Expert Application of the 4x4 Matrix – Focus on Progression

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Symptoms of Internal Combustion Engine Dysfunction

- Rough idle
- Hesitation
- Engine Misfire
- Smoke
- Reduced gas mileage
- Hard to start
- Won’t start

Is adding more gas the solution?
What could the problems be?
Is adding more EMG activity the solution?

Why do we care which exercise produces the GREATEST EMG activity?

Functional Training

Normalize and Stimulate Sensors & Train the Brain

Don't just Train Muscles
**Action Point #1**

Work on the inputs, not the muscle.

Create a sensory rich environment that elicits the movement pattern you want.

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**Lab**

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**SFMA**

- Cervical: FN
- UE: FN
- Flexion: DN - SMCD
- Extension: DN – no forward weight shift – SMCD
- Rotation: FN
- SLS: DN, glut drop, unable to perform eyes closed - SMCD
- Squat: DN – forward lean

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**Segmental Rolling DN - SMCD**

Every time she does anything, she is in extension
3 Corrective Exercises

Adding Sensory Input AND What is the feedback?

General Guidelines

Reset

Re-Enforce

Reload

Ways to stimulate the sensors for fitness professionals

– PNF techniques
– Trigger Point techniques
  • Foam Rolling
  • Stick Work
– Vibration
– Manual contact
– Massage
• Clinical Manual Therapy Techniques
  – Manipulation
  – Mobilization
  – PNF techniques
  – Trigger Point techniques
  – ASTYM
  – Active Release
  – Dry Needling
  – Laser

Clinical Manual Therapy Techniques
  – Manipulation

Clinical Manual Therapy Techniques
  – PNF techniques

Clinical Manual Therapy Techniques
  – Trigger Point techniques
Clinical Manual Therapy Techniques
– Instrument Assisted Soft Tissue Massage

Clinical Manual Therapy Techniques
– Active Release

Discussions and education about hydration, nutrition, sleep quality/quantity/positions, ergonomic positions, driving positions, workout modifications.
Protection to reduce stress and exacerbations such as footwear, orthotics, bracing, splinting and weight-bearing status

Stretching and soft tissue work performed by the patient at home

Forms of biofeedback such as leukotape and kinesio tape to provide enhanced perception and input
“Don’t prescribe strengthening for a motor control problem”

Rotator Cuff Exercise??
Core Exercise???

Do Muscles Have Memory?

Is the best way to learn a new movement pattern to perform an exercise that mimics that movement for 8-10 reps?

If your client performs a movement flawlessly during a training session – does that mean they will change that same movement in daily life or sport?
As long as the client can perform the movement properly, they are training the right thing?

When providing feedback to your client it is best to provide it as frequent, immediate, and as informative as possible?

Recommended Reading

Motor Programs are Different than Cognitive Skills

Retention of motor skills is better and more enduring than factual information
What Research Says About Muscle Memory

Motor Programs are planned in advance and executed without many changes when triggered into action

(Wadman et al.)

So What’s the Best Way to Train for the Brain?

• Block Training
  – Do one exercise for a certain number of repetitions per set
  – Each rep has the same movement
  – No stopping between reps
  – Focus on form

• Random Training
  – Do multiple exercises per set and one rep of each
  – Each rep has some different movement
  – Take time with each rep
  – Focus on feel

Blocked vs. Random Practice

Shea & Morgan, 1979
Retention

Blocked vs. Random Practice

Form

Jerky

Smooth

Practice

Retention

Blocked vs. Random Practice

Form

Jerky

Smooth

Practice

Retention

Illusions of Learning

Form

Jerky

Smooth

Practice

Retention

Simon & Bjork, 2001

Illusions of Learning

Form

Jerky

Smooth

Practice

Retention

Predicted

Actual

Simon & Bjork, 2001
Illusions of Learning

Functional Movement Training

- Train the Brain
- Not the Muscles

Action Point #2

Train randomly for optimal adaptation of movement skill.
SFMA’s 4 x 4 Matrix

Functional Exercise Progressions

Remember the Neuro-Developmental Perspective

Movement was Learned in Stages
- Breathing
- Gripping
- Head-Eye Tracking (Cervical)
- Limb Movements
- Rolling
- Crawling
- Transitional Movements
- Upright Movements

Functional Exercise Positions
- Non-Weight Bearing
  - Supine
  - Prone
Functional Exercise Positions

- Quadruped

Functional Exercise Positions

- Kneeling

Functional Exercise Positions

- Standing

Functional Exercise Progressions

The 4X4 Matrix

1. Non-Weight Bearing
2. Quadruped
3. Kneeling
4. Standing

1. No-Resistance - PA
2. No Resistance
3. Resistance - PA
4. Resistance
Pattern Assistance

- Timing vs. Firing
- High Threshold vs. Low Threshold Strategy
- Stabilizers vs. Mobilizers

Functional Exercise Progressions

The 4X4 Matrix

1 - Non-Weight Bearing
2 - Quadruped
3 - Kneeling
4 - Standing

1 - No-Resistance - PA
PA = Pattern Assistance
2 - No Resistance
3 - Resistance - PA
PA = Pattern Assistance
4 - Resistance

Functional Exercise Resistance

- No Resistance
  - With Pattern Assistance (PA)

Active Straight Leg Raise with Pattern Assistance:
Functional Exercise Resistance

- No Resistance
  - Except:
    - Gravity
    - Body Weight

Example: Kettlebell Swings
4 x 4 – Patterns (Flx, Ext, Sqt)

- Standing
- Resistance
**Turkish Get Up**

- Supine – Quadruped – Kneeling - Standing
- Resistance

**Functional Exercise Progressions**

**The 4X4 Matrix**

1. Non-Weight Bearing
2. Quadruped
3. Kneeling
4. Standing

1. No-Resistance - PA
2. No Resistance
3. Resistance - PA PA = Pattern Assistance
4. Resistance

**Action Point #3**

Place person in posture and position where it can only be done correctly

Higher level postures (standing) can hide dysfunction

Don’t rely on verbal coaching

**Practical Implementation**

- Work on the inputs, not the muscle
  - Create a sensory rich environment that elicits the movement pattern you want

- Train randomly for optimal adaptation of movement skill
Practical Implementation

• Higher level postures (standing) can hide dysfunction
  – Work in the lowest level posture that is challenging

• Place person in posture & position where it can only be done correctly
  – Don’t rely on verbal coaching

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Functional Movement Systems

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