

# BADMINTON Handbook

BRAHMS

- Badminton from A to Z
- Technique & Training
- Tips from the Pros

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# Badminton Handbook

For better readability, we have decided to use the masculine (neutral) form of address, but the information also refers to women.

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Bernd-Volker Brahms

# **Badminton Handbook**

## **Training • Tactics • Competition**



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*Fig. 1: Bird's eye view of the Spaniard Carlos Longo*

# **1 The Philosophy of the Game**



*Fig. 2: In Asia, Badminton tournaments are attended by thousands of spectators, as seen here at the 2007 World Championships in Kuala Lumpur.*

Badminton is one of the fastest sports in the world, and a smash by a Chinese player has been measured at a tournament at 206 miles per hour, faster even than a golf ball. Just as badminton has grown in popularity around the world in the past 20 years, and has now been recognized as an Olympic Sport, the sport itself has also changed a great deal. Sports science and tactical and training innovations as well as industrial research in racket production have revolutionized the sport in recent years. This dynamic sport has long ceased to have anything in common with the birdie in the backyard or the genteel aristocratic sport of yesteryear. Nowadays, only pros who are completely dedicated to the sport can survive at world class level.

Better and better training methods and game analyses have led to extremely high level performances, which the lay observer hardly notices due to the speed of the movements involved. While until the mid-1980s, sweeping strokes and wrist movements were part of the standard repertoire,

world-class badminton now features short backswings in order to considerably reduce the opponent's reaction time.

A good example of this is the serve, which nowadays is almost always performed as a backhand in both singles and doubles matches by elite players, with a short backswing. The understanding of the biomechanics of the basic forearm twist revolutionized the thinking about training methods, as it is not the wrist that is fundamental for most strokes, but the twist of the forearm.

Badminton places demands on the whole body, from speed to concentration and conditions to sensitivity, coordination and finesse. The game is very complex, but nevertheless, beginners can make rapid progress in their game after just a few training sessions, which is one reason why badminton is such a popular high school sport.

In simple terms, the aim of the game is to place the shuttle where the opponent can no longer reach it or can only return it with difficulty. The corners of the opponents' court are therefore tactically the most sensible points to aim for, as they are furthest away from the opponent. The following chapters present the different strokes, running techniques and tactical concepts available to the player. The book is especially aimed at beginners and club players who do not have a coach. The optimal execution of strokes exploiting the body's full potential is the basic requirement for playing top class badminton. It takes years of training to unlearn incorrect movement sequences, and players have a fatal tendency to revert to old patterns under the pressure of competition, hence the need to learn to play badminton systematically and correctly right from the start. The stroke techniques described in the pages that follow are intended for right-handed players and should be adapted for left-

handlers. When I refer to doubles, I include men's doubles, women's doubles and mixed doubles.



*Fig. 3: World Champion Lu Lan from China in action*



*Fig. 4: Danish Youngster Victor Axelsen with his Adidas equipment.*

## 2 Equipment

One of the reasons for the big improvement in the standard of world-class badminton is the improvement in the standard of the equipment. These developments mainly concern the **racket**, the **stringing** and the **shuttlecocks**. But **clothing** and **shoes** have also adapted to the demands of a performance sport, not forgetting special **racket covers** and **sports bags** that have evolved to meet top players' requirements.

## 2.1 The Racket

While in the 1980s rackets weighed between 100g and 130g, good rackets now **weigh** around 85g. However, rackets can still be strung to a hardness of up to 14kg. The parts of the racket are **grip**, the **stringed area**, the **head** and the **shaft**. From the origins of the sport until the 1970s, rackets were entirely made of **wood**. Rackets were kept in frames when they weren't being used to stop them becoming warped.

Only with the professionalization of the sport did Asian companies start experimenting with **materials** other than wood. To start with, the shaft and frame were made of **light metal, steel, aluminum**, and later of **carbon-graphite** (manmade fiber made from carbonized bitumen). This helped firstly to reduce the weight, and secondly to increase the stability of the whole racket. Today, materials like fiberglass and synthetic fibers (**boron, graphite, Kevlar<sup>®</sup> and Magan Beryllium<sup>®</sup>**) are also used. The materials have a very high resilience and are significantly firmer than steel, but most importantly have **greater elasticity**. Rackets also no longer consist of separate parts, but the head and shaft of the more expensive rackets are of **one-piece construction**.

The above materials make the rackets lighter and more flexible. In particular the **elastic shaft** allows the player to hit the shuttle with more **whipping power**, allowing him to hit the shuttlecock harder and faster, but the flexibility of the racket head is more of an impediment as it **reduces stroke precision**. The rule of thumb is: the harder the frame, the more accurate the strokes.

Expensive rackets are characterized by **low torsion** (torsional rigidity of the shaft). This is measured by to what extent the racket head turns left or **right around the longitudinal axis of the shaft**. If the player hits the shuttle not with the center but with the **edge of the racket**, it can be returned equally as well by a racket with low torsion as a shuttle that is hit with the center of a cheaper racket.

Another property of the racket that influences the play quality is **balance**. There are **head and grip-heavy** as well as **balanced rackets** on the market. Basically, head-heavy rackets offer **greater acceleration** in the smash, while grip-heavy models are better suited to **defensive play**, as they allow for **greater accuracy**. Balanced models are a compromise between the above. You can **test** which category a racket falls into by balancing it on your **index finger** at the point where the shaft joins the head.





*Fig. 5: Isometric head shape*



*Fig. 6: Rounded head shape*

Even the **shape of the racket head** has been experimented with, as the rules only stipulate a **maximum size**, i.e. the whole racket frame should not be longer than 68 cm (26.8 inches) and wider than 23 cm (9 inches). As far as the stringing is concerned, the maximum is 28 cm (11 inches) x 22 cm (8.7 inches). The traditional racket head is **oval in shape** to promote good shuttle acceleration, instead of the **drop shaped** head of the early days of the sport. An **isometric head shape** is also common, in which the head is rounded at the top, thus increasing the optimal hitting area, the so-called **sweet spot**.

**Tip 1** Beginners should start off with a more **robust racket** that is often composed of several parts. A good such **beginners' racket** costs around \$70-90. Stable rackets are particularly recommended for novices if they like playing

**doubles.** Their lack of technical and tactical understanding often leads to accidental racket clashes.

**Tip 2** In training and in particular in **competition**, a player should have at least **two rackets** with him. These rackets should be used **alternately** so that they are “broken in” and the player does not have to waste time getting used to them during a match.

**Tip 3** The **grip diameter** can be regulated with **grip tape**. Players with big hands usually have thick grips, which they create by winding two or three grip tapes on top of each other in order to obtain the desired diameter.

**Tip 4** New rackets have grips made of **synthetic material** or leather. Accomplished players who tend to have **sweaty palms** wind a non-slip grip tape made of **rubber or terry cloth** around the original tape. The terry cloth tape becomes worn out after a certain time and must be replaced.

**Tip 5** **Tournament players** should always have a **replacement grip tape** handy in case it needs to be replaced urgently.

## 2.2 Stringing

The **type** and **hardness of racket stringing** is an important factor in badminton that **affects shuttlecock flight** and can cause **acceleration, control** and **effort** to vary considerably. Strings are an average of **about 0.7-0.85 mm** thick and may be made of **synthetic material** or **gut**.

Elite players used to swear by natural gut strings made of **cow or sheep gut**, but they are now becoming less common as the quality of synthetic strings has improved more and more. Gut strings are characterized by **high elasticity** and allow the player to play with great sensitivity and outstanding shuttle acceleration. However, they are more expensive than comparable synthetic strings and **less durable**, as they can be damaged by external influences like temperature and air humidity.

Synthetic strings may consist of **one strand** (polyester) or **of several fibers** (multifilament nylon strings), and each type is suited to a different type of game, such as sensitive or powerful. The durability also varies according to the manufacturing process. One of the highest-profile companies in this field is the American firm Ashaway, which started producing surgical thread and fishing lines more than 180 years ago in the Boston area. They have been developing badminton and squash strings for about 60 years.

A compromise must be found between acceleration and shuttle control in the **stringing hardness**. A good rule of thumb is: the harder the tension, the greater the control and shuttle security, at the expense of acceleration. **Beginners** and **experienced match players** should choose a hardness of **around 7.5-10 kg** (16.5-22 pounds) in order to obtain good durability. Only **pros** choose hardnesses of **between 11 and 14 kg** (24 and 31 pounds). Their good technique and strength allows them to compensate for these weaknesses. The strings often break when the stringing is this hard if the shuttle is hit at the edge of the racket instead of cleanly in the middle of the racket.

**Tip 1:** After the game, rackets should be put into a **racket cover** so that the stringing is not damaged by **climatic conditions**.

**Tip 2:** With regular training once or twice per week, a racket should be restrung **approx. every 6 months**, even if it is not broken, as the **regular tension decreases** over time, thus affecting stroke precision.

**Tip 3:** If a **training racket** string breaks, the racket can be repaired with a **repair string**. This should not be done more than once, as the broken string has already reduced the regular tension of the stringing anyway.

**Tip 4:** If a **match racket** string breaks, it is advisable to immediately cut the other strings with **scissors**. This is particularly done by pros with a **high stringing hardness** in order to stop the **racket frame** from **becoming warped**.

**Tip 5:** Players with **'tennis elbow'** can play with a soft, nylon stringing to relieve elbow pain. They should seek expert advice as to the right strings to buy.

## **2.3 The Shuttlecock**



*Fig 7: Shuttlecock with 16 goose feathers.*

The **size** and **weight** of the shuttle (or shuttlecock; in the US also called Birdie) are specified in the **rulebook** (see [chapter 20](#)). There are two different types: **plastic shuttles** or those made of **natural goose and duck feathers**. While the stringing industry has managed to virtually replace natural products with synthetic ones, this is not the case for shuttles. Only natural shuttles are used in elite badminton, which, although more expensive and less durable than plastic ones, have much better flight qualities.



*Fig. 8: In the Victor shuttlecock factory in Nanjing in China, the distance between each individual feather is checked by hand.*

The manufacturing of natural feather shuttles is **extremely labor-intensive**, which is why they are only produced in Asia, although the majority of **cork bases** come from Portugal. The goose feathers are sorted and washed with soap and bleach and dried. Later they are sorted into left and right bending feathers. Only the cutting of the feathers is done by machine. The **16 feathers** are put into the cork base by hand and fixed with glue and thread.



*Fig. 9: Follow-through of a shuttle hit*

Before the shuttles are packed by the dozen in cardboard tubes, each one is tested with a machine or by hand for its **speed** and **flight path** and classified accordingly. The best shuttles fly in a **deep underhand stroke** from the back boundary line **up to 1-2.5 feet** in front of the opposite base line (**speed test**).

Depending on the manufacturer, there are different designations/names for the shuttle qualities. The following speed data have become internationally accepted: **76 (slow)**, **77 (medium)** and **78 (fast)**. Most National Badminton Associations have chosen the top shuttles of the

three manufacturers Yonex (Aerosena 20), Head (Air Power 70) and Victor (Champion) for the national league and top class tournaments.



*Fig 10: During a match, professional players use more than 40 shuttles. Here the Dane Peter Gade exchanges a shuttle with a service judge.*

The relatively high cost of shuttlecocks makes badminton quite an **expensive sport**. A tube of a dozen shuttles costs between \$10 and \$20, and **4-6 shuttles** are used in an intensive game. Pros who change the shuttle as a preventive measure after a hard smash can even go through **30-40 shuttles** in one game, as in most cases single **feathers break**, which completely alters the flight quality of the shuttle.

Unlike natural shuttles, synthetic ones last for one or two whole training sessions, or two or three games. Even if the manufacturers continue to try to convince us that their plastic shuttles have similar flight qualities to goose feather ones, experience on the court indicates otherwise. Plastic shuttles **lose speed** in the air more quickly. They may need

to be **hit harder** and there is **less accuracy**, particularly during short net play.



*Fig. 11: Cross-section of a shuttle*

Synthetic shuttles are marketed with three different speeds: **red (fast)**, **blue (medium)** and **green (slow)**. The court temperature also determines which category should be chosen. The warmer the court temperature, the quicker the shuttle should be.

**Tip 1: Over-quick shuttles** are slowed down by either every second or every fourth feather being **slightly bent outward** at the tip. If shuttles are too slow, the feathers should be bent inwards.

**Tip 2:** Shuttles that have been too **long in storage** tend to become **dry and brittle**. By keeping the shuttles separate and **briefly steaming** them, they can be “refreshed” so that they don’t break so quickly and last longer.

**Tip 3: Used tournament shuttles** should not just be **thrown away**, as they can still be used in training. Even completely “bald” shuttles can be used for **shuttle machine** drills.



**Tip 4:** Even the **empty shuttle tubes** can be reused by banging two tubes together to make a noise during competitions. Fans in Asia have long supported their **favorites** in this way.

## 2.4 Shoes

Several manufacturers produce special badminton shoes, which feature a **non-slip sole** for indoor courts and a **very flat sole**, so that the player has good contact with the floor at all times and **does not twist his ankle** during the often dynamic movements. Badminton shoes are **reinforced at the toes**, so that they don't wear out too quickly when the feet are dragged - especially during lunges. The soles should also have cushioning as badminton players jump a lot. Good shoes cost between \$70 and \$120.

**Tip 1:** When purchasing shoes, make sure that the **soles** will not **mark the court floor**, which is not allowed in sports centers.

**Tip 2:** You should buy two pairs of shoes at the same time, so that in matches you always have **"broken in" shoes** available. You should never play a tournament with **new shoes** as you will quickly get **blisters** on your feet.

**Tip 3:** Always **tie your laces properly** so that your feet sit snugly in your shoes, and to avoid you **twisting your ankle**.

**Tip 4:** Never play badminton in **jogging or running shoes** as they are designed for running in a straight line and are totally unsuited to **sudden forwards and backwards**

**jumps.** The very high, cushioned soles of jogging shoes will almost certainly lead to a **twisted ankle**.

**Tip 5:** Players with **skew foot, splay foot** or **flat feet** should have a **sports orthotic** in their shoes. Otherwise there is a danger that the sudden movements are not adequately cushioned by the feet and the shock travels directly to the **knees**.

## 2.5 Clothing

Badminton players should above all wear **comfortable clothing**. Baggy trousers or tight skirts are unsuitable as they restrict **flexibility**. Match players, both men and women, usually wear **polo shirts** and **shorts**. Tightly fitting clothing can also be worn if desired. Shirts should be made of a **breathable fabric** so that the player doesn't feel suffocated after a long rally.

Team players wear a uniform team kit. Your kit should also include a **sweat suit**. Sooner or later, every player will need a **large bag** in which to store all training and match equipment, which has room for shoes, clothing, rackets and shuttles as well as something to eat and drink. Special badminton bags are designed so that they can also be carried comfortably on the back like a **rucksack**.



*Fig. 12: Two-time world champion Xie Xingfang from China cuts a fashionable figure on court with this sleeveless shirt.*

**Tip 1:** In **tournaments**, take as **many shirts** as you have games. A sweaty shirt should be **removed** immediately after the game and be replaced by **a dry one**, otherwise the player may catch a **cold** due to drafts.

**Tip 2:** After a game or during a long training break, players should always slip on a **sweat suit** so as not to **get cold**, or else they will stiffen up and **the muscles** will be cold when play resumes.

**Tip 3:** Players with **very sweaty feet** should buy **special socks** that absorb the **moisture** well. It is not advisable to wear two pairs of socks one on top of the other as this can cause **blisters**.

**Tip 4:** Pro players do not usually tuck their **shirt into their shorts**, as it stops the **umpire** from clearly seeing whether the shuttle is really hit below the **waist**, and they try in this way to get away with hitting the **serve** from a slightly higher position.



*Fig. 13: Carola Bott in a trendy outfit*



*Fig. 14: The correct grip*

## **3 Types of Grip**

The **correct racket grip** is the foundation for effective strokes and essential for improving your playing level. This is the only way to achieve the **ideal backswing**, the **ideal power transmission** and to be able to **hit** the shuttle **in the right place**. The so-called **frying pan grip** (Fig. 15), in which the player holds the racket like a pan or a flyswatter, is totally unsuitable. This is a typical beginner's error and can cause so-called **tennis elbow** if not corrected. In the correct position, the racket head is held at **about 90°** to the frying pan grip position.

Beginners should start off using only the **universal grip** (Fig. 14), which allows all strokes to be played safely and effectively. It involves the player holding the racket so that when he holds it out in front of him he can only see the shaft and the frame, not the strings. The hitting surface is then in a sense an **extension of the palm of the hand**. The hand is wrapped around the handle and the **lower edge of the hand** is level with the **end of the racket handle**. Beginners should try very hard to adopt the correct universal grip right from the start, as once any errors become ingrained they are very hard to eliminate later on, and **frustration** is the result when an incorrect grip means that the ground strokes cannot be mastered successfully.