The effectiveness of the TEACCH programme in developing fine motor skills in autistic children.

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Abstract:
Autism is characterised by deficits in the fine motor skills typically used by children to interact with others. In the case of a child with Autism Spectrum Disorder (ASD), these deficits limit their ability to perform the skills necessary for daily life. In this study, we sought to determine the effectiveness of the TEACCH programme in developing some fine motor skills in children with ASD. First, we conducted a pilot study to construct the study tool, which consisted of our self-developed Fine Motor Skills Scale.
We then conducted a baseline study involving a sample of three children with ASD. We used a descriptive approach and measured the pre-intervention fine motor skills of the sample children. We then implemented the TEACCH programme to improve and develop the fine motor skills of the child with ASD, followed by post-intervention measurements. The results of the study were as follows The "TEACCH" programme allows the development and acquisition of fine motor skills in children with ASD.
Keywords: Autism spectrum disorder, child with autism spectrum disorder, development, fine motor skills, TEACCH programme.

Introduction:
Autism Spectrum Disorder (ASD) is considered one of the most puzzling and common developmental disorders. Its causes have not yet been identified. It is characterised by a range of behaviours exhibited by children with ASD that are not adapted to their environment. These children often appear self-absorbed, focused on themselves, which leads them to withdraw and immerse themselves in their own world. This prevents them from forming relationships with those around them and hinders their ability to interact.
The term "autism" has evolved rapidly over the last few decades and has attracted the interest of many researchers, particularly in the field of developmental psychology. Léo Kanner first used the term "autism" in 1943 when he studied a group of children diagnosed with mental retardation. These children showed complete self-isolation, distancing themselves from everything and everyone around them, including their caregivers (parents). They showed introversion, isolation and a lack of responsiveness to external stimuli, as if their senses were impaired and unable to transmit information from the outside world to them. This made it difficult for them to form social relationships with those around them, similar to other children described as neurotypical.

1- Research question:
Children with autism spectrum disorder (ASD) have difficulties interacting with their environment and deficits in social relationships. They also experience impairments in motor skills, particularly fine motor skills, which are typically used to explore the environment and interact with others. Many researchers in the field of care and rehabilitation agree that children with ASD have deficits in motor skills, particularly fine motor skills (Lloyd M. et al, 2013). These deficits limit their ability to perform essential daily living skills, such as grasping and manipulating objects, and hinder their acquisition of age-appropriate skills, including various academic skills. Therefore, there is a need to explore methods that enable these children to develop these skills (fine motor skills) so that they can engage in 'normal' daily activities, achieve a level of independence and interact with others.
One of the programmes used to improve the overall functioning of children with ASD by developing their fine motor skills is the TEACCH programme. Developed by Eric Schopler (1994) in the early

1970s, the TEACCH programme is one of the most widely used training programmes in both private and public centres. It aims to improve the learning abilities of children with ASD. The programme uses the Childhood Autism Rating Scale (CARS) for assessment and focuses on strengths and interests rather than deficits, which motivates the child to engage more actively. In addition, the programme involves not only the child, but also the child's caregivers (e.g. parents) or others, as the training should continue outside the institution, in the family home, where the child is always present (Khatab, 2009).

Can the TEACCH programme correct and improve the fine motor skills of children with autism spectrum disorder (ASD)? In other words, what is the effectiveness of the TEACCH programme in developing fine motor skills in children with ASD? Does the environment of the child with ASD, particularly the involvement of the parent(s), contribute to the effectiveness of the TEACCH programme in improving their fine motor skills? These are the questions that guided this study, which aimed to demonstrate the effectiveness of the TEACCH programme in developing specific fine motor skills in children with ASD. The TEACCH programme is a comprehensive training programme that addresses different aspects of a child's development, rather than focusing on a single aspect such as language or behaviour. It provides a holistic intervention tailored to the individual needs, strengths and weaknesses of each child with ASD.

2- Concept of Autism Spectrum Disorder:

2-1 Autism Spectrum Disorder (ASD): is a neurodevelopmental disorder characterised by deficits in social interaction in children with ASD, both in verbal and nonverbal communication, along with the emergence of repetitive patterns of behaviour. These symptoms appear before the age of three (Rogé B., 2002). ASD is one of the most serious developmental disorders in terms of its impact on the life of the child and the overall well-being of the family. Therefore, it has become necessary to prioritise attention to it, given its recent prevalence among children in different parts of the world.

There are several definitions of autism spectrum disorder due to the different theoretical perspectives and approaches that have focused on this disorder. These definitions often describe the behaviours exhibited by children with ASD, including their tendency towards isolation, withdrawal, atypical development and difficulty in forming relationships with others (Lemay M., 2015).

Kanner first coined the term "autism" in 1943, when he defined the disorder as a lack of language, a desire for isolation, heightened sensitivity to external stimuli, normal physical appearance, high cognitive abilities, and resistance to change. All of these characteristics appear before the age of three. Rutter, on the other hand, identifies three main features of autism, including difficulty in establishing social relationships, delayed or deviant language development and behavioural patterns (Leboyer M., 1985).

In parallel, the American Autism Society defines Autism Spectrum Disorder as a developmental disorder that occurs in children during the first three years of life. Its cause is attributed to neurological impairments that result in dysfunction of brain functions, leading to deficits in social interaction, verbal and nonverbal communication, and specific disturbances in response to sensory stimuli, either through hyperactivity or hypoactivity. There is also a persistent repetition of movements or speech patterns, known as stereotypies (Lussier F. et al., 2018).

2-2 Diagnostic criteria for autism spectrum disorder:

In the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR), there are three main criteria for diagnosing autism: qualitative impairments in social interaction, qualitative impairments in communication, and restricted and repetitive patterns of behaviour. However, in the fifth edition (DSM-5), there is a transition to a two-dimensional categorisation of autism spectrum disorder, moving away from the previous three-dimensional categorisation in the DSM-IV-TR (Amar A., 2020). The DSM-5 diagnostic criteria include:

* Persistent deficits in social communication and interaction across contexts, such as deficits in social-emotional reciprocity, nonverbal communicative behaviours, and difficulties in establishing, maintaining, and understanding relationships.

* Restricted, repetitive patterns of behaviour, interests or activities, manifested by at least two of the following: stereotyped or repetitive motor movements, insistence on sameness or inflexible adherence to routines, severely restricted interests, and hyper- or hyporeactivity to sensory input.

Diagnosis of autism spectrum disorder is primarily a clinical diagnosis based on interviews and observations. We can refer to both ICD-10 and/or DSM-5 to make the diagnosis. The diagnosis of Autism Spectrum Disorder is made by describing the behaviours presented by the child and observed by the specialist (Amar A., 2020). The earlier the diagnosis, the more effective the intervention and therapeutic care, leading to better outcomes. For this reason, mechanisms have been established to facilitate early identification, such as the M-CHAT, a item tool with high sensitivity that has become an important tool for the early identification of individuals with autism spectrum disorder. However, it is important to note that the interpretation of the results should be done by professionals (doctors, psychologists) rather than parents (Amar A., 2020).

It is important to focus on the early detection of autism spectrum disorder, as this allows for early intervention, so that the child can benefit from specialised and appropriate care.

This will help the child to gain independence and to "communicate" with his or her environment.Therefore, it is important to be aware of certain symptoms that parents (especially mothers) or paediatricians usually notice that may indicate that the child may have an autism spectrum disorder.These symptoms include a refusal to breastfeed, a lack of arching of the back when being held and not reaching out to us, and a body that does not adapt when being carried.Other symptoms include lack of smiling by three months and anxiety by eight months, which Spitz identified as regulators of healthy child development (Wendland, J. et al., 2011).

Other symptoms may include sleep disturbances, lack of play (which may be limited to repetitive finger movements in front of the eyes and observing repetitive hand movements), frequent episodes of acute anxiety and crying for no apparent reason, engaging in repetitive body movements (such as touching the whole body or certain parts of the body, spinning around, or repeatedly turning objects), and showing more interest in objects than people (Mustafa, 2008, p. 27).

3-3 The prevalence rate of autism spectrum disorder is difficult to determine accuratelym:
However, it can be estimated to be around 10 cases per 10,000 births. It is important to note that the reported prevalence has been steadily increasing in recent years, reaching approximately 1 in 150 in Europe and 1 in 50 in North America, according to studies and official statistics. This increase can be attributed to a combination of factors, including a broader definition of autism spectrum disorder and increased awareness among parents (Amar A., 2020). It has also been observed that males are more susceptible to the disorder, with a ratio of approximately 4 males to 1 female. In a study conducted at the University of Batna-1 El Hadj Lakhdar, Faculty of Humanities and Social Sciences, on 19 November 2018, it was reported that statistics show that 400,000 children were diagnosed with autism spectrum disorder in 2016. However, it should be noted that these figures have not been confirmed by specialised authorities.

The causes of Autism Spectrum Disorder are numerous and complex, and remain largely speculative. It has been suggested that genetic factors, maternal exposure to toxic substances during pregnancy, maternal illness and infections during pregnancy, metabolic disorders, brain injury before or during birth resulting in brain damage, and predisposing factors for brain dysfunction all play a role in the development of autism spectrum disorder (Al-Qamsh, 2011). It is also noteworthy that autism spectrum disorder is thought to be associated with delayed maturation of the central nervous system (Salama & Shihata, 2014).

On the other hand, psychological factors may contribute to the development of autism spectrum disorder.

In this regard, the psychoanalytic approach suggests that ASDs result from disturbances in the interaction between mother and child, particularly in the early stages of the child's development immediately after birth.Winnicott, for example, sees it as a psychotic breakdown resulting from the loss of the "good enough mother" figure, which is absent in this case on a psychological level (Amar A., 2018, p. 301).

3- Fine Motor Skills:
In this study, we operationally define fine motor skills as the level of performance achieved by children with autism spectrum disorder on the scale we developed, the Fine Motor Skills Scale for Children with Autism Spectrum Disorder.

For a child, motor activity is a fundamental tool that allows them to explore the world around them (Durivage J., 1987). This tool cannot be reduced to purely physiological aspects, but is closely related

to the psychological well-being of the child. It enables the child to acquire skills, particularly fine motor skills, through movement. This acquisition includes activities such as writing, drawing, manipulating and assembling small toys and other tasks that require precise motor control.

The area of fine motor skills can be divided into two levels:

* Level One: Grasping and manual manipulation.

* Level Two: Functional use of fine motor skills.

Level One represents the sequential acquisition of voluntary hand and finger movements. Level Two focuses on the use of these newly acquired skills to manipulate, rotate, assemble, operate and reproduce written forms. Recent experimental studies have shown that motor growth and fine motor development in children with autism spectrum disorder is consistently impaired and atypical (Lloyd M. et al., 2013).

The situations that children experience and encounter, such as play scenarios or exploring their environment, enhance and develop their executive functions and cognitive skills, such as increasing their attention, planning, organising information and making decisions (Diamond A., 2009). However, in the case of autistic children, we find that their range of considerations is often limited, both in terms of interests and activities (Rogers S. & Benetto L., 2002). Since Kanner's initial description, there has been a focus on motor skills in these children and subsequent researchers have emphasised their importance in the child's overall development.Children with Asperger's syndrome are often described as clumsy and having weak muscle tone (Rogers S. & Benetto L., 2002).

The importance of developing fine muscles, and therefore fine motor skills, lies in their impact on the child's cognitive and psychomotor domains and the need for these muscles in all aspects of organised education and vocational training, such as drawing, writing, different types of handwriting, sign language, gestures and the use of objects, both simple and complex (Van der Fels I. M.J. et al., 2015).Fine motor movements allow the child to hold a pencil, open a door, change clothes, use a key, etc. All of these actions are registered at the brain level and become mechanisms that the child uses in everyday situations and activities.

4- The TEACCH programme:

The TEACCH programme, developed by Eric Schopler, is the most widely used and implemented programme for children with Autism Spectrum Disorder (ASD). It provides effective support and rehabilitation to enable them to achieve optimal growth in all dimensions. Unlike other programmes that focus primarily on behavioural aspects, TEACCH emphasises the importance of individual differences in children with ASD. It aims to meet the unique needs of each child, thereby increasing its effectiveness as a therapeutic programme. TEACCH is based on individual characteristics, taking into account cognitive and sensorimotor abilities as well as personality traits. The ultimate goal is to promote independence and participation in daily social and functional activities (Dionisi J. P., 2013).

The TEACCH programme places great emphasis on creating an organised learning environment that facilitates the development of daily living and social skills. It uses visual cues, which are particularly beneficial for children with ASD. Each child is approached individually with the aim of giving them the tools to understand their environment and communicate effectively, thereby enriching social interactions. The focus is on improving the individual's adaptation, specifically looking at how children with ASD adapt to their living environment (Dionisi J. P., 2013).

Experimental research on children with ASD has led to a purposeful collaboration between parents and professionals. Previously, parents, especially mothers, were often seen as playing a significant role in the development of the disorder.ASD was even seen as a result of parental rejection.However, it has been established that ASD is a developmental disorder involving neurological and cognitive dysfunction (Rutter M. & Schopler E., 1978).In reality, children with ASD have not been able to establish a strong relationship with their parents.This led to the idea of involving parents in a targeted training programme for children with autism.

5- Applied study:

5-1 Study methodology:

In order to carry out our study, we used a descriptive methodology appropriate to the nature of the subject. This methodology includes a set of research procedures aimed at describing the phenomenon under study through data collection, classification, processing and analysis in order to obtain results that can be adopted and generalised.

5-2 Sample of the study:
The sample of this study consisted of 33 children with Autism Spectrum Disorder (ASD) regarding the survey study. As for the main study, we relied on a sample of 3 cases to apply the therapeutic programme to them, and the sample selection was purposive.

5-3 Construction of the Fine Motor Scale:
We conducted a survey study with the aim of constructing a scale that identifies fine motor skills in children with autism spectrum disorder (see Appendix 01). This scale makes it possible to measure fine motor skills in children with ASD before and after the application of a therapeutic programme aimed at developing fine motor skills. The items of this scale were formulated based on previous studies that dealt with fine motor skills, including the studies of Rawashdeh and Alian (2016), Hammoud and Hayek (2009), and Al-Samadi and Pipers (2012), as well as theoretical readings such as Mustafa and Al-Sharbini (2011), Abdulatif and Zemam (2013), and Al-Sharqawi (2018).

This scale consists of 24 items divided into three dimensions: Basic Hand Skills (which refers to skills related to hand and finger dexterity), Prewriting Skills (which includes skills related to holding a pen correctly, colouring, and other skills), and Daily Living Skills (which includes skills related to daily living activities, such as buttoning and unbuttoning a shirt and taking off socks).

5-4 Validity and reliability of the Fine Motor Scale:
To determine the validity of the scale, we first relied on expert validity, where we presented it to four professors specialised in the field of psychology (one item was deleted because it did not reach 90% agreement). We then used criterion validity, which indicates the test's efficiency in predicting an individual's performance in specific activities.

This is achieved by referring to a direct and independent scale that measures what the test itself was designed to predict, which is the criterion.

The concurrent validity of this scale was calculated using the Pearson correlation method between this scale and the Fine Motor Skills Scale of the Psychological-Pedagogical File "PEP 3, 3rd edition", translated and standardised by Hamidan (2008), as an external criterion (see Appendix 02).

Table (1) shows the results of the external criterion validity (N=33).

The validity of the measure	Correlation coefficient	Level of significance
The Scale of Fine Motor Skills for Children with Autism Spectrum Disorder (ASD).	0.68	0.01

Finally, we returned to internal consistency reliability, a method based on calculating the correlation of each item with the section or dimension scores for all participants. This method aims to determine whether the responses to particular items as a whole are reasonably consistent with the expected behaviour or personality traits assumed by the scores. Some classify this type of reliability as content validity (Abdul Khaleq, 2013).

Table (2) shows the internal consistency reliability of the Fine Motor Skills Scale (N=33).

Skill	Total score
Basic hand skills	*0.65***
Pre-writing skills	*0.68***
Daily living skills	*0.72***

At a significance level of 0.01, the previous correlation coefficients indicate that the scale has a significant degree of internal consistency. This suggests that the current scale has a high degree of internal consistency.

As for the stability of the scale, which represents the consistency of test scores and the accuracy of its results, free from the influence of retesting when applied to a given group of individuals on two different occasions, or when individuals themselves are tested with two different equivalent sets of items (Abdul Khaleq, 1996).

We calculated the stability of the scale using the split-half method, in which the scale is divided into two equal halves (Moammaria, 2012). The split-half method requires the scale to be divided into two equal halves or forms. The entire scale is administered at once, meaning that we administer both

halves at the same time and then correct them, resulting in individuals in the sample receiving two scores: one score for the first half and another score for the second half.

Table (3) shows the split-half reliability of the Fine Motor Skills Scale for Children with Autism Spectrum Disorder (N=33).

Dimensions	Spearman-Brown	Guttman
Basic hand skills	0.73	0.84
Pre-writing skills	0.92	0.95
Daily living skills	0.78	0.87
Total score	0.98	0.97

Table (3) shows that the scale has good stability. The reliability coefficients range from 0.73 to 0.98 for Spearman-Brown and from 0.84 to 0.97 for Guttmann.
Stability using Cronbach's alpha coefficient of homogeneity, typically represented by the Greek letter α, relates the stability of the test to the stability of its items. An increase in item variance relative to total variance leads to a decrease in the reliability coefficient. Conversely, a decrease in item variance (homogeneity) leads to an increase in the reliability coefficient (Alam, 2000).

Table (4) shows the split-half reliability using Cronbach's alpha coefficient of homogeneity for the Fine Motor Skills Scale in Children with Autism Spectrum Disorder (N=33).

Variables	Cronbach's alpha reliability coefficient
Basic hand skills	0.82
Pre-writing skills	0.78
Daily living skills	0.76
Total score	0.88

From Table (4) it can be seen that the reliability coefficient values for the dimensional test and the total test using Cronbach's alpha equation range from 0.76 to 0.88. These high values indicate homogeneity of items and dimensions and high stability of the scale.

4-6 The main study
The main study was conducted in a school for children with autism spectrum disorder in the town of Sidi Bel Abbes. This school allows mothers to attend training and sessions with their children on a daily basis.
The study sample consisted of three male children diagnosed with autism spectrum disorder. Their chronological age ranged from 5 to 8 years and their mental age ranged from 2 to 7 years according to the Children's Mental Development Test (Adel Mohamed, 2008). They were classified in the category of moderate autism spectrum disorder according to the 2 cars scale, and their selection was purposive.

Table (5) shows the characteristics of the study sample.

Cases[1]	Gender	Age
Mounir	Male	5
Ihab	Male	7
Zoubir	Male	8

7- Programme Implementation (Targeted Skills and Tools Used) (Appendix 03)
We started with an initial session with the children's mothers to give them an overview of the programme and how the sessions would be conducted. We emphasised the importance of attending all sessions to maximise the effectiveness of the programme.
The skills were organised from the easiest to the most difficult and we relied on the use of different tools that were simple and readily available at home or school. These tools were familiar to the child, making it easier to learn new skills.
The children in the study sample attended school from 8:30 am to 1:00 pm. The programme was implemented four days a week, from Sunday to Wednesday (for each child), for one and a half hours

each day. From 8:30 to 10:00 we worked with Munir. Then Ihab took over from 10:00 to 11:30, and finally Zubair from 11:30 to 1:00. Every Thursday after 1pm, the mothers were given the TEACCH fine motor programme form to fill in during the weekend.
The programme sessions were carried out as follows:

Table (6) shows the schedule and distribution of the programme.

Program duration in months	Two months and 15 days
Number of weeks	10 weeks
Number of application days per week	4 days per week
Session duration	90 minutes (divided into 4 skills daily)
Duration of applied skill per day	20 minutes (with 10 minutes break between each two skills)

The skill was practised for two weeks (four days a week), giving a total of eight sessions for each skill. Each skill was practised in the programme for one and a half hours over the eight days.
The same skills were practised for two weeks, with four repetitions of the same skills in each two-week period, for a total of eight skills in one month. The application of 19 skills took two months and 15 days.
The skills were scored on a scale of 1 to 4, with a plus sign (+) indicating mastery of the skill and a minus sign (-) indicating that the skill was not mastered.
Techniques used in the programme included reinforcement, prompting, shaping, modelling and prompting.
Implementation continues at home, following the same instructions and using the same tools.

Table (7) shows the pre- and post-assessment scores on the Fine Motor Skills Scale for Children with Autism Spectrum Disorder (for the primary study cases).

Name Dimension		Basic hand skill	Daily life skill	Pre-academic skill	Total
Mounir	Pre test	14	11	10	35
	tes-Postt	17	15	12	44
Zoubir	Pre test	12	08	06	25
	tes-Postt	15	14	09	38
Zoubir	Pre test	19	18	10	47
	tes-Postt	24	21	15	60

8- Discussion of the results:
The results obtained in the study revealed differences in the scores of the sample individuals between the pre- and post-assessments on the Fine Motor Skills Scale for Children with Autism Spectrum Disorder, favouring the post-assessment. The scores on the scale used increased, indicating an improvement in the level of fine motor skills and the acquisition of new fine motor skills that were not present prior to the implementation of the programme.
These results can be attributed to the behavioural techniques used in the programme. Emphasis was placed on the use of various forms of reinforcement, including positive reinforcement (both verbal and tangible) after the child's attempts to perform the required skill. It was observed that children with ASD tended to respond more positively to tangible reinforcement, such as preferred items such as sweets or toys, which motivated them to perform the required task using the required skill. Negative reinforcement was also used by depriving the child of a preferred item, such as taking away a favourite toy.
Modelling techniques were also used, where a model of the desired skill was demonstrated in front of the child several times until the child was able to perform it easily. In addition, a variety of teaching methods were used to teach the child the skill, including verbal, physical and gestural prompting.The type of prompting used was tailored to each child's ability. Generalisation techniques were also used where, after learning each skill, different means were used to measure the same skill to enable the child to deal with similar skills that were not specifically trained.Individualised training was carried

out during the programme, which helped to develop different fine motor skills in the children.The performance of these skills was also generalised in a group setting, which increased the child's confidence in successfully performing each skill in front of other children.

We took care to use appropriate and safe educational tools (avoiding the use of sharp objects) that could serve multiple purposes (colourful tools to increase concentration and attention). A significant improvement was observed in the ability of children with autism spectrum disorder to acquire basic hand skills such as grasping small objects, as well as some daily living skills such as tying shoelaces and using a spoon effectively.

Through this educational programme, we concluded that this type of programme has a significant role and effectiveness in improving fine motor skills in children with autism spectrum disorder. All these results allow us to claim the effectiveness of the TEACCH programme in developing some fine motor skills in children with autism spectrum disorder. However, we cannot definitively claim that the skills acquired by the children who took part in the programme have become firmly established and that they have developed a certain level of cognitive and perceptual skills that help them to acquire new knowledge and learning experiences. This is because we have not tracked the outcomes of the programme and the sustainability of its effectiveness.

9- Conclusion:

Fine motor skills play a significant role in an individual's life due to their importance in daily activities and their impact on overall cognitive and educational performance. The more limited these skills are, the more the individual's psychological well-being is affected in terms of the frustration they may experience when faced with difficulties. On the other hand, these skills and their acquisition are affected by certain disorders, including autism spectrum disorder. It appears that children with ASD do not automatically acquire fine motor skills or may have weak fine motor skills. This was evident in our study sample through pre-assessment using a measurement tool we developed, which was validated and reliable.

In the main study we relied on a purposive sample of three children diagnosed with autism spectrum disorder. We conducted a pre-assessment to determine the level of fine motor skills, followed by the implementation of the programme, and then a post-assessment to determine the level of fine motor skills after the implementation of the programme. We found an improvement in the level of fine motor skills, indicating that the programme was effective and had positive results. However, it is important to note that the study did not investigate the sustainability of the skills acquired in the study sample. This could open the door for further research in this direction.

List of appendices:

Appendix 1: Fine Motor Skills Assessment Scale for Children with Autism Spectrum Disorder.

N°	The phrases	Masters	Masters moderately	Does not master
1	Picks up small objects with fingertips			
2	Threads beads of different sizes onto the thread			
3	Can form small balls of dough			
4	Picks up small objects with tweezers			
5	-Succeeds in the shape-matching game			
6	Can fold paper			
7	Puts 6 cubes together			
8	Uses both hands consistently and effectively			
9	Can hold a pen between thumb and forefinger			
10	Trace dots on different shapes (circles - squares)			
11	Does not go outside the frame when colouring			
12	Draws a straight line			
13	Draws random and spontaneous shapes			

14	Uses a handle to hold the pen			
15	Uses scissors to cut paper			
16	Can fit 9 pencils into a wooden board			
17	Opens and closes a box lid			
18	Opens and closes shirt buttons			
19	Threads shoelaces through designated holes			
20	Open and close clothing zips			
21	- Use a spoon correctly			
22	Holds a toothbrush correctly			
23	Opens and closes clothes pegs			
24	Can take off socks			

Appendix 2: Fine Motor Skills Assessment Scale included in the Psychosocial-Educational File, 3rd Edition (PEP 3), translated by Hamidan (2008).

N°	The phrases	Severe failure	Simple attempt	Successful/appropriate
1	Opens a bubble container lid.			
2	After demonstration and modelling, successfully blows bubbles.			
3	Visually tracks the movement of bubbles.			
4	Visually and continuously tracks the movement of bubbles or anything else that crosses the centre line.			
5	Demonstrates appropriate eye control.			
6	Uses the handle as a pair of pliers or scissors to place or remove pins in or from clay.			
7	Places shapes in their correct places on a shape board.			
8	Places three pieces in their correct places.			
9	Completely assembles four interlocking jigsaw pieces.			
10	Uses the handle as pliers to pick up pieces of candy, such as M&Ms.			
11	Puts together a single pearl.			
12	Uses both hands to remove 6 beads from a pipe cleaner			
13	Uses both hands consistently and effectively.			
14	Engages in random, spontaneous doodling.			
15	Follows three shapes.			
16	Colours within lines			
17	Cuts a piece of paper with scissors.			
18	Puts a cube in the box.			
19	Puts 8 cubes together.			
20	Turns the light switch on and off.			

Appendix 3: Skills targeted and tools used.

N°	Skill	Goal
1	Spoon grasping	Improving the ability to grasp objects and independence in eating
2	Exploring a box	Helping the child reach the ability to take things without seeing them and picking up items with fingertips.

3	Object grasping	Improving tweezers grasping and fine motor control.
4	Developing tweezers grasping.	Enhancing good tweezers grasping and improving fine motor control.
5	Sugar scooping with a spoon	Improving taking and handling objects and eating independently, to achieve using a spoon to transfer sugar from one container to another.
6	Coin grasping	Increasing fine motor control and grasping.
7	Opening containers	Fine motor control, hand strength, and hand coordination.
8	Giving and taking game	Developing the movement of taking and letting go of objects and fostering the ability to exchange.
9	Bead playing	Enhancing hand coordination and practicing different types of grasping for small objects.
10	Taking off socks	Discovering items by removing covers and developing abilities to dress and undress independently.
11	Paper folding	Developing fine motor skills and learning paper folding.
12	Beginning coloring	Developing basic coloring skills.
13	Soap bubbles	Increasing fine motor control and ability to grasp.
14	Finger exercises	Good finger control
15	String pulling	Improving pulling motion and fine motor control.
16	Hand exercises	Developing hand strength
17	Clothespin grasping	Increasing fine motor control and hand strength.
18	Cutting with scissors	Increasing fine motor control and learning scissor usage.
19	Pins	Developing control, fine motor skills, and finger strength.

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