

# **Developing the evidence for kinesiology-style manual muscle testing: Designing and implementing a series of diagnostic test accuracy studies**

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## **Introduction**

Practitioners have used manual muscle testing (MMT) to assess neuromusculoskeletal integrity since early last century[1]. Since the 1960's, chiropractors began using MMT to detect various other target conditions such as organ, endocrine or immune dysfunction[2]. Subsequently, a third distinct type of MMT has evolved, kinesiology-style MMT (kMMT), commonly referred to as simply "muscle testing." It differs from the other types in that normally only one muscle (commonly called "the indicator muscle") is tested repeatedly as the target conditions change. It is estimated that kMMT is practiced in over 70 different technique systems and by over 1 million people worldwide.

As a result of this divergence of the practice of MMT/kMMT, there exists some confusion surrounding the term itself, and how the tests are performed and interpreted. Consequently, research efforts to assess its validity and clinical utility have been difficult to design, to conduct and even to understand; and as a result, its usefulness as an assessment method has been called into question[3-6].

This paper describes a series of diagnostic test accuracy studies aimed at developing evidence for one application of kMMT: distinguishing true from false spoken statements. The main objectives of Studies 1 and 2 were to estimate the accuracy (overall fraction correct) of this application of kMMT while the objective of Study 3 was to compare these results with grip strength dynamometry.

## **Methods**

Three prospective studies of diagnostic test accuracy were carried out where kMMT practitioners and kMMT-naïve test patients (TPs) were recruited. TPs were shown pictures (via computer) and instructed (via headset) to make simple true or false statements about the picture, after which the muscle test was performed. The reference standard was the statements' actual verity and the index test was kMMT. A secondary index test was also enacted in alternating blocks: practitioners were asked to "guess" the verity of the spoken statement without using kMMT, merely relying on visual, auditory and kinesthetic clues.

In Study 1 (n=48 practitioner-TP pairs), each practitioner performed 40 kMMTs broken up into blocks of 10 which alternated with 4 blocks of 10 guesses. Study 2 (n=20 pairs) replicated Study 1. Study 3 (n=20 TPs) removed the influence of practitioners by using a grip-strength dynamometer to measure muscle strength following the spoken statement in 4 blocks of 5 grip strength tests.

In Studies 1 and 2, overall fraction correct was calculated for each pair, and the overall mean reported. In Study 3, the mean grip strength after false statements was compared to the mean grip strength after true statements was compared.

## Results

In Study 1 kMMT practitioners correctly distinguished lies from truth in 69.3% (95% confidence interval [CI] 66.0-72.5%) of statements more often than by chance alone ( $p<0.01$ ), or guessing (47.4% accuracy; 95% CI 0.449 - 0.500). In Study 2, kMMT accuracy was 63.1% (95% CI 56.8-64.9%;  $p<0.01$ ), while guessing was 51.4% (95% CI 0.483 - 0.544;  $p=0.01$ ). In study 3 there was no significant difference between dynamometer-measured grip strength for true (mean 24.0 kg; standard error 2.1 kg) versus false (mean 23.8 kg; standard error 2.1 kg) statements ( $p=0.94$ ). Testing for various factors that may have influenced kMMT accuracy failed to detect any correlations.

## Discussion

In Studies 1 and 2 significant differences were found between accuracy in identifying verity of spoken statements using kMMT compared to both chance and guessing. Furthermore, the practitioner appears to be an integral part of the kMMT dynamic because when removed, no significance is achieved (Study 3). The main limitation of these studies is its lack of generalizability to other applications of kMMT.

## Conclusion

kMMT when performed by a practitioner can distinguish true from false statements significantly more often than would be expected by chance alone.

## References

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