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ORIGINAL PAPER

THE EFFECTS OF DOG-ASSISTED THERAPY ON CHILDREN AND ADOLESCENTS WITH PHYSICAL AND INTELLECTUAL DISABILITIES

EFEKTY TERAPII Z UDZIAŁEM PSA U DZIECI I MŁODZIEŻY Z NIEPEŁNOSPRAWNOŚCIĄ RUCHOWĄ ORAZ INTELEKTUALNĄ

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ABSTRACT

Introduction

Dog-assisted therapy is a method that facilitates rehabilitation and therapy of persons with disabilities. Therapy sessions are attended by a patient, a therapist, and a trainer with a dog specially selected and trained for this purpose.

Aim

The aim of the study is to evaluate the impact of a dog's presence on the therapy, and consequently on the motor development of children with physical and intellectual disabilities.

Material and methods

This study was conducted during a period from January 2014 to May 2014. We enrolled 25 children with various disorders. The subjects were students of "Always Together" Private Elementary and Middle School in Poznań. The majority of the children have been diagnosed with cerebral palsy or meningomyelocele. Three tests were used for the assessment of the results of the therapy: The EUROFIT Special Test, an original Manual Skills Test, and a Satisfaction Survey.

Results

The results show significant improvement both in the EUROFIT and the manual skills tests accompanied by a high level of satisfaction. The results were not affected by the severity of intellectual disability, sex, or the type of the disorder.

Conclusions

The presence of a specially trained and selected dog had a positive impact on the results of physical fitness tests achieved by children with disabilities.

Keywords: dog-assisted therapy, physical disability, EUROFIT Special Test, Likert Scale

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STRESZCZENIE

Wstęp

Terapia z udziałem psa jest metodą wspomagającą proces rehabilitacji i terapii osób z niepełnosprawnościami. Podczas spotkań obecny jest pacjent, terapeuta oraz przewodnik wraz z specjalnie wyselekcjonowanym i wyszkolonym psem.

Cel

Przedmiotem pracy jest ocena wpływu obecności psa na przebieg terapii i tym samym na rozwój motoryczny dzieci z niepełnosprawnością ruchową i intelektualną.

Materiał i metody

W okresie od stycznia 2014 r. do maja 2014 r., w Niepublicznej Szkole Podstawowej i Niepublicznym Gimnazjum „Zawsze Razem" w Poznaniu zostały przeprowadzone badania u 25 dzieci z różnymi jednostkami chorobowymi. Przeważającą grupę stanowiły dzieci z mózgowym porażeniem dziecięcym i przepukliną oponowo-rdzeniową. W celu oceny efektów terapii posłużono się trzema testami: EUROFIT Specjalny, autorskim Testem Sprawności Manualnej oraz Testem Poziomu Zadowolenia.

Wyniki

Wyniki wskazują na znaczącą poprawę wyników zarówno w teście EUROFIT i teście sprawności manualnej przy wysokim poziomie zadowolenia. Stopień niepełnosprawności intelektualnej, płeć i rozpoznanie nie wpłynęło na wyniki.

Wnioski

Obecność odpowiednio przygotowanego i wyselekcjonowanego psa pozytywnie na wyniki uzyskiwane przez dzieci z niepełnosprawnością w testach sprawności ruchowej.

Słowa kluczowe: terapia z udziałem psa, niepełnosprawność ruchowa, EUROFIT Specjalny, skala Likerta

Introduction

The terms most frequently used in Poland with reference to dog-assisted therapy include dog-therapy, kynotherapy, canistherapy, or contact therapy. The term dog-therapy (pol. dogoterapia) was first used by Maria Czerwińska in 1996. When shooting a movie, she noticed that blind children had very good contact with the dog present on the movie set (Bartkiewicz and Habrowska, 2006). Interestingly, the use of the combination of the English word "dog" (pol. *pies*) and the Polish term for "therapy" (pol. *terapia*) is unique on the global scale. However, no results are returned when the keyword "dogotherapy" is entered in the PubMed search engine. Currently, the term "dog-therapy" (pol. *dogoterapia*) is greatly overused to include all types of activities involving dogs. Consequently, specialists performing therapeutic activities are often viewed as paratherapists. In the US, where dog-assisted therapy was initiated, the term "animal-assisted therapy" (AAT) is mainly used. It refers to therapies with different animals involved, although a dog, due to its willingness to cooperate with humans, is the animal that is most frequently employed for this purpose (Jofre, 2005). To emphasize the difference between therapeutic and stimulating activities, the term "animal-assisted activity" (AAA) has

also been introduced. AAA is highly spontaneous, there is no specified goal for the sessions and it is targeted at a larger group of participants, whereas AAT is usually implemented in the form of individual sessions. Animal Assisted Intervention (AAI) is yet another term found in the scientific nomenclature, which is a cover term for all kinds of activities involving animals. This term covers both AAA and AAT. It is defined as "every intervention that deliberately involves animals in the therapeutic process or enriches human life." The term AAA has been applied with the aim of providing greater flexibility in discussions, both with reference to typically medical as well as quasi-medical activities, but nevertheless with a positive impact on humans (Dimitrijevic, 2009).

The aforementioned studies employed tests, particularly adapted to the capabilities of disabled persons, to provide the assessment of their physical fitness. Although many test batteries for the assessment of motor skills in the healthy population are available, none of them can be used in the case of disabled persons. Extensive involvement of cognitive processes (such as counting the number of repetitions, following the movements, direction changes, etc.) is required in the performance of complex motion tasks. Therefore, the main focus is on the proper execution of an exercise, and not on mobilizing one's maximum motor skills (speed, strength, endurance, coordination). Another problem related to testing motor fitness in disabled persons is the issue of triggering and sustaining motivation throughout the entire study. It is for these reasons that an assessment method taking into account both of these criteria has been searched for. The only standardized test which is compliant with Polish standards for the assessment of the overall physical fitness of people with mild, moderate, and severe intellectual disabilities is the EUROFIT Special Test. The author of the test is Jean C. De Potter from the University of Brussels, whereas the Polish standards were developed by Waldemar Skowroński from the Academy of Physical Education in Warsaw (Skowroński, 1999).

Aim

To assess whether the presence of a dog during movement activities may affect the results reached by children with motor development disorders.

Material and methods

The study was conducted in the period from January 2014 to May 2014. In this period children performed the same tasks first unaccompanied by a dog (January), and then in the presence of a dog (May). Group sessions in dog-assisted therapy were conducted by therapists from the "Suzi's Little Dog" Foundation. These were held in "Always Together" Private Elementary and Middle School in Poznań. These sessions were supervised by experienced and qualified staff (physiotherapists and special needs educators) with the assistance of volunteers. The sessions, apart from the care recipients and the supervisors, were attended by a dog trainer and a specially trained pet. The duration of each session was approximately 30 minutes. The study inclusion criteria were: ability to perform both tests by the subjects, willingness to participate in dog-assisted therapy sessions, and a prior written consent by parents or caregivers. Exclusion criteria encompassed any allergy against dog, fear or unwillingness of patient and/or parents.

The study included 12 girls and 13 boys aged 9 to 19, the median age was 12.

The majority of the children were diagnosed with cerebral palsy or meningomyelocele. The study group also included children with other disorders, as listed in Table 1.

The study group included children with no intellectual disorders (n = 6) as well as those diagnosed with mild (n = 12) or moderate (n = 7) intellectual disabilities.

The first method involved the use of a speed test based on the EUROFIT Special Test. In the original version this test is referred to as "25 meters shuttle run" and therefore its

Table 1. Structure of the study group according to the disorder

Disorder	**Number**
Cerebral palsy	13
Meningomyelocele	7
Joint and muscle laxity	1
Phocomelia	1
Sotos syndrome, scoliosis	1
Muscular dystrophy (MD)	1
Right-sided hemiparesis	1

modification was necessary. The subjects participating in the test were persons running, using a wheelchair, or a walker. Therefore, the goal for the participants of the test was to cover the distance of 25 meters in any possible way. In addition, a test exercise was not performed due to the fact that some of the participants would not be able to do the test twice. However, given the fact that the aim of the test was to cover the distance of 25 meters in a manner that the participants move around on a daily basis, performing the test exercise seemed not to be necessary. The first test was conducted in January. A physiotherapist and the school staff supervising the proper execution of the test were present at that time. The second test was conducted in May. This time a trained dog and a kynotherapist additionally participated in the test.

The second method was the Manual Skills Test developed by a kynotherapist from the "Suzi's Little Dog" Foundation. The goal of the test was to pull out ten rubber objects in the form of dog bones (Figure 1), one at a time, from a plastic "doghouse", and then to put them back. One exception was a patient with phocomelia, who performed this test using feet.

Both of the tests were performed in identical conditions (the same room, the same time of the day, the same physiotherapist taking measurements by means of the same device used in an identical manner).

The third method to assess the results was the Satisfaction Survey conducted among the study participants. It was based on the 5-point Likert scale using graphical images of 5 faces – ranging from the smiley face to the sad face (Figure 2) (Jamieson, 2004).

Results

The data obtained in the study was analysed in detail with Statistica software. First, a comparison of all the results of the tests in terms of the severity of intellectual disability was made, through comparing subgroups with mild and moderate disability. No differences in the test results were reported. Detailed data from all tests is presented in Table 2.

The levels of statistical significance (p-value) for the EUROFIT Special Test, Manual Skills Test (MST), and the Satisfaction Survey (SS) depending on the severity of intellectual disability are presented in Table 3.

It is therefore concluded that the severity of intellectual disability had no statistically significant impact on the results of individual tests. In the same way, neither sex nor the age range (children aged 9–12 and 13–19) affected the results of the analyzed tests.

The results of the EUROFIT Special Test show that in the case of the majority of children the test was performed faster when they were accompanied by the dog. In addition, one should note the great difference in the extreme results, which means that the presence of the dog was a motivation booster for all of the children, regardless of their intellectual or physical disability (Figure 3).

The results of the Manual Skills Test show the same tendency as the results of the EUROFIT Special Test - in the majority of cases

Figure 1. Dog bones used in the Manual Skills Test.

Figure 2. Satisfaction survey.

children performed the test much faster when accompanied by the dog (Figure 4).

The analysis of the Satisfaction Survey results from January and May reveals a generally high level of satisfaction with the exercises manifested by the children participating in the study. Moreover, children who were initially indifferent to the tests conducted in the absence of the dog changed their attitudes to more positive ones when participating in sessions with the dog (Figure 5).

Discussion

The results of the study show that the outcomes of the motor fitness tests were better when the dog was present during the session. Similar results are reported by Gee *et al.*in the study on the impact of a dog's presence on the speed and the accuracy of motor tasks performed by preschool children (Gee *et al.,* 2007) A group of children aged 4 to 6 performed 10 motor tasks (including the long jump, the high jump) in the presence and absence of a dog. The animal presented the task prior to the test in the presence of the dog. The fact that the dog was present was of great significance. As anticipated, the duration of the test was shorter when the dog was present in comparison to the test performed in the absence of the dog. It should be noted that some of the exercises were performed with greater accuracy, while others were conducted less carefully. Nevertheless, the fact remains that a dog can serve as an element that effectively motivates children's motor development. This motivational function is of great significance in the process of rehabilitation for every patient, as the patient's increased involvement results in the achievement of the therapeutic goals at a faster rate. Similar results were also reported by Elmaci and Cevizci, who noticed both better motor task results and less fear in children subjected to animal-assisted therapy (Elmaci and Cevizci, 2015).

Further studies in this field were conducted by the aforementioned author in the years

Table 2. Test results

Sex	Age	Disorder	Intellectual disability	EUROFIT January 2014 (sec)	EUROFIT May 2014 (sec)	MST January 2014 (sec)	MST May 2014 (sec)	SS January 2014 (sec)	SS May 2014 (sec)
F	10	CP	none	12	11	58	57	5	5
M	15	Sotos syndrome, scoliosis	none	12	10	28	26	5	5
M	10	Phocomelia	none	25	23	62	58	5	5
M	11	CP	none	14	16	57	53	5	5
M	14	Joint and muscle laxity	none	10	10	32	34	4	4
F	16	MMC	none	15	14	51	42	4	4
M	8	CP	mild	25	29	82	56	5	5
F	9	CP	mild	28	24	49	44	5	5
F	11	CP	mild	18	15	84	48	5	5
F	11	MMC	mild	18	17	71	53	4	4
M	12	CP	mild	310	173	216	204	4	5
F	10	CP	mild	83	69	265	270	5	5
M	11	Muscular dystrophy	mild	79	57	63	58	5	5
M	19	CP	mild	16	16	78	81	5	5
M	14	CP	mild	10	8	68	37	5	5
F	19	CP	mild	25	25	40	45	4	4
M	9	MMC	mild	25	19	51	50	5	5
F	15	MMC	mild	22	19	72	65	5	5
F	13	CP	moderate	16	14	63	28	4	5
F	8	CP	moderate	50	37	171	151	5	5
M	15	MMC	moderate	16	12	54	37	5	4
F	12	MMC	moderate	16	13	42	35	4	4
M	8	Righ-sided hemiparesis	moderate	8	7	40	31	3	4
F	16	MMC	moderate	16	16	88	76	5	5
M	11	CP	moderate	129	58	147	186	4	5

Abbreviations: F – girl, M – boy, CP – cerebral palsy, MMC – meningomyelocele, MST – Manual Skills Test, SS – Satisfaction Survey

that followed. Two years later she tested children's adherence to the same set of instructions in four different situations: when the task was performed by a child on its own, in the presence of a human, in the presence of a dog, and accompanied by a stuffed dog toy resembling a live animal both in terms of its appearance and size. Children were instructed to perform the tasks in three different ways: first imitate the behavior of the model, then do the task faster than the model, and eventually move in the same way as the model (Gee *et al.*, 2009). The correlation between the presence of a live dog and the task performance was

Table 3. Level of statistical significance for individual tests

Test	Significance level (p-value)	Number of patients with mild intellectual disability	Number of patients with moderate intellectual disability
EUROFIT January 2014	0.19	12	7
EUROFIT May 2014	0.15	12	7
MST January 2014	0.77	12	7
MST May 2014	0.31	12	7
SS January 2014	0.15	12	7
SS May 2014	0.25	12	7

Abbreviations: MST – Manual Skills Test, SS – Satisfaction Survey

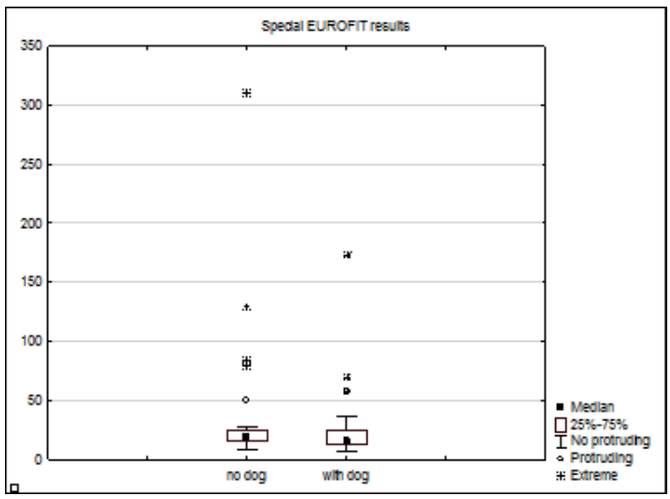

Figure 3. Results of the EUROFIT Special Test achieved by children during sessions with the dog (May 2014) and in the absence of the dog (January 2014).

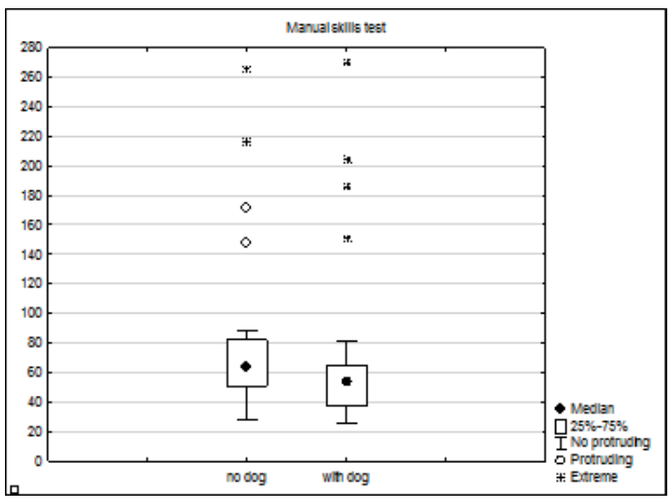

Figure 4. Results of the Manual Skills Test achieved by children during sessions with the dog (May 2014) and in the absence of the dog (January 2014).

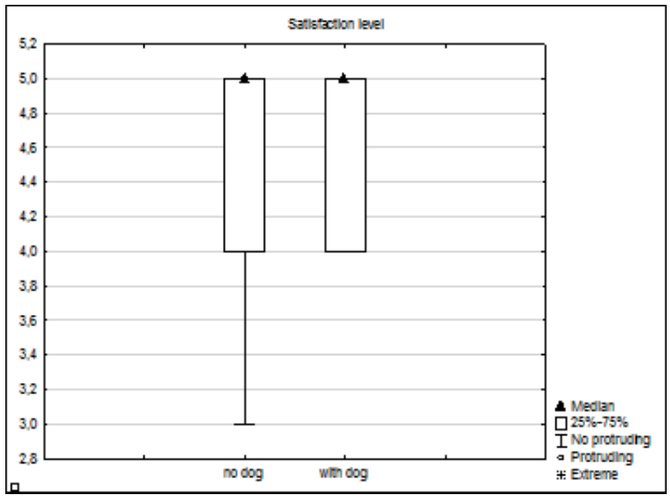

Figure 5. Level of children's satisfaction during sessions with the dog (May 2014) and in the absence of the dog (January 2014).

significant, particularly with regard to the first and second test. It was these tests that provided the best results. When imitating the movement, the best results were achieved by the subjects when accompanied by a human and a stuffed dog toy. This may be due to the fact that the presence of the dog was distracting. However, the results of the tests performed by children on their own were the worst. These results demonstrate the positive effects of a dog's presence in the process of learning new motor skills. This fact may be of importance in the case of children with disabilities, who are afraid of learning new, unfamiliar motor activities.

Similar results were reported by Martin and Farnum as they compared children's reactions in three different situations. In the first one, the therapy involved the use of a non-social toy. A stuffed dog toy was used in the second situation, while a live animal was present during the therapy in the third situation (Martin and Farnum, 2004). They expanded the scope of the investigation to provide the assessment of seven different areas of activity: imitation, perception, fine motor skills, gross motor skills, hand-eye coordination, cognitive performance, and verbal skills. The greatest involvement of the children was observed during the therapy with a live animal. The patients were also more focused on a given activity and more willing to communicate, which positively affected the results of the entire process of rehabilitation.

One of the criteria of the proper course of rehabilitation is adherence, which greatly depends on the patient, the patient's motivation and commitment. Herrald *et al.* conducted studies which show that the attendance in the rehabilitation cycle among dog owners was higher (96.5%) than in the case of non-pet owners (79.2%). It is also emphasized that dog owners are willing to make greater sacrifices. This is related to the daily care of the pet, regardless of the existing weather conditions or the owner's physical and mental state. Increased motivation can be used to achieve therapeutic goals. Another aspect that is of equal importance is the issue of high cortisol levels and high blood pressure (Herrald *et al.*, 2004). Both of these parameters decrease in the presence of a dog. This may be important for patients with spasticity (cerebral palsy, post-stroke conditions), as the elevated stress hormone levels and high blood pressure may aggravate the symptoms of spasticity and impede the therapeutic process. Stress reduction was also described in the study of Kertes (Kertes *et al.*, 2017), analysing the presence of pet dog during stressful condition. In children who were allowed to have their

pet dogs aside, the self-reported stress level and salivary cortisol levels were lower that in their peers who're not assisted by a pet dog.

Even if the overall effects of dog-assisted therapy are reported to be of limited value (Lundkvist *et al*., 2017), yet the majority of authors emphasise that the motivational impact seems quite important and may be of value to simply diversify the monotonous therapy needed in many cases.

Nawrocka-Rohnka also presented her findings from a contact therapy that lasted several months and demonstrates its impact on the individual results of the therapy. The sessions were mostly held in the form of weekly meetings. Parents and caregivers of children who participated in the therapy for over one month and attended the sessions on a regular basis reported improvement regarding various aspects of the children's development. These results were observed with respect to the social and emotional level as well as in the area of motor development. Consequently, all of the children who regularly attended the dog-assisted therapy for at least one month demonstrated increased openness to new situations. Obviously, such an attitude manifested by a patient with a disability can facilitate the patient's further psychomotor development. Better results with regard to motor skills were achieved by children with cerebral palsy and meningomyelocele. Based on the analysis of the results it can be concluded that dog-assisted therapy is an effective method facilitating the development of children with various types of disorders (Nawrocka-Rohnka, 2010).

Further studies were conducted to verify yet another parameter, which is rarely discussed in the literature on pet therapy. Braun *et al.*investigated the issue of subjective feelings of pain in hospitalized children (Braun *et al*., 2009). The subjects of the study, aged 3 to 17, were divided into two groups: control group and study group. The Wong-Baker FACES pain rating scale was used for the assessment of pain severity. This scale consists of 6 black and white face drawings, and each of them corresponds to the numeric pain rating scale. Prior to the test the measurements of blood pressure and respiratory rate per minute were taken. Additionally, each child indicated the current pain level using the aforementioned scale. After taking the measurements, patients from the control group were asked to sit still for 15 minutes while children from the study group had a 15–20 minute AAT session with a dog. After these activities, all of the parameters were measured again. The pain level in both groups was lower than in the first test. However, a significant decrease in the pain level was reported in the study group (four times greater decrease than in the control group). No differences in the blood pressure and pulse rate levels were reported, whereas the respiratory rate per minute significantly increased in the study group. This study provides strong evidence that dog-assisted therapy can serve as an effective method to relieve pain in children. This is extremely important as pain greatly impedes the potential for rehabilitation in children with motor organ dysfunctions. Reducing the level of pain may facilitate the therapeutic process and positively affect further motor development of a child.

Conclusions

1. Dog-assisted therapy as a method supporting rehabilitation facilitates children's motor development.
2. The severity of intellectual disability, sex, and the diagnosed disorder have no impact on the results. Therefore, AAT may be used for patients with various types of disabilities.
3. The presence of a dog during a therapy makes it more attractive, which increases patients' motivation and provides better results.

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