

1. We must strategically understand that balance is to be studied, tested and trained in motion, not in stillness.
2. We must strategically realize that balance is a multiplicity of the integration of all the systems of the body.
3. Balance is functionally understood three dimensionally.
4. The functional test of balance is how far you can displace your center of gravity, chase it down, decelerate it and bring it back home and be effective and efficient.
5. Functional balance is not reflected in the fixed body over an unstable surface.
6. Balance is tested in motion with gravity being the main competitor.
7. Balance is studied in motion, not in stillness.
8. The way you find improved stability is to progressively introduce controlled instability.
9. Standing balance reach strategies can be used with the TRUEStretch™.
10. Balance training . . . turning on your switch a little faster in all three planes.
11. Balance is displacing your body, tracking it down, capturing it, transforming it and bringing it back home.
12. Functional training and rehabilitation programs allow us to reveal and create more balance.



## FUNCTIONAL DESIGN SYSTEMS

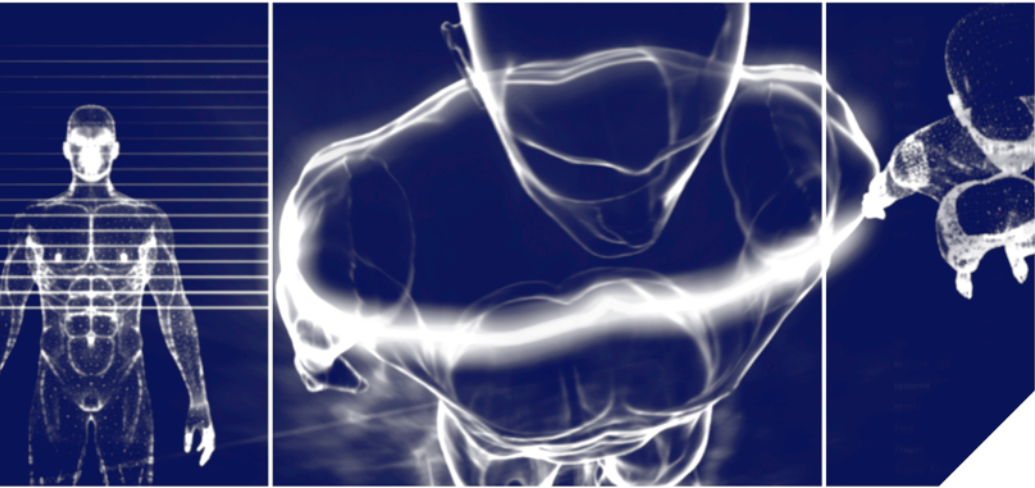
Transforming Knowledge Into Function

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# v1.6 BALANCE

## The Time of Transformation

By: Gary Gray, PT



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### OBJECTIVES FOR BALANCE FUNCTIONAL GUIDE

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To assimilate up-to-date information and knowledge of balance and its dependencies on the body.

To learn how to apply effective functional techniques when testing, training and rehabilitating balance issues.

To understand and appreciate the tri-plane principles as they apply to balance.

### HOW TO USE THIS FUNCTIONAL GUIDE

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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

## THE BLESSING OF PLAYING BALL WITH YOUR KIDS

### STRATEGY 1

Strategically understanding that balance is to be studied, tested and trained in motion, not is stillness

### STRATEGY 2

Strategically appreciating that balance is functionally understood three dimensionally

### STRATEGY 3

Strategically realizing that balance is a multiplicity of the integration of all the systems of the body

### STRATEGY 4

Strategically viewing balance as loading, facilitating transformation and exploding



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STRATEGY 5

Strategically testing successful balance, tweaking towards clinically controlled instability to facilitate expanding the thresholds of functional balance

STRATEGY 6

Strategically turning on phone lines that are within the body but have not been appropriately called upon

STRATEGY 7

Strategically utilizing the functional drivers and balance reach tasks

STRATEGY 8

Strategically creating fun with balance

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Balance is an integration of so many systems . . . the three dimensional range of motion of the joints, the capabilities of the muscles to decelerate, transform and accelerate, the sensitivity and the abilities of the proprioceptors, the information transfer of the spinal cord, the cervical spine sensory systems, the brain itself, the eyes and the systems of the ears all must come together in a functionally integrated manner to produce balance.

- Balance is everything we do.
- Balance is studied from a dynamic systems approach.
- *"Balance is studied in motion, not in stillness"*. G. Gray
- Balance must be looked at in all three planes of motion. It is appreciating balance relative to the plane or planes of motion that dominate that activity versus pure plane motion.
- Balance is tested in motion with gravity being the main competitor. Balance is tested with driving the body with various segments of the body combined with Tweakology over a stable ground. Functional balance is not reflected in the fixed body over an unstable surface.



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### PURE ESSENCE OF BALANCE

*"The ability to load, go somewhere, then be able to decelerate that go somewhere, take advantage of that load and come back home and do something worthwhile". G. Gray*

We can break down balance utilizing segments of the body as a driver, understanding the reaction in the various planes of motion, using different drivers and different tweaks.

*"The functional test of balance is how far you can displace your center of gravity, chase it down, decelerate it and bring it back home and be effective and efficient." G. Gray*

Being able to properly understand and test balance, utilizing a pure functional low tech approach to a high tech concept, allows us to then properly train, condition and rehabilitate balance.

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Gary's opportunity to evaluate and assess Bob

## CASE PRESENTATION

HISTORY - Bob is a youthful 81 year old friend who enjoys walking and jogging. Three years ago while jogging on a hot day he describes "his head spinning". He then indicates that he now "has a balance problem".

He has had comprehensive medical checkups including neurological exams, specific eye and ear, nose and throat examinations.

Bob complains of no headaches or unusual neck or shoulder stiffness. No other problems described.

## GAIT ANALYSIS

- Fast walk "lollygag"
- Long stride
- Wide base stride
- Crossover stride
- Arm rotation
- Cervical rotation "no"
- Exaggeration arm rotation

## STANDING EXAM-Bilateral Stance Cervical Rotation

Functional 3-D Testing System™ (3D FTS)

### BALANCE TESTING (emphasis on safety)

- Right leg balance, bilateral arm anterior reach at chest height
- Left leg balance, bilateral arm anterior reach at chest height
- Right leg balance, bilateral arm overhead posterior reach
- Left leg balance, bilateral arm overhead posterior reach
- Right leg balance, bilateral arm overhead posterior reach (partially stabilized)
- Left leg balance, bilateral arm overhead posterior reach (partially stabilized)
- Left leg balance, left arm lateral reach at chest height
- Right leg balance, right arm lateral reach at chest height
- Left leg balance, right arm left rotational reach at chest height
- Right leg balance, left arm right rotational reach at chest height
- Left leg balance, right arm left rotational reach at chest height (with eyes fixed)
- Right leg balance, left arm right rotational reach at chest height (with eyes fixed)



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### SINGLE LEG BALANCE TEST WITH USE OF OVERHEAD ARM DRIVERS

- Left leg balance, sagittal plane arm overhead lifts
- Left leg balance, frontal plane arm overhead lifts
- Left leg balance, transverse plane arm overhead lifts
- Right leg balance, sagittal plane arm overhead lifts
- Right leg balance, frontal plane arm overhead lifts
- Right leg balance, transverse plane arm overhead lift
- Left leg balance, cervical rotation (partially stabilized hands bilaterally)
- Right leg balance, cervical rotation (partially stabilized hands bilaterally)

### QUESTIONS & DISCUSSIONS WITH BOB

### OUTLINING THE PLAN & GOALS WITH BOB

### ANALYSIS DEBRIEF WITH BOB WIERSMA, P.T.

- Discussion of medical concerns
- Asymmetrical patterns with balance problems
- Safety as a major consideration. . the first thought, the last thought and everything in between
- Progressing through the functional tests
- "Clearing" what is successful
- A hip dominate, plane by plane strategy
- Use of the 3D Functional Testing System™ (3D FTS)
- Are we testing functional balance?
- With most function the ground is stable
- The ground needs to be stable, the body needs to be in motion
- Authentic testing, authentic success
- *"The way you find improved stability is to progressively introduce controlled instability"*  
- G. Gray

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- GARY HAVING FUN WITH BOB
- BOB INTRODUCED TO HIS TRAINING PARTNER (THE WALL)
- EMPHASIS OF SAFETY WITH TRAINING AND REHABILITATION

## TREATMENT/EXERCISES

### HOME BALANCE TRAINING PROGRAM FOR BOB

- Right leg balance, bilateral arm anterior reach at chest height
- Left leg balance, bilateral arm anterior reach at chest height

#### *Positive feedback for Bob*

- Right leg balance, bilateral arm anterior, anterior medial and anterior lateral reach at chest height
- Left leg balance, bilateral arm anterior, anterior medial and anterior lateral reach at chest height

#### *Positive feedback for Bob*

- Right leg balance, bilateral arm anterior reach at chest height with cervical rotation
- Left leg balance, bilateral arm anterior reach at chest height with cervical rotation

#### *Positive feedback for Bob*

### Teaching how to cheat (tweak)

- Right leg balance, right arm lateral reach at shoulder height
- Left leg balance, right arm lateral reach at shoulder height
- Left leg balance, left arm lateral reach at shoulder height
- Right leg balance, left arm lateral reach at shoulder height

#### *Positive feedback for Bob*



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- Right leg balance, right arm lateral reach at shoulder height with left arm rotational swing
- Left leg balance, right arm lateral reach at shoulder height with left arm rotational swing
- Left leg balance, left arm lateral reach at shoulder height with right arm rotational swing
- Right leg balance, left arm lateral reach at shoulder height with right arm rotational swing

*Positive feedback for Bob*

- Right leg balance, bilateral overhead posterior reach
- Left leg balance, bilateral overhead posterior reach

*Positive feedback for Bob*

- Right leg balance, bilateral overhead posterior reach with minimal cervical rotation
- Left leg balance, bilateral overhead posterior reach with minimal cervical rotation

REVIEW OF EXPECTATIONS & GOALS WITH BOB WITH THE EMPHASIS OF SAFETY

REHABILITATION DEBRIEF WITH BOB WIERSMA, P.T

- Expectation of measurable progress
- Lack of objective improvement equals red flag
- Setting the patient up for success
- Standing balance reach strategies with the TRUEStretch™
- Introducing just the right amount of control and stability
- Working from the bottom up . . . understanding foot ware and Orthotics
- Authentic balance is appreciated in motion not in stillness

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## THIS IS GARY'S OPPORTUNITY TO TRAIN WITH KEITH

*Balance training . . . "turning on your switch a little faster in all three planes"*  
- G. Gray

*Balance is displacing your body, tracking it down, capturing it, transforming it and bringing it back home." - G. Gray*

### BALANCE MATRIX WARM-UP

- Left leg balance, arm overhead reaches in the sagittal, frontal and transverse plane
- Right leg balance, arm overhead reaches in the sagittal, frontal and transverse plane
- Left leg balance, arm waist to shoulder reaches in the sagittal, frontal and transverse plane
- Right leg balance, arm waist to shoulder reaches in the sagittal, frontal and transverse plane
- Left anterior/lateral, and posterior/lateral rotational balance lunges
- Right anterior/lateral, and posterior/lateral rotational balance lunges
- Left three plane lunges with increased speed
- Right three plane lunges with increased speed
- Right and left three plane lunges with medial bilateral arm drive
- Right and left three plane lunges with lateral bilateral arm drive
- Right and left three plane lunges with overhead posterior arm drive

### BALANCE TRAINING WITH LOADING TWEAK

- Left leg balance with sagittal overhead lifts, with 10 lb. dumbbells
- Left leg balance with frontal overhead lifts, with 10 lb. dumbbells
- Left leg balance with transverse overhead lifts, with 10 lb. dumbbells
- Right leg balance with sagittal overhead lifts, with 10 lb. dumbbells
- Right leg balance with frontal overhead lifts, with 10 lb. dumbbells
- Right leg balance with transverse overhead lifts, with 10 lb. dumbbells



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- Left leg balance with sagittal waist to shoulder lifts, with 10 lb. dumbbells
- Left leg balance with frontal waist to shoulder lifts, with 10 lb. dumbbells
- Left leg balance with transverse waist to shoulder lifts, with 10 lb. dumbbells
- Right leg balance with sagittal waist to shoulder lifts, with 10 lb. dumbbells
- Right leg balance with frontal waist to shoulder lifts, with 10 lb. dumbbells
- Right leg balance with transverse waist to shoulder lifts, with 10 lb. dumbbells
  
- Lunge balance matrix in all three planes, with bilateral anterior arm drives, with 10 lb. dumbbells at knee height
- Left and right anterior balance lunge, with right arm anterior reach and left arm lateral reach, with 10 lb. dumbbells
- Right and left sagittal plane hops, with Matrix overhead lifts in all three planes, with 10 lb. dumbbells
- Right and left sagittal plane hops, with Matrix waist to shoulder lifts in all three planes, with 10 lb. dumbbells
- Right and left frontal plane hops, with Matrix overhead lifts in all three planes, with 10 lb. dumbbells
- Right and left transverse plane hops, with Matrix overhead lifts in all three planes, with 10 lb. dumbbells

*(All three plane hops can also be done with Matrix waist to shoulder lifts in all three planes, as well as a tweak to the planes and a tweak to the lifts on the right and on the left.)*

**EXPANDING ON THE SPHERE OF BALANCE FOR YOUR CLIENT, ATHLETE AND PATIENT**

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BALANCE IN GOLF - Dynamic motion at both ends of the golf swing . . . balance occurs at transformation.

With the temporary loss of balance in all functional activities as it is in golf, if the loss of balance can be effectively caught, it allows for a greater load in all three planes.

Fun with balance testing and training can be derived by how we "drive" the body. We can drive the body with different implements, with tweaking, with different parts of the body, and within a plane dominant strategy.

- Demonstration of exaggerating a plane of motion in the golf swing to drive the body at transformation.

## DRIVING THE BODY TO TRAINING CONDITIONING BALANCE WITH MOMENTUM

### Two Footed Hop Drills

- Sagittal plane anterior
- Sagittal plane posterior
- Frontal plane right lateral
- Frontal plane left lateral
- Transverse plane right rotational
- Transverse plane left rotational



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### One Footed Hop Drills

- Frontal plane, transverse plane and sagittal plane  
(right anterior hop drill demonstrated)

The whole idea of balance training in life, as it is in golf, is to create various environments with specific tweaks to clinically control expanding our threshold of balance and therefore our functional abilities.

Functional training and rehabilitation programs allow us to reveal and create more balance.

When balance beautifully comes together we are immediately thankful for the ability of:

- Getting there and coming back
- Failing and succeeding
- Being humbled and being uplifted
- Going outside yourself and coming back home
- Loading and exploding

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Balance is the key to life . . . the key to function.

## **PEAK PE (*Promoting Encouragement and Athleticism in Kids*)**

Balance is the stable foundational base and common thread in everything done in **PEAK PE**.

*"The greatest way to encourage a child is to show them what balance abilities and successes they have and then build upon those success to allow them greater abilities in whatever they choose to do."* - G. Gray, **PEAK PE**

Functional balance begets emotional balance begets intellectual balance begets spiritual balance.

## **RESEARCH ROUNDTABLE WITH DR. DAVID TIBERIO**

- Balance is an integration of posture and motion.
- Balance is mostability (motion combined with stability).
- Discussion of center of pressure controlling the center of mass.
- Sheep analogy from the University of Waterloo.
- The center of mass (sheep) center of pressure (sheepdog).
- Creating tasks without consciously being aware in order to appropriately train the "sheepdog".
- *"Take the conscious mind out of the act"*. - G. Gray



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- Discussion of the "sheepdog".
- One of the litmus tests of functional balance training is functional positioning and moving relative to gravity, ground reaction forces and stability tweaks.
- The proof of the pudding is: "So what do we want balance for?"
- Effective functional balance testing is the true test for what is effective in balance training, conditioning and rehabilitation.
- The concept of creating functionally controlled instability.
- There are many ways we can functionally drive the system to challenge balance. The utilization of functional drivers such as parts of the body, the ground and gravity are keys to functional training.
- Discussion of anticipatory postural reactions verses reactive postural motions (**Chain Reaction**) . . . *"its not an anticipation of what is happening it is what's happening". - G. Gray*
- To try to study one functional system without the integration of the other functional systems in balance is not studying that one system.

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