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RESEARCH ARTICLE

Level of Ability Eye, Hand, and Foot Coordination Utilize UMAC-CPF Test Model

Fadilah UMAR[*1,3], Misbah MİSBAH[2], Sapta Kunta PURNAMA[1], Baskoro Nugroho PUTRO[1], Manshuralhudlori MANSHURALHUDLORI[1] and Abdul Aziz Purnomo SHİDİQ[1]

[1]Faculty of Sport, Sebelas Maret University, Surakarta / Indonesia
[2]Faculty of Teacher Training and Education, Lambung Mangkurat University, Banjarmasin / Indonesia
[3]Center for Disability Studies, Sebelas Maret University, Surakarta / Indonesia
*Corresponding author: fadilahumar@staff.uns.ac.id

Abstract
Cerebral Palsy (CP) Football is explicitly played for people with physical disorders in the category of cerebral palsy. People with CP experience damage to parts of the brain that result in impaired motor skills, especially in eye-hand-foot coordination. This study aimed to analyze the eye-hand-and-foot coordination ability of CP football players. This quantitative research was conducted using descriptive methods. The subjects used 50 CP football players participating in the 2022 Asean Para Games XI in Solo. The UMAC-CPF coordination test model measures the eye-hand-and-foot coordination ability of CP football players. The research results show that, in general, the coordination ability of the FT1 class is in a good category, as well as in the FT2 and FT3 classes. However, in the FT1 and FT2 classes, it was found that there were still 1 or 2 CP football players who had poor coordination abilities. Through the UMAC-CPF test model, CP football players in each class's eye, hand, and foot coordination abilities were generally categorized as good. However, it was found that several players still lacked their abilities. This can be used as a basis for coaches or management teams to evaluate the achievements of CP football players, especially the ability to coordinate eyes, hands, and foot.

Keywords
Ability Eye, Hand, and Foot Coordination, CP Football, Coordination Test, UMAC-CPF Test Models

INTRODUCTION

The interests of a nation depend on the development of disability sports success. A person who is disabled is unable to engage in normal activities (Palou, Pulido, Borràs, & Ponseti, 2020; Patel & Brown, 2017). A person who is disabled is unable to engage in usual activities. People with disabilities are restricted in their movements and activities. Different health-related physical fitness factors can impact disability (Iezzoni, 2011; Winnick & Short, 2014).

The CP football branch is one of the advancements for disability sports. For soccer players with CP difficulties, there is a sport called CPF. People with athetosis, ataxia, and physical impairments can play CP football (Henriquez, Riquelme, Abarca, Morales, & Reina, 2020; Nogueira et al., 2022; Umar, Tangkudung, & Asmawi, 2017). CP football has rules with some modifications from FIFA that are tailored to the needs of people with disabilities (Freitas et al., 2020; IFCPF (International Federation of Cerebral Palsy Football), 2020b; Reina, Sarabia, Yanci, García-Vaquero, & Campayo-Piernas, 2016). CP children with disabilities are supposed to use football to learn to overcome their limitations and develop their self-confidence (Sivaratnam, Howells, Stefanac, Reynolds, & Rinehart, 2020; Wilson & Clayton, 2010).

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Motor issues are present in CP sufferers. A CP sufferer will develop motor skills more slowly than a healthy person. Damage to the brain's and spinal cord's myelin sheath can impact poor motor conditions. This disorder may impact control and coordination abilities in people with cerebral palsy. Additionally, impaired athletes have physical limitations that affect their ability to run, head, and kick the ball. As a result, CP players require a training program that will maximize their physical performance in soccer (Alarcon, Henriquez, & Peñailillo, 2021; Ovcharenko, Yakovenko, Sydorchuk, Stepanova, & Pikiner, 2021; Umar et al., 2022; Yanci et al., 2016; Yanci, Castillo, Iturricastillo, & Reina, 2019).

Modified regulations exist for all CP football competitions (Reina, Iturricastillo, Castillo, Urbán, & Yanci, 2020). According to the IFCPF regulations, each potential participant in the competition must satisfy the requirements for the CP football competition (IFCPF (International Federation of Cerebral Palsy Football, 2020a). Any sport begins with classification, and participants are chosen following the regulations. The classification method for the competition determines which athletes are eligible for the CP class. People with impairments and health issues compete in the Paralympics (Reina et al., 2016). It is the goal of the classification of athletes in sports with disabilities that the competition proceeds successfully (Reina, Barbado, Soto-Valero, Sarabia, & Roldán, 2020). In order to ensure competition, classification in the game is not solely dependent on neurological problems (Klavina, Zusa-Rodke, & Galeja, 2017). For impaired athletes to participate, body systems and structures must be categorized (WHO, 2001). Physical capabilities and playing abilities are used to evaluate players with disabilities in the game.

In order to play the game effectively, soccer players need high motor skills. Their motor skills affect their individual or individual activities (Goodway & Branta, 2003; Mensch et al., 2019; Newell, 2020). Balance and motor development will be problematic for children with CP disorders (Boyd et al., 2016; Jahanbakhsh, Sohrabi, Kakhki, & Khodashenas, 2020). One must be familiar with their motor abilities to understand CP players' talents. Physical ability is tested first, then motor ability (Itoh & Hirose, 2020). Physical attributes like quickness, agility, strength, coordination, and balance were measured. The physical prowess of CP football players is anticipated to enhance their performance. A variety of evaluation tools are required to assess the growing physical and technical ability of football players with cerebral palsy. An instrument to measure eye, hand, and foot coordination is one of the tools required.

The eye, hand, and foot coordination exam measures a person's capacity to coordinate their hands, feet, and eyes into predictable, thorough, and controlled movements. In order to accomplish both fundamental and advanced motions in soccer, such as dribbling, passing, and shooting, it is necessary to have good coordination. A specialized coordination test device is needed for athletes with cerebral palsy problems (Ovcharenko et al., 2021; Yanci et al., 2016, 2019). Sportspeople with CP have restricted physical and motor abilities. When playing cerebral palsy football, it can be difficult to coordinate different motions due to these restrictions. However, in CP football, the ability to coordinate players is very important in activities during the game; therefore, the importance of measuring ability is eye, hand, and foot coordination. Many studies have been conducted on CP football players such as examining differences in change of direction performance and the magnitude of asymmetry in para-footballers with CP and controls (Henríquez, Peña- González,Albaladejo- García,Sadarangani, & Reina, 2023), the changes in sprint force-velocity profile of CP football players (Peña-González, Javaloyes, Sarabia, & Moya-Ramón, 2023), effective attack strategies that produce goals (methods of possession of the ball, distribution and movement patterns that most often result in goals) in CP football (Goh et al., 2023). There is little data investigating CP football players' eye, hand, and foot coordination abilities. This study aimed to analyze the eye-hand-and-foot coordination ability of CP football players.

MATERIALS AND METHODS

The research method was carried out with quantitative research using descriptive methods. The sample in this study is all CPF players in Southeast Asia participating in the 2022 Asean Para Games XI in Solo, Indonesia. A total of 50 players with classification categories are: FT1 with 10 players, FT2 with 33 players, and FT3 with 7 players. The participating athlete was informed about the study protocol, their rights, and the

associated risks of participation before providing written informed consent. Ethical approval was obtained from the Ethics Committee before starting the study Approval Date: POLTEKKES MoH SEMARANG, No. LB.02.01/6/KE.099 /2022. After obtaining ethical approval, we obtained institutional permission. The entire study was carried out in a determined adherence to the principles contained in the Declaration of Helsinki. Additional precautions were taken by the investigator(s) to protect the volunteers in this study.

The UMAC-CPF coordination test is used to measure the eye-hand-and-foot coordination ability of CP Football players. The UMAC-CPF Model Eye, Hand, and Foot Coordination test has a validity with a valid category and a reliability level with a reliable category (Umar et al., 2022). The test procedure is (1) The testee is ready to stand behind the boundary line by bringing the handball behind the boundary line at a distance of 4 meters from the wall (target) and unlimited sideways. (2) After the signal "Yes", the Testee as quickly as possible, throws and kicks the ball towards the target (wall) measuring 0,5 m x 2 m which is given a scale of 4, 3, 2, and 1 continuously for 30 seconds. (3) The ball that bounces from the throw or kick must cross the predetermined boundary line. (4) Each Testee is provided with two balls. If the first ball thrown or kicked does not cross the boundary line or go outside the boundary line, the Testee is allowed to take the second ball (reserve) and then return behind the line to continue the next movement until the allotted time runs out. (5) Suppose the second ball thrown or kicked does not cross or go outside the boundary line. In that case, the testee can immediately pick up the ball without assistance and then return behind the line to make the next move until the allotted time runs out. (6) The calculated score is the number of targets the ball has touched due to throws and kicks. The highest score is counted if the ball that is thrown or kicked hits the target line. If the result of the throw or kick does not hit the target, the score is "0". The test is carried out twice, and the best score is taken. The construction form, field size, and instructions for the implementation of the test model can be seen in Figures 1 and 2.

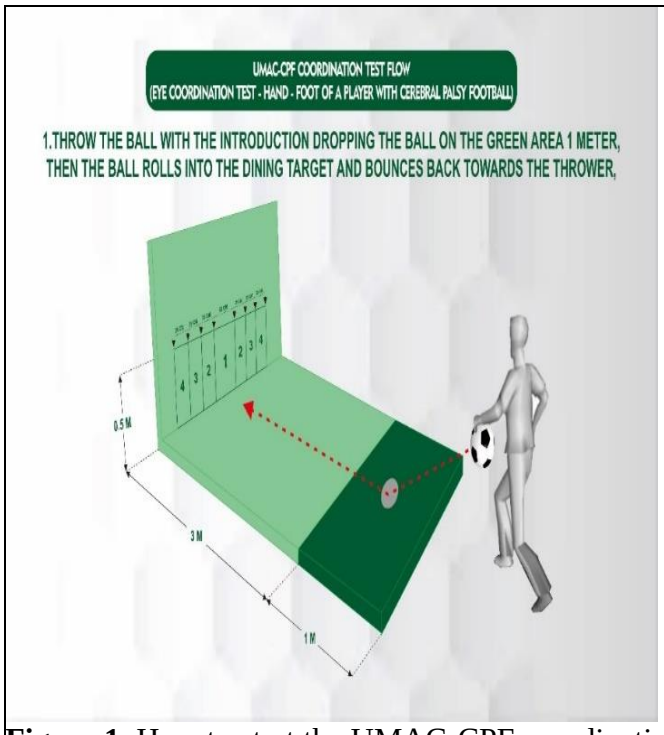

Figure 1. How to start the UMAC-CPF coordination test by throwing (Umar et al., 2022)

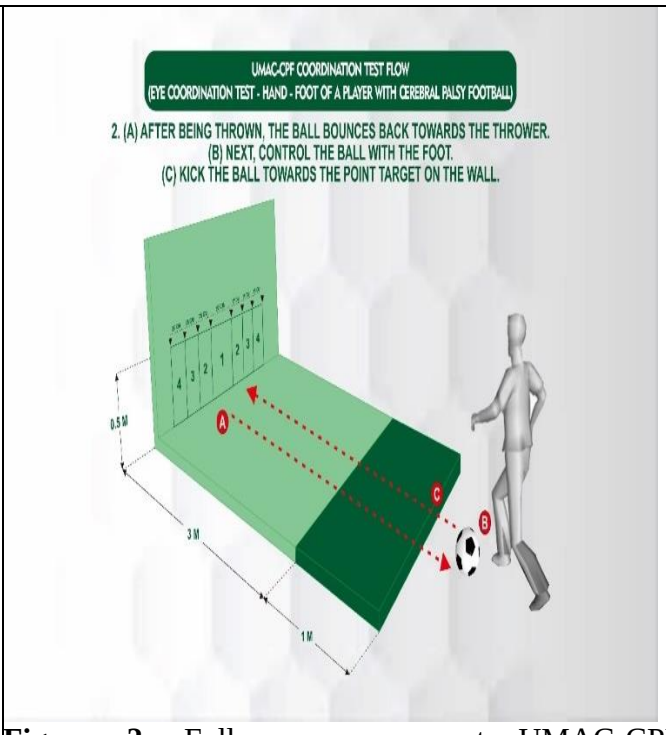

Figure 2. Follow-up movement UMAC-CPF coordination test with stop and kick the ball (Umar et al., 2022)

The procedure for briefly retrieving research data is shown in Figure 3.

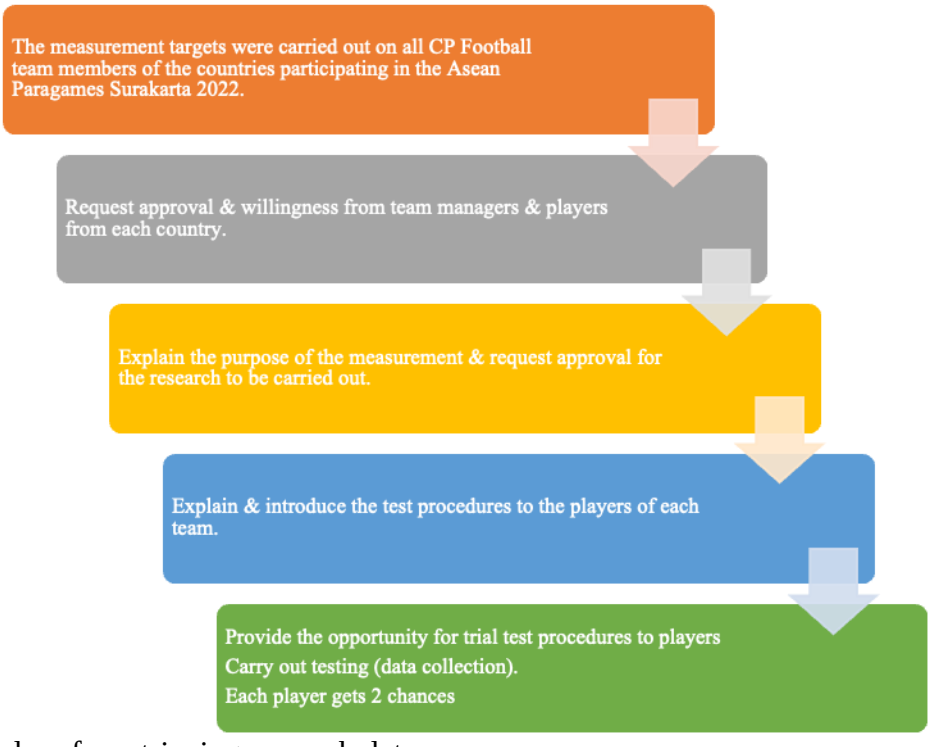

Figure 1. The procedure for retrieving research data

CP football players refers to the norm reference assessment in Table 2 (Umar et al., 2022). In this study, the data obtained were analyzed descriptively and then adjusted to the criteria listed in Table 1. (Umar et al., 2022).

Table 1. CP football eye, hand, and foot coordination test norms

No	Score	Category
1	29 ≥	Very well
2	19 - 28	Well
3	10 - 18	Enough
4	5 - 9	Less
5	≤ 4	Very Less

RESULTS

The following characteristics of CP football players from 4 countries are listed in Table 2.

Table 2. CP football player characteristics

No	Country	Total Players	Class		
			FT1	FT2	FT3
1	Indonesia	14	3	9	2
2	Thailand	14	3	9	2
3	Myanmar	14	3	9	2
4	Cambodia	8	1	6	1
Total		50	10	33	7

The following are the results of general eye, hand, and foot coordination using the UMAC-CPF test model, as shown in Table 3.

Table 3. General eye, hand, and foot coordination ability

No	Score	Category	Value	Total	Percentage
1	29 ≥	Very well	5	12	24%
2	19 - 28	Well	4	22	44%
3	10 - 18	Enough	3	13	26%
4	5 - 9	Less	2	3	6%
5	≤ 4	Very Less	1	0	0

The following are the results of eye, hand, and foot coordination ability per FT1, FT2, and FT3 classes using the UMAC-CPF test model, as shown in Table 4.

Table 4. Eye, hand, and foot coordination ability ft1, ft2, and ft3 classes

No	Score	Category	Total		
			FT1	FT2	FT3
1	29 ≥	Very well	1	9	2
2	19 - 28	Well	4	15	3
3	10 - 18	Enough	3	8	2
4	5 - 9	Less	2	1	0
5	≤ 4	Very Less	0	0	0
Total			10	33	7

DISCUSSION

According to the degree of the activity limitation (i.e., from more to less severe impact), para-football players are categorized as FT1, FT2, or FT3. Their functional profile is also taken into account, which includes bilateral spasticity or diplegia, overall coordination impairment (i.e., athetosis or ataxia), and unilateral spasticity or hemiplegia (Henríquez et al., 2022, 2020; Peña-González, Roldan, Toledo, Urbán, & Reina, 2020).

In this study, the eye, hand, and foot coordination abilities of CPF players were measured using the UMAC-CPF model test. The UMAC-CPF (Umar Motor Ability Circuit-Cerebral Palsy Football) model is a training model created to train the motor abilities of CP football players. The UMAC-CPF model test is part of this model; one of its functions is to test CP football players' eye, hand, and foot coordination abilities (Umar, 2020).

Table 2 explains the number and classification of players in research data from the countries Indonesia, Thailand, and Myanmar, which sent 14 CP players with the same composition of FT1=3, FT2 =9, and FT3 =2. In comparison, Cambodia only sent 8 players with FT1=1, FT2=6 and FT3=1. Even though there are differences in the number of players for each country, this is still in accordance with the rules for matches that can be registered in IFCPF competitions. When playing, a team consists of a maximum of 7 players, with one person having to be the goalkeeper (IFCPF, 2023b). The International Football Association Board (IFAB) explains that CP Football is called Football 7-a-side. Each team of seven players must field 1 player in the FT1 category (if not, then there must be one less player) and can field a maximum of 1 player in the FT3 category (IFCPF, 2023a).

Table 3 shows that the CP players' eye, hand, and foot coordination abilities are generally categorized as good and very good at 44%, 24%, and 26% in enough category, and there are still 6% in the less category. Coordination abilities will help activities for CP players during the game. Players in the good or even very good category will provide many benefits to their team. Players can freely move without the ball and control the ball comfortably in all directions, compared to

those in the sufficient, or even less, category. With better coordination, players can support the team's play and contribute to the team winning the game (Clemente, Martins, Mendes, & Figueiredo, 2014; Gesbert, Durny, & Hauw, 2017; Marcelino et al., 2020).

Table 4 shows that the UMAC-CPF test model can measure coordination abilities for each class. It is proven that from all classes in the FT1, FT2, and FT3 categories, there are categories of players with a good and excellent level of coordination even though players in the FT1 category have heavier physical obstacles than players in the FT2 and FT3 categories. The FT1 category players with a good and very good level of coordination are important key players and are needed by a team. FT1 players are mandatory on the field of play at all times during the game (IFCPF (International Federation of Cerebral Palsy Football, 2020a).

In the FT1 and FT2 classes, it was found that there were still 1 or 2 CP players who had poor coordination abilities. This can be a consideration for coaches in the future. The player wants to be retained or relegated from the team. If not, the choice must be maintained and handled to provide training that can improve coordination.

Apart from that, it was also found that in the FT3 class, there were no people with poor eye, hand, and foot coordination abilities, as in the FT1 and FT2 classes. This follows research results that FT3 players have better technical and physical capacity than FT1 and FT2 (Gamonales, Muñoz-Jiménez, Gómez-Carmona, & Ibáñez, 2022).

The findings obtained can be used as a basis for post-match monitoring of individual CPF players by considering the previously obtained eye, hand, and foot coordination abilities. This is in accordance with the results of research studies, which state that results obtained during matches related to player abilities can facilitate the design of specific training workloads based on FT, player disabilities, and competition demands (Gamonales et al., 2022).

Based on the discussion of the research results, an overview of the level of eye, hand, and foot coordination abilities of CP Football players in Southeast Asia, namely the number of players and class categories in various countries, the general level of coordination, the level of coordination based on the player categories of class FT1, FT2, F3.

This research still has limitations, including, firstly, not all countries in the Southeast Asian region that develop and have CP Football teams are affordable because Malaysia, Singapore, and the Philippines at the time of the research did not compete in the CPF APG Solo 2022 sport. Second, the sample quota for each FT1 category and FT3 is still lacking, so more sample data is needed for further analysis.

Conclusions

Through the UMAC-CPF test model, CP football players in each class's eye, hand, and foot coordination abilities were generally categorized as good. However, it was found that several players still lacked their abilities. This research has contributions, firstly, for coaches or teams to serve as a basis for knowing the level of coordination of their players, preparing training programs, and determining the composition of players in their teams. Second, for researchers as a basis for further research related to coordination variables linked to other variables such as CP athletes' biomotor, physical, technical, and psychological components. The three UMAC-CPF test models were suitable for measuring eye, hand, and foot coordination abilities in all CP Football players in the FT1, FT2, and FT3 categories. To develop this test model, further research must be done and tried on groups of children and non-disabled people.

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Conflict of Interest:

There is no personal or financial conflict of interest within the scope of the study.

Ethics Committee

Board Name: Komisi Etik Penelitian Kesehatan Commission. POLTEKKES MoH SEMARANG, No. LB.02.01/6/KE.099/2022

Author Contributions

Study Design, FA, MM; Data Collection, FA, SKP; Statistical Analysis, FA, BNP; Data Interpretation, FA, MM, SKP, BNP; Manuscript Preparation, FA, BNP, M, AAPS; Literature Search, FA, AAPS. The published version of the manuscript has been read and approved by all authors.

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