

functional training

by Jyri Manninen

New Exercises,
Great Benefits!



In Part 1 of this series in the last issue of Ultra-FIT, we looked at some of the basic premises of functional training, its origins and its applications in sport and everyday life. In Part 2, let's look at these concepts and applications in more depth to better understand why functional training should be an essential part of everyone's exercise program.

Kinetic Chain

One of the most important concepts in exercise is the so-called 'kinetic chain', which comprises your body's bony, ligamentous and muscular chain going from your fingers to your toes. I'm sure you've heard the ditty: 'The hip bone is connected to the knee bone...', which reminds us that it's virtually impossible to isolate a movement in one part of your body so completely that there is no effect on other part of your body.

An example that helps illustrate how the kinetic chain works is to look at the execution of a javelin throw. I'm sure we all understand the importance of the run-up in the javelin throw to build speed and momentum, just like with a cricket bowler's action, but we're not sure what happens when the javelin thrower forcibly plants his supporting foot to transfer this momentum to the throwing arm via the lower limbs and trunk to send the javelin on its way, hopefully as far as possible!

This transfer of force occurs via the complex and coordinated function of the thrower's kinetic chain. At this point, things are less simple than they may seem. Where is the point of support? What is happening at the centre of gravity? What muscles are acting as the primary movers? What other muscles are working in a supportive role during the throwing action? How exactly is the momentum of the run-up transferred from the ground through the ankle, thigh, hip and spine to the throwing arm and javelin? Correct answers to those questions will see the javelin fly from one end of the stadium to the other. It might even get you a job at the AIS as a javelin coach!

I challenge you to try it yourself at a local park, perhaps just with a tennis ball or frisbee if you don't have a javelin handy. You will find that brute strength alone only gets you so far. To throw longer distances requires an improved throwing technique, which can be gained from better understanding the functioning of the kinetic chain and the principles of force transfer. You may have a natural

ability to throw a tennis ball a long way, but have you ever asked yourself how you do it, or how you could throw it even further?

This sports-specific example is equally valid for any kind of physical activity. Functional training involves analysing what occurs, or needs to occur, in the kinetic chain during all kinds of physical activity and movement, and the design and implementation of appropriate and effective exercise programs to result in improved performance.

Neuromuscular Control

Another important concept in exercise is neuromuscular control. In performing very powerful movements, it is not just a question of the force-producing capacity of your muscle cells on their own, but how well your individual muscles and muscle groups can be recruited and activated in a coordinated and effective way by your body's nervous system to produce the desired result. In other words, neuromuscular control is about the capacity of your body's nervous system - or 'internal wiring' as we called it in Part 1 - to appropriately direct the contraction and subsequent force-production of your muscles.

For this reason, you should never get discouraged at your first, relatively clumsy attempts at functional training exercises. Even if you've exercised in a gym for years, it will take time before your neuromuscular system adapts and learns how to perform the new exercises, which require much higher levels of control. Your relatively clumsy movements, poor balance and muscle tremors and shakes are exactly what you should be experiencing. It means your neuromuscular system is starting to make new internal connections by finding better and more efficient ways to perform the new movements. In fact, if you don't experience these physical reactions when you start doing functional training exercises, it probably means you're not performing sufficiently challenging exercises!

Why Go Functional?

Functional training is useful not only for developing sports or activity-specific function, but also for improving the general function of your neuromuscular system, so it can benefit everyone. Another great benefit is injury-prevention, since you are more able to perform activities the right way. A well-planned exercise session can provide a better all-body workout by focusing on components of the kinetic chain that are often forgotten or neglected in your regular gym program eg. a weak or unstable ankle can easily result in non-optimal movement of your pelvis, which in turn can reduce the control and effectiveness of muscles in your upper back during an all-body movement, such as a golf swing. The non-optimal functioning of your ankle may also result in excess tension in your neck and shoulders, which may cause neck pains or tension headaches. So functional training exercises involving your ankle region could ultimately lead to an improvement in your golf swing and a reduction in your handicap!

The previous example illustrates the functional nature of exercise. Every exercise movement is designed to challenge the overall control of your body's neuromuscular system, in which over 600 muscles work together as a kind of 'muscular whip', where the combined recruitment of muscles in the right sequence can result in an very explosive end-result, just like cracking a whip or throwing a javelin or cricket ball.

Training your muscles in more isolation using more traditional gym-based exercises should still be part of your exercise program, but

everyone should include at least some functional training exercises. This might take the form of a separate functional training session each week or simply including a few sets of a functional training exercise after performing your regular gym exercises.

Once you see the possibilities of performing familiar exercises in more functional ways, you can fine-tune your exercise program for maximum effectiveness. eg. a basic push-up can be made more effective by momentarily raising one arm off the ground at the top of the movement to challenge your balance and stability. This can be progressed by raising one leg, or even by raising a leg, then bending your knee back, as if trying to touch your ears, during the lowering phase. The variations are endless and limited only by your imagination. Each new variation stimulates your muscles in different ways and recruits more muscles to meet the increased challenge. Thus a basic push-up can become a neurological fireworks display! This enhanced stimulatory effect is the stuff that gets your body radiating strength, health and vitality.

Johanna Nordblad's Extreme Functional Training

In Part 1, we met world-class freediver (and my sister-in-law), Johanna Nordblad, who won three medals at the 2005 World Freediving Championships in Cyprus, then won the CIPA Open Freediving Competition in June 2006 in Nice, France. Johanna includes functional training as an integral part of her training regime.

Johanna has developed an immense degree of control over her body. She can hold her breath for more six minutes and her personal best depth dive is 58m! Most of us would struggle to hold our breath for even a minute, while holding our breath for two minutes would be almost impossible, and that's while relaxing, not while swimming down into the ocean depths. To appreciate just how deep 58m is, the next time you go to a pool with a 10m tower, stand under it, look up and multiply that distance by six!

Johanna's abilities in freediving are a result of a carefully controlled diet and an exercise program based on functional training. She needs to have absolute control over what her body is doing to achieve maximum power production and minimum oxygen use. In fact, her neuromuscular system is so fine-tuned that she often dives with her eyes closed so she can better feel what her body is doing and make postural adjustments based on her internal sensing or proprioceptive mechanisms. Johanna's functional training program challenges her neuromuscular system even more than her actual freediving, allowing her to build additional performance capacity or reserve to call upon when competing. This increased capacity gained through functional training allows her to conserve energy in the early stages of the dive, and maintain optimal technique and power production in the later stages, when oxygen levels are low and lactic acid levels rise sharply and begin to impede muscle function.

Key components of Johanna's program include performance of balance exercises while standing on one leg, and exercises that activate her trunk musculature in optimal patterns. What is surprising is that she has been able to achieve these results with a relatively small amount of training. In fact, she only performs specific functional training sessions 2-3 times per week for 20-30 minutes per session. This further illustrates the differences between functional training and more traditional exercise methods. The greater focus on effective training of the connections between the body's nervous system and muscular system means that the exercise is more a question of

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Gymstick

Johanna uses the versatile Gymstick for many of her functional training exercises. The two attachment points are on either side of her body's centre of gravity during the movement, like an archery bow. The more she stretches the resistance bands (or 'bends the bow'), the greater the challenge on her core musculature due to the long lever arms formed by upper and lower limbs. If you don't have a Gymstick, try using ankle weights to increase the resistance on your lower limb lever, and suitably weighted dumbbells or a weighted bar for your upper limb lever. www.gymstick.com.au

Hands of the Clock (Pic 1)

This exercise, which is like the movement of the hands of a clock, develops incredible muscular control. Challenging her balance by standing on one leg, Johanna alters the level of demand and stimulation of different muscle groups. She shifts her centre of gravity between front and back thigh musculature, a skill she needs for the monofin dolphin kick used in freediving.

Three-phase X-row (Pic 2, 3 and 4)

This exercise develops the coordinated function of the different components of the body's kinetic chain. Johanna begins with a regular seated rowing movement, continuing to full extension of her upper and lower limbs on a stable core. At the start of the movement, her legs remain on the ground. As she raises her arms above her head, she moves her legs sideways and upwards off the ground. At this point, her whole body is balanced on her pelvis and all her muscles are activated in the shape of an X. Again, this exercise greatly benefits the dolphin kick, in which all the body's muscles need to work together in a coordinated, wave-like motion.



Dare to Experiment

Functional training shouldn't be categorised in a strict form. Each exercise should (in fact, must) meet the needs of the individual. The same is true for the number of reps for each exercise. Always attempt a new exercise carefully at first, with low resistance and low reps (say 4-8) until you develop proper balance, muscular control and technique. eg. if you can only perform 4 reps properly, and lose form from the 5th rep, then only do 4-5 reps. However, be mindful that appropriate resistance levels and number of reps will vary according to your level of neuromuscular fatigue, so listen to your body and exercise appropriately depending on how you feel.

In Part 3 next issue, we will look at a range of functional training exercises for common activities such as cycling, running and golf. Until then, I encourage you to start experimenting by making even small adjustments to your current exercises, eg. sitting on a fitness ball (instead of a stable bench) when performing dumbbell presses or bicep curls, or performing movements in more activity-specific movement patterns with pulley machines. There are no limits to what you can do. So don't just take your water bottle and towel to the gym, remember to take your imagination and creativity too!

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Jyri has worked in the health and fitness industry since 1988, initially as a physiotherapist and then as a sports scientist and physical conditioner, sports coach, personal trainer and educator. He currently runs his own consultancy business, Infinitus Health & Fitness (www.infinitus.com.au). Jyri's own personal sporting interests include all endurance sports, as well as scuba- and freediving.

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