

1. My purpose and passion in life is to *"encourage transformation"*
2. Muscles are reactors and have been given the gift of transformation
3. Econcentrics is a deceleration of motion and the acceleration of motion all at the same time
4. Muscles desire to be turned on eccentrically first . . . as a reactor to motion
5. Muscles have a task specific and functional *synergistic kinship*
6. Muscles react in all three planes of motion
7. Function is a transformational miracle
8. Going through the panic of complexity to get to the serenity of simplicity
9. If dysfunction occurs we need to ask: Where is the 3D motion not taking place throughout the **Chain Reaction™**?"
10. *The bottom line with our training and conditioning programs is to facilitate an environment where the muscles can react econcentrically and therefore say to us that they can economically allow us to be more effective and efficient in what we want to do*
11. Econcentric capability depends upon the effective loading of mass and momentum
12. The key to transformational sequencing (Econcentrics) is to facilitate what is actually observed to happen in function
13. We want to restore the muscles "economical nature"



FUNCTIONAL DESIGN SYSTEMS

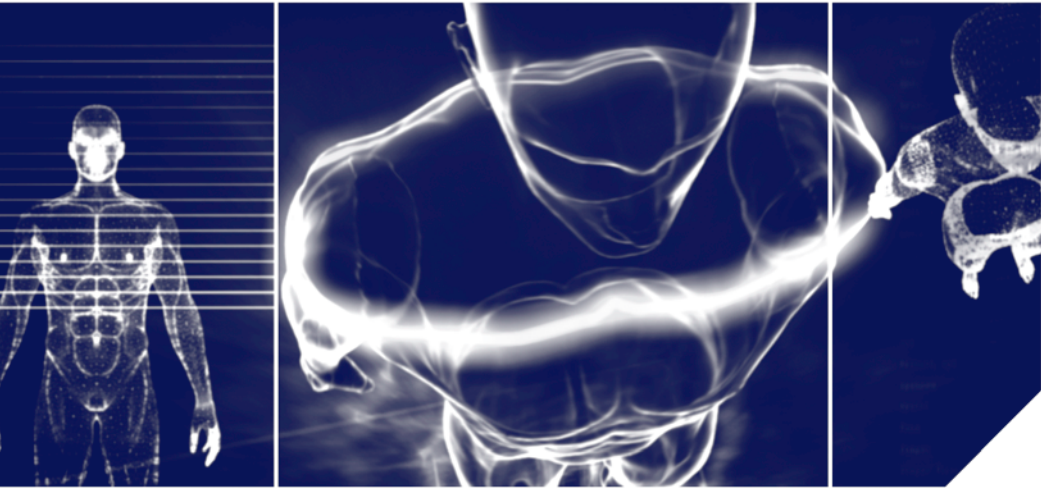
Transforming Knowledge Into Function

866.230.8300 | www.functionaldesign.com

v4.3 ECONCENTRICS

Functional Muscle Function

By: Gary Gray, PT



TAPE CONTENTS	PAGE
Contents / Objectives	1
Functional Strategies	2
Functional Understanding	4
Functional Analysis	6
Functional Rehabilitation	8
Functional Training	10
Functional Transformation	12
Functional Fun	14
Key Messages / Information	16

OBJECTIVES FOR THE ECONCENTRICS FUNCTIONAL GUIDE

To assimilate up-to-date information and knowledge about Econcentrics.

To learn how to apply effective functional techniques when testing, training, and rehabilitating using Econcentrics.

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

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 sense of power of bowling and golf and other functional activities because of the E-concentric nature of muscles

STRATEGY 2

Strategically realizing our functional purpose in order to enhance and encourage the life of others

STRATEGY 3

Strategically understanding the true function of muscles

STRATEGY 4

Strategically taking advantage of the E-concentric characteristics of muscles

STRATEGY 5

Strategically creating the environment in order to facilitate the **Chain Reaction™** transformation of muscles



STRATEGY 6

Strategically sensing the driving forces of function through "intransformationalizing"

STRATEGY 7

Strategically appreciating the Eoconcentric function of the muscles throughout the body

STRATEGY 8

Strategically designing a three dimensional Eoconcentric training and conditioning program

STRATEGY 9

Strategically loading mass and momentum at the points of transformation to enhance all forms of function

STRATEGY 10

Strategically gleaning strategies of function from effective functional research



My purpose and passion in life is to "encourage transformation"

A big question is: "What do I really want to do and what can I really accomplish?"

"I have no power to heal . . . I have no power to save"

I can encourage or create the environment where the healing can take place, where the saving can take place . . . by He who is the Transformer

Muscles are reactors and have been given the gift of transformation

Biomechanically we need to functionally understand what occurs at the point of transformation, especially within our neuromusculoskeletal system

The concept of econcentrics . . . eccentric and concentric function of the muscle occurring at the same time.

Econcentrics is a deceleration of motion and the acceleration of motion all at the same time.

Functionally we need to understand the "point of transformation"

Motion facilitates the proprioceptive system which in turn turns on the muscles.

Muscles are reactors not actors . . . they are transformers . . . we therefore have to create an environment for the transformation to subconsciously and reactively occur.

Muscles desire to be turned on eccentrically first . . . as a reactor to motion

Muscles react to gravity and ground reaction force . . . gravity ground reaction force creates motion which turns on the proprioceptors which then encourages the muscles to react and decelerate the perceived motion

Muscles are encouraged by what gravity and the ground does to them and by the mass and momentum of the body . . . ie; the drivers of the body

Muscles have a task specific and functional *synergistic kinship*



Muscles do not function as agonists and antagonists

Muscles react to their other friends (other muscles) as well

Muscles react in all three planes of motion

To fully understand muscle function we need to take advantage of all the strategies of tweakology along with our understanding of proprioceptive function, along with our understanding of the biomechanics of the body at the points of transformation. Muscles desire the pure replication of the forces of function in order to stimulate them efficiently and effectively.

Muscles do not desire artificial stimulation by the brain isometrically or concentrically in an over stabilized posture. Muscles will decelerate motion while concurrently accelerating motion in another plane at the same joint, or at another joint in the same or another plane.

The muscle is a reactor as a part of the total neuromusculoskeletal system

Function is a transformational miracle

We need to create the environment where the same drivers of motion and function are facilitated to turn on the proprioceptors of the system in order to get the muscles to react within the context of the desired function.

We need to “intransformalize” . . . to become the part in order to sense the positions, motions, forces and drivers of function that muscles react to, via the proprioceptors

Revealing the evidence of the potential causes of functional muscle dysfunction

Creating the environment in order to facilitate the **Chain Reaction™** transformation of muscles

The test is the exercise and the exercise is the test

Asking the Lord, our Transformer, for the wisdom to create the most effective environments to facilitate the desired **Chain Reaction™** of the muscle and of the entire body



Chain Reaction™ muscle function . . . Brad and Doug body painting the major muscle groups on each other

The need to intranormalize . . . becoming the part

Questions we ask ourselves when we intranormalize as the muscle:

- What in the world are we doing?
- What are we reacting to?
- What is our point of transformation?
- When are we really functioning econcentrically?
- How do we do what we do?

Going through the panic of complexity to get to the serenity of simplicity

Becoming the Calf

All 12 muscles of the lower leg are all multi-joint muscles

Four calf personalities . . . soleus, gastrocnemius, posterior tibialis, peroneus longus

The gastrocnemius and the soleus form the achilles tendon

The soleus is first awakened (stimulated) by eversion of the subtalar joint caused by gravity and ground reaction force reacting with the foot

The proprioceptors surrounding and as a part of the soleus, are stimulated and facilitate a reaction "eccentrically" of the soleus, to try to decelerate calcaneal eversion

The soleus then senses the mass and momentum of the body moving forward, creating ankle dorsiflexion, which eccentrically stimulates the soleus to a more significant degree

As this eccentric stimulation builds up, just prior to heel lift, the soleus utilizes its sagittal plane eccentric loading power at the ankle to concentrically invert the heel at the subtalar joint in the frontal plane . . . therefore functioning econcentrically at this point of transformation.

Also at this point of transformation the soleus extends the knee and externally rotates the leg.

Becoming the Posterior Tibialis

The posterior tibialis "sings the same song" as the soleus, except with a greater mechanical advantage in the frontal plane.

The posterior tibialis functions eccentrically at the subtalar joint to decelerate eversion, at the ankle joint to decelerate ankle dorsiflexion, (and functions concentrically like the knee joint), while functioning concentrically at the subtalar joint and knee joint, just as the soleus does.

The posterior tibialis, therefore functions econcentrically at the point of transformation.

Becoming the Gastrocnemius

The gastrocnemius is like the soleus except it crosses the knee with two large heads and grabs the femoral condyles.



The gastrocnemius decelerates frontal plane subtalar joint eversion and femoral internal rotation, then decelerates sagittal plane ankle dorsiflexion, while decelerating knee hyperextension, while accelerating tibial and femoral and hip external rotation . . . therefore functioning econcentrically.

Becoming the Peroneus Longus

The peroneus longus is not an evertor of the foot . . . eversion happens for free.

The peroneus longus crosses under the foot and attaches to the base of the first ray.

The peroneus longus "alarm clock" first goes off as the first ray becomes loaded into the ground and begins to dorsiflex and invert.

The peroneus longus is stimulated to eccentrically decelerate dorsiflexion and inversion of the first ray as well as dorsiflexion and inversion of the mid-tarsal joint.

The peroneus longus then begins to decelerate sagittal plane ankle dorsiflexion.

The peroneus longus utilizes the sagittal plane ankle loading and frontal plane subtalar joint loading to concentrically pull down on the first ray to create first ray stability while creating knee extension . . . therefore functioning econcentrically.

A stable foot, because of the econcentric success of the soleus, gastrocnemius, posterior tibialis, peroneus longus, along with it's friends, allows for the effective loading of the hip and trunk for an efficient and effective propulsion.

What is needed to facilitate the **Chain Reaction™** in order to turn on reactively the calf musculature from the top down and from the bottom up?

Utilization of the Biomechanical Ankle Platform System™ (BAPS) as a bottom up driver along with the opposite leg driver in the sagittal plane.

Renaming the BAPS to "Econcentric Stimulator of the Entire **Chain Reaction™** from the Bottom Up"

Becoming the Quadriceps

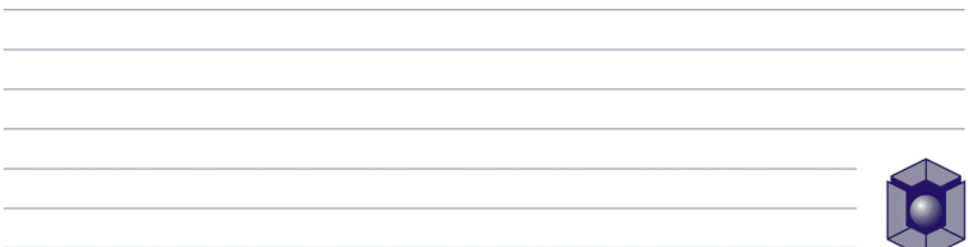
The quadriceps is traditionally known as a knee extensor . . . in gait. It does very little of this.

The quadriceps first stimulus is to decelerate knee flexion along with knee internal rotation and knee abduction.

The quadriceps can decelerate transverse plane internal and external rotation of the leg.

The quadriceps can decelerate frontal plane abduction and adduction of the knee.

The quadriceps takes advantage of the rectus, to utilize the rectus eccentric load of hip extension in order to facilitate continued deceleration of knee flexion in order to allow for knee extension, knee external rotation, and knee adduction.



Becoming the Hamstrings

The hamstrings actually decelerate knee flexion . . . not create knee flexion.

The hamstrings decelerate hip flexion along with knee flexion in gait.

In gait, the hamstrings decelerate internal rotation of the tibia and calcaneal eversion.

In gait, the hamstrings decelerate frontal plane knee abduction and hip adduction.

The hamstrings, at the point of transformation, take advantage of its eccentric load at the knee and hip in all three planes in order to concentrically begin to sequentially produce hip and knee extension with knee external rotation and knee abduction . . . therefore functioning econcentrically.

The hamstrings and quadriceps function synergistically.

Becoming the Adductors

The adductors really don't adduct much in upright function.

The adductors function in gait, in the sagittal plane, with the front leg adductors decelerating hip flexion and the back leg decelerating hip extension, being loaded eccentrically.

During this time the front leg adductors also eccentrically decelerate internal rotation while the back leg adductors concentrically accelerate femoral external rotation, tibial external rotation, talar external rotation and inversion of the calcaneus.

This point of transformation allows the back leg adductor then to become a powerful hip flexor with propulsion . . . therefore functioning, as described above, econcentrically.

The function of the hip adductors in the frontal plane . . . actually the opposite hip adductor decelerates hip adduction.

Becoming the Butt

Feeling Skelly, the skeletons butt.

Why do I have such a big butt in the back and a relatively small butt in the front?

Turning on the sagittal plane, transverse plane and frontal plane butt through all the drivers of function.

Why a "dormant butt" can not provide the transformational power that is needed for function.

In gait, the butt decelerates flexion, internal rotation and adduction of the hip . . . then, at it's first point of transformation, begins to concentrically extend and abduct the hip while concurrently building eccentric capabilities through ongoing internal rotation because of the effective propulsion (pelvic rotation) of the opposite leg . . . therefore functioning econcentrically.

The butt, when effectively turned on in three planes, becomes a **Chain Reaction™** transformational power house.

The iliotibial band, via the tensor fascia lata and gluteus maximus, decelerate hip adduction, hip internal rotation, knee flexion, tibial internal rotation . . . then sequentially transforms to concentrically produce hip abduction, hip extension, knee extension, tibial external rotation and calcaneal inversion . . . therefore functioning econcentrically.



Understanding the ecentric abilities of the butt as we move in all three planes.

Becoming the Abdominals and Hip Flexors

The abdominals and hip flexors are smart enough to take advantage of the forces already "out there" to load to a point of transformation in all three planes in order to create an effective force of production.

The abdominals don't turn themselves off . . . they don't turn themselves on. They get turned on by gravity, ground force, mass and momentum, other muscle forces, intent, arm and leg drivers.

If the abdominals are not being turned on effectively we have to use our functional analysis abilities at the points of transformation to find out why . . . it is not the abdominals fault.

The abdominals control three dimensional motion of the pelvis and three dimensional motion of the trunk . . . concurrently.

In gait, the abdominals get turned on in the sagittal plane eccentrically with pelvic anterior rotation, in the frontal plane with pelvic translation and lateral flexion, and in the transverse plane with pelvic rotation with opposite trunkal rotation.

At the two points of transformation in gait the abdominals function ecentrically to create a reaction to rotate the pelvis forward, therefore allowing the body to move over the ground.

Description of the abdominals ecentrically at points of transformation.

The hip flexors are decelerators of internal rotation, abduction and adduction in the frontal plane, and hip extension and function powerfully and ecentrically at the functional points of transformation to produce effective moment in all three planes.

Sitting on the porch in Adrian intransformationalizing.

Becoming the Back

All back muscles have a 3D oblique orientation.

The desire of the back muscles to be ecentrically turned on in the sagittal, frontal and transverse planes with flexion, lateral flexion and rotation.

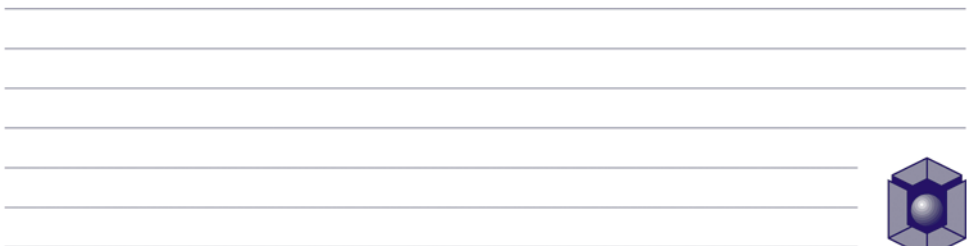
Understanding the 3D propulsion loading of all segments of the **Chain Reaction™**

Describing loading in one or two planes in order to become more effective unloading in another . . . miraculously functioning ecentrically.

If dysfunction occurs we need to ask: "Where is the 3D motion not taking place throughout the **Chain Reaction™?**"

A review of "What begets what?"

Creating the environment, "encouraging transformation" to facilitate the tri-plane initial ecentric capability of the muscles utilizing the drivers of function to activate the proprioceptors in order to facilitate an ecentric reaction at the points of transformation in order to produce productive movement of the body.




Three dimensional econcentric workout with a medicine ball and a wall
The medicine ball is a gravity enhancer and a momentum shifter

Getting six vectors involved at the points of transformation

- Right and left lateral vectors underhand throw
- Right and left lateral vectors overhand throw
- Anterior vector overhead, chest and underhand throw
- Posterior vector overhead and underhand throw
- Right and left rotational vectors forward throw
- Right and left rotational vectors backward throw

Repeat all the above one handed



Biomechanical analysis of the econcentric nature of the workout.

Notch it up econcentrically by doing all the above with one footed hops

Notch it up even more econcentrically by doing all of the above one handed with one footed hopping in all three planes.

The bottom line with our training and conditioning programs is to facilitate an environment where the muscles can react econcentrically and therefore say to us that they can economically allow us to be more effective and efficient in what we want to do.




In golf, as with all activities, there is a need to be economical, efficient and effective.

Understanding the intriguing interplay between the pelvis and the trunk.

At the point of transformation in the backswing and at the point of transformation in the follow through, the muscles of the entire **Chain Reaction™** function ecentrically.

Ecentric capability depends upon the effective loading of mass and momentum.

Taking advantage of the core ball to facilitate mass and momentum at the points of transformation.



Core ball ecentric transformational warm up

- Right hand back swing load
- Left hand back swing load
- Bilateral hand back swing load
- Bilateral hand follow through load
- Right hand follow through load
- Left hand follow through load
- Right hand back swing load with left leg lunging in all three planes
- Left hand back swing load with left leg lunging in all three planes
- Bilateral hand back swing load with left leg lunging in all three planes
- Right hand follow through load with right leg lunging in all three planes
- Left hand follow through load with right leg lunging in all three planes
- Bilateral hand follow through load with right leg lunging in all three planes

Adding a sagittal plane flexion tweak with all of the above

Adding a sagittal plane extension tweak with all the above

Creating an environment to facilitate ecentric transformational power of the muscles.

Did the transformational drill make a difference? . . . In golf the ball will not tell a lie.



RESEARCH ROUNDTABLE WITH DR. DAVID TIBERIO

Neptune RR, Zajac FE, Kautz SA. Muscle force redistributes segmental power for body progression during walking. *Gait and Posture*. 2004, 19: 194-205.

McNeil Alexander R. Tendon elasticity and muscle function. *Comparative Biochemistry and Physiology Part A*. 2002, 133: 1001-1011.

Dave's "dilemmer" of finding Ecentric research articles

The variety of ways the body reveals Ecentrics

What the muscles react to in a dynamic system

The ability of a tendon to lengthen in order to store energy

Functionally understanding flexibility

3D flexibility at the points of transformation to store and transmit energy

Stiffness of the neuromusculoskeletal system

Facilitating the Ecentric capabilities of older individuals

Using our knowledge of function and the power of tweakology to create the most optimal environments of transformation

The distal deceleration and proximal acceleration load at the points of transformation



The key to transformational sequencing (Econcentrics) is to facilitate what is actually observed to happen in function

The deceleration of one segment in order to accelerate another segment along with **Chain Reaction™** is another way to describe Econcentrics.

Flowing sequential **Chain Reaction™** whips of the body

Description of the sequential **Chain Reaction™** of the back muscles

Understanding the whip effect of the soleus by intrasformalizing

"We are not smart enough to understand it all"

The body can much better take advantage of what is functional as compared to trying to take advantage of what is nonfunctional

We want to restore the muscles "economical nature"

The power of transformation is proportional to our biomechanical understanding of human function

Grunting through function

Research is very clearly telling us that "function is function"

A special thanks to Dr. Dave Tiberio

