COACHING EXPLOSIVE SPEED COURSE



COURSE MANUAL

© May 2020 Ranell Hobson (Head Coach / Training Director ASSA)



Coaching Explosive Speed Course Instructions

Thank you for purchasing the ASSA Coaching Explosive Speed Online course. This course is designed to give you the knowledge and skills to be able to coach Speed for Field and Court Sport athletes.

Within this course you receive:

- Course Welcome video file
- Course Manual (Instructions for completion and all theory presentations)
- Coaching Speed Module (recorded webinar, practical video files and 15 Question quiz)
- Linear Speed Module (recorded webinar, practical video files and 15 Question quiz)
- Multi-directional Speed Module (recorded webinar, practical video files and 15 Question quiz)
- Speed Physicality Module (recorded webinar, practical video files and 15 Question quiz)
- Linear Speed Practical session
- Multi-directional Practical Session
- Practical Self-Assessment Performance criteria guide.

In this course you will learn:

Module 1: Coaching Speed

- The importance of speed in sport
- That coaches should be focussed on educating athletes
- How to use your athletes Warm up as an everyday Assessment tool
- What exercises to use to remedy gaps in movement competencies
- The importance of speed
- The importance of agility
- Difference between speed and force

- Difference between internal and external cuing
- The importance of technical training in speed
- How to improve the energy efficiency of players
- What sport speed coaching includes
- The pillars of speed (mechanics, body composition and physicality)

Module 2: Linear Speed

- Specific Linear Speed Terminology
- The pillars of Linear speed
- The importance of Posture
- Difference between Acceleration and Top Speed
- What to look for and How to Coach Acceleration mechanics
- What to look for when coaching linear speed mechanics
- How to coach Foot strike for maximum force delivery
- How to coach Foot recovery for maintenance of front side mechanics
- How to coach the complete Stride Cycle for efficiency and maximum horizontal propulsion
- · How to coach max velocity sprinting
- What to look for in the Arm action of athletes
- When and how to use technical drills
- The importance of training top speed in sport field athletes
- The benefits of training top speed in sport field athletes

Module 3: Multi-directional Speed

- Multidirectional Speed Terminology
- Pillars of Multidirectional speed
- Difference between COD, Agility & Manoeuvrability
- Coaching COD, Agility & Manoeuvrability
- What contributes to perfect mechanics for COD performance
- · Tests for COD, Agility and Manoeuvrability
- Best coaching practice for transition to game
- Example session and drills

Module 4: Speed Physicality

- Physical Qualities required for explosive speed
- Qualities of Mobility (Joint ROM, Motor Control, Muscle extensibility)
- Anterior pelvic tilt and dysfunction
- Restrictions in joint function and risks to athlete
- How to maximise stretch reflex and elastic qualities
- Benefits of Plyometric training
- · Plyometric training progressions
- Need for eccentric strength
- · Strength training for speed foundations
- How to develop the athletic Core
- Core Training Adaptation focus
- Importance of body composition in speed performance

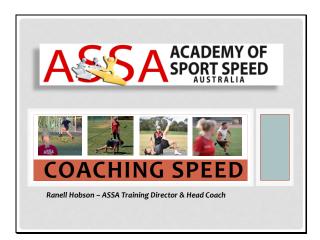
Steps to Completion:

Below you will find the steps to follow to meet the requirements for course completion and the corresponding continuing education and professional development credits.

For best results follow the steps below:

- 1. Print the course manual so you have the corresponding slides within the presentation and can take notes during the recorded presentations.
- 2. Watch the coaching speed presentation
- 3. Complete the coaching speed quiz
- 4. Watch the Linear speed presentation
- 5. Complete the Linear speed quiz
- 6. Complete the practical workshop Linear speed elements (1-6)
- 7. Use the Performance criteria evidence guide to assess your linear speed technique
- 8. Watch the Multi-directional speed presentation
- 9. Complete the Multi-directional speed quiz
- 10. Complete the practical workshop Multi-directional speed elements (7-10)
- 11. Use the Performance criteria evidence guide to assess your Multi-directional speed technique
- 12. Watch the Speed Physicality presentation
- 13. Complete the Speed Physicality quiz
- 14. Print you course completion certificate.

MODULE 1: COACHING SPEED

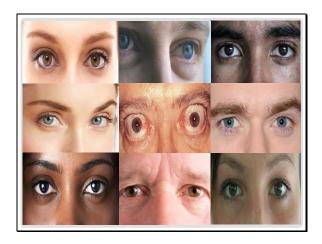


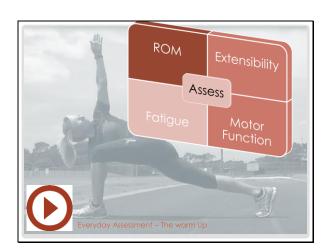
Regardless of the sport, the ability to rapidly and efficiently accelerate, decelerate, change direction and move a body segment or the entire body rapidly, is a universal and essential element of success

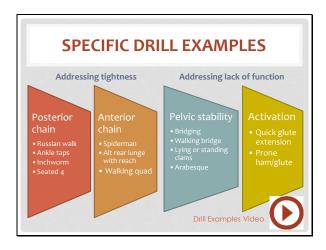
Journal of Strength and Conditioning Research 2012;23:217-221



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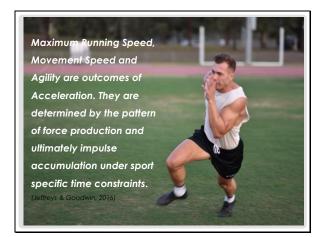
INDIVIDUAL WARM UP & PREP This is where as a speed coach you can individualise programming to address issues with each athlete OR Make these stretches / drills a part of everyone's warm up to cover all your bases



Sport speed, both straight line and multi directional speed is a Motor Skill It can be taught and learned. Correct neural pathways can be set up and ingrained. With each perfect step moving your athletes closer to their goal of explosive speed and increased fuel efficiency

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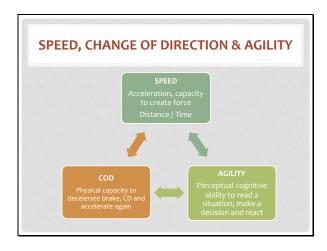












COACH AS EDUCATOR

WHAT – component of performance the drill or exercise will improve (eg: linear speed)

WHY – it is important for to master the drill or exercise (example: increased force production)

HOW – you want the drill performed, demonstrations, instructions, cues



INTERNAL VS EXTERNAL

INTERNAL CUES

- Movement process
- Examples: Extend the hips, Example: Push the Keep shoulders back



EXTERNAL CUES

- Movement outcome
- ground away
- Ille et al (2013) found that both novice and expert athletes performed faster 10m sprint times with external focus compared with internal and non assigned focus.

If you RUN with POOR mechanics you get TIRED really QUICKLY

Coaching GOOD TECHNIQUE is governed by kinesiology, biomechanics and physics





IMPROVING EFFICIENCY



- critical to sporting success
- training athletes to have excellent posture and strong kinetic chains of movement
- this is the missing takes an athletes from good to great by reducing injury, improving efficiency and maximising athletic performance

Specific training
in Speed and
Agility is
required for an
athlete to
achieve
maximum
athletic **
potential. McDowell and Scarlett (2001) Journal of Strength and Conditioning Research 15;519:519

SPORT SPEED COACHING INCLUDES:

- Posture
- Acceleration
- > Transition to Top Speed
- Deceleration
- Stopping with strength under control
- > Changing direction / Engaging in skill
- SSC + reactivity (stiffness)

PILLARS OF SPEED Mechanics Body Composition Physicality

MECHANICS

When an athlete learns HOW to run, they apply maximum force through the foot into the ground in the right direction. This drives horizontal speed. The technique used for acceleration and for maximum speed are different and need to be coached correctly.



BODY COMPOSITION

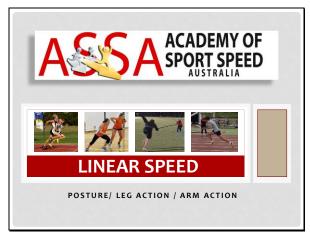


Athletes who apply the most force relative to body mass and in the right direction, are faster athletes. This is simple, the more fat mass you have, the more strength and endurance you need to carry that mass down the track, around the field or the court. Fat is useless mass which slows you down.

In this presentation you learnt:

- The importance of speed in sport
- That coaches should be focussed on educating athletes
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MODULE 2: LINEAR SPEED



LINEAR SPEED TERMINOLOGY

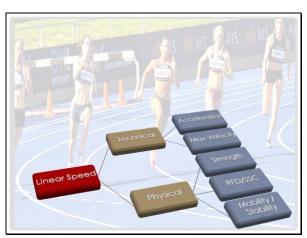
ACCELERATION – The rate at which a body changes it's velocity. Sprint performance over small distances.

SPEED – The ability to achieve a high velocity of movement with respect to time. (a manifestation of explosive force)

TOP SPEED/MAX VELOCITY – The highest rate of velocity change with respect to time. The fastest the athlete travels per unit of time over a given distance.

SPEED STRENGTH – Force developed rapidly (RFD) or at high velocities

REPEAT SPRINT ABILITY (RSA) – The ability to sustain high intensity sprints of short duration / distance interspersed with incomplete recoveries, with as little drop off in speed as possible.



POSTURAL STABILISATION & ALIGNMENT



- Cornerstone of optimal movement
- Stability at the core ensures appropriate movement of the limbs.
- Promotes relaxation, freedom of movement and elastic energy production.

THE GOAL OF ACCELERATION

To sustain a balanced posture while optimising the direction and magnitude of force in an effort to reach maximal velocity as fast and efficiently as possible. (Frans Bosch and Ronald Klomp, 2005)



ACCELERATION





Faults Excessive hip flexion Excessive axial rotation Dropped head position Over-reaching first step

ACCELERATION CONT. Straight line from head to heel on stance leg Ground Contact Straight back, braced core, ball of foot contact, positive shin contact, shin parallel to rear thigh Pushin grorce through foot, driving opposite knee forward, near full extension of hip, knee and ankle

TRAINING ACCELERATION

- Wall acceleratory drill
- Prone start
- Push up start
- 3 point start
- Crouch start
- Falling start
- Rolling start

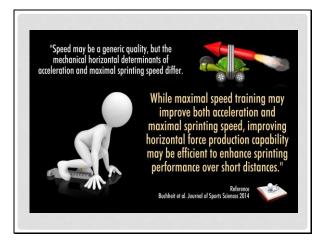


Acceleration Drills Video

CONTEXTUAL INTERFERENCE



After a period of block training, integrate contextual interference into the Acceleration training for greater skill acquisition and game transfer



MAX VELOCITY



Constraints exist across sports when it comes to hitting top speed but everyone wants to cover as much ground as possible in the shortest possible time.







FOOT STRIKE MECHANICS

- Acceleratory position
- Mid to forefoot strike
- Apply force backward
- Only interaction with the ground



Common Faults

- Running on toes
- Heavy feet
- Foot strike in front of hips

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IMPULSE

• A term for the 'foot- ground contact' created by each step and the numeric value defined as:

force x time

• Each impulse has a direction and a magnitude. Direction is the mix of horizontal and vertical propulsion. Magnitude is the measure of force.

FOOT RECOVERY MECHANICS

- Teaches quick recovery of the foot up and off the ground
- Teaches the leg to take the shortest path to the front of the body
- Quick excitation of hamstring

Common Faults

- Anterior dominance
- Excessive time in recovery (negative running) phase
- Windmilling

Foot Recovery video



Pawing is an illusion from rapid hip extension

??- B skips - ??

Too much action at the knee decreases the velocity of the hip which is the prime generator of force.

The closer the heel is to the hip axis, the greater the angular acceleration in the swing thigh



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STRIDE CYCLE MECHANICS



- High hip position
- Punch the knee
- COM high
- Short lever

Common Faults

- Sitting low in the hips
- Shuffling (no knee lift)
- Windmilling



STRIDE TIME

• The time taken to complete one stride (full cycle)

Stride time = stride speed x angular velocity

- Stride speed physiological
- Angular velocity biomechanical



STRIDE LENGTH



HIP MOBILITY

GLUTE STRENGTH

D&M FOOTSTRIKE

TRAINING MAX VELOCITY

Modes:

- Flying sprints
- Variable speed sprints (SSS)
- Short speed endurance
 Long speed endurance (track only)

- **Distance:** 10 40m (field sports) up to 60m (large field AFL)
- Large variations for track athletes 50m to 120m

• 30 – 60 sec per 10m

ILLUSION OF SPEED

- Stressing stride frequency without developing strength
- An athlete must have proper force application

"frequency of leg turn over does not cause linear motion, applying force to the ground does"

Avoiding full ROM sacrifices force application

ARM ACTION

- 90' at elbow and shoulder
- First few steps in acceleratory position can be whipping action

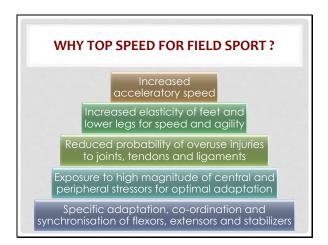
Common Faults

- · Swings across midline of body
- Too high
- Too low
- Drummer boy



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TECHNICAL DRILLS Use to reinforce correct patterns of movement Change incorrect patterns Choose a few drills that are specific to the problem Complete pre-conditioning (fresh nervous system) Not a replacement for actual sprinting



Faude, Koch & Meyer (2012) Journal of Sports Sciences Straight sprinting is the most frequent action in goal situations in professional football
$\hfill \square$ Research was conducted in the first German National League in the
2007/08 season.
☐ 360 goals were analysed
Most actions of the scoring player were straight sprints
☐ Without an opponent
□ Without the ball

In this presentation you learnt:

- Specific Linear Speed Terminology
- The pillars of Linear speed

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MODULE 3: MULTI-DIRECTIONAL SPEED



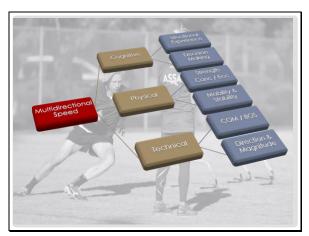
MULTIDIRECTIONAL SPEED TERMINOLOGY

CHANGE OF DIRECTION (COD) – technical skill and physical ability to change movement direction, velocity or mode (DeWeese & Nimphius, 2016)

AGILITY – a rapid whole body movement with change of velocity or direction in response to a stimulus (Sheppard & Young, 2006).

MANEUVERABILITY – 'purpose....to maintain velocity, removing clearly defined 'plant' step Or to describe a COD when one changes mode of travel' (Nimphius, 2018)

CHANGE OF DIRECTION SPEED (CODS) – Overarching description of any test that proposes to examine one's pre-planned COD ability that often has a large component of straight line running (eg: 505, T test, Illinois agility, Pro-agility) (Nimphius et al, 2018)



COD & AGILITY

- In sport you have to accelerate and then STOP, Change direction, Execute a skill, Make contact with another player etc
- Perceptual cognitive Time it takes to react to a stimulus.
- Work on braking (hip, knee and ankle flexion) for both 2 and 1 leg actions.
- Work on propulsion in all directions, accelerating forward, sideways, turning, practice getting up from the ground etc.
- Once the athlete is proficient at this then add in your technical and tactical aspects – add stimulus – add decision making

IDENTIFYING FACTORS



√The ability to start quickly from different positions



✓ Accelerate to top speed in the shortest possible time

- ✓ Change direction and brake / stop under control
- ✓ Rapidly react to a stimulus

Those who apply the most FORCE relative to Body Mass and in the right DIRECTION are <u>FASTER ATHLETES</u>

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COD MECHANICS

- Get COM low
- Shoulders behind hips
- Assess 45, 90, 135 & 180

Common Faults

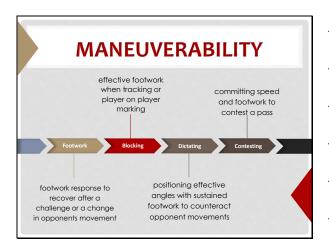
- No breaking step
- Hip, Knee, Ankle Collapses in COD
- Torso swaying outside of BOS
- Puts breaking step in but without force



COD video



TRAINING AGILITY Defensive Agility – Move in the direction I point Offensive Agility – Move in the opposite direction to which I point



COD DRILLS / TESTS • 5-0-5 • Pro-agility • T drill • Illinois Agility • Box drill • RAT (arrow /light/video/

human)



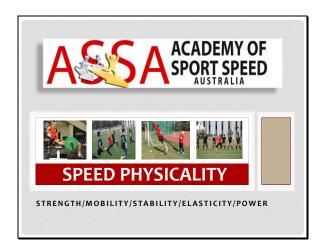
DEST PRACTICE Mix competitive game based aspects with opportunities to focus on technical deficiencies. S&C and Technical coaches working TOGETHER

EXAMPLE SESSION						
1	Game play warm up					
2	Dynamic and Functional warm up					
3	Plyometrics – jumps, hops, bounds (landing technique, 1 & 2 feet in all directions)					
4	Competitive speed work without cueing (observe)					
5	Technical session to work on deficiencies identified in competitive situation					

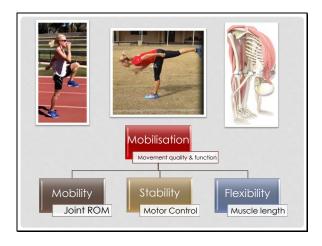
In this presentation you have learnt:

- Multidirectional Speed Terminology
- Pillars of Multidirectional speed
- Difference between COD, Agility & Manoeuvrability
- Coaching COD, Agility & Manoeuvrability
- What contributes to perfect mechanics for COD performance
- · Tests for COD, Agility and Manoeuvrability
- Best coaching practice for transition to game
- Example session and drills

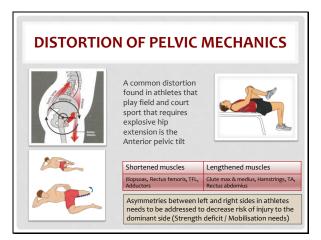
MODULE 4: SPEED PHYSICALITY







STABILITY OR MOBILITY? Shoulder (Gleno-humeral)stability Thoracic spine mobility Lumbar spine stability Hip mobility (multi planar) Knee stability Ankle mobility (plantar and dorsi flexion) Mike Boyle (Joint by Joint approach to training)

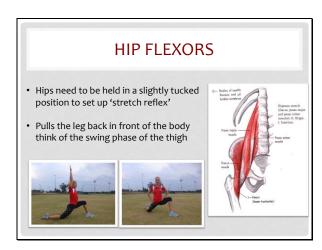


Stretch reflex acts similar to loading a sling shot. • Hip flexors • ITB • Achilles

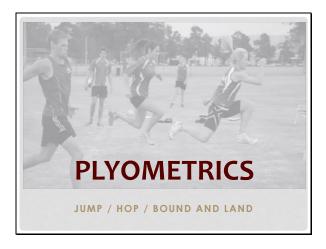
ACHILLES TENDON • Dorsi-flexion Strong Stable Ankle Complex • Slingshot effect at toe off (Elasticity)

• Stiffness

ILIOTIBIAL BAND • Maintain free from adhesions • Whips the leg back down and under the



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PLYOMETRIC TRAINING?

Form of training that involves the stretch shortening cycle. (SSC)

- A stretch of the musculo-tendon unit, followed by a rapid shortening of the muscle unit.
- Goal = Absorb and Produce maximum force in shortest possible time.



PLYOMETRICS

- Bridge between Strength and Power
- Jumps, Hops, Skips, Bounds
- Improves athleticism in all ages
- Progress to highly co-ordinated skilful movements
- Rapid, reactive contacts with surface





BENEFITS OF PLYOMETRICS

- Improved storage and utilization of elastic energy
- Increased active muscle working range
- Enhanced length-tension characteristics
- Enhanced motor coordination
- increase in leg stiffness during ground contact with the ground
- Increased force production during following concentric contraction.

ECCENTRIC STRENGTH





- Aids in prevention of injury plays a large role in rehabilitation programs.
- Eccentric action is when muscle is acting as a shock absorber or as a spring.

PLYOMETRIC PROGRESSIONS

- Start with LANDINGS
- Concentric Jumps
- Countermovement Jumps for height ■
- · In place jumps with contact time focus
- Concentric Box Jumps from small drops (elevate landing box height before drop box height)
- Linear and Lateral Jump Progressions

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WHAT TO STRENGTHEN Strength, Stability, Posture, Stiffness Strength to increase power to weight ratio Multi joint and multi plane exercises If asymmetries are present strengthen weak or lengthen tight muscles

POSTERIOR CHAIN - Lower back - Gluteals - Hamstrings - Calves - Calves - Calves - Castrocnemius - Castrocnemius - Calcaneus

HAMSTRINGS

- Train both as knee flexors and hip extensors
- Build Robustness
- Eccentric training
- Both Unilateral and Bilateral training



GLUTEALS

The strength of the hips and gluteals will directly influence:

- Acceleration from a standing position
- Top end speed
- Deceleration
- Running one and two leg jumps
- Injury prevention to hamstrings and/or low back



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OLYMPIC LIFTS

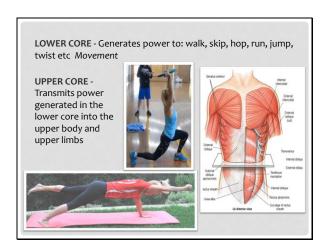
- Pulling derivatives (hip, knee and ankle extension) is the important phase for speed training.
- Add variety based on emphasis in start positions (floor, knee, mid-thigh)







ALL MUSCULATURE IN THE TORSO Global stabilisers – Large musculature that provides gross movement patterns (flexion, extension, lateral flexion and rotation) Local Stabilisers – Small deep musculature generate force that affects lumbar vertebral tension (isometric protection)





Movement / Action Flexion of Spine Extension of Spine Lateral flexion Spinal rotation Diagonal rotations Static holds Static holds with limb movements

PROGRESSIONS

- Start with deep musculature development
- Train in ALL directions
- · Short levers to long
- Stable to unstable

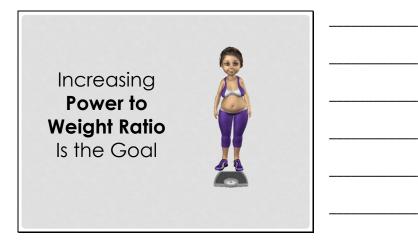


• Wide base of support to narrow (contact points 4, 3, 2)

BODY COMPOSITION



Newtons 2nd law – Acceleration is directly proportional to the **force** applied but inversely proportional to the **mass** of the person



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- Physical Qualities required for explosive speed
- Qualities of Mobility (Joint ROM, Motor Control, Muscle extensibility)
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END OF THEORY MODULES