COMPARISON BETWEEN DASH AND SF-36 OF THE INJURED ELBOW REHABILITATED IN OCCUPATIONAL THERAPY

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ABSTRACT

Objective: The objective of this study was to evaluate upper limb function and quality of life of patients that have suffered from traumatic elbow lesion, submitted to surgical treatment and rehabilitation. Methods: Through a transversal study, 22 patients diagnosed with traumatic elbow lesion, treated surgically by the UNIFESP Shoulder and Elbow Surgery Group and rehabilitated at Lar Escola São Francisco, Occupational Therapy division, Hand and Upper Limb Therapy service, were evaluated using the Disabilities of the Arm, Shoulder and Hand (DASH) and SF-36 Short-Form questionnaires. Results: The average DASH score was 31.36. The average result of the SF-36 domains was 60.32, for functional capacity; 27.05 for the physical aspect; 59.19, for pain; 66.99 for general health; 59.95 for vitality; 73.75 for the social aspect; 38.18 for the emotional aspect and 62.43 for mental health. The results of the DASH were not statistically significant. Conclusion: Patients with elbow traumatic lesion are capable of carrying out daily activities, but show some level of reduced function of the damaged limb and impaired quality of life. Level of Evidence V, Therapeutic Studies investigating the results of treatment.

Keywords: Occupational Therapy. Rehabilitation Program. Elbow/injuries. Evaluation. Quality of Life.

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INTRODUCTION

The elbow functions to take the hand to all places in space. However, a limitation in its mobility may cause reduction of movements and prevent the performance of the individual's activities of daily living, which require a wide range of elbow positions and movements in flexion-extension and pronosupination of the forearm.[1-3] Thus loss of elbow movement is considered more incapacitating than loss of movement of the shoulder and wrist, as it restricts hand positioning for grip.[4]

Traumatic elbow lesions generated by fractures, dislocations, fracture-dislocations, ligament or tendon lesions affect this articular complex, reducing its ample mobility and causing functional limitations, such as incapacity or pain in turning a knob or key, pushing or pulling objects, opening and closing doors, bringing the hand to the mouth, performing perineal hygiene, getting up and carrying objects, among others.[2,5]

Rehabilitation of elbow joint injuries consists of reducing pain and edema, preventing joint stiffness with exercises that promote range of motion, maintenance and integrity of the uninvolved joints, gradual muscle strengthening, besides functional training geared toward the individual's return to activities of daily living. However, when this joint is immobilized, it can cause contractures and limitations of movements, which are very common in humeral, radial and ulnar dislocations and fractures.[5]

The Hand and Upper Limb Therapy service of the Occupational Therapy Sector of Lar Escola São Francisco Rehabilitation Center (LESF), treats postoperative patients referred by the Shoulder and Elbow Surgery Group of the Hand and Upper Limb Surgery Discipline of the Department of Orthopedics and Traumatology of Universidade Federal de São Paulo that have an appointment in the Physiatry sector of LESF before starting rehabilitation.[6]

The goals of postoperative rehabilitation are to maintain the gain of arc of movement of the elbow obtained in the intraoperative period, to minimize the effects of edema and healing, to restore the arc of movement, muscle strength of the supine-extensor and flexor-pronator muscles and the functional capacity of the upper limb of patients diagnosed with distal humerus fracture, proximal

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radial and ulnar fracture, supra and intercondylar fracture, ligament retention and/or reconstruction, tendon reinsertion, ulnar nerve transposition and post-stiff elbow release. Ortheses for mobilization, immobilization or constraint are resources used frequently in elbow rehabilitation and their prescriptions and models depend directly on each lesion.[6]

From this perspective, it appears that elbow lesions generate losses in the individual's functionality, and there are generic and specific tools to analyze this damage that are recommended as part of the evaluation to measure the psychosocial consequences, the impact of the disease on the individual's routine and dysfunction in the affected limb, such as the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) and Disabilities of the Arm, Shoulder and Hand (DASH).[7-9]

The aim of this study is to assess upper limb function and the quality of life of patients that have suffered traumatic elbow lesion submitted to surgical treatment and to occupational therapy.

MATERIAL AND METHODS

A transversal study was carried out with 22 patients diagnosed with traumatic elbow lesion, treated surgically between 2000 and 2008 at the Instituto da Mão, by the Shoulder and Elbow Surgery Group of the Department of Orthopedics and Traumatology and rehabilitated at least 3 months earlier in the Hand and Upper Limb Therapy service of the Occupational Therapy sector of LESF, of the Physiatry Discipline of the Department of Orthopedics and Traumatology of University Federal de São Paulo – Escola Paulista de Medicina (UNIFESP/EPM).[10]

After approval of the study by the Committee of Ethics and Research of UNIFESP (0929/08), between the months of August and December of 2008, the researcher performed a search for the patients' registration numbers in the computer of the Occupational Therapy sector of LESF and selected the medical records according to diagnosis and duration of treatment. The patients were contacted by phone and invited to appear at the survey sites or approached in person, at LESF or at the shoulder and elbow outpatient clinic of Hospital São Paulo. After the patient had signed the Informed Consent Form, at a place that guaranteed privacy, their identification data were collected and the SF-36 and DASH questionnaires, both translated, culturally adapted and validated in Brazil, were applied.[8,9]

The SF-36 is a generic tool that evaluates the general health of individuals. It is made up of 36 questions, subdivided into eight domains: functional capacity, physical aspects, pain, and general state of health, vitality, social aspects, emotional aspects and mental health. It also includes a comparative question between current conditions of health and those from a year ago. The final score ranges from 0 to 100, where zero corresponds to a worse general state of health and 100 to the best state of health. Each domain is analyzed separately to avoid the mistake of not identifying the true problems related to general health.[8]

DASH is a specific tool that assesses the physical function and symptoms of the upper limb as a functional unit. It is composed of thirty questions, involving eighteen components: pain, weakness, stiffness, tingling, daily activities, domestic chores, shopping, recreation activities, self-care, getting dressed, eating, sexual activities, sleeping, caring for the family, work, socialization and self-image, besides the optional modules for athletes and musicians, and another for workers. The total score ranges from 0 to 100, where zero is equivalent to the absence of dysfunction and 100 represents severe dysfunction.[9]

The mean application time of both questionnaires was approximately twenty minutes.

The results were submitted to the descriptive statistical analysis, application of Pearson's correlation coefficient and of the parametric test ANOVA.

Characterization of the Sample

Table 1 shows that 40.9% of the patients are male and 59.1% female. The mean age was 40.68 years, ranging between 24 and 58 years. As regards manual dominance, 95.5% were right-handed and, of these, 31% suffered an injury of the dominant limb. In relation to the clinical profile, the diagnoses with greatest prevalence were fracture-dislocation of the elbow in 45.5% of the cases, followed by 22.7% of supra and/or intercondylar fracture and 18.2% of radius head fracture. The work status after the rehabilitation period showed that 50% of the sample remained on leave, 40.9% were active, 4.5% unemployed and 4.5% retired on account of age.

The start of rehabilitation, which corresponds to the period in weeks that the patient took to begin the rehabilitation treatment after the surgical procedure, occurred on average at 9.12 weeks. The rehabilitation follow-up, which involves the months that the patient spent in treatment, presented an average of 6.51 months.

RESULTS

As regards the results of SF-36, the domains with the highest mean values were social aspects (73.75), general state of health (66.99), mental health (62.43) and functional capacity (60.32). In relation to DASH, the mean score was 31.36.

In Table 2, we can see a statistically significant correlation between DASH and SF-36 (domains: physical aspects, vitality and social aspects), demonstrating that the lower the score of the SF-36 domains, the higher the score of DASH. The results of DASH range from a lower to a higher value, indicating worsening of the dysfunction and symptoms. On the contrary, the values of SF-36 change from the lowest to the highest, according to the evolution of the general state of health. Thus, it is observed that all the correlations are negative, as the variables are inversely proportional.

The statistically significant correlations between SF-36 (domains: functional capacity, pain, general state of health and vitality) and the variable age are presented in Table 3, revealing that the lower the patient's age, the greater their functional capacity, their general state of health and vitality. On the other hand, it is observed that the lower the patient's age, the higher the result of the pain domain. No statistically significant correlation was found between DASH and the variable age.

Table 1. *Characteristics of the sample.*

Characteristics		N	%
Gender:	Female	13	59.1%
	Male	9	40.9%
Dominant Limb:	Right	21	95.5%
	Left	1	4.5%
Injured Dominant Limb:	No	15	68.2%
	Yes	7	31.8%
Diagnosis:	fracture-dislocation	10	45.5%
	supra/intercondylar fracture	5	22.7%
	radius head fracture	4	18.2%
	proximal ulnar fracture	1	4.5%
	ligament lesion	1	4.5%
	tendon lesion	1	4.5%
Work Situation:	On Leave	11	50.0%
	Working	9	40.9%
	Unemployed	1	4.5%
	Retired on account of age	1	4.5%

N= number

Table 2. *Correlation of DASH with SF-36.*

SF-36	DASH	
	Corr	p-value
Functional Capacity	-37.4%	0.087#
Physical Aspects	-55.4%	0.008*
Pain	-36.9%	0.091#
General State of Health	-27.4%	0.217
Vitality	-45.4%	0.034*
Social Aspects	-46.5%	0.029*
Emotional Aspects	-31.6%	0.152
Mental Health	-31.2%	0.158

Table 3. *Correlation of DASH and SF-36 with age.*

		Age	
		Corr	p-value
DASH		10.3%	0.648
SF-36	Functional Capacity	-52.9%	0.011*
	Physical Aspects	-18.8%	0.401
	Pain	-44.9%	0.036*
	General State of Health	-47.7%	0.025*
	Vitality	-54.6%	0.009*
	Social Aspects	2.1%	0.927
	Emotional Aspects	-25.4%	0.254
	Mental Health	-32.8%	0.136

Table 4 presents a comparison of the results of DASH and SF-36 with the variable gender, and demonstrates that there is a statistically significant mean difference between the sexes for the functional capacity and vitality domains of SF-36. In both results the male patients present better conditions than the female patients.

The comparison between the DASH and SF-36 scores with the most prevalent diagnoses (radius head fracture, supra and/or intercondylar fracture and fracture-dislocation) showed that there is no statistically significant difference between the results of the questionnaires and the types of lesions.

As regards the patients that injured the dominant limb, there were no statistically significant differences between the DASH and SF-36 scores when compared to the results of the non-dominant limb.

As regards the work situation, Table 5 shows that the SF-36 physical aspect domain presents a statistically significant mean difference between the patients that returned to work and those who remain on leave. The result found in DASH evidences that patients that obtained a mean score of 26.4 are active.

DISCUSSION

Free elbow movement enables hand positioning for grip and performance of activities of daily living of the individual.[2] Lesions of this joint can restrict its mobility and produce considerable functional limitations in the upper limb that reflect on the individual's general state of health.

Based on this principle, the objective of the study was to assess upper limb function and the quality of life of patients that had suffered traumatic elbow lesion and were submitted to surgical treatment and occupational therapy, with application of the SF-36 and DASH tools.

Compared to traumas that affect different anatomical areas of the upper limb, such as shoulder, wrist and hand, traumatic

Table 4. *Comparison DASH and SF-36 for Gender.*

	Sex	Mean	Median	Standard Deviation	CV	Min	Max	N	CI	p-value
DASH	Fem	37.2	39.2	25.41	0.7	0.8	75.8	13.0	13.8	0.131
	Male	23.0	22.5	10.83	0.5	10.0	47.5	9.0	7.1	
Functional Capacity	Fem	46.6	48.5	29.97	0.6	8.5	93.5	13.0	16.3	0.005*
	Male	80.2	83.5	12.25	0.2	53.5	93.5	9.0	8.0	
Physical Aspects	Fem	28.5	20.0	33.44	1.2	0.0	80.0	13.0	18.2	0.809
	Male	25.0	5.0	31.12	1.2	0.0	80.0	9.0	20.3	
Pain	Fem	54.4	40.8	26.47	0.5	20.8	98.8	13.0	14.4	0.283
	Male	66.1	60.8	20.87	0.3	30.8	98.8	9.0	13.6	
General State of Health	Fem	59.9	65.8	20.98	0.4	23.8	85.8	13.0	11.4	0.071#
	Male	77.3	85.8	21.24	0.3	35.8	98.8	9.0	13.9	
Vitality	Fem	49.2	53.8	22.21	0.5	8.8	83.8	13.0	12.1	0.009*
	Male	75.5	78.8	18.37	0.2	43.8	98.8	9.0	12.0	
Social Aspects	Fem	71.8	73.8	25.94	0.4	23.8	98.8	13.0	14.1	0.651
	Male	76.5	86.3	19.54	0.3	48.8	98.8	9.0	12.8	
Emotional Aspects	Fem	30.8	13.3	36.57	1.2	0.0	80.0	13.0	19.9	0.250
	Male	48.9	46.7	33.17	0.7	0.0	80.0	9.0	21.7	
Mental Health	Fem	56.6	58.8	21.82	0.4	18.8	94.8	13.0	11.9	0.134
	Male	70.8	74.8	19.49	0.3	38.8	98.8	9.0	12.7	

Tabela 5. *Compara situação trabalhista para Dash e SF-36.*

Work situation		Median	Standard Deviation	Min	Max	CI	p-value
DASH	on leave	33.7	18.06	10.0	72.5	10.7	0.451
	active	26.4	24.47	0.8	75.8	16.0	
Functional Capacity	on leave	69.4	19.34	23.5	88.5	11.4	0.103
	active	47.4	36.89	8.5	93.5	24.1	
Physical Aspects	on leave	10.0	18.03	0.0	55.0	10.7	0.005*
	active	47.8	34.29	0.0	80.0	22.4	
Pain	on leave	51.3	20.09	20.8	85.0	11.9	0.144
	active	68.2	29.37	20.8	98.8	19.2	
General State of Health	on leave	68.7	22.38	35.8	98.8	13.2	0.567
	active	62.6	23.85	23.8	90.8	15.6	
Vitality	on leave	59.7	20.20	23.8	83.8	11.9	0.776
	active	56.6	28.63	8.8	93.8	18.7	
Social Aspects	on leave	72.6	18.07	48.8	98.8	10.7	0.920
	active	73.8	31.25	23.8	98.8	20.4	
Emotional Aspects	on leave	41.8	38.88	0.0	80.0	23.0	0.880
	active	39.3	35.50	0.0	80.0	23.2	
Mental Health	on leave	65.7	20.56	30.8	98.8	12.1	0.513
	active	58.8	25.69	18.8	94.8	16.8	

elbow lesions are less common.[11] From this assumption, we can conclude that the number of patients referred for elbow rehabilitation is not very high, a fact that justifies the number of the sample of this survey and the limited frequency of studies in this area.

In national literature we did not locate any systematic review studies and review of literature that used the SF-36 and DASH tools to measure upper limb function and the quality of life of patients with elbow lesions. In international literature, we located some publications, yet with emphasis on surgical treatment and methodological differences, which led us to seek articles that used the same evaluation tools in patients that had suffered lesions indifferent regions of the upper limb.

Besides other aspects, one of the inclusion criteria of this study is the patient's participation in elbow rehabilitation treatment for at least three months. Thus, our sample is formed by rehabilitated patients, that is, patients that have already been discharged, and by patients in treatment, hence with the possibility of evolution of the functional profile.

In contrast to the findings of literature and to the treatment program established in our service, which advocates early movement for function restoration,[5] the survey indicated the late start of rehabilitation, averaging 9.12 weeks after the surgical procedure. This fact can be understood due to the situation of Brazilian public health, in which the demand is greater than the patient admission capacity, and due to the socioeconomic conditions of the population treated in our sector, who are often unable to afford the treatment,[12] yet when they start to feel the functional impairments resulting from the procedures, belatedly seek rehabilitation.

These perspectives, of patients in different postoperative phases associated with late start of rehabilitation, enable the understanding of the results found in the survey.

The mean score of DASH of 31.36 indicates that the sample group studied here is able to perform routine tasks, yet with some degree of difficulty in the physical, social, psychological and symptomatic dimensions. Unlike the result of this survey, a study was located with patients that had suffered an olecranon fracture, and were submitted to surgical treatment, in which the mean result was 10.36, suggesting a low degree of difficulty.[13] On the other hand, the retrospective study that evaluated early mobilization of the elbow in the postoperative period after repair of the distal biceps, presented the mean result of 42.8, demonstrating a greater degree of impairment.[14]

As DASH aims to evaluate these four dimensions, yet with a single result, it precludes the identification of the more impaired aspect.[9] Thus, there is the need to develop or validate another tool to evaluate the impact of involvement on the functionality of the affected limb, enabling the identification of clinically important changes throughout the treatment and the appropriateness of the therapeutic conduct.

The optional module for workers was applied to 50% of the sample, composed of patients that had returned to work, yet when an item is not answered, the score cannot be calculated.[9] Thus, their results were not included in the survey, as they presented incomplete answers.

As concerns SF-36, the highest mean values were observed in the social aspect and general state of health domains, suggesting that the lesion of the limb interfered slightly in social activities in relation to the family, neighbors or friends, yet the patient's self-perception in relation to health conditions is good. On the other hand, the results evidenced greater impairment in the physical and emotional aspect domains. One of the hypotheses for the lower scores obtained on these scales may be related to the low number of answers that constitute them. The physical aspect domain assesses the impact of physical health on the performance of daily and/or professional activities in the last month, in relation to the time spent, to the quantity and to the type of tasks performed.[8] Just two response options, yes and no, do not translate the patient's actual situation in relation to the presence of some difficulty in executing their tasks. If the patient exhibits some type of restriction, that is, answers yes, then their score will be very low, yet the low score does not express performance inability, but instead performance reduction. The same understanding can be applied to the low score of the emotional aspect domain, as it evaluates the reflection of emotional conditions on the performance of daily and/or professional activities[15] and also offers the interviewee two response options. These findings are different from those described in other studies, in which the authors conclude that the quality of life of patients is preserved, when compared to the general population.[13,16-18] In this study, this comparison proved impossible as there are no data on quality of life of the Brazilian population analyzed by SF-36.

Statistically significant correlations between the physical aspect, vitality and social aspect domains of SF-36 and DASH were found. The physical aspect domain presented the best correlation with DASH ($p<0.008$), since the tool aims to evaluate, among other aspects, routine activities of the patient that require use of the upper limb. In the presence of deficit for the performance of such activities, the evaluation of both questionnaires, DASH and physical aspect domain of SF-36, vary.

In relation to the vitality ($p<0.034$) and social aspect ($p<0.029$) domains of SF-36 and DASH, statistically significant results can be observed: the greater the upper limb dysfunction, the worse the degree of vitality and the patient's integration in social activities. Studies suggest that deficits of traumatic origin imply restriction of the pursuit of activities and of social participation, with loss of quality of life.[19]

Correlation between DASH and the pain domain of SF-36 suggests that there is a relation between presence of the symptom and the tools. This finding is consistent with the literature found, in which patient with intra-articular fracture of the elbow, submitted to a surgical procedure, were assessed with DASH, SF-36 and other tools. The authors concluded that isolated pain is responsible for 36% of the variability of DASH and, associated with range of motion, for 45%. Accordingly, the presence of pain is an important predictor of high scores in DASH.[20]

Contrary to the findings of literature, the survey presented statistically significant correlation between the variable age and the functional capacity, general state of health and vitality domains of the SF-36 questionnaire. In other words, the lower the patient's age bracket, the lesser the extent of limitations related to physical capacity, the better the general state of health and the higher the levels of energy and vigor.[13,16]

In relation to gender, significant statistical correlation was observed with the functional capacity and vitality domains of SF-36. Unlike the study found in literature, the male patients presented results that were superior to those of the female patients.[13]

As regards the work situation, half of the members of the evaluated sample are not working, a condition that can be correlated to the mean score of 33.7 of the patients withdrawn from DASH. Our findings are similar to those of Wong et al.[21], who in assessing 127 patients with traumatic hand lesions, submitted to the rehabilitation treatment, noted that 10 individuals who did not return to work obtained 35 points as a mean score with DASH. Most of these patients are laborers, with high physical demands, and have a low level of education, a profile that can be correlated to that of the population treated in our sector, although this factor has not been the object of our study.[21] On the other hand, the mean DASH score for active patients, i.e., who have returned to work, is 26.4 and is consistent with the scores found by Beaton et al.[22], who evaluated patients with different degrees of involvement of the upper limb and concluded that the ability to return to work is present when they reach 27 points on the DASH scale.

With this study it was observed that, besides the sparse academic production on traumatized elbow rehabilitation, it is necessary to standardize the evaluation tools that allow us to verify treatment evolution and to prove the effectiveness of the intervention.

CONCLUSIONS

Patients with traumatic elbow lesion who were surgically treated and rehabilitated by occupational therapy are able to perform routine activities, but exhibit some degree of reduction in the function of the affected limb and impairment of quality of life.

REFERENCES

1. Hoppenfeld S. Exame do cotovelo. In: Hoppenfeld S. Propedêutica ortopédica: coluna e extremidades. Traduzido por Antonio Augusto F. Quadra. São Paulo: Atheneu; 2001. p. 35-58.
2. Morrey BF. The posttraumatic sitff elbow. Clin Orthop Relat Res. 2005;(431):26-35.
3. Hame H, Jacobsen MB, Salomonsson B. The swedish elbow arthroplasty register and the swedis shoulder arthroplasty register. Acta Orthop Scand. 2001;72:107-12.
4. Kisner C. Exercícios terapêuticos: fundamentos e técnicas. 3a. ed. São Paulo: Manole; 1998.
5. Hotchkiss RN, Green DP. Fraturas e luxações do cotovelo. In: Rockwood CA Jr, Green DP, Bucholz RW. Fraturas em adultos. 3a. ed. Traduzido por Nelson Gomes de Oliveira. São Paulo: Manole; 1993. p.729-813.
6. Costa SR, LimaSPF, Oliveira REC, Pacini SRA, Carreira ACG, Pirrello MSV et al. Tratamento dos traumas adquiridos em membros superiores: terapia da mão. In: Jardim JR, Nascimento AO. Guias de Medicina Ambulatorial e Hospitalar da UNIFESP – EPM. Reabilitação. Barueri – São Paulo: Manole; 2010. p. 273-6.
7. Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder and hand) [corrected]. The Upper Extremity Collaborative Group (UECG). Am J Ind Med. 1996;29:602-8.
8. Ciconelli RM. Tradução para o português e validação do questionário genérico de avaliação de qualidade de vida Medical Outcomes Study 36-Item Short--Form Health Survey (SF-36) [tese]. São Paulo: Universidade Federal de São Paulo; 1997.
9. Orfale, AG. Tradução e validação do Disabilities of the Arm, Shoulder and Hand (DASH) para a língua portuguesa [tese]. São Paulo: Universidade Federal de São Paulo; 2003.
10. Papp MR, Costa RS, Lima SM, Matsumoto HD, Chamliam TR, Ishida A. Avaliação da função do membro superior e da qualidade de vida de pacientes que sofreram lesão traumática do cotovelo submetidos ao tratamento cirúrgico e de Terapia Ocupacional [trabalho de conclusão de curso]. São Paulo: Universidade Federal de São Paulo; 2008.
11. Carrera EF, Matsumoto MH, Faloppa F, Ejnisman B, Archetti Netto N, Viveiros M, Pereira HF. Cirurgia ambulatorial: experiência em 769 procedimentos no ombro e cotovelo. Rev Bras Ortop. 2004;39:679-84.
12. Linzmeyer JM, Matsumoto MH, Faloppa F, Masiero D, Laredo Filho J. Programa de reabilitação precoce do cotovelo em 18 pacientes com seqüela de fraturas e submetido à liberação cirúrgica. Acta Ortop Bras. 1999;7:81-7.
13. Bailey CS, MacDermid J, Patterson SD, King GJ. Outcome of plate fixation of olecranon fractures. J Orthop Trauma. 2001;15:542-8.
14. Cheung EV, Lazarus M, Taranta M. Immediate range of motion after distal biceps tendon repair. J Shoulder Elbow Surg. 2005;14: 516-8.
15. Smith P, Lister G. A mão: diagnóstico e indicações. 4a. ed. São Paulo: Revinter; 2003. p. 285-7.
16. Ek ET, Goldwasser M, Bonomo AL. Functional outcome of complex intercondylar fractures of the distal humerus treated through a triceps-sparing approach. J Shoulder Elbow Surg. 2008;17:441-6.
17. McKee MD, Kim J, Kebaish K, Stephen DJG, Kreder HJ, Schemitsch EH. Functional outcome after open supracondilar fractures of the humerus. J Bone Joint Surg Br. 2000;82:646-51.
18. SooHoo NF, McDonald AP, Seiler JG 3rd, McGillivary GR. Evaluation of the construct validity of the DASH questionnaire by correlation to the SF-36. J Hand Surg Am. 2002;27:537-41.
19. De Carlo MMRP, Elui VMC, Santana CS, Scarpelini S, Alves ALA, Salim FM. Trauma, reabilitação e qualidade de vida. Medicina (Ribeirão Preto). 2007;40:335-44.
20. Doornberg JN, Ring D, Fabian LM, Malhotra LZ, Jupiter JB. Pain dominates measurement of elbow function and health status. J Bone Joint Surg Am. 2005;87:1725–31.
21. Wong JY, Fung BK, Chu MM, Chan RK. The use of disabilities of the arm, shoulder, and hand questionnaire in rehabilitation after acute traumatic hand injuries. J Hand Ther. 2007;20:49-55.
22. Beaton DE, Katz JN, Fossel AG, Wright JG, Tarasuk V, Bombardier C. Measuring the whole or the parts? Validity, reliability, and responsiveness of the Disabilities of the Arm, Shoulder and Hand outcome measure in different regions of the upper extremity. J Hand Ther. 2001;14:128-46.