**Strickland JW, Gozani SN. Accuracy of in-office nerve conduction studies for median neuropathy: a meta-analysis. J Hand Surg Am. 2011;36(1);52-60.**

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Design: meta-analysis of tests of diagnostic accuracy

Purpose of study: to determine whether in-office nerve conduction studies have diagnostic accuracy comparable to that of testing done in electrodiagnostic laboratories

Summary of conclusions and reasons not to cite as evidence:

* The authors examined the results of five studies which compared in-office nerve conduction measurements with measurements of nerve conduction performed in a nerve conduction laboratory by a neurologist
  + Data from the five studies was extracted in order to calculate the numbers of true positives, false positives, true negatives, and false negatives for in-office nerve conduction with abnormal results defined by the nerve conduction laboratory
    - For example, in one study, an office definition of “abnormal” as a distal motor latency (DML) of >4.05 ms was compared to a laboratory definition of “abnormal” as a DML >= 4.2 ms; there were 57 TP, 2 FP, 5 TN, and 6 FN in a patient population with a 90% prevalence of median nerve abnormality
  + The authors pooled the results from 5 studies with 448 symptomatic hands and calculated a sensitivity of 88%, a specificity of 93%, and a diagnostic odds ratio of 62.0
  + The authors concluded that the in-office device detects median nerve abnormality with clinically relevant accuracy
  + They also cautioned that the results of in-office nerve conduction studies should be interpreted with consideration of the pretest probability of disease and not in absolute terms
* There are several problems with the methods in the analysis which may lead to an overestimation of test accuracy of the in-office device
  + There is a risk of bias arising from the selection of data, it is stated, “If several parameters were examined, the one with the highest specificity was selected”
  + This will underestimate the numbers of false positives and will inflate the diagnostic odds ratios
* The pooling of sensitivity and specificity were done separately from heterogeneous groups of patients, and the tradeoffs between enhanced specificity and enhanced sensitivity were not sufficiently accounted for
* Several of the selected studies presented comparisons of in-office and laboratory NCS with inadequate comparisons of the results from the two sources of nerve conduction data
  + That is, Rotman 2004, Leffler 2000, and Elkowitz 2005 reported strong correlations between in-office and laboratory measurements of the conduction parameters, and concluded that these strong correlations indicate agreement between the two methods of measurement
  + However, correlation is an incorrect measure of agreement between measurements, which should be done with the Bland-Altman limits of agreement method (Bland and Altman 1983, 1986), which graphs the mean of two measurements on the x axis and the difference between measurements on the y axis
    - This is necessary because two measurements can be strongly correlated while being in wide disagreement
    - The Bland-Altman method can detect by how large an amount two measurements differ from one another, and can be used by clinicians to decide whether the differences between measurements are of sufficient magnitude to be of concern
    - The one study (Kong 2006) which used the Bland-Altman approach did not do the essential step of reporting the standard deviation of the measurement differences, which are needed to estimate the limits of agreement between the two measurements
    - Kong’s Figure 4, which displays the Bland-Altman plots, shows that the differences between the two instruments can vary from 0 ms to 1.0 ms or more, with the in-office measurement being higher
    - The intraclass correlation coefficient, also an appropriate method of estimating agreement between measurements, was not used by these studies, but would have been an acceptable alternative to the Bland-Altman method
  + Although a more recent study (Dale 2015) uses the intraclass correlation coefficient, the authors were studying a different population, active workers from several industries participating in a longitudinal study of median nerve function, and not patients for whom the test was being used to diagnose CTS; therefore, it is not suitable as evidence of the diagnostic accuracy of portable nerve conduction measurements

Additional considerations:

* Although the meta-analysis is not appropriate for citation as evidence, there are issues surrounding the comparison which are relevant for task force discussion, such as whether in-office measurements lead to satisfactory decision-making for CTS surgery, and whether outcomes of CTS diagnosed on the basis of in-office devices differ from those of CTS cases diagnosed on the basis of laboratory electrodiagnosis

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