

USPTA

PLAYER DEVELOPMENT PROGRAM



Anatomy of a modern shot – The hitting and recovery phases

Modern tennis, like its conventional predecessor, has many commonalities that if properly recognized and understood, make teaching the modern game more profitable and enjoyable for teachers and players alike.

continued next page

First, it is important to differentiate between a “*commonality*” and a “*specific difference*” in playing styles among individuals.

Commonalities are broadly accepted principles that apply to almost every modern player. The best example may be the correct technique for hitting loaded, open-stance forehands and backhands and how a player loads the outside leg, explodes into shots with kinetic energy and lands on the most appropriate leg for maximum recovery.

Specific differences are numerous among players and may include a player’s style or flair, which should be distinguished from his more general hitting process. For example, while Hewitt and Kuerten have *commonalities* in their shot-making, they may differ in minute specifics such as how they hold their grips or finish a shot with a particular wrist wrap. Roddick’s abbreviated serve can be considered as a *specific difference* from most other players.

So, while there are numerous minute differences to players’ styles that might be confusing at first glance, we can find and must study primarily the many commonalities that are key to modern shots and are similar among all players and the way they strike the ball.

We will explain these keys to modern shots as we delve further into the final seven components of the anatomy of a shot – starting with No. 5, shot selection, in the hitting phase, and continues through the recovery phase.

Hitting phase

Exhibit I below is the place to start. It illustrates many different processes that are happening both continuously and

simultaneously. The components without color have been covered in the previous inserts. Out of necessity, we discussed footwork as part of the hitting phase of a shot, but the graphic shows the obvious with the yellow component disc – **that footwork is an integral part of all three shot phases.**

Similarly, the kinetic chain (symbolized by a chain linking the seven components) appears throughout the hitting phase and into the first component of the recovery phase (seen below in Exhibit I). The kinetic chain is the sequential coordination of body segments (feet, legs, hips, trunk, shoulders, arm and wrist) to achieve more force than would be possible if the player omitted any of the segments.

This increased force is the advantage of angular momentum over linear momentum. We repeatedly use the term “**load – explode – and land**” to explain the basic mechanics of modern groundstrokes as hit by experienced players. Loading the outside leg for a groundstroke provides the axis around which the core and arm rotate, generating angular momentum (see Exhibit II). When demonstrating this concept to less experienced players, the teacher may more appropriately demonstrate a load – rotate – and weight transfer skill.

The process of loading, exploding and landing happens throughout the hitting phase. Loading occurs during the backswing; the explosion into the shot happens as the body uncoils into the forward swing; and the landing is part of recovery. These concepts are explained in more detail in the following explanation of shot anatomy.

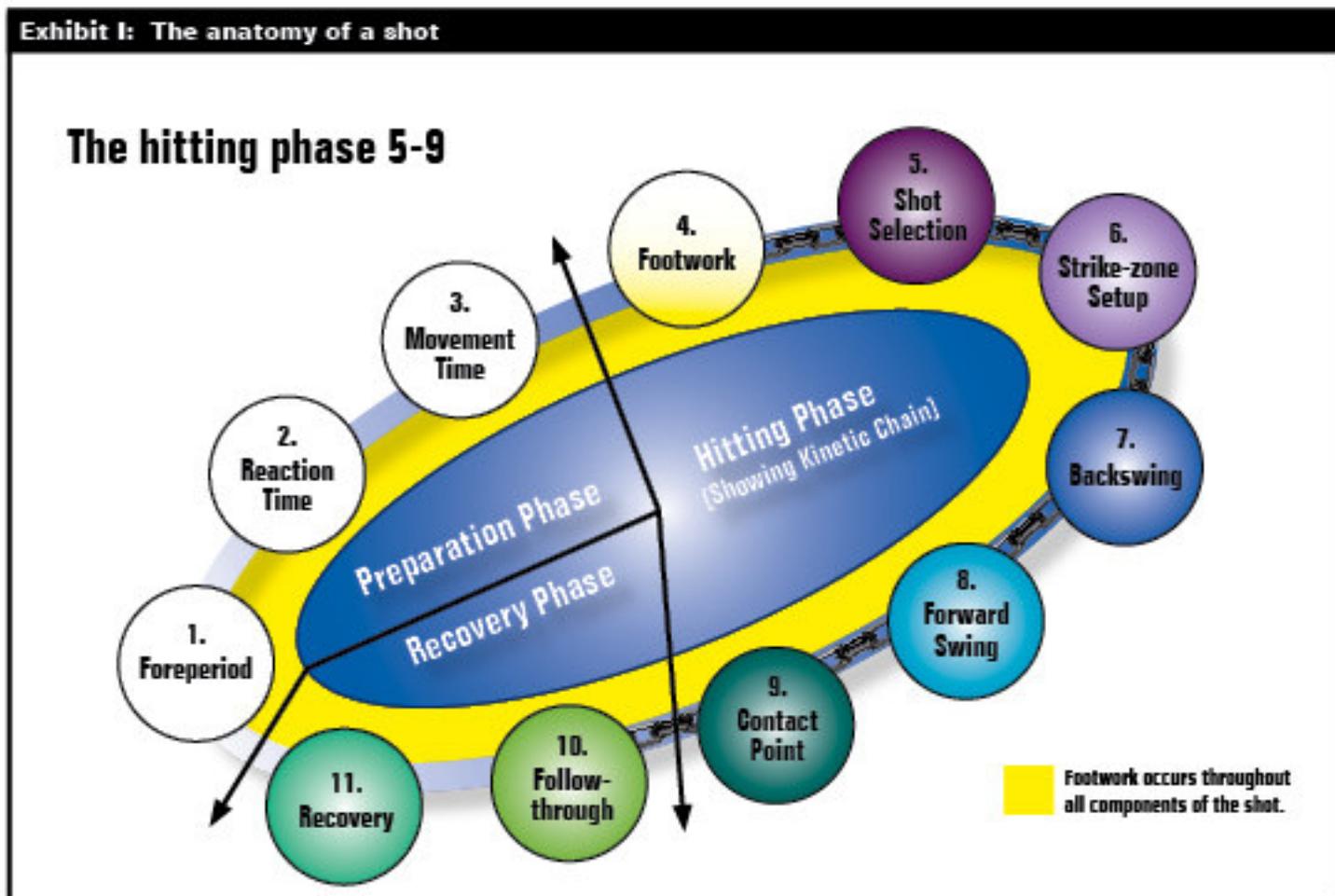


Exhibit II



Load



Explode



Land

Shot selection

Regardless of a player's groundstroke capabilities, he or she still has to know when and how to use them. As teachers and coaches it is important for us to provide a foundation for players to make good decisions. **Shot selection** involves **spin, speed, direction, purpose**, and is highly related to recovery. It is a process of integrating technique with tactics based on circumstance or strategic approach.

Like many of the other components in *Anatomy of a modern shot* (June 2005 *ADDvantage*), shot selection can be an extremely detailed topic. This very general explanation will be explained in greater detail in a later issue under tactics and strategies. At that time, we will also be referencing many noted strategists and systems such as System 5 and The Strategy Zone by Nick Bollettieri and Lance Luciani.

Choosing the right shot at the right time is key to not only playing tennis well, but also winning. Remember, there is no such thing as a low percentage shot if it is executed in the proper situation.

I. Determining factors in shot selection:

There are **many factors** that determine the shot a player should hit in a given situation. Usually, it is a **combination** of these factors and not just one factor that influences a player's shot selection.

- A. Pace of the oncoming ball – a fast, hard-struck ball may limit a player's decision and movement time.
- B. Depth of the oncoming ball – as with pace of the ball, depth will also limit the shot options of a player.
- C. Spin – The amount or type of spin will affect the shot selected.
- D. Height – where the ball is in relation to the net affects shot selection.
- E. Balance – the dynamic or static balance or imbalance of the player.
- F. Court positioning – where the player is going to be positioned when executing the shot helps determine shot selection.
- G. Court positioning of the opponent – will the opponent be in or out of position when the shot is played?
- H. Strengths/weaknesses – both the player's and opponent's strengths and weaknesses must be considered.
- I. Recovery position – the amount of court the player will need to cover to be in proper position to play the opponent's next shot.
- J. Playing conditions – wind, sun, court surface, etc., all play a part in choosing what shot to hit.

II. Types of shots:

The type of shot selected will generally fall under three categories:

- A. **Offensive** – shots that are intended to put the shotmaker in an offensive position or in control of the point.
- B. **Neutralizing or rallying** – shots that are intended to sustain a rally and/or neutralize your opponent's shots so that no one is controlling or dictating the point.
- C. **Defensive** – shots that are intended to defend against the opponent's offensive shots and hopefully allow the player to reestablish neutralizing or offensive shots.

Strike-zone setup

Strike-zone setup requires applying efficient footwork to get to the position judged best for performing the correct technique for the selected shot. However, it might be simplified by saying as technique improves, so does the ability to predict and move to the most effective strike zone.

Strike zone encompasses both the ball's distance from the body and its height. Most players have an optimum height where they will try to contact most groundstrokes. This is often referred to as the "wheelhouse." When the optimum can't be reached, there are variations above and below this zone. Upper-level and lower-level strike zones have to be addressed in the modern game. It is no longer just a waist-high level for the optimum contact on groundstrokes. For example, today's top players have a higher optimum contact point on groundstrokes than players of the past. These shots can be driven into the court, allowing a player to take control of the point. Or, when a player is in control of a point these shots hurt an opponent and force a weak response.

Strike-zone setup involves such preparatory skills as anticipation, prediction, and interception. These skills can be learned and improved with training.

Anticipation:

In review (from *Anatomy of a modern shot* – Vol. 2, No. 3) there are two types of anticipation. Total anticipation is predicting what an opponent will do; partial anticipation is predicting what an opponent will not do in a given situation.

Partial anticipation is what most commonly happens on a tennis court, since players are rarely able to determine exactly what shot an opponent will hit and exactly where the ball will go. It involves cues that a player can use to more accurately predict what shot is not coming and therefore focus on what could be coming. These cues can come from an opponent's:

- Technique – cues in the grip, balance, swing path, body stance, footwork (or lack thereof), ball toss, etc.
- Court position
- Patterns, tendencies, strengths and weaknesses

Prediction

Predicting is the foundation skill in learning to play tennis and is still crucial at its highest level. The ability to recognize the spin, speed, height, trajectory and depth of an incoming ball is the basis of establishing an efficient strike-zone setup. Players must predict not only where the ball will land on their side of the court, but they must also predict (based on the spin, speed, etc.) where the ball will end up. We have often seen the inability of young players to predict when they run toward a ball and then end up reaching high over their shoulders to try and hit it.

Professionals who teach by hitting from a basket to a stationary student find that before the lesson is over their student can hit a reasonably good groundstroke. However, once the “perfect feed” is not present the students newfound success may turn to discouragement and lack of interest when they find they are unprepared to predict accurately where the ball will land and, more importantly, where the ball they are hoping to hit will end up.

This process of learning to predict should start at the beginning of an instructional series and is easily practiced in a variety of ways off the court.

Intercepting

Intercepting is the process of moving to a spot where you have predicted the incoming ball will end up and ideally being there early enough to be waiting in a loaded strike-zone setup. Beginners might be encouraged to wait in position before the ball lands on their side of the court.

Here are two drills from David T. Porter, Ed.D., which can help players work on strike-zone setup:

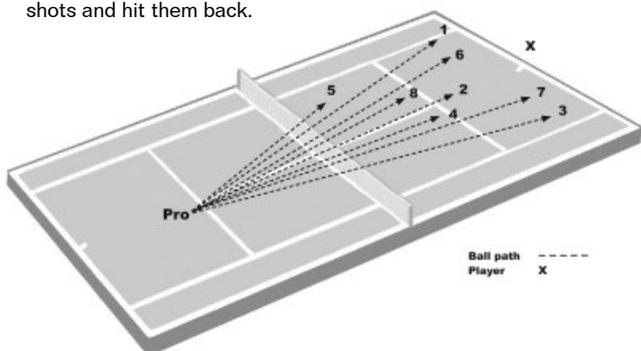
Drill 1: Eight-ball footwork drill – Catching ball on hip

Purpose:

A footwork drill to increase a player’s ability to change directions quickly.

Description:

1. Player “X” starts at the center of the baseline.
2. Pro throws or feeds eight consecutive balls to various parts of the court that are just barely within the reach of the player, providing he reacts fast, runs fast and is quick to intercept the balls on the first bounce. The pro must be the judge of where and at what speed to throw the balls.
3. It is important to feed the balls so that as soon as players catch them, he or she must immediately change directions to move to get the next ball.
4. The pro should allow the player only a brief time to rest before repeating the eight-ball drill again.
5. The drill can be varied by adding a racquet for the player to run down the shots and hit them back.



Drill 2: Up and back drill

Purpose:

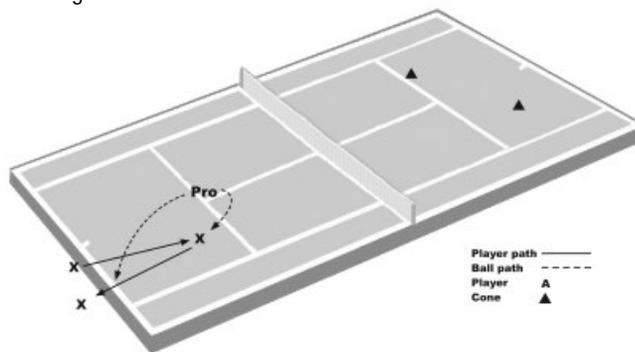
A footwork drill to increase a player’s ability to quickly move forward and backward on the court while emphasizing proper loading, strike-zone positioning, rotation and follow-through.

Description:

1. Player “X” starts at the baseline.
2. Pro tosses ball short to player.
3. Player moves in quickly, loads on dominant side leg, explodes through the shot, lands on non-dominant side foot, and completes shot with hips and shoulders facing single sideline.
4. Pro tosses next ball deep, pushing player back to hit shot so that loaded leg is back. Player must explode and still rotate prior to contact. Player continues rotation in the air and lands on left (or appropriate leg) with hips and shoulders now facing opposite singles sideline.
5. Pro continues to alternate a short toss and a deep toss to keep player moving up and back.

Variations:

1. Can use either forehand or backhand groundstrokes.
2. Use targets for student to hit to.



Backswing

Backswings come in a variety of styles, often varying from player to player and shot to shot.

Take back styles

World Class Tennis Technique explains that there are two styles of take backs on the forehand side: the single unit turn and the leading elbow turn.

However there are commonalities between all modern, topspin groundstroke backswings: looping the backswing on the forehand side and using the body to prepare the racquet for both forehand and backhand. The modern backswing, especially on the forehand side, is almost exclusively done with a loop. The loop facilitates a better transfer of momentum and helps players handle the varying heights of incoming balls. The second commonality is that the body is used to prepare the racquet. The first move is always with the foot, hip and shoulders and this helps keep the backswing from getting too large or too far away from the body.

The decision, on which style of backswing a player will use, should be that of the player. The player will naturally gravitate towards a style that feels more natural and is more efficient for their game. The style of take back might never be mentioned unless a pro feels the student needs to be aware of the process to help their performance. Using the hips and shoulders to take the racquet back is a something that could be taught early on in the process to help the player create efficient and effective shots.

The single unit turn is characterized by:

- Moving the racquet back in synchrony with the shoulder turn
- This movement implies a rotation of the whole racquet arm about the shoulder

Leading with the elbow turn is characterized by:

- Moving the elbow back in synchrony with the right shoulder
- Pointing the tip of the racquet to the oncoming ball
- Closing the racquet face as the elbow is raised
- Pivoting the forearm and the racquet about the elbow so the racquet is rotated up to a position above the elbow and shoulder



Single unit style



Elbow leading style

The single unit take back is used by players who have a more compact swing, such as Andre Agassi and Martina Hingis, who have a reduced swinging radius and rely more on the development of angular momentum during their rotations toward the ball.

Players with the elbow leading style include Lindsay Davenport and Roger Federer. These players have better timing skills and can use the elbow leading take back to their advantage, optimizing racquet head speed without hitting the ball late.

Loops

While use of a loop backswing is almost universal on modern groundstrokes, players differ in the size of the loop – some use a larger loop and some use a smaller loop. Some players use circular loops, while others use a more elliptical loop. The loop provides a more fluid stroke and allows the racquet head to accelerate over a longer distance. Even though a player may exhibit a large loop on most shots, you will see smaller loops on the return of serve and shots with little or no preparation time.

The shape and height of the modern backswing should be measured against the incoming shot. At the 2005 USPTA World Conference, the Player Development Advisory Council discussed the backswing and the height of the take back. Everyone agreed that the highest point of the loop should be above the level of the incoming ball. This enables the player to have the appropriate forward path, whether the ball's bounce is low, medium or high.

Loading

Discussing only the path of the backswing does not convey the importance of the backswing in generating force for modern shots. During the backswing of a modern shot, there is much more going on than just racquet preparation. This is the energy storing phase of the shot, when loading or coiling takes place. Loading is explained as the storing of energy in the large muscle groups. The shoulders, torso, hips, legs are all loaded, storing up energy in the backswing, to be released with the forward swing to contact.

Timing

The backswing should be made early enough so that the player can make the best contact on the ensuing forward swing. There are some variations in timing among players, primarily as a matter of style. It's important to remember that the backswing allows the player to be prepared to make optimum contact.

Forward swing

In the forward swing component we see the forces that were accumulated are uncoiled into the shot, generating the appropriate technical response for the given tactical situation.

The kinetic chain is very much involved in the forward swing. It is the differentiating factor between angular and linear strokes, or modern and traditional shot making. This is the "explode" part of the modern load-explode-land hitting style. The path of the forward swing also directs the amount or degree of spin imparted on the ball.

The racquet path will depend on the shot selected and the strike zone. Topspin shots can be hit with a low-to-high path from lower- and medium-level strike zones. Upper-level shots inside the court (Zone 3 for example) will not use the low-to-high path, but take a more level or even downward path on the ball with the angle of the racquet face and the speed of the swing imparting the topspin rather than the low-to-high brushing motion of the lower-level shot.

Contact point

The contact point probably is the most critical factor in every stroke as the alignment of the racquet and the ball determine a shot's direction. With the variety of grips that can be used to strike the modern forehand, the contact point in relation to the body will be different depending on whether an eastern, semiwestern or western grip is used. However, even with these differences there still are some commonalities in modern shot contact point that should be identified:

- Hips and shoulders are parallel to the net (or perpendicular to the target area) at impact during the loaded open-stance forehand.
- Ball contact is in front of the body.
- On forehands, the free hand plays a key role in balancing body weight for contact.
- Racquet head acceleration culminates in maximum speed at contact.

Recovery phase

The recovery phase of a shot has two components – follow-through and recovery (see Exhibit III below).

Follow-through

The follow-through is an extremely significant element of the modern shot that provides:

- The completion of the rotation required for maximizing angular momentum. This full rotation also plays a key role in body positioning for maximum recovery efficiency. By following through in the direction of the target the dominant side shoulder and hip continue to rotate and are pulled to their final position, taking full advantage of angular momentum.
- A path for the racquet to follow. This helps a player maintain balance throughout the shot.
- Appropriate acceleration through impact. This is particularly important for imparting all types of spin and controlling a shot. If the follow-through is shortened, the racquet will have to slow down before contact.
- Normal racquet head deceleration. This can help reduce arm-related injuries.
- A way for professionals to judge the quality of the stroke.

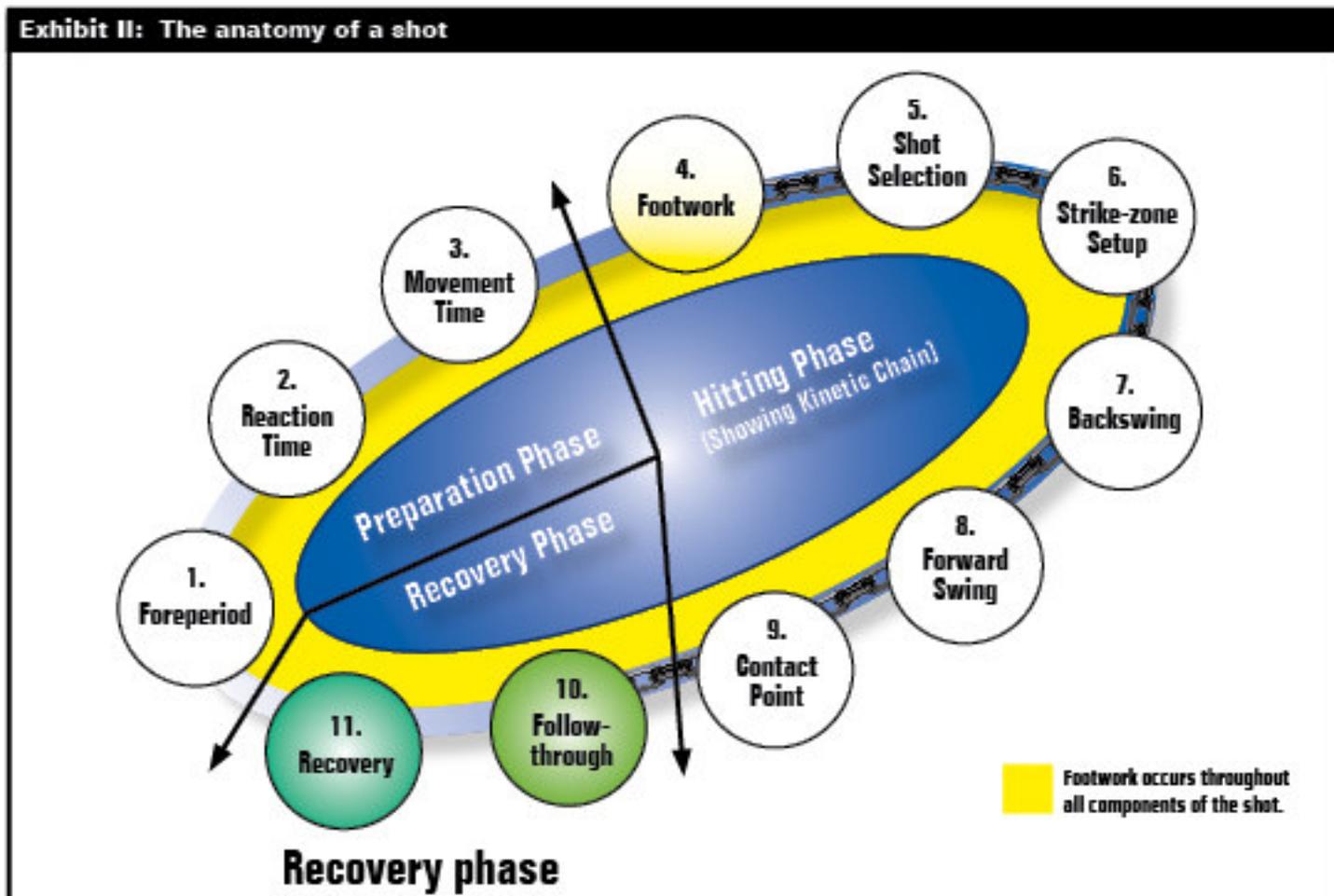
After contact the racquet and arm continue forward until the shot played determines the direction of the finish. On the majority

of finishes, the arm decelerates and rotates as it comes across the body along with angular rotation of the shoulders and trunk. Generally, the player wants to have the elbow high in the deceleration phase. In the vertical finish, the arm is raised above the head vertically to the court as the racquet decelerates.

Careful study of the follow-through leads to the conclusion that there are four places where a player's racquet might finish in relation to his body: vertical (over the hitting shoulder), elevated (over the opposite shoulder), horizontal (chest high/across the opposite arm) and inverted (across the opposite hip/thigh).

This is a tricky subject to discuss, because as teachers we often look at the finish, or location of the follow-through, as an indication of the racquet path. However, for the sake of simplicity in this discussion, the terms only describe the location of the finish without regard to the racquet path. For example, when a player strikes the ball at his ideal contact point, say about waist high, and follows through over his opposite shoulder, his finish is elevated in relation to the racquet path and his body. If that player takes a ball at shoulder level and finishes over the opposite shoulder, the finish is horizontal in relation to the swing path, but we still consider it an elevated finish since the racquet finished over the opposite shoulder.

Examining each possible racquet path and its finish would require consideration of sport science, players' individual artistry and, frankly, some conjecture. So, as you think about the terms below, please remember that they refer only to the location of a racquet's finish without regard to racquet path.



The follow-through finishes can be categorized into four types:

1. Vertical – finishing on the same side of the body, straight up and over the hitting shoulder

The vertical finish is typically used on:

- Shots when the player is unable to rotate the hips and legs
- Neutral or offensive shots off low balls. The player may impart both sidespin and/or topspin.



2. Elevated – finishing over the opposite shoulder

The elevated finish is the most common finish. It is typically used on:

- Drives where the ball is in an ideal strike zone
- Drives when the ball is peaking or on the rise



3. Horizontal – chest high, finishing around the opposite arm

The horizontal finish is typically used on:

- Drives hit off high balls
- Drives that require additional topspin



4. Inverted – finishing around the opposite hip/thigh

The inverted finish is typically used on:

- Excessive spin or sharp-angled shots



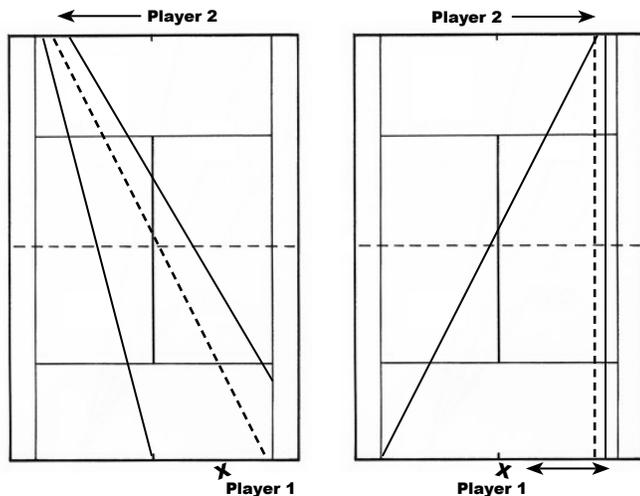
In addition to the biomechanical considerations that make the follow-through an important part of the shot, it allows for variety in shot production.

Recovery

The recovery portion of this phase may be examined both physically and tactically. Physically, we look at how a player lands and then moves to the ideal recovery area on the court. Tactically, we look at where a player may choose to recover on the court based on tactical fundamentals.

The physical technique of modern shot recovery starts with loading from a balanced strike-zone setup and then transferring weight as part of an explosive (not necessarily power producing) rotation. If the strike-zone setup is balanced and the weight transfer moves a player either forward or toward the middle of the court then recovery is both economical and efficient. However, if the strike-zone setup requires a step back or away from the middle of the court then additional time and steps must be taken to achieve the appropriate recovery position (see *Footwork in modern tennis* – Vol. 2, No. 4).

Tactically, the direction and type of shot hit will determine the area to which a player will recover on the court. The general rule of recovery positioning is that a player should recover to the middle of an opponent's angles of reply.



In this graphic, Player 1 has hit a crosscourt groundstroke. The graphic shows the possible angles for Player 2's best shots, and the spot to which Player 1 should recover.

In this graphic, Player 1 has hit a groundstroke down the line. The graphic shows the possible angles for Player 2 to hit to and the spot to which Player 1 should recover.

Conclusion

This concludes the skeletal structure of *Anatomy of a modern shot*. This topic was started three inserts (counting this one) and 24 pages ago. We initially thought the job of describing a shot might be only a little more detailed than writing down the names of the 11 components: foreperiod, reaction time, movement time, footwork, shot selection, strike zone setup, backswing, forward swing, contact point, follow-through and recovery. If you have been one of the followers of our player development documents, you probably understand just how complex it can be to try to explain the “why” and “how” of each shot component.

Some of you, and even some of the members of the USPTA Player Development Advisory Council, may question why it is necessary to go into such detail. The answer is very simple. We are not writing a manual for players to digest word for word, but we are writing a manual for tennis-teaching technicians who must, at a glance, be able to make the correct diagnosis and provide a cure for an ailment in a student's game. Without knowing the minute details of how and why shot components are structured, a teaching professional cannot possibly give an efficient lesson, or offer a diagnosis and cure. Only by having an extensive knowledge of teaching systems can USPTA Professionals provide expert instruction and advice and gain the respect of both their students and the general public.

As we move forward, it is becoming apparent that the USPTA Player Development Program inserts will continue for as long as continuing education is paramount to the Association's purpose.

Credits and thanks

Once again, we must thank our extraordinary resources whose advice and works have aided USPTA in this chapter:

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