

Upper Extremity System

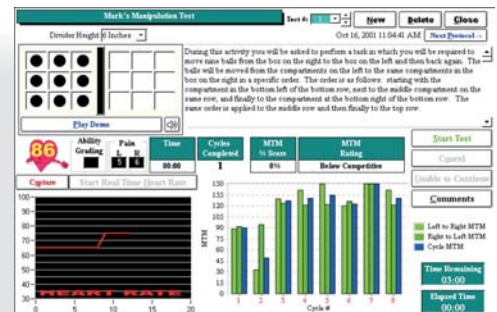


ADVANCING THE SCIENCE OF RSI, CTS, UPPER EXTREMITY AND FINE MOTOR SKILLS ASSESSMENT AND REHABILITATION

After four years of research and development, the Hanoun Upper Extremity System (UE) is taking the medical and rehabilitation fields to an unequaled level. Finally, technology and science are combined to effectively provide comprehensive evaluation and rehabilitation of Repetitive Strain Injuries, Carpal Tunnel Syndrome and an array of other upper extremity conditions. The system also provides over 100 different protocols for fine motor skill evaluations to be used in head, spinal cord and upper extremity injury cases.

The Hanoun Upper Extremity System employs both strength and dexterity testing to allow the professional evaluator the means to assess a wide range of abilities on a job and impairment-specific basis.

With its protocols, unique tools and fatigue analysis software, the ability of the patient to perform sustained work is quantified on a more exact basis than ever before. The ability to determine the validity of effort and provide the reproducible evidence necessary to support the evaluator's opinion is unsurpassed. And, the utility of the system to perform rehabilitation, as well as evaluation activities, enhances the value to the clinic.



BILATERAL SIMULTANEOUS GRIP & PINCH



TORQUE STATION



HANDLING & FINGER DEXTERITY



WRIST FLEXION/EXTENSION



REPETITIVE MOTION



TESTING APPLICATIONS OF THE UE SYSTEM

MANUAL DEXTERITY TESTING WITH MTM STANDARDS

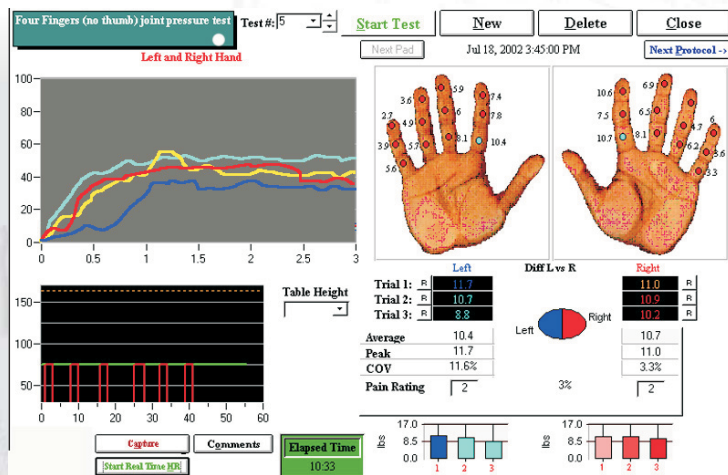
- ▶ Standard and Natural Keyboard Manipulation
- ▶ Repetitive Wrist, Elbow and Shoulder Flexion and Extension
- ▶ Handling, Tool Manipulation and Fine Finger Dexterity
- ▶ Gross Manipulation Testing

SELF PERCEPTION CLINICAL TESTS

- ▶ EPIC Hand Function Sort
- ▶ Advanced EPIC Hand Function Sort Classifier
- ▶ Tinel's, Phalen's, Varus Stress, Valgus Stress Report Templates
- ▶ Range of Motion in compliance with AMA 3rd, 4th and 5th editions with automatic impairment calculation

STRENGTH TESTING

- ▶ Single and Bilateral Jamar Grip Testing in Multiple Positions
- ▶ Single and Bilateral Pinch Grip Testing in Multiple Positions
- ▶ Static Torque Force Testing with Interchangeable Tools
- ▶ Wrist Flexion/Extension Strength
- ▶ Independent Finger Joint Strength Testing
- ▶ Bi-lateral Simultaneous Grip and Pinch Strength Testing
- ▶ Thoracic Outlet (Push Together/Pull Apart)



Upper Extremity System



FEATURES AND SPECIFICATIONS

GRIP TESTING

Historically, upper extremity strength testing has been limited to the published research protocols for grip and pinch dynamometry. In a disability or impairment evaluation context, the use of both the researched protocols and the exact design of the testing device are imperative to the legal acceptability of the findings and the opinions of the evaluator. However, the applicability of the grip tests to return to work issues has been limited in cases where the need to sustain the grip or use differing wrist positions is essential to the safety of the worker.

Hanoun Medical has met the challenge with the Multi-Angle Grip Positioner and the customization capabilities of the ODES-Upper Extremities Software Program. Now, if it is necessary to determine if the patient has the ability to sustain a 12 second grip with only 1-second interval rest periods, and the grip must be in the position with the wrist rotated at 90 degrees of pronation and the spread equivalent to vise grips (e.g., Jamar Position 4), the test can be conducted and recorded on a real-time basis. If it is necessary to determine the minimum grip strength within a set time period during the test, the software will capture and report the effort to the nearest one-tenth of a pound. If it is necessary to analyze the extent of the fatigue, the Real-Time Data Analyzer allows the evaluator to determine the extent of the fatigue between the point of maximum effort during a repetition and the completion of the test, as well as the extent of the fatigue from the first to the final repetition.

PINCH TESTING

As with grip strength testing, Hanoun Medical has recognized the need to make the pinch strength tests customizable to the issues of job and impairment specific testing. While the ODES-Upper Extremity Software Program uses some of the most widely referenced pinch strength protocols, the need to be able to customize pinch strength testing to exact parameters also exists. Hanoun Medical has met this challenge as well with the Multi-Angle Pinch Positioner and the customization capabilities of the ODES-Upper Extremities Software Program. Furthermore, correct positioning during pinch strength testing has been a major problem to the reliability and validity of the test data. The Multi-Angle Pinch Positioner enhances the ability of the evaluator to make certain the test subject is correctly positioned for each type of pinch test. The same data analysis and custom test design features for grip testing are also present for pinch strength testing.

STATIC TORQUE FORCE TESTING

Torque force testing has been one of the most difficult areas in the assessment of an individual's ability to perform a myriad of work related activities. While many have tried, the results have generally been limited to isokinetic forms of testing. Although isokinetic instruments have been beneficial in the rehabilitation of individuals, they have significant limitations in the area of evaluation. Furthermore, the types of torque force applications have been very difficult to replicate on a computer-interfaced basis.

That is until now. Hanoun Medical has developed the most comprehensive static torque force evaluation system. Now, an individual's strength in association with the ability to turn wheels, valves, twist screw drivers and push/pull on wrenches of varying sizes and design styles can be accurately measured. No longer will the test be a crude estimate as to whether an individual can push on a wrench of one set size. The strength in conjunction with the leverage of the tool will be measured, and a more appropriate estimate of the ergonomic ability to perform the task will be given.

As with all of the upper extremity strength tests, the ODES-Upper Extremity Software will allow for the customization of the test to the necessary parameters and allow for the most comprehensive analysis of the data.



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FEATURES AND SPECIFICATIONS

WRIST FLEXION/EXTENSION STRENGTH

Wrist flexion and extension strength testing has been another area that has been under-developed in the functional testing industry. The main problem has been the positioning of the wrist and the isolation of the wrist joint without the use of support devices that may show a false positive in strength measurements. Hanoun Medical has solved the problem and developed additional tools that allow the professional evaluator to measure strength in several different types of hand positions and angles. As with all of the upper extremity strength tests, the ODES-Upper Extremity Software will allow for the customization of the test to the necessary parameters and allow for the most comprehensive analysis of the data.

INDEPENDENT FINGER JOINT STRENGTH TESTING

The ability to measure independently, the strength of digits has been an inaccurate science in functional testing. Once again, hand positioning and the appropriate testing tool interface has plagued the professional evaluator. Hanoun Medical has developed the Hanoun Digit Strength System to enable the measurement of the forces that are sometimes forgotten, but lead to a high number of work-related injuries. Thumb push force with extension is just one example of the type of critical strength measurement that is possible with the Hanoun Digit Strength System. The ability to determine the relative strength of each digit and each phalange will enable the evaluator to determine potential impacts upon overall grip strength capabilities and the extent of improvement that will be capable with a treatment program. As with all of the upper extremity strength tests, the ODES-Upper Extremity Software will allow for the customization of the test to the necessary parameters and allow for the most comprehensive analysis of the data.

BI-LATERAL SIMULTANEOUS GRIP AND PINCH STRENGTH TESTING

Several practitioners have commenced the simultaneous testing of grip strength on a bi-lateral basis as a means of having a validity of effort criteria. Initial clinical trials have determined it is more difficult to control grip on one side versus the other with an invalid effort limited to one extremity. Furthermore, bi-lateral grip strength is an issue in the performance of real work activities. Hanoun Medical is in agreement with the concept and has developed the system to allow for the bi-lateral simultaneous testing of grip or pinch strengths. As with all of the upper extremity strength tests, the ODES-Upper Extremity Software will allow for the customization of the test to the necessary parameters and allow for the most comprehensive analysis of the data.

MANUAL DEXTERITY TESTING

KEYBOARD MANIPULATION (STANDARD AND NATURAL KEYBOARDS)

The quantification of keyboard manipulation capabilities in relation to specific impairment processes and ergonomic corrections has been very limited. Furthermore, the issue of fatigue in performance should not be affected by the cognitive capabilities of the test subject (i.e., spelling, punctuation and knowledge of the keyboard). Typing tests are representative of the skills of the test subject, and in some functional testing platforms the speed of the typist overlooks the subtle possibility of a decrement attributable to a disease or injury process. Decreasing the level of cognitive function required of the test subject increases the ability to measure the actual physical abilities of a broad-based range of test subjects without a bias created by the knowledge of the keyboard. And, with the move toward instituting ergonomically correct workstations with the Natural Keyboard, it is important to know whether or not the ergonomic adjustment is going to provide a true benefit. By eliminating the keyboard knowledge requirement and focusing upon the manipulation speed and the fatigue factors associated with keyboarding, the test has greater validity and reliability as a measurement of physical functioning capabilities. Hanoun Medical has met the challenge with its series of keyboarding manipulation tests that employ the use of the MTM standard for time-motion activities. MTM, as the internationally recognized time-motion standard, will also meet the legal challenges associated with the validity of the test measurement to the performance of work. Furthermore, the protocols allow for the analysis of work on an occasional, frequent and constant basis. The ability to create custom length tests also exists for job-specific testing purposes.



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FEATURES AND SPECIFICATIONS

REPETITIVE WRIST, ELBOW AND SHOULDER FLEXION AND EXTENSION

Measurement of repetitive wrist movement and the impact upon physical function has been strictly observational or a component of isokinetic systems. Unfortunately, relating the physical movement performance to work has been severely limited or non-existent with functional testing systems. Hanoun Medical recognized the problem and has developed the solution with the Hanoun Upper Extremity System.

Wrist, elbow and shoulder flexion and extension activities can vary as widely as the requirements of work. A painter may use broad strokes on a vertical basis, whereas an assembly line worker may use limited stroke movements on a horizontal basis.

The Hanoun Upper Extremity System allows the evaluator to use either a set number of standardized protocols or develop customized protocols to match the nature of the work to be performed. The system allows the evaluator to set the travel distance as well as the angle for the movement and have MTM scores calculated for the performance of the test subject. The fatigue associated with the repetition is also displayed in order to help determine if the test subject has the endurance for the activity and when the breakdown in capabilities has its onset. The real time display of data also helps to establish the reproducible evidence necessary to establish opinions necessary for rehabilitation or the extent of recovery or functional decrement associated with the impairment.

HANDLING, TOOL MANIPULATION AND FINE FINGER DEXTERITY

While many functional testing systems have attempted to quantify the handling and fine finger dexterity capabilities of the patient, the results have been poor. Some systems have used an overall MTM score or a criterion-referenced normal population. Unfortunately, the real value has been overlooked in the test: the ability to determine the extent of the fatigue in repetitive manipulation activities and when the fatigue had its onset. Some individuals may have great capabilities at the start of an activity that create a high time-motion equivalency, but then fatigue to the point manipulation at the end is nearly impossible. However, the overall score is based upon the total number of manipulations and it does not take into consideration the fatigue effect.

The Odes-Upper Extremity Software Program documents the precise time interval between repetitions and graphically display the fatigue curve. This is also beneficial in the case situation where fatigue is never generated and the individual's score is quite low, raising the possibility of greater performance capabilities or psychomotor limitations. MTM scores are given on an interval basis to also help determine the extent of employable production during the performance of the physical demand.

Hanoun Medical brings to the professional evaluator the ability to perform standardized protocols that include over 12 hours of tests. Varying levels of fine finger dexterity, tool manipulation and handling are included in the tests. All tests are graphically portrayed on a real time basis and include MTM measurements of performance.

It also determines if the rate of the fine motor manipulation is within industry standards, as well as the ability to duplicate the required tracing activity. The tests are a progressive series that also help to determine the extent of the manipulative capabilities and whether or not a valid effort is being given. The tests are computer-interfaced, recorded and scored to provide the reproducibility necessary for the most accurate assessment capabilities.

Upper Extremity System



FEATURES AND SPECIFICATIONS

GROSS MANIPULATION TESTING

The ability to create relevant work simulation activities that reflect the nature of work, yet provide viable medical information is sometimes overlooked by the functional testing systems. Recognizing the fact the test must truly represent the performance of physical demands without a cognitive overload, Hanoun Medical has developed a series of gross manipulation tests that employ the use of varying range of motion activities in the testing process.

On a computer-interfaced basis, the test subject is required to perform a simulated production line activity that requires the placement of objects into a box. Through the introduction of a progressive series of obstacles, the worker is required to perform the same transfer process, yet the range of motion and the nature of the manipulation will change. This will enable the evaluator to observe and report the onset of postural variances/splinting and the system will record the performance variations using MTM standards and real-time graphs.

The system is adjustable for all anthropometrical and job-specific considerations necessary to make certain the results are valid and reliable either on a disability evaluation or industrial consideration basis.

**BECOME A CENTER OF EXCELLENCE
BY USING THE MOST ADVANCED METHODS TO
EVALUATE UPPER EXTREMITY AND FINE MOTOR
SKILLS FUNCTIONAL ABILITIES. TECHNOLOGY AND
SCIENCE ARE COMBINED TO EFFECTIVELY
PROVIDE THE MOST COMPREHENSIVE
EVALUATION, AS WELL AS TO ALLOW FOR
REHABILITATION OF THE UPPER EXTREMITIES
AND OTHER CONDITIONS AFFECTING FINE MOTOR
SKILLS.**

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