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TEACHING SPHINCTER CONTROL TO A PERSON WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

To reduce adult presence and control, achieving sphincter control should be among the primary goals of any educational program. Acquiring personal autonomy skills is an indispensable goal to ensure independence and inclusion in the community and to improve the quality of life of the person and his/her family.

Usually, sphincter control is acquired around the age of three. Only after this age, in the presence of uncontrolled emission of urine and/or faeces during the day and/or night, can one speak of a deficit in sphincter control. The case of Andrea, on the other hand, a seven-year-old child who is the subject of the present study, is atypical: the child has perfect sphincter control so much so that he retains stools (continence) for several days if his mother, at his request, does not put a nappy on him where he will then evacuate his bowels. The nappy, that is, has become, for the child, the discriminative stimulus for evacuation.

With an intervention based on Applied Behaviour Analysis (ABA), the authors successfully taught the child how to expel faeces appropriately.

Keywords: Applied Behavior Analysis (ABA), Sphincter control, Discriminative stimulus, Faecal continence.

INTRODUCTION

The acquisition of personal autonomy skills is undoubtedly an essential objective to guarantee independence in the community and inclusion and to improve the quality of life of the disabled person and his or her family. In this context, attaining sphincter control should be among the primary objectives of any educational program to reduce adult presence and control (Guazzo, 1991).

Usually, sphincter control is acquired around the age of three. Only after this age, in the presence of uncontrolled emission of urine and/or faeces during the day and/or night, can one speak of a deficit in sphincter control. Within this deficit, one must then distinguish between incontinence (absence of sphincter control due to a specific ascertained organic damage or a lack of maturation of the central nervous system and/or sphincter musculature), enuresis (uncontrolled urine output in the absence of organic impairment related to function) and encopresis (uncontrolled urine out-put of faeces, in the absence of organic impairment related to function).

The typology of incontinence can be classified as follows: daytime incontinence (episodes that occur only during the day), nocturnal incontinence (episodes that occur only during the night), primary incontinence (failure to acquire sphincter control), secondary incontinence (lack of previously acquired control), continuous incontinence (failure to acquire will manifest continuously), occasional incontinence (failure to acquire will manifest occasionally). In addition, in relation to learning, incontinence can be 'essential' (failure to learn) or 'complicated' (incorrect learning).

Various factors can be the cause of the lack of sphincter control. In addition to organic causes, such as in the case of spinal cord injury incontinence, sphincter control deficits can also result from an inability to recognize signals of bladder and/or rectum fullness. Furthermore, even in the presence of a correct perception of physiological stimuli, the subject may not know the appropriate-atte behavioural response modalities (autonomous approach to the toilet) or be physically unable to manifest them (e.g., the subject with motor difficulties). In addition to all this, some factors affect the frequency with which one urinates and defecates: intense and sudden cold, ingestion of liquids (especially if abundant or sudden), states of emotional tension, ingestion of food (particularly diuretics and/or laxatives), certain food intolerances and states of malaise associated with certain ill-nesses. These contingencies which, in themselves, occur normally and periodically in all people, may, in the case of subjects with atypical development, establish relational patterns and behavioral chains that persist even after the initial cause has disappeared (Fig. 1). For example, in secondary incontinence, the environmental/relational implications that may contribute to the onset of an incontinence problem are broader: gratifying contacts between mother and child almost exclusively during cleaning and changing procedures or the avoidance of unpleasant situations (the layout of the toilets being difficult to reach or causing excessive anxiety because they are located at the end of a dark corridor, or because they are equipped with electric dryers that produce a very loud noise, etc.). Starting from this assumption, it is possible to hypothesize that the effect it has on the social context (parents, educators) allows the problem of sphincter control to be maintained and self-reinforced to obtain benefits for the subject.

Very often, the aspects that stand out the most and that, in a certain sense, bind are those coming from the social sphere and safeguarding one's own and others' hygiene. When a child 'gets dirty', one must intervene. Not only that, but action must also be taken quickly before he soils his surroundings, and especially before prolonged contact with the skin irritates the latter. In addition, an unpleasant smell is often present, which is a factor that has a considerable and immediate impact on the response of the people with whom the person shares spaces.

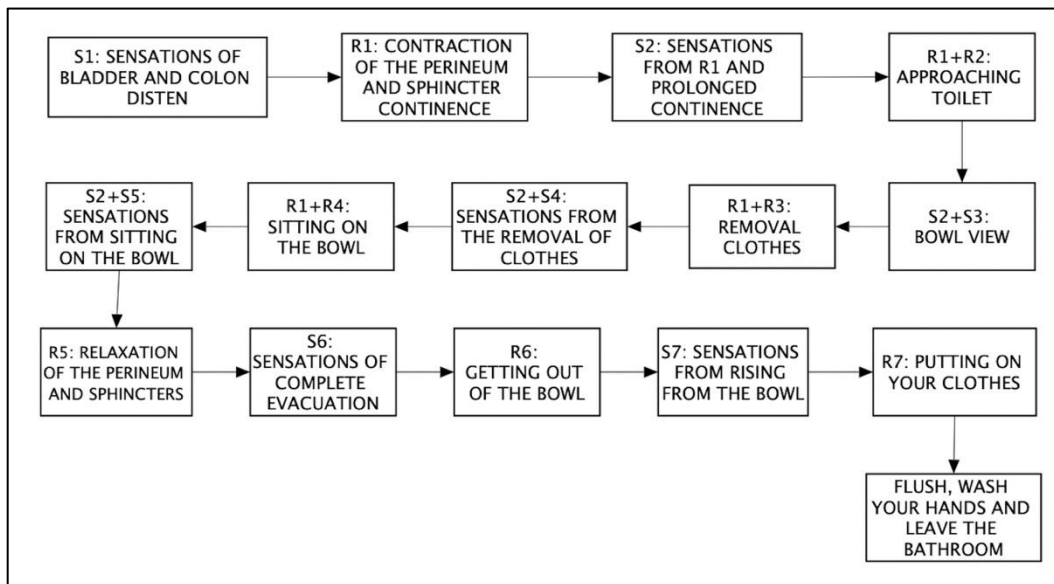


Fig. 1 – Behavioural chain in using toilets. Where S is the stimulus, and R is the response.

The need for timely intervention puts one at a disadvantage in that it 'forces' one to give a very precise and constant response over time with no possibility of choice; this need to intervene is most often realized with modalities that, if on the one hand solve the contingent problem, on the other hand, may not be profitable but rather counterproductive (see for example the systematic use of nappies or the like) for a partial or definitive resolution of the problem.

The practical necessity at this point becomes that of finding effective modalities that can be proposed as a profitable mediation between the elementary need to guarantee good hygiene and that of making the subject learn personal autonomy in sphincter control so that the latter can be managed, totally or partially, by him, rather than vicariously by others.

1. Characteristics of daytime toilet training programs

The lack of sphincter control entails several problems and inconveniences for the individual with atypical development, for his or her family and for educational services. The subject who lacks adequate sphincter control may present serious behavioural problems due to the manipulation and ingestion of faeces (coprophagia). Intestinal and viral infections, as well as epidermal irritations, are also frequent. The subject is dependent on others, often socially stigmatized and marginalized, and his or her family may experience isolation, sometimes self-imposed.

In everyday educational practice, the seriousness of the problems that the deficit in sphincter control entails has rarely been dealt with systematically and effectively: at most, the subject is taken to the bathroom at more or less regular intervals, and sometimes these attempts have led to positive results; generally, however, these 'trips' often end in nothing and the subjects find ways of bathing or soiling themselves at unplanned times. Madsen et al. (1969) found, for example, that such training conducted by parents for one month led to a 5% reduction in accidents, a percentage equal to that achieved without any intervention in the control group.

The most important limitations present in this type of teaching are:

- a) the subject remains passive and is always dependent on other people;
- b) one intervenes on the last link in a chain that begins with the proprioceptive sensations of tension and arrives, through other abilities, at the correct performance of physiological functions;
- c) this type of intervention is based on the conception of an incapacitated subject in need of total assistance.

Over the last thirty years, complex intervention strategies have been elaborated to solve this problem, among them the models of Ellis (1963), Dayan (1964), Mahoney, Van Wagenen and Meyerson (1971), Foxx and Azrin (1973b) and Cicero (2012) are the most widely used despite some limitations.

2. Teaching daytime sphincter control

Intervention modalities that only take the form of the expert-child relationship and do not guarantee maintenance and generalization often produce limited and evanescent results, given that the subject spends most of his time in the family. In this perspective, the need for training and, subsequently, the involvement in the program of all those who deal with the subject daily and who are ultimately the agents of any stable change in his or her behavioural repertoire comes into play. The expert will, above all, have the function of training educators and parents and being a competent role model during the first few days of treatment. Thereafter, his active presence will gradually diminish, and he will become a supervisor of the intervention and let the parents and teachers carry out the program independently (Foxx & Azrin, 1973a).

A comprehensive *toilet training* program aims not to train one to urinate and defecate on command but to educate the individual to carry out his or her physiological functions independently. The general aims of the program can, therefore, be summarized as follows (Fig. 1):

- (a) to recognise and discriminate the physiological stimulations of bladder tension and fullness of the rectum;
- (b) exert voluntary control so as to defer elimination;
- (c) emit all appropriate behavioural sequences of recognition and approach to the toilet in the presence of such stimulations;
- (d) organize and discriminate the motor sequences of the muscles involved in voluntary urination and defecation;
- (e) perform their own physiological functions;
- (f) generalize correct sphincteric behaviour even in unfamiliar environments and maintain it over time.

To achieve these objectives, it is necessary for subjects to possess certain prerequisites, without which it would be impossible to learn and perform this skill in a self-sufficient manner. These essential prerequisites are related to physiological development, especially with the maturity of the central nervous system and the sphincter musculature and the absence of specific organic damage such as brain or spinal injuries or infections or abnormalities of the urinary system or rectum. Before starting the program, a thorough medical examination is therefore essential (Fig. 2). However, the presence of organic damage can be ruled out with some certainty and physiological development can be considered completed if three leading indicators are present:

- (a) The subject should be over two and a half years old. In fact, as with other abilities, sphincter control can be placed in a developmental sequence completed at around two and a half years of age. In order to be able to speak of complete independence in this ability, one must, however, wait for the appearance of the autonomous behaviours of undressing, dressing and cleaning oneself. Foxx and Azrin (1973a) recommend starting the program with severely handicapped subjects only after the age of five.
- b) The subject should demonstrate a stable sequence of urination and defecation. This regularity shows that urination and defecation occur within certain periods of the day rather than being random.
- c) The subject should have stable daily dry periods. The subject, with organic abnormalities, generally urinates very frequently and in small quantities. The presence of retention periods exceeding two hours is a good prognostic indicator.

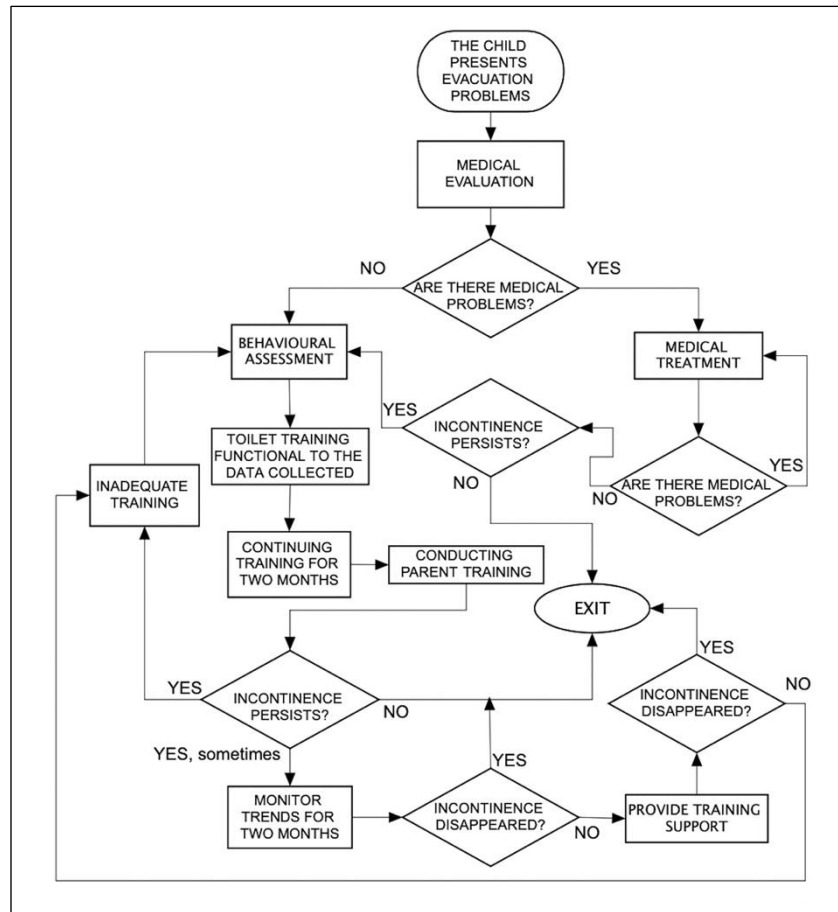


Fig. 2 – Flow-chart of sphincter control.

2.1 The Assessment

Tab.1 presents a record sheet of the frequency of sphincter behaviour. By analyzing the data collected with this form, we can obtain valuable information on the presence or absence of the essential prerequisites. Another purpose of the preliminary quantitative analysis is to obtain an accurate picture of the situation before the program is implemented. The need for this data also stems from the importance of not relying solely on a subjective estimate. Indeed, for future evaluation of the program's effects, it is essential to have a wealth of objective data from specific direct observation as a benchmark. This form is filled in daily by the persons caring for the subject and requires a check on their cleanliness every 30 minutes. The following deliverables are given to the person filling out the form:

DAILY SPHINCTER EVACUATION SHEET							
Name: _____		Age: ____		Date: _____		Observer: _____	
TIME	URINE	FAECES	PLACE	PEOPLE PRESENT	SITUATION	AMOUNT OF FLUID DRUNK	CONSISTENCY OF FAECES
7.00-7.30							
7.30-8.00							
8.00-8.30							
8.30-9.00							
9.00-9.30							
9.30-10.00							
10.00-10.30							
10.30-11.00							
11.00-11.30							
11.30-12.00							
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21.00-21.30							
21.30-22.00							
22.00-22.30							
22.30-23.00							
Notes:							

Tab. 1 - Sphincter behaviour frequency recording sheet. The state of cleanliness should be checked every thirty minutes. In the ‘SITUATION’ column, note: 1. the activity of the subject; 2. the activity of those present; 3. the emotional state of the subject in the period BEFORE elimination.

a) Change absolutely nothing in the subject's daily *routine* or in your behaviour towards him/her. If the subject is taken to the toilet regularly, you should continue to take him; if he wears nappies, you should continue to wear them; you should not vary the amount of liquids, etc.

- b) Check the subject's cleanliness every 30 minutes, avoiding scolding him if he is found wet or dirty and praising him if he is dry. Limit yourself to simple detection.
- c) Carefully record when the subject is found wet or dirty or exhibits appropriate sphincter behaviour.

Note the time in the first column of the form and in the second column if urination occurred. The approximate amount (very little, a little, quite a lot, a lot); in the third, each time defecation occurs; in the fourth, the place where the elimination occurred (in the toilet, in the potty, in a room other than the bathroom, etc.), in the fifth the people who were present and finally in the last column what the subject and those present were doing immediately before the evacuation and the subject's emotional state (laughing, afraid, angry, etc.).

- d) Report any events that may interfere with sphincter behaviour, such as fever and intestinal disorders, in the 'notes' space.
- e) To obtain reliable data, record for ten consecutive days.

Analyzing the data with the form in Tab.1 allows us to identify whether there are any recurrent occasions for accidents. The observation, although set on the subject's behaviour, analyses his interaction with the environment and in this, one must look for the factors that favour the emission of misbehaviour. These factors are called 'antecedent events. If, for example, it is found that the subject has a higher number of accidents when he stays at home or during a specific time slot, we can legitimately assume that this is not due to chance but is strictly dependent on specific antecedents. The analysis of the consequences of enuretic and/or encopretic episodes that involuntarily contribute to maintaining the problem must be added to analyze antecedent events. It often happens that, even if no specific antecedents are identified, there is a certain regularity in what happens after incidents. The most obvious fact observed in this respect is the high concentration of gratifications after accidents. Sometimes, changing and cleaning is one of the most gratifying moments of social contact. Identifying educational mechanisms that maintain or exacerbate the absence of sphincter control generally results from interviews with the person caring for the subject. The importance of this identification is rather obvious in correctly planning and transmitting educational skills.

If the fact that the child urinates or defecates on himself when he is left alone for a long time is rather recurrent from the record sheets, we can assume that this is a facilitating antecedent event. Urination and defecation always have as an immediate consequence a whole series of attentions from the mother, at first even in the form of reproaches. He also learnt to get more pleasant attention from his mother, who looked after him for several minutes and 'cuddled' him (Wrobel, 2023).

3. METHODOLOGY

Sphincter control, as we have seen, is a complex and long chain of responses that includes social, physical and physiological stimuli and requires systematic positive and negative consequences for its maintenance rather than the consideration of a simple muscular reflex associated with internal stimuli (Azrin & Foxx, 1971). This assumes that operant learning procedures can teach subjects lacking sphincter control to pay attention to proprioceptive tension stimuli and respond correctly. The various behaviours that make up the

autonomous evacuation skill can be gradually modelled and concatenated by systematically applying appropriate antecedent stimulus events and reinforcement procedures. Enuretic and encopretic incidents, on the other hand, are eliminated by avoiding the occurrence of the antecedents that might foster them, by subtracting the events that might reward and maintain them (especially with social extinction) and by applying mildly aversive consequences (cleaning) (Greer, Neidert, & Dozier, 2016).

Participant

Andrea is a 7-year-old child diagnosed with Autism Spectrum Disorder (ASD), undergoing rehabilitation treatment based on Applied Behaviour Analysis (ABA) at a Rehabilitation Centre for 40 hours per month, divided between home and school.

Initially, the child was observed directly in the natural environment (home and school) where an anamnestic survey was also carried out with an interview with parents and teachers, and subsequently, in December 2022, two checklists were administered to detect the child's functioning profile (baseline): the 'IPF' (Questionnaire for the Identification of the Functioning Profile; Guazzo, 2022), and the VB-MAPP (Verbal Behavior Milestones Assessment and Placement Program; Sundberg, 2008). From the assessment with the checklists, the results shown in the graphs of Fig. 3 and 4 emerged, from which it can be deduced that Andrea had not mastered, at the time of observation, many adaptive skills (such as language, socialization, play, etc.), and had several dysfunctional behaviours that were not appropriate for his chronological age.

Among these, one behaviour that greatly concerned the parents was his way of evacuating the anal sphincter. The child was not able to use the toilet for defecation. Although he controlled the sphincter, he preferred to use a 'nappy' that he asked his mother when he needed to evacuate his bowels and then pooped standing up, in any room of the house, with the door closed, and in the absence of other people (Freeman, Riley, Duke & Fu, 2014). Attempts at extinction by the parents had failed miserably: the child had lasted about ten days without defecating, sending his caregivers into a 'tailspin', who eventually gave him the nappy when the child showed signs of physical discomfort as well as compromising his feeding.

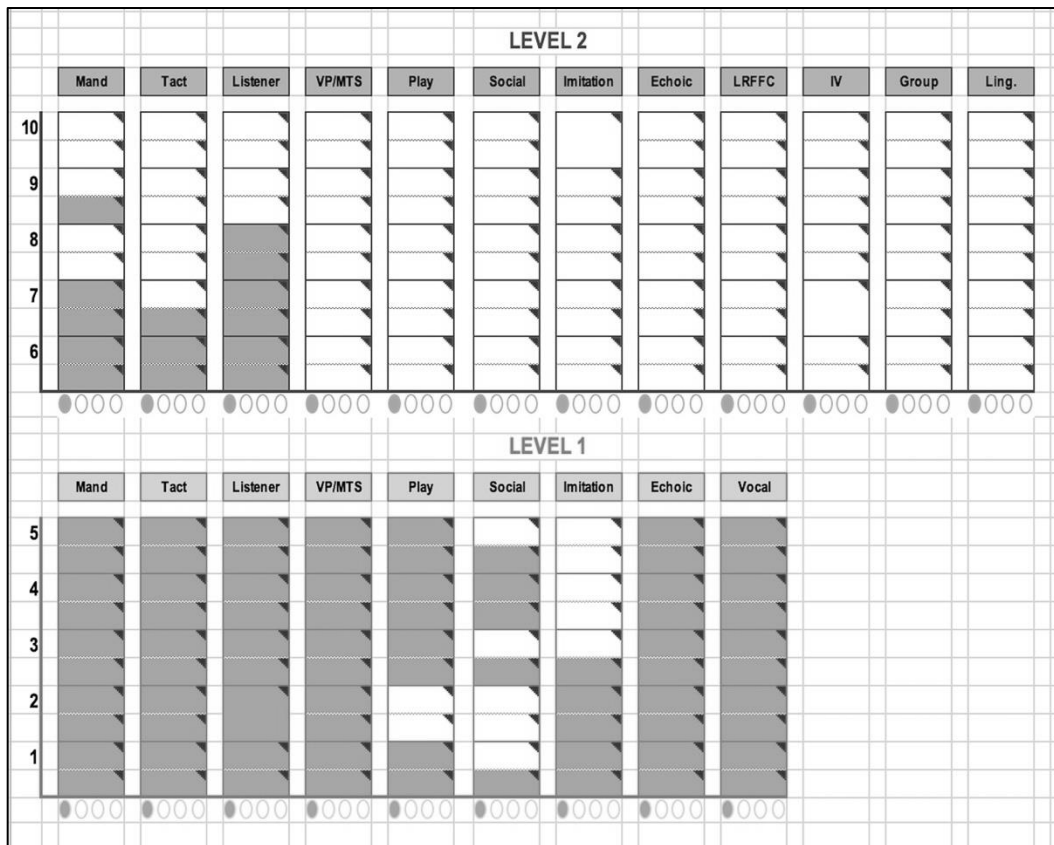
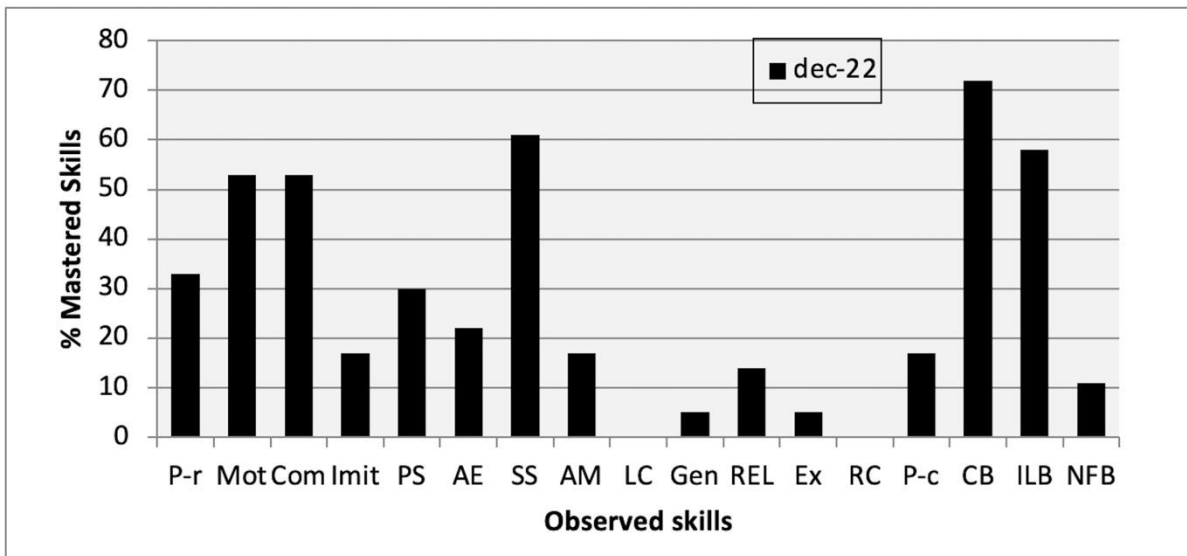


Fig. 3 - VB-MAPP Milestones scoring grid administered in December 2022. Level 3 is missing to take up less space on the page, considering the child has not acquired any items on this level. As seen from the grid, he acquired a total score of 47 compared to the optimum score of 170.



Legend: P-r = Pre-requisite Skills; Mot = Motor Skills; Com = Communication Skills; Imit = Imitation Skills; Gio = Play Skills; A-E = Affective-Emotional Skills; AS = Self-Sufficiency Skills; AM = Attentional and Mnestic Skills; LC = Logical-

Conceptual Skills Gen = Generalisation Skills; LRE = Receptive and Expressive Language Skills; Es = Executive Skills; RC = Rhythm and Coordination Skills; P-c = Pre-curricular Skills; CDS = Challenge Behaviours; CIA = Interfering with Learning Behaviours; CNF = Non-functional Behaviours.

Fig. 4 - Results obtained from the administration of the IPF in December 2022.

Procedure

The intervention started at the beginning of 2024, i.e. approximately 15 months after the identification of the Functioning Profile (Figs. 3 and 4). The ‘delay’ was necessary to assess the absence of ‘physical problems’, related to physiological development (infections, food intolerances, epidermal irritations, etc.), with which it would have been impossible to learn and perform this skill self-sufficiently. In addition, the data collected with the form in Tab. 1 were analyzed both on the frequency of enuretic and/or encopretic behaviour and on the child's interaction with the context to search for possible factors that could have favoured the emission of misbehaviour, thus identifying the presence of recurrent occasions for the emission of accidents.

Subsequently, a Parent Training course was started to change the attitude of the parents who considered their child too severe to be able to acquire sphincter control, making it clear, especially to the mother, that ‘faecal continence’ had as an immediate consequence a whole series of attentions on her part, at first even in the form of reprimands. That is, the mother, to prevent the child from having more serious problems, after a few attempts to make him desist from requesting a nappy, would put it on him and, after evacuation, would care for him, change him, wash him and, so as not to hear him cry, console him and play with him. This interaction typically described a ‘negative reinforcement’ process for the mother, who learned how these behaviours could make the child and herself calm again.

After this initial phase, Andrea’s behaviour was directly observed when he had to evacuate his bowels: he refused to go to the toilet and sit on the potty, asked his mother for his nappy, and once it was on, he immediately evacuated his sphincter. The immediate evacuation indicated that the subject had perfect control of the muscles involved in voluntary evacuation (after all, he had resisted for about ten days!). However, he did not discriminate where to evacuate or, rather, for him, the discriminative stimulus to evacuate the sphincter was the ‘nappy’, not the potty (Wingate, Falcomata, & Ferguson, 2017).

To teach the child to use the toilet bowl as the discriminative stimulus for elimination, we used the following procedure:

Step 1.

Goal: to make Andrea become more regular and have more opportunities to defecate.

Procedure. Every time Andrea asked to poo, mummy put a nappy on him. The only compromise was that he had to wear it in the bathroom and that he had to stay there to defecate, alone and standing up. If Andrea refused, his mother would let him do it as usual without making any judgment.

Duration: from 12 to 26 April 2024, there were six requests, and in all six requests, Andrea refused to go into the bathroom but was still given a nappy.

From 27 April to 13 June, Andrea always agreed to wear the nappy and poo in the bathroom, standing up and on his own, receiving various social reinforcements. During this period, he pooped on average every three to four days.

Step 2.

Goal: The child poops in the bathroom, standing and in the presence of a parent.

Procedure: The mother did not ask to stay but initially left the door ajar or stayed to do other activities, disregarding the child. In the first few days, the child tolerated the mother's presence in the bathroom but evacuated a few times and did not empty the sphincter completely.

Duration: 15 June to 5 October 2024.

Step 3.

Goal: Andrea had to poop while sitting on the toilet bowl.

Procedure: use of an exclusive reinforcer (mobile/tablet for ten minutes): if the child accepted the mother's instruction, i.e. to poo sitting on the toilet bowl, wearing a nappy, and evacuating the sphincter in the set time (ten minutes), he received the exclusive reinforcer, and got a bonus of another five minutes. If he did not evacuate, he would have to hand in his mobile/tablet and get up. If Andrea refused to sit down, the mother remained silent without replying, and the child pooped, standing up as usual. The mother's instruction was: 'Andrea, I will give you the mobile/tablet for ten minutes if you sit on the toilet bowl to poo'.

Duration: from 8 October to 9 November 2024, Andrea always refused to sit but continued to poo standing in the toilet in the presence of his mother, never getting the tablet. On 16 November 2024, he agreed to sit down, got the mobile/tablet and pooped on time, continuing to behave in the same way on the following days. After about ten days, the child spontaneously sat on the potty to defecate without asking for a nappy and still received the reinforcement.

Andrea has evacuated the sphincter daily, generalizing the learning in other contexts.

CONCLUSIONS

Andrea, after having acquired this new skill (evacuating the anal sphincter in an appropriate way), will have to be motivated to practice it consistently as often as he needs to. This motivation will continue to be closely dependent on the consequences of the correct behaviour. One must not think that the program's benefits will last if one does not continue to reinforce the child socially. This is why rare incidents should be discouraged, and the correct behaviour should be emphasized with social approval.

The results highlighted the importance, in accordance with the most recent 'integrated' programs, of interventions that include appropriate parental training (Rinald & Mirenda, 2012; Doan & Toussaint, 2017). Intervention methods that only take the form of the expert-child relationship and do not guarantee

maintenance and generalization often produce limited and evanescent results, given that the child spends most of his or her time in the family and at school. In this 'integrated' perspective, the need for involvement in the program of all those who deal with the child daily and are ultimately the agents of any stable change in the child's behavioural repertoire fits in. The expert will, above all, train educators and parents and be a competent role model during the first few days of treatment. Thereafter, his active presence should gradually diminish so that he can become a supervisor of the intervention and let the parents carry out the program independently.

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