

# “FOOTWORK: KEY CONCEPTS & PRINCIPLES WHEN PLAYING THE BALL”

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## INTRODUCTION

Footwork analysis amongst leading and other talent development Australian and overseas squash coaches has been a popular and somewhat contentious topic over the past few years. There are several basic concepts and principles still adhered to regarding footwork that are fallacious, misleading and can limit one's playing potential if followed.

Effective footwork in squash has enormous implications for a wide range of other fast ball-sports, apart from squash, that require either the striking (e.g. tennis, badminton, hockey, baseball & softball), passing (e.g. AFL, Rugby, R/League, Basketball & Netball) or kicking of the ball. (e.g. Soccer, AFL, Rugby, R/League). What we can learn from footwork concepts and principles in Squash can potentially have important implications for a wide range of other sports.

Many past and present great players (e.g. Geoff Hunt, Ken Hiscoe, Heather McKay, Rodney Martin, Sarah Fitz-Gerald) have indicated or intimated that when their footwork or court movement was poor then their game suffered immeasurably. Whether this arose due to lower fitness levels, poor decision making, poor concentration or otherwise, footwork and court movement for any player is undoubtedly a critical part of success in playing squash.

## RANGE OF POTENTIAL FOOTWORK ANALYSIS IN SQUASH

There are several key important components of footwork which may be analysed:

- 1) Footwork technique upon immediately taking off to hit the ball;
- 2) Footwork technique running towards the ball and just before striking;
- 3) Footwork technique when striking the ball;
- 4) Footwork technique after striking the ball in order to recover to a more central court position - which is generally the "T".

## PURPOSE OF ARTICLE

The purpose of this article is to focus on addressing No. 3... "footwork technique when striking the ball". Other footwork techniques (i.e. Nos. 1, 2 and 4) should be addressed in future articles and are integrally linked to footwork and movement technique when actually playing the ball but are more related to moving to and moving away from the striking position.

More specifically, the purpose of this article is to present a range of footwork concepts and principles that may appear to be controversial or breaking convention. However, it offers a more modern approach to this challenging area of squash analysis in light of a limited range of publications, which comprise coaching books with some reputable ones listed in the Bibliography.

Certainly, the concepts and principles proposed in this article and those previously offered by others need to be confirmed, refuted or redefined via sport science biomechanical research and analysis.

## TERMS AND DEFINITIONS

For the purposes of this article the following terms and respective definitions apply.

- Concept:** An abstract idea or general mental impression.  
**Principle:** Fundamental truth or elementary proposition held to be basic in any system of reasoning or conduct.

### \* Hitting or Striking Shoulder

The shoulder on the same side as that in which the racket is held in the hand.

### \* Feet Parallel:

The line through the toes of the feet in a particular direction such as down the side wall.

\* **F/H:** Forehand side.

\* **B/H:** Backhand side.

\* = Denotes "Refer to Figure 1."

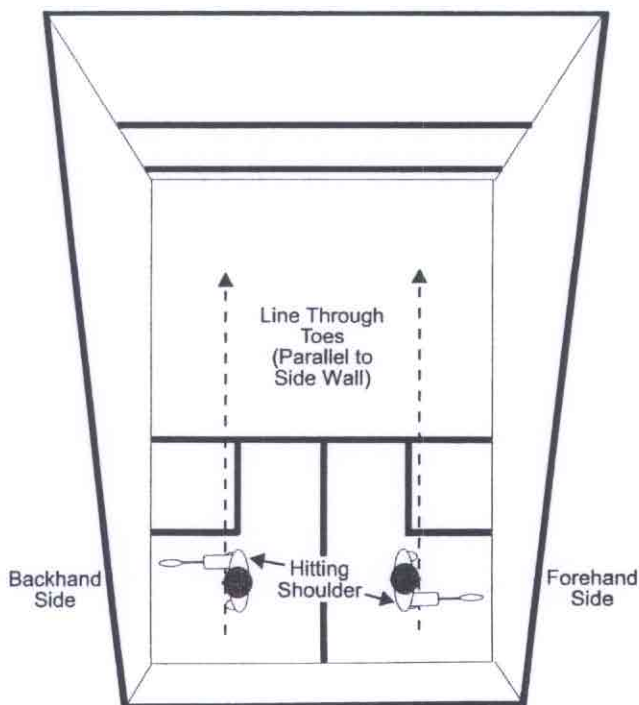


Figure 1: Illustration of Terms

## FOOTWORK CONCEPTS

Footwork itself is a major area of analysis for any aspiring fast-ball sport coach, but has historically defied any concrete concepts and principles for the sport of squash and that have been substantiated via sports scientific research analysis. A range of proposed key concepts is now presented.

### KEY CONCEPT 1:

Quite simply, the primary objective of effective footwork when striking the ball is to enable the greatest range of shots with the greatest opportunity to generate optimal (sometimes maximum) power, control (i.e. accuracy of desired placement) and deception. Of course, this range of objectives is not always possible due to the high speed demands of the game but is integral to achieving and maintaining tactical dominance.

**Associated Key Concept:** Getting to the ball as early as possible with vertical or near-vertical racket preparation greatly enhances a player's potential to hit an effective shot, with the player's given footwork, upon striking. Although addressing this concept is beyond the scope of this article, reference to Wollstein and Neal (1993; pp 29 & 32) provides some further insight.

### KEY CONCEPT 2:

The footwork selected when playing the ball essentially depends on how much time is available to get to the ball. In broad terms, there are two conceptual types of foot placement when striking the ball governed by the time constraints of the fast-ball sport of squash...

- i) When enough time is available the feet should be placed in a chosen "preferred" position depending on the primary objective(s) of the shot selected stated in the choices listed below; or...
- ii) When not enough time is available, the foot placement becomes either "preferred" or "non-preferred" at the striking position but where every effort should still be made to achieve the "preferred" position as described in i) above.

### KEY CONCEPT 3:

When "preferred" footwork is achieved, the primary purpose or objective of the stroke selected includes the achievement of...

- a) The greatest range of shots available;
- b) Optimal power/speed generated for the shot selected;
- c) Creating deception and/or disguise;
- d) The choice of any combination of the above.

### KEY CONCEPT 4:

When "non-preferred" footwork is achieved, the opportunities for selecting from a range of shots, power, deception or any combination of these are reduced.

## CONCEPT OF "PREFERRED" VERSUS "NON-PREFERRED" FOOTWORK

### A) DEFINITIONS

A definition of "preferred" footwork is essentially contained in Key Concept 3 where the feet are placed in a position in order to achieve the primary purpose of playing the shot selected from the range of options i) to iv) listed above. In contrast, a definition of "non-preferred" is that a particular foot placement, either purposefully chosen or imposed due to circumstances leading up to the striking position, has the effect of either reducing the range of shots achievable, the optimal power desired, the extent of deception that can be achieved and/or some combination of these

objectives.

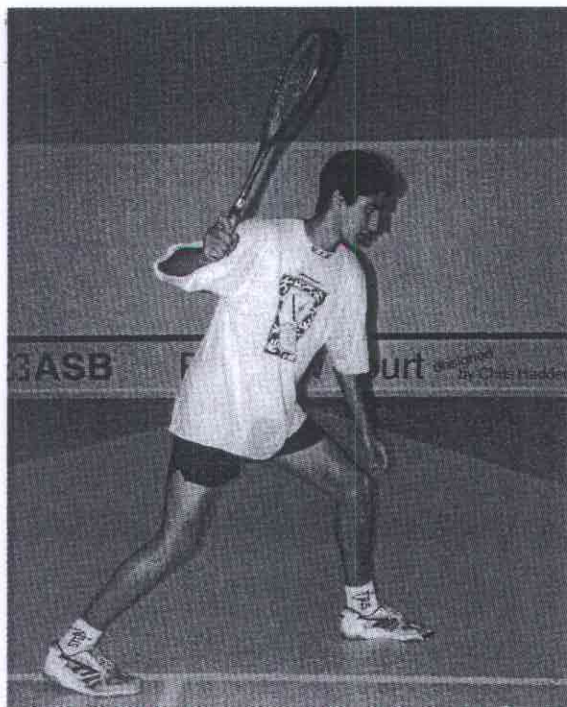
### B) CLARIFICATION OF TERMINOLOGY

This reference to "preferred" or "non-preferred" foot positioning, immediately upon striking the ball, is in stark contrast to conventional literature and historical thinking which refers to the "right" (meaning "correct") and "wrong" foot. This article contends that **there is no such thing as the "right" or "wrong" footwork upon striking the ball but rather "preferred" or "non-preferred", which also implies a well balanced foot positioning so that weight transfer through the ball is effected with opportunities for effectively recovering court position towards the "T"**. Other coaches may prefer to refer to "optimal" or "non-optimal" footwork where the conceptual differences are further addressed later in this section.

It is further contended that **better footwork relates to achieving a preferred foot positioning when striking the ball as often as possible within the time constraints of this fast-ball sport**. This may actually involve playing the ball purposefully off the classical "wrong" foot which may occur in a wide variety of situations for many reasons but generally relates to technique and tactical reasons.

Other terminology that has recently been used by some Australian coaches relates to "optimal" and "non-optimal" footwork as opposed to using "preferred" and "non-preferred" terminology. For clarification purposes, it is intended that the terms "preferred" and "non-preferred" should not mean to readers that a player makes a decision to use particular footwork based on their personal preference but rather their decision should mean that it optimally satisfies the primary purpose(s) of any one stroke. In this sense, "preferred" versus "non-preferred" and "optimal" versus "non-optimal" terminology is essentially similar terminology and can be interchanged in the context of the definitions and clarifications described.

The coach and player should work together to develop "preferred" footwork and movement habits that optimise situations while still practising dealing with non-optimal situations via "non-preferred" footwork.



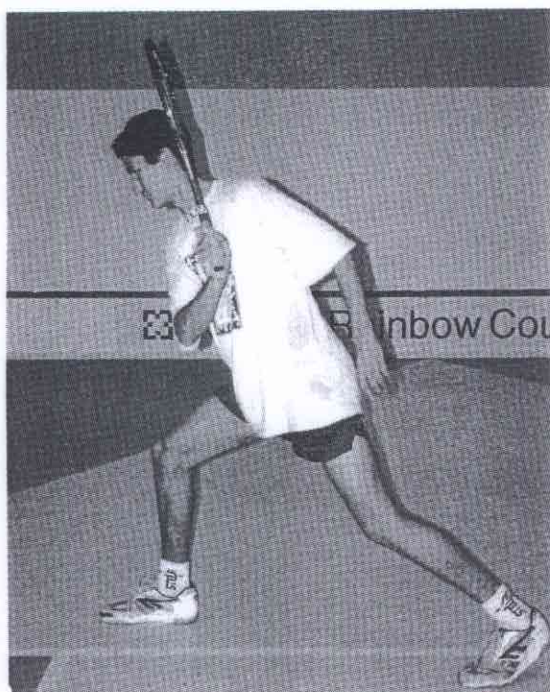
Figures 2: Left foot across and leading on the forehand side.

### c) TRAINING PERSPECTIVE

Preferred and non-preferred foot positioning should be essential parts of training for this sport and should be incorporated into systematic skill development programs. In other words, developing players should be taught and coached to play all shots off either the preferred or non-preferred foot under conditions of increasing time and space limitation dimensions and pressures in order to encounter all types of potential situational demands that occur during competition. However, this is in the context that every effort should be made to achieve "preferred" foot positioning when striking the ball wherever possible.

### d) EXAMPLE OF PROBLEMS WITH "RIGHT" VS "WRONG" FOOT ADOPTION

As a young aspiring player, it was honed into me by my coach (who was quite respected during his time) that I had to "develop better footwork". It was highlighted to me that I often played off my "wrong foot" on the F/H and B/H and this affected my accuracy and power. It was further highlighted to me that one of the reasons why Geoff Hunt and Heather McKay were such great players was that they consistently got their left foot across on the forehand and right foot across on the B/H.



**Figure 3: Right foot across and leading on the backhand side.**

I have since learnt that this was not true of their footwork techniques - it was simply an entrenched perspective of footwork based on mythological dogma passed down through coaching and other publications and general coaching thinking. Nevertheless, at the time, I attempted to train myself to do the same as some of our great players but was continuously troubled by my lack of success, particularly in relation to my choice of shots, my recovery to the "T" and the power I generated.

Over the past 20 years of coaching, playing and analysing this area with many other coaches and players, I grew to understand that this footwork advice from my personal coach was ill-conceived, tended to restrict my choice of shots and often reduced the amount of power that could be generated to the ball. The advice was incorrect and was simply based on a traditional, widely accepted understanding of "right" and "wrong" foot positioning upon striking the ball.

I have since understood, as an example, that you do not have to get your left foot across and leading on the forehand (as per Figure 2) and right foot across and leading on the backhand (as per Figure 3) on every occasion to have effective and efficient footwork. Just watch the "Squash Legends" video compiled by NSW Squash Limited (1993) and you should notice that the footwork employed by great players of 20-30 years ago complies with the proposed footwork concepts and associated principles put forward in this article.

I have also since grown to understand through technical discussions with the two great Australian players, whom my personal coach continually referred to (Geoff Hunt and Heather McKay), that both players - as have many other great players since - developed highly flexible and individualised footwork techniques that were very effective and efficient. Their footwork techniques, that I was privileged to discuss with them and watch occasionally, do not actually match up with those ideas and beliefs formerly espoused by my personal coach, as well as many current day coaches, several years ago.

Those ideas and beliefs were generally widely accepted and promoted during past decades of coaching approaches. The footwork techniques demonstrated by these two great players enabled them to play effective shots with either foot leading (relative to the front wall) but with a general preference for either placing the feet parallel to the side wall or with an open stance relative to the front wall.

The concepts and associated principles provided in this article fundamentally support this general approach to foot placement upon striking. Through greater understanding and modern analysis techniques, particularly through video based playback analysis, further aided by slow-motion facilities, a major leap in redefining footwork concepts and associated principles gradually evolved over the years.

### e) PRELIMINARY COLLECTION OF ELITE PLAYER FOOTWORK DATA

Some time ago, I embarked on a systematic analysis of 1,200 shots played by 12 top male and female players of the modern era, which included 4 World Champions in both male and female arenas (Wollstein & Neal, 1993; 1996a; 1996b). Twenty variables were recorded with 9 being statistically reported on in a 3-part series on squash technique. The variable of "foot placement at racket-ball impact" was not one of the statistically analysed variables although the information was intended to dispel the traditional myth of "right" versus "wrong" foot thinking.

Nevertheless, preliminary indications of footwork trends indicated that the top players used either foot leading, relative to the front wall, but with a preference for an open (i.e. upper body facing towards the front wall) stance. It must be understood that their foot placement patterns, when striking the ball, tended to be very specific to the unique circumstances of each shot played. In other words, for example, the right foot was the preferred leading foot when hitting the ball from the front forehand corner whilst other possibilities, comprising the feet parallel to the side wall or the left foot leading, were used sparingly. (The exact, statistical frequency distribution information certainly warrants publication but may suffer a lack of technical interest unless dealt with as part of a larger statistical examination).

Further study of preliminary data revealed that a great degree of deception could be generated through not only utilising the classical "wrong foot" but by transferring body weight in different directions (e.g. away from the front wall) when striking the ball at opportunistic times. This type of "footwork/weight-transfer" deception must be understood in terms of the situational demands. Generally speaking though, understanding the why, when and how is important in properly understanding footwork applications and principles.

It should be pointed out that the use of any particular foot placement for any one stroke by these top players is not necessarily optimal nor appropriate. Based on the detailed observations of these top players, a basic premise is that the ball will inevitably be struck with either foot leading relative to the front wall predominantly due to the very high speed of the game. In this regard, it should be recognised that an average of just (approximately) 1.5 seconds occurs between shots - irrespective of the standard of play (refer to Wollstein and Abernethy, 1988).

## GOOD FOOTWORK PRINCIPLES

The footwork principles now expressed are founded on the concepts described above. Despite the absence of scientific publications that address good footwork principles and that are particularly founded upon sound footwork concepts, an introductory, basic and sound set of principles has recently been adopted by the Australian national body, Squash Australia. Squash Australia recently endorsed and adopted a Level 1 Coaching Accreditation Course Presenter's Kit material (1994) which specifies that...

*"Good footwork can be identified by three principles..."*

1. *It must be efficient;*
2. *It must get the player into the best possible position from which to play the greatest range of shots;*
3. *It must facilitate the player's recovery to the "T" before the opponent strikes the ball."*

In the context of this article, the above principles are consistent with the general thrust of the present article. An elaboration of these principles is therefore warranted.

Principle No.1 refers to the speed of movement, length of stride, the number of steps, the path of movement, foot placement when hitting, recovery to the "T", etc., that ensures that the stated principles 2 and 3 are attainable without wasting energy.

Principle No.2 specifically refers to the capacity of a player to play the greatest range of shots in a foot position that enables optimal power, control and deception. Principle No.3 refers to the player's body-weight transfer immediately before and during racket-ball impact so that the striker can move towards the "T" sometimes immediately before, at, or at least, immediately after contact.

This third principle also provides a performance measure which can be used to judge the recovery footwork as being "good" or otherwise. For instance, if the player has returned to the "T" or a more central court position and is ready to move in any direction by the time the opponent hits the ball, then the previous footwork can be generally described as "good" - irrespective of the recovery footwork employed.

The basic footwork principles described above are certainly consistent with the overall footwork concepts currently expressed in this article so far.

In the light of the fundamental principles described above, this article will now further expand upon the concepts introduced earlier by detailing these associated principles.

## FOOTWORK PRINCIPLES ASSOCIATED TO CONCEPTS

I will now specifically address the four components (a - d) comprising Key Concept 3. This relates to the point that, when "preferred" footwork is achieved, it is proposed that the primary purpose of the stroke relates to one of the four options (a - d) listed above and elaborated on below.

### A) GENERATION OF OPTIMAL POWER

In order to generate an optimal amount of power to the ball (i.e. freedom of speed generation), at impact, the hitting (striking) shoulder should still be at least partially behind the contact point.

For maximum velocity generation, there are three basic sub-principles involved. Firstly, the feet must be placed in a way that facilitates optimal weight transfer in the precise direction in which you wish to play the ball. Secondly, the ball should be struck so that it is as far as possible from the hitting (striking) shoulder (e.g. low to the floor or high overhead). Lastly, transfer all body-weight through the shot by ensuring that it is struck either in front of the hitting shoulder or no further back than level with the hitting shoulder relative to the front wall.

To illustrate the various ways that these three sub-principles can be applied with quite different foot placements, take the back backhand corner for a right handed player as an example. The player's feet can be placed as in Figure 1 with both feet parallel and the line through the toes parallel to the intended line of flight of the ball. As long as the foot position enables the player to satisfy sub-principles 2 & 3, then this foot placement will assist in delivering optimal power.

Alternatively, the player's "front" foot (the right foot) can be taken back across the left leg so that it is positioned toward the back wall while the player's body also rotates towards the back wall. In this position, weight transfer can be similarly optimised and power generation may even be greater than in the first example (due to potentially greater downswing length).

The swing technique to achieve maximum velocity generation is a separate discussion in itself related to the biomechanical principle of summation of forces but which is beyond the scope of this article (refer to Wollstein and Neal, 1993; 1996a; 1996b).

### B) GREATEST RANGE OF SHOTS

In order to achieve the greatest range of shots (i.e. freedom of direction), the minimum requirement is that the wrist is behind the impact point such that the racket face can be orientated in the chosen direction.

On the other hand, the more body behind the ball at impact the greater the opportunity to generate power as well (refer A above).

As in principle A, the various swing techniques that are available to strike the ball in various directions is a separate discussion but are based upon the use of various grip and/or wrist positions at impact.

### C) FOOTWORK TO DECEIVE

Deception in squash, as with many other fast-ball sports, is a very important part of play. The largest single factor in deceiving your opponent with your own shot is to block the direct sight of the ball from your opponent immediately before and during contact. Other deceptive factors such as "faking", "delaying", "dummying" and other body-language techniques are also important but, blocking the direct sight of the ball using your body is the most effective form of creating an environment in which the opponent can be deceived.

The basic footwork principle here is that, if you have an opportunity to block the direct sight of the impact point from your opponent's view, then do so by setting your feet up in a position, either "right" or "wrong", but certainly "preferred" according to the primary purpose of the stroke, so that your opponent cannot directly view the striking point. This overall proposition is partly supported by an authoritative sports science article in a squash-specific sense by Abernethy & Wollstein (1989).

Footwork movement to the ball in order to eventually place your body, upon impact, in a position to block the direct sight of your opponent is vital footwork training. This may involve "preferred" or "non-preferred" footwork for any particular shot but, when a player recognises an opportunity to block the direct sight of the opponent of the racket/ball impact point, then the chosen footwork facilitates deception. Accordingly, if the primary purpose of the stroke is to deceive then the traditional, classical "wrong" foot placement may, in fact, be the "preferred" foot placement.

## D) COMBINATIONS OF BASIC PRINCIPLES

In order to achieve even greater control than any one dimension (as described in A, B and C above), combinations of these basic principles can be applied - e.g. for maximal power and directional control, principle A is satisfied as long as the ball is struck so that the player's hitting shoulder is behind the ball at impact and this also satisfies principle B in that some part of the player's body is behind the ball at impact.

Depending on the primary purpose of the stroke, a simultaneous selection of any one of the above three choices is possible. Foot position selection on impact (when enough time is available and sometimes when not enough time is available) ultimately depends on...

- i) player experience;
- ii) competitive circumstances;
- iii) the way the player has trained (i.e. their playing habits)...

...all of which comprise a complex area of analysis beyond the full scope of this article.

Nevertheless, one of the best combinations of the above principles is when playing the ball off the preferred foot. In this situation the player has the greatest range of shots with the opportunity to control the power imparted to the ball and/or deception, depending on the body position relative to the opponent.

For example, in the front forehand corner as a right-handed player, approach the ball so that your body remains between the opponent and the intended impact point. Take up a position with the line through the toes "suggesting" a full power cross-court drive. In this position (which has the upper body slightly open to the front wall) the player is optimally positioned (according to the above principles) to play a range of shots. (S)he may go ahead and play the "suggested" cross-court drive, may drive the ball straight, or perhaps play a fast "trickle" boast around the corner.

There are, of course, thousands of examples involving footwork that not only achieve an effective shot but also achieve an outright winning stroke. An interesting example occurred during a 1991 Australian Open match between Pakistan's Jahangir Khan and Australia's Brett Martin. Martin played a cross-court drive on the forehand, which was quickly returned by Khan with a backhand cross-court drive. Martin was somewhat surprised by this shot as he appeared not to expect the shot to be played back to his forehand, deep quarter of the court. With Khan now standing comfortably on the "T", Martin approached the next ball with "wrong" foot positioning (i.e. left foot across with chest facing towards the back wall - a "closed" stance) on the forehand with the ball well behind his striking shoulder. He rocketed the ball back across court resulting in an outright winner with Khan left stationary on the "T".

## FOOTWORK PRINCIPLES RELATIVE TO OTHER TRAINING FACTORS

Beyond the domain of footwork principles, there are the realms of racket technique, tactical decision-making, fitness and psychological factors. These factors, when employed simultaneously at a high level of play, can appear to be indefinable in terms of basic squash playing principles. Nevertheless, fast footwork onto the preferred foot can deliver the greatest range of shots and can provide increased opportunities for the generation of power, control and deception as well as optimal speed of recovery to the "T".

Effective footwork, itself, is a vital component of successful squash but needs to be developed in tandem with other components - such as racket techniques, tactics, fitness and psychological factors. Whilst the improvement in squash play may appear to be complex it can be made simpler by consistently employing the basic principles of footwork proposed in this article.

## 10 KEY FOOTWORK PRINCIPLES IN STRIKING THE BALL

The above concepts and principles, in relation to effective footwork when striking the ball, present a range of ideas that should, if employed, enable better striking of the ball in any dimension. Whilst there are numerous principles in effectively striking the ball, many others not addressed here, 10 key footwork principles are suggested:

- 1) There is no such principle as the "right" or "wrong" foot when playing the ball;
- 2) There is a "preferred" and "non-preferred" foot positioning when striking the ball from every part of the court;
- 3) Choosing the "preferred" foot placement whenever possible facilitates the greatest range of shots with the greatest opportunity for power, control and deception;
- 4) Strike the ball level, relative to the front wall, with the striking shoulder or slightly in front wherever possible;
- 5) In order to generate maximum power, place the feet such that the line through the toes is parallel to the direction in which you want to hit the ball (**Note:** Not necessarily left foot forward of the right foot on the forehand side nor vice versa on the backhand.);
- 6) In order to deceive your opponent, when striking the ball, place your feet in a position where your body blocks your opponent's direct view of your contact point;
- 7) Strike the ball whenever possible, no matter what foot positioning, by transferring your body-weight through your shot, preferably in the direction in which you want to hit your shot but optimally facilitating recovery to the "T";
- 8) Immediately after (and sometimes before) completing your shot (i.e. racket-ball impact point), transfer your body weight towards the "T";
- 9) Attempt to strike the ball with a wide stance (feet at least shoulder width apart) and knees bent to enable a balanced and powerful striking position which also enables a quicker recovery to the "T";
- 10) When in trouble with your footwork, particularly when not enough time is available to achieve optimal positioning, play the ball off either foot leading relative to the front wall.

Seek the advice of an accredited squash coach, particularly someone who specialises in footwork development. Often any problems can be alleviated much easier than you may think after appropriate coaching advice regarding footwork training and development.

## IMPLICATIONS FOR SQUASH COACHING

There are general coaching implications based on the contents of this article:

- 1) Coach players to use the preferred foot placement as often as possible upon striking, depending upon the primary purpose of the stroke;
- 2) Coach players to be competent at playing all shots off either the "preferred" or "non-preferred" foot when striking the ball;
- 3) Coach developing players to experiment with their footwork placement and share their experiences with the coach for feedback with the training objective of working towards preferred or optimal foot placements;
- 4) Coach players to understand and apply good footwork principles (based on the concepts contained herein) in order to improve their game and play with greater enjoyment.

## CLOSING REMARKS

This article has primarily addressed better footwork matters when striking the ball. Whilst there are three other important compo-

nents to footwork listed in the introduction, the concepts and principles espoused in this article when striking the ball are central to achieving greater squash success. It is hoped that employing the footwork principles described in this article whilst focused on footwork placement when striking the ball, will enlighten your understanding, enhance your player's standard of play and make the game easier to play.

Effective footwork is only one important factor in overall squash playing success. Racket technique, psychological aspects and fitness for the game are other important factors, which can enhance the standard of play through effective practice and coach training programs. Nevertheless, effective footwork is a major discipline that needs to be considered when attempting improvement in overall game play. By experimenting with the footwork principles stated above, I believe that you will develop a better way to play and coach the game of squash.

## ACKNOWLEDGEMENTS

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