Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

COMPARATIVE EFFECT OF HOLD-RELAX PERIPHERAL NEUROMUSCULAR FACILITATION TECHNIQUE WITH AND WITHOUT CONVENTIONAL PHYSICAL THERAPY ON KNEE TORQUE AND MOTOR FUNCTION IN CHILDREN WITH SPASTIC CEREBRAL PALSY

Protocol summary

Study aim

To compare the effect of conventional physiotherapy with and without hold- relax PNF Exercises on knee torque and motor function in children with spastic cerebral palsy.

Design

single-blind randomized controlled trial

Settings and conduct

Ambulatory patients of cerebral palsy having GMFC of 1 and 2 in the rehabilitation department of Rehab Care School for Special Children Lahore fulfill the inclusion criteria of the study. The assessor was not aware of the treatment given to either group.

Participants/Inclusion and exclusion criteria

8-16 years old cognitive children with spastic cerebral palsy having Knee flexor and extensors grade 3 and above according to manual muscle testing.

Intervention groups

hold- relax peripheral neuromuscular facilitation technique along with conventional physical therapy. The exercise program included: o Dynamic stretching utilizing the principles of hold relax peripheral neuromuscular facilitation. Keeping the knee straight, the patient was asked to lift the leg for 7 seconds while the therapist held the leg from moving. The muscles were relaxed for 2 seconds while holding the new position. The process was repeated five times and the whole set was done 66 times with a 2-minute rest between each set. o Conventional static stretching was done at the start of the protocol for 5 minutes.

Main outcome variables

• knee torque. • motor function • functional capability • spasticity

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20240530061952N1**
Registration date: **2024-06-15, 1403/03/26**
Registration timing: **retrospective**

Last update: **2024-06-15, 1403/03/26**
Update count: **0**

Registration date

2024-06-15, 1403/03/26

Registrant information

Name

Azka Zulfiqar

Name of organization / entity

University of Lahore

Country

Pakistan

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+92 308 0529889

Email address

azka286@gmail.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2023-12-05, 1402/09/14

Expected recruitment end date

2024-01-10, 1402/10/20

Actual recruitment start date

2023-12-15, 1402/09/24

Actual recruitment end date

2024-01-12, 1402/10/22

Trial completion date
2024-04-18, 1403/01/30

Scientific title
COMPARATIVE EFFECT OF HOLD-RELAX PERIPHERAL NEUROMUSCULAR FACILITATION TECHNIQUE WITH AND WITHOUT CONVENTIONAL PHYSICAL THERAPY ON KNEE TORQUE AND MOTOR FUNCTION IN CHILDREN WITH SPASTIC CEREBRAL PALSY

Public title
Effect of hold relax technique on knee movement of children with cerebral palsy

Purpose
Treatment

Inclusion/Exclusion criteria

Inclusion criteria:
Age 8-16 years Ambulatory patient Normal vision, as well as hearing, and the ability to follow instructions Knee flexor and extensors grade 3 and above according to manual muscle testing

Exclusion criteria:
The patient was unable to respond physically or mentally Subjects with Gross Motor Functional Classification levels 4 and 5 Fixed contractures or deformities of the spine or extremities History of surgical interference of the spine or lower extremities within 1 year

Age
From **8 years** old to **16 years** old

Gender
Both

Phase
N/A

Groups that have been masked

- Outcome assessor

Sample size
Target sample size: **53**
Actual sample size reached: **44**

Randomization (investigator's opinion)
Randomized

Randomization description
participants were randomly allocated to different groups using the sealed enveloped method Non-probability, purposive sampling. A single-blind randomized controlled trial was performed. The assessor was not aware of the treatment given to either group

Blinding (investigator's opinion)
Single blinded

Blinding description
A single-blind randomized controlled trial was performed. The outcome assessor (senior physiotherapist)was not aware of the treatment given to either group

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Research Ethics Committee (REC) Faculty of Allied Health Sciences The University of Lahore

Street address
University of lahore Defence Road Campus, 1-Km, DefenceRoad, 10-Km, LahoreRoad, Off Bhobatian Chowk, Lahore.

City
Lahore

Postal code
54792

Approval date
2023-09-28, 1402/07/06

Ethics committee reference number
REC-UOL-537-09-2023

Health conditions studied

1

Description of health condition studied
Cerebral Palsy

ICD-10 code
G80.9

ICD-10 code description
Cerebral palsy, unspecified

Primary outcomes

1

Description
Knee torque

Timepoint
Baseline, 6,12 weeks

Method of measurement
Dynamometer

2

Description
Motor function

Timepoint
Before intervention ,6,12 weeks

Method of measurement
Gross motor function scale

3

Description
Functional capability

Timepoint
Before intervention, 6, 12 weeks

Method of measurement
Sit and reach test

4

Description
Spasticity
Timepoint
Before intervention, 6, 12 weeks
Method of measurement
Modified Tardieu Scale

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: The children in the experimental group received a hold-relax peripheral neuromuscular facilitation technique along with conventional physical therapy. The exercise program included: Dynamic stretching utilizing the principles of hold relax peripheral neuromuscular facilitation. Keeping the knee straight, the patient was asked to lift the leg for 7 seconds while the therapist held the leg from moving. The muscles were relaxed for 2 seconds while holding the new position. The process was repeated five times and the whole set was done 66 times with a 2 minute rest between each set. Conventional static stretching was done at the start of the protocol for 5 minutes.
Category
Rehabilitation

2

Description
Control group: All children in this group underwent an especially designed Conventional Physical Therapy Program for 40 minutes, 3 times per week for 12 successive weeks. The exercise program included the following:Static Stretching at the knee, ankle, and hip. Knee isometrics for knee strengthening.
Category
Rehabilitation

Recruitment centers

1

Recruitment center
Name of recruitment center
Rehab Care School for special children
Full name of responsible person
Dr. Khushbakht
Street address
176, block Q1, Wapda Town, Phase 2, Lahore
City
Lahore
Postal code
54770
Phone
+92 333 1048076
Email
admin@rehabcare.pk
Web page address
https://rehabcare.com.pk/

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
University of Lahore
Full name of responsible person
Umair Ahmed
Street address
University of Lahore, Defence road Campus,1 km off Bhoobtian road, Lahore
City
Lahore
Postal code
53700
Phone
+92 42 35322501
Email
info@uol.edu.pk
Web page address
https://uol.edu.pk/
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
University of Lahore
Proportion provided by this source
100
Public or private sector
Private
Domestic or foreign origin
Domestic
Category of foreign source of funding
empty
Country of origin
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
Name of organization / entity
University of Lahore
Full name of responsible person
Azka Zulfiqar
Position
MS- PT student
Latest degree
Bachelor
Other areas of specialty/work
Physiotherapy
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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Undecided - It is not yet known if there will be a plan to make this available

Study Protocol
Yes - There is a plan to make this available

Statistical Analysis Plan
Yes - There is a plan to make this available

Informed Consent Form
Yes - There is a plan to make this available

Clinical Study Report
No - There is not a plan to make this available

Analytic Code
Not applicable

Data Dictionary
Not applicable

Title and more details about the data/document
Collection data set for knee torque CP

When the data will become available and for how long
Data can be provided within 6 months of publication

To whom data/document is available
Supporting documents can be provided on request to academic institutions

Under which criteria data/document could be used
Academic institutions can use the data for further research

From where data/document is obtainable
Documents are available on request on azka286@gmail.com

What processes are involved for a request to access data/document
Documents are available on request on azka286@gmail.com

Comments
For additional information contact on azka286@gmail.com