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DEVELOPMENT OF "TATIH" LOCOMOTOR AID TOOLS FOR SPECIAL MOVEMENT DEVELOPMENT PROGRAMS CEREBRAL PALSY SPASTIC DIPLEGIA

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Abstract:
This research aims to: determine the need for the development of the "Tatih" walking aid used to improve gross motor skills in a special movement development program for spastic diplegia cerebral palsy and determine the feasibility of using the "Tatih". This research was Richey Klein's Design and Development Research (DDR). The procedure in this research consisted of three stages, namely planning, production, and evaluation. The results of the research are: (1) the need for the development of the "Tatih" walking aid used to improve gross motor skills in a special program for developing spastic diplegia cerebral palsy; (2) the feasibility of developing the "Tatih" walking aid for a special movement development program for spastic diplegia cerebral palsy has been assessed by experts and revised in accordance with expert review; (3) the results of the intervention show an increase in gross motor skills in cerebral palsy spastic diplegia when practicing motor skills using the "Tatih" walking aid. Increase in subject IY's initial ability score from a baseline of 65% and final baseline of 85% or very good. The HK ability score from the initial baseline is 59.1% sufficient and the final baseline is 75% or good. The use of the "Tatih" walking aid is effective in improving the gross motor skills of walking in students with spastic diplegia cerebral palsy.

Keywords: walking aids, special program, mobility development

1. Introduction

Children with special needs, especially those with physical and motor challenges, face unique challenges. The term "impaired" refers to a condition in which parts of the body do not function properly, accompanied by disorders of the muscles, joints, and bones, thereby affecting the ability to move, balance, sensory coordination, and the ability to

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communicate when adapting. The impact also varies, depending on the severity of the obstacle, which can be classified into mild, moderate, and severe. Cerebral palsy is a type of motor disorder that affects children, caused by brain damage during the baby's development period (Dela Fariha, 2022). In this study, the main focus was spastic motor type cerebral palsy, which often affects the lower part of the body and causes problems such as stiffness, decreased body stability, and difficulty walking (Arshad et al., 2018).

However, these challenges can be overcome through appropriate measures aims to reduce gross motor disorders. Movement development is an approach used to train children with spastic diplegic cerebral palsy to control their body movements. This program is very important in helping them overcome limited limb movement. However, the implementation of this program often faces several problems, including lack of teacher training, inappropriate integration into the curriculum, and limited school facilities.

The special movement development program covers various aspects of gross motor development, such as: controlling head movements, carrying out limb movements, such as moving the body, hands and feet, developing balance skills, making breathing movements, carrying out self-moving movements, both alone and by carrying objects, develop movement skills, balance, and coordination, including gross motor skills, fine motor skills, eye and hand coordination, and eye and foot coordination, and use movement aids according to needs, such as braces (long and short braces), crutch, wheelchairs, walker, or other assistive device. The movement development program is a learning process that aims to develop motor skills by practicing body movements, movements, and guidance from the teacher (Fathona, 2016). This program requires gradual exercise to help children develop movement skills, balance, and coordination, especially in the case of children with spastic diplegic cerebral palsy. In this effort, the use of assistive devices such as braces, crutches, wheelchairs, walkers, or other assistive devices can really help these children carry out correct body movements, improving locomotor abilities, balance, and coordination. By planning and implementing an appropriate movement development program, children with spastic diplegic cerebral palsy can experience an increase in their gross motor skills and can be more independent in carrying out daily activities. In this effort, the use of assistive devices such as braces, crutches, wheelchairs, walkers, or other assistive devices can really help these children in carrying out correct body movements, improving locomotor abilities, balance and coordination. By planning and implementing an appropriate movement development program, children with spastic diplegic cerebral palsy can experience an increase in their gross motor skills and can be more independent in carrying out daily activities.

Data obtained from field observations at SLB Negeri 1 Yogyakarta shows that spastic diplegia cerebral palsy students experience various challenges in their gross motor skills. These motor limitations involve problems with movement, coordination, and balance. Immature motor skills affect students' leg movements, making them weak when moved. This condition shows that it is important to implement a movement development program to help them overcome this obstacle. However, the obstacle faced

is the unavailability of locomotor aids needed by spastic diplegia cerebral palsy students. This is a serious problem because movement development programs are integrated into health and sports physical education, while teachers who teach in these areas may not be experts in specific movement development programs. This condition can affect the effectiveness of the movement development program.

Cerebral palsy automatic bicycles at the Cilacap State Special School has an impact on leg motor development (Krisdianto, 2020). Research on Treadmill Design Development as a walking aid for cerebral palsy (Andreani & Kuswanto, 2019). CPWalker research: Robotic Platform for Gait Rehabilitation in Patients with Cerebral Palsy, namely the development of tools to train the strength of diplegic spastic cerebral palsy (Martín et al., 2016). Research into the development of a robotic walker for individuals with cerebral palsy is the development of a robotic walking aid (Alazem et al., 2019). Previous research has developed assistive devices in the form of automatic therapy bicycles, treadmill designs, walkers as walking training tools to increase muscle strength and stimulate leg motor skills, where these assistive devices use electronic and robotic systems. This research relies heavily on an electronic work system and is equipped with a motion sensor system and is used in rehabilitation settings (Andreani & Kuswanto, 2019; Krisdianto, 2020; Martín et al., 2016; Mccormick et al., 2022). The difference between previous research and the research under study is that the development of locomotor aids was designed with the aim of developing and improving locomotor gross motor skills, improving coordination, and helping them maintain balance in gross motor leg movements.

The research problem formulation includes questions about the need, feasibility, and effectiveness of the "Tatih" locomotor aids in improving gross motor skills in children with diplegic spastic cerebral palsy. In this context, the aim of the research is to determine the need, feasibility and effectiveness of the "Tatih" locomotor aid in improving gross motor skills in a movement development program for diplegic spastic cerebral palsy.

Thus, this research will provide important insights to improve the quality of education and services that suit special needs. In the context of this research, researchers developed a locomotor aid called "Tatih" with the aim of helping spastic diplegia cerebral palsy students in a special movement development program. Thus, the "Tatih" locomotor aid is expected to be a feasible and effective solution to help spastic diplegia cerebral palsy students in following their special movement development program at school.

2. Material and Methods

Design and Development Research (DDR) research is a type of research that aims to develop, design products, systems or processes with a scientific approach (Mukrimaa et al., 2016). Accoding to Richey and Klien (2014), the research uses the Design and Developmental Research method. This research uses the PPE (Planning Production Evaluation) development model which focuses on design and development research in the form of initial to final analysis consisting of three stages, namely planning, production

and evaluation (Michael, 2020). This research is a trial of SSR (Single Subject Research) on two spastic diplegia cerebral palsy subjects at SLB Negeri 1 Yogyakarta. Observation, interview and questionnaire collection techniques (Erwan Agus & Dyah Ratih, 2017). Data from research regarding analysis of interviews with teachers and parents were used for qualitative data analysis. Data analysis regarding design and development was evaluated through descriptive statistical analysis (Gengatharan et al., 2021). Meanwhile, observation data regarding the performance of gross motor development abilities in children with cerebral palsy, spastic diplegia, were analyzed using a descriptive statistical approach. (Sugiyono, 2021). Analysis of changes in gross motor movement development abilities using the "Tatih" locomotor tool which was developed from the results of observing the performance of research subjects. The results of observing the performance of the research subjects were then analyzed using a single subject experiment.

3. Results and Discussion

Spastic diplegia cerebral palsy experiences disorders that spread to the muscles of both legs, balance, coordination, walking disorders so that the function of the limbs is disrupted (Pradipta & Andajani, 2017). Gross motor skills include the large muscle skills of a child's arms, legs and trunk such as walking, running, kicking, jumping, throwing, catching and so on (Ramdani & Azizah, 2019). Gross motor development aims to train gross movements to improve balance, ability to manage, control movements and coordination as well as improve skills and healthy lifestyles (Baan et al., 2020). Better balance and body control can improve independent functional abilities in children with spastic diplegic cerebral palsy (Rahmawati et al., 2023). Factors that can influence movement (locomotor) abilities are gross motor skills. A special program is a series of instructions aimed at achieving a specific target (Salbidah, 2018). Movement development is carried out in a programmed manner for individuals who experience muscle, joint and bone disorders. The movement development that is trained includes head movements, upper limb movements, back movements, lower limb movements, balance, eye and hand coordination, eye and foot coordination (Pradipta & Andajani, 2017).

Assistive technology can be defined as the production of goods, facilities and systems that are adapted to maintain, advance or improve the abilities of children with special needs (Suwahyo et al., 2022). Assistive devices are often called assistive technology or orthoses which aim to help with limited movement and mobility for children with cerebral palsy, spastic diplegia (Trimandasari & Pudjiastuti, 2019). The main aim of using locomotor aids (orthoses) is to assist with a special Movement Development program for gross motor function (Manik et al., 2023). Assistive devices are specially made and adapted to the needs and condition of the child's body, including the child's weight and height. Assistive devices have a big impact on improving the quality and independence of children's lives.

The results of this research aim to develop a locomotor aid called "Tatih", for children with spastic diplegia cerebral palsy. The need for developing locomotor aids "Tatih" is used to improve gross motor skills in a special movement development program for spastic diplegia cerebral palsy

The special movement development program is focused on helping improve locomotor abilities when moving body parts, especially gross motor skills of the legs when operating the "Tatih" aids. During the special movement development program, children can maintain positions comfortably and maintain their body balance upright when using the "Tatih" aids. in practicing the development of movement and coordination in children. Increasing locomotor abilities in children with cerebral palsy spastic diplegia "Tatih" is a type of movement activity that involves moving the body from one place to another such as walking (Simahate & Munip, 2020). When operating using assistive devices, Children can control and maintain the balance of their body and limbs well. When research subjects use the "Tatih" locomotor aid, they can maintain and control the coordination of right and left leg movements, in order to reduce stiffness in the leg muscles. Coordination is the ability to organize and control body movements in an effective and coordinated manner (Rosalina, 2020). This locomotor aid was developed using the design and development research (DDR) development model (Richey and Klein, 2014), namely:

A. Planning

Designing locomotor aids for a special program for the development of movement in spastic diplegia cerebral palsy is a challenge that requires special attention to the needs and condition of the child as well as paying attention to aspects of ease, comfort and practicality so that the tool can be useful according to the desired function (Ayundyahrini et al., 2019; Batan, 2006; Elvaretta, 2022; Saripudin, 2021; Yuwono et al., 2021). Locomotor aids must be designed and adapted to the child's conditions and needs.

The following is the design of the "Tatih" locomotor tool, namely:

Table 1: Initial design of the "Tatih" locomotor auxiliary equipment

No	Picture	Information
		Initial design of the "Tatih" locomotor auxiliary tool.
		The initial design of the "Tatih" locomotor tool used a table.

Figure 1: Ergonometry of Locomotor Aids "Tatih" Front Position

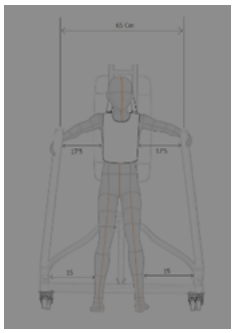


Figure 2: Ergonometry Locomotor Aids "Tatih" Right Side Position and Using a Table

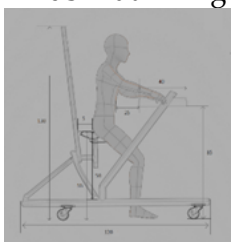


Figure 3: Ergonometry Locomotor Aids "Tatih" Left Side Position and Using a Table

Figure 4: Ergonometry of Locomotor Aids "Tatih" Rear Position

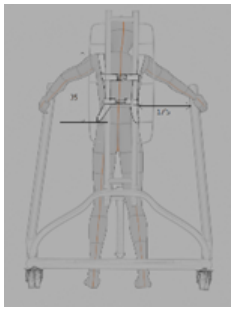


Figure 5: Ergonometry of Locomotor Aids "Tatih" Standing Position without Chair

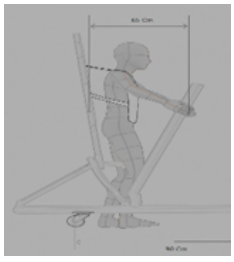


Figure 6: Ergonometry Locomotor Aids "Tatih" Standing Position and Chairs Available

Figure 7: Ergonometry Locomotor Aids "Tatih" Left Position with Seat

Figure 8: Ergonometry Locomotor Aids "Tatih" Right Position with Seat

Based on the results of observations and interviews, teachers and parents really need locomotor aids to train children's gross motor movements when implementing special movement development programs at school and at home. Based on these data, the aim of developing the "Tatih" locomotor aids for a special program for developing movement in spastic diplegic cerebral palsy.

The following are the results of the child's profile assessment (gross motor potential):

1) Subject Profile IY and HK (Potential)
   a) Subject IY has the ability to move using his knees and change places, showing his dexterity in finding alternative solutions in dealing with motor obstacles.
   b) IY can use a wheelchair as a mobility aid, although facilities that support locomotive capabilities are not yet available at school.
   c) HK children develop gross motor skills by crawling to move around.
   d) HK uses a wheelchair as a mobility aid.
2) Obstacles for IY and HK Children
   a) IY still lacks the development of locomotor skills which involve walking, body coordination and balance.
   b) Dependence on the use of a wheelchair shows obstacles in the development of walking locomotor skills, balance and movement coordination.

c) Although HK has the ability to crawl, the ability to walk may not have been fully achieved, indicating obstacles in the development of locomotor walking, balance and coordination.
d) HK's use of a wheelchair shows obstacles in the development of locomotor skills such as walking, balance and motor coordination.

3) IY and HK needs
a) Subjects IY and HK require a special program focused on developing locomotor skills such as walking, body coordination and balance. This program must be adapted to the conditions and abilities of IY and HK and support their movement development.
b) Providing appropriate facilities and supporting the development of IY and HK movements. Facilities such as appropriate locomotor aids and an environment that allows IY and HK to practice moving safely.
c) Requires the involvement of teachers, therapists, parents in developing the movement of children with special needs such as IY and HK to provide appropriate guidance and support.
d) It is important to monitor IY and HK's progress in developing their movements and evaluate the effectiveness of the program provided. Program changes may be necessary based on changing IY and HK needs.

B. Production Stage

The development stage for locomotor aids "Tatih" is to produce locomotor aids for a special movement development program. At this stage the researcher carried out the process of making tools involving tool assembly experts.

Figure 9: Tatih Making Process

The tool developed has several innovative elements as novelty in design. The following are several aspects of the novelty that can be seen from the specifications of the "Tatih" tool, namely a height of 130 cm and a width of 80 cm. Ability to adjust the height of the seat cm and table from 40 to 70 cm. This allows users to design and regulate the use of tools according to the child's needs and comfort, which can vary from one child to another. The presence of a hand grip as a control direction for hand movement which can be adjusted to a distance of 20 to 70 cm and can rotate 90 degrees allows users to get appropriate support when interacting with this tool. This is an innovative feature that is not always available in similar tools. The use of leather and foam materials on the chair

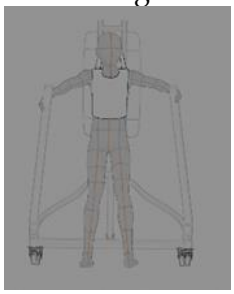
shows attention to user comfort. The ergonomic design of the chair with dimensions of 25 cm long, 20 cm wide and 10 cm high can provide comfort to children with spastic diplegia cerebral palsy when operating the "Tatih" locomotor aids. The specifications for a large open space measuring 250 x 250 cm reflect the use of this tool in various environments including classrooms, classroom yards, fields and other open spaces. The tool's ability to operate in a variety of contexts is novel in its design.

The use of a safety rope with a size of 4 cm x 2 cm and high strength which is wear-resistant and protects against falls is a safety aspect to protect users, especially in children with cerebral palsy, spastic diplegia , which may not always be available on similar devices. The iron design includes 1 $^{1/2}$ inc bottom iron, 1 inc bottom pole support iron, 6 ml beguel backrest safety iron and 25 x 25 table frame iron. Wooden board measuring 2 cm, table setting length measuring 8 m, wheels measuring 2 inc and bolts measuring m 10 x 3 cm show attention to the strength and reliability of the construction of this “Tatih” tool and are an important element in ensuring that the “Tatih” locomotor aid is safe and durable. The existence of the elements contained in the design of the "Tatih" assistive device makes it an innovative and useful tool in developing gross motor skills in children with cerebral palsy, spastic diplegia. This novelty reflects efforts to improve the quality and flexibility of the use of the "Tatih" locomotor aids used in special movement development programs according to children's conditions.

How to use the "Tatih" assistive device for a special program for the development of movement in cerebral palsy, spastic diplegia:

1) Children with spastic diplegic cerebral palsy first wear the safety harness provided. Instruction:

Figure 10: Wearing a Safety Strap



2) Children can sit/stand while moving both feet that reach the ground to be moved. Instruction:

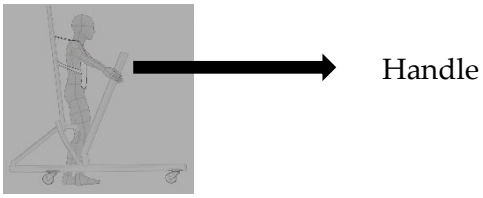
Figure 11: Sitting Position Facing Forward, Right and Left Positions

3) When the child sits/stands while moving both legs, they can hold both handles for strength when using Tatih. Instruction:

Figure 12: Hold Both Handles

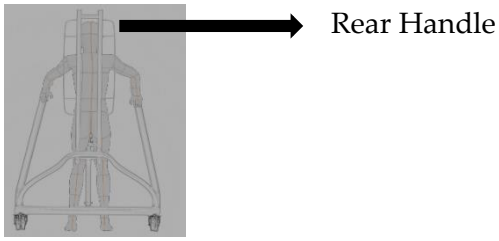
4) The child can stand and hold both handles to move. Instruction:

Figure 13: Handle to Help Move



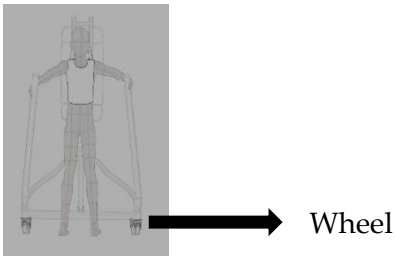
5) When the child is unable to move, another person can help him to push by holding the back handle provided. Instruction:

Figure 14: Rear Handle Available



6) When a child with cerebral palsy has spastic diplegia, he will walk with the help of the wheels available on the Tatih device. Instruction:

Figure 15: Wheels Available



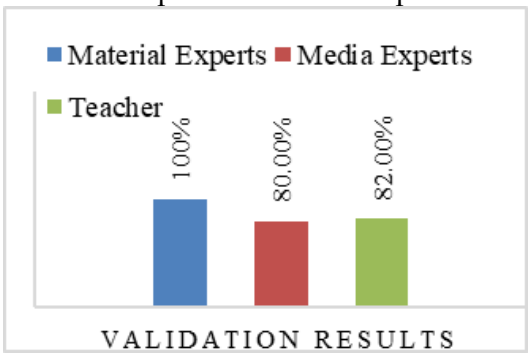
C. Evaluation

The evaluation stage begins with an assessment of the materials and products by experts in the field of Special Education and practicing teachers, which is an important step in the process of developing the "Tatih" locomotor aids. This evaluation stage aims to ensure that the "Tatih" locomotor aids comply with the criteria and needs that have been determined.

The results of product trials in the field found the following data:

1) The feasibility of the "Tatih" locomotor aids used to improve gross motor skills in a special Movement Development program for diplegic spastic cerebral palsy . Assessment of the feasibility of the "Tatih" locomotor aid is an evaluation process carried out on the tool to determine the extent to which the tool is suitable for use in a special movement development program for spastic diplegia cerebral palsy children with the aim of improving gross motor skills for walking. This process involves several evaluation stages including validation of materials and media by field experts and practicing teachers. The following is an explanation of the product validation results and eligibility categories given:
   a) Validation Results by Material Experts.
      Special program material experts for movement development evaluated the material aspects of movement development of the "Tatih" locomotor aids. With validation results of 100%, it shows that the product has high quality based on aspects of flexibility, mobility and motor movement aspects which are considered very feasible. The validation results provide an indication that the product has great potential to provide benefits in improving the development of gross motor movements for children with spastic diplegic cerebral palsy.
   b) Validation results by Media Experts.
      Validation results of 80% indicate the product is considered feasible. There are several suggestions and input for improvement. However, this product is generally considered to have the potential to be a feasible, effective and practical tool in supporting special movement development programs for children with spastic diplegia cerebral palsy.
   c) Validation by Teacher.
      The validation results were 82%, this tool was deemed feasible, effective and practical in terms of use and benefits in improving gross motor skills in children with spastic diplegic cerebral palsy as well as suggestions and input from validators for product improvements to maximize effectiveness and ensure the product meets the needs of spastic diplegic cerebral palsy. The following are the validation results described through assessment charts.

Figure 16: Evaluation Graph of Validator Expert Assessment Results



2) The effectiveness of the "Tatih" locomotor aids in improving gross motor skills in the Movement Development program for spastic diplegic cerebral palsy.

The initial stage of measuring the ability of children with spastic diplegia cerebral palsy begins with coordinating with the class II SDLB teacher. The coordination carried out explained the design and method of using the "Tatih" tool and the evaluation was carried out by researchers by recording the process of using the tatih tool when used by the child. Based on the results of the performance, changes were found in the ability to develop gross motor movements.

This is proven by the differences in performance observation results between pretest, intervention and posttest (Effendy, 2016). This is evidence or evidence of improvement in the form of observations of the performance of children's abilities statistical analysis of research data that describes changes during pretest, intervention and posttest.

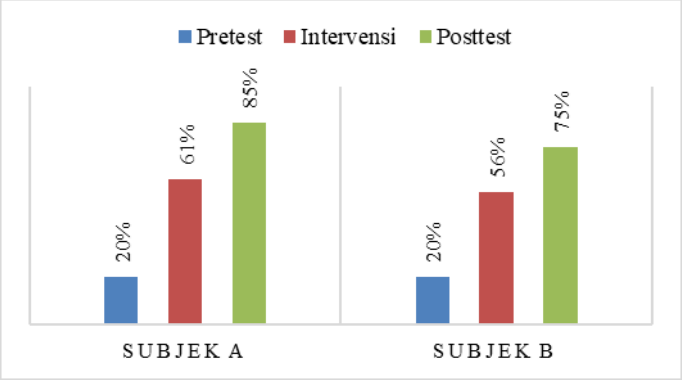
The following is an evaluation of the observation results in the table:

Table 2: Observation Results of Movement Development Performance

Assessed abilities	**Subject A**			**Subject B**		
	Pretest	**Intervention**	**Posttest**	**Pretest**	**Intervention**	**Posttest**
Movement Development Ability	20 %	40% 50% 65% 70% 80%	85%	20%	40% 45% 60% 65% 70%	75%
Average	20%	61%	85%	20%	56%	75%
Interpretation	Very less	Good	Very good	Very less	Enough	Good

The following are the results of observations of Movement Development performance in graphic form, namely:

Figure 17: Observation of Movement Development Capability Performance



Based on the results of performance observations that have been carried out, it is conceptually concluded that the locomotor aid product "Tatih" is needed to improve gross motor skills in children with spastic diplegia cerebral palsy which has been carried out in a validation process by various parties including media, material and teacher experts. The high percentage in this validation reflects the belief that this banti tool is suitable for use. These results are based on a needs analysis involving observations, interviews with teachers and parents as well as assessing children's abilities. The "Tatih" locomotor aids developed are effective and very good for use in assisting special movement development programs for children with spastic diplegic cerebral palsy.

Practical results through performance observations showed positive changes in the results obtained by children with spastic diplegia cerebral palsy. This is proven by an increase in the observation results of Subject A's performance between pretest, intervention and posttest, namely 20% in the very poor category, 61% in the good category and 85% in the very good category. Subject B obtained performance observation results during the pretest of 20% in the very poor category, during the intervention 56% in the sufficient category and at the posttest 75% in the good category. This assessment is based on research results which include observations of the performance of subjects A and B before the intervention (pretest), during the intervention (intervention), and after the intervention (posttest) (Effendy, 2016). Data from observations were used to evaluate the effectiveness of the "Tatih" locomotor aid in improving gross motor skills in individual children with spastic diplegic cerebral palsy.

The results showed that Subject A experienced an increase in gross motor skills from pretest to posttest after undergoing an intervention program using the "Tatih" locomotor aids. At the pretest stage, Subject A had a performance level of 20% in the very poor category. However, after undergoing the intervention, performance increased to 61% in the good category, and at the posttest stage, Subject A's performance reached 85% in the very good category. Subject B also experienced increased gross motor skills. At the pretest stage, Subject B had a performance level of 20% in the very poor category. After going through the intervention, Subject B's performance increased to 56% in the sufficient category. A significant increase in performance occurred at the posttest stage where Subject B achieved a performance of 75% in the good category. The results of observations

of the performance of subjects A and B in this study showed that the use of the locomotor aid "Tatih" positively contributed to improving gross motor skills in children with dipegia spastic cerebral palsy. These results support that the "Tatih" locomotor aid has potential and is effective for use in the movement development program for spastic diplegic cerebral palsy. Based on previous research, the development of assistive devices is also useful for improving leg motor skills, stimulating muscles, and training walking strength (Andreani & Kuswanto, 2019; Krisdianto, 2020; Martín et al., 2016; Mccormick et al., 2016).

The effectiveness of the "Tatih" locomotor aids in improving gross motor skills in a special Movement Development program for children with cerebral palsy spastic diplegia is important in supporting motor development and independence in children with this condition (Nursamsu, 2020). In this context, it appears that the locomotor aid "Tatih" has a positive impact on improving gross motor skills in individuals with spastic diplegic cerebral palsy , as seen in the experiences of IY and HK.

The following are several important findings that are evidence in this research:

a) Improved ability to step on foot: At first IY could only step on one foot correctly. However, with the help of the "Tatih" locomotor aid and instructions, IY was able to slowly step on his right foot correctly. This shows that the locomotor aid "Tatih" helps in improving the coordination of leg movements which were initially difficult for IY.
b) Improve the coordination of both legs: Even though initially only one leg was able to step correctly, with the help of the "Tatih" locomotor aid and instructions IY was able to try to move both legs which were already on the floor. This shows that there is balance and improved coordination between the right and left legs which in turn can help in improving overall gross motor skills.
c) Improvement in backward movement: HK had difficulty in moving both legs forward, but overcame this obstacle with the locomotor aid “Tatih”. He can slowly maintain body balance to move his legs two steps forward. In addition, HK's ability to move both legs quickly when moving backwards shows that this aid can help in developing better movement control.
d) Increased general abilities: The use of the “Tatih” locomotor aids seems to provide significant benefits in improving gross motor skills in IY and HK. This tool teaches coordination and control of movements and encourages children to try to overcome their motor obstacles.

Final Product development is based on the final design, namely:

Table 3: Final Design for Development of the "Tatih" Locomotor Auxiliary Tool

No	Picture	Information
1.		Front “Tatih”
2.		Side Part “Tatih”
3.		Rear Support
4.		Chair
5.		Wheel
6.		Table
7.		Fixed Safety Harness
8.		Practice Using a Table
9.		Without Using a Table

The final product in this research is a locomotor aid tool "Tatih" which can be used in a special movement development program for spastic diplegic cerebral palsy. In developing the "Tatih" locomotor aids for a special program, attention was paid to development aspects in the form of safety, independence, feasibility, practicality and effectiveness (Af et al., 2023; Nursamsu, 2020; Saripudin, 2021; Sekar et al., 2021; Soetji, 2020; Tifali, 2014; Yuwono et al., 2021). The purpose of the "Tatih" locomotor aid is to improve gross motor skills, especially for practicing walking and as a learning medium in special movement development programs.

Figure 18: Final Product "Tatih" Locomotor Auxiliary Equipment

Based on the motor development of school children aged 6-10 or 12 years and over, their abilities develop in terms of strength, flexibility, balance and coordination. Increased strength obtained from muscle work results from overall physical and motoric growth. Increased flexibility is freedom of movement in the joints. Improving balance is divided into two, including: static balance is the ability to maintain the condition of the body when still or so that it does not sway, while dynamic balance is the body's balance when moving or the ability to maintain the body from falling while moving (Endang, 2021).

Based on the results research on the Tatih locomotor aids plays an important role in training gross motor skills in the implementation of special movement development programs such as children being able to adjust their body position when using the "Tatih" locomotor aids, children can adjust the position of both hands on two handles, when operating the "Tatih" locomotor aids in the program Specifically, movement development can increase flexibility and motor skills of the hands, can increase flexibility and motor skills of the leg muscles, can improve flexibility and motor skills of the hand and leg muscles simultaneously, can increase gross motor physical endurance, improve gross motor balance of the legs, and improve the ability to perform overall and coordinated body movement (walking).

4. Conclusion

Based on the results of research on the development of the "Tatih" locomotor aids for the special program for cerebral palsy, spastic diplegia, it can be concluded:

1) The use of procedural design in the development stages of the "tatih" locomotive aids for a special movement development program. Procedure design can be

interpreted as a staged process that involves planning based on the child's profile (potential), obstacles and needs of children with spastic diplegia cerebral palsy, product specifications, development plans and goals. The production stage includes the physical components of the tool, assembly and testing and development of the "Tatih" locomotor tool during the implementation of a special movement development program. The evaluation stage involves testing, measuring performance observations and comparing results with the conditions and aspects tested or that have been determined, documenting test results and making improvements in accordance with suggestions and input from expert validators and the needs of children. The need for the development of locomotor aids "Tatih" is used to improve gross motor skills in a special program for Movement Development for spastic diplegic cerebral palsy based on the results of a needs assessment obtained from observations, teacher and parent interviews, and assessment of students' initial abilities. as well as reviewing theoretical studies related to spastic diplegia cerebral palsy and Movement Development, important aspects were obtained for the development of the "Tatih" locomotor aids in the form of: adjusting body position when using the "Tatih" locomotor aids, adjusting the position of both hands on two handles, increasing flexibility and motor skills hands, increases flexibility and ability of leg muscles, increases flexibility and motor skills of hand and leg muscles simultaneously, increases gross motor physical endurance, improves gross motor balance of legs, and increases the ability to carry out overall and coordinated body movements (walking).

2) The taih locomotor aids were declared feasible because they obtained a score from validation results carried out by material experts with a percentage of 100% which was categorized as very feasible. Media experts get a percentage score of 80% which is categorized as adequate. The validation results from teachers obtained a percentage of 82% which was categorized as very feasible.
3) With positive changes in the performance of Subject A and Subject B. These changes increase the child's gross motor abilities and are explained through the results of observations of Subject A's performance at the pretest , intervention and posttest stages. At the pretest stage, Subject A's performance reached 20% in the very poor category. However, after undergoing the intervention, the performance percentage increased to 61% in the good category, and at the posttest stage, Subject A's performance figure increased further to 85% in the very good category.

Meanwhile, Subject B also experienced changes in the results of performance observations. At the pretest stage, Subject B had a performance of 20% in the very poor category. After participating in the intervention, the performance percentage increased to 56% in the fair category, and at the posttest stage, Subject B's performance rose to 75% in the good category. With the results of this research, the "Tatih" locomotor aid is effective and suitable for helping children with cerebral palsy, spastic diplegia , to train gross motor skills, including walking, coordination and balance. The effectiveness of the intervention through the results of observing the performance of Subject A and subject B

showed a significant increase in gross motor movement development abilities after undergoing intervention using the "Tatih" locomotor aids. At the pretest stage the performance of both children was very poor, but after the intervention the children's abilities increased. This shows that this locomotor aid is effective in helping children with cerebral palsy, spastic diplegia to develop gross motor skills such as walking, coordination and balance. The use of the locomotor aid "Tatih" can be considered effective because it can be used in a special gross motor movement development program to train walking, coordination and balance. This research shows that positive changes in the performance results of subjects A and B can be achieved through the use of the "Tatih" locomotor aids. Based on these results, the locomotor aid "Tatih" can be easily integrated into a special program for children with spastic diplegia cerebral palsy.

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