

Translation of the Patient Scar Assessment Scale (PSAS) to French with cross-cultural adaptation, reliability evaluation and validation

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Accepted for publication
 Feb. 2, 2009

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Background: Patient esthetic satisfaction related to scarring after orthopedic surgery was rarely assessed before the development of the Patient Scar Assessment Scale (PSAS). The purpose of our study was to translate and validate the PSAS and assess the psychometric properties of the French version.

Methods: We conducted a staged validation with forward and backward translation and concurrent validation. The validation committee comprised bilingual experts. The patient validation sample comprised 53 orthopedic surgery patients who were assessed at a minimum of 1 year postoperatively. We followed a standardized process for cross-cultural adaptation to develop and assess the French version. First, 2 independent translators completed the forward translation of the PSAS and then met to achieve a consensus version. This consolidated version was then backward translated into English and cross-verified with the original version. A group of orthopedic and plastic surgeons assessed this version for content validity. We assessed the test-retest reliability of the new French scale, which was filled out twice by a cohort of 53 patients, using scale distribution analysis, internal consistency (Chronbach α) and absolute agreement (intraclass correlation coefficients [ICC (2,1)]).

Results: The level of agreement on the translation process between the translators initially and then later among the expert panel was high. The reliability of the translated version (PSAS-Fr) and its internal consistency was high (Chronbach α 0.87–0.98 for each of the 6 questions), and the test-retest reliability was excellent (ICC 0.96). On the other hand, there was no bias between occasions (retests difference –0.24) and the scores fell within 2 standard deviations of 5. Older patients had higher satisfaction about scar appearance.

Conclusion: The PSAS-Fr was successfully translated from the original English version and demonstrated strong cross-sectional psychometric properties. Further assessment in longitudinal studies is warranted.

Contexte : Avant la mise au point de l'échelle d'évaluation des cicatrices par les patients (*Patient Scar Assessment Scale* ou PSAS), on a rarement évalué la satisfaction esthétique des patients à l'égard des cicatrices après une chirurgie orthopédique. Notre étude visait à traduire et à valider l'échelle PSAS et à déterminer les caractéristiques psychométriques de la version française.

Méthodes : Nous avons procédé à une validation par étapes conjuguée à une traduction et à une rétro-traduction, ainsi qu'à une validation simultanée. Le comité de validation était constitué d'experts bilingues. L'échantillon de validation comportait 53 patients qui avaient subi une intervention chirurgicale en orthopédie et qui ont été évalués au moins 1 an après l'intervention. Nous avons suivi un processus normalisé d'adaptation transculturelle pour créer et évaluer la version française. Tout d'abord, 2 traducteurs indépendants ont traduit l'échelle et se sont ensuite rencontrés pour produire une version concertée. Cette version concertée a ensuite été rétro-traduite en anglais et comparée à la version originale. Des chirurgiens orthopédistes et plasticiens ont évalué la validité du contenu de cette version. Nous avons évalué la fiabilité de test-retest de la nouvelle échelle en français, qu'une cohorte de 53 patients ont remplie 2 fois, en utilisant l'analyse de distribution de l'échelle, l'uniformité interne (α de Chronbach) et la concordance absolue (coefficients de corrélation intracatégorie [CCI (2,1)]).

Résultats : La concordance de la traduction entre les traducteurs au début et ensuite entre les membres du groupe d'experts était élevée. La fiabilité de la version traduite (PSAS-Fr) et sa cohérence interne étaient élevées (α de Chronbach 0,87–0,98 pour chacune des 6 questions), et la fiabilité de test-retest était excellente (CCI, 0,96). Par

ailleurs, il n'y avait pas de biais entre les occasions (différences au niveau des retests $-0,24$) et les résultats se sont établis à moins de 2 écarts types sur 5. Les patients plus âgés sont plus satisfaits de l'apparence de la cicatrice.

Conclusion : L'échelle PSAS-Fr a été traduite avec succès à partir de la version anglaise originale et a démontré de solides caractéristiques psychométriques transversales. Une évaluation plus poussée au cours d'études longitudinales est justifiée.

The appearance of the upper extremity and in particular surgical scars is more important to patients than the medical community often appreciates. Studies in patients with rheumatoid arthritis indicated that both men and women were equally concerned about the appearance of their hands, although physicians assumed that it mattered most to women.¹ This discrepancy suggests that surgeons and patients have different perceptions of physical appearance. Also, it has been suggested that a surgeon failing to appreciate a patient's perception of a scar could contribute to legal action.² The importance of taking into account patients' opinions of their scars has been recognized,³ and the same study confirmed that patients and health care providers do not agree on the appearance of scars. Paradoxically, most of the studies that compare different types of incisions predominantly take into consideration the treating team's opinion⁴⁻⁶ instead of the patient's opinion.

Studies that have compared minimally invasive surgery and standard surgery have rarely evaluated patients' satisfaction with cosmetic appearance. Satisfaction was most often evaluated when the scar was on the breast or on a more visible portion of the body such as the neck following a thyroid lobectomy.⁷⁻¹⁰ Some of these authors used a 10-point numeric rating scale ranging from barely satisfied to excellent.^{8,9} In comparison, relatively little attention has been directed toward studying patient aesthetic satisfaction after orthopedic surgery.^{11,12} To address this problem, the Patient Scar Assessment Scale (PSAS) was published by Draaijers and colleagues;¹³ it is a validated 6-item questionnaire designed to measure patients' satisfaction about their scars.

The purpose of our study was to translate the English version of the PSAS to make it appropriate for a French Canadian audience and assess the psychometric properties of the French version.

METHODS

The PSAS

The Patient Scar Assessment Scale is a validated questionnaire published in 2003 by Draaijers and colleagues¹³ (Appendix 1). It is a simple 6-item self-report scale in which items are scored on a numeric rating of 0–10. The authors used the PSAS to assess 49 scar areas measuring 3 × 3 inches that were caused by a burn injury. The study involved 20 patients aged 15–73 years whose injuries were evaluated an average of 43.7 months after a burn accident. They reported an internal consistency of 0.76.

Translation process

In the present study, we followed the essential methodological steps recommended by internationally recognized publications involved in scale translation and cultural validation^{14,15} (Box 1). The first stage consisted of a forward translation completed by 2 independent professional translators, yielding 2 initial French versions (named T1 and T2). The translators then synthesized the 2 versions to create a consensus version (named T1+2Fr). Next, 2 different independent translators completed a backward translation of T1+2Fr. Finally, an expert committee composed of 5 bilingual professionals (2 orthopedic surgeons, 1 chief resident in plastic surgery, 1 research nurse and 1 medical student) reviewed and compared the final French translation and the back translations to obtain a final version.

The number of patients needed to validate a scale is usually 30–40. Recommendations have also been made to use 5–10 patients per item. As the PSAS comprises

Box 1. Guideline for the process of cross-cultural adaptation of self-report measures*

Stage 1: Translation

- 2 translations (T1 & T2)
- into target language (French)
- informed + uninformed translator

Stage 2: Synthesis

- synthesize T1 & T2 → T1+2Fr
- resolve any discrepancies with translators' reports

Stage 3: Back translation

- 2 English-language translators
- naive to outcome measurement
- work from T1 + 2Fr version
- create 2 back translations, BT1 & BT2

Stage 4: Expert committee review

- review all reports
- methodologist, developer, language professional, translators
- reach consensus on discrepancies
- produce prefinal version

Stage 5: Validation

- $n = 30-40$ (recommendation)
- complete questionnaire
- probe to get an understanding of item

*Adapted with permission from Beaton DE, Bombardier C, Guillemin F, et al. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine* 2000;25:3186-91.

6 straightforward items, 30 patients would be sufficient for validation.¹⁴ Accurate estimation or reliability assuming underlying high reliability might require 35–45 patients.¹⁶

Participants and setting

We recruited volunteers from an orthopedic clinic who had undergone an orthopedic procedure more than 1 year before we began our study. The clinic was located within a university-based hospital with a level-1 trauma centre. Initially, we sent out 119 questionnaires. We selected patients in a random fashion from the hip and knee, trauma, spine and upper limb clinics. We asked all patients to fill out the questionnaire twice: once on the visit day and once 1 week later at home; the second questionnaire was returned by mail. We excluded from our analysis those patients who completed only 1 questionnaire and those whose demographic information was not concordant from the first to the second questionnaire. To ensure the process was anonymous, we did not use names as identifiers, only demographic characteristics; thus, it was impossible to match responses where this information was discordant. We collected minimal information on the date of surgery and location of their scars as well as age and sex. The ethics committee at our institution approved our study, and each patient provided informed consent.

Statistical analysis

We calculated descriptive and analytical statistics using SPSS 16.0 (SPSS, Inc.), and we analyzed the distribution of scores graphically. We computed correlations between age and time since surgery with PSS scores using a Pearson r , and we performed an analysis of variance (ANOVA) to analyze differences between male and female responders. We evaluated internal consistency using a Cronbach α , and we considered a value greater than 0.70 to be satisfactory.^{17,18} We evaluated each question in relation to the instrument as a whole. We estimated the test-retest reliability using the intraclass correlation coefficient (ICC) and confirmed internal consistency by Cronbach α . We computed the absolute error (and 2 units of standard deviation [SD]) across the range of scores according to the method described by Altman and Bland.¹⁸

RESULTS

Participants

Of the 119 patients who received questionnaires, 29 chose not to complete any questionnaires and were excluded; they provided no reason for nonresponse. We excluded 19 patients because they completed only 1 questionnaire and another 18 patients whose demographic information was not concordant from the first questionnaire to the second. The

final sample for psychometric analysis comprised 53 patients who successfully filled out both questionnaires.

Cross-cultural adaptation

There was good agreement on the forward English-to-French translation, and the backward translation to English that was compared with the original version and reviewed by the expert committee of bilingual professionals required only minimal changes. We pretested the resulting version with a small group of 5 patients to ensure that the questionnaire format was comprehensive, and only 1 question was adapted. The final version of questionnaire can be found in Appendix 2.

Validation study

The sociodemographic characteristics of patients are described in Table 1. Participants' PSAS scores crossed the spectrum of the scale with a tendency toward low scores, consistent with the long follow-up interval (mean score 12.0, SD 9.0). Correlation between age and score was significant. Younger patients reported lesser satisfaction (higher score) than older people (Pearson correlation coefficient -0.47 , $p = 0.001$). There was no significant difference in PSAS scores between male and female patients (11.5 v. 12.2).

The internal consistency as indicated by Cronbach α was high at 0.98 (95% confidence interval 0.97–0.99) (Fig. 1). We also calculated correlation for each question (Table 2). Test-retest reliability was excellent (ICC 0.96). The mean error across test intervals was negligible at -0.28 , and the 2-SD range was -5.21 to 4.67 (Fig. 2).

DISCUSSION

Our study established a successful translation of the PSAS for a French Canadian audience. An expert panel verified the content validity of the PSAS-Fr, and it was shown to have high retest reliability and low absolute margins of

Table 1. Patient demographic information

Characteristic	Data
Age range, yr	25–84
Sex, male:female	35:18
Time interval since surgery, mean (range) yr	5 (1–40)
Site of scar, no.	
Neck	2
Upper limb	8
Thorax/abdomen	4
Pelvis	12
Lower limb	27
Total no. of scars	53

error. The reliability coefficients compare favourably to the original English scale or to other self-report scales translated into French.¹⁹⁻²² We attribute the high reliability obtained by the test-retest method to the simplicity of the original questionnaire and the stability of scar appearance

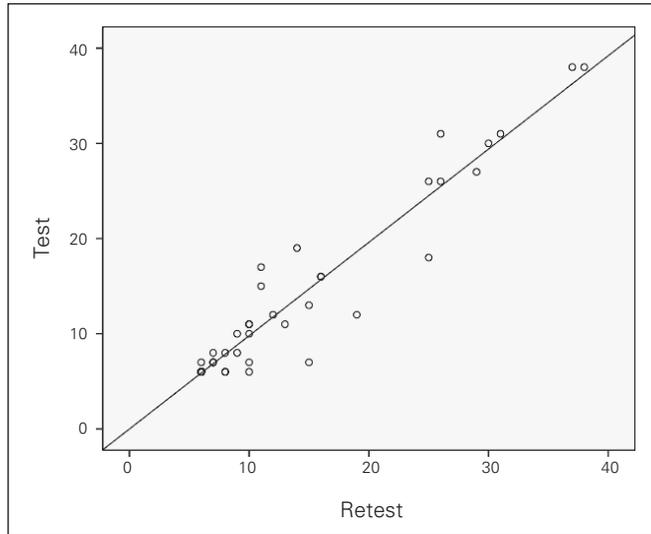


Fig. 1. Correlation of the global score on the Patient Scar Assessment Scale, French Canadian version (PSAS-Fr), initially (test) and 1 week later (retest). The slope corresponds with the correlation coefficient (0.980).

in the same patient at a 1-week interval more than a year after surgery. The data on individual items did not indicate any question to be problematic: all of them showed a correlation coefficient greater than 0.7. An interesting finding is the correlation between age and higher satisfaction related to surgical scars. An explanation could be that older patients had fewer hypertrophic scars.²³ Studies on other potential confounders (e.g., scar location, time interval since surgery, type of closure used, presence of traumatic wound) must be completed before we can conclude with certainty that age is related to scar satisfaction.

The limitations of our study include the fact that not all questionnaires were returned owing to our process of not collecting patient identifiers. This anonymous process protected confidentiality but meant that we were unable to resolve returned questionnaires with discordant demographics or area of scar information. We chose to eliminate these conflicting responses from our analysis to be confident of our data integrity. We are unable to determine the effects of these nonresponses on our estimates of reliability. Owing to the anonymous process, it was impossible for us to verify the reason for these reporting discrepancies. A further limitation of our study was that it was cross-sectional and did not evaluate the responsiveness of the scale to detect differences over time.

Despite these limitations, our study supports the use of this tool for surgical research in a French Canadian population. We recommend that future surgical studies where scars are an issue should incorporate this new PSAS translation. Patient satisfaction with surgical scars could be influenced by length, localization, width or texture. This information could be useful when choosing the surgical approach. For example, the assumption of higher satisfaction for mini-incision surgery could be verified by using this scale in English and French Canadian studies. Also, additional studies addressing the psychometric properties in acute populations and in longitudinal cohorts should be conducted to assess responsiveness.

Table 2. Correlation table for each specific question

No.	Question	IIC matrix*	Cronbach α
1.	La cicatrice est-elle douloureuse?	0.789	0.868
2.	La cicatrice pique-t-elle?	0.802	0.882
3.	La couleur de la cicatrice est-elle différente?	0.931	0.964
4.	La cicatrice est-elle plus ferme?	0.943	0.970
5.	L'épaisseur de la cicatrice est-elle différente?	0.963	0.980
6.	La cicatrice est-elle irrégulière?	0.922	0.958

ICC = intraclass correlation coefficient.
*Interitem correlation matrix.

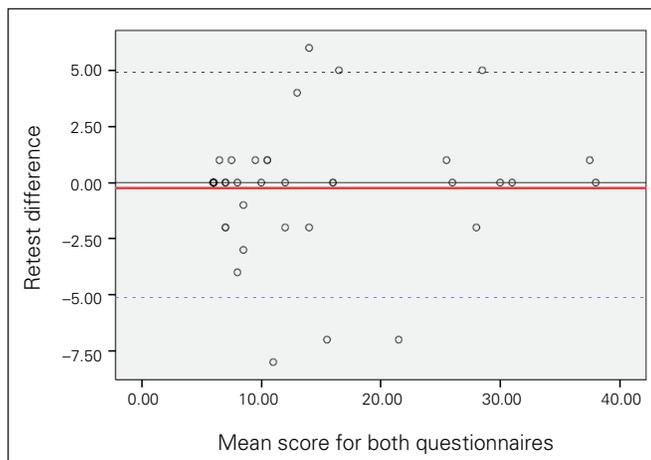


Fig. 2. Score distribution using Altman and Bland's technique.¹⁸

Acknowledgements: J.C. MacDermid's work is supported by a New Investigator Award from the Canadian Institutes of Health Research. The authors thank Amélie Bourget (plastic surgeon), Pierre Beaumont (orthopedic surgeon), Kathleen Beaumont (translator) and Marie-France Poirier (research coordinator).

Competing interests: None declared.

Contributors: All authors designed the study, wrote and reviewed the manuscript and approved the final version for publication. Ms. Deslauriers and Dr. Rouleau acquired the data, which Drs. Rouleau, Alami and MacDermid analyzed.

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Appendix 1. Questionnaire: patient scar satisfaction*

Circle the number corresponding to your opinion.

	<u>no complaints</u> → <u>worst imaginable</u>
Is the scar painful?	1 2 3 4 5 6 7 8 9 10
Is the scar itching?	1 2 3 4 5 6 7 8 9 10
	<u>normal skin</u> → <u>very different</u>
Is the colour of the scar different?	1 2 3 4 5 6 7 8 9 10
Is the scar more stiff?	1 2 3 4 5 6 7 8 9 10
Is the thickness of the scar different?	1 2 3 4 5 6 7 8 9 10
Is the scar irregular?	1 2 3 4 5 6 7 8 9 10
	Total: /60

*Adapted from the PSAS¹³ with permission from Lippincott Williams & Wilkins (<http://www.com>).

Appendix 2. Échelle de satisfaction du patient : cicatrice chirurgicale*

Encerclez le chiffre correspondant à votre opinion pour les 6 questions.

	<u>aucun problème,</u> <u>normal</u>	→	<u>pire situation imaginable</u> <u>catastrophe, anormale</u>
1. La cicatrice est-elle douloureuse?	1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10
2. La cicatrice pique-t-elle?	1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10
	<u>peau normal</u>	→	<u>anormale</u>
3. La couleur de la cicatrice est-elle différente?	1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10
4. La cicatrice est-elle plus ferme?	1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10
5. L'épaisseur de la cicatrice est-elle différente?	1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10
6. La cicatrice est-elle irrégulière?	1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10
			Total: /60

*La PSAS-Fr.