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# Development of the *Chop Instrument* in Table Tennis

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**Abstract**

*This research aims to construct a chop meter for table tennis. This research method is research and development (R&D). The population and sample in this study were 20 PTM Pasir Pengaraian table tennis athletes. The research was carried out by giving a questionnaire to 2 media experts and two material experts to examine the instrument's reliability. The Criteria Test uses the results of the jury's assessment in assessment matrix form to find the validity of the test. This study involved the first and second test samples of 20 Pasir Pengaraian PTM athletes, using data collection methods with questionnaires and tests. The study results were obtained from material experts 87.70% and 94% (very appropriate) and media experts 91% and 89.80% (decent). The result of validity is 0.91, and reliability is 0.87. The number indicates that validity and reliability are proper based on the Kirkendall category.*

***Keywords:*** *Development, Instruments, Chop technique, Table Tennis*

## INTRODUCTION

The rapid development of sports in Indonesia forced the Ministry of Youth and Sports to develop a method to prepare advanced sports in Indonesia. To accommodate the public requirement, the stakeholders created the grand design with the short-term goal of preparing Indonesia for the 2032 Olympics.

Indonesia is a candidate to host the Olympics due to a mutual agreement among international sports organizations. Hosting world sporting events shows that Indonesia is a country that is concerned about sports. The habit of exercising grows because of awareness of the important role of sport as a periodic necessity in life. (Khairi, Zainur, Hidayat, & Aulia, 2022) . A person can achieve attainments and improve physical and spiritual fitness with sport. Sports itself consists of various sports, including team and individual sports. One popular sport with the public is table tennis, known as "ping pong."

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Table tennis is a high-speed ball game requiring a special strategy to perform successfully. Table tennis is a popular net sport with no age limits (Annisa et al., 2022). Table tennis or "ping pong" is a sports game that uses bets as a tool in which two people play for singles and two pairs for doubles players, both men's, women's, and mixed doubles, which is played on a table as a field which is bordered by a net. (Andriani & Widodo, 2019) . Table tennis

is a popular public sport and is often competed at various events, both at regional, national, and international levels; furthermore, table tennis is played for recreational objectives (Paksi, 2016). Table tennis is a sport that increases the level of concentration, reaction speed, and coordination of arm and body muscles. When assembling a movement or playing table tennis, coordination between the arm muscles and the eyes is required. The ball came quickly, and vice versa. It must be returned quickly, too. Table tennis also provides many other benefits, such as good physical, mental, and social growth. Complexity in playing requires mental and tactical readiness. A good table tennis player understands and can perform suitable techniques (Suryapranata et al., 2020).

The training process for learning technical skills in table tennis is through observation and repeated study using models of table tennis games that have reached the highest level in matches. (Yulianto, 2015). A good training program will lead us to a successful and effective training process (Apriyanto & S, 2022). In table tennis, various aspects and techniques are required to win the game and achieve better performance in the future. Training the basic technique is an athlete's first capital to develop or improve sports talent (Julianena & Abdul, 2018). The basic techniques in table tennis to achieve the best performance are *stroke*, *grip*, *stance, footwork*, and hitting (Budiman, 2017). The *stroke techniques* include serving, smashing, *driv*ing, flicking, blocking, and *cho*king (Ewan Irawan, 2019). Table tennis has many variations of strokes, and chopping is the most dominant technique operated in table tennis.

*Chop* is a technique of hitting the ball with a movement, such as chopping a tree with an axe, also known as a chopping movement (Irawan et al., 2021). *Chopping consists of forehand* and backhand techniques *that have different purposes. Forehand chopping is a defensive technique that means defense, whereas the backhand* is a technique that positions the bet open or the front side tilts upwards (Yulianto, 2015

; Kurniawan et al., 2015).



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This research aims to develop a measuring tool for table tennis chop ability. The main problem for table tennis athletes is the ineffective and inefficient chopping technique due to the need for proper measurement. This tool will help the coaches and players measure the athlete's ability and create strategies to maintain achievement for table tennis athletes. The research question is how to develop valid and reliable chopping measuring tools. This research contributes to the development of sports science by providing measuring tools in table tennis sports.

## METHOD

This research utilizes the Research and Development (R&D) method. Research and development methods are used to produce certain products and test their effectiveness (Purnama, 2016).

There were 20 PTM Pasir Pengaraian athletes, consisting of 20 men, and the sample for this *retest test was* 20 men, which was carried out for the *chopping test:* scratch and *chop test* end. The technique for determining the trial sample in this research is to utilize the saturated sample method.

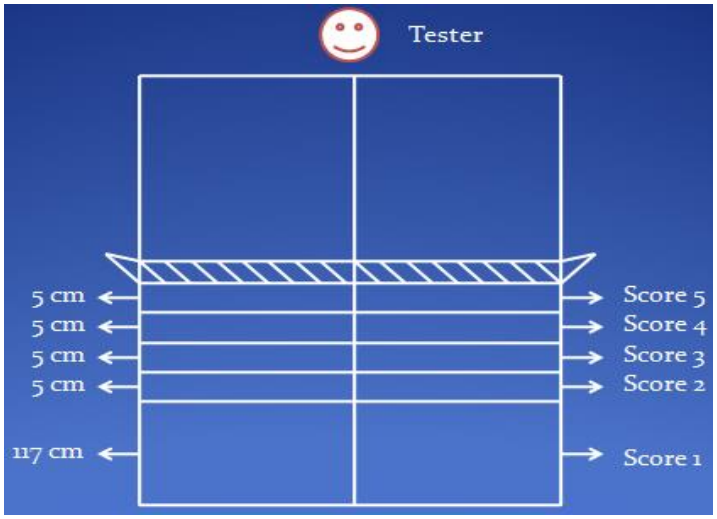


**Figure 1** . Table Tennis Chop Instrument Design

*Chop* Test (forehand/backhand) Table Tennis

Objective: To measure the *chopping ability* of table tennis players

Equipment: Table tennis table, net, bet, 15 balls, chalk, stationery.

Score Size:

1. For a score of 5, the box size from the edge of the net is 5 cm.
2. For a score of 4, the box size from the edge of the score line 5 is 5 cm



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3. For a score of 3, the box size from the edge of line 4 is 5 cm
4. For score 2, the box size from the edge of line 3 is 5 cm
5. For a score of 1, the box size is from the edge of line 2, namely to the back edge of the table tennis court.

Implementation:

1. The testee stands behind the table
2. When the whistle sounds, the feeder gives the ball to the testee.
3. The testee carries out this test with 15 *chop strokes* (15 balls) directed at the number marked with chalk.
4. When we have finished doing 15 *chop strokes*, calculate the score obtained.
5. The test is carried out in just one repetition (15 strokes)
6. When the ball does not go in/out/into the net, it does not get a point/score.

Assessment: Calculate the score obtained by the testee when he has completed 15 *chop strokes*

The data collection method used in this research consisted of questionnaires and measurement tests. Questionnaires were given to experts in the field and media experts to validate *the appropriateness of the test instrument* content. Meanwhile, the test was carried out to collect data to determine the validity and reliability of the table tennis test instrument. Test reliability can be acquired by correlating the first and second test's results. Determining the instrument's validity is accomplished by correlating the results of the first test with the results of the criterion test. The criteria test referred to here is a test that evaluates the jury's field assessment using a matrix.

The data analysis technique in this research uses the *product moment correlation formula* (Effendi et al., 2018).

$$r_{xy} = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{n\sum x^2 - (\sum x)^2\}\{n\sum y^2 - (\sum y)^2\}}}$$

Formula $\frac{: SH}{SK}$

Information:

SH: Score Count

SK: Criterion Score



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## RESULTS

1. Expert Validation

The validation results from the first material expert show that the chop instrument in table tennis obtained a score of 87.70% of the maximum score, so it can be concluded that the instrument is feasible. Meanwhile, the validation results from the second material expert show that the chop instrument in table tennis obtained a score of 94% of the maximum score, so it can be concluded that the instrument is very feasible.

In the first specialist media approval stage, the percentage obtained is 91% of the highest score. It can be stated that according to this media expert, table tennis boxing equipment, in terms of content approval, gets the "Strongly Approved" category. At the time of approval of the first specialist media, the percentage obtained was 89.80%, the highest score. It can be concluded that according to this media expert, table tennis equipment, in terms of content support, reaches the "Good" category.

2. *Chop* Instrument Validity and Reliability

This test was carried out in this study by collecting the first test and the criterion test. According to the received data, the support of the received device is 0.91. Therefore, the rotation of table tennis equipment is declared effective based on the number of Kirkendall moments, which shows 0.91, which is "extremely high." The reliability of the test was tested in this study by comparing the results of the first test with the results of the second test. Based on the results of the data above, the reliability of this test is 0.87. Therefore, table tennis test kits can be trusted based on Kirkendall's number of 0.87, which means "High" *Chop* Test Norms in Table Tennis.

**Table 1** . Table Tennis *Chop Test Norms*

| Mark | Category |
|---|---|
| ≥ 36 | Extremely High |
| 31 - 35 | High |
| 26 - 30 | Medium |
| 21 - 25 | Low |
| ≤ 20 | Extremely Low |

## DISCUSSION



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The development of the *chop* instrument in table tennis was designed and produced to measure the *chop ability of* table tennis athletes. The development process through research and development procedures. Through specific planning, production, and evaluation. This instrument was compiled by various parties who supported the development of this *chop* instrument in table tennis. This early instrument received many suggestions from coaches, material, and media experts. After experts have validated this instrument, retests are carried out to determine the reliability and validity of this test, especially by correlating the results of the first test with the results of the criterion test.

A collaborative process between property experts and media experts generates data that can be used as content for tennis applications, even though empirical validity is the ability obtained from the first reduction and criterion tests. The characteristics of " Development of Chop Instruments in Table Tennis Sports " in terms of content verification are included in the " Very Eligible " section. The advantages of this product are to fulfill the need for easily accessible equipment, and weaknesses of this product include the wide area of use of this equipment, the lack of technology (sensors), and marking. With these weaknesses, we aim to attract attention and continue development efforts to achieve better product results.

The type of shotting is the action adopted by a player when hitting the ball, which is divided into six types, namely, *topspin, flip, chop, chopping short, block*, etc. (Zhang et al., 2010; Malagoli Lanzoni et al., 2013, 2014; Wang J., 2019; Wang et al., 2022). *The chop* is a control shot with a downward spin, resulting in a long put. A short *chop* is a chop with a downward spin, but the placement is short (Wang, 2019).

Analysis of stroke types (or defense) is more difficult for players with stroke types (also called defense) to achieve better results in table tennis than players. Some players who play chop stand out in their usual activities. Among the world's players in the *chopping* style are Joo Se-Hyuk from South Korea, Ma Te, and Wang Yang from China. Relevant research reveals that players chop *players* have two main features, and attacking has become an important technique for *chop* players to win points (Zhang et al., 2018). So-called *chop-blockers* standing slightly closer to the table and not using long-range backhand strokes are considered defensive in this study (Gunter Straub, 2014).

## CONCLUSION



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The results of the research "Development of Chop Instruments in Table Tennis" are classified as effective and reliable as a measuring instrument for chop tests in table tennis. It can be noticed from the learning results with the test of 0.91 and test reliability of 0.87, as well as the chop and table tennis tools being effective and reliable based on the Kirkendall number. However, regarding content validity, the first subject obtained a score of 87.70, and the second subject obtained a score of 94%. This number indicates that as a subject, this test instrument is " Very Feasible." Among media experts, the first 91% and experts the second media 89.90%. This number indicates that in terms of content, according to media experts, the test tool is " Strongly Approved."

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