

What is the essential neurological examination?

O que é o exame neurológico essencial?

Marco A. Lima¹, Péricles Maranhão-Filho²

ABSTRACT

In order to determine which aspects would be essential to the neurological examination (NE) in a given specific situation (a patient referred with a potential neurological complaint, but the history suggests that a neurological problem is unlikely), we presented the same questionnaire used by Moore and Chalk in Canada to 19 neurologists in Rio de Janeiro, Brazil. We considered significant aspects of NE, whose average responses were greater than or equal to 3.5: visual fields, fundoscopy, pursuit eye movements, facial muscle power testing, gait, pronator drift or rapid arm movement in upper limbs, finger-nose, tone in arms and legs, five tendon reflexes, and plantar responses. We concluded that, despite geographical and economical differences between Brazil and Canada, neurologists from both countries agree about the essential NE in the proposed scenario.

Key words: neurological examination, neurosemiology, neurological complaint.

RESUMO

Visando determinar quais aspectos do exame neurológico (EN) seriam essenciais em uma situação específica (paciente com queixa neurológica, mas cuja história sugere ser improvável um problema neurológico), apresentou-se o mesmo questionário utilizado por Moore e Chalk no Canadá a 19 neurologistas do Rio de Janeiro, Brasil. Foram considerados os aspectos significativos do EN com pontuação igual ou superior a 3,5: campo visual, fundoscopia, movimentos de perseguição ocular, mímica facial, marcha, desvio pronador ou movimentos rápidos dos membros superiores, prova dedo-nariz, tônus nos membros superiores e inferiores, cinco reflexos tendinosos e reflexo plantar. Concluiu-se que, apesar de diferenças geográficas e econômicas entre Brasil e Canadá, neurologistas de ambos os países concordam sobre o exame neurológico essencial no cenário proposto.

Palavras-Chave: exame neurológico, neurosemiologia, queixa neurológica.

Many clinicians consider the neurological examination (NE) the most difficult and intriguing aspect of semiology. A common complaint is how to perform an excessive number of complex maneuvers in order to obtain clinical relevant information.

In 2009, Frazer Moore and Colin Chalk¹ published the results of an interesting study called “The Essential Neurological Examination”. In an early part of their work, they elected to investigate how neurologists use NE when faced with a common clinical situation: a patient referred with a potential neurological complaint in which the history suggests that a neurological problem is in fact unlikely, and the NE is being used to confirm that the patient is neurologically normal. Such researchers asked 19 McGill University neurologists to consider this scenario, and then asked them to state how likely they would be to use each of the 46 items of a reasonably complete NE. As

an external validation, 38 neurologists across Canada and 168 students from McGill Medical School in a range of practice settings were asked to rate the 46 NE elements, using the same scenario and rating scale. This study sought to evaluate how a group of neurologists based in Rio de Janeiro, Brazil, would use NE in the same scenario by Moore and Chalk’s study.

METHODS

In order to investigate how experienced neurologists use the NE, we hypothesized a common clinical scenario: a patient referred with a potential neurological complaint, but the history suggests that a neurological problem is in fact unlike, and the NE is being used to confirm that the patient is neurologically normal.

¹MD PhD, Department of Neurosurgery, National Institute of Cancer (INCA); Laboratory of Clinical Research in Neuroinfections, Instituto de Pesquisa Clínica Evandro Chagas, Fundação Oswaldo Cruz (IPEC-Fiocruz), Rio de Janeiro RJ, Brazil;

²MD PhD, Department of Neurosurgery, National Institute of Cancer (INCA); Department of Neurology, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro RJ, Brazil.

Correspondence: Marco A. Lima; Avenida Alexandre Ferreira 420 / apto. 403; 22470-220 Rio de Janeiro RJ - Brasil; E-mail: mlima@inca.gov.br

Conflict of interest: There is no conflict of interest to declare.

Received 27 February 2012; Received in final form 29 June 2012; Accepted 06 July 2012

We presented the same questionnaire used in the Canadian study (Table 1), and asked 19 neurologists from Rio de Janeiro, Brazil, to score each item using a four-point scale, in which four indicates “I would always include this”; three “>80% of the time”; two “sometimes, but less

than 80%”; and one was “never or almost never needs to be included”.

Among the 19 Brazilian neurologists, 13 were general neurologists and 6 spent most of their practice time in specialty clinics (headache, demyelinating diseases, dementia, and epilepsy). Four neurologists had from one to ten years of practice; six had between 11 to 20 years and 9 had more than 21 years.

Mean and standard deviations for each of the 46 NE elements were computed, and then participants were asked to repeat their scoring of the NE elements, however, at this time, taking into consideration the group mean scores. We used the Delphi procedure², which is based on the premise that pooling opinions enhances individual judgments and accurately captures the views of a group, and compared our results with those obtained by Canadian neurologists. NE items that were given scores greater than 3.5 were considered the most relevant.

Table 1. Items of the neurological questionnaire.

Mental status
Folstein mini-mental status test (or equivalent formal test)
Tests of language
Tests of praxis, drawing, executive function
Cranial nerves
Testing smell
Visual fields
Visual acuity
Fundoscopy
Pupillary reflex
Pursuit eye movements
Saccadic eye movements
Corneal reflex
Facial muscles
Gag reflex
Hearing
Palate movement with phonation
Articulation
Sternocleidomastoids
Tongue
Motor exam
Gait
Heel walking
Toe walking
Tandem gait
Rising from squatting or kneeling
Tone in arms
Tone in legs
Pronator drift
Rapid alternating movements in upper limbs
Rapid alternating movements in lower limbs
Finger-to-nose
Heel-shin
Specific muscle power testing in upper limbs
Specific muscle power testing in lower limbs
Reflexes
Biceps
Brachioradialis
Triceps
Knee jerk
Ankle reflex
Plantar response
Primitive (e.g., palmomental or grasp)
Abdominal reflexes
Sensation
Vibration
Pinprick
Thermal
Proprioception
Romberg

RESULTS

Twenty items of the questionnaire had a mean score greater than 3.5 (Table 2), 17 of which were in agreement with the results of the Canadians. The differences were that Brazilian neurologists more often test light touch, while

Table 2. Items of the neurological examination rated 3.5 or greater.

Brazilian neurologists	McGill neurologists	Canadian neurologists
Fundoscopy		Fundoscopy
	Visual fields	Visual fields
Pursuit EOM	Pursuit EOM	Pursuit EOM
Pupillary light reflex		Pupillary light reflex
Facial muscles	Facial muscles	Facial muscles
Gait	Gait	Gait
Tongue		
	Pronator drift	
RAM upper		RAM upper
Finger-nose	Finger-nose	Finger-nose
Tone arms		Tone arms
Tone legs		Tone legs
Power arms		Power arms
Power legs		Power legs
Biceps reflex	Biceps reflex	Biceps reflex
Brachioradialis reflex	Brachioradialis reflex	Brachioradialis reflex
Triceps reflex	Triceps reflex	Triceps reflex
Patellar reflex	Patellar reflex	Patellar reflex
Achilles reflex	Achilles reflex	Achilles reflex
Plantar reflex	Plantar reflex	Plantar reflex
Romberg		
Light touch		
		Pinprick

EOM: extraocular movement; RAM: rapid arm movement.

Canadians test pinprick; Brazilians examine tongue and perform Romberg test but Canadians check visual fields more frequently. McGill neurologists rated only 12 items higher than 3.5 and almost all of them were in agreement with Brazilian neurologists, except for visual fields and pronator drift. However, if we consider a score higher than 3 instead, all of the items are contemplated by both groups.

DISCUSSION

Contemporary neurological practice demands greater efficiency and effectiveness. The NE is a curious compendium of maneuvers; many of these are named, some have multiple names, and many are not named³. Neurologists tailor their own examination practices to judgments of situational utility, a skill that cannot be routinely expected of generalists. Unfortunately, regarding the neurological teaching and learning, many professors create expectations for performance of complete examinations that they usually do not perform or need^{4,5}. Clearly, some tests are more marginal than others, and in a general situation regarding a specificity, it is expected that neurology professors will differ in their choices for pruning the traditional examination^{6,7}.

The NE varies widely by disorder (e.g., dementia *versus* low back pain), and the examination is directed by the history. Thus, there is no single, essential NE. The actual elements identified as being essential would vary depending on the patient's complaint⁸. Furthermore, the proposed scenario is frequently observed in neurology clinics worldwide. Interestingly, despite geographical and economical differences between Brazil and Canada that result in distinct

prevalence of neurological diseases, there was a high rate of agreement among neurologists of these two countries, therefore there is probably a perception that some neurological maneuvers constitute a core of the NE and are performed independently of the background. Rational modification of the NE does not imply that it is becoming obsolete, but rather that neurologists should assist medical students and residents to develop greater competency in a streamlined exam, emphasizing high-yield aspects⁴.

Our results showed that, for neurologists from Rio de Janeiro, the most important aspects of NE were basically the same from Canada: visual fields, fundoscopy, pursuit eye movements, facial muscle power testing, gait, pronator drift or rapid arm movement in upper limbs, finger-nose, tone in arms and legs, five tendon reflexes, and plantar responses. The major aspects of the NE were increased by light touch, Romberg sign, and tongue examination.

In conclusion, this was a pilot study, which showed no significant differences between the NE features used by 19 neurologists from Rio de Janeiro, Brazil, when compared to those used by Canadian ones, when both groups faced the same and common situations. The authors are fully aware that the number of participating neurologists is small and, in the future, this study could also be expanded to other Brazilian cities.

ACKNOWLEDGMENTS

The authors are in debit with the 19 neurologists who agreed to participate in this study and thank Mrs. Raquel de Oliveira for the assistance with the statistical analysis.

References

1. Moore FG, Chalk C. The essential neurologic examination: what should medical students be taught? *Neurology* 2009;72:2202-2203.
2. Linstone HA, Turoff M. The Delphi method: techniques and applications 2002. [Internet] [cited 2011 Dec 04]. Available at: <http://is.njit.edu/pubs/delphibook/>.
3. Louis ED. The neurological examination (with an emphasis on its historical underpinnings). Preface. *Sem Neurol* 2002;22:2.
4. Glick TH. Toward a more efficient and effective neurologic examination for the 21st century. *Eur J Neurol* 2005;12:994-997.
5. Chalk C. How should we teach the neurological examination to medical students? Course 1EP001. Syllabi CD-ROM – AAN; 2010.
6. Maranhão-Filho PA, Maranhão ET, Silva MM, Lima MA. Rethinking the neurological examination I Static balance assessment. *Arq Neuropsiquiatr* 2011;69:954-958.
7. Maranhão-Filho PA, Maranhão ET, Lima MA, Silva MM. Rethinking the neurological examination II Dynamic balance assessment. *Arq Neuropsiquiatr* 2011;69:959-963.
8. Meador KJ, Moore F, Chalk C. The essential neurologic examination: what should medical students be taught? *Neurology* 2009;73:2133-2134.