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Manuscript: A Study on Efficacy of Dry Needling with Deep Friction Massage in Iliotibial Band Syndrome

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ABSTRACT:
Iliotibial band syndrome (ITBS) was first specifically described by Renne as a chronic condition with pain felt on the lateral aspect of the thigh and knee with lower limb activities involving repetitive knee flexion and extension such as running or cycling. The study aims to find out the effectiveness of Dry needling with Deep friction Massage on the reduction of pain & restoration of the functional ability of an individual with ITBS. 30 subjects with lateral thigh & knee pain are taken through proper screening and fulfilling the inclusive and exclusive criteria. The subjects will receive Dry needling with Deep friction Massage for a session of 2 weeks. Pre & Post-test will be analyzed based on the outcome measure i.e., Lower Extremity functional scale (LEFS) and Visual Analogue Scale (VAS). The statistical analysis shows the effectiveness that Dry Needling with deep Friction Massage In IT Band Syndrome. That Study concludes that Dry Needling with Deep Friction Massage is more effective in reduction on of pain and restoring functional ability in IT Band Syndrome.

KEYWORDS: Iliotibial band friction syndrome, Dry needling, Deep friction Massage, Ober's test, Lower Extremity Function Scale (LEFS), Visual Analogue Scale (VAS)**.**

INTRODUCTION

Iliotibial band syndrome (ITBS) is a chronic condition with pain felt on the lateral aspect of the thigh and knee with lower limb activities involving repetitive knee flexion and extension such as running or cycling(1). The overall incidence can range from 1.6%-52% based on examination(2). It is a multifactorial representation of both intrinsic & extrinsic factors. It is caused by friction/rubbing of the distal portion of the Iliotibial band over the lateral femoral epicondyle. (2)

The friction occurs at or slightly below 30° of knee flexion. (3) This can produce irritation and subsequent inflammatory reaction, especially in the region beneath the posterior fibers of the ITB, which are felt to be tighter against the lateral femoral condyle than the anterior fibers. (3) The symptoms usually come after a reproducible time or distance run and consist of sharp pain or burning on the lateral aspect of the knee. Occasionally, there will be swelling and thickening of the tissue where the band moves over the lateral femoral condyle. (3) Early on, the symptoms will subside shortly after a run is over but will return with the next run. (3)

Clinical examination and case history build enough evidence to confidently diagnose this condition. Pain can be reproduced for diagnostic purposes by performing the Noble test, which involves applying pressure to the site of pain during which time the patient is in a supine position with their leg flexed at 30 degrees. This degree of flexion is considered the impingement zone and has implications for athletes. (8)

The iliotibial band is a dense fibrous band of fascia located in the lateral thigh. The ITB transmits forces created by the muscles of the hip and also acts as a lateral stabilizer of the tibiofemoral joint. (1)

The ITB originates from the tendinous junction of the gluteus maximus, gluteus minimus, and tensor fasciae lata (TFL) muscles. The fascia lata is a deep fascia of the thigh made up of collagen fibers that stabilize, enclose, and separate the muscles of the thigh. Along the lateral portion of the thigh, the fascia expands from the gluteus maximus posteriorly and the TFL anteriorly. The lateral portion of the fascia lata is the thickest region and binds to the IT band itself. (1)

As IT band syndrome was originally depicted as a friction syndrome [4] it was postulated that a bursa may exist beneath the IT band at the lateral femoral epicondyle, and so was considered a potential source of inflammation and consequential pain. However, more recent studies, illustrate the presence of adipose tissue at the point of inflammation(8)

Collectively, these anterior and lateral attachments form a horseshoe pattern or inverted U shape well positioned for anterolateral support to the knee. The site of injury is often associated with the insertion at the lateral epicondyle but interrelated with the forces created by the various attachments above and below the lateral epicondyle(5)

Iliotibial band friction syndrome (ITBS) was first specifically described by Renne (1975). (2) It typically manifests in affected individuals as pain or tightness of the lateral knee that can extend proximally up the lateral thigh. The general cause of the syndrome is biomechanical or anatomical abnormalities and some degree of overtraining. (1)

The etiology of ITBS mainly includes friction of the ITB against the lateral femoral epicondyle, compression of the fat and deep connective tissue, and chronic inflammation of the bursa and surrounding tissues. (1) Several training factors have been related to ITBS, including excessive running in the same direction on a track, downhill running, a lack of running experience, abrupt increase in running distance or frequency and running long distances. Strength deficits in the hip abductors also are believed to play a role in the development of ITBS. (9)

The VAS score is a self-reported scale to assess pain severity ranging from 0 to 10, representing the least to the most severe pain sensation. (4) LEFS is a questionnaire containing 20 items assessing the lower extremity function based on the intensity of the related activities' performance. This scoring system is designed based on the five-score Likert scale ranging from zero as the worst condition to four as without bothersome. This scale scores from zero to eighty, and a higher score represents a better condition. Negahban et al. have validated the Persian version of LEFT with Cronbach's alpha of above 0.70 for each item. (4)

The majority of patients will respond to a nonsurgical approach as outlined. In the rare refractory case, various surgical techniques have been recommended to decrease impingement of the ITB on the lateral femoral epicondyle. The most common procedures involve resecting a triangular piece of the ITB from the area overlying the lateral epicondyle when the knee is in a 30-degree flexed position or Z-lengthening of the ITBS. (9)

The main screening tests for detecting ITBS are the Renne test, Noble test, & Ober’s test other investigation procedures like EMG, NCV, and Radiological examinations like X-ray, and CT-Scan MRI

are useful in ruling out any pathological–related condition. [6]
Conservative management includes NSAIDs for symptom relief, massage, stretching of ITB and strengthening is also helpful in the treatment of patients with ITBS. A conservative approach may combine muscle stretches, soft tissue release, positional release muscle energy techniques deep friction massage dry needling & K-Taping for patients with ITBS.[4]

LIST OF ABBREVIATIONS

	SHORT FORM	ABBREVIATIONS
1	VAS	Visual Analogue Scale
2	LEFS	Lower Extremity Functional Scale
3	ITBS	Iliotibial Band Syndrome
4	DN	Dry Needling
5	DFM	Deep Friction Massage
6	LBP	Lower Back Pain
7	TFL	Tensor Fascia Lata

METHODOLOGY

SOURCE OF DATA: The patients for the study are scouted from the. Dr. B.R Ambedkar Medical College & Hospital, Department of Physiotherapy, Bangalore

STUDY DESIGN:

- STUDY TYPE: Experimental study
- SAMPLING TECHNIQUE: Convenient sampling technique
- SAMPLE SIZE: 30
- DURATION OF STUDY: The duration of the study is 6 months

INCLUSION CRITERIA:

- Patients with IT band Syndrome based on VAS
- Age: 25-50 years
- Sex: Both Males and Females
- Ober's test positive
- Lateral thigh pain & knee pain

EXCLUSION CRITERIA

- Any History of surgery less than 2 years.
- Conditions associated with vascular disorders
- Degenerative and inflammatory disorders
- Tumors and Carcinoma
- Ober's test is negative

OUTCOME MEASURES

- PAIN INTENSITY ASSESSMENT: Visual Analogue Scale (VAS)**:** was used to measure pain intensity. A 10 cm line marked with the numbers 0 & 10 was used where 0 symbolizes no pain & 10 is maximum

pain tolerance.

- FUNCTIONAL DISABILITY MEASURE: Lower Extremity Functional Scale (LEFS)

MATERIALS USED

Couch
Dry needles
Pillow
Moisturizer
Sterile Cotton swab
Assessment form
Treatment table
Consent form

PARAMETERS

- Pain
- Disability
- Dry Needling with Deep Friction Massage
- Hip Abductor Muscle Strengthening Exercise

SCREENING TEST:

Ober's test:

- Aim of the test: Identifies tightness of tensor fascia lata and/ or iliotibial band.
- Patient position: Side lying
- Therapist position: Side of the tested side in Walk standing position
- Procedure: Patient lies on the side with the lower limb flexed at the hip & knee. Passively extend & abduct testing hip with knee flexed to 90 degrees. Slowly lower the uppermost limb & observe if it reaches the table.
- Positive sign: Positive if the uppermost limb is unable to come to rest on the table.

STUDY PROCEDURE:

Subjects with ITBS are taken into consideration from a large number of subjects with lateral thigh pain and knee pain. Subjects are selected by the proper screening and fulfilling inclusive and exclusive criteria. Inform consent was taken from each subject before participation instruction was given to the subject above the technique performed.

A total of 30 subjects with ITBS received Dry needling with Deep friction massage along with Hip strengthening exercises a treatment duration of about 30-40 minutes in each session on a regular period of 3 days per week for 6 days

DRY NEEDLING FOR ITBS:

- Patient position:- Supine or prone lying
- Therapist position:- Walk standing on the treatment wide

PROCEDURE:

- Needle direction 90 degrees perpendicular to the fascia band and femur bone Needle size 25*40 mm
- Wash hands and put on the glove(s).
- Locate target structure.
- Select the appropriate needle and remove it from the packaging.
- Place the guide tube in position against the skin with one hand and with the other remove the stopper at the other end and gently "tap" the needle with the tip of the index finger.
- Remove the guide tube.
- Grasp the handle of the needle avoiding the sterile shaft and slowly advance it through the skin to the required depth of penetration.
- Elicit the DE Qi sensation (usually by rotation or thrusting the needle) to the point where the client is comfortable.
- Leave the needle in situ for the required amount of time.
- Following treatment, the needle should be gently removed by placing a small cotton ball adjacent to the skin to stabilize it as the needle is gently drawn out. The cotton ball is then immediately applied to the needle site and accompanied by light pressure.
- The needle should then be disposed of in an appropriate sharps receptacle and the Cotton disposed of in compliance with the department's health and safety policy.
- The patient can then be checked for adverse side effects, debriefed regarding the treatment and possible outcomes, and then may leave.

DEEP FRICTION MASSAGE FOR ITBS;

- Patient position: Side lying
- Therapist position: Walk standing

PROCEDURE:

- Make sure the client is comfortable by placing a pillow or bolster between knees for support.
- Effleurage the entire side of the thigh from the knee to the iliac crest.
- This area is usually very sensitive, so proceed with caution by thumb-stripping up the IT band from the knee to the tensor fascia lata (TFL) muscle.
- Use cross-fiber friction on the entire band, starting on the lateral knee and concluding on the TFL muscle.
- Displace the IT band and perform circular friction just underneath it.
- Thumb-strip (with-fiber friction) the belly of the TFL muscle.
- Use cross-fiber friction on the origin of the TFL muscle.
- Perform deep effleurage over the entire medial thigh.
- Perform concluding strokes.
- Stretch the TFL muscle and IT band

STATISTICAL ANALYSIS

Statistical analysis of the data was performed using SPSS 20.0. The Categorical variables were presented as frequency and percentage. The continuous variables were presented as mean ± SD. Pre-post comparison was done using a paired t-test. A p-value <0.05 was considered statistically significant.

Table 1: Showing age distribution of the patients

		Frequency	Percent
Age	25-34	13	43.3
	35-44	11	36.7
	45 and above	6	20.0
	Total	30	100.0

The above table depicts, majority of 13(43.3%) patients belonged to age group 25-34 years, 11(36.7%) belonged to 35-44 years and 6(20%) belonged to age group 45 years and above.

Figure 1: Representing age distribution of the patients

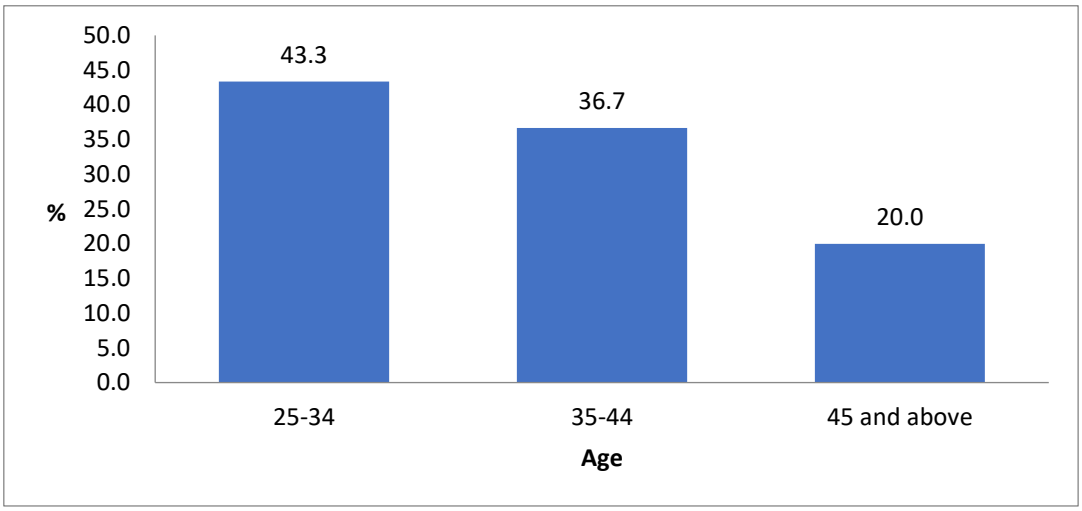


Table 2: Showing gender distribution of the patients

		Frequency	Percent
Gender	Female	10	33.3
	Male	20	66.7
	Total	30	100.0

Among the 30 patients, 20(66.7%) were male and 10(33.3%) were female.

Figure 2: Representing gender distribution of the patients

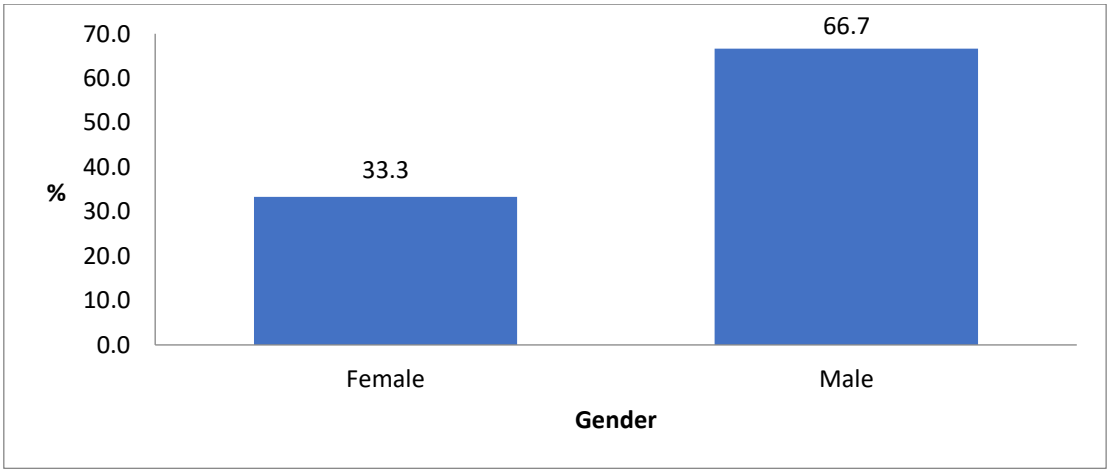


Table 3: Showing pre-post comparison of LEFS interpretation result

		Mean	Std. Deviation	Average difference	t value	p-value
LEFS	Day 1	37.53	7.87	16.500	9.590	p<0.001*
	Day 6	54.03	5.22			

The average LEFS score increased significantly from 37.53 ±7.87 on Day 1 to 54.03 ±5.22 on Day 6, with an average difference of 16.500 and p<0.001.
The analysis shows a significant improvement in LEFS after the intervention from Day 1 to Day 6.

Figure 3: Representing mean of LEFS

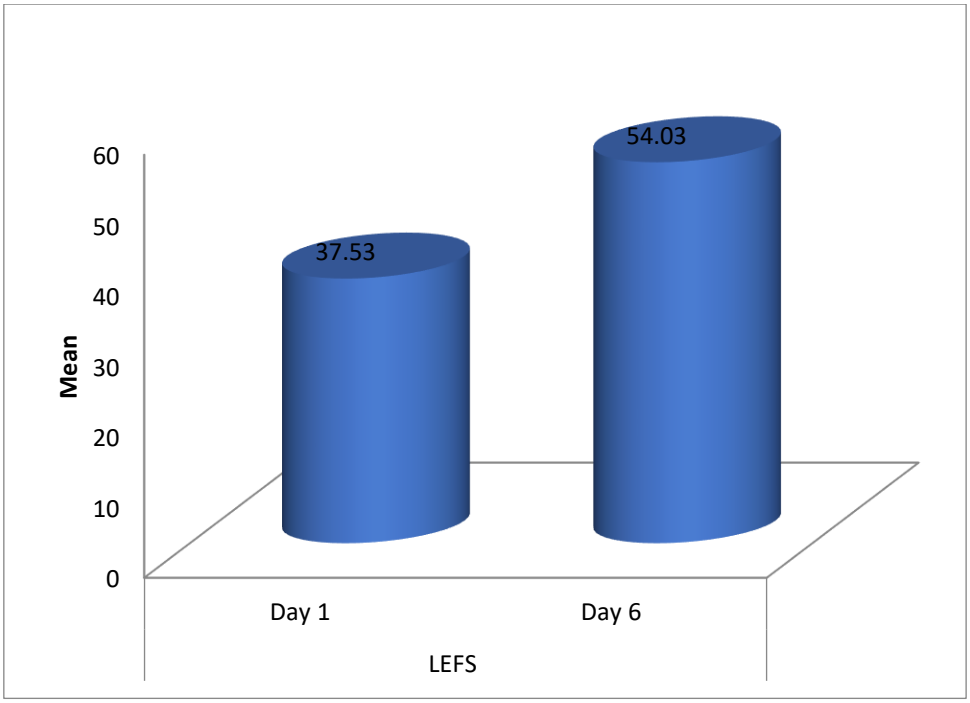


Table 4: Showing pattern disability in LEFS

LEFS		Day 1		Day 6	
		Frequency	Percent	Frequency	Percent
Pattern Disability	MINIMAL DISABILITY	0	0.0	30	100.00
	MODERATE DISABALITY	24	80.0	0	0.00
	SEVERE DISABALITY	6	20.0	0	0.00
	Total	30	100.0	30	100.00

In Day 1, 24(80%) patients had moderate disability and 6(20%) had severe disability.
While in Day 6, all 30(100%) patients had only minimal disability.

Figure 4: Representing pattern disability in LEFS

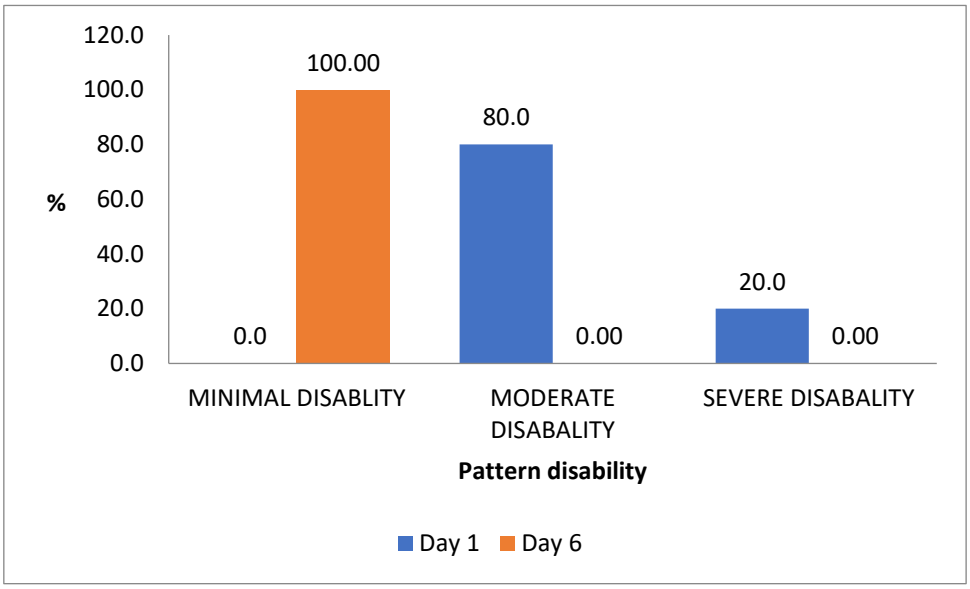


Table 5: Showing pre-post comparison of VAS scale interpretation result

		Mean	Std. Deviation	Average difference	t value	p-value
VAS scale interpretation result	Day 1	7.67	1.60	5.600	15.953	p<0.001*
	Day6	2.07	1.28			

The average VAS scale interpretation result decreased significantly from 7.67 ±1.60 on Day 1 to 2.07 ±1.28 on Day 6, with an average difference of 5.600 and p<0.001.

The analysis shows a significant improvement in VAS scale interpretation results after the intervention from Day 1 to Day 6.

Figure 5: Representing mean of VAS scale interpretation result

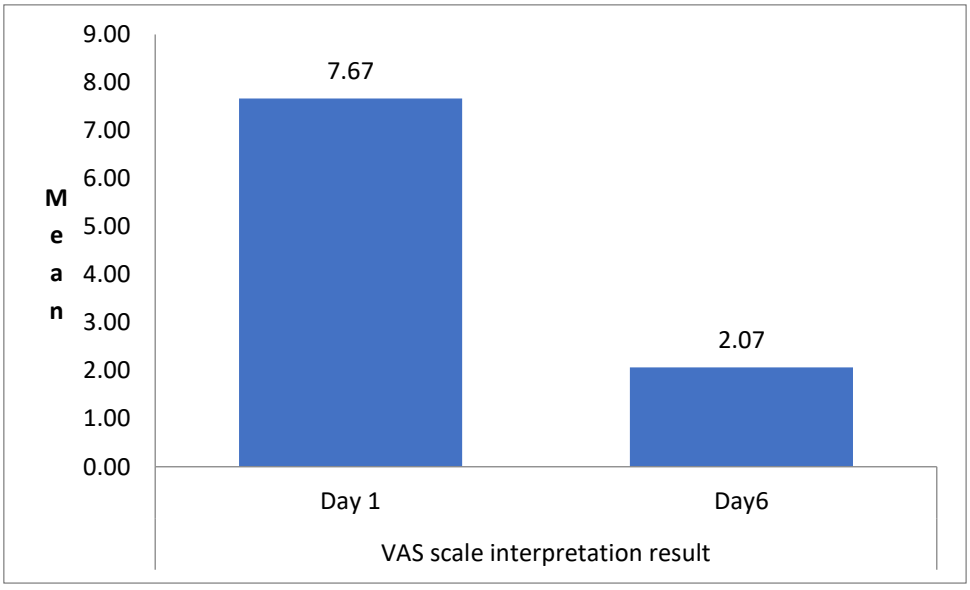
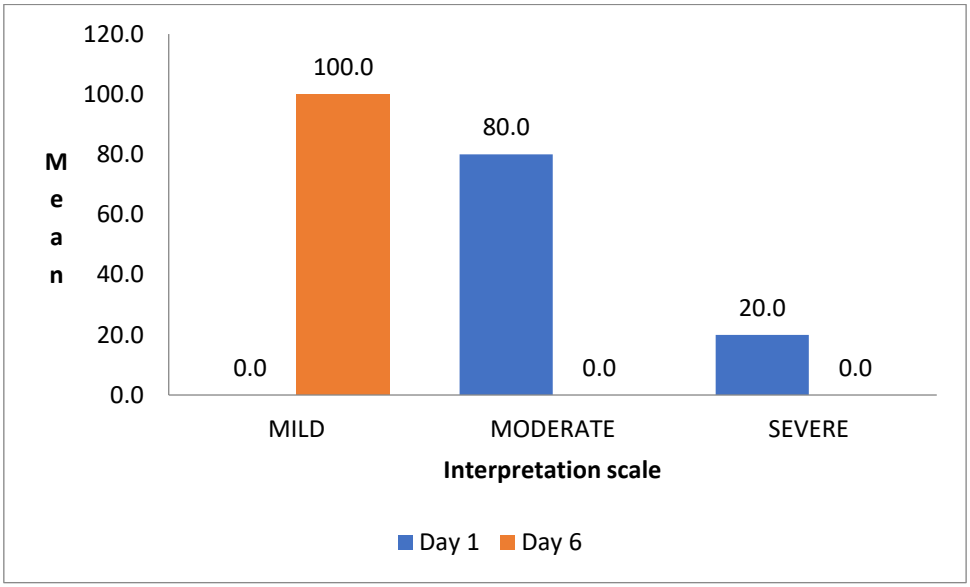


Table 6 Showing interpretation scale in VAS scale interpretation result

VAS scale interpretation result		Day 1		Day 6	
		Frequency	Percent	Frequency	Percent
Interpretation scale	MILD	0	0.0	30	100.0
	MODERATE	24	80.0	0	0.0
	SEVERE	6	20.0	0	0.0
	Total	30	100.0	30	100.0

In Day 1, 24(80%) patients had moderate disability and 6(20%) had severe disability.
While in Day 6, all 30(100%) patients had only minimal disability.

Figure 6: Representing interpretation scale in VAS scale interpretation result



DISCUSSION

A Study on efficacy of dry needling with Deep friction massage in IT Band Syndrome.IT Band syndrome is a chronic condition with pain felt on the lateral aspect of the thigh and knee with lower limb activities involving repetitive knee flexion and extension such as running or cycling.

In this study subjects with low back pain lateral side of the thigh pain and IT Band syndrome were taken into consideration ethical clearance was taken from Dr.B.R. Ambedkar Medical College Department of Physiotherapy

From a large number of subjects with low back pain and lateral thigh pain with IT Band Syndrome subjects are selected by proper screening and fulfilling the Inclusive and exclusive criteria.

30 patients Diagnosed with IT Band Syndrome with pain and functional disability were selected. The Experimental study received Dry Needling along with Deep Friction massage and Strengthening exercises for Hip Abductor pain. Treatment duration is about 30-40 minutes for each session on a regular period of 3 days per week for 6 days

The outcome measures used were LEFS (Lower extremity functional scale) disability index to measure pain and functional disability, and VAS (Visual Analogue scale) to measure pain Intensity. The screening test used for assessment for the Ober test. Each measurement was assessed on day 1 of treatment and day

6 of the treatment then data were analyzed statistically. Statistical data reveals that Dry Needling with Deep Friction massage for IT Band Syndrome showed a significant effect over the lateral side of the thigh pain and strengthening exercise in individuals with IT Band Syndrome

CONCLUSION

The purpose of this was to find the efficacy of Dry Needling with a Deep friction massage in patients with IT Band Syndrome. Were treated with Dry Needling and along with Deep friction massage with Hip Abductors strengthening exercise. Based on statistical analysis. In this study, 30 samples were treated with dry needling with deep friction massage and conventional protocol (Hip Abductors strengthening exercise)

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