

INSIDESOCCER

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Magazine



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SOCCERFit-Facts

Dynamic core stability training:

One of the new and exciting services offered at our Soccer Fitness Training Centre is Plyometric Training, utilizing the state-of-the-art No-ramco HS Elite high speed running treadmill. Designed by Beau Chavez, Director of Rocky Mountain Performance in Trinidad, Colorado, and available in Canada only at the Soccer Fitness Training Centre, the HS Elite's harness system allows athletes to safely run in any direction, at speeds ranging from 0-30mph, and inclines of 0-40percent grade.

This article provides background on "dynamic core stability" training, as well as a rationale for the science behind Soccer Fitness Plyometric Training Protocols.

Core Stability Defined

Core stability relates to the bodily region bounded by the abdominal wall, the pelvis, the lower back and the diaphragm and its ability to stabilise the body during movement. The main muscles involved include the transverse abdominus, the internal and external obliques, the quadratus lumborum and the diaphragm. The diaphragm is the main muscle of breathing in the human body, and so breathing is important in providing the necessary core stability for moving and lifting. It is the action of these muscles contracting together upon the incompressible contents of the abdominal cavity (i.e. the internal organs or viscera) that provides support to the spine and pelvis during movement.

Whenever a person moves, to lift something or simply to move from one position to another, the core region is tensed first. This tension is usually made unconsciously and in conjunction with a change in breathing pattern. An example to try is to sit in a chair and reach forward over a table to pick up a cup. This movement is first accompanied by a tension in the core region of the abdomen and can be felt by placing one hand on the abdomen as the movement is made.

As the load increases, the key muscles contract around the viscera, which are incompressible, to form a stable ball-like

core region against which the forces are balanced in coordination with posture. In martial arts, there is a saying that "power is generated from the ground up," and core stability is necessary for the transfer of force and power from the ground across the body into any movement.

Core stability is essential for the maintenance of an upright posture and especially for movements and lifts that require extra effort, such as lifting a heavy weight from the ground to a table. Without core stability, the lower back is not supported from inside and can be injured by strain



caused by the exercise. Insufficient core stability can result in lower back pain, poor posture, and lethargy.

Treadmill Training and Dynamic Core Stability

The development of high-speed, dynamic core strength and stability, is accomplished through multi-directional 360-degree runs on the revolutionary Noramco HS Elite high speed running treadmill. The muscles in the lower back, pelvis, and hip muscles (termed Rocky Mountains Performance's by Beau Chavez as the "lumbo-pelvic-hip complex") are of particular importance. It is within these crucial structures of the body that the base and foundation for optimal athletic performance is contained. Furthermore, athletes with weaknesses and/or strength imbalances in this area are considerably more prone to overuse injuries.

The unique 360-degree harnessed runs, developed by Mr. Chavez, are the key to providing the "lumbo-pelvic-hip complex" with a dynamic load, at sport-specific velocities. As mentioned previously, athletic movements require athletes to produce maximal propulsive forces. In almost every sport, including soccer, the muscles of the lower extremities, hips and pelvis must continually contract at high speeds, causing the limbs to accelerate quickly, in order for athletes to execute movements efficiently. The inherent problem with most traditional "core" and lower body strengthening programs is that all movements and exercises are performed at low velocities. While performing low-velocity core strengthening exercise is certainly going to give benefits to the athlete in terms of increasing strength and range of motion, the aforementioned high velocity strength/power, which is a requirement of every sport, is neglected with traditional training methods.

During harnessed 360-degree runs on the Noramco treadmill, athletes must run forwards, sideways and backwards, all at a small incline (3-5 percent), while maintaining a certain running speed (5-10 miles per hour). The movements produced and muscles used in the "lumbo-pelvic-hip complex" during 360-degree runs are as follows:

- during lateral movements: hip adduction, internal rotation, and lateral extension of the back leg (adductors, gluteals); hip abduction and external

rotation in the front leg (abductors, gluteals)

- during retro (backward) movements: hip and knee extension (hamstrings, gluteals) and ankle flexion/extension (calves and shin muscles)

The main difference between training these muscles on the treadmill, as opposed to using traditional training methods, is that on the treadmill, they are trained at sport-specific velocities. The limbs are continually forced to accelerate – thus repeating and reinforcing the stretch-reflex pathway in the hip adductors, abductors, extensors and external ro-

tators – in order for the athletes to keep up with the speed of the treadmill. The net result of the repetitive, high-velocity muscular contractions of the "lumbo-pelvic-hip complex" is that the athlete develops dynamic core stability, while using the same muscles, movement patterns, and movement speeds that are used in their actual sport.

Richard Bucciarelli is the President of Soccer Fitness Inc., a soccer-specific strength and conditioning company in Toronto. For more information about Soccer Fitness, visit www.soccerfitness.ca.



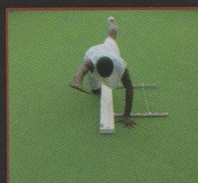
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The Soccer Fitness Training Centre is located inside the newly renovated Trio Sportsplex, Vaughan's premier indoor soccer facility



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