

# Skills of Smash Backhand on Table Tennis of 3 Dimensional Based on Multimedia

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**Abstract--***This study aims to determine the effect of training methods and functional movement on strokes technical skills on the backhand smash in the table tennis game. This research was conducted at table tennis athletes in the city of Makassar. The method used is an experiment using a 2x3 factorial design. The sample consisted of 60 athletes, divided into 6 groups, each consisting of 10 athletes. The data analysis technique used is the analysis of two-way variance (ANOVA) and continued with the t-Dunnet test at the level of significance  $\alpha = 0.05$ . The results showed that: the distributed practice method has a higher effect than the massed practice method on backhand smash skills, the massed practice method is more effect than the mixed practice method for smash backhand skills, methods distributed practice has more effect than the mixed practice method on smash backhand skills, there is interaction between the massed practice method, distributed practice method, mixed practice method, and functional movement on backhand smash skills, massed practice method is higher than mixed method practice on smash backhand skills in high functional movement groups, distributed practice methods are higher than mixed practice methods of smash backhand skills in high functional movement groups, distributed practice methods are higher than massed practice methods of smash backhand skills in low functional movement groups, Mixed practice methods are higher than the massed practice method of low functional movement smash backhand skills. Multimedia technology comes using Kinovea, as a software that has been created specifically for sports professionals and their coaches.*

**Keywords--***Exercise Method, Functional movement, Smash Backhand, Kinovea*

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## I.INTRODUCTION

Obviously, to improve achievement is not an easy thing because it needs a variety of ways and efforts. As in Hartono's (2009: 205-206), he found that the discovery of various problems and challenges faced in the development of today's sports in general can be grouped into the main thing in relation to the field of sports physical education.

Lack of support for the standards of facilities and infrastructure as well as routine scheduled calendar events makes opportunity to accumulate playing experience is also lack. As a result, it has an impact on the development of very slow performance. Alam at al.<sup>1</sup> suggest that increasing sports performance is influenced by several factors; supporting factors such as consistent coaches, good quality athletes, private assistance, and sports events.

Table tennis game is one of the sport's branches having certain basic techniques including; techniques of push, drive, block, smash, and service. That basic technique must be mastered by an athlete or player to be able

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to play games with advanced or high skill levels in accordance with the characteristics of the table tennis game. As known that table tennis technique consists of various punches; service punch techniques, defensive punch techniques, and attacking techniques. Defensive punch group techniques include push and block punches while attacking techniques include drive punches, smash blows, and spin punches.

In the game of table tennis, it is also known various types of games namely the type of defensive game (defensive), type of attack (offensive), and the type of combination (mixed). More types of defensive players use or utilize the ball spin from top to bottom (back spin), the type of attack player uses more or utilizes the round of the ball from the bottom up (top spin) resulting in the emergence of the term modern table tennis game that adheres to the type of attacking game. Saputra<sup>2</sup> states that to achieve achievements in table tennis, the level of accuracy of the punch plays influential role. Then, the level of punch accuracy can be obtained from consistent and programmed training<sup>2</sup>.

## II. LITERATURE REVIEW

Sumarno<sup>3</sup> says that, table tennis is a sports bet that is played by two people (for singles) and played by four people (for a double), sometimes people call it ping-pong. Table tennis has evolved from recreational sports to achievement sports, this sport is now widely favored by students and in society.

Table tennis is one sport where players must have basic strokes techniques which include; techniques of push, drive, block, smash, and service. That basic strokes technique must be mastered by an athlete or player to be able to play games with advanced or high skill levels in accordance with the characteristics of the table tennis game. The table tennis technique consists of various strokes, such as; serve strokes, defensive strokes, and attack shots. Defensive stroke technique groups include push strokes and block strokes, while attack stroke techniques include drive strokes, smash strokes, and spin strokes.

When athletes play or compete in table tennis rarely use a backhand smash, it is because the athlete prefers to return the ball using a forehand smash by shifting and reversing the body rather than directly hitting a backhand smash.

There are several general factors that must be considered in improving table tennis performance. Hadjarati<sup>4</sup> said that these factors were the development of young athletes, training methods, good facilities and infrastructure, good funding, professional trainers, good bureaucracy in the table tennis federation, and community support. In addition, in the study of Faridah<sup>5</sup> said that there are several special factors that must be considered, namely; physical and mental condition.

To improve the performance of table tennis, there is a need for treatment, especially on strokes technique skills, especially on improving the smash strokes technique skills needed in modern table tennis, especially the backhand smash technique that athletes rarely use when competing. In addition, people also tend to be more interested in researching forehand smash than backhand smash, as stated by Takeji and Yoichi<sup>6</sup> who say that: from some biomechanical research that has been done, generally only researching table tennis forehand strokes. However, it paid little attention to the biomechanics of backhand blows.

Hodges<sup>7</sup> says that smash blows are hitting the ball at maximum speed so that the opponent cannot return it. while Backhand is a type of strokes that is done by using a bet to the left of the elbow for the player using the right hand, and the opposite for the player who uses the left hand<sup>2</sup>.

Cook<sup>8</sup> said that functional movement is a condition when the organs of a human body perform a pattern of movement, are in a functional position that is good or performs its functions well, because it is supported by good mobility and stability.

The strategy of passive and active play has the opposite effect on match activities and physiological responses. The effect is more on stroking activities and activity profiles than on walking activities and physiological responses can be seen through kinovea<sup>9</sup>.

Burdick in Murray & Udermann<sup>10</sup> defines massed practice as practice that occurs without resting between experiments. Hale and McMorris<sup>11</sup> define the distributed practice method when work is interspersed with rest periods<sup>11</sup>. Whereas mixed practice is a training method that combines the method of solid or continuous practice and the method of interval training or distributed practice, where the rest time is filled by doing a free strokes to stretch the body so that the muscles, especially in the area arms, stomach and legs relax again.

This problem makes the writer feel it is important to do more in-depth research on how to improve the smash backhand technique skills in table tennis games that involve their functional factors, by applying three training methods, namely; massed practice methods, distributed practice methods, and mixed practice methods. This experimental study aims to determine the effect of training methods and functional movements on the skill of smash backhand techniques in table tennis.

### III. METHODOLOGY/MATERIALS

As what was explained earlier that this research is an experimental research, Sudjana<sup>12</sup>, said that the design of this study was 2x3 factorial. The design of this study can be seen in the following table:

**Table 1**

<b>Exercise Model (A)</b>	<i>Massed Practice</i>	<i>Distributed Practice</i>	<i>Mixed Practice</i>
	(A1)	(A2)	(A3)
<b>Functional movement (B)</b>			
1. High Functional movement (B1)	A1B1	> A2B1	> A3B1
2. Low Functional movement (B2)	A1B2	< A2B2	< A3B2

Regarding the population and sample, table tennis clubs that actively train table tennis athletes in the city of Makassar amount to 4 and the population to be taken for treatment in this study ranges from 40 athletes per

club, so that the overall population is around 160 athletes, so samples that could be taken by randomization (group design) were 110 people.



**Figure 1.** Analysis of Smash Backhand Motion with Kinovea

Determination of the sample came from 160 athletes with a significant level of 5%, then obtained 110 athletes as stated by Sugiyono<sup>13</sup>. Of the 110 athletes or samples tested for functional movement, then 27% were taken, resulting in 29.7 and rounded up to 30 samples for high and low functional movements. to determine the height and low of functional movement based on determining ranking. Athletes in the order of 1-30 are referred to as samples with high functional movement while athletes in the order of 80-110 are referred to as samples with low functional movement.

Based on the target of functional movement, 30 athletes who have high functional movement and 30 athletes have low functional movement. then in a random manner, the researcher determined the athletes who entered the group who received treatment for the massed practice method, distributed practice methods, and mixed practice methods, to be subsequently formed into 6 training groups, each of which numbered 10 people as stated by Edwards<sup>14</sup>.

This research was conducted at the Table Tennis Sports Building in the sports science faculty of Makassar State University for approximately seven weeks. The implementation of this study consisted of three activities, namely: the initial test in the form of a functional movement test to group samples consisting of 5 test items, namely: deep squat test, hurdle test step, test in-line lunge, straight leg raise active test, test seated rotation.

Then the sample or testee is given treatment for 18 meetings or about 6 weeks, with a frequency of 3 meetings a week. The type of treatment given to testee in the form of smash backhand training by applying the 3 training methods, namely: the method of massed practice, distributed practice methods, and mixed practice methods.

After 18 treatments were given, the final test was a test of backhand smash strokes skills for all sample members. Data on smash backhand technique skills is a combination of the scores from the results of the backhand smash skill test and the process score of the smash backhand movement pattern based on the instrument grid consisting of several indicators. before being summed, the two data are first equated with the t-score formula which will then become the data (score) of the backhand smash strokes skill.

In this study the research is experimental research, the data is analyzed as stated by Hasan<sup>15</sup>, namely: by using a variance analysis technique (ANAVA) two ways with a significance level of  $\alpha = 0.05$ .

#### IV. RESULTS AND FINDINGS

A summary of the research data for each treatment can be seen in the following table:

**Table 2:** Table of Research Results Data Summary

Functional movement	subject	Exercise Mode		
		Massed	Distributed	Mixed
High	N =	10	10	10
	$\mu$ =	114,54	111,81	85,74
	sd =	11,18	10,90	13,40
	$\Sigma X$ =	1145,41	1118,06	857,39
	$\Sigma X^2$ =	132320,4	126075,1	75128,7
Low	N =	10	10	10
	$\mu$ =	84,10	97,22	99,41
	sd =	13,64	14,33	13,76
	$\Sigma X$ =	841,02	972,23	994,07
	$\Sigma X^2$ =	72405,5	96370,4	100521,8
Total	N =	20	20	20
	$\mu$ =	99,32	104,51	92,57
	sd =	19,78	14,47	14,97
	$\Sigma X$ =	1986,43	2090,29	1851,46
	$\Sigma X^2$ =	204725,95	222445,50	175650,46

As for the summary analysis of variance can be seen in the table below:

**Table 3:** Table of Calculation Results Summary Anava 2x3

Source Variant	JK	db	RJK	$F_h = F_0$	$F_{table}$ $\alpha=0,05$	$T_{table}$ $\alpha=0,05$
1. Between A	1434,06	2	717,03	4,29	3,17	1,67
2. Between B	1638,46	1	1638,46	9,79	4,02	1,67
3. Interaction AB	4991,60	2	2495,80	14,92	3,17	1,67
4. In	9035,83	54	167,33			
Total (R)	17099,94	59				

The hypothesis that has been tested using the Dunnet t-test can be seen in the table as follows:

**Table 4:** Table of Hypothesis Advanced Test Results in each Anava Category 3x2 Summary

Contrast Value	(Se)	$t_0$	$t_{table}$	Result
1. $\bar{Y}_1 - \bar{Y}_2 = -103,86$	6,47	-25,39	1,67	Significant
2. $\bar{Y}_1 - \bar{Y}_3 = 134,97$	6,47	33,00	1,67	Significant
3. $\bar{Y}_2 - \bar{Y}_3 = 238,83$	6,47	58,39	1,67	Significant
4. $\bar{Y}_{11} - \bar{Y}_{21} = 2,73$	6,47	0,47	1,67	Not-Significant
5. $\bar{Y}_{11} - \bar{Y}_{31} = 28,80$	6,47	4,98	1,67	Significant
6. $\bar{Y}_{21} - \bar{Y}_{31} = 26,07$	6,47	4,51	1,67	Significant
7. $\bar{Y}_{12} - \bar{Y}_{22} = -13,12$	6,47	-2,27	1,67	Significant
8. $\bar{Y}_{12} - \bar{Y}_{32} = -15,31$	6,47	-2,65	1,67	Significant
9. $\bar{Y}_{22} - \bar{Y}_{32} = -2,18$	6,47	-0,38	1,67	Not-Significant

After analyzing the data with a two-way analysis of variance (Anava) approach, then proceed with the Dunnet t-test, the discussion of the research results is as follows:

Based on the results of the hypothesis advanced test calculations, if  $t$  is calculated compared to  $t$  table (0.05; 54), then obtained  $t_0 > t_{table}$ , thus  $H_0$  is rejected. So that it can be interpreted: there are significant differences in the results of backhand smash strokes skills in table tennis games significantly between groups A1 and A2, groups A1 with A3, groups A2 with A3, groups A1B1 with A3B1, group A2B1 with groups A3B1, groups A1B2 with A2B2, A1B2 group with A3B2.

Based on the results of the calculation of  $F_{count} (AB)$  compared with  $F_{table} (0.05)$ , then obtained  $14.92 > 3.17$  so that  $H_0$  is rejected. So that it can be interpreted that there are differences in the results of backhand smash strokes skills in table tennis games significantly between groups of training methods and functional movement groups. The results of research data analysis for group A1 obtained an average score: 99.32, group A2 obtained an average score: 104.51, and group A3 obtained an average score: 92.57, while for group B1 obtained an average score average: 104.03 and group B2 obtained an average score: 93.58. So that it can be concluded, that: there is an interaction between those who are trained using a method with those who have functional movements, against the technical skills of backhand smash.

Overall there are differences in the average backhand smash skills between athletes who are trained in the massed practice method, distributed practice methods, and mixed practice methods. The results of these studies are in accordance with research<sup>16</sup>. The results of backhand smash strokes skills trained using the distributed practice method have a better effect than those trained by using the massed practice method. Likewise those who are trained using the distributed practice method have a better effect than those who are trained using the mixed practice method. The results of this study are in line with the results of research conducted by Leo<sup>17</sup>. In addition, there are interactions between those who are trained using these three methods and those who have functional moves towards the backhand smash technique skills.

## V. CONCLUSION

Based on the analysis of research data, the conclusions of this study are, massed practice methods, distributed practice methods, and mixed practice methods and functional movement are variables that can effect the smash backhand technique skills in table tennis. For athletes who have high functional movement then trained using the massed practice method and distributed practice method, it turns out to have a better effect or there are significant differences in the results of their smash backhand strokes skills than those trained by using the mixed practice method. On the other hand, athletes who have low functional movement are then trained using mixed practice methods and distributed practice methods, which have a better effect or there are significant differences in the results of their smash backhand strokes skills than those trained using the massed practice method.

Based on the conclusions stated earlier, several suggestions can be made in this study, namely: in an effort to improve smash strokes skills and technical skills, especially in the backhand smash technique of table tennis athletes in the city of Makassar, physical education teachers in high school are expected, coaches of table tennis clubs, and table tennis lecturers, to apply these three training methods according to the functional mobility of the athletes they train so that mastery of techniques can be more effective and efficient..

These three training methods can be introduced and applied as early as possible by the trainer to beginner athletes or at the level of cadets at the beginning of the training gradually, so that athletes can adapt if later given a similar training method based on an exercise program to improve their strokes technique skills. This research basically focuses on the effect of training methods and functional movements on improving smash backhand technical skills in table tennis. Thus, it is expected that the next researcher will expand or add to the research variable for the sake of increasing achievement in the table tennis sport in the city of Makassar.

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