

1. We need to understand the cervical spine's relationship to the head, but just as importantly to the thoracic spine, lumbar spine, pelvis and lower extremities.
2. *"It is the neck that can turn the rest of the body"*
3. Cervical spine dramatically influences the integrative function of the NeuroMusculoSkeletal system
4. As with all of our FMR techniques, we need to functionally know what drives the system and take advantage of those drivers, in addition to the compliments of our hand, to create the normalized **Chain Reaction™**
5. Perhaps the most significant drivers of the cervical spine are the eyes
6. The importance of "clearing the thoracic spine" before our FMR approach to the cervical spine
7. The analysis drives the FMR technique and the FMR technique drives the analysis
8. Understanding how Functional Manual Reaction is complimentary to other proven manual approaches
9. *"You be messin' with one dimension . . . you be messing with the other two"*
10. "Utilization of strategies where you transform the function of the thing into a better thing"
11. "The chicken and the egg" . . . with Functional Manual Reaction the treatment is essentially concurrent throughout the **Chain Reaction™** . . . treating the cause, compensations and symptoms
12. The oxymoron "cocky humility" . . . if we don't desire humility then we don't want to be a part of understanding function



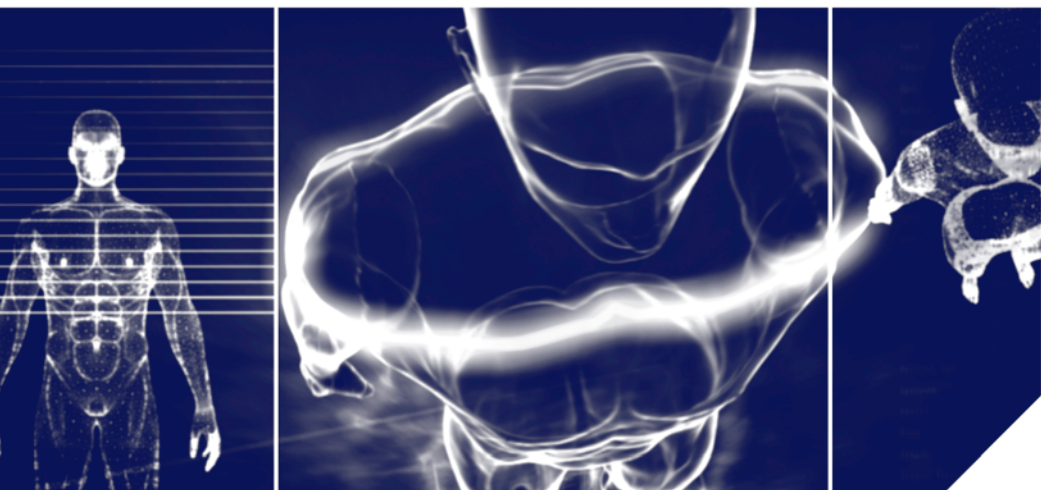
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v4.9 FUNCTIONAL MANUAL REACTION (FMR)

The Cervical Spine
By: Gary Gray, PT



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OBJECTIVES FOR FMR OF THE CERVICAL SPINE FUNCTIONAL GUIDE

To assimilate up-to-date information and knowledge about FMR of the Cervical Spine.

To learn how to apply effective functional techniques when testing, training, and rehabilitating using a FMR of the Cervical Spine approach.

To understand and appreciate the tri-plane **Chain Reaction™** principles as they apply to FMR of the Cervical Spine.

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

The Ab Dolly . . . the cervical dolly

The Ab Dolly designed by Brett Fischer, PT, ATC

The Ab Dolly becomes a driver of the body relative to the cervical spine

Forward and back with driving the cervical spine in the sagittal, transverse and frontal planes

Side to side with driving the cervical spine in the sagittal, transverse and frontal planes

The angulations with driving the cervical spine in the sagittal, transverse and frontal planes

STRATEGY 1

Strategically understanding the authentic biomechanical function of the cervical spine

STRATEGY 2

Strategically realizing the dramatic effect the cervical spine has on the entire body

STRATEGY 3

Strategically taking advantage of functional manual reaction

troupling . . . three dimensional driving in reaction of the cervical spine from the bottom up and top down



STRATEGY 4

Strategically analyzing the function of the cervical spine in relationship to itself, the head and the **Chain Reaction™** of the entire body

STRATEGY 5

Strategically employing effective functional manual reaction treatment techniques within our analysis techniques

STRATEGY 6

Strategically integrating functional manual reaction techniques into our comprehensive functional **Chain Reaction™** rehabilitative process

STRATEGY 7

Strategically training and conditioning the cervical spine with a **Chain Reaction™** approach

STRATEGY 8

Strategically transforming our understanding of function into powerful drills to enhance function

STRATEGY 9

Strategically applying three dimensional research to our three dimensional understanding of the cervical spine and the rest of the body



One of my favorite quotes from *My Big Fat Greek Wedding* is “the man is the head, but the woman is the neck and she can turn the head any way she wants”.

We need to understand the cervical spine’s relationship to the head, but just as importantly to the thoracic spine, lumbar spine, pelvis and lower extremities.

Occipitoatlantal Junction CO-C1

This junction has no disk

- Occipital condyle are convex front to back and side to side
- Because of the osseous and ligamous relationships the primary motion at CO-C1 is in the sagittal plane . . . flexion and extension
- Very little Type I coupled motion of lateral flexion and rotation opposite . . . yet it is significant

Atlantoaxial Junction C1-C2

No disk at this junction either

- Unique convex to convex articulation
- Because of the osseous articulation and ligamentous relationship primary motion available is transverse plane rotation to the right and left
- Very little sagittal plane flexion or extension and very little frontal plane lateral flexion to the right or to the left is available
- Get an interesting “downward creeping” (inferior translation with rotation) with a “crawl back up” (superior translation) with return

Axial-C3 C2-C3

- Has typical cervical spine characteristics
- Has primarily frontal plane motion, lateral flexion to the left and to the right available

C3-C7

- Now have major components of all three planes of motion
- Coupled Type II motion demonstrated C3-C7 . . . lateral flexion and rotation to the same side “troupled” with flexion and extension
- C3-C7 does have Type I motion available to it (lateral flexion and rotation opposite) but it has a “dead end” feeling
- When we palpate the cervical spine, we palpate over the articular pillars not the spinus or transverse processes



C7-T1

- We now get Type I motion (rotation one way, with lateral flexion the opposite way)
- *"It is the neck that can turn the rest of the body"*

Vertebral Artery

- The vertebral artery enters at C6-C7 and runs superior through the intertransverse foramen
- Exits on the superior side of the transverse process of C1
- Enters the foramen magnum and forms the basilar artery
- Vertebral artery compromise can be seen with primary dysfunction at C6-C7, changes in the intertransverse foramen, dysfunction at CO-C1, rotation with lateral flexion asymmetries

Cervical spine has a wealth of mechanoreceptors and nociceptors in the articulations and capsular structures

Cervical spine dramatically influences the integrative function of the NeuroMusculoSkeletal system

As with all of our FMR techniques, we need to functionally know what drives the system and take advantage of those drivers. in addition to the compliments of our hand, to create the normalized **Chain Reaction™**

Drivers of the cervical spine include gravity, ground reaction forces, mass and momentum of the body

Dramatic drivers include the hands along with the feet

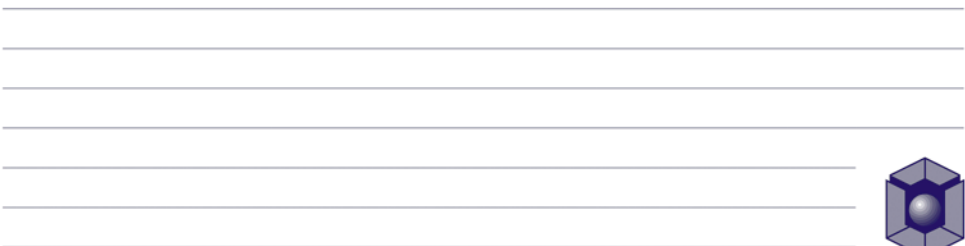
Perhaps the most significant drivers of the cervical spine are the eyes

Understanding "what is messing with the cervical spine"

Troupling . . . understanding three dimensional driving and reaction of the cervical spine from the bottom up and top down

With our FMR (Functional Manual Reaction) approach to the cervical spine we take advantage of our bottom up approach and compliment it with our top down approach in all three planes of motion

Allow the cervical spine to get along with the rest of the body . . . allowing three dimensional function of the head and three dimensional function of the body below it



Analysis and Rehabilitation integrated with Dr. David Tiberio

G2 toggled up in "25" basketball practice jersey

Gait eval and balance reaction and additional functional evaluations to see how the body moves

Traditional six movements of the cervical spine in the three planes of motion

Bilateral right and left rotational reach of hands at shoulder height and observe total range, hip motion, thoracic motion, and cervical spine's ability to "disassociate"

Alternate right and left hand overhead opposite side lateral reach

"Tweaking the motions to get more information"

Left hand overhead right lateral reach, with right hand right rotational reach at shoulder height

Right overhead left lateral reach, with left hand left rotational reach at shoulder height

Observing Type II cervical motion by facilitating Type II thoracic motion

Observing Type II cervical motion by facilitating Type I thoracic motion (lateral flexion with rotation opposite)

Correlate both bottom up findings with top down findings



TrueStretch™ stabilized thoracic Type I motion, with left hand overhead right lateral reach, with right hand left rotational reach at shoulder height, with all six top down cervical motions

Repeat mirror image of above

Observe motions and “listen to the symptoms”

In analysis, one of our questions is, “Can I influence and/or affect what is going on?”

“Positioning to the barrier”

The above described Type I thoracic motion with lateral flexion right, with rotation left facilitating Type I cervical motion, with lateral flexion left, with rotation right

Creating a quick functional barrier

Type II thoracic motion with lateral flexion right, with rotation right facilitating Type II cervical motion with lateral flexion left, with rotation left

The importance of “clearing the thoracic spine” before our FMR approach to the cervical spine

TrueStretch™ stabilized thoracic Type II motion, with left hand right rotational reach at shoulder height, with right hand right lateral same side lateral reach at hip height . . . FMR technique from the bottom up facilitating right rotation (same as the left hand) or facilitating top down rotation to the left (same as the head) or both



The analysis drives the FMR technique and the FMR technique drives the analysis

Combining the transverse planes in the frontal planes with our FMR techniques

Positioning feet relative to hands

“Playing Twister” to fully and functionally analyze

Understanding how Functional Manual Reaction is complimentary to other proven manual approaches

Tweaking the sagittal plane to “free up motion” in the other two planes . . . troupling

Troupling through the trunk to influence the cervical spine

Troupling in the thoracic spine to let the cervical spine hear the thoracic spine say . . . “I can help you or I can make it difficult on you”

The beauty of FMR techniques . . . our hands compliment our other drivers and tweaks such as positioning, gravity, the *Peltrunkula* phenomenon, hand drivers, eye drivers, and other body drivers along with ground reaction forces and reaction forces with the **TrueStretch™**

The transition from the clinic to home



Creating the proper three dimensional **Chain Reaction™** to facilitate normalized motion of the entire body effectively integrating the cervical spine

FMR techniques at the functional threshold of success

Tweaking to expand our threshold

Wisdom of Type I motion in the thoracic spine

Wisdom of taking advantage of the troupling of the spine and initially facilitating the successful plane or planes to get to the other plane or planes

"You be messin' with one dimension . . . you be messing with the other two"

Always build upon successful thresholds

Take advantage of the wisdom of the body, to let the body show us how to help it



Gary's opportunity to train and condition with Doug Gray

Bungee Plane Load at Shoulder Height
3D Cervical Spine Matrix with Bungee Plane Load

Bungee Plane Load at Shoulder Height

- Left stride stance with right hand anterior and left hand posterior
 - Right hand posterior reach and left hand anterior reach
 - Eyes right lateral
 - Eyes anterior
 - Eyes left anterior/lateral
 - Eyes left lateral
 - Eyes left posterior/lateral
 - Cervical left rotation with eyes right lateral to left lateral

Bungee Plane Load at Shoulder Height

- Right stride stance with right hand anterior and left hand posterior
 - Right hand right rotational reach and left hand left rotational reach
 - Eyes right lateral
 - Eyes anterior
 - Eyes left anterior/lateral
 - Eyes left lateral
 - Eyes left posterior/lateral
 - Cervical left rotation with eyes right lateral to left lateral

Bungee Plane Load at Shoulder Height

- Wide stance with right hand right lateral and left hand left lateral
 - Right overhead left lateral reach and left hand right lateral reach
 - Eyes driven cervical lateral flexion left
 - Eyes driven cervical spine neutral
 - Eyes driven cervical lateral flexion right
 - Cervical lateral flexion right

Bungee Plane Load at Shoulder Height

- Right wide stance with right hand right lateral and left hand left lateral
 - Right hand left rotational reach and left hand left rotational reach
 - Eyes left lateral
 - Eyes left anterior/lateral
 - Eyes anterior
 - Eyes anterior right/lateral
 - Eyes right lateral
 - Cervical right rotation with eyes left lateral to right lateral



Bungee Plane Load at Shoulder Height

- Right wide stance with right hand right lateral and left hand left lateral
- Right hand right rotational reach and left hand overhead right lateral reach (Type II Motion)
 - Eyes right lateral
 - Eyes right anterior/lateral
 - Eyes anterior
 - Eyes left anterior/lateral
 - Cervical right rotation with eyes right lateral to left lateral

Bungee Plane Load at Shoulder Height

- Right wide stance with right hand right lateral and left hand left lateral
- Right hand right rotational reach and right hand overhead left lateral reach (Type I Motion)
 - Eyes right anterior/lateral
 - Eyes anterior
 - Eyes left anterior/lateral
 - Eyes left lateral

Bungee Plane Load at Shoulder Height

- Left leg balance with right hand anterior and left hand posterior
- Right hand posterior reach and left hand anterior reach
 - No "drive" (transverse plane)
 - Yes "drive" (sagittal plane)
 - I don't know "drive" (frontal plane)
 - Tweaking the height of the bungee cord
 - Feeling the "freedom feel"

Special thanks to Doug Gray



G2's opportunity to play "tweak pong" with Dougie

"Utilization of strategies where you transform the function of the thing into a better thing"

Ping pong . . . tweak pong

Paddle can be in the right hand, left hand or hold the paddle bilaterally

The eyes following the ball create a powerful cervical driver

- Left stride stance with cross volley
- Alternate lateral lunges with opposite hand floor height same side reaches with high volley
- Eye patch dominant eye with alternate lateral shuffle with regular volley
- Baby BAPS (BAPS Satellite) single leg balance with mid line volley to cross volley
- Frontal plane box jumps with regular volley



- Transverse plane box jumps with regular volley
- Left hand body blade with regular volley
- Left hand shoulder to overhead 3D Dumbbell Matrix with regular volley
- Right shoulder to overhead 3D Dumbbell Matrix with regular volley
- Sagittal head bungee load with 3D Hop Matrix with regular volley
- Anterior/lateral same side bungee head load with same side and opposite side rotational reaches
- Anterior/lateral opposite side bungee head load with same side and opposite side rotation reaches
- "Yes, No, I don't know" with regular volley

Transformational drills allow us to do what we want to do more effectively and more efficiently

Doug back hands the fly



RESEARCH ROUNDTABLE AND DEBRIEF WITH DR. DAVID TIBERIO

Ishii T, et al. Kinematics of the subaxial cervical spine in rotation: in vivo three-dimensional analysis. Spine 2004, 29(24): 2826-2831.

Ishii T et al. Kinematics of the cervical spine in lateral bending: in vivo three-dimensional analysis. Spine 2006, 31(2): 155-160.

Lateral flexion rotational sequential MRI studies

Upper cervical coupling is Type I . . . lateral flexion with rotation opposite

Mid to lower cervical coupling is Type II . . . lateral flexion with rotation same

Upper cervical spine coupling with the extremes of rotation create sagittal plane extension

Lower cervical spine coupling with the extremes of rotation create sagittal plane flexion

What we might want to facilitate in the sagittal plane in order to facilitate transverse and frontal plane reactions

A “top down” study

Insight into primary frontal plane abnormalities causing transverse plane instabilities in the lower and mid cervical spines

The thoracic spine significantly influences the cervical spine, as well as the cervical spine significantly influencing the rest of the body

“The chicken and the egg” . . . with Functional Manual Reaction the treatment is essentially concurrent throughout the **Chain Reaction™** . . . treating the cause, compensations and symptoms



Bottom up and top down hybrid manual approaches

Active - assistive passive top down approach in upright postures

Discussion of the direct opposite strategy of eye driver head positions and motions demonstrated in training and conditioning

The training and conditioning is the rehabilitation and the rehabilitation is the training and conditioning properly sequenced and applied

We always learn something with "this functional stuff"

The oxymoron "cocky humility" . . . if we don't desire humility then we don't want to be a part of understanding function

Special thanks to Dr. David Tiberio

