



Measures of Spinal Fitness

Tara Keller, Hons. B.Sc. (KIN), RK, MES

It is common practice in both the clinical and fitness training environment to see clients who continue to suffer from low back pain. Challenges often arise when attempting to establish some measurable baseline of a client's spinal fitness so that effective training strategies can be applied. After all, it is not like we have a second spine in the body to compare one's responses to; as we can for comparing an injured shoulder or knee, for example, to the non-injured extremity. As a result, clients are all too often assumed fit if they can demonstrate a functional squat, push against certain resistance or lift a specified weight without reporting an exacerbation of their back pain. While this may provide a measured degree of maximal trunk strength, this form of testing does not serve the purpose in establishing levels of spinal stability or back fitness. Some may even go so far as to monitor responses to sustained standing or sitting as a baseline to try and further add value to their testing measures. While these measures give us some indication of a client's tolerance for sustaining activity or level of perceived disability, they fail to provide standardized measures of spinal health. Do you know how long a healthy adult should be able to sustain a particular seated or standing posture for, given variables of age and gender? Are these tests performed on a particular floor covering to reduce the stress-load to the spine and or is a chair set with specific parameters that is reproducible for each client's variability? In order to identify whether muscles in the trunk have become dysfunctional and/or to what degree they may be either contributing to or the result of a particular problem, it is important to apply quantifiable, well-standardized and reliable tests that can be referenced against established norms.

A clinical study was undertaken by McIntosh, Wilson, Affleck & Hall (1998) to establish such normative data for seven standardized tests of trunk and lower extremity muscular endurance¹. Their results help to highlight the importance of applying validated tests to quantify the physical function of the spine and prove to be a useful tool in both the clinical and fitness-based settings. I have found one of the most useful of these tests to be the Prone Double Straight-Leg Raise, whereby insufficient lower back extensor endurance can be identified and appropriately addressed through corrective exercise measures.

When using functional assessments, an evaluator is better equipped to identify markers of inefficiency or instability by taking joints through a specified range of movement and applying appropriate and relative forces. The Prone Double Straight-Leg Raise test is one of **10 key Movement Patterns** that make up the Functional Assessment developed by Keller (2008) for Building a Strong Foundation®: "How to Train the Endurance Athlete in the Gym". As a clinician or trainer, valid and objective measurement of your client or athlete's low back extensor endurance will help you appropriately direct training applications for injured and non-injured populations to both restore and optimize function.

Prone Double Straight-Leg Raise



Instructions:

1. Lie prone with legs extended and hands underneath forehead/forearms perpendicular to the body.
2. Raise both legs from the floor until knee clearance is achieved.
(Evaluator slides one hand under the thighs to monitor that clearance is sustained)
3. Client holds for as long as possible, giving maximal effort to the point of fatigue.
(Evaluator times response)

Expected Response & Joint Alignment:

- Test is stopped if the client is unable to clear both legs from the floor or when they are no longer able to maintain knee clearance.

Common Adaptations & Markers of Instability:

- lateral pelvic rotation (hip hike)
- shoulder retraction or chest elevation
- absence or delay in gluteal contraction

Scoring Against Normative Data:

- compare the timed result of your client with the percentile scores listed in the table below to establish the relative degree of dysfunction in lower back extensor endurance

Within their study, McIntosh, et al. (1998) cite several other studies and researchers who have identified the importance of establishing trunk musculature endurance versus trunk strength; citing that clients with low isometric trunk extensor endurance and high fatigability of the extensors and flexors experience greater incidence of serious low back pain and increased frequency of low-back concerns and that maximum strength of the trunk muscles does not correlate with maximum endurance¹. These muscles are crucial in their role of providing extrinsic spinal stability and postural support for which so many tasks in sporting and life activities demand.

Normative Percentile Data in Seconds for Prone Static Leg Raise*

Age	Sex	25%ile	50%ile	75%ile
19-29	F	49	74	126
	M	55	88	130
30-39	F	45	73	111
	M	45	73	123
40-49	F	29	45	87
	M	35	55	95
50-59	F	18	37	83
	M	22	48	80
60+	F	7	23	40
	M	11	22	60

*adapted from McIntosh, et al. (1998)

Given useful normative data, clinicians and trainers who work with low back pain clients now have the ability to establish improved treatment and training guidelines and timelines in their efforts to return their clients to the activity levels of able-bodied individuals while evaluating the effectiveness of their rehabilitative efforts.

References:

1. McIntosh, G., Wilson, L., Affleck, M., Hall, H. (1998), Trunk and lower extremity muscle endurance: normative data for adults. *Journal of Rehabilitation Outcomes Measurement*, 2(4):20-39.

A detailed description of Tara Keller's **10 key Movement Patterns** is included in the **BSF® Manual: "How to Train the Endurance Athlete in the Gym"**. This manual applies the latest scientific research and literature to teach coaches, therapists and trainers how to identify precursors to injury and address areas of biomechanical inefficiency and details how to apply the science of periodization to endurance athletes within the strength-training environment. Anyone interested in further information or in purchasing the complete manual can visit <http://www.humanmotion.ca>

Tara Keller is the owner of Essential Kinetics and co-author of the BSF® Manual: "How to Train the Endurance Athlete in the Gym". Her company provides post-rehabilitative exercise programming and educational services and can be reached at

ESSENTIAL KINETICS
info@essentialkinetics.com
tel: 778-838-8272

"Reconnecting Movement"