

WHAT IS THE BIOMECHANICAL PRINCIPLE OF FOREHAND SMASH IN BADMINTON? - ARTICLE REVIEW

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SUMMARY

The pattern of human movement is strongly influenced by biomotor conditions, age development will affect the level of biomotor maturity. Forehand smash is one of the techniques that every badminton athlete must master well. To do this stroke well, a good movement pattern is needed, biomotor maturity which in this study is related to the age of the athlete. So that the development of age will cause differences in movement patterns which in this study analyzes the forehand smash movement patterns in badminton based on age. It is known that the most efficient badminton technique for gaining points in badminton is the smash. The smash-hit is more likely to produce a fast shuttle lock rate performed using the forehand smash technique. So that in this study the writer will analyze a technique in badminton, namely the forehand smash technique. These findings contribute to future research on the biomechanical analysis of forehand smash motion in badminton.

Keywords: Biomechanics, Forehand Smash, Badminton, Athletes

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INTRUDUCTION

Humans are living things that have the internal power to move parts of the body's organs to move (Burhaein, 2017a; Mustofa, Mansur, & Burhaein, 2019). Basic motion is an inherent movement pattern that forms the basis for complex movement skills (Ardian, Suharjana, & Burhaein, 2019; Phytanza, Burhaein,

Sukoco, & Ghautama, 2018). Basic motion includes locomotor motion, non-locomotor motion, and manipulative motion (Burhaein, 2017b; Purnomo, Tomoliyus, & Burhaein, 2019). The ability of movement skills will be influenced by several factors, including the age factor starting from toddlers, early age, children, and adolescents, there will continue to be developments in the mastery of movement skills, at this stage of development. (Burhaein, 2020; Phytanza & Burhaein, 2019). It can be seen that the difference in doing movement skills, for example, children who are at an early age when throwing movements are not as complex as teenagers (Phytanza & Burhaein, 2020; Pramantik & Burhaein, 2019). Seeing this phenomenon, the researcher intends to analyze the movement patterns in one of the most popular sports in Indonesia, namely badminton.

Badminton is a popular sport in Indonesia, this net game sport has become one of Indonesia's mainstays in winning gold medals at various world championships. This achievement is inseparable from the efforts of the Indonesian Badminton Association (PBSI) in the search for the seeds of talented athletes to be fostered to be able to become new champions at world championships, in addition to PBSI services in the current era badminton training centers have started to be established from rural areas. to urban areas (Purnama, 2010). This of course helps PBSI in the search for talented athletes and makes badminton competition in Indonesia even tighter.

The number of badminton championships from the district, provincial to national levels motivates athletes to continue training in the hope that they can give their best performance when competing, to be able to become an athlete champion, of course, must be provided with a foundation in the form of excellent physical condition, good technique, good strategy. accurate and mentally tough (Bimanggara & Mansur, 2020; Burhaein, Ibrahim, & Pavlovic, 2020). Badminton players need the following physical components: (a) Agility, (b) Cardiovascular Endurance, (c) Local Muscle Endurance, (d) Strength, (e) Power, (f) Speed, and (g) Flexibility (Bompa, 1996; Purnama, 2010).

In the badminton championship, several numbers are contested, starting from men's/women's singles, men's/women's doubles, and mixed doubles. The stages of the championship are also held starting from the level of competition or even from the age grouping level, the competition level consists of the district, provincial, national to international levels, while the age grouping level consists of an early age, children, beginners, adolescents, and adults. To become a badminton player, you are required to have an excellent physical condition, good technique, accurate strategy, and a strong mentality.

To be able to master this technique, of course, it is influenced by several factors including biomotor factors and the level of efficiency of motion. Then the importance of badminton techniques starting from standing, holding the racket,

hitting the ball to the technique of footsteps, of course, these are all very helpful in the badminton player practice process (Rana, 2012).

In the training process, the basic badminton techniques refer to the same basic technique or movement pattern, but according to the observations of the researchers, there are differences in technique mastery between early childhood, children, beginners to adolescents (Fauzan & Graha, 2020). From these differences, of course, there is a gap in the mastery of techniques between athletes' ages, this makes the author's basis for analyzing motion patterns of basic badminton techniques based on age.

The need for an assessment of movement patterns based on age, especially the skills of athletes during adolescence or adulthood, is very important, so the need to study human motion during infancy, childhood, and the next life is a requirement. (Ma'mun & Saputra, 2000; Pot, van Hilvoorde, Afonso, Koekoek, & Almond, 2017). The development of movement at all age levels will increase if it is done through a learning or training process. This development process will continue with age.

Considering that in the search for references the author did not find an explanation of the differences in motion patterns of badminton techniques based on age, to know the best movement patterns in each age group and analyze the differences from the results of the best movement patterns for each age, this is necessary to be able to know how the best movement patterns are at each age and the differences will be seen so that it can be used as an evaluation material in developing an exercise program.

Smash is a technique in playing badminton, an authentic hit with a strong, fast, and sharp punch. A smash is an over-head shot that relies on the strength and speed of the arm and a resuscitation of the wrist to make the ball slide sharply into a dive (Purnama, 2010). The findings of previous research found that the smash was the most effective shot to get points in badminton (Ariff & Rambely, 2012). The smash can be done in two ways, namely the forehand smash and the backhand smash. Smash using forehand results in a faster shuttle cock rate than a backhand smash (Tsai, Hsueh, Pan, & Chang, 2008).

LITERATURE REVIEW

The Role of Biomechanics

In the field of sports, whose goal is the highest achievement of an achievement, it is necessary to apply science and technology, what they need is none other than the knowledge of how to analyze skill movements (Bartleet, 2007). The results of such research provide information with which to refine their sportsmen's techniques. Further studies on the analysis of human movement biomechanics

and its application to athletes found that this analysis is beneficial to the effectiveness of techniques and even new and sustainable movements in technological development (Lu & Chang, 2012).

Biomechanical analysis is an important thing about the objectives of analyzing sportsman performance. This is reinforced by the theory that with the analysis of sports biomechanics, new techniques and tools are designed to be more advanced to support an appearance (Curran & Frossard, 2012).

The biomechanical analysis specifically aims at improving performance, improving techniques, repairing equipment, and improving exercise programs, (2) injury prevention and rehabilitation, techniques for reducing injuries, and designing equipment (McGennis, 2005).

Moving on from analyzing the objectives of sports biomechanics, it can be concluded that the function of understanding biomechanics is (Bartleet, 2007; Lu & Chang, 2012; McGennis, 2005):

1. Provides a scientific basis for making decisions regarding children's psychomotor skills and basic movements in sports.
2. As a basis for obtaining answers about problems in sports performance (practice).
3. The principles and principles are used in providing assessments and corrections to the performance performed by students/athletes or children while playing.
4. Able to develop basic sports or basic physical movements for children that are more efficient and useful.

Forehand Grip Technique

The way to do the forehand grip is by holding the racket neck in the left hand, the racket heads sideways, holding the racket in a way like a handshake. The V shape of the hand is placed on the handle of the racket. Holding the racket rests on three fingers, namely the middle finger, ring finger, and little finger tightly holding the racket, while the index fingers are slightly apart, while the thumb is placed between the three fingers and the index finger (Deli, 2017). The way to hold a forehand racket is to hold the racket with your left hand, with the racket plane perpendicular to your body. Place your right hand on the racket strap (string) and slide it towards the racket handle so that the center of the bottom of the palm rests on the end of the racket handle. The grip of the racket should lie across the palm and fingers of the right hand. Your index finger should be slightly apart from the other fingers as if you were pulling the trigger of a gun. Your thumb will be

naturally around the left side of the racket grip. The fingers are slightly apart from each other (Poole, 2013).

Motion Patterns on Badminton Forehand Smash

Smash is one of the techniques in playing badminton, this hard and nosedive shot is done to turn off the opponent's defense to get points. A smash is an overhead shot that relies on the strength and speed of the arm and a resuscitation of the wrist to make the ball slide sharply into a dive (Purnama, 2010). Smash is also called a deadly blow, this blow is an overhead that is directed downwards with the power of the player which is one type of punch that is taken to attack the opponent (Deli, 2017). In making this stroke there is a difference with a lob or drop shot, where the impact position on the lob is right above the head position, for the impact position the drop shot is slightly above the head, while in the impact position the smash is above the front of the head (McGinnis, 2005; Purnama, 2010).

The results of previous studies emphasize the importance of rotational movements in the shoulder and radio-ulnar joints in performing the smash technique (Waddell, 2011). The most important component of a smash is the rotation speed of the shoulder to move the angle of the upper arm. In the forehand smash, it consists of several phases of movement from the initial position or standing position to advanced movements so that it becomes a motion pattern involving locomotor, non-locomotor, and manipulative movements (Tsai et al., 2008).

Some things that must be considered in standing posture are as follows (Deli, 2017):

1. Stand with your body weight resting on both feet while maintaining body balance.
2. Keep your hips upright and relaxed, bend your knees at your toes. The feet are shoulder-width apart, with one foot in front of the other.
3. Your hands are at your sides with your elbows bent so that your upper arms are free to hold the racket.
4. The racket is held properly and not too tightly, keep the racket position higher than the head.
5. Always pay attention and be alert to the movement of the shuttlecock.

In the preparation position for hitting the shuttlecock, the player must pay attention to the following matters: in this position, the body is sideways towards the net. The right foot is placed behind the left leg. When hitting the ball, the body

weight in the right leg moves to the left foot. Also, the position of the body must be behind the ball to be hit. Some hints for making a forehand smash (Poole, 2013):

1. Touch the shuttlecock while it is in front of you, and do so with the outstretched arm.
2. On contact, the wrist and forearm should rotate rapidly.
3. On contact, the racket plane is in a flat position pointing downwards.
4. Hit the shuttle hard
5. The sharp angle of fall is more important than the speed of the shuttle.

Do not smash further back than three-quarters of the court. Because the shuttle decelerates over long distances.

CONCLUSIONS

Based on the theoretical study above, it can be concluded that human movement patterns are strongly influenced by biomotor conditions, age development will affect the level of biomotor maturity. Forehand smash is one of the techniques that every badminton athlete must master well. To do this stroke well, a good movement pattern is needed, biomotor maturity which in this study is related to the age of the athlete. So that the development of age will cause differences in movement patterns which in this study analyzes the forehand smash movement patterns in badminton based on age.

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ШТА ЈЕ БИОМЕХАНИЧКИ ПРИНЦИП ФОРХЕНДА У БАДМИНТОНУ? - ПРЕГЛЕДНО ИСТРАЖИВАЊЕ

САЖЕТАК

На образац људског кретања снажно утичу биолошки и моторички фактори, а развој који настаје услед хронолошког старења утицаће на ниво биомоторне зрелости. Ударац форхенд је једна од техника коју сваки спортиста у бадминтону мора добро да савлада. Да би се овај ударац добро извео, потребан је добар образац кретања и биомоторна зрелост која је у овој

студији посмартана у вези са узрастом спортисте. Узрасне карактеристике развоја проузроковаће разлике у обрасцима кретања, а у овом истраживању је анализиран ударац форхенд кроз обрасце кретања у бадминтону повезане са узрасним карактеристикама спортиста. Познато је да је најефикаснија бадминтон техника за освајање бодова у бадминтону смечирање. Смеч ударац производи највећу брзину техником форхенд смечитања. Тако да ће у овој студији бити анализирана техника смечирања у бадминтону, односно техника форхенд смечирања. Добијени резултати допринеће будућим истраживањима биомеханичке анализе удараца форхенда у бадминтону.

Кључне речи: биомеханика, форхенд, бадминтон, спортисти.

ЧТО ТАКОЕ БИОМЕХАНИЧЕСКИЙ ПРИНЦИП УДАРА ОТКРЫТОЙ РАКЕТКОЙ В БАДМИНТОНЕ? – ОБЗОР СТАТЕЙ

АННОТАЦИЯ

На характер передвижения человека сильно влияют биомоторные условия, возрастное развитие влияет на уровень биомоторного развития. Удар открытой ракеткой – одна из техник, которую должен хорошо освоить каждый бадминтонист. Чтобы хорошо выполнять этот удар, необходима хорошая траектория движений, биомоторная сформированность, которая в этом исследовании соотносится с возрастом спортсмена. Таким образом, с возрастом возникают различия в моделях движений, которые в этом исследовании посвящены анализу моделей движений по время выполнения удара открытой ракетки в бадминтоне в зависимости от возраста спортсмена. Известно, что самая эффективная техника бадминтона для набора очков – это разбивание. Сильный удар с большей вероятностью приведет к быстрой блокировке волана, выполняемой с использованием техники удара справа. Итак, в этом исследовании автор анализирует технику, характерную для бадминтона, а именно технику удара открытой ракеткой. Эти результаты внесут вклад в будущие исследования биомеханического анализа движения удара открытой ракеткой в бадминтоне.

Ключевые слова: биомеханика, удар открытой ракеткой, бадминтон, спортсмены.

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