Return to Work Evaluation Report

Testing Performed on BTE Technologies Evaluation System

Clinic Name:	**BTE Technologies**
Address:	**7455 L New Ridge Road**
	HANOVER, MD, 21076
	USA

Mr. Bill Smith

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BTE Technologies
7455 L New Ridge Road
HANOVER,MD 21076

Return to Work Evaluation

Client Information

Name : Mr. Smith, Bill

2345 West Beacon Dr.
BRADYVILLE,TN USA

Phone:

Date of Birth : 6/11/1960 **Age:** 48

Gender: M **Hand Dominance:** L

Height: 72.0 in. **Weight:** 180.0 lbs.

Occupation: Laborer

Employer : ACME,
40 Road Runner Way,
WILLMAR, MN, 56201,
USA

Contact: Wiley Coyote
123-234-5678

Case Information

Evaluation Date: 3/11/2009 9:24:00 AM

Physician : Richard Cast

Case Manager: John Case
555-985-6321

Referral Source: Case Manager

Mr. Case, John
3009 Payment Rd
WASHINGTON, DC, 20035,
USA.

Injury Information/Diagnoses

Diagnosis	ICD-9 Code	Location	Side	Injury Date
Spinal stenosis of lumbar region	724.02	Lumbar Spine	RIGHT	9/16/2008

Primary Evaluator : Timothy Seals,MS,OTR/L _____

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Report Summary

Referral Information

Thank you for referring Mr. Bill Smith for a Return to Work Evaluation. Testing was completed on 3/11/2009 9:24:00 AM at BTE Technologies of HANOVER, MD. The purpose for the Return to Work Evaluation was to determine his safe capabilities related to work activity. The assessment included a review of medical history, subjective reports and objective physical testing. All testing was performed voluntarily and the quality of effort was thoroughly evaluated.

Mr. Bill Smith is a 48 year old, left handed male referred for a Return to Work Evaluation. He is here for evaluation only and no therapist-patient relationship has been established. Mr. Smith arrived on time for the assessment on 3/11/2009 9:24:00 AM and was in the clinic for 4 hours and 20 minutes.

Mr. Smith sustained a work related injury on 9/16/2008. He reported that the injury occurred while pushing a wheelbarrow across grass. He felt a sharp, shooting pain in the right low back region and upper thigh. Medical care was received in a physician's office. A diagnosis of spinal stenosis of lumbar region was received. Treatment for this injury has been discontinued. Interventions included 12 physical therapy visits. Symptoms persist. They include occasional radiating ache in right low back and upper thigh. Mr. Smith stated that these symptoms do not prevent participation in work activities, leisure activities and activities of daily living.

Apart from the presenting condition, Mr. Smith denied any relevant medical history. He reported feeling well, without symptoms or dysfunction prior to this incident.

Mr. Smith has been employed by ACME Landscaping since May 2, 2001. At time of injury, he was working full time, regular duties in Maintenance. According to the description given by the client, this job involves walking, pushing wheelbarrows, digging, lifting, carrying, reaching and using various gardening tools. The heaviest objects he has to lift and/or carry are bags of mulch and cement blocks weighing 50 pounds.

A functional job analysis from the employer is available. Please refer to Job Demands and Outcomes section.

Referral Questions

To assist your interpretation of findings, we have provided a response to each referral question below.
The referral question(s)/issue(s) outlined for this evaluator in Mr. Smith's case are as follows:
1. What are the maximum functional capacities of Mr. Smith? He meets 8/10 essential job demands.

2. Were the results of this evaluation consistent and reliable indicating maximum safe effort? Mr. Smith performed consistently throughout the evaluation. Please refer to Consistency Results and Effort Analysis for details.

3. Is Mr. Smith capable of returning to his previous position with ACME, as outlined in the essential functions of the physical demands analysis provided? Two of ten essential job demands were not met.

4. Please specify the areas of the essential functions he did not meet. Mr. Smith was unable to lift 50 lbs. to shoulder height (demonstrated ability was 30 lbs.) and exert 50 lbs. of push force to move wheelbarrow (demonstrated ability was 37.5 lbs.).

Conclusions

The performance levels documented in this report should be considered as the client's safe maximal abilities.
Based on the physical demands provided with this referral for work as a Laborer for ACME, Mr. Smith's demonstrated tolerances are less than the required demands. Client did not meet 2/10 job demands. He demonstrated ability to lift only 30 lbs.to shoulder height and push 37.5 lbs during wheel barrow task simulation. With accommodation of the floor to shoulder 30 lb. lift requirement (changing to waist to shoulder height), client would be capable of performing that lift. Additionally, placing lighter load in the wheel barrow would allow client to accomplish that task of pushing the wheel barrow.

It is anticipated that the results of this assessment will be used in further case management.

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Consistency Results

During the functional testing, numerous factors, including subjective reports, clinical observations and objective performance were evaluated in order to comment on Mr. Smith's quality of effort. While no single factor is an absolute means to determine whether or not performance is consistent, reliable and valid, the overall performance on all effort assessments and coefficient of variation testing does provide information about the client's level of participation. Based on this, it is the evaluator's opinion that the results of this FCE do represent the client's current safe maximal performance level.

Mr. Smith demonstrated expected results in the following areas:
1. The maximum voluntary effort (MVE) grip test, when graphed resembled a bell shaped curve.
2. Rapid exchange grip demonstrated a "negative" result which is an indicator of good effort.
3. Cross-reference validity between the MVE, REG and standard grip test was within the expected 20%.
4. There were consistent physiological changes normally associated with maximum effort observed during functional testing.
5. Subjective reports were congruent with objective findings and clinical observations.
6. There were coefficient of variations less than 15% on 14 out of 14 tests equaling 100%.

Findings and Results

Mr. Smith demonstrated the ability to sit for 65 minutes, stand for 80 minutes, and intermittently stand, sit and walk for 120 minutes. He reported the ability to sit for 60 of minutes, stand for 60 minutes, and walk for 60 minutes.

Additionally, Mr. Smith demonstrated the ability to lift 50 pounds from waist to shoulder, 50 pounds from floor to waist, and 30 pounds from floor to shoulder on an occasional basis. The biomechanical and physiological changes normally observed when an individual is providing a maximal acceptable effort during these activities were demonstrated by the client.

Other functional capacities measured include the ability to carry 50 pounds over a distance of 40 feet and to static push 127 pounds and static pull 128 pounds of force. Again, he demonstrated the biomechanical and physiological changes normally observed when an individual is providing a maximal acceptable effort.

Job Demands & Outcomes

Mr. Bill Smith's ability to perform his job functions were assessed based on the information supplied by Job description from employer. The corresponding demands or similar tasks were tested to determine suitability for return to work for each individual demand and/or task.

Job Demand Levels and Ability Demonstrated	
OCC = OCCASIONAL	0-33%
FREQ = FREQUENT	34-66%
CONST = CONSTANT	67-100%
NF = Not Frequency Based	

Job Match
YES --> Capable of performing task at current job demand
NO --> Not capable of performing task at current job demand
MOD --> Capable of performing task at modified job demand

Job :

		Job Demand Level				Ability Demonstrated				Job Match			
Physical Demand	Job Task	OCC	FREQ	CONST	NF	OCC	FREQ	CONST	NF	YES	NO	MOD	Comments & Observations
Walking	intermittent throughout the day (min)		X				X			☑	☐	☐	See Note 1 below
Carrying	multch bags (lbs)	50				50				☑	☐	☐	See Note 2 below
Lifting	cement blocks to shoulder height (lbs)	50				30				☐	☑	☐	See Note 3 below
Hand Grip Strength	trimming shears ()	X				X				☑	☐	☐	See Note 4 below

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		Job Demand Level				Ability Demonstrated				Job Match			
Physical Demand	Job Task	OCC	FREQ	CONST	NF	OCC	FREQ	CONST	NF	YES	NO	MOD	Comments & Observations
Reaching	Prunning branches ()	X				X				☑	☐	☐	See Note 5 below
Pushing	utility cart (lbs)	30				127				☑	☐	☐	See Note 6 below
Pulling	utility cart (lbs)	30				128				☑	☐	☐	See Note 7 below
Pulling	wheelbarrow (lbs)	40				254				☑	☐	☐	See Note 8 below
Pushing	wheelbarrow (lbs)	50				37.5				☐	☑	☐	See Note 9 below
Pushing	Shovel push with foot (lbs)	X				114				☑	☐	☐	See Note 10 below

Notes

1.Client met or exceeded job requirement.
2.Client met or exceeded job requirement.
3.An accommodation could be made by placing the 50 lbs. at waist height instead of at floor level. Doing so improves the ergonomic position of the lift.
4.Client met or exceeded job requirement.
5.Client met or exceeded job requirement.
6.Client met or exceeded job requirement.
7.Client met or exceeded job requirement.
8.Client met or exceeded job requirement.
9.Increase in low back pain reported
10.Client met or exceeded job requirement.

Effort Analysis

——MET EXPECTED RESULT —— DID NOT MEET EXPECTED RESULT

Test / Test Template Name	Expected Result	Result
Strength - Grip - Maximum Voluntary Effort	Hand Grip - Three Trials in Position 1 Absolute Peak Force Is Less Than (<) Hand Grip - Three Trials in Position 2 Absolute Peak Force	
Hand Grip - Standard	Left COV Is Less Than (<) 15	
Hand Grip - Standard	Right COV Is Less Than (<) 15	
Hand Grip - Three Trials in Position 1	Left COV Is Less Than (<) 15	
Hand Grip - Three Trials in Position 1	Right COV Is Less Than (<) 15	
Hand Grip - Three Trials in Position 2	Left COV Is Less Than (<) 15	
Hand Grip - Three Trials in Position 2	Right COV Is Less Than (<) 15	
Hand Grip - Three Trials in Position 3	Left COV Is Less Than (<) 15	

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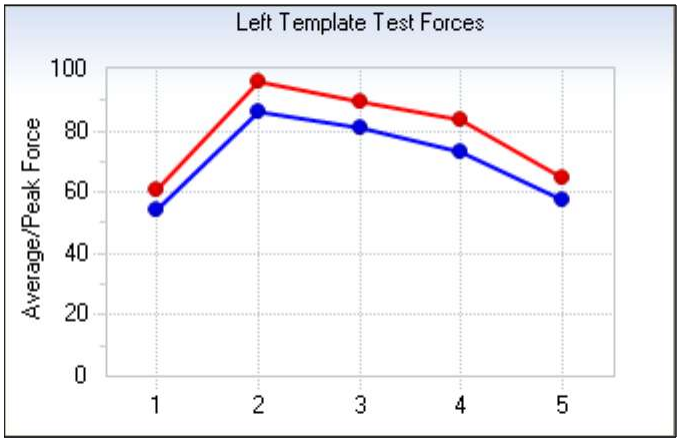
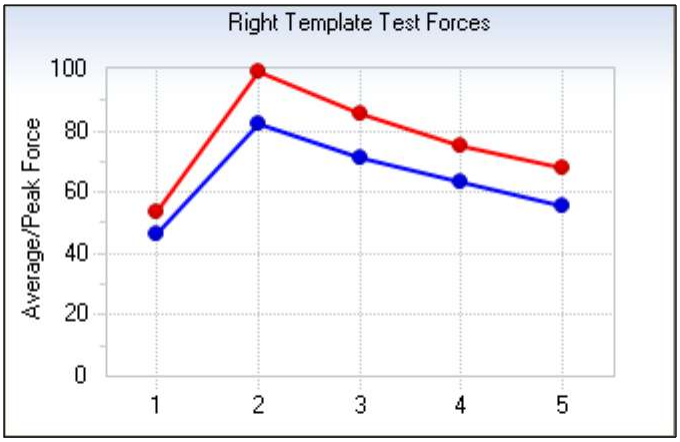
Test / Test Template Name	Expected Result	Result
Hand Grip - Three Trials in Position 3	Right COV Is Less Than (<) 15	✓
Hand Grip - Three Trials in Position 4	Left COV Is Less Than (<) 15	✓
Hand Grip - Three Trials in Position 4	Right COV Is Less Than (<) 15	✓
Hand Grip - Three Trials in Position 5	Left COV Is Less Than (<) 15	✓
Hand Grip - Three Trials in Position 5	Right COV Is Less Than (<) 15	✓
UTM Cart Pull Test	COV Is Less Than (<) 15	✓
UTM Cart Push Test	COV Is Less Than (<) 15	✓

Of the 15 expected results from the testing, Mr. Smith met 15 or 100.0%.

Strength - Grip - Maximum Voluntary Effort





Strength - Grip - Maximum Voluntary Effort

No.	Test Name	Left Avg. Force	Left Peak Force	Left COV	Right Avg. Force	Right Peak Force	Right COV
1	Hand Grip - Three Trials in Position 1	54.54	60.75	5.96	46.5	53.52	3.81
2	Hand Grip - Three Trials in Position 2	86.56	96.28	4.12	82.37	99.19	3.5
3	Hand Grip - Three Trials in Position 3	80.92	89.41	5.75	71.19	85.79	5.8
4	Hand Grip - Three Trials in Position 4	73.2	83.85	6.27	63.36	74.95	4.34
5	Hand Grip - Three Trials in Position 5	57.44	64.98	4.99	55.72	67.98	3.66

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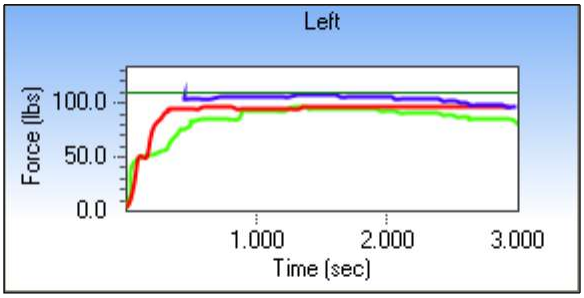
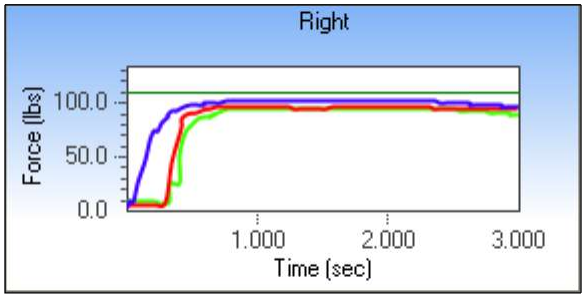
Hand Grip Strength

The BTE hand dynamometer was used to quantify grip strength and determine whether Mr. Bill Smith exerted consistent effort during grip strength testing. Mr. Bill Smith was tested using the standard, maximum voluntary effort and rapid exchange grip protocols. He is left handed. Normative data are based on the assumption that right and left hand dominant subjects, analyzed separately show little functional difference beween their mean scores.

Standard Hand Grip





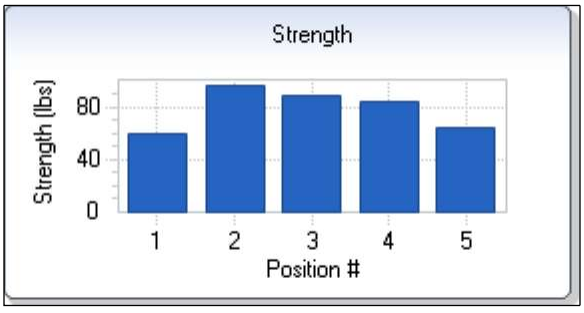
Rep #	Avg. Force (lbs)	Peak Force (lbs)	Time to Peak (secs)
1	103.9	107.4	1.4
2	90.7	97.1	1.6
3	82.9	95.8	1.3
Average	92.5	100.1	
Maximum	103.9	107.4	
COV	N/A	5.2%	

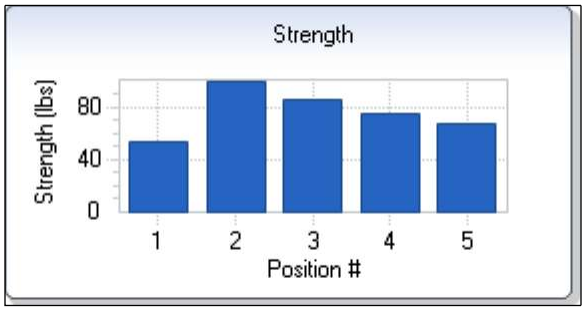
Rep #	Avg. Force (lbs)	Peak Force (lbs)	Time to Peak (secs)
1	94.8	102.6	1.2
2	84.5	96.5	0.9
3	81.9	95.2	1.0
Average	87.1	98.1	
Maximum	94.8	102.6	
COV	N/A	3.3%	

Diff L vs R (L>R) 2.0%

Mr. Bill Smith's grip strength was compared to age and gender matched normative data. The published normal grip strength for the left hand is from 100.8 lbs to 100.8 lbs. Mr. Bill Smith displayed an average force of 100.1 lbs. which is considered below normal when compared to the normal population of the referenced study. The published normal grip strength range for the right hand is from 109.9 lbs to 109.9 lbs. Mr. Bill Smith displayed an average force of 98.1 lbs. which is considered below normal when compared to the normal population of the referenced study. The coefficient of variation was 5.2% for the left hand and 3.3% for the right hand. Values grater than 15% may be an indicator of inconsistent effort.

Maximum Voluntary Effort (MVE)





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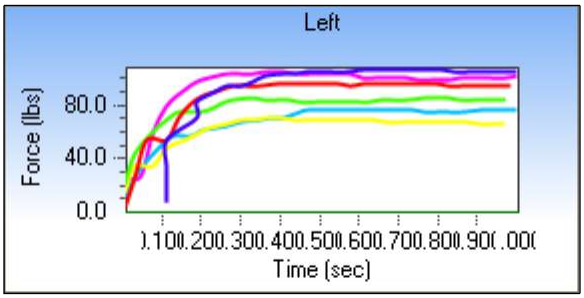
Position	Strength	COV
1	60.8	6.0
2	96.3	4.1
3	89.4	5.8
4	83.9	6.3
5	65.0	5.0
St. Dev.	15.5 lbs	

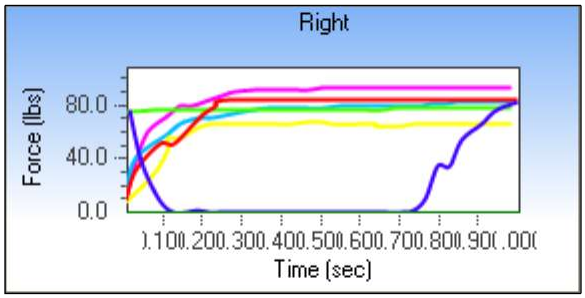
Position	Strength	COV
1	53.5	3.8
2	99.2	3.5
3	85.8	5.8
4	75.0	4.3
5	68.0	3.7
St. Dev.	17.4 lbs	

Using the Maximum Volunatry Effort (MVE) protocol over a range of five positions on the hand dynamometer, it is expected that the strength graphs obtained result in a bell shaped curve even in a disabled population or if the client's hand is injured with at least 6 of the 10 coefficients of variation within the acceptable 15% or less limit.

The graphs obtained for Mr. Bill Smith did demonstrate bell shaped curves which may be an indicator of maximum effort. The coefficients of variation of the underlying data may be an indicator of consistent effort with all 10 of the coefficients of variation within the 15% acceptable limit.

Rapid Exchange Grip (REG)





Rep #	Avg. Force (lbs)	Peak Force (lbs)	Time to Peak (secs)
1	91.7	106.3	0.6
2	84.9	95.8	0.4
3	77.9	84.6	0.3
4	62.1	70.4	0.3
5	68.0	77.0	1.0
6	93.9	104.5	0.4
Averages:	79.8	89.8	
Maximum	93.9	106.3	

Rep #	Avg. Force (lbs)	Peak Force (lbs)	Time to Peak (secs)
1	20.9	82.5	1.0
2	76.2	84.1	0.4
3	76.6	77.8	0.7
4	61.1	66.7	0.5
5	73.0	82.3	1.0
6	84.8	93.4	0.8
Averages:	65.4	81.1	
Maximum	84.8	93.4	

Diff L vs. R (L>R) 10.6%

The average peak force value recorded during the maximum voluntary effort protocol was 99.2 lbs performed at position 2. The Rapid Exchange Grip (REG) protocol was therefore administered at this position. A negative rapid exchange grip (REG) occurs when the average of the values recorded during the rapid exchange grip protocol is less than the average of the values recorded during the maximum voluntary effort protocol in the same position for the same hand. Conversely, a positive REG occurs when the average of the values recorded during the REG protocol exceeds the average of the values recorded during the MVE protocol in the same position for the same hand. A negative REG allows the evaluator to have more confidence that the client is performing maximally. A positive REG may be an indicator of submaximal effort. Mr. Bill Smith produced an average peak value of 89.8 lbs. for the left hand and 81.1 lbs for the right hand during the rapid exchange protocol. He produced an average value of 96.3 lbs for the left hand and 99.2 lbs for the right hand during the MVE protocol. A NEGATIVE was determined which may be an

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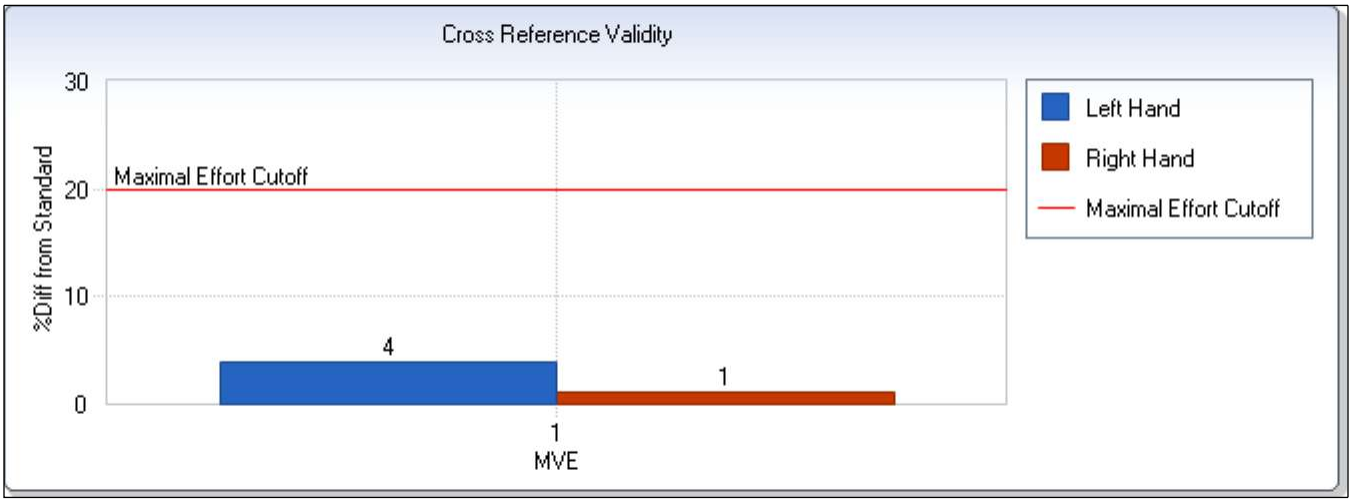
indicator of maximal effort.

Cross-Reference Validity Check



Tests repeated with full volitional effort should not have more than a 20% variation in force readings. The average peak force values obtained from testing in position 2 during the standard grip strength test were 100.1 lbs. for his left hand and 98.1 lbs. for his right hand. During the MVE protocol the average peak force in position 2 was 96.3 lbs. for his left hand and 99.2 lbs. for his right hand. These values should be within 20% of the standard handgrip results. Mr. Bill Smith's results for the left hand are within 3.8% and his right hand are within 1.2%. These results may be an indicator of maximal effort

Comment

Client demonstrated expected result of bell shape curve.

Comprehensive Report of Evaluation

Behavorial Observations

Mr. Smith was pleasant and cooperative in nature. His affect appeared normal and he was able to follow instructions and maintain concentration adequately throughout the evaluation. His speech was normal and he did not have difficulty in communicating effectively.

Mr. Smith appeared comfortable during the intake process, sitting continuously for 50 minutes. He was not observed guarding, bracing, grimacing, static weight shifting, moaning/groaning, rubbing and/or massaging. During the physical examination, Mr. Smith appeared comfortable. He was not noted to guard, brace, grimace, static weight shift, moan/groan, rub and/or massage. A pain level of 3 out of 10 was reported by the client.

Physical Examination

CARDIOVASCULAR/PULMONARY
CIRCULATION: Unremarkable.

INTEGUMENTARY
SOFT TISSUE OBSERVATION: Clinical examination reveals no soft tissue changes of gluteal and thigh musculature.

MUSCULOSKELETAL
EDEMA: Clinical examination reveals no edema.

POSTURE: In the standing position, Mr. Smith exhibited normal head position, normal cervical lordosis and normal upper thoracic kyphosis. He presented without protracted shoulders and normal position of scapulae, and there was no scoliosis present. Lumbar lordosis was well maintained. The pelvis appeared symmetric. Knee joints were not

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extended beyond neutral and the slight valgus position was within normal limits.

RANGE OF MOTION (ROM):
Objective ROM measures are included in detailed report.

STRENGTH: Mr. Bill Smith's strength was tested manually. Strength of both lower extremities was within normal limits (5/5).

NEUROMUSCULAR
SENSATION: Deep tendon reflexes were within normal limits of both lower extremities.

GAIT: Bill Smith exhibited a normal gait pattern. At increased speeds or with fatigue, gait remains normal.

ADDITIONAL TESTS:
Other Tests: Waddell's Non-organic Signs performed; findings insignificant.

PAIN PROFILE:
Pre-test pain level was reported to 3 on a scale of 0 to 10, with 0 being no pain and 10 being severe unrelenting pain that requires immediate medical attention. Post-test pain level was reported to be 6 out of 10 on the same scale. Best/lowest pain level over the past 30 days was reported to be 1 out of 10; worst/highest pain over the past 30 days was 7 out of 10.

Test Details

Range of Motion Test - Lumbar Spine

Evaluation Date and Time : 3/11/2009 9:54:09 AM Instrument: Inclinometer

	Left Lateral Flexion	Right Lateral Flexion	Flexion	Extension
Normals:	25	25	60	25
Trial 1:	14	15	21	13
Trial 2:	13	17	21	16
Trial 3:	14	16	22	13
Average	13	16	21	14
AMA Valid	Yes	Yes	Yes	Yes
Maximum	14	17	22	16
% of Normal	52	64	35	56

Evaluator Comments

Motion(s) during this test were performed in a fluid manner.
Motion(s) during this test were performed in a fluid manner.

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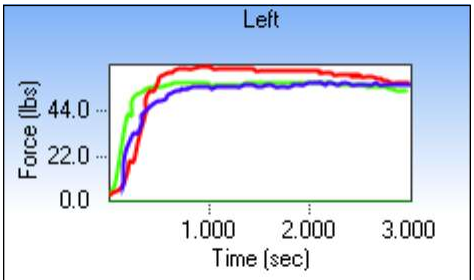
Strength Test - Hand Grip - Three Trials in Position 1

Evaluation Date and Time : 3/11/2009 10:10 AM Instrument: Hand Grip

Description

Mr. Smith reached an average peak force of 60.8 pounds for the left Hand Grip - Three Trials in Position 1 and 53.5 pounds for the right Hand Grip - Three Trials in Position 1. This yields 11.9% (R<L) difference between the sides. The coefficient of variation (COV) was 6.0% for the left side and 3.8% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Left

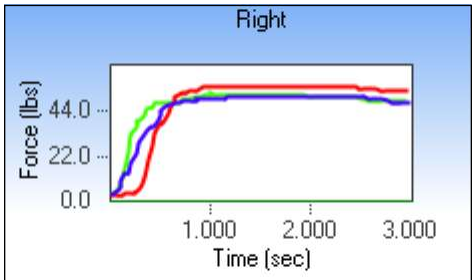


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	57.9	2.0
2	65.9	0.9
3	58.5	1.5

Average Peak (lbs): 60.8

COV (%): 6.0

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	51.6	1.6
2	56.3	1.0
3	52.6	1.0

Average Peak (lbs): 53.5

COV (%): 3.8

Comparison (R-L) (%)	-11.9

Comment

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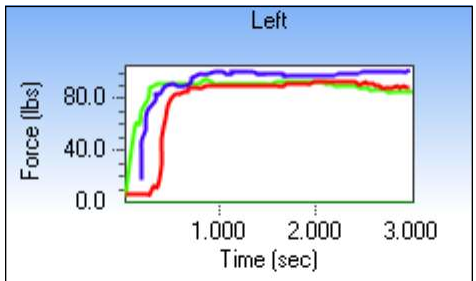
Strength Test - Hand Grip - Three Trials in Position 2

Evaluation Date and Time : 3/11/2009 10:11 AM Instrument: Hand Grip

Description

Mr. Smith reached an average peak force of 96.3 pounds for the left Hand Grip - Three Trials in Position 2 and 99.2 pounds for the right Hand Grip - Three Trials in Position 2. This yields 3.0% (R>L) difference between the sides. The coefficient of variation (COV) was 4.1% for the left side and 3.5% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Left

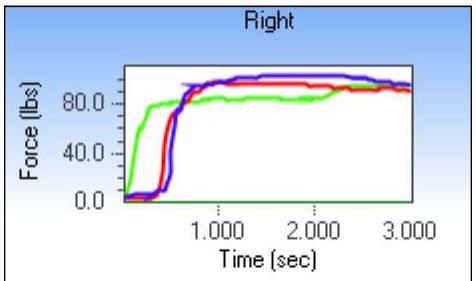


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	101.8	3.0
2	92.8	2.1
3	94.2	0.8

Average Peak (lbs): 96.3

COV (%): 4.1

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	104.0	1.7
2	97.9	0.9
3	95.8	2.5

Average Peak (lbs): 99.2

COV (%): 3.5

Comparison (R-L) (%)	3.0

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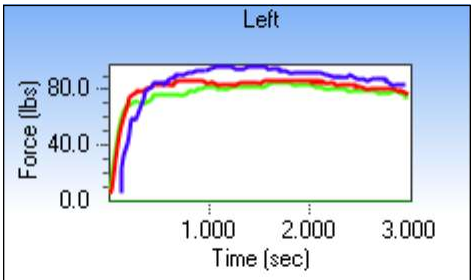
Strength Test - Hand Grip - Three Trials in Position 3

Evaluation Date and Time : 3/11/2009 10:12 AM Instrument: Hand Grip

Description

Mr. Smith reached an average peak force of 89.4 pounds for the left Hand Grip - Three Trials in Position 3 and 85.8 pounds for the right Hand Grip - Three Trials in Position 3. This yields 4.0% (R<L) difference between the sides. The coefficient of variation (COV) was 5.8% for the left side and 5.8% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Left

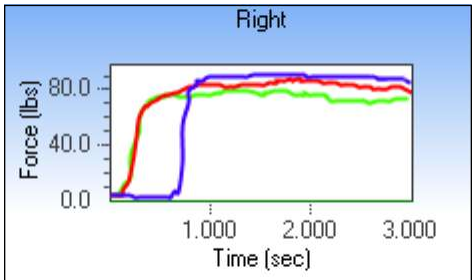


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	96.5	1.4
2	87.0	1.7
3	84.6	1.7

Average Peak (lbs): 89.4

COV (%): 5.8

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	91.0	1.6
2	87.3	1.8
3	79.1	1.2

Average Peak (lbs): 85.8

COV (%): 5.8

Comparison (R-L) (%)	-4.0

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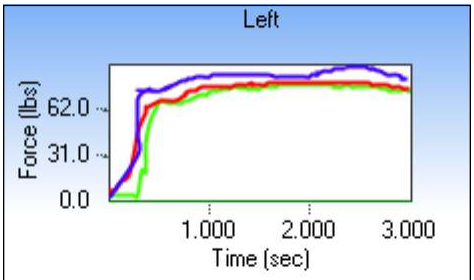
Strength Test - Hand Grip - Three Trials in Position 4

Evaluation Date and Time : 3/11/2009 10:14 AM Instrument: Hand Grip

Description

Mr. Smith reached an average peak force of 83.9 pounds for the left Hand Grip - Three Trials in Position 4 and 74.9 pounds for the right Hand Grip - Three Trials in Position 4. This yields 10.6% (R<L) difference between the sides. The coefficient of variation (COV) was 6.3% for the left side and 4.3% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Left

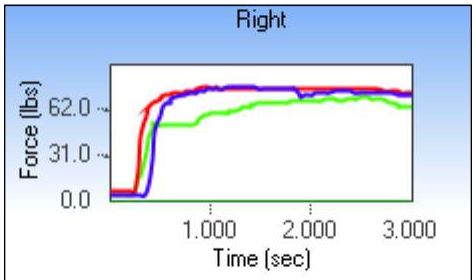


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	91.3	2.5
2	80.7	1.7
3	79.6	1.8

Average Peak (lbs): 83.9

COV (%): 6.3

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	77.5	1.3
2	77.0	0.9
3	70.4	2.5

Average Peak (lbs): 74.9

COV (%): 4.3

Comparison (R-L) (%)	-10.6

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Strength Test - Hand Grip - Three Trials in Position 5

Evaluation Date and Time : 3/11/2009 10:25 AM Instrument: Hand Grip

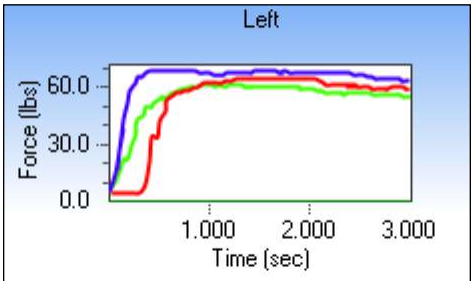
Description

Mr. Smith reached an average peak force of 65.0 pounds for the left Hand Grip - Three Trials in Position 5 and 68.0 pounds for the right Hand Grip - Three Trials in Position 5. This yields 4.6% (R>L) difference between the sides. The coefficient of variation (COV) was 5.0% for the left side and 3.7% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Using the Maximum Voluntary Effort (MVE) protocol over a range of five positions on the hand dynamometer, it is expected that the strength graphs obtained results in a bell-shaped curve even in a disabled population or if the client's hand is injured. Additionally, at least 6 of the 10 coefficients of variation are expected to be within the acceptable 15% or less limit.

The graph obtained for Mr. Smith did demonstrate a bell-shaped curve which may be an indicator of maximal effort and the coefficients of variation of the underlying data may be an indicator of consistent effort with coefficients of variation within the 15% acceptable limit.

Left

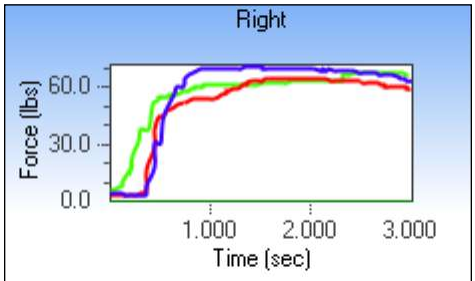


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	69.0	0.6
2	64.8	1.5
3	61.1	0.9

Average Peak (lbs): 65.0

COV (%): 5.0

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	70.9	1.5
2	64.8	1.6
3	68.2	2.5

Average Peak (lbs): 68.0

COV (%): 3.7

Comparison (R-L) (%) 4.6

Comment

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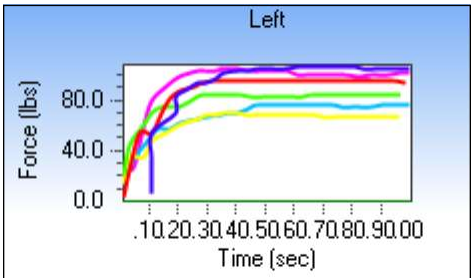
Strength Test - Rapid Exchange Grip

Evaluation Date and Time : 3/11/2009 10:31 AM Instrument: Hand Grip

Description

Mr. Smith reached an average peak force of 89.8 pounds for the left Rapid Exchange Grip and 81.1 pounds for the right Rapid Exchange Grip. This yields 9.6% (R<L) difference between the sides. The coefficient of variation (COV) was 15.0% for the left side and 9.8% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Left

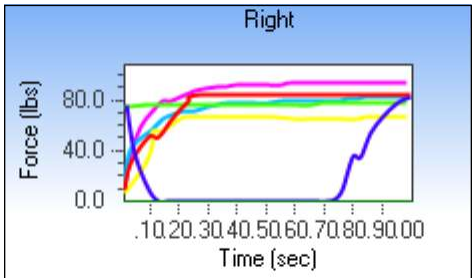


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	106.3	0.6
2	95.8	0.4
3	84.6	0.3
4	70.4	0.3
5	77.0	1.0
6	104.5	0.4

Average Peak (lbs): 89.8

COV (%): 15.0

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	82.5	1.0
2	84.1	0.4
3	77.8	0.7
4	66.7	0.5
5	82.3	1.0
6	93.4	0.8

Average Peak (lbs): 81.1

COV (%): 9.8

Comparison (R-L) (%) -9.6

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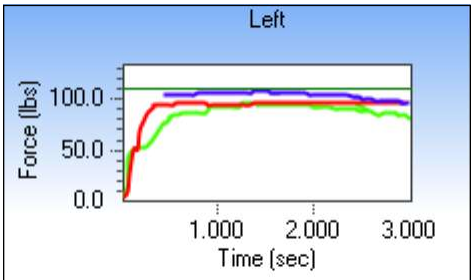
Strength Test - Hand Grip - Standard

Evaluation Date and Time : 3/11/2009 10:32 AM Instrument: Hand Grip

Description

Mr. Smith reached an average peak force of 100.1 pounds for the left Hand Grip - Standard and 98.1 pounds for the right Hand Grip - Standard. This yields 1.9% (R<L) difference between the sides. The coefficient of variation (COV) was 5.2% for the left side and 3.3% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Left

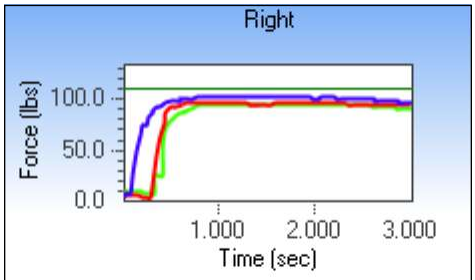


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	107.4	1.4
2	97.1	1.6
3	95.8	1.3

Average Peak (lbs): 100.1

COV (%): 5.2

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	102.6	1.2
2	96.5	0.9
3	95.2	1.0

Average Peak (lbs): 98.1

COV (%): 3.3

Comparison (R-L) (%)	-1.9

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Strength Test - UTM Cart Push Test

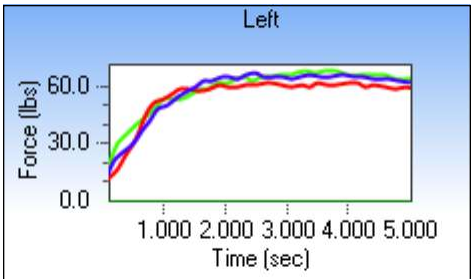
Evaluation Date and Time : 3/11/2009 10:40 AM Instrument: UTM

Description

Mr. Smith reached a combined peak force of 127.1 pounds during the UTM Cart Push Test. The combined peak force is calculated by storing the combined maximum of the left and right force at any instant in time during each trial then averaging over all trials. The average of the peak forces for the individual sides are 65.5 pounds for the left side and 61.7 pounds for the right side. This yields a 5.8% (R<L) difference between the sides. The coefficient of variation (COV) was 4.0% for the left side and 3.1% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Lower Arm Height: 49 inches

Left

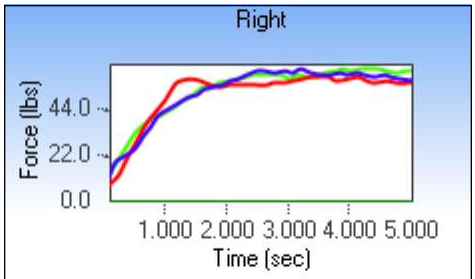


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	66.8	2.5
2	61.9	2.6
3	67.8	3.3

Average Peak (lbs): 65.5

COV (%): 4.0

Right

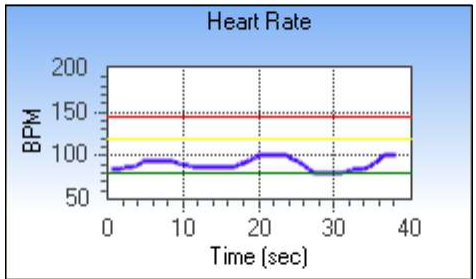


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	63.4	3.2
2	59.0	3.5
3	62.6	3.9

Average Peak (lbs): 61.7

COV (%): 3.1

Heart Rate



Initial HR (BPM)	84
Max HR (BPM)	100
Final HR (BPM)	100

Combined Average (lbs)	127.1
Comparison (R-L) (%)	-5.8

Comment

Mr. Smith complained of slight increase in pain during testing.
Facial grimacing was not observed during testing.
Observable weight shifting was not noted during testing.
Lower extremity stance was not altered during testing.
Coefficients of variation (COV) under 15% and strength graphs indicate an increase to safe maximal force over the timed duration.

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Strength Test - UTM Cart Pull Test

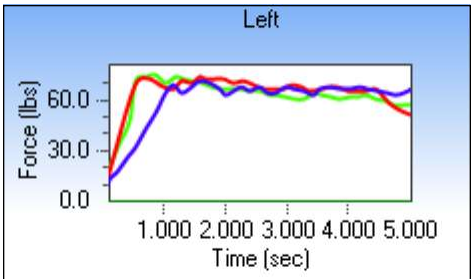
Evaluation Date and Time : 3/11/2009 10:43 AM Instrument: UTM

Description

Mr. Smith reached a combined peak force of 128.4 pounds during the UTM Cart Pull Test. The combined peak force is calculated by storing the combined maximum of the left and right force at any instant in time during each trial then averaging over all trials. The average of the peak forces for the individual sides are 73.6 pounds for the left side and 54.7 pounds for the right side. This yields a 25.7% (R<L) difference between the sides. The coefficient of variation (COV) was 2.0% for the left side and 5.0% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Lower Arm Height: 49 inches

Left

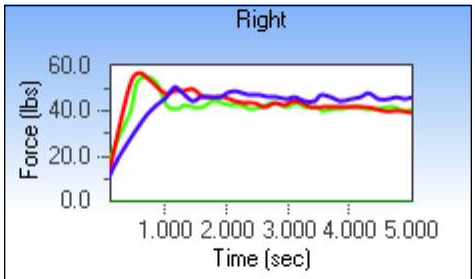


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	71.9	1.6
2	73.5	1.6
3	75.5	0.9

Average Peak (lbs): 73.6

COV (%): 2.0

Right

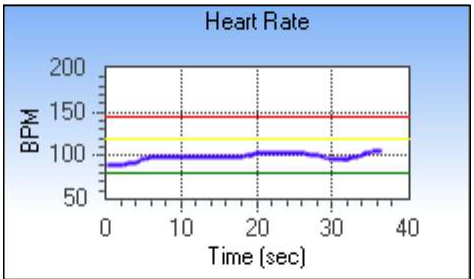


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	51.0	1.1
2	57.5	0.6
3	55.7	0.7

Average Peak (lbs): 54.7

COV (%): 5.0

Heart Rate



Initial HR (BPM)	89
Max HR (BPM)	105
Final HR (BPM)	105
Combined Average (lbs)	128.4
Comparison (R-L) (%)	-25.7

Comment

Mr. Smith reported no change in pain during testing.
Observable weight shifting was not noted during testing.
Lower extremity stance was not altered during testing.
Coefficients of variation (COV) under 15% and strength graphs indicate an increase to safe maximal force over the timed duration.

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Cardiovascular Test - Single Stage Treadmill

Evaluation Date and Time : 3/11/2009 10:58 AM Instrument: Treadmill

Description

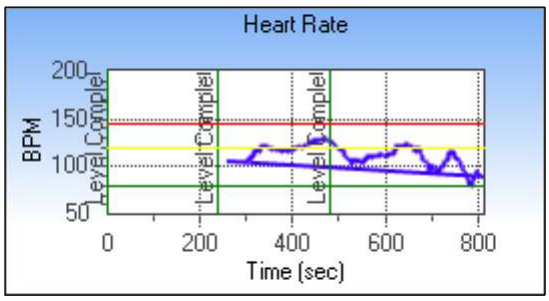
The Single Stage Treadmill test is designed to estimate maximal oxygen uptake (VO2max in ml/(kg*min.) based on a single submaximal stage of treadmill walking. The VO2max and resulting energy level of METS are then compared to a work demand level to provide an indication of the cardiovascular ability of the client to perform such work.

Detailed results of Single Stage Treadmill test:

VO2max: 28 ml/(kg*min.)
MET Level: 1.3 METS
Functional Aerobic Capacity: Light

Time (Secs)	Distance (Miles)	Power (Watts)	Speed (MPH)	% Grade	METS	Heart Rate (BPM)	Blood Pressure
240	0	0	0	0	0.0	111	0/0
240	0	0	0	5	1.3	125	0/0
0	0	0	0	0	0.0	0	0/0

Heart Rate



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Work Simulation Test - Waist to Shoulder Occasional

Evaluation Date and Time : 3/11/2009 11:22 AM Instrument: Dynamic Lift

Description

The Waist to Shoulder Occasional was conducted in order to determine Mr. Smith's ability to complete the task. A progressive loading method was used to determine Mr. Smith's capacity for the performance of dynamic lifting activities on a safe and dependable basis. Lifting was conducted between an initial height of Waist Height and a final height of Shoulder Height with a total of 5 lifts completed. The increase in the amount of weight lifted was in 10 pounds increments.

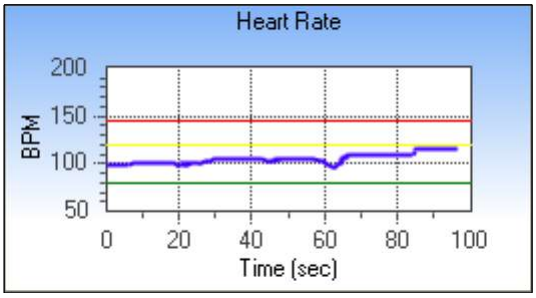
In order to ensure safety in administration of the testing protocol, Mr. Smith's heart rate was monitored on a real-time basis. A cut-off of 146 beats per minute based upon age predicted maximum was used in order to ensure the safe administration of the dynamic lifting protocol.

During the course of testing, Mr. Smith's heart rate started at 98 beats per minute and ended at a value of 116 beats per minute at a final weight of 50 pounds. This represents a change of 18.37% increase during the lifting protocol. Mr. Smith's heart rate recovered to 0 beats per minute. (If this value is 0 bpm, heart rate recovery was not measured.)

Mr. Smith demonstrated the ability to lift 50 pounds on a safe and dependable basis.

Test Time (sec):	86		Lift Item:	BTE Crate	
Start Position:	Lower Shelf	Waist Height		Lift to Capacity:	50
Lift Weight To:	Upper Shelf	Shoulder Height			

Heart Rate



Increment List

Weight (lbs)	# Lifts	Time (mm:ss)	Max HR (BPM)	% APMHR	RPE
10	1	6	99	58	0
20	1	15	102	60	1
30	1	15	105	61	2
40	1	17	110	64	3
50	1	17	116	68	4

Comment

Client demonstrated proper body mechanics during this activity. Appropriate physiologic response noted. Slight increase in low back pain reported post activity.

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Work Simulation Test - Floor to Waist Occasional

Evaluation Date and Time : 3/11/2009 11:40 AM Instrument: Dynamic Lift

Description

The Floor to Waist Occasional was conducted in order to determine Mr. Smith's ability to complete the task. A progressive loading method was used to determine Mr. Smith's capacity for the performance of dynamic lifting activities on a safe and dependable basis. Lifting was conducted between an initial height of the floor and a final height of Waist Height with a total of 5 lifts completed. The increase in the amount of weight lifted was in 10 pounds increments.

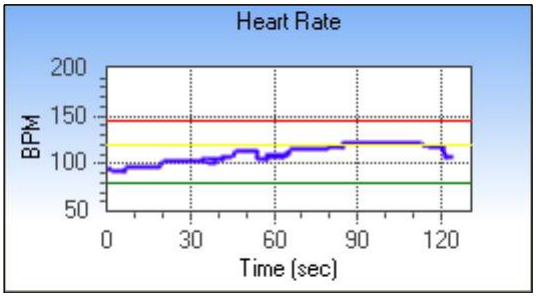
In order to ensure safety in administration of the testing protocol, Mr. Smith's heart rate was monitored on a real-time basis. A cut-off of 146 beats per minute based upon age predicted maximum was used in order to ensure the safe administration of the dynamic lifting protocol.

During the course of testing, Mr. Smith's heart rate started at 97 beats per minute and ended at a value of 122 beats per minute at a final weight of 50 pounds. This represents a change of 25.77% increase during the lifting protocol. Mr. Smith's heart rate recovered to 0 beats per minute. (If this value is 0 bpm, heart rate recovery was not measured.)

Mr. Smith demonstrated the ability to lift 50 pounds on a safe and dependable basis.

Test Time (sec):	84		Lift Item:	BTE Crate	
Start Position:	Floor			Lift to Capacity:	50
Lift Weight To:	Lower Shelf	Waist Height			

Heart Rate



Increment List

Weight (lbs)	# Lifts	Time (mm:ss)	Max HR (BPM)	% APMHR	RPE
10	1	7	97	57	1
20	1	26	103	60	2
30	1	45	114	67	3
40	1	65	116	68	4
50	1	84	122	71	5

Comment

Good body mechanics demonstrated during lifts. No complaints offered. Appropriate physiologic response noted.

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Work Simulation Test - Floor to Shoulder Occasional

Evaluation Date and Time : 3/11/2009 11:43 AM Instrument: Dynamic Lift

Description

The Floor to Shoulder Occasional was conducted in order to determine Mr. Smith's ability to complete the task. A progressive loading method was used to determine Mr. Smith's capacity for the performance of dynamic lifting activities on a safe and dependable basis. Lifting was conducted between an initial height of the floor and a final height of Shoulder Height with a total of 3 lifts completed. The increase in the amount of weight lifted was in 10 pounds increments.

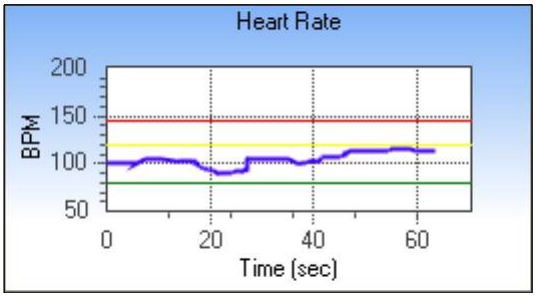
In order to ensure safety in administration of the testing protocol, Mr. Smith's heart rate was monitored on a real-time basis. A cut-off of 146 beats per minute based upon age predicted maximum was used in order to ensure the safe administration of the dynamic lifting protocol.

During the course of testing, Mr. Smith's heart rate started at 101 beats per minute and ended at a value of 114 beats per minute at a final weight of 30 pounds. This represents a change of 12.87% increase during the lifting protocol. Mr. Smith's heart rate recovered to 0 beats per minute. (If this value is 0 bpm, heart rate recovery was not measured.)

Mr. Smith demonstrated the ability to lift 30 pounds on a safe and dependable basis.

Test Time (sec): 46 Lift Item: BTE Crate
Start Position: Floor Lift to Capacity: 30
Lift Weight To: Lower Shelf Shoulder Height

Heart Rate



Increment List

Weight (lbs)	# Lifts	Time (mm:ss)	Max HR (BPM)	% APMHR	RPE
10	1	7	105	61	1
20	1	26	105	56	2
30	1	46	114	67	3

Comment

Client demonstrated proper body mechanics during this activity. Appropriate physiologic response noted. Slight increase in pain in low back reported post activity.

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Work Simulation Test - Bilateral Carry

Evaluation Date and Time : 3/11/2009 11:48 AM Instrument: Dynamic Carry

Description

The Bilateral Carry was conducted in order to determine Mr. Smith's ability to complete the task. A progressive loading method was used to determine Mr. Smith's capacity for the performance of dynamic carrying activities on a safe and dependable basis. The load started from the floor and was carried a distance of 40 Feet for a total of 5 repetitions at each weight increment. The increase in the amount weight carried was in 10 pounds increments.

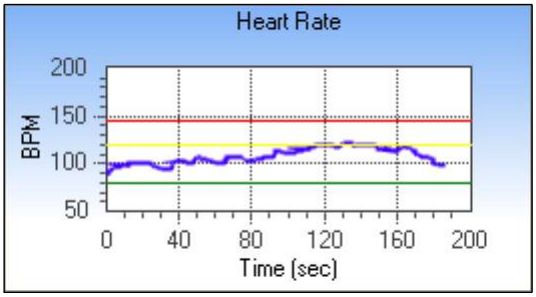
In order to ensure safety in administration of the testing protocol, Mr. Smith's heart rate was monitored on a real-time basis. A cut-off of 146 beats per minute, based upon age predicted maximum was used in order to ensure the safe administration of the dynamic carrying protocol.

During the course of testing, Mr. Smith's heart rate started at 88 beats per minute and ended at a value of 121 beats per minute at a final weight of 50 pounds.This represents a change of 37.5% increase during the lifting protocol. Mr. Smithheart rate recovered to 0 beats per minute.

Mr. Smith demonstrated the ability to carry 50 pounds on a safe and dependable basis.

Test Time (sec):	135		Lift Item:	BTE Crate	
Start Position:	Shelf		Distance:	40 ft	Lift to Capacity: 50
Carry Item To :	Lower Shelf	Waist			

Heart Rate



Increment List

Weight (lbs)	# Lifts	Time (mm:ss)	Max HR (BPM)	% APMHR	RPE
10	1	47	102	58	1
20	1	19	108	63	2
30	1	19	107	62	3
40	1	18	118	69	4
50	1	17	122	71	5

Comment

Client offered no complaints. No observed safety issues during activity.

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Non-Integrated Test - Stair Climbing

Evaluation Date and Time : 3/11/2009 11:53 AM Instrument: Non-Integrated

Description

Cycle	Climbing Pattern	Heart Rate Pre	Heart Rate Post	Completed Repetitions	Time
1	step over step	99	113	90 steps	2:21

Comment

Client reported slight increase in low back pain at conclusion of activity.

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Strength Test - Wheelbarrow Lift

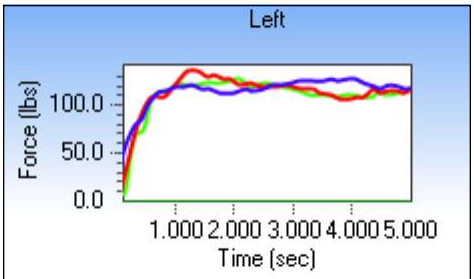
Evaluation Date and Time : 3/11/2009 12:23 PM Instrument: UTM

Description

Mr. Smith reached a combined peak force of 254.0 pounds during the Wheelbarrow Lift. The combined peak force is calculated by storing the combined maximum of the left and right force at any instant in time during each trial then averaging over all trials. The average of the peak forces for the individual sides are 130.3 pounds for the left side and 123.7 pounds for the right side. This yields a 5.1% (R<L) difference between the sides. The coefficient of variation (COV) was 3.4% for the left side and 6.2% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Upper Arm Height: 24 inches

Left

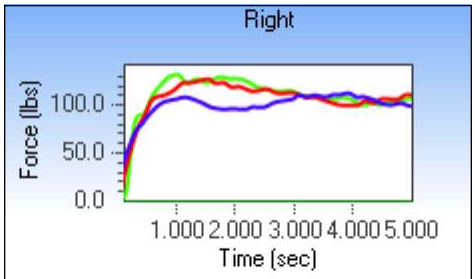


Rep #	Peak Force (lbs)	Time to Peak (secs)
1	127.8	3.9
2	136.6	1.2
3	126.5	2.1

Average Peak (lbs): 130.3

COV (%): 3.4

Right



Rep #	Peak Force (lbs)	Time to Peak (secs)
1	113.1	3.9
2	126.8	1.5
3	131.2	1.0

Average Peak (lbs): 123.7

COV (%): 6.2

Heart Rate

Initial HR (BPM)	85
Max HR (BPM)	103
Final HR (BPM)	103

Combined Average (lbs)	254.0
Comparison (R-L) (%)	-5.1

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Strength Test - Wheelbarrow Push

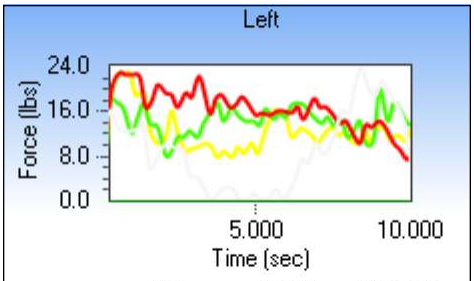
Evaluation Date and Time : 3/11/2009 12:30 PM Instrument: UTM

Description

Mr. Smith reached a combined peak force of 54.0 pounds during the Wheelbarrow Push. The combined peak force is calculated by storing the combined maximum of the left and right force at any instant in time during each trial then averaging over all trials. The average of the peak forces for the individual sides are 22.0 pounds for the left side and 32.0 pounds for the right side. This yields a 59.6% (R>L) difference between the sides. The coefficient of variation (COV) was 11.2% for the left side and 7.4% for the right side. Values greater than 15% may be an indicator of submaximal effort.

Lower Arm Height: 30 inches

Left

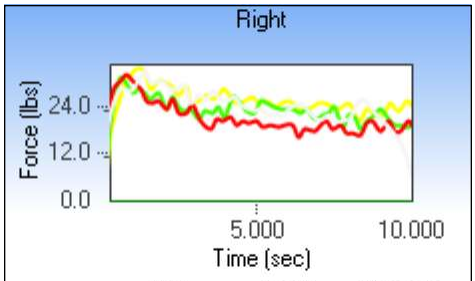


Rep #	Avg. Force (lbs)	Peak Force (lbs)	Time to Peak (secs)
1	9.2	23.7	8.4
2	16.5	22.9	0.5
3	14.3	20.1	9.0
4	12.5	22.9	0.8

Average (lbs): 14.5

COV (%): 11.2

Right



Rep #	Avg. Force (lbs)	Peak Force (lbs)	Time to Peak (secs)
1	23.9	33.0	1.3
2	21.0	32.0	0.7
3	22.9	30.7	0.7
4	25.2	33.2	1.1

Average (lbs): 23.1

COV (%): 7.4

Heart Rate

Initial HR (BPM)	108
Max HR (BPM)	120
Final HR (BPM)	120
Combined Average (lbs)	37.5
Comparison (R-L) (%)	59.6

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Work Simulation Test - Positional Test - Axial Rotation - Occasional

Evaluation Date and Time : 3/11/2009 2:08 PM Instrument: Work Simulation

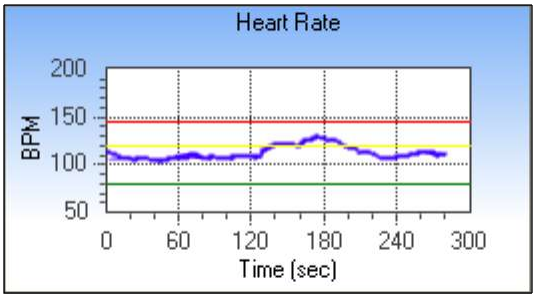
Description

The Positional Test - Axial Rotation - Occasional protocol was used to determine Mr. Smith's ability to perform this activity on a sustained basis. Mr. Smith was tested using the Functional Range of Motion (F.R.O.M.) System and the performance was calculated using the internationally-recognized Methods-Time Measurement (MTM) standard. MTM is an industrial engineering-based method for the determination of time-motion performance in conjunction with work-related activities. The MTM standard score allows for the means to determine an exact percentage score of performance against the most widely recognized criteria for the assessment of time-motion activities. MTM scoring is based on a criterion referenced time-motion standard to complete a task as opposed to an estimate of ability.

The test scoring is based upon the total time necessary to complete 1 cycle(s) of the task. The time required to complete the test is converted into the equivalent MTM standard score. Mr. Smith had a MTM score of 126% which correlates to a rating of Above Competitive.

Test Time (min:sec) : 4:33 **Number of Pegs :** 15

Set	Rep	Time
1	1	64
1	2	59
1	3	77
1	4	73
Set 1 Total		273



Comment

Mr. Smith reported no difficulty in completing this activity.
Functional range of motion observed during this activity is consistent with that of measured range of motion.

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Work Simulation Test - Positional Test - Kneeling to Standing to Kneeling - Occasional

Evaluation Date and Time : 3/11/2009 2:35 PM Instrument: Work Simulation

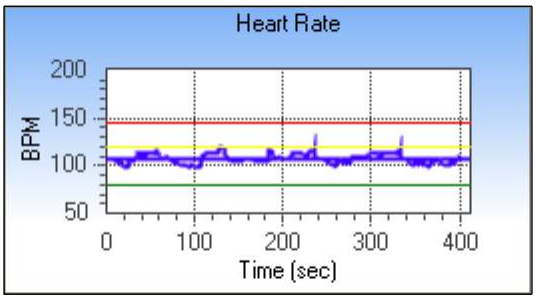
Description

The Positional Test - Kneeling to Standing to Kneeling - Occasional protocol was used to determine Mr. Smith's ability to perform this activity on a sustained basis. Mr. Smith was tested using the Functional Range of Motion (F.R.O.M.) System and the performance was calculated using the internationally-recognized Methods-Time Measurement (MTM) standard. MTM is an industrial engineering-based method for the determination of time-motion performance in conjunction with work-related activities. The MTM standard score allows for the means to determine an exact percentage score of performance against the most widely recognized criteria for the assessment of time-motion activities. MTM scoring is based on a criterion referenced time-motion standard to complete a task as opposed to an estimate of ability.

The test scoring is based upon the total time necessary to complete 1 cycle(s) of the task. The time required to complete the test is converted into the equivalent MTM standard score. Mr. Smith had a MTM score of 74% which correlates to a rating of Entry Level.

Test Time (min:sec) : 6:26 **Number of Pegs :** 3

Set	Rep	Pnl2 Zn B	Time
1	1	50	50
1	2	68	68
1	3	56	56
1	4	51	51
1	5	44	44
1	6	54	54
1	7	63	63
Set 1 Total			386



Comment

Mr. Smith reported difficulty in completing this activity; experienced increased low back pain during transitional phase of kneel to stand.
Functional range of motion observed during this activity is consistent with that of measured range of motion.

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Work Simulation Test - Positional Test - Stooping Reach - Occasional

Evaluation Date and Time : 3/11/2009 2:42 PM Instrument: Work Simulation

Description

The Positional Test - Stooping Reach - Occasional protocol was used to determine Mr. Smith's ability to perform this activity on a sustained basis. Mr. Smith was tested using the Functional Range of Motion (F.R.O.M.) System and the performance was calculated using the internationally-recognized Methods-Time Measurement (MTM) standard. MTM is an industrial engineering-based method for the determination of time-motion performance in conjunction with work-related activities. The MTM standard score allows for the means to determine an exact percentage score of performance against the most widely recognized criteria for the assessment of time-motion activities. MTM scoring is based on a criterion referenced time-motion standard to complete a task as opposed to an estimate of ability.

The test scoring is based upon the total time necessary to complete 1 cycle(s) of the task. The time required to complete the test is converted into the equivalent MTM standard score. Mr. Smith had a MTM score of 98% which correlates to a rating of Competitive.

Test Time (min:sec) : 5:02 **Number of Pegs :** 15

Set	Rep	Time
1	1	59
1	2	75
1	3	49
1	4	64
1	5	55
Set 1 Total		302

Comment

Mr. Smith reported difficulty in completing this activity; experiencing increased low back pain as activity proceeded. Functional range of motion observed during this activity is consistent with that of measured range of motion.

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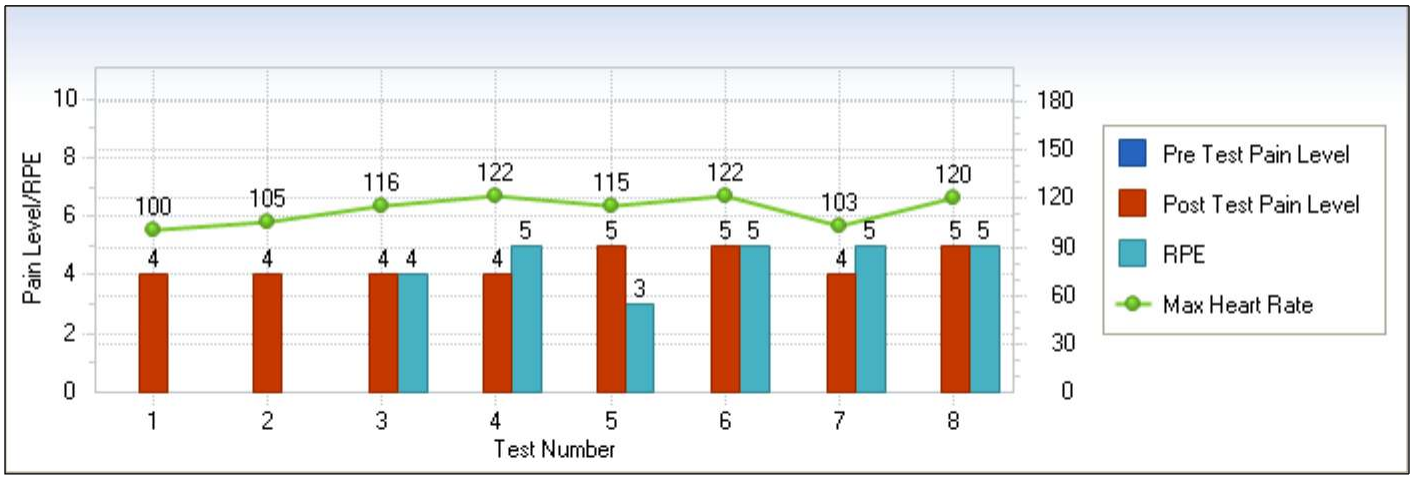
Cardiovascular Intake

Resting Heart Rate (BPM)	Systolic BP (mm Hg)	Diastolic BP (mm Hg)	Date	Intake Type
80 Normal Heart Rate	127 Normal Systolic BP	74 Normal Diastolic BP	3/11/2009 10:08 AM	Pre-Test
0 Low Heart Rate	127 Normal Systolic BP	74 Normal Diastolic BP	3/11/2009 10:02 AM	Pre-Test

Pain and Exertion Profile



0 - No Pain	10 - Severe Unrelenting Pain

Test Number	Test Name	Pain Level
1	UTM Cart Push Test	4
2	UTM Cart Pull Test	4
3	Waist to Shoulder Occasional	4
4	Floor to Waist Occasional	4
5	Floor to Shoulder Occasional	5
6	Bilateral Carry	5

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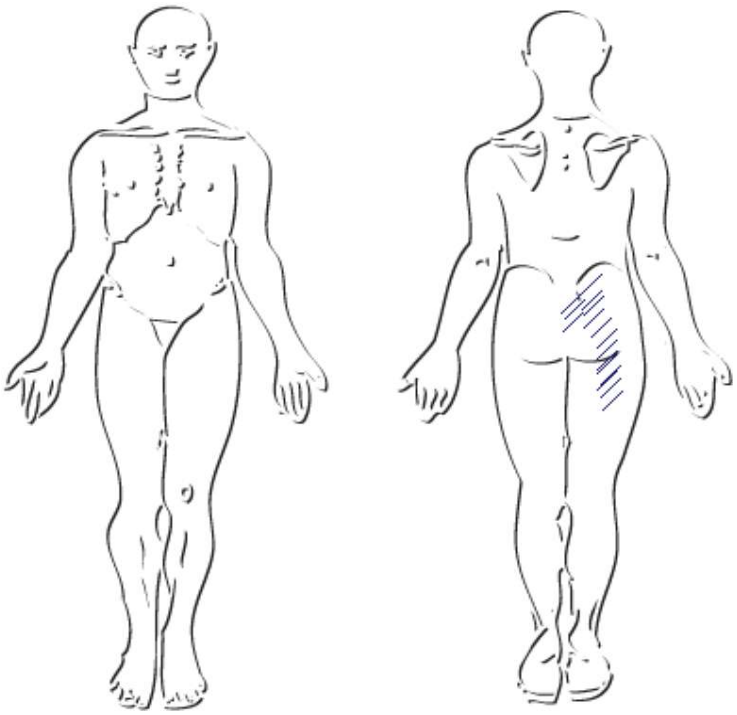
Test Number	Test Name	Pain Level
7	Wheelbarrow Lift	4
8	Wheelbarrow Push	5

Mr.Smith's subjective reports of pain were monitored throughout the course of the above activities. A standard self report scale of 0-10 (0 = no pain; 10 = severe unrelenting pain that requires immediate medical attention) was used to gauge his subjective tolerance to specific activities. A progressive loading test format was used, to gradually increase the difficulty of activity, with Mr.Smith reporting his pain after each successful task. The graph above indicates his reported pain following each activity. It is reasonable to expect as the difficulty of the tasks increase there will be a correlative increase in the report of pain level. Mr.Smith did demonstrate the expected result. Other factors may have influenced his subjective reports of any given task.



/// Stabbing

XXX Burning

Numbness

OOO Pins and Needles

Case Picture(s)

Case:

CaseID: 1752066510

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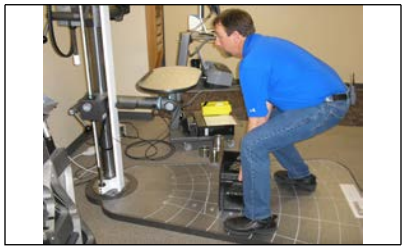
Demonstrated safe body mechanics during waist to shoulder lift.



No observed or reported difficulty associated with this activity.

No observed or reported difficulty associated with carrying task.

Performed axial rotation activity without observed or reported difficulty.

Client reported increased low back pain during transitional phase of kneel to stand. No difficulty observed related to fine motor manipulation of pegs.

No reported increase of symptoms during isometric pushing activity.

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Custom test created to duplicate wheelbarrow lift. Client reported minimal diificulty with this activity.

Custom test created to duplicate wheelbarrow push. Client reported mild increase in low back pain during this activity.

Custom test created to duplicate shoveling activity. Client demonstrated acceptable body mechanics during task simulation.

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