

E.L.I.T.E. Table Tennis Club

卓越乒乓球會



Table Tennis Training Course

-A Beginner's Guide for Junior Players-

by

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Contents

Introduction

Administration

Equipment

- The table
- The net and posts
- The ball
- The racket
- The rubber
- The glue
- The clothing
- The accessories

The grip

The ready position

The spin

- The effects of spin – topspin, backspin, sidespin

Warm up & Cool down

Physical exercises

Bat & ball exercises

The basic strokes

- Backhand push
- Forehand drive
- Backhand drive
- Forehand push

Service

Service return

Footwork

Practice

- Technical practice
- Tactical practice

Advanced strokes

- The loop
- The block
- The chop
- The lob
- The advanced service
- Others advanced strokes

Training program planning

Rules & regulations

Mental training

Sports nutrition

References

Introduction

Table tennis is one of the world's most participated indoor sports. It is an Olympic sport and Paralympic sport. It can be played as a highly athletic and competitive activity or as a relaxing and healthy recreation. It is a sport for all. It can be played by the young and old, males and females, by the fit and not so fit, by the able bodied or those with disabilities, even on wheelchairs.

Table tennis requires relatively inexpensive equipment and it is possible to learn the game in a short period of time, although mastering the game requires time and effort.

This publication is aimed at introducing junior beginners to the elements of the game, using simple and clear instructions, making it easy to understand and learn the game.

A table tennis table, a racket and a small ball can be the beginning of a lifetime enjoyment and adventure.

Enjoy the game and Good luck!

Administration

The International Table Tennis Federation (ITTF), made up of member countries' national governing body associations, is responsible for the game's rules.

The Oceania Table Tennis Federation (OTTF) is responsible for the administration of the sport in the Oceania region.

Table Tennis Australia (TTA) is the governing body of the sport in Australia.

Table Tennis New South Wales (TTNSW) is the governing body of the sport in the State of New South Wales in Australia.

E.L.I.T.E. Table Tennis Club is a non-profit organisation duly incorporated in New South Wales for the sport of table tennis.

Equipment

The table

Table tennis table are 2.74m x 1.525m (9ft x 5ft), with a surface thickness of 22-25 mm (0.8-0.98in).

The table stands 76cm (2ft 6in) above the floor. Smaller mini tables are available for the younger players. The edges of the table are marked with a white line that is 2cm (3/4in) wide. A continuous white line, 3mm (1/8in) thick, divides the table into two halves, and marks the service area for doubles.

The colour of the playing surface is regulated by the ITTF and must be dark matt in various shades of green or blue. The overall playing area for one table must be at least 14m (about 46ft) long, 7m (about 23ft) wide, and 4m (about 13ft) high. The minimum strength of light at every point must not fall below 1000lux. The floor must not be made of concrete, brick, or stone, and it must be flat over the entire playing area. The surrounding area must be of a dark colour.

The playing surface of the table must be such that a ball dropped vertically onto it from a height of 30cm (1ft) bounces back to a height of at least 23cm (about 9in).

The type of bounce that the table provides is determined not only by the choice of material used for the playing surface (chipboard or plywood), but also by the type of leg (wood or metal), as well as the quality and thickness of the varnish on the playing surface.

'Rollaway' tables on casters are becoming increasingly popular as they are easy to move around and require far less space for storage.

The net and posts

The top of the net is 15.25cm (6in) above the playing surface. The net posts clamp to the playing top so that the net is held firmly in place. The net usually has cord through the top of it so that the tension can be adjusted. Most nets and posts are easily removed from the table for easy storage.

The ball

Balls are made of celluloid or plastic, and are white, yellow or orange in colour. The ball in the past has been 38mm in diameter and weighs 2.4-2.53 grams. A new rule has been passed by the ITTF in 2000 and all national and international tournaments are now using balls of 40mm in diameter.

It is claimed that the bigger balls have the effect of reducing the spin of the balls by 23 % and speed by 13%. The rationale behind the change is to slow the game down so that there will be more rallies and therefore more spectators will be attracted to the game.

The quality of the ball is determined by a 'star' rating: the higher the rating, the higher the quality. Generally 3 star balls are the best quality. All official competitions are played with 3 star balls.

The rackets

Table tennis rackets (or bats) may be of any size, shape or weight. They are made of a wooden blade and normally two rubbers. Penhold rackets may have only one rubber on one side. Typical blades have handles that are straight, anatomic, or flared. Blades vary according to the layers of plywood, weight and speed and control. The number of layers and the softness or hardness of the wood affects the speed and control of the blade. Greater speed generally means less control. Slow blades are made of three-ply wood, whereas very fast blades may be seven-ply with additional layers of carbon or fibre glass or titanium or other high tech materials inserted in between the layers.

The rubbers

The rubbers have a smooth side and a pimple side. Most are used in conjunction with a layer of sponge of varying thickness (0.5-2.5mm). The total thickness of the covering (rubber and sponge) on either side of must not be more than 4mm.

Rubbers are usually reversed pimple (smooth side out) but more advanced players may use short pimple, long pimple rubber or anti-spin rubber, or a combination, ie. two different rubbers. Different types of rubber have different characteristics in terms of speed, spin and control. As your game develops, your coach will advise you on the most effective rubber for your style of play.

Rubbers must be red on one side and black on the other. In case of a penhold player where one sheet of rubber is used, the bat must still be red on one side and black on the other. This is usually done by staining the blade.

The glue

In the past 10 years, a new type of glue has been used by nearly all top players in the world to increase the spin and speed of the rubbers. The so called “speed glue” (or flesh glue) was at one stage banned because of the toxic nature of some of its components. However manufacturers have worked together to eliminate the toxic substances from the glue and the current versions of speed glue on the market are generally approved by ITTF.

When applied to the sponge and the wood prior to a match, it is alleged that the glue will increase the speed and spin of the rubber by up to 30%. There are various theories as how the glue works. One is that the porous cells of soft sponge are forced to expand due to the chemical vapors of the speed glue. Since the top rubber sheet was originally attached to the sponge base in a non-stressed condition, then it too becomes stretched. This causes an extra “kick” or mini-trampoline effect.

The speed glue’s advantages and disadvantages are as follows:

Advantages :

- Adds spin and speed to soft sponge rubber without giving up significant control.

Disadvantages :

- Sometimes the effect is inconsistent.
- Takes practice to find optimum amount of glue to use per sheet and to know how long the effect will last.
- New sheets take several re-gluing before they behave optimally.

There are specifically designed rubbers on the market to make use of the effects of the speed glue.

As the governing body of the sport is very concerned about the safety of use of the speed glue, all gluing in major tournaments must be done in a specifically designated area or room. No gluing is allowed on the playing area.

The clothing

As table tennis is a fast game, the clothing worn should be comfortable and not restrict movements. It should be made up of light and easily washable materials and in colours that contrast with that of the ball. Shirts are usually short sleeved and shorts should be loosely fitting and made of light and airy fabric. Socks may be of any colour but should be thick, preferably made of cotton which absorbs perspiration.

Playing shoes should have a good grip but must be light and flexible for the fast movements that are required. The shoes should support the heel and the instep.

There are specifically designed table tennis clothing and footwear in the market. Ask your coach for more information.

Please note that baseball caps, basketball or soccer shirts, shorts and shoes are not designed for the game of table tennis and should not be worn during table tennis training sessions.

The accessories

- Racket covers
A racket cover may hold one or two rackets and comes in various shapes. Some covers have extra pockets or provision to carry balls.
- Rubber spray
Comes in spray cans and is used to remove dirt and grease from the surface of the rubbers.
- Sponge
Used to wash pimples rubber surfaces and when dampened, it removes surface dirt.
- Edging tape
Prevents separation of the rubber surfaces and protects the edges of the blade against damages.
- Handle tape
Usually a piece of soft leather, wound around the handle to absorb the perspiration during play.
- Training bag
This should be large enough to contain everything needed for the game, and also for maintenance of personal hygiene after playing. If you are playing in tournaments which lasts for a few days, ensure that the bag is big enough to accommodate all the equipments.

The grip

There are two ways of holding a table tennis racket; the shakehand grip and the penhold grip.

The shakehand grip is increasingly popular with players because it has the option of using both sides of the racket and consequently using two different types of rubber surface. However recent penhold grip players, mainly from China have adopted a penhold style which use both sides of the racket. Beginners are encouraged to adopt a grip style that is most comfortable to the player.

Penhold grip

This grip is similar to that used to hold a pen. The ball is hit using only one side of the racket which is covered in rubber. However as mentioned above, some penholders now use rubbers on both sides of the racket. The remaining fingers support the back of the handle.

Within the penhold grip, there are two variants, the Chinese penhold grip and the Japanese penhold grip.

The Chinese penhold grip is similar to holding a pen between the thumb and forefinger. The racket head points downward, with your three fingers curled and centered onto the back of the racket, while the racket handle, held between the thumb and forefinger, points upward. Because your wrist is relatively free, this is an excellent grip for both the forehand stroke and forehand serving. The main drawback is using the same side of the blade for the backhand, it cramps the backhand and makes a forceful shot from this side of the table very difficult. This grip requires exceptional good footwork.

The Japanese penhold grip is similar to the Chinese penhold grip except that you do not hold the racket straight up and down, but directly out to the side.. Here the racket, nestled tightly between the thumb and forefinger, becomes nearly an extension of your arm. Unlike the Chinese penhold

grip, your fingers are fully extended and centered down the back of the blade. This grip allows for a powerful forehand and easier backhand than the Chinese penhold grip. However with the wrist mostly locked into position, touch and spin shots are more difficult. You still have the same problem with the backhand and good footwork is essential.

Shakehand grip

The handle is held using the palm of the hand, with the index finger outstretched and always resting on the back side of the racket. The position of the thumb indicates the forehand side of the racket. The depth of the grip is a matter of preference. A shallow grip will have more flexibility and a deeper grip will have more control. You can keep your wrist loose to increase the spin on a particular shot or you can stiffen it for a higher percentage, lower spin shot.

The shakehand grip is the most preferred grip of most players in the world. It allows both strong forehand and backhand to be played.

The ready position

The correct stance and position at the table is of great importance when you are learning the game.

A player should stand in a position at the start of every rally that allows him to move quickly in any direction. The knees should be slightly bent with the weight forward in order to lower your centre of gravity. Your body weight should be rested on your toes with your heels slightly raised. The legs should be apart slightly more than the width of your shoulders in order to stabilise your position. Your free hand should be kept bent at the elbow. The upper and lower body should be balanced.

The bat should be held above the height of the table and in a neutral position so that you can play a forehand or backhand equally quickly.

The spin

Table tennis evolves around different types of spin. The type of spin applied to the ball depend on various factors. The most important are: a player's position in relation to the ball, the ability to read the type of spin, and the type of bat used.

Topspin

Topspin is produced by starting the stroke below and/or behind the ball and contacting the ball as lightly as possible, ie. brushing the ball in a upward and forward motion.

Backspin

Backspin is produced by starting the stroke above and/or behind the ball and contacting the ball as lightly as possible, ie. brushing the ball in a downward and/or forward motion.

Sidespin

Sidespin is produced by brushing across the ball lightly. This spin can be imparted in addition to topspin or backspin to make it top side spin or back side spin.

Warm up & Cool down

Before taking part in any physical activity, players should spend at least a few minutes warming up. Warming up helps to warm the muscles and so prevent injuries; it also mobilises the joints and raises the heart rate.

The warm up should begin with general body exercises such as light jogging or skipping which should be slowly increased in intensity. These should be followed by static stretching exercises covering the whole body, beginning at the top and working down as follows:

- Neck and shoulders
- Arms/wrists and chest
- Lower back and stomach
- Groin and hips
- Upper leg/hamstring
- Knees
- Lower leg/calves and ankle

The warm up should take place just prior to the beginning of the practice session or match.

Cool downs after exercise will help to avoid any stiffness or soreness in the muscles. Slow jogging or walking and light stretching are ideal and should be continued for a few minutes until the body returns to a near resting state.

Physical Exercise

General physical fitness, which includes strength, speed, agility/flexibility and endurance are important if you want to improve your standard in table tennis.

Strength training

Simple resistance training includes, push ups, sit ups, abdominal crunches, dips, squats, calf raises, back/scissors raises can ensure that your bones, ligaments, tendons and muscles have the basic strength to handle the training.

Advanced players may require training with weights. Done correctly, weight training will improve your speed of movement and muscle to fat ratio, making you fitter.

Speed training

The following exercises are examples of speed training in table tennis and are by no means exhaustive:

- Take large steps to the right, over 3-4m, the step back to your original position, moving as quickly as you can. Repeat the exercise for 20 seconds.
- Using a running action, move forward over a distance of 3-4m, before “running” backwards to your original position. Repeat the exercise for 20 seconds.
- Run back and forth several times over a distance of 15m within a set time limit, keep increasing your speed within the same time limit, and take a 1-minute break after each session.

Agility/Flexibility training

Table tennis utilises all the major muscle groups. Therefore you should stretch each of these muscles thoroughly before you begin play.

There are two specific rules in stretching:

- Perform each stretch slowly so that the stretching feels relaxed and not strained. You should never feel pain when you are stretching.
- Hold each stretch for at least 20 seconds and maintain your breathing during the stretch.

Stretching exercises should be incorporated as often as possible in your warm up and cool down routines. For examples of different stretches, refer to Appendix 1.

Endurance training

This should be incorporated in the above training methods by prolonging the time and intensity of exercise.

Examples of endurance training are 2000m run, 5000m run, 2400m variable speed run and skipping (5-8 minutes). Cross country run can also be included.

Bat & Ball Exercises

For beginners, the following exercises can assess and improve your ability to judge the direction and speed of the ball by using the bat and the ball.

Bat exercise

Step 1

Starting in the ready position, bounce the ball on your bat by alternating between forehand and backhand strokes. Start by bouncing the ball quite high then gradually reducing the height. Once you have mastered this, try bouncing the ball by alternating between one side and the edge of the bat.

Step 2

Stand 2-3m from a wall. Try to hit the ball so you can return it as the ball bounces off the wall. Initially only play backhands, then alternate between two sides.

Step 3

Stand 3m from the wall and hit the ball so that it returns to you after bouncing off the floor.

Ball exercise

Step 1

Using one hand, throw a ball against a wall, and catch it with the other hand. Do not follow the returning ball with your eyes, but keep it within your field of vision.

Step 2

Stand 5m from your partner and throw the ball to each other. Gradually increase the degree of difficulty by varying the speed and type of throw. You can also perform this exercise on your own. Throw the ball against a wall and catch it as the ball returns, first with both hands and then one hand. You can make the exercise more difficult by using a second ball. Building up speed, try various ways of passing the ball to your partner, such as bouncing it off the floor, while your partner throws the ball up high. The final part of the exercise is to throw two balls simultaneously to your partner. This helps to combine your reflexes with improved eye-to-hand co-ordination.

Step 3

Stand 3m from a wall, with your partner. The distance between you and your partner should be 2-3m. Throw the ball against the wall so that it bounces towards your partner, who catches it and throws it back. Vary this exercise by throwing the ball with a bounce, so that it goes floor-wall-partner or wall-floor-partner.

Step 4

Place container about 2m from the wall. With your partner, throw the ball into the bucket by bouncing it against the wall followed by the floor, or the floor then the wall.

The basic strokes

Backhand push

From the ready position, the ball is hit with an open bat angle imparting slight backspin on the ball. The body action is limited as the ball is played in front of the body with the player taking a square stance. The stroke is short with movement coming from the elbow and with a short follow through towards the bottom of the net. The free arm helps the player to maintain balance.

This stroke is commonly used to return short balls and backspin services.

Forehand drive

From the ready position, the body turns to the right so that the ball is hit from a side –to-square stance. The bat angle is closed and the player imparts topspin on the ball by using a “saluting” action. The stroke is of medium length with the ball being hit at the top of the bounce. Initially almost straight, the playing arm is bent at the moment of contact with the ball. The free arm assists with balance and body rotation. Weight is transferred from the right to the left foot as the ball is hit while the body weight moves forward.

This stroke is used to return any long balls and to hit any high balls with the aim of winning the point quickly. In order to hit a high ball, the player needs to use a longer stroke known as “smash” or a “kill”. When the forehand drive is played with a very short stroke and the ball is hit before the peak of its bounce, the stroke is known as a “block”.

Good footwork is essential so this stroke can be played from the backhand corner of the table.

Backhand drive

This is similar in technique to the backhand push except that the bat angle is closed so that topspin can be imparted by the bat arm moving in a down-to-up direction. The follow through finishes with the bat pointing towards the top of the net.

This stroke is used to counteract top-spun balls and to return topspun serves.

Forehand push

From the ready position, the player plays a short stroke with an open bat angle, imparting slight backspin on the ball. The body position is side-to-square to the line of the ball. The player is close to the table with the bat arm moving from the elbow. The free arm again assists with the balance and body rotation.

The forehand push may be used to play any short balls that cannot be attacked.

Service

While the serve is used to start a game, it can also give the server an enormous advantage. The service is one of the most complex elements of the game, in view of the range and degree of spin that can be imparted on the ball.

In the early learning stage, a player should concentrate on two factors:

1. the length of the serve
2. the type of spin

Topspin and backspin serves can be learnt easily from the same techniques that are used to play the four basic strokes. If a player focuses on positioning these serves (both long and short) then the variations are immense.

The service law states:

*From the start of service until it is struck, the ball shall be above the level of the playing surface and behind the server's end line, and it shall not be hidden from the receiver by any part of the body or clothing of the server or his doubles partner; **as soon as the ball has been projected, the server's free arm shall be removed from the space between the server's body and the net.***

At the start of service the ball shall be stationary, resting freely on the flat, open palm of the server's free hand, behind the end line and above the level of the playing surface.

The server shall then project the ball near vertically upwards, without imparting spin, so that it rises at least 16cm after leaving the palm of the free hand.

As the ball is falling from the highest point of its trajectory, the server shall strike it so that it touches first his court and then, after passing over or around the net, the receiver's court; in doubles, the ball shall touch successively the right-hand court of server and receiver.

The ball and racket shall be above the level of the playing surface from the last moment at which the ball is stationary before being projected until it is struck.

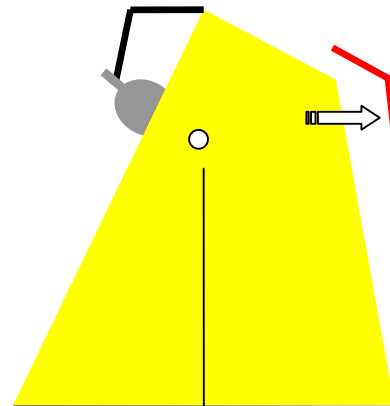
When the ball is struck it shall be behind the server's end line but not further back than the part of the server's body, other than his arm, head or leg, which is furthest from his end line.

“Where ?”

“The space between the server's body and the net” is the imaginary vertical four-sided column defined by the farthest parts of the **net posts** and the 2 parts of the server's trunk (= body except head legs and arms) being **farthest left** and **farthest right** relating to his end line (see **shaded** area at the attached figure!).

“When ?”

The **free arm** (= the arm connected to the free hand as in 2.5.6) has to be **removed** from the space described above at **the moment the ball leaves the free hand** and has to **remain outside** this space **until the ball is struck**.



The service begins when the ball and the bat are held above the height of the table, and the ball is in play the moment it leaves the hand. A poor throw or a miss with the bat is a lost point.

A good service must bounce on both sides of the table. In singles, the ball may bounce anywhere but in doubles it must bounce diagonally from the right hand side.

If a service ball touches the net, but is otherwise correct, the umpire calls a "let" and the serve is taken again.

The choice of service is decided by the toss of a coin. The winner of the toss may choose to serve, to receive the service or which end to start play from.

If he chooses either of the first two options, his opponent may choose the third and vice versa.

Service return

The player who is returning the service should be in the ready position, so that he can move easily in any direction to cover all possible angles that the server may use. The stroke used to return service depends on the type of serve, but generally speaking forehand and backhand drives are used to return topspin and long serves, whereas forehand and backhand pushes or flicks are used for short serves with backspin.

A good return is when the ball bounces once only on the receiver's half of the table. It must then be hit and returned to the opponent's side of the table without touching any obstacle (other than the net). There is no height limit to the path of the ball. If the ball touches any obstacle the ball is "dead" and the last striker loses the point.

A good return can pass over the net at any point in its length, or around the side of the net post. It is also a good return if the ball passes under the net post.

A player is allowed to follow a spinning ball back across the net and strike it over the opponent's half of the table as long as he does not touch the net or net posts with his bat or clothing.

The main types of service return can be categorised as:

- defensive – typically used by defensive players in the form of a push or a chop shot.
- Aggressive – used by attacking players in the form of topspin, half-volley or smash.

Whichever stroke you choose to return a short service, you should position yourself with the right leg forwards (or the left leg forwards if you are a left hander). At the point of impact with the ball, move the body weight onto that leg. After playing the shot, push against this leg in order to return to the ready position. To return a long service on the forehand side, assume a position with the right leg placed slightly back, and use this leg to return to the ready position after you have played the ball. When returning a long service on the backhand, move your left foot back slightly and use it to return to the ready position, after playing the stroke. Having learned the backhand and forehand drives, use this method to return a long service.

Footwork

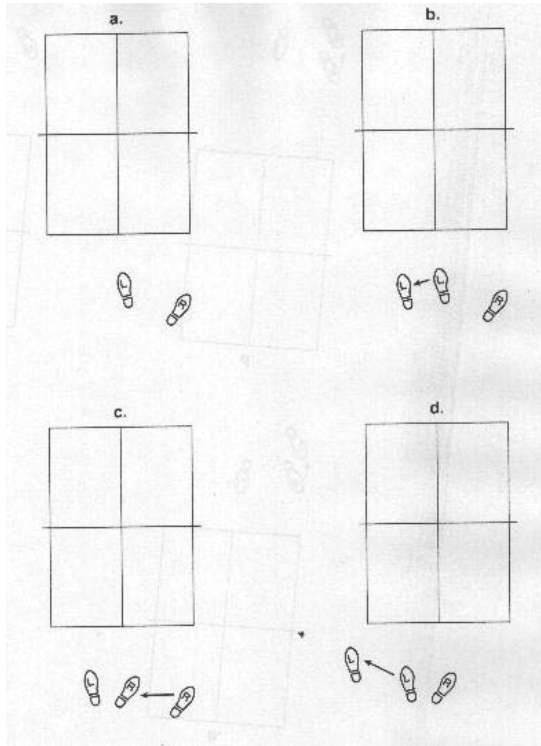
Footwork is important in table tennis. Stoking techniques will be of little benefit if you are constantly in the wrong position to utilise them. There are 4 elements of good footwork:

1. knowledge of the steps
2. foresight/anticipation
3. return to the ready stance
4. physical fitness

There are 4 primary footwork techniques:

Lateral Two-Step

This is a short distance footwork technique which enables you to move quickly and with good balance from side to side.

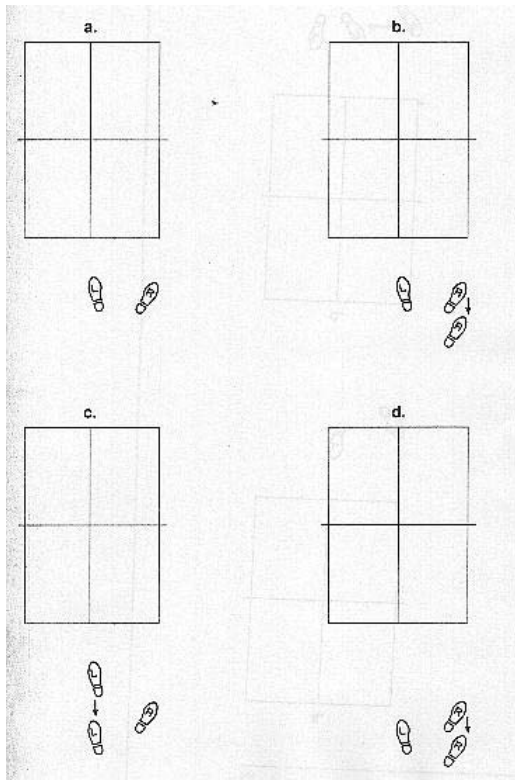


To move quickly from the FH to the BH side, begin from the FH corner, lift your leg so it just clears the floor, then push off with the right foot. With the momentum from the initial thrust, bring your right foot over until it nearly hits the heel of the left and set it down. Then move the left foot outward so you are in a balanced position. You can now hit the ball from the BH corner.

To move back to the FH side of the table, do exactly the reverse. Push off with the left foot and bring the right foot to the right side. After bringing the left foot to the heel of the right, move the right foot out and ready yourself. You can now hit from the FH side of the table.

Up-and-Back Two-Step

This allows you to change your depth position as needed. It helps you to move efficiently either away from the table, if you are at the table and being attacked, to toward the table, if you are away from the table and have to move forward.



When at the FH side of the table and preparing to move back to play a FH, lift your right foot off the floor. With the left foot anchored, move the right back. Then move your left foot behind the right. Last, move the right foot about a foot behind the left. You are now set for a FH shot. Movement toward the table to play a FH is merely the reverse of this.

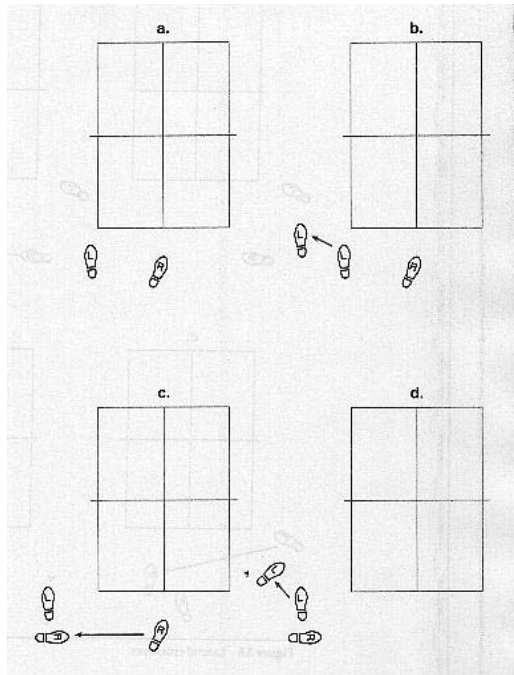
At the BH side, the movement is similar when moving away from the table, but the right foot is even with or slightly in front of the left at the start. First, lift your left foot off the floor and push off with the right, moving your left leg back. With your left foot planted, move the right foot behind the left. Anchor it, then follow by moving the left behind the

right. You are now ready to play a BH shot away from the table. The amount of space covered by each step will be determined by the total space you need to cover.

Movement toward the table will be exactly the reverse of this.

Backhand Corner Two-Step

This movement is almost the same as the lateral two-step. Here, however, the object is to enable you to play your FH from your BH side. FH attack shots from the BH corner are the most effective attack shots.

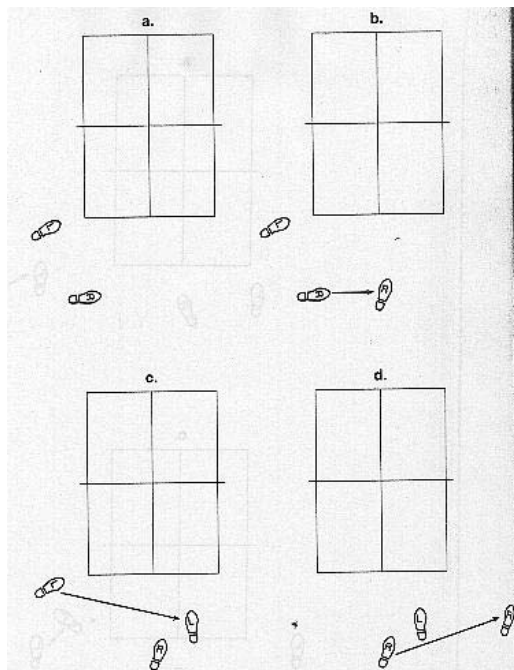


To play a FH when standing deep within the BH corner, two-step past the left end of the table so that the front of your body is nearly parallel to the table's side and perpendicular to its end. The footwork here is the same as in the lateral two-step. The only difference is that you are not moving laterally, but curling around the end of the table, moving both sideways and up. You are now in a position for a FH attack from deep within the BH corner.

To return to a set position in the BH corner, simply two-step back. Because this footwork takes you around the BH end of the table (both back and to the right), the footwork combines elements of the lateral two-step and the front-and-back two-step.

Lateral Crossover

This is the most difficult footwork technique to practise and incorporate in a game. Use it only to cover lateral distances over 4-5 feet quickly.



When moving from deep in the BH corner to the FH corner, first step outward as far as comfortably possible to the right with the right leg. Then, after bringing the left leg over and across the front of the right, swing the right leg out from behind the left foot and over as far as comfortably possible to the right. You are now in a position to hit.

When moving from the FH to the BH side, step outward with the left foot, cross the right behind the left, then throw the left out again to your BH end so you are in a set position in the BH corner.

Practice

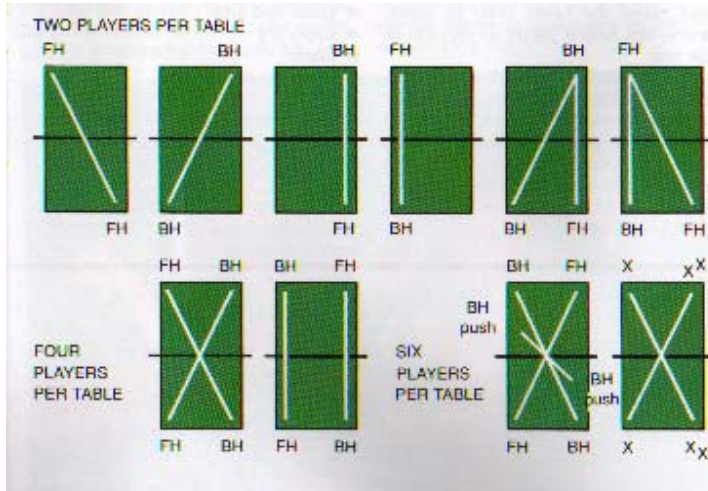
Practice can be divided into two elements:

1. practice to improve the strokes, ie. technical practice
2. practice to improve the tactics, ie. tactical practice.

Technical practice

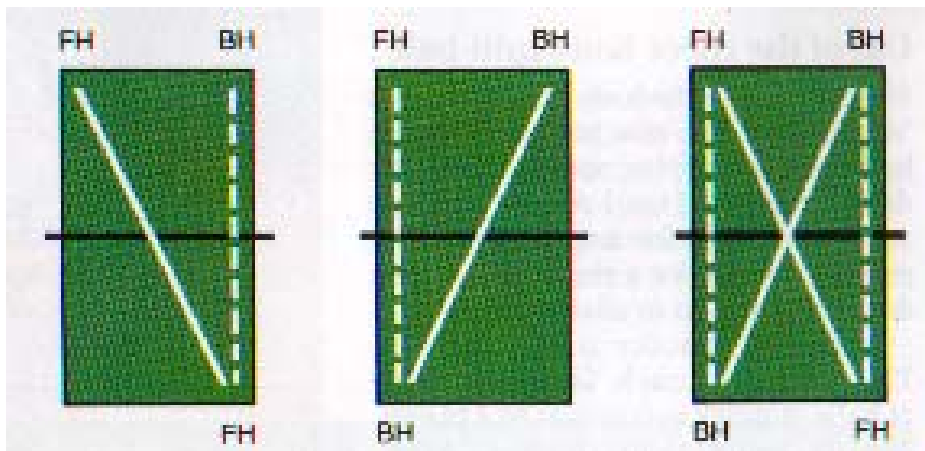
Stroke practice is either regular or irregular.

Regular practices involve situations in which the player knows where the ball is going to be placed. This allows the player to concentrate on improving techniques.



Technical practice: regular

Irregular practices involve an element of surprise when the player does not know where the ball is going. These practices are harder because the player has to look for clues from the opponent and learn to anticipate when the ball is likely to be hit in a different direction.



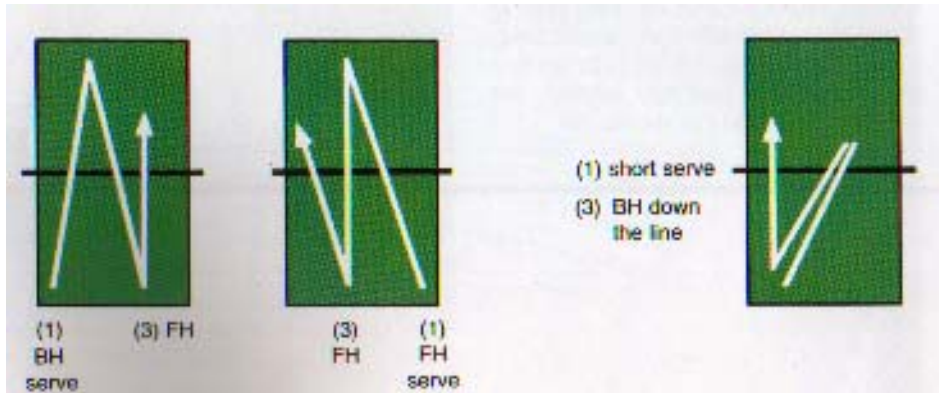
Technical practice: irregular

Play begins as indicated by a solid line and is then switched at random (dotted line).

Tactical practice

Tactical practices are very individual since the tactics that each player uses will depend on his style of play and his technical abilities.

Tactical practices should be devised to allow a player to play to his strengths while exploiting the opponent's weaknesses (if known).



Tactical practice

Eg. A player with strong forehand drive may practise fast topspin services followed by forehand drives, aiming to win the point on the third ball. A player with a strong backhand strokes may find that short backspin serves to the backhand side may result in greater chance to play a backhand on the third ball.

Use of Robot and multi-ball

Practices may include the use of a 'robot'. This is a machine that shoots balls out varying speeds and with different spins. If used properly, they are useful aids for improving strokes and footwork, especially if a practice partner is not available.

Multi-ball practice is also popular. This is when a coach feeds a number of balls in quick succession to a player. The feeder can vary the speed, spin and placement of the ball to offer a more realistic practice. This type of practice can be physically very demanding depending on the level of the practice.

Fun games

Table tennis is fun and there are numerous variations of the main game that can be used to arouse and maintain the interest of beginners while retaining a competitive element.

- **Overtaking**

The players balance the ball on their bats and run around the outside of the playing area. Anyone who is overtaken or who drops the ball is out. This can be advanced with players bouncing the ball on the bat, either forehand, backhand or alternating forehand and backhand.

- **Minute rallies**

Two players play a rally and count the number of strokes played in one minute. A variation is to count the number of strokes played without a mistake.

- **Round the table**

All players are at the end of the table with a feeder at the other end. After hitting the ball, each player must run around the table to rejoin the line. A variation is to have equal numbers at each end of the table and the players run to opposite end after hitting the ball. Players have three lives, one of which is forfeited on each mistake.

- **Team singles**

One player from each team plays a point. The losing player is replaced by the next member of his team for the second point. A player winning three points in a row must retire.

- Targets
 - A small target (eg postcard) is placed on the table. Two players play a rally on one diagonal where the target is) and score points as normal. If they hit the target they score two points.
 - A target (eg A3 sheet of paper) is placed on either side of the net. Each player serves alternatively, aiming to hit the target. When the target has been hit three times, the paper is folded in half. Each player aim to make his target smaller than his opponent's.
 - In teams, players serve to various targets of different sizes, scoring points if they are successful. Points may be allocated according to difficulty (size, position).

- Cricket

Each team has a minimum of three players. One team bats and the other fields. One of the fielding team throws the ball underarm over the net to bounce on the opposite side of the table. The batsman hits the ball so that it lands on the opposite side of the table and then on the floor before the fielders can catch him out. If successful he scores a run and continues his innings. He remains in until: he misses the ball; he misses the table; he hits the ball into the net; or he is caught out. When all the players on the batting side have an innings, the teams change over.

Advanced strokes

The block

The block is a variation of the forehand and backhand drive which is used to counteract the topspin. The ball is struck very early (before the peak of the bounce) with very little follow through of the bat, and so reduces the time that the opponent has to recover between the strokes. The stroke is played with a closed bat angle.

The loop

The loop is an advanced stroke in which accentuated topspin is imparted on the ball. It may be played on both backhand and forehand. To play the shot correctly, the player must accentuate his body movement by pushing strongly from the legs, using a longer stroke, and accelerating the bat arm, making light but fast brushing contact on the ball.

The chop

The chop is an advanced stroke in which accentuated backspin is placed on the ball. It may be played on both forehand and backhand. The chop is a development of the push strokes and is used to return topspin strokes when the player is away from the table. The chop differs from the push in that the stroke is longer, the ball is hit at or after the peak of the bounce, and there is greater body action.

Advanced service

Advanced players tend to use a forehand service from the backhand corner of the table to enable them to play the next stroke with their forehand. However the player must be very quick with his footwork as he may have to cover the whole table. A player may use a combination bat with different types of rubbers on each side when he is serving thus producing very different spin on the ball. A very loose grip is required so that a fast wrist action can be used to produce maximum spin. High tossed service is often used to produce a faster service.

Other advanced strokes

Top players use other variations of the strokes already described. These include topspins with early, peak and late bounce contact points; chop strokes with spin variations such as heavy backspin or float; drop shots and chop blocks. These strokes are beyond the scope of this publication.

Training program planning

Table tennis training must be organised and planned. A single session can be organised as follows:

- Warm up 10%
- Knock up 5%
- Regular exercises 45%
- Irregular exercises 25%
- Conditional play 15%
- Match play 15%
- Cool down 5%

When more than one session is planned, a physical training program should be incorporated. This should include work on stamina, speed, flexibility and strength. The intensity of the physical training will depend on the age and standard of the players.

Physical training can be performed on or off the table. Multi ball drills are ideal for on-table exercises, as are shadow play exercises.

Most stamina and flexibility work is practised off the table. This includes distance running, skipping and a variety of stretching exercises.

The competitive player needs to make long term plans called periodisation. The aim is to train so that the player can peak for important tournaments. A periodised yearly cycle for juniors would include three phases:

- Preparation
- Competition
- Rest

The preparation phase would be during the summer holidays. This time is used to concentrate on improving technique and tactical awareness.

The competition phase runs from February to about November. This is when players are competing in various competitions and trying to gain the best possible results.

The rest phase is about one month prior to the summer holidays. This is a time when players participate in other activities to maintain their fitness without getting stale by playing too much table tennis.

The timing of these phases will vary depending on the level of play and the location of play.

Rules & Regulations

A point begins with a service delivered by one of the players. In the course of a game, service alternates between both players, with each player having two consecutive services. The point is won when an opponent is unable to return the ball correctly. A match can be played over the best of either five or seven games. A game is won when a player has scored 11 points, with a lead of at least two points. If the score is leveled at 10:10, play continues until one player gains a two point lead, which wins the game. The break allowed between games is 2 minutes. If the match goes into a final game (either the fifth or seventh game), players change sides when one player has reached 5 points.

The service is the only stroke where the ball must first bounce in the server's court, and after crossing the net, bounce on the opponent's court. Subsequent strokes are played by hitting the ball so that it bounces only in the opponent's court. If the service bounces in the opponent's court having touched the net, the service must be repeated.

For the rules regarding service, see above section under "Service".

Mental Training

To be a winner, you must first think like a winner. There are several ways of orienting yourself to turn positive thinking into improved play:

Goal setting

Goals are important and essential in sport and setting the right kind of goals is the first important mental skill you must acquire to be successful in the sport.

The way in which you set goal strongly affects their effectiveness.

Before you start to set goals, you should have set the background of goal setting by:

- understanding your commitment to the sport
- understanding the level you want to reach within the sport
- knowing the skills that will have to be acquired and the levels of performance that will be needed
- know where this will fit into your overall life goals

The following broad guidelines apply to setting effective goals:

- **Positive Statement:** express your goals positively: 'To execute this technique perfectly' is a much better goal than 'don't make this stupid mistake'
- **Be Precise:** if you set a precise goal, putting in dates, times and amounts so that achievement can be measured, then you know the exact goal to be achieved, and can take complete satisfaction from having completely achieved it.
- **Set Priorities:** where you have several goals, give each a priority. This helps you to avoid feeling overwhelmed by too many goals, and helps to direct your attention to the most important ones.
- **Write goals down** to avoid confusion and give them more force.
- **Keep Operational Goals Small:** Keep the goals you are working towards immediately (i.e. in this session) small and achievable. If a goal is too large, then it can seem that you are not making progress towards it.
- **Keeping goals small and incremental** gives more opportunities for reward. Today's goals should be derived from larger goals.

A number of general principles should be noted about goal setting:

- **Set Performance, not Outcome Goals**

This is very important. You should take care to set goals over which you have as much control as possible - there is nothing as dispiriting as failing to achieve a personal goal for reasons beyond your control such as poor judging, bad weather, injury, excellence in

other athletes, or just plain bad luck. Goals based on outcomes are extremely vulnerable to things beyond your control.

If you base your goals on personal performance targets or skills to be acquired, then you can keep control over the achievement of your goals and draw satisfaction from them. For example, you might achieve a personal best time, but still be disqualified as a result of a poor judging decision. If you set an outcome goal of being in the top three, then this will be a defeat. If you set a performance goal of achieving a particular time, then you will have achieved the goal and can draw satisfaction and self-confidence from its achievement.

Another flaw is where outcome goals are based on the rewards of winning, whether these are financial or are based on the recognition of being a winner. In early stages these will be highly motivating factors, however as they are achieved, the benefit of winning another prize or championship at the same level reduces. You will become progressively less motivated.

One difficulty you will face is that people who are ignorant of sports psychology, such as many poor coaches, parents, media, fans, etc. base their assessment of success on winning. This completely ignores the effect of raw luck on high quality performance. As with many things, stick with what you know is right rather than what uninformed people think.

- **Set Specific Goals**

Set specific measurable goals. If you achieve all conditions of a measurable goal, then you can be confident and comfortable in its achievement. If you consistently fail to meet a measurable goal, then you can adjust it or analyse the reason for failure and take appropriate action to improve skills.

- **Set Realistic Goals**

Goals may be set unrealistically high for the following reasons:

- **Other people:** Other people (fans, parents, media) can set unrealistic goals for you, based on what they want. Often this will be done in ignorance of your goals and training programs.
- **Insufficient information:** If you do not have a clear, realistic understanding of your sport and of the techniques and performance to be mastered, it is difficult to set effective and realistic goals.
- **Always expecting your best performance:** Many people base their goals on their best performance, however long ago that was. This ignores the inevitable backsliding that can occur for good reasons, and ignores the factors that led to that best performance. It is better to set goals that raise your average performance and make it more consistent.
- **Lack of respect for self:** If you do not respect your right to rest, relaxation and pleasure in life then you risk burnout.

- **Setting Goals Too Low**

Alternatively goals can be set too low because of:

- **Fear of failure:** If you are frightened of failure you will not take the risks needed for optimum performance. As you apply goal setting and see the achievement of goals, your self-confidence should increase, helping you to take bigger risks. Know that

failure is a positive thing: it shows you areas where you can improve your skills and performance.

- Taking it too easy: It is easy to take the reasons for not setting goals unrealistically high as an excuse to set them too low. If you're not prepared to stretch yourself and work hard, then you are extremely unlikely to achieve anything of any real worth.

- **Setting Goals at the Right Level**

Setting goals at the correct level is a skill that is acquired by practice.

You should set goals so that they are slightly out of your immediate grasp, but not so far that there is no hope of achieving them: no-one will put serious effort into achieving a goal that they believe is unrealistic. However, remember that the belief that a goal is unrealistic may be incorrect. Such a belief can be changed by effective use of imagery.

Personal factors such as tiredness, injury, stage in the season, etc. should be taken into account when goals are set.

Now try setting some goals, and then measure them against the points above. Adjust them to meet the recommendations and then review them. You should now be able to see the importance of setting goals effectively.

Where Goal Setting Can Go Wrong

Goal setting can go wrong for a number of reasons:

- Outcome goals can be set instead of performance goals. Where an athlete using outcome goals fails to achieve the goal for reasons outside his or her control, this can be very dispiriting and can lead to loss of enthusiasm and feelings of failure. Always set performance goals.
- Goals can be set unrealistically high. When a goal is perceived to be unreachable, no effort will be made to achieve it. Set realistic goals. Conversely goals can be set so low that the athlete feels no challenge or benefit in achieving the goal. Setting goals has been a waste of time. Always set goals that are challenging.
- Goals can be so vague that they are useless: it is difficult to know whether vague goals have been achieved. If achievement cannot be measured, then your self-confidence will not benefit from goal setting, nor can you observe progress towards a greater goal. Set precise, quantitative goals.
- Goal setting can be unsystematic, sporadic and disorganised. Here goals will be forgotten, achievement of goals will not be measured, and feedback will not occur into new goals. The major benefits of goal setting have been lost. Be organised and regular in the way that you use goal setting.
- Too many goals may be set, leading to a feeling of overload. Remember that you deserve time to relax and enjoy being human.

Where goal setting does go wrong, not only are the benefits of goal setting lost, but the whole process of goal setting can fall into disrepute.

By avoiding these problems, and setting goals effectively as described above, you can achieve and maintain strong forward momentum.

Achieving Goals and Feedback

- Achieving Goals

When you have achieved a goal, take the time to enjoy the satisfaction of having achieved the goal. Absorb the implications of the goal achievement, and observe the progress you have made towards other goals.

If the goal was a significant one, or one that you had worked towards for some time, take the opportunity to reward yourself appropriately.

Feedback: Failure

Where you have failed to reach a goal, ensure that you learn the lessons of the failure. These may be:

- that you didn't try hard enough
- that your technique was faulty and needs to be adjusted
- that the goal you set was unrealistic etc.

Use this information to adjust the goal if it was set too high, or to set goals to acquire new skills or build stamina. Feeding back like this turns everything into a positive learning experience - even failing to meet a goal is a step forward towards perfect technique!

Remember that the fact of trying something, even if it does not work, often opens doors that would otherwise have remained closed.

Feedback: Success

Where you have achieved a goal this should feed back into your next goals:

- If the goal was easily achieved, make your next goals harder
- If the goal took a dispiriting length of time to achieve, make the next goals a little easier
- If you learned something that would lead you to change goals still outstanding, do so
- If while achieving the goal you noticed a deficit in your skills, set goals to fix this.

Remember too that goals change as you mature - adjust them regularly to reflect this growth in your personality. If goals do not hold any attraction any longer, then let them go - goal setting is your servant, not your master. It should bring you real pleasure, satisfaction and achievement.

Summary of Goal Setting

This section has shown that:

Goal setting is an important method of:

- Deciding how committed you are to your sport
- Deciding what is important for you to achieve, and what is irrelevant.
- Motivating yourself to achievement
- Building your self-confidence based on measured achievement of goals

You can set goals effectively by:

- Phrasing them positively
- Defining them precisely
- Prioritising multiple goals
- Writing them down
- Keeping them manageable: Not too hard, but not too easy.
- Setting performance goals, not outcome goals

Failure in meeting goals is useful in improving technique and long term success as long as you draw useful lessons from it and feed these back into your training program.

You should allow yourself to enjoy the achievement of goals and reward yourself appropriately. Lessons should be drawn where appropriate, and should be fed back into training.

As a final point, if you do not already set goals, or if you have not yet focussed on your life goals, now is a great time to start!

Mental Rehearsal/Visualisation

One mental skill that all good athletes use to some extent is mental rehearsal or visualisation. Mental rehearsal is the mental representation of an event to bring about a certain level of future athletic performance. For example if you wish to defeat a chopper in an upcoming match, you would imagine yourself beforehand successfully attacking his best serve, third-balling your own serves and so on.

As a table tennis player you might use mental rehearsal to improve some aspect of your game, improve your overall game, maintain a certain level of performance, give yourself a feel for a competitive environment, or condition yourself a feel for a good practice or competition. When it is done correctly, mental rehearsal seems true to the event for which it is being rehearsed.

There are two primary attributes of images in mental rehearsal: vividness and controllability. Vividness refers to the distinctness and clarity of the image in the mind. Controllability is the extent to which the image can be manipulated. To be a good imager, you must be capable of bringing about a desirable, vivid image and manipulating that image.

Mental rehearsal is usually practised internally and externally. Internal imaging involves mentally performing the skill just like you are seeing and feeling the action from your eyes, as if you are actually performing the action. External imagery is chiefly visual. You visualise yourself from outside your body performing to some desired level.

In imagery rehearsal, you practise by thinking through an initial mental representation that you hope will transfer to a future behaviour, like your table tennis performance. The key to successful transference is the similarity of the two situations. The more about your future situation and the more realistically you practise rehearsal, the easier it is to transfer your images successfully.

The most effective and transferable images are those that are multi-sensory and not just visual. In other words, the greater the number of senses that you bring into mental rehearsal, the more the results will transfer. When imagining yourself performing a forehand drive, see and feel the bat strike the ball, hear the sound the ball makes when you strike it crisply and cleanly, and feel the appropriate muscles tense and then relax. Even smell the air, musty from the sweat.

Whilst table tennis is an open skill sport, it is suggested that mental rehearsal should be used where you can:

- For preparing your serves
- For setting a mood at the table
- For practice drills that are mostly mechanical, like stroking and footwork drills.

There are several guidelines that may be helpful for learning imagery:

- Practise imagery techniques
- Keep negative and irrelevant thoughts completely out of your head
- Determine your correct level of arousal when rehearsing
- Rehearse only for those things over which you have some control
- Do not use imagery techniques as an exhaustive means of practice
- Bring in as many senses as you can while rehearsing

Arousal

Table tennis players have their own style and character. Some get very psyched, charging around aggressively after every point they win. Others appear to play with a calm confidence and less aroused.

Arousal is a measure of physical and mental intensity or energy. Physically, arousal is characterised by increase in heart rate, blood pressure, blood sugar, and sweating, to name a few. In contrast, narrowed attention, fatigue, depression, dizziness, confusion, and loss of control are mental signs of arousal. Although too little arousal is obviously detrimental and a sure sign of lack of motivation, the physical and mental signs of arousal themselves suggest too much arousal is not good as well.

The precise relationship between arousal and performance is not fully understood. However it is true that different athletic tasks demand different levels of arousal. "Psyching up" has been shown very beneficial for closed skills (for which the environment is relatively stable) and tasks requiring great muscular coordination, strength, speed, and endurance, but less beneficial and sometimes harmful for open skills (for which the environment is constantly changing). Because the skills in table tennis are mostly open, they are less friendly to heightened arousal than say weight-lifting.

Because table tennis is a complex and speedy game, temper your emotions by common sense. Too little arousal is a sign that your head is not sufficiently in the game. Too much arousal may lead to overly aggressive play, a tendency to be easily distracted and inability to think on your feet.

Focus & Flow

Focus is complete attention to the execution of a skill. Flow is the state of being completely engrossed in the execution of a performance to the exclusion of everything else

When you are in a state of flow, focussing intensely on the execution of skills, you will give your best performances. You enter a state of almost Zen-like meditation in which mood, distraction and different stressors simply have no place in your consciousness. You are free to execute skills just as you have trained to execute them. This is an immensely satisfying state to achieve.

The qualities of flow are:

- All your attention is focused either
 - on the skills or routine being performed or
 - on the input from your senses relevant to the sport
- You are fully focused of the activities being performed, and are:
 - not aware of your own awareness, consciousness of self or ego
 - not evaluating the quality of execution of skills during performance
 - not concerned with distractions such as results, judges, audiences or other peoples expectations
 - not making any conscious decisions in your mind or reasoning with words - you are trusting your body to follow its training
- You are in complete control of actions and reactions
- You feel almost in an altered state of consciousness: achieving flow is exhilarating, and gives a powerful feeling of competence.

Training to Improve Focus

You can improve focus by practice and training, much like any other skill.

You can practise it at its simplest almost as a form of meditation - firstly study an object for some time: get completely involved with it, in its shape, colour, texture, smell, etc. Then practise switching the focus to a different object, being completely involved in this, and nothing else.

Similarly you can practise focus on sounds, listening to them and then switching focus to other sounds.

This concentrated attention helps you to feel what sporting focus feels like. The rapid switching to another thing practises your ability to switch focus.

Mood Control

Bad moods damage your motivation to succeed in training or competition. They make you more prone to negative thinking, and cause distraction, often as you trigger bad moods in other people. Bad moods emerge as bad temper, unhappiness, lethargy and sluggishness.

If you are in a good mood, then even dull training can be enjoyable.

Your mood is completely under your control - bad moods are an indulgence you cannot afford. You can improve your mood in the following ways:

- Through positive thinking and suggestion - say to yourself 'I feel good' or 'I am going to move faster' or 'I can feel energy pouring into my limbs'. This really does help.
- By treating each element of a performance individually - when you make a mistake, refocus and concentrate on the next separate element of the performance. Treating a performance in this way ensures that a bad move or a missed shot does not effect following moves or shots.
- By using imagery - imagine a beautiful scene or a time when you were performing very well and feeling good. Alternatively, imagine feeling good directly.
- By reviewing your goals to re-motivate yourself.
- By smiling! - Forcing a smile onto your face for more than just a few seconds always seems to lift a bad mood. Try it - it really does work!

Distraction Management

Distraction is damaging to your performance because it interferes with your ability to focus and disrupts flow. It interferes with the attention that you need to apply to maintain good technique. This causes stress and consumes mental energy that is better applied elsewhere.

Sources of Distraction

Distraction can come from a number of sources, both internal and external, such as:

- the presence of loved ones you want to impress
- family or relationship problems
- media - photographers, interviewers, cameras, heat form lights, etc.
- teammates and other competitors
- coaches who do not know when to keep quiet
- underperformance or unexpected high performance
- frustration at mistakes
- unjust criticism
- poor refereeing decisions
- changes in familiar patterns etc.

You can prepare for and deal with all of these sources of distraction.

Coping with distraction

Coping with distractions and minor irritations is mainly a matter of attitude - you can either dwell on them and blow them up out of all proportion to their significance, or you can accept them and bypass them. If you waste mental energy fretting over a trivial problem, then this is energy that cannot be spent maintaining good technique (hence preserving physical energy). Over long events or competitions, this wastage of mental energy can seriously damage your performance.

What is worth remembering is that when you are distracted, lose concentration and make a mistake, you have not lost your skills. All you have lost is your focus.

The following points may help you to deal with distractions:

- Remember that although events may be beyond your control, your reactions to events are entirely controlled by you.
- Think positively - recognise petty irritations as such, and let them go
- Know you can perform well despite distraction
- Prepare for and expect more distraction at bigger events
- Expect other competitors to be more nervous at big events - use your ability to resist stress and distraction as a competitive advantage
- Develop a refocusing plan and practice using it when you are distracted
- Learn how to change bad moods to good moods
- Sleep and rest more before big events so that you have more mental energy to devote to distraction, mood and stress control.

Stress, Anxiety and Energy

Too much stress and anxiety can seriously affect your ability to focus on your skills and flow in a performance. This section examines the causes of excess stress and anxiety, explains their symptoms and then explains techniques that you can use to manage them.

It is important that you recognise that you are responsible for your own stress levels. Very often they are a product of the way that you think. Learn to monitor your stress levels, and adjust them up if you need more arousal, or down if you are feeling too stressed. Also learn that other people may seek to manipulate your stress levels: if you are feeling stressed and uptight, the last thing you may need is a motivational talk from a coach or manager who may not be able to see your stress.

Stress

A certain level of stress is needed for optimum performance. If you are under too little stress, then you will find it difficult to motivate yourself to give a good performance. Too little stress expresses itself in feelings of boredom and not being stretched.

At an optimum level of stress you will get the benefits of alertness and activation that a good level of stress brings.

Excessive levels of stress damage performance and damage your enjoyment of your sport.

These excessive levels occur in the following circumstances:

- When you think that what is being asked of you is beyond your perceived abilities
- When too much is asked of you in too short a space of time
- When unnecessary obstacles are put in the way of achieving goals

The negative effects of stress are:

- That it gets in the way of judgement and fine motor control

- It causes competition to be seen as a threat, not a challenge
- It damages the positive frame of mind you need for high quality competition by:
 - promoting negative thinking
 - damaging self-confidence
 - narrowing attention
 - and disrupting flow
- It consumes mental energy in, for example, worry. This is energy that you could devote to keeping technique good.

Very often stress can be caused by negative thinking as well as being a result of negative thinking: If you interpret a situation saying 'I'm in trouble', then you are much less likely to do well than if you think positively, seeing a new situation as an opportunity to exhibit your skills at a higher level.

Stress and Adrenaline

When you are in a competitive environment or are in an environment in which you are being evaluated, adrenaline may enter your bloodstream.

This has the following positive and negative effects on your body:

Positive Effects:

- Adrenaline causes physiological arousal
- It causes alertness
- It prepares the body for explosive activity

Negative Effects:

- It inhibits judgement
- It interferes with fine motor control, and makes executing complex skills difficult.

You will experience the preparatory flow of adrenaline into your body typically as 'Butterflies in your stomach'.

In sports such as shooting where fine motor control is important, adrenaline may be a negative factor. However in sports like sprinting or power lifting, where explosive activity is required, adrenaline may be useful in generating optimum performance.

You may currently view high levels of adrenaline in your body negatively as stress. You may need to review this, perhaps welcoming adrenaline as an aid to your performance. Similarly you might like to consider using 'Psych Up' routines to raise your adrenaline levels if you are not sufficiently aroused.

Anxiety

Anxiety is different from stress. Anxiety comes from a concern over lack of control over circumstances. In some cases being anxious and worrying over a problem may generate a solution. Normally, however, it will just result in negative thinking.

There are five main unrealistic desires or beliefs that cause anxiety:

- The desire always to have the love and admiration of all people important to you. This is unrealistic because you have no control over other peoples minds: people can have bad days, can see things in odd ways, can make mistakes, or can be plain disagreeable and awkward.
- The desire to always be thoroughly competent. This is unrealistic because you only achieve competence at a new level by making mistakes. Everybody has bad days and makes

mistakes. One of the benefits of training with better athletes is that you can see them making mistakes and having bad days too.

- The belief that external factors cause all misfortune. Often negative events can be caused by your own negative attitudes. Similarly your own negative attitudes can cause you to view neutral events negatively. Another athlete might find something positive in something you view as a problem.
- The desire that events should always turn out the way that you want them to and people should always do what you want. Other people have their own agendas and do what they want to do.
- The belief that everything that has happened in the past will inevitably condition and control what has happened in the future. Very often things can be improved or changed if you try hard enough, or look at things in a different way.

Mental Energy

You need mental energy to be able to concentrate your attention and maintain good mental attitudes. If you are concentrating effectively then you can conserve physical energy by maintaining good technique when your muscles are tired, can maintain focus and good execution of skills, and can push and drive your body through pain and fatigue barriers.

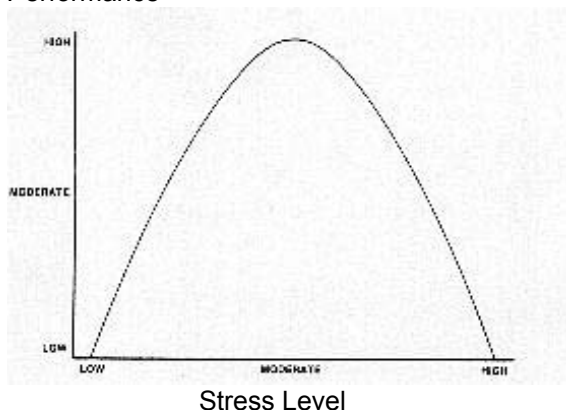
You can waste mental energy on worry, stress, fretting over distractions, and negative thinking. Over a long competition these not only damage enjoyment, but also drain energy so that performance suffers.

It is therefore important to avoid these by good use of sports psychology, and by resting effectively between events and by ensuring that you sleep properly.

Optimum Stress Levels

The level of stress under which you operate is important: if you are not under enough stress, then you may find that your performance suffers because you are bored and unmotivated. If you are under too much stress, then you will find that your results suffer as you find it difficult to focus on technique and fail to flow with the performance.

The graph below shows the relationship between stress and quality of performance:
Performance



Where stress is low, you may find that your performance is low because you become bored, lack concentration and lack motivation. If this state persists for a long time, then you may find the sport tedious, and give it up.

Where stress is too high, your performance can suffer from all the symptoms of stress. Your flow can be disrupted, you can be distracted, and competition can become threatening and unpleasant.

In the middle, at a moderate level of stress, there is a zone of best performance. If you can keep yourself within this zone, then you will be sufficiently aroused to give a high quality performance, while not being over-stressed and unhappy.

This zone of optimum performance is in a different place and is a different shape for different people. Some people may operate most effectively at a level of stress that would leave other people either bored or in pieces. It is possible that someone who functions superbly in a low level competition might experience difficulties in high level competition. Alternatively someone who performs only moderately at low level of competition might give exceptional performances under extreme pressure.

Not only will the zones of optimum performance be in different places for different athletes, they will also be different heights and different widths. This is why you must take responsibility for controlling your own levels of stress, particularly in a team situation: if the team generally needs motivation, but you are in an optimum zone, then paying attention to a motivating team talk may move you to a state of being over-stressed. Similarly if some team members need to be relaxed, then relaxation techniques applied to an entire team may move you to a state of bored demotivation.

You may also find that fine and complex skills are less tolerant to stress than simple skills - your zone of optimum performance may be narrower for very difficult skills than for the basic skills of the sport.

Finding Your Optimum Stress Level

An effective way of finding the stress level at which you operate best is to keep a training and performance log. In this record the quality of every training session or performance, along with the level of stress that you felt during that performance.

If you have stress monitoring equipment, and can score your performance, then this gives you hard, objective figures to use in your training log. If you do not have the ability to do this, then record your subjective views of the stress levels you felt and the quality of the session.

After a time review the training log - this should give you some good information on the way that you respond to stress. This information will help you to decide and implement a stress management program that is appropriate to the different sporting situations you find yourself in.

Symptoms of Stress

The following is a list of the major symptoms of stress that you might feel:

Physical Symptoms - mainly in response to increased levels of adrenaline:

- Increase in heart rate
- Increase in Sweating, and a cooler skin as this combines with a reduction in the blood flow to your skin.
- 'Butterflies' in your stomach
- Rapid Breathing
- Tense Muscles
- Dry Mouth
- A desire to urinate

Mental Symptoms

- Worry
- Confusion, inability to concentrate or difficulty making decisions
- Feeling ill or odd
- Feeling out of control or overwhelmed

Behavioral Symptoms

- Talking rapidly
- Nervous mannerisms: nail biting, foot tapping, increased blinking, twitching, pacing
- Scowling
- Yawning

These symptoms of stress should not be taken in isolation - they could be caused by other factors. However if you find yourself exhibiting or recognising a number of them, then it would be worth investigating stress management techniques.

Increasing Stress Levels - Psyching Up

Where you are not feeling motivated towards an event, either because you are bored by it, because there is no serious competition or because you are tired, you may need to psych yourself up. This will raise your level of arousal so that you can perform effectively.

The following techniques can be used to psych up:

- Warm up faster and harder
- Use imagery - for example, a swimmer might imagine himself being chased by a shark!
- Use suggestion - 'I can feel energy flowing into me'
- Focus on the importance of the event
- or Focus on personal goals, such as running a race in a particular time, rather than unchallenging outcome goals such as winning (when competition is not intense).

Stress Reduction Techniques

This section shows you effective methods of reducing stress to a level where you can perform most effectively.

The techniques that you select depend on the cause of the stress and the situation in which the stress occurs.

In choosing methods to combat stress, it is worth asking yourself where the stress comes from: if outside factors such as relationship difficulties are causing stress, then a positive thinking or imagery based technique may be effective. If the stress is based on the feeling of adrenaline in the body, then it may be effective purely to relax the body and slow the flow of adrenaline.

As with all sports psychology skills, the effectiveness of the stress reduction technique depends on practice.

Some stress Reduction Techniques are:

Environmental Methods

- Reduce the Importance of the Event
A number of factors can make an event take on a high level of significance and cause stress as a result:
 - The importance and size of an event
 - The thought of a large financial reward
 - The presence of family, friends, selectors, or judges
 - The consequences of an event may be important, e.g. for selection to a higher level team

If stress is a problem under these circumstances, then think carefully about the event - take every opportunity to reduce its importance in your eyes:

- If the event seems big, put it in its place along the path to your goals. Compare it in your mind with bigger events you might know of or might have attended.
- If there is a financial reward, remind yourself that there may be other opportunities for reward later. This may not be the only chance you have. Focus on the quality of your performance. Focusing on the rewards will only damage your flow if you are performing.
- If friends or family are watching, remind yourself that they liked or loved you before you took up the sport, and will continue to do so whether you win or lose.
- If selectors are watching then remind yourself that you may well have other chances to impress other selectors.

If you focus on the correct execution of skills, then the importance of the event will dwindle into the background.

- **Reduce Uncertainties**
Uncertainty can cause high levels of stress. Causes of uncertainty can be:
 - Not knowing whether you will be performing, perhaps because teams are not announced until just before a performance
 - Not knowing what a coach or instructor thinks of your abilities
 - Receiving vague or inconsistent instructions

In these cases the actions of other people are negatively affecting your ability to perform. The most effective way of countering this is to ask for early posting of a team list, to ask for a clear statement of what a coach thinks, or to ask for clarification of vague instructions. Where instructions are inconsistent or conflicting, ask for clarification.

If you ask for clarification in a positive way, then people are usually quite happy to help.

- Listen to Music or Relaxation Tapes

Physical Techniques: these are most effective where stress is driven by excessive levels of adrenaline.

- **Progressive Muscular Relaxation**
Progressive Muscular Relaxation (PMR) is a purely physical technique for relaxing your body when muscles are tense.

The idea behind PMR is that you tense up a group of muscles so that they are as tight as contracted as possible, and hold them in a state of extreme tension for a few seconds. Then relax the muscles to their previous state. Finally you consciously relax them again as much as you can.

You can apply PMR to any or all of the muscle groups in your body depending on whether you want to relax just a single area or your whole body.

Experiment with PMR by forming a fist, and clenching your hand as tight as you can for a few seconds. Then relax your hand to its previous tension, and then consciously relax it again so that it is as loose as possible. You should feel deep relaxation in the muscles.

Although you might well be able to relax the muscle as far without the initial tensing, tensing the muscle helps to provide a starting point for the exercise, and helps to gauge the initial level of tension in the muscle.

PMR can be used in conjunction with breathing techniques and imagery (e.g. of stress flowing out of the body) for maximum relaxation.

It can also be effective to link the exercise of PMR to a keyword that you can say to yourself. Associating the feeling of relaxation with the keyword means that in a moment of tension you can bring the feeling of relaxation purely by repeating that word.

- **Breathing Control**
Deep breathing is a very effective method of relaxation, which is a core component of everything from the 'take ten deep breaths' approach to calming someone down, right through to yoga relaxation and zen meditation. It works well in conjunction with other relaxation techniques such as Progressive Muscular Relaxation, relaxation imagery and meditation to reduce stress.

Mental Techniques: most effective where psychological factors are driving stress.

- **Imagery Relaxation**
Imagery is a potent method of stress reduction, especially when combined with physical methods such as deep breathing.

One common use of imagery in relaxation is to imagine a scene, place or event that you remember as peaceful, restful, beautiful and happy. You can bring all your senses into the image, with sounds of running water and birds, the smell of cut grass, the taste of cool white wine, the warmth of sun, etc. Use the imagined place as a retreat from places of stress and pressure.

Other uses of imagery in relaxation involve mental pictures of stress flowing out of the body; or of stress, distractions and everyday concerns being folded away and locked into a padlocked chest.

Use of imagery is as flexible as the effort you put into developing images that meet your specific needs. This use of imagery to drive relaxation is one of the main ways that Eastern mystics use to achieve spectacular reductions in, for example, pulse rate.

- **Thought Awareness, Rational Thinking and Positive Thinking**
These three related tools are useful in combatting negative thinking. Negative thoughts occur when you put yourself down, criticise yourself for errors, doubt your abilities, expect failure, etc. Negative thinking is the negative side of suggestion - just as making positive statements to yourself helps you to build confidence, improve performance, and improve your mental skills, negative thinking damages these things.

- Thought Awareness

Thought awareness is the process by which you observe your thoughts for a time, perhaps during a performance or a training session, and are aware of the thoughts going through your head. It is best not to suppress any thoughts - just let them run their course while you observe them.

Watch for negative thoughts while you observe your 'stream of consciousness'. Normally these will appear and disappear being barely noticed. Normally you may not even notice them. Examples of common negative thoughts are:

- worries about performance
- a preoccupation with the symptoms of stress

- dwelling on consequences of poor performance
- self criticism
- feelings of inadequacy

Make a note, whether mental or physical, of the thought, and then let the stream of consciousness run on.

Thought awareness is the first step in the process of eliminating negative thoughts - you cannot counter thoughts you do not know you think.

- Rational Thinking

Once you are aware of your negative thoughts, write them down and review them rationally. See whether the thoughts have any basis in reality. Often you will find that when you challenge negative thoughts they disappear as you see that they are obviously wrong. Often they persist only because they escape notice.

- Positive Thinking and Affirmation

You may find it useful to counter negative thoughts with positive affirmations. You can use affirmations to build confidence, and change negative behaviour patterns into positive ones. You can base affirmations on clear, rational assessments of fact, and use them to undo the damage that negative thinking may have done to your self-confidence.

Examples of affirmations are:

- I can do this.
- I can achieve my goals.
- I am completely myself and people will like me for myself.
- I am completely in control of my life.
- I learn from my mistakes. They increase the basis of experience on which I can draw.
- I am a good valued person in my own right.

Traditionally people have advocated positive thinking almost recklessly, as a solution to everything. It should, however, be used with common sense: no amount of positive thinking will make everyone who applies it an Olympic champion marathon runner (although an Olympic marathon runner is unlikely to have reached this level without being pretty good at positive thinking). Firstly decide rationally what goals you can realistically attain with hard work, and then use positive thinking to reinforce these.

- Remembering past good workouts, performances and achievements
- Self-Hypnosis and Auto-Suggestion
Self-hypnosis is not a magical state. It is merely a state of mind in which:
 - You are very relaxed
 - You are paying complete attention to the suggestions you want to implant
 - You do not criticise the suggestions made, and accept them at face value.

Self-hypnosis is used to directly program your unconscious with affirmations and suggestions that would otherwise have to run through critical processes in your mind. You can use this programming as an effective method to reduce stress and induce relaxation.

Normal hypnosis is not normally effective in sports psychology as it requires the presence of a hypnotist. Self-hypnosis, however, is just as easy and has the additional benefit that you can completely control the inputs to your mind when you are in a suggestible state.

- Hypnotising Yourself

The first few times that you use self-hypnosis, it is best to find a place where you can be undisturbed for a while. Sit or lie down, eliminate any distractions, and relax. This puts you in the best possible conditions for using the technique - however as you get more practice you will find that you can use self-hypnosis almost anywhere.

The first step is to relax yourself: close your eyes, and try using imagery of waves of relaxation running down your body from your scalp downwards, washing out stress. Let the waves run in time with your breathing, first washing down over your head, then your neck, then your torso, then arms, and finally your legs. Feel the muscles in your body relaxing as the waves of relaxation wash over them.

Alternative techniques can involve fixing your eyes on a spot on the wall, or riding down in a lift/elevator from the top of a tall building, slowly dropping down into relaxation and drowsiness. The method you choose to induce hypnosis is up to you.

The next step is to use suggestion to deepen the state. This is as simple as saying to yourself something like 'I am feeling relaxed and comfortable. With every breath I am becoming more relaxed and more comfortable.'

Once you are completely relaxed and focussed on your own suggestions, you are in a useful state of self-hypnosis. One suggestion you can usefully embed is that when you repeat a particular trigger word to yourself you will relax into this state.

As stated earlier, self-hypnosis is not a magical thing - it is just one of many things people have tried to make mystical to boost their own self-esteem and bank balance.

- Suggestion and Hypnosis

Before you enter a hypnotic state it is useful to think about the suggestions that you want to apply in it. Suggestions can be simple affirmations that undo the damage done by negative thinking (see Thought Awareness, Rational Thinking and Positive Thinking), or can be used to make psychological adjustments or reinforce confidence to help to achieve goals that you have set.

Once you have decided what you want to use in suggestions, spend a little time working out a form of words for each suggestion that is short, positive, and powerful. Repeat this to yourself when you have reached a self-hypnotic state.

Effective use of suggestion can:

- Build confidence
- Reinforce goals by etching them into your mind
- Reduce stress
- Motivate and energise when you are feeling sluggish.

Suggestion can be used without hypnosis, for example you might make a suggestion tape to play when you are driving, while still wanting to remain alert. Using suggestion with self-hypnosis just makes it more effective.

Sports Nutrition

Good nutrition is important for table tennis especially for the young athletes. Of the nutrients a player consume, only calories give you energy. Proteins, carbohydrates and fats will provide nearly all the caloric content in the foods consumed. Consequently, calories fulfill a player's energy needs. Other nutrients like vitamins and minerals, though essential for proper bodily functioning, do not give energy.

Carbohydrates

Carbohydrates are the main sources of energy for the aerobic metabolism and it is of great importance to table tennis players whose training are characterised by great intensity and duration. Carbohydrates function mostly as short term fuel for the muscles and the brain. They are the main primary fuel for glycogen storage. Blood and muscle glycogen serve as the main fuel for muscular performance, especially during intensive exercise. Further glycogen is stored in the liver and is used when blood and muscle glycogen stores are depleted.

As a table tennis player, about 60% of your calories should be in the form of carbohydrates. When in intensive training, the level may be increased to 70%. The extra 10% should come at the expense of the fats.

Of the carbohydrates you ingest, eat mostly the complex ones (bread, pastas, cereals, vegetables, certain fruits, and beans) and the rest simple ones (most fruits, certain vegetables, and fruit juices). Complex carbohydrates quickly pass through the stomach and are unlikely to produce gastrointestinal discomfort. They also elevate blood-glycogen levels, but not harmfully like most simple sugars do. By increasing your blood-glycogen levels too rapidly, which the ingestion of simple sugars often does, your pancreas produces insulin to neutralise the excess fuel. This in turn prevents the use of fats for energy. In short, complex carbohydrates keep the blood-glycogen levels high enough to give you more fuel, but not so high as to trigger an insulin response. Complex carbohydrates are also higher in fibre. A higher fibre diet also helps to stabilise blood-glycogen, keep it from getting too high. Complex carbohydrates also generally have more vitamins and minerals than simple ones.

Proteins

Proteins are the second form of working-producing nutrients. They control all your bodily functions through the activity of enzymes (substances that help to bring about the chemical changes in your body) and comprise over 50% of the dry weight in your body. Proteins also build and repair muscle tissue, red blood cells, and other tissues, and synthesize hormones. Therefore you must consume quality proteins everyday, and take them wisely, if you want to play your best table tennis.

The recommended dietary allowance (RDA) for protein intake is 0.8 grams per kilogram of body weight per day (.8g/Kg/day). Regular moderate exercise may increase the protein intake. However taking in too much protein may saddle you with unneeded calories.

Lean meats, like chicken and venison, and most fishes are quality sources of protein. If possible, buy only fresh meats and fish. Canned tuna is a preferred choice of protein among athletes. If you eat meat, avoid red meats altogether because of their high fat content.

Overall consume protein in small amounts during the day, no more than 30 grams per sitting.

Fats

Fats are the third work-producing nutrient. Like carbohydrates, fats are an important source of energy during exercise. Light and low-intensity practice sessions of long duration use both fats and carbohydrates as fuel sources. As you practise longer in such sessions, you use fats more and more, as long as the oxygen supply is adequate. When exercise intensity increases, you use

less fat. Obviously, table tennis requires both aerobic and anaerobic fitness, both fat reserves and glycogen stores will be drawn plentifully.

Fats burn very slowly for energy because your body cannot break down fats as quickly as carbohydrates. Therefore, though denser sources of potential energy, fats are much less efficient fuel sources than carbohydrates. They are utilised primarily when muscle and blood-glycogen levels are in low reserve. Therefore fats are a last-resort energy source. Limit your fat intake to be a more efficient athlete. Optimally, fat intake should never comprise more than 25 to 30% of your total calories.

Ideally a table tennis player's food intake should consist of 60-70% carbohydrates, 10-15 proteins and 20% fat.

Breakfast is important and should not be missed. The breakfast composition depends on the time of the morning training session. If a player is playing in tournaments with multiple games during the day, he should eat small meals which will ensure a continuous energy supply without overloading. In addition, 45 minutes before the game and immediately thereafter, a player should consume a simple fruit, eg. a banana, which besides being extremely easy to digest, is an excellent source of energy.

Never forget fluid intake before, during and after the game. The quantity and the quality of the consumed liquid must be such that will not overload the functioning of the stomach. Milk is to be avoided if possible. Sports drinks eg. Gatorade or Powerade are recommended.

Sleep

Adequate sleep is essential for good table tennis play. The harder and more frequently you train, the more sleep you need.

Lack of sleep by itself is often the cause of over-training and lethargy. At other times it is one of many causes. Intensive training increases the need for the deeper and most vital stages of sleep.

To optimise health, a person needs between 7-8 hours of sleep each night. This will increase with more training. When practising table tennis everyday, try to get between 8-9 hours of sleep per night, on average. If you train more than once a day or for more than 4 hours, incorporate a midday nap into your schedule, if possible.

References

Table Tennis Specific

- Michel Gadat, *Train To Win- Learn and Teach Top Level Table Tennis*, Ottawa, Ontario, 1997.
- Andrzej Grubba, *Learn Table Tennis in a Weekend*, Dorling Kindersley, 1998.
- English Table Tennis Association, *Table Tennis-Know The Game*, A & C Black (publishers) Ltd, 1995.
- Jerzy Grycan, *A Long Term Plan for Elite Australian Table Tennis Players*, Table Tennis Australia,.
- Dimosthenis E Messinis, *Table Tennis From A-Z*, D E Messinis, 2000
- Seemiller D & Holowchak M, *Winning Table Tennis, Skills Drills And Strategies*, Human Kinetics, 1997.

Exercise Training

- Bob Anderson, **Stretching**, Shelter Publications, Inc. Bolinas, California, USA, 1980.
- Michael J Alter, **Sport Stretch**, 2nd Edition, Human Kinetics, 1998.
- Oliver Barteck, **All around Fitness**, Konemann, 1998.
- Toni Battison, **Fighting Fit**, Allen & Urwin, 1997.
- Kenneth Baum, **The Mental Edge- Maximize your sports potential with the Mind-Body connection**, Perigee, 1999.
- Tudor O. Bompá, **Total Training for Young Champions- Proven Conditioning Programs for athletes ages 6 to 18**, Human Kinetics, 2000.
- Matt Brzycki, **Youth Strength and Conditioning**, Master Press, 1995.
- Donald A Chu, **Jumping into Plyometrics**, 2nd Edition, Human Kinetics, 1998..
- Garry Egger, Nigel Champion & Allan Bolton, **The Fitness Leader's Handbook**, 4th Edition, Kangaroo Press, 1998.
- Garry Egger, Nigel Champion & Greg Hurst, **The Fitness Leader's Exercise Bible**, 2nd Edition, Kangaroo Press, 1996.
- Avery Faigenbaum & Wayne Westcott, **Strength & Power for Young Athletes**, Human Kinetics, 2000.
- Ann Goodsell, **The Fitness Handbook**, Universal International, 1999.
- William J Kraemer & Steven J Fleck, **Strength Training for Young Athletes**, Human Kinetics, 1993.
- Mo Rosser, **Sports Therapy- An Introduction to Theory & Practice**, Hodder & Stoughton, 1997.

General Coaching

- Misia Gervis & John Brierley, **Effective Coaching for Children-Understanding the Sports Process**, Crowood, 1999.
- Jack L Groppe, James E Loehr, D Scott Melville & Ann M Quinn, **Science of Coaching Tennis**, Leisure Press, 1989.
- David Jenkins & Peter Reaburn, **Guiding the Young Athlete**, Allen Urwin, 2000.
- Frank S Pyke, **Better Coaching-Advance Coach's Manual**, Australian Coaching Council Incorp., 1997.
- Rainer Martens, **Successful Coaching**, Human Kinetics, 1997.
- Youth Sport Trust, **Young Athlete's Handbook**, Human Kinetics, 2001.

Mental Training

- Mark H Anshel, **Sport Psychology- from theory to practice**, 3rd Edition, GSP, 1997.
- Vic Braden & Robert Wool, **Mental Tennis-How to Psyche yourself to a Winning Game**, Little Brown And Company, 1993.
- Ted Garratt, **Sporting Excellence-Optimising Sports Performance Using NLP**, Crown House Publishing Limited, 2000.
- Alan S Goldberg, **Sports Slump Busting**, Human Kinetics, 1998.
- Ken Hodge, **Sport Motivation, Training Your Mind for Peak Performance**, Reed, 1999.
- Jeffrey Hodges, **Champion Thoughts Champion Feelings**, Sportsmind International Institute for Human Performance Research, 1998.
- Jeffrey Hodges, **Sports Mind – An Athlete's Guide to Superperformance Through Mental and Emotional Training**, Hawk Personal Excellence, 1993.
- Jeffrey Hodges, **Sports Mind – Training Manual**, 2nd Edition, Sportsmind International Institute For Human Performance Research.
- Rex Johnson & David Swindley, **Decide to Win**, Ward Lock, 1996.
- Brian Miller, **Gold Minds-The Psychology of Winning in Sport**, The Crowood Press, 1997.
- Robert M Nideffer, **Athletes' Guide to Mental Training**, Human Kinetics, 1985.

- Joseph O'Connor, ***NLP & Sports- How to Achieve Your Own Peak Performance***, Thorsons, 2001.
- Terry Orlick, ***In Pursuit of Excellence***, 2nd edition, Leisure Press, Champaign, Illinois, 1990.
- Rainer Martens, ***Coaches Guide to Sport Psychology***, Human Kinetics, 1987.
- Robin McConnell, ***The Successful Coach***, Harper Sports, 2000.
- Karl Slaikeu & Robert Trogolo, ***Focused for Tennis***, Human Kinetics, 1998.
- John Syer & Christopher Connolly, ***Sporting body Sporting Mind – An Athlete's Guide to Mental Training***, Simon & Schuster, 1992.
- Robert S Weinberg & Daniel Gould, ***Foundations of Sport and Exercise Psychology***, Human Kinetics, 1995.
- Robert S Weinberg, ***The Mental Advantage***, Leisure Press, Champaign, Illinois, 1988.

Sports Nutrition

- Louise Burke, ***The Complete Guide to Food for Sports Performance***, Allen & Urwin, 1995.
- Nancy Clark, ***Sports Nutrition Guidebook***, Human Kinetics, 1997.
- Susan M Kleiner, ***High Performance Nutrition***, Wiley, 1996.
- Helen O'Connor & Donna Hay, ***Sports Competition Nutrition***, J B Fairfax Press Pty Ltd, 1998.
- Helen O'Connor, & Donna Hay, ***Sports Nutrition Basics***, J B Fairfax Press Pty Ltd, 1998.
- Rosemary Stanton, ***Eating for Peak Performance***, Allen & Urwin, 1997.

Internet

- www.geocities.com/elitettc E.L.I.T.E. Table Tennis Club
- <http://www.ausport.gov.au/tta/> Table Tennis Australia
- <http://www.tnsw.org.au/> Table Tennis New South Wales
- www.ttv.com.au Table Tennis Victoria Incorporated
- www.tabletennis.org.nz Table Tennis New Zealand
- www.ittf.com International Table Tennis Federation
- <http://www.tabletennis.gr> Denis Table Tennis World
- <http://www.cn-tt.com/> China Table Tennis (in Chinese)

Appendix 1

