



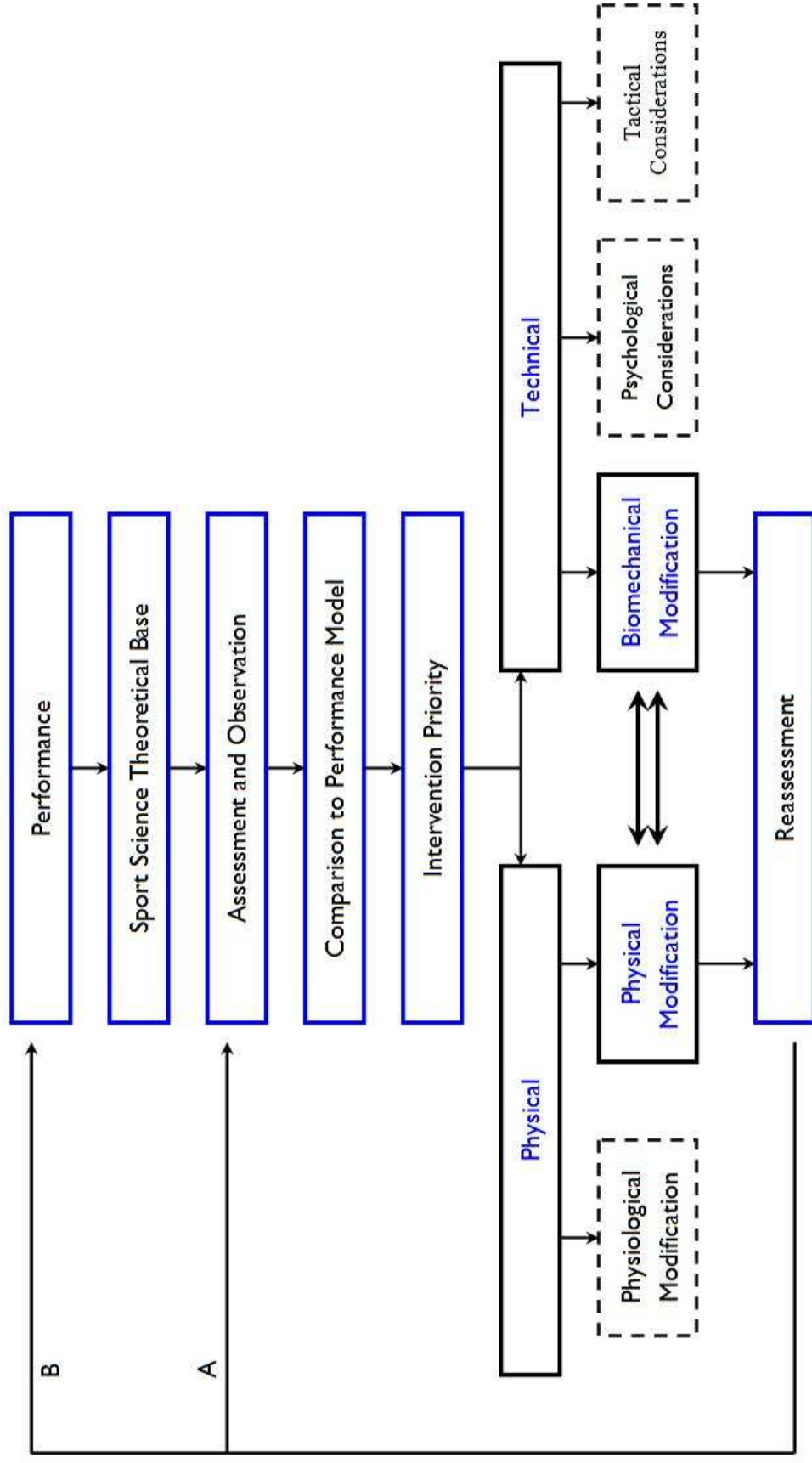
Q GOLF

Quantifying your game

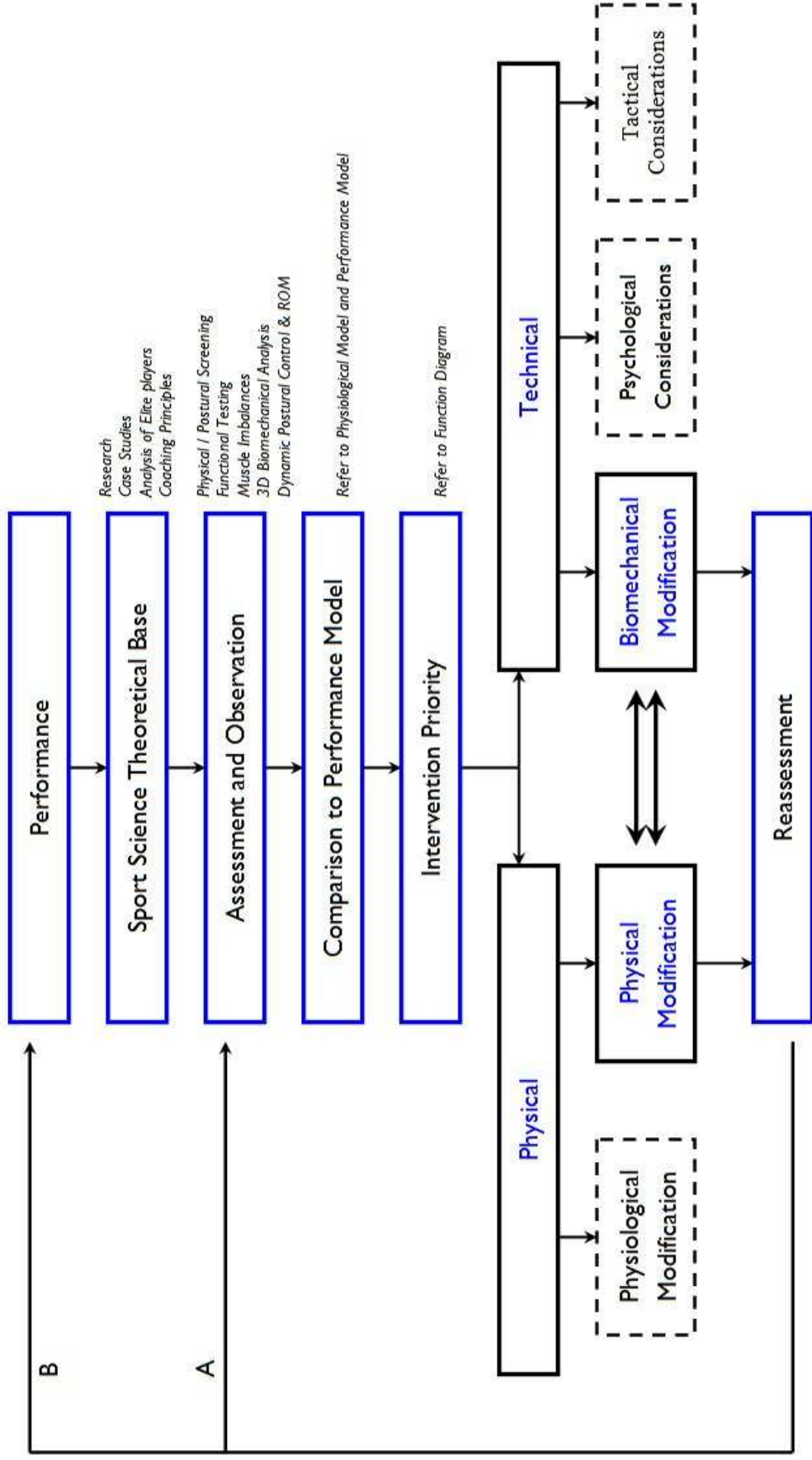
Golf Biomechanics: 3D Swing Analysis, Interventions & Integration

Ryan Lumsden (Q Golf)

Assessment & Intervention Model



Assessment & Intervention Model





Performance Model

Using the knowledge base of biomechanics to advocate a particular pattern of movement that optimally meets the demands of the game

- Analysis of elite players
- Research
- Coaching Principles
- Case Studies

Key Criteria:

A swing that produces efficient technique and minimal stress on the body

- Produce consistent and repeatable movement patterns and dynamics
- Generates high club-head speed
- Places the body at minimal risk of injury
- Adaptability – variability in shot shape with minor changes in swing mechanics

Physiological Model

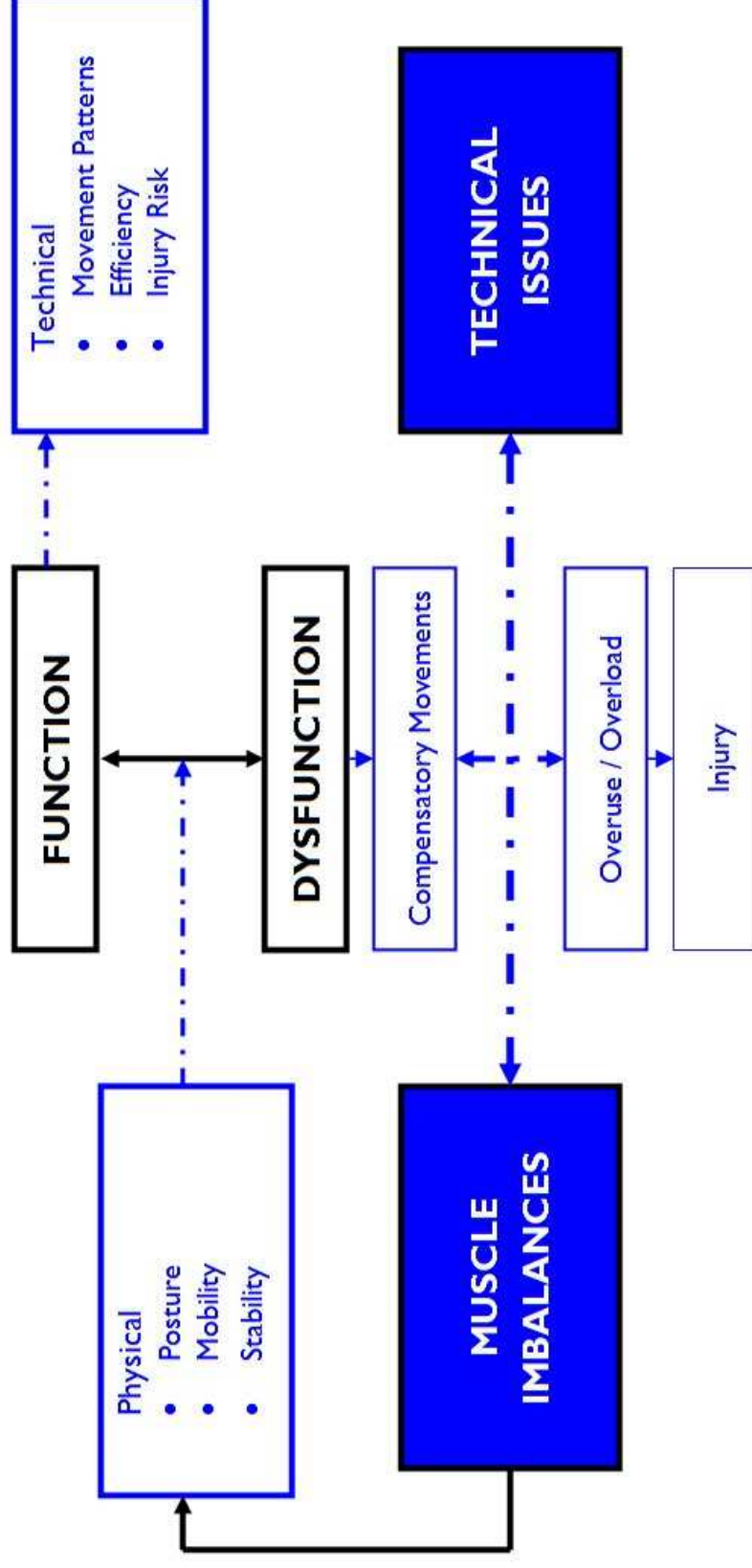


- Ideal posture and range of motion underpin the ability to move efficiently during the swing, and any physical limitations tend to compromise dynamic postural control, with coordination and timing being influenced as a result

Good function of the three body segments (UBS, MBS, LBS) leads to:

- Correct body posture and body alignment
- Improved body awareness
- Improved balance within muscle groups
- Reduced risk of injury
- Synchronicity of the body segments and coordination between segments (connection)

Function



Postural issues & limitations in mobility can predict instability and compensation patterns -> therefore predictable injury patterns and technical issues

Physiology Components



Lower Body Segment

Muscle Strength & Posture Tone Requirements

- Arches of feet
- Peronei
- Adductors
- Inner quads
- Vastus medialis and oblique
- Glutei

Flexibility (Relaxed Tone)

- Hamstrings
- Piriformis
- Ilio Tibial Band
- Tensor Facia Latae
- Outer quadriceps
- Rectus Femoris

Middle Body Segment

Muscle Strength & Posture Tone Requirements

- Latissimus Dorsi
- Mid and Lower Trapezius
- Serratus Anterior
- Rotator Cuff
- Multifidus
- Glutei
- Transverse abdominus
- Lower and abdominals

Flexibility (Relaxed Tone)

- Quadratus Lumborum
- Hip Flexors
- Upper Abdominal
- Thoracic Paravertebrals

Upper Body Segment

Muscle Strength & Posture Tone Requirements

- Good neck alignment. Ears over shoulders
- Deep flexors of the neck
- Mid trapezius
- Lower Rhomboids
- Rotator Cuff
- Serratus Anterior
- Latissimus Dorsi
- Triceps & Long Extensors of the wrist

Flexibility (Relaxed Tone)

- Pectoral Major and Minor
- Biceps
- Sternocleidomastoid
- Scalenes
- Upper Trapezius
- Levator Scapulae
- Long flexors of the forearms and wrists

Linking Physical & Technical Aspects



3D Analysis as an Assessment Tool and integration with Physical Screening

- Ideal posture and range of motion underpin the ability to move efficiently during the swing, and any physical limitations tend to compromise dynamic postural control, with coordination and timing being influenced as a result.
- Through the combination of a physical screening and 3D motion analysis, we can measure key aspects of technical performance, technical and physical correlates, and establish cause and effect relationships. From this, we are able to **identify sources of technical deficiencies and physical limitations**, so that appropriate intervention strategies can be identified and implemented
- These strategies can be easily implemented for improvement, and always occur with complete understanding and integration of the individual golfer's technical development. **Specific postural awareness, flexibility exercises, biofeedback, and golf specific exercise drills** complement your coaching program to aid technical corrections and the learning of new “feels” associated with swing changes

Biomechanical Analysis



Performance Enhancement – linking the technical and physical aspects for accelerated technical development

3D Motion Analysis provides a quantitative evaluation of:

- Coordination & Timing
- Swing Dynamics
- Dynamic Postural Control & ROM
- Injury Risk
- Swing Consistency
- Performance Record (Individual “model” / Track Technical Change)

Through biomechanical analysis, the key aspects of technical performance, technical and physical correlates, and cause and effect relationships can be established

Biofeedback



Current technology incorporates a biofeedback training mode that provides real-time auditory feedback -> enables us to define the ranges of intended movements during the swing, which **helps a player establish what their focus needs to be during the swing, as well as the “feels” they should attach to the desired movements:**

- Auditory tone triggered by the golfer’s movements during the swing
- Enhances technical development
- Allows coaches to define the boundaries of preferred swing paths
- Real-time kinaesthetic feedback
- Accelerates skill learning and the understanding of “feels” associated with technique change

Implications for coaching -> putting a learner into appropriate swing positions as opposed to them achieving the same positions dynamically

Biofeedback



- Through Biofeedback, learning is optimised, together with **improved body awareness and an understanding of why certain drills or exercises are most appropriate** to achieve desired swing changes
- Also utilised to reinforce body awareness drills, feedback is more specific as players' are able to achieve appropriate swing positions dynamically -> valuable tool in bringing about technique change
 - Appropriate Drills & Exercise Application (Specificity)
 - Postural awareness / dynamic drills -> assist technical improvements and transfer into the golf swing (effective)

Practical

- Case Studies
- 3D Analysis -> establishing priorities (Technical & Physical)
- Common Technical Issues
- Identification of Technical Priorities and Potential Corrections
- Determining Injury Risk
- Examples
 - Drills
 - Biofeedback
 - Integrating 3D information with Screening process
 - Rationale for Training Programs

