

*The Development of the Physical
Abilities Evaluation-- “Clinical
Utilization of Standard Fitness Tests to
Insure Safety and Compliance”*

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Introduction

Compliance and retention of those involved in an Exercise and or Fitness Program has been an ongoing and increasing concern throughout the fitness and clinical rehabilitation settings. In order to appropriately guide an individual through a safe and

sound program the Director of the Clinic or Gym needs to be as specific as he can be in both, his or her prescription and evaluation methods.¹

Many of the outcome measures and questionnaires utilized today to indicate risk factors, give us only qualitative information and a patient's perceived subjective findings.² Though utilization of these measures is a long standing norm for evaluation and patient management for health care professionals it is noted that besides individual muscle testing and the ever popular Functional Capacity Evaluation, which is often cumbersome in expenses and time, there has not been a formal "low tech" evaluation process by which to gain similar and, as profound Quantitative information to help manage our patients.³

By developing a Standardized Physical Abilities Evaluation, the Director of a fitness or rehab institution can gain a Quantitative measure which will directly relate to the individual's Physical Performance, their Functional Abilities and more importantly their specific weaknesses.⁴ In order to appropriately do so, it was first necessary to determine the critical points of interest and challenges concerning the majority of patients in our offices today.

It is estimated that 85-95 percent of the patients that enter into a rehabilitation or "Active Model" practice are suffering from some form of ailment secondary to the "Natural Degenerative Process" (NDP).⁵ Since 1992 in the initial version of the PAE, (Physical Abilities Evaluation), developed for post graduate education and licensure in the field of Chiropractic, more and more doctors and allied health care professionals have utilized this easy to use and "low tech" method of measuring one's Physical Abilities in order to determine the client or patient's level of physical or functional disability.

In order to further develop this test it was necessary to further substantiate and validate the NDP, and the effects that it has on the human body. A literature review was performed and the information gathered was utilized to develop a Standardized Physical Abilities Test that most relates one's physical abilities and weaknesses associated with this naturally occurring degenerative process. Literature regarding the natural degenerative process

indicates that there are many events that are triggered by a response to Plastic Deformation.⁶

Plastic deformation is a lengthening of muscles that occurs secondary to static long-term stretch to that muscle. This stretch and often, unrecoverable change in length, tension and contractility leads to inert structure deformation and reflex inhibition to surrounding muscle groups. Often affecting the opposite muscle of that being effected by this change.⁷ Because of the body's natural defense process, once a muscle has changed its function and balance it will set off a chain reaction that will cause the inert structures to be affected in much the same way, and ultimately the joint and bone-on-bone relationship will be compromised.⁸ This compromise will obviously and ultimately alter the natural biomechanics and proprioceptive ability. For example, many shoulder injuries that can be traced to one common source, Plastic Deformation of the Scapular Stabilizers. Jobe and Vitne went on to conclude in their studies that shoulder conditions are independent of age and that the older population's conditions, though often more severe, are simply a worsening and a later stage of the complaints of the younger population, all triggered by plastic deformation of the scapular stabilizers and the trickle down effect it has on the rest of the upper torso.

It is noted that there are five major muscle groups that continually battle the effects of this deformation and muscle deconditioning. These muscles or muscle groups are constantly affected by long standing postural stress or gravity causing them to become elongated and weak.⁹ This in turn may cause reflex inhibition or overcompensation via the stretch reflex of the muscle spindles and Golgi-Tendon Organs located in the muscle themselves.

This Reflex Inhibition and degradation of the optimum 20-30 percent agonist to antagonist relationship will then cause joint irritation and alteration of distal (upper extremity) and proximal (lower extremity) joint biomechanics as well, further influencing the NDP. This in turn will cause repetitive trauma to these areas and ultimately degeneration with all of its complications, i.e. arthritis, adhesions, compartment and entrapment syndromes etc.

There are five major muscle groups that are involved in the Natural Degenerative Process, due to plastic deformation and they are the

- 1) Arch
- 2) Hamstrings
- 3) Abdominal Muscles
- 4) Scapular Stabilizers
- 5) Deep Cervical Flexors

Changes in either, length, tension, strength or endurance can occur. It is noted that proprioceptive ability of the joint involved occurs within 45 minutes of such changes then tension and strength are affected, then length and endurance. This further illustrates the clinical points of interest for these NDP patients and the multitude of physical ailments that occur, giving us a model to follow and to further understand the course of the types of injuries that occur.

On the clinical standpoint, first noticed are the “-itis’s” ranging from bursitis to capsulitis to tendonitis. Knowing that this suffix simply means an inflammatory process, and by understanding that changes in Biomechanics and Proprioception occur almost immediately with the NDP, we can now see that it is all part of a bigger picture. Many inconsistencies are noted in the literature as to whether we as clinician’s, should stretch or strengthen an area that is undergoing these changes associated with the NDP. It is my opinion that a test to indicate whether an area is short and hypertonic or lengthened and hypertonic must be developed. Physiologically speaking, if we can test for endurance in an area along with a strength assessment then we can better determine if an area is actually in the tight and shortened state,

requiring stretching or if it is in fact in the lengthened and hypertonic position requiring strengthening. In no way should an area being effected by the NDP or Plastic Deformation be stretched, as it further alters the natural muscular balance.

The clinical correlation gained by this test will aid the doctor and or clinician to look further to the ultimate cause and effect

relationship of the said injury of presentation and not simply the symptoms.

Therefore, tests to be utilized in the Physical Abilities Evaluation (PAE) need to check length, strength, tension and endurance of the major areas involved. The first PAE developed in 1992 included 7 tests and was a good starting point for such a test.¹¹ As the understanding of the NDP and cause and effect relationship of an injury increased, it was felt that a few other tests needed to be added to further justify a persons physical ability at each of the levels if disturbance, and cater to both the cervical and lumbar areas.¹²

With understanding of the NDP and plastic Deformation we see how changes and deformation of each area listed above can alter and change the opposing musculature functionally, alter both, proximal and distal joint bio-mechanics and alter innate proprioceptive ability as well. That is, the Quadriceps, the Lumbar Extensors, the Pectorals and Biceps and the Cervical Extensors, and surrounding joints and structures.

Each of these areas is found to be weak on a regular basis in the clinic setting and is often a secondary weakness. Each of these effected areas can be related to a multitude of ailments seen in the clinic setting and a test such as this can guide us to an appropriate acute and therapeutic treatment plan with the introduction of standardized exercise protocols necessary to counteract the weaknesses found by the test. Also included in the PAE are tests for areas of health that may develop with the de-conditioning

process and that may increase the risks associated with de-conditioning and or back pain, namely the Cardiac Recovery Test and the Body Composition analysis. The Jaymar Hand Grip test is utilized to essentially assess the extent of any imbalance and or cervical nerve root complications. Each test that is utilized has standardized normative data for grading. Some changes and variations to the grading tables were performed to fit the utilized

scoring model. It is noted that no normal date was found for the arch that could be used in this test.

The tests that were isolated to best fit the intentions of such a Physical Evaluation are listed below and their definitions are included on the test sheet itself.

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|--------------------------|----------------------------|
| 1) Body Composition | 2) Hand Dynamometer |
| 3) Repetitive Squat Test | 4) Sit n' Reach Test |
| 5) Static Abdominal Hold | 6) Shoulder Elevation Test |
| 7) Trunk Extension Test | 8) Static Neck Endurance |
| 9) Static Back Endurance | 10) Cardiac Recovery Test |

Discussion

Each of the tests includes standardized methods of performance and values for grading and assessment. The tests are performed in specific manner and order so that one movement does not counteract or otherwise inhibit the other and each test graded on a 1-5 point level scale from poor (1) to excellent (5) (See the Enclosed Test and Grading Sheet). The points are totaled then divided by the total points possible to give an appropriate percentage of their Physical Abilities in relation to the general healthy population and can indicate a sound value to ones improvement and status. In the clinical setting these numbers are guides for graduation from one stage of the active model to another or release from in- house rehabilitation.

The total expected score for an injured individual is 90 percent before release, and can be considered fully functional by workman compensation guidelines.

As an individual achieves tested physical ability levels from 67 percent, to 72 percent then 81 percent respectively then he or she is graduated from one level to the next of the three levels of the exercise program with the appropriate increase in perceived exertion, or release.

The three basic levels of the rehabilitation process are categorized as Stage I, (Re-education / Reactivation), Stage II (Muscle Balance-Strength Training), and Stage III (Functional Movements). This is an easy to use, standardized evaluation process utilized to ensure quality, safety, and gives us a more accurate account of a client's level of physical abilities for appropriate management of the complete active model. This test is utilized as two to three units of a low tech "Physical Performance with Report" as defined by the ICD-9 insurance definitions code book.

This Physical Abilities Test will also enable the clinician to correlate Qualitative Outcome Measure's utilized in standard, passive to active practices to an inexpensive yet valid and accepted Quantitative measurement as well.¹³

It is recommended that further research be performed and other tests introduced as future testing procedures are introduced and clinical understanding develops.

References Available Upon Request

Remember – Perfect Practice Makes Perfect

For further information or for any questions you may have please contact the doctor at his e-mail address included on this site.

Thanks for visiting.