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

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BACKGROUND

Healthcare practitioners have been using muscular strength testing to assess the integrity of the neuromusculoskeletal system since early last century.[1] Since then, its use has broadened, and now it is estimated that over 1 million practitioners use kinesiology-style manual muscle testing (kMMT) to evaluate a wide variety of conditions. However, its clinical validity has yet to be firmly established.

A number of kMMT techniques have been developed that assess a patient's response to semantic stimuli.[2-4] Monti et al. found that following the speaking of true statements, a muscle was able to resist significantly more force compared to after speaking false statements.[5] They found that speaking true statements resulted in a "strong" kMMT response, while speaking false statements resulted in a "weak" kMMT response.[5] Reported here are the results of a series of 3 studies of the diagnostic test accuracy using kMMT to distinguish true statements from false, under varying conditions: Study I used different levels of practitioner blinding, Study II repeated Study I blinding the practitioner throughout, and Study III replaced practitioner-applied kMMT with grip-strength dynamometry.

AIM

To estimate the accuracy of using kMMT to distinguish true statements from false statements, compared to using grip strength and guessing.

METHODS

	Inclusion	Exclusion
Practitioners	• Healthcare Practitioners who routinely use kMMT • Healthy • Fluent in English • Aged 18 to 65yo	• None
Test Patients	• Healthy • Fluent in English • Aged 18 to 65yo	• Prior kMMT experience • Known to Practitioner

kMMT practitioners and kMMT-naïve test patients (TPs) were recruited. For participant flow, see Figure 1. 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. In all 3 studies, the reference standard was the statements' actual verity, in Studies I & II, the index test was kMMT, and in Study III, the index test was grip-strength (kg). In Study I each practitioner performed 40 MMTs and 40 guesses (without using kMMT). Study II replicated Study I, and Study III removed the influence of practitioners by using a grip-strength dynamometer to measure muscle strength. In addition, in Studies I & II, a control condition was enacted where the practitioner was asked to guessed the verity of the TP's spoken statement. See Figure 2 for pictorial descriptions of study methods.

FIGURE 1 – General summary of methodology : Studies I, II, III

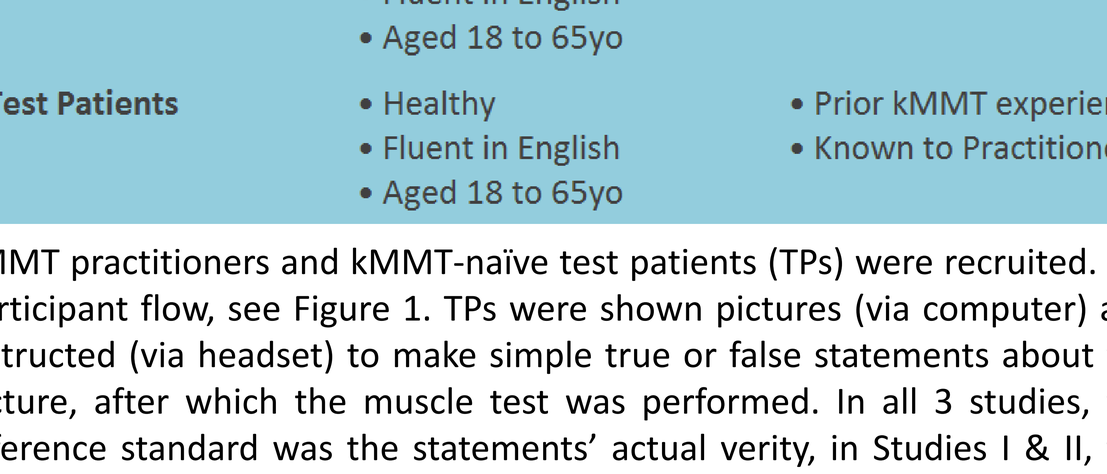
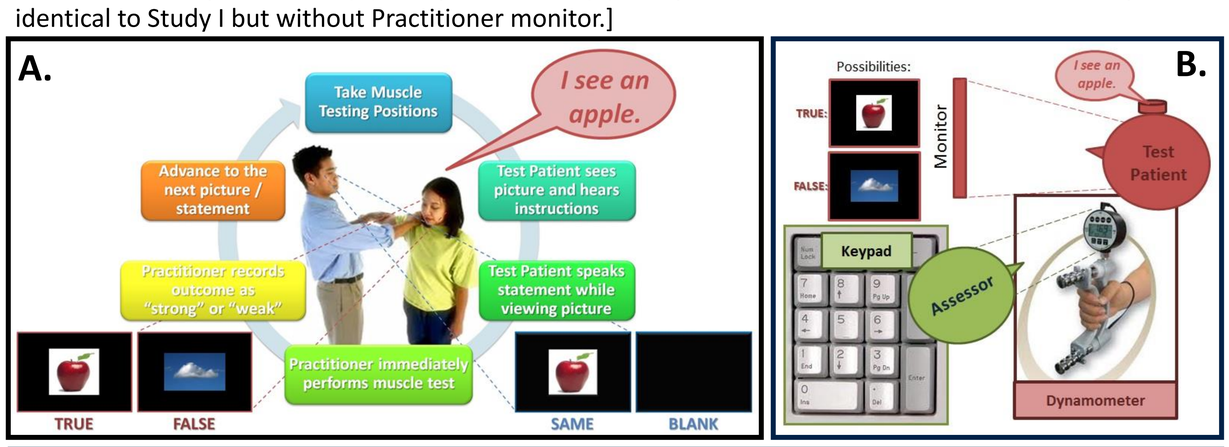


FIGURE 2 – Study Methods : (A) Study I Methods, (B) Study III Methods . [NOTE: Methods for Study II are identical to Study I but without Practitioner monitor.]



RESULTS

In Study I, 48 unique practitioner-TP pairs were assessed, and kMMT was used to correctly distinguish truth from falsehood in 69.3% (95% confidence interval 66.0-72.5%) of statements more often than by chance alone (p<0.0001). In Study II, 20 unique pairs were assessed, and kMMT was used to correctly distinguish truth from falsehood in 63.1% (95% confidence interval 56.8-64.9%) of statements more often than by chance alone (p<0.0001). 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=0.4693). Contrary to previous studies[6 7] we found that the years of a practitioner's kMMT experience did not significantly correlate with a practitioner's kMMT accuracy, nor did the practitioner's self-ranked kMMT expertise. See Tables 1 and 2 below.

TABLE 1 - Results of Study I & II : Mean Accuracies for kMMT & Guessing, CI's, Ranges, and p-values

	kMMT			Guessing			Chance		
	Mean Accuracy†	95% CI	Range (%)	Mean Accuracy†	95% CI	Range (%)	p-value	(%)	p-value
Study I	69.3	66.0-72.5	45.8-92.3	49.8	46.6-53.1	27.8-76.2	<0.0001*	50.0	<0.0001*
Study II	63.1	56.8-69.4	35.0-95.0	57.6	52.1-63.2	35.0-90.0	0.245	50.0	0.0006*

kMMT, kinesiolgy-style Manual Muscle Testing; CI, Confidence Interval; †% Correct; * Significant

TABLE 2 - Results of Study III : Mean Grip Strengths, CI's, Ranges, and p-values

TRUE Statements			FALSE Statements			
Mean Grip Strength (kg)	95% CI	Range (kg)	Mean Grip Strength (kg)	95% CI	Range (kg)	p-value
24.0	19.9-28.1	10.5-39.5	23.8	19.7-27.9	10.8-38.9	0.4693

CI, Confidence Interval

SUMMARY

In Studies I and II significant differences were found between accuracy in identifying verity of spoken statements using kMMT compared to chance. Furthermore, the practitioner appears to be an integral part of the kMMT dynamic because when removed, no significance is achieved (Study III). The main limitation of these studies is its lack of generalizability to other applications of kMMT. The broad range of kMMT accuracies suggests there is much yet to be learned about the skills involved and possible influencing factors.

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

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