

EVALUATION AND TRAINING OF BASIC AND INITIAL TECHNIQUES FOR PROBING CANE USE IN SCHOOL ENVIRONMENTS¹

AVALIAÇÃO E TREINAMENTO DAS TÉCNICAS BÁSICAS E INICIAIS PARA A LOCOMOÇÃO COM A BENGALA EM AMBIENTES ESCOLARES

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ABSTRACT: The aim of this study was to evaluate a program for training basic probing cane techniques in the school environment. A 13-year-old female student with congenital blindness enrolled in the 1st grade of Middle School participated in the study. The instruments used were the evaluation protocols of the basic orientation and mobility techniques. The evaluation took place in three environments: corridors, classroom and schoolyard, and the quasi-experimental design consisted of pretest, intervention and posttest. The analysis was quantitative for the student's performance and, in the intervention, it was qualitative for the choice of the teaching strategies. The results of the pretest indicated that the student had no difficulty in performing the basic behaviors of the proposed techniques, but failed to perform those that are specific, which were the focus of the training. The teaching strategies were explanations, instructions and presentation of kinesthetic models. Posttest results pointed out that the student was able to perform most behaviors of all techniques in all environments. It was concluded that the training program was successful due to: the quasi-experimental study type that objectively allowed the evaluation of behaviors; registration and filming forms, which ensured control of the teaching process; the teaching strategies employed; teaching and training focused on the blind student's natural environment. Two points were identified as necessary to improve the use of the techniques: the type of clothing, the accessories, the student's shoes and the training time.

KEYWORDS: Special Education. Training. Probing Cane. Orientation and Mobility.

RESUMO: Este estudo teve como objetivo avaliar um programa de treinamento das técnicas básicas com a bengala em ambiente escolar. Uma estudante com 13 anos de idade, com cegueira congênita, matriculada no 6º ano/ 5ª série do Ensino Fundamental, participou do estudo. Os instrumentos utilizados foram os protocolos de avaliação das técnicas básicas de orientação e mobilidade. As avaliações ocorreram em três ambientes: corredores, sala de aula e pátio, e o *design* quase experimental foi composto por pré-teste, intervenção e pós-teste. A análise foi quantitativa para os desempenhos da estudante e, na intervenção, qualitativa para a escolha das estratégias de ensino. Os resultados do pré-teste apontaram que a estudante não teve dificuldades em executar os comportamentos básicos das técnicas propostas, porém deixou de realizar aqueles que são específicos, que foram o foco do treinamento. As estratégias de ensino foram explicações, instruções e apresentação de modelos cinestésicos. Os resultados do pós-teste apontaram que a estudante conseguiu executar a maioria dos comportamentos de todas as técnicas em todos os ambientes. Conclui-se que o programa de treinamento teve sucesso devido: ao tipo de estudo quase experimental, que possibilitou objetivamente a avaliação dos comportamentos; às fichas de registro e de filmagem, que garantiram o controle do processo de ensino; às estratégias de ensino empregadas; ao ensino e ao treinamento focado no ambiente natural da aluna cega. Dois pontos foram identificados como necessários para melhora do uso das técnicas: o tipo de vestimenta, os acessórios, os calçados da aluna e o tempo de treinamento.

PALAVRAS-CHAVE: Educação Especial. Treinamento. Bengala. Orientação e Mobilidade.

1 INTRODUCTION

Among all the techniques proposed by the Orientation and Mobility programs, the teaching and training of probing cane use techniques can be considered the most complex to

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be implemented, since its use depends not only on the perfect execution of the techniques themselves, but also the efficient appropriation of different capacities, skills and interdependent competences, such as: posture, strength, balance, coordination, spatio-temporal orientation and use of the remaining senses; that must be constantly stimulated (Giacomini, Sartoreto, & Bersch, 2010).

In addition to influencing the development and, consequently, increasing the blind person's self-confidence, the act of using the probing cane correctly, to move around both indoors and outdoors, is directly associated with the development of autonomy, independence, personal domain and increased self-esteem (Felippe & Felippe, 1997; Maciel, 1988, 2003; Melo, 1991).

When it comes to the school context, the teaching of basic techniques with a probing cane is essential, since it is through the correct use of these techniques, along with the remaining senses, that the student will be able to dominate the spaces with greater security, autonomy and independency to come and go in school environments, whether they are internal or external. In addition, the mastery of techniques enables the development of better social contact in addition to offering "a cyclical facilitation in the motor, cognitive, affective and social development, and may even acquire, in the long term, capacity and resources for a future obtaining of better employment opportunities and economic power" (Hoffmann, 1998, p. 147). Using the cane therefore, is much more than being with it during locomotion, it is knowing what, how and when to perform certain movements with it and with the body itself, so that the risk of falls, impacts, shocks and/or trauma can be minimized (Maciel, 1988, 2003).

According to the literature, there are 14 basic techniques with the probing cane that must be taught during the Orientation and Mobility service: 1) probing cane grip in the static position; 2) probing cane grip for movement; 3) touch; 4) gait; 5) changing surfaces; 6) climbing stairs; 7) going down stairs; 8) up and down ramps; 9) opening and closing doors; 10) narrow passages; 11) body alignment; 12) sitting down; 13) following guiding lines; and 14) change direction (Bruno & Mota, 2001; Felippe & Felippe, 1997; Felippe, 2001; Garcia, 2003; Giacomini, Sartoreto, & Bersch, 2010; Maciel, 1988, 2003; Melo, 1991).

To perform these techniques correctly, it is necessary that the person has knowledge about the behaviors that compose them. Only after understanding the specificities of each one, and mastering them, the person will be able to move with independence, autonomy and, especially, safely, avoiding the risk of accidents during locomotion both indoors and outdoors (Garcia, 2003).

Although walking techniques with a probing cane are essential in the lives of blind people, not everyone has the knowledge on how to perform them correctly. Currently, it is possible to notice that most blind students move around with some independence and autonomy in school environments, but do not consider safety during transportation (Zengo, Fiorini, & Manzini, 2017). It is worth mentioning that the number of systematized national materials, which discuss the process of teaching, training and evaluating these techniques, is scarce, especially when it comes to school environments, making it difficult for professionals in the area to provide education, training and evaluation of quality (Orbolato, 2018).

In view of this, this study focused on the following research problem: How to plan, apply and evaluate a training program for basic techniques with a probing cane in school environments through a pre and post-test design? Based on this problem, the study aimed to *evaluate a training program for basic techniques with a probing cane in school environments*.

2 METHOD

This work refers to a quasi-experimental research, intrasubject, which is configured with a design composed of three elements: 1) an evaluation or pre-test; 2) an intervention; and, subsequently, 3) a reassessment or post-test. This type of research has been called that way by the literature in the area (Cozby, 2003; Portney & Watkins, 2008). It is part of a broader research⁴ that used the 14 basic techniques with the probing cane.

In this study, six basic techniques will be presented, which are initial so that the blind person can move with the cane: 1) probing cane grip in the static position; 2) probing cane grip for movement; 3) touch; 4) gait; 5) body alignment; and 6) following guiding lines. Data collection took place at a school in a city in the interior of the state of São Paulo. The following criteria were adopted for the selection of the participant: 1) having a diagnosis of blindness, ensuring the absence of other disabilities; 2) be enrolled in regular education (from the 6th year/5th grade); and 3) being over 11 years old.

Based on these criteria, a 13-year-old teenager enrolled in the 6th grade/5th grade of Elementary School participated in the study, diagnosed as congenitally blind and who had not received systematic training regarding the Orientation and Mobility techniques. The procedures for data collection were carried out in the premises of the school where she was enrolled⁵.

2.1 EXPLORATORY STUDY AND ELABORATION OF THE EVALUATION CIRCUIT

The research started with the *exploratory study*. For that, the school environments were mapped, in order to help the researcher⁶ to outline how, where and when the basic techniques with the probing cane would be performed (Sampieri, Collado, & Lucio, 2006). After an informal conversation with the director of the institution and the caregiver responsible for accompanying the student upon arrival at school, the internal and external environments, which were more and less frequented by the student, were identified.

Considering the need to make training as challenging as possible and the importance of measuring the same variable in different environments, the process of preparing the *Evaluation Circuit* began. Based on the information obtained through the exploratory study, three environments were selected that had structures that favored the realization and training

⁴ A broader research, entitled *Treinamento e avaliação de técnicas de orientação e mobilidade em ambientes escolares* (Training and evaluation of orientation and mobility techniques in school environments (Orbolato, 2018), aimed to evaluate the training of Orientation and Mobility techniques in school environments and was funded by the National Council for Scientific and Technological Development (CNPq).

⁵ The Free and Informed Consent Forms and the Photography and Filming Consent Forms were delivered and signed by the student's parents and guardians.

⁶ The first author took the training course promoted by the Educational Institute of the State of São Paulo, with a workload of 120 hours, and has the title of Technician in Orientation and Mobility. The second author has a 40-hour certification from the Benjamin Constant Institute, Rio de Janeiro.

of the six proposed techniques. The criteria for selecting these environments were: 1) having enough space for the student to move around safely; and 2) having guiding structures for the student to orient herself during the course. The selected environments were: 1) hallway; 2) classroom; and 3) outdoor area.

2.2 ELABORATION OF EVALUATION PROTOCOLS

Considering that each of the basic and initial techniques with the probing cane has different behaviors that must be performed in order to guarantee safety and naturalness during locomotion, it was necessary that such behaviors were identified in the literature. Thus, in order that these behaviors could be evaluated before and after training, the *Basic Techniques Evaluation Protocols with the probing cane* were developed.

In order to contemplate the specificities of each technique - due to its different objectives - an evaluation protocol was elaborated for each one. For example, in Table 1, part of the evaluation protocol regarding the technique of using a probing cane in the static position is presented.

PROBING CANE GRIP TECHNIQUE IN STATIC POSITION
Hold the top of the probing cane with one hand (with all fingers).
Keep the hand, which is holding the top of the probing cane inside the wrist strap.
Keep the probing cane in the vertical position.
Keep the tip of the probing cane in contact with the ground.
Keep the whole probing cane close to the body.
Keep the other arm extended at the side of the body.
Maintain upright posture.

Table 1. Evaluation protocol: probing cane grip technique in static position.

Source: Elaborated by the authors.

2.3 PROCEDURES FOR DATA COLLECTION

The filming was used as a form of recording that guaranteed the review of the data obtained during the evaluation and training process. The collection was divided into three stages: 1) pre-test; 2) training; and 3) post-test. In the study, the pre-test was configured in the evaluation of the student during the execution of each of the basic techniques with the probing cane in each of the environments, without the intervention of the researcher.

As a strategy used to carry out the pre-test, it is important to highlight that it was not based on specific commands for the execution of the techniques, such as, “*do the probing cane grip technique in the static position*”. On the contrary, natural situations were developed, within school’s daily routine, in which the student should move around. Thus, according to each situation presented, the student should move around in the way she thought was correct.

After the execution of all techniques in Environment 1, they were performed in Environment 2 (reading room), subsequently, in Environment 3. In order for the student’s

performance to be evaluated and quantified, *pre and post-test Registration Forms* were elaborated. This instrument was composed of the same behaviors proposed by the Evaluation Protocols (Table 1), however, for each of the environments, registration fields were added for the pre and post-test moments. Thus, a Registration Form was prepared for each technique.

To fill in the registration forms for each technique, the pre-test footage was analyzed and the behaviors performed correctly by the student were marked with an “x”. After completing the registration forms for each technique, in each environment, referring to the pre-test, the second stage of data collection began: the training.

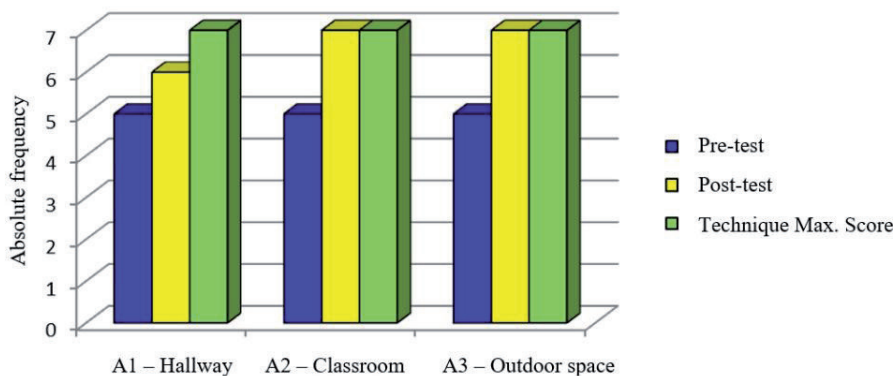
The training took place weekly, in the same environments where the pre-test evaluations were carried out. From the moment the researcher found that the student had assimilated the correct execution of the behaviors of each of the techniques, in each of the environments, the third stage of collection began: the post-test. The post-test evaluation took place in a single day. For that, they were attributed to the same conditions, orientations and situations of the school daily routine, proposed in the pre-test.

2.4 DATA PROCESSING AND ANALYSIS

Data processing and analysis took place quantitatively. It was considered the sum of the absolute frequency of behaviors correctly performed by the student in the pre and post-test assessments, in each of the environments. Such values were plotted in graphs for further comparative analysis.

3 RESULTS AND DISCUSSION

The training started with the Probing cane Grip technique in a static position that aims to allow the blind person to handle the cane naturally and safely while standing, without interfering with the other’s space. Graph 1 shows the values obtained by the student when performing the probing cane grip technique in the static position.



Graph 1. Values obtained by calculating the absolute frequency of the behaviors performed by the student regarding the probing cane grip technique in the static position.

Source: Elaborated by the authors.

This technique was composed of seven distinct behaviors. When analyzing the pre-test registration form, it was possible to identify that the student was able to perform five of them easily. On the other hand, it was identified that the student did not perform the other two behaviors, that of *keeping the hand, which is holding the upper part of the probing cane inside the wrist strap*, and that of *keeping the other arm extended at the side of the body*. In terms of these behaviors, it is believed that the fact that the student never received specific training in Orientation and Mobility meant that she did not know the existence and the importance of using these behaviors.

In fact, being familiar with the probing cane is fundamental for the blind person, since, through this domain, the subject may have more confidence to use it and more security during locomotion (Felippe & Felippe, 1997). Therefore, it is essential to know the parts of the probing cane, to know how to disassemble and assemble it, and also to identify the physical conditions of this resource, in order to identify when it should undergo a review, for example. Thus, it is only after being familiarized with the probing cane- and all its specifications - that the person will be able to start training the techniques themselves effectively, favoring the possibility of moving confidently and safely.

The behavior of *keeping the hand, which is holding the top of the probing cane, inside the wrist strap*, for example, is fundamental even when the blind person is not moving, so that he/she does not run the risk of “losing the probing cane” if, for some reason, it escapes the hand. Even though it is so important, it is possible to notice that the literature does not discuss its importance for locomotion.

The moment of the break, for example, which occurs in the outdoor area, offers situations in which not keeping the hand inside the wrist strap of the probing cane can compromise the safety of the blind person. In these environments, there are usually a large number of people in transit and the risk of someone unintentionally bumping and/or kicking the probing cane is very high. In such cases, if the blind person does not have the *hand inside the handle of the probing cane*, it may loosen up, causing a difficult recovery. In this perspective, it is necessary that the blind person has internalized this behavior to avoid situations of embarrassment.

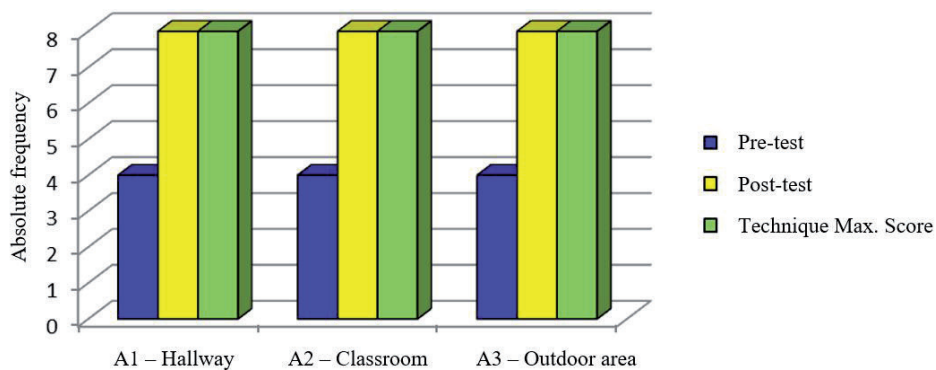
It was also assessed that the student did not keep the other arm extended at the side of the body. Filming indicated that she remained with both hands on the handle of the cane. Although this is a behavior that is also not discussed in the literature, being with both hands on the handle of the cane does not become a favorable strategy in any type of environment, since, in case someone bumps into the cane or bumps into the person, the risk that the person will become unbalanced and/or fall is high, considering that sustains all the weight of the body on it.

The training was based on the correct execution of these two behaviors that the student was unable to perform in the pre-test and started in the hallway (A1). When starting the training, the researcher identified that the student did not know how to identify the parts of the probing cane, for this reason, the training started with the presentation of the respective parts of the probing cane.

At the end of the recognition, the researcher started the verbal explanation on how to correctly carry out the grip technique and informed about the losses caused by the non-execution and/or incorrect execution of the necessary behaviors. In addition, it was identified that the student took long to stop placing both hands on the grip of the probing cane. Each time she performed this action, the researcher verbalized the correct way to perform them. The training ended after the researcher realized that the student would have understood the importance and way of executing the seven behaviors.

When analyzing the graph of the post-test of this technique, it was possible to notice that the student's performance improved significantly in all environments, with emphasis on the execution in the classroom and outdoor area (A2 and A3), where the student performed all behaviors correctly.

Of the seven behaviors, the student had difficulties in executing the one of *keeping the other arm extended on the side of the body* in the hallway (A1). In this case, there is no way to infer a cause for the non-realization of this behavior, since the student was able to execute it in the two other environments. Graph 2 shows the values obtained by the student when carrying out the probing cane grip technique for movement.



Graph 2. Values obtained by calculating the absolute frequency of the behaviors performed by the student regarding the probing cane grip technique for movement.

Source: Elaborated by the authors.

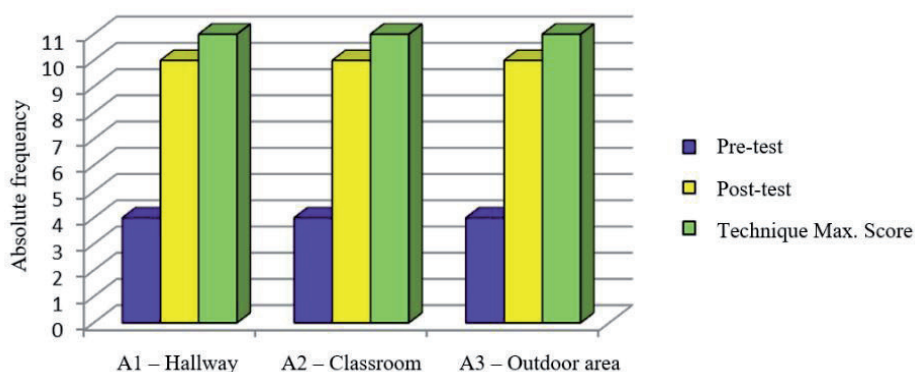
The technique of the probing cane grip for movement aims to allow the blind person to grip the cane correctly so that he/she can move around naturally and safely, without interfering negatively in the space of the other. This technique was composed of eight behaviors. When analyzing the registration form referring to the pre-test, it was possible to notice that the student was able to perform four of them: 1) keeping the hand, which she is holding at the top of the cane, inside the strap of the probing cane; 2) keeping the arm that is holding the cane on the midline of the body (approximately); 3) extending the index finger over the top of the cane, leaving the thumb and index finger visible; and 4) performing a half rotation of the wrist, allowing the palm to turn to the side. In this case, it is understood that, as they are specific

behaviors of the technique, and the fact that the student does not know their existence, she did not manifest the intention to execute them, in any of the three environments. Considering these facts, the training was based on learning these behaviors.

The training started in the hallway (A1), with the explanation of the importance of each behavior for safety during locomotion. In order to instruct her, in addition to verbalizing how the student should act, the researcher was placing the student's arm, hand and fingers according to the specificity of each of the behaviors. Each time the student performed the technique, the researcher observed her performance in order to identify the behaviors that she was not performing correctly, and then make the correction.

After training all the behaviors of this technique, the third moment of the research, the post-test evaluation, began. From the data in the graph, it was possible to observe that the student was able to naturally, autonomously and safely perform all the behaviors proposed by this technique, in the three environments. In this sense, it is understood that the strategies used for training were successful.

Graph 3 shows the values obtained when performing the touch technique.



Graph 3. Values obtained by calculating the absolute frequency of behaviors performed by the student regarding the touch technique.

Source: Elaborated by the authors.

According to Garcia (2003, p. 109), the touch technique aims to provide “the maximum protection and information of the environment with regard to different objects that can be found from the ground to the waist line”. It is through this technique that the blind person can move with the probing cane in a coordinated, natural, safe, autonomous and independent way, so that he/she can perceive the environment efficiently (Felippe & Felippe, 1997). To perform this technique, it is necessary that the person, in addition to having good coordination to perform the probing cane movement, also has the necessary strength in the fingers, wrist and arm to keep the cane out of contact with the ground when executing the movement.

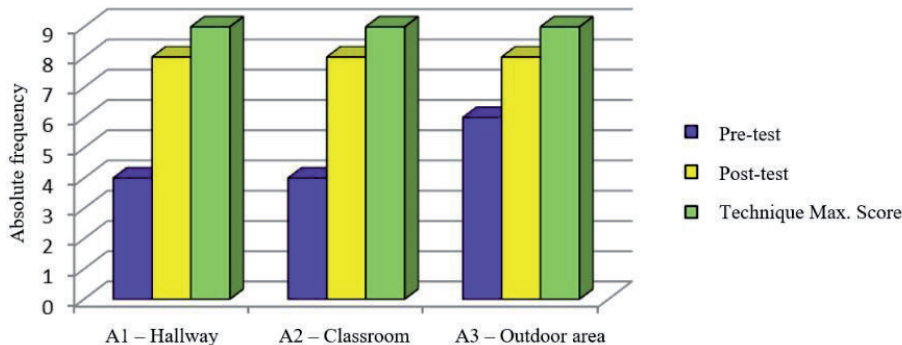
In this study, the touch technique was composed of 11 behaviors. When analyzing the registration form, it was identified that the student was able to easily perform the four behaviors that are basic to this technique. However, it was possible to notice that the student was unable to perform, in the three environments, any of the seven that are characterized as specific: 1) flexing the wrist to both sides, without moving the arm that is holding the probing cane; 2) keeping the arm holding the cane at the midline of the body; 3) extending the index finger over the top of the cane, leaving the thumb and index finger visible; 4) flexing the wrist to both sides, without moving the arm that is holding the cane; 5) touching the tip of the probing cane at the right and left points (without dragging); 6) keeping the probing cane in opening angle (when touching the points on the ground) at a distance slightly wider than the shoulders; and 7) remaining with another arm and hand free during locomotion (natural movements). For these behaviors, it was noticed that the student was unaware of the need and the importance of performing them. The training focused on these behaviors and started in the hallway (A1) with information about the importance of this technique for locomotion.

The fact that some behaviors proposed by this technique have been trained in the previous technique (using a probing cane for movement) favored the student's learning. Regarding the other four behaviors, the researcher informed of their importance for safety during locomotion and instructed her physically on how to perform them. Even so, the student had difficulties in carrying out the behavior of *flexing the wrist to both sides, without moving the arm that is holding the probing cane* correctly.

Instead of just flexing the wrist to both sides, the student was moving her arm, preventing the hand from remaining positioned on the midline of the body. For this behavior, it was necessary to offer an execution model. Thus, it was observed that, after verbal, physical and kinesthetic instruction, the student was able to perform the behavior correctly. Concomitant with the performance of this behavior, the researcher requested that the student should touch the cane on the ground while moving. This behavior was readily understood and performed by the student. However, the student reported that she was afraid that people would stumble over her cane and, therefore, preferred to move around with her cane still. In view of this, the researcher informed the possible consequences of walking with the probing cane still and the correct way to do so, so as not to occupy the space of the other. At the end of this moment, the researcher asked the student to perform the touch technique, which was performed with excellence. At that moment, the student demonstrated to have learned the behaviors taught.

When checking the pre-test data in Graph 3, it was possible to notice that, of the 11 behaviors, the student failed to perform one, in all environments. When analyzing the registration form, this behavior was to *remain with the other arm and hand free during locomotion (natural movements)*. For this behavior, it is believed that the student felt uncomfortable and insecure to move around using only the probing cane, thus, remaining with the arm and hand, which were not holding the cane tense - in this case, holding the shirt hem. In these situations, it is believed that more training time could make the student minimize this lack of security and move more naturally in these environments.

Graph 4 shows the values obtained by the student when performing the gait technique.



Graph 4. Values obtained by calculating the absolute frequency of behaviors performed by the student regarding the gait technique.

Source: Elaborated by the authors.

The gait technique aims to allow the blind person to move in a balanced, coordinated, safe and natural way using the probing cane. It consists of nine distinct behaviors. When analyzing the pre-test registration form, it was possible to identify that the student was able to perform four out of the nine techniques.

Regarding the behaviors that the student had difficulty in performing, which she performed in at least one of the environments, was the *step with the left foot when the probing cane touches the right side of the ground* and the *step with the right foot when the cane touches the left side of the ground*. Both were performed only in the outdoor area (A3). Based on this data and after analyzing the footage, it is believed that she performed this behavior unintentionally, since, in the hallway and in the classroom (A1 and A2), she did not show any intention of executing them correctly.

The three behaviors that the student did not perform in any of the environments were: 1) remaining with the other arm and hand free during locomotion with natural movements; 2) removing the entire foot from the floor during the stride, without dragging the shoes; and 3) keeping pace, between feet and hands. Regarding these behaviors, it is assumed that the main factors for the student not being able to perform such behaviors, in any of the three environments, was the fact that she used open shoes (flip-flop style) and also due to the lack of habit in getting around using only the cane.

According to the literature, this technique can be trained in two ways. The first is individually, when gait and its specificities - coordination, balance, height, distance between feet, distance between steps, among others - are stimulated, developed and improved (Felippe & Felippe, 1997; Giacomini, Sartoreto, & Bersch, 2010) and, concomitantly, when the person is already aware of the necessary physical and motor skills and abilities. In the second case, gait training occurs concurrently with the training of other techniques, such as, for example, touch training (Felippe & Felippe, 1997; Garcia, 2003; Giacomini, Sartoreto, & Bersch, 2010; Maciel, 1988, 2003; Melo, 1991).

As a result of the student exhibiting awareness of the capacities and physical and motor skills necessary to perform the gait, in this study, the training of this technique was performed concurrently with the training of the Touch technique. The training was based on

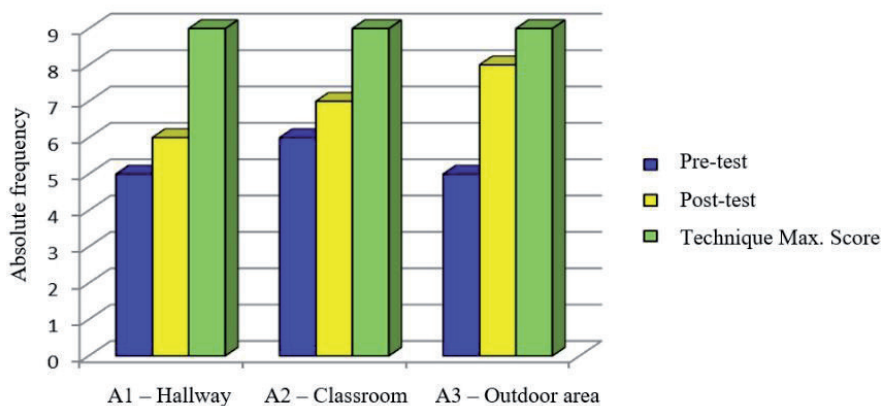
the development of behaviors that the student had difficulty, and also, those that she failed to perform during the pre-test.

Considering that performing the gait technique, especially when it occurs concurrently with the Touching technique, becomes one of the most complex techniques in this category, it is necessary that the blind person maintain a synchrony in the movements of the upper and lower limbs in order to maintain him/herself safe during locomotion. The training of this technique started in the hallway (A1). The actions to be performed and the benefits of the correct performance of the behaviors were informed.

When she demonstrated that she had understood this information, the researcher began to explain how to perform the steps of walking with the left foot when the cane touches the right side of the ground and walking with the right foot when the cane touches the left side of the ground. In addition to verbally informing what the student should do, it was necessary for the researcher to use kinesthetic information. The student's greatest difficulty was the ability to move her hips without turning when performing the stride. That was the focus of the training.

The training ended when the researcher realized that the student was managing to execute all the proposed behaviors in the most correct way possible. After the training period, the post-test started. Although coordination, between the stride and the touch, is the most complex factor of this technique, it was observed, in the registration form, that the student had no difficulties in performing it in the post-test. When analyzing the registration form, it was observed that her greatest challenge was to perform the behavior of *remaining with another arm and hand free during locomotion with natural movements*. This behavior was not performed in any of the three environments. In this case, it appears that, even though the researcher informed both the details of the environment where she was (hallway, classroom and outdoor area) as well as the situation in which she was involved (environment with few people passing by), the student did not feel comfortable, keeping the arm and hand free without natural movements.

Graph 5 shows the values obtained by the student when performing the technique of changing surfaces.



Graph 5. Values obtained by calculating the absolute frequency of behaviors performed by the student regarding the framing and/or body alignment technique.

Source: Elaborated by the authors.

The technique of framing and/or aligning the body has the function of allowing the blind person to establish a straight line of the gait, so that he/she can establish conditions to determine his/her position in relation to objects and, from that, establish the line of making the desired direction using the cane.

In this study, this technique was composed of nine behaviors. Of these, the student had the facility to execute seven. In contrast, the student was unable to perform two of them - which can be characterized as specific - in any of the three environments: 1) *remain with the other arm and hand free during locomotion (natural movements)*; and 2) *remove the entire foot from the ground during the stride (without dragging the shoes)*.

For the first, the fact that the student does not have the habit of getting around using only the cane made her appear not to be confident in performing this technique; therefore, she kept her arm and hand free, without natural movements of locomotion. For the second, it was observed that the fact that the student uses inappropriate shoes may have contributed to her not having a good performance. In the second case, it is believed that, if the student was wearing closed toe shoes, her performance could have been better in the pre-test.

Regarding the other two behaviors that are characterized as specific to this technique, it was possible to identify that the student did not perform the behavior of *aligning the feet towards the sound*, in any of the three environments, and performed the *locomotion in a straight line* only in the classroom (A2).

The training focused on the behaviors that the student had difficulty and/or failed to perform during the pre-test. The training started in the outdoor area (A3). When starting the training, the researcher realized that the student was not able to locate the sound easily and, therefore, started auditory stimulation, in order to favor the location of the sound more accurately during the displacement. The stimulation occurred until the moment that the student was able to direct her body correctly most of the time. Subsequently, the behaviors related to the techniques that the student had difficulty performing were taught and trained during locomotion. Most of the time, verbal instructions were sufficient for the student to perform the behaviors correctly. When necessary, physical instructions were also employed.

When analyzing the data related to the post-test, it was possible to identify that, even having a better performance than in the pre-test, the student had difficulties in performing three behaviors: 1) aligning the feet towards the sound; 2) performing locomotion in a straight line; and 3) remaining with the other arm and hand free during locomotion (natural movements).

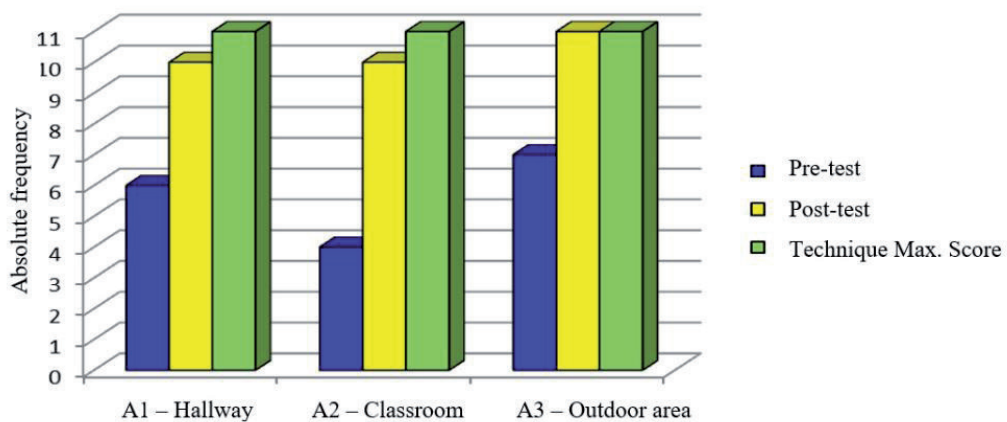
As for the locomotion in the hallway (A1), it was identified that the student did not perform any of these three behaviors. It is believed that the fact that other students were talking in nearby rooms may have distracted the student. Given these data, it is worth emphasizing the importance of concentration during the training of Orientation and Mobility techniques and the losses that the lack of it can cause.

In the classroom (A2), it was observed that the student stopped performing the behaviors of *remaining with the other arm and hand free during locomotion (natural movements)* and that of *performing locomotion in a straight line*. Thus, although the student managed to align her feet towards the sound, she was unable to move in a straight line. It is inferred that she

may not have appropriated the necessary motor actions to perform such action. Therefore, it is believed that more training time is needed for the student to develop concepts of motor memory.

In the outdoor area (A3), the student stopped performing only the behavior of *remaining with the other arm and hands-free during locomotion (natural movements)*. It is assumed that, because she did not feel comfortable moving around in this environment, she kept her arm and hands free, in constant tension (holding the shirt). Therefore, more than teaching specific behaviors of the Orientation and Mobility techniques, it is necessary that issues such as concentration and self-confidence are developed. In general, they are crucial for a safe locomotion.

Graph 6 presents the data regarding the technique of following guiding lines.



Graph 6. Values obtained by calculating the absolute frequency of behaviors performed by the student regarding the technique of following guiding lines.

Source: Elaborated by the authors.

According to Garcia (2003), the technique of following guiding lines is intended to provide the blind person with conditions to walk independently and safely in familiar environments, to ensure a safe locomotion and facilitate mobility in congested areas using the probing cane as a resource. This technique was evaluated by 11 behaviors. Of these, seven are considered basic for mobility and four are specific to the technique. It was possible to identify that the student was unable to perform three of them: 1) remain with the other arm and hand free during locomotion (natural movements); 2) remove the entire foot from the ground during the stride (without dragging the shoes); and 3) maintain a steady pace.

Regarding the specific behaviors of the technique of following guiding lines, it was possible to identify that the student had difficulties in performing three of them: that of *positioning the body parallel to the guiding line* and that of *touching the tip of the cane on the guiding line during locomotion (without dragging it)*, which were performed in the hallway and in the outdoor area (A1 and A3) and that of *maintaining an approximate distance of 20 cm from the guiding line*, which was performed only in the classroom (A2). In these cases, it is clear that,

although the student was aware of how to guide herself, she was not sure how to perform the necessary behaviors. Regarding the behavior of *keeping the probing cane in opening angle (when touching the points on the ground) at a distance slightly larger than the shoulders*, it was identified that the student did not execute it in any of the three environments.

From the analysis of the student's performance in the pre-test evaluation, training started. The training started in the hallway (A1) with the researcher informing about what was the technique of following guiding lines and why this technique is so important for locomotion. From the verbal instructions, already, in the first essay, the student was able to execute the behaviors correctly.

The student's greatest challenge was to be able to *remain with another arm and hand free during locomotion (natural movements)*. The student performed the behavior correctly only when the researcher instructed her verbally, when not, she returned to remain with her arm and hand free, in a tense way. In these cases, instead of interrupting locomotion to explain how the student should act, the researcher verbally instructed with phrases such as: "*Don't miss the wall*", "*Where's the wall?*", or "*Concentrate so you don't get lost*"; thus, the student was correcting herself.

Upon realizing that the student was performing well in this environment, training continued in the classroom (A2). In this location, the researcher used two structures that could serve as guiding lines: space from the blackboard to the classroom door and the rows of students' desks next to the wall. The student had difficulty getting around the row of desks. To do this, it was necessary for the researcher to offer a model for the touch of the cane. After these instructions, it was observed that the student was able to move, in all tests, using the behaviors proposed by the technique.

After being identified that the student had managed to perform most of the proposed behaviors in the most correct way possible, in the three environments, the post-test began. When analyzing Graph 6, it is possible to identify that the student was able to perform all behaviors naturally, safely, autonomously and independently in the outdoor area (A3). In the hallway and in the classroom (A1 and A2), although her performance had improved in relation to the pre-test, she still failed to perform the behavior of *remaining with the other arm and hand free during locomotion (natural movements)*.

Regarding this behavior, although the student had been instructed on the importance of getting around naturally, she had difficulties in deconstructing the patterns of locomotion created by her throughout her life. It is believed that, with more training time, these locomotion vices could be minimized.

4 CONCLUSION

The data allowed us to conclude that the training and evaluation program that was systematized contributed positively for the student to learn how to use the locomotion techniques with a probing cane in school environments.

The points that can be evaluated as positive in the program are: 1) considering the fact that is about a single subject, the quasi-experimental study enabled the evaluation before

and after the training, which allowed to objectively assess the learning of the necessary behaviors for each of the techniques; 2) the registration forms specified in detail the behaviors to be taught and were important at the time of evaluation, teaching and training, which ensured the control of this process; 3) filming was another important registration procedure for reviewing and evaluating teaching and training situations; 4) the teaching strategies employed by the researcher were important for the successful acquisition of the participant's target behaviors, among them, explanations, verbal instructions, and kinesthetic models can be emphasized; 5) the systematization of work was also an important factor, such as the circuit composed of the three environments (hallway, classroom and outdoor area), which enabled the evaluation, teaching and training focused on the natural environment of the blind student.

In the evaluation of the program, as points that deserve attention on the part of those who carry out training in orientation and mobility techniques, the following should be highlighted: 1) the type of clothing, accessories and shoes of the student; 2) training time. The type of clothing, accessories and footwear to be used by the student during training is decisive for the success (or not) of his/her locomotion. It is necessary that, when making this choice, the student must be aware of what can favor and what can harm his/her learning.

There is no standard regarding the time required for training. Each student brings with him/her different experiences that must be evaluated. After teaching, there is a need to train the techniques, and the time factor is a variable to be considered. The most important thing is that the student finishes the training feeling safe, autonomous and independent, so that he/she can move around the school environments, whether internal or external.

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