EFFECTS OF INHIBITORY PRESSURE ON TONE – AN EXPERIMENTAL STUDY

By

(Reg. No . 27101810)

PADMAVATH COLLEGE OF PHYSIOTHERAPY

PERIYANAHALLI

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Under the guidance of

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Submitted in Partial fulfillment of the requirements for the

Degree of **Master of Physiotherapy**

From

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

PADMAVATH COLLEGE OF PHYSIOTHERAPY

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CERTIFICATE

This is to certify that the project entitled **"EFFECTS OF INHIBITORY PRESSURE ON TONE – AN EXPERIMENTAL STUDY "**

Submitted by the candidate

(Reg. No . 27101810)

is a bonafide work done in partial fulfillment of the requirements for the Degree of **Master of Physiotherapy** from

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

Guide **Principal**

Viva-voce Examination held on _____

Internal Examiner **External Examiner**

DECLARATION

I hereby declare and present my dissertation entitled entitled **"EFFECTS OF INHIBITORY PRESSURE ON TONE – AN EXPERIMENTAL STUDY"** the outcome of the original research work undertaken and carried out be me , under the guidance of **Mr. G. ANANDAN, M.P.T. , MIAP.,** Associate Professor , Padmavathi College of Physiotherapy, Periyanahalli, Dharmapuri , Tamilnadu.

I also declare that the material of this dissertation had not formed in any basis for the award of any other Degree previously from the Tamilnadu Dr. M.G.R. Medical University, Chennai.

(MAHESH . M)

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DEDICATED TO MY BELOVED

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AND

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INTRODUCTION

Tone[1] is defined as the resistance of muscle to passive elongation or stretch. It is also said to be in a state of readiness [2] . It represents the residual contractions in normally innervated resting muscle or steady state contractions. Changes in tone lead to hypertonia or hypotonia.

Hypertonia[3] is defined as velocity dependant resistance to stretch. It is primarily due to one of three factors passive muscle stiffness, neurally mediated reflex stiffness would presumably be due to fibrosis with in the Muscle tissue or even a change in the cellular properties of muscle. Increase reflex gain may reflect a change in descending influence in the monosynaptic reflex between muscle spindle afferent alpha motor neurons or on polynaptic stretch reflex pathways. Increased active muscle stiffness may be due to an increase in number of cross bridges attached during contraction or to an increased in stiffness per cross bridges.

Number of technique have been developed in physiotherapy to address problem of tone with neurophysiology basis, Among those inhibilitory pressure is one of the recommended, but still not used popularly, and has many critical appraisals.

Inhibilitory pressure refers to the pressure which causes inhibition to the decreased capacity to initiate a movement response through altered synaptic potential. The synaptic potential is raised making it more difficult for the neuron to fire and produce movement. The combination of spinal inputs and supraspinal inputs acting on alpha motor neuron will cause the muscle spindle, Golgi tendon organs. It is applied by firm pressure to long tendons manually or through positioning at end ranges using firm objects in hand[4-6]. Many studies states that applying pressure reduces tone.

The relationship[7] between the rate of pressure applied over the muscle and the [8. 9] pressure pain threshold was studied with an aid of algometer.[10] pain is defined as an unpleasant tissue damage according to the international association for the study of pain.[11] Pressure threshold is the minimal pressure that induces discomfort. Pressure tolerance is defind as maximal pressure the subject can tolerate.[12,13-] Pain threshold is physiological but pain tolerance is psychological.[14]-pain tolerance differs between men and woman. [15,16]-Men have more pain tolerance than woman.. [17,18,19]- There is much reliability in measuring[20] pain pressure threshold using algometer.

1.1 Statement of the problem:

Tone plays a major part in performing a movement. If normal tone is altered than ADL will be affected and depending upon the muscle group affected it leads to Impairment, Disability or Handicap.

This study attempts to find the alteration in tone on applying inhibitory pressure over a tendon of a muscle.

1.2 Significance of the study:

Many studies has documented the effect of Inhibitory pressure on tone, but the system becomes more complicated to measure the pressure quantitatively in our setting. This study aims to quantify the pressure with help of an Algometer by Analayzing Pressure pain threshold and Applying the standardized value an normal muscle to Analyses the effect of inhibitory pressure on Tone [21,22,23]

1.3 Objective:

To standardize pressure Threshold value.

To find the effect of inhibitory pressure on tone.

1.4 Hypothesis:

Ho: There is no significant difference in tone on applying inhibitory pressure.

AH1: There is significant difference in tone on applying Inhibitrary Pressure.

1.5 Operational definitions:

a) Algometer[24]:

It is defined as the use of a pressure guage attached to a rubber disc for measuring pressure threshold and pressure tolerance.

b) Pressure threshold:

It is defined as the minimal pressure that induce discomfort to a subject.

c) Pressure tolerance:

It is defined as the maximal pressure that the subject can tolerate.

d) Pain threshold:[25]

When the patient spontaneously complain of pain that pressure was taken as pain threshold.

REVIEW OF LITERATURE

Susan B O' Sullivan 1 et a[1] l describes tone as resistance to passive elongation or stretch. Susan B O' Sullivan4 et al describes about inhibitory pressure and how muscle is inhibited and methods of applying inhibitory pressure.

Bernstein[2] 1967 describes tone as a state of readiness.

Richard L. Limber et al [3] did a study on structural and functional changes in spastic skeletal muscle and stated and started the definition of hypertonia and physiological state of spasticity.

Kukulka CG et al[4] did a study on effect of tendon pressure on alpha motor neuron excitabity states that applying inhibitory pressure supports the clinical impression of reduced muscle tone resulting from tendon pressure applying pressure for 10 seconds.

Kukulka CG6 et al[5] in 1986 did a study on Effects of intermittent pressure on alpha motor neuron excitability states that a maintained

reduction in muscle tone might be induced through intermittent tendon pressure.

Mayer M7 et al[6] did a study on Some maneuvers for releasing the hypertonous of spastic and shortened muscles states pressure stimulation of particular zones reduces tone.

List T8 et al[7] did a study on Influence of pressure rates on reliability of a pressure threshold meter states relationship between the rate of pressure applied over the messeter muscle and pressure pain threshold was studied using algometer.

Brown et al[8] studied better palpation of a new pressure pain protocol in TMD states that pressure algometer is a reliable means of measuring pressure pain threshold and employs a magnitude matching psychological protocol to obtain a multidimensional pain report.

Nezire kose et al[9] in did a study on the assessment of the pressure pain threshold and its correlation with depression and anxiety in geriatric nursing home residents with cognitive impairments states that subjects with cognitive impairment were more depressed and anxious.

Merskey and associates[10] the international association for the study of pain defines pain as An unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Kenneth M Wookow11 et al[11] studied Pain tolerance: Difference according to age sex and race states that pain threshold level of stimulus at which the subject recognizes pain and pain tolerance is subjects request stimulus cessation.

Merskey ans Spears FG[12] states that pain threshold is more dependent on physiology factors and pain tolerance on physiological factors.

Beecher HK[13] in 1996 studied the measurement of pain in man states that experimental pain cannot be compared to clinical pain.

Tophoff MMWA[14] in 1967 states that there is disagreement in the relationship of pain sensitivity to sex.

Petrie A and Chapman WP[15] in 1944 states that pain toloerence is more in men.

AntonaciF et al[17] in 1998 from university centre for adaptive disorders and headache did a study on Pressure algometer in healthy subjects inter examiner variability states that manual algometer has a good and excellent interrater reliability.

Ogimoto.T et al[18] in 2002 from Dept of removable prosthodontics did a study on Pressure pain threshold determination in oral mucosa states that pressure algometer is reliable in assessing the pressure pain threshold in oral mucosa sensitivity discriminating pressure pain threshold difference at different sites and at different load rates.

Chesterton LS et al[16] did a study in Gender difference on pressure pain threshold in healthy humans and stated that healthy females exhibited significance lower mean pressure pain threshold in the first dorsal interossies muscle than males.

Kosek E et al[21] in 1993 did a study on A comparison of pressure pain threshold in different tissues and body region states that there was no significant difference between the mean pressure pain threshold from the first session and those from the second session however and the third session after 10 weeks the average pressure pain threshold was substantially higher than in previous session.

Fisher AA[22] did a study on Documentation of myofacial trigger points in 1998 and concluded that Pressure tolerance measured over normal muscles and shinbones express pain sensitivity.

White KP et al [23] in 1993 did a study on The effect of changing the painful stimulus upon dolorimetry scores in patients with fibromyalgia says that statistically lower dolorimetre scores were obtained when using the small sized dolorimeter head.

Fisher[24] in 1968 describes the pressure algometer as use of a pressure guage attached to a rubber disc for measuring pressure threshold and tolerance.

Susan L O' driscoll[25] in 1974 did a study on Pain threshold analysis in patients with osteoarthritis of hip and states that patient complaints of pain while applying pressure this is referred as pain threshold.

Goddard G et al[31] in 2004 did a study on Reproducibility of visual analog scale pain scores to mechanical pressure states that visual analog scale scores to mechanical stimulation were reproducible over a short period.

Vermans GE et al[37] did a study on neurophysiological methods for the assessment of sapasticity, the hoffmans reflex tendon feflex and stretch reflex and states that the reflexes are basically monosynaptic there are many supraspinal pathways which modulate the responses in terms of there amplitude and latency.

Morit H et al[32] did a study on Sensitivity of H reflex and stretch reflex to presynaptic inhibition in humans and states that different sensitivity of mechanically and electrically evoked reflexes to presynaptic inhibition is caused by a difference in the shape and composition of the excitatiory postsynaptic potentials underlying in two reflexes.

Voigt et al[33] did a study on the reflex in passive human soleus muscle and said it modulated faster than predicted from postactivatin depression states that major part of the H reflex modulation observerd in healthy subjects was caused by peripheral and spinal influence. The fast 500 ms recovery of H reflex had a time cause comparable to presynaptic inhibition.

Patikas Da et al[34] in 2004 did a study on the effect of the ankle joint angle in the level of soleus Ia afferent presynaptic inhibition says

that the level of presynaptic inhibition was higher at the dorsiflexed positions.

Hoffman MD et al[36] in 2004 did a study on Intensity and duration threshold for aerobic exercises induced analgesia to pressure pain states that outcome measure pain rating scale was measure on visual analog scale at 10 seconds interval during a 2 minute pressure pain stimulus and concluded that there was no significant changes in pain rating after 10 minutes of exercises or after exercises at 50% $V_o(2)max$.

Nussbaum E L et al[19] in 1998 did a study on Reliability of clinical pressure pain algometric measurements obtained on consecutive days states that there is perfect reliability for measurements of pressure pain threshold within and across 3 days and substantial reliability between examiners.

Fisher AA [29]in 1987 did a study on pressure algometry over normal muscles standard values validity and reproducibility of pressure threshold states that pressure threshold meter is with a disc of 1 centimeter surface. It shows that there is excellent reproducibility and validity of pressure threshold measurements.

Stuat Catherart et al[28] in 2005 did a study on Reliability of pain threshold measurements in young adults states that pressure applied is converted to Kg/cm^2. Reliability of repeat assessment was high as assessed by interclasscorrelation although coefficients of repeatability and variation indicated considerable inter individual variation in repeat measurements.

Kerstin Waling et al[30] in 2001 did a study on a comparison of variability of pain rating and pain threshold in women with trapezius myalgia states that pain was assessed on visual analogue scale and pressure pain threshold. No correlation between visual analogue scale and pressure pain threshold was found, it indicates that the instruments measure different characteristics of pain.

Issclee H et al in 1997 did a study on Short term reproducibility of pressure pain threshold in maesseter and temporalis muscles of symptom free subjects states that pressure pain threshold was assessed for one day with an aid of algometer. It indicate that the pressure pain threshold measurement will not be systematically influenced by the time of registration or in between consecutive days.

R.Jason et al[20] in 2004 did a study on a comparison of pressure pain detection threshold in people with chronic low back pain and volunteers without pain states that peripheral sensitization in the head and neck region is like temporally and that hypersensitivity of tissues unrelated to the area of injury. It also has a clinical implications.

Fatima goulart[35] in 2000 did a study on Posture related changes of soleus H-reflex excitability states that there is no significant changes between positions regarding onset latency or amplitude of H-reflex.

Yasuhiro Kagamihara et al[26] in 1977 did a study on Reassessment of H-reflex recovery curve using the double stimulation procedure states that the higher initial peak of recovery may be due to the mechanical effect of the ankle movement by the conditioned H reflex and that quicker is due to the use of greater H reflex in spastics than in controls.

Sabbhai et al[29] and Wolf et al in there study have described that the role of cutaneous mechanocepors in the amplitude changes of the H-relfex in both neurological healthy subjects.

METHODOLOGY

3.1 Research design:

Experimental study design.

3.2 Settings:

Padmavathy College of Physiotherapy. PG Research lab which was maintained in room temperature.

3.3 Sampling:

Samples were collected for the study in a random manner.

3.4 Inclusion criteria:

a) All healthy subjects with normal tone

b) Muscle power 5

c) Normal H-Reflex.

3.5 Exclusion criteria:

a) Any neuro, ortho, and cardo problems

b) Any local lesions

3.6 Data collection procedure:

Datas were collected initially according to inclusion criteria for first 100 healthy subjects and later 30 subjects were collected from the previously collected group in a random method.

3.7 Tools for data collection:

Algometer, pen, note pad and H-reflex

3.8 Evaluation and Parameters:

Datas are collected by visual analogue scores initially for pressure threshold and later collected by algometer which shows the readings in Kg/cm^2. Later tone alterations are measured using H-Reflex, latency is noted.

3.9 Procedure:

Initially the subjects who were selected for the study were within the inclusion criteria and they were selected randomly for the study. All subjects were taken for the study after signing the informed consent form.

PHASE 1:

Initially 100 healthy subject were selected for the study randomly. Each subject were explained about the study later the patient is informed

about the application of pressure with the help of algometer they were also informed that once the subject feels any pain/discomfort on applying pressure the subject should express to the examiner. Once they have understood about the study the subject is asked to lye in prone position with the right ankle joint in neutral position. The pressure is applied 5 times on the right tendoachillis and the same procedure is done for 100 health subjects. Once the values have been obtained the mean value is found. The mean value for 100 subjects is 6.7 kg/cm2[28]. The pressure is applied on the tendon of right tendoachllis above its insertion point. The pressure is applied perpendicular to the tendon. The rubber disc is of 1cm2[29], with the help of that pressure is applied over the insertion of the tendon the pain is noted using VAS[30,31]. During this procedure the subject is asked to be in a relaxed posture. Once the first phase ends the 100 subjects were informed that 30 subject will be selected for the phase 2 in random method.

PHASE 2:

In this phase the 30 healthy subjects were selected form the 100 subjects using random sampling. Once the 30 subjects were selected for the study they were again explained about the Phase 2. Each subject is made to lye in prone position with right ankle in neutral position. Initially H-reflex is taken which give the base line value for further readings for

the subject. Later the mean pressure is applied on the right tendoachills tendon after marking a point on the subject skin. A pressure of 6.7 Kg/cm^2 is applied for 10 Second[4] immediately after applying pressure H-reflex is taken. The subject is made to still lye in prone position after 5 minutes again H-reflex[32] is taken later after 10 minutes after pressure application[34] H-reflex is noted again to observe the effect of pressure on tone.

Surface electrodes were used for both stimulation and recording. Paired electrodes for recording (diameter 10 mm) were placed 2-3 cm apart over the belly of soleus muscle, and connected to the EMG machine. The tibial nerve was stimulated at the popitial fossa to eleict H-reflex form the soleus muscle. The ground electrode was placed in the opposite leg.

Readings are noted in the form of minimum latency and maximum latency. Based on these values the statistical analysis is done.

Statistical Analysis:

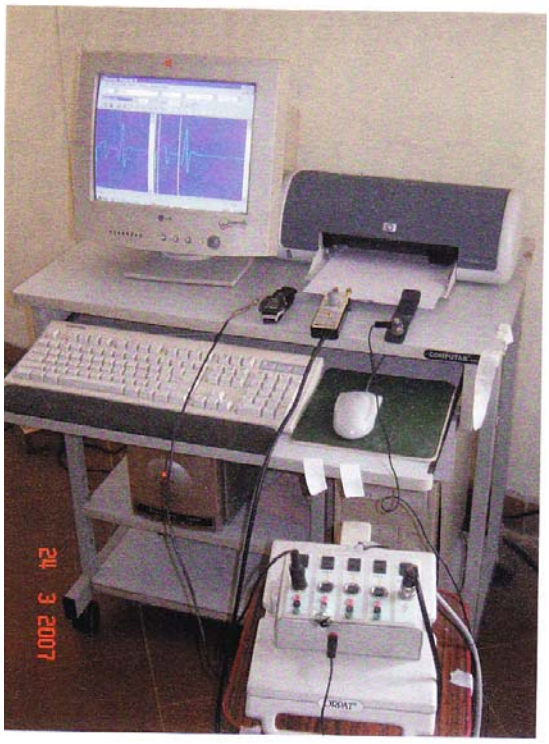
To test the effectiveness of pressure in reducing tone using paired t-test.

Statistical Methods:

The collected data were tabulated and analyzed using descriptive statistics to assess all the parameters mean and standard deviation was used. To find out significant changes between pre-test and post test by paired t-test. To find the effect of inhibitory pressure on tone paired t-test was used.

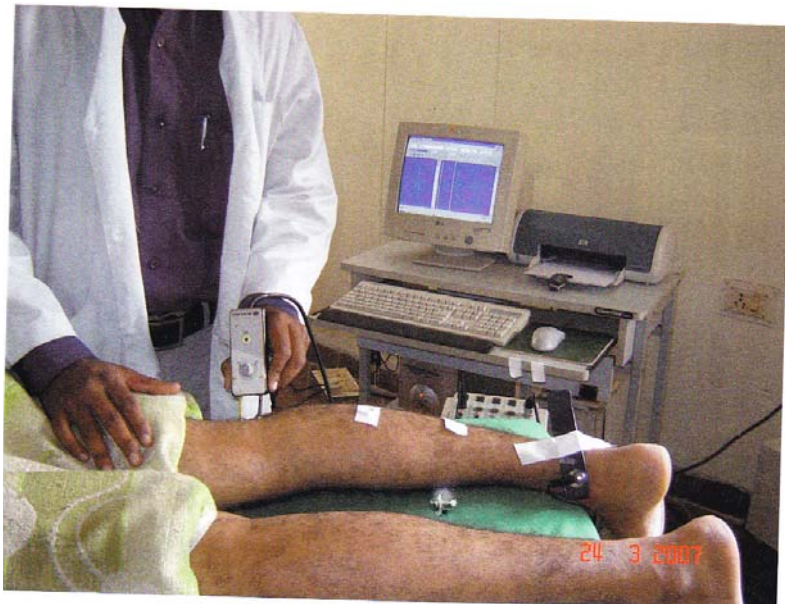
MATERIALS USED

MATERIAL USED



PLACEMENT OF ALGOMETER

PLACEMENT OF ELECTRODES



STATISTICAL ANALYSIS AND RESULTS

Testing the effectiveness of inhibitory pressure by calculating the amplitude.

Amplitude	Mean	S.D	Mean difference	Paired t-value	P Value
Pre test	4.78	0.61	0.29	7.20	
Post test	4.49	0.57			<0.0001

The above table reveals that the pre test with mean 4.78 and S.D=0.16, post-test with a mean of 4.49 and S.D. = 0.57. The post test values are gradually decreasing with a mean difference of 0.29. The paired t-value (7.20) shows that there is statistically significant changes at $p<0.05$ (5% level) from the pre-test to post-test using pressure to decrease tone.

Comparing the amplitude with the base value and following 5 minutes after inhibitory pressure.

Amplitude	Mean	S.D	Mean difference	T-value	P-value
Pre-test	4.78	0.61	0.25	4.97	<0.0001
After 5 min	4.53	0.55			

The above table suggest that the pre-test mean is 4.78, S.D = 0.61, post-test mean is 4.53 S.D = 55. The post test values are gradually decreasing with a mean difference of 0.25. The paired t-value (4.97) shows that there is statistically significant change at $p<0.05$ (5% level) from pre test to post 5 minutes using pressure to decrease tone.

Comparing the amplitude with the base and following inhibitory pressure application after 10 minutes.

Amplitude	Mean	S.D	Mean Difference	T-value	P-Value
Pre-test	4.78	0.61	0.104	7.12	<0.0001
After 10 min	4.88	0.61			

The above table suggest that the pre-test mean is 4.78, S.D=0.61, post-test mean is 4.88, S.D=0.61. The post test values are gradually increasing with a mean difference of 0.104. The paired t-value (7.12) shows that there is statistically significant change at $p<0.05$ (5% level) from pre-test to post-test which is 10 minutes after inhibitory pressure application.

Testing the effectiveness of inhibitory pressure on tone by comparing the latency.

Latency	Mean	S.D	Mean difference	T-value	P-value
Pre-test	29.48	1.98	0.74	8.94	<0.0001
Post-test	30.22	1.93			

The above table suggest that the pre-test mean is 29.48, S.D=1.98, post-test mean is 30.22, S.D = 1.93. The post test values are gradually increasing with a mean difference of 0.74. The paired t-value (8.94) shows that there is statistically significant change at $p<0.05$ (5% level) from pre-test to post-test which is taken immediately after inhibitory pressure.

Comparing the latency with the base value and following inhibitory pressure application after 5 min.

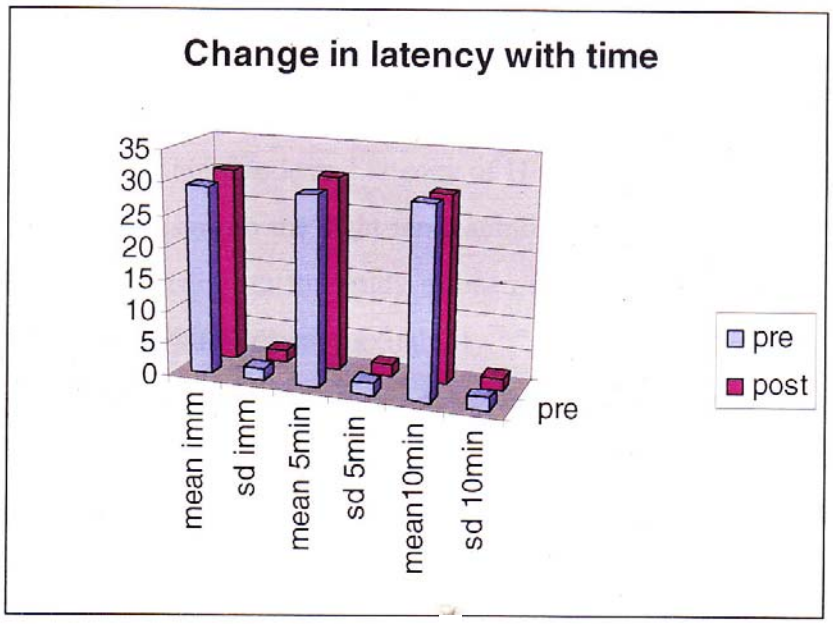
Latency	Mean	S.D	Mean Difference	T-Value	P-Value
Pre-test	29.48	1.98	0.91	10.65	<0.0001
After 5 min	30.39	1.87			

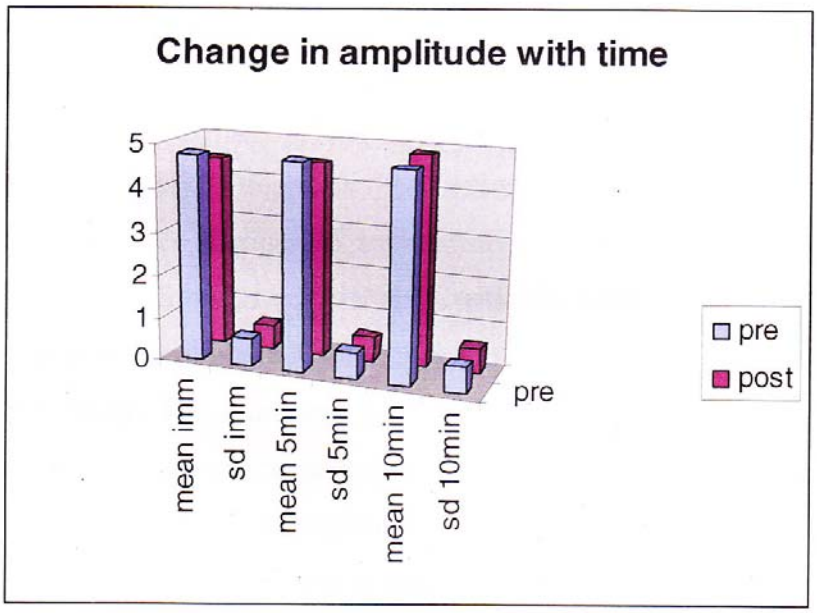
The above table suggest that the pre-test mean = 29.48, S.D = 1.98 and the post test mean is 30.39 S.D=1.87. The post test values are gradually increasing with a mean difference of 0.91. The paired t-value (10.65) shows that there is statistically significant change at $p<0.05$ (5% level) from pre-test to post-test which is taken 5 minutes after inhibitory pressure application.

Comparing the latency with the base value and following inhibitory pressure application after 10 min.

Latency	Mean	S.D	Mean difference	T-Value	P-Value
Pre-test	29.48	1.98	0.30	4	0.0004
After 10 min	29.17	1.95			

The above table suggest that the pre-test mean is 29.48 and is 1.98, the post-test mean is 29.17, S.D is 1.95. The post test values are gradually decreasing with a mean difference of 0.30. The paired t-value (4) shows that there is statistically significant change at p 0.0004 (5% level) from the pre-test to post-test which was taken 10 minutes after inhibitory pressure application.


Change in latency with time
35
30
25
20
15
10
5
0
mean imm
sd imm
mean 5min
sd 5min
mean10min
sd 10min
pre
pre
post


Change in amplitude with time
5
4
3
2
1
0
mean imm
sd imm
mean 5min
sd 5min
mean 10min
sd 10min
pre
pre
post

DISCUSSION

The foregoing analysis reveals that there is a highly significant difference between the pre-test and the post test. This study compared the changes in the amplitude and latency of H-reflex during the application of inhibitory pressure to the right tendoachillis of 30 neurologically healthy subjects. According to the study a mean inhibitory response in the right tendoachillis motor neuron exitability[35,36,37] (as evidenced by a peak to peak H-reflex amplitude) was recorded during the application of inhibitory pressure, as compared with the values obtained during the immediate and after 5 minute session but there was a significant increase in the value after 10 min. This response was consistent in all subject. In this study the latency was also noted and it showed a steady increase in values immediately and after 5 minutes of the study. After 10 minutes there was a decrease in latency which suggested that in our study there was a consistent decrease in the motor neuron excitability.

These results supports those reported in this earlier studies[4-5] and reemphasize the findings of an inhibitory response produced during the application of inhibitory pressure. A noticeable difference, however exists between the amplitude and the latency of the inhibitory response recorded in this study. The inhibitory pressure undoubtly activates the cutaneous and the muscular mechanoreceptors but it is difficult to determine which

of these receptors are responsible for the inhibition recorded during applying inhibitory pressure to tendoachillis[27]. Sabbhai et al and Wolf et al in there study have described that the role of cutaneous mechanocepors in the amplitude changes of the H-reflex in both neurological healthy subjects. Consequently it may be assumed that these cutaneous mechanorecptors presumably activated by massage and other manual techniques (eg application of tendon pressure, muscle tapping).

This study also examined whether there was any over effect upon cessation of inhibitory pressure. A mean carryover effect was detected following the cessation of inhibilitory pressure. This effect lasted for about 5 minutes and by 10 minutes the H-reflex amplitude and latency were more than the base line value.

Clinical Implications:

The decrease in amplitude and the increase in the latency in this study would be useful for the clinicians who requires feed back to the pressure being exerted during manual therapeutic techniques in order to control the amount of pressure being exerted. It can be quantitatively found out by algometer. The amount of pressure applied during application of inhibitory pressure is important not only for the safty and comfort of the procedure, but also in the sp-ecificity of the results

obtained. Because the reduction of spinal motor neuron excitability is pressure dependant it is cirtical in training a therapist to produce a pressure that is both clinically effective yet comfortable, safe especially in patients with sensory deficit.

CONCLUSION:

The result of this study demonstrate that the application of inhibilitory pressure to the right tendoachillis produces a decrease in the peak to peak amplitude of H-reflex until 5 minutes and by 10 minutes the peak to peak amplitude comes to normal. The latency showed an increase in peak to peak until 5 minutes later by 10 minutes comes to normal. The inhibitory pressure response was sustained for 5 minutes. The effect of inhibitory pressure was transitory, with the return of base line levels of H-reflex after 5 minutes.

RECOMMENDATION AND LIMITATION

1) The similar study can be conducted in both gender groups, gedriatic group.
2) The similar study can be conducted in paediatric and gedriatic groups.
3) The similar study can be conducted using a large sample size.
4) Similar study can be conducted in spastic condition like stroke, cerebral palsy, spinal cord injury.

Limitations:

1. Psychology aspect of pain threshold was not considered.
2. Small sample size was used for the study.

   Post time analysis was less.

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APPENDIX – I

Selection schedule

Name :

Age :

Gender :

History of Medical illness :

History of current/ recent injuries :

History of altersd sensation :

Apprcciation of sensation :

Pin prick :

Touch :

Deep Pressure :

APPENDIX –II

1.Visual analogue scale :

It is line which is of 3.9 inches (10 cm) At the beginning it is no pain and at the end it is severe pain.

2.Algometer :

Electronic Engineering Corporation

H-reflex :

APPENDIX – III

Table for H-reflex Latency.

Post	Post 5	Post 10	
Per lat	**imm**	**min**	
30.1	**31.2**	**31.3**	**30**
32.2	**33.1**	**31.1**	**32.1**
30	**31**	**31.2**	**30**
27.2	**28**	**28.6**	**27.1**
31.3	**32.1**	**32.6**	**31.1**
26.5	**28.2**	**28.4**	**26.2**
29.5	**29.8**	**30**	**29.2**
32.3	**32.4**	**32.4**	**32.1**
30	**31.3**	**31.4**	**29.5**
30	**30.5**	**30.6**	**29.5**
29.9	**30.3**	**30.6**	**29.8**
30.5	**30.6**	**30.8**	**30.4**
27.25	**28.1**	**28.2**	**27.1**
28.75	**29.1**	**29.6**	**28.5**
27.75	**28.1**	**28.2**	**27.1**
28.75	**29.1**	**29.6**	**28.5**
32.25	**32.7**	**32.5**	**32.1**
25.75	**26.2**	**26.3**	**25.5**

30.1	**31.3**	**31.4**	**30**
30	**30.5**	**30.6**	**29.9**
31.3	**32.4**	**32.5**	**31.1**
29.5	**31.5**	**31.6**	**29.1**
30	**31.5**	**31.6**	**29.4**
32.2	**32.7**	**32.8**	**29.9**
27.2	**28.9**	**28.9**	**27**
26.5	**26.9**	**27**	**26.3**
32.2	**32.8**	**32.9**	**32**
30	**30.5**	**30.6**	**29.8**
28.65	**29.2**	**29.3**	**28.4**
25.6	**26.7**	**26.8**	**25.5**
29.9	**30**	**30.1**	**29.5**

APPENDIX-IV

Table for H-reflex amplitude

Pre amp	Post imm	after 5min	after 10 min
5.6	5.4	5.5	5.7
5.1	5	5	5.2
4.8	4.7	4.7	4.9
4.5	4.4	4.4	4.4
5.4	5.3	5.4	5.5
5	4.8	5	5
5	4.9	5	5
4.8	4.7	4.7	4.9
3.8	3.7	3.7	3.9
5	4.9	4.8	5.1
4.5	4.4	4.4	4.7
4.5	4.4	4.5	4.7
4.5	4.4	4.4	4.7
4	3.9	3.9	4
3.25	3	3.1	3.26
6.25	5.5	5	6.26
5	4.5	4.6	4.9
5.4	5.2	5.3	5.5

5	**4.5**	**4.6**	**5.2**
3.8	**3.5**	**3.6**	**3.9**
5.1	**4.5**	**4.6**	**5.2**
4.5	**4.3**	**4.4**	**4.6**
5	**4.5**	**4.6**	**5.1**
4.8	**4.2**	**4.3**	**4.9**
5	**4.5**	**4.6**	**5.1**
4	**3.5**	**3.6**	**4.3**
5	**4.8**	**4.9**	**5.2**
4.5	**4.2**	**4.3**	**4.6**

APPENDIX - V

Padmavathi college of Physiotherapy

Dharmapuri.

Consent Form

I…… agree to take part in the research study, conducted by …… Post of graduate student (M.P.T.- Specify) Padmavathy College of Physiotherapy,

I acknowledge that the research study has been explained to me and I understand that agreeing to participate in the research means that I am willing to

* Provide information and complete questionnaire (if any) my health status to the researchers(s)

* Allow the researcher(s) to have access to my medical / academic / professional records, pertaining to the purpose of the study.

* Participate in evalutory / therapy / observatory program for duration of …… days / weeks.

* Make myself available for further interview (s) / follow up

* Understand and follow the home advice(s) that will be provided.