

Comparison:

Progressive Isoinertial Life Evaluation

WEST Standard Evaluation

EPIC Lift Capacity Test

Introduction

The Progressive Isoinertial Lift Evaluation (PILE) and the EPIC Lift Capacity (ELC) test were both based on the WEST Standard Evaluation (WSE) developed by Leonard N. Matheson, PhD, at Rancho Los Amigos Hospital in Downey, California, in the 1970s.

The PILE was developed by Tom Mayer, MD, and Nancy Kishino, OTR, at the PRIDE clinic in Dallas, Texas, in the mid-1980s.

After several years of experience with the WSE and PILE, the ELC was developed by a team headed by Dr. Matheson to resolve inconsistencies in the earlier tests, take advantage of advances in technology, and address professional standards issues. Collaboration was provided by Vert Mooney, MD, of the University of California San Diego and Rowlin Lichter, MD, of CHART Rehabilitation with major contributions provided by Janet Grant RN of ERIC, Hamilton Hall MD, Tony Melles, PT, and Mike Affleck, HBSc of the Canadian Back Institute and Scott Leggett, MS, Scott Negri, MD, Bryon Holmes, PT, and Debbie Holmes, EP, of the OrthoMed program at the University of California San Diego.

Test Configuration

All three tests are progressive isoinertial tests of lift-lower capacity which use free weights.

The WSE uses a single series of progressive loads over the full vertical range, decreasing the range until a minimum is achieved which corresponds to the evaluatee's maximum acceptable weight.

The PILE uses a series of progressive loads over two vertical ranges at one frequency. The ELC uses a series of progressive loads over three vertical ranges at two frequencies.

For both the PILE and ELC, the evaluatee's maximum acceptable weight is recorded at each range.

Weight Increments

The WSE begins at 5 pounds and progresses in 5-pound increments to 30 pounds and at 10-pound increments thereafter to 110 pounds. The evaluatee is aware of the starting and incremental loads.

The PILE begins at 5 pounds for women and 10 pounds for men and progresses in 5-pound increments for women and 10-pound increments for men. The evaluatee is aware of the starting and incremental loads.

The ELC begins at 10 pounds and progresses in 10-pound increments. The evaluatee is not made aware of the starting and incremental loads. The ELC uses masked weight canisters to allow re-test confirmation of full effort.

Frequency

The WSE frequency is left to the discretion of the evaluator.

The PILE frequency is four lifts per 20-second cycle for each of the two vertical ranges.

The ELC frequency begins at one lift per cycle for each of the three vertical ranges and proceeds to four lifts per cycle for each range if the evaluatee is capable.

Duration of Testing

The time duration of each test depends on how far the evaluatee is able to proceed. In a “side to side” comparison with 30 pounds maximum, the WSE requires 24 minutes for a full-range test on an infrequent basis, while the ELC requires 16 minutes. With 80 pounds maximum, the WSE requires 42 minutes for a full-range test on an infrequent basis, while the ELC requires 24 minutes. Because it is not possible to test either full range or infrequent lifts with the PILE, no meaningful time comparison can be made.

Normative Data

The WSE and ELC both reference the U.S. Department of Labor Physical Demand Characteristics of Work (PDC) system and MTM norms.

There are no healthy normal reference data for the WSE, as there are for the PILE and ELC, though the PILE norms are quite limited and not tested for reliability.

In comparison, the ELC normative data are based on test-retest trials of healthy normal males and females ranging in age from 18 years to 60 years. Data sets of this quality are extremely difficult to achieve on more than small samples. There are more than 2,000 reference subjects in the normative pool for the ELC, which is updated periodically. Norms are published for males and females of several age groups.

Safety

All three tests use psychophysical criteria to identify maximum load levels. The High Risk Work Style Guidelines developed for the WSE are applied in simpler form on the ELC, while body mechanics are not measured on the PILE.

A “Rating of Perceived Load” system was developed especially for the ELC and is not available on the WSE or the PILE.

In addition, the ELC and PILE use heart rate response limits and gender-height-based biomechanical limits, neither of which is available on the WSE.

Only the ELC provides a “heart rate window” within which the test is conducted in order to minimize cardiovascular risk.

All three tests have peer-reviewed research studies that demonstrate their safe use in populations of persons with physical impairments.



Control and Support

The WSE and PILE are not copyrighted or patent protected and can be used without restriction. The ELC is protected with both copyrights and a United States patent. This restricts use of the ELC to qualified evaluators.

Neither the WSE nor the PILE is supported by its developers, with no research published on either test for several years, while the ELC is supported by Dr. Matheson and his colleagues who also sponsor a training and certification program, ongoing research and frequent peer-reviewed scientific publications.

More than 1400 professionals in the world have been trained and certified on the ELC.