

Animal-assisted Therapy in Patients with Psychomotor Disorders and Mental Disabilities

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Abstract

Mental disabilities are associated with communication and socialization difficulties, as well as psychomotor disorders which increase the risk of falls and complicate basic daily activities. Animal-assisted therapy (AAT) is a complementary therapeutic technique in which the animal adopts the role of motivator and facilitator. The objectives of this study were to assess the effectiveness of an AAT program in patients with mental disabilities and psychomotor disorders and measure improvements in gait, balance and activity as well as the degree of satisfaction with physiotherapy sessions. This study was a randomized clinical trial, with all subjects obtained through the Occupational Therapy Department of the ASPROS Foundation. We observed improvement in both the intervention and control groups, although this improvement was greater (a statistically significant difference) in the intervention group with regard to balance and satisfaction. Therefore it is a resource that has shown its usefulness and novelty as a community intervention performed by professionals in a Primary Care Center.

Keywords: Animal-assisted therapy; Intellectual disability; Psychomotor problems; Primary health care

Introduction

Primary health care has a huge responsibility in taking care of vulnerable people and/or at risk of worsening their health and/or dependency. It is at this level of care that most activities of health promotion and primary prevention are developed.

The Health Plan [1] poses as an objective: "Improve care from a comprehensive care of the person."

Among other measures proposed:

- Promote primary health care actions to promote an improvement in the care of people, especially those dependent, encouraging the fact of keeping people inside their family environment, whenever possible.
- Generate scientific evidence environments in primary care respecting the improvements in quality care and set up specific interventions.

The important tasks to perform by primary care are community interventions. These actions are aimed at groups or collective groups and can be made along with other services in which their own collective groups are involved.

The group activity is a series of educational proposals that aim to encourage communication, teach people how to live in a healthy way, promote the acquisition of knowledge, skills and attitudes and develop skills in health [2].

It has been shown that teamwork can help to achieve the objectives that would hardly be achieved individually. Working in groups helps finding important social and psychological needs, and to give and receive affection and attention, and even to achieve a sense of belonging. In the field of health, work groups have proven highly effective [3].

Animal-assisted therapy (AAT) consists of having animals participate in therapeutic interventions, with the goal of promoting human health and welfare. These are complementary programs where the animals are elements which motivate

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participants and facilitate therapy. They contribute to creating a fluid interaction and encourage play [4], making therapy more effective and enriching.

AAT should be directed by a health professional and oriented to promoting improvements in physical, social, emotional and/or cognitive function. Sessions can be in both individual and group settings, with specific predefined objectives where progress is documented and evaluated.

Animals have been used since the 18th century to improve physical and mental health in humans. William Tuke used farm animals in 1792 to treat psychiatric patients. Some initial work was published by Boris Levinson in 1960, who observed that pets were helpful in therapy [5].

There are authors who have suggested that the presence of animals contributes to reducing agitation and aggressiveness, promoting sociable behaviour [6]. The aim of this study was to review the literature on AAT in people with intellectual disabilities measuring psychosocial outcomes. Overall there was a positive improvement reported from studies for all psychosocial outcomes (with some cognitive, behavioural, social, emotional components reaching statistical significance) [7].

In the institutionalized population, animals reduce feelings of loneliness [8] and in patients with schizophrenia; they improve socialization, basic daily activities, reduce anhedonia and increase feelings of well being [9]. Definitively, the presence of animals reduces anxiety levels and produces high levels of compliance with these programs [10].

Preliminary studies have suggested the potential benefits of animals on the physical and psychological health in humans. Despite over four decades of research, these studies remain preliminary. They are compounded by methodological problems including small sample sizes and a lack of adequate controls [11]. Some of these results come from observational studies, case series or non-controlled trials in populations that were very heterogeneous with regard to age and pathology, and have limited scientific evidence, with studies of mental disability being scarce and studies with psychomotor disorders entirely absent.

Falls are the second leading cause of accidental or unintentional injury deaths worldwide, also, falls generate severe disabilities, institutionalization and increase healthcare cost. People with intellectual disabilities experience high rates of falls. Balance and gait problems are common in people with intellectual disabilities, increasing the likelihood of falls; thus, tailored exercise interventions to improve gait and balance are recommended [12]. In fact, the best way to contribute to the prevention could be research on intervention programs.

In this sense, the referrals in the Program of Preventive Activities and Health Promotion are: practice of physical exercise as well as physiotherapy and rehabilitation of gait and balance [13].

The principal objective of this study was to evaluate the efficacy of an AAT program, in conjunction with physical therapy sessions in patients with mental disabilities and psychomotor disorders, by measuring improvements in gait and balance and evaluating their level of satisfaction with these activities.

Methods

A prospective simple-blind, parallel randomized clinical trial was conducted.

Study Population

The study sample was obtained from the Occupational Therapy Department of the "Our House" complex of the ASPROS Foundation. Two groups were created, an intervention group (IG) who were part of the AAT program and a control group (CG) that received the same therapy, but without animals. Each subject was assigned to a group using a random number table.

Inclusion Criteria: Study subjects fulfilled all of the following criteria: a) over 18 years of age, b) diagnosed with a mental disability associated with a gait and/or balance related psychomotor disorder, c) informed, written consent for the study signed by a legal guardian.

Exclusion Criteria: Study subjects could not have any of the following: a) an animal allergy; b) fear or phobia of animals.

The sample size of 20 was calculated based on the following criteria: the power to detect differences from the hypothesis using the Student's t-test, with alpha=0.05, and an expected mean difference of 6 units (SD=5) between groups in the Tinetti Test.

Study variables

Demographic variables: age and sex.

Clinical variables: malformations of the spinal column, parkinsonian gait, distinct degrees of hemiparesis, and osteoarthritis in the lower extremities.

Outcome variables

The Tinetti Assessment Tool [14] was used to evaluate gait (TG) and balance (TB), with the tool being applied before the program and after completion. This is a two-part scale, the first being balance when seated, standing and when standing up or sitting down, using 13 parameters and with a maximum score of 16 points. The second part evaluates different aspects of gait, using nine items and with a maximum score of 12 points. The maximum total score is 28 points.

The Analogue Visual Scale (AVS) for evaluating the grade of satisfaction upon completion of the program. This is a "thermometer" scale, a straight line which is 10 cm long and equivalent to 10 points. The subjects mark an "X" to indicate their level of satisfaction on a scale of 0 to 10.

Therapy Animal

This is an animal specifically trained to integrate itself into a therapeutic program as a facilitator therapy assistant. A dog was chosen due to their sociability, familiarity and ability to stimulate and interact with people. The same animals participated throughout the program. Specifically the two therapy animals were an 8-year-old female of Golden Retriever and a 7-year-old female of West Highland Terrier.

Both therapy dogs have not shown any sign of stress throughout the intervention; results such as those have been achieved by Ng et al. [15] who analyzed the wellbeing of the animals taking part in AAT, concluding that there is no risk for the animal.

Intervention (Annex 1)

Twenty-eight group physical therapy sessions were conducted during fourteen weeks, twice a week for 60 minutes each. The groups were divided into two sub-groups, with both sessions being held on the same morning in the IG and on the same afternoon in the CG. The sessions were overseen by a physiotherapist from the ASPROS centre who was directing the intervention and guaranteeing the right performance of the exercises; and the AAT technician who controls the interaction between the dogs and their users ensuring the wellbeing of the animals.

The sessions had concrete objectives predefined and agreed upon by the physical therapist and the AAT technician. Several physical therapy exercises addressed to working on gait and balance were conducted, with specific objectives for each session: in some the balance work predominated, using pathways with cones, rings and obstacles that, in the IG were performed with the dog; in other sessions gait work was predominant, where the control group walked alone and the intervention group walked with the dog. There were also imitation exercises: sitting, squatting, walking backward, turning in place, etc. (in the IG the dog was taught to do these exercises). The physical therapist was the same for both groups.

A collaborator from outside the program evaluated the test before and after therapy, blinded to whether the patient was in the IG or the CG.

Data Analysis

A descriptive analysis of all the variables was done. Quantitative scales were summarized as means, medians, standard deviations (SD), and group ranges. Inter-group comparisons of age were done using the Student's t-test. Categorical variables (gender and psychomotor disorders) were compared using the chi-squared test. To evaluate the effectiveness of the intervention, the two groups were compared using the Mann-Whitney test for the following variables: Tinetti scores before and after therapy (delta TM and delta TB), and the post-therapy AVS score. The 95% confidence interval was calculated for the estimated mean improvement of the scores in both groups. P-values below 0.05 were considered statistically significant.

Results

The mean (SD) age of subjects was 49 (9.2) years: 45 (10) years in the IG and 52 (7) in the CG, without statistical differences (p=0.1).

A total of nine women (45%) and 11 men (55%) were included. There were four (40%) women and six (60%) men in the IG, and five women (50%) and five men (50%) in the CG, non-differences between groups (Table 1).

The most frequent motor disorders and their prevalence among cases were: spinal column deformations, 25% (three IG

	AAT	Control	Total
Mean Age ± SD	45 ± 10	52 ± 7	49 ± 9.2
Gender (M/F)	6 / 4	5 / 5	11 / 9

P > 0.1 for inter-group differences by age and gender.

Table 1. Inter-group comparison of age and gender.

and two CG); parkinsonian gait, 15% (one IG and two CG); distinct degrees of hemiparesia, 15% (two IG and one CG); osteoarthritis in the lower extremities, 10% (zero IG and two GC); and more than one disorder, 35% (four IG and three CG) (Table 2).

The Tinetti scores showed a significant improvement in balance (mean improvement = 0.85, CI95%:0.18 - 1.52) and gait (mean improvement = 2.15, CI95%: 1.17 - 3.13) in both groups.

The mean difference in Tinetti scores before and after

Motor Disorder	Intervention Group (n = 10)	Control Group (n = 10)
Malformation of spinal column	3 (30%)	2 (20%)
Parkinsonian gait	1 (10%)	2 (20%)
Hemiparesis	2 (20%)	1 (10%)
Osteoarthritis LE	0 (0%)	2 (20%)
Multiple issues	4 (40%)	3 (30%)

Table 2. Basal Motor Disorders in each group

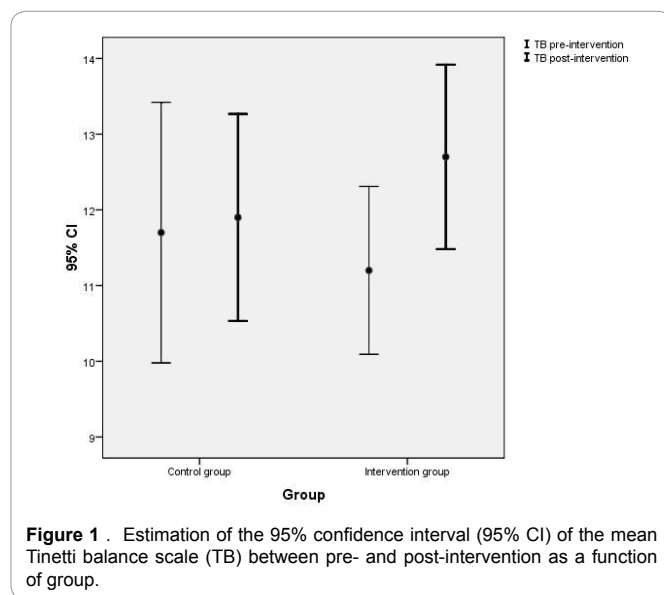


Figure 1 . Estimation of the 95% confidence interval (95% CI) of the mean Tinetti balance scale (TB) between pre- and post-intervention as a function of group.

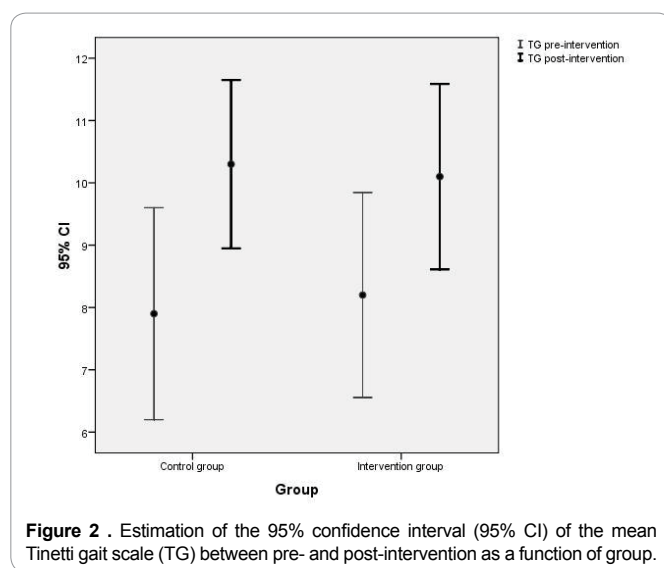


Figure 2 . Estimation of the 95% confidence interval (95% CI) of the mean Tinetti gait scale (TG) between pre- and post-intervention as a function of group.

		AVS*	Gait Tinetti			Balance Tinetti		
			Basal	Final	Δ TG	Basal	Final	Δ TB*
Control	Mean	7.0	7.9	10.3	2.4	11.7	11.9	0.2
	SD	3.6	2.4	1.9	1.9	2.4	1.9	1.1
	Median	9.0	8.5	11.0	2.5	11.5	11.0	0.0
	Minimum	2.0	3.0	7.0	0.0	7.0	10.0	-1.0
	Maximum	10.0	11.0	12.0	6.0	15.0	15.0	3.0
AAT	Mean	10	8.2	10.1	1.9	11.2	12.7	1.5
	SD	-	2.3	2.1	2.3	1.5	1.7	1.4
	Median	10	8.5	10.5	2.5	11.5	13.0	1.0
	Minimum	10	3.0	6.0	-3.0	8.0	9.0	0.0
	Maximum	10	11.0	12.0	5.0	13.0	15.0	4.0

* p<0.05 on the Mann-Whitney test

AVS: Analog Visual Scale

ΔTG: Increase Tinetti Gait (Final - Basal assessment).

ΔTB: Increase Tinetti Balance (Final - Basal assessment).

Table 3. Outcome Differences between groups.

treatment was, for balance: 0.2 (CG), 1.5 (IG) (p<0.05) and for gait: 2.4 (CG), 1.9 (IG) (p>0.05), as shown in Figures 1 and 2.

The degree of satisfaction measured on the AVS scale was a mean of seven in the CG and 10 in the IG, a statistically significant difference (Table 3).

There were no losses to follow-up and compliance was 100% in both groups for all participants.

Discussion

In recent decades animals have been incorporated into a broad range of therapies in several fields, including clinical psychology, occupational therapy, physical therapy and physical rehabilitation, speech therapy, geriatric care, mid- and long-term care institutions and nursing homes, hospitals, orphanages, juvenile centers and prisons [16].

This study shows an improvement in balance and gait in patients with mental disabilities and psychomotor disorders after a therapeutic program. This improvement is greater and statistically significant when the therapy is assisted by an animal as regards balance and satisfaction. Part of these results can be attributed to the fact that the IG developed more interest in their activities and had greater motivation to participate in exercises, because the dog was a novel, amusing and exciting element of therapy. It is difficult to compare the results of our study since no bibliography has been found on this question and in this population group.

Balance training is an important component of physical activity interventions, with growing evidence that it can be beneficial for people with intellectual disabilities. In other study, postural balance and functional strength showed significant improvements in the balance training group (p<0.05) as compared to baseline [17]. The Tinetti balance and gait instrument was successfully administered to adults with intellectual disabilities and resulted in high diagnostic accuracy for identifying individuals at risk for falls [18].

As reported by other authors, AAT is an innovative resource for the management of situations of functional dependence, psychiatric or behaviour disorders and care of people with disabilities and special educational needs [4].

In a clinical trial performed among the elderly population, improvement in pain and functional capacity through physical therapy sessions was assessed; the results obtained with therapy dogs were the following: a statistical significance obtained in the IG of the values "Walking on flat ground" and "Raising and descending stairs" of the WOMAC Questionnaire in patients with osteoarthritis, which means a greater facility to leave home. Other items that showed a higher and meaningful improvement in IG were "Getting in and out of the bathtub" and "Performing light domestic tasks". All of this means a protection factor of the fragility and dependence of the elderly population. Therefore, AAT, as a complementary therapy to physical therapy, seems to be effective [19].

As other authors claim, AAT helps participants improve their functionality using their own capabilities [20]. The improvement obtained in the walking ability of the participants is similar to the results obtained by other authors with significant improvements, such as the AAT being included in the re-education of the gait [21].

In a bibliographic review by Muñoz et al. in which they analyzed a total of 23 publications of important medical journals related to the field of rehabilitation of neurological diseases, it was seen that AAT increasingly shows scientific evidence as a complementary method to other existing therapies [22].

Patients appeared more involved in exercises with the animal, increasing the spontaneity of the sessions up to the point that subjects began to do exercises on their own initiative or in response to prompting by the animal, promoting social interaction between members of the group, with a better degree of satisfaction.

Participants of the two groups expressed high satisfaction with the intervention which was reflected in the satisfaction survey; this improvement is greater and statistically significant in the IG. This was similar to another controlled study with 52 patients, where 83.33% of the participants of the IG made a positive comment in the survey and only 27.27% from the CG. This difference was statistically significant (p=0.0002) [23]. This satisfaction concerning AAT is also reflected in other studies by other researchers [24,25].

AAT favours relationships as the animals open an emotional communication pathway between the therapist and the animal, thus changing the initial resistance of the patient to initiate any therapy [4]. In fact, in this project the presence of the dog apparently draws and holds the attention of the patients and this was used to achieve more productive sessions. Cheriack [11] argued that animals often constitute an important focus of attention and are a topic of conversation.

Aspects such as motivation, empathy, concentration and attention are difficult to measure objectively and quantify, but it is important to take them into account when planning any type of therapy, because they help improve outcomes. AAT is going to promote a better communication with health professionals. The results of this study suggest that AAT may provide benefits, but the goals will mean a bigger opportunity for a greater adherence to the therapeutic sessions and to explore more deeply the patient's feelings in a comfortable environment [25].

This study was focused on measuring and evaluating whether balance and gait improved, which are more easily quantified variables.

An important limitation of the study was the variability in psychomotor disorders and degrees of handicaps. Another limitation of the study was the small sample size, affecting its statistical power to detect differences and the possibility of an analysis adjusted by age groups or psychomotor disorders. However, the sample size was bigger than in the majority of studies found in our search of the literature [26] and sufficient to detect some differences in responses (AVS, Tinetti scale). With this study we aim to contribute to the knowledge on the therapeutic benefits of these animal assisted therapies, but we highlight the need of developing wider research on this field.

Other fields that have adopted AAT are the treatment of spinal injury rehabilitation [27] and AAT also elicits a good response in the treatment of communication problems and speech disorders, having been applied in persons with aphasia [28], because the presence of the animal stimulates both verbal and non-verbal communication [29].

Based on bibliographic searches and the results obtained, it appears that AAT is a therapeutic modality which promotes quality of life and provides positive health benefits and that in recent decades this type of therapy has gained followers and its use is increasing [11]. Nevertheless, it is necessary to provide a theoretical and scientific basis for its use, with objective parameters and results.

Primary health care needs to develop non-pharmacological methods and treatments for the comprehensive treatment of people; these have become an important part of the management of chronic disorders, often used as a complement to pharmacological treatment. These include AAT [30], where the literature has shown that animal-assisted interventions can bring benefits to people's living standards [26].

Animal assisted therapy can be of great utility in occupational therapy centres and centres for the treatment and support of people with special needs, to improve physical function. It is a resource that has shown its usefulness and novelty as a community intervention performed by professionals at primary care centers.

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Annex 1: Sessions

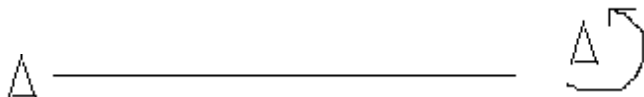
Session 1: Introducing Therapy Dogs

Goals:

1. Introduce the activity with female dogs
2. Work the march

Session Development:

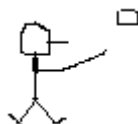
1. Exercises



Work: Walking, taking short strolls



Work the balance change



Ball throwing exercises to enhance the relationship between the individual and the dog

2. Reward the dog

Observations:

Combine exercises with dog contact

Material: Cones and balls

Session 2: And What's Next?

Goals:

1. Start the game to enhance the relationship between the user and the dog, inducing spontaneity
2. Perform launching games that may lead to balance stimulation
3. Oculomotor coordination

Session Development:

1. Object throwing games



Standing:

Close / far / hit a hoop

With the right and left hand

With both hands

In all cases the dog returns it

3. Reward the dog

Observations:

Favour correct positions. Difficulties in maintaining the standing position. Perform the seated throws.

Material: Items to throw

Hoops, mark home position

Session 3: Day and Night

Goals:

1. Distinguish between day and the night
2. Re-educate the pace among obstacles to encourage the appearance of raising the feet from the ground

Session Development:

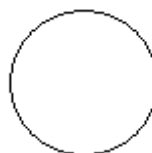
1. Communication: Name different actions and relate them to day or night
2. Track in the room



Parallel flat rings
x tacos

Flat zig-zag rings

Raised hoop



Big hoop at the end of the track where we make the dog sit

3. Reward the dog

Observations:

If there is any time left, the individual will comb the dog's hair.

Material: Medium hoops and large hoop, tacos.

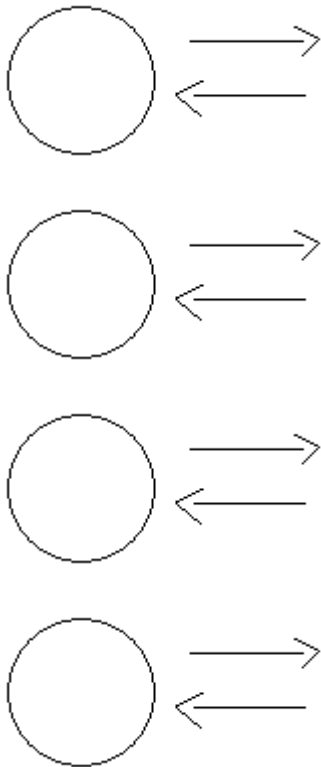
Session 4: The Days of the Week

Goals:

1. Relate each day of the week to usual activities
2. Work height changes from daily gestures (ADL) to boost static balance
3. Walking without dragging your feet along

Session Development:

1. Circuit with rings:



Go to each big hoop and crouch down to pick up the small hoop that we will put on the dog. On the way back, go to each big hoop, take it off the dog and place it back on the ground

2. Reward the dog with something

Observations:

Walk without dragging the individual's feet along.

They have to crouch down.

Material: 5 large hoops and 5 small hoops.

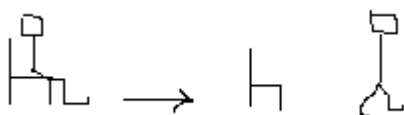
Session 5: The Seasons of the Year

Goals:

1. Distinguish between the four seasons of the year
2. Copy actions of everyday life that involve position changes and displacements changing speed or height

Session Development:

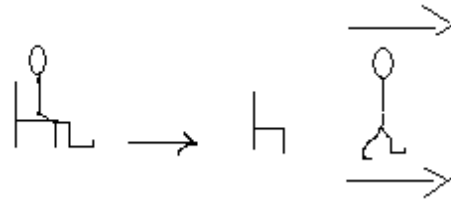
1. Communication: Try to remember what happens in each season of the year
2. Imitation games such as partner dog + user.



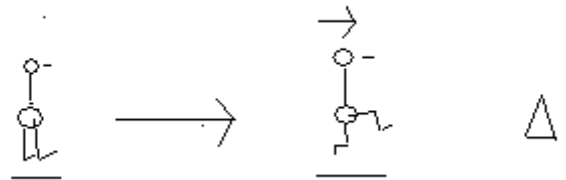
To sit and get up
Turn on yourself



From sit position, start walking to the cone



From right walk towards the cone



3. Give the dog a reward.

Observations: The dog imitates the user, but if there are any difficulties understanding the exercise, the dog will do it in the first place.

Material: Chair and cone

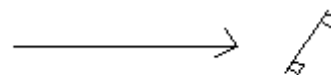
Session 6: Doing gymnastics With Our Friends

Goals:

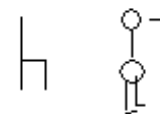
1. Work actions of daily life that involve changes in height and turns

Session Development:

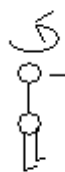
1. Exercises to perform different actions:



Pass a spike



Stand up and sit (the individual in a chair, and the dog on the floor)



Turn around



Crouch and get up (the dog stretches on the ground)

2. Reward the dog

Material: Chair, two cones and a spike.

Session 7: The Mirror

Goals:

1. Identify the parts of the body
2. Work short paths that imply continuous orientation changes to enhance rebalancing

Session Development:

1. Communication: identify the different parts of the animal body and then identify those of the user
2. Circuit with cone:

A. Go in zig-zag crossing and come back in a straight line



B. Go in zig-zag crossing through spades, walking forward in a straight line



3. Reward the dog

Observations: DO NOT DRY FEET!!!

Repeat 2 times individually

Material: cones, spades and tacos.

Session 8: I would like to eat ...

Goals:

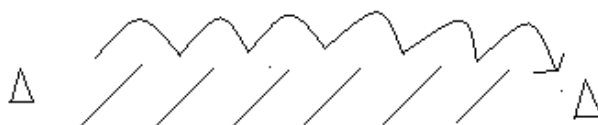
1. Name different foods
2. Incite the walking aspects most frequently affected, such as dragging the feet in circuits that involve lifting them.

Session Development:

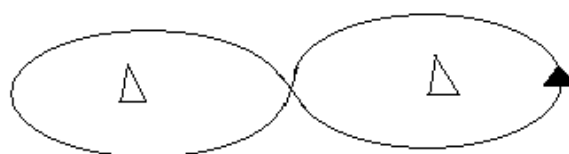
1. Communication: Which foods do they like the most, and therapy female dogs?

2. Circuits:

A. Hop! Jump spikes at different heights (with cleats)



Make an eight



2. Reward the dog

Observations:

Enter word 'ANDA' while walking through the spades.

We will do each circuit individually at least twice.

Material: cones, spades, tacos

Session 9: Female Dog Toys

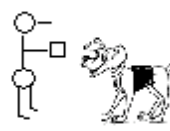
Goals:

1. Identify the different toys of the dog
2. Make short trips to work the pace
3. Introduce SPC vocabulary to provide easier comprehension

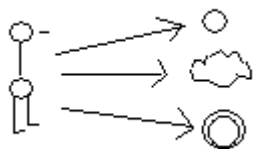
Session Development:

1. Communication: identify the different ropes, balls and rubber rings, with their own shape and colour, and identify which they like the most

2. The user takes out a pictogram and tells a mate which object to carry with the dog. On the side of the harness pictograms, and on the other side objects to pick up



Distribution and objects: localize the object placed inside a large hoop (like a track) in different places: chair, floor, etc



3. Walk back and reward the dog

Observations:

The individual who takes out the SPC card tells the companion what to look for (up to 3 objects, 3 routes); the purpose would be to improve the person-to-person relationship between the members of the group

Material: harness, big hoops, little balls, ropes, small hoops, cards, small materials and colours

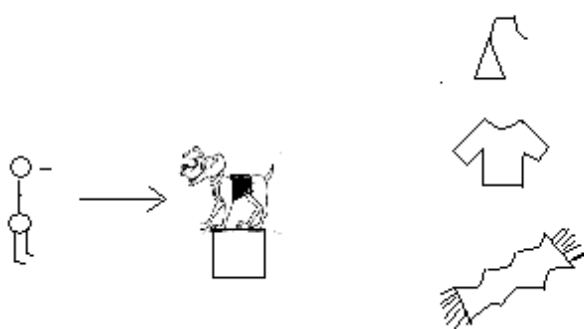
Session 10: Merry Christmas

Goals:

1. Identify the different garments of the Santa Claus clothing costume
2. Perform medium-long displacements carrying objects by means of the dog

Session Development:

1. Communication: talk about the Christmas season and as the user keeps picking up the Santa Claus attire pieces, identify them
2. Dress up "Santa Claus": the clothes are inside a cardboard box on the other side of the room, so they have to go piece by piece (work marching), crouch and take one of the boxes (to work balance), go back to the dog (walk) and put it on



Take photos with the dog, in order to have memories

3. Reward the dog

Observations: With the photos taken the user can make a Christmas greeting for families

Material: Photo camera

Costume for the dog

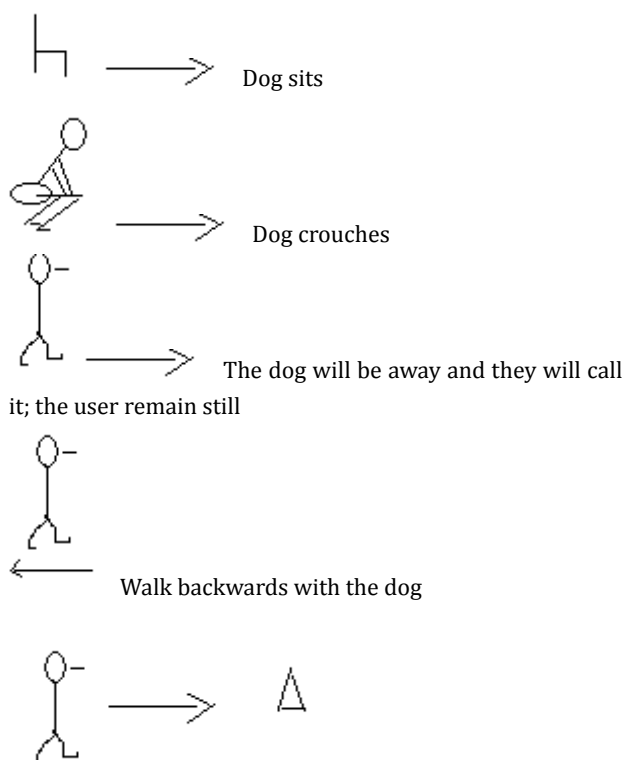
Session 11: What's the Weather like?

Goals:

1. Talk about the weather
2. Imitate actions of daily life involving changes of position, displacements, etc.
3. Introduction of stock cards in SPC

Session Development:

1. Communication: whether it rains or shines an umbrella is needed, etc.
2. Imitate the action that comes out to the card in the dog's harness



Take the dog to the cone and once there command: 'SIT AND STILL'

Observations:

It can be done: individually, in pairs or in a group. Rate according to the day

Material: harness, cards, chair, cones.

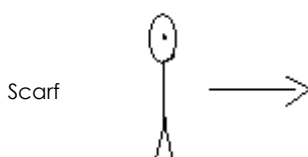
Session 12: Colour Collars

Goals:

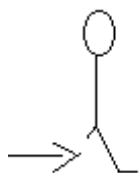
1. Make short trips exaggerating muscular actions involved in walking and increase the base of support to obtain greater stability

Session Development:

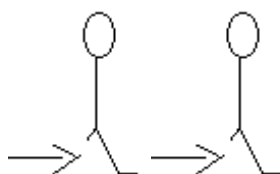
1. Displacement



Walk sideways until you find the dog's bottom and put on a Hawaiian necklace on the dog



legs



The dog walks between the user's

The dog passes between the legs of two different people (the coach or usual user and a more unusual user).

2. Brush the female dog's hair

Observations:

Material: Hawaiian necklace.

Session 13: Run and Win

Goals:

1. Make long trips by exaggerating muscular actions involved in walking

2. Work outdoors and on a non-level ground

Session Development:

1. Users will be divided in two groups and each group will have one dog; the first team will be at the one end of the football pitch and the other one at the other end. They must run or walk fast (depending on individual ability) from one end to the other to deliver the dog to the partner as if a relay race.

2. They will brush the female dogs to calm them down

Session 14: Go on a Ride

Goals:

1. Enhance the work of the march in a standard environment

2. Favour social integration by means of therapy dogs

Session Development:

There will be a walk through the town to work the march with usual obstacles such as kerbs or sidewalks. Users will take turns tying the dogs with a leash.

Along the ride, individuals will travel at different paces. It will help the interaction between the users and the environment and with the people that they might come across along the way.

We say goodbye to the female therapy dogs and give the individual a photo memory souvenir