Translation and Adaptation of the RDC/TMD Protocol

Prepared by:

Richard Ohrbach, DDS, PhD
University at Buffalo, NY, US

Mike T John, DDS, PhD
University of Leipzig, Germany

Frank Lobbezoo, DDS, PhD
ACTA, The Netherlands

Yoly M Gonzalez, DDS, MS
University of Buffalo, NY, US

Samuel F Dworkin, DDS, PhD
University of Washington, Seattle, WA, US

For the

Committee for Translations and Protocols

International RDC-TMD Consortium

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The "Guidelines for Establishing Cultural Equivalency of Instruments", Ohrbach et al, [1] specifies in detail the recommended steps and procedures for adapting an instrument to another language. This document provides additional information specific to the translation of the RDC/TMD protocol, the assessment components of the original publication, Dworkin SF LeResche L, editors, Research Diagnostic Criteria for Temporomandibular Disorders: Review, Criteria, Examinations and Specifications, Critique, Journal of Craniomandibular Disorders, Facial & Oral Pain, 6:301-355, 1992. This document describes the following:

A. Notes on the translation process;
B. Particular aspects of the RDC-TMD Initial Patient History which require specific attention in the translation process proper;
C. Examiner commands to facilitate the translation of that part of the protocol;
D. Alternative methods of constructing selected coding sections of the examination form;
E. Summary of the psychometric issues associated with each major section to be translated, in order to highlight equivalency issues and anticipated problems in producing a correct translation.

A. Notes on the Translation Process

1. While most extant translated versions of the RDC/TMD available on the website for the International RDC/TMD Consortium (www.rdc-tmdinternational.org) were created with only one translator, it is more efficient in the long-run to create translations via two translators working independently with respect to the eventual goal of cultural adaptation.

2. The minimal sections of the RDC/TMD protocol which must be translated include:
    a. the entire Initial Patient Questionnaire;
    b. the verbal commands used for directing the patient during the examination;
    c. examination recording form.

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3. The other published components of the RDC/TMD protocol (examination specifications, scoring rules for Axis I and Axis II components, and summary diagnosis form, all available in English on the Consortium website) may be translated, depending on time, interest, and needs of the developer of the translated version; whether those parts are translated may depend on English fluency of clinicians who will be using the RDC/TMD protocol.

4. For the final document containing the translated version of the RDC/TMD, two face pages should be constructed; the first face page will be in the target language (i.e., non-English), and the second face page will be in English. The face pages identify the various contributors for the translation, back-translation, and review. See examples of preferred face pages (e.g., Spanish, Italian, and Arabic) that accompany the translated versions of the RDC/TMD posted on the Consortium web site (www.rdc-tmdinternational.org).

B. RDC/TMD Initial Patient History

Regarding the Initial Patient Questionnaire as originally published, there are several items that require either correction or modification:

1. Items 12 and 13 addressing the Graded Chronic Pain Status use the wrong forms of the question and anchors for the response scale. Item 11 demonstrates the correct form of the question, along with the correct anchors.
    a Item 11: the question states “In the past six months, how much has facial pain interfered with your daily activities rated on a scale from 0 to 10, where 0 is ‘no interference’ and 10 is ‘unable to carry on any activities’?” And the anchors are “no interference” and “unable to carry on any activities” for 0 and 10, respectively".
    b Item 12 should be: “In the past six months, how much has facial pain interfered with your ability to take part in recreational, social, and family activities rated on a scale from 0 to 10, where 0 is ‘no interference’ and 10 is ‘unable to carry on any activities’?” The anchors for the response scale should be as listed for Item 11.
    c Item 13 should be: “In the past six months, how much has facial pain interfered with your ability to work (including housework) where 0 is ‘no interference’ and 10 is ‘unable to carry on any activities’?” The anchors for the response scale should be as listed for Item 11.

2. Item 22: The question "How good a job do you do..." does not refer to employment, but rather to how well a person is taking care of their oral health. The phrase “how good a job” is idiomatic English, and is frequently mistranslated.

3. Items 25 and 26 should be adapted to the ethnic and racial groups prevalent in the area of the target language. See E.5 for further guidelines.

4. Item 30 should be adjusted to reflect appropriate subdivisions in annual income in the area of the target language. See E.5 for further guidelines.

5. Item 31 (zip code in the US) is probably not the correct term for areas outside the United States; however, many countries use similar location or postal codes, and if so, that terminology can be substituted.

6. The RDC/TMD is organized with clinical items first, and demographic items last. For some cultures, this appears to be an expected sequence, especially in a busy university clinic. In other cultures, however, the expectation is that demographic items will precede clinical items. For such situations, the recommended solution is to insert a HardPage into the translated document, just prior to the items assessing demographics. The user can then rearrange the pages so that the demographics appear first, followed by the clinical items, yet the item numbering remains intact.

C. Examination Commands

The language used by the examiner during the examination is a set of operationalized commands that must be translated just as carefully as a self-report instrument; otherwise, the exact behavioural context for subject response during the examination may not be consistent with the intent of the command and may result in non-comparability of data with that obtained in other languages. As stated in the original RDC/TMD publication, the RDC/TMD examination protocol was intended to accomplish two objectives in particular: (1) be a starting point for developing examination standards, and (2) provide an operationalized basis for collecting descriptive data of an individual's physical status. Consequently, translators must be very careful in the translation process to produce examination commands that have the same meaning (which includes the same cultural equivalence) as expressed in the English examination commands. Examiners must then be equally careful to use the culturally equivalent commands when actually conducting the RDC/TMD examination.

Nothing in these instructions about rigorous examination commands that carry the same meaning and clarity in all languages should be construed to imply that investigators are not free to add new or modified items, following the core protocol, if they wish to empirically test hypotheses about the examination protocol or particular types of findings; again, the emphasis here regards adding items, not modifying the verbal command protocol.

Appendix A lists the verbal commands for the RDC/TMD protocol examiner; included are the original RDC/TMD protocol commands, text revision commands, and translation-base commands. The text-revision commands have been extracted from the document, "Expanded Specifications for TMD Examinations with Clarifications" (2005), available on the Consortium web site; that document is a text revision of the published protocol and it should be consulted for the current operationalizations of the clinical examination. The text-revision commands and operationalizations were modified according to ambiguities and based on consideration of the original intention of each clinical test. Some portions of the text-revision commands are stated figuratively but not literally, and no attempt was made to modify the commands in terms of

possible translation concerns. The translation-base version was modified from the text-revision version of the commands in order to foster greater clarity in translating the commands correctly.

Ongoing examiner training around the world as well as extensive discussions with translators of other language versions of the RDC/TMD protocols have indicated that the English language verbal commands needed slight modification in order to better lend themselves to translation to the conversational form in other languages; the primary goal of all modifications in the translation-base commands was to resolve potential ambiguities in the English form of the commands. For example, for pain-free opening, the command (in English) might be "Open as wide as you can, without any pain", or it might be "Open as wide as possible without pain" or it might be "Open maximally without pain". While each of these versions means the same thing in English and while each can be translated reasonably accurately to another language; only the version "Open as wide as you can…." appears to translate well to the conversational forms in other languages and consistent with the intention of the source item. Another example is to "close your teeth completely together"; in one language (at least), the phrase "completely together", if translated literally, means to the speaker of that language that the teeth should be clenched tightly together, which is not at all a requirement for the valid performance of the particular examination command; hence, the phrase, "…but not clenching" was added as a reminder to the translator that the intent in bringing the teeth completely together is a spatial one, not one that involves any extra force. The Commands for Translation have been reviewed and revised as necessary following evaluation by current translators of the Arabic, Dutch, German, Spanish, and Swedish versions of the RDC/TMD. If other translators find problems with the current wording, they are invited to contact the first author of this document for further review.

Slight modifications in sequencing of segments of commands in order for the verbal component to better match the mechanical component, so that translators and users in other languages would potentially have a better understanding of how the command is supposed to be used. The translator should also refer to the column, "Revised Command", as a comparison to the translation-base command in order to better understand why additional text is sometimes present for the translation-base commands; that additional text is intended as a guide to the translator and not necessarily a requirement for inclusion into a literal translation. Rather, translation for meaning and cultural equivalency is the goal.

Our bias is that verbal language used during the examination should be as simple and direct as possible (i.e., make it as clear as you can) in order to foster common-sense understanding on the part of the patient or subject. The form of the language for the verbal examination commands should therefore be regarded as our attempt to provide as clear a statement as possible regarding what the essential operations are in the performance of each examination procedure. We also recognize, however, that the final performance of a command rests upon shared understanding on the part of the subject or patient, and that that understanding often emerges from non-verbal communication or ancillary commands which examiners instinctively provide. After capturing the essential component of a command, common-sense usage should be foremost for the translator and user.

The Commands for Translation in Appendix A must be translated and included as a separate section in the translated version of the RDC/TMD.

D. Examination Recording Form

The examination form in the original published RDC/TMD contains three problems.

The first problem pertains to a lack of clarity in the history review that is the first part of the examination. The modified questions are included in Appendix A.

The second problem lies in the sequencing of the examination sections. The examination protocol, supported by the suggested examination form, has the sequence: vertical mobility, open and close joint sounds, horizontal mobility, horizontal movement joint sounds. While there is a logic to this sequence, most examiners find it cumbersome for two reasons: (1) picking up and putting down the measurement ruler twice, and (2) lack of continuity of fully tracking (a) the mobility associated with open/close vs horizontal movements and (b) joint sounds associated with open/close vs horizontal movements. For these reasons, the suggested sequence for the examination procedures and recording form are: vertical mobility, horizontal mobility, open and close joint sounds, and horizontal movement joint sounds.

The third is an error, with respect to how pain is recorded in response to jaw movement. The original publication has the following two tables, the first for vertical mobility and the second for horizontal mobility:

VERTICAL MOBILITY

		PAIN				JOINT		
		None	Right	Left	Both	Yes	No	NA
a. Unassisted opening without pain	__ __mm							
b. Maximum unassisted opening	__ __mm	0	1	2	3	1	0	9
c. Maximum assisted opening	__ __mm	0	1	2	3	1	0	9
d. Vertical incisal overlap	__ __mm							

HORIZONTAL MOBILITY

		PAIN				JOINT		
		None	Right	Left	Both	Yes	No	NA
a. Right Lateral Excursion	__ __mm	0	1	2	3	1	0	9
b. Left Lateral Excursion	__ __mm	0	1	2	3	1	0	9
c. Protrusion	__ __mm							
d. Midline Deviation	__ __mm	RIGHT 1				LEFT 2		

The problem with the preceding arrangement is that if muscle pain is absent, contralateral to the side of the joint pain, or bilateral but joint pain is unilateral, the laterality of the joint pain cannot be identified and, consequently, a diagnosis of arthralgia cannot be assigned.

There are two possible solutions. The first one (A) is the method that has been used by most translated versions of the RDC/TMD to date; note that this arrangement represents a different organization compared to how palpation findings are recorded.

Version A:

MUSCLE				JOINT			
None	Right	Left	Both	None	Right	Left	Both
0	1	2	3	0	1	2	3

The other solution (B) represents a more recent change in the way that many examiners monitor and record the information as subjects report the data; please note, however, that the format of version B, if used for recording mobility associated pain, is also the same as that used for recording palpation pain, which in our mind makes it a clear choice.

Version B:

RIGHT				LEFT			
None	Muscle	Joint	Both	None	Muscle	Joint	Both
0	1	2	3	0	1	2	3

But more importantly, note that the data in Version A and in Version B are logically equivalent as recorded in these two solutions and simply represent different methods of conveying the same information. Obviously, any data storage methods would need to incorporate the arrangement of the variables on the examination form.

Because the method for recording muscle pain is unambiguously like that of Version B (i.e., spatially organized by side), Version B is the preferred method for organizing the examination form for all other items on the examination recording form which require lateralization.

E. Psychometric Issues Associated with Translation and Equivalency of Major RDC/TMD Sections

The RDC/TMD document describes a clinical assessment protocol that is actually very complex in terms of the psychometric methods associated with establishing reliability and validity in a cultural context. The types of instruments include examination commands (discussed above), single item inquiries, checklists (an aggregate of single item inquiries held together by a common theme such as “jaw symptoms” or “joint sounds”), and formal measurement scales (e.g., Graded Chronic Pain, Depression, Somatization). Each type of instrument has its own standards for assessing reliability and validity. In the following section, “Stages” refers to process stages of development as described in the document, Guidelines for Establishing Cultural Equivalency of Instruments.

1. Clinical RDC/TMD examination

- Translation. All verbal commands need to go through Stages I-IV. The pre-testing phase of Stage V in a small group of subjects is sufficient and should be done, but the field test phase is probably not necessary. The recording form (used by the examiner) should also be translated for data collection and reviewed via trial usage.
- Reliability. The primary psychometric methods for verbal commands are bilingual reliability (see Guidelines document for explanation), test-retest reliability, and inter-rater reliability. Such analyses provide evidence for the correctness of the translated verbal commands.
- Validity. Simple face validity of the examination commands can be verified through usage in an examination reliability study; in other words, does the command result in the expected subject behavior or demonstration of the phenomenon. Construct validity of the clinical examination items and diagnoses is a very complex undertaking, and not part of the purview of this document.
- Responsiveness**.** Not applicable.

2. Jaw disability checklist. (This instrument has been revised, but the potential replacement has not yet been approved by the Consortium)

- Translation. If using this set of items, Stages I-IV are appropriate.
- Reliability. The primary assessments are test-retest reliability and bilingual reliability. There is no evidence for the items, as stated, forming a construct and hence internal reliability coefficients might be misleading.
- Validity. Not applicable in its present form.
- Responsiveness**.** Not applicable for a checklist.

3. Graded Chronic Pain items

- Translation. The published RDC/TMD instrument contains errors in wording of the stems for items 12 and 13 (as described above), and in contrast to correct version of the Graded Chronic Pain instrument as published (M. Von Korff, J. Ormel, F. J. Keefe, and S. F. Dworkin. Grading the severity of chronic pain. Pain 50:133-149, 1992). The stems for the measurement scale, for items 12 and 13, should be the same as in item 11. Translation is straight-forward for the pain aspects, but terms for the three domains of life, as expressed in items 11-13, need careful review for cultural equivalency. Stages I-V should be performed.
- Reliability. Test-retest assessment is the primary form of analysis that can be done, as internal reliability for this item is harder to interpret due to the complex nature of all seven of the items that comprise the Graded Chronic Pain Scale (items 7-13).

  Moreover, the Chronic Pain Grades 1-4 are derived from a Mokken analysis, and hence customary reliability statistics are not useful for the instrument as a whole. However, internal reliability is appropriate for the Characteristic Pain items (items 7-9) and for the interference items (items 11-13). Additionally, Rasch analysis also yields a clearly reliable measurement scale for each of pain and interference items, when using data

collected in the US, but whether this holds true for other countries is as yet unknown and, as such, Rasch (or other IRT) analysis for item reliability may be premature.

- Validity. Pain scaling across cultures (i.e., from the characteristic pain items) clearly needs attention via data analysis. However, cultural equivalency should not be based solely on demonstrating the equivalence of pain scores across cultures. This may be a situation where confirmatory factor analysis is the appropriate assessment method for validity.
- Responsiveness**.** Establishing responsiveness in the context of cultural equivalency of these items is beyond these guidelines.

4. Depression and somatization items
   - Translation. These items index traits that clearly require the full set of Stages described in the Guidelines document. RDC/TMD translation developers should note that the anxiety items from the SCL90 should also be included in this section of the RDC/TMD instrument. Translators should note that the item referencing a "blue" mood will likely need cultural modification. Alternately, a developer may want to consider two other options. The first is to include the entire SCL90-Revised (SCL90-R) which may already be available in the target language, sometimes even accompanied by psychometric data with regard to reliability and validity; note that the Revised version of the SCL90 is copy-righted, while the original SCL90 is not. The second is to include the Hopkins Checklist 58 (HSC-58, a public domain shorter version of the SCL90), in order to measure other constructs. The HSC-58 has been translated into a number of languages around the world, is actively used by cross-cultural researchers, and consequently provides an existing translation for the depression, somatization, and anxiety items needed for the RDC/TMD instrument; translators/developers may want to consider that instrument as a reference (if not to be totally included) for the translation stage, but further equivalency stages cannot be assumed to have been performed on that instrument unless clearly indicated in a publication. The intent of the original RDC/TMD was to include psychological items for assessing mood and behavior in the most efficient manner possible as a screening instrument, not as a definitive diagnostic evaluation of the respective constructs. This intention, vis-à-vis stepped models of evaluation and treatment, should be carefully considered before making a final decision regarding the level of assessment to incorporate for a clinical (research) version of the RDC/TMD.
   - Note1. While the Initial Patient History, as published, contains scales only for depression and somatization, the addition of anxiety into pain research is regarded globally as very relevant. A suggested set of items which assess depression, somatization, and anxiety (all derived from the SCL90, in English) is attached as Appendix B.
   - Note2. As stated in the original RDC/TMD publication, other instruments with established reliability and validity in the target language could be substituted for the depression, anxiety, and somatization items in the RDC/TMD Initial Patient History Questionnaire. While maintaining direct comparability is ideal, pragmatics with respect especially to the translation of items pertaining to personal experience may be more important and dictate the selection of other instruments assessing depression, somatization, and anxiety for use in a given culture when such instruments already exist.

As noted in the Guidelines document [1], translation and in particular cultural equivalency of instruments that assess mood and similar constructs can be a complex undertaking.

- Reliability. Stages I-V should be followed.
- Validity. Stages I-V should be followed. Moreover, full construct validity in a given culture requires collection of data for assessing formal validity as is commonly used in test development assessment. See Norman and Streiner, Health Measurement Scales, 3rd edition, NY: Oxford University Press, 2003, for suggested methods.
- Responsiveness**.** Contemporary methods should be used such as those described in Norman and Streiner.

5. Education, income, and ethnic status.
   - Translation. Questions in the RDC/TMD Initial Patient History assessing education, income, and ethnic status need to be carefully revised for each national setting in order to appropriately capture the respective information in a manner that is accurate for that setting. Suggested approaches are as follows:

     (1) Years of education seem to be based on an approximately equivalent unit throughout the world. At an instrument level, the grouping of the years may well differ (e.g., elementary school may be 4, 5, or 6 years). And, in some countries, the number of years of education do not necessarily map directly to other countries due to strong differences in the education programs. Consequently, significant attention in data analysis of this variable is needed even though the raw numerals appear equivalent across settings.

     (2) Income levels for each bracket should be based on national indices which may represent quartiles. Socioeconomic status is still best measured on the basis of both education and income; in the US, there is also a directory of job classifications, which also permits the inclusion of job status into the computation of SES. If there is such a directory on other countries, the instrument developer might want to consider the inclusion of that kind of item in the Questionnaire if SES is of significant interest.

     (3) There are also national statistics units which provide classifications of value for these variables. The national statistics unit in The Netherlands has links to similar units in many countries throughout the world; see http://www.cbs.nl/nl/service/links/default.asp#Europa to get started. In general, it can be recommended to use instruments which have been already used in large national health-related surveys. National survey databases should be consulted, if available.

   - Reliability. If new items are developed, bilingual reliability and test-retest reliability are important.
   - Validity. For new items, face validity is probably sufficient if the constructs are well established.
   - Responsiveness**.** Not applicable.

6. Remainder of Patient Questionnaire
   - Translation. The remainder of the Questionnaire can be translated directly, recognizing that some words such as “click”, “lock”, and “pain” may require special attention. Clinical symptoms relating to mechanical jaw problems seem especially prone to problems in translation and adaptation; this is also true in English.
   - Reliability. Test-retest reliability or bilingual reliability are sufficient for single items.
   - Validity. Prospective validation studies are needed to assess the physical symptom items.
   - Responsiveness**.** Not applicable.

References

1. Ohrbach R, Jezewski MA, Bjorner JB et al. Guidelines for Establishing Cultural Equivalency of Instruments. 2007.

Appendix A. RDC/TMD Examination Commands

Instructions to patients during the examination have been modified as follows. See Section C for further information.

CONSTRUCT	PUBLISHED COMMAND	REVISED COMMAND*	COMMAND FOR TRANSLATION
REVIEW HISTORY			
Laterality of pain: last month	<Not literally stated>	In the past month, have you had pain on the right side of your face, the left side, or both sides?	In the past month, have you had pain on either the right side of your face, the left side, or both sides?
Location of pain: last month	<Not literally stated>	Could you point with one fingertip to each of the areas where you have felt pain *in the past month*? Are there any other areas where you have felt pain *in the past month*?	Could you point with one fingertip to each of the areas where you have felt pain *in the past month*? Are there any other areas where you have felt pain *in the past month*?
OPENING PATTERN			
Starting position	Place your mouth in a comfortable position with your teeth lightly touching.	Place you mouth in a comfortable position with your back teeth completely together.	Place your mouth in a comfortable position with your back teeth completely together but not clenching.
Opening pattern	I'd like you to open your mouth as wide as you can even if it's a little painful.	I'd like you to open your mouth as wide as you can, even if it's painful.	I would like you to open your mouth as wide as you can three times, even if it is painful.
VERTICAL RANGE OF MOTION **PAIN FREE OPENING**			
Starting position	Place your mouth in a comfortable position.	Place your mouth in a comfortable position.	[Place your mouth in a comfortable position. **]
Pain-free opening	I would like you to open as wide as you can without feeling any pain.	I would like for you to open your mouth as wide as you can, without feeling any pain, or without increasing your current pain.	IF THERE IS NO PAIN PRIOR TO STARTING THE EXAMI would like you to open your mouth as wide as you can without feeling any pain. IF PAIN IS ALREADY PRESENT: I would like you to open your mouth as wide as you can without increasing your current pain.
MAXIMUM UNASSISTED OPENING			
Starting position	Place your mouth in a comfortable position.	Place your mouth in a comfortable position.	[Place your mouth in a comfortable position.]
Maximum unassisted opening	I would like you to open your mouth as wide as you can, even if it's a little uncomfortable.	I would like for you to open your mouth as wide as you can, even if it's painful.	I would like you to open your mouth as wide as you can, even if it is painful.
Post-MUO pain	When your opened this time, did you have any pain?	When you opened this time, did you have any pain?	Did you have any pain when

CONSTRUCT	PUBLISHED COMMAND	REVISED COMMAND*	COMMAND FOR TRANSLATION
			you opened this time? IF YES, USE FOLLOW-UP QUESTIONS ***
MAXIMUM ASSISTED OPENING			
Starting position	Place your mouth in a comfortable position.	Place your mouth in a comfortable position	[Place your mouth in a comfortable position.]
Preliminary opening	I would like you to open your mouth as wide as you can, even if it's a little uncomfortable.	I would like for you to open your mouth as wide as you can, even if it's painful.	I would like for you to open your mouth as wide as you can, even if it is painful.
Maximum assisted opening	I am checking to see if I can push your mouth open a little further and I will stop if you raise your hand.	I am checking to see if I can push your mouth open a little further and I will stop if you raise your hand.	I will place my fingers between your teeth and I will try to open your mouth wider. Please raise your hand if you want me to stop.
Post –MAO pain	Did you feel any pain when I tried to open your mouth wider with my fingers?	Did you feel any pain when I tried to open your mouth wider with my fingers?	Did you feel any pain when I tried to open your mouth wider with my fingers? IF YES, USE FOLLOW-UP QUESTIONS.
<u>HORIZONTAL RANGE OF MOTION</u> RIGHT LATERAL EXCURSION			
Right lateral excursion: measurement	Move your jaw as far possible toward the right, even if it is uncomfortable, and move your jaw back to its normal position.	Open slightly, and move your jaw as far as possible towards the right, even if it is painful. Then hold it in that position with your teeth slightly apart until I take a measurement.	Open slightly, and move your lower jaw as far as possible towards the right, even if it is painful. Then hold it in that position with your teeth slightly apart until I take a measurement.
Return jaw	<See prior command>	<Not literally stated>	Move your jaw back to its normal position.
Post excursion pain	<Not literally stated>	Did you feel any pain when you moved your jaw to the side?	Did you feel any pain when you moved to the right side? IF YES, USE FOLLOW-UP QUESTIONS.
LEFT LATERAL EXCURSION			
Left lateral excursion: measurement	I would like you to now move your jaw as far as possible toward the other side and back to its normal position.	Open slightly and move your jaw as far as possible towards the left, even if it is painful. Hold it in that position with your teeth slightly apart until I take a measurement.	Open slightly and move your lower jaw as far as possible towards the left, even if it is painful. Hold it in that position with your teeth slightly apart until I take a measurement.
Return jaw	<See prior command>	<Not literally stated>	Move your jaw back to its normal position.
Post excursion pain	Did you feel any pain when you moved to the side?	Did you feel any pain when you moved to the side?	Did you feel any pain when you moved to the left side? IF YES, USE FOLLOW-UP QUESTIONS.

CONSTRUCT	PUBLISHED COMMAND	REVISED COMMAND*	COMMAND FOR TRANSLATION
PROTRUSIVE			
Protrusive excursion: measurement	Slide your jaw straight out in front of you as far as you can, even if it is uncomfortable**.**	Open slightly and slide your jaw straight out in front of you as far as you can, even if it is painful. Then hold your jaw in that position until I take a measurement.	Open slightly and slide your lower jaw forward as far as you can, even it is painful. Then hold your jaw in that position until I take a measurement.
Return jaw	<Not literally stated>	<Not literally stated>	Move your jaw back to its normal position.
Post protrusion pain	Did you feel any pain when you moved your jaw forward?	Did you feel any pain when you moved your jaw forward?	Did you feel any pain when you moved your jaw forward? IF YES, USE FOLLOW-UP QUESTIONS.
INCISAL RELATIONSHIPS			
Starting position	<Not literally stated>	<Not literally stated>	Put your back teeth completely together, but not clenching.
Vertical incisor overlap	<Not literally stated>	<Not literally stated>	Open slightly.
Horizontal incisor distance *Midline*	<Not defined> <Not literally stated>	<not defined> <Not literally stated>	Put your back teeth completely together again, while I make some measurements.
<u>JOINT NOISES</u> **PRESENCE OF CLICK: VERTICAL RANGE OF MOTION**			
Inquiry regarding joint sounds prior to exam	<Not literally stated>	Do you have sounds in your right joint, left joint or both? IF YES: What sounds do your joints make and on which side do you hear these sounds?	Do you notice sounds in your right jaw joint, left jaw joint or both? IF YES: What sounds do your joints make and on which side do you hear these sounds?
Detection of open and closing joint sounds	While I have my fingers over your joint, I would like you to slowly open as wide as you can and then slowly close until your teeth are completely together.	While I have my fingers over your joint, I would like you to slowly open as wide as you can, even it is painful, and then slowly close until your back teeth are completely together.	While I have my fingers over your jaw joints, I would like you to put your back teeth completely together. Then, slowly open as wide as you can [even if it is painful] and then slowly close until your back teeth are completely together again.
POSITION OF CLICK AND ELIMINATION OF CLICK *<IF click is present on at least 2 of 3 cycles>*			
Measurement of opening click	<Not literally stated>	I would like you to slowly open your mouth as wide as you can, even if it's painful, until you feel a click [OR: I ask you to stop] and I will take a measurement.	I would like you to put your back teeth completely together, then slowly open your mouth as wide as you can, even if it is painful, until you feel a click on the right side [OR: I ask you to stop] and I will take a

CONSTRUCT	PUBLISHED COMMAND	REVISED COMMAND*	COMMAND FOR TRANSLATION
			measurement. REPEAT/SUBSTITUTE FOR LEFT SIDE
Measurement of closing click	<Not literally stated>	Open you mouth as wide as you can, even it it's painful, and then close until you feel a click [OR: I ask you to stop] and I will take a measurement**.**	Then, continue opening as wide as you can, even it is painful, and now slowly close until you feel a click on the right side [OR: I ask you to stop] and I will take a measurement. REPEAT/SUBSTITUTE FOR LEFT SIDE
Protrusive reduction of click	<Not literally stated>	Open slightly and slide your jaw straight out in front of you as far as you can, even if it is painful. Keep your jaw forward and open and close from this position.	Put your back teeth completely together. Open slightly and move your lower jaw forward as far as you can, even if it is painful, and from this position open and close your mouth.
PRESENCE OF CLICK: HORIZONTAL RANGE OFMOTION			
Right lateral excursion: joint sounds	Move your jaw as far possible toward the right, even if it is uncomfortable, and move your jaw back to its normal position.	Open slightly and move your jaw as far as possible towards the right, even if it is painful, and move your jaw back to a comfortable position and put your back teeth completely together each time.	Put your back teeth completely together, now open slightly and move your lower jaw towards the right as far as you can, even if it is painful, and move your jaw back to its normal position and put your back teeth completely together each time.
Left lateral excursion: joint sounds	I would like you to now move your jaw as far as possible toward the other side and back to its normal position.	Open slightly and move your jaw as far as possible towards the left, even if it is painful, and move your jaw back to a comfortable position and put your back teeth completely together each time.	Put your back teeth completely together, now open slightly and move your lower jaw towards the left as far as you can, even if it is painful, and move your jaw back to its normal position and put your back teeth completely together each time.
Protrusive excursion: joint sounds	Slide your jaw straight out in front of you as far as you can, even if it is uncomfortable**.**	Open slightly and slide your jaw straight out in front of you as far as you can, even if it is painful, and move your jaw back to a comfortable position and put your back teeth completely together each time.	Put your back teeth completely together, now open slightly and move your lower jaw forward as far as you can, even if it is painful, and move your jaw back to its normal position and put your back teeth completely together each time.
Inquiry regarding joint sounds following exam	<Not literally stated>	Did you hear or feel any sounds in either of your joints when you moved to the right [left, forward]? What sounds did you hear and on which side did you hear them?	Did you hear or feel any sounds in either of your joints when you moved to the right [left, forward]? What sounds did you hear and on which side did you hear them?
Alternate instruction for jaw movement	<Not defined>	IF SUBJECT IS CONFUSED: Move your jaw towards this hand.	IF SUBJECT IS CONFUSED: Move your lower jaw towards this hand.

CONSTRUCT	PUBLISHED COMMAND	REVISED COMMAND*	COMMAND FOR TRANSLATION
MUSCLE AND JOINT PALPATION FOR TENDERNESS			
Introduction to muscle and joint palpation	In the next part of the exam, we'd like to record whether you feel pain or pressure when I palpate or press on certain parts of your head and face.	In the next part of the exam, we'd like you to report whether you feel pain or pressure when I palpate or press on certain parts of your head and face.	Now I am going to touch different areas of your face and head. I will ask you if you feel pain or pressure. If you feel pain, I want you to tell me if the pain is mild, moderate, or severe. Please relax your jaw with your teeth slightly apart while I am pressing.
Defining muscle boundaries	I'm going to press on some muscles. I would like you to clench your teeth together gently and then relax and have your teeth slightly apart form each other.	I'm going to press on some muscles. I would like you to clench your teeth together gently and then relax your jaw with your teeth slightly apart**.**	I am going to press on some muscles. I would like you to gently clench your teeth together and then relax your jaw with your teeth slightly apart.
TMJ condyle: lateral pole	<Not literally stated>	<Not literally stated>	Open slightly, and slide your lower jaw forward and then move it back to its normal position with your teeth slightly apart.
TMJ: posterior aspect	<Not literally stated>	<Not literally stated>	Now, I am going to put my finger in each of your ears. Then, I would like you to open your mouth about half way and then close your mouth, putting your back teeth completely together.
Prelude: lateral pterygoid and temporalis tendon	Now I am going to palpate around to inside of your mouth. While doing these palpations I would like you to keep your jaw in a relaxed position.	Now I am going to palpate around the inside of your mouth. While I do these palpations I would like you to keep your jaw in a relaxed position with your teeth apart.	Now I am going to touch inside of your mouth. While I do this, I would like you to keep your jaw in a relaxed position with your teeth apart.
Lateral pterygoid	<Not literally stated>	<Not literally stated>	Open slightly, and move your jaw towards this hand.

* "Revised Command" refers to the commands found in "Expanded Specifications for TMD Examinations with Clarifications – Prepared for the International RDC/TMD Consortium, 7/10/05.

** The command, "Place your mouth in a comfortable position" is hereafter placed in square brackets indicating that its use at that point in the examination is optional, depending on what the subject does. If the subject automatically returns his/her mandible to a "comfortable position", then nothing more needs to be done by the examiner. Else, the examiner should use the command. It is included with each set of commands in order to remind the examiner that that examination maneuver takes as its starting point the neutral position of the mandible and muscles.

*** “Follow-up questions” are ones that clinicians and researchers generally ask automatically when subject responses are vague or incomplete. For the RDC/TMD protocol, we recommend that following all initial questions that focus on pain and that elicits a positive response from the subject/patient, a systematic set of follow-up questions be used:

- IF YES: Could you point with one finger-tip to each of the areas where you felt pain with that movement? (as indicated by Revised Command, under “Location of pain: last month”)
- IF YES: Are there any other areas where you felt pain with that movement? (as indicated by Revised Command, under “Location of pain: last month”)

Appendix B. Distress items for depression, somatization, and anxiety (from SCL-90)

DISTRESS CHECKLIST
Note: A = Anxiety, D = Depression, S = Somatization are listed only for clarification; these should be removed before actually administering this set of items.

In the LAST MONTH, how much have you been distressed by: (circle appropriate response)

		not at all	a little bit	moderately	quite a bit	extremely
1.	(S) headaches	0	1	2	3	4
2.	(A) nervousness or shakiness inside	0	1	2	3	4
3.	(S) faintness or dizziness	0	1	2	3	4
4.	(D) loss of sexual interest or pleasure	0	1	2	3	4
5.	(S) pains in the heart or chest	0	1	2	3	4
6.	(D) feeling low in energy or slowed down	0	1	2	3	4
7.	(D) sleep that is restless or disturbed	0	1	2	3	4
8.	(A) trembling	0	1	2	3	4
9 .	(D) poor appetite	0	1	2	3	4
10.	(D) crying easily	0	1	2	3	4
11.	(D) feeling of being caught or trapped	0	1	2	3	4
12.	(A) suddenly being scared for no reason	0	1	2	3	4
13.	(D) blaming yourself for things	0	1	2	3	4
14.	(S) pains in the lower back	0	1	2	3	4
15.	(D) feeling lonely	0	1	2	3	4
16.	(D) feeling blue	0	1	2	3	4
17.	(D) worrying too much about things	0	1	2	3	4
18.	(D) feeling no interest in things	0	1	2	3	4
19.	(A) feeling fearful	0	1	2	3	4
20.	(A) heart pounding or racing	0	1	2	3	4
21.	(S) nausea or upset stomach	0	1	2	3	4
22.	(S) soreness of your muscles	0	1	2	3	4
23.	(D) trouble falling asleep	0	1	2	3	4
24.	(S) trouble getting your breath	0	1	2	3	4
25.	(S) hot or cold spells	0	1	2	3	4
26.	(S) numbness or tingling in parts of your body	0	1	2	3	4

In the LAST MONTH, how much have you been distressed by: (circle appropriate response)

		not at all	a little bit	moderately	quite a bit	extremely
27.	(S) a lump in your throat	0	1	2	3	4
28.	(D) feeling hopeless about the future	0	1	2	3	4
29.	(S) feeling weak in parts of your body	0	1	2	3	4
30.	(A) feeling tense or keyed up	0	1	2	3	4
31.	(S) heavy feelings in your arms or legs	0	1	2	3	4
32.	(D) thoughts of death or dying	0	1	2	3	4
33.	(D) overeating	0	1	2	3	4
34.	(D) awakening in the early morning	0	1	2	3	4
35.	(D) thoughts of ending your life	0	1	2	3	4
36.	(D) feeling everything is an effort	0	1	2	3	4
37.	(A) spells of terror or panic	0	1	2	3	4
38.	(A) feeling so restless you couldn’t sit still	0	1	2	3	4
39.	(D) feelings or worthlessness	0	1	2	3	4
40.	(A) the feeling that something bad is going to happen to you	0	1	2	3	4
41.	(A) thoughts and images of a frightening nature	0	1	2	3	4
42.	(D) feelings of guilt	0	1	2	3	4