england programmes

SWIMMING

Age Group Land work

Diane Elliot

2016

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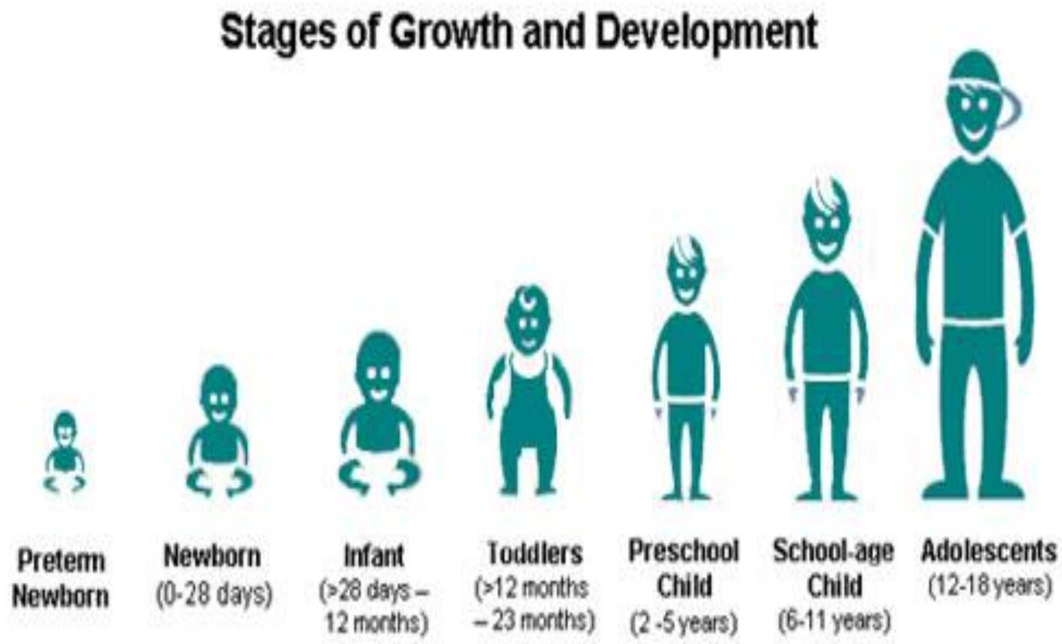
What are the normal stages of growth related to LTAD ?



0-6 years

- Brain grows rapidly and responds to stimulation
- Coordination
- Gross motor skills
- Balance
- Neural connections increasing

6-9 boys/ 6-8 girls

- Steady growth 3-4 inches a year
- Need to develop basic skills
  - Hand foot coordination
  - Balance
  - Agility
  - Rhythmical activities
  - speed
- Develop fine coordination and gross motor skills
- Need clear rules set out
- Difficulty recognising others viewpoint

How do we learn new skills

- Conscious Vs unconscious movement
- Initially we learn a movement through conscious learning
- Eventually it becomes subconscious (habit)

- Habit
  - Do you think about it?

9-12 boys, 8-11 girls

- Onset of growth spurt
- Brain nearly adult size
- Puberty can begin for some
- Body image critical at this stage
- Need to work on general skills
- Best time to work on refining skills
- Later developers stay longer in this period and can develop higher level of skills
- Need to consider different activities in this age group due to maturity differences
- Can take on more responsibility and adapt behaviour for different social situations—need to encourage to start taking some responsibility
- Develop coping skills and strategies

Young teens 12-16 males,11-15 females

- Growth spurt
  - Girls 11-14
  - Boys 12-17
- Puberty
  - Girls 11-14
  - Boys 12-15
- Consolidation of skills and basic tactics
- Significant physical development
- Aerobic training a priority at onset of PHV
- Maintain flexibility, skill and strength

- Rapid bone growth so significant importance on flexibility
  - Often muscular pains at this stage
  - May need to reduce some joint stress at period of maximum growth
- Develop logical thinking and consequences of actions
- Can problem solve
- Can action plan

Significant strength gains during this period

- Females immediately at start of PHV and again at start of first period
- Males 12-18 months after PHV

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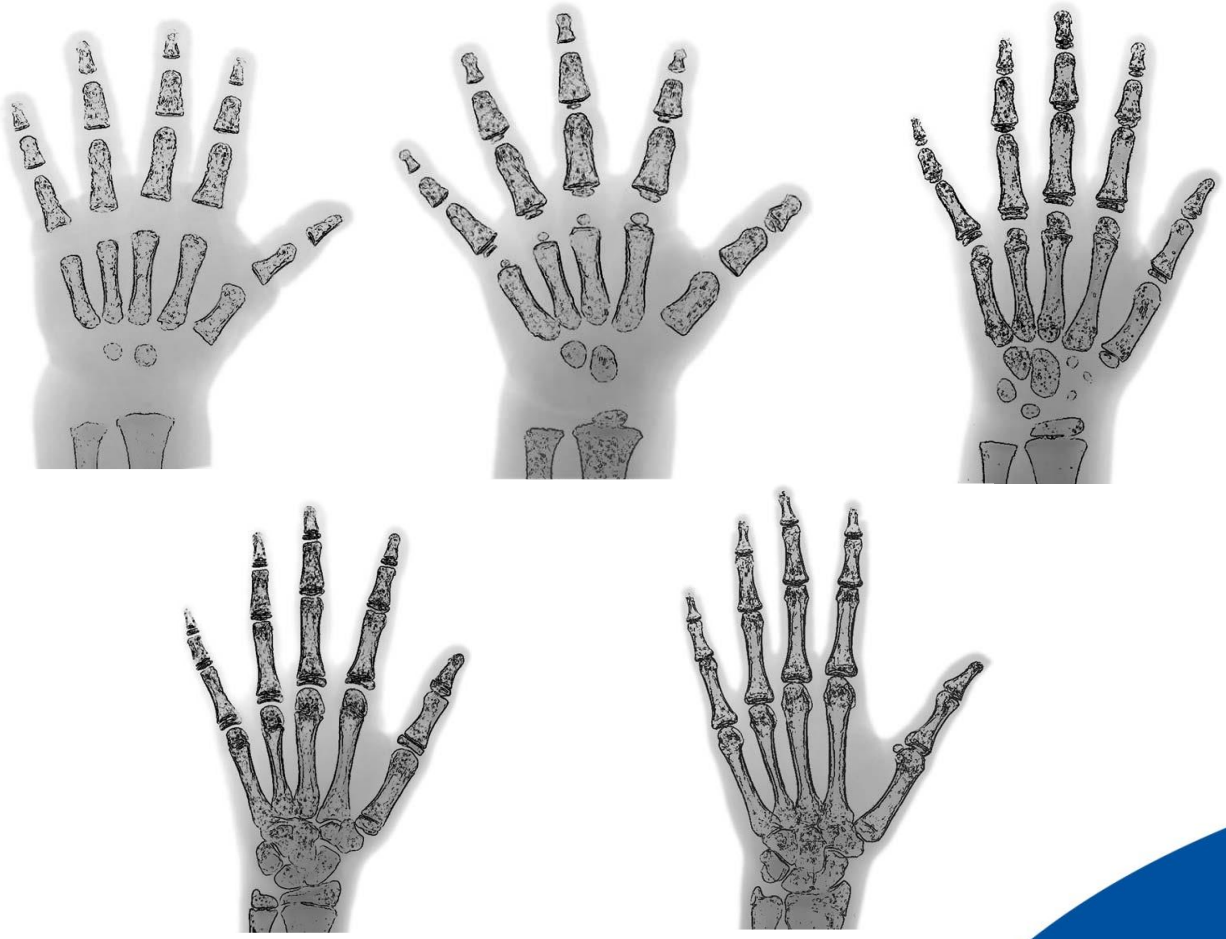
- Growth spurts often cause musculoskeletal issues in athletes
- Eg. Osgood schlatters disease

Teenagers 15-18

- More emotional changes during this stage
- Most girls have completed maturity
- Boys are still developing
- Have complex thought processes
- Training tailored to the individual

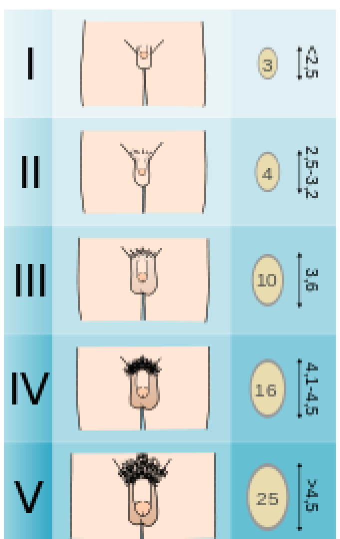
How to measure maturity

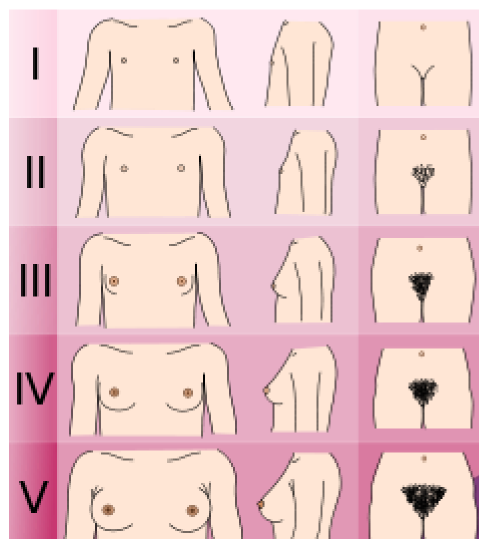
- Gold standard is hand xrays



Tanner Stages

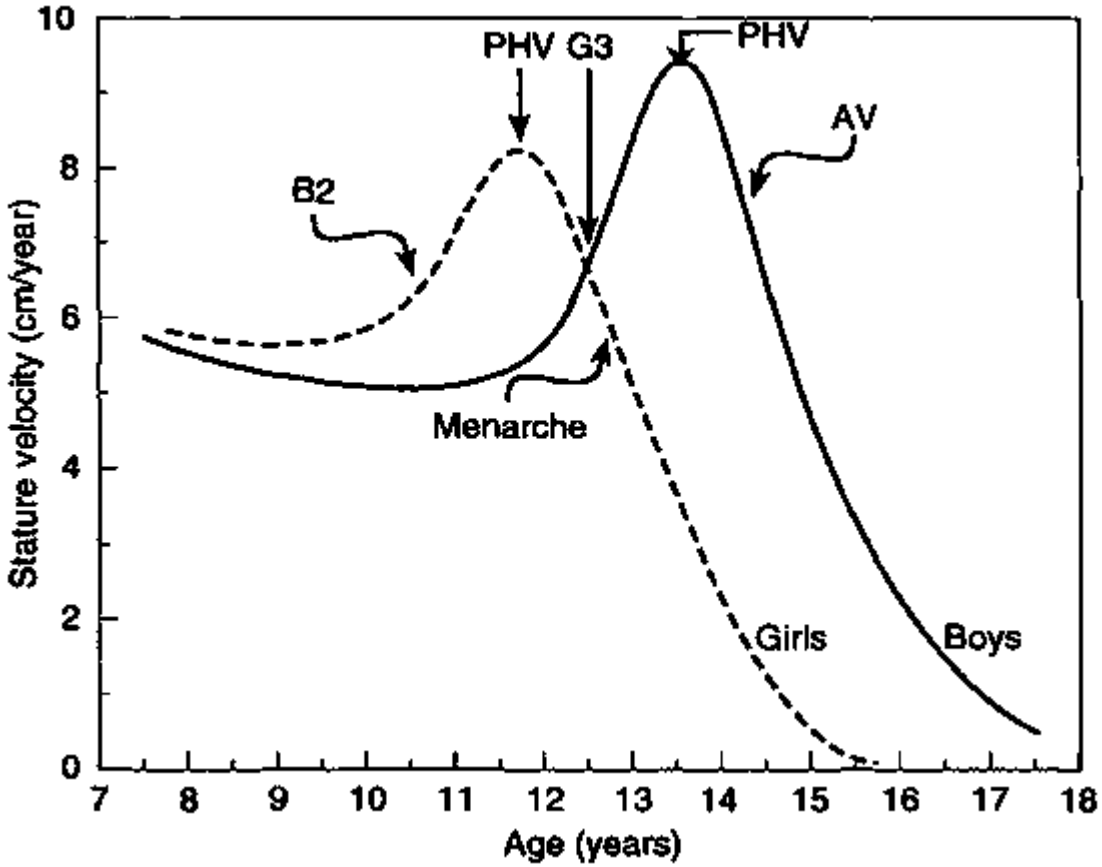
- Scores for genital formation, breast formation and pubic hair
- Widely used in medicine and sports research
- **Not** to be used by coaches due to Child protection issues





Peak Height Velocity

- Time when a person reaches the maximum growth rate—velocity of growth
- Not maximum height
- Directly linked to development age of athletes
- Practical way of finding a reference point for the design of training programmes
- Influenced by genetics, climate, cultural and social factors
- Girls 10-15 (average 12-13)
- Boys 11-15(average 14)



B2-tanner breast 2
G3-genital 3
AV-voice breaking
Menarche-first period

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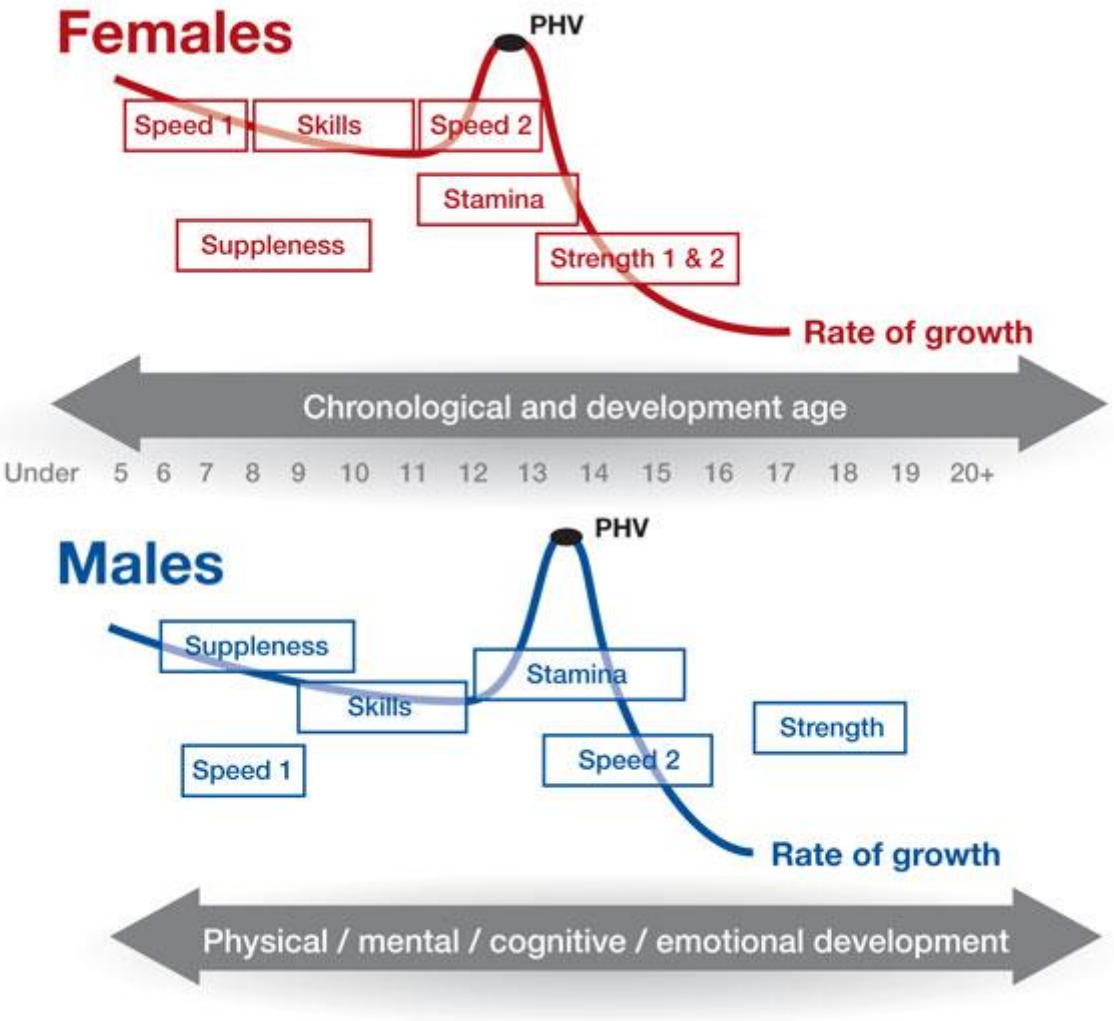
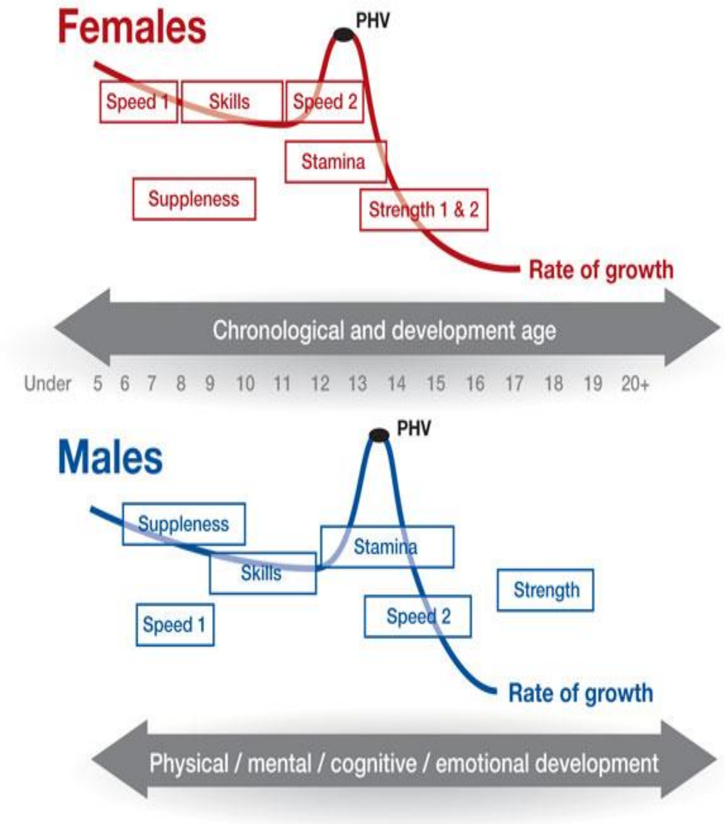
Training in relation to PHV LTAD Model



At PHV

- At the onset of PHV aerobic training base should be developed
- Strength window differs for boys and girls—related to sex hormone increases (PWV)
  - Girls have 2 strength windows
  - 1-immediately after PHV
  - 2-at the start of the first period
  - Boys have 1 strength window12-18 months after PHV



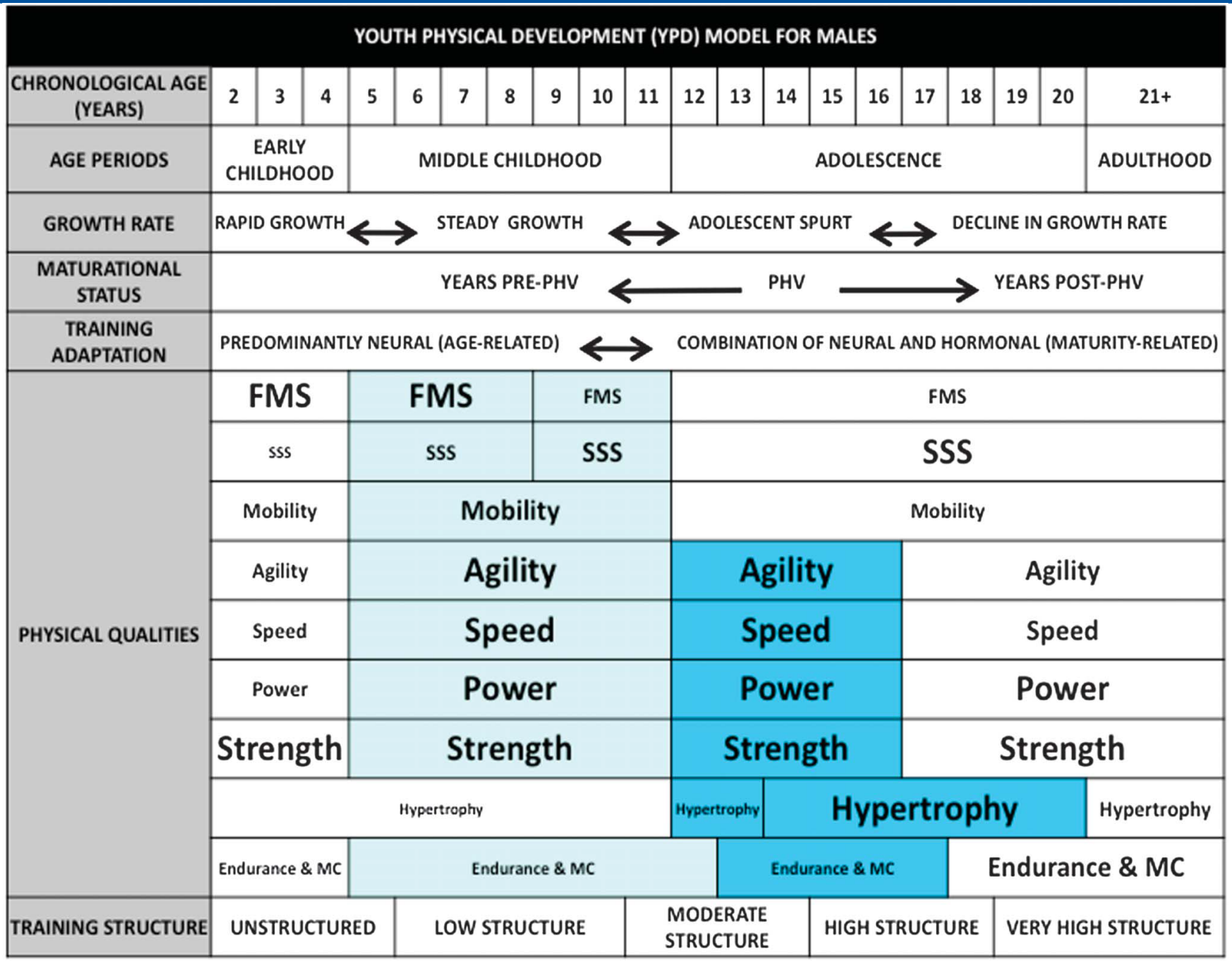
Limitations of the LTAD Model

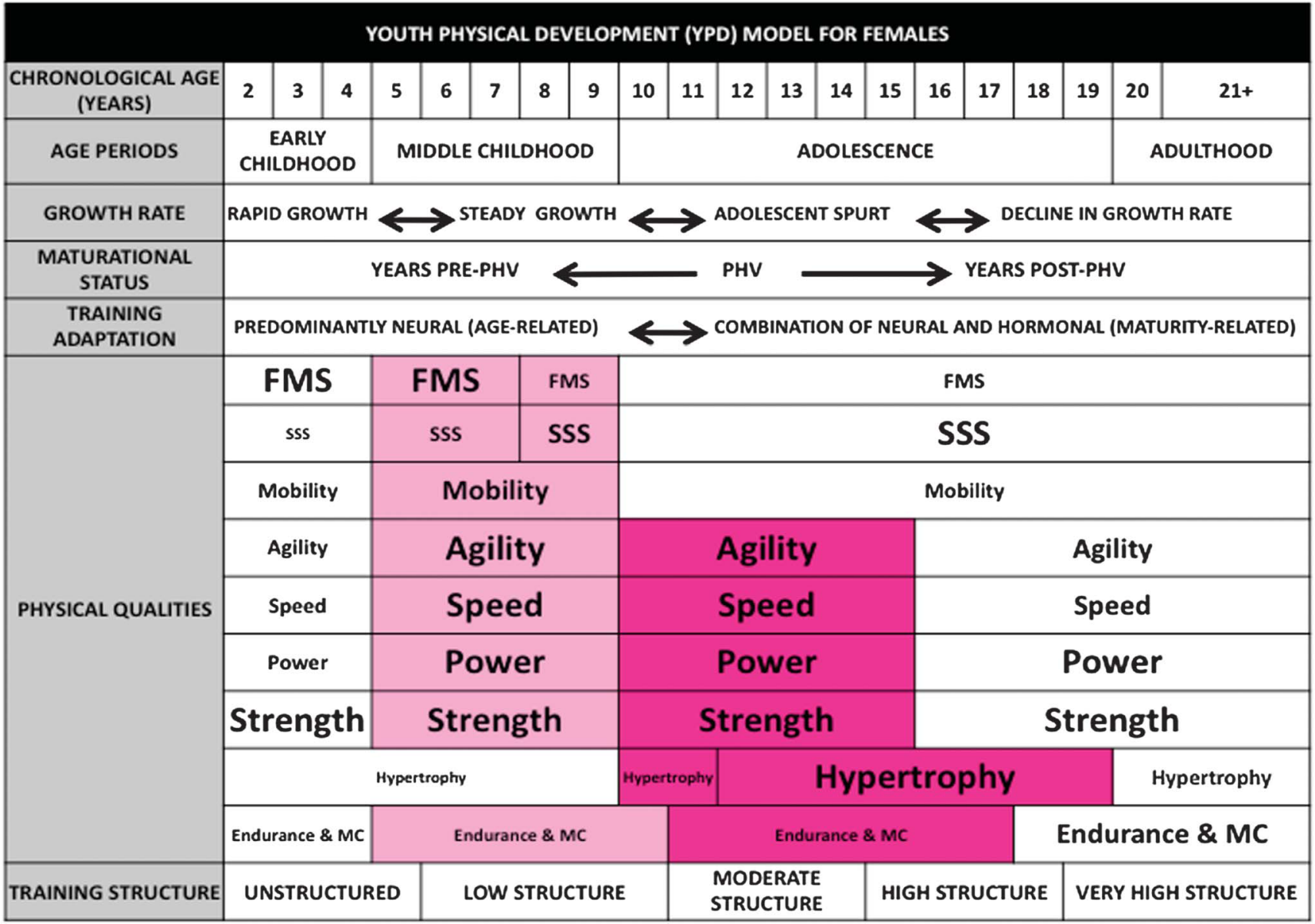
- 10 000 hour rule ?
- Lack of longitudinal evidence
- Do we elevate ceiling potential or just reach it earlier ?
- Key physiological variables missing
- Lack of holistic development
- Late focus on muscular strength development

Youth Physical Development Model

- Rhodri Lloyd and Jon Oliver 2012
- “Most if not all the components of fitness are trainable during childhood”

- All types of training should be undertaken but some require more focus at different stages.


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


YOUTH PHYSICAL DEVELOPMENT (YPD) MODEL FOR FEMALES
CHRONOLOGICAL AGE (YEARS)
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AGE PERIODS
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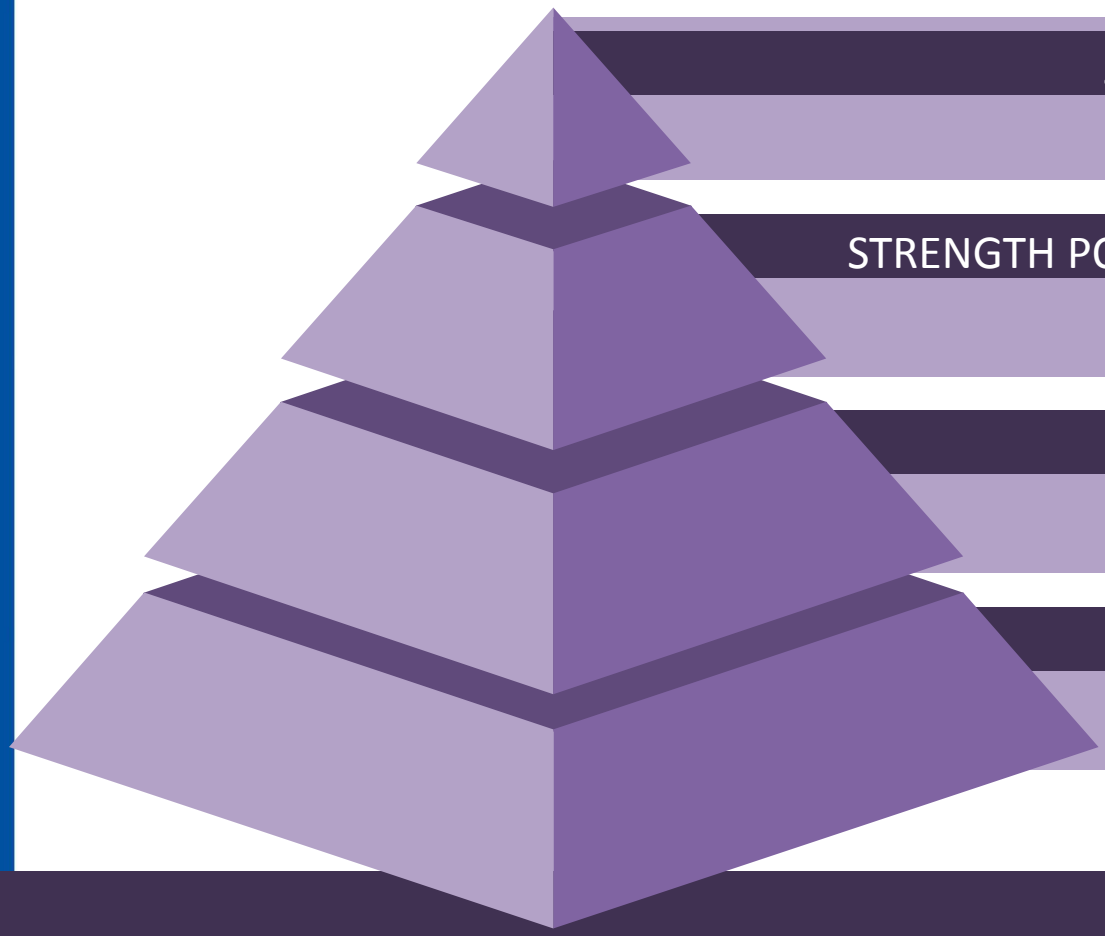

SPORT SKILL

STRENGTH POWER SPEED ENDURANCE

Specific Strength and conditioning work.

MOBILITY STABILITY

FUNDAMENTAL MOVEMENT PATTERNS

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AMBITION, WORK ETHIC

COACHABILITY, SELF MOTIVATION, EMOTIONAL STABILITY

PERFORMANCE PYRAMID
Modified Cook 2011

RMAP WARM UP

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RMAP-Adapted from Jeffries 2007

1. **RAISE**

➢ Aim of elevating body temperature, heart rate, blood flow, joint viscosity and respiratory rate. Through movement skills such as skipping, jogging etc.

2. **MOBILISE**

➢ Move joint through full ROM in a dynamic fashion

➢Focus on swim specific movement patterns

3. **ACTIVATE**

➢Stimulate key muscle groups involved in swim performance

4. **POTENTIATE/PRIME**

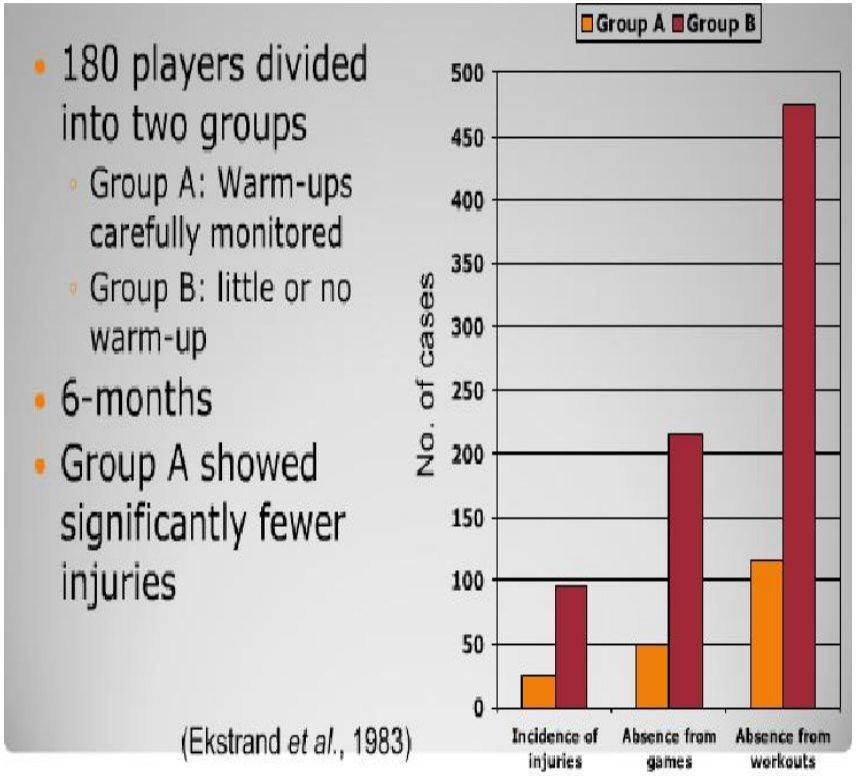
➢ Powerful/dynamic swim specific activities that improve effectiveness

➢ High intensity / High force activities

Why warm up ?

- Warm ups are a widely accepted practice preceding nearly all athletic events
- Prepare the athlete mentally and physically for optimum task completion – Conflicting research supporting its performance effectiveness (physiologically and performance related).
- Improved athletic performance has been attributed to increased core temperature, muscle temperature, blood flow and the additional ergogenic benefits they bring.
- Evidence is mixed on injury prevention.
- Many studies investigating warm up used poorly controlled procedures and tested different durations, intensities, modes and recovery periods

- Faster contraction and relaxation times
- Improved RFD and reaction times
- Lower viscous resistance in muscles
- Improved O2 delivery, where high temp facilitates O2 release from haemoglobin and myoglobin.
- Increase blood flow to active muscle groups
- Elevation of baseline o2 consumption – anaerobic sparing
- A COACHING OPPORTUNITY



RAISE

- Endurance exercises: light activities (50-70% HRmax)
- Light speed/plyo/agility activities: plantar flexors and glute activation
- Light resistant training: bands/dowels
- Drills utilising specific patterns related to the sport
- Gradual increase in intensity

Mobilise

- To mobilise key joints and ranges of motion used in swimming
- Approach focuses around movement (maintains elevation effects)
- Sport specific in nature
- Time efficient
- Mobilisation approach involves actively working muscle groups through full ROM while activating all key muscles involved as well as key stabilisers
- You must consider task specificity

Activate

- Activate key muscle groups involved in swimming

- Related to the needs of the athlete and the demands of the sport

- Often involve exercises associated with pre-hab, such as mini band work, glute activation, SL control, scapula stabilisers, rotator cuff etc.

- Individualised routines if required, Joint S&C and physio input

Prime/ Potentiate

- Shift towards actual sporting performance, involving high force, high velocity activities
- Increase exercises to a point where athletes are able to perform their activities at their maximal levels
- Or select activities that may result in in supra-maximal effect, contributing to enhance performance
- Sport, movement specific
- Often involve exercises such as MB throws/slams, squat jumps, plyo's etc.

Write down a list of exercises for RMAP

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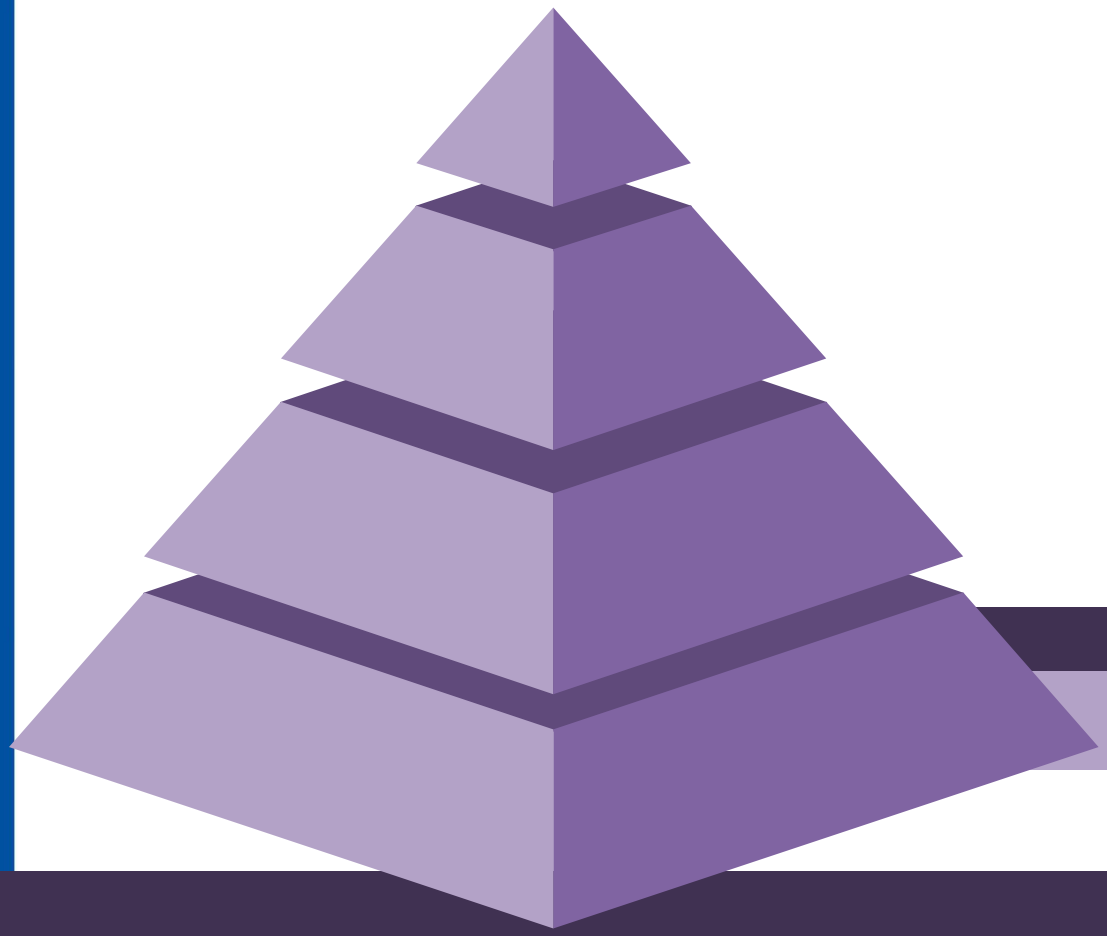

AMBITION, WORK ETHIC

COACHABILITY, SELF MOTIVATION, EMOTIONAL STABILITY

PERFORMANCE PYRAMID
Modified Cook 2011

- Develop basic movement literacy.
- Using a multi-sport approach using games and sprint drills.
- Developing agility, balance and co-ordination (ABC’s).
- Developing reactions and athletic positioning,
- Developing running, jumping and throwing (RJT’s)

In groups plan an exercise session for under 10’s

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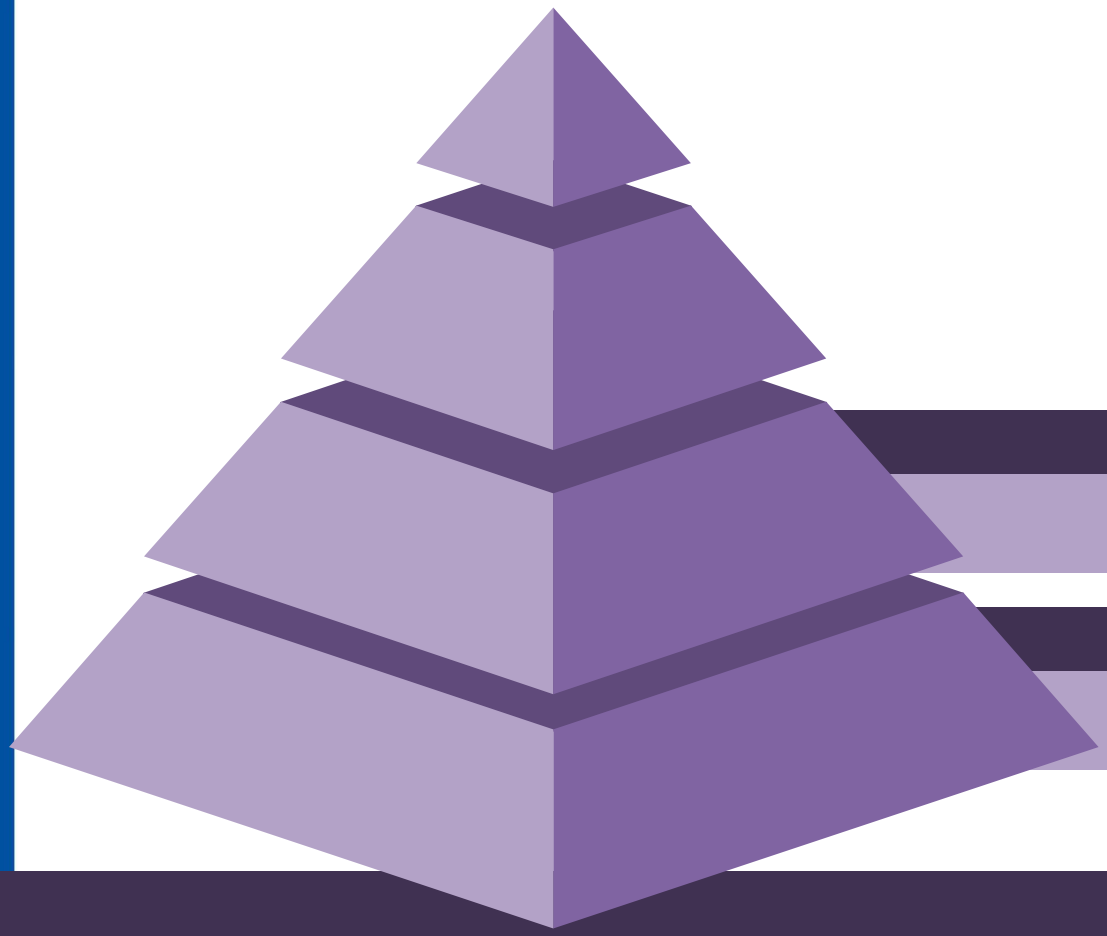


MOBILITY STABILITY

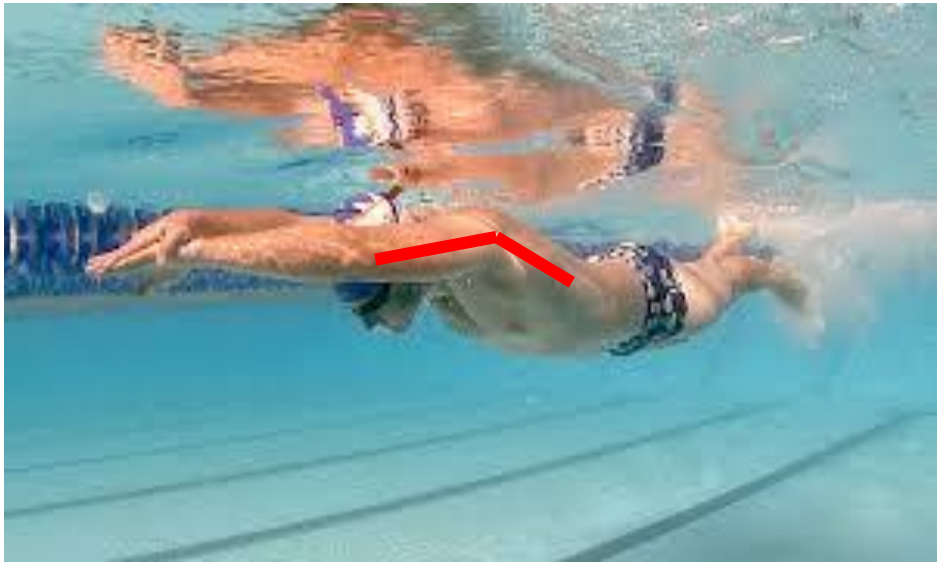
AMBITION, WORK ETHIC

COACHABILITY, SELF MOTIVATION, EMOTIONAL STABILITY

PERFORMANCE PYRAMID
Modified Cook 2011

- Increasing flexibility and improving core engagement.
- Learning thoracic, streamline and anti-rotation exercises & understanding the benefit of these exercises with a transfer into the pool.
- Body weight exercises developing suppleness and core control.

Shoulder flexibility



Shoulder flexibility

Stand with your back and buttocks against the wall. Your feet can be slightly in front.

• Place your head (chin tucked), your shoulders, elbows and wrists against the wall with
shoulders and elbows at 90 degrees.

• Keeping the entire body in contact with the wall, slowly slide your arms upward along the
wall.

• Breathe normally during movement and slowly return to initial position.

• Take your arms as far as possible without the back arching or head dropping forwards

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Exercises to increase lats flexibility

On all fours, bring the buttocks onto (or as close as you can) your heels and lengthen the arms (palms up) in front as far as possible without moving the buttocks.

• Keep the head down and aligned with the spine.

Hold a stable object in front of you with one hands with an overhand grip. Lean forward by bending at the hips while pushing the hips backward.

• Turn your hips slightly to one side to accentuate the stretch along the opposite side of your armpit and shoulder blade.

• Hold the position.

• Switch sides.

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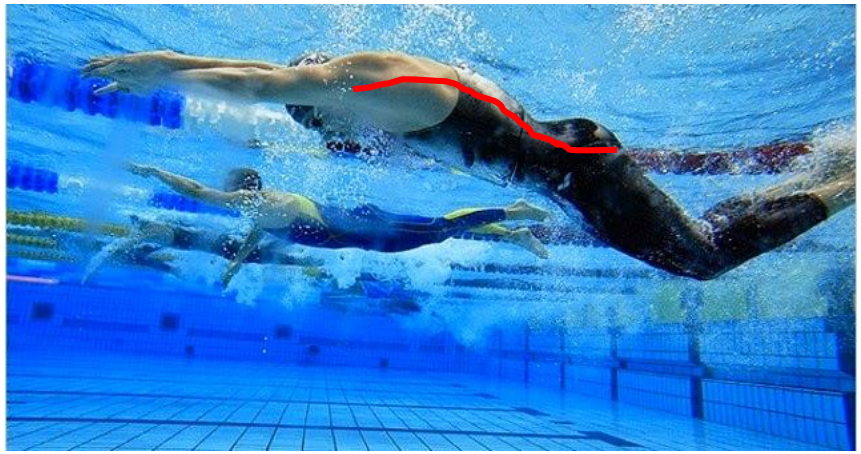
Thoracic flexibility

- Flat thoracic spine allows better shoulder and lower back position



Thoracic flexibility

- Lying on the front
- Streamline the hands and see how far they come off the floor or bed

Thoracic spine exercises

Lay down on your stomach with a small rolled towel under your forehead.
• Lift the head off the towel and upper chest off the floor.
• Hold slightly then lower.
• Make sure to keep your feet on the floor at all times.
Make sure the lower back does not arch

Lie down with the arms outstretched on a rolled towel placed lengthwise on the spine and make sure that the neck is supported.
• Hold the position and slowly slide the arms upwards towards the head
• Do not let the lower back arch

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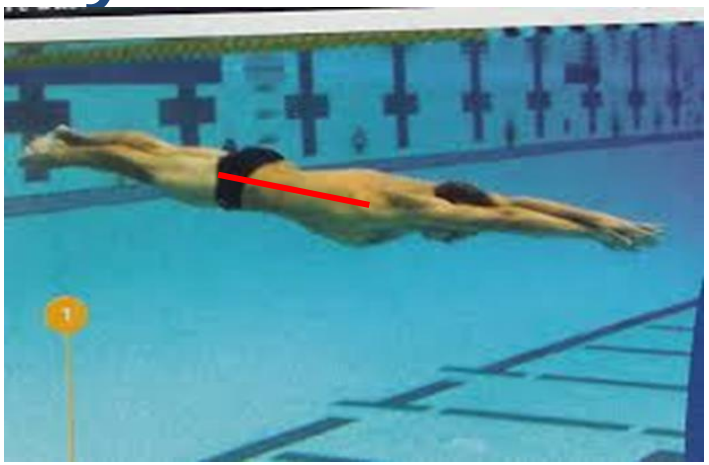
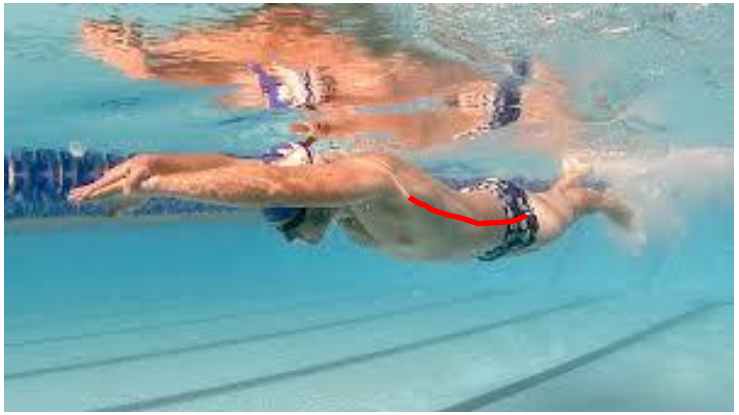
Lumbar Spine Stability

- Streamline requires a stable flat back position
- Core needs to work to maintain this flat back during underwater phase
- Cannot get good core with tight hip flexors





Lumbar Spine stability exercises

Lie on your back and place both knees and hips bent to 90 degrees and both arms pointed towards the ceiling.

• Activate your lower abdominals (transversus abdomininis) by bringing your belly button inward and by activating your pelvic floor muscles 20 to 30% of a maximal contraction.

• Maintain a steady abdominal breathing while you lower one leg straight and lower the opposite arm over the head.

• Just before you touch the ground return the leg and arm to the starting position and repeat with the other leg and opposite arm.

Lumbar Spine stability exercises

- Get on your hands and knees (four point position) with your knees directly under your hips
and your hands directly under your shoulders.
- Your back is in a neutral position (slightly arched) and your chin must be tucked in.
- Tighten slightly your abdominals and lumbar muscles, then lift one arm and the opposite leg without allowing the trunk or pelvis to move or rotate.
- Try to grab something far away in front of you with your hand and touch an imaginary wall far behind you with your foot instead of just lifting them up.
- Lower your leg and arm back to the floor and repeat with the other leg and the opposite arm.

Lie on your back with your knees bent and your back in a neutral position (slightly arched).
- Engage your core by recruiting your pelvic floor and transverse abdominis.
- Lift one knee towards your chest to 90 degrees (vertical) without holding it.
- Maintain a steady abdominal breathing while you slide the other foot out until your leg is straight, keeping your back and pelvis completely still.
- Return slowly to the initial position and repeat the entire sequence beginning with the other
leg.

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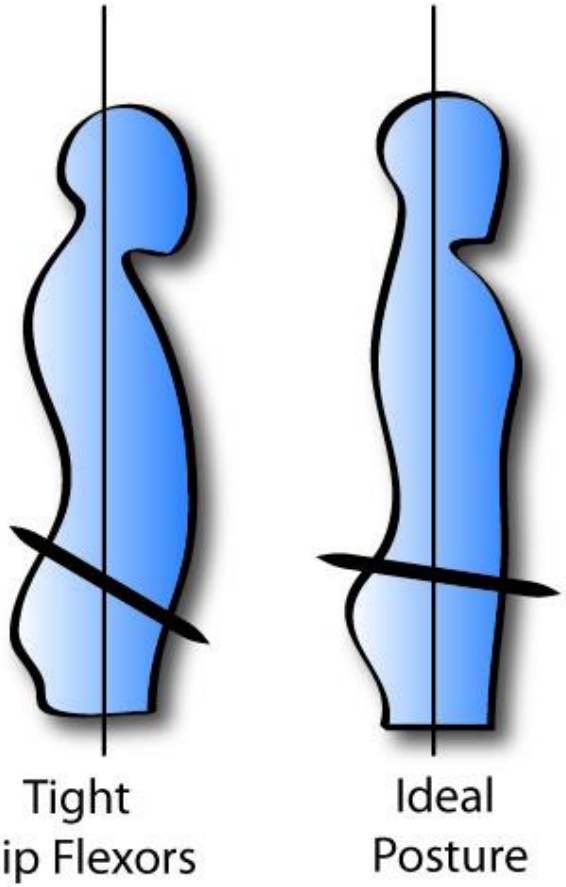
Hip flexibility



- Tight hip flexors
- Increased lower back arch
- More drag with legs
- More resistance through the water

Hip flexibility

- Need good hip extension for streamline
- Should keep the thigh on the bed with the other leg fully flexed
- Limited by tight hip flexors

Hip flexor mobility exercises

Kneel on one knee creating a 90 degree angle with the opposite hip and use a chair for support.

• Tilt your pelvis backwards to flatten your lower back and transfer your weight forward until you feel a gentle stretch on the anterior aspect of your hip of the lower leg.

• Maintain the position and relax.

• Maintain your upper body upright and your lower back flatten (not arched).

Walking Spiderman

Take an exaggerated lunge step forward and push the hips forward while keeping the chest up to prevent lower back rounding.

• Bring the hands to the ground (for increased stretch, bring the same-side elbow than the forward leg toward the heel/ground).

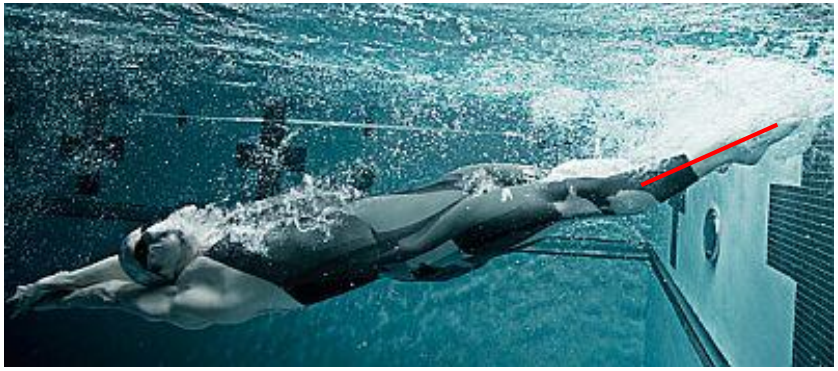
• Go as low as your flexibility allows..

• Keep the upper back rounding to a minimum.

• move forwards with the back leg and take the front leg backwards in one movement

Ankle flexibility

- Better ankle flexibility reduces drag



Ankle flexibility

Stand beside a chair and place your foot on the chair as shown.

- Press on your heel to increase the stretch and maintain the position for 30 seconds
- Relax and repeat.

Kneel on one knee and slowly sit back, lowering your buttocks towards your heel until a stretch is felt on the front of your ankles.

- Maintain the position for 30 seconds and relax.

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Plan an exercise session of mobility and stability for swimming

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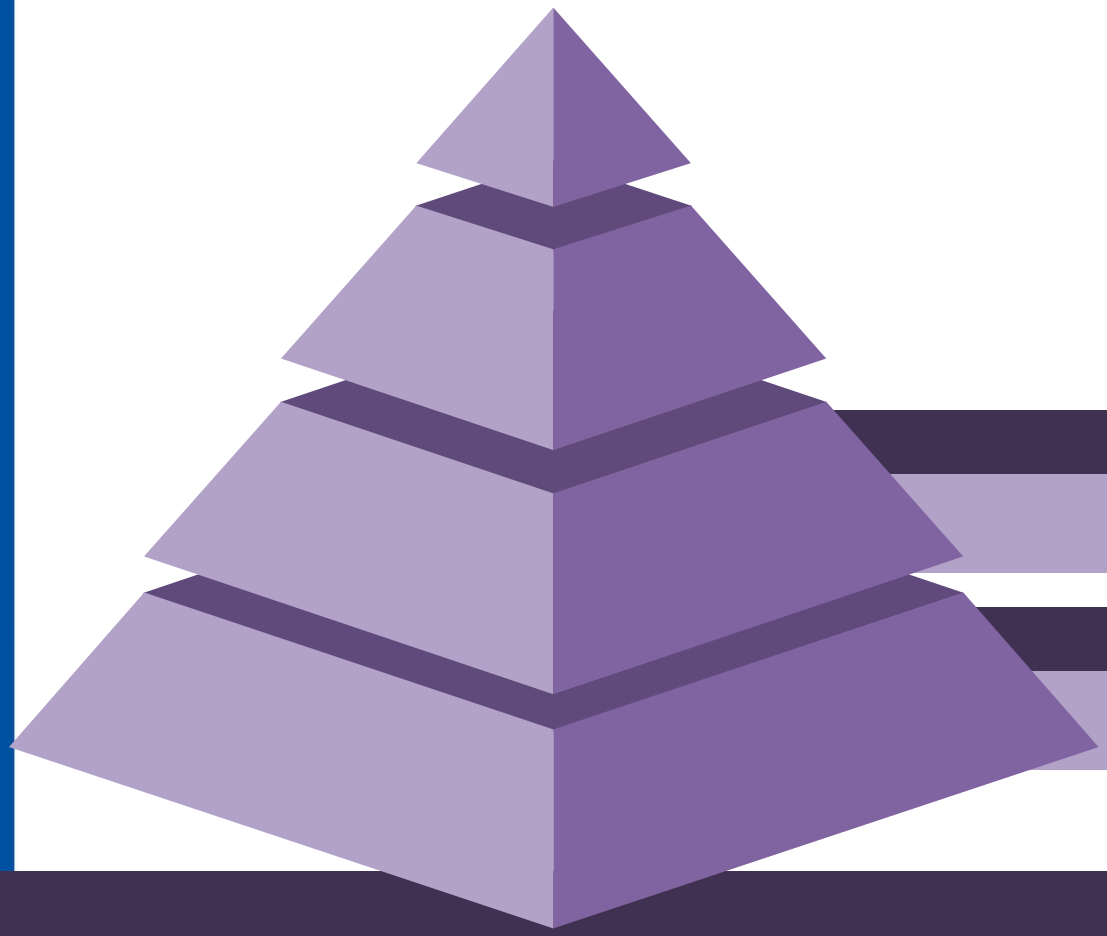

MOBILITY STABILITY

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PERFORMANCE PYRAMID
Modified Cook 2011

Split Squat

Start Position

- Bar placement and grip the same as the Back Squat
- Split position is a moderately large step forward
- Weight evenly distributed between both feet
- Torso vertical and trunk braced
- Front foot flat, rear foot on the balls
- Toes pointed forward

Descent

- Knee and hip flexion of the lead leg – rear leg knee descends to floor
- Trunk remains vertical throughout
- Knee, hip and shoulder alignment of the rear leg
- Ankle, knee and hip alignment of lead leg while flexing

Ascent

- Drive lead foot into floor
- Ankle, knee and hip alignment while extending
- Trunk remains in vertical position

Exercise Variation

Elevated split squat, forward lunge, back Lunge, helicopter lunge, OH lunges

SPLIT SQUAT PROGRESSIONS

1.		Stand next to a chair, wall or countertop for balance if you need to. • In a split stance, lower your body straight down so both knees flex to 90°. • Keep your trunk vertical. • Keep your front knee centered over the toes. • Breath normally during the exercise.
2.		Place your feet in a straight line so the knee of the back leg will come right behind the front heel, almost touching, in the bottom position. • Hold the dowel behind your back, the top arm opposite of the front leg. • The dowel must be in contact with your head, upper back and sacrum at all time. • Next, lower your back knee close to the floor and behind the front heel. • Keep your balance and lift yourself back up to the standing position. • The dowel must remain vertical. • The torso should be kept still.
3.		With your feet in line, lower the back knee close to the floor and behind the front heel. • Keep your balance and lift yourself back up to the standing position. • The knees should be bent at 90 degrees in the bottom position.
4.		Start in a split squat position with your rear foot elevated on a step. • Bend the knees to lower your body. • Do not move your weight forward as you lower.

Stiff Leg Deadlift

Starting Position

- Hands evenly spaced just wider than shoulder width
- Bar is held at arms length just below waist
- Stand in an erect position with an extended spine
- Feet hip width apart
- Toes forward or slightly angled out
- Knees are slightly unlocked to approximately 15-20^{o}

Descent

- Hips are flexed and move back
- Spine is locked and movement created about the hip
- Centre of mass moves to the back of foot
- Shoulders move in front of the bar
- Bar remains close to thighs
- Descent ends at the point just prior to when the lumbar spine flexes (normally just below knees)

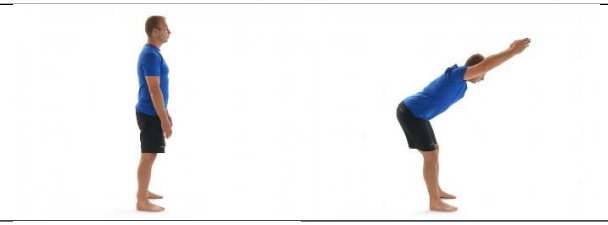
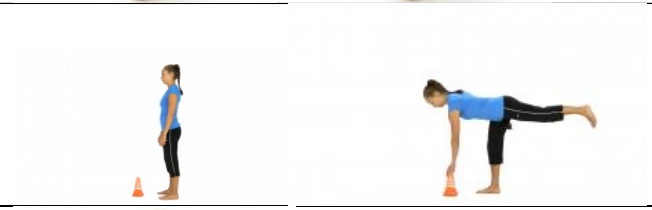
Ascent

- Rigid spine posture remains
- Hips are extended through driving hips forward
- Return to starting position

Exercise Variation

Single leg stiff leg deadlift, hyperextension

Stiff deadlift progressions

1		Stand up with feet shoulder-width. • Keeping your back straight, bend forward from the hips as you raise your arms overhead to reach forward. • Come back to the standing position and repeat.
2		Stand with the feet under the hips. • Place a stick behind your back with three point of contact which are the back of the head, mid-back and tailbone. • Hold the stick with one hand overhead and one hand behind the lower back. • Bend the trunk forward, hinging at the hip. • Keep the three points of contact at all times.
3		Step on the band with both feet and loop it over your shoulders. • Push your hips back to bend your trunk forward. • Keep your lower back straight at all time during the exercise.
4		Stand and bend over on one leg, hinging at the hips and keeping the back straight, to pick up a cone (or any other object) on the floor.
5		Keep your back straight, abs tight and head up. • Bring your dumbbells down in front of you keeping your back straight and chest out. • Pronation grip.

Plank

Starting Position

Plank position

- On starting on your toes feet hip width apart
- Gluteals engaged and scapula retracted
- Head looking down with spine extended and abdominals braced
- Elbows below shoulders on your forearms
- Torso straight and rigid (no sagging)

- Keep the torso rigid and braced throughout Ensure the hips are fixed with no flexion
- Scapula retracted in the press up position
- Gluteals engaged throughout
- Keep straight postural alignment throughout descend

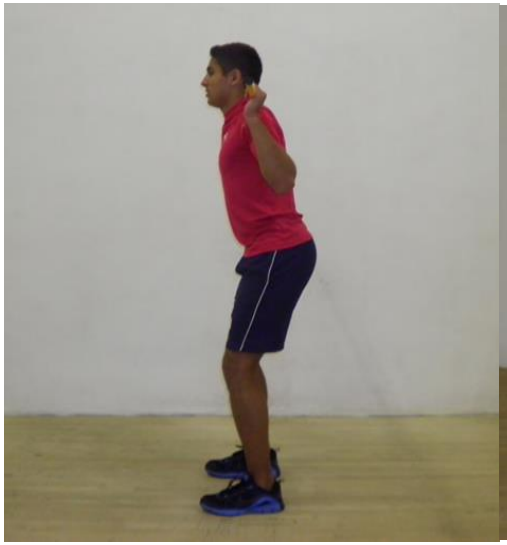
Exercise Variation

Add rotations, single leg stance, and lateral shuffle to plank, plank to press up

Plank Progressions

1		On your forearms and knees. • Lift yourself up in a straight line. • Contract your glutes and do not arch your lower back. Keep your body in a straight line from your head to your knees. • keep your elbows under your shoulders.
2		Start in all fours, then prop yourself up on your forearms and toes, with your chin tucked in. • Lift up your body, creating a straight line with your body. • Maintain the position without arching the lower back.
3		Lie on your stomach, propped up on your forearms with your chin tucked in and feet together. • Lift up your pelvis creating a straight line with your body without arching your back. • Lift up one leg and bring it out to the side slowly. • Return your leg to the middle without touching the floor and repeat.
4		Lie on your stomach, propped up on your forearms with your chin tucked in and your feet together. • Lift up your pelvis, creating a straight line with your body without arching the back. • Lift one leg straight up keeping the back straight and then lower the leg. • Repeat.
5		Place the forearms on an elevated surface. • With the elbows directly under the shoulders, prop yourself up on the elbows, keeping a neutral back and head aligned with the spine. • Hold the position.

Squat



Starting Position

- Space hands evenly using a narrow pronated grip
- Bar positioned across the ledge created by the scapulae on the rear shoulder
- Retract shoulder blades and elevate chest
- Feet positioned just outside shoulder width with toes pointed slightly outwards
- Stand extended through the spine, hips and knees – bracing trunk musculature

Descent

- Unlock hips and begin to flex a knees with a slight forward lean
- Maintain a flat back with an elevate chest
- Hips go behind heels, knees go over toes and maintain alignment over toes
- Feet remain flat throughout
- Continue flexing hips and knees until the thighs are parallel to the floor
- Stop when trunk begins to round or flex forward, or the heels rise off the floor

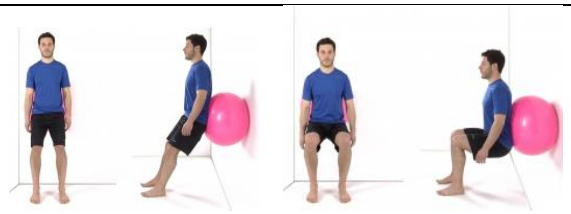
Ascent

- Drive forcefully up through the floor
- Extend the knees and hips at the same rate, maintaining torso angle
- Feet remain flat on the floor throughout
- Back remains flat during the ascent until the athlete reaches the starting position

Exercise variations

Sumo squats, front squats, OH squats

Squat Progressions

1		Place the ball between your back and the wall with your feet hip-width apart and facing forward. • Slowly bend your knees and roll under the ball as if you are sitting on a chair, keeping your knee caps in line with the second toe. • Slowly return to the standing position by pushing through your heels to activate your buttock. • Maintain proper low back posture (slightly arched) and stability of the knees (avoid any lateral movements).
2		Stand with your feet facing forward at hips width. • Tie elastic around your knees, just below them. The band should be taut and applying a tension that pulls the knee inward. • Lower your body to a squat position by pushing your hips backward, bending your knees while keeping your back neutral. • Squeeze your buttocks to resist the pull of the band and keep the your knee caps aligned with the center of your feet (2nd toes). Do not let the band pull your knees inward. • Return to the standing position and repeat.
3		Stand tall and place your hands on your hips and your feet hip width. • Initiate the squat by pushing your hips back, as if you were sitting on a chair. • Continue the movement by bending the knees, keeping them directly over the feet. • Lower yourself until the thighs are about parallel to the ground or to the point where you begin to lose the neutral spine by rounding your lower back. • Lift back up and repeat. • Make sure to keep the spine neutral and knees aligned at all times.
4		Stand with feet hip-width apart, toes pointing straight ahead. • Keep your back straight and push your knees 3-4cm in front of your feet, keeping the knees over the second to third toe of each foot. • Lean forward, sit back on your heels until your thighs are parallel with the floor. Do not let your back bend until the thighs are below parallel. • Sit on your heels (heels on the floor) and keep your feet straight. At this point, you can round your back.

THERABAND STANDING ROW

Starting Position

- Set theraband at lower chest height
- Grasp theraband in a closed neutral grip
- Extend arms forward and step back under tension
- Assume an athletic position flexed ankle knees and hips
- Maintain and upright and neutral spine throughout

Backward Movement Phase

- Pull the band towards the abdomen
- Ensure the elbows stay in and brush passed the body
- Elbows finish passed the line of the body
- Maintain an erect torso position throughout
- Scapula retracted
- Abdominals engaged

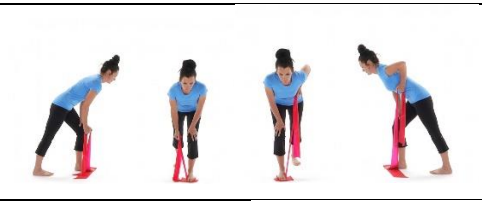
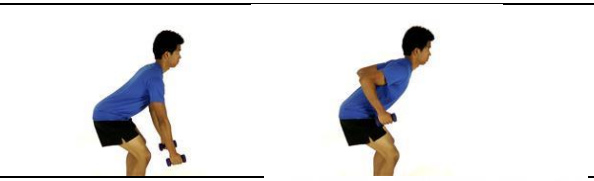
Forward Movement Phase

- Allow the elbows to slowly extend back to the starting position
- No anterior tilt at the hips
- Slow controlled movement

Pull Variations

Wide arm pulls, Face pulls, Single arm rotational pull, Squat pulls, Single leg pulls

Rowing progression

1		While sitting in a chair, attach a band in front of you. • Hold both ends of the band and pull towards you, squeezing the shoulder blades together.
2		Anchor a resistance band in front of you at chest level and hold the ends in your hands. • Pull the band with your elbows near your sides and keep your chest out and shoulders down and back. • Do not move you head forward as you pull.
3		In a split stance position, bend over with back straight. • Step on one end of a band and hold the other end in your hand. • Row the band without rotating the trunk. • Keep the shoulder back and chest up. • Keep the head still during the movement.
4		Stand with your hips slightly bent and hold weights in your hands. • With your shoulders down and back, lift your arms up and then back. • Return to the starting position and repeat.
5		Start on your knees with a band attached to bottom of a door or other low anchor point. • Keeping your shoulder blades down and back, pull both arms back in a (W). • Hold for a few seconds and repeat.

In groups write an exercise programme of fundamental movement exercises

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PROGRAMME STAGES OVERVIEW

6-10yrs

- Technical proficiency – WU & CD focus
- BW control – Establishing Co-ord & key movement patterns
- Mobility and Stability
- X3 per week – Consistency
- Neural development fundamental
- Low fatigue
- Holistic skill development – proprioceptive skills

1. Warm Up DVD foundation
2. Vestibular control
3. Large focus on exercise performance – exercise regression

Hip

DL Glute Bridge

Quadruped Hip ext

Clams

Shoulder

Scapula wall drops / retraction skills

Forearm wall slides

Prone T,Y,L's

Ankle

Vest – walks and balances onto toes

SL MB catches

Core
Long kneel planks
Quadruped drills
Prone drills
Rotational skills

Foundational lifts
Squat stream
Lunge streams
Push pull streams

Introduce challenges – ISO, Tempo, games, Planes, Partnered

10-16 YRS

- Skill Mastery focus
- Introduction of power movements – velocity control
- Low loads
- Mobility & stability reinforcement
- Introduction to weight bearing & rep ranges
- Re-visting movement patterns (maturation)

Top end completion of exercise streams (low load)

Up to 50-60% load (Individual differences)

Explosive movement proficiency

Limited fatigue work – Control/execution focus

- Foundational movements

OH squats & squats with weight limited load

SL movements – SLDL (increase complexity)

MB throws

Unbalanced loads and surfaces

- Glutes

Hip thrust

SL Bridges (endurance)

Elevated mini Band Clams

Hip Hinge – RDL's

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