Connecting - Function
Functional Training

Doesn’t replace a good cardiovascular program
Is a complement to other types of resistance training
Is key to injury prevention or “Prehab”
Function

• The natural action or intended purpose of a person or thing in a specific role (Collins English Dictionary)

• Structure dictates function & function dictates performance & dysfunction (Cressey)
  • i.e. Poor mobility, strength & stability may reduce stoke length, negatively effect technique and increase the risk of injury
Functional Training Defined

Function is, essentially purpose. Therefore Purposeful Training.

Often occurs in a closed kinetic chain environment (foot/hand is in contact with the ground or another object)

Training movement not muscles

Involves multiple joints in multiple planes
Benefits

• Proprioception
• Postural re-education
• Improves balance / co-ordination
• Challenges the CNS - improve joint stability and sports performance
Positional Considerations

What general considerations must be taken into account in designing functional exercises for athletes?
Connecting the Dots – Athlete Screening

Posture, ROM, Control
The Swimming Body
Performance Pyramid
Functional Skill

Functional Performance

Functional Movement
Functional Skill
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Functional Performance
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Functional Movement
Upper Cross System: Rounded Back/Forward Head

- Tight - pec mj/min, lat dorsi, upper trap levator, subscap, teres major, sternocleidomastoid, rectus capitus and scalenes
- Weak - rhomboids, middle trap/lower trap, teres minor, infraspinatus, post deltoid, deep neck flexors
- Joint Dysfunction - Upper cervical, cervical thoracic, SC joint, rotator cuff problems
Lower Cross System
Anterior Pelvic Tilt/Increase lumbar lordosis

- Tight - ES, IP, upper rectus, RF, sartorius, TFL, adductors
- Weaker - TA, internal oblique, multifidus, erector spinae, biceps femoris, glut med/max
- Joint dysfunction - sacral rotations, SI, L-spine,
- Injury Patterns - plantafaciitis, AKP, Tib Post
Muscular Inbalance
Poor recruitment in the local stabilisers can lead to over-activity of the global stabilisers to compensate.
Scap Function

Shoulder Function
Streamline
• Key Issues
  • Poor Hip Mobility – hip flexors & hamstrings
  • Poor Gluteal & Core control & strength

• Lumbo-Pelvic Issues
• Lacking Posterior Chain
• Thoracic Mobility
• Flexibility
Postural Alignment
Questions?
Background Information
Lumbar Spine Muscles

- **Transversospinalis group**
  - Rotatores
  - Interspinales
  - Intertransversarii
  - Semispinalis
  - Multifidus

- **Erector spinae**
  - Iliocostalis
  - Longissimus
  - Spinalis

- **Quadratus lumborum**

- **Latissimus Dorsi**

29 muscles attach to core
Rectus abdominis

- External obliques
- Internal obliques
- Transverse abdominis

- Work to optimize spinal mechanics
- Provide sagittal, frontal & transverse plane stabilization

Abdominal Muscles
Psoas

- Closed chain vs. open chain functioning
- Works with erector spinae, multifidus & deep abdominal wall
- Works to balance anterior shear forces of lumbar spine

- Can reciprocally inhibit gluteus maximus, multifidus, deep erector spinae, internal oblique & transverse abdominus when tight
  - Extensor mechanism dysfunction

- Synergistic dominance during hip extension
  - Hamstrings & superficial erector spinae
  - May alter gluteus maximus function, altering hip rotation, gait cycle

Hip Musculature
Hip Musculature

Gluteus medius
- Frontal plane stabilizer
  - Weakness increases frontal & transverse plane stresses (patellofemoral stress)
- Controls femoral adduction & internal rotation
- Weakness results in synergistic dominance of TFL & quadratus lumborum

Gluteus maximus
- Hip extension & external rotation during OKC, concentrically
- Eccentrically hip flexion & internal rotation
- Decelerates tibial internal rotation with TFL
- Stabilizes SI joint
- Faulty firing results in decreased pelvic stability & neuromuscular control
Functions & operates as an integrated unit

- Entire kinetic chain operates synergistically to produce force, reduce force & dynamically stabilize against abnormal force

In an efficient state, the CORE enables each of the structural components to operate optimally through:

- Distribution of weight
- Absorption of force
- Transfer of ground reaction forces

Requires training for optimal functioning!
Train entire kinetic chain on all levels in all planes
Neuromuscular efficiency

- Ability of CNS to allow agonists, antagonists, synergists, stabilizers & neutralizers to work efficiently & interdependently
- Established by combination of postural alignment & stability strength
- Optimizes body’s ability to generate & adapt to forces
- **Dynamic stabilization** is critical for optimal neuromuscular efficiency
  - Rehab generally focuses on isolated single plane strength gains in single muscles
  - Functional activities are multi-planar requiring acceleration & stabilization
- Inefficiency results in body’s inability to respond to demands

Can result in repetitive microtrauma, faulty biomechanics & injury

Compensatory actions result
A specific core strengthening program can:

- **IMPROVE** dynamic postural control
- Ensure **appropriate muscular balance & joint arthrokinematics** in the lumbo-pelvic-hip complex
- **Allow** for expression of **dynamic functional performance** throughout the entire kinetic chain
- **Increase neuromuscular efficiency** throughout the entire body

**Spinal stabilization**

- Must effectively utilize strength, power, neuromuscular control & endurance of the “prime movers”
  - Weak core = decreased force production & efficiency
- Protective mechanism for the spine
- Facilitates balanced muscular functioning of the entire kinetic chain
- Enhances neuromuscular control to provide a more efficient body positioning
Postural Considerations

Core functions to maintain postural alignment & dynamic postural equilibrium

- Optimal alignment = optimal functional training and rehabilitation

Segmental deficit results in predictable dysfunction

- Serial distortion patterns
  - Structural integrity of body is compromised due to malalignment
  - Abnormal forces are distributed above and below misaligned segment
Neuromuscular Considerations

Enhance dynamic postural control with strong stable core

Kinetic chain imbalances = deficient neuromuscular control

− Impact of low back pain on neuromuscular control
− Joint/ligament injury → neuromuscular deficits

Arthrokinetic reflex

− Reflexes mediated by joint receptor activity
− Altered arthrokinetic reflex can result in arthrogenic muscle inhibition

• Disrupted muscle function due to altered joint functioning
Figure 8.16: The Spiral Line (SL); a) anterior view, b) posterior view.
The successful athlete approaches every aspect of their training with an open mind.

Lots of support & assistance in a range of areas & with your coaches will help you to decide what is best for you.

It is better to be in a position to make a choice than not!