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Psychometric Properties of Arabic Version of Facial Disability Index in Facial Burn Patients to ensure Better Care Delivery

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ABSTRACT

Background: Facial burns can cause orofacial mobility dysfunction, which in turn can affect fundamental functions like eating, drinking, as well as speaking to varying degrees. Impairments in facial mimetics and social expressive abilities are also possible consequences. A validated index to measure patient-related outcome and quality of life in facial burn is not available in Arabic language, So, this study was done to assess the reliability and validity of the Arabic Egyptian version of the Facial Disability Index in measuring the quality of recovery following a facial burn injury in order to provide better care.

Methods: one appropriate questionnaire, the Facial Disability Index (FDI) was adeptly translated to Arabic version according to international guidelines. Content validity of Arabic version of FDI was measured, the internal consistency was assessed, and also test re-test reliability. Reliability was assessed in 121 patients with 2nd to 3rd facial burn injury of either sex, their ages were more than 20 years and they had no other burn injuries in other body parts. They were asked to fill the scale, with average 3 days interval, They were once again requested to refill it. It was thought that their condition had improved. Content Validity was assessed in 32 experts whose specialty in facial burn injury, they were asked to complete Index of Content Validity (ICV) according to their opinion of each question. Experts assigned a score of 1 (agree), 0 (undetermined), or -1 (disagree) to each question.

Results: The content validity was very good after measuring experts' opinions, the mean ICV of the Arabic FDI (ICV= 0.82), the internal consistency of the Arabic FDI was good (Cronbach alpha=0.72) and test- retest reliability was good in physical function part of FDI (Pearson correlation coefficient = 0.730) and for social part of the index it was acceptable (Pearson correlation coefficient = 0.680).

Conclusion: The translated Arabic facial Disability Index is a viable and reliable tool for assessing the quality of life as well as patient-related outcomes following a face burn injury.

KEYWORDS: Psychometric properties, Validation Study, Facial Disability Index, Facial Burn Injury.

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INTRODUCTION

One of the top causes of mortality and disability around the world is burns. In resource-constrained areas, burn injury is one of the major causes of permanent disability among survivors, whereas traumatic injuries are the fourth highest cause of disability globally. Fortunately, the majority of persons who incur burn injuries survive; however, many suffer from chronic pain, disfigurement, or incapacity. The World Health Organization (WHO) estimates that 11 million people around the world incur substantial enough burn burns to seek medical attention each year **[1].**

A third of all burn injuries affect the face. The majority of facial bum injuries cause esthetic disfigurement and functional incapacity. The quality of life for individuals affected by these disorders can be significantly impacted by the dysfunction of orofacial motility, which in turn affects fundamental daily functions including eating, drinking, speaking, as well as social communication. In addition to expected impairment in facial mimetics and its ramifications in the ability of engagement and social expression **[2].**

Motor and psychological outcomes must be evaluated in patients with fascial burn. Patients suffering from facial paralysis can be assessed using the short self-report outcome questionnaire known as the facial disability index (FDI). Its validity and superiority to other general health-related quality of life questionnaires have been proven **[3].**

The FDI is a self-reporting questionnaire that assesses aspects of quality of life related to psychological and physiological limitations brought on by orofacial motor disorders. It has shown to be a more reliable and focused to evaluate quality of life for those who have facial paralysis compared to other general measurements. It has been translated into other languages and used in various research **[4, 5, 6].** Arabic cultural adaption and validation of the FDI has not been completed yet. Consequently, this study was done to translate, culturally adapt, and validate the Arabic version of the face Disability Index so that patients in Egypt may evaluate their own recovery from face burn injuries.

MATERIAL AND METHODS

Design

One hundred and twenty-one men and women with facial burns injuries ranging from second to third degree participated in this non-experimental survey research.

Ethical Consideration

The faculty of physical therapy at MTI University's ethical committee gave their approval to this study **(No. REC/2111/MTI.PT/2412312).**

Participants

The present study was conducted on all patients with face injuries received treatment at the Outpatient Burn Clinic of the Faculty of Physical Therapy, MTI University, Kasr Al Eni Hospital, Hospital, Ahmed Maher Hospital, Ahl Masr Hospital, Matarya Hospital and Orabi Organization from 4th January 2025 to 4th April 2025. 121 patients (94 male +27 female) taking physiotherapy treatment were took-part in the study.

Measurement Tool

Assessment Questionnaire: Arabic Version of Facial Disability Index

The Facial Disability Index (FDI) is a self-administered questionnaire that assesses quality of life aspects associated with the physical and psychological limitations resulting from orofacial motor changes. It has proven to be more significant and specific than other conventional quality of life assessment tools for those with facial paralysis **[4].**

The FDI questionnaire (Appendix A) has ten questions classified into physical in addition to social well-being subscales, each including five items rated on a 6-point scale and translated into a score of a maximum of 100 points, reflecting unmodified physical as well as social well-being functions. The physical subscale evaluates problems related to eating, drinking, speaking, oral hygiene, in addition to ocular symptoms such as tears or dryness. The social welfare subscale examines dimensions of anxiety, irritation, as well as social interaction **[4].**

The American Physical Therapy Association, which has the publishing rights, granted permission for both translation and culturally adaptation the FDI. The employed approach adhered to global guidelines for the translation and cultural adaption of self-reported outcome measures, encompassing the six phases outlined below: Forward translation, translation synthesis, backward translation, expert evaluation, pre-final version testing, as well as validation **[7].**

Step 1: Forward translation (Initial translation)

Two Arabic-speaking individuals who were fluent in English were tasked with translating the Facial Disability Index from its original English to Arabic (forward translation). They asked the researcher to explain each issue in a way that an individual with a reading level of about 20 years might comprehend. Diverse profiles and backgrounds were represented by the two translators. We called one translator's version T1 because he understood the ideas being researched in the questionnaire, and we called the other T2 since he had no idea what they were or any medical or clinical background.

Step 2: Synthesis of the translation

The researcher created a common translationT12 from the original questionnaire, in addition to the T1 and T2 versions.

Step 3: Backward translation

Two native English speakers who were able to reverse-translate this Arabic version T12 into English had no prior exposure to the original English text. Although neither of them has a background in medicine, they are fluent in Arabic and English. The two back-translations, BT1 and BT2, were made by them.

Step 4: Expert review

The researcher integrated all translated versions of the questionnaire, consulted with experts to create the pre-final version for field testing, and examined the translated instrument T12 for necessary modifications to ensure conceptual similarity for adult Egyptian individuals suffering from burn injuries).

Step 5: Test of the pre-final version

Five individuals, all of whom were Egyptians and specialized as burn over physiotherapists, volunteered to take the (Arabic FDI) in its pre-final form. The purpose of the survey was to get feedback from each individual. Their opinions and remarks were recorded. An item was revised in consultation with a language specialist in order to ensure that the questionnaire was clear and easy to comprehend if two or more participants had problems with it.

Step 6: Submission of Documentation to the Developers or Coordinating Committee for Appraisal of the Adaptation

process (Authentication)
An authorized office for translation (the Consulting Office for translation) was given the task of translating the final version of the (Arabic FDI) (Appendix B) 27 Al Nasr St., Al Maadi, Cairo, Egypt. Tel. No: 0225191146

Intervention
Data was collected at Physiotherapy burn clinics at the previously mentioned six hospitals using Arabic version of FDI. Measuring content validity, internal consistency as well as test-retest reliability of the Arabic FDI.

Content Validity
It is the degree to which the concept of concern is correctly captured by a measure. Rather than relying on bio-physiological methods, content validity is often evaluated by self-report or observational methods. [8]. This type of validity cannot be quantified. The usual methods for determining an instrument's content validity include comparing it to the domains intended to be assessed and consulting with experts in the field, such as physicians and research participants. [9]. One step in ensuring content validity was having experts mark the number that best reflected their judgment on each question in the Arabic Index of Content Validity (ICV) of FDI (Appendix C). Each expert assigned a score of 1 (agree), 0 (undetermined), or -1 (disagree) to each item. Each item's Index of Content Validity (ICV) was determined by adding together the ratings of all experts and dividing the total by the number of experts.

(2) Reliability
The Pearson Correlation Coefficient (PCC) was used for test-retest reliability analysis, and the Cronbach Alpha Coefficient was employed for internal consistency measurement. This scale was administered to 121 patients with second- to third-degree facial burns at the Burn Clinic at the Faculty of Physical Therapy at MTI University and the previously mentioned hospitals. They were requested to refill the scale at regular intervals of three days. We presumed that their health had stabilized.

DATA ANALYSIS

- SPSS 28.0 was used for statistical analysis.
- A basic statistical analysis of ICV data was used to determine the Arabic Facial Disability Index's (FDI) content validity.
- The Pearson Correlation Coefficient (PCC) was used to correlate the first and second scores in order to determine the test-retest reliability of the FDI.
- Cronbach's alpha was used to assess internal consistency.

RESULTS

The Arabic version of the FDI self-report questionnaire was validated from January to April 2025 with 121 adult patients (aged 20 and up) who had suffered a second- or third-degree burn to their face and received treatment at the Outpatient Clinic of the previously mentioned hospitals.

Participants descriptions:
The study's 121 participants, all of them suffered from face burns of the second to third degree, are detailed in table 1. Categorical variables are represented as a numerical value with the percentage included in parentheses, whereas age is shown as Average ± Standard Deviation (SD) having the range enclosed in parenthesis.

Table (1) Demographic and clinical characteristics of the sample

Characteristics	Results
Age	32.1± 12.2 (17-72)
Gender	M: n=94 F: n= 27

Content Validity
Table (2) and Figure (1) show that all 10 items had relevant questions with Index of Content Validity (ICV) values ranging from 0.65 to 0.93, based on the expert judgments of 32 academic professors, lecturers, and physiotherapy specialists in burn and surgery departments. Expert judgments as well as the fact that the Arabic FDI contained elements in the English version indicate that its content validity is very good (mean ICV = 0.82).

Table (2) Experts' opinions according to ICV of the Arabic version of Arabic Facial Disability Index

Question Number	N. of Experts who agree (1)	N. of Experts who can't determine (0)	N. of Experts who disagree (-1)	ICV
(1)	30	2	0	0.93
(2)	29	3	0	0.90
(3)	27	4	1	0.81
(4)	27	5	0	0.84

(5)	**24**	**5**	**3**	**0.65**
(6)	**24**	**6**	**2**	**0.68**
(7)	**28**	**4**	**0**	**0.87**
(8)	**30**	**2**	**0**	**0.93**
(9)	**26**	**5**	**1**	**0.81**
(10)	**27**	**5**	**0**	**0.84**

Note: **Scores: 1 = agreed, 0 = undetermined, and -1 = disagreed, ICV (Index of Content Validity) = Summation of the scores from each expert divided by the number of experts (n = 32).**

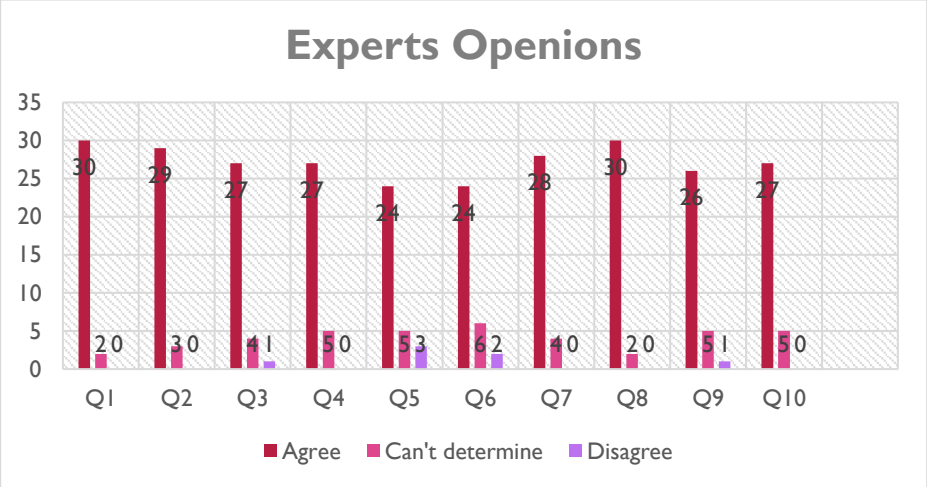

Figure 1. **demonstrates experts' opinions of Arabic Facial Disability Index**

Scoring of Arabic Facial Disability Index

The following formula has long been used to estimate item answers and convert them to scores: **N= Number of answered questions.**

Physical function: $\frac{\text{Sum of degrees (question No 1 to No 5)} - N}{N} \times \frac{110}{4}$

Social function: $\frac{\text{Sum of degrees (question No 6 to No 10)}}{N} \times \frac{110}{5}$

Internal Consistency

The Arabic FDI was tested for internal consistency utilizing the Cronbach alpha value. The scale's alpha coefficient was 0.72, which is considered good.

Test-retest Reliability

The reliability of the Arabic FDI test-retest (Physical Function Part) was evaluated using the Pearson Correlation Coefficient (PCC). Between the first and second tests, an average of three days passed. The first score and the second one were highly related. In Table (3) and Figure (2), the p-value is 0.000, and the PCC was 0.730, therefore it was good.

Table (3) demonstrates a good direct relationship between 1st score and 2nd score in Physical part of Arabic FDI:

	1st Score
2nd Score **Pearson Correlation Sig. (2 - tailed)** **N**	**0.730** **0.000** **121**

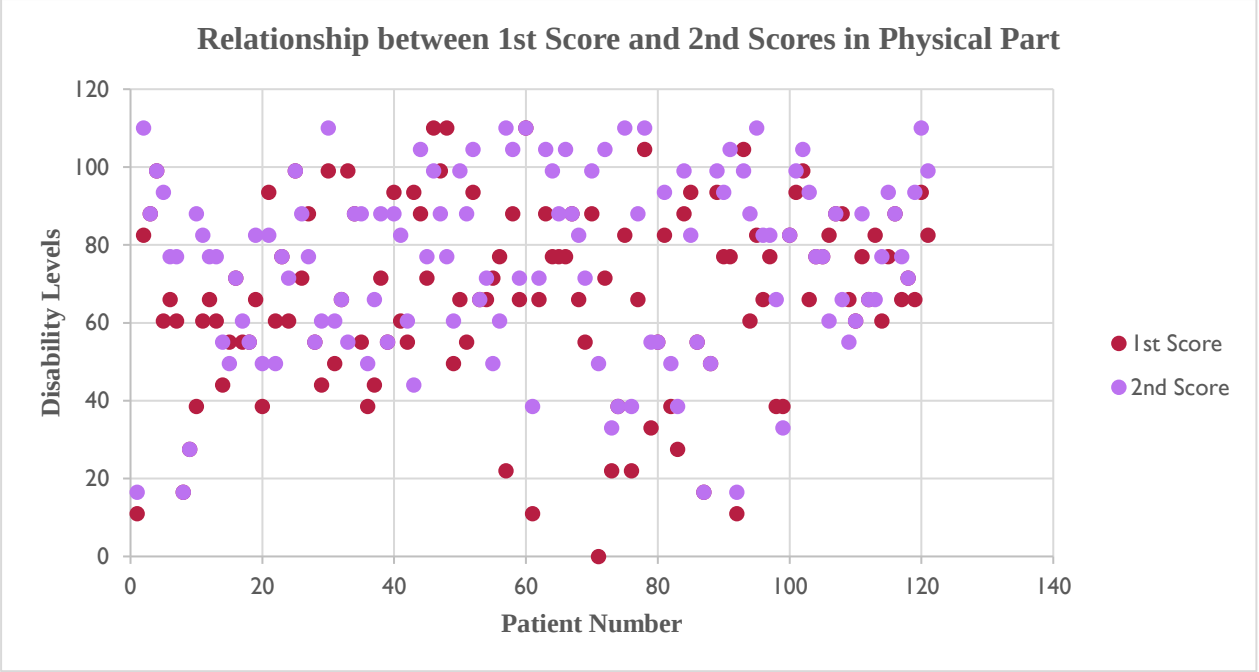

Figure 2. **Scatter plot demonstrates a strong direct relationship among the 1st score and the 2nd one in Physical part of Arabic FDI.**

The Pearson Correlation Coefficient (PCC) was used to evaluate the test-retest reliability of the Arabic FDI (Social Function Part). Between the first and second tests, an average of three days passed. The correlation between the first and second scores was acceptable. Table (4) and Figure (3) show that the PCC was acceptable with a p-value of 0.000 and a value of 0.680.

Table (4) shows a good direct relationship among the first and second scores in the social element of Arabic FDI:

	1st Score
2nd Score	**0.680**
Pearson Correlation Sig. (2 - tailed)	**0.000**
N	**121**

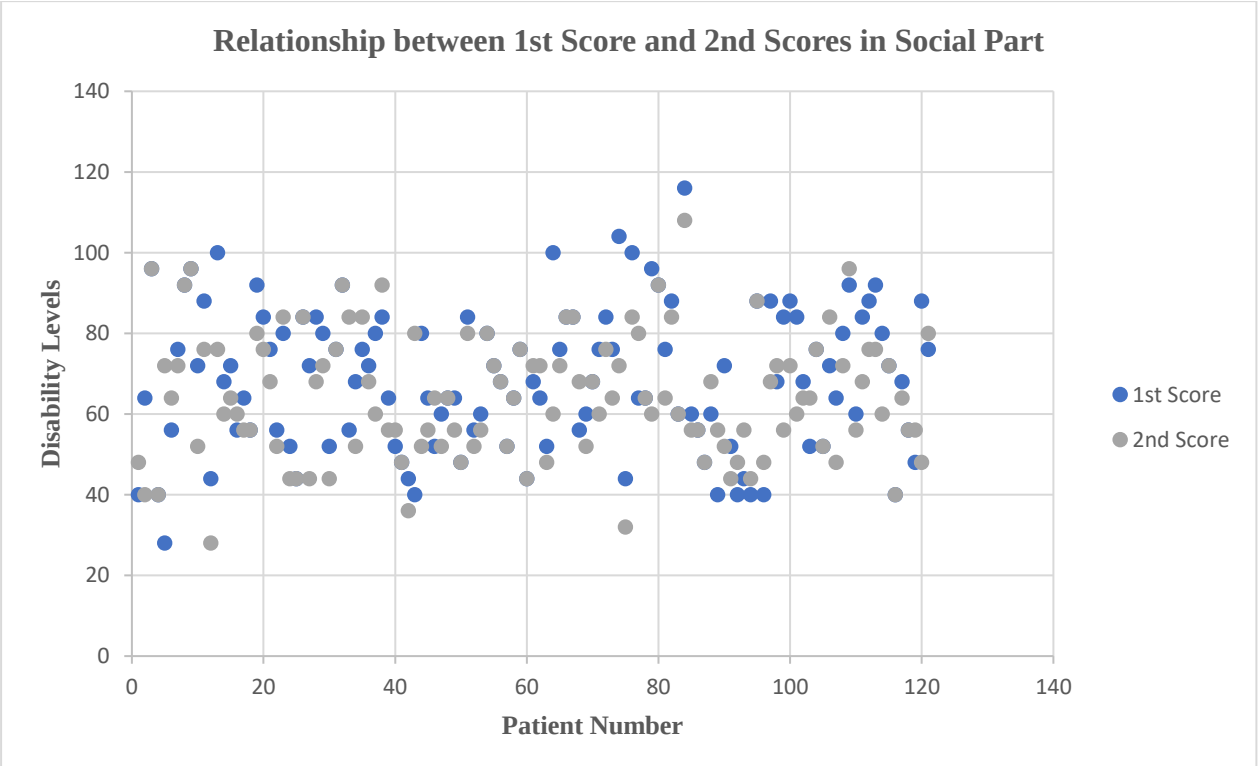

Figure 3. **Scatter plot demonstrates a strong direct relationship among the 1st score and the 2nd one in social part of Arabic FDI.**

DISCUSSION

The inadequacy of broad questionnaires to identify specific obstacles faced by people with facial paralysis is a major obstacle to their subjective assessment of their quality of life. Despite the abundance of questionnaires designed to assess individuals with facial paralysis, only a small number have undergone thorough validation [3]. For individuals with facial neuromuscular disorders Van Swearingen and Branch created FDI in 1996. A total of 10 questions make up the FDI, with five questions pertaining to physical function and five related to social function and well-being. Eating, drinking, talking, and tooth brushing are the primary activities tested in the first set of functional disability impairment (FDI) tests. In Section 2, we go into the topic of social well-being, which encompasses factors like emotional state, sleep quality, as well as social life. A six-point Likert scale is used to grade these 10 questions. The final score might range from 0 (worst) to 100 (excellent) **[4,5].**

Some studies discovered moderate-to-strong correlation among social areas and their SF 36 counterparts, including bivariate positive links among FDI and the House-Brackmann (H-B) scale. While the FDI social/well-being function subscale was linked to the 12-item mental element of the Short Form Health Questionnaire (SF-12), the physical function subscale was linked to the Sunnybrook Face Rating System composite score. A correlation among FDI and facial dysfunction severity was found on the H-B global scale; the SF-36 in addition to the H-B physical function subscale were both linked to the FDI physical function subscale. In addition, all SF-36 subscales (with the exception of the role-functioning physical (RP) subscale) were associated with H-B, and the FDI social/well-being function subscale was additionally related to it **[4,5].**

Results from studies on cultural adaptation, validity, as well as reliability have been published in a variety of languages, including Spanish, Swedish, Italian, French, Brazilian, Turkish, along with Dutch.

According to research by Agnaldo J. Graciano et al., this modified version of the facial disability index is a valid and reliable tool for evaluating the psychological and physiological effects of facial nerve impairment in patients who speak Brazilian Portuguese [11]. An independent along with larger clinical subgroup was used to corroborate the FDI's conceptual validity, responsiveness, and test-retest reliability, as well as its internal consistency (Pavese C et al., 2010) **[12]**.

Results from the Swedish Facial Disability Index (FDI) were found to be psychometrically valid by Marsk et al. (2013) [13]. Patients suffering from facial nerve paralysis might benefit from the FDI questionnaire, developed by Gonzalez-Cardero et al., as it is a targeted tool for evaluating face neuromuscular impairment **[14]**.

In the current study, the Arabic version of the FDI was found to be valid and trustworthy for assessing Arabic Egyptian speaking patients suffering from facial burns. The study was done effectively and in accordance with the objectives. The cross-cultural adaption process took into account both language and cultural aspects. This adaption study was valuable given the lack of Arabic evaluation instruments to evaluate facial functions and the necessity in this field. Arabic FDI may be used in future in assessment of other cases like: peripheral facial paralysis and TMJ dysfunction.

In the process of content validity, according to expert opinion , item number one and eight which referring to difficulty in keeping food in mouse , and getting irritable around others respectively were considered the most highest ICV value which equal 0.93 while the lowest item in ICV = 0.65 was item number five which referring to difficulty in brushing teeth, experts who did not agree this item did not explain their rejection instead of its importance in ADL activities. The mean ICV= 0.82 in the current Arabic adapted index which was considered very good in validation process. Content Validity was not in the original English version, the researchers correlated the clinician's physical assessment of face movement with that of the FDI physical function subscale to determine its construct validity. A clinical evaluation of psychosocial status as well as the FDI physical function subscale were shown to be linked with the FDI social/well-being subscale, demonstrating its good validity **[4].**

The present investigation confirmed the FDI's (physical function portion) reliability by its good test-retest reliability, as shown by a direct correlation among the first and second scores. Using the Pearson Correlation Coefficient (r=0.730) and the acceptable value (r=0.690) for the social component, as well as the direct link between the first and second scores, it was analyzed. On average, three days intervened among the two assessments. With respect to the first English FDI, r=0.88. Its dependability and social component were both 0.83. A check for internal consistency was performed on the Arabic version of FDI. Although it was not tested in the first English translation, its Cronbach alpha coefficient of 0.72 indicates satisfactory internal consistency.

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REFERENCES

1. Organization WH. World Health Organization. Accessed January 26, 2022. ⟨https://www.who.int/news-room/fact-sheets/detail/burns⟩.
2. Van Swearingen JM, Cohn JF, Turnbull J, Mrzai T, Johnson P. Psychological distress: linking impairment with disability in facial neuromotor disorders. Otolaryngol Head Neck Surg. 1998; 118:790---6.
3. Ho AL, Scott AM, Klassen AF, Cano SJ, Pusic AL, Van Laeken N. Measuring quality of life and patient satisfaction in facial paral ysis patients: a systematic review of patient-reported outcome measures. Plast Reconstr Surg. 2012;130:91---9.
4. Van Swearingen JM, Brach JS. The facial disability index: reliability and validity of a disability assessment instrument for disorders of the facial neuromuscular system. Phys Tk. 1996;76:1288---300. 6. 6.

5. Pavese C, Cecini M, Camerino N, De Silvestri A, Tinelli C, Bejor M, et al. Functional and social limitations after facial palsy: expanded and independent validation of the Italian version of the facial disability index. Phys Ther. 2014;94:1327---36.
6. Marsk E, Hammarstedt-Nordenvall L, Engström M, Jonsson L, Hultcrantz M. Validation of a Swedish version of the Facial Dis ability Index (FDI) and the Facial Clinimetric Evaluation (FaCE) scale. Acta Otolaryngol. 2013;133:662---9.
7. Gonzalez-Cardero E, Infante-Cossio P, Cayuela A, Acosta-Feria M, Gutierrez-Perez JL. Facial disability index (FDI): adaptation to Spanish, reliability and validity. Med Oral Patol Oral Cir Bucal. 2012;17:e1006---12.
8. Beaton DE, Bombardier C, Guillemin F and Ferraz MB, (2000): Guidelines for the process of cross cultural adaptation of self- report Measures. SPINE 25(24), 3186–3191.
9. Domholdt E, DenegarCR ,Moyers ,PA and Hinton VA, (2011): Rehabilitation research: Principals and applications.6th Ed.
10. Goldstein,M.S. Elliott, S.D. and Guccione, A.A.(2000).The development of an instrument to measure satisfaction with physical therapy . phys Ther,80, 853-863.
11. Translation, cultural adaptation and validation of the facial disability index into Brazilian Portuguese Agnaldo J. Graciano a,∗, Marcela M. Bonin b, Marion R. Mory b, Adriana Tessitore b, Jorge R. Paschoal a, Carlos T. Chone Braz J Otorhinolaryngol. 2020;86(5):602---608
12. 6. Pavese C, Cecini M, Camerino N, De Silvestri A, Tinelli C, Bejor M, et al. Functional and social limitations after facial palsy: expanded and independent validation of the Italian version of the facial disability index. Phys Ther. 2014;94:1327---36.
13. Marsk E, Hammarstedt-Nordenvall L, Engström M, Jonsson L, Hultcrantz M. Validation of a Swedish version of the Facial Dis ability Index (FDI) and the Facial Clinimetric Evaluation (FaCE) scale. Acta Otolaryngol. 2013;133:662---9.
14. Gonzalez-Cardero E, Infante-Cossio P, Cayuela A, Acosta-Feria M, Gutierrez-Perez JL. Facial disability index (FDI): adaptation to Spanish, reliability and validity. Med Oral Patol Oral Cir Bucal. 2012;17:e1006---12.