# Patient Experiences of Therapeutic Jaw Exercises in the Treatment of Masticatory Myofascial Pain: A Qualitative Study

**Erik Lindfors, DDS**
Senior Consultant
Department of Stomatognathic Physiology
Public Dental Health Service
Uppsala, Sweden
and Department of Dental Medicine
Karolinska Institutet and Scandinavian Center for Orofacial Neurosciences (SCON) Huddinge, Sweden

**Eva Hedman, PhD**
Dental Hygienist
Public dental health service
Uppsala, Sweden

**Tomas Magnusson, DDS, PhD**
Professor Emeritus
School of Health and Welfare
Jönköping University
Jönköping, Sweden

**Malin Ernberg, DDS, PhD**
Professor
Department of Dental Medicine
Karolinska Institutet and Scandinavian Center for Orofacial Neurosciences (SCON)
Huddinge, Sweden

**Pia Gabre, DDS, PhD**
Professor
Public Dental Health Service
Uppsala, Sweden
and Institute of Odontology
Sahlgrenska Academy
University of Gothenburg
Gothenburg, Sweden

**Correspondence to:**
Dr Erik Lindfors
Department of Stomatognathic Physiology, Public Dental Health Service
Box 1813, SE-751 48 Uppsala, Sweden
Fax: +4618-18692947
Email: erik.lindfors@ki.se



**Aims:** To investigate patients' experiences of therapeutic jaw exercises for treating masticatory myofascial pain. **Methods:** A total of 10 patients were selected for the interview study. All patients had received treatment with jaw exercises at a specialist clinic. Semi-structured interviews were conducted in a nonclinical environment according to an interview guide with 10 domains. The interviews were transcribed and translated into English. Systematic text condensation (STC) was used to arrange and analyze the text material. **Results:** In the systematic process of analyzing the qualitative data, four main themes were identified: "Patient Adherence," "Symptoms," "Treatment Effect," and "Participation." Most informants were initially skeptical of the jaw exercises due to their simplicity. Later on, the simplicity of the exercises and the fact that they did not need more advanced treatment were valued most by a majority of patients. Some informants suspected serious disease behind their symptoms. Treatment effects on pain and physical impairment were reported. To do the jaw exercises in conjunction with an already established routine seemed important to enhance adherence. Trust in the caregiver and being able to remedy their pain by themselves were also important to the informants. **Conclusion:** Jaw exercises are a useful treatment valued by patients due to their simplicity and effectiveness. However, before the treatment, patients should be informed about the cause of the symptoms, and any skepticism should be addressed. Results from this qualitative study cannot be generalized, but the study design and the selected population allow the results to be transferable to similar contexts. *J Oral Facial Pain Headache 2017;31:46–54. doi: 10.11607/ofph.1623*

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Temporomandibular disorders (TMD) are a group of conditions affecting the temporomandibular joints (TMJ) and masticatory muscles.[1] Pain is the most common symptom of TMD and is usually localized in the muscles of mastication, the preauricular area, and/or the TMJ. Patients with TMD frequently report related symptoms such as headache, restricted mouth opening capacity, and pain in connection to chewing or other jaw functions; in this way, TMD reduces quality of life. Approximately 10% of the adult population have chronic masticatory myofascial pain, which is the most common subdiagnosis of TMD.[1] Many different treatments have been proposed in the treatment of this condition.[2,3,4] Therapeutic jaw exercises are one of the most commonly used treatments for TMD cases in Scandinavia.

Therapeutic jaw exercises aim to attain relaxation in tender jaw muscles, to optimize jaw function, and to divert habitual patterns. The exercise program can be executed in a number of different ways and usually consists of relaxation exercises, free movements of the mandible, movements of the mandible with a small resistance, and stretching of the jaw muscles.[3] The exercise program should always be individually tailored to the patient depending on the specific symptoms. The mechanisms behind the treatment effect are considered to be a result of reciprocal inhibition, proprioceptive neuromuscular facilitation, increased awareness, and stretching.[5] Magnusson and Syrén[5] and Michelotti et al[6] have shown that adherence to jaw exercises is considered acceptable. Magnusson

and Syrén[5] concluded in their randomized controlled trial (RCT) that therapeutic jaw exercises are also a cost-effective treatment for TMD, with an effect comparable to treatment with a stabilization appliance. Michelotti et al[6] have also shown that the combination of education and a home physical therapy regimen is slightly more clinically effective than education alone for the treatment of masticatory myofascial pain. Nonetheless, due to the limited number of RCTs and small sample sizes in published studies, the evidence for both effectiveness and efficacy of therapeutic jaw exercises is still weak.[7,8]

One of the most subjective and complex experiences is that of pain. Chronic masticatory myofascial pain has components of a sensory, affective, and cognitive nature.[9,10] No information is available about patients' emotions and experiences with therapeutic jaw exercises in the treatment of masticatory myofascial pain. Quantitative research methods aim to objectively collect data that are broken down into units and numbers to analyze data statistically and to generalize the findings; however, it is difficult to investigate subjective phenomena such as emotions and experiences in this manner. A qualitative research method that takes emotional, psychological, social, and existential aspects into account is more suitable to investigate these phenomena.[11,12]

Systematic text condensation (STC) is a descriptive and explorative approach for thematic analysis of qualitative data and is influenced by Giorgi's phenomenologic principles. Rather than exploring the possible underlying meaning of what was said, the experiences of the patients as expressed by the patients themselves are presented.[13]

The aim of this study was to investigate patients' experiences of therapeutic jaw exercises for treating masticatory myofascial pain.

## Materials and Methods

Data were collected through semi-structured interviews. The interviewer (E.H.) was a dental hygienist and a researcher with experiences in both qualitative methods and interview techniques. The interviewer had no connection with the patients' treatments and had very little experience and knowledge about the treatment studied; therefore, prior to the interviews, a TMD specialist (E.L.) gave the interviewer a short education (1.5 hours) about TMD with a special focus on therapeutic jaw exercises. The TMD specialist also gave the patients careful verbal and written information about the study before the patients agreed to join the study. The interviewer also gave the informants verbal information about the study before the interviews. The voluntary participation was repeatedly emphasized. The information was given in this manner to foster trust between the researchers and the informants.

A written informed consent was obtained from each patient. No private data that would jeopardize the anonymity of the informants are published. Additionally, in an interview situation, there is always a risk of encroachment on the informant's integrity, and so it was clearly emphasized that the informants did not have to answer any questions that made them feel uneasy. During an interview, information can emerge that might need further management; therefore, a psychologist that could offer treatment, if required, was attached to the project. Ethical approval was obtained from the regional ethical review board at Uppsala University (2014/001).

### Study Population

The objective was to select a strategic sample of patients in order to obtain age and gender variation in the study population. The following inclusion and exclusion criteria were used:

Inclusion criteria:

- Myofascial pain with or without limited mouth opening according to the Research Diagnostic Criteria for TMD (RDC/TMD) axis I[14]
- Pain for a minimum of 6 months prior to performing the therapeutic jaw exercises
- Age > 18 years
- The performance of the therapeutic jaw exercises for at least 3 months and not longer than 12 months

Exclusion criteria:

- Osteoarthritis, osteoarthrosis, and disc displacement without reduction in the TMJ, according to the RDC/TMD axis I[14]
- Dental pain
- Neuropathic pain
- Rheumatic disease or general inflammatory condition
- General myopathy (eg, fibromyalgia)
- Whiplash diagnosis
- Language difficulties
- Treatment modalities other than jaw exercises received at the specialist clinic

The number of participants was not decided on before the start of the study. Those patients who met the inclusion criteria and not the exclusion criteria were asked to participate in the study. No patient declined to be a part of the study. A total of 10 patients, 1 man and 9 women, with a mean age of 35 years (range:

**Table 1 Sociodemographic Description and Characteristics of Informants (n = 10)**

| Sex | Age (y) | Symptom duration before treatment (mo) | Occupational status | Treatment time with jaw exercises (mo before interview) |
|---|---|---|---|---|
| Female | 58 | 9 | Unemployed | 8 |
| Male | 26 | 7 | Student | 6 |
| Female | 34 | 156 | Full-time work | 6 |
| Female | 20 | 36 | Student | 12 |
| Female | 58 | 9 | Part-time work | 10 |
| Female | 57 | 24 | Full-time work | 3 |
| Female | 22 | 14 | Part-time work | 7 |
| Female | 23 | 20 | Student | 3 |
| Female | 21 | 6 | Student | 5 |
| Female | 30 | 12 | Full-time work | 3 |

**Table 2 Interview Guide**

| Domain | Description |
|---|---|
| 1 | Experiences of the orofacial pain |
| 2 | Descriptions and reflections on outpatient care until the patient received treatment at the unit for Stomatognathic Physiology |
| 3 | Initial reflections on therapeutic jaw exercises |
| 4 | Expectations of the treatment |
| 5 | Experiences of the practical issues of treatment |
| 6 | The pros and cons of therapeutic jaw exercises |
| 7 | Patient adherence |
| 8 | Difficulties during treatment |
| 9 | Treatment effect |
| 10 | Reflections after treatment |

20–58 years), was enrolled. The patients had been referred to the Department of Stomatognathic Physiology, Public Dental Health Service, Uppsala, and had received treatment only with therapeutic jaw exercises at the Department. The exercise program had been individually designed for each patient according to clinical routine and included jaw relaxation exercises, free movements of the mandible, movements of the mandible with a small resistance, and stretching of the jaw muscles. It was recommended to all patients to do the jaw exercises three times a day, and the patients were evaluated according to clinical routine after 2 and 8 weeks. Six patients had a partner and four were single; four patients had children. For further sociodemographic description and characteristics of the patients, see Table 1. Six of the patients had completed treatment and four were still undergoing treatment when the interviews were conducted between April and September in 2014. Data collection was continued until no further relevant information emerged; the point at which this occurred was decided by the interviewer (E.H.) and one of the researchers (E.L.) together after listening to the interviews separately.

### Semi-Structured Interviews

An interview guide with 10 domains was constructed (Table 2) and tested in a test interview. The test interview was conducted in the same manner as the rest of the interviews, and the interviewer considered the interview guide to be sufficient. The informant in the test interview was also enrolled in the study (female, 20 years old).

The semi-structured interviews, which lasted 20–35 minutes, focused on the patient's experience of therapeutic jaw exercises as a treatment of masticatory myofascial pain. The interviews were conducted in a nonclinical environment at the Department. Both the open-ended and the follow-up questions aimed to encourage the patient to reflect and freely comment on the different themes. The interviews were recorded and then transcribed verbatim from spoken to written language. The interviewer and the researchers involved in the analysis of data took care to restrain their personal notions and expectations to reduce the risk of affecting the interviews and text analysis, respectively. This was partially accomplished by writing down the researchers' expectations before the interviews and text analysis.

### Text Analysis

Two researchers were involved in the analysis of the text material. One of these researchers (E.L.) is a TMD specialist and also the former caregiver for all patients. The other researcher (P.G.) who was involved in the analysis is a dentist and professor in cariology with experience in qualitative research methods.

The STC according to Malterud[13] was used to arrange and analyze the text material. In the first phase, reading all transcriptions from cover to cover provided the two researchers with a general impression of the whole sample and an overview of the data. Listening to the interviews while simultaneously reading the transcripts was useful in testing the quality and accuracy of the transcribed texts. Small alterations to the texts were made. Preliminary themes of each patient's experiences were established, and in this process the researchers carefully tried to restrain their preconceptions.

In the second phase, meaning units were identified, coded, and sorted under those preliminary themes. Coding involves decontextualization, in which the text is temporarily removed from its context for a cross-case synthesis. Some of the preliminary themes were refined, and a couple of subcategories emerged. The tacit rules used to code and sort the meaning units were recurrently identified and questioned. A research triangulation was carried out to test the themes' legitimacy. The two researchers involved in the analysis and the interviewer separately sorted a number of randomly selected quotes under the different themes. Complete

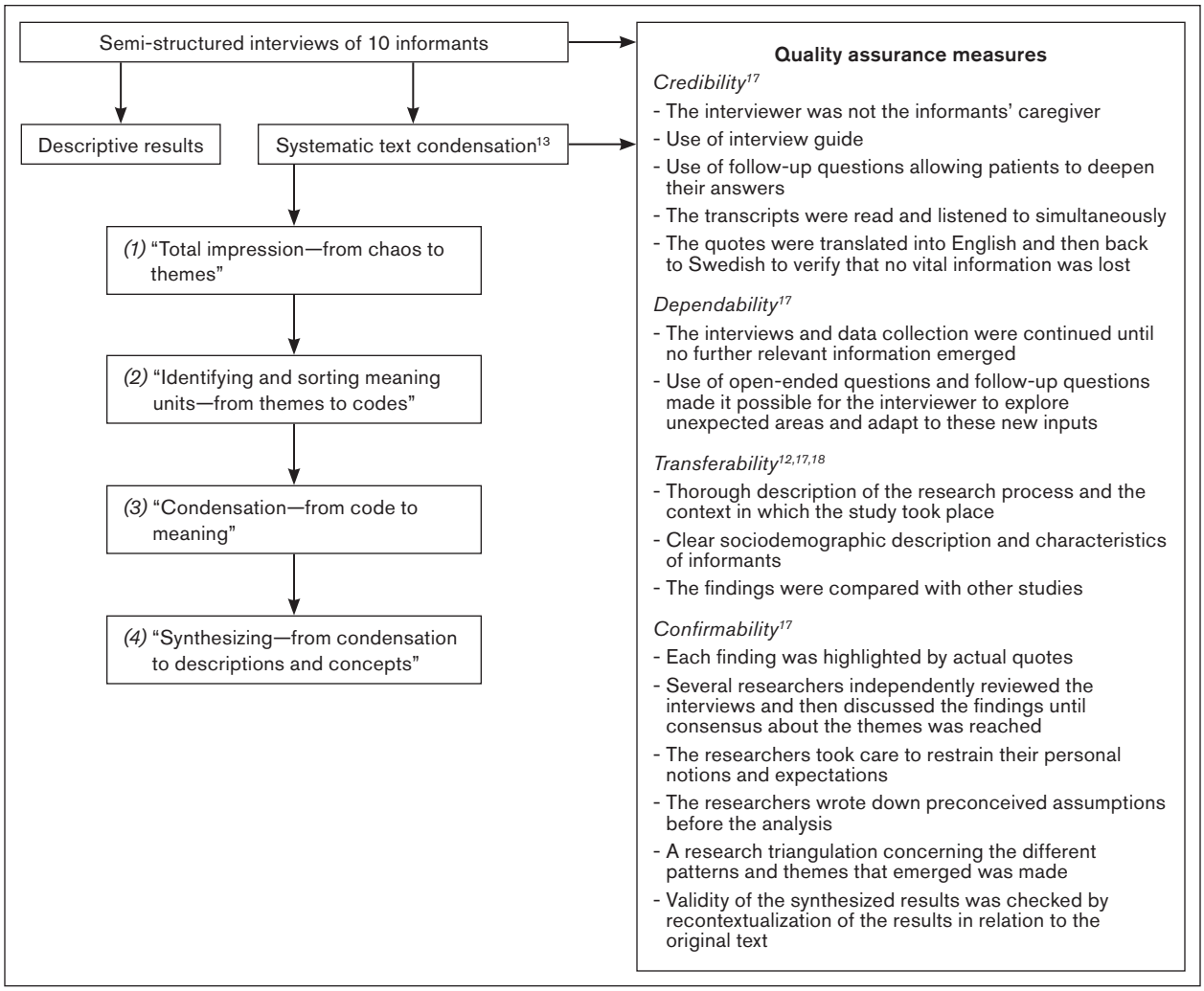


**Fig 1** Summary of the research method and quality assurance measures. The steps of achieving trustworthiness are thoroughly described by Hamberg et al.[17]

versions of the transcripts were kept in order to recontexualize the findings at the end of the analysis.

In the third phase, the meaning units in each subgroup were condensed to an artificial quotation that summarized the different data in the subgroup. Some authentic quotations were selected to support these condensates. The names of the themes and subgroups were further adjusted as a result of evolving understanding.

In the fourth phase, the content of each condensation was synthesized. Some authentic quotations were selected to support these descriptions. Validity of the synthesized results was checked by recontextualization of the results in relation to the original text. After the analysis, the quotes in Swedish were translated into English by a translator outside the research group and then translated back in order to ensure that no vital information was lost. Definite titles of the subgroups were chosen. A summary of the research method can be seen in Fig 1.

## Results

In the systematic process of analyzing the qualitative data according to STC, four main themes were identified. In the research triangulation concerning the different patterns and themes that emerged, the intersubjective agreement was 98%. The first theme, "Patient Adherence," was divided into six subgroups: "routines," "instructions," "social context," "personality," "treatment effect," and "view on treatment." The second theme, "Symptoms," was divided into four subgroups: "onset," "experience," "own explanations," and "reactions." The third theme, "Treatment Effect," was divided into three subgroups: "pain," "physical impairment," and "time." The fourth theme, "Participation," was divided into three subgroups: "empowerment," "create trust," and "knowledge and comprehension."

## Patient Adherence

### *Routines*

The patients found it hard to incorporate the jaw exercises as a natural part of their everyday lives. To find recurrent opportunities (taking a walk, go by car, tooth brushing, etc) in their already established routines (when the patients had a moment for him-/herself) and do the exercises in conjunction with these routines seemed to be a key to success:

> *"...either when I get up in the morning or when I'm going to bed, that's when it's easiest...you remember because it's a kind of routine when you're getting ready for bed or before you get up."*

Many patients did their jaw exercises twice a day. In the middle of the day around lunchtime, many patients felt that they were too stressed to do the exercise.

### *Instructions*

The verbal and written information concerning the jaw exercises were both perceived as plain and structured. One informant thought that pictures and layout of the written information were old fashioned and almost "scary." Many informants found the follow-up instructions to be helpful. On the other hand, one informant said that the written information was enough and that she did not need so many clinical follow-ups:

> *"Well, they aren't that complicated....a written description and a clear picture....I had no problems understanding them as it was very clear from the start."*

Written information about the underlying cause of symptoms was requested.

### *Social Context*

Several informants felt uncomfortable doing the jaw exercises among other people—this was especially in public, but also in a more private setting. The reasons for this could be that the jaw made noises during exercise, children became afraid, or the informants felt that they looked peculiar when doing the exercises:

> *"...I don't do this near other people and the children are frightened when I do the stretching exercise as they think I look like a lion."*

> *"...you don't want to sit next to someone who can hear what you sound like...people would wonder what you were up to."*

One informant stressed the importance of not making the exercises too demanding and burdensome; the informant said that patients may have a lot of other exercises (eg, from a physical therapist) and it is therefore important, especially in the beginning, to be content with oneself even if you only manage to do the jaw exercises once a day instead of the recommended three times a day.

### *Personality*

The patient's personality seemed to affect adherence to a great extent. Informants that reported they were negligent and had general problems with structuring their lives also had problems incorporating jaw exercises as a daily routine:

> *"...It may sound completely ridiculous that it can be such a bloody big problem to do this three times a day...it's mad really. But hell, I'm just bad at it."*

On the other hand, informants who said they were stubborn and actively wanted to participate in the treatment reported that they did the exercises more frequently.

### *Treatment Effect*

Severe symptoms and treatment effects motivated the patients to do the jaw exercises more frequently:

> *"...now I'd really got to do something about this because it was painful, so I started to take it more seriously and do it properly."*

When the symptoms subsided, the frequency of exercise also decreased.

### *View on Treatment*

Many informants stated that they were suspicious and skeptical about the jaw exercises in the beginning of the treatment. The jaw exercises seemed too simple and the informants had expected a more advanced treatment. Some informants thought that a surgical treatment was necessary. Patients who earlier had received physical therapy for other pain conditions reported that the jaw exercises seemed reasonable and stated that they understood the connection between muscle pain and exercise as a treatment modality. When the patients started to experience a treatment effect, they were happy that advanced treatment, such as surgery, was not needed. At the end of treatment, the simplicity of the therapeutic jaw exercises was what most informants valued most. One informant stressed the positive fact that no tools are needed to do the exercises and that the exercises can be done at any place:

> *"At first I was a bit skeptical about whether a couple of exercises would really help my jaw...it was good that I only needed to do a few exercises...I didn't need an operation and all that…that would have been awful."*

## Symptoms

### *Onset*

Most informants described persistent symptoms for many years. The onset of symptoms was often described as gradually increasing pain over a period of

time in conjunction with stress from work/studies or home situation. Some informants described a more sudden start of their symptoms in connection with a trauma to the jaw or clicking sounds from the TMJ:

*"...I think I've always been prone to a bit of pain now and again in a joint, the joint in my jaw, but over a year ago now my jaw started to feel really sore."*

***Experience***

Most informants had pronounced pain and fatigue localized to the cheeks, temples, and neck. Jaw function aggravated their pain and they felt restricted in their mouth-opening capacity. Headache was a frequently described symptom:

*"Around lunchtime you get a headache that radiates from your jaw muscles all the way up to your temples and then down again to the base of your skull."*

***Own Explanations***

Some informants said that they initially thought that the pain was a symptom of a more serious disease such as cancer. One informant was certain that the pain came from her sinus and another informant suspected that the symptoms were related to the eruption of wisdom teeth. However, most informants saw a connection between stress, general tension, and pain:

*"...when I get stressed I've noticed that the problem gets worse, plus I start breathing from my chest instead and I start to tense my jaws...so everything is linked to stress."*

***Reactions***

The patients reported feelings of fear of a more serious illness as well as panic, especially in conjunction with loss of function and feelings of being unfortunate or ill fated:

*"...then I couldn't open my mouth wide and I panicked..."*

*"...I felt really unhappy about how I was being affected..."*

## Treatment Effect

***Pain***

Many of the patients experienced a positive effect from the treatment from the beginning and reported that the pain started to decrease after a couple of weeks. The pain then decreased over a longer period of time:

*"...I have less pain now, which is a great improvement. And the pain in my temples...I haven't felt that for a long time."*

Two informants experienced minor effects on their symptoms:

*"It didn't have much effect at all, at the start...I have really done my training exercises three times a day and I think that it has had some effect anyway."*

***Physical Impairment***

The therapeutic jaw exercises had a very distinct effect on maximal mouth opening. Several of the informants said that their mouth-opening capacity had gradually increased:

*"...I have noticed a difference—that I have more mobility (in my jaw) and that I can open my mouth wider."*

***Time***

Increased mouth opening was an effect that came early in the treatment. Pain reduction started later, after approximately 4 to 8 weeks:

*"...after a few weeks I knew that I had more mobility (in my jaw). Especially when it came to opening my mouth widely. The effects were very rapid. And I also think that the pain I felt when I was chewing also disappeared quite quickly. But I cannot say exactly how...if it took one month or two...."*

## Participation

***Empowerment***

A majority of the patients wanted to continue with their jaw exercises in the long term to reduce the risk of regaining the symptoms. Some of the informants stated that they felt safe, secure, and strengthened by having the potential to manage potential jaw symptoms by themselves in the future:

*"...it feels pretty good to know that I don't need to call in as soon as I feel a bit of stiffness as I now actually have some solutions available to me."*

***Create Trust***

The patients considered that being met with kind treatment and their perception of the caregiver's competence were two factors of initial importance to foster trust. The caregiver's personality and the structure of the following treatment were also important. To be listened to, understood, and to receive attention were other factors that were mentioned to foster trust:

*"...Yes I was really pleased with the first meeting, with the way they dealt with me and how much they knew....it felt professional and well thought-out...it feels*

*that you're in good hands and that they understand your problems..."*

***Knowledge and Comprehension***

The patients also considered that the simple explanation of the underlying causes of the pain and how the treatment with jaw exercises work were important to motivate them to participate in the treatment regime. Knowledge about the underlying causes increased acceptance and awareness and also reduced the feeling of fear. At the end of the treatment, information about the prognosis was important to reduce the risk that patients would worry about a possible recurrence of their symptoms:

*"...I thought the advice was good...they explained what the problem was and all that, and I felt like I understood."*

*"...It increases awareness, and you understand why you have to do it three times a day."*

## Discussion

This study has demonstrated how 10 patients with masticatory myofascial pain experienced their pain and treatment with therapeutic jaw exercises. The following discusses in turn methodologic matters and the findings and their implications.

### Methodologic Considerations

Qualitative research manages many different methods with their own distinctive characters, and the researcher should choose a method that gives the data optimal relevance and validity.[15] In this project, the focus was on the patients' experiences of therapeutic jaw exercises in the treatment of masticatory myofascial pain.

STC was developed as a systematic, thematic, cross-case analysis, which, according to Malterud,[13] is an easier way of qualitative analysis than a phenomenologic approach. For this reason, STC was chosen in this study. STC, like most other qualitative methods, has the theoretical foundation of social conservatism.[13] In social conservatism, individuals develop subjective meanings of their experiences of certain objects or phenomena.[15] The dynamic interpretation of multiple and varied versions of reality results in knowledge. Although obviously inspired by phenomenology, Malterud[13] does not consider STC to be a phenomenologic method, and there is not a clearly stated phenomenologic philosophy in STC. STC is considered to be more of a procedure rather than a specific, theoretically devoted method. This means that many different theories, depending on the research question, can be used to support STC analysis.[13]

In STC there is a risk that the individual context of data will get lost in the coding process, in which data are decontextualized. Information is always lost in a qualitative study design when data are reduced as part of the analyzing process. In order to reduce this risk of fragmentation, the STC process includes recontextualization, in which the researchers' interpretations are validated against the original transcripts.[13]

According to Lincoln and Guba,[16] trustworthiness can be achieved through credibility, dependability, transferability, and confirmability.

"Credibility" deals with whether the chosen methods produce credible and truthful findings in the data collection and interpretations in the analysis.[17] A doctor-patient relationship might influence an interview, making the informant more prone to withhold information that they think would endanger further treatment. This threat to credibility was reduced in this study, since the interviewer had no relations to the informants. Preconceptions and personal notions can further influence and direct an interview. The fact that the interviewer had limited experience and knowledge about the treatment studied reduced this threat and kept the interviews open minded. Another threat to credibility in this study was the translation of the quotes from Swedish to English. To minimize this problem, a translator outside the research group was engaged. In the analysis, the researchers made an effort to stay close to the data and to continuously make critical reflections about the findings of themes. This further strengthened the credibility.

"Dependability" means that a research project must adapt to new inputs and changes in the studied environment during the time period of the study.[17] In this study, the interview guide could have limited the dependability, but through the interviewer´s concern to use open-ended and follow-up questions, the informant was encouraged to express his/her own perspectives in the interview.

Results and conclusions from a qualitative study can never be generalized to the population level, but the results can in some instances be transferred to a similar context. A thorough description of the research process, the study population, and the context in which the study took place makes it possible for the reader to decide the degree of "transferability."[18] The population in this study had an acceptable age variation. Nine women and only one man were included in the study, which could be a weakness; however, a majority of patients attending a specialist clinic for TMD problems are women,[2] and this fact, in combination with the strict inclusion and exclusion criteria, made it difficult to fulfill the aim of strategic selection with good gender variation. However,

regarding other sociodemographic factors and characteristics of the informants, the variation was good (Table 1). Although the informants displayed a wide variation concerning other sociodemographic factors, the themes that emerged from the analysis were similar. Therefore, the composition of the participants in this study acknowledges that the results can be transferred to other contexts.

"Confirmability" means that the study should include procedures that show that the findings originate from the data and are not fabrications due to poor analytic work or preconceived assumptions.[17] In this study, confirmability could be achieved by the researchers' independent analyses of the text and quotations based on the informants´ statements.

## Findings and Implications

### *Patient Adherence*

The interviews showed that a majority of informants found it hard to incorporate the jaw exercises in their daily routine. In a previous study[19] using home exercises, it was concluded that 64% of the patients reported varying degrees of nonadherence to the prescribed exercises. Considering the effect that nonadherence has on treatment outcome, it is of the utmost importance to have strategies that aim to enhance adherence in clinical practice.[20] Doing the jaw exercises in conjunction with an established routine seemed to increase the frequency of training. It was also important for the informants to do their training when they were alone. Consequently, it seems important to recommend that the patient do the exercises in conjunction with an already established routine and in privacy. Tooth brushing twice per day seems to be a good routine with which to connect the jaw exercises. Patients who felt unorganized as a person also described difficulties in remembering to do the jaw exercises. It can therefore be suitable to ask the patients about their personality and their everyday life before treatment. If they consider themselves to have an unstructured personality, extra effort should be made to give the patient tools to increase adherence. Brewer et al[21] have shown that patients complete fewer home rehabilitation exercises on days when they feel stressed. If the patient reports high levels of stress from other daily activities, they could be informed not to despair if they cannot manage to do the exercises three times per day. In such a case, once per day may be satisfactory in the beginning, with an increase in the frequency at a later stage when a natural routine has been established. It has been suggested that jaw exercises should be performed several times per day for optimal effect.[7,8]

Most informants described that they were skeptical of the jaw exercises in the beginning due to their simplicity. Later on, the simplicity of the treatment was what the majority of the patients valued most. This aspect is very important to address in the beginning of treatment. A patient who is too skeptical of treatment is not likely to follow the instructions in an optimal way. More severe initial symptoms and a perceived treatment effect made the patients do the exercises more frequently. A correlation between adherence and treatment effect has also been shown in an earlier study concerning interocclusal appliances.[22]

### *Symptoms*

Most informants initially described restricted mouth opening and pronounced pain and fatigue localized to the cheeks, temples, and neck. This is in line with the description of masticatory myofascial pain in the literature.[3] Some informants were afraid that the pain was a symptom of a more severe disease such as cancer. Initial reassuring information about the reason for muscle pain, the treatment protocol, and the prognosis of treatment is of utmost importance. This has also been suggested in an earlier review.[7] Some patients had explanatory models of their own, even though they had received information about the disorder. It appears important to ask the patients about their own thoughts about the cause of pain at an early stage and to discuss these alternative explanations, as it could be speculated that a patient who does not believe the caregiver's explanation for cause and effect might be less prone to follow the treatment recommendation. Adequate information to assist the patient in making choices and overcoming unhelpful beliefs is therefore important.[7]

### *Treatment Effect*

Many of the patients described a good treatment effect on both restricted mouth-opening capacity and pain. These findings are in line with earlier quantitative studies on the subject.[5,6,23,24]

### *Participation*

A majority of patients wanted to continue with the jaw exercises, and some reported that they felt secure and that if the symptoms returned, they had tools to tackle the problems themselves. In a previous study,[8] it was suggested that jaw exercises can prevent relapse of TMD pain. It is important in all kinds of pain therapy to make the patient participate and take responsibility for their own well-being (ie, locus of control).[7] Positive long-term effects have been described in self-management pain programs.[25]

To foster trust and to give the patient knowledge are factors that are important to increase participation. It seems important to have plenty of time during the examination to give the patient attention and really listen to the patient to foster trust. The information should be both verbal and written and it is important to keep the information simple and to have a clear structure. Well-informed patients are more likely to participate in the treatment and show better adherence.[26]

## Conclusions

The main results that the study showed were:

- To enhance adherence, it seems important to recommend that the patient do the exercises in conjunction with an already established routine; eg, tooth brushing.
- Most informants were skeptical of the jaw exercises in the beginning due to their simplicity. Later on, the simplicity of the treatment and the fact that they did not need more advanced treatment were highly valued by the patients. Skepticism might influence adherence in a negative way and thus should always be addressed at the beginning of treatment.
- Some informants were afraid that the pain was a symptom of a serious disease. Initial information about the cause of the symptoms, their benign character, and the favorable prognosis of the treatment are therefore very important to reassure the patient.
- A majority of patients wanted to continue with the jaw exercises, and some reported that they felt safe, secure, and that they had tools to tackle the problems themselves if the symptoms should return. Empowerment is an important factor to aid the patients in this process.

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## References

1. American Academy of Orofacial Pain, Okeson JP (ed). Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management. Chicago: Quintessence, 1996.
2. Anastassaki A, Magnusson T. Patients referred to a specialist clinic because of suspected temporomandibular disorders: A survey of 3194 patients in respect of diagnoses, treatments, and treatment outcome. Acta Odontol Scand 2004; 62:183–192.
3. Carlsson GE, Magnusson T. Management of Temporomandibular Disorders in the General Dental Practice. Chicago: Quintessence, 1999.
4. De Laat A, Stappaerts K, Papy S. Counseling and physical therapy as treatment for myofascial pain of the masticatory system. J Orofac Pain 2003;17:42–49.
5. Magnusson T, Syrén M. Therapeutic jaw exercises and interocclusal appliance therapy. A comparison between two common treatments of temporomandibular disorders. Swed Dent J 1999;23:27–37.
6. Michelotti A, Steenks MH, Farella M, Parisini F, Cimino R, Martina R. The additional value of a home physical therapy regimen versus patient education only for the treatment of myofascial pain of the jaw muscles: Short-term results of a randomized clinical trial. J Orofac Pain 2004;18:114–125.
7. Michelotti A, de Wijer A, Steenks M, Farella M. Home-exercise regimes for the management of non-specific temporomandibular disorders. J Oral Rehabil 2005;32:779–785.
8. Moraes Ada R, Sanches ML, Ribeiro EC, Guimarães AS. Therapeutic exercises for the control of temporomandibular disorders. Dental Press J Orthod 2013;18:134–139.
9. Dworkin RH, Turk DC, Farrar JT, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. Pain 2005;113:9–19.
10. Turk DC, Dworkin RH, Allen RR, et al. Core outcome domains for chronic pain clinical trials: IMMPACT recommendations. Pain 2003;106:337–345.
11. Britten N, Jones R, Murphy E, Stacy R. Qualitative research methods in general practice and primary care. Fam Pract 1995; 12:104–114.
12. Malterud K. Qualitative research: Standards, Challenges, and Guidelines. Lancet 2001;358:483–488.
13. Malterud K. Systematic text condensation: A strategy for qualitative analysis. Scand J Public Health 2012;40:795–805.
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. Creswell JW. Qualitative Inquiry and Research Design: Choosing Among Five Traditions, ed 3. London: Sage, 2012.
16. Lincoln YS, Guba EG. Naturalistic Inquiry. Beverly Hills: Sage, 1985.
17. Hamberg K, Johansson E, Lindgren G, Westman G. Scientific rigour in qualitative research- Examples from a study of women's health in family practice. Fam Pract 1994;11:176–181.
18. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. Nurse Educ Today 2004;24:105–112.
19. Sluijs EM, Kok GJ, van der Zee J. Correlates of exercise compliance in physical therapy. Phys Ther 1993;73:771–782.
20. McLean SM, Burton M, Bradley L, Littlewood C. Interventions for enhancing adherence with physiotherapy: A systematic review. Man Ther 2010;15:514–521.
21. Brewer BW, Cornelius AE, Van Raalte JL, Tennen H, Armeli S. Predictors of adherence to home rehabilitation exercises following anterior cruciate ligament reconstruction. Rehabil Psychol 2013;58:64–72.
22. Lindfors E, Helkimo M, Magnusson T. Patients' adherence to hard acrylic interocclusal appliance treatment in general dental practice in Sweden. Swed Dent J 2011;35:133–142.
23. Maloney GE, Mehta N, Forgione AG, Zawawi KH, Al-Badawi EA, Driscoll SE. Effect of a passive jaw motion device on pain and range of motion in TMD patients not responding to flat plane intraoral appliances. Cranio 2002;20:55–66.
24. Nicolakis P, Erdogmus B, Kopf A, Nicolakis M, Piehslinger E, Fialka-Moser V. Effectiveness of exercise therapy in patients with myofascial pain dysfunction syndrome. J Oral Rehabil 2002;29:362–368.
25. Lorig KR, Ritter P, Stewart AL, et al. Chronic disease self-management program: 2-year health status and health care utilization outcomes. Med Care 2001;39:1217–1223.
26. Epstein RM, Alper BS, Quill TE. Communicating evidence for participatory decision making. JAMA 2004;291:2359–2366.