



Your Evaluation Center

Your Street, Your City, ST 00000

Phone: (000) 000-0000

Fax: (000) 000-0000

FUNCTIONAL CAPACITY EVALUATION

August 1, 1999

Ms. Edna Benoiter
Big Giant Insurance Co.
100 Giant Way
New York, NY 10012

RE: Sample Patient (12345678)

[Evaluated: July 13, 1999]

PURPOSE OF ASSESSMENT

Patient has completed course of physical therapy for Lumbar Sprain/Strain. Treating therapist has released patient for work. Need to determine if he can return to his own job, and what restrictions might apply.

RELIABILITY AND CONSISTENCY OF EFFORT

The results of this evaluation suggest that Mr. Patient gave a reliable effort, with 68 of 70 consistency measures within expected limits.

FUNCTIONAL ABILITIES

Patient's demonstrated abilities meet specified job demands in the following categories: Walk, Carry - 11 Lb, Carry - 21 Lb, Carry - 51 Lb, Push Cart - 41 Lb, Pull Cart - 41 Lb, Balance, Stoop, Crouch, Kneel, Climb Stairs, Reach to Front, Reach Side/Across, Reach with Weight, Handling, Bi-Manual Handling, Fingering, Bi-Manual Fingering, Feeling, Eye-Hand-Foot, Tool Use, Stand/Sit, Sitting, Standing.

FUNCTIONAL LIMITATIONS

Patient is unable to meet job demands in the following categories: Mid Lift, Low Lift, Full Lift.

CONCLUSIONS

Patient can return to work with modified duties. Limited to medium lifting category until re-evaluation is performed in six weeks.

Sincerely,

Harvey Mudd, PT

Functional Abilities Summary

Mr. Patient's demonstrated abilities in this evaluation (FCE) are summarized below. A value of **n/a** indicates the activity was not included in the evaluation. If job demands were provided with this evaluation, functional abilities are compared to the corresponding job demand level. FCE performance below job demand is shown as a **Yes** in the deficit column, while mixed performance (both above and below the job demand level) is shown as **?** indicating a possible deficit.

Activities Rated by Strength Level						
Activity	FCE Performance (PDC Category)	Equivalent Strength Level			Job Demand (PDC Category)	Deficit
		Occasional 0 to 2.6 hours/day	Frequent 2.7 to 5.3 hours/day	Constant 5.4 to 8 hours/day		
Low Lift (floor to knuckle)	Medium	21 - 50 lb	11 - 25 lb	1 - 10 lb	Very Heavy	Yes
Mid Lift (knuckle to shoulder)	Medium	21 - 50 lb	11 - 25 lb	1 - 10 lb	Very Heavy	Yes
High Lift (shoulder and above)	n/a					
Full Lift (floor to shoulder)	n/a					
Carry	Very Heavy	over 100 lb	over 50 lb	over 20 lb	Heavy	No
Push (static)	Heavy	51 - 100 lb	26 - 50 lb	11 - 20 lb	Medium	No
Pull (static)	Medium	21 - 50 lb	11 - 25 lb	1 - 10 lb		
Overall Strength Category	n/a					
Activities Rated by Frequency and Duration						
Activity	FCE Performance			Job Demand	Deficit	
Walk	Constant			Constant	No	
Climb Stairs	Constant			Occasional	No	
Balance	Constant			Frequent	No	
Stoop	Frequent			Occasional	No	
Kneel	Constant			Occasional	No	
Crouch	Frequent			Occasional	No	
Crawl	Constant			Not Required	No	
Reach (front)	Left: Constant	Right: Constant		Frequent	No	
Reach (side)	Left: Constant	Right: Constant		Frequent	No	
Handling	Left: Constant	Right: Constant	Both: Constant	Frequent	No	
Fingering	Left: Constant	Right: Constant	Both: Constant	Frequent	No	
Feeling	Constant			Frequent	No	
Eye-hand-foot	Constant			Frequent	No	
Sitting	Frequent			Frequent	No	
Standing	Frequent			Frequent	No	
Push Cart	Constant			Frequent	No	
Pull Cart	Frequent			Occasional	No	
Other Activities						
Grip/Grasping Strength (Dynamometer Position 2)	Left: 83.8 lb		Right: 94.8 lb			low
Cardiovascular Fitness	Above average					



Your Evaluation Center

Your Street, Your City, ST 00000

Phone: (000) 000-0000

Fax: (000) 000-0000

**FUNCTIONAL
CAPACITY
EVALUATION**

PATIENT INFORMATION:

Report Date: August 1, 1999

Patient: **Sample Patient**

ID#: **12345678**

DOB: 11/29/69 Age: **39**

Address: **1166 Jamestown Road
Williamsburg, VA 23185**

Sex: **M** Dom. Hand: **R**
Height: **65** in Weight: **185** lb

Phone (H): **(757) 555-1212**

Phone (W): **(757) 221-8134**

Evaluation Date: **07/13/1999**

Occupation: **Plate Maker**

... Referred by: **Richard Helpren**

Employer: **Virginia Printing**

... Resting Pulse Rate: **71**

Insurance Co: **The Principle Group**

... Blood Pressure (sitting): **130/90**

Physician: **Dr. Yang**

Tested By: **Sample Operator**

Attorney: **Thompson, Rogers**



Injury: Diagnosis	Side	Injury Date	ICD-9 Code
Sprain/Strain of Knee/Leg NEC	B	10/01/98	844.8
Sprain/Strain Lumbar Region	B	10/01/98	847.2

JOB INFORMATION:

Company: **Virginia Printing**

Representative: **Albert Bessemer**

Address: **1004 Industrial Parkway**

Williamsburg, VA 23185

Phone: **757-555-1212**

FAX: **757-555-1234**

Job Title: **Plate Maker**

Job Subtitle: **n/a**

Employment History:

May 1998 to present: ACME Widget - inspection and packaging

Jul 1996 to Feb 1998: Goodwill Industries - warehouse worker

Sep 1994 to Jun 1996: Home Quarters - Stocker

Education:

1984 to 1988: Tidewater High School

HISTORY:

Mechanism and History of Injury:

Patient was referred to our clinic as a result of an injury sustained on 10/1/98 on the assembly line at his place of employment. Mr. Jones stated that he was lifting a carton from a conveyor when he slipped and fell. He indicated that as he fell, he tried to push the carton away so that it would not fall on him. He landed in an awkward position and felt a sharp pain in his lower back, as well as his right hip and knee that were under him when he fell. He was sent to the Main Street Clinic where he was diagnosed with a severe Lumbar Strain/Sprain and a mild Knee Sprain. The treating physician recommended rest, analgesics, and anti-inflammatory drugs.

Therapies:

Oct 1, 1998: Treatment for acute Lumbar Strain/Sprain

Oct 8, 1998 to Oct 22, 1998: Physical Therapy, Lumbar strength, Lumbar flexibility

Medications:

Oct 1, 1998: Tylenol w/Codine

Intake Interview:

Patient reported on time, and was cooperative for interview and testing. He indicated that his back was bothering him somewhat as he sat for his interview, and displayed some postural adjustments consistent with his symptoms. He said that his physical therapy was helpful, but that the pain in his back has not gone away completely.

SUMMARY:

Mr. Patient demonstrated a reliable effort in this evaluation, with 68 of 70 consistency measures recorded as reliable *except those* as noted in Table 1, below.

Table 1 – Reliability and Consistency of Effort					
Test	Date	Result	Expected	Measure	Reliable
H HIGH NEAR LIFT	7/13/99	64.5 LB	< 60.8 LB	IHSC	No
Straight Leg Raise	7/13/99	SLR=62	< 17 + 10	SLR	No

Mr. Patient’s perceptions regarding his ability to function are illustrated in the Activity Rating, Pain Drawing and Perceived Exertion Charts presented below.

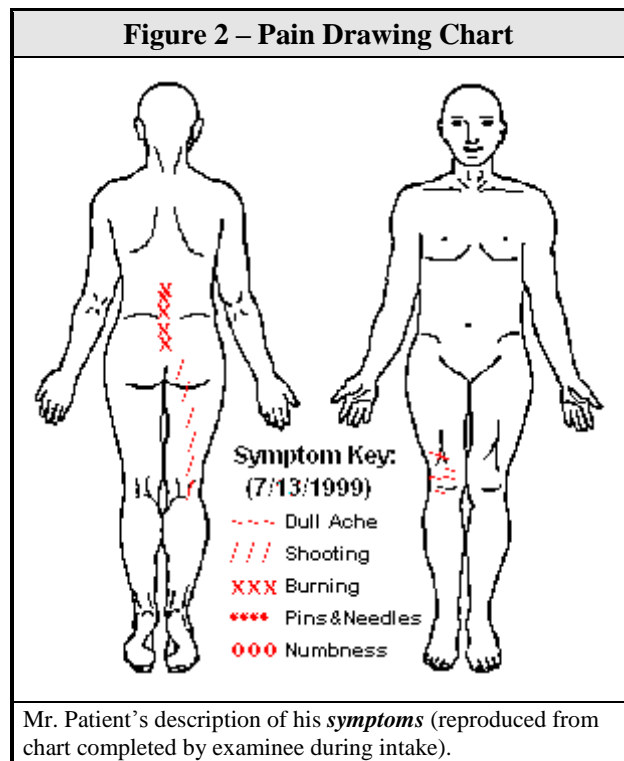
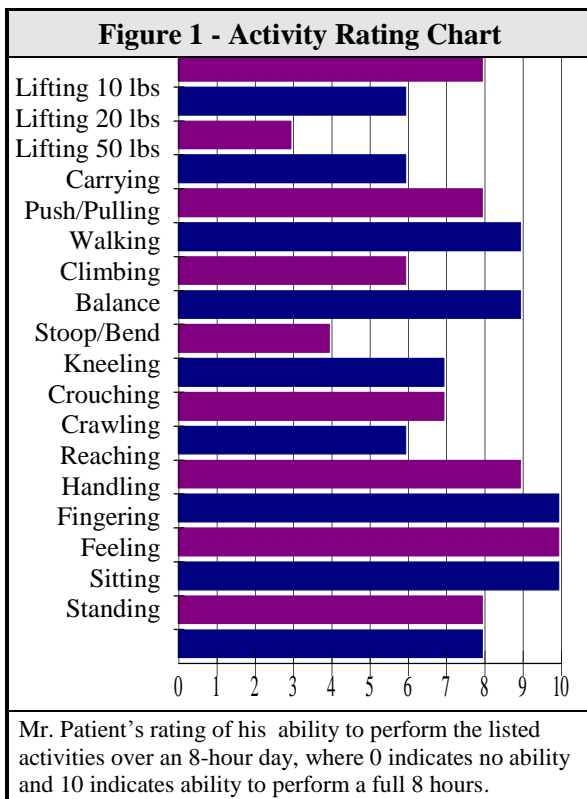
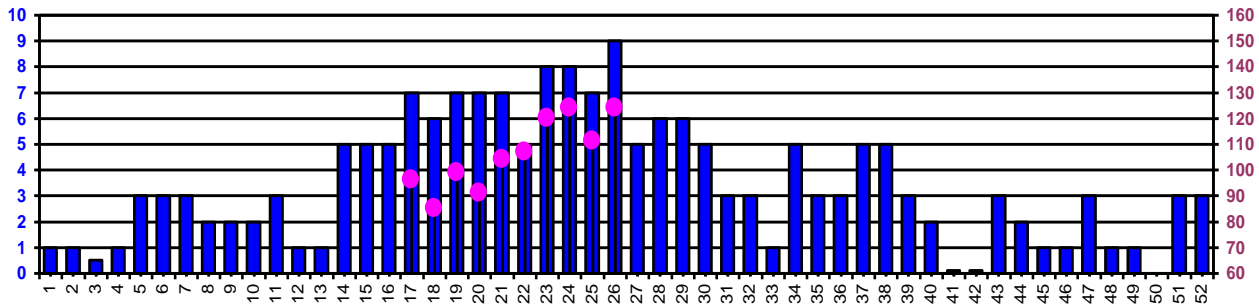


Figure 3 – Perceived Exertion Chart

Mr. Patient’s perceived exertion *during this evaluation*. 0 indicates no exertion, and 10 is the highest level of exertion one could imagine. The scale is non-linear with a value of 2 for **light**, 3 for **moderate**, 5 for **strong** and 7 for **very strong**. If heart rate values were measured during a test, the peak heart rate will appear over the exertion level bar as a shaded circle using the scale shown to the right.



Perceived Exertion Values Listed by Test Number – Test Names and Start Time of Test Appear Below

1: Cervical Flexion/Extension.....(7/13/1999 10:08)	19: TORSO LIFT(7/13/1999 11:18)	37: Climb Stairs.....(7/14/1999 12:14)
2: Cervical Lateral Flexion(7/13/1999 10:09)	20: H TORSO LIFT(7/13/1999 11:21)	38: Stoop(7/14/1999 12:18)
3: Cervical Rotation.....(7/13/1999 10:11)	21: HIGH NEAR LIFT(7/13/1999 11:22)	39: Crouch.....(7/14/1999 12:20)
4: Thoracic Flexion.....(7/13/1999 10:13)	22: H HIGH NEAR LIFT.....(7/13/1999 11:25)	40: Kneel.....(7/14/1999 12:25)
5: Thoracic Rotation(7/13/1999 10:15)	23: Floor to Knuckle Frequent(7/13/1999 11:40)	41: Reach to Front(7/14/1999 12:29)
6: Lumbar Flexion/Extension.....(7/13/1999 10:17)	24: Floor to Shoulder Frequent....(7/13/1999 11:45)	42: Reach Side/Across.....(7/14/1999 12:33)
7: Lumbar Lateral Flexion.....(7/13/1999 10:20)	25: Knuckle to Shoulder Frequent(7/13/1999 11:49)	43: Stand/Sit.....(7/14/1999 12:33)
8: Straight Leg Raise Right.....(7/13/1999 10:23)	26: CAFT Step Test(7/13/1999 14:15)	44: Reach with Weight(7/14/1999 12:35)
9: Straight Leg Raise Left.....(7/13/1999 10:24)	27: Position 1(7/14/1999 10:53)	45: Handling.....(7/14/1999 12:38)
10: Knee Flexion/Extension.....(7/13/1999 10:27)	28: STANDARD.....(7/14/1999 10:54)	46: Bi-Manual Handling.....(7/14/1999 12:40)
11: Hip Extension.....(7/13/1999 10:30)	29: Position 3(7/14/1999 11:00)	47: Eye-Hand-Foot.....(7/14/1999 12:42)
12: Hip Internal/External Rotation(7/13/1999 10:33)	30: Position 4(7/14/1999 11:01)	48: Fingering.....(7/14/1999 12:45)
13: Ankle Dorsi/Plantar Flexion ..(7/13/1999 10:44)	31: Position 5(7/14/1999 11:03)	49: Bi-Manual Fingering(7/14/1999 12:47)
14: KEY.....(7/13/1999 11:06)	32: Rapid Exchange(7/14/1999 11:05)	50: Feeling.....(7/14/1999 12:49)
15: TIP.....(7/13/1999 11:08)	33: Walk.....(7/14/1999 11:56)	51: Tool Use.....(7/14/1999 12:52)
16: PALMAR(7/13/1999 11:10)	34: Carry(7/14/1999 12:05)	52: Crawl.....(8/13/1999 16:42)
17: FLOOR LIFT.....(7/13/1999 11:14)	35: Push/Pull Cart(7/14/1999 12:09)	
18: H FLOOR LIFT.....(7/13/1999 11:16)	36: Balance(7/14/1999 12:11)	

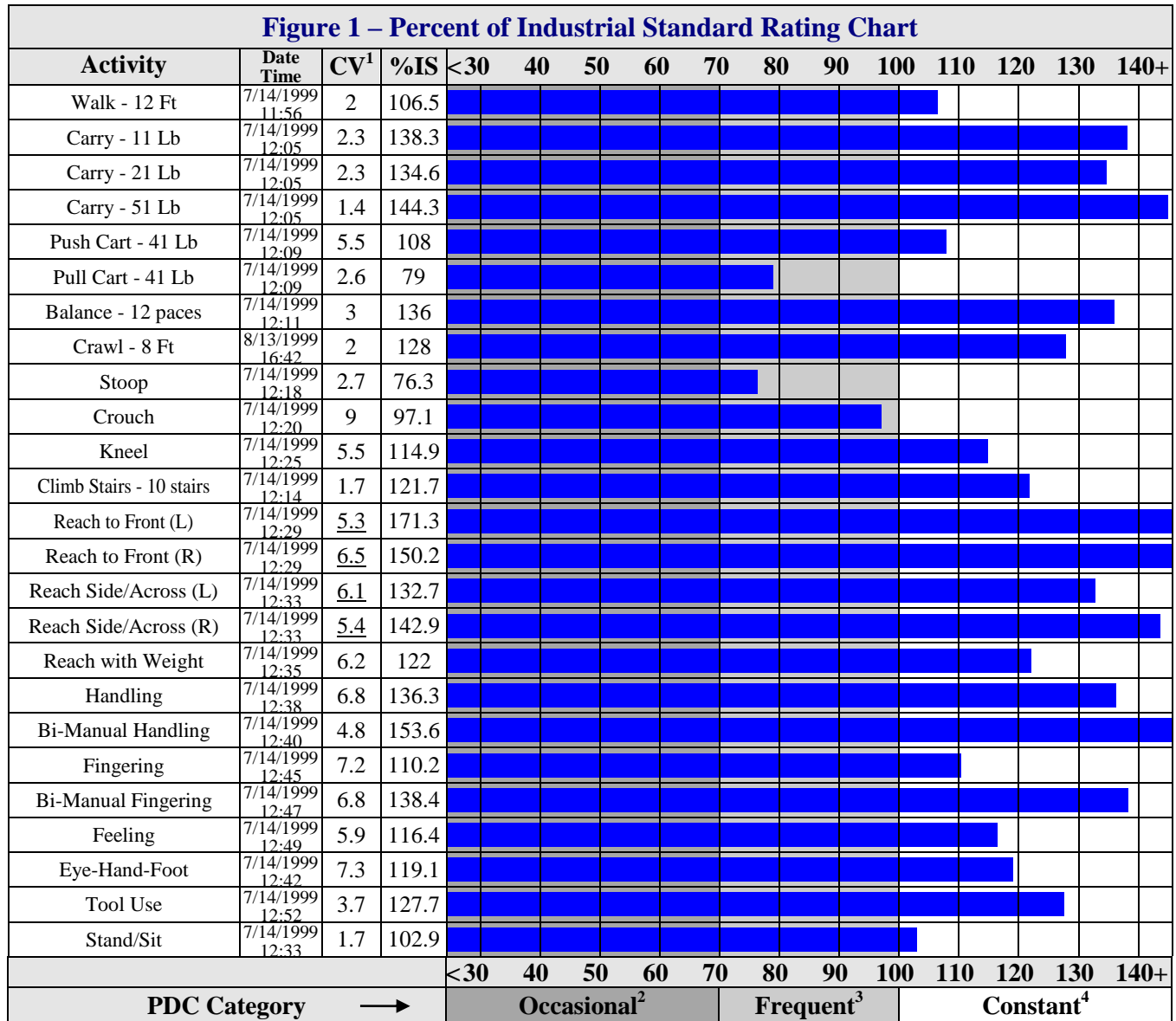
Physical Capacity Summary:

Mr. Patient’s physical capacity, as related to overall body strength, cardiovascular condition and range of movement is summarized below. Cardiovascular condition is rated on the five-level scale of Excellent, Above Average, Average, Below Average and Poor. Range of movement is considered within normal limits except as reported below.

Strength Rating		Cardiovascular Condition	
Dictionary of Occupational Titles, Physical Demand Level		Evaluated using: CAFT	
Overall Strength Category	Medium	Rating: Above average	
Range of Movement			
Joint/Movement	Measured	Norm	Deficit
Lumbar Extension (7/13/99)	14	25	yes
Thoracic Rotation L (7/13/99)	21	30	yes
Thoracic Rotation R (7/13/99)	21	30	yes
Ankle Dorsi Flexion L (7/13/99)	6	20	yes
Ankle Dorsi Flexion R (7/13/99)	9	20	yes
Hip Internal Rotation L (7/13/99)	22	40	yes
Hip Internal Rotation R (7/13/99)	12	40	yes

VerNova MTM Functional Abilities Summary

Methods-Time Measurement (MTM) data provides a quantifiable description of the functions required of a worker in the performance of certain physical job demands. An evaluatee's demonstrated ability in the assessment is compared to the MTM Industrial Standard (IS), which is the time an average worker with average training could perform the listed activity, assuming the activity is performed over an average eight hour day. Percent of Industrial Standard (%IS) is the evaluatee's demonstrated ability as a percent of the Industrial Standard, where 100% and up indicates performance at or above the Standard, while below 100% indicates performance below the Standard.



¹ **Coefficient of Variance.** If value is underlined, CV calculated for multiple test sets. For CV > 10%, value is shaded to call attention to results that may indicate a problem in consistency or ability to perform this task.

² **Occasional** - allows 31-70% Rest Allowance Standard (RAS) from the IS, or activity performed 0 - 2.6 hours/day

³ **Frequent** - allows up to 30% RAS from the IS, or activity performed 2.7 - 5.33 hours/day

⁴ **Constant** - allows no RAS, or activity performed 5.33 - 8 hours/day

VerNova ST - Static Strength Report:

The patient was evaluated using the VerNova ST static strength testing system. This system is designed to quantify an individual's ability to lift, push, or pull in various postures and to compare strength to norms adopted by the U. S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health (NIOSH).

<i>Individual Test Results</i>		Strength Data		Percent Capable by Most Loaded Joint		
TASK NAME	DATE	Avg Force	CV [†] (%)	Most Loaded Joint	Joint % Capable	75% Cap. Goal
FLOOR LIFT	07/13/99	94.5 lb	13.5	Hip	83	No
H FLOOR LIFT	07/13/99	34.4 lb	n/a	Hip	91	No
TORSO LIFT (1)	07/13/99	63.1 lb	2.0	Ankle	70	Yes
H TORSO LIFT	07/13/99	95.5 lb	n/a	Hip	79	No
HIGH NEAR LIFT (2)	07/13/99	91.3 lb	6.1	n/a	n/a	...
H HIGH NEAR LIFT (3)	07/13/99	64.5 lb	n/a	n/a	n/a	...

("n/a" indicates results that are not available or applicable for the listed task)

The patient's heart rate was monitored during one or more of the ST tests in order to determine if the patient was performing at a maximal effort. Population studies[§] indicate that an appropriate elevation in heart rate should follow a maximal whole-body exertion. The table below shows average pre and post exertion heart rates, the actual change, and the *expected* (population average) and *minimum acceptable* (one standard deviation below average) increase. If the patient demonstrated *at least* the minimum increase, a valid effort is reported.

<i>Heart Rate Results</i>		Measured Heart Rates			Comparison to Norms		
TASK NAME	DATE	Pre-exertion	Post-exertion	Change	Expected Increase	Minimum Acceptable Increase	Valid?
FLOOR LIFT	07/13/99	83	96	13	21.4	10.2	Yes
H FLOOR LIFT	07/13/99	93	85	-8	21.4	10.2	No
TORSO LIFT	07/13/99	81	99	18	21.4	10.2	Yes
H TORSO LIFT	07/13/99	60	91	31	21.4	10.2	Yes
HIGH NEAR LIFT	07/13/99	83	104	21	19.7	9.0	Yes
H HIGH NEAR LIFT	07/13/99	93	107	14	19.7	9.0	Yes

As an additional means of determining if the patient gave a full and consistent effort, certain tests were repeated with the patient being asked to move either 10 inches closer to or 10 inches farther away from the lifting handles. Population studies[¥] indicate that such a change should produce a 33% or greater *increase* in strength when moving closer, and a 33% or greater *decrease* in strength when moving farther away. When



[†] Based on the NIOSH guideline for validity, test results that exhibit a coefficient of variation (CV) greater than or equal to 15% cannot be considered as valid, consistent and reproducible.


[§] "Assessing Reliability of Performance in the Functional Capacity Assessment", *Journal of Disability*, Volume 3, Numbers 1-4, July, 1993.

[¥] "Horizontal Strength Changes: An Ergonomic Measure for Determining Validity of Effort in Impairment Evaluations", *Journal of Disability*, Volume 3, Numbers 1-4, July, 1993.

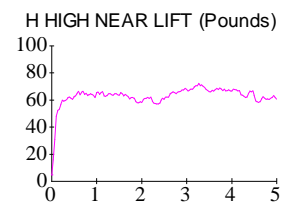
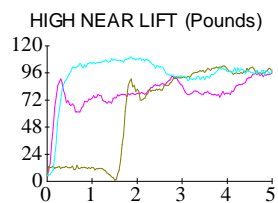
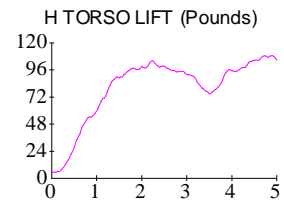
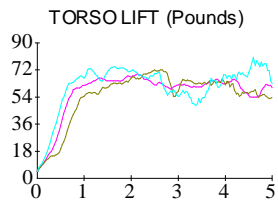
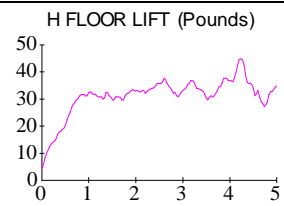
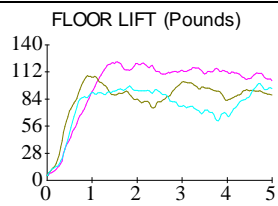
the expected change of at least 33% is *not* observed, an *Inappropriate Horizontal Strength Change (IHSC)* is reported by assigning a *FAIL* status to indicate inconsistent performance.

<i>I H S C Results</i>		Repeated Test		Strength Change %		
Task Name and Distance	Avg Force	Distance	Avg Force	Expected	Actual	Status
FLOOR LIFT: H = 10 in	94.5 lb	H = 20 in	34.4 lb	< -33 %	-63 %	PASS
TORSO LIFT: H = 15 in	63.1 lb	H = 5 in	95.5 lb	> 33 %	51 %	PASS
HIGH NEAR LIFT: H = 10 in	91.3 lb	H = 20 in	64.5 lb	< -33 %	-29 %	FAIL

<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
<p>(1) Patient showed pain symptomatology during back lift. Patient stated 6/10 pain in low back lifting with his low back. Body mechanics were poor. Patient shows flexion of the lumbar spine when lifting. Position could cause re-injury. Appeared to be trying to lift too much weight, leaning back. Third lift was acceptable. See lumbar flexion during lift.</p>	
<p>(2) Patient states no increased pain with shoulder lift. Again third lift only acceptable effort due to raising on toes apparently trying for more effort. Must lift correctly or heart rate not calculable.</p>	

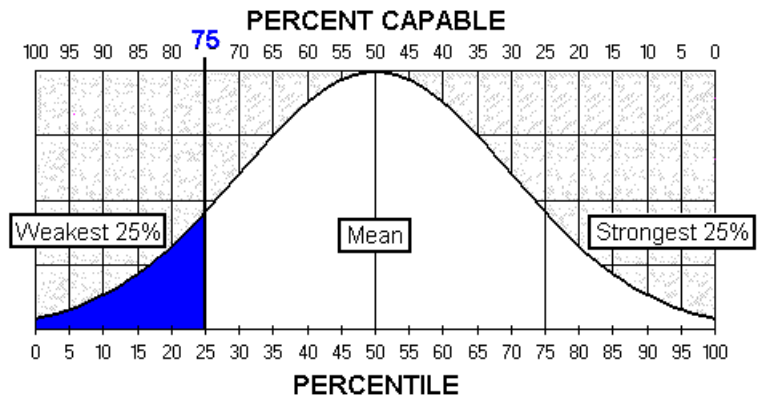
<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(3)	

ST Test Graphs (in order of Test Results)



Understanding the VerNova ST Results

The curve at right represents the strength distribution of the normal population. Note that in comparing strength to population norms, **Percent Capable** is the opposite of **Percentile**. For example, an individual in the 25th percentile is 75 percent capable. This means that **75 percent** of the normal population is **capable** of producing that level of strength. NIOSH has selected the 75% capable level as a guideline in determining if an individual has sufficient strength to safely perform a job.[‡]



[‡] *Work Practices Guide For Manual Lifting*, U.S. Department of Health and Human Services, March, 1981.

VerNova LC - Dynamic Lifting Capacity Report:

The patient was evaluated using the VerNova LC *Dynamic Lifting Capacity* system. This system is designed to quantify an individual’s dynamic lifting capacity (strength). The VerNova LC is based on the PILE (Progressive Isoinertial Lifting Evaluation) Protocol[†] developed at the University of Texas Southwestern Medical Center at Dallas. This protocol has been adapted and enhanced for automated test sequencing and data collection to provide safe, efficient and accurate administration of the test. In addition, results are correlated to the appropriate U.S. Department of Labor’s *Physical Demand Characteristic Level* (PDC - see **Table LC3**) for application to the competitive labor market.

The test consists of repeatedly lifting and lowering a weighted box to a shelf set at a standard height, during a fixed testing interval (four lifts in 20 seconds when assessing *frequent* lifting ability, and one lift in 10 seconds when assessing *occasional* lifting ability). The patient’s heart rate is measured continuously during the test, and the box is weighed and lifts are counted using a scale located on the lifting shelf. Box weight starts at a low level and is progressively increased until one of the endpoints described in **Table LC2** are achieved.

The patient is also asked to rate his or her perception of the weight at each level or cycle on a scale of 1 to 9 (see **Table LCI**). A rating of 8 or 9 is interpreted as “excessive discomfort”, and terminates the test (psychophysical endpoint). The patient’s maximum safe lifting weight (shown in bold face in the “weight” column of the results table below) is the weight lifted in the last *completed* cycle with a *perceived* weight level of 8 or less. The patient’s PDC Level is obtained by comparing the safe lifting weight to the weight range for that level as shown in Table LC3.

<i>Floor to Knuckle Frequent (1)</i>				<i>0 in. to 30 in. lift</i>		<i>4 lifts/cycle</i>	<i>07/13/99</i>
Heart Rate: Start = 88 ; 75% target = 136 ; 85% limit = 154						Weight Limit = 85 lb	
Frequent PDC Level = Heavy (26 - 50 lb)						Endpoint = Psychophysical	
Cycle #	Weight	Perceived	Reps	HR Lifting	HR % Max	Total Work	Post Cycle HR
1	11	4	4	102	56	220	103
2	21	6	4	107	59	640	109
3	26	7	4	107	59	1160	0
Test Graphs (Heart Rate and Work) vs. Elapsed Time		Heart Rate (beats/min)				Cumulative Work (lb-ft)	

[†] *Progressive Isoinertial Lifting Evaluation, I. A Standardized Protocol and Normative Database*; Mayer, Barnes, Kishino, Nichols, Gatchel, Mayer and Mooney; Spine, Vol 13, No. 9, Sept. 1988.
Progressive Isoinertial Lifting Evaluation, II. A Comparison with Isokinetic Lifting in a Disabled Chronic Low-Back Pain Industrial Population; Mayer, Barnes, Kishino, Nichols, Gatchel, Mayer and Mooney; Spine, Vol 13, No. 9, Sept. 1988.

<i>Floor to Shoulder Frequent (2)</i>				<i>0 in. to 54 in. lift</i>		<i>4 lifts/cycle</i>	<i>07/13/99</i>
Heart Rate: Start = 94 ; 75% target = 136 ; 85% limit = 154						Weight Limit = 85 lb	
Frequent PDC Level = Medium (11 - 25 lb)						Endpoint = Psychophysical	
Cycle #	Weight	Perceived	Reps	HR Lifting	HR % Max	Total Work	Post Cycle HR
1	11	3	4	100	55	396	104
2	21	6	4	121	67	1152	0
Test Graphs (Heart Rate and Work) vs. Elapsed Time		Heart Rate (beats/min)				Cumulative Work (lb-ft)	

<i>Knuckle to Shoulder Frequent (3)</i>				<i>30 in. to 54 in. lift</i>		<i>4 lifts/cycle</i>	<i>07/13/99</i>
Heart Rate: Start = 92 ; 75% target = 136 ; 85% limit = 154						Weight Limit = 85 lb	
Frequent PDC Level = Medium (11 - 25 lb)						Endpoint = Psychophysical	
Cycle #	Weight	Perceived	Reps	HR Lifting	HR % Max	Total Work	Post Cycle HR
1	11	2	4	79	44	176	97
2	21	6	4	91	50	512	0
Test Graphs (Heart Rate and Work) vs. Elapsed Time		Heart Rate (beats/min)				Cumulative Work (lb-ft)	

<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
<p>(1) THE PATIENT COMPLETED 3 OF 4 REPS IN THE FINAL CYCLE.</p> <p>HE FEELS CONSTANT BURNING IN HIS MID LOWER BACK.</p>	


<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(2) HAS SEVERE LOWER BACK PAIN.	
(3) COMPLETED 3 OF 4 REPS IN FINAL CYCLE. LOWER BACK IS FEELING VERY FATIGUED.	

Table LC1 Rating of Perceived Load	
VALUE	DEFINITION
1	Like Nothing
2	Very Light
3	Light
4	Light-Medium
5	Medium
6	Medium-Heavy
7	Heavy
8	Very Heavy
9	Too Heavy

Table LC2 - Test Endpoint Conditions	
CONDITION	DESCRIPTION
Psychophysical	Voluntary test termination by the patient based on complaints of fatigue, excessive discomfort, or inability to complete the required number of movements during the testing interval (cycle).
Physiological	Achievement of an age-determined target heart rate (based on a percent of patient's maximal heart rate - normally 85%, or in excess of 75% continuously for one minute).
Safety	Achievement of a predetermined anthropometric safe lifting limit based on the patient's adjusted body weight; or intervention by the ARCON operator based upon an evaluation of the patient's signs & symptoms.

Table LC3 - Physical Demand Characteristics Of Work (Dictionary of Occupational Titles - Volume II, Fourth Edition, Revised 1991)			
Physical Demand Level	OCCASIONAL 0-33% of the workday	FREQUENT 34-66% of the workday	CONSTANT 67-100% of the workday
Sedentary	1 - 10 lbs.	Negligible	Negligible
Light	11 - 20 lbs.	1 - 10 lbs.	Negligible
Medium	21 - 50 lbs.	11 - 25 lbs.	1 - 10 lbs.
Heavy	51 - 100 lbs.	26 - 50 lbs.	11 - 20 lbs.
Very Heavy	Over 100 lbs.	Over 50 lbs.	Over 20 lbs.

VerNova HD - Grip Strength Report:

The patient was evaluated using the VerNova HD grip strength testing system. This system is designed to quantify an individual's grip strength in one or more standard grip positions, and to compare such strength to recognized population norms (note: normative data is shown as "n/a" for grip positions with no published norms).

<i>Individual Test Results</i>		STRENGTH DATA		NORMATIVE DATA [‡]		
TASK NAME	DATE	Avg Force	CV [†] (%)	Population Norm	Standard Deviation	Comp. to Norm
Position 1 - Left (1)	07/14/99	72.2 lb	4.2	n/a	n/a	n/a
Position 1 - Right	07/14/99	71 lb	4.6	n/a	n/a	n/a
STANDARD - Left (2)	07/14/99	83.8 lb	3.0	112.9 lb	+/- 21.7	low
STANDARD - Right	07/14/99	94.8 lb	6.4	119.7 lb	+/- 24.0	low
Position 3 - Left (3)	07/14/99	80.3 lb	7.4	n/a	n/a	n/a
Position 3 - Right	07/14/99	90.7 lb	5.5	n/a	n/a	n/a
Position 4 - Left (4)	07/14/99	77.2 lb	4.2	n/a	n/a	n/a
Position 4 - Right	07/14/99	72.5 lb	4.7	n/a	n/a	n/a
Position 5 - Left (5)	07/14/99	61.1 lb	5.7	n/a	n/a	n/a
Position 5 - Right	07/14/99	64.7 lb	4.4	n/a	n/a	n/a
Rapid Exchange - Left (6)	07/14/99	78.7 lb	8.1	n/a	n/a	n/a
Rapid Exchange - Right	07/14/99	79.8 lb	3.4	n/a	n/a	n/a

("n/a" indicates results that are not available or applicable for the listed task)

The following table compares the patient's grip strength on opposite body sides, and reports a percent difference in strength for the *weaker hand* compared to the stronger hand. In cases of reported injury, an *expected strength* is calculated based on the measured strength of the uninjured side (note: *right* hand dominant subjects are assumed to be 10% stronger on the right side, while *left* hand dominant subjects are assumed have equal strength on both sides[‡]). When demonstrated strength is *less* than expected strength, the percent of *strength deficit* is reported.

<i>Left Hand vs. Right Hand</i>		STRENGTH DATA (* indicates Dominant Hand)			INJURED SIDE COMPARISON		
TASK NAME	DATE	LEFT	RIGHT	Weaker Hand	Injured Side	Expected Strength	Strength Deficit
Position 1	07/14/99	72.2	* 71	-2 %	n/a	n/a	n/a
STANDARD	07/14/99	83.8	* 94.8	-12 %	n/a	n/a	n/a
Position 3	07/14/99	80.3	* 90.7	-11 %	n/a	n/a	n/a
Position 4	07/14/99	77.2	* 72.5	-6 %	n/a	n/a	n/a
Position 5	07/14/99	61.1	* 64.7	-6 %	n/a	n/a	n/a
Rapid Exchange	07/14/99	78.7	* 79.8	-1 %	n/a	n/a	n/a

[‡] Virgil Mathiowetz, MS, OTR, Nancy Kashman, OTR, Gloria Volland, OTR, Karen Weber, OTR, Mary Dowe, OTS, Sandra Rogers, OTS, "Grip and Pinch Strength: Normative Data for Adults", Occupational Therapy Program, University of Wisconsin-Milwaukee, Milwaukee, WI, Arch Phys Med Rehabil 66:69-72, February, 1985.

[†] Based on common guidelines for consistency of effort, test results that exhibit a coefficient of variation (CV) greater than or equal to 15% are likely to indicate an unreliable or inconsistent performance.

The patient was asked to perform a Rapid Exchange Grip Test (REG test) as a means to assess the reliability of effort in the standard grip test. Research[§] has shown that REG strength *exceeding* standard grip strength (positive REG score, denoted below as + REG) is a probable indication of submaximal or unreliable effort in the standard test.

<i>Rapid Exchange Results</i>	STANDARD TEST		RAPID EXCHANGE TEST			
TASK NAME	DATE	Avg Force	DATE	Avg Force	% Chg	+ REG
Rapid Exchange - Left	07/14/99	83.8 lb	07/14/99	78.7 lb	-5.6 %	no
Rapid Exchange - Right	07/14/99	94.8 lb	07/14/99	79.8 lb	-15.4 %	no


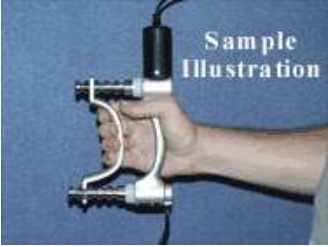
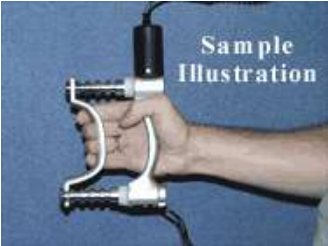
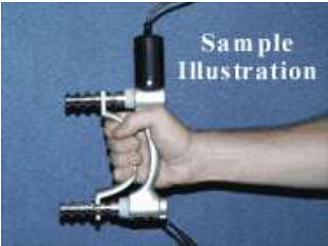
The Maximum Voluntary Effort (MVE) protocol was used to determine if the patient exerted a maximal effort during the grip test. This protocol consisted of successive grip tests over the full range of five positions of the hand dynamometer. Research[£] has shown that both normal and injured hand strength should be greater in positions 2, 3 and 4, and less in positions 1 and 5. The table below shows the patient's MVE results.

<i>MVE Results</i>	Hand Strength vs. Position	
In the graphs to the right, maximal effort is indicated by a "humped" or bell shaped curve (may be skewed toward position 2 or 4, based on patient's hand size), while sub-maximal effort is indicated by a flat or randomly varying curve.	<p>Left Hand (Pounds)</p>	<p>Right Hand (Pounds)</p>

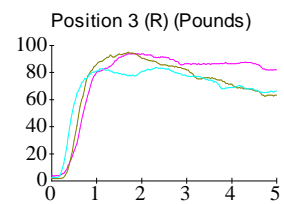
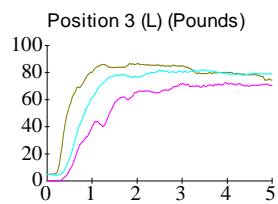
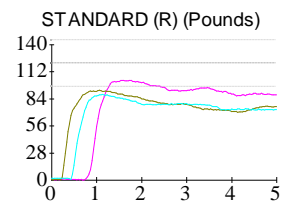
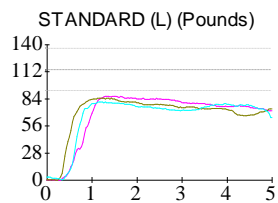
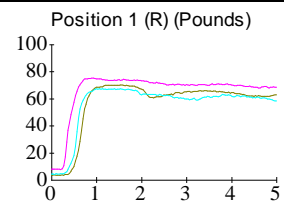
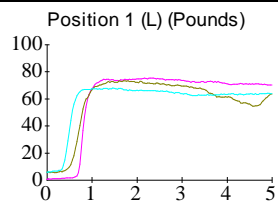
<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(1) NONE.	
(2) THE PATIENT DID TAKE A 5 MINUTE REST DUE TO LOWER BACK PAIN.	

[§] Hildreth, D. H. & Lister, G. D. (1989). Detection of submaximal effort by use of the rapid exchange grip. Journal of Hand Surgery, 14A: 742-745.

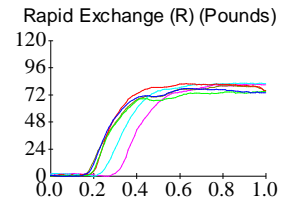
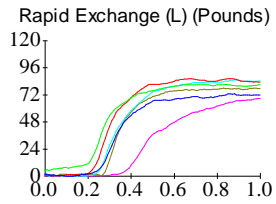
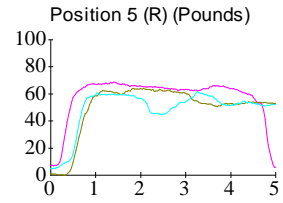
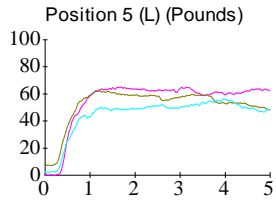
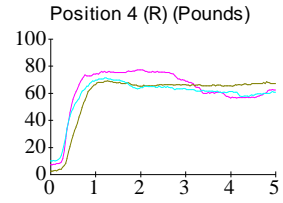
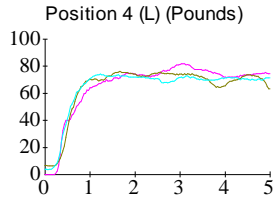
[£] Harold M. Stokes, M.D., "The Seriously Uninjured Hand - Weakness of Grip", Journal of Occupational Medicine, Vol. 25, No. 9, Sept. 1983.

<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(3) ACHING IN RIGHT UPPER TRAPEZIUS MUSCLE.	
(4) CRAMPING IN THE RIGHT SIDE OF NECK. PAIN ACROSS LOWER BACK.	
(5) NONE.	
(6) MILD ACHING IN RIGHT UPPER TRAPEZIUS MUSCLE.	

HD Test Graphs (in order of Test Results)



HD Test Graphs (in order of Test Results)



VerNova PG - Pinch Strength Report:


The patient was evaluated using the VerNova PG pinch strength testing system. This system is designed to quantify an individual's pinch strength in the standard *Key*, *Tip* and *Palmar* positions, and to compare such strength to recognized population norms.

<i>Individual Test Results</i>		STRENGTH DATA		NORMATIVE DATA [‡]		
TASK NAME	DATE	Avg Force	CV [†] (%)	Population Norm	Standard Deviation	Comp. to Norm
KEY - Left (1)	07/13/99	273.6 oz	2.8	409 oz	+/- 62	low
KEY - Right	07/13/99	298.8 oz	0.6	417 oz	+/- 51	low
TIP - Left (2)	07/13/99	14.3 lb	1.0	17.7 lb	+/- 3.8	normal
TIP - Right	07/13/99	15 lb	12.4	18.0 lb	+/- 3.6	normal
PALMAR - Left (3)	07/13/99	16 lb	2.8	25.9 lb	+/- 5.4	low
PALMAR - Right	07/13/99	19.4 lb	5.0	26.2 lb	+/- 4.1	low

("n/a" indicates results that are not available or applicable for the listed task)



The following table compares the patient's pinch strength on opposite body sides, and reports a percent difference in strength for the *weaker hand* compared to the stronger hand. In cases of reported injury, an *expected strength* is calculated based on the measured strength of the uninjured side (note: *right* hand dominant subjects are assumed to be 10% stronger on the right side, while *left* hand dominant subjects are assumed have equal strength on both sides[‡]). When demonstrated strength is *less* than expected strength, the percent of *strength deficit* is reported.

<i>Left Hand vs. Right Hand</i>		STRENGTH DATA (* indicates Dominant Hand)			INJURED SIDE COMPARISON		
TASK NAME	DATE	LEFT	RIGHT	Weaker Hand	Injured Side	Expected Strength	Strength Deficit
KEY	07/13/99	273.6	* 298.8	-8 %	n/a	n/a	n/a
TIP	07/13/99	14.3	* 15	-5 %	n/a	n/a	n/a
PALMAR	07/13/99	16	* 19.4	-18 %	n/a	n/a	n/a

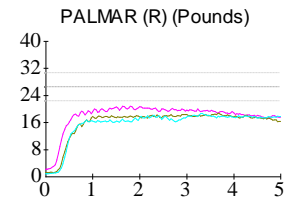
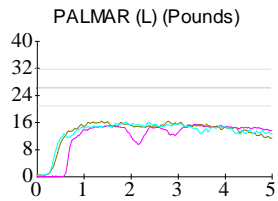
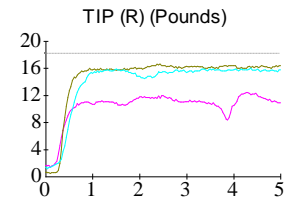
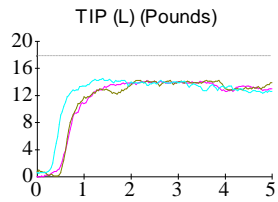
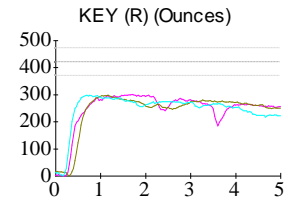
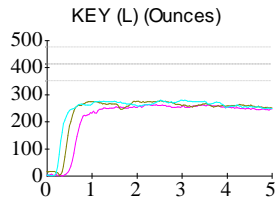
<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(1) NONE.	 <p>A photograph showing a person's hand holding a small black device (the VerNova PG) against their thumb and index finger. The device is connected to a cord. The text 'Sample Illustration' is overlaid on the image.</p>

[‡] Virgil Mathiowetz, MS, OTR, Nancy Kashman, OTR, Gloria Volland, OTR, Karen Weber, OTR, Mary Dowe, OTS, Sandra Rogers, OTS, "Grip and Pinch Strength: Normative Data for Adults", Occupational Therapy Program, University of Wisconsin-Milwaukee, Milwaukee, WI, Arch Phys Med Rehabil 66:69-72, February, 1985.

[†] Based on common guidelines for consistency of effort, test results that exhibit a coefficient of variation (CV) greater than or equal to 15% are likely to indicate an unreliable or inconsistent performance.

<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(2) NONE.	
(3) NONE.	

PG Test Graphs (in order of Test Results)

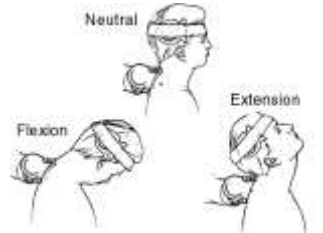



VerNova ROM - Spinal ROM Inclinator Report:

The patient was evaluated using the VerNova ROM computerized dual inclinometer system. This system is designed to quantify an individual's spinal range of motion (ROM) in the cervical, thoracic and/or lumbar regions, and to compare these ROM values to recognized population norms.

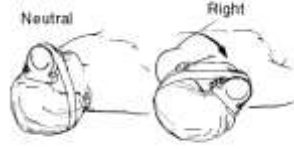
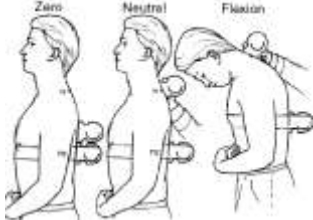
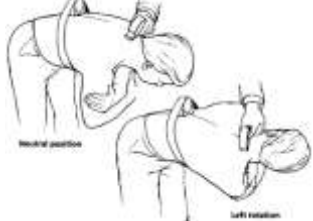




<i>Individual Test Results</i>		Range of Motion		NORMATIVE DATA [‡]	
Joint/Axis Tested	DATE	ROM Value	Valid [†]	Population Norm	Percent of Norm
Cervical Flexion (1)	07/13/99	50 deg	Yes	50 deg	100 %
Cervical Extension	07/13/99	47 deg	Yes	60 deg	78 %
Cervical Lateral Flexion - Left (2)	07/13/99	35 deg	Yes	45 deg	78 %
Cervical Lateral Flexion - Right	07/13/99	44 deg	Yes	45 deg	98 %
Cervical Rotation - Left (3)	07/13/99	75 deg	Yes	80 deg	94 %
Cervical Rotation - Right	07/13/99	87 deg	Yes	80 deg	109 %
Thoracic Flexion (4)	07/13/99	50 deg	Yes	50 deg	100 %
Thoracic Rotation - Left (5)	07/13/99	21 deg	Yes	30 deg	70 %
Thoracic Rotation - Right	07/13/99	21 deg	Yes	30 deg	70 %
Lumbar Flexion (6)	07/13/99	59 deg	Yes	60 deg	98 %
Lumbar Extension	07/13/99	14 deg	Yes	25 deg	56 %
Lumbar Lateral Flexion - Left (7)	07/13/99	25 deg	Yes	25 deg	100 %
Lumbar Lateral Flexion - Right	07/13/99	33 deg	Yes	25 deg	132 %
Straight Leg Raise Right (8)	07/13/99	62 deg	Yes	n/a	n/a
Straight Leg Raise Left (9)	07/13/99	72 deg	Yes	n/a	n/a

(“n/a” indicates results that are not available or applicable for the listed task)

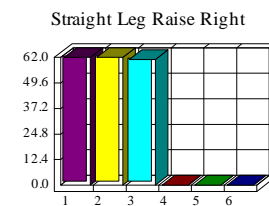
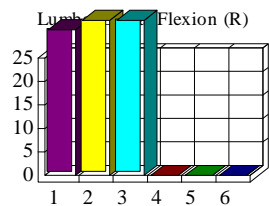
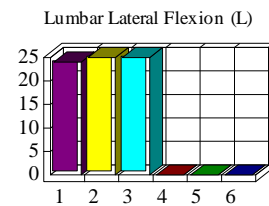
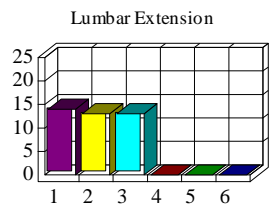
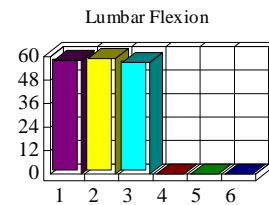
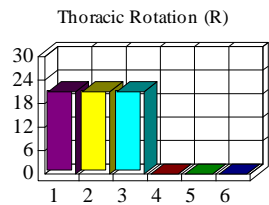
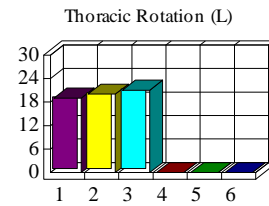
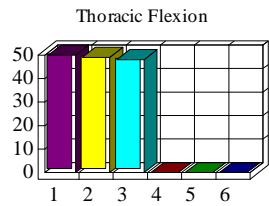
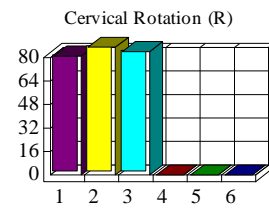
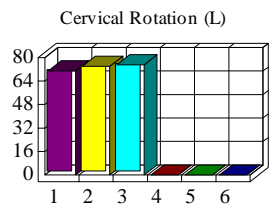
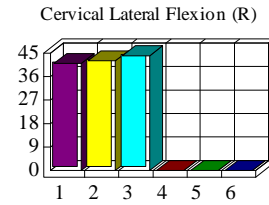
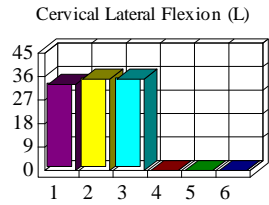
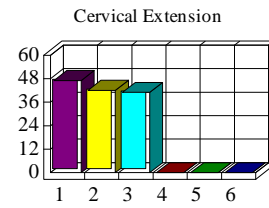
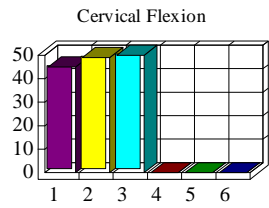
<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(1) NONE.	
(2) NONE.	

[‡] From “Guides to the Evaluation of Permanent Impairment”, Fourth and Fifth Editions, American Medical Association, 1995 & 2001.

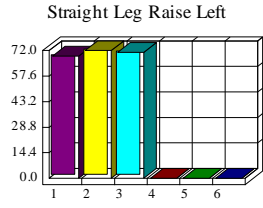
[†] The AMA “Guides” validity criterion is three consecutive measurements within ±5° or ±10% of mean value.

<p><i>COMMENTS (referenced by number from test result table)</i></p>	<p>Comment Picture</p>
<p>(3) PULLING IN UPPER CERVICALS ON LEFT AND RIGHT.</p>	
<p>(4) HAS A 'KNOT' BETWEEN SCAPULA AT T5-6 LEVEL. ACHING ACROSS LOWER BACK.</p>	
<p>(5) HAS BURNING ACROSS LOWER BACK.</p>	
<p>(6) STIFFNESS FROM LOWER BACK TO MID THORACICS. CONSTANT BURN ACROSS LOWER BACK.</p>	
<p>(7) WHEN IN RIGHT LATERAL FLEXION THE PAIN WAS FELT ON THE LEFT SIDE OF THE LOWER BACK.</p>	
<p>(8) WHEN AT MAXIMUM RIGHT SIDE STRAIGHT LEG RAISE HE FELT TINGLING DOWN HIS RIGHT LEG. IN MAX WHOLE RT LEG TINGLES.</p>	
<p>(9) FEELS PULLING IN RIGHT HIP FLEXOR MUSCLES. HAS MILD TINGLING IN LEFT LEG WHEN IN MAXIMUM STRAIGHT LEG RAISE POSITION. FEELS MILD TINGLING DOWN LEFT LEG.</p>	

RM Test Graphs (in order of Test Results)



RM Test Graphs (*in order of Test Results*)



Cervical ROM Impairment Report **Test Date: 07/13/99**

Movement	Description	Range					
Cervical Flexion	Occipital ROM	46	49	50			
	T1 ROM	1	0	0			
	Cervical flexion angle	45	49	50			
	± 10% or 5° ?	Yes					
	Maximum cervical flexion angle	50					
	% Impairment	0					
Cervical Extension	Occipital ROM	51	47	46			
	T1 ROM	4	5	5			
	Cervical extension angle	47	42	41			
	±10% or 5° ?	Yes					
	Maximum cervical extension angle	47					
	% Impairment	2					
Cervical Ankylosis in Flexion/Extension	Position	(Excludes any impairment for abnormal flexion/extension motion)					
	% Impairment						
Cervical Right Lateral Flexion	Occipital ROM	41	42	44			
	T1 ROM	0	0	0			
	Cervical right lat flexion angle	41	42	44			
	±10% or 5° ?	Yes					
	Maximum cervical right lat flexion angle	44					
	% Impairment	0					
Cervical Left Lateral Flexion	Occipital ROM	35	38	40			
	T1 ROM	2	3	5			
	Cervical left lat flexion angle	33	35	35			
	±10% or 5° ?	Yes					
	Maximum cervical left lat flexion angle	35					
	% Impairment	1					
Cervical Ankylosis in Lateral Flexion/Extension	Position	(Excludes any impairment for abnormal lateral flexion/extension motion)					
	% Impairment						
Cervical Right Rotation	Cervical right Rotation angle	81	87	84			
	±10% or 5° ?	Yes					
	Maximum cervical right rotation angle	87					
Cervical Left Rotation	Cervical left Rotation angle	71	74	75			
	±10% or 5° ?	Yes					
	Maximum cervical left rotation angle	75					
Cervical Ankylosis in Rotation	Position	(Excludes any impairment for abnormal rotation)					
	% Impairment						
Total Cervical Range of Motion Impairment (add all ROM impairments if no ankylosis; use largest ankylosis impairment value if ankylosis is present)		3 %					

Note: Shaded column shows which measurement (of three consecutive within 5° or 10%) produced maximum ROM value.

Thoracic ROM Impairment Report	Test Date: 07/13/99
---------------------------------------	----------------------------

Movement	Description	Range					
Angle of Minimum Kyphosis (Thoracic Ankylosis in Extension)	T1 reading	38	XXXX	XXXX	XXXX	XXXX	XXXX
	T12 reading	0	XXXX	XXXX	XXXX	XXXX	XXXX
	Angle of minimum kyphosis	38	XXXX	XXXX	XXXX	XXXX	XXXX
	% Impairment due to thoracic ankylosis	5 (Use larger of either ankylosis or flexion impairment)					
Thoracic Flexion	T1 ROM	50	49	48			
	T12 ROM	0	0	0			
	Thoracic flexion angle	50	49	48			
	±10% or 5° ?	Yes					
	Maximum thoracic flexion angle	50					
	% Impairment	0					
Thoracic Right Rotation	T1 ROM	31	33	30			
	T12 ROM	10	12	9			
	Thoracic right rotation angle	21	21	21			
	±10% or 5° ?	Yes					
	Maximum thoracic right rotation angle	21					
	% Impairment	1					
Thoracic Left Rotation	T1 ROM	25	28	27			
	T12 ROM	6	8	6			
	Thoracic left rotation angle	19	20	21			
	±10% or 5° ?	Yes					
	Maximum thoracic left rotation angle	21					
	% Impairment	1					
Thoracic Ankylosis in Rotation	Position	(Excludes any impairment for abnormal flexion / extension motion)					
	% Impairment						
Total Thoracic Range of Motion Impairment (add all ROM impairments if no ankylosis is present; use largest ankylosis impairment value if ankylosis is present)		7 %					

Note: Shaded column shows which measurement (of three consecutive within 5° or 10%) produced maximum ROM value.

Lumbar ROM Impairment Report	Test Date: 07/13/99
-------------------------------------	----------------------------

Movement	Description	Range					
Lumbar Flexion	T12 ROM	77	80	78			
	Sacral ROM	19	21	21			
	True lumbar flexion angle ± 10% or 5° ?	58	59	57			
	Maximum true lumbar flexion angle	59 = 73% of T12 ROM					
	% Impairment	* Not Valid *					
Lumbar Extension	T12 ROM	18	16	20			
	Sacral ROM	4	3	7			
	True lumbar extension angle ±10% or 5° ?	14	13	13			
	Maximum true lumbar extension angle	14 (add Sacral flexion and extension ROM and compare to tightest Straight Leg Raising Angle)					
	% Impairment	* Not Valid *					
Straight Leg Raising Right	Right SLR	62	62	61			
	±10% or 5° ?	Yes		(if tightest SLR ROM exceeds sum of Sacral flexion and extension by more than 15°, Lumbar ROM test is invalid)			
	Maximum SLR Right	62					
Straight Leg Raising Left	Left SLR	69	72	71			
	±10% or 5° ?	Yes		(if tightest SLR ROM exceeds sum of Sacral flexion and extension by more than 15°, Lumbar ROM test is invalid)			
	Maximum SLR Left	72					
Lumbar Right Lateral Flexion	T12 ROM	35	37	37			
	Sacral ROM	4	4	4			
	Lumbar right lat flexion angle ±10% or 5° ?	31	33	33			
	Maximum lumbar right lat flexion angle	33					
	% Impairment	0					
Lumbar Left Lateral Flexion	T12 ROM	26	30	29			
	Sacral ROM	2	5	4			
	Lumbar left lat flexion angle ±10% or 5° ?	24	25	25			
	Maximum lumbar left lat flexion angle	25					
	% Impairment	0					
Lumbar Ankylosis in	Position	(Excludes any impairment for abnormal flexion/extension motion)					
Lateral Flexion	% Impairment						
Total Lumbar Range of Motion Impairment (add all ROM impairments if no ankylosis; use ankylosis impairment value if ankylosis is present)		0 %					


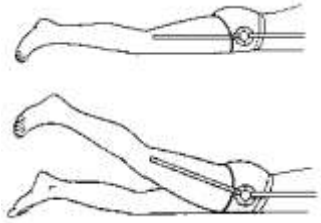
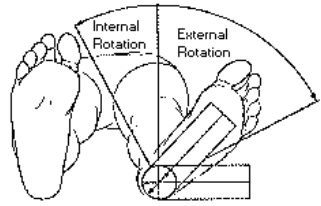
Note: Shaded column shows which measurement (of three consecutive within 5° or 10%) produced maximum ROM value.

VerNova EG - Extremity ROM Goniometer Report:


The patient was evaluated using the VerNova EG computerized electronic goniometer. This device is designed to quantify an individual's range of motion (ROM) on one or more of the extremities, and to compare these ROM values to recognized population norms.

<i>Individual Test Results</i>		Range of Motion		NORMATIVE DATA [‡]		
Joint/Axis Tested	DATE	LEFT	RIGHT	NORM	LEFT %Norm	RIGHT %Norm
Knee Flexion (1)	07/13/99	125 deg	127 deg	120 deg	104 %	106 %
Knee Extension	07/13/99	2 deg	2 deg	0 deg	n/a %	n/a %
Hip Extension (2)	07/13/99	26 deg	24 deg	30 deg	87 %	80 %
Hip Internal Rotation (3)	07/13/99	22 deg	12 deg	30 deg	73 %	40 %
Hip External Rotation	07/13/99	66 deg	65 deg	40 deg	165 %	163 %
Ankle Dorsi Flexion (4)	07/13/99	6 deg	9 deg	20 deg	30 %	45 %
Ankle Plantar Flexion	07/13/99	38 deg	46 deg	30 deg	127 %	153 %

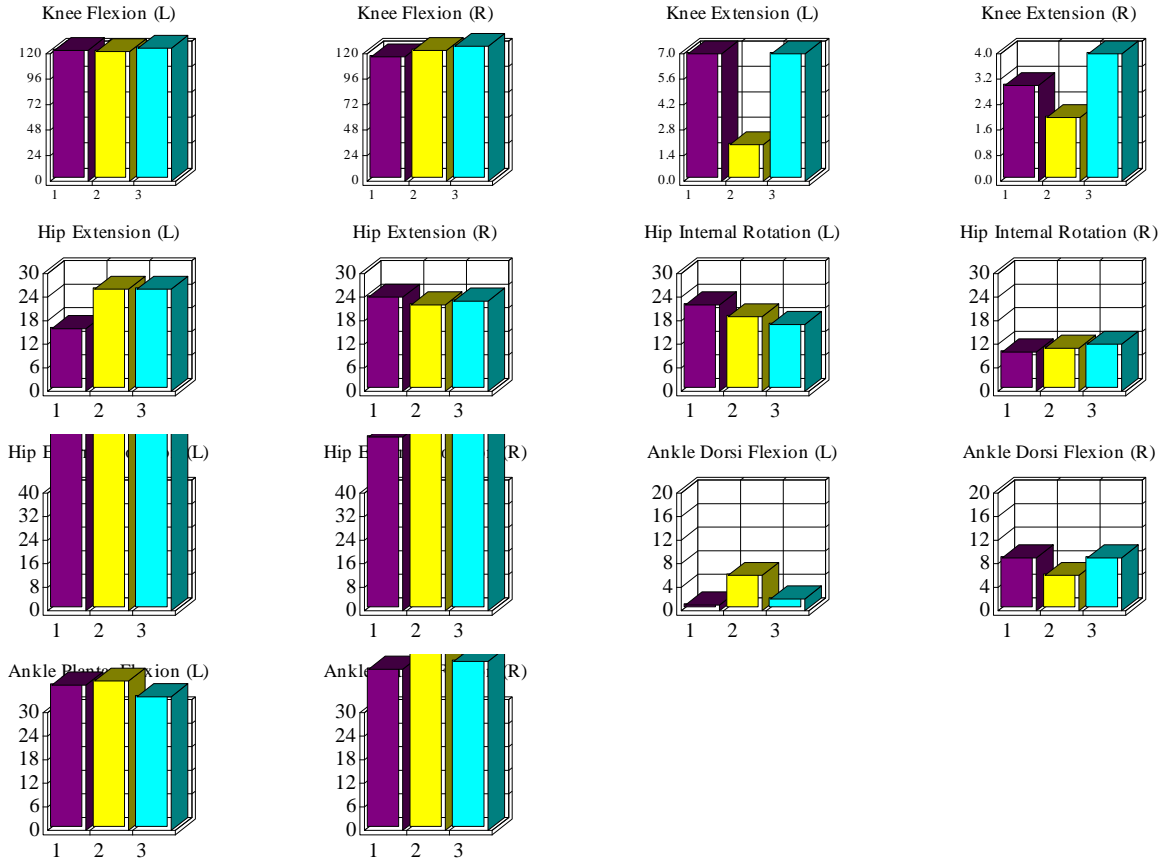
("n/a" indicates results that are not available or applicable for the listed task)

<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
(1) LEFT AND RIGHT HIP FLEXOR MUSCLES ARE ACHING.	
(2) FEELS PAIN ON THE OPPOSITE SIDE OF LOWER BACK WHEN OTHER IS IN EXTENSION.	
(3) BURNING IN LEFT AND RIGHT SIDE GLUTEAL MUSCLES TO UPPER THORACIC PARASPINAL MUSCLES. ACHING LEFT AND RIGHT HIP FLEXORS	

[‡] From "Guides to the Evaluation of Permanent Impairment", Fourth and Fifth Editions, American Medical Association, 1995 and 2001.

<i>COMMENTS (referenced by number from test result table)</i>	Comment Picture
<p>(4) THE PATIENT NOW HAS CONSTANT LOWER BACK PAIN.</p> <p>HAS A SEVERE CRAMPIN RIGHT GASTROC. MUSCLE.</p>	

EG Test Graphs (in order of Test Results)



Canadian Aerobic Fitness Test Results:

The patient was evaluated using the *Canadian Aerobic Fitness Test (CAFT)*. This test is designed to measure an individual’s cardiovascular fitness level through the use of a simple, submaximal stepping procedure. The test is performed by having the patient step for up to three consecutive three-minute sessions on double 20.3 cm steps. The stepping rate increases for each session, and is determined by the patient’s age and gender. The patient’s heart rate is monitored during the test for safety (test is terminated if heart rate exceeds 85-90% of age-adjusted maximal heart rate). At the end of each session the patient stops exercising for ten seconds while their heart rate is measured. If the patient’s heart rate is below a predetermined ceiling following each of the first two sessions, an additional session is performed at an increased step rate. The heart rate measured at the end of the *last* session is used to determine the patient’s fitness category (one of five standard levels as shown in table C1, below) as well as a prediction of the patient’s aerobic capacity (**VO₂ Max** in ml/kg/min). Also included is the equivalent category of work (Physical Demand Characteristic or PDC) based on the energy cost of the stepping activity performed. Test results are as follows:

Results	Heart Rate Information				Aerobic Fitness Score			
	DATE	Start of Test	End 1st Session	End 2nd Session	End 3rd Session	Predicted VO ₂ Max	Classification	PDC Equivalent
	07/13/99	101	111	110	116	42.2	Above Average (80%tile)	Heavy (5.9 kcal/min)

(“n/a” indicates results that are not available or applicable for the listed task)

Table C1 CAFT Step Test Fitness scores [‡] for adult males and females	Classification	Predicted VO ₂ Max (ml/kg/min) – by age and gender							
		20 – 29		30 – 39		40 – 49		50 – 59	
	M	F	M	F	M	F	M	F	
	Excellent	≥ 57	≥ 40	≥ 48	≥ 37	≥ 42	≥ 35	≥ 38	≥ 30
	Above Average	52-56	37-39	46-47	34-37	40-42	32-34	36-38	27-29
	Average	43-51	35-37	42-45	31-33	37-39	26-31	34-35	25-27
	Below average	40-42	32-34	38-41	29-31	34-37	24-25	31-33	22-25
	Poor	≤ 40	≤ 31	≤ 37	≤ 29	≤ 33	≤ 23	≤ 30	≤ 21

[‡] Based on data from the Canadian Fitness Survey, 1981.

VerNova MTM Functional Abilities Evaluation:

VerNova MTM evaluates occupational Physical Demand Characteristics (PDC) based on Methods-Time Measurement (MTM) data, the most widely developed and validated work analysis system in the world. MTM data is used to establish fair labor standards by numerous employers and unions and has been accepted in the courts and in arbitration as a valid standard of work performance. The MTM system has been used in personnel selection and disability evaluation for thirty years (Acker and Thompson, 1960; Anderson and Edstrom; Birdsong, 1972; Birdsong and Chyatte, 1970; Brickey, Drewes; 1961; Farrell, 1993; Foulke; Grant et al., 1975; Mink, 1975; McQuaid and Winkler; Poocke; Todd et al., 1979; Wilcock, 1980; Wilcock and Mink, 1982; Yokomizo, 1985).

An evaluatee's demonstrated ability in the assessment is compared to the MTM Industrial Standard (IS), the time it takes an average worker with average skill to perform a specific motion throughout an average eight hour day (Karger and Hancock, 1982; Karger and Bayha, 1987; Maynard et al., 1948; MTM Assoc, 1972, 1980).

The VerNova MTM Report presents data from the evaluation in tabular form, as shown and defined below:

Trial	Body Side	Wgt/Pos.	Dist/Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed

Trial	Count of repetitions of the identical task, repeated for consistency and endurance measurement. A series of Trials comprise a Set . MTM tests may consist of several sets of data.
Body Side	Indicating if the activity was performed with the right, left or both body members, if applicable. Dominant side, if applicable, is indicated by "Dom."
Wgt/Pos.	The weight of the object being handled in the activity, or the body position used for this activity (varies by activity).
Dist/Plane	Distance over which the activity was performed (for return trips, the distance is one way through the round trip), or the plane in which the activity was performed (varies by activity).
Reps	Repetitions that the activity was performed through the distance noted. Definition of Reps is presented in each table footnote.
Time (sec)	The evaluatee's time to perform a single trial of the activity.
% IS	The evaluatee's time compared to the Industrial Standard (IS) time, and reported as a percentage of the IS. An evaluatee can score at, above or below 100% IS, representing an ability that meets, exceeds or falls below the Industrial Standard for that activity.
CV (%)	Coefficient of variance (CV) is a statistical representation of consistency of evaluatee trial times. A minimum of three trials must be collected to calculate a CV. The empirically derived CV for MTM data is 8%. This evaluation uses a consistency threshold of 10% to allow for a 'learning curve' that is present in these activities. Many factors can affect test scores, including physical impairment, environmental conditions and motivation. CV's slightly greater than 10% should not automatically be interpreted as indication of lack of evaluatee reliability. Reliability must be determined by a suitably qualified evaluator. This data is computed at the end of a set, hence the CV is presented in the Avg table row for sets with three or more trials. When multiple sets are performed, the CV reported in the MTM Summary Table is calculated from all trials and thus does NOT represent the consistency within sets. The reader should refer to the MTM details for valid consistency data.
PE:HR	The Borg Perceived Exertion (PE) Scale is a self-report scale of degree of exertion the evaluatee perceived during the activity. Heart Rate (HR), if present, is the evaluatee's measured heart rate. Perceived exertion "integrates various information, including the many signals elicited from the peripheral muscles and joints, from the central cardiovascular and respiratory functions, and from the central nervous system" (Borg, 1982). This data is optionally collected at the end of a set, hence PE and HR are shown in the Avg row.
Time Set Completed	The time (recorded by the computer) when the last trial of the set of activity was completed.
<i>The following items appear within or below the table of results</i>	
Avg: S1	The averages per set (ie. S1 represents Set 1). Evaluatee time is averaged across all trials, the average time forms the basis for a comparison to the Industrial Standard to calculate the average percent IS.
Comments (listed below results table)	Evaluator notation of inappropriate body mechanics and/or presence of symptom complaints or behaviors is indicated by a ☒. Comments in reference to the completed set of activity follow if noted by the evaluator. Pictures associated with the activity are presented to the right of the comments box if the evaluator included a picture for the activity.

Walk: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	None	None	12 Ft	3	24.6	104.0			
2	None	None	12 Ft	3	24.1	106.2			
3	None	None	12 Ft	3	23.4	109.4			
Avg: S1	None	None	12 Ft	3	24.0	> 106.5 <	2.0	1 : n/a	11:56

(Reps indicates Return Trips for this activity)

Comments for Walk, by Set (e.g. S1)	
S1:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors NONE.



Carry: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Both	11 Lb	12 Ft	1	7.0	142.3			
2	Both	11 Lb	12 Ft	1	7.2	138.3			
3	Both	11 Lb	12 Ft	1	7.4	134.6			
Avg: S1	Both	11 Lb	12 Ft	1	7.2	> 138.3 <	2.3	n/a : n/a	11:59
1	Both	21 Lb	12 Ft	1	7.3	137.7			
2	Both	21 Lb	12 Ft	1	7.7	130.6			
3	Both	21 Lb	12 Ft	1	7.4	135.9			
Avg: S2	Both	21 Lb	12 Ft	1	7.5	> 134.6 <	2.3	n/a : n/a	12:01
1	Both	51 Lb	12 Ft	1	8.5	147.2			
2	Both	51 Lb	12 Ft	1	8.7	143.8			
3	Both	51 Lb	12 Ft	1	8.8	142.2			
Avg: S3	Both	51 Lb	12 Ft	1	8.7	> 144.3 <	1.4	5 : n/a	14:56

(Reps indicates Return Trips for this activity)

Comments for Carry, by Set (e.g. S1)	
S1:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S2:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors hip pain
S3:	<input type="checkbox"/> Inappropriate Body Mechanics <input checked="" type="checkbox"/> Symptom Complaints or Behaviors LOWER BACK IS BURNING. HE IS FEELING A 'PINCH' IN LOWER BACK.



Push/Pull Cart: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Push	41 Lb	8 Ft	1	2.4	102.0			
2	Push	41 Lb	8 Ft	1	2.1	116.6			
3	Push	41 Lb	8 Ft	1	2.3	106.4			
Avg: S1	Push	41 Lb	8 Ft	1	2.3	> 108.0 <	5.5	n/a : n/a	08:14
1	Pull	41 Lb	8 Ft	1	3.0	81.6			
2	Pull	41 Lb	8 Ft	1	3.2	76.5			
3	Pull	41 Lb	8 Ft	1	3.1	79.0			
Avg: S2	Pull	41 Lb	8 Ft	1	3.1	> 79.0 <	2.6	3 : n/a	08:14

(Reps indicates One Way Trips for this activity)

Comments for Pull Cart, by Set (e.g. S1)	
S1:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors in turning
S2:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors tight lb



Balance: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	None	None	12 paces	1	5.6	131.1			
2	None	None	12 paces	1	5.2	141.2			
3	None	None	12 paces	1	5.4	136.0			
Avg: S1	None	None	12 paces	1	5.4	> 136.0 <	3.0	3 : n/a	14:58

(Reps indicates One Way Trips for this activity)

Comments for Balance, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 LOWER BACK IS BEGINNING TO TIGHTEN UP.



Crawl: (tested 8/13/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Both	None	8 Ft	1	7.9	131.2			
2	Both	None	8 Ft	1	8.1	128.0			
3	Both	None	8 Ft	1	8.3	124.9			
Avg: S1	Both	None	8 Ft	1	8.1	> 128.0 <	2.0	3 : n/a	14:58

(Reps indicates One Way Trips for this activity)

Comments for Crawl, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors



Stoop: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	<2 Lb	None	6	17.7	74.3			
2	Dom.	<2 Lb	None	6	17.4	75.6			
3	Dom.	<2 Lb	None	6	16.6	79.2			
Avg: S1	Dom.	<2 Lb	None	6	17.2	> 76.3 <	2.7	5 : n/a	12:18

(Reps indicates Return Trips for this activity)

Comments for Stoop, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 LOWER BACK IS FEELING 'FATIGUED'
 HAS PAIN ALONG THE SPINE IN LOWER THORACICS.

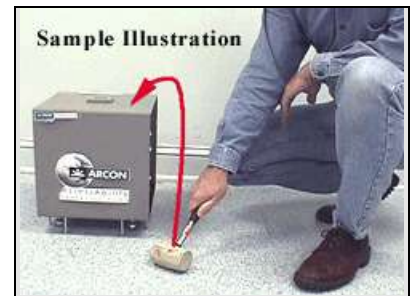


Crouch: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	<2 Lb	None	6	8.5	86.4			
2	Dom.	<2 Lb	None	6	7.3	100.6			
3	Dom.	<2 Lb	None	6	6.9	106.4			
Avg: S1	Dom.	<2 Lb	None	6	7.6	> 97.1 <	9.0	3 : n/a	12:20

(Reps indicates Return Trips for this activity)

Comments for Crouch, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 HAS A BURNING FEELING IN LOWER BACK.

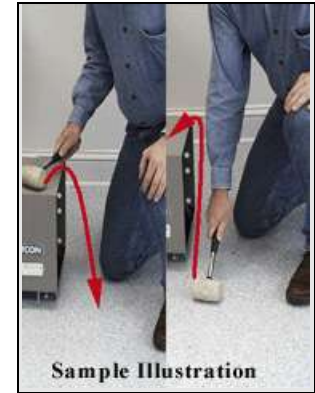


Kneel: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	<2 Lb	None	6	8.8	108.4			
2	Dom.	<2 Lb	None	6	8.4	113.5			
3	Dom.	<2 Lb	None	6	7.7	123.8			
Avg: S1	Dom.	<2 Lb	None	6	8.3	> 114.9 <	5.5	2 : n/a	08:36

(Reps indicates Return Trips for this activity)

Comments for Kneel, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 HAS BURNING IN LOWER BACK AND PAIN IN CENTER OF LUMBAR REGION.



Climb Stairs: (tested 7/14/1999)

Trial	Body Side	Weight	Distance	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	None	None	10 stairs	1	5.4	124.7			
2	None	None	10 stairs	1	5.6	120.2			
3	None	None	10 stairs	1	5.6	120.2			
Avg: S1	None	None	10 stairs	1	5.5	> 121.7 <	1.7	5 : n/a	15:01

(Reps indicates One Way Trips for this activity)

Comments for Climb Stairs, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 HAS A 'KNOT' IN LOWER BACK.



Reach to Front: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Right	Sitting	Immediate	6	5.0	133.9			
2	Right	Sitting	Immediate	6	4.3	155.7			
3	Right	Sitting	Immediate	6	4.7	142.5			
Avg: S1	Right	Sitting	Immediate	6	4.7	> 143.5 <	6.1	n/a : n/a	12:26
1	Left	Sitting	Immediate	6	3.7	181.0			
2	Left	Sitting	Immediate	6	3.8	176.2			
3	Left	Sitting	Immediate	6	3.7	181.0			
Avg: S2	Left	Sitting	Immediate	6	3.7	> 179.4 <	1.3	n/a : n/a	12:27
1	Right	Sitting	Overhead	6	4.2	159.4			
2	Right	Sitting	Overhead	6	4.4	152.2			
3	Right	Sitting	Overhead	6	4.2	159.4			
Avg: S3	Right	Sitting	Overhead	6	4.3	> 156.9 <	2.2	n/a : n/a	12:28
1	Left	Sitting	Overhead	6	4.0	167.4			
2	Left	Sitting	Overhead	6	4.0	167.4			
3	Left	Sitting	Overhead	6	4.3	155.7			
Avg: S4	Left	Sitting	Overhead	6	4.1	> 163.3 <	3.4	.5 : n/a	12:29

(Reps indicates Return Trips for this activity)

Comments for Reach to Front, by Set (e.g. S1)	
S1:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S2:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S3:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S4:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors NONE.



Reach Side/Across: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Right	Sitting	Immediate	9	7.7	130.4			
2	Right	Sitting	Immediate	9	7.2	139.5			
3	Right	Sitting	Immediate	9	6.8	147.7			
Avg: S1	Right	Sitting	Immediate	9	7.2	> 138.9 <	5.1	n/a : n/a	12:30
1	Left	Sitting	Immediate	9	8.0	125.5			
2	Left	Sitting	Immediate	9	6.9	145.6			
3	Left	Sitting	Immediate	9	7.6	132.2			
Avg: S2	Left	Sitting	Immediate	9	7.5	> 133.9 <	6.1	n/a : n/a	12:31
1	Right	Sitting	Overhead	9	7.2	139.5			
2	Right	Sitting	Overhead	9	6.8	147.7			
3	Right	Sitting	Overhead	9	6.5	154.5			
Avg: S3	Right	Sitting	Overhead	9	6.8	> 147.0 <	4.2	n/a : n/a	12:32
1	Left	Sitting	Overhead	9	7.8	128.8			
2	Left	Sitting	Overhead	9	8.1	124.0			
3	Left	Sitting	Overhead	9	7.0	143.5			
Avg: S4	Left	Sitting	Overhead	9	7.6	> 131.6 <	6.1	.5 : n/a	12:32

(Reps indicates Return Trips for this activity)

Comments for Reach Side/Across, by Set (e.g. S1)	
S1:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S2:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S3:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors
S4:	<input type="checkbox"/> Inappropriate Body Mechanics <input type="checkbox"/> Symptom Complaints or Behaviors NONE.



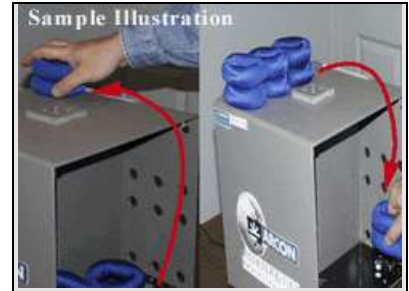
Reach with Weight: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	Standing	Immediate	8	10.5	128.4			
2	Dom.	Standing	Immediate	8	11.1	121.5			
3	Dom.	Standing	Immediate	8	12.2	110.5			
Avg: S1	Dom.	Standing	Immediate	8	11.3	> 122.0 <	6.2	2 : n/a	08:18

(Reps indicates Weight Moves for this activity)

Comments for Reach with Weight, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



Handling: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	Standing	Immediate	12	13.1	125.2			
2	Dom.	Standing	Immediate	12	11.9	137.8			
3	Dom.	Standing	Immediate	12	11.1	147.7			
Avg: S1	Dom.	Standing	Immediate	12	12.0	> 136.3 <	6.8	1 : n/a	12:38

(Reps indicates Peg Turns for this activity)

Comments for Handling, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



Bi-Manual Handling: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Both	Standing	Immediate	6	7.3	145.9			
2	Both	Standing	Immediate	6	6.5	163.8			
3	Both	Standing	Immediate	6	7.0	152.1			
Avg: S1	Both	Standing	Immediate	6	6.9	> 153.6 <	4.8	1 : n/a	12:40

(Reps indicates Pegs/Hand for this activity)

Comments for Bi-Manual Handling, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



Fingering: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	Standing	Immediate	10	15.9	100.0			
2	Dom.	Standing	Immediate	10	13.7	116.1			
3	Dom.	Standing	Immediate	10	13.7	116.1			
Avg: S1	Dom.	Standing	Immediate	10	14.4	> 110.2 <	7.2	1 : n/a	12:45

(Reps indicates Rivet Moves for this activity)

Comments for Fingering, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



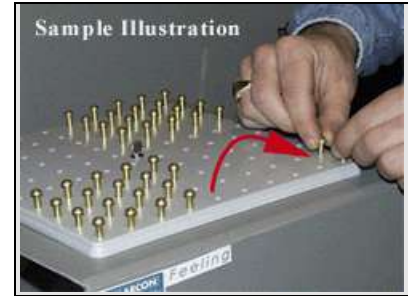
Bi-Manual Fingering: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Both	Standing	Immediate	5	16.9	126.7			
2	Both	Standing	Immediate	5	15.1	141.8			
3	Both	Standing	Immediate	5	14.4	148.7			
Avg: S1	Both	Standing	Immediate	5	15.5	> 138.4 <	6.8	1 : n/a	12:47

(Reps indicates Rivets/Hand for this activity)

Comments for Bi-Manual Fingering, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



Feeling: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Both	Standing	Immediate	6	9.7	111.2			
2	Both	Standing	Immediate	6	9.6	112.3			
3	Both	Standing	Immediate	6	8.5	126.9			
Avg: S1	Both	Standing	Immediate	6	9.3	> 116.4 <	5.9	n/a : n/a	12:49

(Reps indicates Shape IDs for this activity)

Comments for Feeling, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



Eye-Hand-Foot: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	Standing	Immediate	6	12.2	132.8			
2	Dom.	Standing	Immediate	6	14.2	114.1			
3	Dom.	Standing	Immediate	6	14.4	112.5			
Avg: S1	Dom.	Standing	Immediate	6	13.6	> 119.1 <	7.3	3 : n/a	08:19

(Reps indicates Peg Movements for this activity)

Comments for Eye-Hand-Foot, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



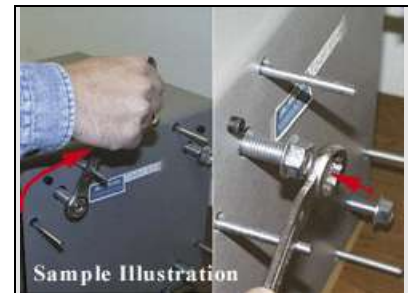
Tool Use: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	Dom.	Standing	Immediate	6	10.1	132.3			
2	Dom.	Standing	Immediate	6	10.3	129.8			
3	Dom.	Standing	Immediate	6	11	121.5			
Avg: S1	Dom.	Standing	Immediate	6	10.5	> 127.7 <	3.7	3 : n/a	15:03

(Reps indicates Tool Movements for this activity)

Comments for Tool Use, by Set (e.g. S1)

S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 NONE.



Stand/Sit: (tested 7/14/1999)

Trial	Body Side	Position	Plane	Reps	Time (sec)	% IS	CV (%)	PE:HR	Time Set Completed
1	None	Stand-Sit	None	1	2.7	104.1			
2	None	Stand-Sit	None	1	2.7	104.1			
3	None	Stand-Sit	None	1	2.8	100.4			
Avg: S1	None	Stand-Sit	None	1	2.7	> 102.9 <	1.7	3 : n/a	08:37

(Reps indicates Return Trips for this activity)

Comments for Stand/Sit, by Set (e.g. S1)
S1: Inappropriate Body Mechanics Symptom Complaints or Behaviors
 Twinge in back when standing.

