

The background image shows a group of rugby players in black and yellow kits celebrating on a grass field. They are holding trophies and raising their arms. In the background, there are two large blue banners. The top banner reads 'Rugby Europe 7^s 2019 Grand Prix Series' and the bottom banner reads 'Grand Prix Series 2019 EUROPEAN CHAMPIONS'. Both banners feature the Rugby Europe logo and the word 'LODZ'.

(REVERSE) ENGINEERING PHYSICAL PREPAREDNESS

A principles approach to creating long term athlete performance

**JUST LET THEM
PLAY!**

Important to understand that: **Context**
is always king over **Content**

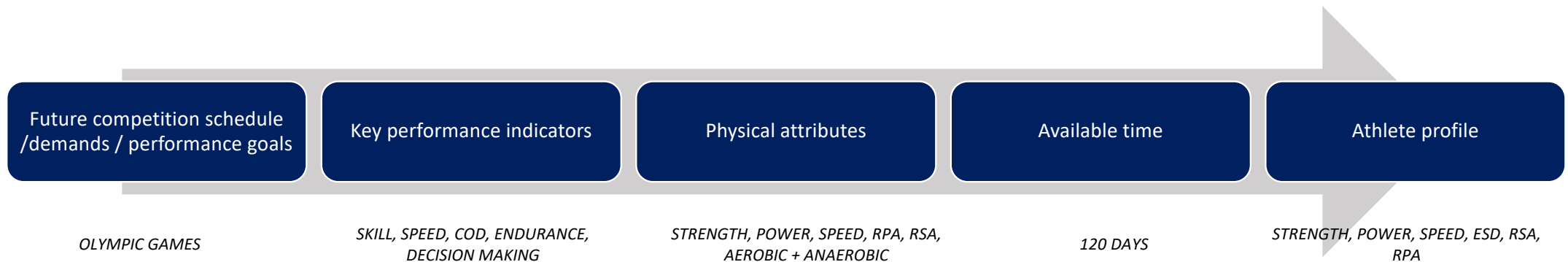
However, using a principles-based approach
can bridge the gap between different
contexts and achieving a similar outcome

(REVERSE) ENGINEERING PHYSICAL PREPAREDNESS

A principles approach to creating long term athlete performance

Reverse engineering or also known as ‘back engineering’ refers to the process of **working backwards** by deconstructing the component parts of the final product.

Through **deductive reasoning**, the coach attempts to recreate the component parts (*related to future competition or performance goals*) in a **systematic approach**; thereby significantly **increasing** the chances of the athletes **performing at their best** during the competitive period.



Work backwards from what you are trying to achieve

Have an idea of what type of athlete you would like to have

How much time do you have available

Is winning now the most NB or is developing players who stay in rugby more important

Train according to the game demands

Change the training stimulus from day to day

Have a plan

Work towards something

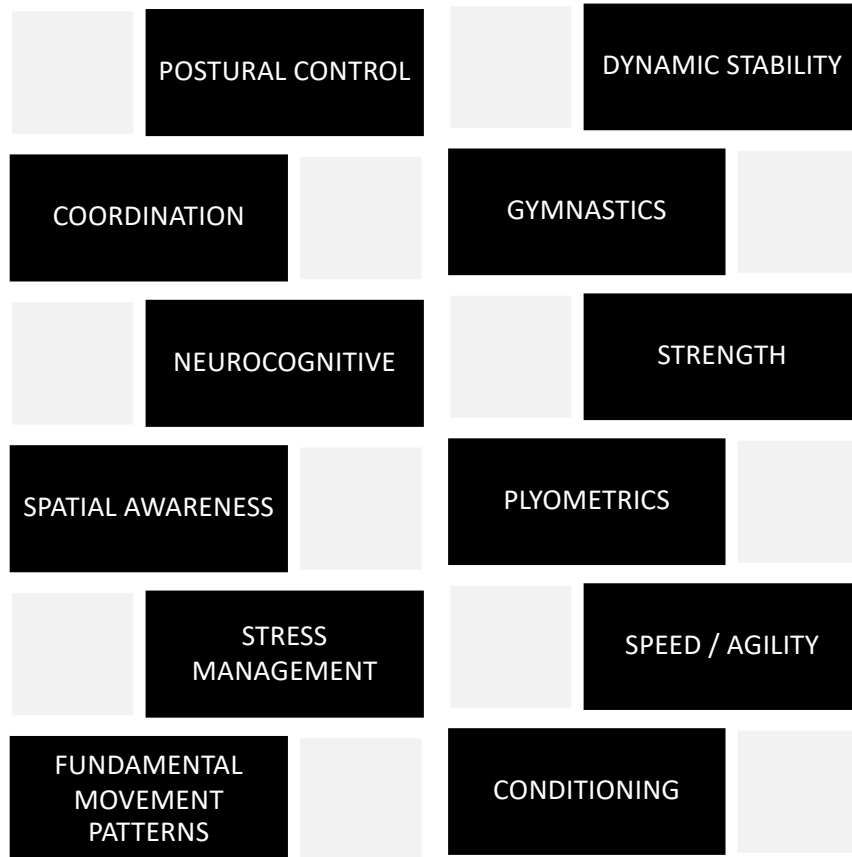
Monitor to see if you are getting closer to the goal

Moving from CONTEXT to CONTENT...
applying systems thinking to maximize
training session prescription

**JUST LET THEM
PLAY!**

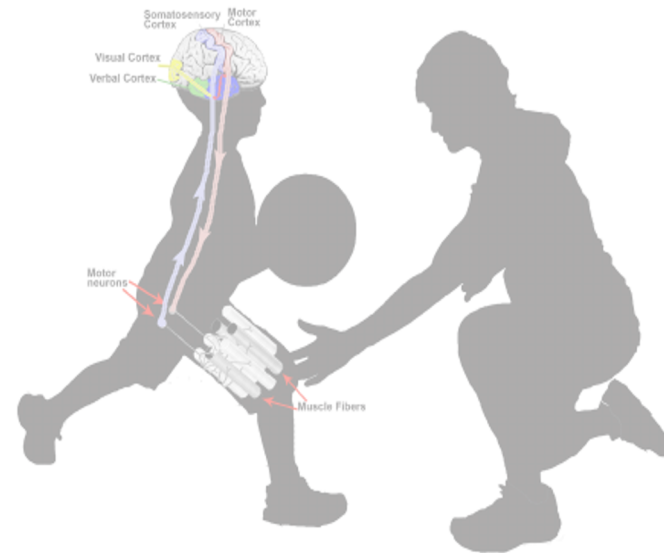
Integrative Neuromuscular Training (INT)

BLOCK ONE



BLOCK TWO

SPORT SPECIFIC
SKILLS AND
COMPETITION



Moving away from single year cycles and implementing a...



5

Tiered Accumulative Athletic Development Model

There is a need for a paradigm shift in school sports programming

Therefore, the aim of athletic training should be to enable the individual to tolerate training loads maximizing his or hers technical and tactical coaching.



5 Tiered Accumulative Athletic Development Model

It is evident that many / most youth athletes lack basic fitness and athleticism, thus starting out on a very low base level of physical fitness and possibly technical skill. Even though to some degree general sports skill may be well developed, the same is often not true for fundamental movement patterns. Therefore, the need for effective programming to readdress these issues is paramount and possibly requires a new model of development to be devised which builds these elements into long term models rather than a **short term “fix”**.



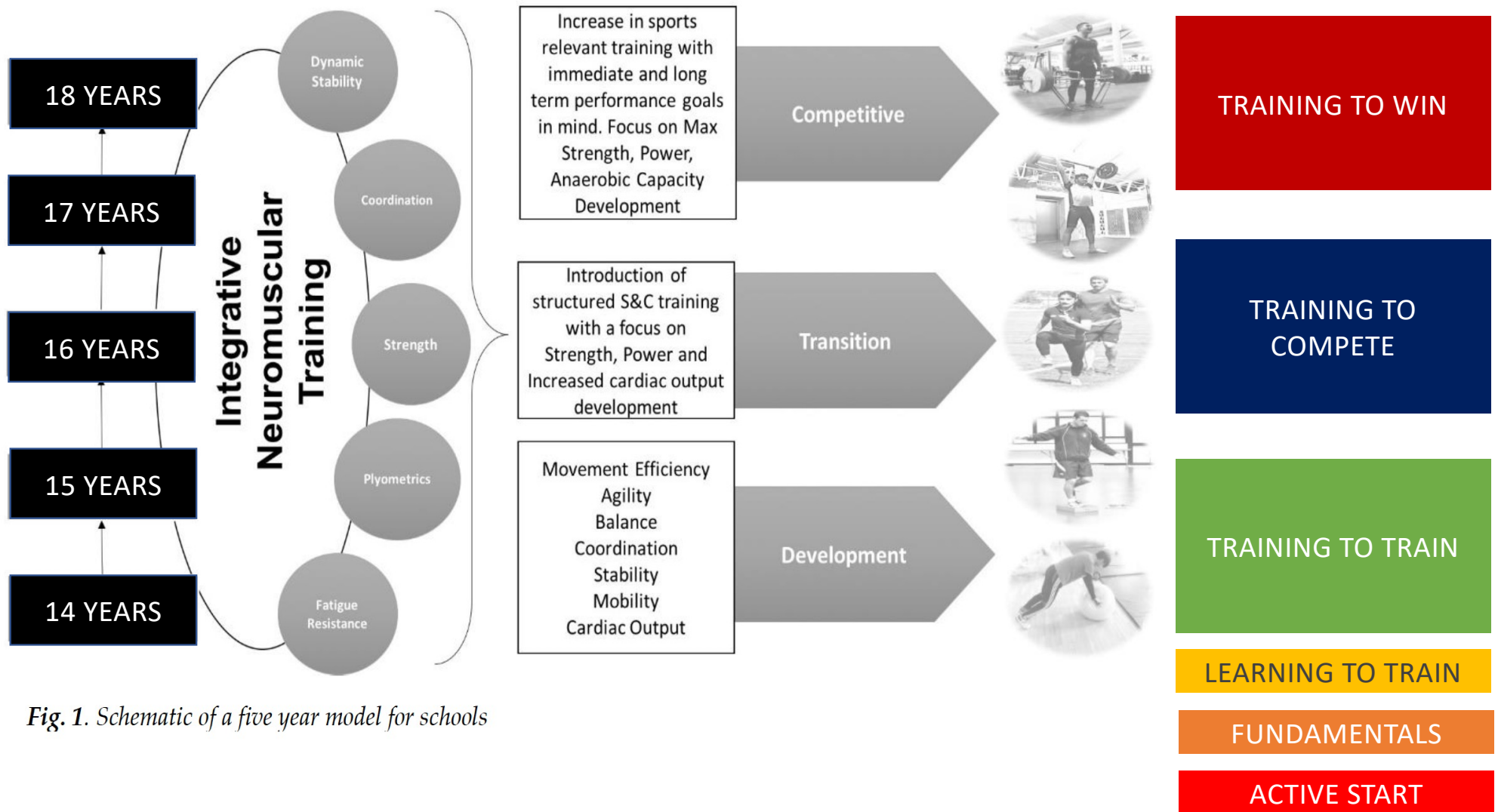
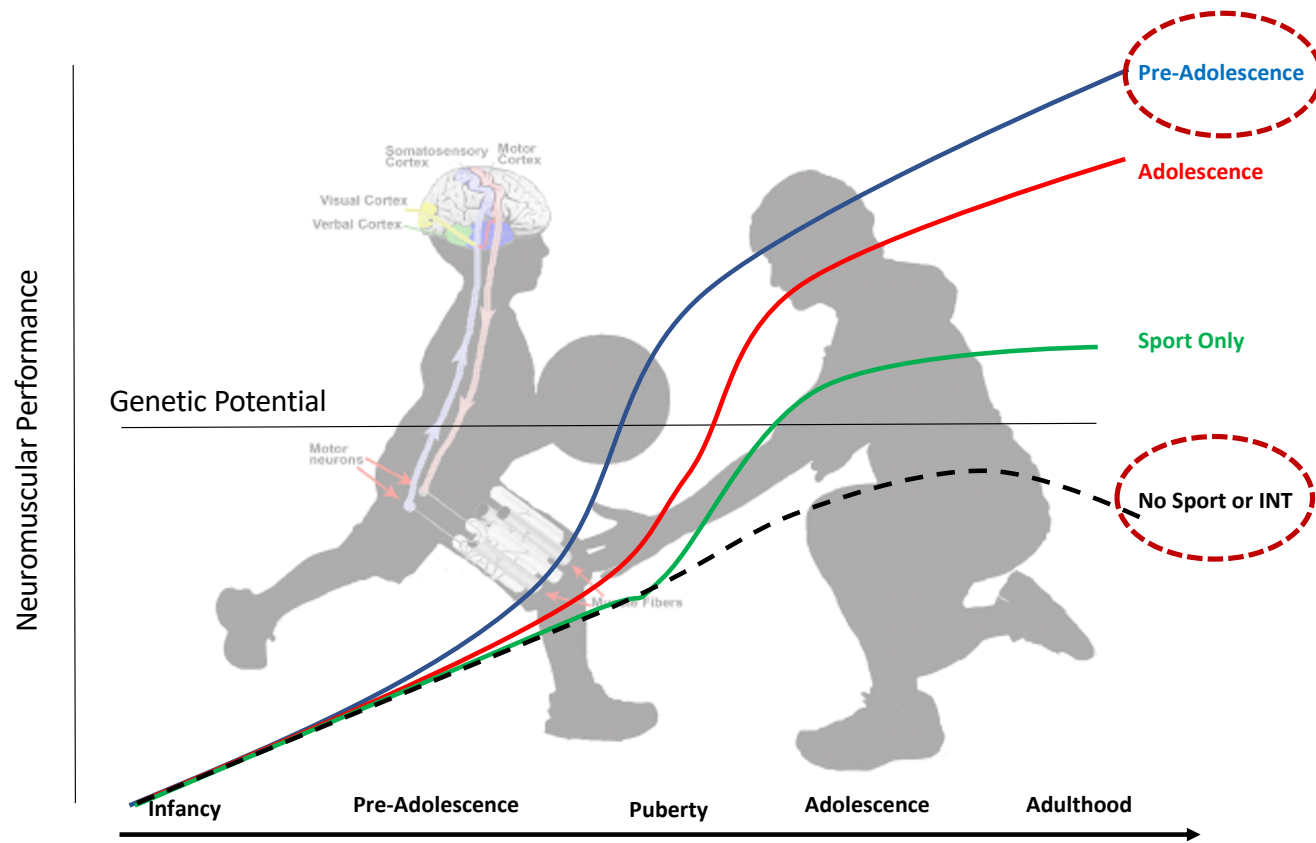


Fig. 1. Schematic of a five year model for schools

Integrative Neuromuscular Training (INT)



Meyer et al; BJSM; 2014

R A M P A G E SYSTEM

The RAMPAGE framework is:

1. Applicable across multiple youth levels (physically inactive – sports performers)
2. Applicable to multiple sports (team & individual)
3. Applicable to all stages of development
4. Integration of physical development in conjunction with technical, tactical & psychosocial development
5. Consideration of how coaches may implement this for LTAD purposes

The RAMPAGE framework allows coaches to:

1. Customize sessions specific to their context
2. Allows flexibility, variety and coach autonomy
3. Provides guidance on which activities can be delivered at the specific stage of development
4. Provides clarity on when specific activities can be implemented during a session



R

- **RAISE** – aim is to raise the body and muscle temperature
- Target qualities = locomotor or object control (obstacle course – dynamic games – technical run-based drills)

A

- **ACTIVATE** – aim is to activate key working muscles
- Target qualities = stability, strength, mobility (movements which simultaneously activate and mobilize the muscle + joint)

M

- **MOBILISE** – aim is to mobilize key working muscles
- Target qualities = stability, strength, mobility (movements which simultaneously activate and mobilize the muscle + joint)

P

- **PREPARE** – aim is to increase the intensity of the session
- Target qualities = speed, power and agility (acceleration – deceleration – rebounding – jumping – sprinting – wrestling)

A

- **ACTIVITY** = main technical or tactical focus of the session
- Target qualities = fundamental movement skills – sport specific skills – tactics

G

- **GAMES** – implementation of the technical skill or tactics within games
- Target qualities = game specific conditioning

E

- **EVALUATE** – evaluate the session during a cool down
- Target qualities = individual work ons.

Sample Training Plan Using RAMPAGE System

<i>Squad</i>	Squad name
<i>Duration</i>	Session duration
<i>Sport skills (Challenge)</i>	Goal Scoring, transitions, SSG, Big games, etc Challenge = low/medium/high)
<i>Physical emphasis</i>	COD focus / Speed focus / Endurance focus / Essential skills
<i>Session Objectives</i>	KPI's for the session

Session Section	Activity	Coaching Points
<i>Raise (5 min)</i>	<i>Various running drills</i>	<i>Focus on running mechanics</i>
<i>Activate & mobilize (10 - 15 min)</i>	<i>Injury prevention circuit incorporating various BW – med ball - DB - BB - bands etc exercises</i>	<i>INT block focusing on postural control, spatial awareness, fundamental movement patterns and coordination</i>
<i>Potentiate (10 - 15 min)</i>	<i>Speed and agility drills</i>	<i>Speed and agility development</i>
<i>Activity (20 -30 min)</i>	<i>Low intensity sport skills</i>	<i>Sport specific skill block</i>
<i>Games (20 - 30 min)</i>	<i>Game based training skills</i>	<i>Application of sport skills into a contextual environment</i>
<i>Evaluate (5 min)</i>	<i>Feedback to and from players on the session</i>	

Resistance Training Progressions

Week 1 - 4	Week 5 - 8	Week 9 - 12
Sets / Reps / Exercises	Sets / Reps / Exercises	Sets / Reps / Exercises
1 set of 20 reps (15 - 18 exercises) <i>Body weight</i>	1 set of 20 reps (18 - 25 exercises) <i>Body weight</i>	2 sets of 14 reps (25 - 30 exercises) <i>Body weight</i>

Week 13 - 16	Week 17 - 20	Week 21 - 24
Sets / Reps / Exercises	Sets / Reps / Exercises	Sets / Reps / Exercises
1 set of 20 reps (15 exercises) <i>added external resistance</i>	2 sets of 14 reps (18 exercises) <i>added external resistance</i>	3 sets of 14 reps (20 exercises) <i>added external resistance</i>

Graduation to barbell training (Girls) - Dan Bakers 18 Point System		
60's 10% BW Goblets (5 = >40; 4=33-39; 3=26-32; 2=19-25; 1=11-18; 0=<10) SL Squats (5 = 5; 4=4; 3=3; 2=2; 1=1; 0=0)	Push Ups (5 = >20; 4=15-19; 3=10-14; 2=5-9; 1=1-4; 0=0) Pull Ups (Under Hand Grip) (5 = >6; 4= 4-5; 3=3; 2=2; 1=1; 0=0)	Broad Jump distance of standing height (with perfect technique) CMJ Height (with perfect technique)

Graduation to barbell training (boys) - Dan Bakers 18 Point System		
60's 10% BW Goblets (5 = >40; 4=33-39; 3=26-32; 2=19-25; 1=11-18; 0=<10) SL Squats (5 = 5; 4=4; 3=3; 2=2; 1=1; 0=0)	Push Ups (5 = >40; 4=30-39; 3=20-29; 2=10-19; 1=3-9; 0=<3) Pull Ups (Under Hand Grip) (5 = >12; 4= 9-11; 3=6-8; 2=4-7; 1=1-3; 0=0)	Broad Jump distance of standing height (with perfect technique) CMJ Height (with perfect technique)

Small sided games prescription

Table 1 Field dimensions (width × length) for different small-sided shapes						
	1-a-side	2-a-side	3-a-side	4-a-side	5-a-side	6-a-side
Small (m)	5 × 10	10 × 15	12 × 20	16 × 24	20 × 28	24 × 32
Medium (m)	10 × 15	15 × 20	15 × 25	20 × 30	25 × 35	30 × 40
Large (m)	15 × 20	20 × 25	18 × 30	24 × 36	30 × 42	36 × 48

Small sided games prescription

Table 2
Methodological suggestions to developing small-sided soccer games

	Shape of game	Lactate threshold 5-a-side to 8-a-side	$\dot{V}O_{2\max}$ 3-a-side to 4 a-side	Anaerobic 1-a-side to 3-a-side
Intensity	%HRmax	80–90	90–95	>85
	RPE	Quite hard	Stressful	Maximal
	Blood lactate (mmol/L)	3–6	6–12	>10
Duration	Total work (min)	30–60	12–35	4–16
	Repetitions	1–8	4–8	2–4 sets of 4–8
	Repetitions duration (min)	30–60	3–6	20 s to 3 min
	Recovery	<1 min	Ratio: 0.5:1	Ratio: 1:4

RPE = rating of perceived exertion.

Managing the athlete

Note: that racquet and endurance-based sports are known to accumulate higher weekly loads between 700 – 1000 minutes

Also: >16 hours has shown an 8-fold increase in the probability of injury

Age	Duration in Min	Duration in Hours
7 to 11	<500	8,3
12 to 13	<550	9,2
14 – 15	<600	10,0
>16	<700	11,7

Managing the athlete

Age	Gym Load (AU)	Field Load (AU)	Match load (AU)
U18	501 ± 38 (5.5)	2464 ± 607 (6.6)	759 ± 51 (8.4)
U16	347 ± 49 (5.8)	1892 ± 142 (6.3)	680 ± 34 (8.5)
U14	188 ± 11 (6.3)	1643 ± 131 (6.2)	693 ± 10 (8.4)

Wrigley et al (2012)

THANK YOU!