

Telma Leonel Ferreira¹

Rosicler Rocha Aiza Alvarez²

Marcos da Cunha Lopes Virmond³

Edilberto Assumpção de Araujo⁴

QUESTIONNAIRE TO EVALUATE HAND FUNCTION WITH NERVE LESIONS

RESUMO

Objetivo: elaborar um questionário de avaliação funcional para analisar as dificuldades manuais encontradas na realização de atividades cotidianas de indivíduos ocidentais adultos com lesão dos nervos ulnar, mediano ou radial.

Método: foi realizada entrevista com 50 pessoas, idade entre 21 e 65 anos, portadoras de lesão nos nervos ulnar, mediano ou radial para identificar as dificuldades manuais ao realizar as tarefas cotidianas. Em seguida, seis cirurgiões de mão e nove terapeutas de mão, analisaram as tarefas listadas pelos entrevistados e as classificaram em níveis de importância para uma avaliação funcional das mãos. Posteriormente, o questionário foi elaborado baseado nessa classificação.

Resultados: o "Questionário de avaliação da mão com lesão de nervo" é constituído por 30 questões objetivas divididas em domínios de tarefas (vestuário, alimentação, higiene pessoal, tarefas domésticas, escrita, uso de computador e atividades diversas). As respostas são atribuídas de acordo com o grau de dificuldade na realização das tarefas listadas no instrumento. O questionário foi respondido por 32 pessoas com idade entre 18 e 65 anos apresentando sequela de hanseníase. O cálculo do alfa de Cronbach foi utilizado para avaliar a confiabilidade do instrumento. Após a remoção de duas questões relacionadas ao uso de computador, o resultado do alfa

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de Cronbach aumentou para 0,90.

Conclusão: o "Questionário de avaliação da mão com lesão de nervo" apresenta alta consistência interna. Além disso, é conciso, de fácil preenchimento não necessitando a presença de profissional especializado para sua aplicação e permite a verificação do nível de independência do indivíduo com lesão de nervo periférico na mão na realização de suas tarefas habituais.

Palavras-chave: Questionários, mão, nervos periféricos, hanseníase.

ABSTRACT

Objective: to develop a functional evaluation questionnaire to limitations in hand function by western adults individuals with lesions of the ulnar, median or radial nerves in their routine tasks.

Design: an interview was conducted with 50 patients of 21-65 years of age with ulnar, median and radial nerve lesions to identify any manual difficulties in their performance of routine daily tasks. Six hand surgeons and

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1 Physiotherapist, master, SARAH Network of Rehabilitation Hospitals, Brasília, DF, Brazil, SQS 103, Bl E, 70342-050 Brasília, DF, Brazil telleonel@pop.com.br

2 Doctor, Ph.D, University of Brasília, Brasília, DF, Brazil, clinicaaiza@yahoo.com.br

3 Doctor, Ph.D, Institute Lauro de Sousa Lima, Bauru, SP, Brazil, mvirmond@iisl.br

4 Doctor, SARAH Network of Rehabilitation Hospitals, Brasília, DF, Brazil, edilberto@sarah.br

nine hand therapists then analyzed the tasks listed by the patients and graded them in levels of importance for the evaluation of hand function, after which a questionnaire based on this classification was drawn up.

Results: the instrument Evaluation of Hand with Nerve Damage Questionnaire, consists of 30 objective questions divided into task domains (dressing, feeding, personal hygiene, housework, writing, use of computers and "others"), answers being classified according to degree of difficulty. The questionnaire was completed by 32 patients of 18-65 years of age with sequelae of Hansen's disease. Cronbach's coefficient alpha was used to assess the reliability of the instrument. Following removal of two questions regarding computer use, Cronbach's coefficient alpha increased to 0.90.

Conclusion: the Evaluation of Hand with Nerve Damage Questionnaire shows a high internal consistency. In addition it is concise, easy to fill instrument not requiring specialized professional to apply and allows evaluation of the degree of independence of the individual with peripheral nerve lesion in the hand in performing routine daily tasks.

Key words: Questionnaires, hand, peripheral nerves, Hansen's disease.

INTRODUCTION

For effective and precise hand function, the peripheral nervous system must be intact. Lesions to this system may result in functional limitations affecting the life of individuals with lesions of the ulnar, median or radial nerves (1-6).

Evaluation of hand function, thus permitting identification and quantification the limitations in the use of the hand in performing routine tasks, may be of use in defining the patient's degree of independence, in providing guidance on health education, in detecting a need for orthoses to facilitate or enable performance of certain tasks and for assessing outcome following either conservative or surgical interventions in the upper limb (7-9).

Questionnaires have been widely used as functional evaluation instruments. Their application is usually simple, rapid and inexpensive (10-12). In what regards function of the hand with nerve compromise there are some questionnaires reported in the literature. However, most of them seems not to comply with questions exclusively to assess lesions of the major three nerves supplying the hand and to bore relationship with cultural habits of most of the western adult population (13-16).

Therefore, the objective of the present article is to present and discuss the first phase of the development of a questionnaire for Evaluation of Hands with Nerve Damage for adult westerners with lesions of the ulnar, median or radial nerves performing routine daily tasks

MATERIAL AND METHODS

This study was developed in four phases.

The first phase included an *interview* using a semi-structured questionnaire to identify difficulties in performing routine daily tasks. The inclusion criteria were patients from 18 to 65 years of age with single or associated lesions of the ulnar, median or radial nerves. Fifty patients, 14 women and 36 men of 21 to 65 years of age (mean age \pm SD = 46.5 \pm 13 years) were interviewed by the principal investigator, which recorded answers in an specific form. Twenty-two patients had diagnosed with Hansen's disease and were being followed up at the Teaching Hospital of the University of Brasilia, while 28 had diagnosed with laceration/contusion, perforation/contusion, perforation/cuts or fractures and were being followed up in the Brasilia unit of the SARAH Network of Rehabilitation Hospitals. Questions were related to the past 30 days in performing tasks related to dressing, feeding, personal hygiene, housework, professional activities, leisure activities and writing. A space was left in the form to collect information on difficulties in tasks not included in the aforementioned items.

In the second phase, an *Analysis* with health professionals with experience in upper limb nerve lesions was conducted to reveal which activities these professional would consider relevant for any functional evaluation of hand function. The selection criteria included hand surgeons or hand therapists working in the SARAH Rehabilitation Hospital who had at least 3 years' experience with patients with peripheral nerve lesions of the upper limbs. Fifteen professionals participated in the analysis, 6 hand surgeons (2 women and 4 men) and 9 hand therapists (7 women and 2 men). The list of task reported by patients in the first phase was presented to these professional to rank the tasks on a scale that from 1 to 5 according to their importance for the functional evaluation of the hands in cases of lesion to the ulnar, median and radial nerves. The final score of each task was obtained by calculating the weighted sum of the multiplication of the number of professionals by the score given to each task (Appendix 1).

In the third phase, a *questionnaire* (EHND – Evaluation of the Hand following Nerve Damage) was elaborated. The activities included were those more mentioned by patient and those that had been given the highest scores by the professionals. The Questionnaire (EHND) included 30 objective questions (4 related to dressing, 4 to feeding, 4 to personal hygiene, 4 to housework, 1 to writing, 2 to using a computer and 11 tasks listed as "others"). Each one of the 30 questions is rated according to the perception of the individual of his/her difficulty in performing the task: 0 = no difficulty; 1 = slight difficulty; 2 = great difficulty; 3 = impossibility (unable to perform the task) or X: not applicable (does not constitute part of the individual's daily routine). The final

functional evaluation score is obtained from adding the scores given to each question divided by the number of applicable tasks (17) (Appendix 2).

In the last phase (fourth), and to determine the reliability of the instrument, the EHND Questionnaire was completed by 32 patients with disabilities due to Hansen's disease and lesions of the ulnar, median and/or radial nerves. Were 12 women and 20 men of 18 to 65 years of age (mean \pm SD: 39.6 \pm 14.9 years). Sixteen patients were being followed up at the Asa Norte Regional Hospital, 11 at the Teaching Hospital of the University of Brasilia and 5 at the SARAH Rehabilitation Hospital. These cases did not participated in the previous phases. Prior to completing the EHND Questionnaire, it was explained the objective and the coding to be used in the responses. All patients answered the questions to the interviewer (care was taken to avoid inducing replies), and answers referred to tasks performed in the past 30 days. The time elapsed from beginning of the explanation to the moment patient had completed the questionnaire was recorded. Afterwards patients were asked on their opinion on the clarity and format of the instrument and about any tasks that should be added to or removed from the questionnaire.

Statistical analysis

The interviews (1st phase) were analyzed and a database was constructed (Microsoft Access - 2003) using the variables resulting from the subjective responses provided by the patients. The SPSS statistical software package, version 13.0 was used in the descriptive data analysis. The reliability of the EHND Questionnaire (4th phase) was determined by calculation of the Cronbach's alpha coefficient. Questionnaires are considered reliable when the Cronbach coefficient alpha is \geq 0.80 (18, 19).

Ethical Considerations

The study was approved by the Committee of Ethics of the SARAH Network of Rehabilitation Hospitals under registration number 482, and those that agreed to participate signed an informed consent form.

RESULTS

Interview

A total of 50 patients (46 right-handed and 4 left-handed) were interviewed using the semistructured questionnaire to identify their difficulties in performing everyday tasks (1st phase). Of these 50 patients, 22 (44%) had been diagnosed with Hansen's disease-related neuropathy, while 28 (56%) had nerve lesions of other etiologies including 18 patients with lacerations/contusions (lacerations caused by glass, crockery, axes, electric saws, steel plates, grinders or printers, or resulting from a car accident or from being run over by a vehicle), 3 had a perforation/contusion (lesion caused by a bullet), 4 had perforation/cuts (lesions resulting from knife wounds) and in 3 of cases the lesion was the result of a fracture.

The ratio between the number of affected nerves and the level of the lesion the side affected in 50 patients who completed the semistructured questionnaire is shown in Table 1.

The lesion was in the dominant hand in 40% of cases and in the non-dominant hand in 18%.

The time between the occurrence of the nerve lesion and the date of the interview varied considerably, 42% of patients having had the lesions for periods \leq 3 years, 30% for periods ranging from 4 to 7 years and 14% for periods of 8 to 11 years and 14% had had the lesion for longer than 11 years.

A list of the routine daily tasks identified as difficult by the 50 patients is shown in Appendix 1.

Table 1 Ratio between the number of affected nerves and the level of the lesion and the side affected in patients who completed the semistructured questionnaire (n=50).

Etiology	Ulnar Nerve		Median Nerve		Radial Nerve		Ulnar + Median Nerves		Median + Radial Nerves	
	Right n (%)	Left n (%)	Right n (%)	Left n (%)	Right n (%)	Left n (%)	Right n (%)	Left n (%)	Right n (%)	Left n (%)
O Level of the lesion										
T upper third of the arm	-	-	01 (02)	-	-	01 (02)	-	-	-	-
H mid-third of the arm	-	01 (02)	-	01 (02)	01 (02)	-	-	-	-	-
E lower third of the arm	-	01 (02)	-	-	-	01 (02)	-	-	-	-
R upper third of the forearm	01 (02)	-	-	-	-	-	-	-	-	-
S mid-third of the forearm	-	-	-	-	-	-	-	01 (02)	02 (04)	-
* lower third of the forearm	03 (06)	01 (02)	05 (10)	03 (06)	-	-	03 (06)	02 (04)	-	-
Hansen's disease	02 (04)	01 (02)	-	-	-	-	20 (40)	20 (40)	-	-
Unaffected	44 (88)	46 (92)	44 (88)	46 (92)	49 (98)	48 (96)	27 (54)	27 (54)	48 (96)	50 (100)
Total	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)

* lacerations/contusions, perforation/contusion, perforation/cuts and fracture.

Analysis by professionals

Following the analysis and classification carried out by the hand surgeons and therapists, the 107 tasks reported by the patients received scores that ranged from 28 to 73 as shown in Appendix 1.

EHND Questionnaire

The tasks that received the highest scores in the analysis carried out by the professionals and the tasks most cited by patients were sorted into groups of tasks and selected to form the questionnaire as shown in the Appendix 2. When there was disagreement between groups (patients vs. professionals) it was preferred the answer given by patients. Most common activities of adult westerners were taken into consideration.

The EHND questionnaire was answered by 32 individuals with a diagnosis of Hansen's disease (Table 2). The number of the affected nerve and the affected side in patients who completed the EHND questionnaire can be seen in Table 3.

Table 2 Distribution by sex and hand dominance of HD patients who completed the EHND questionnaire (n = 32).

HD patients	Right-handed	Left-handed	total
	n (n%)	n (n%)	n (n%)
female	12	0	12 (37.5)
male	18	2	20 (62.5)
total	30 (93.75)	2 (6.25)	32 (100)

Table 3 Ratio between the affected nerve and the affected side in patients who completed the EHND questionnaire (n=32).

Side affected	Lesioned nerve					
	Ulnar		Median		Radial	
	n	%	n	%	n	%
Right	06	18.7	04	12.5	01	3.1
Left	04	12.5	04	12.5	01	3.1
Bilateral	22	68.7	14	43.7	01	3.1
No lesion	-	-	10	31.2	29	90.6
Total	32	≈ 100	32	≈ 100	32	≈ 100

The mean time taken by the patients to fill up the questionnaire was 5 minutes and 27 seconds.

When the patient was asked to report any tasks that he/she found difficult to perform that were not listed in the questionnaire, the following tasks were mentioned: holding soap in the bath (n=1); using both hands to cup liquids (n=1), driving (n=3), carrying bags weighing more than 8 kg (n=1), polishing shoes (n=1), sewing (n=1), sewing on buttons (n=1), heating food on the stove (n=4), clapping hands (n=1), shaking hands (n=1), holding a plate to serve food (n=1), combing hair (n=2), dressing (n=1), changing diapers (n=1), embroidering (n=1), knit-

ting (n=1) and crocheting (n=1). None of the patients suggested removing any of the listed tasks.

Cronbach's alpha values for each domain are as follows: dressing 0.86; feeding 0.85; personal hygiene 0.78; housework 0.81; computer 0.23; others 0.95. Calculation of the Cronbach coefficient alpha for the 30 tasks included in the questionnaire resulted in unacceptable internal consistency (0.16). Following exclusion of tasks 18 and 19, which refer to the use of computers, the Cronbach's alpha value increased to 0.90.

DISCUSSION

A key point in proposing such Hand Function Evaluation Questionnaire is that most of the similar proposed instruments in the literature (13-16) do not fully comply with specific aspects for an specific evaluation of the hand with lesion of its relevant nerves and, in addition, show poor relation to cultural habits of most western adults in performing daily tasks.

In fact, the ADL questionnaire (13), that list 28 activities, have open questions related to leisure, work and school that could make difficult for patient to remember specific activities. On the contrary, the EHND questionnaire list such tasks in a multiple-choice system.

The Green Pastures Activity Scale (14) is an instrument developed to evaluate quality of life and is not restricted to assessment of the hands, which is the primary objective of the EHND questionnaire.

The Karigiri Activities of Daily Living Rating Scale (15) is a concise questionnaire that is practical to apply and classify difficulty of performing tasks accordingly to the speed that each task is accomplished. However, some questions refer to tasks that do not form part of the daily routine of the majority of the western adult population such as picking up semi-solid food with the fingers and lifting a mug full of water to bathe oneself.

The Screening Activity Limitation and Safety Awareness (SALSA) (16) scale is an instrument to evaluate limitation of activities and to the conscience of risk by individuals affected by leprosy, diabetes and peripheral neuropathies. It was not specifically intended to evaluate hand function.

As one can see none of these questionnaires was fully appropriate for use in the functional evaluation of the hands in cases of lesions of the ulnar, median and radial nerves in the western adult population. The present study checked the perception of the patient with a lesion of the ulnar, median or radial nerves with respect to the routine daily tasks in which they experience some form of limitation or disability. In addition, it was take into consideration the experience of hand therapists and hand surgeons in what regard the activities they consider relevant to assess the function of the hand (Appendix 1). Lastly, it was included in the proposed questionnaire

the most cited tasks mentioned by patients and those highly ranked by professionals, which guarantee a sound range of relevant tasks to be checked. However, due to its variability, specific professional and leisure activities were excluded from the final version of the EHND questionnaire although tasks such as using a hammer and turning the pages of a book, notebook or magazine, which received the highest scores within their groups (64 and 59, respectively) were maintained and included in the item "Others" (Appendix 2). In this process of refining the questionnaire, the task Depilation was included as an alternative to the task of shaving, since the former was considered to be more specific to men and the latter to women. Furthermore, the routine tasks selected were those that formed part of the daily life of most of the participants and that would, therefore, most accurately reflect hand function (Appendix 2). In fact, the analysis of the semistructured interview carried out with 50 patients confirmed that individuals with lesions of the ulnar, median or radial nerves have difficulty performing daily routine tasks associated with dressing, feeding, personal hygiene, housework, professional activities, leisure activities, writing, using the computer and using a bank card at an ATM, among others, which reinforce the decision as selecting these tasks as the most relevant while aiming to evaluate the function of hands with such nerves lesions.

Since *Mycobacterium leprae* affects the nerve trunks of the ulnar, median and radial nerves (20), different from lacerations/contusions, perforation/contusion, perforation/cuts and fracture, which may produce an associated musculotendinous lesion, Hansen's disease was the etiology selected for evaluation of the reliability of the EHND questionnaire, and the instrument was completed by 32 patients with sequelae resulting from this disease. Indeed, as found in the previously conducted semistructured interview, lesions of the tendons and muscles may result in a heterogenous population and hamper analysis of the results.

REFERENCES

- 1 Hamill J, Knutzen KM. Functional Anatomy of the Upper Extremity. In: _____, editors. Biomechanical Basis of Human Movement. ed. Philadelphia: Lippincott Williams & Wilkins; 2003. p. 147-161, 436-439.
- 2 Lippert LS. Hand. In: _____, editor. Clinical Kinesiology for Physical Therapist Assistants. Philadelphia: F. A. Davis Company; 2000. p. 201-237.
- 3 Mackenzie CL, Iberall T. Introduction. In: _____, editors. The Grasping Hand. Amsterdam: North-Holland; 1994. p. 3-13.
- 4 Schieber MH, Santello M. Hand Function: Peripheral and Central Constraints on Performance. *J Appl Physiol* 2004 Jun; 96: 2293-2300.
- 5 Tubiana R, Thomine JM, Machin E. Anatomia Funcional. In: _____, editors. Diagnóstico Clínico da Mão e do Punho. Rio de Janeiro: Interlivros; 1996. p. 1-177.
- 6 Valero-Cuevas FJ. An integrative approach to the biomechanical function and neuromuscular control of the fingers. *J Biomech* 2005; 38: 673-684.
- 7 Rosén B, Lundborg G. A model instrument for the documentation of outcome after nerve repair. *J Hand Surg [Am]* 2000 May; 25(3): 535-543.
- 8 Rajkumar P, Premkumar R, Richard J. Grip and pinch strength in relation to function in denervated hands. *Indian J Lepr* 2002 Oct-Dec; 74(4): 319-328.
- 9 Jester A, Harth A, Wind G, Germann G, Sauerbier M. Disabi-

The initial Cronbach's alpha for the EHND questionnaire was unacceptable (0.16). By excluding tasks # 18 and 19 (ranking 0.23 alone in their domain), the reliability of the questionnaire increased to 0.90, a score considered highly satisfactory. Therefore, these tasks correlated poorly with the set of questions in the instrument, since they are related to computer use and the majority (78%) of Hansen's patients interviewed did not have access to computers.

The EHND questionnaire is concise, which makes its application practical and fast. The mean time for participants to respond the questionnaire was 5 minutes and 27 seconds. Albeit concise, it contains a wide variety of routine daily tasks and with the inclusion of tasks such as using cellular telephones and bank cards at ATMs it has also incorporated technological advances.

CONCLUSIONS:

Although it is impossible to analyze the way in which an individual performs a certain task, this questionnaire allows evaluation of the degree of independence of the individual with a peripheral nerve lesion in the hand in performing routine daily tasks. It may also be used to evaluate and follow-up the functional progress of patients' hands following surgical interventions by comparing scores obtained in successive evaluations. Furthermore, result of evaluation can indicate use of orthoses and adaptations to improve patient's independence in performing relevant daily living activities.

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- lities of the arm, shoulder and hand (DASH) questionnaire: determining functional activity profiles in patients with upper extremity disorders. *J Hand Surg [Br]* 2005 Feb; 30(1): 23-28.
- 10 Boynton PM, Greenhalgh T. Selecting, designing, and developing your questionnaire. *BMJ* 2004; 328(29): 1312-1315.
 - 11 Coderre SP, Harasym P, Mandin H, Fick G. The impact of two multiple-choice question formats on the problem-solving strategies used by novices and experts. *BMC Med Educ* 2004 Nov; 5; 4:23.
 - 12 O’Cathain A, Thomas KJ. “Any other comments?” Open questions on questionnaires – a bane or a bonus to research? *BMC Med Res Methodol* 2004 Nov; 8; 4:25.
 - 13 Rosén B. Recovery of sensory and motor function after nerve repair – a rationale for evaluation. *J Hand Ther* 1996; 9: 315-327.
 - 14 van Brakel WH, Anderson AM, Wörpel FC, Saiju R, Bk HB, Sherpa S, et al. A scale to assess activities of daily living in persons affected by leprosy. *Lepr Rev* 1999 Sep; 70(3): 314-23.
 - 15 Rajkumar P, Premkumar R, Richard J. Grip and pinch strength in relation in denervated hands. *Indian J Lepr* 2002; 74(4): 21-30.
 - 16 The Salsa Collaborative Study group. The development of a short questionnaire for screening of activity limitation and safety awareness (SALSA) in clients affected by leprosy or diabetes. *Disabil Rehabil* 2007; 29: 689-700.
 - 17 Rosén B. Recovery of sensory and motor function after nerve repair – a rationale for evaluation. *J Hand Ther* 1996; 9: 315-327.
 - 18 Carroll L. Classical test theory. In: Maxim PS. *Quantitative Research Methods in the Social Sciences*. New York: Oxford University Press; 1999. 233-250.
 - 19 Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951; 16(3): 297-335.
 - 20 Garbino JA. Neuropatia hanseniana. In: Opromolla DVA, editor. *Noções de Hansenologia*. Bauru: Centro de Estudos “Dr Reynaldo Quagliato”; 2000. 79-89.

Appendix 1 Relationship between the tasks related by patients and the classification of tasks analyzed by professionals.

Tasks	Professional Analysis (G C *)	Patients	
		n	%
DRESSING			
Taking off/putting on shirt/blouse	63	1	2
Buttoning/unbuttoning	63	36	72
Opening/closing zipper	54	14	28
Tying a bow/shoelaces	51	31	62
Putting on socks	51	4	8
Opening/closing brass	49	1	2
Putting on/removing earrings	43	7	14
Opening/closing belt fastening	42	1	2
Opening/closing watch fastening	41	9	18
Opening/closing necklace/bracelet fastening	33	16	32
Rolling up shirt sleeves	31	1	2
FEEDING			
Using cutlery	73	10	20
Cutting food at meals	69	13	26
Holding a glass	69	12	24
Peeling fruit/vegetables	50	22	44
Using switches on the stove	49	3	6
Preparing food	48	1	2
Using plastic cups	48	5	10
Opening/closing screw-on caps	48	4	8
Lifting a full jar	46	6	12
Opening the seal of a plastic bottle	44	2	4
Using household appliances	44	3	6
Opening/closing soda bottle tops	42	10	20
Lifting jug/bottle of more than 1.5 liters	41	13	26

Screwing on blender jars	40	2	4
Filtering coffee	35	2	4
Cutting raw fowl	33	1	2
PERSONAL HYGIENE			
Brushing teeth	72	12	24
Flossing teeth	71	9	18
Combing hair	67	3	6
Washing hair	64	2	4
Shaving	64	13	26
Cutting nails	63	34	68
Cleaning dentures	58	1	2
Soaping oneself in bath	58	8	16
Squeezing toothpaste	55	1	2
Washing feet	50	1	2
Opening/closing shampoo bottle	49	5	10
Using sponge in bath	47	3	6
Cutting nails with scissors	46	1	2
Using hairdryer	40	2	4
HOUSEWORK			
Washing dishes	65	18	36
Washing clothes	57	7	14
Ironing	53	1	2
Washing small items	51	1	2
Cleaning the floor with a broom/squeegee	49	7	14
Wringing clothes	48	8	16
Using clothespins	48	1	2
Drying dishes	43	3	6
Using a hoe, scythe, axe	40	3	6
Picking up nail	39	2	4
Using shovel, pickax	39	1	2
Carrying a full bucket	38	2	4
Gardening tasks	35	2	4
Washing sports shoes	34	1	2
Cleaning walls	32	1	2
PROFESSIONAL ACTIVITIES			
Using a hammer	64	1	2
Threading nut on screw	57	2	4
Setting a brick in cement	49	1	2
Plastering a wall	49	1	2
Cutting floor tiles	40	1	2
Repairing a motor cycle	39	1	2
Carrying 50 kg or more	39	5	10
LAISURE ACTIVITIES			
Turning pages of book, notebook, magazine	59	3	6
Threading needle	53	1	2
Sewing, embroidering	53	6	12
Using screw-driver	51	1	2
Knitting	47	1	2

Crocheting	46	2	4
Playing guitar	46	1	2
Using pliers	46	1	2
Holding material for sewing, embroidering	45	3	6
Playing cards	45	3	6
Using a camera	42	1	2
Playing keyboard	41	2	4
Playing dominoes	38	5	10
Playing video-game	37	3	6
WRITING			
Writing with a pen or pencil	71	25	50
COMPUTER			
Typing	64	8	16
Using mouse	60	1	2
OTHERS			
Locking/unlocking with key	69	11	22
Opening/closing door handles	67	13	26
Turning on/off tap	65	8	16
Handling money (notes)	64	2	4
Rolding on while standing on public transportation	64	3	6
Carrying more than 1 kg	60	1	2
Keying in data at ATM	59	3	6
Using bank card at ATM	57	13	26
Using cellular telephone	56	9	18
Using key with one hand only	55	1	2
Putting money away in wallet/removing money from wallet	55	1	2
Using scissors	54	5	10
Picking up a coin from a flat surface	53	8	16
Holding paper	53	1	2
Holding a telephone	53	2	4
Carrying more than 2 kg	50	3	6
Opening/closing a lock	48	2	4
Carrying bag	47	2	4
Changing a bulb	44	1	2
Containing grains/liquids in the hand	44	1	2
Cleaning baby's bottom	36	2	4
Putting on nail polish	36	7	14
Putting key in lock	35	1	2
Carrying more than 10 kg	35	2	4
Playing piano	34	1	2
Drawing using a ruler	32	1	2
Squeezing spots	28	1	2

* GC: General Classification

Appendix 2 Questionnaire for evaluation of hand with nerve damage
(EHND Questionnaire)

Name: _____ Patient # _____

Date of birth: ____/____/____ Sex: (Male) (Female)

Dominant hand: (Right) (Left) (Ambidextrous)

Current job: _____

Etiology and duration of the nerve lesion: _____

Upper limb surgery following nerve lesion: _____

Level of lesion		
Ulnar nerve	Median nerve	Radial nerve
Proximal third of the arm () Left Right ()	Proximal third of the arm () Left Right ()	Proximal third of the arm () Left Right ()
Mid-third of the arm () Left Right ()	Mid-third of the arm () Left Right ()	Mid-third of the arm () Left Right ()
Distal third of the arm () Left Right ()	Distal third of the arm () Left Right ()	Distal third of the arm () Left Right ()
Proximal third of the forearm () Left Right ()	Proximal third of the forearm () Left Right ()	Proximal third of the forearm () Left Right ()
Mid-third of the forearm () Left Right ()	Mid-third of the forearm () Left Right ()	Mid-third of the forearm () Left Right ()
Distal third of the forearm () Left Right ()	Distal third of the forearm () Left Right ()	Distal third of the forearm () Left Right ()

State how you perform each task listed below (use last month as a reference and apply the following codes):

- 0 – No difficulty
- 1 – Slight difficulty
- 2 – Great difficulty
- 3 – Impossible (unable to perform this task)
- X – Not applicable (this does not form part of my routine daily tasks)

#	Tasks	Date __/__/__
		Code
DRESSING		
01	Buttoning/unbuttoning	
02	Opening/closing zipper	
03	Tying a bow/shoelaces	
04	Opening/closing necklace/bracelet fastenings	
FEEDING		
05	Using cutlery at meals	
06	Peeling fruit/vegetables	
07	Holding a glass	
08	Lifting a jug/bottle of more than 1.5 liters.	
PERSONAL HYGIENE		
09	Brushing teeth	
10	Flossing teeth	
11	Shaving, depilating	
12	Cutting nails	
HOUSEWORK		
13	Washing dishes	
14	Washing clothes	
15	Wringing clothes	
16	Cleaning floor with broom or squeegee	
WRITING		
17	Writing with a pen or pencil	
COMPUTER		
18	Typing on computer	
19	Using computer mouse	
OTHERS		
20	Locking/unlocking with key	
21	Opening/closing door handles	
22	Turning on/off tap	
23	Handling money (notes)	
24	Holding on while standing on public transportation	
25	Using bank card at ATM	
26	Using cellular telephone	
27	Using scissors	
28	Using a hammer	
29	Turning pages of book, notebook, magazine	
30	Picking up small objects (coin, staple, needle) from flat surface (table/floor)	
FINAL RESULT		
Supervising professional:		

Apêndice 1 Relação das atividades relatadas pelos 50 entrevistados e classificação geral das atividades após enquête realizada com 15 profissionais.

Atividades	Classificação Geral (Enquete Profissional)
VESTUÁRIO	
Tirar/colocar camisa/blusa	63
Abotoar/desabotoar	63
Abrir/fechar zíper	54
Dar laço/amarrar cadarço	51
Vestir meias	51
Abrir/fechar presilha sutiã	49
Colocar/tirar brinco	43
Abrir/fechar fivela de cinto	42
Abrir/fechar fecho relógio	41
Abrir/fechar fecho corrente/pulseira	33
Dobrar manga de camisa	31
ALIMENTAÇÃO	
Usar garfo/talher	73
Cortar alimentos durante refeição	69
Segurar copo	69
Descascar fruta/legume	50
Manusear botão de fogão	49
Preparar alimentos	48
Usar copo plástico	48
Abrir/fechar tampa de vidro de rosca	48
Levantar jarra cheia	46
Abrir lacre da tampa de garrafa plástica	44
Usar eletrodoméstico	44
Abrir/fechar tampa de refrigerante	42
Levantar garrafa plástica com mais 1,5 litros	41
Manusear copo de liquidificador	40
Coar café	35
Cortar ave crua	33
HIGIENE PESSOAL	
Escovar dentes	72
Usar fio dental	71
Pentear cabelos	67
Lavar cabelos	64
Barbear	64
Cortar unhas	63
Realizar higiene em prótese dentária	58
Ensaboar-se no banho	58
Manusear creme dental	55
Lavar os pés	50
Abrir/fechar tampa de xampu	49
Usar bucha no banho	47
Cortar unhas com tesoura	46
Usar secador de cabelo	40
ATIVIDADES DOMÉSTICAS	
Lavar louça	65
Lavar roupa	57
Passar roupa	53
Lavar objetos pequenos	51
Limpar chão com vassoura/rodo	49
Torcer roupa	48
Usar prendedor de roupa	48
Secar louça	43
Usar enxada, foice, machado	40

Pegar prego	39
Usar pá, picareta	39
Carregar balde cheio	38
Atividade de jardinagem	35
Lavar tênis	34
Limpar parede	32
PROFISSÃO	
Usar martelo	64
Colocar porca em parafuso	57
Assentar tijolo	49
Assentar reboco em parede	49
Usar máquina de cortar piso	40
Consertar motocicleta	39
Carregar 50kg ou mais	39
LAZER	
Folhear página de livro, caderno, revista	59
Colocar linha na agulha	53
Costurar com agulha de mão, bordar	53
Usar chave de fenda	51
Fazer tricô	47
Fazer crochê	46
Tocar violão	46
Usar alicate	46
Segurar tecido para costurar, bordar	45
Jogar baralho	45
Usar máquina fotográfica	42
Tocar teclado	41
Jogar dominó	38
Jogar vídeo game	37
ESCRITA	
Escrever com caneta ou lápis	71
COMPUTADOR	
Digitar em teclado	64
Usar mouse	60
ATIVIDADES DIVERSAS	
Abrir/fechar com chave	69
Abrir/fechar maçaneta de porta	67
Abrir/fechar torneira	65
Manusear nota de dinheiro	64
Segurar-se em transporte coletivo	64
Carregar mais de 1kg	60
Usar teclado – máquina de banco	59
Usar cartão magnético – caixa eletrônico	57
Usar telefone celular	56
Manusear chave com uma mão	55
Colocar/tirar nota de dinheiro na carteira	55
Cortar com tesoura	54
Pegar moeda em superfície plana	53
Segurar papel	53
Segurar telefone fixo	53
Carregar mais de 2kg	50
Abrir/fechar cadeado	48
Segurar sacola	47
Trocar lâmpada	44
Segurar grãos/líquido – mão em concha	44
Realizar higiene em nádega de nenê	36
Esmaltar unhas	36
Colocar chave em chaveiro	35
Carregar mais de 10kg	35
Tocar piano	34
Desenhar usando régua	32
Remover acne com dedos	28

Apêndice 2 – Questionário de avaliação da mão nas lesões de nervos

Nome: _____ Registro Nº _____

Data Nasc: ____/____/____ Sexo (M) (F) Dominância (D) (E) (Ambidestro)

Profissão Atual: _____

Etiologia e Tempo da Lesão do Nervo: _____

Cirurgia no membro superior após lesão do nervo: _____

Nível da Lesão					
Nervo Ulnar		Nervo Mediano		Nervo Radial	
D	E	D	E	D	E
() $\frac{1}{3}$ Proximal Braço	()	() $\frac{1}{3}$ Proximal Braço	()	() $\frac{1}{3}$ Proximal Braço	()
() $\frac{1}{3}$ Médio Braço	()	() $\frac{1}{3}$ Médio Braço	()	() $\frac{1}{3}$ Médio Braço	()
() $\frac{1}{3}$ Distal Braço	()	() $\frac{1}{3}$ Distal Braço	()	() $\frac{1}{3}$ Distal Braço	()
() $\frac{1}{3}$ Proximal Antebraço	()	() $\frac{1}{3}$ Proximal Antebraço	()	() $\frac{1}{3}$ Proximal Antebraço	()
() $\frac{1}{3}$ Médio Antebraço	()	() $\frac{1}{3}$ Médio Antebraço	()	() $\frac{1}{3}$ Médio Antebraço	()
() $\frac{1}{3}$ Distal Antebraço	()	() $\frac{1}{3}$ Distal Antebraço	()	() $\frac{1}{3}$ Distal Antebraço	()

RESPONDA COMO VOCÊ REALIZA CADA ATIVIDADE LISTADA ABAIXO

USE COMO REFERÊNCIA O ÚLTIMO MÊS

UTILIZE O CÓDIGO:

- 0 – Sem Dificuldade
- 1 – Pouca Dificuldade
- 2 – Muita Dificuldade
- 3 – Impossível (não consegue realizar a tarefa)
- X – Não aplicável (não faz parte da rotina diária)

Nº	Atividades	Data ___/___/___
		Código
VESTUÁRIO		
01	Abotoar, desabotoar	
02	Abrir, fechar zíper	
03	Dar laço, amarrar cadarço	
04	Abrir, fechar fecho de corrente, pulseira	
ALIMENTAÇÃO		
05	Usar colher, garfo, faca nas refeições	
06	Descascar fruta, legume	
07	Segurar copo	
08	Levantar jarra, garrafa com mais de 1,5 litros	
HIGIENE PESSOAL		
09	Escovar dentes	
10	Usar fio dental	
11	Barbear-se, depilar-se	
12	Cortar unhas	
ATIVIDADES DOMÉSTICAS		
13	Lavar louça	
14	Lavar roupa	
15	Torcer roupa	
16	Limpar chão com vassoura, rodo	
ESCRITA		
17	Escrever com caneta, lápis	
COMPUTADOR		
18	Digitar em teclado de computador	
19	Usar mouse de computador	
ATIVIDADES DIVERSAS		
20	Abrir, fechar com chave	
21	Abrir, fechar maçaneta de porta	
22	Abrir, fechar torneira	
23	Manusear nota de dinheiro	
24	Segurar-se em transporte coletivo	
25	Usar cartão magnético em caixa eletrônico	
26	Usar telefone celular	
27	Cortar com tesoura	
28	Usar martelo	
29	Folhear página de livro, caderno, revista	
30	Pegar objetos pequenos (moeda, grampo, agulha) em superfície plana (mesa, chão)	
RESULTADO FINAL		
Professional Responsável		

