BROMLEY TENNIS ACADEMY
STRENGTH & CONDITIONING JUNIOR
PHYSICAL DEVELOPMENT PROGRAMME

NAME

2011 / 2012

Introduction

For your strength & conditioning physical development programme at Bromley Tennis Academy (BTA), you will be assigned to one of three groups. The group you are assigned to will depend on your 'developmental age'. Your developmental age will be determined and tracked by measuring your standing and sitting heights, your chonological age (how old you are) and your weight.

Why is this important?

Primarily there are three reasons why it is important for you to be categorised according to your developmental age:

Reason 1 – the 'relative age effect'

The relative age effect (RAE) describes the observation that greater numbers of players born early in a selection year are over-represented in junior and senior elite squads compared to what might be expected.

For example: the age group cut-off date for entry into organised youth sport in English schools is typically August 1st. This means that someone born on 1st August may participate in the same programme as someone born on July 31st of the same year, although one is almost a year older than the other!

Question: who is older?

Answer: none of them – they all have the same chronological age of 14!

Reason 2 – 'early, average and late maturers'

Although growth and development is a natural process, the rate of maturation can vary among individuals. This means that you may grow and mature physically quicker or slower than someone else. You can probably tell this by comparing the heights of different people in your school class. Someone who is 12 years old may possess a biological age between nine and 15 years. The physical difference between someone who is nine and someone who is 15 is generally huge, yet often these players are often trained in the same way and participate in age group competitions, which give early maturers a huge advantage in performance and in the selection process.

The boys in the following pictures have the same chronological age of 12. However, the boy on the left has a developmental age of 15 and is an early maturer, whereas the boy on the right has biological age of an 11 year old and is a later maturer.

Early maturers:

- Often receive more attention and coaching
- Are trained in the same way as late maturers – can lose motivation

Late maturers:

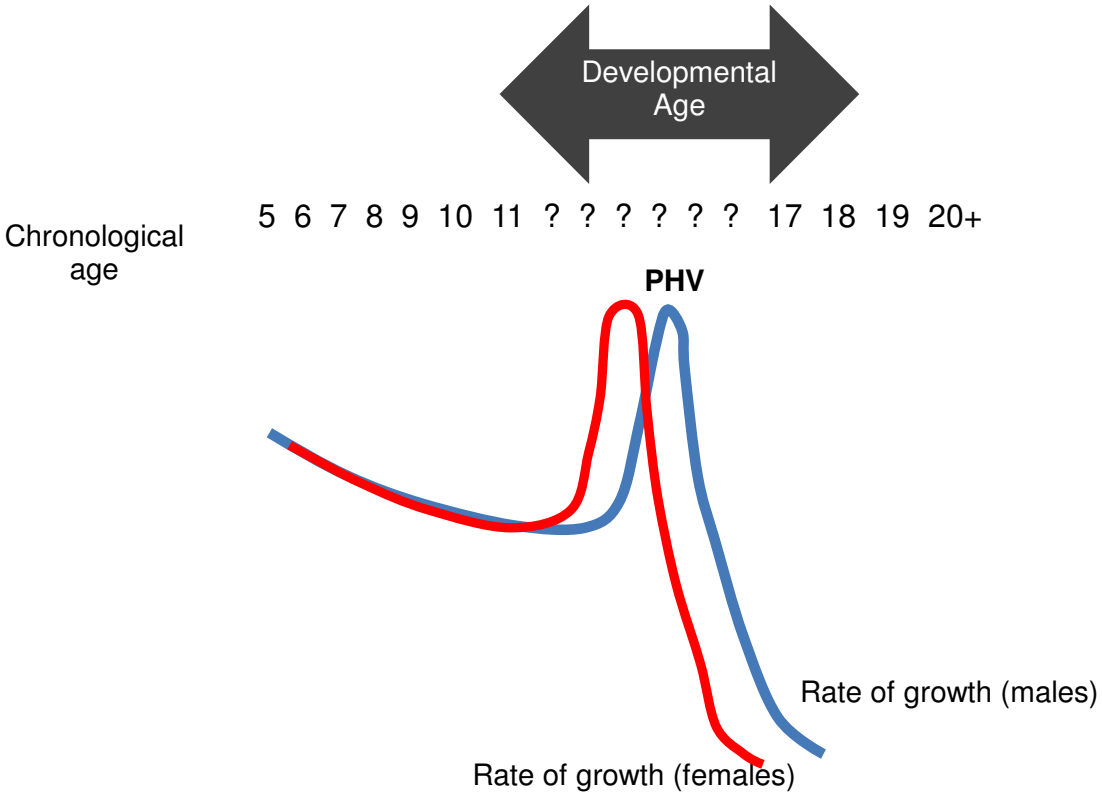
- Often receive less attention and coaching
- Are trained in the same way as early maturers – can lose motivation

Whether you are an early, average or late maturer does not matter. What matters is that your strength & conditioning programme is appropriate to your developmental age.

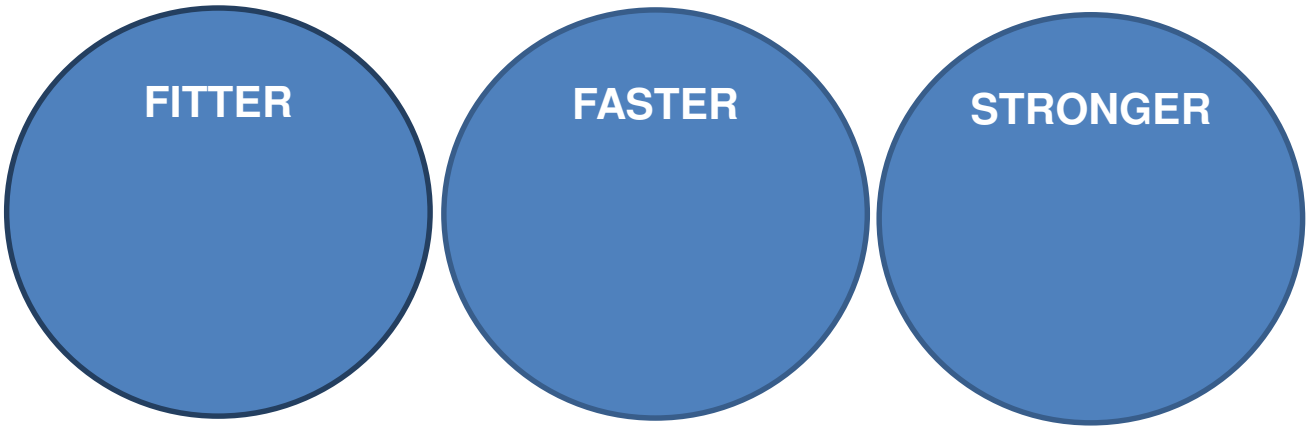
Reason 3 – 'windows of trainability'

As you grow there are certain time periods where it is possible to accelerate the development of specific areas of fitness greater than at any other time in your life. If these specific areas are not targeted during these 'windows of trainability' then it is likely that you will never reach your full physical potential in these areas.

Where these time periods sit in relation to your chronological age and what specific areas of fitness need to be worked during these 'windows of trainability' will depend upon the rate you are growing at. Up until the age of 11 you will grow at a similar rate to others the same age as you. However, between the ages of 11 and 16 it is common for everyone to grow at different rates and it during these years that you will reach your Peak Height Velocity (PHV). PHV is the fastest rate of growth during the adolescent growth spurt. PHV velocity is usually reached at different times between males and females (see figures below) and between those of the same sex.



The specific areas of fitness that should be targeted during the developmental stages around PHV include endurance, speed and strength. Depending on where you are in relation to your PHV you will therefore be assigned to one of the following groups:



What will I be doing in fitter, faster or stronger sessions?

Regardless of the group you are in, you will be completing similar activities across the year. Each group will perform endurance, speed and strength work across the year, but you will spend more time working on one aspect of fitness than any other depending on the group you are in. For example, if you are in the 'fitter' group you will perform more general fitness work than speed or strength work; if you are in the 'faster' group you will perform more speed / agility fitness work than endurance and strength work; if you are in the 'stronger' group you will perform more fitness strength work than endurance and speed / agility work.

How many sessions should I do per week?

FITTER	FASTER	STRONGER

The Warm-up

Why do we warm-up?

- To prepare both physically and mentally for exercise or competition

What does a warm-up do (provided it is done correctly!)?

- Increases muscle and core body temperature
- Increases blood flow
- Increases mobility
- Focuses the mind

What effects can a warm-up have on performance?

- Improvements in strength and power
- Improvements in reaction time
- Increased blood flow to active muscles
- DECREASES THE RISK OF INJURY!

How do we warm-up at BTA?

BTA uses the **RAMP** system of warming up.

RAISE – the main aim of this phase it to elevate body temperature, heart rate, respiration rate, blood flow and circulation of fluid within the joints via low intensity activities. It is still common place in a number of sports for athletes and coaches to waste a lot of time during this phase by jogging around the court / pitch. This time is spent better working on a variety of activities that will improve an athlete's ability to move skilfully in addition to the primary aim of this phase.

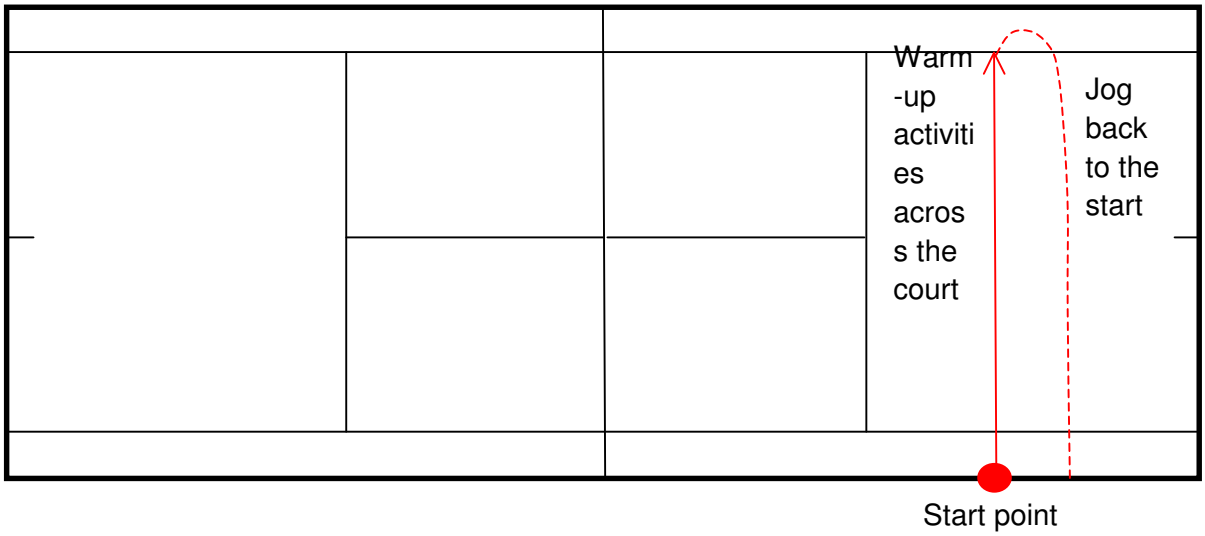
ACTIVATE – the aim of this phase of the warm up is to activate key muscle groups. This phase includes exercises that are typically carried out to help prevent injury and will be dependent upon the sport the athlete takes part in.

MOBILISE – the aim of this phase of the warm-up is to mobilise key joints and move through ranges associated with the sport being performed. This phase does not include static stretching which is still carried out prior to exercise in a number of sports despite the lack of evidence to suggest it has any benefit on performance. Instead, a series of dynamic stretches are carried out to provide the mobilisation needed for effective sports performance.

POTENTIATE – the aim of this phase of the warm-up is to increase the intensity of an exercise to the point at which an athlete is able to perform their training / match activities at their maximal levels. This phase of the warm-up will see a gradual shift towards the actual sport performance or workout itself, and will normally involve sport specific activities of increasing intensity.

How do I perform the warm-up?

Essentially you will need half a tennis court and a theraband to complete you warm-up. For most of the warm up you will perform a number of activities working across the court. Once you have travelled the width of the court performing each activity, you then jog back to the start point ready for the next activity (see figure below).



RAISE component

There are many different activities that you could complete during this phase of the warm-up. The following list provides some example activities that can be carried out. You should complete approximately 6-8 activities, performing each one twice.

- Stride walk throughs

- A skips
- Sotos
- B skips
- Lateral shuffles
- Lateral skips
- Cariocas
- Back pedalling

ACTIVATE component

There are many different activities that you could complete during this phase of the warm-up. This is an ideal time to carry out any specific prehab exercises you have been given individually. The following list provides some example activities that can be carried out. As a minimum you should perform exercises that target the shoulder (e.g. external and internal rotator cuff exercises), trunk (e.g. plank rotations) and the hip and knee (i.e. single leg squats) joints.

- External rotator cuff exercises using therabands
- Wall angels
- Toe and heel walks
- Plank rotations
- Lower and upper body space invaders
- Hip extensions
- Partial single leg squats

MOBILISE component

There are many different activities that you could complete during this phase of the warm-up. The following list provides some example activities that can be carried out. You should complete approximately 6-8 activities, performing each one twice.

- Arm swings
- Shoulder circles
- Walking high knee holds

- Walking quads stretches
- Walking hamstring sweeps
- Walking lunge with hamstring stretch
- Walking lunge with hip flexor stretch
- Lateral walking sumo squats
- Inchworm
- Hip circles
- Trunk rotations

POTENTIATE component

There are many different activities that you could complete during this phase of the warm-up. The following list provides some example activities that can be carried out. You should complete approximately 3-4 activities, performing each one twice. Where applicable, it is recommended that you walk back to the start point after completing each activity during this phase of the warm-up rather than jogging back

- Falling starts – 75 to 95% effort
- 90 degree turns and acceleration – 75 to 95% effort
- 180 degree turns and acceleration – 75 to 95% effort
- Shuttles – 75 to 95% effort

All in all, the **RAMP** warm-up should take around 15-20 minutes to complete. Following this you can then progress onto your 'hitting' warm up.

Strength Programme

You will find over the following pages a number of strength programme templates which you will complete during those sessions in which you perform strength fitness work. Your Strength & Conditioning Coach will show you how to do this during your strength & conditioning sessions.

Strength training movement patterns

You will notice on the programme templates that a number of the strength exercises are classified as a type of pattern. Examples of exercises which are classified as a 'push' pattern would be a press up and a bench press. These types of exercises have been classified as movement patterns for two main reasons:

Reason 1 – performance

These movement patterns (squat, bend, lunge, push and pull) form a number of the primary movements of tennis. Becoming strong in these patterns of movement, therefore will improve your tennis performance by increasing your ability to move quicker around the court and produce more powerful shots. There are other movement patterns important to tennis (‘twist’ for example) that will also be covered among a number of the exercises you will perform.

Reason 2 – injury prevention

Firstly, becoming strong in these movement patterns will provide a good balanced strength programme which will help eliminate muscular imbalances which can lead to injury. Secondly, becoming strong in these patterns of movement will mean that your connective tissues will be able to better withstand the forces imposed on your joints when you play tennis – again reducing the risk of injury.

What sort of exercises will I be performing?

The type of exercises you will be performing for each movement pattern will be determined by your developmental age (i.e. whether you are in ‘fitter.’ ‘faster,’ or ‘stronger’), your current strength levels and training experience. The strength progression matrix details a typical progression.

Strength Progression Matrix

Push Pattern

Pattern	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise	Pre-re
Push pattern (horizontal)	Kneeling push up	Be able to do 3 sets of 10 kneeling push ups	Full push ups	Be able to do 3 sets of 10 push ups	DB chest press	Be abl sets of with 15
Push pattern (vertical)	MB shoulder press	Be able to do 3 sets of 10 MB shoulder press with 5kg ball	DB shoulder press	Be able to do 3 sets of 10 DB shoulder press with 15kg DB	BB shoulder press	-

Key: MB = medicine ball; DB = dumbbell; BB = barbell; SA = single arm; BW = bodyweight; SL = single leg; SB = swiss ball

Pull Pattern

Pattern	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise
Pull pattern (horizontal)	Bent leg inverted pull up	Be able to do 3 sets of 10 bent leg inverted pull ups	Inverted pull ups	Be able to do 3 sets of 10 inverted pull ups	Weighted inverted pull ups	-	-
Pull pattern (horizontal)	MB bent over row	-	SA Cable row	Be able to perform 3 sets of 10 MB bent over row or SA cable row with 6kg MB or with 10 kg on cable	SA DB row	Be able to do 3 sets of 10 SA DB row with 12kg DBs	BB bent over row
Pull pattern (vertical)	Cable pull down	-	Seated pull up	Be able to do 3 sets of 8 seated pull ups	Pull ups	Be able to do 3 sets of 8 pull ups	Chin ups

Key: MB = medicine ball; DB = dumbbell; BB = barbell; SA = single arm; BW = bodyweight; SL = single leg; SB = swiss ball

Squat Pattern

Pattern	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise	Exercise	Pre-requisite	Exercise	Pre-requisite

Squat pattern (biateral)	BW squats	Be able to do 3 sets of 20 BW squats	MB squats	Be able to do 3 sets of 15 with 5kg MB	DB squats	Be able to do 3 sets of 8 with 12 kg DBs or 3 sets of 8 with single 24kg DB	BB squats	-	-	-	-
Squat pattern (unilateral)	SL hip extension	Be able to do 3 x 15 SL hip extensions	SL SB wall squats	Be able to do 3 sets 8 of SL SB wall squats	BW SL squats	Be able to do 3 sets of 10 BW SL squats	SL MB squats	Be able to do 3 x 10 SL MB squats with 5kg	DB SL squat (back foot on step)	Be able to do 3 sets of 10 DB SL squats with 12kg DBs	BB SL squats (back foot on step)

Key: MB = medicine ball; DB = dumbbell; BB = barbell; SA = single arm; BW = bodyweight; SL = single leg; SB = swiss ball

Lunge and bend Patterns

Pattern	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise	Pre-requisite	Exercise
Lunge pattern	BW static lunge (split squat)	Be able to do 3 sets of 12 BW static lunges	MB static lunge	Be able to do 3 x 10 MB static lunge with 5kg	BW lunges	Be able to do 3 sets of 12 BW lunges	DB lunges	Be able to do 3 sets of 10 with 10kg DBs	BB lunges
Bend pattern	BW RDL (bi and unilateral)	Be able to do 3 sets of BW RDL	MB RDL (bi and unilateral)	Be able to do 3 sets of 12 MB RDL with 7kg	BB RDL	-	-	-	-

Key: MB = medicine ball; DB = dumbbell; BB = barbell; SA = single arm; BW = bodyweight; SL = single leg; SB = swiss ball

AUTUMN TERM STRENGTH PROGRAMME Weeks 1 – 4 (19th September to 15th October).

Warm up:

		Week 1 - M						Week 3 - H					
Power exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**
Strength exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**
Trunk exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**

AUTUMN TERM STRENGTH PROGRAMME Weeks 5 – 8 (17th October to 12th November)

Warm up:

		Week 1 - M						Week 3 - H					
Power exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**
Strength exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**
Trunk exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**

AUTUMN TERM STRENGTH PROGRAMME Weeks 9 – 12 (14th November to 10th December)

Warm up:

		Week 1 - M						Week 3 - H					
Power exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**
Strength exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**
Trunk exercise:	**Tempo**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**	**Reps**	**Load**	**Rest**