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EFFECTIVENESS OF PRE-EMPLOYMENT TESTING
The use of post-offer, pre-employment testing to reduce musculoskeletal disorders in the in the workplace


INTRODUCTION TO PRE-EMPLOYMENT FUNCTIONAL TESTING

## Overview

One-third of all work injury claims in 2011 were from musculoskeletal disorders (MSDs).[1]

Nearly two million American workers per year suffer an MSD, with 600,000 experiencing lost time.

Direct cost estimates are $15 to $20 billion, with total MSD-related costs (such as lost production and employee replacement costs) averaging $45 to $54 billion annually"[2-3]

Often, indemnity and other secondary costs comprise more of a cost than direct medical care[4-5]

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## Introduction

Employers have begun to search for more effective preventative services to combat the effects of work-related MSDs

Increasingly, employers have looked to such services as:

- Aggressive early reporting programs for MSDs
- Wellness and preventative programs
- Alternative models of heath care delivery like on site services and telehealth
- Pre-employment functional testing

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## Introduction to Pre-Employment Functional Testing

Pre-employment functional tests are designed to provide employers with a way to ensure that potential new workers can tolerate the physical requirements of the job

They can range from short 'lift tests' to longer duration evaluations that involve cardiovascular fitness, strength, and position tolerance

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## Introduction to Pre-Employment Functional Testing

Post offer, pre-employment testing is becoming more prevalent and common with companies that want to ensure their applicants can perform the physical demands of the job, while maintaining compliance with ADA guidelines.

Many studies have validated and supported the benefits of pre-employment testing which include:

- Decrease in incidence and prevalence of work-related musculoskeletal disorders
- Decrease in workers compensation costs
- Decrease in lost work days, and
- Increase in retention and decrease in turnover rates of workers

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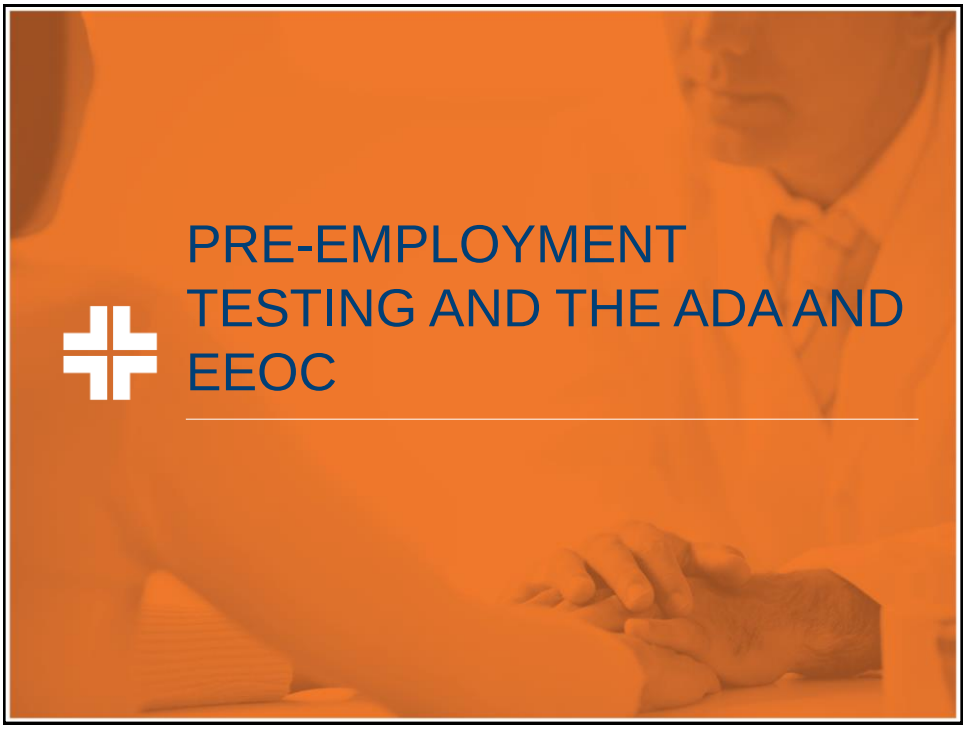


## Pre-employment Tests and the ADA and EEOC

- While pre-employment tests are highly beneficial to workers and employers, alike, there are specific guidelines for their use
- Both the Americans with Disabilities Act (ADA) and the Equal Employment Opportunity Commission (EEOC) limit what can and cannot be expected of a potential worker during a test
- In addition, the EEOC and the ADA limit the use of these tests to only a few specific situations to ensure that they are not used to discriminate against qualified individuals[6-7]

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## The ADA and Post-off, Pre-Employment Tests

### The ADA & Pre-Placement/Return to Work Testing

**If the examination tends to screen out individuals with disabilities it must be**

"job related and consistent with business necessity" [6]

**(29 CFR 1630.14(b))**

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## The ADA: The Concept of a Conditional Offer

An employer may make a job offer conditional upon passing of the Pre-placement functional test.

If the test is directly related to the functional tasks of the job, and a prospective employee fails one or more aspects of the test, the employer has the legal right to rescind the offer. This concept is similar to that of a post-offer, pre-employment drug screen.

The functional test must be given to each and every employee offered a job with such job title.

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## Defensibility

- Title I of the ADA addresses employment provisions and expressly prohibits the discrimination of “otherwise qualified individuals” due to a disability in all areas of employment.
- However, it permits employers to, as a qualification standard, ensure that an individual not pose a direct threat to the health or safety of other individuals in the workplace.
- The ADA defines “direct threat” as a significant risk to the health or safety of others that cannot be eliminated by reasonable accommodation.
- The Equal Employment Opportunity Commission (EEOC) regulations extend that definition to include situations where there is a significant risk to the individual as well as others.

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## Defensibility

- Determining whether an individual poses a “direct threat” requires an assessment of the individual’s ability to safely perform the essential functions of the job.
- This assessment, according to the EEOC, shall be based on a reasonable medical judgment that relies on the most current medical knowledge and/or the best available objective evidence.
- Following the ADA guidelines and having an external vendor determine the essential functions of a job will ensure a legally defensible test.

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## Validation of Essential Job Functions:

**A defensible pre-employment/post-offer testing program should follow specific steps in order to validate the essential functions which will be utilized when testing candidates:**

1. Onsite evaluation by the therapist to determine the essential job functions (EJFs) with a knowledgeable employee(s) or supervisor(s)
2. Through review of the rough draft of the EJF's, the employee or supervisor will certify that the data accurately collected the represents the EJF's
3. Other supervisors or employees will then review the report to ensure that it accurately depicts the true EJF’s of the job.
4. If needed, modifications are made to the EJF’s before it is finalized

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## The ADA & Post-Offer / Return To Work Testing

### Validation of the pre-employment/post offer test:

- The test is created based upon the validated EJF's.
- The test is reviewed by the employer to ensure that it meets their expectations.
- A group of employees or supervisors who are knowledgeable about the job will go through the test and determine if the test accurately measures the physical demands of the job
- If the test is not a good representation of the essential tasks, these employees will be given the opportunity to provide feedback for modifying the test components.

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## Validating a Post-offer, Pre-employment Functional Test

- If there is no pattern or grouping to the people who failed, then another 3 month trial should be started. Failure rates should be carefully monitored.
- If again, the failure rates are higher than expected, the test may need to be made easier from a physical demand level or individual tasks that may be causing the candidates to fail the test will need to be re-evaluated.
- Once the appropriate pass-fail rates are established and the make-up of the workforce is maintained at previous levels, the test is considered to be valid.

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# TYPES OF PRE-EMPLOYMENT TESTING

## Types of Pre-employment Functional Tests

Depending on the needs of the employer, a variety of options exist for pre-employment functional tests

Test components vary depending on the physical requirements of the job

Regardless of the type of pre-employment test, all ADA and EEOC requirements must be met

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## Types of Pre-Employment Functional Testing

### Isokinetic Testing:

Test pertaining to an exercise providing variable resistance to a movement at a constant speed; at times utilizing special equipment:

- Generally tests a person's isokinetic strength and then compares it to a measured norm
- Usually requires specialized equipment that can be costly
- Does not usually use real-life tools and equipment

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## Types of Pre-Employment Testing

### Dynamic Lift Testing

- Tests the capability/output of human muscles to move body segments against internal and external forces
- Usually involves lifting actual parts or equipment from the job or simulations using weights, lift boxes, carts and sleds, etc.
- The more the simulation represents the actual job the more the test is defensible

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## Types of Pre-Employment Testing

### Aerobic Testing

- Tests of the maximal amount of physiologic work that an individual can do as measured by oxygen consumption; i.e.. VO2 max
- Examples of this include the use of treadmills, arm bikes, bicycles, or step platforms
- The VO2 Max is then compared to the measured physiological requirements of the job to ensure that the worker can meet the aerobic demands of the job

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## Isokinetic Testing

### Support of isokinetic testing:

**A study of the effects of isokinetic pre-employment physical capability screening in the reduction of musculoskeletal disorders in a labor intensive work environment. By: Rosenblum KE, Shankar A[14]**

- Investigated the effects of pre-employment physical ability screening using isokinetic dynamometry in injury development, specific to musculoskeletal disorders (MSDs) of the knees, shoulders and back among workers in physically demanding jobs
- 503 new hires from US employer's 105 industrial yards were screened to match the physical demands of their prospective jobs and tracked for up to 33 months. Results were compared to a control group of 1423 workers.
- Conclusion that objective pre-employment screening may significantly reduce injuries in physically demanding jobs. Effective matching employee to physical demands of the job may be at lesser risk of injury and disability from both musculoskeletal disorders.

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## Isokinetic Testing, Continued

**Dueker et. al. Isokinetic trunk testing and employment. *Journal of Occupational Medicine.***

- Conclusion: There was no difference between the isokinetic scores of workers who experienced occupational low back injury and those workers who did not over almost a 6-year follow-up period. In this study isokinetic trunk evaluation was of no value in employee selection.[22]

**Mostardi et. al. Isokinetic lifting strength and occupational injury. A prospective study. *Spine*.**

- Conclusion: It was concluded that in this high risk population, in which loads are heavy and lifting postures are variable, the use of low-back strength or prior history of pain or injury are poor predictors as to subsequent low-back pain or injury.[23]

**Levene, J. The Effects of Functional Pre-employment Testing on Work Injuries and Workers' Compensation Costs.**

- Conclusion: isokinetic studies that tested subject's strength matched to job requirements reported favorable reduction in injury incidence and compensation costs.[24]

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## Dynamic Lift Testing

**Harbin and Olson. Post-offer, pre-employment testing in industry. *American Journal Independent Medicine.*[20]**

- Conclusion: This study indicates that physical capacity testing that compares lifting ability to job lifting requirements correlates to work injury incidence. The application of appropriate post-offer, pre-placement testing is shown to be a cost-effective method to lower the incidence of work-related injuries.

**Anderson and Briggs. A study of the effectiveness of ergonomically-based functional screening tests and their relationship to reducing worker compensation injuries. *Work.*[9]**

- Conclusion: A meta-analysis of the three predictive validation studies indicated that new-hires who passed the battery had a 47% lower worker compensation injury rate and 21% higher retention. A meta-analysis of the 175 pre/post-implementation studies indicated a 41% reduction in worker compensation injuries associated with implementation of ergonomically-based physical ability tests.

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## Dynamic Lift Testing

**Bunch, R. Pre-employment (Post-Offer, Pre-Placement) Functional Assessment and Benefits for Employee and Employer.[25]**

- Pre-employment physical function tests can prevent an injury of a new hire by measuring pre-existing impairments that can be used for second injury fund coverage and/or avoidance of claims after an injury for an impairment that was pre-existing at time of hire.
- Additionally, the evaluation/testing system can be utilized to teach proper body mechanics and personal wellness feedback based on physical assessment performance results.
- Net results: The employer is less likely to hire a person who will become injured while performing the essential duties of the job.
- Better qualified work force and improved productivity.
- Employer also protected against inappropriate claims of injuries related to pre-existing injuries.
- Pre-employment physical function tests are proven to be most effective system for matching employees to the job, reducing injuries and claims.

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## Aerobic Testing

**Sothmann et al. Age as a bona fide occupational qualification for firefighting. A review on the importance of measuring aerobic power. [26]**

- In this review, a rationale is presented for the measurement of aerobic power (VO2max) as a predictor of the physical performance capabilities.
- The study found that VO2max is an important predictor of performance effectiveness of firefighters to be used in conjunction with task-specific testing

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## Summary of Pre-Employment Functional Testing Types

- Levene concluded that not one testing methodology appears superior to another; it is evident that specific methods are most effective when they are matched to the essential job functions.[19]
- Pre-placement testing programs are most effective for jobs with heavy physical demands or higher, and less effective for jobs with medium or lower physical demands.
- According to the evidence, it is appropriate to recommend testing of the physical essential job functions as a strategy to lower injury rates and costs for jobs requiring heavy physical demands.

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## Costs Associated with Implementation

While the benefits of post-offer, pre-employment tests have been well supported in the literature, these tests have require resources to set-up, execute, and monitor

These costs must be considered by any employer that wishes to implement a testing program

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## Costs to the Employer

Factors that influence the costs of Post-Offer Pre-employment Tests:

- Method of test design
  - direct observation of tasks can be more expensive
  - review of existing job descriptions can be less expensive but may not be adequate for creating a test
  - costs can range from $200 to $1500
- Method of test implementation
  - cost / test or flat fee method
  - typical testing costs range from $70 to $250 to complete

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## Cost Impact of Provider Choice

In the post-offer functional test market place, the cost to provide testing can vary depending on the type of company that creates an executes the test. Some companies only design tests while others design and implement them.

- Companies that specialize in test design provide their customers with an ADA compliant test, but generally do not have the facilities to implement the test for the employer's candidates.
- In this scenario, the design company may have a network of facilities that can provide the post-offer functional test. If not, the design company will provide the test to the employer and the employer will have to locate a professional to provide the test at an additional cost.
- Companies that both design and implement ADA-compliant tests have locations where tests can be performed.

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## Costs of the Test Provider

Influences on test provider's costs:

- Training
  - Jobsite Analysis Certification
  - Pre-employment test completion
  - Regulatory oversight (e.g.: ADA)
- Equipment
  - Analysis Tools: force gauge, linear measure, etc.
  - Test Execution:
    - Lifting station/boxes
    - Push/pull sled
    - Weights
    - Ladder
    - Isokinetic equipment
- Other
  - Night or weekend availability
  - On site testing

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## Effectiveness of Pre-Employment Testing: A Literature Review

Several studies have examined the benefits of pre-employment testing, including:

- Decrease in incidence of work-related musculoskeletal disorders
- Decrease in workers compensation costs
- Decrease in lost work days
- Increased retention/decrease turnover rate

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## Effectiveness of Pre-Employment Testing

Littleton et al. **Cost Effectiveness of a Pre-work screening program for the University of Illinois at Chicago Physical Plant.**[13]

- 712 screens completed between 1998 and 2001.
- Injury rates and mean cost per injury compared between non-screened and screened workers.
- Dollar spent/dollar saved ratio to determine impact of screening on cost
- The study revealed a cost savings of $18 per dollar spent on screening

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## Effectiveness of Pre-Employment Testing

Gassoway and Flory. **Pre-work screen: is it helpful in reducing injuries and cost.**[14]

- 144 subjects hired without completing a pre-work screen (unscreened) & 163 subjects hired having completed the pre-work screen (screened)

| | Unscreened subjects (n=143) | Screened subjects (n=164) |
|---|---|---|
| Injury rate | 18.1% | 13.5% |
| Cost per employee | $377 | $320 |
| Turnover rate | 60.4% | 41.7% |

- Pre-work screen was effective in reducing injuries, controlling costs, and reducing employment turnover.

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## Effectiveness of Pre-Employment Testing

Anderson and Briggs. **A study of the effectiveness of ergonomically-based functional screening tests and their relationship to reducing worker compensation injuries**[9]

- This paper summarizes a series of studies on the effectiveness of ergonomically based functional screening tests for post offer pre-placement of applicants for physically demanding jobs, and their relationship to reducing worker compensation injuries.
- A meta-analysis "indicated that new-hires who passed the battery had a 47% lower worker compensation injury rate and 21% higher retention."
- Of the 175 pre/post-implementation studies indicated "a 41% reduction in worker compensation injuries associated with implementation of ergonomically based physical ability tests."

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## Effectiveness of Pre-Employment Testing

Faris, J. **Lowering nursing injuries using post-offer pre-employment testing.**[10]

- This study assessed the impact of a post-offer pre-employment testing on controlling work-related injury cost for nurses in a health care system.
- "Injuries were significantly lower in the employment pool that was tested when compared the nursing staff that had not been tested."
- 5 injuries reported in the tested group, resulting in $1,778 spent on the injuries.
- 54 injuries reported in the non-tested group, totaling $26,208.
- The total return on investment by this program was $4,541,059."

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## Effectiveness of Pre-Employment Functional Testing Summary

- Studies show that post offer/pre-employment testing is effective in reducing worker's compensation costs.
- Studies also show that the cost of administering post offer/pre-employment functional testing far outweigh the worker's compensation costs for injury care.
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- Cost reductions were noted most often in the reduction of the severity of injuries which is directly related to a reduction in medical expenses and lost work days.
- Post offer/pre-employment testing program are most effective for heavy demand level jobs and are less effective for medium demand level jobs.
- Post offer/pre-employment functional testing programs are effective in predicting or preventing on the job injuries.[9-10, 13-14]

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