatment subjects received, with hypnorelaxation exhibiting an even more pronounced effect than the occlusal appliance. As to patients' self-report of present and maximal pain (ΔPresP, ΔMaxP),

Table III. Differences (Δ) in signs and symptoms after treatment (S4)

	Hyp	*OA*	*MT*	P *value (ANOVA)*	*Outcome between groups*
ΔPresP	34.6 ± 5.3	30.13 ± 8.1	6.6 ± 6.8	.027	OA = MT Hyp > MT* OA = Hyp
ΔMaxP	37.33 ± 6.0	25.47 ± 7.7	9.00 ± 5.8	.03	OA = MT Hyp > MT* OA = Hyp
ΔAMO	–4.13 ± 0.9	–6.13 ± 1.6	–1.5 ± 0.8	NS	—
ΔPMO	–1.5 ± 0.3	–3.00 ± 0.8	–0.7 ± 0.7	NS	—
ΔDAP	2.4 ± 0.7	3.13 ± 1.0	0.5 ± 0.5	NS	—
ΔMS	1.12 ± 0.1	0.92 ± 0.2	–0.12 ± 0.12	<.0001	OA > MT** Hyp > MT** OA = Hyp
ΔTS	0.93 ± 0.2	0.63 ± 0.2	0.15 ± 0.2	NS	—
ΔSMS	1.025 ± 0.14	0.775 ± 0.21	0.013 ± 0.13	.0017	OA > MT* Hyp > MT** OA = Hyp

Data are expressed as mean ± SEM.
NS, Not significant.
Grade of significance according to Tukey studentized range method for multiple comparisons: **1% level; *5% level.

only hypnorelaxation (but not occlusal appliance) was more beneficial than time combined with support. The lack of significant improvement in the range of mouth opening in any of the groups (ΔAMO, ΔPMO, ΔDAP) was probably because patients in all 3 groups exhibited quite normal mouth-opening ranges at baseline (S0).

To date there have been only a few controlled clinical trials with hypnosis and imagery for pain control with continuous pain.[28] For example, Spiegel and Bloom[29] randomly assigned patients with breast cancer to 3 groups: no treatment, support group, and support group with hypnosis. Patients in the hypnosis group reported the lowest pain levels at 1 year. To the best of our knowledge, no such studies exist regarding the efficacy of hypnosis in the treatment of MPD.

Unfortunately, in the present study the number of patients in each group was relatively small. Recruitment of adequate patients for clinical studies is extremely difficult, a fact that is reinforced when patients have chronic pain, such as those who participated in our study. Also, other clinical studies in this field report results collected from similar size groups.[27,30] In spite of the group size, a significant advantage was shown in both active treatment groups (OA, Hyp) as compared with the minimal treatment group, with hypnorelaxation showing an even more significant effect regarding some of the subjective pain parameters.

Recently, a new model (the pain-adaptation model) of Lund et al[31] replaced the old classic "vicious cycle" hypothesis with regard to the etiology of MPD.[11,32] According to this model, pain causes muscle movement limitation by voluntary agonist restriction of movement to the range-free range and by reflex co-contraction of antagonist muscles to reduce speed and amplitude of movement. In the present study the target of the treatment was pain rather than muscle tension. No hypnotic or posthypnotic suggestions aimed at reducing possible bruxist activity were included. Hypnorelaxation was used only to induce muscle relaxation.

Although pain effect and pain sensation are reduced in hypnosis, it has been suggested that hypnosis may exert a more powerful reduction of pain effect than pain sensation.[33] Our results confirmed this notion in that only hypnosis, but not occlusal appliance, led to a significant reduction in the patients' subjective perception of pain when compared to minimal treatment.

It is important to point out that all patients who participated in the study (in the 3 treatment groups) were initially a grade 2 on the chronic pain scale and had moderate depression and moderate measure of nonspecific symptoms as defined by the RCD/TMD. In the study, only patients in the hypnosis group were provided with a therapeutic tool that had the potential to reduce emotional stress, which, in turn, could lead to reduced overall tension and possible reduction of perceived pain levels. MPD patients usually report greater anxiety and feeling of muscle tension compared with healthy control subjects.[34] Thus, the hypnorelaxation protocol might have caused a reduction in the patients' general anxiety and, as a result, improved their feeling of well-being and decreased their subjective perception of pain. Because the clinical follow-up of patients was relatively short (about 2 months), no attempt was made to reclassify the patients according

to RDC/TMD Axis II at the end of treatment. Further follow-up of the patients' condition during a longer time period should supply more data to evaluate possible long-term changes in psychological status over time.

Biobehavioral interventions, including hypnosis, are considered safe, reversible, and noninvasive and emphasize strategies under patient control.[15] Hypnorelaxation has no side effects, is not very time consuming or cost consuming, and is available to patients whenever they need it. Therefore, it is an efficient, safe, and easily available tool in the treatment of MPD. It is recommended to incorporate hypnorelaxation in the multidisciplinary treatment modality for patients with myofascial pain.

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