

Validation of the French version of the Bournemouth Questionnaire

Johanne Martel, DC, FCCS^{1,2}

Claude Dugas, PhD¹

D. Lafond, PhD¹

M. Descarreaux, DC, PhD²

Self questionnaires are an important aspect of the management of neck pain patients. The Bournemouth Questionnaire (BQ), based on the biopsychosocial model, is designed to evaluate patients with neck pain. The validated English version of this questionnaire (BQc-English) has psychometric properties that range from moderate to excellent. The goal of this study is to translate and validate a French version of the Bournemouth Questionnaire for neck pain patients (BQc-f). Its translation and adaptation are performed using the translation back-translation method, generating a consensus among the translators. This validation study was performed on 68 subjects (mean age 41 years old) who participated in a randomized controlled trial regarding the efficiency of manual therapy for neck pain patients. This experimental protocol was designed to generate data in order to evaluate the construct validity, longitudinal validity, test-retest reliability and responsiveness. The BQc-f psychometric properties of construct validity ($r = 0.67, 0.61, 0.42$) for pre treatment, post treatment and longitudinal validity, respectively), test-retest reliability ($r = 0.97$) and responsiveness (effect size = 0.56 and mean standardized response = 0.61) are sufficient to suggest it could be used in the management of patients with neck pain.

(JCCA 2009; 53(2):102-110)

KEY WORDS: Bournemouth questionnaire, French version, validation, neck pain.

Introduction

Cervical pain is prominent in the adult population, with an estimated annual prevalence of between 30 and 50%. During the course of their pathology, 50 to 85% of patients with neck pain have persistent or reoccurring symptoms.¹ Numerous factors interact in the prognosis of cervical pain.² For example young people recuperate faster and more completely, previous episodes have a negative impact on prognosis, and psychological factors such as fear avoidance are also associated with a less positive prognosis.²

Generally the clinical evaluation is based on the patient's history, thus allowing the clinician to collect information on the patient and elaborate a differential diagnosis, and then eliminate any potential red flags. Usually physical exam, including the testing of various elements of the patient's physical condition such as visual inspection, range of motion, muscular testing, palpation, neurological testing, orthopaedic testing, functional testing and others follows patient's history.^{3,4} Self-administered questionnaires are an integral part of patient evaluation and they are useful for quantifying their functional capabilities and the evolution of their pain perception.^{3,4} Many tests are used to evaluate neck pain perception and related disabilities, such as the Neck Disability Index (NDI),⁵ the Copenhagen Neck Functional Disability Scale,⁶ global assessment of neck pain, the Norwick Park neck pain questionnaire⁷ and the Bournemouth Questionnaire.⁸ All these tests are validated and their psychometric properties range from moderate to excellent in terms of test-retest reliability, validity and responsiveness. These psychometric

¹ Département des sciences de l'activité physique and ²Département de chiropratique, Université du Québec à Trois-Rivières (UQTR), Trois-Rivières, QC, Canada G9A 5H7.

Correspondence: Martin Descarreaux, DC, PhD, Département de chiropratique, Université du Québec à Trois-Rivières, 3604 Pavillon de chiropratique, Trois-Rivières, QC, Canada G9A 5H7. Tel: (819) 376-5011 Ext. 3977. Fax: (819) 376-5204. martin.descarreaux@uqtr.ca
© JCCA 2009.

properties were not however evaluated for all these questionnaires.⁴

Bolton and Breen⁹ developed the Bournemouth Questionnaire (BQ) to measure the pain perception of patients having lower back disorders. BQ psychometric properties were found to be adequate (test-retest reliability: ICC = 0.95, internal consistency (Cronbach's alpha = 0.9)⁹ The reasoning for developing this questionnaire emerged from the need to have a test based on the biopsychosocial model for lower back disorder patients. This model was developed by Georges Engel in the late seventies, and was presented as a holistic alternative to the predominant biomedical approach. The main strength of this model is that the clinician must consider the biological, psychological and social aspects of the pathology in order to understand and respond adequately to pain reported by the patient.¹⁰ In order to incorporate the model's premises, the authors integrated into their questionnaire elements related to emotional dimensions such as anxiety, depression and cognitive factors related to fear-avoidance beliefs. Bolton and Breen⁹ suggested that the BQ should be brief so that it could be used in ambulatory settings such as clinics providing manual therapy. This brevity implies that each aspect of pain be measured on a single-item global scale. The items chosen for the BQ are those most often measured in pain perception and which are responsive to clinical changes.

Three years later, Bolton and Humphreys⁸ adapted the BQ for patients with neck pain. This self-administered cervical questionnaire (BQc) is also based on the biopsychosocial illness model.¹⁰ This simple questionnaire is easy to complete and can be administered in a clinic or in clinical research. The BQc's psychometric properties provide high internal consistency over three administrations (Cronbach's alpha = 0.87, 0.91, 0.92), construct validity (Pearson correlation between 0.48 and 0.71 for the overall questionnaire and between 0.14 and 0.83 for individual items), test-retest reliability (ICC = 0.65) and responsiveness (Pearson correlation between 0.42 and 0.82 for individual items).⁸ Moreover, upper and lower limits were identified (effect size = 0.5 and percentage of change = 34%), and these allowed us to single out any patients demonstrating clinically significant improvements.¹¹

The BQc is an interesting evaluation tool for neck pain patients since it is the only questionnaire based on the biopsychosocial illness model. As such, any clinician or re-

searcher who needs to succinctly evaluate neck pain in a context that considers the biological, psychological and social dimensions would prefer this test to other validated tools based on pain and disability evaluation. The goal of this study is to translate and validate a French version of the BQc. We thus present the translated version of the BQc, the construct validity, test-retest reliability and the responsiveness of the translated version.

Methodology

The Questionnaire

The BQc is based on the biopsychosocial disease model and used to measure cervical pain.¹⁰ It consists of a one-page questionnaire and takes less than five minutes to complete. The BQc includes seven independent questions, each representing a different dimension of the pain experience.⁸ Each question is scored on an eleven point numerical rating scale (0–10). The seven sub-scales include pain intensity, functional status in daily living and social activities, affective dimensions of anxiety and depression, cognitive aspects of fear-avoidance belief and pain locus of control. The pain locus of control reflects the degree of representation among individuals, expressing the relationship between their behaviour and personal characteristics, and the positive or negative feedback they get from these.¹² The maximum score for the BQc is 70 points, obtained by totaling the scores of each of the seven items.

Questionnaire translation and adaptation

The French adaptation of the Bournemouth Questionnaire (Questionnaire de Bournemouth cervical-Français QBc-f) was obtained using a double translation approach.¹³ When compared to a more complex approach (revision committee and pre-testing), this simpler approach generates adequate psychometrics quality for a translated questionnaire.¹³ Each item in the English version of the original Bournemouth Questionnaire (BQc-a) was independently translated by two bilingual researchers whose first language is French and who had knowledge of the subject matter (a kinesiology professor and a chiropractor). The emphasis was placed on the translation of meaning rather than a literal one, and a consensus between the two translators gave rise to the French version. A backward translation of this version was conducted by

a third bilingual individual (chiropractor) who had knowledge of the subject matter but who had not participated in the first translation phase and whose mother tongue was English. This step was important in order to verify that the meaning of the French version was concordant with the meaning of the original English version. If the meaning of a particular item seemed to be lost or altered, the whole process had to be repeated for this item. This new French questionnaire formed the basis of validation for the psychometric properties on the QBc-f.

Validation of French version of cervical Bournemouth Questionnaire

Patients

The QBc-f's validation was performed by a cohort of cervical pain patients who had participated in a randomized clinical trial on the impact of manual therapy on chronic cervical pain. The main criteria for including these subjects were: aged between 18 and 60 years, experienced chronic cervical pain (minimal duration of 12 weeks), were uni- or bilateral pain of mechanical origin (excluding any underlying pathology or red flags). The pain could be post-trauma but not related to a whiplash injury.

This study was conducted at the Université du Québec à Trois-Rivières (UQTR) among French-speaking patients. These patients were recruited from radio and newspaper ads placed at the university and in the Trois-Rivières area. In this study, symptoms were followed through the regular use of a visual analog scale, the Neck Disability Index, the Fear-Avoidance Questionnaire, the SF-12 Questionnaire and the QBc-f. Physical measurements were also taken on a regular basis, namely joint palpation for pain and cervical ranges of motion, measured with an objective tool known as "cervical range of motion device" or cROM©. All patients participating in the randomized control trial were asked to participate in the validation of the QBc-f.

Seventy-eight randomly selected patients were invited to participate in the study. Of these 87.2% (n = 68) completed the questionnaires needed for the analysis. The sample included 30.9% (n = 21) males and 69.1% (n = 46) females, and the average age was 41.1 years (SD = 10.1). Of these participants, 8.8% had cervical pain for a year or less, 45.6% from 1 to 5 years, 20.6% from 5 to 10 years and 25% for more than 10 years.

Construct validity

A questionnaire's construct validity refers to how measurements correlate with theoretical concepts related to the phenomenon under study. In other words, they must corroborate the measure's conceptual or theoretical meaning. For the BQc-f, we tested the construct validity by calculating the correlation between the BQc-f results and that of a comparative external measure, the Neck Disability Index (NDI). The NDI, based on the Oswestry Questionnaire, is an instrument that measures disability related to neck pain. Its psychometric properties were studied and yielded a test-retest reliability of 0.89 ($p \leq 0.05$), an α coefficient of 0.80 for global item homogeneity and a correlation of 0.60 and 0.70 for the construct validity, when compared to the McGill Pain Questionnaire and the Visual Analog Scale (VAS).^{5, 14} Construct validity was also tested by correlating BQc-f results and VAS scores, and a questionnaire on fear and avoidance behaviour at work (FABQ-1) and in physical activities (FABQ-2). For the BQc-f, longitudinal (including passage of time) the construct validity was calculated by correlating BQc-f and NDI differences. The BQc-f construct validity was tested using data from the baseline questionnaires completed by each patient at the start of the RCT. Comparative data collected following the intensive care phase comprising a maximum of 15 treatments using spinal manipulation (diversified technique) of the cervical and upper thoracic spine, within a maximum time frame of 5 weeks, was used to evaluate longitudinal construct validity.

Test-retest reliability

The questionnaire test-retest technique was used to reproduce the same results following two different administrations of the questionnaire and thus test their repeatability. The test-retest reliability technique involved correlating the results of two different administrations of the BQc-f during and after a maintenance care visit for the randomized controlled trial. Patients first completed the BQc-f during a visit and completed the second one 24 hours later. The patients were not allowed to look at the first questionnaire when filling in the second. All patients had to return the completed questionnaire by mail in a pre-stamped envelope. A follow-up phone call was made to all patients within 24 hours of each of the two pre-determined administrations of the questionnaire.

Responsiveness

A questionnaire's responsiveness refers to its capacity to precisely detect the presence of a clinical change.¹⁵ This responsiveness was estimated using data from each patient's baseline QBc-f and data from each patient's QBc-f after this study's regular care phase (a maximum of 15 treatments comprising only cervical and upper thoracic spine manipulations). The effect size and the standardized response mean were then calculated. A greater effect size or a standardized response mean indicates greater questionnaire responsiveness. The minimally important clinical difference was calculated using the "Reliable Change Index" (RCI) with a cut-off score of 1.96, as commonly suggested.¹⁶

Statistical analysis

Data was analysed using Version 6.1 of Statistica software (Statsoft, Tulsa, Ok, USA). Patients' demographic characteristics were described by averages and standard deviations. The Shapiro-Wilk W test was used to evaluate each variable for normality and establish the type of correlation statistic to be used. Construct validity, longitudinal construct validity and test-retest reliability were analysed using the Pearson correlation. The correlation of coefficients interpretation was scored as follows: excellent > 0.91; good, 0.90–0.71; moderate, 0.70–0.51; fair, 0.50–0.31; and poor, < 0.30.¹⁷ Since the Pearson correlation usually over-estimates reliability, intraclass correlations (ICC) were also used. The QBc-f responsiveness was tested using the effect size and standardized response mean. Effect size refers to the difference between average score at baseline and average score at follow-up, divided by the standard deviation of the baseline score. The standardized response mean divides this difference by the standard deviation of change scores.¹⁸

Results

Questionnaire translation and adaptation

The two bilingual investigators immediately reached a consensus regarding the questionnaire's two translated versions that were almost identical. No cultural adaptation was needed and only minor changes in the vocabulary were carried out. At this stage, it was recognized that the questionnaire's French version did correspond to the original version and that no items were lost or signifi-

cantly modified in the translation process. The French version of the questionnaire is shown in Appendix 1.

Validation of the French version

Construct validity

Construct validity and longitudinal construct validity were calculated using pre- and post-intervention data from the QBc-f questionnaire. Construct validity was established by comparing QBc-f scores with NDI scores. Results from the Shapiro Wilk test confirmed normal distribution, and subsequent analyses were performed using parametric statistics. The Pearson r correlation coefficients were respectively found to be 0.61 [IC 95%: 0.44–0.74] and 0.67 [ICC 95%: 0.51–0.78] ($p < 0.05$) for pre- and post-construct validity (Figure 1) and 0.42 [ICC 95%: 0.20–0.6] ($p < 0.05$) for the longitudinal construct validity (Figure 2). Finally, correlation coefficients for QBc-f vs. VAS and QBc-f vs. Fear avoidance questionnaires (FABQ-1 and FABQ-2) were found to be 0.43 [ICC 95%: 0.21–0.61] ($p < 0.05$), 0.17 [ICC 95%: –0.07–0.39] ($p > 0.05$) and 0.249 [ICC 95%: 0.01–0.46] ($p < 0.05$) respectively.

Test-retest reliability

The QBc-f test-retest reliability was assessed by asking participants to complete the questionnaire twice in a 24 hour interval. The Pearson r correlation coefficient for test-retest reliability was 0.97 [ICC 95%: 0.95–0.98] ($p < 0.05$). The intraclass correlation coefficient yielded similar results, producing a value of 0.97 [ICC 95%: 0.95–0.98]. Figure 3 illustrates the test-retest correlation.

Responsiveness

The responsiveness was evaluated using QBc-f scores from the pre- and post- intervention evaluations. The effect size was 0.56 and the standardized response mean was 0.61. The NDI effect size and standardized response mean were 0.51 and 0.58 respectively. Data used for the responsiveness calculation are shown in Table 1. Finally, the minimally important change was estimated at 4.4 points on the QBc-f 70 point scale.

Discussion

Considering the prevalence of cervical pain in the adult population and the impact of this pathology on society

Figure 1 Construct validity for pre- and post-QBc-f evaluation

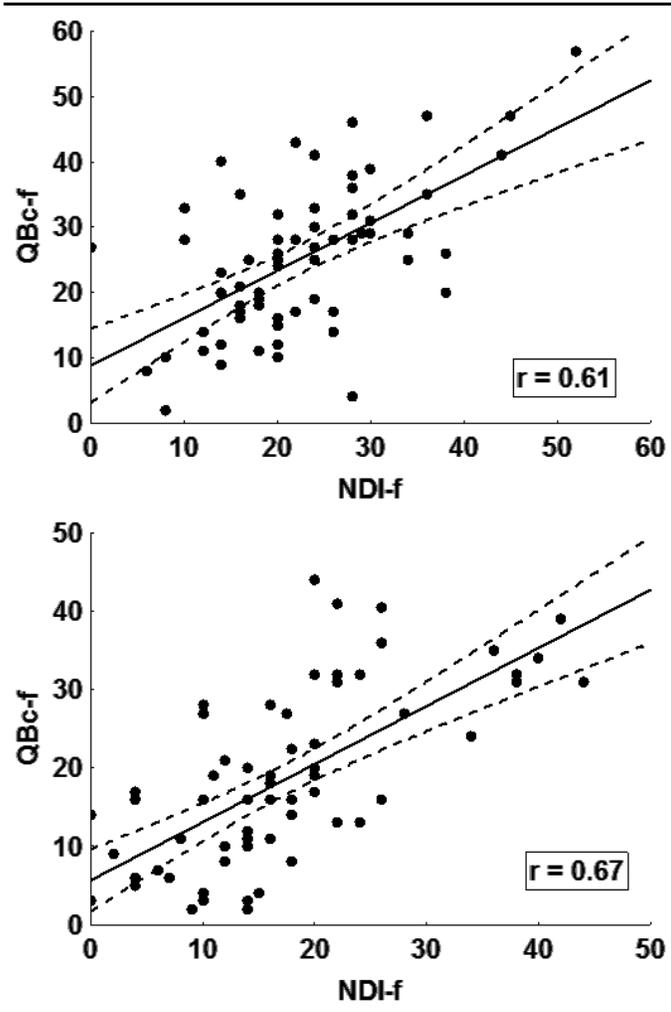


Figure 2 QBc-f longitudinal construct validity

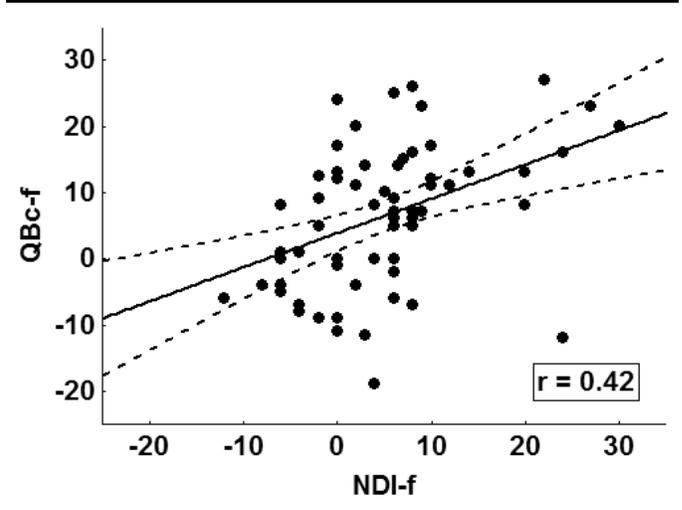


Figure 3 QBc-f test-retest reliability

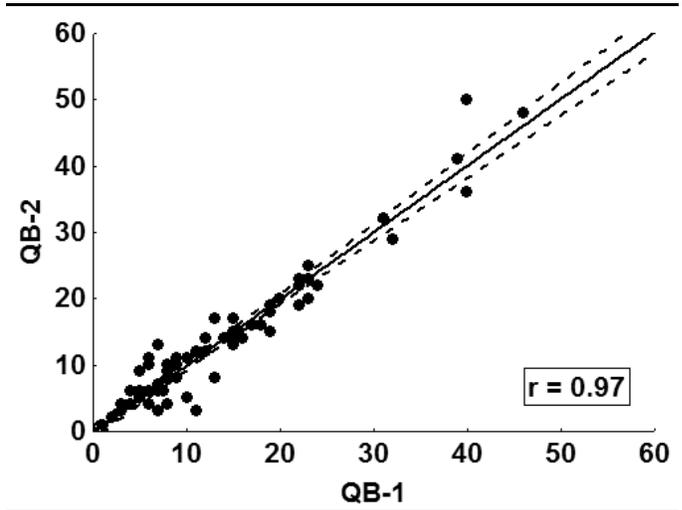


Table 1 QBc-f responsiveness data

	Differences*	SD**	SD***	Effect size	SRM [¶]
QBc-f	6,47	11,61	10,53	0,56	0,61
IIC	4,93	9,67	8,46	0,51	0,58

Differences* = Mean of Individual differences
 SD** = Baseline standard deviation results
 SD*** = Standard deviation for individual differences
 SRM[¶] = Mean of standardized response

and the individual,^{1,19,20} the development of objective tools constitutes an important step in therapeutic intervention and optimal clinical follow-up care. Moreover, it is generally admitted that for musculoskeletal pain, including cervical pain, the biopsychosocial model is preferable to the biological paradigm.^{21,22} The Bournemouth questionnaire is the only tool that includes this situation when evaluating neck pain. The results of this study demonstrate that the psychometric properties of the BQ's French translation are sufficiently adequate, thus permitting its use with neck pain patients. Because no gold standard exists, validity testing for an instrument such as the QBc-f is a challenging task. The best comparison is the Neck Disability measure used mainly with pain and incapacity levels. Studies on validity, fidelity and sensibility were thus carried with respect to the IIC.

Construct validity is an important feature of questionnaires that measures the corroboration with the theoretical construct of the studied phenomenon. In this study, we found the Pearson correlation coefficient for the QBc-f questionnaire's construct validity before and after treatment to be 0.67 and 0.61 respectively. The validation values for the BQc in English resulted in correlation of 0.51 and 0.71 respectively ($p < 0,01$). The validation of QBc-f resulted in a correlation of 0.42 for the longitudinal construct validity while for the English version it was 0.50. The construct validity results for the French and English versions are similar: moderate construct validity and acceptable longitudinal construct validity, according to the scale used by Donner and Eliasziw.¹⁷ We also verified whether the clinical variable used in the neck pain evaluation could also partly explain variations in longitudinal construct validity. Thus, an acceptable correlation was found between the QBc-f and the analog scale of pain, indicating a relationship between these two measures. As for the questionnaire on fear avoidance, only the aspect related to physical activities revealed a low correlation with the QBc-f, while the correlation with professional activities and the QBc-f was not significant and could not explain the variations of scores for QBc-f.

A questionnaire's test-retest reliability is related to the consistency of measurements of studied phenomenon. The Pearson correlation for QBc-f's test-retest reliability is 0.97 ($p < 0,05$), while for the BQc in English the ICC is 0.65. This disparity could be attributed to certain methodological differences between the validation studies in

French and English. In the English validation study, patients initially completed four different questionnaires. They completed, in the same day, the BQc in English with a transformation in the presentation order of seven questions (the delay between the two evaluations was not given) and only the patients that indicated a stable condition between the two evaluations are included in the results. For the French validation study, patients completed only one questionnaire (the QBc-French) and were instructed to complete another version 24 hours later. For this version there was no transformation in the presentation order of the seven questions. Moreover, all patients were included in the study, regardless of the possible changes in their condition. These disparities in the experimental protocol could explain the differences observed in the test-retest reliability between the French and English questionnaires.

The responsiveness of a questionnaire refers to its capacity to precisely detect the presence of clinical change.¹⁵ The QBc-f validation produced an effect size of 0.56 and a standardized response mean 0.61. For the ICC's, these values are 0.51 and 0.58 respectively. In the English validation study, the effect size and the standardized response mean were 1.67 and 1.43 respectively for BQc-English and 0.80 and 0.83 for the ICC. It is difficult to make a comparison between these results because the responsiveness calculation methods were different. In the study by Bolton and Humphreys, the numerator used to calculate the effect size and the standardized response mean was the mean of the individual differences between the initial and follow-up visits. The numerator used in our study was the difference between the baseline mean and the follow-up mean.¹⁶ For this questionnaire we believe that these results are a better indicator of the effect size and standardized response mean.

The statistical methods chosen probably explain a large portion of the differences between the responsiveness of the two studies. These modifications could also be attributable to the differences in terms of inclusion and exclusion criteria that were more restrictive in the French version of the study's questionnaire. Since the BQ is based on the biopsychosocial model, one could formulate the hypothesis that a patient population including only subjects with cervical pain would have a smaller mean for individual differences for this questionnaire compared to a population in which the other pathologies were

strictly excluded. This hypothesis remains to be tested. The results of this study also confirm a similar responsiveness between the QBc-f and the NDI, thus the French versions of these two questionnaires could be used interchangeably.

We must consider some of the limitations in this study. Firstly, 91.2% of the subjects in the group had chronic cervical neck pain and this raises the question of generalizations about patients with acute or sub-acute neck pain. Secondly, the procedure used for the test-retest reliability, could allow for the possibility of a memorizing bias, since the order of presentation of questions was not modified. Thirdly, it should be considered that we used a simpler translation, compared to a more complex approach (the revision committee and pre-testing suggested by Guillemin et al.)²³ However, this simpler method has been recognized as efficient in terms of the translation quality.^{13, 24} Finally, we did not undertake an internal consistency analysis for each of the seven QBc items, which was done in the validation study in English. Considering that the BQ is a fairly simple questionnaire and the excellent results of the translation procedure, we believe that the questionnaire's structure was not altered in the translation.

Conclusion

The purpose of this study was to present a validated French version of the cervical Bournemouth Questionnaire. The psychometric evaluation of a questionnaire usually includes an assessment of its transversal and longitudinal properties. The present study indicates that the QBc-f's reliability is excellent and that most of the components related to validity and responsiveness are moderate. It can therefore be concluded that the French version of the QB can be considered a valuable tool for assessing patients with cervical pain.

Acknowledgments

This project was funded through a grant from the National Board of Chiropractic Examiners (NBCE) and administered by the Foundation for Chiropractic Education and Research [FCER]. Financial support was also provided by the Chaire de recherche en chiropratique FRCQ-Système Platinum.

References

- 1 Hogg-Johnson S, van der Velde G, Carroll LJ, Holm LW, Cassidy JD, Guzman J, et al. The burden and determinants of neck pain in the general population: Results of the bone and joint decade 2000–2010 Task force on neck pain and its associated disorders. Best evidence on the burden and determinants of neck pain. *Spine*. 2008; 33(4S):S39–S51.
- 2 Carroll LJ, Hogg-Johnson S, van der Velde G, Haldeman S, Holm LW, Carragee E, et al. Course and prognostic factors for neck pain in the general population: Results of the bone and joint decade 2000–2010 Task force on neck pain and its associated disorders. *Spine*. 2008; 33(4S):S75–S82.
- 3 Rubinstein SM, Peerdeman SM, van Tulder MW, Riphagen I, Haldeman S. A systematic review of the risk factors for cervical artery dissection. *Stroke*. 2005; 36(7):1575–1580.
- 4 Nordin M, Carragee EJ, Hogg-Johnson S, Weiner SS, Hurwitz EL, Peloso PM, et al. Assessment of neck pain and its associated disorders: Results of the bone and joint decade 2000–2010 Task force on neck pain and its associated disorders. Best evidence on assessment and intervention for neck pain. *Spine*. 2008; 33(4S):S101–S122.
- 5 Hains F, Waalen J, Mior S. Psychometric properties of the neck disability index. *J Manip Physiol Ther*. 1998; 21(2):75–80.
- 6 Sabes PN, Jordan MI, Wolpert DM. The role of inertial sensitivity in motor planning. *J Neurosci*. 1998; 18(15):5948–5957.
- 7 Chiu TTW, Lam T, Hedley AJ. Subjective health measure used on chinese patients with neck pain in Hong Kong. *Spine*. 2001; 26(17):1884–1889.
- 8 Bolton JE, Humphreys BK. The Bournemouth Questionnaire: a short-form comprehensive outcome measure. II. Psychometric properties in neck pain patients. *J Manip Physiol Ther*. 2002; 25(3):141–148.
- 9 Bolton JE, Breen AC. The Bournemouth Questionnaire: a short-form comprehensive outcome measure. I. Psychometric properties in back pain patients. *J Manip Physiol Ther*. 1999; 22(8):503–510.
- 10 Borrel-Carrio F, Suchman AL, Epstein RM. The Biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Ann Fam Med*. 2004; 2:576–582.
- 11 Hurst H, Bolton J. Assessing the clinical significance of change scores recorded on subjective outcome measures. *J Manip Physiol Ther*. 2004; 27(1):26–35.
- 12 Wallston KA. The validity of the Multidimensional Health Locus of Control Scales. *J Health Psychol*. 2005; 10(5):623–631.
- 13 Perneger TV, Leplege A, Etter JF, Rougemont A. Validation of a French-language version of the MOS 36-Item Short Form Health Survey (SF-36) in young healthy adults. *J Clin Epidemiol*. 1995; 48(8):1051–1060.

- 14 Vernon H, Mior S. The Neck Disability Index: a study of reliability and validity. *J Manip Physiol Ther.* 1991; 14(7):409–415.
- 15 Beaton DE, Bombardier C, Katz JN, Wright JG. A taxonomy for responsiveness. *J Clin Epidemiol.* 2001; 54(12):1204–1217.
- 16 Jacobson NS, Truax P. Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *J Consult Clin Psychol.* 1991; 59(1):12–19.
- 17 Donner A, Eliasziw M. Sample size requirements for reliability studies. *Stat Med.* 1987; 6((4)):441–448.
- 18 Husted JA, Cook RJ, Farewell VT, Gladman DD. Methods for assessing responsiveness a critical review and recommendations. *J Clin Epidemiol.* 2000; 53(5):459–468.
- 19 Cote P, Kristman V, Vidmar M, Van Eerd D, Hogg-Johnson S, Beaton D, et al. The prevalence and incidence of work absenteeism involving neck pain: A cohort of Ontario lost-time claimants. *Spine.* 2008; 33(4S):S192-S198.
- 20 Côté P, Velde G, David C, Carroll L, Hogg-Johnson S, Holm L, et al. The burden and determinants of neck pain in workers: results of the bone and joint decade 2000–2010 task force on neck pain and its associated disorders. *Eur Spine J.* 2008; 17 (Suppl. 1):60–74.
- 21 Guzman J, Hurwitz E, Carroll LJ, Haldeman S, Cote P, Carragee EJ, et al. A new conceptual model of neck pain: Linking onset, course, and care: The bone and joint decade 2000–2010 Task force on neck pain and its associated disorders. *Spine.* 2008; 33(4S):S14–S23.
- 22 Waddell G. *The back pain revolution.* 2nd. ed. ed. New York: Churchill Livingstone: Edinburgh; 2004.
- 23 Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol.* 1993; 46(12):1417–1432.
- 24 Mathias SD, Fifer SK, Patrick DL. Rapid translation of quality of life measures for international clinical trials: avoiding errors in the minimalist approach. *Qual Life Res.* 1994; 3:403–412.

Appendix 1 *French adaptation of Bournemouth Questionnaire*

Overall Dimensions for Cervical Bournemouth Questionnaire

<p>Les questions suivantes ont pour objectif de décrire votre douleur cervicale et comment celle-ci vous affecte. Veuillez, s'il vous plaît, répondre à TOUTES les questions en encerclant LE chiffre pour CHAQUE question qui décrit le mieux comment vous vous sentez :</p>										
<p>1. Au cours de la dernière semaine, en moyenne, comment évaluez-vous votre douleur cervicale?</p>										
Aucune douleur					Pire douleur imaginable					
0	1	2	3	4	5	6	7	8	9	10
<p>2. Au cours de la dernière semaine, comment votre douleur cervicale a-t-elle affecté vos activités quotidiennes (effectuer les tâches ménagères, vous laver, vous habiller, lever des charges, lire, conduire)?</p>										
Aucun effet									Incapable d'effectuer ces activités	
0	1	2	3	4	5	6	7	8	9	10
<p>3. Au cours de la dernière semaine, comment votre douleur cervicale a-t-elle affecté votre habileté à prendre part à des activités récréatives, sociales et familiales?</p>										
Aucun effet									Incapable d'effectuer ces activités	
0	1	2	3	4	5	6	7	8	9	10
<p>4. Au cours de la dernière semaine, quel a été votre niveau d'anxiété (tension, nervosité, irritabilité, difficulté à se concentrer ou à relaxer)?</p>										
Aucune anxiété									Extrêmement anxieux	
0	1	2	3	4	5	6	7	8	9	10
<p>5. Au cours de la dernière semaine, avez-vous eu le sentiment d'être déprimé (avoir le cafard, se sentir triste, se sentir déprimé, être pessimiste, se sentir malheureux)?</p>										
Aucun sentiment d'être déprimé									Extrêmement déprimé	
0	1	2	3	4	5	6	7	8	9	10
<p>6. Au cours de la dernière semaine, comment votre travail (à l'intérieur ou à l'extérieur de la maison) a-t-il affecté (ou affecterait-il) votre douleur cervicale?</p>										
Aucune aggravation								Aggravation très importante		
0	1	2	3	4	5	6	7	8	9	10
<p>7. Au cours de la dernière semaine, comment avez-vous été capable de contrôler (diminuer/aider) votre douleur cervicale par vous-même?</p>										
Contrôle complet									Aucun contrôle	
0	1	2	3	4	5	6	7	8	9	10