

Static Lift Analysis Report:

Subject Name: Sample Patient

Date of Birth: 5/2/63

Sex: Female

Subject Number: 123-45-6789

Exam Date: 03/16/1998

Height/Weight: 167.64 cm / 59.0 kg



A two-dimensional static lift analysis is utilized to reliably predict any biomechanical risks that may exist as a result of poor body mechanics, extreme postures, excessive load carrying or any combination of the three. To ensure a more accurate evaluation, anthropometric measurements are determined along with angular joint values. This evaluation can provide an improved level of comprehension as it relates to the musculoskeletal health of the individual assessed.

Load Carried: 30 KG	L5/S1	
Total Compressive Forces	4036.85 N > AL	907.57 lb
Total Shearing Forces	1003.61 N	225.63 lb
Total Torque or Bending Moment	182.01 N-m > AL	134.25 ft-lb
Total Reactive Force	5040.46 N	1133.20 lb
Erector Spinae Force	3640.26 N	818.40 lb
Compressive Force due to Load Carried	193.01 N	43.39 lb
Compressive Force due to Upper Body Weight	239.01 N	53.73 lb
Compressive Force due to Erector Spinae Muscles	3604.83 N	810.44 lb
Shearing Force due to Load Carried	222.04 N	49.92 lb
Shearing Force due to Upper Body Weight	274.95 N	61.81 lb
Shearing Forces due to Erector Spinae Muscles	506.63 N	113.90 lb
Horizontal Distance from L5/S1 to Hands	36.80 cm	14.49 in

	Angular Joint Values		Anthropometric Measurements	
	Biomechanical	Goniometric		
Cervical	70°	-29°	Shoulder to Ear	15.3 cm
Elbow	-76°	13°	Forearm	25.5 cm
Shoulder	-89°	50°	Upper Arm	26.0 cm
Trunk	41°	49°	Trunk	40.5 cm
Hip	-60°	30°	Upper Leg	31.4 cm
Knee	-100°	40°	Lower Leg	37.0 cm

Static Lift Analysis Report: Patient, Sample

Glossary of Terms:

ACTION LIMIT (AL): A load weight above which musculoskeletal injury incidence and severity rates increase moderately. It is defined by the following criteria:

1. Compressive forces acting on the L5/S1 spinal disc are 3425 N (770 lb) or greater.
2. Twenty-five percent of the female workers and one percent of the male workers do not have the muscle strengths to be capable of performing the work.
3. Metabolic rates would exceed 3.5 Kcal/minute (when integrated over an eight-hour day).
4. Lumbosacral torque equal to or greater than 163 N-m (120 ft-lb) is considered hazardous to all but the healthiest of workers.

BIOMECHANICS: The application of mechanics to the living human body.

COMPRESSION: Occurs when equal and opposite loads are applied toward the surface of the vertebrae.

MAXIMUM PERMISSIBLE LIMIT (MPL): A load weight at which musculoskeletal injury rates and severity rates have been shown to increase significantly. It is defined by the following criteria:

1. Compressive forces acting on the L5/S1 spinal disc are 6361 N (1430 lb) or greater.
2. Seventy-five percent of the men and ninety-percent of the women do not have the muscle strengths to be capable of performing the work.
3. Metabolic rates in excess of 5.0 Kcal/minute (when integrated over an eight-hour day).

MUSCULOSKELETAL: Refers to a system that consists of the peripheral parts of the motor system and comprises muscle and the connective tissue elements that form the skeleton.

SHEAR: Occurs when a force is applied parallel to the surface of the vertebrae.

TORQUE: Or moment of a force, is the product of a force times the perpendicular distance from it's line of action to the axis of motion (or potential motion). Force x Distance.

UPPER BODY WEIGHT (UBW): Represents approximately 65% of the force exerted by the total body weight.

References:

1. Smith LK, Weiss EL, Lehmkuhl LD., Brunnstrom's Clinical Kinesiology, 5th Edition., F.A. Davis Company., 1996.
2. Soderberg GL., Kenesiology, Application to Pathological Motion, 2nd Edition., Williams & Wilkins., 1997.
3. Enoka RM., Neuromuscular Basis of Kinesiology, 2nd Edition., Human Kinetics., 1994.
4. Gray H., Anatomy, Descriptive and Surgical, 1901 Edition., Running Press., 1994.
5. Nordin M, Frankel VH., Basic Biomechanics of the Musculoskeletal System, 2nd Edition., Lea & Febiger., 1989.
6. Magee DJ., Orthopedic Physical Assessment, 2nd Edition., Human Kinetics., 1994.
7. Ozkaya N, Nordin M., Fundamentals of Biomechanics., Van Nostrand Reinhold., 1991.
8. American Medical Association., Guides to the Evaluation of Permanent Impairment, 4th Edition., 1994.
9. Waters TR, Putz-Anderson V, Garg A., Applications Manual for the Revised NIOSH Lifting Equation., Cincinnati., U.S. Department of Health and Human Services, NIOSH., 1994.

Virtual X-Ray: Static Lift

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