fizjoterapia polska

POLISH JOURNAL OF PHYSIOTHERAPY

OFICJALNE PISMO POLSKIEGO TOWARZYSTWA FIZJOTERAPII

THE OFFICIAL JOURNAL OF THE POLISH SOCIETY OF PHYSIOTHERAPY

NR 5/2021 (21) KWARTALNIK ISSN 1642-0136

Influence of physiotherapy on exercise tolerance in patients after COVID-19

Wpływ fizjoterapii na tolerancję wysiłku u chorych po przebytym COVID-19

Gross motor impairments in autism

Zaburzenia motoryki dużej w autyzmie

mindray
healthcare within reach

ULTRASONOGRAFIA W FIZJOTERAPII

Mindray Medical Poland Sp. z o. o.
ul. Cybernetyki 9, 02-677 Warszawa

+48 22 463 80 80
info-pl@mindray.com
MindrayPoland
mindray.com/pl

medkonsulting

PROFESJONALNE URZĄDZENIA DIAGNOSTYCZNE I TRENINGOWE
KOMPLEKSOWE WYPOSAŻENIE SPRZĘTU DIAGNOSTYCZNEGO DLA KLUBÓW PIŁKARSKICH, OŚRODKÓW SPORTOWYCH I REHABILITACYJNYCH

TANITA
ZAUFANIE profesjonalistów

Światowy lider w dziedzinie analizy składu ciała metodą BIA

Kompleksowa analiza składu ciała wykonywana jest w około 30 sekund, a wyniki przedstawiane są na przejrzystym raporcie. Produkty profesjonalne TANITA wykorzystywane są przez ośrodki badawcze, centra diagnostyczne, kluby piłkarskie, placówki rehabilitacyjne, osoby pracujące ze sportowcami różnych dyscyplin na całym świecie.

Zobacz więcej na: www.tanitapolska.pl

Zaawansowana technologia diagnostyczna dla profesjonalistów, idealna w pracy z pacjentami

Systemy MICROGATE umożliwiają kompleksowe testy zdolności motorycznych i analizy chodu, wspomagając diagnozę, ocenę postępów oraz proces rehabilitacji. Modelowanie programów rehabilitacyjnych i kontrola procesu rehabilitacji są ułatwione dzięki obiektywnej ocenie sposobu ruchu, wykrywaniu problematycznych obszarów, ocenie biomechanicznych braków oraz ocenie asymetrii.

Parametry pomiarowe:

● fazy chodu lub biegu ● długość kroku ● prędkość i przyspieszenie
● równowaga i symetria ruchu ● wideo Full HD

.... i wiele innych w zależności od przeprowadzonych testów.

W połaczeniu z systemem urządzeniem GYKO, mamy możliwość oceny stabilności dynamicznej tułowia podczas chodu/biegu, analizę skoku, analizę stabilności posturalnej, analizę w zakresie ruchomości stawów (ROM), ocenę siły mięśniowej. oraz ewaluację pacjenta.

Zobacz więcej na: www.microgatepolska.pl

MICROGATE

OPTOGAIT

EXXENTRIC

Flywheel Training - trening siłowy i rehabilitacja z użyciem zmiennej bezwładność kół zamachowych.

kBox4 pozwala na wykonywanie skutecznych, standardowych ćwiczeń, a także zaawansowanych metod treningu ekscentrycznego i koncentrycznego, umożliwiając uzyskanie indywidualnych efektów – poprawienia ogólnego stanu zdrowia, wyników sportowych, rehabilitacji, oraz zapobiegania urazom.

Jedną z głównych zalet treningu z użyciem koła zamachowego jest możliwość skupienia się na ekscentrycznym przeciążeniu. Zwiększenie oporu poprzez skurcz ekscentryczny, jest skuteczną metodą poprawy siły i stabilności – aspektów treningu tak ważnych dla osób żyjących z niepełnosprawnością.

Seria dostępnych uchwytów i uprzęży sprawia, że na jednej platformie mamy możliwość przeprowadzenia treningu dla wszystkich partii mięśni.

Zobacz więcej na: treningekscentryczny.pl

MEDKONSULTING Tanita Polska - Wyłączny dystrybutor urządzeń Tanita w Polsce
T: +48 518 375 475 | 61 868 58 42 E: kontakt@medkonsulting.pl A: ul. Jana Ludygi-Laskowskiego 21 61-407 Poznań

Zawód Fizjoterapeuty dobrze chroniony

Poczuj się bezpiecznie

INTER Fizjoterapeuci
Dedykowany Pakiet Ubezpieczeń

Zaufaj rozwiązaniom sprawdzonym w branży medycznej.
Wykup dedykowany pakiet ubezpieczeń INTER Fizjoterapeuci, który zapewni Ci:

- ochronę finansową na wypadek roszczeń pacjentów – NOWE UBEZPIECZENIE OBOWIĄZKOWE OC
- ubezpieczenie wynajmowanego sprzętu fizjoterapeutycznego
- profesjonalną pomoc radców prawnych i zwrot kosztów obsługi prawnej
- odszkodowanie w przypadku fizycznej agresji pacjenta
- ochronę finansową związaną z naruszeniem praw pacjenta
- odszkodowanie w przypadku nieszczęśliwego wypadku

Nasza oferta była konsultowana ze stowarzyszeniami zrzeszającymi fizjoterapeutów tak, aby najskuteczniej chronić i wspierać Ciebie oraz Twoich pacjentów.

Skontaktuj się ze swoim agentem i skorzystaj z wyjątkowej oferty!

Towarzystwo Ubezpieczeń INTER Polska S.A.
Al. Jerozolimskie 142 B
02-305 Warszawa
www.interpolska.pl

inter UBEZPIECZENIA

KALMED
Iwona Renz, Poznań

ARTROMOT®
WYŁĄCZNY PRZEDSTAWICIEL
WWW.KALMED.COM.PL

DJO GLOBAL

SPRZEDAŻ I WYPOŻYCZALNIA ZMOTORYZOWANYCH SZYN CPM ARTROMOT®

Nowoczesna rehabilitacja CPM stawu kolanowego, biodrowego, łokciowego, barkowego, skokowego, nadgarstka oraz stawów palców dłoni i kciuka.

ARTROMOT-K1 ARTROMOT-SP3 ARTROMOT-S3 ARTROMOT-E2

ARTROMOT-H

ARTROMOT-F

ARTROSTIM FOCUS PLUS

Najnowsze konstrukcje ARTROMOT zapewniają ruch bierny stawów w zgodzie z koncepcją PNF (Proprioceptive Neuromuscular Facilitation).

KALMED Iwona Renz
ul. Wilczak 3
61-623 Poznań
www.kalmed.com.pl

tel. 61 828 06 86
faks 61 828 06 87
kom. 601 64 02 23, 601 647 877
kalmed@kalmed.com.pl

Serwis i całodobowa pomoc techniczna:
tel. 501 483 637
service@kalmed.com.pl

REHA TRADE SHOW 3

24.02.2022 PGE NARODOWY, WARSZAWA

JEDYNE TARGI I KONFERENCJA BRANŻY REHABILITACYJNEJ W POLSCE!

www.rehatradeshow.pl

PATRON MEDIALNY

REHA Biznes.pl

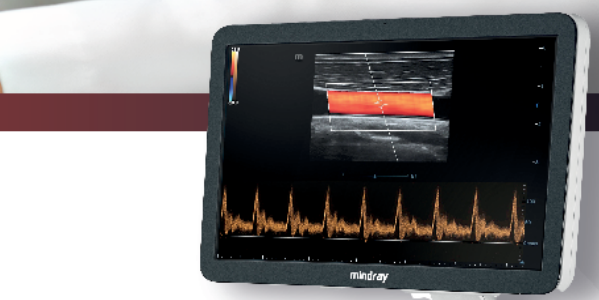
NAJNOWOCZEŚNIEJSZY, BIZNESOWY PORTAL DLA BRANŻY REHABILITACYJNEJ W POLSCE

ZOSTAŃ NASZYM PARTNEREM I DAJ SIĘ ZAUWAŻYĆ W BRANŻY!

mindray
healthcare within reach

ULTRASONOGRAFIA

W FIZJOTERAPII



Mindray Medical Poland Sp. z o. o.
ul. Cybernetyki 9, 02-677 Warszawa

+48 22 463 80 80
info-pl@mindray.com
MindrayPoland
mindray.com/pl

13-14.05.2022, EXPO Kraków

Reha INNOVATIONS

Zostań Wystawcą!

Fizjoterapia. Nowoczesna diagnostyka. Odnowa biologiczna

Fizjoterapia

Nowoczesna diagnostyka

Odnowa biologiczna

www.rehainnovations.pl

organizator:

Targi w Krakowie

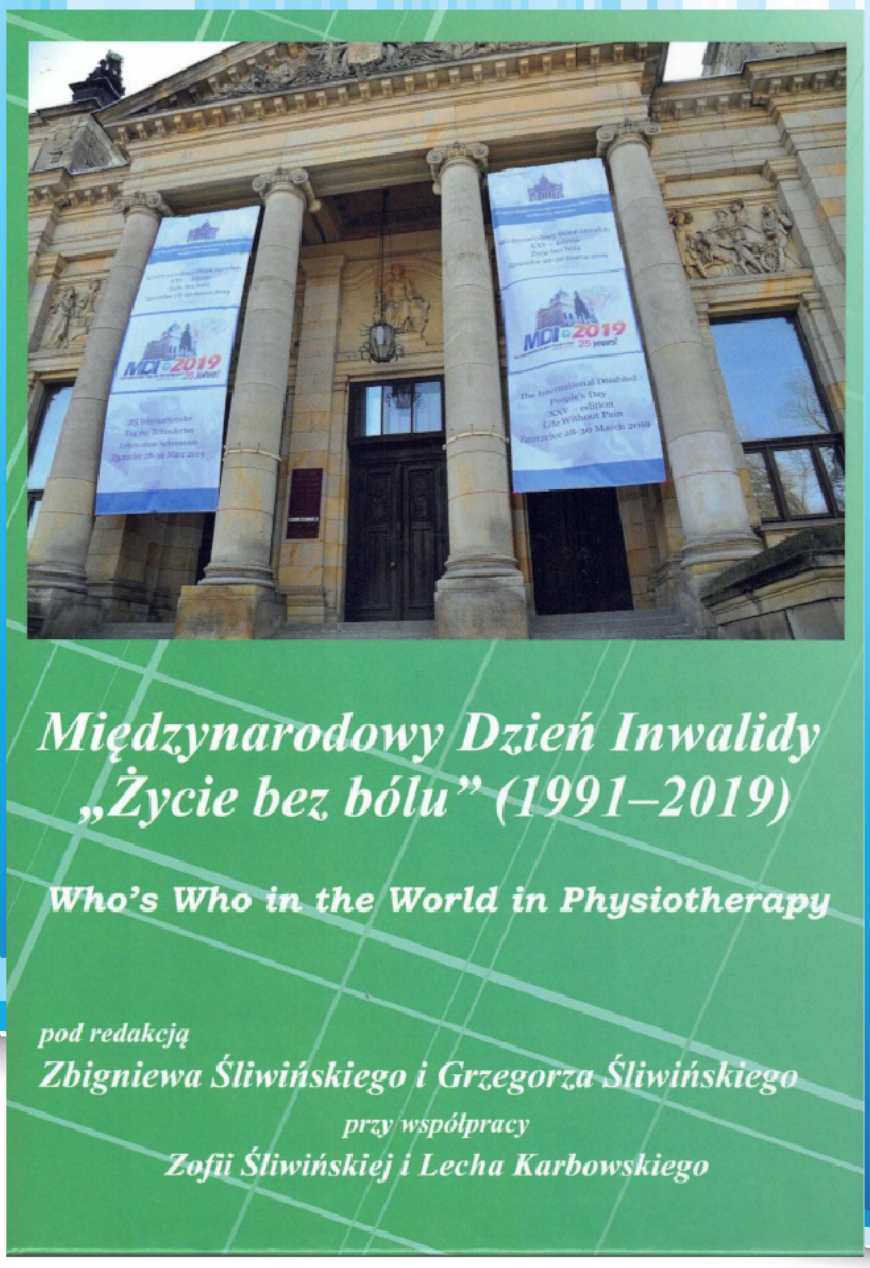
partnerzy:

MIFiZ

Fizjo Coach

miejsce wydarzenia:

EXPO KRAKOW



Indeks uczestników MDI z Polski i zagranicy

fizjoterapia polska
nr 5/2021 (21)

Online-based versus photos-based home programs on upper extremity functions for children with hemiplegic cerebral palsy following botulinum toxin injection

Internetowe i oparte na zdjęciach programy domowe usprawniające funkcje kończyn górnych dla dzieci z porażeniem mózgowym połowiczym po wstrzyknięciu toksyny botulinowej

Eslam E. Hassan[1,2(A,C,D,E,G)], Khaled A. Mamdouh[3(B,C,D)], Samia A. Abdel Rahman[3(A,B,C,D,E,F)], Tarek E.I. Omar[4(A,C,D,E)]

[1]Faculty of Physical Therapy, Cairo University, Egypt
[2]Ministry of Health Hospitals, Alexandria, Egypt
[3]Faculty of Physical Therapy, Cairo University, Giza, Egypt.
[4]Faculty of Medicine, Alexandria University, Alexandria, Egypt

Abstract

Background. Online-based home program allows continuous care at any time controls the economic demand and is considered as a perfect method for infection control. This study was conducted to study the effect of adding online-based versus photos-based home program to the traditional physical therapy program, on hand grasping skills and range of motion of wrist extension and forearm supination of the affected upper extremity for children with hemiplegic cerebral palsy following botulinum toxin A injection. Materials and methods. Thirty children with hemiplegic cerebral palsy were classified into two equal groups (A and B). Both groups received traditional physical therapy program in clinic in addition to online-based home program for group (A) and conventional photos-based home program for group (B). The measured variables were the grasp domains of Quality of Upper Extremity Skills Test and range of motion of wrist extension and forearm supination using electronic digital goniometer for the affected upper extremity before as well as after three successive months of treatment. Results. The study revealed significant improvement of all measured variables in both groups in post treatment compared to pretreatment values. Regarding between groups comparison, there was significant improvement in group (A) post treatment regarding grasp domain score compared to group (B), while there was non-significant difference regarding the range of motion of wrist extension and forearm supination. Conclusion. Adding online-based home program is more effective than adding photos-based home program to the traditional physical therapy program in improving hand grasping skills in children with hemiplegic cerebral palsy.

Key words:
botulinum toxin A, cerebral palsy, online-based home program, upper extremity functions

Streszczenie

Informacje wprowadzające. Internetowy program domowy pozwala na ciągłą opiekę w dowolnym momencie, kontroluje zapotrzebowania i jest uważany za doskonałą metodę kontroli infekcji. Niniejsze badanie przeprowadzono w celu zbadania wpływu zastosowania programu domowego i programu opartego na zdjęciach w porównaniu do tradycyjnego programu fizjoterapii, na umiejętności chwytania dłonią i zakres ruchu wyprostu nadgarstka i supinacji przedramienia dotkniętej chorobą kończyny górnej u dzieci z porażeniem mózgowym po wstrzyknięciu toksyny botulinowej A. Materiały i metody. Trzydzieścioro dzieci z porażeniem mózgowym połowiczym podzielono na dwie równe grupy (A i B). Obie grupy były poddawane tradycyjnemu programowi fizjoterapii w klinice, oraz realizowały internetowy program domowy w przypadku grupy (A) i konwencjonalny program domowy oparty na zdjęciach w przypadku grupy (B). Mierzone zmienne to chwyt na podstawie testu jakości umiejętności kończyn górnych oraz zakres ruchu wyprostu nadgarstka i supinacji przedramienia przy użyciu elektronicznego goniometru cyfrowego dla dotkniętej chorobą kończyny górnej przed i po trzech kolejnych miesiącach leczenia. Wyniki. Badanie wykazało znaczną poprawę wszystkich mierzonych zmiennych w obu grupach po leczeniu w porównaniu z wartościami sprzed leczenia. Jeśli chodzi o porównanie między grupami, wystąpiła znaczna poprawa w grupie (A) po leczeniu pod względem chwytu w porównaniu z grupą (B), podczas gdy nie było istotnej różnicy w zakresie wyprostu nadgarstka i supinacji przedramienia. Wniosek. Internetowy program domowy jest bardziej skuteczny niż program domowy oparty na zdjęciach w tradycyjnym programie fizjoterapii dla poprawy umiejętności chwytu ręką u dzieci z porażeniem mózgowym połowiczym.

Słowa kluczowe
toksyna botulinowa A, mózgowe porażenie dziecięce, internetowy program domowy, funkcje kończyn górnych

Introduction

Cerebral palsy (CP) is a broad term for motor impairments acquired during the early stages of brain development and has similar features as a non-progressive brain injury [1]. Unilateral CP affects approximately 30% of total children with CP [2]. The motor aspects are the focus area during studying of children with unilateral CP [3]. Usually, the upper limb is more affected than the lower limb, which considered the main limitation for children's daily living activities and affects their quality of life [4].

Assessment of the upper limb for children with CP is often based on the account of its functionality, which usually includes passive and active range of motion (ROM) analysis, presence of deformities, stereognosis and sensitivity. The limitations of functional aspects that clearly appeared by dynamic or fixed deformities are rarely objectively analyzed [5]. The Quality of Upper Extremity Skills test is a reliable test that measures the components of hand function as well as the quality of upper limb movement [6].

There are a multi-disciplinary ways for managing CP that include occupational therapy, speech therapy, orthoses, physiotherapy, pharmacotherapies, orthopedic surgery and others. Botulinum toxin type-A (BoNT-A) has been established as an important treatment modality for spastic movement disorders in children with CP [7].

Cerebral palsy is considered as one of the highest healthcare expenditures, as well as high costs to family and individual through many factors as chronic stress and loss of employment [8]. Given a self-management is the most effective healthcare model for individuals with CP [9].

Exercise programs delivered in the home environment complement direct intervention and help children with CP to achieve the necessary intensity of practice to effect outcome [4]. Telerehabilitation is a term used to describe using of information and communication technologies for rehabilitation purposes at home. It allows continuous care at any time, and controls the economic demands for families and institutes. Moreover, it enables strict monitoring of patients' performance through online tracking [10]. Thus, this study aimed to investigate the effect of adding online-based versus photos-based home program to the traditional physical therapy program on ROM of wrist extension and forearm supination as well as hand grasping skills of the affected upper extremity for children with hemiplegic CP [HCP], following botulinum toxin A injection.

Subjects and methods

Study design

This study is a quasi-experimental pretest-posttest study that was approved from the ethical committee of the Faculty of Physical Therapy, Cairo University (P.T.REC/012/002167). The consent forms were distributed to the parent's guardians after explanation of the procedures in details. The study was conducted between 1st March 2019 and 30 June 2020.

Participants

Thirty spastic HCP children with age ranged from 5 to 8 years were recruited from Alexandria University Children's Hospital and Roaia center. The children were assigned into two equal groups. Group (A) received an online-based home program on the New Vision Organization website. Group (B) received a conventional, photos-based home program. Both groups received a traditional physical therapy program at the clinic. All children were included if they had Level (III) of fine motor ability, according to Manual Ability Classification System (MACS), Level (I) of gross motor ability according to the Gross Motor Function Classification System (GMFCS), Grade 1+/2 of spasticity according to the Modified Ashworth Scale (MAS) and undergone botulinum toxin A injection from three months for the pronator teres and wrist flexors muscles of the affected upper extremity. Children were excluded if they had visual or auditory problems, epilepsy, fixed deformity related to the joint of the upper extremities or mental retardation.

Sampling Method and Venue

Convenient sample of children with HCP were selected from AUCH and Roaia center, Alexandria. Physical therapy program was conducted in Roaia center, Alexandria. The online-based home as well as the conventional, photos-based home programs was conducted at home.

Children recruitment

After collecting the consent forms, children were examined by the researcher for the eligibility criteria. Each eligible child (according to the consent form and examination) was participated in the study. Eligible children were divided into two equal groups (A and B).

Interventions

The online-based home program for group (A) and the conventional photos-based home program for group (B) were applied three times per week for three consecutive months. The home programs were designed according to Novak and Cusick [11], who suggested a model used for designing a home program for a child with CP. Additionally, children in both groups received physical therapy program in the clinic three times per week for three successive months.

Online-based home program

The therapist arranged appointment with the child and his/her parents to explain to them how to use the website. The website of New Vision Organization (http://newvisionalex.org) contained customized videos library was used. The videos included demonstrating voice for explanation of the aim and the procedure of each exercise recorded by the therapist. The videos (which were recorded using normal child) were arranged into three sets of exercises (A, B and C). Every set included four exercises that involve direct reaching, grasping and release, carrying and bilateral hand use. A rest was given between every set of exercises where the child was asked to do simple gross motor skill such as standing on one limb.

Every time the participants finished the three sets of exercises, they were asked to complete an exercise logbook that consisted of a single sheet for each month, set out in a table format. In this sheet, the child or parent easily recorded the repetitions of each exercise. Families were reminded monthly, by text message and email, to return a copy of the completed exercise log sheets.

Conventional, photos-based home program
The program was documented using photos, which included same sets of exercises as those used for the online-based home program. The parents received training on how to make their children perform the program by themselves. The exercises were demonstrated in front of the child at home before asking him/her to perform them. The child was asked to perform each exercise he/she saw it at the photos. The therapist provided support to the family through contact with the parents on a regular basis, helping parents to identify areas of improvement, and providing appropriate and positive feedback.

Physical therapy program
Children of both groups received physical therapy program at Roaia Center, three sessions/week for three consecutive months. Each session consisted of the same exercises, which were used at the home program.

Outcome measures for eligibility criteria
1. Modified Ashworth Scale is a valid and reliable scale for measuring the degree of spasticity [12].
2. Manual Ability Classification System is a valid and reliable scale for assessment of the ability of children from 4–18 years old with CP to handle objects in everyday activities [13].
3. Gross Motor Function Classification System was used to measure the gross motor ability. Jooyeon et al. [14] confirmed the reliability and validity of the GMFCS, supporting its use in clinical practice and research.

Outcome measures for comparison between both groups
1. Medi Gauge Electronic Digital Goniometer was used to measure ROM of wrist extension and forearm supination of the affected upper extremity. It has an adequate concurrent criterion-related validity as a tool for assessment of joint ROM and equivalent inter- and intra-rater reliability to the universal goniometer [15].
2. Quality of Upper Extremity Skills Test [QUEST] is a reliable and valid measure for the components of hand function as well as the quality of movement in children with CP [16]. It assesses four aspects: dissociated movements, grasps, weight bearing and protective extension. Grasp domain was measured in this study.
Participants were assessed for eligibility by the use of MAS, MACS and GMFCS. All eligible children underwent assessment for the ROM of wrist extension and forearm supination of the affected upper extremity using the electro-goniometer and assessment for the grasp domain of QUEST before as well as after three successive months of intervention

Statistical analysis and sample size calculation
Based on a pilot study, sample size was calculated according to the significant difference in the value of mean difference [pre-treatments–post treatment values] of quest grasp domain between laser therapy (27.22 ± 3.22) and pulsed electromagnetic field groups (10.23 ± 2.83) in unpaired t test, with $\alpha = 0.05$, power of 80%. So, a sample size of 15 patients / group would be required (G*Power 301 http:www.psycho.uni-duesseldorf.de).
Descriptive and t-test were conducted for comparison of participant's characteristics between both groups. Chi-squared test was used for comparison of sex and affected side distributions between groups. Normal distribution of data was checked using the Shapiro-Wilk test for all variables. Levene's test for homogeneity of variances was conducted to test the homogeneity between groups. Mixed MANOVA was performed to compare within and between groups effects on ROM of wrist extension, forearm supination and grasp domain of QUEST. Post-hoc tests using the Bonferroni correction were carried out for subsequent multiple comparison. The level of significance for all statistical tests was set at $p \leq 0.05$. All statistical analysis was conducted through the statistical package for social studies (SPSS) version 25 for windows (IBM SPSS, Chicago, IL, USA).

Results
The participant characteristics of both groups were summarized in table 1. There was no significant difference in the mean age, weight and height between both groups ($p < 0.05$). As well as Chi-square test revealed that there was no significant difference ($p < 0.05$) in sex and affected side distributions between both groups.

Table 1. Baseline characteristics of participants in both groups

	Group A Mean ± SD	Group B Mean ± SD	t-value	p-value
Age [years]	6.51 ± 1.02	6.45 ± 1.09	0.156	0.877^{NS}
Weight [kg]	23.87 ± 4.16	24.87 ± 4.26	−0.651	0.520^{NS}
Height [cm]	88.50 ± 25.14	95.93 ± 9.29	−1.074	0.292^{NS}
Boys/ Girls	6/9	6/9	($\chi 2 = 0.00$)	1.00^{NS}
Affected side [Right/Left]	8/7	8/7	($\chi 2 = 0.00$)	1.00^{NS}

SD: Standard deviation; NS: P > 0.05, non-significant, P: Probability, χ2: chi-square test.

There was a significant increase in the ROM of wrist extension, forearm supination and grasp domain of QUEST after treatment compared with that before treatment within both groups ($p < 0.05$). There was no significant difference between groups (A) and (B) in all parameters before treatment ($p > 0.05$). A significant increase was found in grasp domain of QUEST of group (A) after treatment compared with that of group (B) ($p < 0.05$). There was no significant difference in the ROM of wrist extension, forearm supination of group (A) compared with that of group (B) after treatment ($p > 0.05$) (table 2).

Table 2. Descriptive and inferential statistics of ROM of wrist extension, forearm supination and Grasp domain of QUEST within and between groups

	Before treatment			After treatment			Before vs After	
	Group A Mean ± SD	Group B Mean ± SD	P value	Group A Mean ± SD	Group B Mean ± SD	P value	Group A P value	Group B P value
ROM wrist extension	33.33 ± 8.84	38.07 ± 7.34	0.112^{NS}	38.00 ± 7.97	43.00 ± 6.49	0.354^{NS}	0.008**	0.001**
Forearm Supination	17.33 ± 5.94	18.00 ± 6.21	0.766^{NS}	23.67 ± 5.50	24.33 ± 4.58	0.846^{NS}	0.001**	0.001**
Grasp domain of QUEST	56.05 ± 4.40	58.33 ± 3.90	0.144^{NS}	83.34 ± 2.17	69.49 ± 4.95	0.001*	0.001**	0.001**

*SD: Standard deviation; * Inter-group comparison; ** intra-group comparison of the results pre and post training, NS: P > 0.05, non-significant; S: P < 0.05, significant; P = Probability*

Discussion

Patients with CP reported high costs to family and institutes. The understanding of cortical plasticity referred to the effect of intensive motor training programs to improving upper limb function [17]. Furthermore, the need for intensive intervention by a rehabilitation specialist may be cost prohibitive for many individuals, especially those with chronic conditions or who have limited access to therapy services [18]. Exercise programs delivered in the home environment have less cost and help children with CP to achieve the necessary need of practice to gain an effective outcome. Therefore, this study was conducted to investigate the effect of adding online-based versus photos-based home programs to the traditional physical therapy program, on hand grasping skills and ROM of wrist extension and forearm supination in children with HCP following Botulinum Toxin A injection.

The results of this study revealed that there was a significant increase in the ROM of wrist extension, forearm supination and grasp domain of QUEST after treatment compared with that before treatment for all participants. These results may be explained by that the repetition of the home program over a successive three months helped the children to improve their selective motor control and fine motor skills by constructing sensory and motor memory about these skills that enabled them to become more skillful.

Additionally, the treatment program consists of three sets of functional tasks every set included four exercises that involving direct reaching, grasping and release, carrying and bilateral hand use. This type of functional exercises are preferred in the rehabilitation of CP. Novak et al. [19] mentioned that the rehabilitation of CP has been shifted towards approaches that emphasis goal-oriented activity-based therapy, and frequent task practice with creation of optimal environments for motor learning. These approaches, based on motor learning principles focus on task practicability and environmental context, but do not focus on passive interventions such as stretching, or the normalization of movement like traditional neurodevelopmental therapy [20].

Our findings come in agreement with Brown et al. [21] who stated that a home-based, self-administered, and internet-monitored upper limb training program led to improved function in adults with CP, including increased movement speed and enhanced hand manipulation skills. There were also improvements in sensory function, including better performance on tests of stereognosis and tactile discrimination. Children might benefit as well because this could be an adjunct to therapies they receive in school and other locations during their developmental years.

Regarding between groups comparison, there was a significant increase in grasp domain of QUEST of group [A] after treatment compared with that of group [B]. This may be explained by that the online videos achieved more intensity and accuracy of training than what was achieved with the photo based method. These results come in agreement with Bilde et al. [22] who concluded that it is feasible to deliver interactive training of children with CP at home through the internet and thereby ensure more intensive and longer lasting training than what is normally offered to them. Our findings also agree with Lorentzen et al. [23], who concluded that interactive home-based training delivered and supervised through the internet is an efficient way of providing multi-modal training of children with CP that may lead to lasting functional benefits.

Moreover, Amatya et al. [24] found that the information and communication technology such as telerehabilitation which is transmitted by phone or video, represent an alternative method to deliver therapy in a setting convenient to the patient, such as their home, by minimizing the barriers of distance, time, cost and health care system load.

Our results also come in agreement with Speyer et al. [25] who reported that telehealth services are as effective as or more effective than face-to-face interventions, which is positive given the potential benefits of telehealth in rural and isolated areas concerning healthcare access, cost savings and time.

Controversially, our finding of significant increase in grasp domain was opposed by the insignificance found by Kosma et al.

[26] who reported that the results of an internet-based physical activity intervention for adults with physical disabilities, including CP reported statistically insignificant difference between the intervention and comparison group for change in leisure time physical activity. However, their study was limited by small sample size being a pilot study as well as by applying only four-week web-based leisure-time physical activity, which may be insufficient time for making significant difference.

The results obtained from post-treatment evaluation of wrist extension and forearm supination ROM in the children on both groups revealed significant improvement in each group but also revealed a non-significant difference between the two groups, which may be resulted from the effect of botulinum toxin A injection, which decreased muscle tone and produced improvements in passive ROM in the joints over which injected muscles cross [4].

Our findings agree with Wallen et al. [27] who demonstrated that the dynamic joint ranges in the upper extremity respond to BoNT-A injection and that there was a significant improvement in activities and participation at 3 and 6 months following injection.

Conclusion

Adding the online-based home program is more effective than adding photos-based home program to the traditional physical therapy in improving hand-grasping skills in children with HCP after botulinum toxin A injection.

Adres do korespondencji / Corresponding author

Eslam Elsayed Hassan

E-mail: eslam_elhadry2010@yahoo.com

Acknowledgments

We would like to thank all participants who contributed to the completion of this work, especially the study participants.

Piśmiennictwo/ References

1. Colver A, Fairhurst C, Pharoah PO.Cerebral palsy. Lancet.2014; (383): 1240-1249.
2. Stanley FJ, Blair E, Alberman E. Cerebral Palsies: Epidemiology and Causal Pathways. Cambridge University Press: Cambridge, UK.2000.
3. Jovellar-Isiegas P, Collados IR, Jaén-Carrillo D, et al. Sensory processing, functional performance and quality of life in Unilateral cerebral palsy children: a cross-sectional study. International Journal of Environmental Research and Public Health.2020; (17): 7116-7129.
4. Sakzewski L, Ziviani J, Boyd RN.Efficacy of upper limb therapies for unilateral cerebral palsy: a meta-analysis. Pediatrics.2014; (133): 175-204.
5. Butler EE, Ladd AL, Louie SA, et al. Three-dimensional kinematics of the upper limb during a Reach and Grasp Cycle for children. Gait Posture.2010; (32): 72-77.
6. Thorley M, Lannin N, Cusick A, et al. Reliability of the Quality of Upper Extremity Skills Test for children with cerebral palsy aged 2 to 12 years. Physical and Occupational Therapy in Pediatrics.2012; (32): 4-21.
7. Heinen F, Desloovere K, Schroeder AS, et al. The updated European consensus 2009 on the use of botulinum toxin for children with cerebral palsy. European Journal of Paediatric Neurology.2010; (14): 45-66.
8. Kancherla V, Amendah DD, Grosse SD, et al. Medical expenditures attributable to cerebral palsy and intellectual disability among Medicaid-enrolled children. Research in Developmental Disabilities.2012; (33): 832-840.
9. Wagner EH, Austin BT, Davis C, et al. Improving chronic illness care: translating evidence into action. Health Affairs (Millwood).2001; (20): 64-78.
10. Galea MD.Telemedicine in rehabilitation. Physical Medicine and Rehabilitation Clinics of North America.2019; (30): 473-483.
11. Novak I, Cusick A. Home programmes in pediatric occupational therapy for children with cerebral palsy: Where to start? Australian Occupational Therapy Journal.2006; (53): 251-264.
12. Ansari NN, Naghdi S, Arab TK, Jalaie S.The interrater and intrarater reliability of the modified Ashworth scale in the assessment of muscle spasticity: limb and muscle group effect. Neurorehabilitation. 2008; (23): 231-237.
13. Eliasson AC, Krumlinde L, Rösblad B, et al. The Manual Ability Classification System (MACS) for children with cerebral palsy: scale development and evidence of validity and reliability. Developmental Medicine and Child Neurology.2006; (48): 549-554.
14. Jooyeon K, Ji-hea W, Jin-gang H. The Reliability and concurrent validity of the GMFCS for children with cerebral palsy. Journal of Physical Therapy.2011; (23): 255-258.
15. Carey MA, Laird DE, Murray KA, Stevenson JR. Reliability, validity and clinical usability of a digital goniometer. Work Journal.2010; (36): 55-66.
16. DeMatteo C, Law M, Russell D, et al. The reliability and validity of the quality of upper extremity skills test. Physical and Occupational Therapy in Pediatrics.2009; (13): 1-18.
17. Blanton S, Wilsey H, Wolf SL. Constraint-induced movement therapy in stroke rehabilitation: perspectives on future clinical applications. Neurorehabilitation.2008; (23): 15-28.
18. Gordon AM, Schneider JA, Chinnan A, Charles JR.Efficacy of a hand-arm bimanual intensive therapy (HABIT) in children with hemiplegic cerebral palsy: a randomized control trial. Developmental Medicine and Child Neurology.2007; (49): 830-838.
19. Novak I, McIntyre S, Morgan C, et al. Systematic review of interventions for children with cerebral palsy: state of the evidence. Developmental Medicine and Child Neurology.2013; (55): 885-910.
20. Law MC, Darrah J, Pollock N, et al. Focus on function: a cluster randomized controlled trial comparing child-versus context-focused intervention for young children with cerebral palsy. Developmental Medicine and Child Neurology.2011; (53): 621-629.
21. Brown SH, Lewis CA, McCarthy JM, et al. The effects of internet-based home training on upper limb function in adults with cerebral palsy. Neurorehabilitation and Neural Repair.2010; (24): 575-583.
22. Bilde PE, Kliim-Due M, Rasmussen B, et al. Individualized, home-based interactive training of cerebral palsy children delivered through the Internet. BMC Neurology.2011; (11): 32-40.
23. Lorentzen J, Greve LZ, Kliim-Due M, et al.Twenty weeks of home-based interactive training of children with cerebral palsy improves functional abilities. BMC neurology.2015; (15): 75-86.
24. Amatya B, Galea MP, Kesselring J, Khan F. Effectiveness of telerehabilitation interventions in persons with multiple sclerosis: a systematic review. Multiple Sclerosis Related Disorder.2015 (4): 358-369.
25. Speyer R, Denman D, Wilkes-Gillan S, et al. Effects of telehealth by allied health professionals and nurses in rural and remote areas: a systematic review and meta-analysis. Journal of Rehabilitation Medicine.2018; (50): 225-235.
26. Kosma M, Cardinal B, McCubbin J. A pilot study of a web based physical activity motivational program for adults with physical disabilities. Disability and Rehabilitation Journal.2005; (27): 1435-1442.
27. Wallen M, O'Flaherty SJ, Waugh MC. Functional outcomes of intramuscular botulinum toxin type A and occupational therapy in the upper limbs of children with cerebral palsy: a randomized controlled trial. Archives of Physical Medicine and Rehabilitation.2007; (88): 1-10.