



ELITE FOOTBALL SPORTS SCIENCE SUPPORT



Alan McCall

BACKGROUND

- Education:

- Bachelor Degree Sport and Exercise Science (Napier University)
- Master of Exercise Science (Edith Cowan University, Western Australia)

- Work Experience

- Edinburgh Rugby (Student Assistant S&C Coach 2004 – 2005)
- Queensland Reds Super 14 Rugby Union (S&C intern 2005 - 2006)
- Brisbane Lions Australian Rules Football (Sport Science Intern 2005)
- East Tigers Rugby League (Head of Strength & Conditioning 2005 - 2006)
- Professional development in various sports teams and institutes of sport (Australia, Japan, England)
- Scottish Institute of Sport (S&C Coach 2006)
- Scottish Rugby Union (S&C Coach 2006)
- Celtic Football Club (Sport Scientist 2006 – present)

Physical Qualities in Football

- To be fast (sprints)
- To be powerful (jumping, shooting)
- To be strong (hold off players, 1v1, balance)
- To be able to recover quickly between high intensity actions
- To maintain a high intensity throughout 90 – 120 minutes



So where do we fit in?

CELTIC LAB

- Objectives
 - To optimise the performance during the games
 - To enable youth players to reach the level to play 1st team



CELTIC LAB

- **Methods**

- To make players stronger physically
- To help players to understand their strengths & weaknesses and the strengths & weaknesses of team-mates
- To prevent injuries
- To help players to return quicker and stronger following injury
- To gather all scientific resources to enable players and staff to make the right decisions



CELTIC LAB

- Support Services
 - Testing
 - Training
 - Monitoring
 - Recovery
 - Match Analysis
 - Injury prevention/later stages rehabilitation
 - Nutritional advice and recommendations
 - Football specific scientific research

TESTING

- Assessing the athletic capabilities of elite footballers is essential
 - To identify strengths and weaknesses
 - To design a training program
 - To assess the effectiveness of that training program

TESTING

- Aerobic Qualities
 - University of Montreal Track Test (UMTT) (Leger and Bouchet, 1980)
 - » Determines individuals' Maximal Aerobic Speed (MAS)
 - » Estimates VO₂max
- Anaerobic Qualities
 - Speed (10m, 20m and 40m)
 - Power (Squat Jump, Countermovement Jump, Free Jump)
- Maximum Strength
 - 3 repetition maximum (3RM) (Lower body and Upper Body)
- Also Anthropometric tests, flexibility tests

TEST RESULTS



TESTS RESULTS

STATE	
First name:	
Last name:	
Born:	

PLAYER PROFILE	
Position:	MID CENTRE
Right/Left handed:	RIGHT

ANTHROPOMETRIC DATA			
	Values	Level	Reference
Height (cm):	173	-	-
Weight (kg):	65.4	-	-
Body Mass Index:	21.9	-	-
Body Fat (%):	8.8	A	< 10%
Comment:	Excellent value		

FLEXIBILITY TEST			
	Values	Level	Reference
Flexibility (cm):	30.5	B	> 30
Comment:	Good result		

LEVEL A: EXCELLENT
LEVEL B: GOOD
LEVEL C: AVERAGE
LEVEL D: POOR

ANEROBIC QUALITIES			
JUMP TEST (OPTOJUMP)			
	Values	Level	Norms
Height Squat Jump (cm):	38.9	B	> 35
Height Counter Movement Jump (cm):	44.1	A	> 45
Height Free Jump (cm):	50.6	A	> 50
Ratio CMJ/SJ:	1.13	-	> 1,25
Comment:	Excellent values		

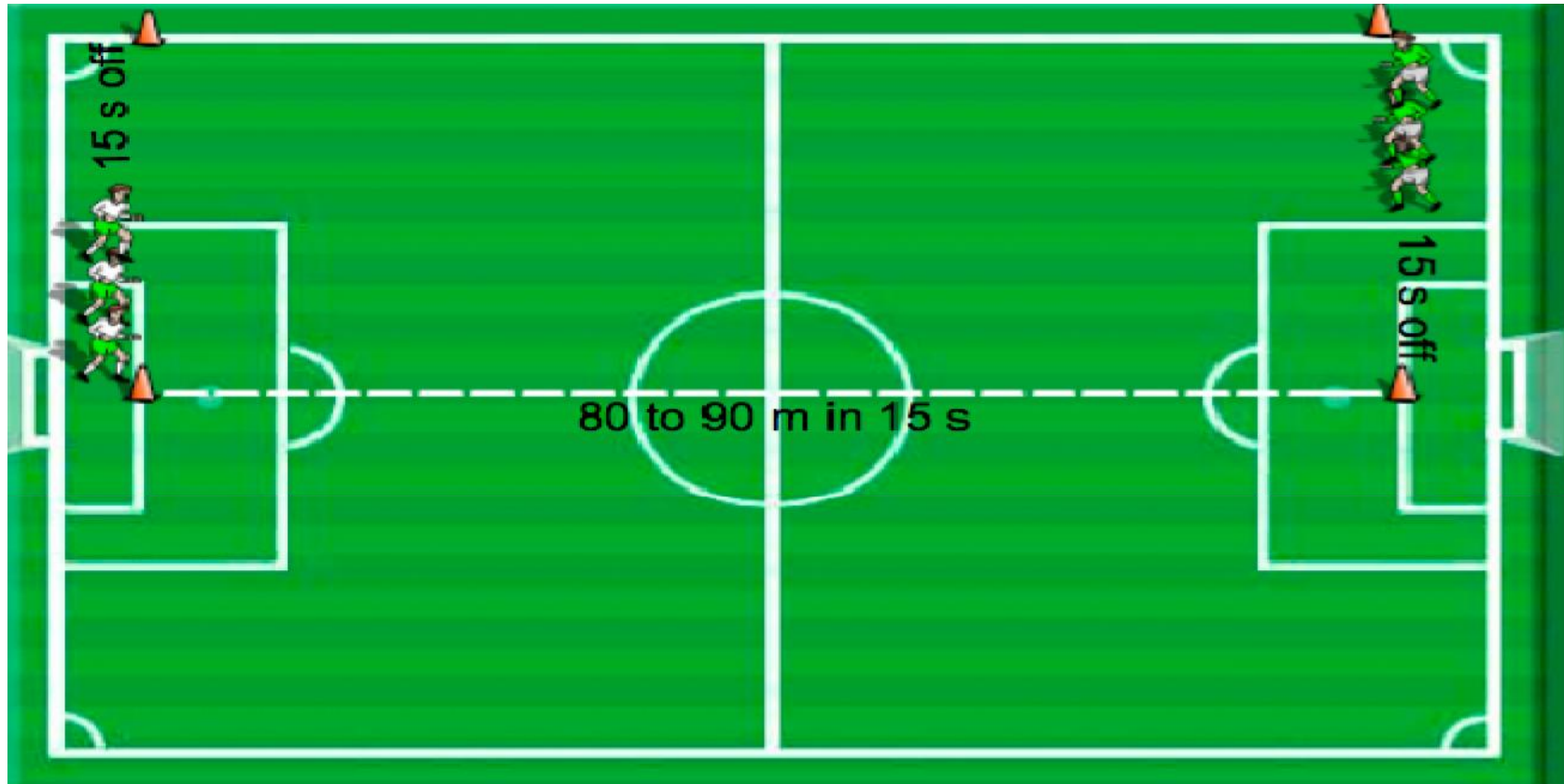
SPEED TEST (PHOTOCELLS)			
	Values	Level	Norms
Time on 10 m (s)	1.81	A	< 1,85
Time on 20 m (s)	3.02	A	< 3,05
Time on 30 m (s)	4.11	B	-
Time on 40 m (s)	5.21	B	< 5,25
Comment:	Excellent values		

AEROBIC QUALITIES (field)			
	Values	Level	Norms
Maximal Aerobic Speed (km/h):	15	D	> 17
Time to exhaustion (min,sec):	14.11	D	> 16
VO2max estimated (ml/kg/min):	52.5	D	> 59,5
Comment:	Poor values		

TRAINING – AEROBIC QUALITIES

- A high level of aerobic fitness is required to meet the physiological demands of football
- Aerobic Endurance
 - Continuous exercise at 80 – 90% MAS
 - » e.g. 30 min @ 80% MAS, 20 min @ 85% MAS
- Aerobic Power
 - High intensity intermittent exercise (>90% MAS)
 - » e.g. 30sec/30sec @ 100% MAS, 15sec/15sec @ 120% MAS

AEROBIC EXERCISE – 15/15 @ 120% MAS



	Group 1	Group 2	Group 3
	16 km/h	17 km/h	18 km/h
Distance	80m	85m	90m

ANAEROBIC QUALITIES

- In football, the performance depends on anaerobic qualities (i.e. Speed & Power)
 - Accelerating to win the ball before an opponent
 - To jump higher than an opponent
 - Striking the ball
- Therefore – the improvement of anaerobic qualities should be an important objective of training

TRAINING METHODS – SPEED & POWER



- Strength

- Plyometric



- Ballistic



EXPLOSIVE SESSION





MONITORING TRAINING

- To prevent overtraining, injury & illness
- **Rate of Perceived Exertion (RPE)**
 - quantifying exercise intensity
 - Aerobic
 - High intensity interval training
 - Small Sided Games
 - Plyometrics
 - Strength Sessions
- Using the Session RPE method allows calculation of the weekly training load (RPE x duration of session)

RATE OF PERCEIVED EXERTION (RPE)

SCALE 1: RPE

HOW WAS YOUR WORKOUT DURING THE SESSION?

Rating	Descriptor
0	NOTHING AT ALL
1	VERY, VERY EASY
2	EASY
3	MODERATE
4	SOMEWHAT HARD
5	HARD
6	
7	VERY HARD
8	
9	
10	MAXIMAL

BORG RATING OF PERCEIVED EXERTION SCALE MODIFIED BY FOSTER *et al.*, 1996

RPE

RPE x Duration

SCALE 1 : RPE	
WEEKLY LOAD	5130
DAILY MEAN LOAD	733
DAILY SD OF LOAD	701
MONOTONY	1.05
STRAIN	5367

Between 3000
to 6000

Less than
10,000

Training Load x Monotony

CONCLUSION

- Football performance is dependant on various factors:
 - PHYSICAL
 - MENTAL
 - TECHNICAL
 - TACTICAL
- Sport Science Support helps to ensure that players are prepared physically and also mentally

QUESTIONS?

