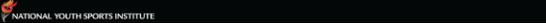
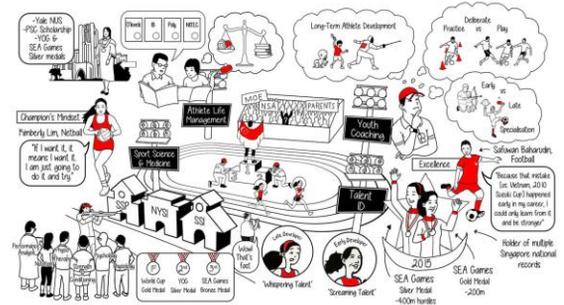
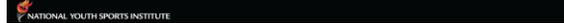




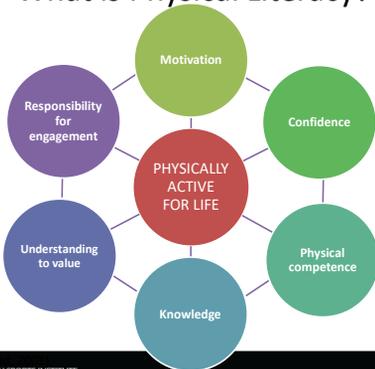
Talent Identification & Development



Building strong movement foundations



What is Physical Literacy?



What is Physical Literacy?

Physical Literacy is the ability to *move* with **competence** and **confidence** in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person (Mandigo, Francis, Lodewyk, & Lopez, 2009)



Other literacy models

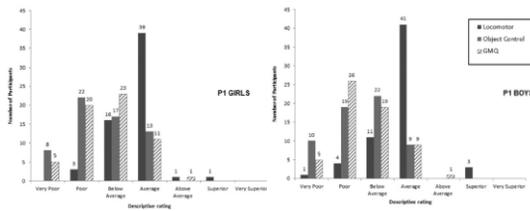
Literacy	Numeracy	Music	Physical Literacy
<ul style="list-style-type: none"> •ABC •Words •Sentences 	<ul style="list-style-type: none"> •123 •Fractions •Equations 	<ul style="list-style-type: none"> •Do-re-mi •Scale •Score 	<ul style="list-style-type: none"> • Movement vocabulary • Sequences • Tasks
			

Why is physical literacy important?

The proportion of overweight and severely overweight children in our mainstream schools has increased from 11% in 2011 to 12% in 2015. (Ministry of Health, 2016)

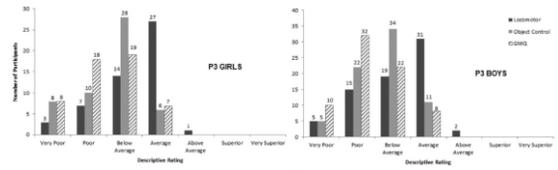


Why is physical literacy important?



(Mukherjee et al., 2012)

Why is physical literacy important?



(Mukherjee et al., 2012)



Process of building physical literacy

- Basic to Fundamental Motor Skills.
- Establish the basis for life-long participation by building competence and confidence.
- Must Be Fun!



Developmental Stages – Gross Motor



Fundamental Movement Skills and Physical Activity



YOUTH PHYSICAL DEVELOPMENT (YPD) MODEL FOR MALES																													
CHRONOLOGICAL AGE (YEARS)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21+									
AGE PERIODS	EARLY CHILDHOOD					MIDDLE CHILDHOOD					ADOLESCENCE					ADULTHOOD													
GROWTH RATE	RAPID GROWTH					STEADY GROWTH					ADOLESCENT SPURT					DECLINE IN GROWTH RATE													
MATURATIONAL STATUS	YEARS PRE-PHV										PHV					YEARS POST-PHV													
TRAINING ADAPTATION	PREDOMINANTLY NEURAL (AGE-RELATED)										COMBINATION OF NEURAL AND HORMONAL (MATURITY-RELATED)																		
PHYSICAL QUALITIES	FMS					FMS					FMS					FMS													
	SSS					SSS					SSS					SSS													
	Mobility										Agility					Agility													
	Speed										Power					Strength													
	Strength										Hypertrophy					Hypertrophy													
	Endurance & MC										Endurance & MC					Endurance & MC													
	UNSTRUCTURED										LOW STRUCTURE					MODERATE STRUCTURE					HIGH STRUCTURE					VERY HIGH STRUCTURE			

(Lloyd & Oliver, 2012)

How do we develop physical literacy?

Provide more time for physical activity

Increase unstructured play time during recess or after school



How do we develop physical literacy?

Plan physical education programmes that are fun, develop knowledge and skills that are developmentally appropriate

- Modified and small sided games
- Differentiating instruction by ability



Play Setting: (circle one)

Bedroom Local Paved area Back Yard Indoor Area

Name of Activity: Follow the leader soccer juggling.

Circle the appropriate symbols of your activity:



Equipment you will need: Soccer ball & four people

Description of the activity:

1) One person starts juggling the soccer ball. First the leader does a trick & passes it to the next person.
2) Second person does the same.
3) If a person drops or does something wrong they're out.

Who is this activity suitable for? Ages: 5 and up

Is there anything about this activity that could be unsafe? Soccer ball might hit you in the head.

(Switch-2-Activity, <http://www.goforyourlife.vic.gov.au>)



Identifying Potential Champions of the Future



Early TID is very difficult

The task

- Performance **structure** and **demands change** across athlete generations

The performer

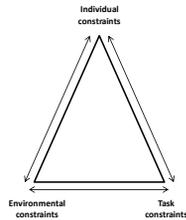
- Biological **maturational**, **relative age (RAE)**, **psychological** qualities vary inter- and intra-individually over time.

The environment

- Prior** and **future training** and socio-material **environments** vary inter- and intra-individually over time.

Interaction of task, performer, and environment

- TID tests are **imperfectly** objective, reliable and valid



Early Youth Success ≠ Elite Senior Success

International medalists vs. non-medalists

Güllich, 2016

Sample
 * 83 matched pairs **Medalists and non-medalists** matched by sport, age, gender
 * Cgs sports (n=88), games sports (n=24), combat sports (n=16), artistic composition sports (n=10), others (n=28)
 * Medalists: incl. 38 Olympic and World Champions

Age structure

	Medalists M (s. SD)	Non-Med. M (s. SD)	p	d
Start main sport [years]				
Practice	11.8 (4.5)	10.3 (4.0)	**	0.35
Competitions	13.2 (4.1)	12.4 (3.9)	n.s.	0.30
Specialisation	16.4 (6.0)	13.4 (6.4)	*	0.48
Duration other sports [years]				
Practice	9.6 (6.6)	6.6 (4.1)	**	0.55
Before start main sport	3.1 (4.0)	1.4 (2.6)	**	0.53

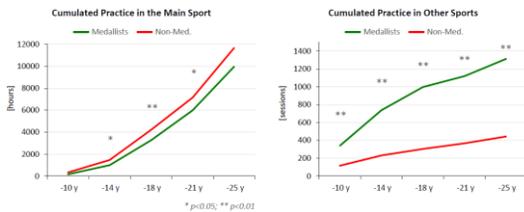
Note: * p<0.05; ** p<0.01; d = Cohen's d.

Early Youth Success ≠ Elite Senior Success

International medalists vs. non-medalists

Güllich, 2016

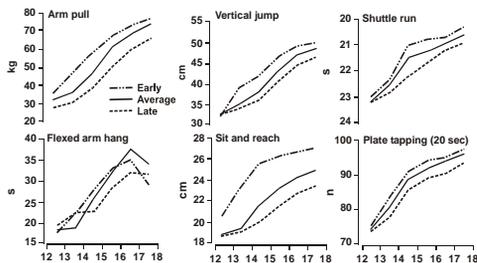
Sample
 * 83 matched pairs **Medalists and non-medalists**



Selection Biases for Youth Sports

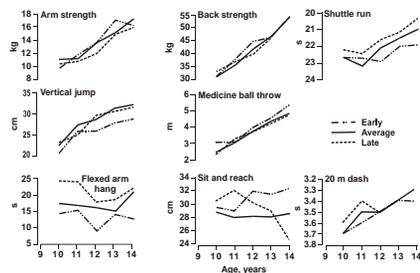
- Selection strategies **favour athletes** on the basis of physical attributes not realised until adulthood
- Physically gifted athletes play to their strengths; **neglecting** technical/tactical development
- Less physically gifted, yet equally talented, athletes **overlooked** or excluded too early

Pubertal Timing and Fitness in Boys



* Malina et al., (2004) Growth Maturation and Physical Activity

Pubertal Timing and Fitness in Girls



* Malina et al., (2004) Growth Maturation and Physical Activity

Assessing Growth & Maturation

- Players regularly assessed for **height, seated height and weight**; heights of bio-parents
- Data used to **calculate maturity status**, maturity timing, growth velocity, age at PHV, future height
- www.bonexpert.com/documentation/adult-height-predictor
Important to note that the equation still has a large variance in the accuracy

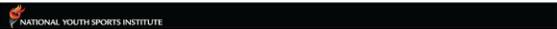
Anthropometrics

- Height, weight, (two measures per child)
- Take a 3rd measure if differences between first measures is > .5 (cm./kg.)
- Note time, date of assessment/birth; investigator ID



Guidelines for measuring height

1. Shoes off
2. Flat feet, heels together
3. Stand up tall
4. Eyes in Frankfort plane
5. Adjust chin if required
6. Inhale and hold
7. Measure to apex of head
8. Record and repeat the measurement



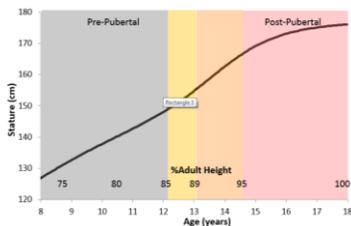
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	SSS	SSS	SSS	SSS							SSS									
	Mobility	Mobility			Mobility					Mobility										
	Agility	Agility			Agility					Agility										
	Speed	Speed			Speed					Speed										
	Power	Power			Power					Power										
	Strength	Strength			Strength					Strength										
	Hypertrophy			Hypertrophy			Hypertrophy			Hypertrophy										
	Endurance & MC			Endurance & MC			Endurance & MC			Endurance & MC										
	TRAINING STRUCTURE	UNSTRUCTURED			LOW STRUCTURE			MODERATE STRUCTURE			HIGH STRUCTURE			VERY HIGH STRUCTURE						

(Lloyd & Oliver, 2012)



Matching Training to Maturational Status

Figure 2. Bio-bands of maturity for an individual male based on cumulative growth and percentage of adult height.



Cumming, Lloyd, Oliver, Eisenmann, Malina (2017) Str Cond J



Matching Training to Maturational Status

- ~85% PAH
 - About to enter the growth spurt; closer monitoring of training load and skills
 - Potential to introduce structural adaptation
- ~89% PAH
 - Mid growth spurt; increased risk for epiphyseal injuries
 - Can benefit from combined training (neural & structural adaptation)
- ~99% PAH
 - Post-growth spurt; reduced risk for growth related injuries
 - Physically ready to engage in more mature training programs



Bio-banding for competition

- Athletes **matched by maturity bands** rather than chronological age
- Optimise **challenge and opportunity** for early and late developers, respectively



Cumming et al. (2017) J Sports Sci

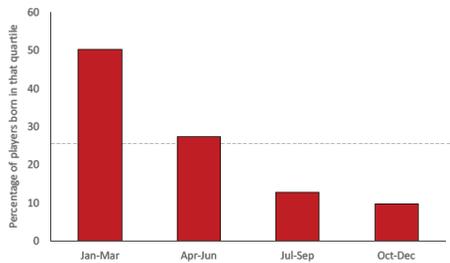


Relative Age Effect

- Children born towards the start of the year are relatively older than those born later in the selection year.
- Being relatively older can afford a large advantage in terms of:
 - Height
 - Weight
 - Coordination
 - Strength
 - Cognitive development
 - Accumulation of practice volume



The RAE on PSV juniors



Barnsley, Thompson, & Barnsley, 1985, *J. Canadian Ass. Health, P.E. & Recreation*; Dudink, 1994, *Nature*

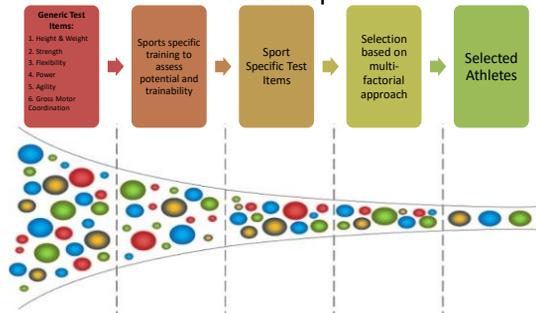


Strategy to overcome RAE



Athlete Identification & Selection

Roadmap



Regular use of numbered shirts encourages coaches to adapt training to each individual's skill and maturation status

BENEFITS

ABC

Simple

May potentially boost the confidence and self-esteem of relatively younger players.

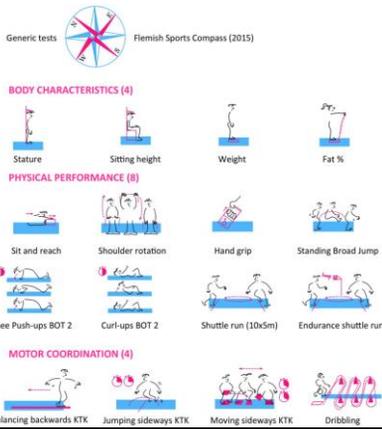


Talent Pyramid



Local Identification

- Primary 4s in Singapore
- 6 components
 1. Anthropometry
 2. Power
 3. Agility
 4. Speed
 5. Balance and Flexibility
 6. Motor Coordination



The Körperkoordinations Test für Kinder

- 4 subtests
1. Jumping sideways with 2 feet in 15 seconds
 2. Hopping for height
 3. Moving sideways on platforms in 20 seconds
 4. Walking backwards 3 times with decreasing width of balance beam each time



- Used it as a part of TiD for triathletes in Belgium
- *The value of a non-sport-specific motor test battery in predicting performance in young female gymnasts*

Barbara Vandorpe, Joric B. Vandendriessche, Roel Vaeyens, Johan Pion, Johan Lefevre, Renaat M. Philippaerts & Matthieu Lenoir



KTK for use of talent identification

- Callewaert, M., Boone, J., Celie, B., De Clercq, D., & Bourgois, J. G. (2014). *Indicators of sailing performance in youth dinghy sailing. European Journal of Sport Science, 15(3), 213-219.*
- Pion, J. A., Fransen, J., Deprez, D. N., Segers, V. I., Vaeyens, R., Philippaerts, R. M., Lenoir, M. (2015). *Stature and jumping height are required in female volleyball, but motor coordination is a key factor for future elite success. Journal of Strength & Conditioning Research, 29(6), 1480-1485.*



Talent Pyramid



Current Identification

Recruitment Report

General Information

- Date of birth, Height, Weight

1. Physical Assessment

2. Psychological Survey

- Grit, Motivation

3. Coaches' Observation (Technical ability)

The form contains the following sections:

- Anthropometry:** Includes fields for Name, Date of Birth, Gender, Age, and Height. It features a BMI calculator and a BMI status gauge.
- Physical Performance:** Includes fields for Agility, Strength, Endurance, and Recovery. It features a gauge for Agility and a line graph for Endurance.
- Psychological Profile:** Includes a Grit score (Raw Score Average) and Achievement Goals (Play, PAV, MAP). It features a bar chart for Grit and a line graph for Achievement Goals.
- Technical Ability:** Includes fields for Footwork, Quality of Stroke, Timing, Skill Ability, and Potential. It features a gauge for Footwork and a line graph for Potential.

Normative Data for Comparison

Badminton

(Boys & Girls)

- 2004-2016

- 3 stations

- Beep test

- Court Agility

- Vertical Jump

2004-2016 (BOYS)		n	m	SD
Height	cm	105	151.000	8.9923
Weight	kg	93	40.6543	8.15189
BMI	kg.m ²	93	17.7089	2.17276
Beep test (Predicted VO2max)	ml/min/kg	154	41.453	5.3894
Court agility	sec	156	12.186	1.11438
Vertical jump	cm	143	37.8	7.177

2004-2016 (Girls)		n	m	SD
Height	cm	97	151.616	6.9384
Weight	kg	79	41.0232	6.71038
BMI	kg.m ²	79	17.829	2.10606
Beep test (Predicted VO2max)	ml/min/kg	133	37.28	4.467
Court agility	sec	129	12.8447	0.9834
Vertical jump	cm	124	32.52	5.442

Physical Assessment Components

Badminton	Football	Table Tennis	Netball	Athletics	Swimming
Court Agility	20m Sprint Test	3.5m Shuffle Footwork	10m Sprint Speed Test	50m Sprint	3RM Squat
Vertical Jump	Vertical Jump	Vertical Jump	Vertical Jump	Vertical Jump	Vertical Jump
Yo-Yo Intermittent Recovery 1 Test	Agility 505	Planking	Agility 505	3kg Medicine ball throw	Swim based analysis
	Jump Test (Reach)	Shuttlecock Throw	Jump Test (Reach)	600m Endurance Test	Musculoskeletal screening
		Wall Toss			Functional movement screening

Grit and Achievement Motivation

- Grittier individuals have been found to spend more time on deliberate practice on their craft (Duckworth et al., 2011).

Higher grit scores (1 lowest, 5 highest) indicate greater motivation and perseverance.

	Approach	Avoidance
Mastery	-task approach-oriented -focused on gaining mastery of tasks (MAP)	-task avoidance-oriented -seeks to avoid failure in task mastery (MAV)
Performance	-ego-approach oriented -focused on demonstrating superior competence over others (PAP)	-ego-avoidance oriented -avoids displaying normative incompetence (PAV)

(Adie et al., 2010)

Ideal score: High MAP and PAP, and low MAV and PAV. Lowest score is 3, highest is 21.

Technical/Coaches' Observation

Badminton	Netball	Table Tennis
Footwork	Footwork (Attack)	Forehand Rally
Quality of Stroke	Ball handling (Attack)	Forehand-Backhand Push
Timing	Footwork (Defense)	Structure of basic skills
Skill Ability	Ball handling (Defense)	Tactics
Potential	Spatial Awareness	

Observation by: At least 3 internal coaches + 1 external coach

Talent Pyramid



Identification Campaigns

- RBC Training Ground (Canada)
- UK Sport



- Multi-phased talent recruitment and confirmation programmes
- **Phase 1**
 - Range of generic physical and skill-based tests at various testing centres around the UK.
 - Tests may include: sprints, jumps, aerobic fitness, and upper and lower body-strength tests.
 - Also includes an in depth analysis of each athlete's training and competition history.

NATIONAL YOUTH SPORTS INSTITUTE

UK Sport



- **Phase 2 – 3**
 - further assess an athlete's suitability for a sport
 - better equip athletes
 - athlete's pathway outlined
 - E.g. functional movement screening, medical screening, performance lifestyle workshops and psychology and behavioural assessments.
- **Confirmation Phase**
 - 6 – 12 month
 - rates of progression are tracked to further assess their suitability
 - Unsuccessful athletes are provided with opportunities to continue the sport through the club system.

NATIONAL YOUTH SPORTS INSTITUTE

TALL & TALENTED



https://www.youtube.com/watch?v=BC2_7dPtTgs

NATIONAL YOUTH SPORTS INSTITUTE

UK Sport



- **SPORTING GIANTS (2007)**
 - basic criteria of being tall (minimum 190cm for men and 180cm for women), young (between 16 and 25), and with some sort of athletic background.
- **GIRLS4GOLD (2008)**
 - highly competitive sportswomen who can potentially be Olympic champions
 - targeted Olympic sports; skeleton, canoeing, modern pentathlon, rowing and sailing.



NATIONAL YOUTH SPORTS INSTITUTE

Successful Transfer Athlete

- **Helen Glover – Sporting Giants**
- **Sport:** Rowing (women's pair)
- **Former Sport:** Athletics, Hockey
- London 2012 & Rio 2016 gold medalist in Women's coxless pairs



Retrieved from: <http://www.independent.co.uk/sport/olympics/rio-2016-rowing-helen-glover-set-to-pay-back-family-and-friends-with-gold-medal-for-olympic-17387156.html>

NATIONAL YOUTH SPORTS INSTITUTE

RBC Training Ground (Canada)

<https://www.youtube.com/watch?v=XG7V3R3JR7w&t=102s>

Talent Optimisation

- Who & When?
 - Burn out, reached his/her peak, injury
- What & How?
 - Around 14-16
 - Transfer into sports with similar skill sets
- Why?
 - Senior top athletes emerge as a result of repeated selection, de-selection, and replacements across all age ranges.
 - Allow athletes to extend their sporting careers



44% of all Olympic and senior world champion medallists have changed to compete in another sport

Gulich, A., & Collins, S. (in Press). On the efficacy of talent identification and talent development programmes. In Baker, J., Collins, S., Schone, J., & Watt, N. (eds). The Routledge handbook of talent identification and development in sport. Routledge.

Implication for Practitioners



- Early specialisation ↔ Varied experiences
- Early selection ↔ Later selection
- Standardised pathway ↔ Individualised pathway
- **Focus on the selected few ↔ Enlarge the 'talent pool'**

