

1. Big Toe - When the big toe effectively loads it assists dramatically in our overall propulsion and our ability to move effectively over the ground.
2. All of our muscles including the peroneus longus get proprioceptively stimulated and begin to decelerate in all three planes of motion .
3. With effective ankle dorsiflexion and the initiation of heel raise, the hallux is then dorsiflexed against a stable first ray and loading of the big toe quickly gets transformed into loading and unloading and effective propulsion.
4. Butt - The power of the butt is proportional to how effectively it "gets turned on."
5. Effectively loading in all three planes of the limbs, with proper loading in the big toe and the butt, in combination with effective loading of the trunk in all three planes of motion, turns the abdominals on in all three planes.
- 6 The goal is to get our clients and patients enjoying running for a lifetime.
7. Does the training allow the trainee to be more efficient and effective in what they desire to do? in this case running.
8. The key to understanding transformation between the pelvis and the shoulders is to look at the relative motion in all three planes of the pelvis and the shoulders.
9. In golf, the pelvis and shoulders load in the same direction, in the transverse plane . . . in running they load in opposite directions.
10. *"Train the body to transform"*. - G. Gray
11. Biomechanical discussion of unloading "up the chain" and unloading "down the chain"
12. Making training, conditioning and rehabilitation functional for running is key if we want to enjoy running.



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v2.7 RUNNING

More Than Just Faster Walking

By: Gary Gray, PT



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OBJECTIVES FOR RUNNING FUNCTIONAL GUIDE

To assimilate up-to-date information and knowledge about running. To learn how to apply effective functional techniques when testing and training for running.

To understand and appreciate the tri-plane **Chain Reaction** principles as they apply to running.

HOW TO USE THIS FUNCTIONAL GUIDE

This *functional guide* can be used as a convenient summary of the program's contents to take with you after viewing. You can also use this guide as a notebook; space has been provided so that you can make notes on relevant tracts as you watch them.



FUNCTIONAL

Video Digest Series

STRATEGY 1

Strategically appreciating the **Chain Reaction** of the 3 B's.

STRATEGY 2

Strategically understanding the dual loading and dual unloading phases of running.

STRATEGY 3

Strategically analyzing all biomechanical components of running.

STRATEGY 4

Strategically comprehending **Chain Reaction** ramifications for various analysis techniques.

STRATEGY 5

Strategically blending appropriate biomechanical analysis techniques.



STRATEGY 6

Strategically transforming analysis findings into effective rehabilitation.

STRATEGY 7

Strategically designing efficient and effective training and conditioning programs for runners.

STRATEGY 8

Strategically applying tweakology for runners.

STRATEGY 9

Strategically revealing the ability to train to transform.

STRATEGY 10

Strategically taking advantage of running research for the benefit of our runners.



Getting ahold of our Runner's World (for subscription information call 800-666-2828)

A tribute to Dr. George Sheehan . . . still appreciating his writings about the Romance of Running.

Discussion of Dr. George Sheehan's tremendous wisdom and insight.

Dr. Sheehan described a kinesetic awareness in running when "everything comes together". We would describe that as a successful **Chain Reaction**.

Dr. Sheehan indicated when the three B's come together in running, running becomes more efficient and even more beautiful.

B #1 - Big Toe, B #2 - Butt, B #3 - Belly

"We can't make it happen . . . it happens by grace." - G. Gray

Big Toe - When the big toe effectively loads it assists dramatically in our overall propulsion and our ability to move effectively over the ground.

"Getting good dorsiflexion". What has to happen to effectively load the big toe

With ground contact we get collapsing of the foot with eversion of the heel and unlocking of the midtarsal joint.

All of our muscles including the peroneus longus gets proprioceptively stimulated and begin to decelerate in all three planes of motion. The motions that are being facilitated by ground reaction force, gravity and momentum.

The first ray begins to dorsiflex and invert with eversion of the calcaneus and inversion of the midtarsal joint.

As all of our locomotor muscles decelerate the initial loading phase, the peroneus longus can then be effective at beginning to evert and dorsiflex the first ray, forcing it firmly into the ground. With effective ankle dorsiflexion and the initiation of heel raise, the hallux is then dorsiflexed against a stable first ray and loading of the big toe quickly gets transformed into unloading and effective propulsion.



Butt - The power of the butt is proportional to how effectively it “gets turned on”.

As the foot enters into the ground, the foot collapses, we get calcaneal eversion, which allows the talus to drop down and in. This drives the tibia into internal rotation and therefore the femur into internal rotation with the hip undergoing sudden and remarkable internal rotation to turn the powerful hip muscles on in the transverse plane.

Concurrently the hip gets turned on in the sagittal plane as well as the frontal plane.

As the opposite leg passes the ground contact leg in swing phase it then drives the pelvis forward which loads the down leg hip into even more effective transverse plane loading.

This significant transverse plane loading, in addition to the sagittal and frontal plane loading of the hip occurs at the exact same time as the loading of the big toe.

Belly - Our tendency, without effective loading throughout the system, is to collapse in all three planes and therefore essentially “turning off” the abdominal musculature. Effective loading in all three planes of the limbs, with proper loading of the big toe and the butt, in combination with effective loading of the trunk in all three planes, turns the abdominals on in all three planes and therefore allows them to be a powerful contributor to our ability to run efficiently and effectively. During the second loading phase of the stance leg, just prior to heel lift, we get loading of the first ray and the hallux, and therefore the big toe. We get significant loading of the hip in all three planes, especially the transverse plane, and we get maximal loading of the abdominals, in all three planes.

“On behalf of myself, when I get loaded in all three planes and on behalf of my buddies the big toe and the butt, I would like to thank George Sheehan for his tremendous insight into our abilities.” - The Belly

A key clinical question is: “Are the big toe, butt, and belly being properly stimulated at the point of transformation during running?”

A final thanks and tribute to Dr. George Sheehan and a special thanks to Runner’s World.



CASE PRESENTATION -

A special thanks to Kendall Holsopple for his valuable assistance as a patient.

The goal is to get our clients and patients enjoying running for a lifetime.

Description of the two loading phases of stance phase and the two unloading phases along with the airborne phase for running.

- Assessment of the runner running
- Gait assessment with shoes on
- Gait assessment with shoes off
- Tweaking the gait

- Standing assessment feet parallel, full body rotation
- Standing assessment stride stance, full body rotation
- Stride stance, flexion excursion squatting
- Unilateral balance, flexion excursion squatting

- Right leg balance, left leg anterior medial reach
- Left leg balance, right leg anterior medial reach
- Left leg balance, right leg posterior medial rotational reach
- Right leg balance, left leg posterior medial rotational reach
- Right leg balance, right arm right rotational reach with left leg posterior reach
- Left leg balance, left arm left rotational reach with right leg posterior reach

- Right leg balance, right arm right rotational reach with left arm overhead posterior reach with right leg posterior reach
- Left leg balance, left arm left rotational reach with right arm overhead posterior reach with left leg posterior reach

“Getting a hankering to take a look at the feet”.

- Look at callus pattern
- Subtalar mobility
- Midtarsal joint assessment with subtalar joint inversion
- Midtarsal joint assessment with subtalar joint eversion
- Rear foot to lower leg
- Forefoot to rear foot
- Forefoot



- Right leg balance, bilateral arm overhead posterior reach to anterior reach
- Left leg balance, bilateral arm overhead posterior reach to anterior reach
- Right leg balance, right hip extension excursion
- Left leg balance, left hip extension excursion
- Right stride stance, bilateral arm overhead right rotational reach
- Left stride stance, bilateral arm overhead left rotational reach
- Left stride stance, left arm left rotational reach, frontal plane hip excursion
- Right stride stance, right arm right rotational reach, frontal plane hip excursion

- Right stride stance, right arm right rotational reach
- Right stride stance, left arm right rotational reach
- Left stride stance, left arm left rotational reach
- Left stride stance, right arm left rotational reach

- Left leg balance, right leg left rotational reach
- Right leg balance, left leg right rotational reach
- Right leg balance, right hip internal rotation excursion
- Left leg balance, left hip internal rotation excursion

- Recheck of subtalar joint mobility
- Assessment of hallux dorsiflexion

Discussion of findings with training and treatment strategies in the clinic and for home.



Runner's stretch specific for Kendall

Self mobilization of the iliopsoas in all three planes

- Ankle dorsiflexion with hip extension (down leg toed in)
- Ankle dorsiflexion with hip extension with bilateral overhead posterior reach
- Ankle dorsiflexion with hip extension with bilateral overhead posterior reach with frontal plane oscillation
- Ankle dorsiflexion with hip extension with bilateral overhead posterior reach with transverse plane oscillation
- Ankle dorsiflexion with hip extension with bilateral overhead rotational reach with sagittal plane oscillation
- Ankle dorsiflexion with hip extension with internal rotation with bilateral overhead posterior reach with transverse plane oscillation

Self mobilization of the subtalar joint into eversion

- Doorway stretch with ankle dorsiflexion, opposite leg drive to facilitate calcaneal eversion
- Doorway stretch with ankle dorsiflexion, knee flexion with opposite leg drive to facilitate calcaneal eversion



Discussion of balance reach exercises.

"Maybe the follow-up exercise will be running itself".- G. Gray

Discussion of functional mobilization with the True Stretch™

"Form feeds function and function feeds form". -G. Gray

Discussion of strategies of a comprehensive evaluation for the runner.

Expression of a great appreciation for Kendall

Debrief with Bob Wiersma, Executive Director, Accelerated Functional Rehabilitation Network

- Discussion of various running styles by their potential plane dominance
- The pure tri-plane runner
- Assessment of long distance runners versus the sprinter
- With the sprinter loading at the end range points of transformation is critical
- Functional tests to predict the ability to run
- Description of gait analysis



RUNNING WORKOUT AND TRAINING SESSION

Gary's opportunity to work out with Kendall

Training and conditioning program to facilitate running

Anterior lunge to posterior lunge with arm drive

Short anterior lunge to posterior lunge with arm drive

Long anterior lunge to posterior lunge with arm drive

Anterior lateral lunge to posterior lateral lunge with arm drive

Anterior medial lunge to posterior medial lunge with arm drive

Toed out anterior lunge to posterior lunge with arm drive

Toed in anterior lunge to posterior lunge with arm drive

Anterior lunge to posterior lunge with kettle ball arm drive

(Discussion of above lunge tweaks with kettle ball arm drive)



Short anterior lunge to posterior lunge with kettle ball arm drive

Anterior lunge to posterior lunge with bungee cord arm drive (tweaking of the bungee cord load)

Anterior lunge to posterior lunge with ankle band resistance with arm drive

Sagittal plane lunge jumps with sagittal plane arm drive

Sagittal plane lunge jumps with transverse plane arm drive

Sagittal plane lunge jumps with frontal plane arm drive

Does the training allow the trainee to be more efficient and effective in what they desire to do? . . . in this case running.

The proof is in the pudding.

Special thanks to Kendall for his great effort.



Special thanks to Dr. David Tiberio for his valuable assistance

Transformation training for running to make us a better runner.

Transformation of our biomechanical understanding allows us to design effective training and conditioning as well as rehabilitation programs for all activities and sports.

The key to understanding transformation between the pelvis and the shoulders is to look at the relative motion in all three planes of the pelvis and of the shoulders.

Understanding the hands as a driver in running, as well as in golf, as well as in other functional activities.

In golf, the pelvis and the shoulders load in the same direction, in the transverse plane . . . in running, they load in opposite directions.

At the point of transformation the pelvis is rotating right and the upper body is rotating right in the right handed golfer.



Transverse plane tweak

Exaggerated toed out foot position to facilitate pelvis

Exaggerated toed in foot position to inhibit pelvis

Sagittal plane tweak

Exaggerated left anterior lunge to facilitate pelvis

Exaggerated right anterior lunge to inhibit pelvis

Frontal plane tweak

Exaggerated narrow base to facilitate pelvis

Exaggerated wide base to inhibit pelvis

Super Tweak

Right anterior lunge, toed out

Left anterior lunge, toed in, narrow base

"Train the body to transform." - Gary Gray



RESEARCH ROUNDTABLE WITH DR. DAVID TIBERIO

A. Belli, H. Kryolainen, P.V. Komi, Moment and power of the lower limb joints in running. *Int. J. Sports Med.* 2002; 23: 136-141

M.D. Johnson, J.G. Buckley. Muscle power patterns in the mid-acceleration phase of sprinting. *J. Sports Sci.* 2001; 19: 263-272

B.I. Prilutsky, V.M. Zatsiorsky. Tendon action of two-joint muscles: transfer of mechanical energy between joints during jumping, landing, and running. *J. Biomech* 1994; 27: 25-34.

S.A. Bus. Ground reaction forces and kinematics in distance running in older-aged men. *Med. Sci. Sports Exerc.* 2003; 35: 1167-1175.

Biomechanical discussion of unloading "up the chain" and unloading "down the chain".

Discussion of initial loading, then mid stance unloading, and then secondary loading and finally unloading into propulsion.

Proximal to distal sequencing during the propulsive phase revealing the hip generating the propulsive energy.



The foot is the instrument that sets the hip up to allow the hip to propel us.

The back, belly, and butt, our core, needs to be three dimensionally efficient to allow for effective hip loading and propulsion.

A good load creates a good unload.

The first loading phase sets up the success or the demise of the second loading phase and therefore the propulsive unload.

Comparing young runners with older runners

Older runners absorb more and generate less

Making training, conditioning and rehabilitation functional for running is key, if we want to enjoy running.

A special thanks to Dr. David Tiberio for sharing such relevant research articles.

