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Creating a Reaction Time Tester for Reacting Reflex of the Football Goalkeepers with the Estimated Extrapolation in Average Reaction Time

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Abstract

Introduction: Designing the semi-experimental method to create the reaction time tester for Reacting Reflex of the football Goalkeeper Inventory (RTTGI) was integrated. The RTTGI was assessed by the 7-professional experts: The electronics and wireless engineer, and the football goalkeeper trainers on the quality and potential invention with the content validity, index of Item Objective Congruence (IOC) value, reliability, and objectivity value.

Methodology: Creating the Reaction Time Tester (RTTGI) was assessed the 20-football goalkeepers' specific on the Thailand Football U-League was a sample size. The RTTGI includes three parts and recording reaction time with a digital test display in two weeks. The GKs' action speeds were tested by 2 testers of their performances. Using means, standard deviation, simple correlation, and IOC was analyzed.

Results: The efficiency and effectiveness of the RTTGI on the content validity analysis comprises as 89% that over than standardized criteria value at 85% with the IOC, the reliability as 0.88. The 7-professional experts' perceptions of the appropriateness suitability analysis as Utilization, Possibility, Suitability, and Accuracy scales indicated that of their performances at the very suitable level on all four scales.

Conclusion: A person can have great reaction time that response by the stimulus. Goalkeepers need agility to change the shape or form of their body to make successful saves. They separated the ability to pull off reaction save frequently a good goalkeeper. It's those sharp reflex saves that enable keepers to dent the league table over the course of a season.

Full body kinematics were measured in ten elite goalkeepers diving to save high and low balls at both sides of the goal to investigate their starting position, linear and angular momentum, and legs' contribution to end-performance. Coaches need to highlight horizontal lateral skills and exercises with emphasis on pushing-off with the contra-lateral leg, when training and assessing goalkeeper's physical performance.

Keywords: Creation; Reaction time tester; Reacting reflex; Football goalkeepers; Estimated extrapolation; Average reaction time

Introduction

Many physiological and nutritional demands occur within the body during exercise. As muscles contract, the demand for oxygen, hydrogen and other key nutrients increase. The human body requires a continuous supply of energy to perform its many functions. As energy demands increase with exercise, additional energy must be supplied or the exercise will end [1]. A person who is physically fit is capable of performing and enjoying daily activities. The importance of being physically fit cannot be understated. More people are at risk to cardiovascular diseases, depression, obesity, hypertension, and other health issues because of their fitness level [2].

There are 7 characteristics of perfectly healthy people: Strong nails; healthy teeth and gums, body mass index is balanced; enough sleep; social interaction; and healthy diet [3]. Physical performance ability tests have also been used in personnel selection, especially in certain jobs such as firefighting and police work. One classification conceptualizes physical ability as being composed of nine dimensions: Static strength, explosive strength, dynamic strength, trunk strength, extent flexibility, dynamic flexibility, gross body coordination, gross body equilibrium, and stamina [4].

Getting indulged in physical activities like sports improves your heart function, reduces the risks of diabetes, controls blood sugar, and lowers tension and stress levels. It also brings positive energy, discipline, and other commendable qualities to your life [5]. Repeated physical activity causes an increase in your body's performance capacity. This physiological response is called Training Effect (TE). Measuring and making sense of training effect is the key to training effectively and achieving optimal results [6]. Application for professional heart beat analysis to support diverse aspects of well-being. The solution is developed for the needs of work-related research, occupational and preventive healthcare and applied physiological research [7].

Benefits of sport players reduced risk of obesity; increased cardiovascular fitness, healthy growth of bones, muscles, ligaments and tendons, improved coordination and balance. A greater ability to physically relax and, therefore, avoid the complications of chronic muscular tension such as: Headache or back ache [8]. Soccer (also called football, especially in other countries) is the most popular sport in the world and is played in most countries. It is a team sport, involving 11 players on each side who use their legs, head and torso to pass a ball and score goals. The nature of the game means that players may be sprinting, running fast or slow, and sometimes may be standing around soccer can be a great workout and lots of fun. The health benefits include that it: Increases aerobic capacity and cardiovascular health lowers body fat and improves muscle tone builds strength, flexibility and endurance, increases muscle and bone

strength, and improves health due to shifts between walking, running and sprinting [9].

The goalkeeper, sometimes shortened to keeper or goalie, is one of the major positions of association football. It is the most specialized position in the sport. The goalkeeper's primary role is to prevent the opposing team from scoring (moving the ball over the defended goal-line within the frame of the goal) [10]. This is accomplished by the goalkeeper moving into the path of the ball and either catching it or directing it away from the vicinity of the goal line. Within the penalty area goalkeepers are able to use their hands, making them (outside throw-ins) the only players on the field permitted to handle the ball [11]. The special status of goalkeepers is indicated by them wearing different colored kits from their teammates. Because the position requires different skills from the outfielders, goalkeepers train separately from their teammates and instead work with a goalkeeping coach because they have different skills. A goalkeeper must be able to move quickly and have fast feet for little bursts [12].

Based on the researcher's experience as a football coach at Kasetsart University in Thailand and has been in football throughout the present day. The football competition match, the losing team has the goalkeeper having less reaction time than the winning team. In addition to the physical fitness enhancement equipment associated with soccer skills, there is no reaction time tester for football goalkeepers. The reflexes test invention does not classify sports and is not specifically intended to be tested for football goalkeepers.

Time testing equipment is expensive and is powered by electricity. Therefore, there are limitations for testing. Reaction time should have low tolerances, and the timekeeping resolution is in milliseconds or 0.001 seconds [13].

Reaction time is an important indicator of neuromuscular status in older adults. A simple, portable, and inexpensive method of measuring reaction time is needed for use in geriatric clinical settings [14]. In addition to measuring your reaction time, this test is affected by the latency of your computer and monitor. Using a fast computer and low latency/high frame rate monitor will improve your score. Scores in this test are faster than the aim trainer test, because you can react instantly without moving the cursor.

This is discussed in further detail on the statistics page. While an average human reaction time may fall between 200-250 ms, your computer could be adding 10-50 ms on top. Some modern TVs add as much as 150 ms. If you want, you can keep track of your scores, and see your full history of reaction times. Just perform at least 5 clicks and then save [15].

The reasons as above, the researchers have made sense to the importance of the reaction time invention for testing the football goalkeepers. We have interested in creating a reaction time testing invention for football goalkeepers that were up-to-date and to a testing invention that needs of users. It will be useful for trainers and people with general interests. Goalkeepers can test their responses' physical reflexes themselves with this reaction time was invented.

Research objective

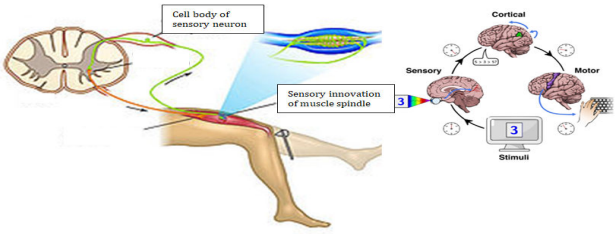
To create a reaction time testing inventory was a high quality and efficiency of the reaction time tester's reflex of the football goalkeepers for estimating extrapolation in the average reaction time

Materials and Methods

Historical background of the reaction time, interest in the measurement of human reaction time (the time elapsing between the onset of a stimulus and the onset of a response to that stimulus) apparently began as a result of the work of a Dutch physiologist named F. C. Donders. Beginning in 1865, in his early experiments, Donders applied electric shocks to the right and left feet of his subjects. Donders found that the difference between the two conditions was 1/15 second. In 1840, the Englishman Charles Wheatstone invented a device for measuring the velocity of artillery shells. By 1842, a Swiss watchmaker named Mathias Hipp had improved on Wheatstone's design and began selling an instrument. Later models of his 'Hipp Chronoscope' had vibrating regulators which vibrated at 1000 Hz. Although a significant portion of each day was spent in laboriously calibrating the Hipp Chronoscopes, Wundt gradually collected measurements of a wide variety of mental phenomena [16].

Reaction time is a measure of the quickness an organism responds to some sort of stimulus. You also have "reflexes" too. Reflexes and reactions, while seeming similar, are quite different. Reflexes are involuntary, used to protect the body, and are faster than a reaction. Reflexes are usually a negative feedback loop and act to help return the body to its normal functioning stability, or homeostasis. The classic example of a reflex is one you have seen at your doctor's office: The patellar reflex [17]. The brain then needs to send many signals to various muscles. Feet begin to move, hands might travel in front of the face, and eyes may close shut, along with many more processes. This is the work of many neurons as well as numerous systems and circuits in the brain, and what's more, and you can train and enhance your skill through practice. This is how you get better at sports over time [18].

Simple Reaction Time (SRT), the minimal time needed to respond to a stimulus, is a basic measure of processing speed. SRTs were first measured by Francis Galton in the 19th century, who reported visual SRT latencies below 190 ms in young subjects. However, recent large-scale studies have reported substantially increased SRT latencies that differ markedly in different laboratories, in part due to timing delays introduced by the computer hardware and software used for SRT measurement. Precise computer-based measurements of SRT latencies show that processing speed is as fast in contemporary populations as in the Victorian era, and that age-related increases in SRT latencies are due primarily to slowed motor output [19]. Previous studies were mainly on simple reaction time and there are very few studies on visual choice reaction time. When compared with yellow. This could be because individual color mental processing time for yellow color is more than red and green (Figure 1) [20].



a) b)

Figure 1: Reflex and reaction time with response time with the mental chronometry. Note: a) Reflex *vs*. Reaction b) Mental chronometry.

Mental chronometry is the scientific study of processing speed or reaction time on cognitive tasks to infer the content, duration, and temporal sequencing of mental operations. Reaction Time (RT; sometimes referred to as "response time") is measured by the elapsed time between stimulus onset and an individual's response on Elementary Cognitive Tasks (ETCs), which are relatively simple perceptual-motor tasks typically administered in a laboratory setting (Figure 2) [23].

a) b)

Figure 2: Reaction time' responses by goalkeepers' training. Note: a) Goalkeeper training: Quick reflex and reaction drills. b) Goalkeeper speed and Reaction training.

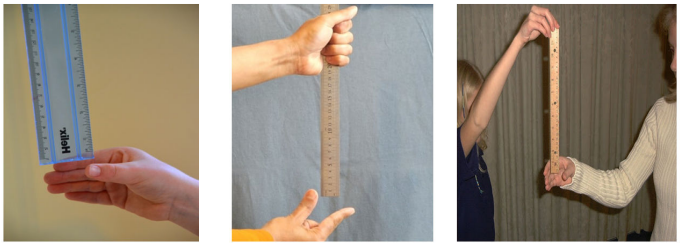
Goalkeepers need agility to change the shape or form of their body to make successful saves. Reaction time all comes down to the keeper's reflexes. If the keeper sees the ball early enough and accurately judges the speed and flight of the ball, they will have time to react and make the save. Great goalkeepers need glut and hamstring mobility as well. Mobility in this part of the body permits the keeper to generate as much power as possible. Dynamic stretching exercises such as walking toe touches will increase a keeper's glut and hamstring mobility [25]. But reaction time is especially important in football, because plays develop quickly, last only a short time and feature massive athletes racing all about the field. Regardless of your position on the team, the quicker you're able to react to any set of circumstances, the better your chances of making the play [26].

Goalkeeper can reflex training on five reaction drills for goalies: turn and stop drill, this drill will help to develop recognition and reaction time; turn and cover drill, a variation on the previous drill, this one also begins with the goalkeeper facing the goal; double strike drill; drop catches drill; pick one drill; and follow the bouncing ball drill [27]. The ability to frequently pull off an unbelievable, seemingly impossible, reaction save is what separates a good goalkeeper from a great goalkeeper. It's those sharp reflex saves that enable keepers to dent the league table over the course of a season (Figure 3) [28].

Figure 3: Goalkeeper can reflex training on five reaction drills for goalies.

Test your reaction time: There's an easy way to test reaction times using just a ruler. Reaction time is the time taken for a person to respond to a stimulus [29].

- Hold the top of the ruler with your arm stretched out. Your fingers should be on the highest measurement.
- Ask a friend to put their thumb and index finger slightly open at the bottom of the ruler, with the ruler between their fingers.
- Drop the ruler and record the measurement on the ruler where the other person's fingers are.
- Repeat for all participants. Let each person have three attempts and record the average value.
- The person with the fastest reaction time is the one who catches the ruler at the lowest measurement, as the sooner the ruler is caught the less time it has had to fall (Figure 4).



a) b) c)

Figure 4: An easy way to test reaction times using just a ruler. Note: a) Test reaction times using just a rule. b) Reaction time: The ruler drop test. c) Reaction time by ruler test.

Evaluation of a specific reaction and action speed test for the football goalkeeper that involved perceptual and movement response components (i.e., sprint running, jumping, diving, and direction changing), and performance (i.e., first goalkeepers and substitutes) groups of goalkeepers, including measures of test-retest reliability. The test-retest correlations of the Reaction and Action Speed (RAS) test performance were significant in all single with the intra-class correlation coefficient, and complex measurements. The RAS test provided a reliable and valid method of assessing specific defensive agility in a group of youth soccer goalkeepers. Performance responses during the RAS test allow coaches to discriminate between age-matched goalkeepers, identify weaknesses Knoop (Figure 5) [30].

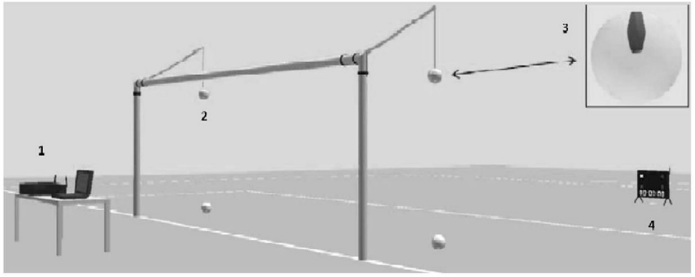


Figure 5: Schematic representation of the reaction and action velocity device. 1) Computer and receptor; 2) Soccer balls (footballs); 3) Slot position for the touch-sensitive tri-axial transponder; and 4) Signal panel.

The use of a new electronic measurement platform to assess the performance of goalkeepers based on their cognitive and motor skills. A test was run in order to show how the GoMeSy platform could be used by coaches to evaluate the penalty shot-stopping skills of goalkeepers, consequently, the performance of 22 players was measured. In the case of the cognitive skills, there is not a significant difference between novice and expert goalkeepers ($p=0.333$), meanwhile, in the case of the motor skills, there is a significant difference ($p=0.006$). In addition, there is a moderate, positive correlation between weight and motion time ($r=0.437$). The body mass index depends on the height and weight of each subject, coaches should focus primarily on monitoring the weight of players to improve their performance (Figure 6) [31].

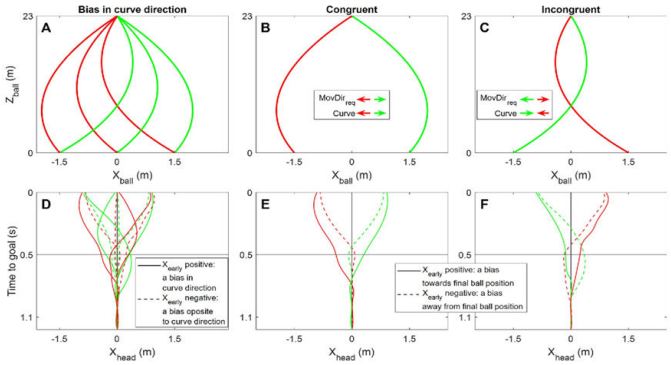


Figure 6: Assessing the performance of soccer goalkeepers based on their cognitive and motor skills. Note: —— X_{early} positive; - - - - X_{early} negative.

U League or Thailand University League is a football competition between football teams of higher education institutions in Thailand. It was first organized in 1997 and has held every year by U-League International Company Limited and Miss U League Contest. The number of teams participating in the U-League football each year varies depending on the invitation from the U-League Company, and the whole team will be from Bangkok because of the limited travel budget. They gave management rights to RK Media Holding company Limited followed by Canon, AIA in the following years before the U-League has finally ended and returned to organize the U-League football again in 2014 until the present [32].

Research on semi-experimental research method for creating the reaction time testing invention was tested the reflex of the football goalkeepers for estimating extrapolation in the average reaction time. The steps of research procedures including

Step I: Consulted an expert on building a reaction time test invention for goalkeepers from an electronics and wireless engineer.

Step II: Designed the invention by drawing a blueprint of the invention to be created and consulting the goalkeeper trainer experts, and engineering specialist to investigate the possibility of creating an invention (Figure 7).

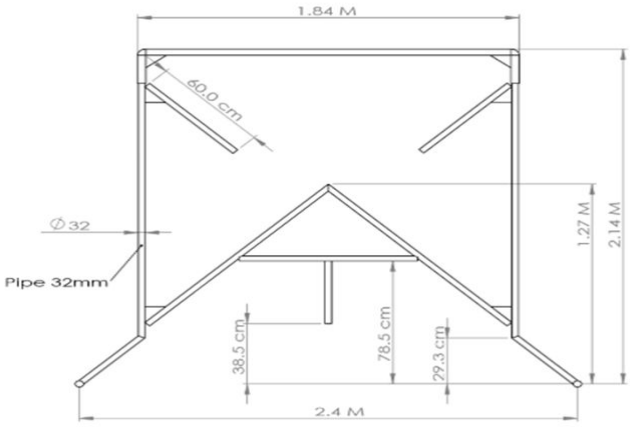
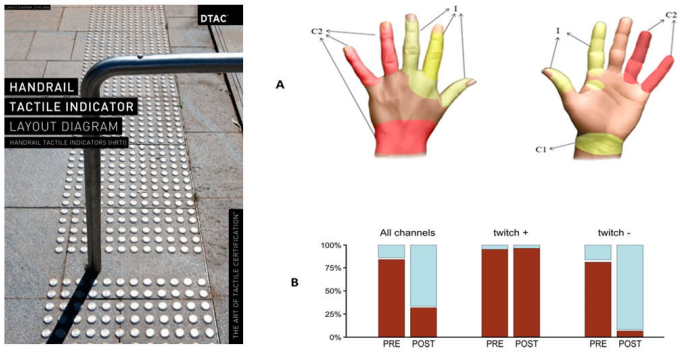


Figure 7: Drawing a blueprint of the invention to be created and consulting the goalkeeper.

Step III: Invented a reaction time tester for football goalkeepers, which includes a hand-tactile indicator light, a foot-touch indicator light, and a digital test display (Figure 8).



a) A hand-tactile indicator light b) Restoring tactile sensations *via* neural interfaces for real-time force-and-slippage closed-loop control of bionic hands.

Figure 8: A hand-tactile indicator light. Note: Median, Ulnar, Tacticl Sensation, Movement sensations.

A foot-touch indicator light

Modified the Reaction Times (RTs) for a switch release are faster for hand-controlled than for foot-controlled switches for physiological and anatomical reasons (e.g., nerve conduction speed). The risk of accidental trauma could be reduced if the surgeon reacted quicker and therefore improve the surgical outcome; the RT for hands is faster than feet. The data suggest a hand-controlled ophthalmic instrument might have distinct advantages; however, clinical correlation is required (Figure 9) [35].

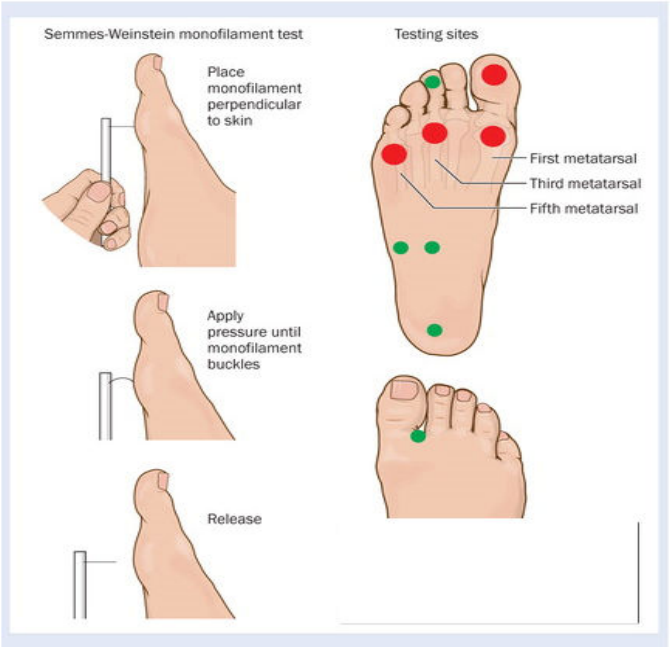


Figure 9: A foot-touch indicator light. Note: Sites shown to identify 90% of patients with Other abnormal monofilament test, recommended sites.

A digital test display

Drafting and designing the digital test display invention on the principles and theories according to scientific and engineering processes (Figure 10).

a) b)

Figure 10: A digital test display. Note: a) The master control box and the LCD screen. b) The controller and stopwatch.

A hand-tactile indicator light

Step IV: Analyze the invention quality in terms of content validity and suitability of the invention (appropriateness) by assessing suitability in all 4 aspects such as: utilization, the possibility of suitability, the accuracy of the invention by 7 expert professionals that consisted of engineers specializing in electronics and wireless systems, academics specializing in physical education, and the trainers who were specifically responsible for training goalkeepers. It was found that the instrument had an IOC value as 89%, and to appropriate at the highest level.

Step V: The goalkeeper's reaction time test invention created by the researcher (Try-out) brought to the football goalkeepers in the experimental group to find out the flaws of the invention and to improve it for the research.

Step VI: Reliability invention quality analysis by testing (Test–retest) by bringing one set of inventions to test 2 times, the first and the latter 1 week apart. It was found that the quality of the inventions was at a good level.

Step VII: Objectivity analysis by using two testers to conduct the test and as a scorer. It has found that the quality of the invention was very good.

Step VIII: Preparing user manual for a guide to using the reaction time testing invention for soccer goalkeepers.

Step IX:

- Content validity was analyzed by IOC (Index of Item Objective Congruence) values and assessed the suitability of the invention by means and variance.
- Reliability analysis with internal consistency cronbach (alpha reliability) coefficient
- Objectivity was analyzed by pearson product moment correlation coefficient statistic.

Step X: The sample consisted of 20 football goalkeepers who participated in the Thailand University Football Champions Cup League for Higher Education League.

Step XI: Research instruments include a Reaction Time Testing Goalkeeper Invention (RTTGI) for assessing the football goalkeepers, and the Suitability Assessment Form (SAF).

Results

Research on semi-experimental method to investigate the reaction time testing invention for football goalkeepers that can be used to measure the reaction time of football goalkeepers for estimating extrapolation in the average reaction time was created. The results have summarized as

The reaction time testing invention

The reaction time testing invention for soccer goalkeepers created by the researcher includes:

- Hand Touched Light Button means a hand touched light button to turn off the light during the test on the goalkeeper reaction time tester.
- Foot-Touch Light Button means the foot-touch indicator light to turn off the light during testing on the Goalkeeper's Reaction Time Tester.
- Digital Test Display refers to the reaction time test instrument display for soccer goalkeepers.

Content validity analysis

The content validity analysis of the reaction time tester for football goalkeepers with the IOC that reports in Table 1.

Trial	Scoring orders of professional experts (-1, 0, and +1)							IOC level	Interpretation
	1	2	3	4	5	6	7		
The RTTGI can ensure that the test results are accurate.	1	1	1	1	1	1	1	1	Accept
The RTTGI is capable of testing	0	1	0	1	1	1	0	0.57	Non accept

exactly the purpose of the measurement.									
The RTTGI can be used to test. Practice and quality.	1	0	1	1	1	0	1	0.71	Accept
The RTTGI can be used to test. Practice and efficiency.	1	0	1	1	1	1	1	0.86	Accept
The RTTGI can be used to test. Practice and effectiveness.	1	1	1	1	1	0	1	0.86	Accept
The RTTGI can be put to practical use to apply.	1	1	1	1	0	1	1	0.86	Accept
The RTTGI has a highly accurate measurement resolution.	1	1	0	1	1	1	1	0.86	Accept
To develop and evaluate a new test for the football goalkeeper that involved perceptual, and movement response components with the RTTGI	1	1	1	1	1	0	1	0.86	Accept
The evaluation consisted in measurements in different age with the RTTGI Tester	1	0	1	1	1	1	0	0.86	Accept
Total	8	6	7	9	8	6	7	0.8895	Accept

Table 1: The content validity analysis with the IOC for the RTTGI Tester. Note: N=7, RTTGI: The Reaction Time Testing Goalkeeper Invention.

The content validity analysis of the reaction time tester that accepted at the level of 89% with the IOC as reported in Table 1. This result is higher than value the standardized omit criteria at 85%.

Pearson correlation coefficients

The first week and the second week of the goal keepers' reaction, and action speed, sprint, and counter movement jump performances with mean, standard deviation, variance for the RTTGI that reports in Table 2.

Trial	The first week		The second week	r	
	Means	S.D.	Means	S.D.	
Reaction time	0.876	0.05	0.875	0.25	0.88

Table 2: The average reaction time with means, S.D. using the Pearson Correlation Coefficients (r) for the RTTGI Tester. Note: N=20.

Table 2 reported the reliability of the RTTGI Tester as 0.88.

The Objectivity analysis for the RTTGI Tester

The results of the objective analysis of the reaction time testing invention for football goalkeepers using two testers as the time recording operator that report in Table 3.

Trial	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Tester 1(sd)	0.954	0.975	0.887	1.031	0.929	0.874	0.925	0.929	0.874	0.925	1.116	1.025	1.035	1.036	0.97	0.875	0.992	0.653	0.854	0.925
Tester 2(sd)	0.954	0.975	0.887	1.031	0.929	0.874	0.925	0.929	0.874	0.925	1.116	1.025	1.035	1.036	0.97	0.875	0.992	0.653	0.854	0.925

Table 3: The objective analysis for the RTTGI recoding data (second) by the two testers.

Table 3, the time scorings were recorded by two testers for assessing the 20-football goalkeepers, similarly.

Appropriateness suitability analysis

The Appropriateness Suitability Analysis (ASA) of the reaction time test invention for football goalkeepers from a total of 7 professionals in 4 areas: utilization, possibility, suitability, and accuracy scales that reports in Tables 4-7.

Definition of suitability level and scoring values on five options as following

- Means ranged 1.00-1.80 refers to not very unsuitable.
- Means ranged 1.81-2.60 refers to unsuitable.
- Means ranged 2.61-3.40 refers to suitable.
- Means ranged 3.41-4.20 refers to highly suitable.
- Means ranged 4.21-5.00 refers to very suitable.

Trial	Means	S.D.	Suitability level
Utilization scale			
The RTTGI provides information to meet the needs of users.	4.57	0.73	Very suitable
The RTTGI uses for improving the reaction time of football goalkeepers.	4.71	0.45	Very suitable
Total	4.62	0.59	Very suitable
Possibility scale			
There is a practical possibility to improve the reaction time of football goalkeepers for the RTTGI Tester	4.71	0.45	Very suitable
The RTTGI is acceptable and possible to be exploited in football sports	4.14	0.64	Very suitable
The RTTGI is possible to put it into practice really	4.43	0.49	Very suitable
Total	4.42	0.52	Very suitable

Suitability scale			
The RTTGI can ensure that the results of the test are accurate and appropriate.	4.29	0.45	Very suitable
The RTTGI responses of the basic abilities for a football goalkeeper.	4.71	0.45	Very suitable
The RTTGI is appropriate to develop the reaction time of football goalkeepers.	4.71	0.45	Very suitable
Total	4.57	0.47	Very suitable
Accuracy scale			
The RTTGI assures the results of measurements and they are accurate.	4.29	0.45	Very suitable
The RTTGI is accurate and accurate according to the evaluation principles.	4.57	0.49	Very suitable
Total	4.43	0.47	Very suitable

Table 4: Means and standard deviation of the ASA on utilization, possibility, suitability, and accuracy scales for the RTTGI Tester. Note: N=7.

As reported in Table 4, the 7-professional experts' response of their ASA on Utilization, Possibility, Suitability, and Accuracy scales for the RTTGI Tester indicated that of their perceptions' outcomes at Very Suitable level on all items and totalized resulting the four scales.

Discussion

Research on measuring development and evaluate a new test for the football goalkeepers that involved perceptual, and movement response components with the Reaction Time Testing Football Goalkeepers Invention (RTTGI) was tested by the two testers including the sprint running, jumping, diving and direction changing of 20 football goalkeepers of the competition of the Thailand University Football Leagues (U-League) in 2019 in Thailand.

The content validity analysis of the reaction time tester for football goalkeepers with the IOC was valid and reliable with pearson correlation efficient analysis by the 7 professional experts included the electronic and wireless specialist engineer, the soccer goalkeeper trainers were assessed with the content validity and appropriateness analysis in four scale namely; utilization, possibility, suitability, and accuracy scales that overall on four scales indicated at the very suitable levels.

Free kicks are an important goal scoring opportunity in football. It is an unwritten rule that the goalkeeper places a wall of defending players with the aim of making scoring harder for the attacking team. However, the defensive wall can occlude the movements of the kicker, as well as the initial part of the ball trajectory. Research on one-handed catching suggests that a ball coming into view later will likely delay movement initiation and possibly affect performance of naïve participants and skilled goalkeepers. The movements were thus initiated sooner after the ball came into view, based on less accumulated information. For both naïve participants and skilled goalkeepers this delayed initiation significantly affected performance.

However, many changes in navigation tools and surgical devices have been introduced over the last few decades. In the early 1990's, the semiautomatic transmission vehicle was introduced in the Formula 1 car racing game. In a sport where high performance is crucial in every aspect, the hand-controlled pedal shift had completely displaced the conventional gearbox with the foot-controlled clutch within just 5 years. Changes can also be seen in aviation. With advancing technology, the fly-by-wire system, a computer-assisted navigation unit, became more and more common in commercial and military airplanes. The centerpiece control unit for the pilot is a multifunctional hand-controlled side sticks.

In terms of the reaction time testers, an attempt has been made to study the variation of three forms of visual and auditory reaction times namely

- Simple reaction time.
- Discriminative reaction time.
- Choice reaction time of Football players with respect to their field playing positions.
- Visual reaction time varies with respect to playing positions of Football players whereas the auditory reaction time has no significant variation. Reaction time is duration between applications of a stimulus to onset of response. Reaction time acts as a reliable indicator of rate of processing of sensory stimuli by central nervous system and its execution in the form of motor response. Reaction time can be described into three types:
- Here there is one stimulus and one response.
- Here there are some stimuli that should be responded to and other that should not get response.
- Here there are multiple stimulus and multiple responses. Reaction time, reflexes, quickness, or whatever the response is called, is a complex function that includes mental, physical, innate, and learned components.

But reaction time is especially important in football, because plays develop quickly, last only a short time and feature massive athletes racing all about the field. Regardless of your position on the team, the quicker you're able to react to any set of circumstances, the better your chances of making the play. Changing the disjunctive reaction time in selected training load zones of soccer goalkeepers was tested. To expand the knowledge of the training load and its influence on the disjunctive reaction speed, which is one of the limiting factors of the

individual game performance of goalkeepers, were provided. There was an assumption of changes in the disjunctive reaction time of goalkeepers from different age categories in the selected training load zones. A statistically significant was assessed the relationship between the value of the disjunctive reaction time by the observed goalkeepers in the calm zone (50%-59% HRmax) and in the 90%-100% HRmax zone.

In terms of validity, to evaluate the reproducibility and validity of two new tests designed to examine goalkeeper-specific technique. Twenty-six goalkeepers, each separated by one week, to evaluate the reproducibility of the Sprint-Keeper Test (S-Keeper) and the Lateral Shuffle-Keeper Test (LS-Keeper). Construct validity was assessed among forty goalkeepers All participants were examined in vertical jump (CMJ and CMJ-free arms), acceleration (5 m and 10 m sprint) and goalkeeper-specific technique. Performance was respectively measured as total time correlations between repeated measures were high and significant (r=0.835-0.912). The S-Keeper and LS-Keeper are reliable and valid tests for assessing goalkeeper-specific technique.

The speed of the football players and goal keeper; football players have to avoid collisions and dodge some players that run over 20 mph. Similarly, a goalie usually has only 0.3 seconds to react to a penalty kick. It's evident that to stay a step ahead of the competition, you have to be able to process visual information more quickly to make faster plays. The best keepers have good stats for the entire essential attributes diving, handling, positioning, reflexes, and kicking. The best goal keeper is the obvious choice with 90 diving, 94 reflexes, 88 positioning and 85 handling. He'll be expensive though. He's got the best reflexes in this list, but he hasn't got the best kick for a keeper. "What a reflex!" is a sentence that is often heard in professional soccer. Certainly, goalkeepers often don't have an easy time, what with all of the stimuli catching their eyes. Reaction speeds can be trained in the same way that muscles can catch the ball before it hits the ground by the GKs.

Creating a reaction time testing invention; to provide acquaintance with some of the issues in designing, conducting, analyzing, interpreting, and evaluating Reaction-Time (RT) experiments. These issues are best considered in relation to particular substantive questions and interpretations, but time limitations prevent this. The ideas to be presented reflect a personal and possibly idiosyncratic view about what sorts of questions are interesting and about how to go about answering them. Although the Simple Reaction Time (SRT) tests, where subjects simply respond as fast as possible to the occurrence of a stimulus, are among the most basic measures of processing speed. SRTs were first studied by Francis Galton in the late 19th century. A simple reaction time tester, it will randomly turn on a L.E.D. and measure the time it takes user to press a button and then send the measurement to user's computer.

To investigate the influence of muscle soreness on the speed of performing a motor reaction speed task in football goalkeepers was tested by the reaction time tester that was invented by the researcher team that followed the goalkeepers participated in two training sessions on each of the following 2 weeks. Before each training session, the same speed test was performed. Lap times for 5 m and 15 m were recorded. After the second training session each day, the participants drew digital pain maps using a computer tablet, marking separate areas of the body where they felt muscle soreness. These data were consolidated and the total area was analyzed to investigate if, throughout the training, there were any changes to the size of the area that was indicated as having MS.

Thus, the technical staff selected the preselected outfield players with a particular anthropometry and best performance, particularly agility and endurance, while GKs had a different profile. Moreover, chronological age had an important role in the whole selection process. Because football is a demanding and fast paced sport, and the opposing players will always try to be ahead of you. Whenever you have the ball, the opposing players will always try to steal it from you, so you must have reaction time to keep the ball and do moves to get past them. You also must have reaction time to pass to your teammates properly and to shoot to goal. Reaction time could be the difference between scoring and missing a goal. As the goalkeeper you must have the reaction time to save shots from the opposing players. A goalie's reaction time could be the difference between winning and losing a game.

This is the case why did the research team create the reaction time inventory tester to reflex of the football goalkeepers for estimating extrapolation in the average reaction time that are provided.

Conclusion

Research on semi-experimental method for creating the reaction time tester for Reacting Reflex of the Football Goalkeeper Inventory (RTTGI) was integrated. The RTTGI was assessed by the 7-professional experts such as the electronics and wireless engineer, and the football goalkeeper trainers on the quality and potential invention with the Content Validity, Index of Item Objective Congruence (IOC) value, Reliability, and Objectivity value of the RTTGI.

Statistically significant was analyzed with means, standard deviation, and Pearson Product Moment Correlation Coefficient. Administration to a sample size consisted of 20 Football Goalkeepers who participating competitions in the Thailand University League Cup in 2019 in two weeks at Kasetsart University Stadium Club with the estimated extrapolation in average reaction time was controlled and recording the RTTGI time by the two testers.

The RTTGI includes a hand-tactile indicator light, a foot-touch indicator light, and a digital test display that modified from the original RTs. In terms of the efficiency and effectiveness of the RTTGI of the content validity analysis indicated that of 89% with the IOC that higher than the standardized omit criteria value at 85%, the reliability as 0.88, the time scorings were recorded by two testers for assessing the 20-football goalkeepers on their objective value analysis by the two testers are the same values, significantly.

The 7-professional experts' perceptions of the Appropriateness Suitability Analysis (ASA) on fore scales, namely: utilization, possibility, suitability, and Accuracy scales indicated that of their performances at the very suitable level on all four scales.

Limitation and Study Forward

The RTTGI created that has attributed for this research. Even though it has assessed the quality and potential by the professional experts, but if compared to the international standard, therefore still unable to be of equal quality or can be invented for business.

Due to the U-League Cup, there will be over 20 teams participating in the competition, but each team is from a different university. Asking for permission and permission from the head coach to borrow goalkeepers as a research sample there will be problems with the secret skills of each team's football goalkeepers. The time schedule of the empirical research data wasn't detailed, sufficiently.

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Authors Contribution

R. Harnmak contributed substantially to the conception and design of the study, the acquisition of data, or the analysis and interpretation. He drafted or provided critical revision of the article, and provided final approval of the version to publish.

J. Singhchainara agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

N. Sungpook agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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