

## Evaluating the Babinski sign

In a study of the performance of examination methods, Miller and Johnston found that the Babinski sign was unreliable and a poor predictor of upper motor neuron weakness. Testing for speed of foot tapping was more reliable, sensitive, and specific. They question whether the Babinski sign should be a part of the routine neurologic examination.

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*The editorial by William Landau observes that the plantar reflex, like the tendon jerk or pupillary light reflex, is an involuntary physiologic test, qualitatively different and not properly comparable with voluntary task performance. Both sorts of data have independent value; side-to-side comparison of reflex as well as behavioral performance is obviously essential. He laments Miller and Johnston's lack of standard technical instruction/supervision for elicitation of the plantar reflex. "Over half a century I have too often observed bizarrely faulty performance by house officers, medical and neurologic, and, alas, by candidates for Board Certification in Neurology." He argues that the indeterminate range of incompetent test performance must confound impertinent statistical conclusions.*

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## The Babinski sign: Thumbs up or toes down?

Commentary by Robert Holloway, MD, MPH

Miller and Johnston and the accompanying editorial by Landau present differing opinions about the value of the plantar reflex. "The truth is always a compound of two half-truths, and you never reach it, because there is always something more to say." Here are the two half-truths.

To the master clinician and educator, it is inconceivable that the Babinski sign can be reduced to a  $2 \times 2$  table. For 100 years our specialty has worked to refine the uses of the plantar reflex; its "rule in" function (the reassuring Babinski sign in a patient with an ischemic stroke); its "rule out" function (its reassuring absence in a patient with early hemiparkinson disease); its "alerting" function (alerts to the possible presence of multilevel disease and contributing comorbidity); and its "syndromic" function (allows for the parsimonious explanation of a combination of signs and symptoms—e.g., amyotrophic lateral sclerosis, Friedreich's ataxia, vitamin B12 deficiency). The above categorization is not complete (nor necessarily correct), but little has been done to explicitly define these roles and the teaching of the plantar reflex

in clinical neurology continues to occur in haphazard, apprenticeship fashion.

To the seasoned researcher, the plantar reflex is a diagnostic test that is eminently testable. It is used to revise prior probabilities of disease; there is no reason why it can not and should not be subjected to usual standards of test assessment.<sup>1</sup> Many in fact have argued that more physical examination findings should undergo such rigorous assessments and only a few have addressed the neurological exam.<sup>2,3</sup> Recognizing that the plantar reflex is not one test, but multiple tests with many uses (much like an MRI), detailed testing paradigms must be properly defined for specific patient populations in specific settings. Other considerations include how best to define gold standard diagnoses, the need for test-retest reliability (given how the plantar reflex fluctuates over time), and whether to use subjective test outcomes on an ordinal scale (e.g., trace to + + +), which would allow for ROC comparisons among different tests.

The study by Miller and Johnston proves that such as-

sessments can be done and is a step in the right direction. Landau's editorial points out their study's shortcomings. Rather than discarding or de-emphasizing the plantar reflex (Miller and Johnston) or concluding that such a study is junk science (Landau), this study and editorial should prompt clinicians, educators, and researchers to work together to define how elements of the neurologic examination (including the plantar reflex) are used in clinical practice, and to determine how they can be properly assessed and compared with other examination approaches. The same standards that we impose on new diagnostic tests should be used to evaluate elements of the neurologic examination.

### References

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