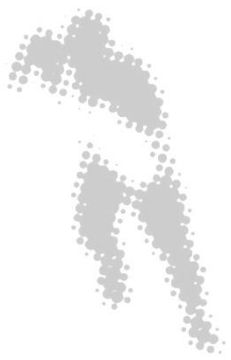


Maximum Velocity



scottishathletics



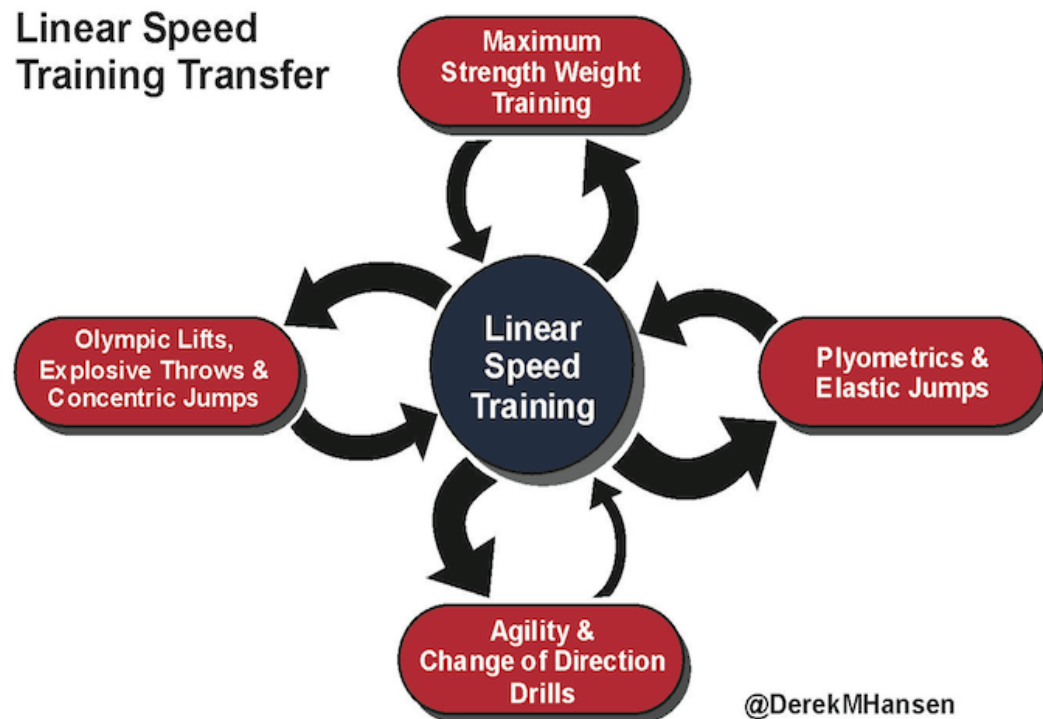
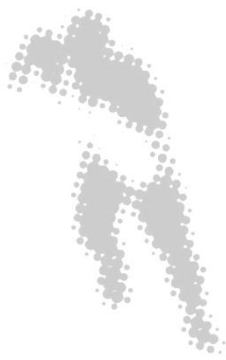
Emirates Arena 24/25 September 2016

Jared Deacon

Maximum Speed

- Philosophy
- Technical Model – Max Velocity
- Specific Skills
- Coaching Process & Problem Solving

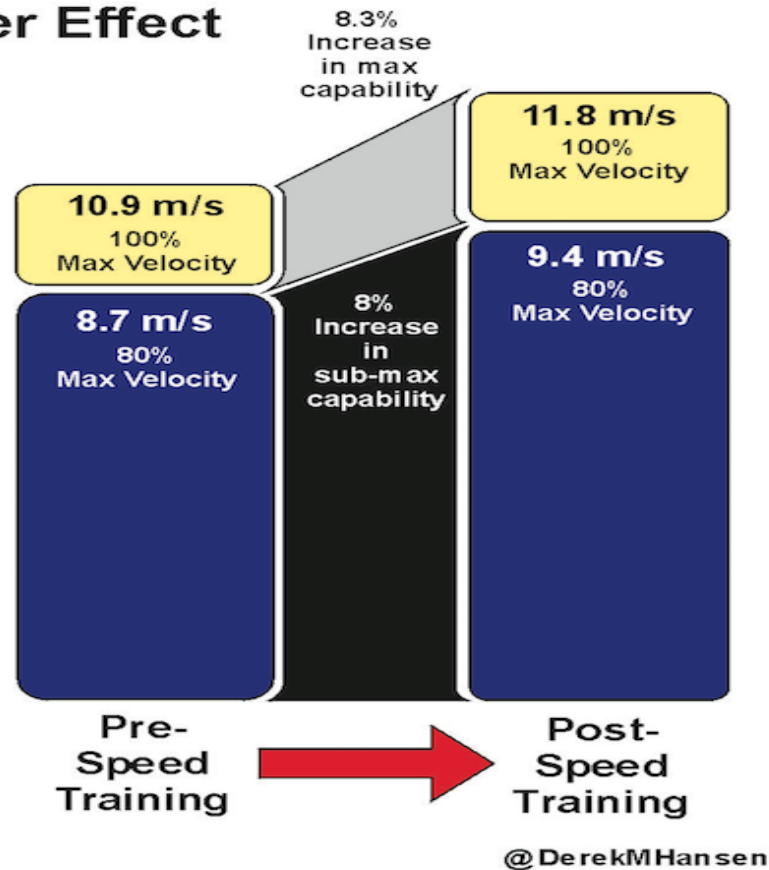
Philosophy - Transferability



The transfer of abilities developed through maximal speed training is a huge benefit as an enhancement to many other training modalities.

Philosophy - Efficiency

Speed Reserve Transfer Effect



The development of a speed reserve is a huge factor in favour of the benefits of maximal speed training.

Increasing maximal speed will affect speed reserve in 2 ways:

1. Ability to operate at a faster speed for same relative effort
2. Ability to operate at the same speed as previous which now becomes a lesser relative effort due to higher maximal capabilities



SPRINTING IS AN EXTREMELY COMPLEX MOTOR TASK INVOLVING REPEATED RAPID 'SWITCHING ON AND OFF' OF PRACTICALLY EVERY MUSCLE IN THE BODY

Lewis (1988)**Bolt (2008)**

0-10m

1.89

10-20m

1.07

20-30m

0.94

30-40m

0.89

40-50m

0.86

50-60m

0.83

60-70m

0.85

70-80m

0.85

80-90m

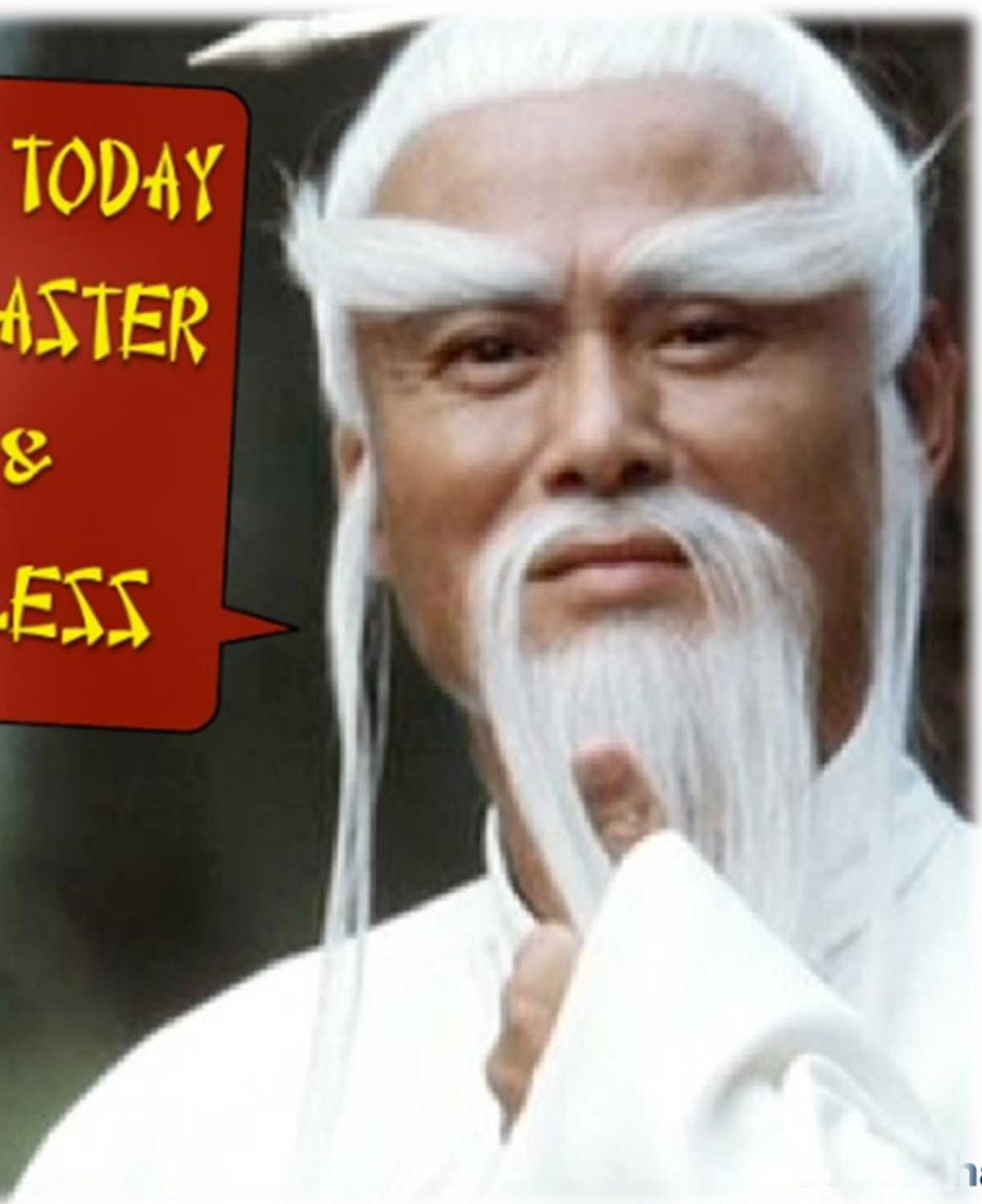
0.86

90-100m

0.88

Time**9.92****9.69**

TOP SPRINTERS TODAY
ACCELERATE FASTER
& LONGER &
DECELERATE LESS



Some keys points.....

- All sprinters spend the same amount of time in the air between steps
- The best sprinters spend less time on the floor
- They travel further in each stride

Due to

- Exerting higher forces earlier in the ground contact phase

Combination of

- Ability to generate force
- Technical ability in exerting force



Technical Model – Maximum Velocity

3 key positions:

- Toe Off
- Ground Contact
- Ankle Cross

Running should display the attributes of positive running where there is a greater proportion of running action to the front of the midline of the body AKA front side mechanics



Maximum Velocity – Toe Off



- Knee remains below or just behind hip – rear leg
- Knee not fully extended – rear leg
- Positive or neutral shin angle – front leg
- Neutral/dorsiflexed foot – front leg
- Hip angle ~ 90 – front leg

Maximum Velocity – Ground Contact



- Knees at or close to being together
- Foot contact back of the ball of the foot
- Foot contact close to line of gravity
- Stiffness through system

Maximum Velocity – Ankle Cross



- Ankle of recovery leg passes above knee of support leg

Maximum Velocity – Common Errors



- Over-reaching out in front
- Early plantarflexion
- Looping foot of recovery leg
- Shuffling feet

General Skills

- Underpinning basic movement skills will allow the development of the more specific skills to improve at a faster rate
- This implies that the development of running based motor skill requires a strong relationship and crossover with exercises and activities throughout the training programme and is not a stand alone entity
- A wide variety of general skills is useful; including activities that assist in developing coordination, balance, reactivity, mobility, postural control, spatial awareness

General Skills (cont.)

- The process of:
 - Learning the activities
 - Becoming competent at the activities
 - Adding variety of challenge to the activitiesshould be the method of progressing through the skill continuum
- This is the same for all skills and drills

Specific Skills

- The running cycle can be broken down into 3 key positions which can be worked on and developed as drills:
 - High Knees (HK)
 - High Heels (HH)
 - Foot Contact (FC)
- HK are most specific to acceleration
- HH & FC, along with HK, form the whole running cycle (RC)
- Once the individual components are mastered the RC drill sequence can be developed

Running Drills – High Knees

Key positions for all drills:

- Knee to hip height
- Free leg hip higher than stance leg hip
- Shin neutral to slightly positive
- Foot neutral/dorsiflexed
- Tall posture

Sequence:

- Walking
- Skipping
- Running



Running Drills – High Heels

Key positions for all drills:

- Heel and knee rise simultaneously
- Heel tucks under hip
- Path of heel is upwards
- Foot neutral/dorsiflexed
- Tall posture

Sequence:

- Walking
- Skipping
- Running



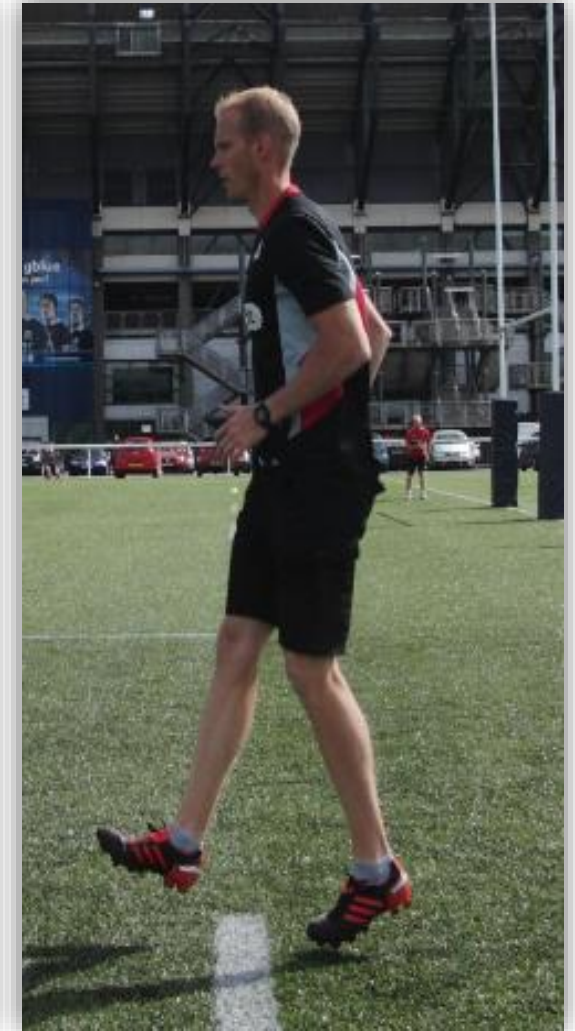
Running Drills – Foot Contact

Key positions for all drills:

- Legs remain stiffened throughout movement
- Contact with back of ball of foot
- Active foot contact
- Foot neutral/dorsiflexed in air
- Tall posture

Sequence:

- Walking
- Skipping
- Running



Running Drills – Running Cycle

Key positions for all drills:

- Cyclic action of foot
- All action in front of midline
- Active foot contact
- Foot neutral/dorsiflexed in air
- Tall posture

Sequence:

- Small/Over Ankle
- Medium/Over Calf
- Large/Full Cycle/Over Knee

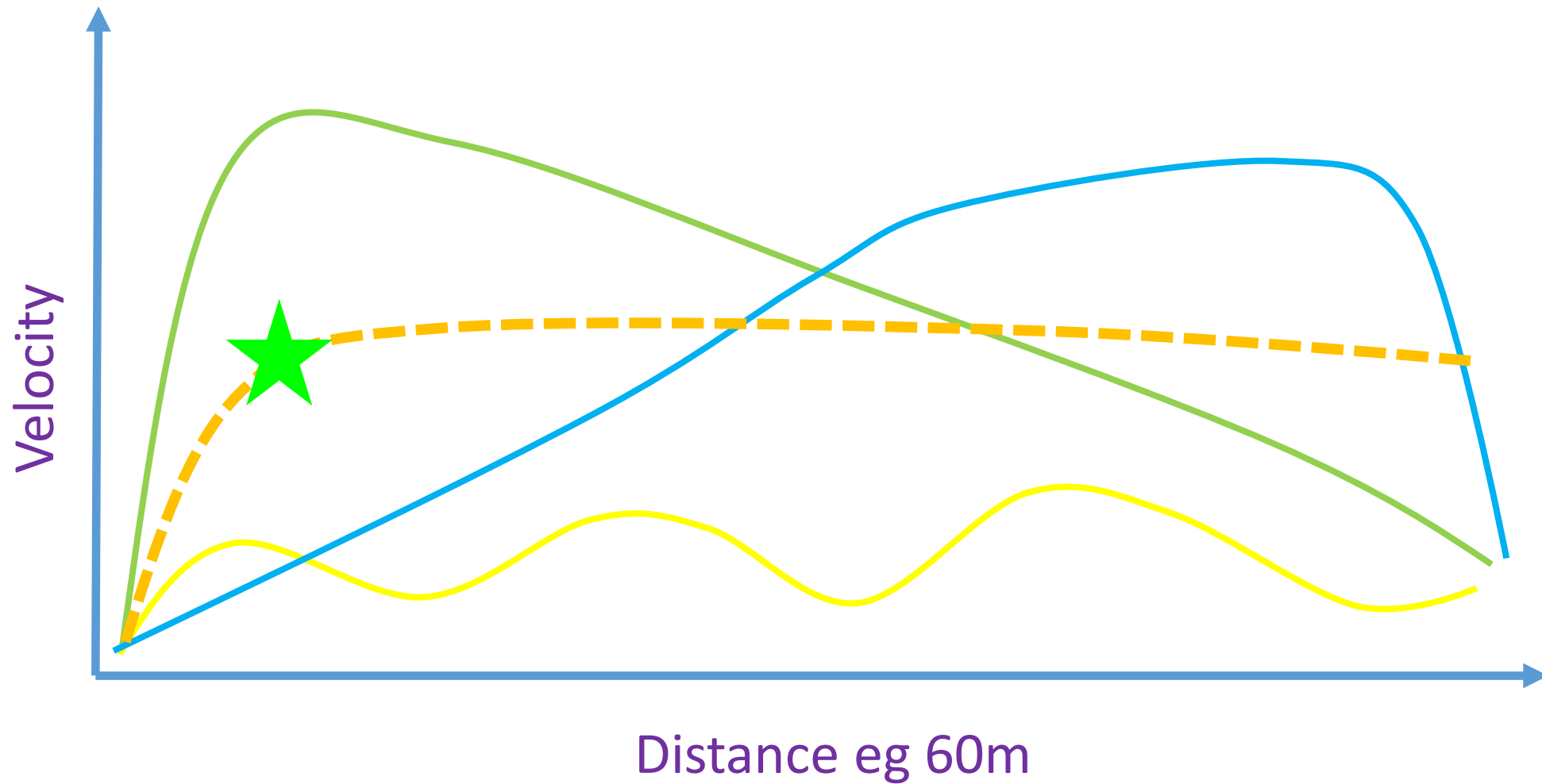
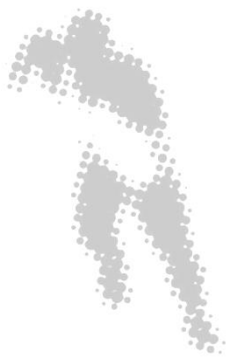


SPEED DRILL OPTIONS

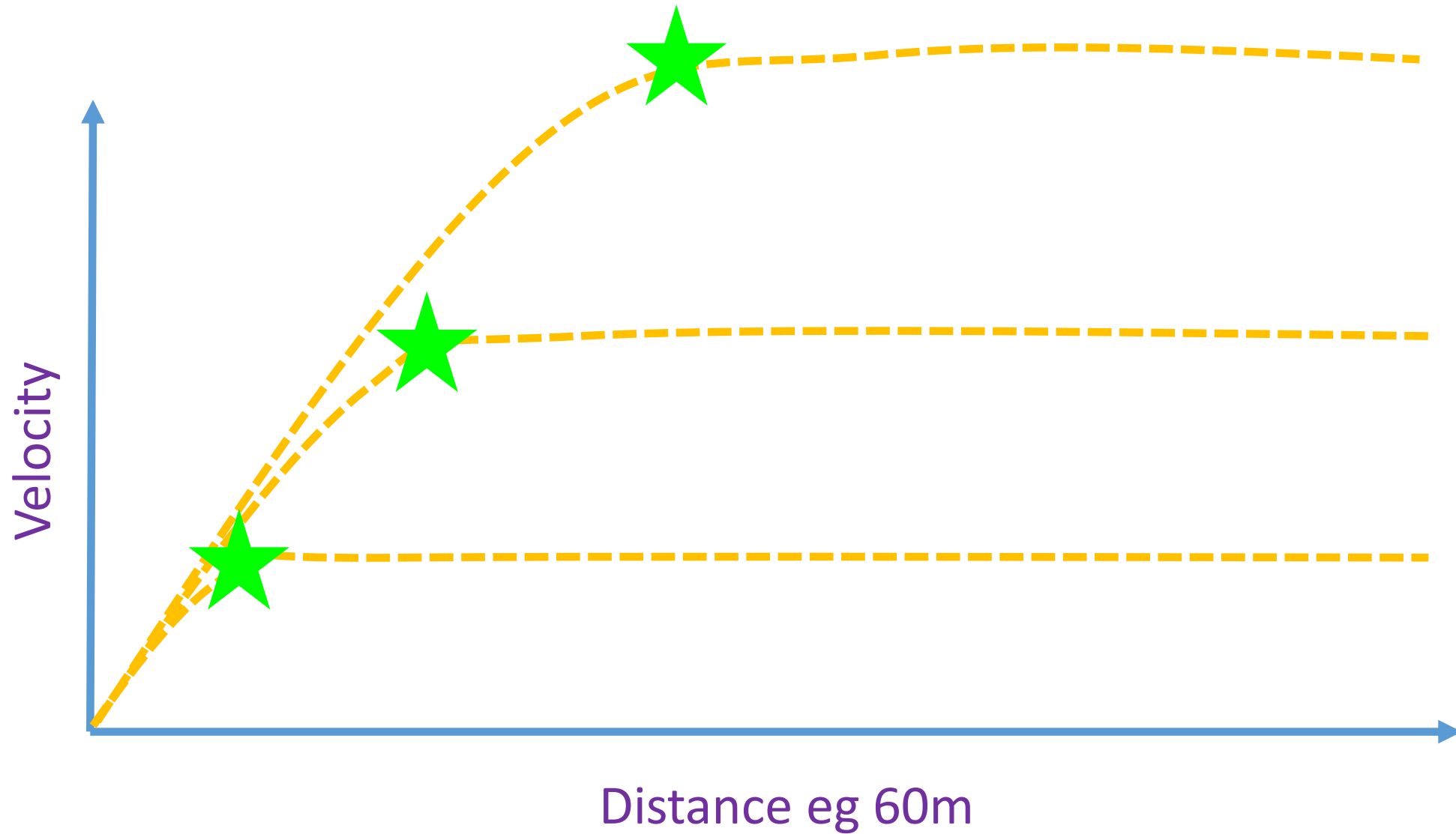
EXERCISE	SETS	DIST	VARIATIONS	CUES
HIGH KNEE WALK	2-3	10-15m	ARMS OH	Upper body upright with good tension, foot neutral (pull toes up). Land with heel and come onto ball of foot. Lift free hip when knee is at optimal height.
HIGH KNEE RUN	2-3	10-15m	DIRECTION OF TRAVEL/ ARMS OH/ONE ARM OH	Upper body upright with good tension, foot neutral (pull toes up). Land with active foot to rebound off the floor. Lift free hip when knee is at optimal height.
HIGH KNEE 3 STEP STOP	2-3	10-15m	ARMS OH ON STOP/OPP ARM OH ON STOP	Upper body upright with good tension, foot neutral (pull toes up). Land with active foot to rebound off the floor. Hold STOP position with good balance and control for 2-3sec. Lift free hip when knee is at optimal height.
HIGH KNEE BOUND	2-3	10-15m	VARY HEIGHT	Upper body upright with good tension, foot neutral (pull toes up). Land with heel and roll onto ball of foot. Lift free hip when knee is at optimal height. Take off and land on same leg then switch legs in step phase.
HIGH KNEE SKIPS	2-3	10-15m	NUMBER OF HOPS/ ARMS OH/ONE ARM OH	Upper body upright with good tension, foot neutral (pull toes up) Land with active foot to rebound off the floor. Lift free hip when knee is at optimal height. Take 2-5 little hops on one leg then switch legs in the air.
SINGLE LEG HIGH KNEE	2-3	5-10m	DIRECTION OF TRAVEL/ ONE ARM OH	Upper body upright with good tension, foot neutral (pull toes up) Land with active foot to rebound off the floor. Lift free hip when knee is at optimal height. Same foot continually rebounding off floor.
STRAIGHT LEG BOUND	2-3	20-30m	DOUBLE TAPS	Upper body upright with good tension, foot neutral (pull toes up). Land with active foot to rebound off the floor. Try to land under centre of mass.
HIGH HEEL LIFT	2-3	10-15m	VARY COUNT/RANDOM THROUGH HURDLES	Upper body upright with good tension, foot neutral (pull toes up). Fast and active lift up and put down. Land with active foot to rebound off the floor. Try to land under centre of mass.
RUNNING CYCLE	2-3	10-15m	OVER ANKLE/CALF/KNEE AND SWITCHING BETWEEN A/C/K	Upper body upright with good tension, foot neutral (pull toes up). Land with active foot to rebound off the floor. Try to land under centre of mass.

SKIPPING DRILLS & SKIPPING RUNNING - ANY OF THE ABOVE EXERCISES PLUS SKIPPING POLE RUNNING

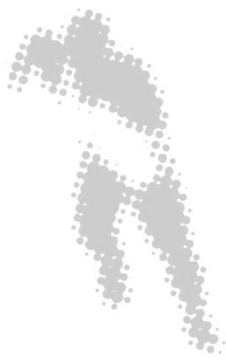
Developing & Controlling Speed



Developing & Controlling Speed



Coaching Process & Problem Solving



- Know the desired technical model
- Know the technical model of the athlete – create a mental video library
- Observe the athlete in real time and with video feedback
- Compare the mental video library with the new footage
- Then ask these questions:
 - What is the biggest technical gap/technical issue?
 - What is the most important technical gap/technical issue?
 - What gap/issue will be addressed first?
 - What could be done to address the gap/issue?
- Then draw on coaching toolbox of drills, exercises, cues, tasks

Practical Session

- High Heels & Foot Contact Drills
- Full Cycle drills
- Drills into strides
- Skipping Drills & Runs
- Speed Limiter Runs