

## WORKSTEPS ARTICLES RECENTLY PEER REVIEWED AND ACCEPTED FOR PROFESSIONAL PUBLICATION

HISTORY: In 2001, WorkSTEPS affiliate company X-RTS, published the most accurate study in the history of research regarding detection of sincerity of effort during a functional test. The test was 99.9% accurate in predicting normal subjects who feigned 50% weakness versus when they gave a maximum effort. WorkSTEPS and X-RTS exclusively provide such testing currently on-line as a part of their system.

ABSTRACT ONE: *Simultaneous Bilateral Hand Strength Testing in a Client Population: Diagnostic, Observational, and Subjective Complaint Correlates to Consistency of Effort*

AUTHORS: Feeler, Schapmire, St. James, Kleinkort

Distraction based bilateral hand testing is the most accurate method of classifying sincerity of effort that has been peer review published regarding "normal" subjects asked to perform maximum effort testing followed by "feigning" weakness at what they perceived as 50% of maximum effort. This study replicated bilateral simultaneous hand testing in a *patient population* of claimants during a Functional Capacity Evaluation. The findings of the functional testing were correlated to common pain and perception questionnaires, common principles of visually detecting sincerity by health care professionals, common medical measurements such as range of motion, strength, etc. The purpose of the study was twofold: 1) To assess the correlation of these common parameters to sincerity detection and 2) To determine if "pain" is likely to account for failure of two or more of the validity criteria.

The results showed that clients failing two or more of the statistically-based validity criteria had higher scores on most of the pain questionnaires, presented with a higher frequency of various pain behaviors and had a higher prevalence of diagnoses and surgeries that would not be expected to affect their performance (foot surgery). There were no significant differences in the number of failed criteria of these patient clients compared to the normal's who were asked to give a maximum effort and to feign weakness in the previous study. As a result, the test was 99.9% accurate in classifying sincerity of effort in a patient population and was also significantly more accurate than the use of observational and subjective input commonly used in medical practices.

EMPLOYER BENEFITS: You now have the ability to empirically decide the sincerity of effort of injured workers to expedite relevant treatment, accurate return to work, fraud investigation and or appropriate case closure based upon statistical odds.

ABSTRACT TWO: *Simultaneous Bilateral Hand Strength in a Client Population: Relationship to a Distraction-Based Lifting Evaluation*

AUTHORS: Feeler, Schapmire, St. James, Kleinkort

This study involved the same patient population of the previous study, but added a second distraction based test that compared the results of weights lifted in a box to performance of weights lifted on a class two lever arm (Picture enclosed). The purpose of this study was to determine whether a pattern of distraction based test behavior identified in bilateral hand strength testing would predict test outcome in a distraction-based lifting assessment. Clients failing two or more statistically-based hand strength validity criteria had significantly more variability between repeated measures in the lifting assessment for right one hand lifting, left one hand lifting and two hand lifts in 3 different postures. The test outcome (passing or failing sincerity testing) in one of the protocols is predictive of test outcome in the other protocol.

EMPLOYER BENEFITS: You now have the ability to empirically decide the sincerity of effort of injured workers with two physical distraction based tests that will expedite relevant treatment, accurate return to work, fraud investigation and or appropriate case closure based upon statistical odds.

ABSTRACT THREE: *ISOMETRIC STRENGTH ASSESSMENT: STATIC TESTING DOES NOT ACCURATELY PREDICT DYNAMIC LIFTING CAPACITY*

AUTHORS: Feeler, Schapmire, St. James, Townsend

Commercially available isometric / static equipment has been utilized nationally for over 30 years to decide functional capability during new-hire testing and patient care in the United States. Such devices may be manual or computerized, but consist of a handle connected to a strain gauge that the client pulls/ lifts against (without movement) to measure body strength in various "static" postures. In the past, published research regarding the forces generated in these immovable positions found modest correlations to dynamic (moving) lifts typical in the real world. Even so, most national medical equipment companies manufacture and distribute such equipment and the use of the devices is common to countless medical clinics and functional capacity systems throughout the United States. The purpose of the study was to determine if isometric strength measurements can be used to predict dynamic lift capacity. This study was comprised of 107,755 male and 23,078 female prospective job candidates tested with isometric equipment in the three most common postures -- compared to real world dynamic lifting in 4 postures as established previously by the National Institute of Occupational Safety and Health (NIOSH). The study reaffirms modest correlations of static to dynamic strengths in similar postures, but most significantly, reveals that the standard error of estimate for ALL comparisons is so high that it is meaningless to try to predict dynamic capability from isometric test results.

EMPLOYER BENEFITS: For over 30 years, the medical industry has utilized static testing equipment to classify a patient's effort, to say whether or not they can work and sometimes to justify continued

treatment. The equipment is not capable of accurately calculating any of these results. Therefore, it is highly likely that in the past, prospective employees, existing employees, and injured clients have been misclassified as far as their physical capability in regard to lifting and other functional measures. This research should eliminate the use of inaccurate measuring devices and test procedures as well as the fiscal waste associated with such tests, thereby resulting in much more accurate qualifying procedures, fewer injuries, better work injury management outcomes and diminished liability for employers and medical practitioners alike. Furthermore, this study provides the FIRST real substantial normative database of strength measures for industrial workers.

ABSTRACT FOUR: *ISOMETRIC STRENGTH ASSESSMENT: STATIC TESTING DOES NOT ACCURATELY CLASSIFY VALIDITY OF EFFORT*

AUTHORS: Feeler, Schapmire, St. James, Townsend

Commercially available isometric / static equipment has been utilized nationally for over 30 years to decide functional capability during new-hire testing and patient care in the United States. Such devices may be manual or computerized, but consist of a handle connected to a strain gauge to measure body strength in various "static" postures. Such devices have also been promoted as a type of physical test that can be used to assess sincerity of effort. This is accomplished by comparing the consistency of each repetition to the other by calculating a coefficient of variation (CV) which is expected to be less than 15% for normal subjects and as high as 25% for injured clients giving a good effort .

An extensive search of the literature finds no controlled studies in which two of the most common static lifts demonstrated sensitivity and specificity that would meet scientific standards in regard to accurately predicting sincerity of effort. The purpose of this study was to determine if these two commonly used tests accurately indicate client effort. In this controlled study, 34 healthy subjects were tested once giving a maximum voluntary effort and once attempting to feign weakness at what they believed was 50% of their maximum. The results of testing showed that there is a large overlap in distribution of scores for both static test positions. Although one can be reasonably sure that a very "high" CV indicates feigned weakness, there is no way to be sure at all that a low CV indicates sincere effort.

EMPLOYER BENEFITS: It is highly likely that in the past, insincere patient's effort s were misclassified as valid. The results of this research support the use of other more stringent procedures to accurately qualify effort, enhance appropriate treatment recommendations, improve work injury management, investigate fraud, provide case closure based upon statistical odds, and diminish liability for employers and medical practitioners alike.

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ABSTRACT FIVE: Accuracy of Visual Estimation in Classifying Effort During a Lifting Task

AUTHORS: Feeler, Schapmire, St. James, Townsend

The objective was to determine if visual estimation of effort (VEE) during lifting tasks is accurate in classifying relative levels of exertion or distinguishing between incomplete lifts that may be potentially unsafe and incomplete lifts of "actors" feigning weakness. A convenience sample of 117 health professionals and lay subjects participated in the study. Methods: Four actors were videoed performing four complete dynamic lifts (sets of five repetitions) of varying levels of exertion (relative to subjects' physical maximum). Subjects viewed the videoed performances, presented in no apparent order, attempting to properly classify the lifting tasks. For the four levels of exertion, participants were to judge if the lifts were 25%, 50%, 75% and 100% of each actor's maximum lifting capacity and to distinguish between an incomplete (failed) lift of 110% of maximum and a feigned failure of a lift of 25% of maximum. Results: Accuracy for in classifying all lifting activities was marginally higher than chance. There were no differences in the accuracy of health professionals or lay subjects. Conclusion: The VEE does not accurately classify relative levels of exertion or distinguish between incomplete feigned effort lifts and lifts that are potentially too heavy to safely lift.

EMPLOYER BENEFITS: For decades, most doctors and therapists have visually estimated material handling strength of industrial patients. New vision research in conjunction with this study reveals serious limitations in the accuracy of such estimations by all clinicians regardless of their education or training. This study reinforces the need for all clinicians who measure functional strength to cross-validate or reconfirm their findings with similar "disguised" measures such as real objects, unmarked weights or a lever arm lifting device. By doing so, injured workers will be accurately classified so employers can appropriately match them to safe work capability or know empirically that they are not giving a good effort.

NOTE: WorkSTEPS surpassed ONE MILLION workers tested in 2007. All employee tests and functional capacity evaluations are a part of WorkSTEPS database, which is, to our knowledge, the largest industrial database in the world. WorkSTEPS is currently in the process of continued research and publications for the betterment of the medical profession and society as a whole. We are proud to play such a vital role in the future of scientific protocol development. The articles referenced in this correspondence have been peer reviewed and "accepted" for publication in 2010.

You may visit our web site at [www.worksteps.com](http://www.worksteps.com) or call us at 888 597 8377 if you would like more information.