Reviewer's report

Title: Diagnostic accuracy of the neurological upper limb examination I: Inter-rater reproducibility of selected findings and patterns.

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Reviewer: John Quintner

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Assessment of the work

1. Is the question posed by the authors new and well defined?

In the authors' (and others) experience, the standard orthopaedic/neurological upper limb examination is not sensitive enough to diagnose many patients presenting with upper limb pain that develops in an occupational context.

The authors' hypothesis is that a focussed physical examination of patients presenting with symptoms of widespread upper limb pain, weakness and paraesthesiae is more likely to yield important findings such as subtle disturbances of sensibility, mildly diminished motor power and mechanical allodynia overlying nerve trunks.

Furthermore, by drawing upon the known neurological anatomy and neurophysiology, the authors claim that the various patterns of neurological dysfunction identified can assist the examiner by revealing underlying focal neuropathies in this group of patients.

The principal questions posed in these papers are:

(i) whether these additional clinical examination findings are reproducible between different examiners.

(ii) whether the patterns of neurological dysfunction so identified by the examiners are indicative of specific neurological diagnoses, i.e. focal neuropathies.

(iii) If focal (entrapment) neuropathies can be accurately diagnosed on clinical grounds, then more specific diagnostic techniques (e.g. MRI, electrophysiological studies) can be utilised and a surgical approach (nerve decompression) may then be justified.

2. Are the methods appropriate and well-described, and are sufficient details provided to replicate the work?

In Paper I, the answer is yes, although it would be helpful to readers if the authors had provided more details of their cohort of patients in terms of their duration of complaints, previous diagnoses and treatment, work status and, where relevant, length of time off work. It would seem that they were by and large a group of chronic pain patients. The same criticism is relevant to Paper II.

The methodology used in Papers I & II might be improved if the authors simplified the grading of presence of changes in sensibility and nerve trunk mechanosensitivity to a YES or NO answer.

3. Are the data sound and well controlled?
In Papers I and II, the figures in Table 5 and Table 2 respectively, indicate that where the examiners agreed as to the pattern of classification, overlapping patterns of neurological dysfunction were found in 90 limbs. However, in Table 4 of Paper II, there were only 38 symptomatic limbs. In the text, it is stated that the two examiners agreed on the presence of 90 patterns in 30 limbs. The respective Tables need to be altered to better reflect these findings.

In the abstract for Paper II, it is stated that the two examiners identified pattern(s) suggesting focal neuropathy in 34/36 of 38 symptomatic limbs. However, according to Table 4, the examiners reached agreement on the presence of patterns in 28 limbs. Can the authors explain this discrepancy?

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?

Table 3 in Paper II is mislabelled - it should read “Number of limbs in which any pattern was identified by primary examiners.”

5. Are the discussion and conclusions well balanced and adequately supported by the data?

In the discussion of Paper I, the authors argue that many of the overlapping patterns of neurological dysfunction can only be explained by proximal involvement (i.e. brachial plexopathy). Patterns of more distal focal neuropathy at elbow and wrist were rare in their study. However, they have not discussed the possibility that in at least some of their patients, the initial event was in fact a distal focal neuropathy at wrist or elbow level, and that with the passage of time, pain and other sensory phenomena had become more widespread in the painful upper limb (and even the contralateral limb). As the authors concede in Paper II, the identification of minor degrees of muscle weakness and sensory abnormalities may be difficult to interpret in this situation where functional changes in the central nervous system are likely to be present.

The primary examiners are said to have “defined” (made clinical diagnoses in) upper limb conditions in 22 of the 38 symptomatic (pain, weakness, and/or numbness/tingling) limbs. The authors suggest that some of these conditions might have been present in limbs where neither secondary examiner was able to recognize a pattern.

However, they do need to list the diagnoses made by the primary examiners. They must then explain why the secondary examiners were unable to detect these conditions, particularly when they assert that the patterns that the secondary examiners detected could occur in isolation or combined with upper limb conditions diagnosed by the primary examiners.

In paper II, the authors claim in the abstract that “[T]he improved diagnostic confidence indicates construct validity of the physical examination”. In their cohort, the principal clinical diagnosis made by the secondary examiners appears to have been “brachial plexopathy”. However, it is quite possible that this same pattern can occur at a relatively late stage of what commenced as a more distal focal neuropathy.

Construct validity refers to a set of procedures for evaluating the validity of a testing instrument based on the determination of the degree to which the test does capture the hypothetical quality or trait it was designed to measure. In the absence of gold standards for diagnosis of diffuse upper limb pain syndromes, I cannot agree that the authors have established construct validity for their data and conclusions.

My concern is that if readers come to share the author’s belief that in many of these patients “brachial plexopathy” is a valid diagnosis, then unnecessary and potentially harmful surgery may be undertaken at this level to relieve presumed entrapment of the plexus by fibrous bands or muscles.
Instead of construct validity, the authors might prefer to claim that their findings achieve face validity, which is assessed by having “experts” review the contents of a test to see if they seem appropriate “on their face value”.

6. Do the title and abstract accurately convey what has been found?

In the Paper I, the title and abstract do indeed convey the inter-rater reproducibility of the selected findings and patterns. They have shown that two similarly trained examiners are likely to reach agreement as to the patterns of clinical findings in most symptomatic upper limbs.

In Paper II, the authors claim that the more detailed physical (neurological) examination leads to “improved diagnostic confidence”. However, as they do acknowledge, there are a number of confounding variables that may make it impossible to make a diagnosis of focal neuropathy in this cohort of patients with chronic widespread upper limb pain and other positive sensory symptoms.

These variables include: tendency of the presumed initially localised pain to extend proximally, distally and even contralaterally; central nervous system modulation; alldynic tissues (e.g. muscles) overlying peripheral nerve trunks etc. In my opinion, the authors have not shown that focal neuropathies can be reliably identified on purely clinical grounds in their cohort of chronic pain patients.

7. Is the writing acceptable? Might I suggest a few minor changes for consideration by the authors?

Paper I

Abstract:

Background:

… the mechanosensitivity of nerve trunks …. 

… may potentially reflect a peripheral neuropathy.

Methods:

… suggesting a focal neuropathy.

Results:

… reproducibility of the defined patterns …

Conclusions:

… reproducibility in cohorts ..

… validity when compared to currently applied standards …

Background

With a prevalence in the general population of approximately 20% ..

… acronyms, e.g. RSI (repetition strain injury) …

… the physical examination often fails to identify well-described clinical conditions.
... paraesthesiae (typographical) ...

Minor weakness of the individual muscles ...

... in the evaluation of patients ...

... weakness, and/or numbness/tingling.

... depends on its content, execution ...

... diagnostic accuracy of physical examination ..

Even with widespread use, ...

Methods:

... when known to the examiners ..

... earlier contacts with the department ..

... foreign language speaking ...

Physical examination and diagnostic interpretation:

Both examiners were blinded ...

... each suggesting a specific location of nerve affliction ...

Results:

... applied definitions, the location of neurological involvement was assigned to the brachial plexus ..

The site of neurological involvement was assigned to the carpal tunnel ...

Discussion:

... comparable and superior to that of other physical examination techniques ...

... manual muscle strength has resulted in recommendations ...

While support for the diagnosis ...

Some of the findings may be unexpected.

... with its intended clinical application in mind.

... variously affected on one or both sides ...

Conclusions:
and their occurrence in patterns.

in a greater proportion of symptomatic limbs.

Paper II

Abstract:

identify patterns of findings suggesting upper limb focal neuropathies.

each suggesting a localized nerve affliction.

Background:

cannot identify well-described clinical conditions.

In many patients the character of pain ...

presence of diffuse upper limb pain ...

Methods:

when speaking a foreign language ...

Test methods:

including the range of motion of individual joints together with ...

Results:

for which concurrent presumed pathology ...

Discussion:

association of complaints in limbs ...

peripheral nerves may be difficult due to tissue covering nerves

In comparison to an inaccurate reference ...

characteristic of upper limb neuropathy ...

complaints to non-neural pathology limits specificity ...

clinically justified to suspect the target disorders ...

Major Compulsory Revisions: See 1, 2 & 3 above.

Minor Essential Revisions: See 4 & 7 above.

Discretionary Revisions: See 7 above

Fate of papers:
Paper I: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions.

Paper II: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions.

Level of Interest: An article whose findings are important to those with closely related research.

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions.

Level of interest: An article whose findings are important to those with closely related research interests.