Personal Exercise Programme

Purpose / Aim of the Personal Exersise programme

My personal aim for this personal Exercise Programme is to improve my stamina and as well as my endurance. My other aims are to:

- Improve my speed.
- Improve my muscular strength.
- Improve my muscular endurance.

My chosen sport is Tennis, and this sport involves strength, muscle endurance, endurance and speed. Fitness however has two components which are health related which are physiologically based and determines the ability of an individual to meet the physical demands of the activity, and also the skill related factors which are based upon the neuromuscular system and determines how successful a person can perform a specific skill.

Health related components include strength, speed, flexibility and muscular endurance, whereas skill related component that takes place in Tennis is agility.

The **reasons** for doing this Personal Exercise programme are:-

- ✓ To identify the strengths and weaknesses of myself.
- ✓ To monitor my performance.
- ✓ To modify a training programme and to assess the value of different types of training.
- ✓ To predict athletic and physiological potential that I may have.
- ✓ To enhance my motivation and self confidence.
- ✓ To make comparisons with the national averages of all the physical activities that I will do and with previous tests.
- ✓ To identify overtraining syndrome.

Below are the **main fitness** components involved in the game of Tennis.

- **Strength** – This is the maximum force developed in a muscle or group of muscles throughout a single maximal contraction and relates to the ability of the body to apply a force. Strength can be split into three sections:-

    1. Maximum strength.
    2. Elastic strength.
    3. Strength endurance.

- Tennis involves strength endurance because it requires repeated contractions and being able to withstand fatigue. There are many different ways to improve this, such as working in the gym with the weights and good exercises might include hamstring stretch, shoulder stretch, groin stretch, Achilles stretch, sit ups and step ups. But as the body ages, less proteins become available in the body for muscle growth, and the stress and anaerobic nature of strength training.

- **Speed** – This is the ability to put the body parts into quick motion and being able to move to a given point in a short space of time. This also gives you better balance and control. The explosive movement depends on the efficiency of muscle; how fast, far and for how long they

will contrast and stretch. Good exercise for this is knee lifts and 'Star' jumps. A simple test for speed is the 30 metre sprint and all this involves is sprinting as hard as you can for this distance and recording the time at the end and the advantage of this is that the equipment is readily available. The FTG (fast twitch) muscle fibres come into benefit here because when doing running activities, energy is being released from muscular contractions very quickly and rapidly. You must have the ability to do this in Tennis, particularly when running from the position of the base line to coming in at the net for a volley.

- **Muscular Endurance** – This is the ability of a muscle or a group of them and trying to constant repeat a contraction against a resistance for a long period of time. A rich supply of blood will be received at the slow twitch muscles and this gives the most efficient production of aerobic energy. This is necessary due to the demands made through continuous heavy action in one way, such as the serve which puts pressure on the shoulder, the arm, the stomach and the back. Therefore these muscle areas should be built up in order to cope with this strain. There are many numbers of good strengthening programmes that may be worked out in a gym, using free weights. It is very easy to over bulk muscles through overtraining to the point where it becomes counter productive to Tennis. It relies upon the efficiency of the body to produce energy under both anaerobic and aerobic conditions. A test for this is the abdominal conditioning test where you perform as many sit-ups as you can, within a certain duration of time. You have to keep to the bleeps on the tape and your partner has to count the number of sit-up that is performed in that time. The advantages of this is that large numbers of people can take part at once, there is little equipment – so setting it up is quick and the abdominal muscles can be easily isolated.

- **Flexibility** – This is the range of movement possible at a joint and is determined by the elasticity of ligaments and tendons. The degree of movement is determined by the type of joint which is working. An example is the hinge joint at the knee (which is designed for stability). For a tennis player, the bending of the knees are important for producing top spin of a shot, as well as being about to position yourself with a volley. This allows flexion and extension at the lower leg at the uniaxial plane. The movement of many directions throughout the duration of a tennis match uses both the shoulders to produce the direction of where the shot is intending and the knees. A good test for this is the Sit and Reach Test where only a Sit and Reach box is required, and this gives an indication of the flexibility of the hamstrings and the lower back. The test is easy to set up and the data for comparison is of a wide variety.

- **Agility** – This is a skill related component and it is the ability to move and change direction and position the body quickly and effectively while under control.. In tennis, you need the ability to move from side to side, backwards and forwards. The development of this skill related component is limited. A test for ability is the Agility Test where four cones are placed, roughly three metres apart and to start off with, you need to lay flat on the floor at the start off position and running the course as quickly as possible. The advantage of this is that the testing procedure is simple and little equipment is needed.

- **Endurance** – Tennis is a game of explosive action and endurance training can be performed with on court practice activities and can train with equal amounts of steady jogging and exhaustive work. So for this, working out at the gym is good for stamina and examples of steady

state work would include distance and 'fartlek' training (which is variable pace running) while exhaustive work, a shuttle run between the court lines of the court would be excellent to do because it involves sprinting hard to touch each line in succession.

- **Co-ordination** – As a tennis player, co-ordination is key because it is the ability to perform motor tasks accurately and effectively. This is mostly important on a serve because the player must co-ordinate the toss of the ball with one hand with the striking of the ball with the racket head at the optimum position.

Previously, I performed:-

- a one minute Sit Up Test,
- an Agility Test,
- a Sit and Reach Test,
- a 30 metre sprint,
- A maximum oxygen uptake test.

Below are tables with the national averages for each test and I will make a comparison with my result and the national average result to see which category I fit into:-

Sit and Reach Test	
Rating	**Men**
Super	> +27
Excellent	+17 to +27
Good	+6 to +16
Average	0 to +5
Fair	-8 to -1
Poor	-19 to -9
Very Poor	<-20

In the Sit and Reach Test, I got +5 which again is average, so my flexibility doesn't need that much work on.

Agility Test	
Agility Run Ratings (seconds)	
Rating	**Males**
Excellent	<15.2
Good	16.1 -15.2
Average	18.1 – 16.2
Fair	18.3 – 18.2
Poor	>18.3

In the Agility Test, I got an average time of 18.67 seconds which is classed as 'Poor', according to the national averages. Maybe this is an area I need to improve on because agility is a massive requirement in tennis because you are moving in many different directions. My target for when I do it again would be to get into the average category.

Sit-ups						
1 Minute Sit up Test						
Age	**18 -25**	**26 - 35**	**36 - 45**	**46 - 55**	**56 - 65**	**65+**
Excellent	>47	>45	>41	>35	>31	>28
Good	44 - 49	40 - 45	35 - 41	29 - 35	25 - 31	22 - 28
Above Average	39 - 43	35 - 39	30 - 34	25 - 28	21 - 24	19 - 21
Average	35 - 38	31 - 34	27 - 29	22 - 24	17 - 20	15 - 18
Below Average	31 - 34	29 - 30	23 - 26	18 - 21	13 - 16	11 - 14
Poor	25 - 30	22 - 28	17 - 22	13 - 17	9 - 12	7 - 10
Very Poor	<25	<22	<17	<9	<9	7

In the sit ups, I did 35 sit ups which to my nearest age group is average, so I am relatively pleased with this, but I would like to improve this area slightly.

Safety Considerations

A warm up is very important before undergoing intense fitness training. It is intended to raise the body temperature and prepare a player physiologically and psychologically to compete in a competitive game. Research has suggested that the optimum duration of the warm up period, before flexibility or functional activities are undertaken, should be between 15 and 20 minutes. This should consist of a gradual increase in intensity until the player is working at 70% of maximal heart rate. A warm up at this intensity has the effect of allowing an increase in the range of movement of the joints and improving aerobic performance. This means the player becomes more flexible and running efficiency improves.

A warm up produces a 2 to 3 degree rise in body temperature that can last for 45 minutes. This increase in temperature leads to beneficial changes in body tissue:

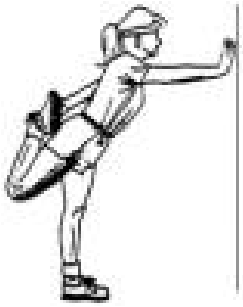
- The heating effect allows muscles and tendons to become more extensible. This makes stretching muscles and tendons easier and more effective. Research has suggested that this decreases the incidence of muscle strains.
- There is an increase in blood flow, which means that there is an increase in oxygen to muscle tissue.
- There is an increase in the temperature of the blood, which changes the partial pressure of blood gases. This means that more oxygen leaves the blood and enters muscle tissue.
- The increase in temperature causes a rise in enzyme and metabolic activity. This improves the efficiency of muscle contraction.
- By carrying out functional activities such as sprinting in the later stages of the warm up, there will be an activation of neural pathways, which speeds up reaction time during a tennis match.

The reason for doing the cool down is that during training sessions and matches the body's systems are maximally stressed. This leads to an increase in body temperature, heart rate and blood pressure. There is also a build-up of waste products (such as creatine kinase and myoglobin) in the muscles. In addition, the body releases hormones such as adrenaline and endorphins into the circulatory system. If an athlete simply stops after exercising, the levels of circulating adrenaline are high. The waste products in muscles are thought to cause tiredness and stiffness, and it is not good for anyone to have a rapid decrease in body temperature, heart rate and blood pressure.

For these reasons it is thought that a cool down is beneficial. It allows a gradual decrease in temperature, heart rate and blood pressure, back to resting levels. By gently working the major muscle groups, waste products are actively removed. During the gentle exercise of the cool down the body releases hormones that counter the effects of adrenaline and allow rest and sleep after exercise. Because of the increase in tissue temperature the post-exercise period is an ideal time to stretch and improve or maintain joint range of movement and flexibility.

Below are all of the stretches that I am going to uses in my warming up and cooling down .

	**<u>Achilles Stretch</u>** Calf Muscle--stand 3-4 feet from a wall, put your outstretched hands on the wall, and shoulder width apart. Keep the knee straight and the heels flat on the ground. Lean in towards the wall slowly, keeping the body and knee straight: Stop when you think the calf is at its limit...when it and the Achilles tendons feel stretched. **Muscles used: - gastrocnemius muscle, calf muscle**
	**<u>Groin Stretch</u>** Stand with your legs wide apart. Shift your weight to one side, bending your knee somewhat. Do not let your knee bend beyond your ankle; in other words, you should be able to look down and still see your toes. You should feel the stretch in your opposite leg, which remains extended. Both of your feet stay flat on the ground facing forward. Hold for 10-20 seconds, and then lean to the other side. **Muscles used: - Adductor muscles**
	**<u>Hamstring Stretch</u>** Extend one leg in front of you with the foot flexed. Bend your other knee and lean back slightly. Your pelvis should be tilted forward. Keep your upper body upright as you hold the stretch for 10-20 seconds, then switch sides. You should feel the stretch up the back of your extended leg (all the way up your calf and thigh). **Muscles used: - Hamstrings (Mid rear thigh)**

	**Quadriceps Stretch** Hold on to something for balance. Standing on one leg, grasp the foot of the other leg. Keep your knees pointing down. Pull up with light pressure. If it feels uncomfortable or painful, you are putting too much strain on the knee joint. Hold your foot behind you for 10-20 seconds, then switch sides. You should feel the stretch in the front of the thigh. **Muscles used: - Adductors (Inner Thigh), longus, magnus, brevis**
	**Tricep Stretch** Bring one of your elbows across your body, towards the opposite shoulder. Use your other hand to bring your elbow closer to your shoulder. Hold for 10 to 20 seconds, then switch sides. Alternate method: raise your arm over your head and bend your elbow all the way so your hand is behind your neck. Use your other arm to stabilize your elbow. Hold for 10-20 seconds, then switch sides. You should feel either of these stretches in the back of your arm. **Muscles Used: - Triceps (Mid Point Arm)**
	**Hip Stretch** Stand with one foot in front of you and your weight equally distributed between them. Bend both knees and lift your back heel off the ground. Bring your pelvis forward so your back is flat. (You can lean against a wall or column for balance.) Hold for 10-20 seconds, then repeat on other side. You should feel the stretch in the front of the hip and into your abdomen. **Muscles Used: - Quadriceps (Mid Lower Thigh), gastro/soleus**

As I am doing these exercises, I will need to consider the safety aspects:-

- ✓ When doing sit-ups, never push through back pain. Stop immediately at even the slightest twinge in the lower back. Sit-ups can be hazardous to your lower back, especially when using the straight-leg variety, which arches the back and may create overextension and strain. Twisting (right elbow to left knee and vice versa) at the top of the sit-up movement is not only useless, it places tremendous rotational stress on the lower back that can lead to injury.
- ✓ Make sure that the equipment that I will use works correctly, such as the treed mill.
- ✓ Make sure I know how to use the equipment before I start.
- ✓ Make sure that the step up block is at a comfortable height for jumping onto.
- ✓ Don't over stretch the muscles, as I have specified for each stretch, I will not stretch no longer than 20 seconds on each stretch.
- ✓ Learn to breath properly, particularly for stamina training and should avoid prolonged breathe holds during repetition, or otherwise this can lead to a blackout or fainting.

- ✓ When I feel that I have put to much strain on my muscles, I will take recovery time before undergoing the next exercise.
- ✓ Use the correct techniques for the exercises.
- ✓ The right environment, in my case, I will be using the tennis court.

Suitablility/Purpose of Exercises

In my Personal Exercise Programme, I am going to concentrate on **three training methods**:

- ❖ **Continuous Training**

Continuous training is when an athlete exercises in a steady aerobic way and interval training is the repetitions of work with a recovery period following each repetition. For my particular sport (Tennis), running at 60 – 75% of my maximum heart rate would be useful for a duration of 45 minutes at a slightly fast pace improves the cardiovascular system.

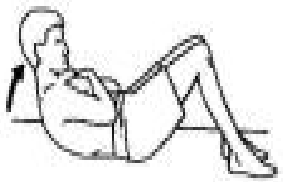
- ❖ **Interval Training**

I will undergo Interval running which enables the athlete to improve the work load by interspersing heavy bouts of fast running with recovery periods of slower jogging. During the run lactic acid is produced and a state of oxygen debt is reached. During the interval (recovery) the heart and lungs are still stimulated as they try to pay back the debt by supplying oxygen to help break down the lactates. The stresses put upon the body cause an adaptation including capillarisation, strengthening of the heart muscles and improved oxygen uptake. All this leads to improved performance, in particular within the cardiovascular system – (useful for stamina).

When doing Interval Training, I will undertake a period of Continuous running before starting Interval running. All changes should be gradual in nature and take place over a period of time. I need to make sure that the surface that I will be running on is flat and even, so I will be doing my training on the tennis court with the shuttle run and many other running activities. I will need to consider the various elements of the session, such as the length of the work interval; the pace should be comfortable raising the athlete's heart rate to the required % of MHR. The number of repetitions should reflect the condition and age of the athlete and the rest interval should enable the athlete to jog and bring the heart rate down to near 100-110 beats per minutes.

These are the exercises that I will do in the Personal Exercise Programme

	**<u>The Shuttle Run</u>** With the shuttle run, you have to sprint hard and touch all the lines with your right hand and you must time yourself and keep a record and work to improve your time. In this particular diagram, you have to run along the baseline between the two singles court sidelines. Then you have to repeat five times, turning on alternate feet each time.

	**Sit ups** Lie on your back with your feet flat on the floor, legs bent at a 45 degree angle and hands resting underneath the neck. It is very important to press the small of your back into the floor throughout the duration of the exercise to guard against back injury. Lift the back and head off the floor and towards the legs. The feet, buttocks and small of the back remain on the floor. There is no need to bring your head and body right up against your thighs, if you keep your abdominal muscles clenched you will get the desired effect. Roll the shoulders upwards towards the knees, lifting the head and top of the back off the floor. The lower back then goes to the ground and into the starting position. **Muscles used: - lower abdominal muscles, sartorius**
	**Step ups** Step onto box at walking pace, leading with the left leg. Counting only the left leg step-ups, perform five sets of 30 repetitions. Complete five sets of 30 repetitions as before but at jogging pace. With one leg on the box, alternate left and right legs in a jumping motion - perform five sets of 30 repetitions. Jump on and off the step with both legs, completing five sets of 10 repetitions, After that, rest for 2-3 minutes in between sets and stretch the calf, quads and hamstrings.

Application of theory

In this Personal Exercise Programme, I will be using many principles of training, including:

- Specificity
- Progressive overload
- Reversibility
- Tedium.

✓ **Specificity**

The training undertaken must be relevant and appropriate to the sport that I am taking, which is tennis, so if I am concentrating on stamina, I must do training relating to stamina and nothing else. Specificity governs muscles and fibre types, but also all the energy systems which have been exerted during exercise. The energy systems must be worked in isolated conditions at a high intensity. I will be staying with my Personal Exercise Programme and I may make small alterations or modifications relating to the workload and the intensity.

✓ **Progression overload**

This is done to monitor the improvements to certain aspects to training. This type of training must put stress and discomfort to the body, this is known as overload. But if exercise is undertaken on a regular basis, the body can adapt to these stresses that exercises does to the body. In time however, the intensity of training will increase and this is known as progression. You can progress by running

faster, or training for longer. I could do this by increasing the number of repetitions or incorporate more exercises that are relevant to my Programme.

- ✓ **Recovery**

Known as regression and it is when the intensity of training decreases for an extended period of time. This is also when a player's form deteriorates and this leads to the cardiac output and the stroke volume to decrease. So in the programme, this will be the cooling down method. I will experiment with recovery time in terms of whether it will improve my endurance, if not, then I will shorten the recovery time which will increase the intensity.

- ✓ **Tedium**

Being able to make the training schedule exciting, and having a variety of different exercises.

Within my personal exercise programme, I will be incorporating tedium because it will encourage me to keep going with the training. So a variety of stretching such as the Achilles stretch and the groin stretch. So for stamina, I will incorporate Continuous training and Internal training. It is important to have a recovery time. In a game of tennis, you usually have a 30 second break after every odd number of games. I will keep my programme specific, only doing what I need to do.

The **F.I.T.T** Regime will be used to calculate the:

- '**F**' – The frequency of training, how many times I am prepared to train throughout a period of time. For example, any aerobic activity can be done at least five times a week, whereas any anaerobic activity can be done at least three times a week, it depends on the area that I need to improve on. In my case, it is stamina that I need to improve on, which is an aerobic activity would have to be perform five times a week

- '**I**' – The intensity of training. As stamina is aerobic, this can be measured by calculating the 'Training zone' – comparing the differences between minimal and maximal heart rate. To work out the maximal heart rate reserve, you subtract the minimum heart rate from the maximum heart rate. To work out the maximum heart rate for myself, I would need to subtract 16 (my age) from 220. I will need to find 60% and 75% for the training heart rate. So for example, if I was to work out 60% of the training heart rate, this is how I would calculate it:-
  = 0.6 (204 – 65) (Maximum heart rate – resting heart rate)
  = 83.4 + 65 (answer + resting heart rate)
  = 148.4 beats per minute

- '**T**' – This is the time and duration of each exercise. For stamina, I would need to roughly have to work 25 – 30 minutes until I get my maximum heart rate.

- '**T**' – The type of training undertaken, such as fartlek training.

For my personal exercise programme, I am going to try my hardest to achieve optimal performance. This programme will last for six to eight weeks, and this period of time is known as meso-cycle, as this period concentrates on the weaknesses of the athletes, so that they can get ready for the competitive season. This period is the preparation period, so it is like a pre season for football.

Aerobic activity within this period would include steady running, fartlek training, weights and circuits.

It is important however to not over train within this period. Overtraining is caused by the imbalance of training and recovery. To achieve the optimal performance, you would need to increase the training loads and frequency training above optimum levels. To reduce overtraining, prolonged rest is needed and a reduction in workload for a certain period of time.

Also there are seasonal factors which can cause problems. In the summer, a tennis player is playing for long periods in hot environments and this causes an imbalance of Fluid intake and leads to changes in fluid balance which may affect ionic concentration and contribute to fatigue. Even in a match lasting just two hours, at high temperatures, a water loss of around 2 litres must be expected, and even small water deficits (2% body weight) have been shown to impair key elements of mental performance, thus emphasising the need for continuous and sufficient hydration.
Heat acclimatisation can be a key factor here, since players who have been training regularly in a hot environment for several weeks will sweat more readily but with reduced sodium concentrations, and are capable of maintaining a higher sweating rate for a prolonged period of time.