University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XX, ISSUE 1, 2020, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

Science, Movement and Health, Vol. XX, ISSUE 1, 2020
January 2020, 20 (1): 34 - 39
Original article

EFFECTS OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION PROGRAM ON RANGE OF MOTION OF SOME UPPER LIMB JOINTS OF CHILDREN WITH NEURODEVELOPMENTAL DISORDERS

MAHMOUD ELSAYED[1], AHMED ELOLEMI[1]

Abstract

Purpose. The main purpose of the study is to design a rehabilitation program that includes some techniques of Proprioceptive Neuromuscular Facilitation, which can identify the difference between the pre-post measurement in the range of motion of the wrist joint, the elbow joint and the shoulder joint.

*Methods***.** The sample of the research was selected in a deliberate manner from children with Neurodevelopmental Disorders. The basic research sample (7) children and (2) children were in the exploratory study after excluding children with different disabilities and multiple disabilities. The researcher used the program (Angelus Software Version 3.1.5) to measure the range of motor joints was. Rehabilitation program implemented for a month and use three training units per week, which included the program 18 rehabilitation units.

*Results***.** Considering research procedures, sample boundaries and statistical analysis, it was found that the proposed rehabilitation program had a positive effect on the range of motion of the wrist joint, elbow joint and shoulder joint.

Conclusions. Within the limits of the research sample and the results reached, it is recommended to direct the results of this research and the program to the workers in the field of motor rehabilitation for people with special needs in general and rehabilitation of the groups of neurodevelopmental disorders in particular and conduct other research using the method of Proprioceptive Neuromuscular Facilitation technique on disorders and other disabilities.

Key words: Neurodevelopmental Disorders. Proprioceptive Neuromuscular Facilitation. upper limb joint.

Introduction

ASD's are Neurobiological Developmental Disorders that occur within the first three years of life and continue throughout the lifespan (American Psychiatric Association, 2000). ASD's a kind of lifelong mental-neurological disorder characterized by defects in social, linguistic, non-linguistic, imaginative plays and Stereotyped behavior (N. Papadopoulos et al. 2012). Children with an ASD may also have motor difficulties and delays (G. T. Baranek, 2002).

Motion disturbances include disorders of basic movement control (walking, muscle tone, posture, coordination, and balance), common in these children. Parents and professionals often see that children with autistic spectrum show abnormal walking, hypotonia, imbalance and lack of manual skills and coordination (NJ. Minshew, et al. 2004). It was also shown in the research that there is a significant difference between the children of

the autistic spectrum and their healthy counterparts in all aspects of physical fitness, including strength and muscular endurance, static and dynamic balance and flexibility (L. Wing, 2006).

Some research on these children also suggests that they have developmental disability Coordination and general movement functions, and the planning and implementation of the movement. It was also found that Children with ASD have deficits in control areas of motor abilities Comprehensive development of basic motor skills, bowling skills and ball skills Balance and general disability in manual responses to visual effects. (B. Hakim, et al. 2014)

(S. Tom, 2002) points out that the method of neural facilities, [PNF] is a collection of techniques related to Tension It involves exchanges contractions, tension and control of the musculoskeletal system by stimulation Sensory receptors. These receptors and their efficiency help to facilitate the movement of the joint to its maximum extent During the exercises that extend on the negative stretches and the muscle contraction of the motor muscles that helps to reduce the act of flexibility on these receptors (A. Tariq, et al. 2017).

[1]Faculty of physical education, Benha University, Egypt
Email: amr297@aswu.edu.eg
Received 8.11.2019 / Accepted 2.01. 2020

University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XX, ISSUE 1, 2020, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

flexibility means the motor range of the joint, Flexibility is measured to the maximum extent possible between the capture and extension of the joint and is expressed either by degree or angle In a line measured by centimeters, elasticity is related to the functional characteristics of the motor Joints, ligaments, tendons and muscles working around this joint in terms of degree of tension or Relaxation and elasticity (L. Omar and M. Ayman, 2009).

Through work in the field of motor rehabilitation for those with special needs, the researcher found that Children with neurodevelopmental disorders have a weakness in the motor range that appears in The skills of throwing and lifting, which requires arresting, stretching and lifting the joint to perform the performance as noted by the researcher A decrease in qualifying programs that are used to improve the range of motion and attention to strength and balance And improve motor skills, although the flexibility of the joints affects the acquisition and improvement of these Skills and scarcity in the use of rehabilitation for this type of Proprioceptive Neuromuscular Facilitation in the rehabilitation programs for children with Neurodevelopmental Disorders.

Hence, the problem of this research was crystallized through the design of a preparatory program using some Techniques for Proprioceptive Neuromuscular Facilitation to improve the motor range of some Upper limb joints of children Neurodevelopmental Disorders.

The main purpose of the study is to design a rehabilitation program that includes some techniques of Proprioceptive Neuromuscular Facilitation, which can identify the difference between the pre-post measurement in the range of motion of the wrist joint, the elbow joint and the shoulder joint.

.

Material and Methods

Samples

The research community is composed of children with neurodevelopmental disorders in Hafez Center Academie for people with special needs. The sample of the research was chosen in a deliberate manner Children with neurodevelopmental disorders and the basic research sample (7) Children after the exclusion of children with different disabilities and multiple disabilities.

Data collection procedure

Pediatric Balance Scale (PBS) consists of 14 items balance-related skills, with a maximum score of 56. The skill items include sitting to standing, standing to sitting, transfers, standing unsupported, sitting unsupported, standing with eyes closed, standing with feet together, standing with one foot in front, standing on one foot, turning 360 degrees, turning to look behind, retrieving object from floor, placing alternative foot on stool, and reaching forward with outstretched arm. PBS was scored after completion of the static balance tests in pre- between and post-assessments.

Range of motion of upper body

Angelus software version 3.1.5 to measure the Range of Motion of the joints.

Purpose of measurement

To determine the motor range of the joints by means of images or videos to perform movements Detailed in the adduction – abduction – extension – flexion

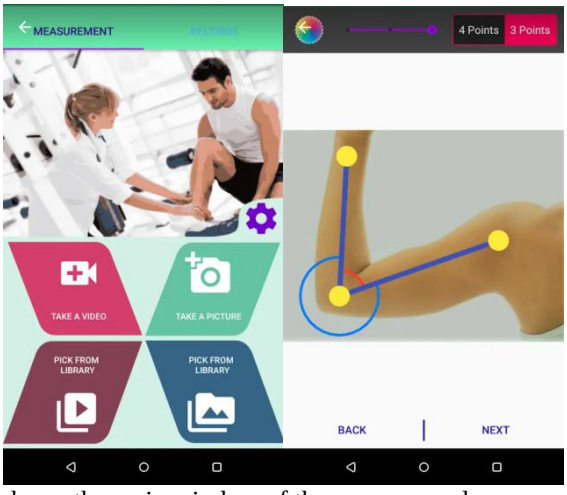

Figure (1) shows the main window of the program and a measurement model.

Method of measurement

The child performs the motion required for the joint and through the program it shoots Perform either by image or video by selecting the appropriate image or better A correct attempt to measure the motor range of the joint by three main starting points of range, Base Range and end of range that the program places on the desired joint Measure it as an angle to determine the range of motion.

Test results

The angle of the joint is determined in the movement or range to be measured and recorded in the program in the name of the child for its use

Training Program

The program was implemented for a period of one month and three training units per week which included the program has 18 rehabilitation units.

Statistical analysis

Ztest and Nonparametric Wilcoxon signed rank used to analyze differences between pre – post measurements of (ROM) of upper body. All data is presented in the tables are the mean ± SD. Data presented in the figures are the mean and 95% confidence interval. IBM SPSS software was used for statistical analyses.

Results.

Table 1. Shows the age, Anthropometric Characteristics Scale for the experimental Group (Mean ± SD)

Group	N	Age [years]	Weight [kg]	Height [cm]
Experimental	7	9.73 ± 0.45	33.60 ± 3.94	135.66± 0.72

Table 1 showed the age, Anthropometric Characteristics. The study sample of children with autism withmean age 9.73 ± 0.45 as seen in table (1), mean weight 33.60 ± 3.94 and mean height 135.66± 0.72

Table 2. Range of Motion of Upper Limb joints (wrist – elbow – shoulder)

Variables	pre	post	(z) value	Level of significance
Flexion of wrist	35.85 ± 4.98	57.97 ±5.21	2.36	0.18
Extension of wrist	50.28 ±3.25	68.45 ± 6.25	2.37	0.18
Flexion of elbow	41.42±2.07	57.21± 3.21	2.37	0.18
Extension of elbow	88.00± 1.00	90.00 ± 0.00	2.57	0.18
Flexion of shoulder	86.71± 0.95	104.9± 4.95	2.37	0.18
Abduction of shoulder	87.14 ±1.95	102.9±3.11	2.37	0.18

Table (2) show that The calculated z value is greater than the table value at the level(0.05) indicating statistically significant differences between the measurement of the pre – post measurement of range of motion of upper limb joints (wrist – elbow – shoulder) in favor to the post measurement of the range of motion measurements for children with Neurodevelopmental Disorders.

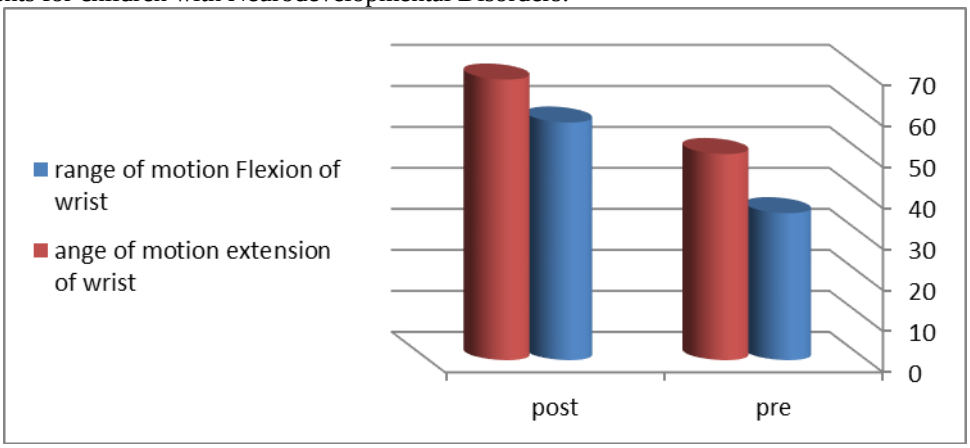

Figure 2. Change in range of motion of wrist. This figure shows individual data points comparing the pre-post measurement of range of motion of wrist joints

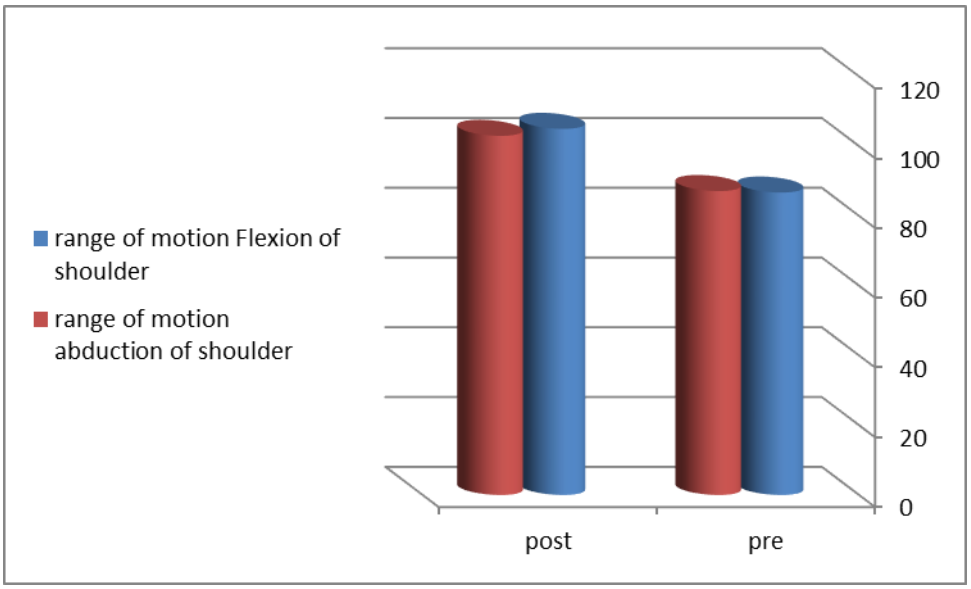

Figure 3. Change in range of motion of elbow. This figure shows individual data points comparing the pre-post measurement of range of motion of elbow joints

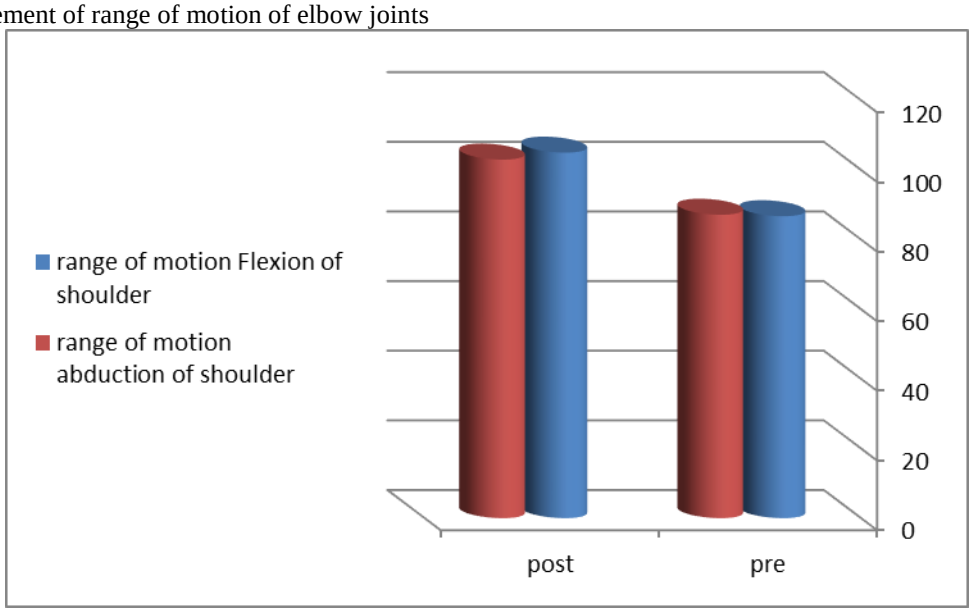

Figure 4. Change in range of motion of shoulder. This figure shows individual data points comparing the pre-post measurement of range of motion of shoulder joints.

Discussion

The researcher also found that the training using the techniques Proprioceptive Neuromuscular Facilitation is one of the best and best ways to improve the range of motor and to the knowledge of the researcher and through theoretical readings and previous studies and scientific references specialized in the field noted That this study was not addressed for children with neurodevelopmental disorders.

Prolongation in the form of Proprioceptive Neuromuscular Facilitation aims to benefit from the physiological processes to achieve muscle relaxation so that the muscles can be stretched under the best possible conditions. These methods are the best ways to lengthen because they increase the flexibility of the positive and because they help to build the method of movement compatible and they use physiological neurological mechanisms Before the mutual nerve effect and the reflexive muscle relaxation (H. Reham, 2016).

These receptors and their efficiency help to facilitate the movement of the joint in its maximum extent during the exercises that extend on the negative stretches and the contraction of the muscles of the muscle helps to reduce the act of flexibility on these receptors. (S. Tom, 2002)

The results of Table (2) and Figure (2), (3)and (4) show that there are statistically significant differences between the pre and post in favor of the post measurements of the range of movement of the upper limb joint (wrist – elbow – shoulder).

The researcher attributed the differences and improvement that the rehabilitation program using Proprioceptive Neuromuscular Facilitation exercises has a positive effect in the process of improving the range of motion of the movement of the upper limb joint (wrist – elbow – shoulder).

These results are in line with the study of (M. Dalia, 2011; A. Mohamed, 2001; H. Mohamed, 2006) Which referred to the training programs using the methods of Proprioceptive Neuromuscular Facilitation, which are carefully planned to improve the range of motion.

It agrees with (A. Faraj, 2005) that rehabilitation exercises increase the flexibility of the joints and the range of motion of the joint. This is what the researcher indicates that the proposed program has increased the range of motion of the joint.

These results are consistent with the study of (A. Tariq, et al. 2017; M. Ahmed, 2018) that indicated that the program of rehabilitation using the methods Proprioceptive Neuromuscular Facilitation improved the motor range of wrist joint.

These results are consistent with the study of (A. Esra, 2017; H. Ahmed, 2016) pointed out that the proposed program using Proprioceptive Neuromuscular Facilitation improved the motor range for the shoulder joint.

Conclusion

Considering research procedures, sample boundaries and statistical analysis, it was found that the proposed rehabilitation program had a positive effect on the range of motion of the wrist joint, elbow joint and shoulder joint.

Within the limits of the research sample and the results reached, it is recommended to direct the results of this research and the program to the workers in the field of motor rehabilitation for people with special needs in general and rehabilitation of the groups of neurodevelopmental disorders in particular and conduct other research using the method of Proprioceptive Neuromuscular Facilitation technique on disorders and other disabilities.

References

Ahmed H., 2016, training program using some methods of Proprioceptive Neuromuscular Facilitation and their effect on the motor range and level of performance of bow and arrow players, Master Thesis, Faculty of Physical Education of boys, Benha University.

Ahmed M., 2018, Effect of Rehabilitation Program Using Some Methods of Proprioceptive Neuromuscular Facilitation on Some Musculoskeletal Fractures, Master Thesis, Faculty of Physical Education, Assiut University.

American Psychiatric Association, 2000, Diagnostic and statistical manual of mental disorders (4th ed., text rev.). Washington, DC: Author.

Baranek, G. T., 2002, Efficacy of sensory and motor interventions for children with autism. Journal of Autism and Developmental Disorders, 32, 397-422.

Dalia M., 2011, Effect of a proposed program for flexibility using some PNF methods in the motor range of the working joints and the performance level of the slow backbone on the ground movement device, Master Thesis, Faculty of Physical Education in the island.

Esra A., 2017, Effect of Rehabilitation Program on the Use of Proprioceptive Neuromuscular Facilitation with Some Physical Therapy Methods on the Seamless Shoulder Joint of Women, PhD Thesis, Faculty of Physical Education, Assiut University.

Faraj A., 2005, The Importance of Physical Exercise in the Treatment of posture deviation, Dar Al Wafaa Printing and Publishing, Cairo.

Hakim et al., 2014, The effects of balance training intervention on postural control of children with autism spectrum disorder: Role of sensory information, Research in Autism Spectrum Disorders 8 (2014) 8–14.

Minshew NJ, Sung K, Jones BL, Furman JM (2004) Underdevelopment of the postural control system in autism. Neurology 63: 2056-2061.

Mohamed A., 2001, Effect of the combination of electrical stimulation training and the method of slow-reverse stabilization as a method for the development of muscular strength, PhD thesis, Faculty of Physical Education for Boys, Helwan University.

Mohamed H., 2006, Effect of a proposed preventive program using the latest methods of Proprioceptive Neuromuscular Facilitation on the shoulder belt and its relation to the digital level of the national team of bow and arrow, Master Thesis, Faculty of Sports Trials for Boys, Helwan University.

Omar L. and Ayman M., 2009, Karate (preparation - performance - training methods),

Papadopoulos N, McGinley J, Tonge B, Bradshaw J, Saunders K, et al., 2012, Motor proficiency and emotional/behavioral disturbance in autism and Asperger's disorder: another piece of the neurological puzzle? Autism 16: 627-640

Reham H., 2016, Effectiveness of some methods of Proprioceptive Neuromuscular Facilitation to improve the level of performance in rhythmic exercises, Assiut Journal of Physical Education Sciences and Arts.

Tariq A. et al., 2017, Effect of the Rehabilitation Program on Some Methods of Proprioceptive Neuromuscular Facilitation on Some Cases of Wrist Joint Fractures after Surgical Intervention, Assiut Journal of Physical Education Sciences and Arts.

Tom S., 2002, flexibility stretching (PNF) al ballistic stretch Golgi tendon organ, American college of sport medicine.

Wing L., 2006, Children with autistic spectrum disorders. Included or Excluded, Routledge; p. 53-63.