

Self-Care Behaviors Associated with Myofascial Temporomandibular Disorder Pain

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Aims: To document the frequency of self-care in a clinical sample of patients with myofascial temporomandibular disorder (TMD) pain; report the perceived relief and control of pain for each of the self-care behaviors; and to test for associations between the frequency and efficacy of each self-care behavior and pain, depression and sleep quality, as assessed during a clinical visit, and to determine whether the frequency was associated with changes in pain intensity, depression, and sleep quality 30 days later. **Methods:** The sample consisted of 99 female and 27 male myofascial TMD pain patients who were participants in a multidisciplinary facial pain evaluation program. The subjects participated in a structured interview during a clinical visit and a follow-up telephone interview 30 days later. The interviews included questions about self-care, including resting, relaxation techniques, massage, hot and/or cold packs, home remedies, stretching or exercise, herbal remedies, and the use of vitamins or nutritional supplements for pain. **Results:** The passive self-care behaviors, such as resting when experiencing pain (66%) and relaxation techniques (62%), were the most commonly used. Patients reported that hot or cold packs (5.3, 0-to-10 scale) and massage (4.7) provided the greatest relief from pain, whereas resting (4.9), relaxation (4.8), and massage (4.8) resulted in the greatest ability to control pain. The most striking finding was that initial levels of pain or change in pain were not consistently associated with self-care use; however, psychosocial outcomes of depression and sleep quality were associated with self-care frequency and reported efficacy and improved in relation to patient-reported self-care frequency. **Conclusion:** Since people with chronic myofascial TMD pain engage in a range of pain self-care strategies, clinicians need to discuss self-care with patients regularly. J OROFAC PAIN 2007;21: 194-202

Key words: depression, massage, myofascial pain, relaxation, self-care, sleep

Health care typically refers to the treatment of conditions by professional health-care providers. However, individuals with pain engage in many other health-care-related behaviors not directly tied to the formal health-care system.^{1,2} Self-care has been defined as a process by which the layperson functions on his or her own behalf to promote health, prevent illness, and detect and treat disease when it occurs.³ In the context of pain, these behaviors can include the use of prescription or over-the-counter medication, self-massage, resting, practicing

relaxation techniques, strengthening and stretching exercises, application of cold or heat, herbal medicine, megavitamins, or the use of various folk remedies. Stoller et al⁴ assessed the patterns of self-care in a sample of community-dwelling older adults. Of the 26 different symptoms assessed, 4 involved pain (chest pain, stomach pain, headache, and muscle/joint pain). The authors found that more than half of respondents experiencing painful symptoms engaged exclusively in self-management of their symptoms.

Several studies using community sampling techniques have reported on a range of chronic pain-related health behaviors, including self-care. For example, Andersson et al⁵ assessed a range of pain-related health behaviors in a sample from southern Sweden that had experienced pain for greater than 3 months. The authors found that 58% had practiced some form of nonpharmacologic self-care in the past 3 months; the most common were heat (34%), rest (32%), and physical exercise (21%). Data collected from an Australian sample indicated that 34% had used active behavioral self-management (exercise/postural) and 60% had used strategies classified as passive, such as rest, massage, or hot or cold packs.⁶ Riley et al⁷ reported that self-care for the control of orofacial pain is also common among older adults in the United States. Approximately 33% of the sample had used heat and herbal treatments for jaw joint and face pain. They also found that ingestion of alcoholic beverages to self-medicate ranged from 12% to 25%, depending on the painful oral symptom.

Self-care can be considered among the complementary and alternative medicine (CAM) techniques that are used for treating pain.^{8,9} Many CAM modalities are usually administered by a practitioner, but others can be self-administered. However, many studies reporting CAM do not make a distinction between these 2 modalities. Using a telephone survey that reported rates of CAM therapies among respondents who reported back or neck pain, Wolsko et al¹⁰ found that the most commonly used self-care behaviors were massage (20%) and relaxation techniques (14%). In a sample of health maintenance organization (HMO) members with chronic low back pain, Sherman et al¹¹ reported that massage was used by 38% of those surveyed. Among subjects who agreed to participate in a larger study on the effectiveness of CAM for temporomandibular disorders (TMD), DeBar et al¹² found that 36% of the respondents had used some form of CAM. Of those that could be self-administered, massage was the most common (24%), followed by biofeed-

back/visual imagery (14%) and over-the-counter herbal supplements (8%). No time period for use was specified. None of the 3 aforementioned studies distinguished between professional or at-home use of massage. Another study reported the lifetime use of CAM among patients receiving treatment at a university facial pain clinic.¹³ It was found that 22.2% of the patients had received some CAM treatment and the most common treatments were relaxation therapy (12.7%) and chiropractic care (9.5%). The patients were asked only about treatments provided by a caregiver. More than half of the subjects had not sought prior care for TMD,¹³ which suggests that the patients in this sample were in the early stages of TMD. Therefore, rates of self-care for patients seeking care for orofacial pain have not been accurately documented.

Few of the studies reviewed here have considered how effective these modalities are for managing pain or whether those with certain levels of pain are more likely to find them useful (ie, which treatments are more commonly used for mild pain compared with severe pain).

Therefore, the present study had several aims:

1. To document the frequency of self-care behaviors in a clinical sample of patients with myofascial TMD pain
2. To report the perceived relief from pain, the control of pain for each of the self-care behaviors, and the degree to which patients viewed each as an acceptable treatment for their pain condition
3. To test for associations between the frequency and efficacy of each self-care behavior and pain (intensity and duration), depression, and sleep quality during a clinical visit, and to determine whether the frequency was associated with changes in pain intensity, depression, and sleep quality 30 days later.

Materials and Methods

Subjects

The sample consisted of 126 orofacial pain patients (99 females, 27 males) evaluated at the University of Florida College of Dentistry Parker Mahan Facial Pain Center. Patients were participants in a multidisciplinary facial pain evaluation program. All patients were new referrals and, at the time of the baseline assessment, had not been under treatment at the facial pain center. To be

included in the study, patients were required to meet the Research Diagnostic Criteria for TMD (RDC/TMD) for an Axis I Group I diagnosis (myofascial TMD) at the time of evaluation and to have pain greater than 3 months in duration.¹⁴ All subjects were given a mouth/bite splint in addition to a range of other treatment recommendations following the facial pain center evaluation. The specific treatments received are unknown, as most patients were followed by the referring dentist or physician. A previous study from this clinic that documented treatment recommendations and compliance found that patients subsequently received these follow-up treatments: medication changes, 47%; therapeutic injections, 20%; physical therapy, 39%; or psychological counseling, 37%.¹⁵

Procedure

The study procedures were approved by the University of Florida Institutional Review Board. Subjects were recruited by the attending dentist in the facial pain clinic. After receiving a description of the study and giving their verbal consent, patients participated in a 20-minute structured interview. The interview was administered by a research assistant who was not a member of the treatment team. Approximately 30 days later the same research assistant contacted each subject and conducted a follow-up interview, which included an assessment of pain, depression, and sleep quality.

Measures

Pain. At baseline and follow-up, pain was assessed with a verbal 0-to-10 rating scale of the usual pain intensity experienced over the past week with 0 equal to no pain and 10 equal to the most intense pain imaginable.

Pittsburgh Sleep Quality Index (PSQI). The PSQI is a self-report questionnaire used to assess sleep quality and quantity. Its subjective global sleep quality scale was used in this study.^{16,17} This scale yields scores from 0 to 21; a score greater than 6 is considered an indicator of clinically relevant sleep disturbance. A Cronbach's alpha of 0.81 has been reported for the global sleep quality scale.¹⁸ The PSQI was administered at baseline and follow-up.

Beck Depression Inventory (BDI). The BDI is a widely recognized measure of depression and is used to assess the extent to which an individual currently reports behaviors, thoughts, or affective symptoms commonly associated with depression.¹⁹ The BDI was administered at baseline and follow-up.

McGill Pain Questionnaire (MPQ). The MPQ is a self-report questionnaire which consists of 20 groups of single-word pain descriptors listed in order of increasing intensity. The sum of the rank values for each descriptor based on its position in the word set provides a total score and is an overall index of pain. The MPQ has been shown to have excellent validity and reliability.²⁰

Self-Care Items. Eight self-care techniques were assessed. The following formats were used to question the patient about each technique:

- How acceptable to you personally is it for (you to) _____, on a scale of 0 to 10, where 0 is not acceptable and 10 is completely acceptable? (Acceptability was not asked for resting)
- On how many days during the past week did you (use) _____ for pain?
- How much relief from pain did _____ give you, on a scale of 0 to 10, where 0 is no relief from pain and 10 is complete relief from pain?
- How much control over pain did _____ give you, on a scale of 0 to 10, where 0 is no control over pain and 10 is complete control over pain?

Each question was asked for each of the following 8 behaviors. Did you:

- Stop your activities and rest because of the pain
- Use a relaxation technique for pain
- Massage the painful area (or ask a family member to do this)
- Apply hot and/or cold packs
- Use a home remedy for pain
- Stretch or exercise for pain
- Use an herbal remedy for pain
- Take vitamins or nutritional supplements for pain

For relaxation and herbal remedies subjects were asked for the specific relaxation techniques and herbal remedies used.

Statistical Methods

Descriptive statistics were calculated for each of the self-care behaviors. Multiple linear regression models were used to test the strength of the relationships between baseline pain, depression, and sleep quality as the independent variables and the perceived efficacy associated with each of the pain self-care behaviors as the dependent variable. The baseline frequencies of the self-care behaviors were also tested as predictors of changes in pain, depression, and sleep quality variables from the baseline

Table 1 Frequency of Each Self-care Behavior

Self-care behavior	None		1 to 2 times per wk		3 to 4 times per wk		5 times or more per wk	
	n	%	n	%	n	%	n	%
Resting	43	34	30	24	16	13	37	29
Relaxation	48	38	24	19	24	19	30	24
Massage	40	32	37	29	24	19	25	20
Hot/cold packs	57	45	24	19	13	10	32	25
Home remedies	91	72	12	10	10	8	13	10
Stretching/exercises	67	54	13	10	17	13	29	23
Herbal remedies	106	84	5	4	5	4	10	8
Dietary supplements	106	84	4	3	5	4	11	9

n = 126. Rows may not sum to 100% because of rounding to the nearest 1%.

clinical visit to the telephone interview in a series of prospective regression models. As the correlations between pain relief and control ranged from 0.86 to 0.69, only pain relief was used as the dependent variable in these regression models. Herbal remedies and dietary supplements were not tested in the regression models because of the small sample size. Age, sex, duration of pain, and secondary diagnosis were entered in the first step of each regression model as control variables. To account for secondary diagnosis, separate dummy-coded variables for myofascial pain with joint involvement, myofascial pain with a vascular component, and myofascial pain with a neurologic component were created using myofascial pain only as the comparison group. Sex was also reported as a variable in the regression tables because the pain literature suggests significant sex differences in orofacial pain.²¹ Females were coded 0 and males 1.

A longitudinal design was employed in testing the final aim and used baseline behaviors to predict future changes in clinical outcomes to eliminate the issue of reciprocal causality associated with cross-sectional data. Many other factors not included in the model may also have influenced the subsequent pain outcomes. One is the frequency of each of the self-care behaviors reported at the 30-day follow-up. To address this confounding factor Spearman's rank correlation coefficients were calculated for baseline and follow-up self-care frequency. Values ranged from 0.66 to 0.80, suggesting that self-care frequency was similar for most subjects during both time periods.

Results

The duration of pain in the sample ranged from 3 to 360 months, with a mean of 48.3 months (SD = 66.3) and a median of 24 months. At baseline, the mean BDI score was 12.1 (SD = 9.8), the mean PSQI score was 17.8 (SD = 6.9), the mean MPQ score was 26.9 (SD = 15.4), and the mean pain rating for usual pain for the past week was 5.9 (SD = 2.5) on a verbal numeric rating scale of 0 to 10. Primary/secondary diagnoses were muscle pain with a vascular component (23%, n = 29), muscular pain only (29%, n = 37), muscle and joint pain (31%, n = 39), and muscle pain with a neurologic component (17%, n = 21). Seventy-one percent of the patients were married. Their age ranged from 18 to 79 years, with a mean age of 40.9 years (SD = 15.1). They had a mean of 13.8 years (SD = 2.1) of formal education.

Frequency and Efficacy of Self-care Behaviors

Table 1 presents the reported frequency of each of the targeted self-care behaviors. Resting, relaxation, and massage were the most likely to be used, whereas herbal remedies and dietary supplements were least likely to be used. Resting, relaxation, and cold/hot packs were most often used 5 or more times per week. Fourteen percent of the sample did not endorse the use of any of the self-care treatments. The likelihoods of the use of specific relaxation techniques and herbal remedies are reported in Table 2.

Table 2 Use of Specific Relaxation Techniques and Herbal Remedies

	Frequency	
	n	%
Relaxation techniques reported (n = 78)		
Meditation/imagery based	24	31
Breathing	23	29
Reclining	19	24
Television	9	12
Music	6	8
Massage	5	7
Stretching	4	5
Prayer	4	5
Hot tea	4	5
Herbal remedies reported (n = 20)		
Drinking herbal tea	8	40
Echinacea	4	20
Ginkgo biloba	4	20
Oil of clove	3	15
Bark extract	3	15
Garlic	2	8
Ginger root	2	8

Table 4 Regression Models Predicting Frequency of Self-care Behaviors from Baseline Pain Outcomes

	β	SE	Sig
Frequency of resting			
Sex	-1.082	.528	.043
Usual pain	.439	.098	< .001
Depression	.371	.077	< .001
Model $R^2 = .42$			
Frequency of relaxation exercises			
Sex	-2.015	.569	< .001
Depression	.302	.083	< .001
Model $R^2 = .29$			
Frequency of massage			
Sex	-1.392	.661	.037
Model $R^2 = .11$			
Frequency of hot/cold packs			
Sex	-1.458	.612	.019
Pain duration	.009	.003	.048
Sleep quality	.310	.101	.003
Model $R^2 = .23$			
Frequency of stretching/exercises			
Sex	-1.546	.764	.046
Sleep quality	-.430	.122	.001
Model $R^2 = .18$			

n = 126. Sig = statistical significance value.

The mean ratings for relief from pain, control over pain, and ratings of acceptability as a treatment for pain for each of the self-care behaviors are presented in Table 3. Hot/cold packs and massage were rated as providing the most pain relief, whereas rest, relaxation, and massage were associated with the highest ratings of pain control.

Table 3 Ratings of Pain Control and Pain Relief for Each Self-care Behavior

Self-care behavior	Pain relief		Pain control		Acceptability	
	Mean	SD	Mean	SD	Mean	SD
Rest (n = 83)	3.8	2.7	4.9	2.8	–	–
Relaxation (n = 78)	3.9	2.3	4.8	2.4	5.8	3.2
Massage (n = 86)	4.7	2.8	4.8	3.0	7.8	3.2
Hot/cold packs (n = 69)	5.3	1.9	3.9	2.5	6.6	3.0
Home remedy (n = 35)	4.0	2.5	3.5	2.6	5.2	4.0
Stretching/exercises (n = 59)	4.5	2.5	2.8	2.1	6.4	2.4
Herbal remedies (n = 20)	3.9	3.2	3.8	2.4	5.0	3.8
Dietary supplements (n = 20)	4.1	2.1	3.0	3.4	5.3	3.9

Ratings based on a 0-to-10 numeric rating scale. Acceptability was asked of all 126 subjects. Subjects were not questioned about the acceptability of resting.

Table 5 Regression Models Predicting Efficacy of Self-care Behaviors from Baseline Pain Outcomes

	β	SE	Sig
Relief from resting (n = 83)			
Sex	2.104	.933	.027
Sleep quality	.691	.119	< .001
Model $R^2 = .51$			
Relief from relaxation exercises (n = 78)			
Sex	2.393	.763	.003
Pain duration	.005	.002	.022
Sleep quality	.261	.089	.004
Model $R^2 = .54$			
Relief from massage (n = 86)			
Sleep quality	.376	.091	< .001
Model $R^2 = .26$			
Relief from hot/cold packs (n = 69)			
Pain duration	.007	.003	.031
Sleep quality	.297	.140	.039
Model $R^2 = .39$			
Relief from stretching/exercises (n = 59)			
Sex	-1.825	.874	.041
Pain duration	-.013	.004	.004
Depressed	.535	.139	< .001
Sleep quality	.318	.141	.048
Model $R^2 = .31$			

Massage received the highest acceptability ratings of the self-care behaviors.

Regression coefficients for significant predictors of self-care frequency and efficacy for each self-care behavior are presented in Tables 4 and 5, respectively. Higher levels of depression were associated with greater frequency of resting ($\beta = .371$)

and relaxing ($\beta = .302$). Poor sleep quality was associated with increased use of hot/cold packs ($\beta = .310$) but decreased use of stretching/exercises ($\beta = -.430$). Patients with higher usual pain rested more frequently than those with low levels of pain ($\beta = .439$). Pain duration was positively associated with frequency of use of hot/cold packs ($\beta = .009$). Women were more likely than men to use self-care for all 5 of the self-care behaviors tested (resting, relaxation, massage, hot/cold packs, and stretching/exercises).

Better sleep quality at the baseline clinical visit was associated with higher ratings of relief from pain for resting ($\beta = .691$), relaxation ($\beta = .261$), hot/cold packs ($\beta = .297$), and stretching/exercises ($\beta = .318$). Pain duration was also a significant predictor of pain relief. Patients with longer pain duration reported greater relief from relaxation exercises ($\beta = .005$) and hot/cold packs ($\beta = .007$), whereas those with shorter duration of pain reported greater relief from stretching/exercises ($\beta = -.013$). Women reported more relief from pain than men using stretching/exercises ($\beta = -1.825$) but less relief than men for relaxation techniques ($\beta = 2.393$) or resting ($\beta = 2.104$).

Frequency of Self-care and Changes in Pain Outcomes

The last aim was to determine whether self-care frequency as reported at the clinical evaluation was associated with changes in pain intensity, depression, or sleep quality in the 30 days following the clinical visit. Certainly, patients may be expected to improve following a clinical visit, whether from the efficacy of treatment or the natural time-course of their symptoms. To adjust for initial differences in clinical symptoms, residualized change scores for pain intensity, depression, and sleep quality were calculated by subtracting predicted follow-up scores from observed scores. The predicted score was computed by regressing baseline values on scores from the follow-up interview. Residualized change scores are preferable to simple change scores because they eliminate autocorrelated error and regression to the mean effects.²²

Regression coefficients for the frequency of the self-care methods as predictors of changes in pain, depression, and sleep quality are presented in Table 6. Changes in each of the outcomes were modestly correlated (pain and depression, $r = .26$; pain and sleep quality, $r = -.23$; and depression and sleep quality, $r = -.23$). Decreased pain was predicted by increased number of days resting ($\beta = -.127$), with the full model resulting in an R^2 of

Table 6 Regression Models Predicting Residualized Change in Pain Outcomes From Frequency of Self-care Behaviors at Baseline

	β	SE	Sig
Change in pain			
Days rested	-.127	.040	.012
Model $R^2 = .21$			
Change in depression			
Duration of pain	-.003	.001	.037
Days stretched/exercised	-.087	.017	<.001
Days relaxed	-.052	.017	.017
Model $R^2 = .45$			
Change in sleep quality			
Sex	.664	.250	.024
Duration of pain	.003	.001	.001
Days rested	-.049	.017	.009
Days used massage	-.052	.016	.017
Days used relaxation exercises	-.070	.015	<.001
Model $R^2 = .49$			

Note: A negative value for symptom change represents a reduction in that symptom; therefore, a negative β reflects a relationship where increased self-care predicts a reduction in pain or pain impact. The dependent variables are residualized change scores that eliminate autocorrelated error and regression to the mean effects ($n = 126$).

.21. The number of days per week where stretching/exercises were used was the strongest predictor of reduced depression ($\beta = -.087$), followed by the frequency of days relaxed ($\beta = -.052$). Greater pain duration was also associated with reduced depression ($\beta = -.003$) with the full model resulting in an R^2 of .45. Improved sleep quality was associated with 3 of the self-care behaviors (days using relaxation, $\beta = -.070$; massage, $\beta = -.052$; and days rested, $\beta = -.049$). Male sex and shorter pain duration were also associated with better sleep quality, with an R^2 of .49 for the full model.

Discussion

This study examined the frequency and efficacy of a range of self-care behaviors and, in the case of massage, family- or friend-administered approaches in a sample of patients with chronic myofascial pain. The association between self-care and important patients, outcomes of pain intensity, depression, and sleep quality was also examined. This project focused on patient-administered and layperson-administered therapies rather than those provided by health-care professionals. Pain-

related self-care was a common practice with approximately two thirds of the sample; these subjects used massage, a relaxation technique, or resting for pain at least once a week. This would indicate that patients in this clinical sample were very active in self-management of their pain. These percentages are higher than those previously reported for orofacial pain patients by DeBar et al¹² and Raphael et al.¹³

In general, massage has been the most commonly reported nonmedical pain management strategy among patient samples, with rates ranging from 38% in a primary care setting for back pain¹¹ to 24% for health maintenance organization (HMO) members with orofacial pain.¹² Among population-based studies, a postal survey in Finland reported that 52% of persons that had experienced pain once or more in the past week had used physical exercise as a pain management strategy, while 23% reported receiving a massage from a friend or family member.²³ Andersson et al⁵ found that relaxing was the most prevalent strategy; it was used for chronic pain by 32% of their community sample.

Acceptability of Self-care

Patients rated all modalities as acceptable, with massage receiving the highest acceptability rating. Several studies have suggested that pain patients are most enthusiastic about massage compared to other therapies. The use of massage is also on the rise. For example, Eisenberg et al²⁴ found that 11% of the US population had used massage as a therapy for various medical conditions and that its use had increased more than 60% in a 7-year period. Back pain patients participating in a randomized clinical trial indicated that, given the choice, they would choose massage over chiropractic or acupuncture by a factor of greater than 2 to 1.²⁵ The present study further reinforces the notion that pain patients are amenable to being involved in the management of their pain. This and other studies indicate that many persons with chronic pain develop a range of pain management strategies,²⁶ but it is unclear whether clinicians regularly discuss self-care with patients. None of the ratings of acceptability were correlated with the measure of pain, indicating that self-care was not preferred by those with lower or higher levels of pain.

Frequency of Self-care

Patients with higher levels of pain rested more frequently than those with less pain. However, the

frequencies of the other self-care behaviors were not associated with baseline pain. In a population-based study, Andersson et al⁵ reported that self-care was more likely to be practiced by persons with high pain intensity. By contrast, Turunen et al²³ did not find an association between pain intensity and physical exercise but did find a relationship with pain duration (those with greater chronicity used more relaxation). The multivariate analysis used in the present study revealed a positive relationship between pain duration and use of hot/cold packs but not the other measures of self-care frequency. Pain duration was associated with the efficacy of self-care, but the direction of the relationship differed across self-care behaviors.

The strongest relationships were found between self-care frequency and depression and sleep quality. Patients with the highest levels of depression rested and used relaxation techniques more days per week than patients with less depressive symptoms. Those reporting the poorest sleep quality were more likely to use hot/cold packs but less likely to engage in stretching and exercises. Other studies have reported mixed findings for an association between clinical symptoms and self-care. For example, DeBar et al¹² and Raphael et al¹³ did not find an association between CAM and TMD-related features, such as depression, well-being, and sleep. In a population-based sample, Blyth et al⁶ found that use of exercise/postural strategies was associated with less pain-related disability than were less passive techniques (eg, rest, hot/cold packs).

Efficacy of Self-care

During the structured interviews, patients were asked to rate both pain control and pain relief associated with the use of self-care. Both measures were highly correlated, and the mean ratings for each followed a consistent pattern. Techniques of hot/cold packs, massage, or stretching/exercises that involve manipulation of tissue provided the highest ratings of relief, whereas control appears to be more associated with arousal control strategies such as resting and relaxing. Massage, a treatment modality that manipulates tissue and provides some relaxation, was the only self-care behavior that was given a high rating for both relief and control. Studies have also reported massage by a trained therapist to be the most effective CAM treatment in dealing with chronic back pain.^{10,11}

It is logical that a patient's level of pain and related symptoms would be linked to the potential effectiveness of various self-care techniques. The pattern observed in the present study was that self-

care was most effective among those reporting poorer quality of sleep. Retrospective studies of TMD patients²⁷ and prospective studies of patients receiving knee surgery²⁸ have shown that disturbed sleep is associated with a negative outcome. To the authors' knowledge, the only other study that correlated helpfulness with pain impact was that of DeBar et al.¹² They reported that CAM therapies combined were not associated with pain or depression, but as in the present study, fewer sleep problems were found to be associated with rating self-care as very helpful.

Self-care Frequency and Changes in Pain Outcomes

This research team was unable to find any studies assessing self-care in which patients were followed to assess changes in their pain condition over time. In the current study, the most striking finding was that changes in pain were the least associated with the frequency of self-care use. Certainly fluctuations in chronic pain are related to many factors not measured in this study. However, the psychosocial outcomes of depression and sleep quality did improve in relation to patient-reported self-care frequency. The relationship between stretching and exercise and change in depression was the strongest. It is not clear whether the higher activity level associated with this self-care behavior played a role in subsequent patient improvement. Certainly therapy often involves planning of increased physical activity for depressed patients, and there is good evidence that physical exercise is a useful treatment for clinical and subclinical levels of depression.²⁹⁻³¹

That resting, relaxation, and massage, all self-care modalities that reduce arousal and acute stress, were associated with improvement in the quality of sleep suggest that arousal may contribute to the frequent report of sleep difficulty among orofacial pain patients.^{32,33} A recent study linking daily masticatory muscle tension and stress with TMD suggests a rationale for treatment involving arousal control that helps to reduce parafunctions and muscle tension.³⁴ It is possible that sleep improves because patients do not wake up with pain resulting from night-time parafunctional activity. It is also possible that a particular self-care modality interacts with 1 of the treatments patients received. An example could be rest and relaxation working synergistically with splint therapy to reduce the pain associated with inflamed masticatory muscles.

There are several methodologic issues that should be considered when interpreting these results. There may have been some overlap between self-care modalities such as resting, massage, and relaxation techniques or between home remedies and herbal supplements. Self-care frequency and the subjective measures of health are based on self-report and subject to an individual's interpretation. The specific reasons for treatment choices are unknown and may reflect the role of patients' choices of treatment as well as recommendations made by their dentists or physicians. Although associations were modeled between baseline self-care and changes in pain, depression, and sleep across time, other factors, including medications and/or other treatments, are likely to have influenced the observed changes in the outcomes at the 30-day follow-up interview. It is also unknown to what extent it is valid to draw longer-term conclusions on the relationship between the self-care and changes in pain, depression, and sleep quality. The sample included only chronic pain patients seeking care in a tertiary care specialty center, and self-care practices may differ among persons with acute myofascial pain who seek initial evaluation or community samples. In addition, other pain outcomes, such as physical functioning, were not tested.

Conclusions

This study found that passive self-care behaviors such as resting and relaxation techniques are used often by a large percentage of myofascial TMD patients, and clinicians need to discuss self-care with patients regularly. Patients found that hot or cold packs and massage provided the greatest relief from pain, whereas resting resulted in the greatest ability to control pain. Although patients rated self-care as effective in controlling their pain, reported self-care frequency was most highly associated with psychosocial outcomes of depression and sleep quality. Many patients with chronic myofascial pain have tried past medical/dental interventions without success, and it is possible that palliative self-care, when selected and performed appropriately, may have utility in controlling and reducing pain through improvement in depression and sleep quality. Certainly these relationships are complex, and better models of changes in clinical outcomes as a function of patients' health behaviors should be a focus of future research.

References

1. Stoller EP, Gilbert GH, Pyle MA, Duncan RP. Coping with tooth pain: A qualitative study of lay management strategies and professional consultation. *Spec Care Dentist* 2001;21:208–215.
2. Vallerand AH, Fouladbakhsh JM, Templin T. Self-treatment of pain in a rural area. *J Rural Health* 2004;20:166–172.
3. Segall A, Goldstein J. Exploring the correlates of self-provided health care behaviour. *Soc Sci Med* 1989;29:153–161.
4. Stoller EP, Forster LE, Portugal S. Self-care responses to symptoms by older people. A health diary study of illness behavior. *Med Care* 1993;31:24–42.
5. Andersson HI, Ejlerthsson G, Leden I, Schersten B. Impact of chronic pain on health care seeking, self care, and medication. Results from a population-based Swedish study. *J Epidemiol Community Health* 1999;53:503–509.
6. Blyth FM, March LM, Nicholas MK, Cousins MJ. Self-management of chronic pain: A population-based study. *Pain* 2005;113:285–292.
7. Riley JL III, Gilbert GH, Heft MW. Orofacial pain: Racial and sex differences among older adults. *J Public Health Dent* 2002;62:132–139.
8. Barnes PM, Powell-Griner E, McFann K, Nahin RL. Complementary and Alternative Medicine Use Among Adults: United States, 2002. Advance Data from Vital and Health Statistics; no. 343. Hyattsville, MD: National Center for Health Statistics, 2004.
9. Myers CD, White BA, Heft MW. A review of complementary and alternative medicine use for treating chronic facial pain. *J Am Dent Assoc* 2002;133:1189–1196.
10. Wolsko PM, Eisenberg DM, Davis RB, Kessler R, Phillips RS. Patterns and perceptions of care for treatment of back and neck pain: Results of a national survey. *Spine* 2003;28:292–297.
11. Sherman KJ, Cherkin DC, Connelly MT, et al. Complementary and alternative medical therapies for chronic low back pain: What treatments are patients willing to try? *BMC Complement Altern Med* 2004;4(1):9.
12. DeBar LL, Vuckovic N, Schneider J, Ritenbaugh C. Use of complementary and alternative medicine for temporomandibular disorders. *J Orofac Pain* 2003;17:224–236.
13. Raphael KG, Klausner JJ, Nayak S, Marbach JJ. Complementary and alternative therapy use by patients with myofascial temporomandibular disorders. *J Orofac Pain* 2003;17:36–41.
14. Dworkin SF, LeResche L. Research Diagnostic Criteria for Temporomandibular Disorders: Review, criteria, examinations and specifications, critique. *J Craniomandib Disord* 1992;6:301–355.
15. Riley JL III, Robinson ME, Wise EA, Campbell LC, Kashikar-Zuck S, Gremillion HA. Predicting treatment compliance following facial pain evaluation. *Cranio* 1999;17:9–16.
16. Backhaus J, Junghanns K, Broocks A, Riemann D, Hohagen F. Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *J Psychosom Res* 2002;53:737–740.
17. Buysse DJ, Reynolds CF III, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Res* 1989;28:193–213.
18. Beck SL, Schwartz AL, Towsley G, Dudley W, Barsevick A. Psychometric evaluation of the Pittsburgh Sleep Quality Index in cancer patients. *J Pain Symptom Manage* 2004;27:140–148.
19. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561–567.
20. Melzack R, Katz J. The McGill Pain Questionnaire: Appraisal and current status. In: Melzack R, Turk DC (eds). *Handbook of Pain Assessment*. New York: Guilford Press, 2001:35–52.
21. Dao TT, LeResche L. Gender differences in pain. *J Orofac Pain* 2000;14:169–184.
22. Cohen J, Cohen P, West SG, Aiken LS. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (ed 3). Mahwah, NJ: Lawrence Erlbaum Associates, 2003.
23. Turunen JH, Mantyselka PT, Kumpusalo EA, Ahonen RS. How do people ease their pain? A population-based study. *J Pain* 2004;5:498–504.
24. Eisenberg DM, Davis RB, Ettner SL, et al. Trends in alternative medicine use in the United States, 1990–1997: Results of a follow-up national survey. *JAMA* 1998;280:1569–1575.
25. Connelly MT, Hrbek A, Post D, Davis RB, Canning C, Phillips R. Comparison of patient and provider perceptions of back pain severity, likelihood of improvement, and treatment preferences. *J Gen Intern Med* 2001;(suppl 16):123–124.
26. Verbrugge LM, Ascione FJ. Exploring the iceberg. Common symptoms and how people care for them. *Med Care* 1987;25:539–569.
27. Friction JR, Olsen T. Predictors of outcome for treatment of temporomandibular disorders. *J Orofac Pain* 1996;10:54–65.
28. Creameans-Smith JK, Millington K, Sledjeski E, Greene K, Delahanty DL. Sleep disruptions mediate the relationship between early postoperative pain and later functioning following total knee replacement surgery. *J Behav Med* 2006;29:215–222.
29. Callaghan P. Exercise: A neglected intervention in mental health care? *J Psychiatr Ment Health Nurs* 2004;11:476–483.
30. Brosse AL, Sheets ES, Lett HS, Blumenthal JA. Exercise and the treatment of clinical depression in adults: Recent findings and future directions. *Sports Med* 2002;32:741–760.
31. Paluska SA, Schwenk TL. Physical activity and mental health: Current concepts. *Sports Med* 2000;29:167–180.
32. Riley JL III, Benson MB, Gremillion HA, et al. Sleep disturbance in orofacial pain patients: Pain-related or emotional distress? *Cranio* 2001;19:106–113.
33. Yatani H, Studts J, Cordova M, et al. Comparison of sleep quality and clinical and psychologic characteristics in patients with temporomandibular disorders. *J Orofac Pain* 2002;16:221–228.
34. Glaros AG, Williams K, Lausten L. The role of parafunctions, emotions and stress in predicting facial pain. *J Am Dent Assoc* 2005;136:451–458.