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ORIGINAL ARTICLE

Short clinical examination for temporomandibular symptoms in general practice

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ABSTRACT

Objective: The aims of the study are to assess the reliability of the short clinical examination, and to compare the information gained with a well-known and validated examination, the diagnostic criteria for temporomandibular disorders (DC/TMD).

Materials and methods: The study comprises 52 consecutive, newly referred patients at their first visit and examination to an Orofacial Pain and TMD Clinic, 15 years and older, mean age 44 years. The patients first answered three screening questions for reported symptoms. The clinical examination was performed using both the short examination and the DC/TMD and the result was compared. Another group of 40 newly referred patients, with similar inclusion criteria, was examined twice according to the short clinical examination by two examiners, and the inter-examiner variation was studied. The protocol of the short clinical examination is described.

Result: The overall agreement between the two methods was fairly good to excellent, as was the degree of agreement between repeated examinations and two examiners using the short clinical examination method. The sensitivity and specificity of the short examination for diagnoses were acceptable to high (with DC/TMD as the golden standard).

Conclusions: The short clinical examination has acceptable reliability and, together with three screening questions, provides enough information about the jaw function to decide whether there is a dysfunction.

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Introduction

Examination of the temporomandibular joints (TMJ) and muscles, jaw function and dysfunction, as well as oral parafunctions and over-loading of the temporomandibular system, is sometimes overlooked by the general practitioner and symptoms of temporomandibular disorders (TMD) consequently remain undiagnosed and are not dealt with [1]. Recent studies indicate a 7% prevalence of TMD symptoms in the population [2] and an incidence of 3.9% per year [3]. Considerable dysfunction was found among adolescents receiving free dental care [4,5]. Studies also indicate an increase in TMD symptoms and need for treatment during the last decades [6].

The neglect of the general practitioner to examine and treat the symptoms could have many explanations, such as a lack of time or knowledge [7], or routines that may focus on other diseases. TMD symptoms is sometimes regarded as difficult and time-consuming, and the result of treatment difficult to assess [8]. However, patients may also be unaware of where to seek treatment for their jaw problems and they do not complain about their symptoms when they see the dentist, or they may be reluctant to pay for the treatment [8].

The education for a dental degree provides the student with enough knowledge to be able to diagnose and treat patients' TMD symptoms, but there may be a discrepancy between what was taught during the training and what is implemented in general dental practice [9–11]. Statements like, 'there is too little a time to include an examination for TMD symptoms and dysfunction during the patients' routine dental examination in general practice', are common. Sometimes, dental hygienists perform the examination and, if no aberration is found, the patient will not meet a dentist at all. However, if the hygienist lacks the necessary knowledge, the dysfunction may not be detected and there will be no report to a dentist.

Some dentists and hygienists focus on the facets of the teeth and draw conclusions from that about the patient's present symptoms, or predict the risk of future symptoms. However, there is little or no association between the facets and attrition of the teeth and TMD symptoms [12].

A limited clinical functional examination has been suggested for the routine dental examination of the temporomandibular system [13]. Delcanho published a less time-consuming method for screening for temporomandibular disorders in dental practice [14], and Zhao et al. [15] tested a reduced history for TMD symptoms. Screening questions for subjective symptoms have been used and validated [15,16]. Three screening questions for reported symptoms (3Q/TMD) have been introduced in some clinics and has been validated [1].

In order to facilitate the inclusion of a clinical examination for temporomandibular function and dysfunction, and to

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help the dentist to pay attention to such symptoms, a short clinical examination for TMD has been used for some years. The aims of the study are to assess the reliability of this short clinical examination, to compare the information gained from the short examination with a well-known and validated examination method, the DC/TMD (diagnostic criteria for temporomandibular disorders) and to evaluate the sensitivity and specificity of the short examination.

Materials and methods

Patients with different types of TMD symptoms, 15 years of age and older, referred to an Orofacial Pain and TMD Clinic in Gothenburg, Sweden, were included. Persons not speaking Swedish, or in bad general medical or psychological condition were excluded. The study comprises 52 consecutive, newly referred patients at their first visit and examination at the clinic; 38 females, mean age 44.2 years, and 14 males, mean age 44.4 years. Clinical examination was performed using both the short examination and according to the DC/TMD [17]. Informed consent to be examined twice was obtained from each patient. No patient identification was obtained or saved.

The patients first answered the three screening questions with 'yes' or 'no' posed by an assisting staff member [1]: (1) Do you have pain of the temple, face, TMJ or jaws once a week or more often? (2) Do you have pain when you open your mouth wide or chew once a week or more often? (3) Does your jaw 'catch or lock' once a week or more often? The answers were available to the examiners only after their clinical examination had been performed.

During the first part of the study the new short clinical examination was compared to the DC/TMD examination. The DC/TMD examination followed the instructions and commands, and the examiner was trained in and used to performing that examination. Half of the group of patients was first examined according to the DC/TMD, with the same examiner for all patients, and half of the group first had the short clinical examination, with the same examiner for all patients. There was an interval of five minutes between the examinations and then the examiners changed the groups. The examiners, one male and one female, had no information about the result of the preceding examination or the reason for the patient's referral to the clinic.

In order to evaluate the inter-examiner variation of the short examination another group of 40 newly referred patients to the clinic, with the same inclusion and exclusion criteria as the previous group, was examined twice according to the short clinical method by two different examiners and with the examination repeated with an interval of five minutes. Half of the group was first examined by examiner A and half of the group by examiner B. Both examiners were women and colleagues at the clinic, but had not been trained together before the examination. The gender proportions were the same as for the previous group examined, and the mean age was 44 years (15–81). Also, for this group, no information was available to the examiners about the patients' reason for the referral or the result of the preceding examination. The patients' answers to the screening questions were presented to the examiners after the clinical examination.

For both patients group, an assisting staff member noted the findings during the examination, and after each examination, the examiner reported the patient's diagnoses. The patients then continued with the treatment at the clinic.

The short clinical examination method is presented in Figures 1 and 2. Muscle tenderness to palpation gave the diagnosis of myalgia and TMJ tenderness the diagnosis of arthralgia. The diagnosis of disc displacement with reduction was given from the clinical examination and the sign of TMJ clicking. For the diagnosis of headache associated with TMD, a tenderness to palpation in the temporal muscle and the patient's report of pain in the screening question was required.

Statistical analysis

The data from the examinations were analysed using the SPSS version 22. The reliability was determined using the percentage of agreement between the examinations (both negative and positive findings) and with Cohen's Kappa (0–1), which was interpreted as excellent if >0.80, good 0.61–0.80, moderate 0.41–0.60 and fair ≤ 0.40 [18]. The results for both the left and right sides were pooled for each patient.

The reliability of the continuous variables was determined by using the intra-class correlation coefficient (ICC) [19] with values of ≥ 0.75 as of acceptable agreement [20], and the 95% confidence interval (CI) [21] is presented. The sensitivity (true positive/positive = true positive/(true positive + false negative) and specificity (true negative/negative = true negative/(true negative + false positive) of the short examinations, with the DC/TMD as the golden standard, was analysed using the SAS software. The analysis was performed in cooperation with Academic Statistics, Gothenburg University.

Results

The mean maximum mouth opening capacity was 46.2 (SD = 8.38) mm with the DC/TMD examination and 44.7 mm (SD = 7.28) with the short examination, a significant difference between the two different examination methods ($p = 0.014$, mean difference = 1.71 mm). Regarding the inter-examiner analysis of the short examination the mean maximum mouth opening capacity was 45.0 mm (SD = 7.75) and 45.3 mm (SD = 7.30) respectively for the two examiners (not significant, mean difference = 0.15 mm).

The reliability for maximum opening capacity evaluated by the ICC for a single measure by the DC/TMD and the short clinical examination was 0.862 (95% CI 0.721–0.918), and for repeated examinations by two examiners with the short examination 0.945 (95% CI 0.899–0.971). The reliability for the two examination methods, as well as repeated short examinations, was acceptable.

The overall agreement between the two examination methods for different diagnoses was good to excellent and

The short clinical examination method

Instructions	Observe
Place the patient in a slightly upright position in the dental chair and the examiner in front of the patient.	
Place the palms of examiner´s hands on both sides of the cheeks, TMJs and temples with good contact but no pressure, to be able to "listen" and feel with the hands.	
Ask the patient to open the mouth as much as possible at a moderate speed and if any pain or discomfort, to point to the area with a finger, or fingers if bilateral.	During the opening path, listen with your hands and observe any clicking, locking or deviation. Note the area of reported pain or discomfort during opening.
Ask the patient to keep the open position for a couple of seconds, then to close the mouth and to clench in the normal bite position.	Observe the opening capacity and measure it with the width of your fingers or with a ruler. Observe any deviation or clicking during closing.
Ask the patient to repeat the opening procedure once more,	Confirm or reject your impression from the first opening. During the seconds of opening, also look briefly for mucosal impressions and attrition/erosion.
and then to clench in the normal bite position.	Observe briefly how this is done and look for major aberrations of the occlusion.
Palpate bilaterally and extra-orally; m. temporal anterior and middle, the TMJs laterally and m. masseter superficial and posterior. Maintain the palpation pressure in each site at approx. one kg for two seconds.	Note any tenderness to palpation

Figure 1. The short clinical examination method.

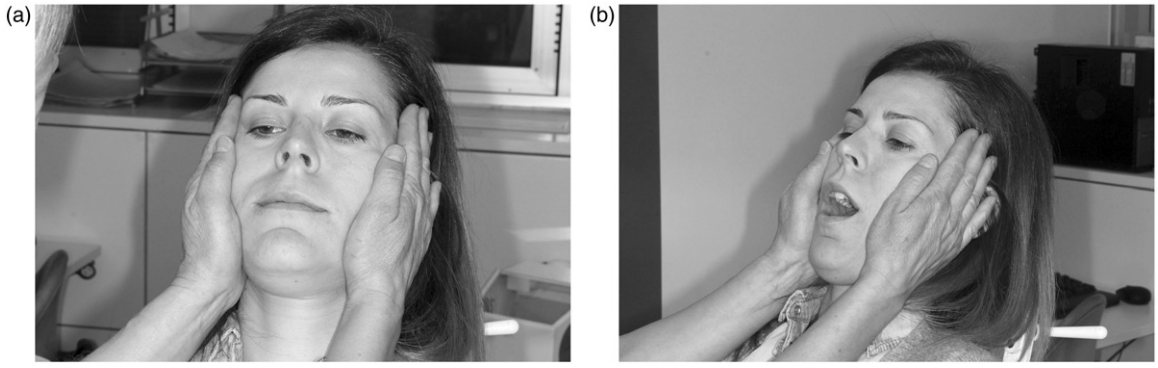

Figure 2. (a, b) The short clinical examination with the palms on both sides of the cheeks, TMJs and temples with a good contact but no pressure, to be able to 'listen' and feel with the hands.

Table 1. Prevalence of some TMD diagnoses according to DC/TMD/short examination and agreement with Cohens Kappa and percentage of agreement, and specificity and sensitivity of the short examination with the DC/TMD as the golden standard.

	DC/TMD/short examination ($n = 52$)					Short examination ($n = 40$) two examiners		
Diagnoses	Prevalence	Kappa	Agreement (%)	Sensitivity	Specificity	Prevalence	Kappa	Agreement (%)
Myalgia	39/41	0.844	96	1	0.97	33/32	0.754	93
Arthralgia	30/32	0.650	83	0.84	0.77	20/16	0.655	86
Disc displacement with reduction	18/17	0.711	87	0.88	0.94	14/18	0.688	85
Headache associated with TMD	22/21	0.881	94	0.91	0.94	14/14	1	100

Prevalence of TMD diagnoses with repeated short examinations, examiner A/B, and agreement with Cohens Kappa and percentage of agreement (n = number of patients).

about the same degree of agreement was found for examinations with the short examination and two examiners (Table 1). The sensitivity and specificity for diagnoses of the short examination, with the DC/TMD as the golden standard, was high. The greatest variation between the different methods was noticed for arthralgia (Table 2). Arthralgia also had the least good agreement with repeated short examinations.

Regarding different TMD symptoms, TMJ tenderness on palpation and pain on movements had a moderate agreement between the different examination methods. Deviation of the opening path showed moderate agreement for repeated short examinations, but only fair agreement between the DC/TMD and the short examination (Table 3). The specificity of the short examination was good, while somewhat lower values was found for the sensitivity compared to DC/TMD as the golden standard.

Discussion

The short examination method provided enough information to decide if there was a clinical dysfunction. Both groups examined were regarded as representative of patients referred to a specialist clinic due to TMD symptoms and suitable for a comparison of the methods. The screening questions are a simple way get information about reported symptoms, but they should be combined with a clinical examination, both to decide whether the reported symptom is associated with the jaw function, and to discover dysfunction unknown to the patient.

One important factor when comparing the different examination methods is the different definitions of the diagnoses according to the DC/TMD, on the one hand, and the short examination on the other, and the comparison is not based on quite the same fundamentals. This distinction is important, and the different conditions required for a diagnosis could partly explain the differences found between the examinations methods. From the comparison of different signs it can be seen that the specificity of the short examination is high while the sensitivity is lower, which can be expected from a less detailed examination.

The DC/TMD examiner was self-instructed and was calibrated in that method [22], meaning that there was a valid DC/TMD examination performed. The two dentists performing the short examination had read the instructions for that examination, were colleagues at the same TMD Clinic and thought they examined and interpreted signs in the same way, but they had no calibration before the examination, which would probably have increased the agreement of their examinations [23].

The greater mouth opening capacity recorded with the DC/TMD examination was probably a result of the method, where the patient first 'opened as much as possible without pain' before 'opening as much as possible despite pain', while 'opening as much as possible' was the only opening performed with the short examination. The examiners' different gender may also have influenced the patient's opening capacity in different ways [24].

Arthralgia showed great variation. It may be difficult to differentiate between muscle and joint pain on palpation, but the examiners had similar instructions for the lateral palpation of the TMJ for both the examination methods. Another study found the agreement for TMJ arthralgia to vary greatly between different examiners and with a mean agreement of 56% with repeated examinations according to the research diagnostic criteria for TMD (RDC/TMD) [25].

The examination regarding the sign of TMJ clicking is more detailed with the DC/TMD than with the short examination, which could explain some of the differences regarding this sign between the methods. However, TMJ clicking showed great variation also for the inter-examiner variation of the short examination, which was regarded as a consequence of joint sounds varying and a possible variation in the interpretation between examiners. A study found a 78% inter-observer agreement for clicking examined according to RDC/TMD [20], and another study concluded that the joint sound reliability was moderate to poor [26].

For the reliability of muscle palpation an agreement of 65% was found [27], and the inter-observer variability was regarded unacceptable. Since then, the method of palpation, both regarding muscle and joint palpation with the DC/TMD and the RDC/TMD methods have been better standardized. However; the reliability of the diagnosis of myofascial pain, with repeated examinations according to the RDC/TMD, was only fair/good regarding the ICC values [25].

Table 2. The number of patients with arthralgia found with the DC/TMD and the short clinical examination in 52 patients.

	DC/TMD	
Short	Negative	Arthralgia
Negative	17 (32%)	3 (6%)
Tenderness on TMJ palpation laterally	5 (10%)	27 (52%)

Table 3. Prevalence of some TMD symptoms according to DC/TMD/short examination and agreement with Cohens Kappa and percentage of agreement, and specificity and sensitivity of the short examination with the DC/TMD as the golden standard.

	DC/TMD/short examination ($n = 52$)					Short examination (two examiners) ($n = 40$)		
Symptoms	Prevalence	Kappa	Agreement (%)	Sensitivity	Specificity	Prevalence	Kappa	Agreement (%)
Pain on movement	38/27	0.425	71	0.66	0.86	28/21	0.541	76
Deviation on opening	7/20	0.214	67	0.71	0.67	13/11	0.514	75
TMJ tenderness (right + left joints)	41/29	0.435	69	0.66	0.82	21/17	0.655	86
TMJ clicking (right + left joints)	22/20	0.583	87	0.64	0.93	21/18	0.574	83

Prevalence of TMD symptoms with repeated short examinations, examiner A/B, and agreement with Cohens Kappa and percentage of agreement (n = number of patients).

Deviation on mouth opening was examined in a similar way with both the examination methods, and the variation between the examinations could therefore mainly be explained by individual variations in performing and judging the deviation on mouth opening. This symptom should be looked at with greater importance and accuracy when examined, regardless of the method.

The short examination took 2–3 min to perform, an examination of the jaw system that might be possible to include in the general dental examination. However, the study was performed at a specialist clinic and therefore a validation of the short examination should be performed also at a population level where TMD signs and symptoms are less common than among TMD referrals.

Conclusions

The short clinical examination has acceptable reliability, and the examination provides enough information about the jaw function to decide whether there is a dysfunction and to discuss the symptoms with the patient.

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Disclosure statement

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