Physically Developing Children the Arsenal Way

Des Ryan

Arsenal FC

in association with

WHERE WE ALL BELONG

Physically Developing Children the Arsenal Way (Overview 11/01/20)

By Desmond Ryan – Msc, (UKSCA) ASCC, (BASES) HPSA & CSCI

Des Ryan

Connacht Rugby – Youth Development Coach 1997-1999

Connacht Rugby – Head of Fitness 1999-2008

Ireland / Ireland A – 2005 - 2008

Irish Rugby – Fitness Education Manager 2008 – 2013

International Rugby Board –
Strength & Conditioning Advisor 2008-2013

Roscommon – 2000 -2004

Galway – 2005 - 2007

Various Dev, Minor & U21–
2006 - 2012

Connacht GAA – Various

Arsenal FC – Head of Sports Medicine & Athletic Development -
2013 – Present

Qualifications –

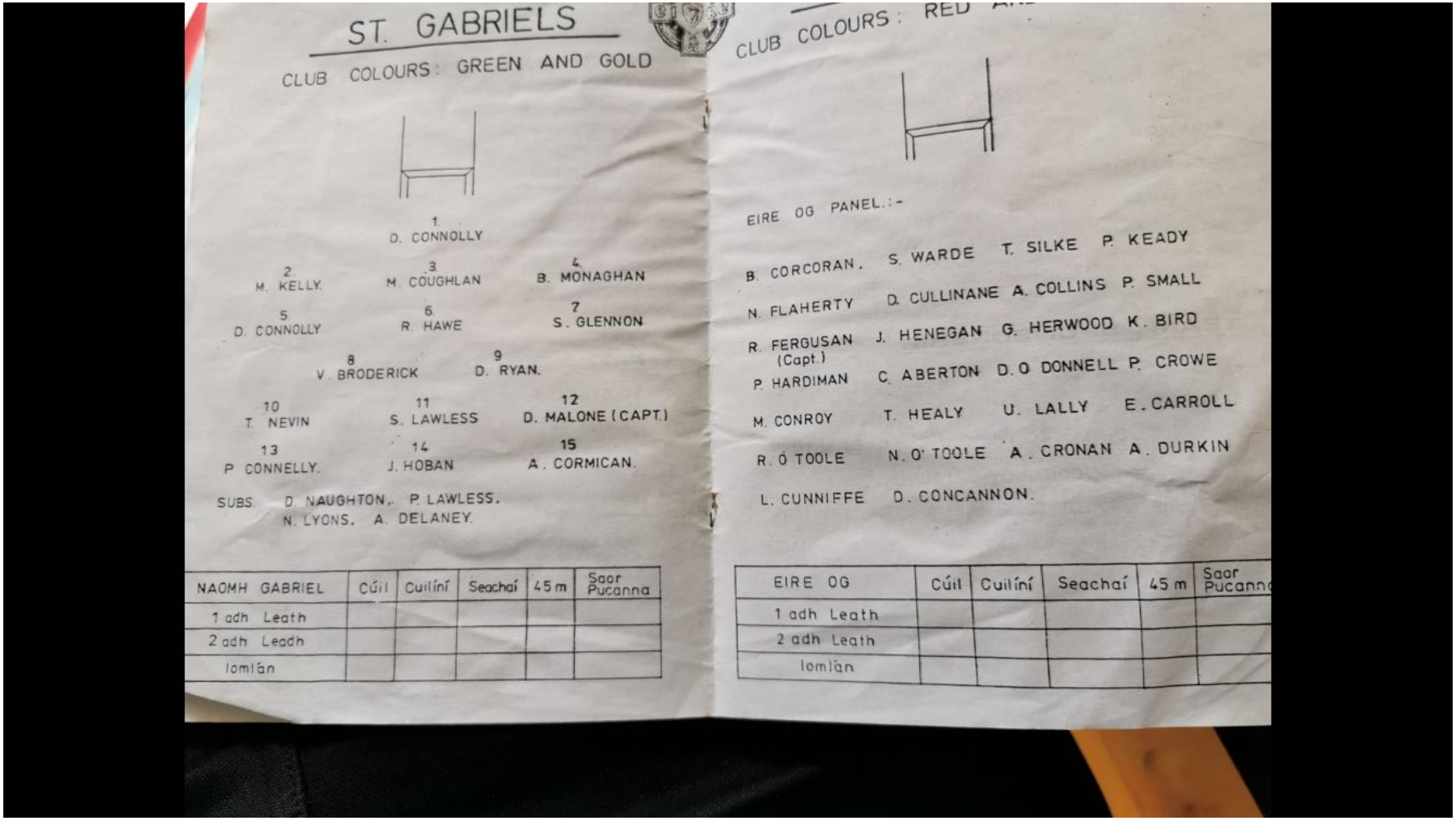
Bsc – Sport Science
MSc – Strength & Conditioning
BASES (High Performance Sports Accredited)
Chartered Scientist
UKSCA Accredited
World Rugby – Educator & Trainer
I.R.F.U. – Tutor

Arsenal

I would like to examine two U16 teams from the 90's

Arsenal

Galway U16 B County Final 1990



ST. GABRIELS

CLUB COLOURS: GREEN AND GOLD

1 D. CONNOLLY

2 M. KELLY. 3 M. COUGHLAN 4 B. MONAGHAN

5 D. CONNOLLY 6 R. HAWE 7 S. GLENNON

8 V. BRODERICK 9 D. RYAN.

10 T. NEVIN 11 S. LAWLESS 12 D. MALONE (CAPT.)

13 P. CONNELLY. 14 J. HOBAN 15 A. CORMICAN.

SUBS. D. NAUGHTON, P. LAWLESS, N. LYONS, A. DELANEY.

NAOMH GABRIEL	Cúil	Cuilíní	Seachaí	45 m	Saor Puicanna
1 adh Leath					
2 adh Leadh					
Iomlán					

CLUB COLOURS: RED

EIRE OG PANEL:-

B. CORCORAN, S. WARDE T. SILKE P. KEADY

N. FLAHERTY D. CULLINANE A. COLLINS P. SMALL

R. FERGUSAN (Capt.) J. HENEGAN G. HERWOOD K. BIRD

P. HARDIMAN C. ABERTON D. O DONNELL P. CROWE

M. CONROY T. HEALY U. LALLY E. CARROLL

R. Ó TOOLE N. O' TOOLE A. CRONAN A. DURKIN

L. CUNNIFFE D. CONCANNON.

EIRE OG	Cúil	Cuilíní	Seachaí	45 m	Saor Puicanna
1 adh Leath					
2 adh Leath					
Iomlán					

Arsenal

Arsenal

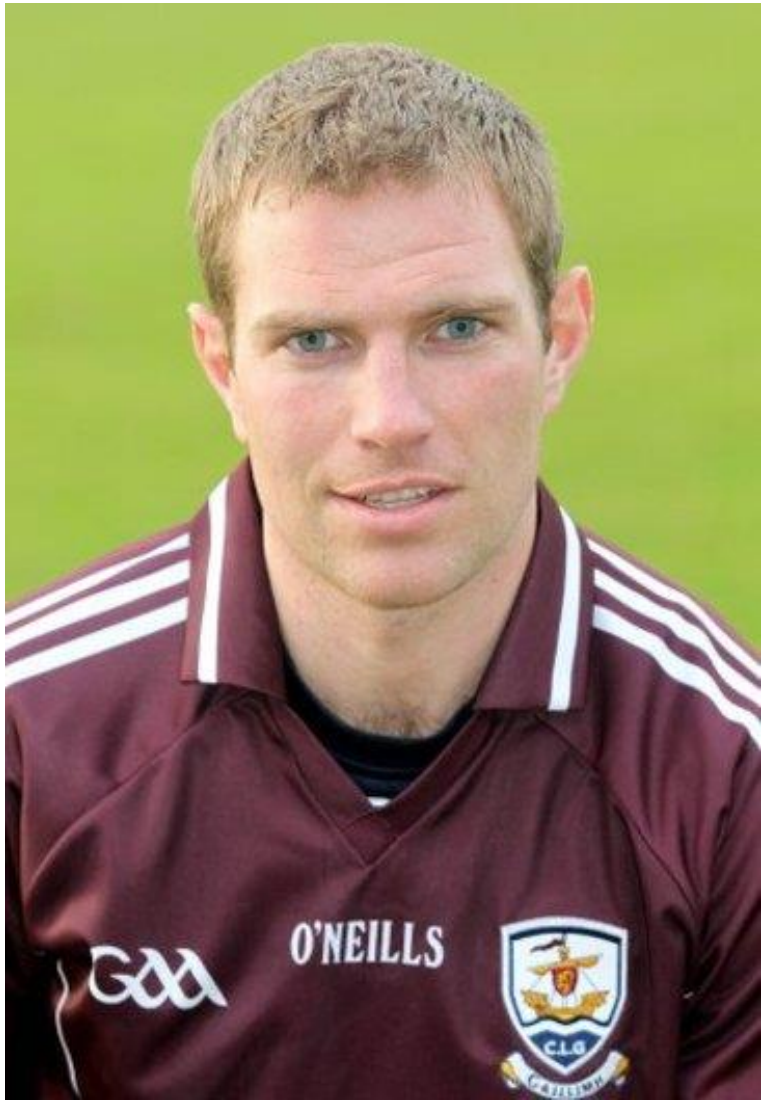
Ballinasloe RFC U16 Team 1999

Arsenal

John Muldoon (Ex Connacht Rugby Player)

Arsenal

Eoin Lynch (Ex Galway Hurler)



Arsenal

Fergal D’Arcy (Today FM DJ)

Arsenal

Lets compare an Irish and an English Village

Arsenal

London Colney

- Population – 9,507

Arsenal

Aughrim / Cappataggle / Kilconnell

- Aughrim Population – 595
- Cappataggle Population – 797
- Kilconnell Population - 670

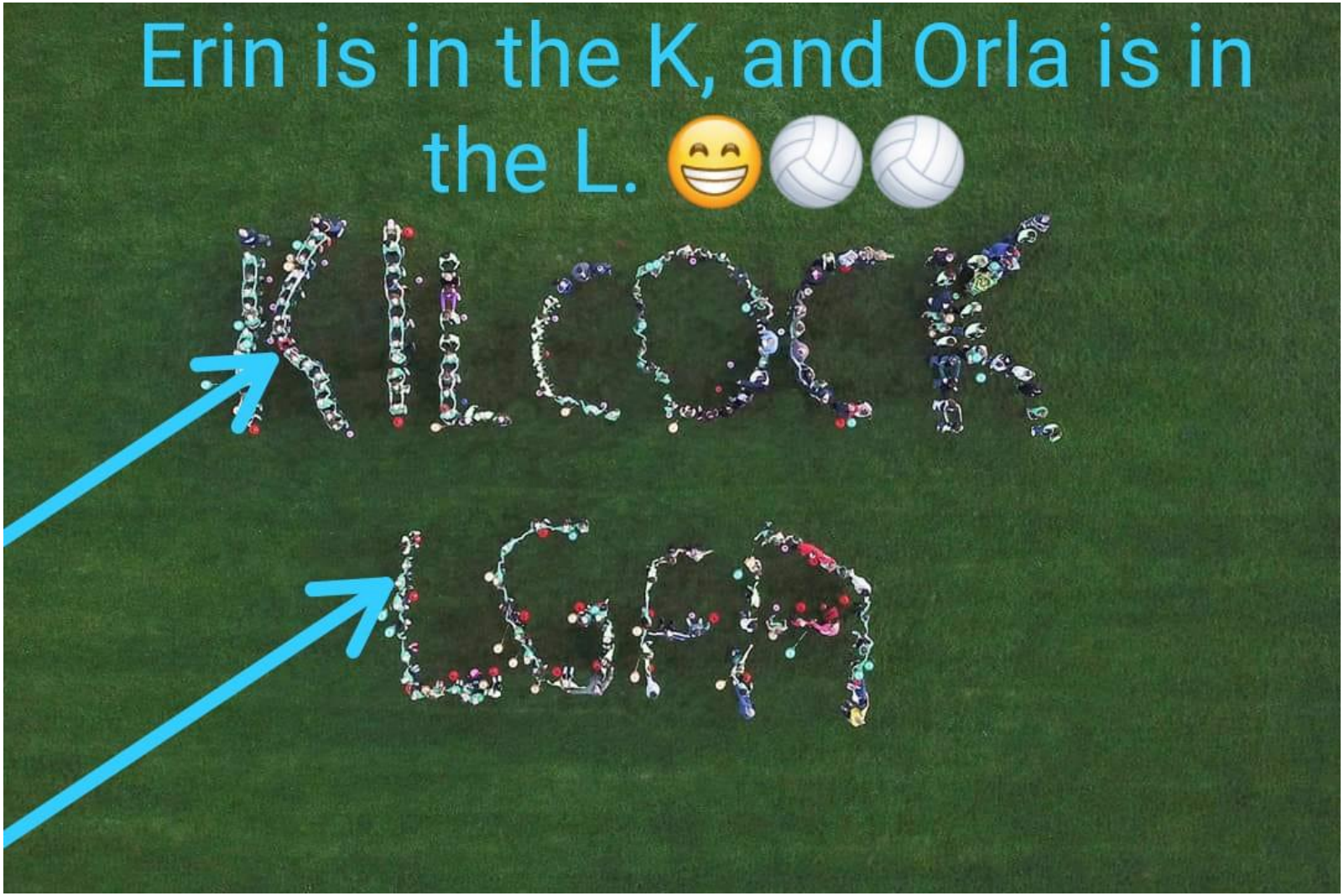
- Combined Population - 2062

Cappataggle Hurling Club


80m x 40m
AstroTurf


1691
Ceapach an tSeagail C.L.G.

Arsenal


Erin is in the K, and Orla is in the L.
KILCOCK
LGFA

Do you like GAA ?
Yes

Whats the best part ?
Running around going crazy

Why do you like it ?
Fun
Playing with my friends

How can very good become excellent ?

Conference Theme - Values, Behaviours and Culture

Arsenal

First Suggestion –

Listen to the players and think about your childhood memories.

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TOGETHER

WE

ADVISE & SUPPORT THROUGH TOUGH STUFF

PROMOTE SOCIAL DEVELOPMENT HERE & ON TOURS

CREATE A PSYCHOLOGICALLY SAFE ENVIRONMENT

MANAGE THE HOLISTIC CURRICULUM

PROVIDE A SAFE SPACE TO TALK

PROMOTE WELLBEING

PERSONAL DEVELOPMENT & PSYCHOLOGY PRACTIONER

PLAYER LIAISON & WELFARE OFFICER

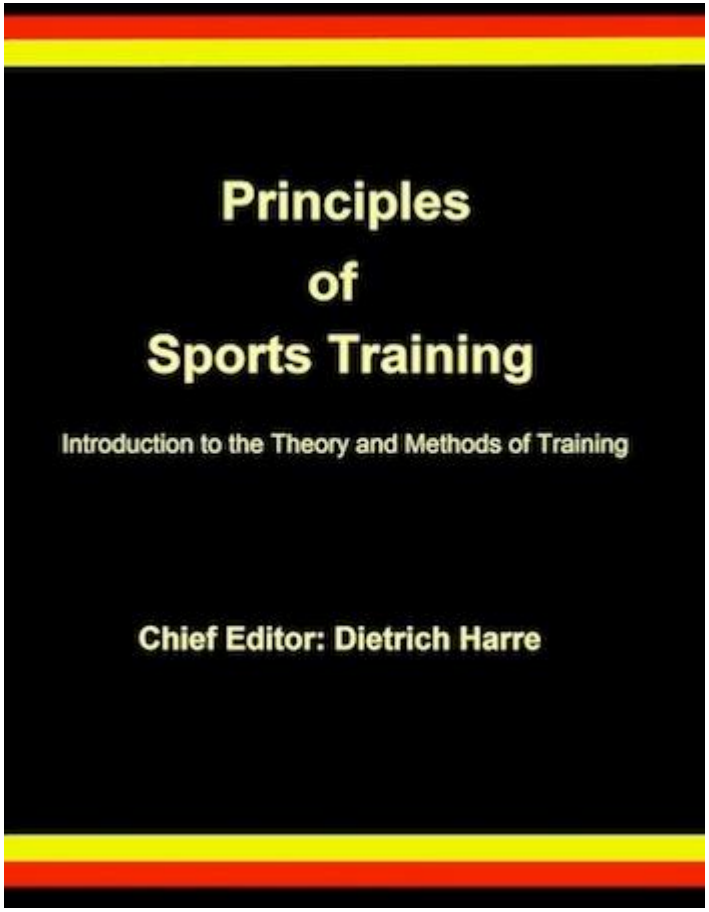
SAFEGUARDING LEAD

Arsenal

Childhood Memories

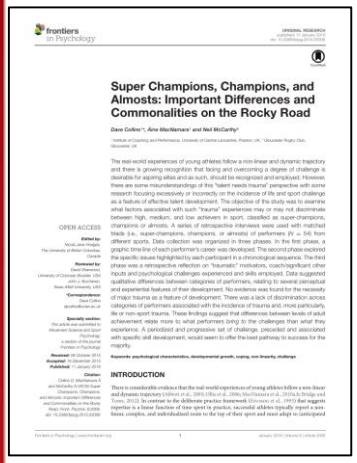
Arsenal

Where did Long term development Begin ?

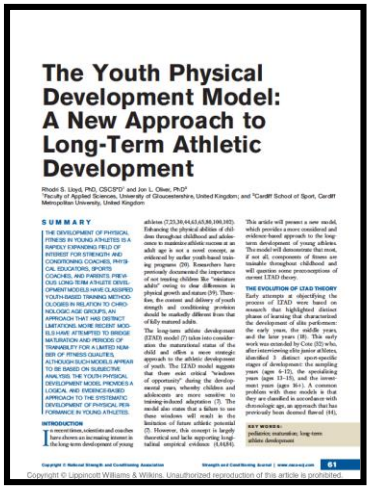


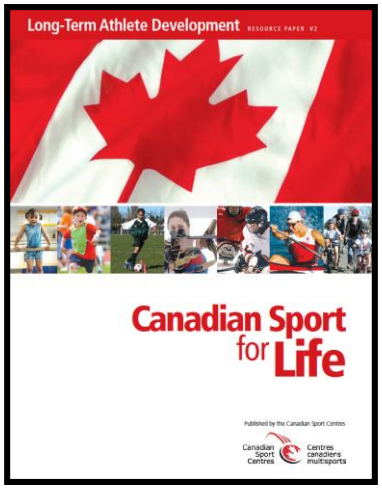
1969

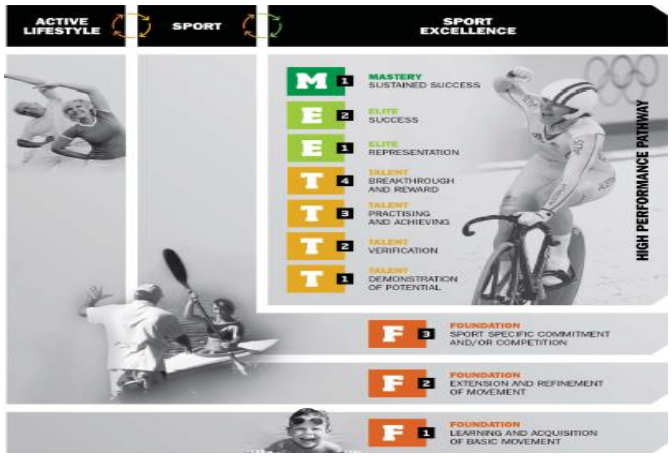
Arsenal


frontiers in Psychology

Super Champions, Champions, and Almosts: Important Differences and Commonalities on the Rocky Road


The Youth Physical Development Model: A New Approach to Long-Term Athletic Development





	Balyi's LTAD	Côté's DMSP	Abbott et al's PCDE	Bailey and Morley's Model of Talent Development
Aim	To present 'an all-embracing coaching philosophy that puts the needs of participants/athletes at the centre of decision-making about sports system development' (Balyi, Ross and Duffy, 2010)	'to understand different pathways of sport involvement from childhood to adults' (Côté, per. comm., 23/09/2009)	'to explore prerequisites to success in sport, and the comparative efficacy of employing these prerequisites within talent identification schemes' (Abbot and Collins, 2004)	'to make explicit theorising about the nature, content and character of the talent development process in physical education' (Bailey and Morley, 2006)
Primary disciplinary background	• Exercise physiology • Anatomy (especially biological maturation)	• Social psychology • Developmental psychology	• Performance psychology	• Education • Philosophy
Research methods	• Analysis of literature • Empirical observations of practice	• Retrospective recall with elite performers, recreational participants, and dropouts from sports • Analysis of literature	• Analysis of literature • Retrospective recall with elite performers in various performance domains • Sliding populations tracking with developing elites in various performance domains • Pilot interventions in schools	• Qualitative research with teachers and young people • Quantitative research with schools • Analysis of literature • School-based case studies

Arsenal

Long-Term Athletic Development- Part 1: A Pathway for All Youth

Rhodri S. Lloyd,[1] Jon L. Oliver,[1] Avery D. Faigenbaum,[2] Rick Howard,[3] Mark B. A. De Ste Croix,[4] Craig A. Williams,[5] Thomas M. Best,[6] Brent A. Alvar,[7] Lyle J. Micheli,[8,9,10] D. Phillip Thomas,[11] Disa L. Hatfield,[12] John B. Cronin,[13,14] and Gregory D. Myer[10,15,16,17]

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Abstract

Lloyd, RS, Oliver, JL, Faigenbaum, AD, Howard, R, De Ste Croix, MBA, Williams, CA, Best, TM, Alvar, BA, Micheli, LJ, Thomas, DP, Hatfield, DL, Cronin, JB, and Myer, GD. Long-term athletic development: Part 1: A pathway for all youth. *J Strength Cond Res* 29(5): 1439–1450, 2015–The concept of developing talent and athleticism in youth is the goal of many coaches and sports systems. Consequently, an increasing number of sporting organizations have adopted long-term athletic development models in an attempt to provide a structured approach to the training of youth. It is clear that maximizing sporting talent is an important goal of long-term athletic development models. However, ensuring that youth of all ages and abilities are provided with a strategic plan for the development of their health and physical fitness is also important to maximize physical activity participation rates, reduce the risk of sport- and activity-related injury, and to ensure long-term health and well-being. Critical reviews of independent models of long-term athletic development are already present within the literature; however, to the best of our knowledge, a comprehensive examination and review of the most prominent models does not exist. Additionally, considerations of modern day issues that may impact on the success of any long-term athletic development model are lacking, as are proposed solutions to address such issues. Therefore, within this 2-part commentary, *Part 1* provides a critical review of existing models of practice for long-term athletic development and introduces a composite youth development model that includes the integration of talent, psychosocial and physical development across maturation. *Part 2* identifies limiting factors that may restrict the success of such models and offers potential solutions.

Key Words children, adolescents, health, fitness, performance, resistance training

Introduction

Although a number of existing development models are designed to optimize sporting talent towards a senior level, a pertinent question that practitioners must ask is should we only be interested in developing elite young athletes? The number of youth who can expect to successfully follow the pathway from grassroots youth sport to elite professional sport is relatively small. In comparison, there will be a greater number of youth who opt to play sport only at a recreational level, or as current data would suggest, do not participate in organized sports or fail to accumulate the daily physical activity guidelines recommended by leading health authorities (60). Consequently, it would seem intuitively naive to overlook the potential benefits of long-term athletic development as a pathway that could enhance the health, fitness, and performance of all children and adolescents.

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29(5)/1439–1450

Journal of Strength and Conditioning Research

Long-Term Athletic Development, Part 2: Barriers to Success and Potential Solutions

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[1]Youth Physical Development Unit, School of Sport, Cardiff Metropolitan University, Cardiff, United Kingdom; [2]Department of Health and Exercise Science, The College of New Jersey, Ewing, New Jersey; [3]Department of Kinesiology, Temple University, Philadelphia, Pennsylvania; [4]School of Sport and Exercise, University of Gloucestershire, Cheltenham, United Kingdom; [5]Children's Health and Exercise Research Centre, University of Exeter, Exeter, United Kingdom; [6]Department of Family Medicine, Division of Sports Medicine, Sports Health and Performance Institute, Ohio State University, Columbus, Ohio; [7]Rocky Mountain University of Health Professions, Provo, Utah; [8]Department of Orthopaedics, Division of Sports Medicine, Boston Children's Hospital, Boston, Massachusetts; [9]Harvard Medical School, Boston, Massachusetts; [10]The Micheli Center for Sports Injury Prevention, Boston, Massachusetts; [11]Department of Trauma and Orthopaedics, University of Wales, Cardiff, United Kingdom; [12]Department of Kinesiology, University of Rhode Island, Kingston, Rhode Island; [13]Sport Performance Research Institute New Zealand, AUT University, Auckland, New Zealand; [14]School of Exercise, Health and Biomedical Sciences, Edith Cowan University, Joondalup, Australia; [15]Division of Sports Medicine, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio; [16]Department of Pediatrics and Orthopaedic Surgery, College of Medicine, University of Cincinnati, Cincinnati, Ohio; and [17]Sports Health and Performance Institute, Ohio State University, Columbus, Ohio

Abstract

Lloyd, RS, Oliver, JL, Faigenbaum, AD, Howard, R, De Ste Croix, MBA, Williams, CA, Best, TM, Alvar, BA, Micheli, LJ, Thomas, DP, Hatfield, DL, Cronin, JB, and Myer, GD. Long-term athletic development: Part 2: Barriers to success and potential solutions. *J Strength Cond Res* 29(5): 1451–1464, 2015–The first installment of this two-part commentary reviewed existing models of long-term athletic development. However, irrespective of the model that is adopted by practitioners, existing structures within competitive youth sports in addition to the prevalence of physical inactivity in a growing number of modern-day youth may serve as potential barriers to the success of any developmental pathway. The second part of this commentary will initially highlight common issues that are likely to impede the success of long-term athletic development programs and then propose solutions that will address the negative impact of such issues.

Key Words youth, children, adolescents, resistance training, fitness, long-term athlete development

Introduction

Although longitudinal data are needed to validate the design of existing pathways of either talent or athletic development, it is generally considered more beneficial to have a progressive system in situ rather than have no structure at all. However, although long-term athletic development programs continue to evolve, a number of contraindicating factors associated with modern-day lifestyles of youth are becoming an increasing cause for concern. Enhancing practitioner's knowledge and understanding of how exercise prescription for youth should align with training age, technical competency, growth, maturation, and development is crucial to the progression of our field (59). However, without addressing current issues facing the development of today's youth, practitioners will likely be working in a compromised environment. Specifically, this article will examine how long-term athletic development programs are negatively impacted by (1) inactive lifestyles of youth, (2) the prevalence of obese and overweight youth, (3) early sport specialization and associated injury risk, (4) high workloads of young athletes, and (5) the limitations of existing education curricula.

Operational Terms

For the purposes of this commentary, the terms *youth* and *young athletes* represent both children (generally up to the age of 11 years in girls and 13 years in boys) and adolescents (typically including girls aged 12–18 years and boys aged

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29(5)/1451–1464

Journal of Strength and Conditioning Research

Editor's choice
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International Olympic Committee consensus statement on youth athletic development

Michael F Bergeron,[1,2] Margo Mountjoy,[3,4] Neil Armstrong,[5] Michael Chia,[6] Jean Côté,[7] Carolyn A Emery,[8] Avery Faigenbaum,[9] Gary Hall Jr,[10] Susi Kriemler,[11] Michel Léglise,[12] Robert M Malina,[13,14] Anne Marte Pensgaard,[15] Alex Sanchez,[16] Torbjørn Soligard,[17] Jorunn Sundgot-Borgen,[18] Willem van Mechelen,[19,20,21] Juanita R Weissensteiner,[22] Lars Engebretsen[17,23]

For numbered affiliations see end of article.

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Accepted 18 May 2015

ABSTRACT

The health, fitness and other advantages of youth sports participation are well recognised. However, there are considerable challenges for all stakeholders involved—especially youth athletes—in trying to maintain inclusive, sustainable and enjoyable participation and success for all levels of individual athletic achievement. In an effort to advance a more unified, evidence-informed approach to youth athlete development, the IOC critically evaluated the current state of science and practice of youth athlete development and presented recommendations for developing healthy, resilient and capable youth athletes, while providing opportunities for all levels of sport participation and success. The IOC further challenges all youth and other sport governing bodies to embrace and implement these recommended guiding principles.

INTRODUCTION

The goal is clear: Develop healthy, capable and resilient young athletes, while attaining widespread, inclusive, sustainable and enjoyable participation and success for all levels of individual athletic achievement. Yet, this is a considerable challenge for all stakeholders in youth sports—parents, coaches, administrators, sport governing bodies *and*, especially, youth athletes.

The process begins with a subjective assessment of potential talent, followed by a structured programme of training in a specific sport. However, the limited success of talent identification and athlete development programmes is not surprising, as the model of athlete development is built on an individually unique and constantly changing base, including the demands of normal physical growth, biological maturation and behavioural development, and their interactions.[1 2] Athletic development is also multidimensional and difficult to assess in youth, and the trajectories from the novice to elite levels can vary greatly among athletes. Adding to the complexity, the demands of specific sports are superimposed on this dynamic integrated scheme. Moreover, the development of sport-specific skills, motivation and behaviours in an integrated learning culture is not well characterised; and, given the selectivity and exclusivity of sport, it is the choice athletes who generally receive the most attention in research. Accordingly, less is known about those who are systematically excluded (cut), who drop out (voluntarily withdraw) or are injured, along with contributing factors such as overuse, overtraining and burnout.

There is also an urgent need to extend our views of youth athlete development to include the 'culture' of specific sports and youth sports in general, including the underlying philosophy for developing youth athletes, the systems of specific sports and interactions between athletes, coaching styles and practices, the effects on youth athletes from parental expectations and the view of youth athletes as commodities, which is often intrusive with a fine line between objectivity and sensationalism.

In an effort to advance a more unified, evidence-informed approach to youth athlete development, the IOC convened a consensus meeting of experts in the field in November 2014. The group was charged with two tasks:

1. Highlight key considerations and challenges in competitive youth sport, and critically evaluate the current state of science and practice of youth athlete development;
2. Create guidelines for a sustainable model to develop healthy, resilient and capable youth athletes, while providing opportunities for all levels of sport participation and success.

MATURATION

Assessment of biological maturity status and timing

Biological maturation is an ongoing process that begins prenatally and continues through approximately the first two decades of postnatal life. Outcomes of the underlying biological processes are observed, assessed and/or measured to provide an indication of *maturity status* (ie, the status of the youngster at the time of observation), commonly specified by skeletal age (SA) and secondary sex characteristics. *Maturity timing* refers to the chronological ages when specific maturational events occur, frequently assessed by age at peak height velocity (PHV) and age at menarche. For accuracy, both require longitudinal data that span adolescence, as recalled age at menarche has error associated with memory and a tendency for reporting in whole years.[2–6]

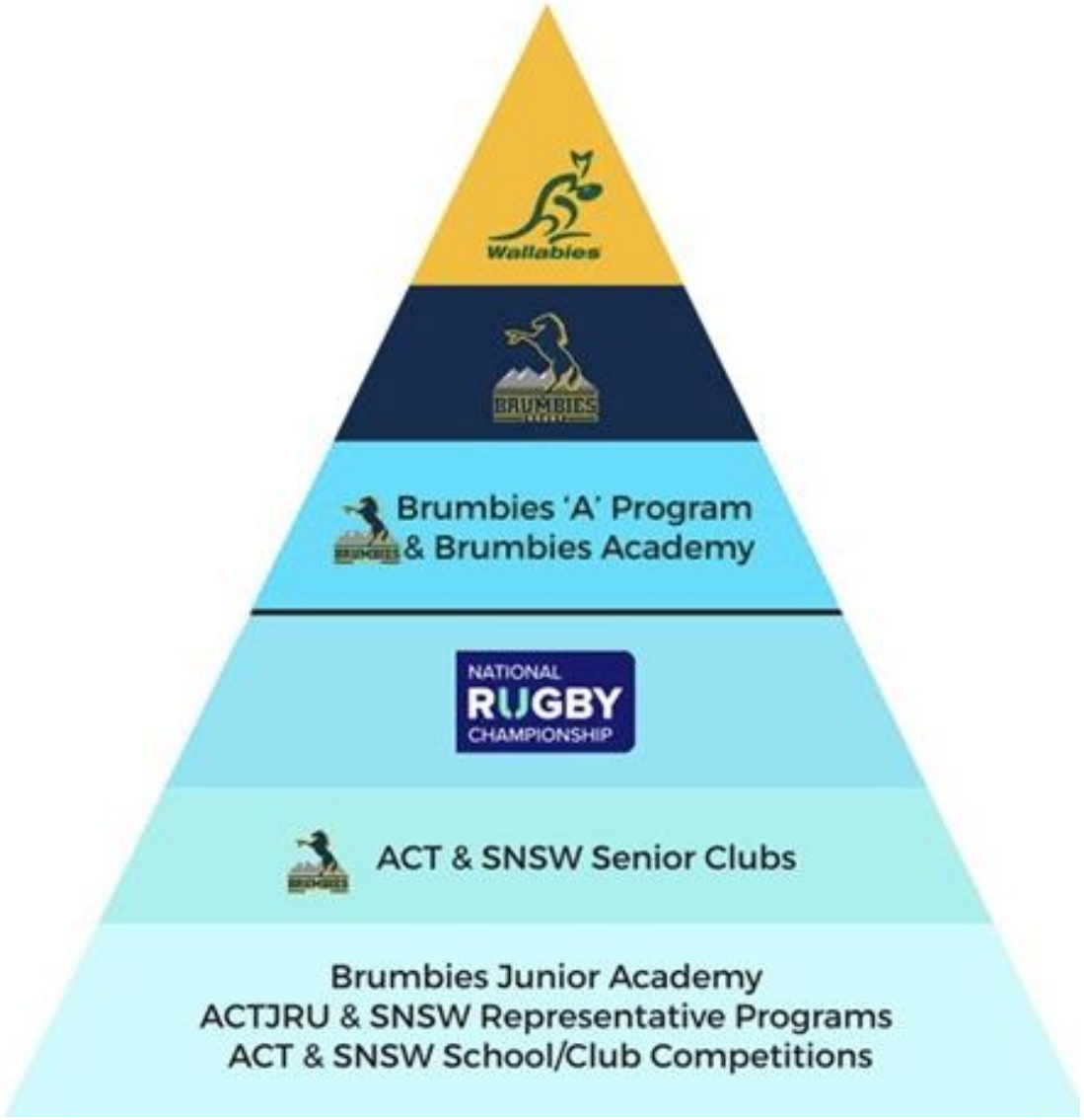
SA is the most useful estimate of maturity status and can be used from childhood into late adolescence.[2 7] It can also be used with current body height and/or mid-parent height to predict mature height, which is of interest in some sports. Radiation

To cite: Bergeron MF, Mountjoy M, Armstrong N, *et al*. *Br J Sports Med* 2015;**49**:843–851.

Summary

- **Excellence takes time** so provide long term plans.
- Provide good **age/stage appropriate** evidence based athletic development content.
- Understand the **pro and cons of early specialisation**. Encourage participation in many different structured and unstructured sport related activities.
- Understand the players stage of **biological development** and let it inform the programme.
- Make sure the development **plan is holistic** and includes social, cognitive and emotional development.
- Aim to have all **programmes and systems aligned and integrated**.
- Make sure **competition rules are appr**opriate to the players stage of development.
- Help the player to be **the best they can be** and **also active for life** and life long participants in the sport.

Arsenal



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SKI & SNOWBOARD AUSTRALIA

ALPINE ATHLETE PATHWAY

SKI & SNOWBOARD AUSTRALIA

TALENT TO ELITE

PATHWAY TO HIGH PERFORMANCE

PODIUM M1
SUSTAINED INTERNATIONAL SUCCESS OVER MULTIPLE HIGH PERFORMANCE CYCLES

PODIUM READY E2
ACHIEVING PODIUM SUCCESS IN PEAK INTERNATIONAL COMPETITIONS SUCH AS WORLD CHAMPIONSHIPS, OLYMPIC GAMES AND WORLD CUPS

PODIUM READY E1
ACHIEVEMENT OF AN ELITE STATUS THROUGH SENIOR NATIONAL SELECTION AND REPRESENTATION

PODIUM POTENTIAL T4
BREAKTHROUGH AND PREPARATION FOR TRANSITION THROUGH ELITE INDIVIDUAL PROGRAM PLANS, BENCHMARKING, COMPETITION PREPARATION AND EXPOSURE

DEVELOPING T3
COMMITMENT AS A PRE-ELITE ATHLETE AND REFINEMENT OF HOLISTIC SKILLS THROUGH EFFECTIVE, DELIBERATE PROGRAMMING

EMERGING T2
PERFORMANCE POTENTIAL IS VERIFIED THROUGH HOLISTIC ATHLETE PROFILING SUPPORTED BY CLUB/SSA INDIVIDUAL PERFORMANCE PLANS AND BENCHMARKING

POTENTIAL IDENTIFIED T1
PERFORMANCE POTENTIAL IDENTIFIED THROUGH INITIAL DEMONSTRATION OF SKILLS

FOUNDATION

PARTICIPATION PATHWAYS

COMPETING IN PARTICIPATION EVENTS ACROSS THE LIFESPAN FROM INTERSCHOOLS TO MASTERS

ENJOYMENT IN ON-SNOW RECREATIONAL ACTIVITY ACROSS THE LIFESPAN

FOUNDATION F3
REGULAR COACHING, PRACTICING AND COMPETING THROUGH CLUBS, SSA PROGRAMS AND FIS EVENTS. CONTINUED ENJOYMENT IN FREESKI ACTIVITY AND COMPETING IN PARTICIPATION EVENTS ACROSS THE LIFESPAN

FOUNDATION F2
INTRODUCTION TO SNOWSPORTS THROUGH DEVELOPMENTALLY-APPROPRIATE PROGRAMS WITHIN SCHOOLS AND CLUBS, FREESKI AND SPORT SAMPLING

FOUNDATION F1
LEARNING AND ACQUIRING THE BASIC FOUNDATIONS OF SNOWSPORTS THROUGH OFF-SNOW FUNDAMENTAL MOVEMENT SKILLS, FREESKI AND SNOW PLAY

Arsenal

Arsenal

Arsenal

Arsenal

Arsenal

Arsenal


Fly
Emirates


Arsenal
adidas
Fly
Emirates


Arsenal
adidas
Fly


Arsenal
adidas
Fly
Emirates


Fly
Emirates


Arsenal
adidas
Fly
Emirates

Arsenal

Arsenal

Hale End Layout Ariel View

Hale End Proposed Layout - Aerial View

Arsenal

U9 to U16








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First Team, Ladies Team, U23 & U18

Arsenal

Conference Theme - Values, Behaviours and Culture

Arsenal

Vision & Mission

Arsenal

ACADEMY

THE ARSENAL ACADEMY: ONE MISSION, ONE VISION

Mission –
To create the most challenging and caring football academy in the world

Vision –
Strong Young Gunners

Arsenal

RESPECT

DISCIPLINE

HUMILITY

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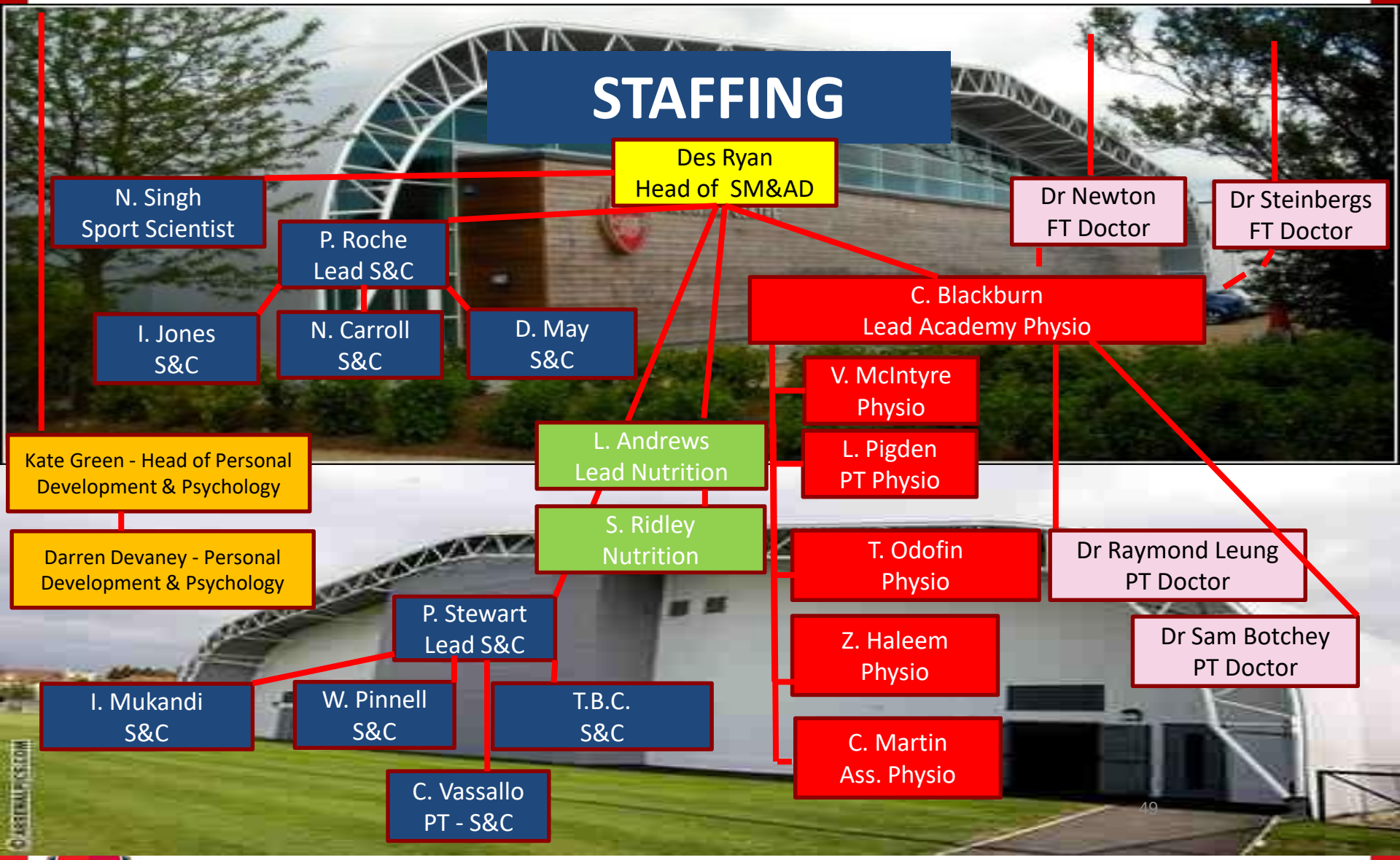
STAFFING



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Framework Document

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Developing World Class Soccer Players

An example of the academy physical development program from an English Premier League team

NSCA NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

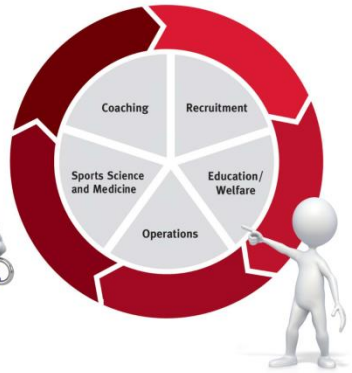
Reference: by Ryan et al. SCJ 2017

Designed by @YLMSportScience

04/2020

Developing talented footballers is multidimensional and as such the football academy also needs to be multifaceted

The Arsenal FC Academy is defined by the integration of 5 key pillars



The Physical Development Framework

An arrow approach is used to progress the player to the next level as quickly and efficiently as possible

THE ARSENAL ACADEMY APPROACH TO PHYSICALLY DEVELOPING YOUNG PLAYERS

EMPHASIS 1

Functional competence – good mobility and stability and then moving onto more advanced strength activities

EMPHASIS 2

Movement Skills – achieve mature level movement skills and then moving onto more advance speed activities

EMPHASIS 3

Integrated Conditioning – As we are a highly technical club most of the on field conditioning is completed through the game

EMPHASIS 4

Planning and Periodisation – We make sure the players don't do too much or too little

Key consideration

Maturation is an important part of the academy in the areas of program design and talent selection. The key to success is that all departments are aware of the players stage of biological maturation

Finally, a flexible framework is integral

The Academy framework must be dynamic and flexible – continuous evaluation is integral! The Academy prioritises quality injury audits, fitness testing, workload monitoring, player profiling and of course reviewing the progressions of players through to becoming an adult professional footballer

The Academy puts huge importance in the physio/nutritionist/S&C having a good relationship with the player like a big brother or favourite uncle

Arsenal

Developing World-Class Soccer Players: An Example of the Academy Physical Development Program From an English Premier League Team

Desmond Ryan, MSc,[1] Colin Lewin, BSc (Hons), SRP,[1] Shad Forsythe, MS, ATC, CSCS,[1] and Alan McCall, PhD,[1,2]
[1]Research and Development Department, Arsenal Football Club, London, United Kingdom; and [2]Research & Development Department, Arsenal Football Club, Edinburgh, United Kingdom

ABSTRACT

THE ROLE OF THE YOUTH ACADEMY IN ELITE SOCCER IS TO CREATE WORLD-CLASS PLAYERS. THIS INVOLVES TARGETED DEVELOPMENT OF A MYRIAD OF FACTORS, INCLUDING TECHNICAL, TACTICAL, PSYCHOLOGICAL, AND PHYSICAL QUALITIES. THE ROLE OF SPORTS SCIENCE AND MEDICINE IS TO OPTIMIZE THE PHYSICAL DEVELOPMENT OF YOUNG PROMISING PLAYERS. IN LINE WITH THE MULTIFACETED NATURE OF PLAYER DEVELOPMENT, THE SPORTS SCIENCE AND MEDICINE DEPARTMENT MUST INTEGRATE EFFECTIVELY INTO THE OVERALL YOUTH ACADEMY. THE PURPOSE OF THE PRESENT ARTICLE IS TO OUTLINE THE OBJECTIVES, METHODS, AND OPERATIONS OF A SPORTS SCIENCE AND MEDICINE DEPARTMENT OF ONE OF THE BIGGEST SOCCER TEAMS IN THE WORLD.

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INTRODUCTION

As with many sports, the identification of talent in soccer is followed by the selection onto a systematic program (the academy) for developing playing abilities and nurturing the individual toward realizing potential that has already been predicted (26). Therefore, the role of the youth academy represents an integral component in the long-term development of soccer players (19). Success in young soccer players and ultimately, later success (e.g., achieving an elite playing standard, obtaining a professional contract) is the product of a myriad of factors including training history and match experience (14,15), technical (26), motor (8), and perceptual cognitive (29) skills and also personal, social, and cultural factors (26). Other physically related parameters such as remaining free of injury (26), anthropometric (e.g., body size, percent body fat), and fitness/strength-derived qualities (e.g., aerobic fitness, maximal sprinting, maximal anaerobic power, jumping capacity) also contribute to this myriad of predictors and success (19). As the International Olympic Committee eloquently described it, "the goal of youth athletic development is to develop healthy, capable and resilient young athletes" (4).

Frameworks for athlete physical development should be flexible, using a combination of both best practice and experience underpinned by high-quality up-to-date research (4). Although the sports performance research literature is increasing exponentially, this only forms one part of the puzzle and insights into best practice, that is, what is being done in the practical setting by experts servicing athletes, is not as widespread. It has recently been proposed in the elite sporting environment that we must start to share our knowledge and experiences to learn from each other and

KEY WORDS:
talent; youth; football

AC ADEMY PLAYER JOURNEY

Chronological Age	8	9	10	11	1	13	14	15	16	17	18	19	20	21	22	23	
Squad	U9	U10	U11	U12	U13	U14	U15	U16	Scholar (U18)	U23							
Football Phase	FUNdation Phase			Early Yo th Development			Late Youth Development		Professional Development Phase								
Stage of Life	Childhood			Adolescence					Adulthood								
Growth Rate	Steady Growth			Rapid Growth					Declining Growth Rate →								
Maturation Status	Pre PHV			Approac ing PHV		Crica PHV			Post PHV								
Physical Adaptation	Predominantly Neural			Combination of Neural & Morphological →													
Physical Training Focus	FUNdamentals *(Generalisation)*			Sport Supporting					Sport Specific *(Specialisation)*								
Training Structure	Low			Moderate			High		Very High								
Academic/Vocation	Student-Athlete (Primary School) SATS			Student-Athlete (Secondary School) GCSE					Athlete-Student (FE)	Professional							
Psych-Social Support	Parents Siblings Peers			Peers Coach Parents					Partner Coach Teamates								
	Dependent			Interdependent					Independent								

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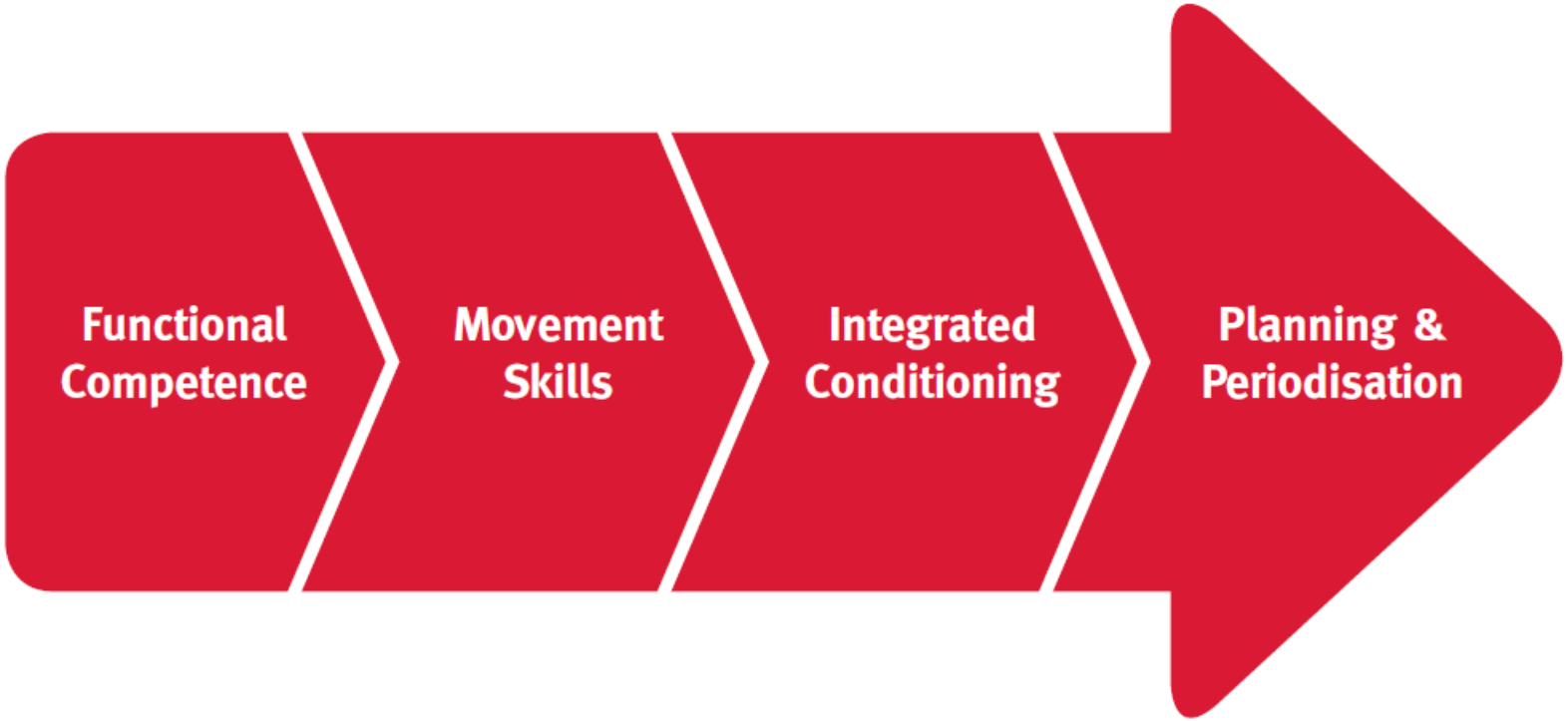
ACADEMY PLAYER JOURNEY

Chronological Age	8	9	10	11	12	13	14	15	16	
Squad	U9		U10	U11	U12	U13	U14	U15	U16	Schol
Football Phase	FUNdation Phase				Early Youth Development			Late Youth Development		
Stage of Life	Childhood					Adolescence				
Growth Rate	Steady Growth					Rapid Growth				De
Maturation Status	Pre PHV				Approaching PHV		Crica PHV		Post PHV	
Physical Adaptation	Predominantly Neural					Combination of Neural & Morpholo				
Physical Training Focus	FUNdamentals *(Generalisation)*					Sport Supporting				
Training Structure	Low					Moderate		High		
Academic/Vocation	Student-Athlete (Primary School) SATS					Student-Athlete (Secondary School) GCSE				Athlet
Psych-Social Support	Parents Siblings Peers					Peers Coach Parents				
	Dependent					Interdependent				

THE ARSENAL ACADEMY APPROACH TO PHYSICALLY DEVELOPING YOUNG PLAYERS



Red Line of Athletic Development

Foundation	Early Youth Dev.	Advanced Youth Dev.	Professional Dev.	First Team
Athletic Dev x 3 (30min – 15min S&C)	Athletic Dev. X 2 (30min) Speed Units WU x 2 (15min) Integrated WU x 1 (15min) Multi Sport x 1	Athletic Dev. X 2/3 (30/40min) Speed Units WU x 2 (15min) Integrated WU x 2 15min)	Athletic Dev. x 2/3 (60min) Speed Unit x 2 (10min) Integrated WU x 3 (15miin) Activation x 4 Monitoring x 2	Athletic Dev. x 2 (30min) Speed Unit x 2 (10min) Integrated WU x 4 (15min) Activation x 4 Monitoring x 1





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U9 to U12

Arsenal

- **Hot Topic**

Early Specialisation v Sampling

Arsenal

Sampling or Early Specialisation

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Key Terms.

- **Specialisation –** Intensive, year round training in a single sport at the exclusion of other sports.
- **Sampling –** Engagement in multiple sports/activates.
- **Burnout –** A spectrum of conditions that includes overreaching and overtraining.

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What has happened to society?

Arsenal

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Trends in paediatric and adolescent Anterior Cruciate Ligament (ACL) injuries

ACRISP
AUSTRALIAN CENTRE FOR RESEARCH INTO INJURY IN SPORT & ITS PREVENTION

Background

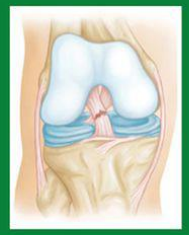
- **Media attention and parental concern** brought higher awareness to ACL injuries in paediatrics and adolescents
- Potential for **unfavourable healthcare costs** and outcomes in the long term

Methods

- Victorian Admitted Episodes Dataset (VAED)
- Admitted ACL injuries aged 5-14 years, between 2005-2015

Results

320
hospital-treated ACL injuries over 10 yrs



147.8%
overall increase 2005-2015

Increase from
2.74/ 100,000 population
to
6.79/ 100,000 population

Male versus female

145 **(45.3%)** injuries in girls

175 **(54.7%)** injuries in boys

Age differences

5-9 year olds: 10 diagnoses **(3.1%)**

10-14 year olds: 310 diagnoses **(96.9%)**

Those with known activity at time of injury*:

Sport = **56.6%** ACL injuries

Boys: **35.4%** while playing ball sports

Girls: **52.4%** while playing ball sports

* activity at time of injury unknown for 40.3% of cases

Take home messages

- Large increase in ACL injuries in 5-14 y/o in Victoria, Australia over 10 yrs highlights **significant health burden**
- Population-wide ACL **prevention policies required** to halt trends
- Investigation needed into design and implementation of prevention programmes involving **neuromuscular training**

@ACRISPFedUni
@CarolineFinch

Shaw & Finch
Trends in Paediatric and Adolescent Anterior Cruciate Ligament Injuries in Victoria, Australia 2005-2015
Int. J. Environ. Res. Public Health 2017; 14(599): doi:10.33.90/ijerph14060599

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Overuse Injuries and Burnout in Youth Sports: A Position Statement from the American Medical Society for Sports Medicine

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(*Clin J Sport Med* 2014;24:3–20)

Executive Summary

BACKGROUND

- Youth sport participation offers many benefits including the development of self-esteem, peer socialization, and general fitness.
- However, an emphasis on competitive success, often driven by goals of elite-level travel team selection, collegiate scholarships, Olympic and National team membership, and even professional contracts, has seemingly become widespread.
- This has resulted in increased pressure to begin high-intensity training at young ages.
- Such an excessive focus on early intensive training and competition at young ages rather than skill development can lead to overuse injury and burnout.

PURPOSE

- To provide a systematic, evidenced-based review that will:
  - Assist clinicians in recognizing young athletes at risk for overuse injuries and burnout.
  - Delineate the risk factors and injuries that are unique to the skeletally immature young athlete.
  - Describe specific high-risk overuse injuries that present management challenges and/or can lead to long-term health consequences.
  - Summarize the risk factors and symptoms associated with burnout in young athletes.
  - Provide recommendations on overuse injury prevention.

METHODOLOGY

- Medical Subject Headings (MeSHs) and text words were searched on March 26, 2012, for MEDLINE, CINAHL, and PsychINFO.
- Nine hundred fifty-three unique articles were initially identified. Additional articles were found using cross-referencing. The process was repeated July 10, 2013, to review any new articles since the original search.
- Screening by the authors yielded a total of 208 relevant sources that were used for this paper.
- Recommendations were classified using the Strength of Recommendation Taxonomy (SORT) grading system.

DEFINITION OF OVERUSE INJURY

- Overuse injuries occur due to repetitive submaximal loading of the musculoskeletal system when rest is not adequate to allow for structural adaptation to take place.
- Injury can involve the muscle-tendon unit, bone, bursa, neurovascular structures, and the physis.
- Overuse injuries unique to young athletes include apophyseal injuries and physeal stress injuries.

EPIDEMIOLOGY

- It is estimated that 27 million US youth between 6 to 18 years of age participate in *team* sports.
- The National Council of Youth Sports survey found that 60 million children aged 6 to 18 years participate in *some*

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The authors report no conflicts of interest.

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Overuse injuries are prevalent in children's competitive football: a prospective study using the OSTRC Overuse Injury Questionnaire

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ABSTRACT

Objectives To investigate the prevalence and burden of overuse injuries in children's football as well as player characteristics and their association with overuse injury risk.

Methods This investigation is based on the control arm (10 clubs) of a randomised controlled trial investigating prevention of injuries in youth football. We conducted a prospective 20-week follow-up study on overuse injuries among Finnish football players (n=733, aged 9–14 years). Each week, we sent a text message to players' parents to ask if the player had sustained any injury during the past week. Players with overuse problem were interviewed over the phone using an overuse injury questionnaire. The main outcome measures were prevalence of all overuse injuries and substantial overuse injuries (those leading to moderate or severe reductions in participation or performance) and injury severity.

Results The average response rate was 95%. In total, 343 players (46.8%) reported an overuse problem while in the study. The average weekly prevalence of all overuse problems and substantial overuse problems was 12.8% and 6.0%, respectively. Injuries affecting the knee had the highest weekly prevalence (5.7% and 2.4% for all and substantial knee problems, respectively). Girls had a higher likelihood of knee problems (OR 2.70; 95% CI 1.69 to 4.17), whereas boys had a higher likelihood of heel problems (OR 2.82; 95% CI 1.07 to 7.44). The likelihood of reporting an overuse problem increased with age (OR 1.21; 95% CI 1.00 to 1.47).

Conclusion Overuse injuries are prevalent in children's competitive football. Knee overuse injuries represent the greatest burden on participation and performance.

Trial registration number ISRCTN14046021.

INTRODUCTION

Football is the world's most popular sport and a large proportion of registered players are under 18 years of age (The Federation Internationale de Football Association, FIFA Big Count 2006, available from https://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.statspackage_7024.pdf). Participation in organised football during childhood can induce significant health benefits[1 2] and support a physically active lifestyle in later life.[3] However, playing football entails a risk of injury.[4] Injuries can diminish health benefits, have long-term consequences such as pain, dysfunction and early osteoarthritis,[5 6] and discourage children from playing football or other sports.[7]

While many studies have investigated the epidemiology of football injuries among adolescent and adult players,[4 8–11] only a few prospective studies regarding injuries in children's (under 14 years old) competitive football have been published.[7 12] Some studies have suggested that children's organised football is associated with a low risk of injuries.[12–14] However, these studies have mainly used time-loss injury definition,[15] which is likely to substantially underestimate the full extent of overuse injuries[16]—thought to be the main injury type in children's sports.[17] One recent study recorded all physical complaints that resulted in time loss or required medical attention. The authors reported that half of children's football injuries did not lead to medical consultation.[12] In children's sports, where clubs rarely have access to medical staff, even using a medical attention injury definition can underestimate the prevalence of injuries, in particular for less severe injuries.[7] Thus, epidemiological studies using data collection methods specifically designed to record overuse injuries are needed in children's sports. Recording the injury severity based on players' self-assessment of their pain and the impact that the injury has had on their participation and performance, rather than focusing solely on time loss from sports, is a more accurate way of describing the full injury burden caused by overuse problems.[16]

Exercise-based injury prevention programmes have been shown to be effective in various sports[18–20] including football.[21 22] These studies have focused mainly on acute injuries, whereas studies on prevention of overuse injuries, especially among children, are lacking. Prospective epidemiological data on overuse injury prevalence is needed to inform future injury prevention strategies.[23]

The main aim of this prospective cohort study was to investigate the prevalence and burden of overuse injuries in children's football. In addition, we examined player characteristics and their association with overuse injury risk.

METHODS

Study design and participants

This study is based on the control arm of a cluster-randomised controlled trial to investigate the effect of a prevention programme for acute and overuse injuries (ISRCTN14046021).

We carried out this study in collaboration with Sami Hyypiä Academy (SHA), the national training and research centre for Finnish football. Every

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Journal of Athletic Training 2011;46(2):206–220

www.nata.org/jat

position statement

National Athletic Trainers' Association Position Statement: Prevention of Pediatric Overuse Injuries

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Objective: To provide certified athletic trainers, physicians, and other health care professionals with recommendations on best practices for the prevention of overuse sports injuries in pediatric athletes (aged 6–18 years).

Background: Participation in sports by the pediatric population has grown tremendously over the years. Although the health benefits of participation in competitive and recreational athletic events are numerous, one adverse consequence is sport-related injury. Overuse or repetitive trauma injuries represent approximately 50% of all pediatric sport-related injuries. It is speculated that more than half of these injuries may be preventable with simple approaches.

Recommendations: Recommendations are provided based on current evidence regarding pediatric injury surveillance, identification of risk factors for injury, preparticipation physical examinations, proper supervision and education (coaching and medical), sport alterations, training and conditioning programs, and delayed specialization.

Key Words: adolescents, children, chronic injuries, microtrauma, growth, development

Overuse injuries in the pediatric population represent a significant health care concern. Some reports and clinical observations[1,2] indicate that 50% of pediatric patients present to sports medicine clinics for chronic injuries. In addition to their costs (direct and indirect medical expenditures), these injuries also result in lost participation time, numerous physician visits, and lengthy and often recurring rehabilitation.[3–5] Furthermore, athletes who sustain recurrent overuse injuries may stop participating in sports and recreational activities, thus potentially adding to the already increasing number of sedentary individuals and the obesity epidemic.

In the pediatric population, overuse injuries can include growth-related disorders and those resulting from repeated microtrauma.[6] Growth-related disorders include Osgood-Schlatter disease, Sever disease, and other apophyseal injuries. Overuse injuries resulting from repetitive microtrauma and chronic submaximal loading of tissues include stress fractures, similar to those described in adult athletes.[6] However, overlap exists between broad classifications; some growth-related disorders may occur in sedentary children but much less often than in their active peers.[6] Regardless of the cause, these injuries can result in significant pain and disability. Although little research has identified causative factors for overuse injuries in children and adolescents, these injuries may be caused by training errors, improper technique, excessive sports training, inadequate rest, muscle weakness and imbalances, and early specialization.[6–10] More than half of all reported overuse injuries are speculated to be preventable,[5] but few empirical data support this statistic.

The purpose of this position statement is to provide certified athletic trainers, physicians, and other health care professionals with current best practice recommendations regarding the prevention of overuse injuries in pediatric athletes, including children (aged 6–12 years) and adolescents (aged 13–18 years).[11] Even though specific age ranges have been identified, it is important to note that the occurrence of puberty, followed by skeletal maturity, is a far more important marker of maturity than chronologic age when managing pediatric overuse injuries. In particular, this position statement will provide recommendations based on current evidence (Table 1) pertaining to injury surveillance (eg, incidence, prevalence), identification of risk factors for injury, preparticipation physical examinations (PPEs), proper supervision and education (coaching and medical), sport alterations, training and conditioning programs, and delayed specialization.

RECOMMENDATIONS

Injury Surveillance

1. Research should be devoted to improved understanding of the prevalence, incidence, and economic cost of overuse injuries among pediatric athletes in the United States and should focus on prevention and treatment of these overuse injuries.[12,13] *Evidence Category: C*

IMPLICATIONS FOR TRAINING IN YOUTH: IS SPECIALIZATION BENEFITING KIDS?

Reference : by D. Sugimoto et al. Strength & Cond J 2017

NSCA NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

Designed by ©YLMSportScience

1 Early sports specialization has been a controversial topic in the field of sports medicine, training, and conditioning

2 Recent studies report increased sports-related injuries in single-sport specialized athletes compared with multisport specialized athletes

3 Two studies demonstrate the proportions of athletes who focused on a single sport in early ages and advanced to elite level in their later careers are <1%

4 Furthermore, performing multiple sports was identified as an indicator for greater future athletic success

5 Synthesizing available evidence, participating in multiple sports seems more beneficial than focusing on a single sport

6 It is important to provide adequate recovery time for pediatric and adolescent athletes because they are in a growth spurt process

7 Finally, because a history of previous injury is evidenced as a risk factor for future sports-related injuries, preventive approaches such as resistance training need to be implemented within a training regimen for youth

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15 REASONS WHY CHILDREN SHOULD PLAY MULTIPLE SPORTS

@BELIEVEPHQ

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Current State of Elite Sport Participation.

89% of players in superbowl played multiple sports in high school.

52% - Basketball
47% - Track & Field
19% - Baseball

52 Bundesliga (18 International)
Vs
50 4th – 6th League Players

Bundesliga = More multisport
+ Unorganised play as child
+ Organised football as adult

83 Medalists
Vs
83 Non-Medalists

- **Medallists specialised at an older age**
- **Participated in more sports during childhood and adolescence.**
- **Results robust across all Olympic sports**

Arsenal

Sampling or Early Specialisation

Arsenal

The effectiveness of exercise interventions to prevent sports injuries: a systematic review and meta-analysis of randomised controlled trials

Jeppe Bo Lauersen,[1] Ditte Marie Bertelsen,[2] Lars Bo Andersen[3,4]

Editor's choice
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► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/bjsports-2013-092538).

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ABSTRACT

Background Physical activity is important in both prevention and treatment of many common diseases, but sports injuries can pose serious problems.

Objective To determine whether physical activity exercises can reduce sports injuries and perform stratified analyses of strength training, stretching, proprioception and combinations of these, and provide separate acute and overuse injury estimates.

Material and methods PubMed, EMBASE, Web of Science and SPORTDiscus were searched and yielded 3462 results. Two independent authors selected relevant randomised, controlled trials and quality assessments were conducted by all authors of this paper using the Cochrane collaboration domain-based quality assessment tool. Twelve studies that neglected to account for clustering effects were adjusted. Quantitative analyses were performed in STATA V.12 and sensitivity analysed by intention-to-treat. Heterogeneity (I^2) and publication bias (Harbord's small-study effects) were formally tested.

Results 25 trials, including 26 610 participants with 3464 injuries, were analysed. The overall effect estimate on injury prevention was heterogeneous. Stratified exposure analyses proved no beneficial effect for stretching (RR 0.963 (0.846–1.095)), whereas studies with multiple exposures (RR 0.655 (0.520–0.826)), proprioception training (RR 0.550 (0.347–0.869)), and strength training (RR 0.315 (0.207–0.480)) showed a tendency towards increasing effect. Both acute injuries (RR 0.647 (0.502–0.836)) and overuse injuries (RR 0.527 (0.373–0.746)) could be reduced by physical activity programmes. Intention-to-treat sensitivity analyses consistently revealed even more robust effect estimates.

Conclusions Despite a few outlying studies, consistently favourable estimates were obtained for all injury prevention measures except for stretching. Strength training reduced sports injuries to less than 1/3 and overuse injuries could be almost halved.

INTRODUCTION

Increasing evidence exists, for all age groups, that physical activity is important in both prevention and treatment of some of the most sizable conditions of our time,[1–3] including cardiovascular disease, diabetes, cancer, hypertension, obesity, osteoporosis, and depression. Although overall population levels of physical activity is a general concern, increasing levels of leisure time physical activity and sports participation have been reported in some population groups.[4] Injuries are virtually the sole drawback of exercise, but may be a common consequence of physical activity and have been shown to pose substantial problems.[5–7] Management of sports injuries is difficult, time-consuming and expensive, both for the society and for the individual.[8–10] However, sports injury prevention by different kinds of strength training, proprioception exercises, stretching activities, and combinations of these, is accessible to essentially everyone and requires limited medical staff assistance. This adds several interesting aspects regarding the potential dispersion, applicability, and compliance to these programmes.

Most studies on musculoskeletal injuries have focused on one particular intervention, injury type/location, sport or studied other relatively narrowly defined research questions. This applies to most reviews and meta-analyses as well.[11–18] However, Parkkari *et al*[19] described 16 controlled trials in a narrative review. Central concepts of sports injury prevention such as extrinsic (including exposures, environment, equipment) and intrinsic (including physical characteristics, fitness, ability, age, gender, psychology) risk factors and the 'sequence of prevention' model of van Mechelen[20] were summarised. Aaltonen *et al*[21] presented an overview of all sports injury prevention measures, but as in the literature up until their search in January 2006, the focus of this review was primarily on extrinsic risk factors.[22] Recently, and with less restrictive exclusion criteria, Schiff *et al*[23] covered the same topic with additional studies. Aaltonen *et al* and Schiff *et al* were unable to obtain full quantification of intervention effect estimates. Steffen *et al*[24] presented a narrative review of acute sports injury prevention written by field experts for each location of injury, but an examination and quantification of specific training exposures and a differentiation of acute and overuse outcome effect estimates is still lacking.

This review and meta-analysis will broaden the scope of previous reviews and meta-analyses on sports injury prevention and focus on the preventive effect of several different forms of physical activity programmes and complement the existing summative literature on extrinsic risk factor reduction. Valuable summary literature exists for both neuromuscular proprioception[14 15] and stretching exercises.[17 18] However, aggregation of effect estimates and comparison with the effect of strength training and an intervention group with multiple exposures (combining ex strength, proprioception, stretch etc) could reveal new and interesting information, enabling proposals for future directions in the field of sports injury prevention. This study consequently aimed at performing stratified analyses of different injury prevention exercise programmes and additionally provides separate effect estimates for acute and overuse injuries.

To cite: Lauersen JB, Bertelsen DM, Andersen LB. *Br J Sports Med* 2014;**48**:871–877.

OPEN ACCESS

Reducing musculoskeletal injury and concussion risk in schoolboy rugby players with a pre-activity movement control exercise programme: a cluster randomised controlled trial

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► Additional material are available. To view these files please visit the journal online (http://dx.doi.org/10.1136/bjsports-2016-097434).

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ABSTRACT

Background Injury risk in youth rugby has received much attention, highlighting the importance of establishing evidence-based injury reduction strategies.

Aim To determine the efficacy of a movement control exercise programme in reducing injuries in youth rugby players and to investigate the effect of programme dose on injury measures.

Methods In a cluster-randomised controlled trial, 40 independent schools (118 teams, 3188 players aged 14–18 years) were allocated to receive either the intervention or a reference programme, both of which were to be delivered by school coaches. The intervention comprised balance training, whole-body resistance training, plyometric training, and controlled rehearsal of landing and cutting manoeuvres. Time-loss (>24 hours) injuries arising from school rugby matches were recorded by coaches and medical staff.

Results 441 time-loss match injuries (intervention, 233; control, 208) were reported across 15 938 match exposure-hours (intervention, 9083; control, 6855). Intention-to-treat results indicated unclear effects of trial arm on overall match injury incidence (rate ratio (RR)=0.85, 90% confidence limits 0.61 to 1.17), although clear reductions were evident in the intervention arm for concussion incidence (RR=0.71, 0.48 to 1.05). When trial arm comparisons were limited to teams who had completed three or more weekly programme sessions on average, clear reductions in overall match injury incidence (RR=0.28, 0.14 to 0.51) and concussion incidence (RR=0.41, 0.17 to 0.99) were noted in the intervention group.

Conclusion A preventive movement control exercise programme can reduce match injury outcomes, including concussion, in schoolboy rugby players when compared with a standardised control exercise programme, although to realise the greatest effects players should complete the programme at least three times per week.

INTRODUCTION

The injury risk in youth rugby has received attention in the mainstream public and sports medicine literature[1 2] and has prioritised the formulation of appropriate preventive measures.[3] Musculoskeletal injuries and concussion are prominent reasons for time loss from sport for adolescent rugby players,[4 5] and significant youth sports injuries, in general, have been implicated in long-term disability and compromised quality of later life.[6 7] Conditioning the musculoskeletal system to tolerate external forces, through enhancing strength and movement control, has been advocated as means of reducing musculoskeletal injury risk, as indicated by a growing evidence base that supports using multifaceted preventive exercise programmes to reduce musculoskeletal injury risk across male sports such as basketball[8] and soccer.[9–11] Moreover, cross-sectional associations between neck strength measures with concussion risk in young athletes invite the possibility that interventions to enhance neck strength may reduce concussion risk.[12] The injury patterns in rugby differ from other team sports, owing to a greater frequency of concussion, upper body and contact-related injuries,[13 14] and so it is uncertain if introducing a targeted exercise programme can reduce musculoskeletal injuries and/or concussion in youth rugby players.

The efficacy of preventive exercise programmes is dependent on several factors, of which the frequency of programme use (ie, dose) may be one such factor.[15] Dose–response relationships have typically been identified between programme use and reductions in knee ligament injury incidence in female sportspeople.[16 17] Assessing the effects of programme dose can be useful in reinforcing the outcomes of intervention research and informing subsequent implementation attempts.[18]

The aims of this study were to assess the efficacy of a pre-activity movement control exercise intervention to reduce the incidence and burden of rugby-related injuries in a schoolboy population and to assess the influences of programme dose and compliance on injury outcomes.

METHODS

Study design and recruitment

A cluster-randomised controlled trial was conducted across independent school rugby teams over one playing season (August to December 2015). The study design was in accordance with the Consolidated Standards of Reporting Trials statement,[19] and the trial was registered before recruitment (trial registration number: ISRCTN13422001). Study procedures were approved by the Research Ethics Approval Committee for Health at the University of Bath.

Each school was treated as a cluster, within which under-15 (U15), under-16 (U16) and under-18 (U18) teams were allocated to the same trial arm.

To cite: Hislop MD, Stokes KA, Williams S, *et al*. *Br J Sports Med* 2017;**51**:1140–1146.

Journal of Strength and Conditioning Research, 1996, 10(2), 115-119

Monitoring Injuries on a College Soccer Team: The Effect of Strength Training

Robert A. Lehnhard[1], Holly R. Lehnhard[1], Richard Young[2], and Stephen A. Butterfield[1]

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Reference Data

Lehnhard, R.A., H.R. Lehnhard, R. Young, and S.A. Butterfield. Monitoring injuries on a college soccer team: The effect of strength training. *J. Strength and Cond. Res. 10(2):115-119. 1996.*

ABSTRACT

Progressive resistance (strength) training has become the basis of year-round training programs for many sports. Training effects including muscle fiber hypertrophy, improved muscle fiber recruitment, increased strength of tendons and ligaments, and increased bone density are often equated with improved resistance to physical injury on the playing field. However, there is little research to document such a relationship. This study recorded injury rate and classification in a men's college soccer team over a 4-yr period. The yearly practice and game exposures for each athlete were also recorded. During the first 2 years none of the participants were involved in any strength training regimen. For Years 3 and 4 all participants were placed on a year-round strength training program. The incidence of injuries decreased following strength training, from 15.15 to 7.99 per 1,000 exposures. Changes in injury classification were also noted.

Key Words: exercise, prevention, resistance training

Introduction

Over the past two decades the contribution of strength training to performance has increased to the point of being the dominant mode of off-season training for many sports. Even during the competitive season many teams incorporate some form of strength training in their regular regimen. Improvements in running speed and jumping ability, for example, have been documented as a result of strength training. Such improvements have traditionally been found in power sports such as football and the field events in track (1, 2, 3, 10). However, sports not usually thought of as strength oriented have also been found to benefit from resistance training (18, 19).

The basis for any strength training program has been the overload principle (5, 8). This principle states that strength is improved by requiring a muscle to generate force against a resistance that is greater than the muscle commonly encounters. Adaptations to this resistance training include the well-known changes in both physical (hypertrophy) and neurological (fiber recruitment) characteristics of the muscle (4, 6, 7, 9, 11, 15). In addition, dynamic exercise studies with animals have demonstrated increases in the strength of tendons and ligaments surrounding the working joints (16, 17, 20).

These known adaptations have led many sports medicine professionals to equate them with improved resistance to injury. It is widely assumed that muscles with greater strength and joints with greater integrity, or stability, are less susceptible to injuries on the practice or playing field. But there is little research to document such a relationship in young athletes. Joint integrity, as a function of bone density, has been found to improve with strength training in women 50 to 70 years of age (13).

In view of the known physiological adaptations to strength training, a college men's soccer team was studied over a 4-yr period to determine whether strength training had an effect on the incidence of injuries. During the first 2 years strength training was not part of the team's regimen; it was incorporated into their training for Years 3 and 4. Incidence of injuries was compared between Years 1/2 and Years 3/4

Methods

An in-season injury record was kept over the 4-yr period. In-season was defined as Sept. 1–Nov. 31. Player injuries were recorded as time of occurrence (practice vs. game), body part affected (lower leg, thigh, shoulder, etc.), and type of injury (sprain, contusion, break, etc.). Also recorded were each athlete's total exposures (practice and game) and number of exposures (participation opportunities) lost due to injury. A single exposure was defined as one athlete participating in one practice or game in which there was the possibility of injury (12).

Duration of participation, whether 5 or 60 min, was not weighed. Any participation in a practice session or game, regardless of length, was counted as an exposure. By combining individual data we developed an injury-to-exposure ratio for the team. This relationship was

UKSCA Position Statement: Youth Resistance Training

Rhodri S. Lloyd, PhD, CSCS*D, ASCC; Avery D. Faigenbaum, EdD, FACSM, CSCS*D; Gregory D. Myer, PhD, CSCS*D, FACSM; Michael H Stone, PhD, ASCC, FNSCA, FUKSCA; Jon L. Oliver, PhD; Ian Jeffreys, PhD, CSCS*D, ASCC, FNSCA; Jeremy Moody, PhD, ASCC; Clive Brewer, MSc, CSCS, ASCC; Kyle Pierce EdD, CSCS

Preamble

Operational Definitions

UK STRENGTH AND CONDITIONING ASSOCIATION

26 © UKSCA | Issue 26 | SUMMER 2012 w: www.uksca.org.uk e: info@uksca.org.uk

Youth Resistance Training: Updated Position Statement Paper From the National Strength and Conditioning Association

Avery D. Faigenbaum, William J. Kraemer, Cameron J. R. Blimkie, Ian Jeffreys, Lyle J. Micheli, Mike Nitka, and Thomas W. Rowland

Abstract

Resistance Training for Children and Youth: A Position Stand from the Australian Strength and Conditioning Association (ASCA) 2007

ASCA Position Stand: Resistance Training for Children and Youth

Journal of Sports Sciences, 2004, 22, 383–390

BASES Position Statement on Guidelines for Resistance Exercise in Young People

Introduction

Evidence base on the risks and benefits of resistance exercise in young people

Guidelines

1. All young people should be encouraged to participate in safe and effective resistance exercise at least twice a week.
2. Resistance exercise should be part of a balanced exercise and physical education programme.

PEDIATRICS

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Strength Training by Children and Adolescents
Committee on Sports Medicine and Fitness
Pediatrics 2001;107;1470-1472
DOI: 10.1542/peds.107.6.1470

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://www.pediatrics.org/cgi/content/full/107/6/1470

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American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN

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•A properly designed resistance training programme is safe for children.

•A properly designed and supervised resistance training programme can improve the strength of a children.

•A properly designed and supervised resistance training programme can help to enhance motor fitness skills and sports performance of children.

•A properly designed and supervised resistance training programme can help to prevent injuries in youth sport and recreational activities.

•A properly designed and supervised resistance training programme can help improve psycho-social well being in children.

•A properly designed and supervised resistance training programme can help enhance the overall health of children.

Summary of the position statements

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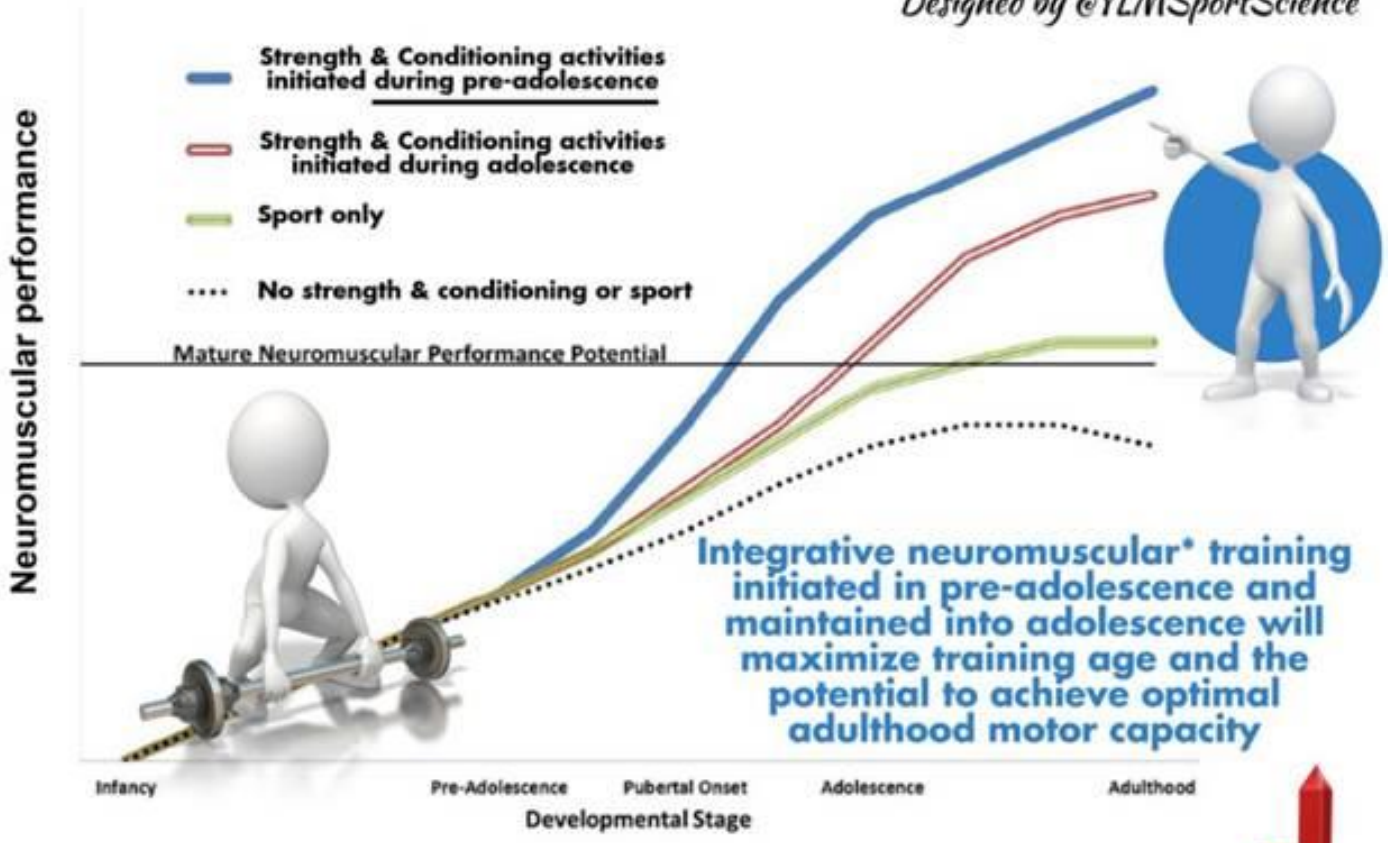
How Young is "Too Young" to Start Training?

Designed by @YLMSportScience



Reference

by Myer, Lloyd, Brent & Faigenbaum, ACSMs Health Fit J 2014

*Resistance training, dynamic stability exercises, core focused training, plyometric drills and agility training

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Arsenal

Sampling or Early Specialisation or Hybrid

Arsenal

Arsenal Academy Specialisation Position Statement

The aim of this document is to highlight the position of Arsenal Academy and give advice in relation to Academy players participating in more than one sport. Our advice is based on the best scientific evidence available.

Key Definitions –

Specialisation – Sport specialisation may be considered as intensive, year round training in a single sport at the exclusion of other sports.

Burnout – Burnout is part of a spectrum of conditions that includes overreaching and overtraining.

Too much *Specialisation* at an early age can have a negative effect on the player's wellbeing. *Burnout* can have a negative effect on the player's wellbeing at any age. The aim of this document is to avoid both through "smart" training. Researchers have indicated that youth who do specialise early in a sport are at increased risk of overtraining, overuse injury and *burnout* whereas youth who participate in different sports at a young age have been shown to have better movement competency. This is why we encourage participation in different sports and physical education at the Arsenal Academy. However this participation must be closely monitored and clearly communicated in order to prevent burnout. We encourage multi activity participation to different levels at different stages. The below table explains how this looks at the different age groups.

U9 to U11 – We fully encourage sampling of different sports/activities on non-training days. Ideally there is one full day where there is no Academy or any other sports activity (Rest day).

- 2 days available plus normal school P.E. Content

U12 to U14 - We fully encourage sampling of different sports/activities on none training days. It is advised that these activities are not at an elite level (County/Elite Training or Competitions). This would lead to putting the player in danger of *burnout*. Ideally there is one full day where there is no Academy or any other sports activity (Rest day).

- 2 days available for light/mod intensity activities plus P.E. Content

U15 to U16 – At this stage the player should specialise in football. All other physical development requirements will be catered for by their athletic development programme at Arsenal.

N.B. – At all times the sport science and sport medicine staff are available to advise what good training options are for your son on an individual basis.

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Arsenal Specialisation Position Statement

Foundation	Early Youth Dev.	Advanced Youth Dev.	Professional Dev.	First Team
One day off Two days for other sports / activities / play *Facilitate school sports / other sports	One day off Two days for other sports / activities / play *Facilitate school sports / other sports	One day off Two days for other sports / activities / play No Representative Sports	One Day Off One Sport	One Day Off One Sport
				

Arsenal

(Parents) What can you do…

- Encourage PE attendance at school
- Encourage unorganised play with friends and family
- Sample in a variety of sports with different focus,
- Have at least 1 day off sport per week.
- Take part in Arsenal Athletic Development.
- Play other sports during off-season.
- Communicate sport participation to Arsenal SS&M team.
- Avoid using external trainers/running coaches etc...
- **ENJOY THE JOURNEY.**

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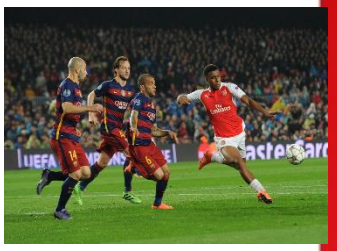

Sampling or Early Specialisation or Hybrid

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U9 to U12

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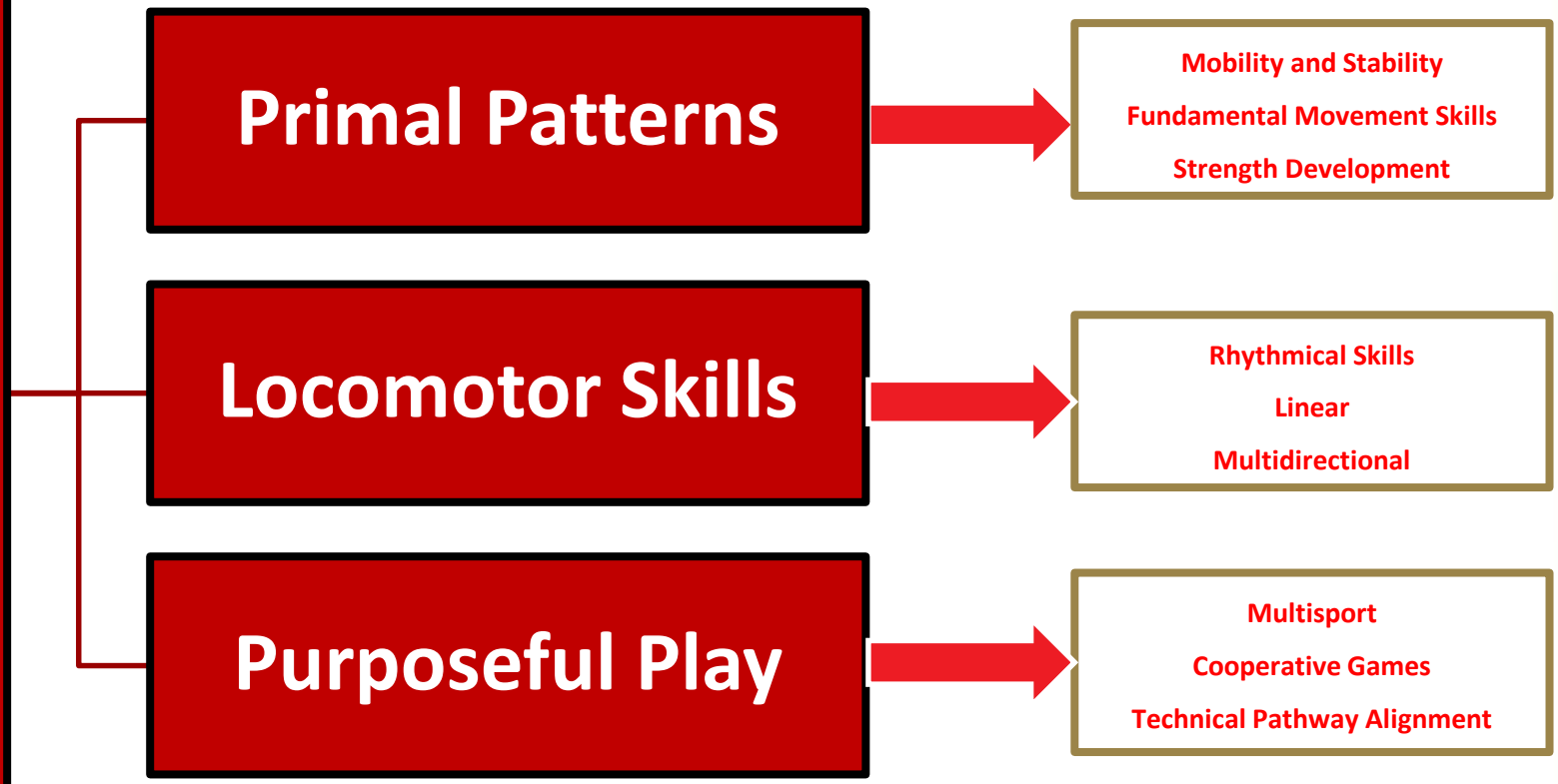
Foundation Phase
Strength and Conditioning Curriculum

Arsenal

Arsenal

Foundation Phase S&C



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Microcycle Structure

Movement Monday — x 15 minutes

↓

Wednesday Playday — x 15 minutes

↓

FUNdamental Friday — x 15 minutes

LTAD Exposure

45 min per week

4.5 hours per mesocycle

31.5 hours per season

Arsenal

Movement Monday

Primal Patterns

5 min

Micro 1+7	A1 Squat	A2 Jump + Land*	*Parkour
Micro 2+8	B1 Lunge*	B2 Pull	*Balance Beams
Micro 3+9	C1 Hinge	C2 Push + Throws*	*Medicine Balls
Micro 4+10	D1 Bridge + Brace*	D2 Animal Crawls	*Balance Beams
Micro 5+11	E1 Squat	E2 Jump + Land*	*Parkour
Micro 6+12	F1 Lunge*	F2 Pull	*Balance Beams

Locomotor Skills: Linear

5 min

Micro 1+2	A1 Ankling*	A2 Dribbles	*Cone Dribbles
Micro 3+4	B1 A-Marches*	B2 A-Skips + A-Runs	*Hurdle Drills
Micro 5+6	C1 Straight Leg Skip	C2 Straight Leg Shuffle + Scissor Runs	*Runway Runs
Micro 7+8	D1 B-Skip	D2 Hurdle Runs*	*Hurdling
Micro 9+10	A1 Ankling	A2 Dribbles	*Cone Dribbles
Micro 11+12	B1 A-Marches*	B2 A-Skips + A-Runs	*Hurdles

Purposeful Play: Cooperative Games

5 min

Micro 1+2	A1 Obstacle Tag
Micro 3+4	B1 Gladiators
Micro 5+6	C1 Dodgeball
Micro 7+8	D1 Bucket Ball
Micro 9+10	E1 Kabaddi
Micro 11+12	F1 Spike Ball

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Wednesday Playday

Locomotor Skills: Multidirectional

5 min

Micro 1+2	A1 Sagittal Hops + Deceleration	→	A2 Lateral Shuffle	*Mirror Drills
Micro 3+4	B1 Lateral+Medial Bounds+Hops	→	B2 45 Deg Cutting	*1 v 1 / 2 v 2
Micro 5+6	C1 Lateral+Medial Bounds+Hops	→	C2 90 Deg Cutting	*2 v 2 / 3 v 3
Micro 7+8	D1 Cross-Over Step + Drop Step	→	D2 Shuttle Relays	*Med Ball
Micro 9+10	E1 Swerve	→	A2 Curved Run Relays	*Mirror Drills
Micro 11+12	A1 Sagittal Hops + Deceleration	→	B2 Lateral Shuffle	*1 v 1 / 2 v 2

Purposeful Play: Multisport

10 min

Micro 1, 2, 3	A Handball
Micro 4, 5, 6	B American Football
Micro 7, 8, 9	C Tag Rugby
Micro 10, 11, 12	D Gaelic Football
Micro 13, 14, 15	E Netball
Micro 16, 17, 18	F Aussie Rules Football

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FUNdamental Friday

Coach Led Purposeful Play

15 min

Micro 1, 2, 3	A Handball
Micro 4, 5, 6	B American Football
Micro 7, 8, 9	C Tag Rugby
Micro 10, 11, 12	D Gaelic Football
Micro 13, 14, 15	E Netball
Micro 16, 17, 18	F Aussie Rules Football

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U13 to U16

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HALE END: GYM BASED COMPETENCIES

Movement Pattern	Level 1	Level 2	Level 3	Level 4	Level 5
Squat	OH Squat (dowel)/ Goblet Squat	OH Squat (loaded)	Front Squat	Back Squat	Back Squat ≥1.25 x BW x 5 reps
Lunge	Front/Reverse/ Lateral Lunge	Split Squat (loaded)	Front/Reverse/ Lateral Lunge (Loaded)	Walking Lunges (loaded)	Split Squat ≥0.75 x BW x 5 reps
Hinge	Bi-Lateral RDL	Uni-Lateral RDL	Deadlift	Bi-Lateral RDL Uni-Lateral RDL (Loaded)	Bi-Lateral RDL ≥1 x BW x 5 reps
Push	Trunk Stability Push Up	Push UP	Behind Neck Press	Push Press	Push Press ≥0.25 x BW x 5 reps
Pull	Bent Over Row (dowl)	Horizontal Row BW x 5	Pull Up BW x 5	DB Row	Weighted Pull Up ≥0.10 x BW x 5 reps
Clean/Snatch		Drop Snatch/Clean	Hang Clean/Snatch	Clean & Snatch	Clean ≥0.75 x BW x 3 reps Snatch ≥0.50 x BW x 3

U18 to First Team

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How Young is "Too Young" to Start Training?

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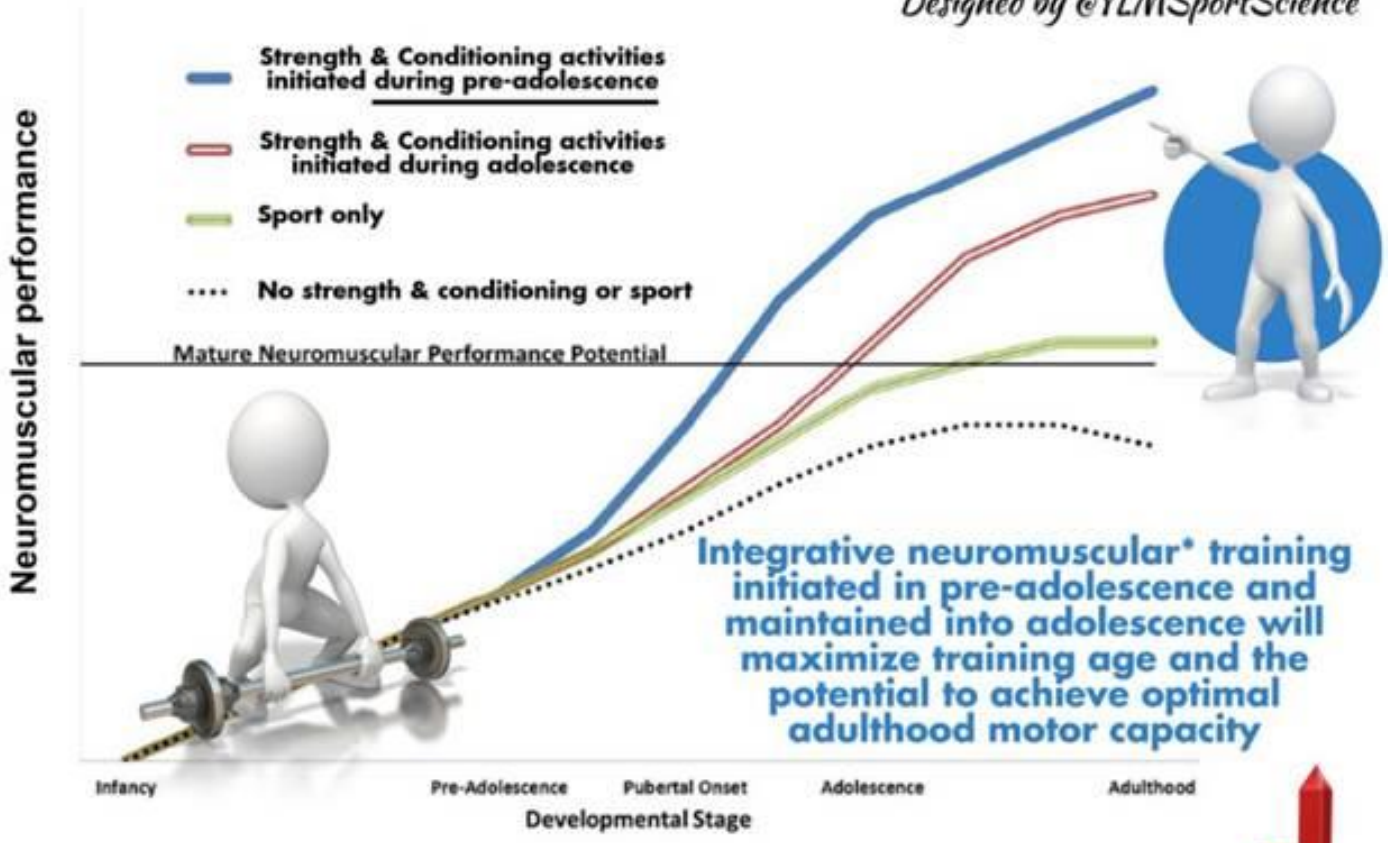

Reference

by Myer, Lloyd, Brent & Faigenbaum, ACSMs Health Fit J 2014

*Resistance training, dynamic stability exercises, core focused training, plyometric drills and agility training

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Biological Age

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Field House
ESPN Wide World of Sports Complex
Fly Emirates


ARSENAL F.C. YOUTH ACADEMY
Fly Emirates


DMR
U15
25
Fly
Emirates
10
8
5
2
11


DMR
Fly Emirates
U15
10
8
17


STATSports
Fly Emirates
Fly Emirates
Fly Emirates
Fly Emirates
Fly Emirates
U15


Fly Emirates
DMR
86
82
81
74


DMR
Fly
Emirates
52
Fly
Emirates
45
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38
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Emirates

Arsenal


Fly Emirates

Maturation Status and Growth Rate

U14	Current Ht (cm)	Predicted Adult Height	% Adult Ht	GR (cm/yr)
[redacted]	181.9	189.6	96.0	4.81
	179.5	188.9	95.0	9.10
	177.8	187.7	94.7	2.24
o	178.8	189.1	94.6	5.75
	174.4	185.0	94.2	9.58
	175.1	186.3	94.0	5.27
	170.1	183.2	92.8	4.79
n	168.4	181.5	92.8	2.87
	167.2	181.0	92.4	9.10
i	173.6	188.5	92.1	10.22
	164.3	179.0	91.8	5.75
	176.1	192.3	91.6	11.49
	169	185.0	91.3	2.87
	156.4	171.6	91.2	9.10
	156.9	174.1	90.1	8.62
	160.6	180.4	89.0	6.71
	150.9	170.8	88.4	6.71
[redacted]	151.6	175.4	86.4	5.75
Approaching PHV				
In PHV				
Post PHV				

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Correct as of 14/12/2016

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Other Support

Nutrition Workshop

Arsenal

Arsenal

TOGETHER

WE

ADVISE & SUPPORT THROUGH TOUGH STUFF

PROMOTE SOCIAL DEVELOPMENT HERE & ON TOURS

CREATE A PSYCHOLOGICALLY SAFE ENVIRONMENT

MANAGE THE HOLISTIC CURRICULUM

PROVIDE A SAFE SPACE TO TALK

PROMOTE WELLBEING

PERSONAL DEVELOPMENT & PSYCHOLOGY PRACTIONER

PLAYER LIAISON & WELFARE OFFICER

SAFEGUARDING LEAD

Benefits of Academy (In my environment)

You coach in the more important environment Community

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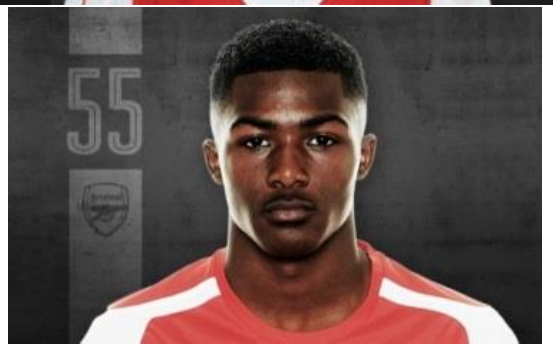
Number of players who became Professional Footballers since 2013

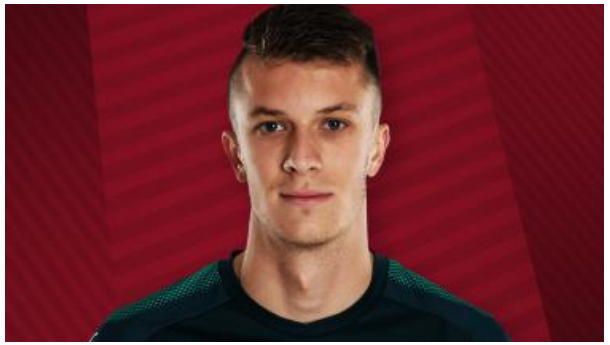
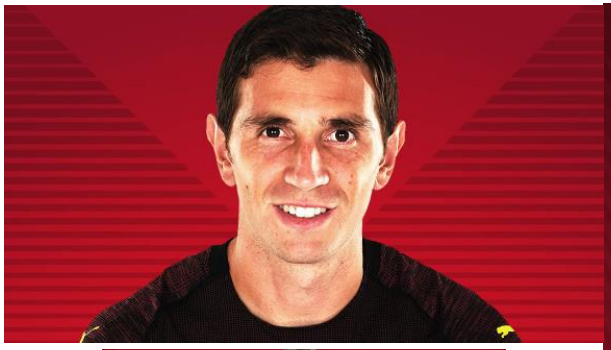
Arsenal

Players with first team and graduates







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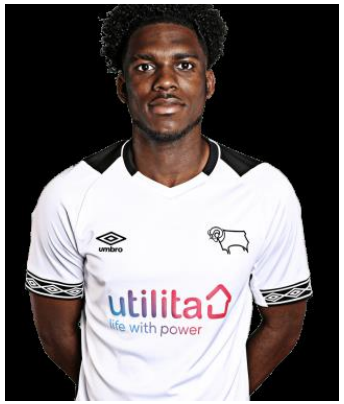

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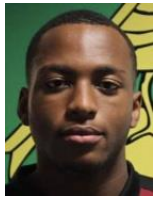
Austin Lipman – Works in City and
plays for Maccabi Lions

Elliot Wright – Level 3 Personal Trainer Virgin Health
and has own home gym

Alex Crean -
Arinse Wade -
Alfred Mugabo
All currently unattached



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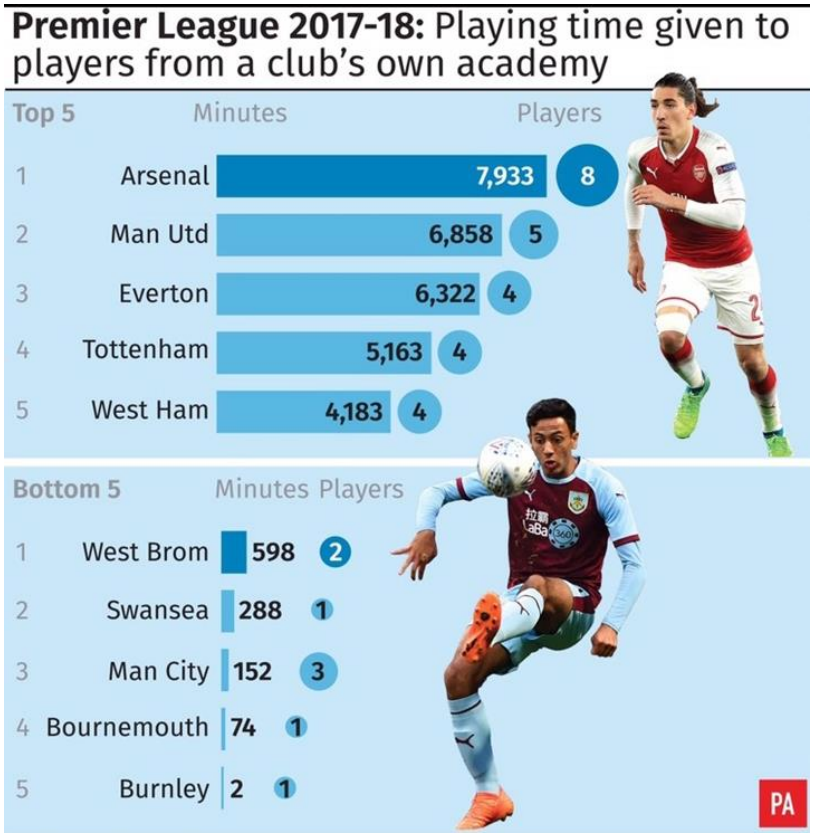
Playing Time Given to Clubs own Academy Players



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ACADEMY AVERAGE (players tested all 3 years)			
	0 - 10	YOYO	CMJ
2017	1.74	19.4	38.8
2018	1.69	19.8	41.2
2019	1.66	21.1	44.8
Sample size	9	3	8

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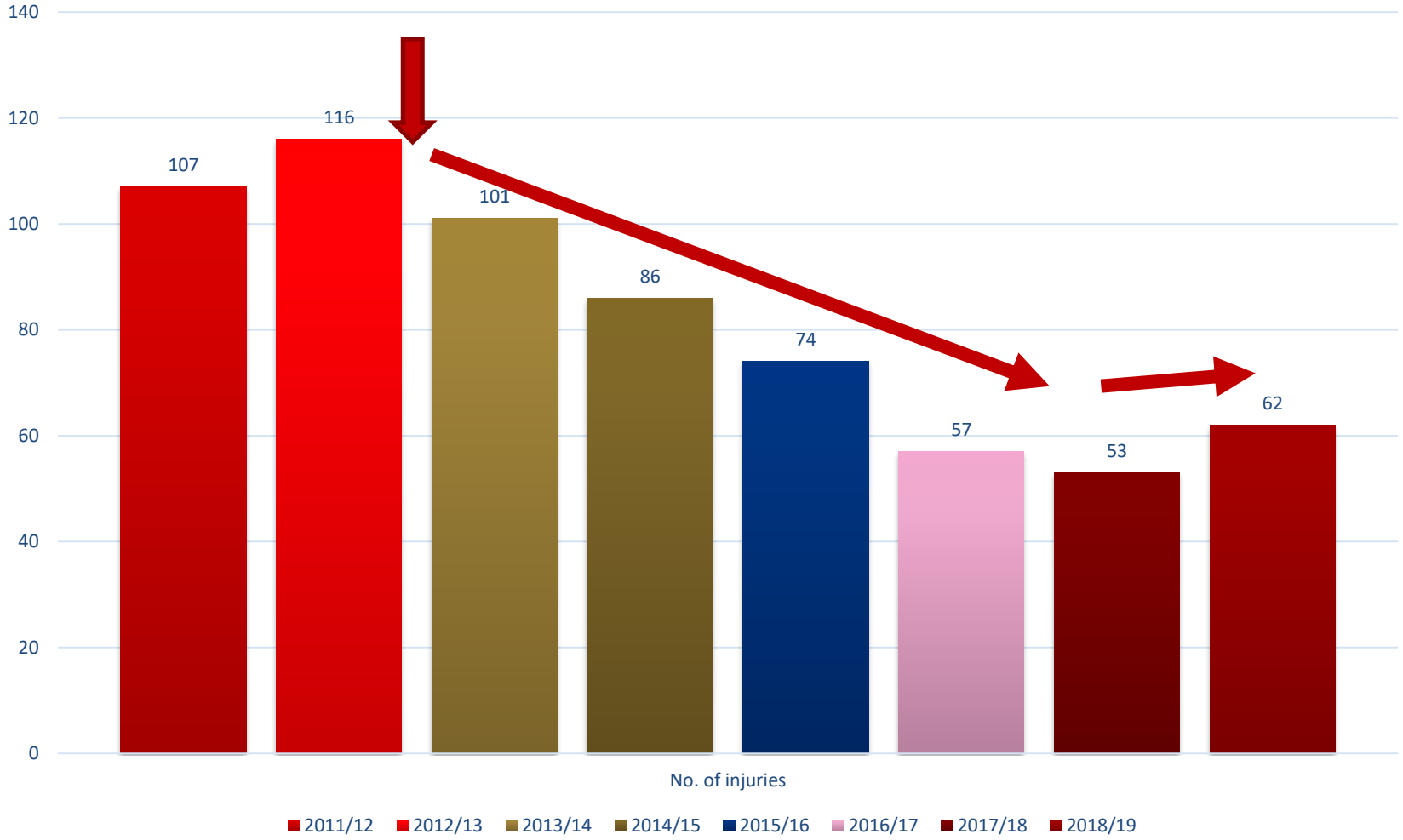
Full Season – Total Number of New Injuries



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	Incidence (Number of Injuries Per 1000 hours)		
Injury Type	*Training*	*Match*	*Total Muscle*
Season 2018/19	**2.9**	**18**	**1**
Season 2017/18	**3.1**	**12.4**	**1.3**
Season 2016/17	**2.8**	**22.2**	**1.4**
Season 2015/16	**3.7**	**25.2**	**2.7**
Season 2014/15	**4.4**	**33.8**	**2.7**
EPPP Average	**5.6**	**28**	

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How can very good become excellent ?

Conference Theme - Values, Behaviours and Culture

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ACADEMY

THE ARSENAL ACADEMY: ONE MISSION, ONE VISION

Mission –
To create the most challenging and caring football academy in the world

Vision –
Strong Young Gunners

Arsenal

RESPECT

DISCIPLINE

HUMILITY

Arsenal

Developing World Class Soccer Players

An example of the academy physical development program from an English Premier League team

NSCA NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

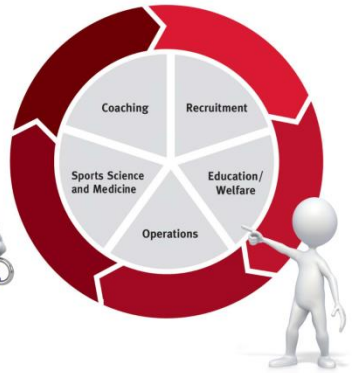
Reference: by Ryan et al. SCJ 2017

Designed by @YLMSportScience

04/2020

Developing talented footballers is multidimensional and as such the football academy also needs to be multifaceted

The Arsenal FC Academy is defined by the integration of 5 key pillars



The Physical Development Framework

An arrow approach is used to progress the player to the next level as quickly and efficiently as possible

THE ARSENAL ACADEMY APPROACH TO PHYSICALLY DEVELOPING YOUNG PLAYERS

EMPHASIS 1

Functional competence – good mobility and stability and then moving onto more advanced strength activities

EMPHASIS 2

Movement Skills – achieve mature level movement skills and then moving onto more advance speed activities

EMPHASIS 3

Integrated Conditioning – As we are a highly technical club most of the on field conditioning is completed through the game

EMPHASIS 4

Planning and Periodisation – We make sure the players don't do too much or too little

Key consideration

Maturation is an important part of the academy in the areas of program design and talent selection. The key to success is that all departments are aware of the players stage of biological maturation

Finally, a flexible framework is integral

The Academy framework must be dynamic and flexible – continuous evaluation is integral! The Academy prioritises quality injury audits, fitness testing, workload monitoring, player profiling and of course reviewing the progressions of players through to becoming an adult professional footballer

The Academy puts huge importance in the physio/nutritionist/S&C having a good relationship with the player like a big brother or favourite uncle

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Mentors

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PROMOTE SOCIAL DEVELOPMENT HERE & ON TOURS

CREATE A PSYCHOLOGICALLY SAFE ENVIRONMENT

MANAGE THE HOLISTIC CURRICULUM

PROVIDE A SAFE SPACE TO TALK

PROMOTE WELLBEING

PERSONAL DEVELOPMENT & PSYCHOLOGY PRACTIONER

PLAYER LIAISON & WELFARE OFFICER

SAFEGUARDING LEAD


ACADEMY ISLAND
THE ISLAND OF OPPORTUNITY
FIRST TEAM
THE FERRY
THE COMFORT CRUISE
TIDES OF TRANSITION
THE FROZEN ICELANDS
COMPLACENCY
NEW CONTRACT
BAY OF PLENTY
FRIENDS
FAMILY
THE LIFT
THE CITY
$
LAKE CALM
DESERT OF DETERMINATION
WINDS OF CHANGE
COURAGE CREST
QUIDDITCH POINT
THE LOST FOREST
THE BOG OF BOREDOM
PRESSURE POINT
EXPECTATIONS
VALLEY OF DESPAIR
HEADLOSS
MT. CHALLENGE
EDUCATION BASE
PROBLEMS
BULLYING
BETTING
DISASTER ZONE
BLACKMAIL
DRUGS
MATCH-FIXING
NOT ALLOWED OUT
GANGS
EXPLOITED ONLINE
URBAN JUNGLE
GROWTH - GRASSLANDS
PERFORMING PLAINS
DE-SELECTION
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ISOLATION ISLAND
ISLE OF LOAN
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POSITIVE RELATIONSHIPS
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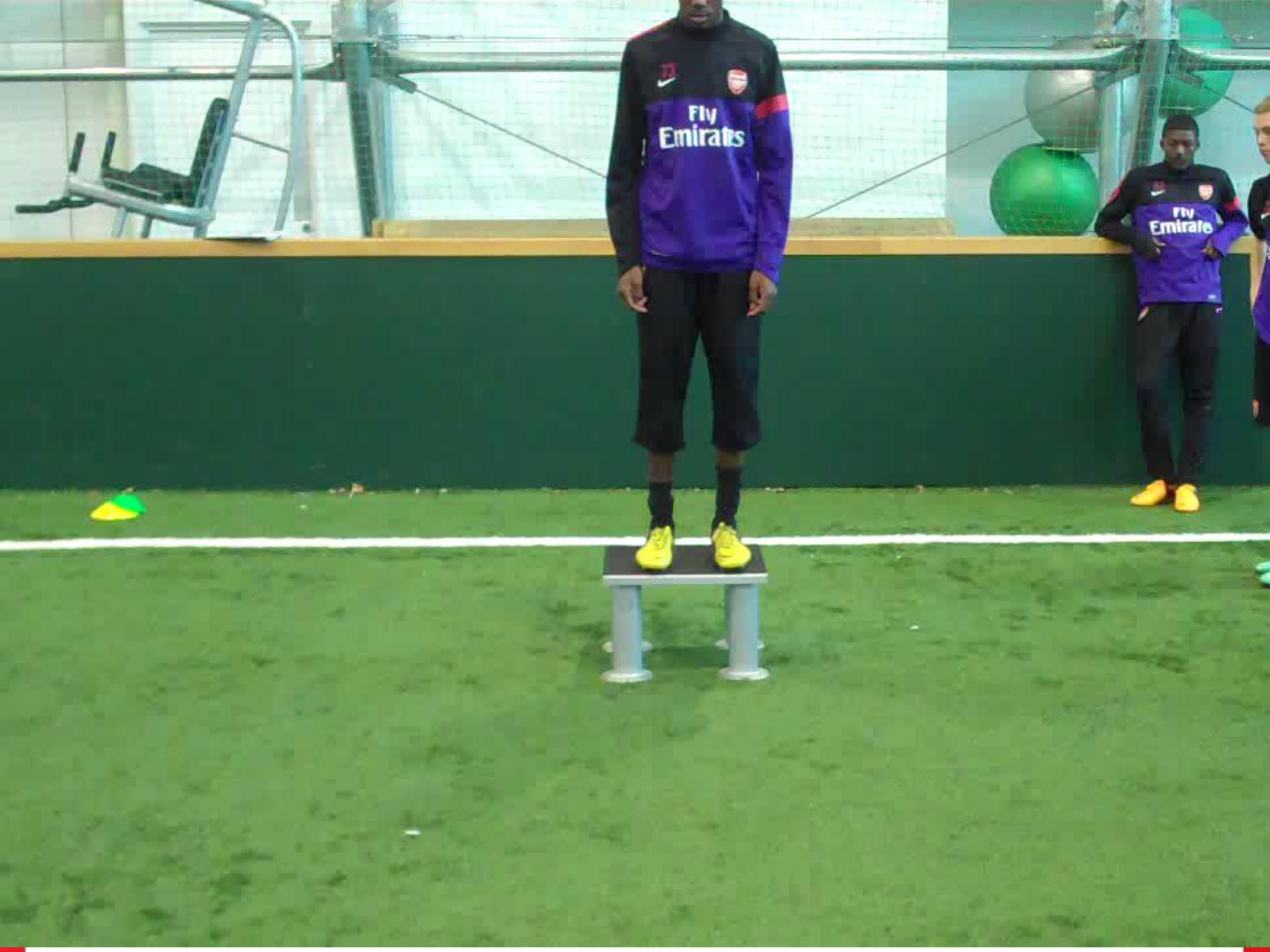
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