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ITF coaching & sport science review

The official coaching and sports science publication of the International Tennis Federation

editorial

Welcome to issue 25 of the ITF Coaching & Sport Science Review – the final issue of 2001.

Recently some of our readers will have attended the showpiece of the ITF's coaches education programme – the 12th ITF Worldwide Coaches Workshop. The Workshop, held in conjunction with the LTA of Thailand, was staged in Bangkok, Thailand from October 28 to November 1, 2001. It was the first time this educational forum had been held in Asia and the ITF Development Department were delighted to welcome 300 coaches from 80 countries around the world. The workshop theme was "Progressive Development of High Level Players from Junior to Professional" and it provided an ideal stimulus for both scientists and coaches to learn and interact. Speakers included some of the most highly respected scientists, coaches and coach educators worldwide and we would like to take this opportunity to thank them for their efforts in making the workshop such a success.

The ITF, together with Human Kinetic Publishers, has produced a video entitled "Doubles tactics". The author of the video is Louis Cayer, Canadian Gold Medal-winning Doubles Coach at the Olympic Games Sydney 2000. The video includes footage from Davis Cup and Fed Cup matches featuring some of the best doubles teams in the world. The video covers the most used tactical patterns in advanced doubles play together with progressive drills to practice these patterns.

In addition, the ITF has recently published two new books in English - entitled "Tennis Medicine for Tennis Coaches" and "The Tennis Volunteer". The first, is part of the International Tennis Federation mission, through its Development Department and its Medical and Sport Science, Coaches and Technical Commissions to act as a catalyst for different tennis medicine initiatives and research worldwide, while the booklet, "The Tennis Volunteer" has been produced to commemorate the International Year of the Volunteer.

We would also like to extend congratulations to Jean Brechbhül (Switzerland), Richard Schonborn (Germany), and Jean Claude Marchon (France), who following a recommendation by the ITF Coaches Commission and nomination by their respective National Associations were each honoured with an Award for Services to the Game for the year 2001 at the ITF's Annual General Meeting held in Cancun (Mexico). The Awards are given for long and distinguished service to the game of tennis both nationally and internationally.

We hope that the articles in ITF Coaching & Sport Science Review continue to generate considerable discussion among coaches worldwide and with the addition of the link to the ITF Coaching & Sport Science Review in the "Coaches News" section of the ITF website, www.itftennis.com, this information is becoming increasingly accessible. We continue to welcome your comments on any of the articles published, and if of interest, they too may be published. Similarly, if you have any material that you think relevant and worthy of inclusion in a future issue, please forward it to us for consideration

We hope you enjoy our 25th issue.

Spain's Davis Cup Team Captains reading Issue 24 of ITF Coaching & Sport Science Review.

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key behavioural characteristics of successful juniors

By David Wilson (Ireland)

SUCCESS in tennis is clearly dependent not only on athletic ability and training, but also on a host of behavioural factors. Young people who reach high levels of performance in tennis, and indeed in almost any other endeavour, frequently share common personality characteristics. Studies have shown that development of these critical qualities can serve to accelerate learning, maximise potential, and improve competitive performance. The following list therefore provides a brief outline of '10 Behavioural Characteristics of Successful Juniors'.

Vision

The benefits of goal-setting have long since been advocated, however it is undoubtedly true that high level performers consistently possess specific aims and targets towards which all of their efforts are directed. Essentially, every performer needs a reason for training – the clearer the goal, the easier it is to overcome difficulties and challenges along the way. Young players in particular need to develop realistic ambitions. With the help of a coach, dreams and aspirations can be moulded into intelligent plans and stepping-stones to success. Players with a positive vision of the future can deal with any obstacle in the present.

Long-Term Perspective

Junior players need to be aware that progress in tennis is a long-term challenge. Goal setting, training focus and commitment are needed over a period of years. Unfortunately many junior players are overly focused on winning *now!* They improve a little but then are disheartened by a poor performance or injury. By emphasising long-term development it's easy for juniors to understand that no match is ever too important, no injury is ever that devastating and no challenge is ever impossible to deal with. Progress is easy if time is available. Successful young players have a definite picture of their long-term goals and have learned that steady and consistent progress provides the most efficient route to competitive success.

Action-Oriented

Winners are doers. All over the world there are many talented young players hoping to make a breakthrough into the professional ranks. Those who commit themselves to hard work and training on a consistent basis are obviously most likely to succeed. Unfortunately, progress in tennis is not easy and training can often be monotonous, time consuming and physically demanding. The temptation to cut corners is constantly present. In addition, the social pressures exerted by family, school and friends make training a difficult task not only to schedule, but also to complete effectively. Winners in tennis are often those who are excellently organised, intensely focused and committed to action. They know exactly what areas of their game need work, have a solid understanding of training principles and are willing to make training and practice a priority in their lives. Ask your players: "What is your long-term goal and what did you do today to move closer to achieving it?" Remember, talent development requires information, motivation and self-discipline.

Independence

While very few players have ever succeeded without the help of coaches, family and friends, a large volume of research literature has shown that successful people in all walks of life display a significant level of independence. Undoubtedly the characteristics of tennis itself lend themselves to the cultivation of independence – an individual sport where competitive players often travel alone and are required to fend for themselves in unfamiliar surroundings. For this reason, it is not surprising that a high percentage of our top professionals have come through the ranks of Junior ITF events, Futures and Satellite tours. Equally, it is easy to see how many top junior players, protected by coaches and family over a number of years, often fall by the wayside when they suddenly take the plunge into international competition. The answer therefore is an increasing prescription of freedom, control and responsibility from parents and coaches to the young player. Successful athletes frequently describe themselves as 'workers', 'problem solvers' and 'independent'. Players lacking in any of these departments will almost certainly experience huge difficulties in the world of professional tennis.

Attention To Detail

A fine line separates numerous talented juniors around the world from those who eventually make it as top professionals. It is interesting to note however, that the gap between these two groups is often created off the court. Those who expect high standards of themselves, who have a precise progress plan and who show a ruthless attention to detail, are obviously in an excellent position to improve steadily. Organisational characteristics are clearly crucial in determining progress. Psychology research tells us that elements of risk and uncertainty are removed by controlling as much of the environment as possible. In tennis terms this simply means that players who are fully prepared for competition, are likely to perform better. Juniors should certainly be expected to scout opponents, to follow competitive rituals, and to devise game-plans. In short, players need to be aware that success in competitive tennis is dependent on a vast array of variables and that preparation and attention to detail are critical in terms of controlling the environment and developing confidence.

Responsibility

Winners make progress, losers make excuses. The foundation of improvement in junior tennis is a willingness of players to accept responsibility for their own performance. In a sport where coaches and parents frequently offer generous guidance and encouragement, it is often easy for competitors to lose sight of their responsibilities. Ultimately, it is the player who steps onto the court to compete and, as a result of this, they must be willing to accept the inevitable burdens that accompany this position. Losses and poor performances cannot be blamed on others. Excuse-makers look to apportion blame anywhere but on themselves and consequently, miss countless opportunities to learn, improve and grow. Top athletes understand that their future is in their own hands. While others may provide support along the way, their role is almost always temporary and their involvement rarely vital. Those players who have learned to rely on themselves and who are willing to face challenges without apportioning blame or making excuses, are in an excellent position to progress in the face of adversity.

Positive Approach To Competition

Competitive tennis by its very nature can be stressful and mentally demanding. A continuous stream of tournaments and ranking events creates a high level of performance pressure. Players are expected to peak at numerous stages during the year and are frequently met with difficult opponents, crucial matches and challenging conditions. Understandably, those young competitors who struggle to adapt to these situations, will almost certainly fail to reach their true potential. In order to maintain progress, it is vital therefore that players view competition as a stepping stone, a challenge, and an opportunity to improve. Losing is never a problem as long as lessons are learned, responsibility is accepted and plans are made. Competition is the best way for players to monitor their progress and positive athletes will always look for opportunities to test what they have learned against top opposition. It is always a pity to see situations where players avoid tournaments, opponents or 'threatening' situations. Clearly these types of players have adopted an attitude that will restrict their long-term growth. Great players look for challenges and use what they learn to ensure that every performance is better than the last.

Resilience

The ability to cope with failure, to deal with injury and to 'bounce back' from defeat often characterises great champions. It has to be remembered that at the early stages of player development, success is the exception rather than the rule. Young players need to learn that things won't always go their way and that strength can be gained from challenging situations. History is littered with examples of athletes, academics, musicians and public figures who were continuously met with failure in their early years, but whose determination and self-belief carried them to ultimate success. Winners don't quit and quitters don't win.

Confidence

Confident players experience less competitive stress, are more likely to face challenges and risks, and frequently adopt a positive attitude towards training and match play. The type of confidence usually displayed by top competitors is almost always 'performance related'. In other words, they rarely believe any more than other players, that they are going to win a specific match or tournament. Instead, their focus is on their performance and on the belief that skills learned in training, can be applied in matches. Confidence is therefore largely an 'ability-driven' behaviour. A player cannot be confident unless they have trained a particular skill effectively and have used it in competitive situations. Interestingly, the particular skill in question may need to be tested in numerous matches before the player feels truly confident. Obviously there may be problems along the way and the skill may breakdown under pressure. In the event of this happening both parties must accept their joint responsibilities – the coach must assess the breakdown and train the problem, the player must focus on improvements and implement the changes positively in the next match.

Perspective

It is always frustrating to see junior players behaving poorly or getting upset at themselves for performing badly. Equally, it is fascinating to see how well many champions can separate their 'tennis life' from their 'everyday life'. While training, travel and competition clearly take up a large part of any modern player's time, it is vital that juniors are aware of the world outside tennis. They are very lucky to be young, fit and healthy and to have the opportunity to compete against many talented peers. They should never lose sight of the fact that they are fortunate to be in such a position, that their experiences and memories will stay with them forever and that they clearly have the support of many wonderful people. Respect, appreciation of others and a positive outlook on life will contribute to tennis and personal growth. Life is a gift, talent is a bonus, and competition is a privilege.

There is no doubt that in our efforts to help young players, we must always look further than their basic technical, tactical and physical abilities. While the merits of psychological training on-court have been heavily promoted over the last few years, it is perhaps time now to turn our attention to the role of primary behavioural characteristics. Success in tennis is about much more than just winning matches.

References

Blakeslee, T. (1997). *The Attitude Factor*. Thorsons Press.

Coopersmith, S. (1981). *The Antecedents of Self-Esteem*. Consulting Psychologists Press.

Csikszentmihalyi, M., Rathunde, K. & S. Whalen. (1997). *Talented Teenagers - The Roots of Success and Failure*. Cambridge University Press.

Frydenberg, E. (1997). *Adolescent Coping - Theoretical and Research. Perspectives*. London Routledge.

Goleman, D. (1996). *Emotional Intelligence*. Bloomsbury Paperbacks.

Lazarus, R. (1984). *Stress, Appraisal and Coping*. New York Springer.

Rimm, S. (2000). *See Jane Win - How 1000 Girls Became Successful Women*. Penguin Books.

Loehr, J. (1986). *Mental Toughness Training For Sports*. Plume Books.

Lindenfield, G. (2000). *Confident Children*. London – Thorsons

Dweck, E. (1998). *Motivation and Self-Regulation across the Life Span*. Cambridge University Press.

Shaw, C. (1996). *Help Your Child Be Confident*. Hodder and Stoughton.

Ochse, R. (1990). *Before the Gates of Excellence*. Cambridge University Press.

recovery for the tennis player

By Machar Reid (ITF Development Assistant Research Officer), Miguel Crespo (ITF Development Research Officer) & Angela Calder (Recovery and Performance Consultant, Australian Institute of Sport)

Introduction

Alfie Smith has just finished his seventh relatively intense on court training session in four days. During the session he found his concentration levels wavering and his legs feeling heavy and hitting arm tired. While recognizing he wasn't getting the most out the session, he continued diligently, determined to finish the session. He was beat and couldn't wait to get off the court!

The above vignette illustrates a common training scenario: a player sacrificing training quality for training quantity. Alfie was going through the motions. Was he training smart? The answer is probably a rather large NO.

The injured, stale or overworked athlete is not uncommon to modern sport. Within tennis circles, although there is an intensifying awareness of the need to periodise a player's training program, without the provision of appropriate recovery, overtraining risks are as specific to the developing player as they are to the touring professional. While off court strength and conditioning programs along with cross training initiatives play an important and necessary role in optimal athlete preparation, additional recovery initiatives should also be considered.

Recovery, as it relates to the healthy, functioning tennis player, simply refers to the adaptation to training stressors. This adaptation can either be physical or psychological in nature and the recovery processes involved are commonly referred to as restoration and regeneration. The scheduling of recovery sessions is thus designed to

promote adaptation to training loads or a particular training stimulus, and in the process minimise the prospect of players encountering a non-adaptive or maladaptive (overtraining, overuse or burnout) training response.

By understanding the principles and processes of recovery, coaches can better appreciate that the implementation of recovery regimens are as important for development as are skill acquisition, strength, flexibility and mental skills protocols. Clearly when on court training is isolated and provided as the sole training stimulus, a player's progress is likely to be stagnated and monotonous. And yet, while coaches may recognise that it is essential for players to take to every training session absent of any neural, psychological or physical fatigue likely to hinder training performance, in general few measures are taken to ensure this is achieved. Calder (1994) then highlights that the challenge that lays ahead for coaches is to integrate recovery programs effectively into planned training in order to promote the most effective and efficient development of athletes.

The series of articles to follow in ITF Coaching & Sport Science Review will elaborate on the use of appropriate recovery techniques, specific to the demands of tennis, and will hopefully better assist you incorporate effective recovery methods into your player's training and competitive schedules. Methods will include:

- Stretching
- Self massage
- Active recovery
- Hydrotherapy
- Cross Training
- Meditation
- Progressive muscle relaxation
- Visualisation
- Floatation
- Yoga

Conclusion

Within the tennis coaching fraternity, most coaches appreciate the importance of developing the complete player. The dynamicity of the modern game along with the increasingly large expectations placed on the developing player has emphasised the need for coaches to assist players acquire the skills to cope with this growing number of demands. As part of this process, it is also the coach's role to educate players as to how to plan training more carefully to provide time for their bodies to grow, recover and adapt. Recovery techniques that provide for adaptation to training stressors are an important means through which this can be achieved and thus form an essential component of optimal tennis player preparation.

References

Calder, A. (1994). Recovery Programs. Australia Coaching Council, Canberra, Australia.

some observations on the service action

By Jean Brechbuhl, Léon Tièche and Daniel Frey (Swiss Association of Tennis Teachers)

Many children and beginners think that fast services must be directed downwards. However, every tennis teacher knows that this is a belief which must be resisted at first, because most services by beginners or players of average strength should be hit with an upward trajectory.

In order to know exactly what needs to be achieved, an engineer and member of the Association Suisse des Professeurs de Tennis (Swiss Association of Tennis Teachers), decided to process certain data and compare his results with those found

by other colleagues interested in the same issue. Consequently he was able to determine what actually happens during the service action by taking the following parameters into account:

* *The player's height and reach.* The latter data is an average value as arm length and the ability to develop one's full reach are individual features. As an example, the heights of 1.55m (approx. 5'1"), 1.75m (approx. 5'9"), 1.85m (approx. 6'2") and 2m (approx. 6'5") were selected with the hitting heights of approximately 2.30m (approx. 7'5"), 2.60m (approx. 8'5"), 2.85m (approx. 9'3") and 3.20m (approx. 10'5").
* *The speed of the ball.* Four different ball speeds were studied:
  - 70 kph (43.5 mph). Speed of a beginner's first serve.
  - 100 kph (62.1 mph). Speed of a decent first serve hit by a player of average strength.
  - 150 kph (93.2 mph). Speed reached by the best female players and certain male players who don't have particularly fast serves. (A number of first serves were hit at this speed during the 1999 final of the Davis Cup.)
  - 200 kph (124.3 mph). Typical speed of fast serves hit by great servers.
* *The importance of the 'safety window' in terms of height,* i.e. the space above the net into which the serve can be successfully hit.
* *The angle, positive or negative, of the initial trajectory in relation to the horizontal.*

These theoretical models were studied in the consideration that balls are hit with no spin, that the server stands in the middle of the baseline and aims at the centre of the court, therefore hitting the balls over the lowest point of the net, and that the shots are played at sea level.

The intention of this article is not to provide all the data collected. Rather, only some of the most practical results of this small will be outlined.

FINDINGS

- At a low speed (service hit by a beginner or a player of average strength), balls are played upwards or with a trajectory which is horizontal in its early part.
- At very high speeds, the ball drops only by a few degrees initially, especially if it must clear the net far from the centre.
- As one would expect, the dimensions of the 'safety window' decrease with speed and increase with the height of the player.
- Even for a very tall player, safety margins are minimal at very high speeds.

Examples:

- A service hit by a beginning player measuring 1.55m (a child for instance) at 70 kph, a relatively high speed for a beginner, must go up by 3° in order to clear the net. The ball can in fact ascend by up to 10° without being hit 'out'. The 'safety window' is approximately 1.20m above the net.
- A service struck at 70 kph by a 1.75 metre-tall player must also have an upward trajectory of approximately 2° to clear the net and of no more than 8° to land in the service box. The 'safety window' is approximately 1.35m high.
- The same player hitting at 100 kph can strike the ball with a trajectory which is horizontal in its early part or downward by 1° for the ball to land in the service box and by no more than -3° for the ball to clear the net. The 'window' is approximately 55cm high.
- For a player 1.85m tall striking the ball at 150 kph, the ball needs to be travelling down at 5° for it to land in and by no more than -7° for it to clear the net. The 'safety window' is 30 cm high.
- A very fast serve of 200 kph hit by a 2m tall player will be 'out' if not travelling down by 8° and in the net if coming down by more than -10°. In this case, the 'safety window' is no more than 20 cm high despite the server's height.

NOTES

Given the individual morphological differences, the figures are not meant to be absolute. However, these findings lead us to suggest the following guidelines for the instruction of the service action:

- *Beginner players* (who strike the ball at very low speeds) *must focus on hitting the ball upward.*
- At relatively high speeds, *the initial part of the trajectory must be almost horizontal and at extremely high speeds, balls must not be directed down too sharply when hit by players who are relatively short.*

This has an impact on the ball toss:

Beginner players must not have a high ball toss. This is because they have to strike the ball upward. Furthermore, the risks of deviation are less if the ball toss is lower.

Very high ball tosses are not very efficient. Ball tosses which are extremely high (70 cm and more above the point of maximum reach) have the following disadvantages:

- Deviation (e.g. after an imperfect toss or due to the effect of the wind) can be considerably increased.
- The player has to strike the ball in its descending phase – and all the more quickly as the ball toss was high – which can reduce the precision of the shot.
- The timing of the shot can be affected.

Considerable individual differences in ball toss and rhythm are noticeable among high level players: players such as Tanner or Leconte gave the impression of striking the ball on the rise while others toss the ball considerably higher than the contact point. These days, it seems that very high ball tosses are not as common and that most high level players toss the ball at or slightly above the point of impact.

The ball can then be struck during the few split seconds when it is relatively still and deviation is not excessive, to therefore allow the rhythm of the shot to remain relatively unaffected.

Considering how small safety margins are, one understands why topspin serves, which increase the arc of the ball's trajectory and the dimensions of the 'safety window', are important to master when making the serve is essential (as is the case on the second serve).

circuit training to develop specific strength for tennis

By David Sanz and Francisco Ávila (Faculty of Sport Sciences, University of Extremadura, Spain)

1. Introduction

One of the main problems facing tennis coaches when working to develop the strength levels of their players is the search to find exercises capable of transferring improvements in muscular strength to the technical movement specific to competition. There is little point in having very high levels of maximum strength in a given exercise if part of it cannot be applied to the specific tennis movement.

In order to increase specific strength: the strength a player requires to perform the specific tennis strokes, we have to analyze the muscular involvement in tennis. This can, in fact, be summarized as follows:

1. In the upper body, predominantly explosive musculature, which allows players to increase the mean power of their stroke production, is needed.
2. In the lower body, predominantly endurance musculature, which allows players to move at a set rhythm, is needed. Occasionally however, this musculature is required to act explosively to allow us to perform movements at high speed.

This said it is this article's intention to present a practical, on court strength training session that allows players to train the explosive strength in their upper body with plyometric power work, and the endurance strength in their lower body through plyometric compensation work.

2. Training program

The program is tailored for competitive players aged 16-17. The exercises attempt to improve explosive strength as a specific physical quality and strength endurance as a side quality. The type of load (according to a model of Accumulation-Transformation-Performance) is accumulative. This work can continue throughout the entire season except during important competition phases.

The strength endurance work is also very important as complementary metabolic and cardiovascular work. Thus, in previous phases, it is crucial to prioritize the cardiovascular development and oxidative capacity mainly by means of aerobic work.

Explosive strength, on the other hand, will be developed through the speed of exercise performance, i.e. with light loads. That is why intensity will be controlled by means of time/speed in the exercises that use body weight and by percentages of load/speed in the drills that incorporate additional loads.

A crucial aspect in all conditioning work is the specificity of training. In order to achieve this:

- Strength exercises should have a neuromuscular similarity to the tennis specific gestures (angles of application and neuromuscular timing).
- Strength exercises should have a similar speed of performance to that of the specific tennis movement.
- Strength exercises should have a similar energetic demand to those of tennis.
- The coordinative abilities, which are fundamental for the technical and tactical aspects (the actions that facilitate the optimization of the technical movements specific to tennis) should also be taken into account in the strength exercises.
- The movements involving flexo-extensions with a short transition phase between both actions will use the myotatic reflex.
- The precision of the movement is an important criterion for controlled performance.

3. Stations and exercises

In a circuit of fixed time, players perform 4 series of 10, 15, 15, and 30 seconds respectively, with a 1 minute rest when working the same muscle group and 30 seconds when the muscle group alternates. During these pauses, recovery should be active and players should perform stretching. There will be a 3 minute recovery period between circuits, with a 2 minute continuous light run and 1 minute walk. The sequence of exercises tries to improve the neuromuscular activation of the limbs in the different tennis strokes.

Each station has 2 exercises, an assimilation one that requires a specific neuromuscular activation, and an application one, which has the same goal yet requires the activation be closer to the specific stroke.

> Circuit characteristics: 4 Series (10s, 15s, 15s, 30s), Rec. 1min/30sec – 3min

STATION 1

Exercise 1

The screw: Player extends the elbow joint, pronates the forearm and internally rotates about the shoulder (similar to the action of the serve). Note: Perform the movement at maximum speed with a 1 Kg free weight.

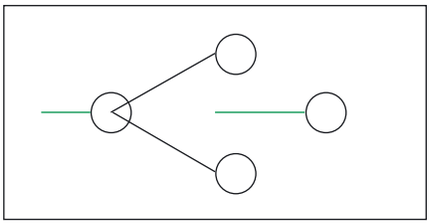
Exercise 2

Mini-serve: Player performs the movement of the serve and hits the ball griping the racket at its throat. The extension and pronation movement to ball impact has to be at maximum speed.

STATION 2

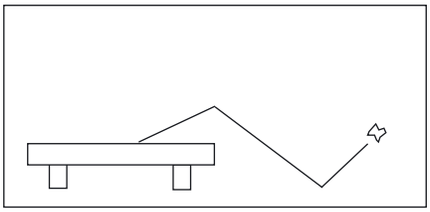
Exercise 3

Calderon: Series of plyometric jumps with low impact alternating on one and two legs.



Exercise 4

Split Step: With a serve movement; gripping the racket at its throat and keeping the elbow bent high, the player performs a plyometric jump and impacts the ball in the air.



STATION 3

Exercise 5

Volleys: Player performs the forehand volley movement with a 1 kg free weight. Impact point should coincide with the step forward. Free arm is kept in an isometric work (flexed) with a (1kg) free weight.

Exercise 6

Repeated volleys: Coach feeds balls to the player. Player alternates hitting forehand and backhand volleys at maximum speed.

STATION 4

Exercise 7

Turns: Starting with open stance, the player rotates the trunk holding the 2 kg medicine ball with extended arms and throws the ball. Rotations should involve the flexion and extension of the legs. Leg and arm extension should be performed at the same time when in open stance.

Exercise 8

The chair: Coach feeds balls to a player seated on a chair. Player has to move only from the waist up to hit the ball. Feet should be fixed on the ground. Impact should always be made in front of the body.

STATION 5

Exercise 9

Shadows: Player moves with a lateral step (right leg moves closer to the left leg without surpassing it) and performs a shadow forehand movement and then a backhand movement. Use two rackets instead of one.

Exercise 10

Popeye: Same as the previous exercise but the backswing will involve a complete turn of the arm under the ball before hitting it. Player alternates hitting forehands and backhands.

STATION 6

Exercise 11

The "v": Player moves diagonally to shadow a stroke in a given zone, player returns to the starting position and repeats the movement in the other side.

Exercise 12

Same as the previous drill but now the player hits the ball fed by the coach, only if however, he is in the correct position to hit it.

References

Aparicio, J.A. (1998): "Preparación Física en el tenis". Madrid. Gymnos.

Aspillaga, E.; González, R.; Ochoa, C.: Circuito de resistencia anaeróbica láctica y aláctica específico para el tenis. ITF Coaching and Sport Sciencie Review. N 21. Agosto 2000.

Behm, D.G. y Sale, D.G. (1993). Velocity specificity of resistance training. Sports Medicine 15 (6), 374-388.

González, J.J. (2000). Metodología del entrenamiento para el desarrollo de la fuerza. Centro Olímpico de Estudios Superiores. Madrid.

Groppel, J. et Al. (1989) "Science of Coaching". Illinois. Leisure Press.

Groppel, J. (1999):" High Tech Tennis." Illinois. Leisure press.

Schonborn, R.(1999): "Entrenamiento técnico". Madrid. Tutor.

Talbot, P. (1990) "Filières énergétiques et temps réels de jeu. Education Physique et Sport. N 228, págs 24-26.

Vila, C. (1999): "Fundamentos prácticos de la preparación física en el tenis". Barcelona. Paidotribo.

ten ways to prevent jet lag

By Babette Pluim (Medical Advisor, Royal Netherlands Lawn Tennis Association) and Miguel Crespo (ITF Development Research Officer)

Tennis players and coaches at competition level may have to travel across multiple time zones to reach tennis events all over the world. This disturbs the normal human circadian rhythm and may induce that dragged-out, out-of-sync feeling know as jet lag. Symptoms include fatigue, irritability, sleeping difficulties, loss of motivation, loss of appetite, loss of mental acuity, and headache. These effects are temporary and disappear in the course of a few days, when your internal clock is attuned to the new, local environment again.

Flying eastwards, and therefore resetting your body clock forward, is often more difficult than flying westwards and adding hours to your day. This is because the body clock adjusts more easily to a phase delay (going to bed and getting up later) than a phase advance (going to bed and waking up earlier). Also, the longer the flight, and the more time zones you cross, the longer the jet lag symptoms will last and the worse they will be. Flying north or south does not produce jet lag.

As a general rule, for each hour of time difference you need approximately 12 hours to one day of "adaptation time". Thus, if you travel to another country with an 8-hour time difference, you may need to travel a minimum of 4 days in advance to ensure that you have at least partially recovered from the jet lag by the day of your first match. Of course, whether or not you choose to do so also depends on your personal experience with jet lag, the local conditions (expenses, availability of practise course etc), and how much time you have available.

Below are several guidelines that you can follow in order to overcome the symptoms more efficiently.

1. Adjust your sleep-wake cycle prior to departure

Begin resetting your body's clock one or two days in advance of your departure by going to bed earlier and getting up earlier prior to flying west (e.g. when flying from the US to Europe), and by going to bed later and getting up later when you have to fly east (e.g. from Europe to Asia). However, adjusting the sleep-wake cycle prior to travelling is of marginal benefit only, and an adjustment of more than 2 hours is not recommended.

2. Plan your arrival time

Another strategy is to try to schedule your arrival at your destination at roughly your usual bedtime, according to the clocks in the time zone to which you are flying. That way you can start with a good night of sleep. This is usually the best option when you fly west. Or try sleeping on the plane and planning to arrive at the hour you usually start your day. This may the best option when you fly east. In these ways, you immediately begin to orient your body systems to the new time schedule, a valuable psychological and physiological advantage.

3. Reset your watch

Set your watch to the local time of your destination when you step into the plane. This way, you start thinking in terms of the new time, and you use the hours that you travel to start the adjustment process.

4. Get some extra sleep in the plane

Prepare yourself for optimal sleep in the plane. Close the window shade or put a blanket over your head. You can also use an eye shade, ear plugs and a neck pillow to be more comfortable and sleep better. Try to stretch your body as much as possible and avoid sleeping contracted.

5. Drink plenty of fluids

When travelling by air, the atmosphere inside the plane is very dry, ranging from 6 to 15% humidity. To avoid dehydration you should drink extra fluids during your flight, but moderate your consumption of beverages containing alcohol and caffeine. They increase dehydration and may disrupt your sleep. Apply a moisturiser to keep your skin moist; massage your body, especially legs and feet, to stimulate circulation.

6. Eat light

Avoid eating heavy, fatty, and salty meals before and during your flight. A light meal is easier to digest, and will allow for better sleep. It has been suggested that carbohydrate rich meals stimulate the indolamine-system, thereby inducing sleep, whereas meals rich in proteins stimulate the adrenaline-system and wake you up. However, there is no scientific evidence to support these claims. It seems that the timing is more important than the contents of the meals. If you have a special diet, be sure to follow it.

7. Make yourself comfortable

It is crucial that you feel comfortable on board. This can be accomplished by wearing light loose-fitting clothes or by bringing comfortable clothes or shoes to change into. Avoid shoes with cords, heavy boots and tight socks that may affect blood circulation or alternatively take off your shoes. You may want to consider wearing layers to remove or add depending on the cabin

temperature.

Try listening to relaxing music or follow the guidelines on relaxation strategies (fly-aerobic) provided in the in-flight magazines and audio channels of many of the airlines. They include several ideas on relaxation and stretching exercises that can be performed while seated and that will help you to minimise fatigue and ease your body.

8. Move around

During your flight, and especially on lengthy flights, move your toes, ankles and knees from time to time while you are seated, and get up frequently to stretch and walk the aisles. This periodic exercise will help improve your blood circulation and avoid stiffness in your body. It may reduce the risk of the so-called "economy class" syndrome, a venous thrombosis caused by sitting (too) still for a long period of time. Also, do not place your bag underneath the seat in front of you, but place it in the overhead cabins to preserve the available space around your seat.

9. Use natural signals to tune your body

There are several main signals that govern the internal body clock, including light, activity, and food. Try to use these signals to help your body come into synch with the local time. Avoiding light in the morning and actively seeking stimulation (light, social activity, exercise) is useful after westward flights; performing moderate exercise in the morning and closing the curtains at night will help you recover faster after an eastward flight. Avoid prolonged napping. Mid-afternoon tiredness should prompt some exercise rather than sleep. Also, use meal times to speed up your adjustment to the local situation. Eat your meals at the appropriate time to help your body adjust as quickly as possible.

10. Be moderate with chronobiotic drugs

Occasionally, you may want to ask your doctor for a light sleeping pill (short half-time) that can be easily eliminated by your body. They are sometimes helpful when you want to sleep in the plane or after flying east, when you have trouble falling asleep the first or second night.

It has been suggested that melatonin, whose main functions are to co-ordinate biological rhythms, might be better than sleeping pills to alleviate jet lag. Melatonin levels are low during the day and high at night, thereby providing a signal to the organism indicating when it is day or night. Melatonin secretion at night may be advanced 2-3 hours when melatonin is given in the early evening, thereby producing a phase advance. However, it is advisable for athletes to try to limit the use of either type of drug, because of possible side-effects and the risk of hangovers.

self-confidence

By Antoni Girod (Master in Neuro-linguistic Planning, France)

The effect self-confidence has on a player's game is quite simply amazing. A lack of self-confidence can transform the number one player in the world into an ordinary player, while a subtle increase can help a player going downhill achieve things that no one would have thought possible. This has to do with alchemy: confidence seems to be a real catalyst that turns lead into gold or suddenly turns things around in an incredible way.

What is confidence?

Put simply, it is a particular internal state that enables us to make maximum use of one's potential, or even go beyond that potential. Three main mechanisms participate in the building of self-confidence:

First, there is the process of accumulation. This is a chain reaction that requires feelings of success to function. It is this series of successes, first during practice sessions and then in matches that enables the player to develop his self-confidence. The player knows he can count on his shots and on his physical condition. He knows he can win points, matches and tournaments. Confidence by accumulation requires continued success to work. It demands results that are tangible to develop.

A few years ago, Andre Agassi was in search of his lost confidence. He recharged his batteries by winning matches in lower rung tournaments. A place in the final of the Las Vegas tournament in early November, immediately followed by a victory in Burbank, California, got things going again for him. His results in the early part of the following year were indicative of his increase in confidence: a place in the 4th round of the Australian Open, a victory in Scottsdale, a second victory in San Jose (this time over Pete Sampras), a quarter-final showing in Indian Wells and a place in the final of the Lipton Championships at Key Biscayne.

ACCUMULATION OF SUCCESSES ⇨ CONFIDENCE

Second, there is the process of revelation. This can occur after a significant success in which the emotional intensity reaches such a level that it gives the player a very strong feeling of confidence. From that point in time, the player will start to approach each match in a very positive way.

In Patrick Rafter's case, his Davis Cup match against Pioline in February 1997 was a real eye-opener. Down two sets to love, he recovered to win the match and thus give his country a decisive point. He was then ranked number 63 in the world. His 1997 results? A semi-final at the French Open, a victory at the US Open and a career high ranking of number two (that he went on to improve to number one in 1999).

SUCCESS +++ ⇨ CONFIDENCE

On the other hand, a revelation can also occur after a negative experience of high intensity that triggers a feeling of pride, as long as the player has the minimum potential to succeed.

In 1998, Nicolas Escudé, ranked 406th in the world at the start of 1997, said that the successes of players like Kuerten, Rios, and Costa, whom he used to beat when he was 16, had made him suddenly realise what his true potential was. After the 1998 Australian Open, his coach Tarik Benhabiles, described the event that triggered this realisation by Escudé:

'He had every chance of succeeding. He only needed that little extra something to realise what he was capable of doing. That happened about a year ago while he was playing a satellite tournament in Montrouge. He had just lost to Olivier Malcor (then ranked -30). He was shattered, he had hit rock bottom. After the match, we spent four and a half hours working really hard on the court. In his head, the defeat was history'.

A comparison of the Nicolas Escudé who was playing and losing the Montrouge satellite tournament in February 1997 and the Nicolas Escudé who reached the semi-final at the 1998 Australian Open, had seen barely a year go by. Technically speaking, it is unlikely his game underwent any major changes in such a short period of time. How can we then explain this turnaround? The difference lies elsewhere: it lies inside the player. The French player started to build his confidence. The comparison of his

poor results at the beginning of 1997 (up to his defeat in Montrouge) with the brilliant results of the players he used to beat when he was 16 acted as a stimulus to his confidence. All of a sudden, he decided to believe in himself!

INITIAL SUCCESS + DEFEAT ⇨ CONFIDENCE

Third, there is the process of the fundamental positive faith. This can be described as an unconditional and intrinsic self-confidence. This type of self-confidence does not require any external motivators to show itself. The player has blind faith in himself, whatever his results may be. His confidence appears to be indestructible and permanent. He has absolute faith in his potential. The player uses this fundamental positive faith to succeed. It dictates day after day his decisions, his training methods and his behaviour on the court.

Venus Williams is undoubtedly the player that best epitomises this fundamental positive faith. She is firmly convinced that she will be the number one player in the world. She said it when she first appeared on the WTA tour and has kept saying it ever since. But most importantly, she keeps saying it to herself. She fundamentally believes in herself, her talent and her potential. With her recent victories back-to-back at Wimbledon and at the US Open it is clear that such faith is bearing considerable fruit. In her case, confidence does not come from success. In fact, it is to the contrary and it is this feature that distinguishes her confidence from that which has been previously presented.

FAITH +++ ⇨ CONFIDENCE ⇨ SUCCESS

Here are five efficient ways to build, develop and maintain self-confidence:

1. **Use self-persuasion at all times (especially when in doubt).** For instance, decide on a positive belief on your serve or return of serve. And then repeat it to yourself time and time again, like a leitmotif, things like: 'My serve is my real strength', or 'My return of serve is my real strength'. This positive assertion will have a positive influence on your training methods and on the way you approach your shots during match play.
2. **Follow a thorough physical, technical and tactical training program.** A well-trained player will develop tremendous confidence. He knows that he can count on himself and have faith in himself during match play.
3. **Memorise experiences of success.** The player should memorise each shot that he performs well during practice. This may well be the first link in the confidence chain. Each point that a player wins in a match, each victory, especially in difficult conditions, should also be memorised. To do so, the player can use the following four methods:
   a. Use positive self-talk after each significant success (e.g. 'come on!'). You can also say the word aloud.
   b. Use rituals after each significant success (e.g., clench your fist).
   c. Take a 'mental picture' of the success you have just experienced.
   d. Develop post-match routines: in a notebook **write down** all of the significant successes that you have experienced in the match in order to implant them in your memory.

   Whenever a player is in doubt, these words, rituals, mental images, or a quick look at the notebook will help him to rapidly reactivate his feeling of confidence.
4. **Recognise negative signs and reactions.** The following are signs are indicative of a player in doubt:
   - Negative self-talk ('*I stink*').
   - Negative body language: head, eyes, racket and shoulders down, rapid breathing, physically lethargic, etc.
   - Continuous mental images of missed shots, lost matches, etc.

   As soon as a negative sign appears, it is important to realise that you are experiencing doubts to help put things into perspective. You then have to chase away all the negative thoughts by switching back to positive statements or beliefs. To do so, you need to activate the positive aspects of your performances that you have memorised (refer to **3.**).

   Following a defeat or a match that you have won by playing badly it is similarly important to get into the habit of writing down on a flyer, objectively and as soon as possible, the things that did not work. Then, you must try to learn from your mistakes to avoid repeating them. Write down in your notebook the new positive attitude that you need to develop in the future and get rid of the flyer. This is an excellent way to learn from your mistakes in a positive way while simultaneously extinguishing any self-doubts. Finish this routine by once again reading your list of past successes to further re-affirm your positive thoughts.
5. **Pretending.** If I had confidence in myself, how would I feel? What would my attitude be like? How would I walk? The trick is to reproduce the stance (head up, eyes looking straight ahead, shoulders back and broad), the gestures (confident steps, sure movements), the respiratory rhythm and amplitude, as well as the muscular tone that epitomise self-confidence. You need to identify yourself with the character that you want to be: a tennis player who believes in himself. It is always surprising to see how quickly and efficiently this technique works in match play!

use of weight lifting for strength development in tennis players

By Armando Salas Rojas, Alberto V. Fernández García, Juan A. Pino Pérez, Wilfredo Henry Torrientes and Javier Rojas Marín (Davis Cup and Fed Cup Coaches, Cuba)

1. Introduction

In order to achieve high quality sports performance it is crucial to combine multiple factors.

It is not easy to correctly execute the different movements to hit the ball. The best results require, among other factors, an effective technique, an efficient development of physical qualities, a sound co-ordination of muscular forces and a great deal of speed and precision in the execution of the different components of the movement.

Among these aspects we should consider the development of strength, an indispensable quality for the execution of basic actions in tennis such as: the serve, the forehand and the backhand, and the footwork.

Strength development is achieved with the aid of weighted exercises and the use of weight lifting as an auxiliary sport. This is a variation, initiated several years ago, which has considerably influenced the development of athletes, of both sexes, in a variety of different sports.

2. Goals

The goals of the article are to:

- Present the fundamentals of the application of strength workouts in tennis, in order to allow coaches to start this activity by using weight

Mini-Tennis

Being on time for the tennis lesson

By Miguel Miranda (ITF Development Officer for South America)

Introduction

Being on time is an important issue for the running of all tennis lessons. Even though beginner and mini-tennis players attend their lessons "to play tennis while having a good time", the coach should remind them that arriving late is a sign of disrespect to their peers, the coach and to oneself. The coach should attempt to explain to them that tennis is characterised by punctuality, pointing out that when they start competing in official matches, they will be defaulted if they are late for a match and will lose without even entering the court.

With beginner or mini-tennis students however, the coach should be sufficiently flexible as unfortunately in many instances the delay is not due to the kids, but to the parents. With that in mind, it is possible that parents may need some time to understand how the tennis school operates and develop an appreciation of the rules of the game. For this reason, an initial meeting with the parents is particularly important as it allows the coach to explain these rules and procedures to the parents when they are enrolling their children into the tennis school.

A proposal

One of the main tools, obviously not the only one, that the coach can use to try to solve the problem of poor punctuality is the teaching methodology used in our lessons. In my experience, I do not think that this is too great a problem if we use a more open teaching methodology, that is to say, if the games and drills are more flexible. This flexibility can primarily be used for the games of ball control, which comprise one of the most important issues for the beginner students. When we refer to "ball control" we are not only speaking of keeping the ball in play but also of the ability to change direction, height and speed, according to the skill level of each player.

Let's imagine that we have started the lesson 10 minutes ago, maybe we are in the final stage of the "warm-up". I have used inverted commas because the warm-up in our lessons should be VERY, VERY AMUSING: with many co-ordination and balance games and basic motor skill activities such as throwing and catching balls, running, etc. The warm-up should be organised WITH SHORT COMPETITIONS, which are not affected by the late arrival of a student. In fact, ideally, a late arrival or newcomer would be welcomed with: "Kids, Look who is here, Great! The game will be even better. Petra, you cannot imagine how much fun we are having playing this game! Please, come and play!" If the player who is late is one of the less skilful ones, we should help her by providing her opportunities during the game.

If the games at the start of the lesson are ENJOYABLE AND A LOT FUN, the kids will be the ones who put pressure on their parents to be on time in order not to miss out. That is, the child will tell her parents something like: "Mum, I do not want to be late because the other kids have lots of fun with the games the coach organises when we start the lesson".

On the other hand, it is obvious that the child will make little attempt to be on time if what she finds at the start of the lesson is a long and boring "technical chat", attendance control, or students preparing the lesson's equipment - which should have been done by the coach well before the lesson's start. If the coach is "only 5 minutes" late doing this, and we are to add in a technical chat and an attendance control as well, we will have LOST 15 very boring "minutes".

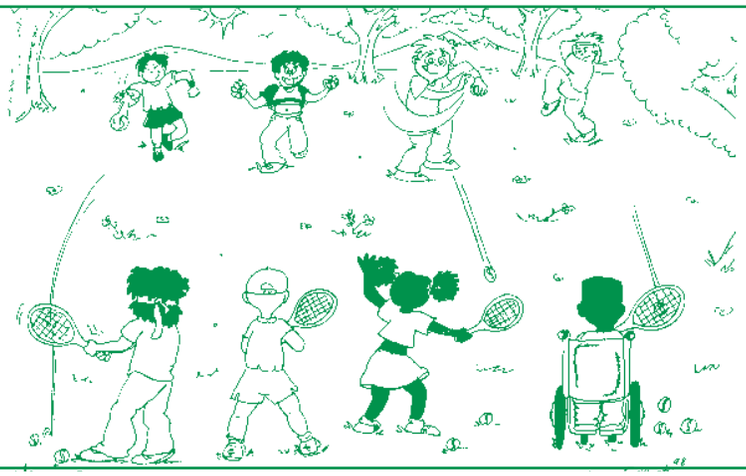
Conclusion

We should avoid monotonous activities at the beginning of the lesson that will only serve to de-motivate our students and provide a reason for them to abandon our programme to join another (which would not be too bad) or to simply (which is even worse) give up the game all together.

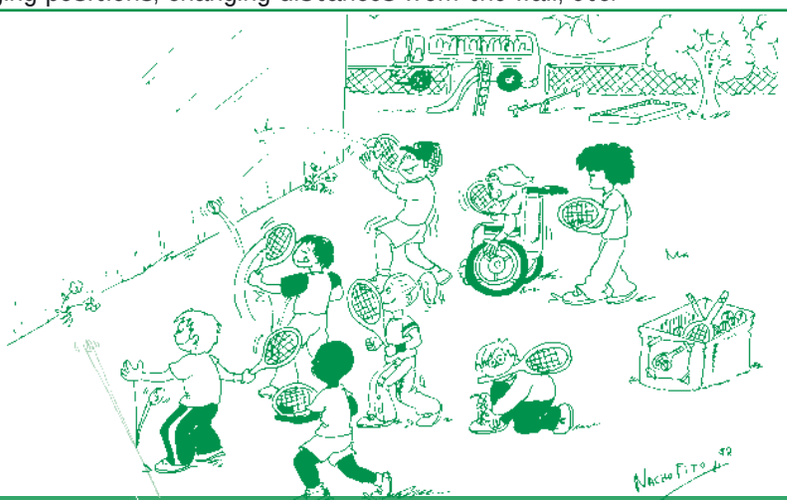
Thus, it is crucial to start the lessons with fun activities that motivate children to be on time and, more importantly, to see tennis as a fun and easy sport to play. Coaches should be creative and be continuously attuned to the likes and opinions of their students. By doing this, tennis will be an unforgettable experience for all.

2 ONE HOUR LESSONS FOR CHILDREN 5 - 8 YRS OLD

LESSON 15	Theme: GETTING THE BALL TO LAND IN A PRECISE SPOT
Objective	To throw the ball to a precise spot enabling partner to block it.
Warm up	Racket stretch: Stretching exercises which involve racket handling. Two pupils stand back to back and pass the racket around their bodies, or the pupils pass the racket through the legs and over the head. There are many variations of these exercises relating to the passing of equipment between partners. The pupils themselves can invent their own.
Games/ Exercises	Blocking machine: Students form pairs. One student throws the ball with his hand to his partner who has to block it with the racket, making contact with the ball before the bounce. Pair with the most balls blocked wins.
Variations	After one bounce, racket facing the feeder, palm or back facing the feeder, before it bounces, at various heights, over the head, etc.

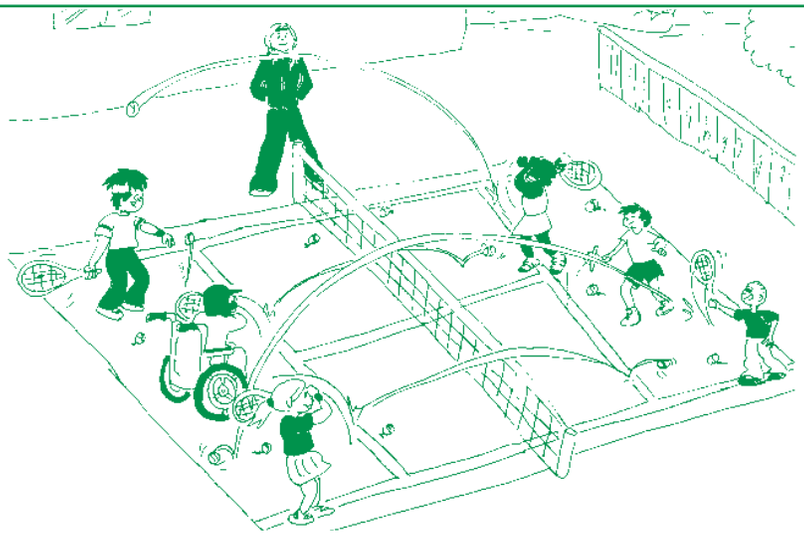


LESSON 16	Theme: PROPELLING THE BALL WITH THE RACKET AND MOBILITY
Objective	To hit the ball so it strikes the wall in a precise spot.
Warm up	Grand Slam: To develop general co-ordination and movement skills in a tennis context. With the pupils working as a whole group moving around a hall or full court area. Pupils respond to three different commands: ATTACK - Pupils sprint for 5 - 10 metres twisting and turning to avoid others. DEFEND - Pupils stop immediately and take up a ready position. RALLY - Pupils jog around court area. Done without rackets pupils can mimic actions of Grand Slam Champions.
Games/ Exercises	Wall and catch: Students in teams one behind each other facing the wall. First student lets the ball bounce and hits it to the wall, next student catches it with the racket and the hand and does the same and so on. First team to complete the task down the whole line wins.
Variations	Changing positions, changing distances from the wall, etc.

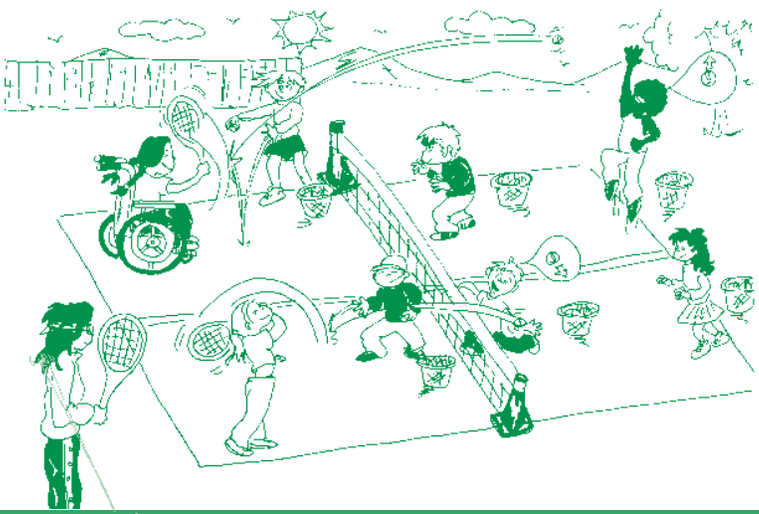


2 ONE HOUR LESSONS FOR CHILDREN 8 – 10 YRS OLD

LESSON 15	Theme: RECEIVING LOW AND HIGH BALLS, PROPELLING AND CO-OPERATING
Objective	To introduce to students the proper racket preparation depending on the height of the ball received.
Warm up	Letter shapes: Students jog on the spot. Teacher calls out a letter, eg. "B" and students run drawing out the shape of the letter as they move.
Games/ Exercises	Racket Basketball: Students are in pairs (one feeder and one hitter). On signal, feeders feed one low ball and one high ball and hitters hit from their side to the other side one ball low and the next one high. Pair with the least number of balls in the net wins. Students rotate positions.
Variations	High - low on volleys and on groundstrokes. One feeder and one hitter, etc.



LESSON 16	Theme: RECEPTION OF VARIOUS BALLS, PROPELLING AND CO-OPERATING
Objective	To bring together the various skills required to hit balls received on the right or left, short or deep, and high or low.
Warm up	Animal mover: Students jog around. Teacher then asks the students to move like a specific animal (eg. Slowly like a tortoise, quickly like a mouse, jump like a kangaroo, etc.).
Games/ Exercises	Clean up your court: Students are in 4's (one feeder, one hitter, one net catcher and one fence catcher). The feeder feeds the ball to the hitter, the catchers call "right or left, short or deep, and high or low" and the hitter has to hit the ball accordingly. First team to finish the balls wins. Students rotate positions.
Variations	Review of reception skills: right or left, short or deep, and high or low. One feeder and one hitter, etc.



lifting as an auxiliary sport.
- Suggest measurements that allow one to evaluate the results of strength workouts and provide some indicators regarding "loads".

3. Aspects that should be considered when developing strength with weights

In order to more effectively utilise weight lifting as a training medium we should consider the following factors:

➢ Selection of the exercises

They should be targeted toward working those muscles that, generally or specifically, will have an effect on the competitive movement. This is based on the principle of dynamic correspondence (according to Y. V. Verjoshanski), that states that the exercises performed should have a certain correspondence with the competitive action in terms of range and sense of the movement, magnitude and development of maximal force and muscular work regime.

The selection and distribution of the exercises could be altered according to: the goals set in the training plan, the characteristics of the mesocycles, the competitive schedule, the player's needs in any particular training phase and the results of the maximum effort strength tests.

➢ Muscle specificity

Each exercise should influence specific muscles or muscle groups such that the coach needs to have a comprehensive understanding of each to allow him to adequately select them according to the goals set and the player's needs.

➢ Frequency of the training

The tennis player requires an optimal strength level that he will endeavour to maintain during competitions. For this reason we recommend the performance of 3 weights sessions per week (each separated by a rest day to allow adequate recovery) during the general and special preparatory periods of the training plan. In this stage, the goal is to enhance the player's strength levels.

In the pre-competitive period, strength can be worked 2 times per week, and then once a week during the competitive period. In these stages, the main goal is to maintain the strength levels achieved.

➢ When to perform the weight training in a training day

Weights can be performed before, during or after the tennis (technical-tactical) training. Typically however, the order depends on, among other aspects, the training period and the type of strength to be worked.

For example, if we work strength endurance, we should do so after the tennis training, especially during the

general preparation period. However, as we near competition, these exercises should be performed before or during the tennis training. This is because we will work mostly strength speed and explosive speed during this period such that the last exercises or movements will be tennis specific and remain as a lasting impression of the training day.

➢ Volume and intensity of the load

In tennis, one is required to achieve a certain level of strength and in order to do so, the following abilities should be worked: strength endurance, power speed and explosive speed, and maximum strength.

The development of power speed and explosive speed should prevail due to the specific characteristics of tennis. However, we also should work to develop the other two abilities as the combination of work on these types of strength will benefit a lot the players. They should be worked depending on the period of the season and the individual needs of each player.

Each type of strength should be developed according to the following volumes and intensities:

GOALS	% Maximum Strength	Repetitions per series	Tempo
Maximum Strength	90+	1 – 3	Slow
Power and explosive speed	60 – 89	5 – 8	Fast
Strength endurance	50 – 60	> 6	Medium

Per training day, close to 8 exercises combining arms, trunk and legs can be performed.

➢ Technical mistakes when performing exercises with weights

The correct execution of weighted exercises provides not only for high sports performance but also helps to avoid injuries that could limit a sportsman's career. Thus, it is a must for the coach, trainer or expert to have a thorough understanding of all possible training mistakes and how to correct them.

➢ Determining the main load indexes

During workouts tennis players receive a physical load than can be measured both in terms of volume and intensity.

Volume is the quantity of work done: total number of repetitions and overall weight are the indexes typically used. The total number of repetitions is determined by the sum of repetitions performed during each exercise in a training microcycle, mesocycle or macrocycle. Overall weight is calculated by multiplying the weight lifted with the number of repetitions performed.

Average weight is the result of dividing the overall weight by the number of repetitions.

Since there is a close relationship between muscular strength and body weight, it is also necessary to relate the weight lifted to body weight, in order to determine absolute and relative strength levels.

➢ Tests

Maximum strength tests are important to evaluate the effect of weight training on the strength of the player. The intensities (through percentages) of workouts can then be determined according to the results of these tests.

The tests can be performed approximately every 4th or 5th microcycle, or at the end of a mesocycle, depending on the coach's need to determine the values of maximum strength and therefore the intensity percentages. If the tests are not performed periodically this could adversely affect the intensity of the work and the development of strength.

The tests that we use to determine maximum strength include: standing strength (for arms), clean and jerk (for the trunk) and half squat (for legs). Variations

can, and do exist however, and often depend on the training period and the individual needs of the players among other factors.

Results of other tests such as the vertical jump, long jump, throws and other maximum/explosive strength measures can also help to determine the impact a weight training program is having on the development of a player's strength.

Furthermore, it is also necessary to monitor the weight and height of the players and note the date of the tests so as to relate these data with technical aspects such as the speed of the serve, the on court movement efficiency and the competitive performance.

4. Conclusion

By following this type of process, trainers and coaches should be able to structure and plan weight training such that it has a positive influence on strength levels and, thus, on the power of a player's strokes and his movement efficiency - both of which should lead to an improved tennis performance.

some cautions on the coaches role in managing anxiety related problems in junior tennis players

By Robert Heller (Ed.D., ABPP, USPTA)

I enjoyed reading coach Mamassis' excellent analysis of the player who consistently under-performs in competitive situations (see ITF Coaching and Coaches Review, issue 22, December 2000). The tools for assessing the problem and for treating it make a great deal of sense. For the most part, they are methods taught to doctoral level psychologists in clinical and counselling psychology from schools of cognitive-behavioural therapy. When, how and under what circumstances to use them, can be very complex and have serious implications for the well being of the player. Therefore I don't believe it is the role of the coach to, "treat" anyone. In fact, in most cases, it is contraindicated clinically and I believe few if any coaches have the training, experience and qualifications to do what is basically a psychological therapy based on this cognitive-behavioural therapy model.

I believe that the main job of the coach in this regard is to recognize when there is a problem and to be knowledgeable enough so that he/she can motivate the player and/or the parents to seek appropriate professional help. Educating, informing, advising and referring is the more appropriate and safer role for the coach to assume.

In today's complex game, the serious player should have a "team" of professionals to work with or at least, who can be called upon when the need arises. While the coach should be knowledgeable about the various areas of the sports sciences and how they effect performance, such as motor learning, biomechanics, nutrition, exercise physiology, psychology, etc., no coach should be expected to have the expertise to perform the task in the best way possible. In the hypothetical case cited by Coach Mamassis, the coach should have a psychologist, preferably a sport psychology consultant with whom he could talk with. Together, they could decide if the player and/or parents just need some basic guidelines and suggestions or if the problem is beyond that and could benefit by the intervention of the sports psychology specialist.

Assessment by the coach should be limited to observation of the player and informal discussions with the player and/or parents and general guidelines for performing at one's best.

The coach should be very cautious about administering, scoring or interpreting "questionnaires" which in some cases may be a violation of both ethical codes of conduct as well as law in some countries and jurisdictions. Similarly, "treatment" of players may well exceed the ethical boundaries of competency and where it is a violation of law, leave the coach open to costly litigation should a negative result occur.

While I applaud Mamassis' efforts to educate and broaden the coach's knowledge in being helpful to their players, it is important for the coaches to recognize "boundary" issues and be fully aware of the implications of interventions they may choose to make on their player's behalf.

topics in ITF coaching & sport science review (issues 12-24)

MEDICINE AND PHYSICAL CONDITIONING

Aspillaga, E., González, R. & Ochoa, C. (2000). Lactic and alactic anaerobic circuit training for tennis, 21, 2-3.
Born, H.P. (1999). Improving the condition and co-ordination of young tennis players, 17, 7-8.
Chu, D.A. (1997). Improving speed and footwork in tennis, 13, 4-5.
Chu, D.A. (1998). On-court circuit training for improving change-of-direction speed in tennis, 14, 6-8.
Ellenbecker, T. (1997). Prevention of shoulder and elbow injuries in tennis players, 13, 9-10.
Ellenbecker, T.S. & Roetert, P. (1999). Strengthening the upper back in tennis players, 18, 2-3.
Garipuy, C. (2001). The use of laterality in tennis training, 23, 3-5.
González, R. (2000). Flexibility in mini-tennis: let's make it a game and not a pain, 21, I-II.
Otis, C. (1999). Special challenges of coaching adolescents, 18, 14.
Pluim, B . (1997). Ten ways to prevent lower back problems, 12, 4-5.
Pluim, B. (1998). Ten ways to improve psychological skills on court, 15, 2-4.
Pluim, B. (1999). Conditioning and medical aspects on the female tennis player, 18, 15-17.
Pluim, B. (1999). Ten ways to prevent neck pains and problems, 17, 5-6.
Pluim, B. (2000). Ten ways to improve your eating habits, 22, 3-4.
Pluim, B. (2000). Ten ways to prevent Achilles Tendon disorders, 20, 4-5.
Pluim, B. (2000). Ten ways to prevent wrist problems, 21, 7-8.
Reid, M. (2000). Improving tennis performance using a different type of ball: the Swiss ball, 22, 4-6.
Reid, M. (2001). Working upper body strength and flexibility with the Swiss ball, 23, 7-9.
Roetert, P. (1998). Fit tips, 16, 2-3.
Roetert, P. (2000). Facts and fallacies about strength training for women, 20, 7.
Unierzyski, Sczepanowska, E. & Schefke, T. (1998). Training methods for improving endurance, 15, 6-8.
Van Aken, I. (1998). Maintaining fitness during tournaments, 15, 8-11.
WTA. (1999). How is your footwork?, 18, 4-5.

MINI-TENNIS

FFT. (1999). How to create a mini-tennis space, 19, I-II.
FFT. (1999). The child comes first!, 18, 9-10.
FFT. (2000). The child first, the student second, 22, I-II.
FFT. (2001). Mini-tennis planning: first of two parts, 23, I-II.
FFT. (2001). Mini-tennis planning: last of two parts, 24, I-II.
ITF. (1999-2001). 2 One our lessons for children aged 5-8 years old.
ITF. (1999-2001). 2 One our lessons for children aged 8-10 years old.
Marchon, J.C. (1999). Mini-tennis: the French approach, 17, 9-10.
Quezada, S., Riquelme, N., Rodríguez, R. & Godoy, G. (2000). Mini-tennis, 20, I-II.

PSYCHOLOGY

Cooke, K. & Crespo, M. (2000). What tennis research tells us about visualisation and imagery, 21, 13-14.
Crespo, M . (1997). What tennis research tells us about... anticipation and visual search, 12, 11-13.
Crespo, M. (1998). Mental training applied to tennis, 14, 9-10.
Girod, A. (1999). Concentration and tennis: mechanisms and exercises, 17, 4-5.
Granitto, G. (2001). What type of intelligence does the successful player have?, 23, 11-13.
Harwood, C. (2000). Developing youngsters mental skills…without them realising it!, 21, 6-7.
ITF Advanced Coaches Manual. (1997). Communication skills checklist, 12, 14.
ITF. (1998). KB Fed Cup players reveal factors of success, 16, 3-4.
Mamassis, G. (2000). Motivation in junior tennis, 22, 10-12.
Stojan, S. (1998). Mental training simply done, 16, 16-17.
Young, J. (2000). In the zone, 20, 10-11.

TACTICS

Andrade, J.C. (1999). How to improve the baseline game, 17, 2.
Brabenec, J. (2000). Why the forehand is a key stroke, 21, 11-13.
Brabenec, J. (2000). A serious look at second shots, 20, 13-14.
Brody, H. (2001). It's about time, 23, 2-3.
Cayer, L. (1998). Singles tactics, 14, 2-4.
Crespo, M. & Reid, M. (2001). What tennis research tells us about strategy and tactics, 23, 13-15.
Davies, K. (2000). Playing in the wind, 21, 9-10.
Farrell, P. (1998). The short ball, 16, 4.
Hedelund, C.E. & Rasmussen, A. (1997). Serve and return tactics, 13, 6-8.
Herbst, D. (2000). The signature game, 21, 5.
Lightbody, E. (2000). Tactical decision making for advanced juniors, 20, 12-13.
Pestre, B. (1998). Improving the game in fast courts through tactical situations, 14, 13-15.

TECHNIQUE & BIOMECHANICS

Bahamonde, R. (2001). Biomechanics of the forehand stroke 24, 6-8.
Born, H.P. (2000). How to hit the ball harder but with control, 20, 15-17.
Born, H.P. (2000). Training to improve the player's footwork, 21, 3-4.
Brody, H. (2001). Racket technology and tennis strokes, 24, 13-14.
Crespo, M. (1998). What research tells us about Biomechanics of groundstrokes, 15, 12-13.
Crespo, M. (1999). What tennis research tells us about Biomechanics of volleys and approach shots, 17, 15-16.
Dent, P. & Pankhurst, A. (1998). Technical analysis: User-friendly Biomechanics, 14, 4-6.
Elliott, B. (2001). Biomechanics and stroke production: implications for the tennis coach, 24, 2-3.
Elliott, B. (2001). The serve, 24, 3-5.
Filipcic, A. (2000). The reliability and validity of motor tests in tennis, 20, 14-15.
Giffenig, E. (1997). Racket acceleration and control in tennis, 13, 2-4.
Kleinoder, H. (2001). The return of serve, 24, 5-6.
Knudson, D. (2001). Improving stroke technique using Biomechanical principles, 24, 11-13.
Meier, M.K. (1998). Dealing with deficiencies, 16, 8-9.
Pezarat, P. (1998). Neuromuscular patterns in the serve, 16, 12-14.
Reid, M. (2001). Biomechanics of the one and two-handed backhands, 24, 8-10.
Roetert, E. P. & Ellenbecker, T.S. (2001). Biomechanics of movement in tennis, 24, 15-16.
Roetert, E. P. & Groppel, J.L. (2001). Biomechanics of the volley, 24, 10-11.
Roetert, E. P. (1997). The split step, 12, 4.
Rolley, L. (1999). Davenport's dazzling serve, 18, 18.
Schonborn, R. (1997). The structure of technical training - presented in a different way (II), 12, 1-3.

TRAINING & TEACHING, PLANNING & PERIODISATION

Aspillaga, E . (1997). Competitive tennis for children, an educational proposal, 12, 6-7.

Bothorel, W. (2000). The tennis programme for adults in France, 21, 10-11.
Brabenec, J. & Stojan, S . (1997). Great player or only a good player?, 12, 7-8.
Brabenec, J. (1999). Competition: the most desirable form of training, 17, 3.
Brechbühl, J. & Anker, P. (2000). The action method in tennis, 22, 7-10.
Carballo, C. & Blasco, M. (1999). Problems in tennis teaching: statements and possible solutions, 19, 16-17.
Cooke, K. (1999). The importance of implicit learning in skill development, 19, 7-8.
Crespo, M. & Cooke, K. (1999). The tactical approach to coaching tennis, 19, 10-11.
Crespo, M. & Cooke, K. (1999). What research tells us about coaching methods, 19, 18-19.
Crespo, M. & Miley, D. (1999). Player Profile, 17, 14.
Crespo, M. (1999). Teaching methodology for tennis, 19, 3-4.
Crespo, M. (2000). The easy five, 20, 8-9.
Filipcic, A. (1998). From technical to tactical training, 16, 10-11.
Filipcic, A. (2001). Birth date and success in tennis, 23, 9-11.
Fraayenhoven, F.v. (1998). A systematical approach to the development of club and performance players, 14, 10-12.
Granitto, G., Guizar, N., & Mota, M. (1998). Drills for improving reception and projection of the ball, 15, 5-6.
Meier, M.K. (1999). The GAG Method, 19, 15.
Menon, S. (1998). A systematic approach to training sessions, 16, 11-12.
Menon, S. (2000). A systematic approach to training sessions: baseline game, 20, 5-7.
Menon, S. (2000). Systematic approach to training sessions, 22, 2-3.
Miley, D. (1998). The importance of competition planning, 16, 5-7.
Miranda, M. (2001). Several issues in tennis coaching, 23, 6-7.
O'Connell, D. (1999). The six progressive steps of learning, 17,13.
Pankhurst, A. (1999). Game based coaching, 19, 11-13.
Pettersson, U. (1997). The Swedish method of developing players aged 16-21, 13, 11-12.
Polic, M. (2000). Club programming for wheelchair tennis, 22, 12-14.
Thorpe, R. & Dent, P. (1999). Developing a more player oriented approach to coaching tennis, 19, 5-7.
Van Aken, I. (1999). Tactical and technical learning process, 19, 8-10.
Veasey, P. (1999). Game based approach to teaching doubles, 19, 13-14.
Wilson, D. (1997). Court practice drills, 12, 8-9.
ZLesak, F. (1998). Revision is the mother of all wisdom, 14, 1.

MISCELLANEOUS

Cooke, K. & Reid, M. (2000). Juniors and Sports Science on the web, 22, 14.
Crespo, M. (1997). Tennis on the internet, 12, 10.
Crespo, M. & Cooke, K. (1999). Tennis coaching on the web, 19, 19.
Crespo, M. & Cooke, K. (1999). What research tells us about junior tennis, 20, 17-18.
Crespo, M. (1998). Tennis information on the internet, 16, 18.
Crespo, M. (1998). Tennis on the internet – Associations, Organisations and more, 15, 14.
Crespo, M. (1999). What research tells us about women's tennis, 18, 7-8.
Crespo, M. (1999). Women's tennis on the web, 18, 13.
Gargini, D. (1998). Reader's letters, 15, 15.
Giffenig, E. (1999). Training women players, 18, 5-6.
Hassan, F. (1997). What makes a good coach?, 12, 9.
ITF News. (1997). Coaching news, 12, 13.
ITF. (1998). ITF instant information faxback, 16, 19.
ITF. (1998). ITF introduces the ITF Code of Ethics for coaches, 14-15.
ITF. (1999). ITF Regional training centres, 17, 20.
ITF. (1999). The online service from the ITF, 17, 8.
Jevans, D. (1999). The new format for the Fed Cup, 18, 17.
MacCurdy, D. (1997). ITF Update, 13, 13-14.
Massias, J.C. (1998). Charter for players on national teams, 15, 2.
Miley, D. (2000).1999 Development Report, 20, 2-3.
Saviano, N. (1999). USA Tennis High Performance Coaches Programme Philosophy, 19, 2.
Stojan, S. (1997). What makes a good coach indeed?, 13, 14-15.

what tennis research tells us about tennis scoring systems

Compiled and summarised by Miguel Crespo and Machar Reid (ITF)

A series of articles on tennis scoring systems which have appeared in sport scientific publications are summarised below. Coaches interested in obtaining more information from these articles can find them using the relevant references.

No-ad scoring

The paper asserts that no-ad scoring modifies tennis tactics and strategy. The author states that it permits a two-set match to be played in under an hour, yet giving the players a better opportunity to test their skills in a competitive situation.

The author indicates that when not playing advantage the duration of the matches is shortened and every point becomes crucial. Tactics and strategy are more conservative than in the traditional scoring, mainly because a point is far more valuable.

One feature of no-ad scoring is that considerable effort and energy go into a point. In traditional scoring, at deuce, an error may be costly but not so much so that it is always decisive. In the no-ad scoring however, the player has no second chance. This led the author to recommend that players should learn to think no-ad and limit their attempts at outright winners. Coaches should in turn help their players to evaluate game situations and to make appropriate decisions.

Goldstein, B.J. (1977). No-ad scoring in tennis. *Scholastic coach*, 58-64.

Tie-break versus "win-by-two games" tennis rules

This paper compares the "win-by-two games" tennis rule with the effect of the tie-break rule on the

expected outcome and duration of a tennis set once the game score has reached 6-6. Within these situations, the probability of a particular player winning each point (when playing a specific opponent) may be estimated from previous matches between the two players.

If a player in a social match is given the option between the two rules, and she feels that her estimated probability of winning each point is less that 0.50, then her prospects for victory will be enhanced by choosing the tie-break rule.

The probabilities obtained indicate that the winner of the set will often be decided in less than half the number of points when the tie-break system is used.

Croucher, J.S. (1982). The effect of the tennis tie-breaker. Research Quarterly for Exercise and Sport, 53, 4, 336-339.

Probability of winning games

This paper analyses the status of each point played in a game of tennis. As well as giving the probability of each player winning from any score, it also determines the relative importance of each point.

The paper states that every point is equally important to both players. Additionally, the importance of a point is weighed by the expected number of times the point is played in a game. Several of the paper's conclusions are: 1. The point 30—40 always ranks higher in terms of importance than the point 15-30, 2. The first point (0-0) is always of only average importance, 3. No point has a consistently high or low ranking for all probabilities.

Croucher, J.S. (1986). The conditional probability of winning games of tennis. Research Quarterly for Exercise and Sport, 57, 1, 23-26.

New tennis scoring system

This study addressed the problem of delays incurred in the scheduled starting times of tennis matches as a result of unexpectedly long previous matches and devises a new scoring system to reduce the problem.

The subsequent aim was to take the present tennis scoring system and modify it as little as possible to produce a new scoring system with a more predictable duration. The new system is a best of five half sets system. This system is very similar to the present best of three tie-breaker sets system with only one exception – the standard deviation of the number of points in a match is typically considerably smaller with the new system.

The half sets operate in the following way: A half unit is awarded to a player as soon as that player's game score reaches four (4-0, 4-1, 4-2). The player would therefore also win the half set and receive one unit score. If the game score reaches 3-3, the half set counts as a draw and each player receives a half unit. The next half set is played. The match is over as soon as one player's score reaches 3 units. However, if the unit score reaches 2.5 to 2.5, a tie-break as is currently used, is played to determine the winner.

Pollard, G.H. (1987). A new tennis scoring system. Research Quarterly for Exercise and Sport, 58, 3, 229-233.

Reaction time and tie-breaks

The aim of this paper was to evaluate the reaction time of the return of serve while also comparing the speed of the serve with the percentage of tie-breaks at Roland Garros, Wimbledon and the US Open (1999). Results showed that:

1. Receivers decrease their success of returning when the serve is above approximately 100 mph,
2. Service speed is related to the surface played upon with grass having the fastest serves and clay the slowest,
3. The number of tie-breaks increase significantly at speeds above 110 mph, and
4. The higher the speed of the serve and the faster the surface, the greater number of tie-breaks that are played in matches.

Haake, S.J., Rose, P. & Kotze, J. (2000). Reaction time testing and Grand Slam tie-break data. In S.J. Haake & A.O. Coe (Eds.). Tennis Science & Technology. Blackwell Science. Oxford. (269-275).

Other references

Schutz, R.W. (1970). A mathematical model for evaluating scoring systems with specific reference to tennis. Research Quarterly for Exercise and Sport, 41, 552-561.

recommended books and videos

books

Player Development Handbook. By Tennis Canada. Year: 2000. Pages: 67. Language: English. Level: All levels. This book is the Official Tennis Canada Player Development Handbook. Contents include: **Section 1:** Player Development via System Development. Community tennis development, Domestic competitive structure, Training environment, International associations. **Section 2:** Player development via National Team Program. More top 200 players, Davis Cup/Fed Cup, National junior touring teams. **Section 3:** Player Development via High Performance assistance. For more information contact: Tennis Canada. E-mail: info@tenniscanada.com.

Tennis and laterality. (Tennis et latéralité). By Catherine Garipuy. Year: 2000. Pages: 113. Language: French. Level: All levels. This book covers the impact of laterality in tennis. It presents the results of research performed with 665 French tennis players of different skill levels. Contents include: Introduction. Chapter 1: The laterality. Chapter 2: Laterality tests. Chapter 3: The influence of laterality in the movements. Chapter 4: How to play according to laterality. Chapter 5: Working by playing. Appendix. For more information contact: cgaripuy@yahoo.fr.

Streetennis. By Luis Mediero. Year: 2000. Pages: 120. Language: Spanish. Level: Beginners. Contents include: Introduction to Streetennis. Equipment. The game. The strokes. Drills to improve. Streetennis programmes. **Charlytennis**. By Luis Mediero. Year: 2001. Pages: 155. Language: Spanish. Level: Intermediate. Contents include: Introduction to Charlytennis. Equipment. The game. The strokes. Drills to improve. Charlytennis programmes. For more information contact: Editorial Tutor. E-mail: tutor@autovia.com.

Noble Tennis: The Wisdom of Sport. By Tony Roth. Year: 2000. Pages: 200. Language: English. Level: All levels. This book provides practical, easy to understand techniques for coaches and players to improve and develop their understanding of sport psychology. Contents include Chapters on Enthusiasm, Serenity, Patience, Concentration, Understanding fear, Fearlessness and Physical Cooperation. The book can be ordered through 1-866-888-7779 or www.amazon.com.

videos

Tennis Game and Teaching. (Tennis, Gioco e didattica). By Vittorio Santini. Year: 2000. Pages: 96. Language: Italian. Level: Beginners. This is a set that includes a book and a 33 min. colour video. Contents include the following: Chapter 1: A sport for the pre-pubertal and pubertal stages. Chapter 2: Fundamentals and simplified rules of the game. Development of co-ordination through games. Methodological aspects. References. For more information contact: Edi-Ermes. Milano. Website www.eenet.it

A tennis champion is born. Author: Dr. Martin Baroch. Year: 1995. Approx. 30 min. Available in English. This video provides comprehensive information about junior development and how a player can become a champion. For more information contact: baroch.martin@rhone.ch

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