

## TO COMPARE THE EFFECT OF CRYOTHERAPY WITH STRETCHING VERSUS TAPING WITH STRETCHING ON ILIOTIBIAL BAND FRICTION SYNDROME IN LONG DISTANCE RUNNERS

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**ABSTRACT:** Iliotibial band syndrome (ITBS) is the most common injury of the lateral side of the knee in runners. Runners typically complain of persistent lateral knee pain not associated with swelling, usually it occurs due to one to two miles of running and further worsening of the pain during running on the downhill. The popularity of running is still growing and, as participation increases, the incidence of running-related injuries will also increase. The Iliotibial track (ITT) or the band is an anatomical structure of the lateral upper leg that recently has been highly published as an overused structure during sports. A friction syndrome has been attributed to excessive distance running, inappropriate running regimens and worn footwear<sup>[1]</sup>. Hence we have taken up this study to study about the effect of cryotherapy and kinesio taping technique with stretching exercise in patients with iliotibial band friction syndrome in long distance runners.

**KEYWORDS:** Iliotibial band, cryotherapy, taping, stretching, friction syndrome in long distance runners.

**INTRODUCTION:** Iliotibial Band Friction Syndrome (ITBFS) is an inflammatory non-traumatic repetitive strain injury caused due to friction of the iliotibial band over the Lateral Femoral Epicondylar (LFE) prominence.<sup>[2]</sup> It is commonly seen in male than female In the age group of 16-30years that affects both the side bilateral or unilateral.<sup>[3]</sup> It is generally accepted that ITBFS is most common injury of the lateral knee, with an incidence between 1.6 and 12%. It comprises 22% of lower extremity injuries.<sup>[4]</sup> There are so many causes for Iliotibial Band Friction Syndrome. They are downhill runners and downhill skiers, cyclists, long distance runners, military personnel undergoing training, football players, Weight lifters are commonly suffering from Iliotibial Band Friction Syndrome.<sup>[4,5]</sup>

There are other causes like the abnormal pronation of the ankle joint may cause greater than normal internal rotation of the tibia, accompanied by increased tension on the ITB at its insertion point on Gerdy's tubercle. There are various physiotherapy treatment modalities are available for treating Iliotibial Band Friction Syndrome. Out of which the cryotherapy and kinesio taping has a vital role in decreasing pain and increasing range of motion. Cryotherapy is the type of treatment where the operator uses ice for therapeutic purpose. Cryotherapy is usually applied for 20 to 30 minutes for maximum cooling of both superficial and deep tissues.

There are various techniques in cryotherapy treatment for treating Iliotibial Band Friction Syndrome. The ice bag method found to be very effective on Iliotibial Band Friction Syndrome. Here the ice bag is applied to the distal knee, or proximal hip (wherever painful) for 15-20 minutes, 3-5 times a day for the first 24-72 hours. Kinesiology tape is a thin, stretchy, therapeutic tape that can

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benefit a wide variety of injuries and inflammatory conditions. Kinesiology tape is applied directly over the iliotibial band or around the periphery of the area. Most applications can be worn 4-5 days.

Therapeutic benefits accumulate 24/7 for the entire time the tape is worn. Kinesiology taping is the form of treatment that can bring immediate relief of pain and inflammation, as well as accelerate the healing process in those suffering from iliotibial band syndrome. This study has been done in Kempegowda institute of medical sciences, Bangalore in Department of Orthopedics and Department of Physiotherapy.

### **Inclusion Criteria:**

- Grade 2 and 3 injury of ITBFS.
- Individuals with localized LFE pain.
- Worst pain at iliotibial band during downhill run.
- Individuals with sudden onset of pain after a long distance run.
- Both male and female athletes.
- Age group between 16-30 years.
- Positive modified Thomas test.
- Positive Treadmill running test.

### **Exclusion Criteria:**

- Grade 1, 4 and 5 injury of ITBFS.
- Unwilling athletes for the treatment.
- Allergic skin to ice and tape.
- Any old femur fracture, tibial fracture and chondromalacia patella.
- Bilateral ITBFS.
- Any cardiac, lung and renal problems.

**Sampling Technique:** Randomized sampling technique was chosen for this study. The 60 samples were selected for the study based on the inclusion and exclusion criteria. The samples that were qualified to take part in the study were explained about the pros and cons of the study with their informed consent form. 60 samples with iliotibial band friction syndrome were selected and 30 samples in each group were distributed respectively. Baseline measurements of pain intensity and range of motion of all the subjects were measured using VAS and universal goniometer respectively, and recorded as pretest data for statistical analysis.

**Group I:** In this group 30 subjects will be given ice bag treatment along the length of the muscle for 15-20 minutes. After ice bag application the sustained stretching will be given for iliotibial band, hip flexors, knee extensors, hip abductors, hamstrings and gluteus muscles. Sustained stretching will be given for the duration of 20 seconds with 3 repetitions and 10 seconds rest period will be given between each repetition. Treatment will be given in one session per day for 14 days.

**Group II:** In this group 30 subjects are treated with kinesio taping for iliotibial band. The patient is positioned in the side lying to stretch the ITB by keeping the affected leg straight forward and

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dropped down. Anchor the tape right on the ITB, put 30% stretch in the tape following the course of the ITB and no stretch in the ends of the tape. Break the tape into two halves and apply it over the site of ITBFS tape in the crisscross manner for anchoring. Apply 80-90% of the stretch in the middle and no stretch in the ends of the tape.

Followed by sustained stretching to iliotibial band, hip flexors, knee extensors, hip abductors, hamstrings and gluteus muscles for the duration of 20 seconds with 3 repetitions and 10 seconds rest period will be given between each repetition. Treatment will be given in one session per day for 14 days.

**Hip flexor Stretch:** Kneel with affected knee on the ground, same side arm goes back, causing pelvis (hips) to shift forward and back to extend.

**Quadriceps Stretch:** Using a towel, or band, lie on your stomach, attach the band to affected foot, and pull your heel to your buttock.

**Abductor Stretch:** Prop the inside of your ankle up on a table, lean into the side you're stretching.

**Hamstring Stretch:** Prop the back of your heel up on a table, keep your back straight and lean forward at the hips.

**Side lying IT Band Stretch:** On your side, using a towel or band, pull foot back as if stretching quadriceps and use the opposite foot to push down on distal part of the leg.

**C stretch for IT Band:** Standing, place affected leg behind the good leg and lean away.

**Gluteal stretch:** Prop the outside of your ankle up on a table, make sure the leg is at 90 degrees, keep your back straight and lean forward at the hips.

### Results and Interpretation:

**Age wise distribution of Subjects:** In group A and group B Majority, 56.7% of the subjects were of 19yrs of age, 30% were of the age 20yrs and 13% were of the age 21yrs. All were males in both the groups.

		Group		Total
		Group A	Group B	
AGE	19	17 56.7%	17 56.7%	34 56.7%
	20	9 30.0%	9 30.0%	18 30.0%
	21	4 13.3%	4 13.3%	8 13.3%
Total		30 100.0%	30 100.0%	60 100.0%

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**Distribution of subjects according to side Involved:** In group A and group B there is equal distribution with respect to side involved.

		Group		Total
		Group A	Group B	
SIDE	LT	15 50.0%	15 50.0%	30 50.0%
	RT	15 50.0%	15 50.0%	30 50.0%
Total		30 100.0%	30 100.0%	60 100.0%

**Comparison of groups before the treatment:** There is no significant difference between group A and group B with respect to all the parameters as p value for all the parameters > 0.05.

### PRETEST

Parameter	Group	Mean	Std. Deviation	Median	t value	p value
HIP ABDUCTION	Group A	30.00	1.948	30.00	1.154	.253
	Group B	30.60	2.078	30.00		
	Total	30.30	2.019	30.00		
HIP FLEXION	Group A	99.83	6.086	100.00	1.077	.286
	Group B	101.50	5.894	100.00		
	Total	100.67	5.999	100.00		
KNEE FLEXION	Group A	119.83	5.490	120.00	.246	.806
	Group B	119.50	4.974	120.00		
	Total	119.67	5.197	120.00		
PRESSURE ALGOMETER	Group A	.74	.100	.75	.266	.791
	Group B	.75	.094	.75		
	Total	.74	.096	.75		
VISUAL ANALOUGE SCALE	Group A	7.63	.615	8.00	1.817	.074
	Group B	7.30	.794	7.00		
	Total	7.47	.724	8.00		

### Pre post comparison of Hip abduction in group A and group B:

#### Parameter: HIP ABDUCTION

Group		N	Minimum	Maximum	Mean	Std. Deviation	Median	ANOVA F value	p value	
Group A	PRETEST	30	28	35	30.00	1.948	30.00	188.098	.000	HS
	7TH DAY	30	30	38	34.83	2.408	35.00			
	14TH DAY	30	35	45	39.93	3.237	40.00			
Group B	PRETEST	30	28	35	30.60	2.078	30.00	221.668	.000	HS
	7TH DAY	30	30	40	35.50	2.474	35.00			
	14TH DAY	30	35	45	40.67	3.407	40.00			

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## Pairwise Comparisons

Measure: MEASURE\_1

Parameter: HIP ABDUCTION

Group	(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	change (%)	p	
Group /	PRETEST	@7THDAY	-4.833	.468	16.11	.000	HS
		@14THDAY	-9.933	.645	33.11	.000	HS
		@7THDAY @14THDAY	-5.100	.391	14.64	.000	HS
Group I	PRETEST	@7THDAY	-4.900	.366	16.01	.000	HS
		@14THDAY	-10.067	.593	32.90	.000	HS
		@7THDAY @14THDAY	-5.167	.447	14.55	.000	HS

In group A mean hip abduction before the treatment was  $30.0 \pm 1.9$ , at 7<sup>th</sup> day  $34.83 \pm 2.4$  at 14<sup>th</sup> day  $39.93 \pm 3.2$  In group B hip abduction before the treatment was  $30.6 \pm 2.07$ , at 7<sup>th</sup> day  $35.5 \pm 2.4$  at 14<sup>th</sup> day  $40.67 \pm 3.4$ .

### Comparison of effect between the groups:

Parameter: HIP ABDUCTION

change pre to 7th day	Group A	Mean diff	S.D of diff	change (%)	t value	p value	
change pre to 7th day	Group A	4.83	2.561	16.11	.110	.911	NS
	Group B	4.90	2.006	16.01			
change pre to 14th day	Group A	9.93	3.532	33.11	.150	.880	NS
	Group B	10.07	3.248	32.90			
change 7th day to 14th	Group A	5.10	2.139	14.64	.110	.911	NS
	Group B	5.17	2.451	14.55			

### Pre post comparison of Hip flexion in group A and group B:

Parameter: HIP FLEXION

Group		N	Minimum	Maximum	Mean	Std. Deviation	Median	ANOVA F value	p value	
Group A	PRETEST	30	90	110	99.83	6.086	100.00	241.763	.000	HS
	7TH DAY	30	100	120	113.90	4.671	115.00			
	14TH DAY	30	120	130	123.67	3.698	125.00			
Group B	PRETEST	30	90	110	101.50	5.894	100.00	321.288	.000	HS
	7TH DAY	30	100	120	113.33	4.971	115.00			
	14TH DAY	30	120	130	123.83	3.640	125.00			

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### Pairwise Comparisons

Measure: MEASURE\_1

Parameter: HIP FLEXION

Group	(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	change (%)	p	
Group A	PRETEST	@7THDAY	-14.067	1.092	14.09	.000	HS
		@14THDAY	-23.833	1.284	23.87	.000	HS
		@7THDAY @14THDAY	-9.767	.849	8.57	.000	HS
Group B	PRETEST	@7THDAY	-11.833	.847	11.66	.000	HS
		@14THDAY	-22.333	.981	22.00	.000	HS
		@7THDAY @14THDAY	-10.500	.808	9.26	.000	HS

In group A mean hip flexion before the treatment was  $99.83 \pm 6.0$ , at 7<sup>th</sup> day  $113.9 \pm 6$  at 14<sup>th</sup> day  $123.67 \pm 3.6$ . In group B hip flexion before the treatment was  $101.5 \pm 5.89$ , at 7<sup>th</sup> day  $113.3 \pm 4.97$  at 14<sup>th</sup> day  $123.83 \pm 3.64$

### Comparison of effect between the groups:

Parameter: HIP FLEXION

change		Mean diff	S.D of diff	change (%)	t value	p value	
change pre to 7th day	Group A	14.07	5.982	14.09	1.620	.112	NS
	Group B	11.83	4.639	11.66			
change pre to 14th day	Group A	23.83	7.032	23.87	.930	.357	NS
	Group B	22.33	5.371	22.00			
change 7th day to 14th day	Group A	9.77	4.651	8.57	.630	.534	NS
	Group B	10.50	4.424	9.26			

### Pre post comparison of knee flexion in group A and group B:

Parameter: KNEE FLEXION

Group		N	Minimum	Maximum	Mean	Std. Deviation	Median	ANOVA F value	p value	
Group A	PRETEST	30	110	130	119.83	5.490	120.00	188.635	.000	HS
	7TH DAY	30	120	135	128.67	4.342	130.00			
	14TH DAY	30	130	145	139.50	4.424	140.00			
Group B	PRETEST	30	110	130	119.50	4.974	120.00	322.037	.000	HS
	7TH DAY	30	120	135	128.83	4.292	130.00			
	14TH DAY	30	130	145	139.50	4.974	140.00			

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### Pairwise Comparisons

Measure: MEASURE\_1

Parameter: KNEE FLEXION

Group	(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	change (%)		
						p	
Group A	PRETEST	@7THDAY	-8.833	1.008	7.37	.000	HS
		@14THDAY	-19.667	1.197	16.41	.000	HS
		@7THDAY @14THDAY	-10.833	.798	8.42	.000	HS
Group B	PRETEST	@7THDAY	-9.333	.785	7.81	.000	HS
		@14THDAY	-20.000	.959	16.74	.000	HS
		@7THDAY @14THDAY	-10.667	.574	8.28	.000	HS

In group A mean knee flexion before the treatment was  $119.83 \pm 5.45$ , at 7<sup>th</sup> day  $128.67 \pm 4.3$  at 14<sup>th</sup> day  $139.5 \pm 4.4$ . In group B knee flexion before the treatment was  $119.5 \pm 4.97$ , at 7<sup>th</sup> day  $128.83 \pm 4.29$  at 14<sup>th</sup> day  $139.50 \pm 4.97$

### Comparison of effect between the groups:

Parameter: KNEE FLEXION

		Mean diff	S.D of diff	change (%)	t value	p value	
	Group B	9.33	4.302	7.81			
change pre to 14th day	Group A	19.67	6.557	16.41	.220	.829	NS
	Group B	20.00	5.252	16.74			
change 7th day to 14th day	Group A	10.83	4.371	8.42	.170	.866	NS
	Group B	10.67	3.144	8.28			

### Pre post comparison of pressure in group A and group B:

Parameter: PRESSURE ALGOMETER

Group		N	Minimum	Maximum	Mean	Std. Deviation	Median	ANOVA F value	p value	
Group A	PRETEST	30	1	1	.74	.100	.75	765.725	.000	HS
	7TH DAY	30	1	1	1.19	.098	1.20			
	14TH DAY	30	2	2	1.60	.081	1.60			
Group B	PRETEST	30	1	1	.75	.094	.75	1455.462	.000	HS
	7TH DAY	30	1	2	1.41	.090	1.40			
	14TH DAY	30	2	2	1.89	.074	1.90			

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### Pairwise Comparisons

Measure: MEASURE\_1

Parameter: PRESSURE ALGOMETER

Group	(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	change (%)		
						p	
Group A	PRETEST	@7THDAY	-.453	.018	61.26	.000	HS
		@14THDAY	-.863	.024	116.67	.000	HS
	@7THDAY	@14THDAY	-.410	.024	34.36	.000	HS
Group B	PRETEST	@7THDAY	-.667	.022	89.29	.000	HS
		@14THDAY	-1.147	.022	153.57	.000	HS
	@7THDAY	@14THDAY	-.480	.021	33.96	.000	HS

In group A mean pressure before the treatment was  $0.74 \pm 0.1$ , at 7<sup>th</sup> day  $1.19 \pm 0.098$  at 14<sup>th</sup> day  $1.6 \pm 0.081$

In group B pressure before the treatment was  $0.75 \pm 0.094$ , at 7<sup>th</sup> day  $1.41 \pm 0.09$  at 14<sup>th</sup> day  $1.89 \pm 0.074$ .

### Comparison of effect between the groups:

Parameter: PRESSURE ALGOMETER

		Mean diff	S.D of diff	change (%)	tvalue	p value	
	Group B	.67	.118	89.29			
change pre to 14th day	Group A	.86	.130	116.67	8.790	.000	HS
	Group B	1.15	.120	153.57			
change 7th day to 14th day	Group A	.41	.130	34.36	2.230	.029	sig
	Group B	.48	.113	33.96			

### Pre post comparison of Pain in group A and group B:

Parameter: VISUAL ANALOUGE SCALE

Group		N	Minimum	Maximum	Mean	Std. Deviation	Median	ANOVA F value	p value	
Group A	PRETEST	30	6	9	7.63	.615	8.00	870.458	.000	HS
	7TH DAY	30	4	6	5.23	.626	5.00			
	14TH DAY	30	2	4	3.20	.664	3.00			
Group B	PRETEST	30	6	9	7.30	.794	7.00	609.724	.000	HS
	7TH DAY	30	3	6	4.63	.765	5.00			
	14TH DAY	30	0	2	1.40	.621	1.00			



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## Pairwise Comparisons

Measure: MEASURE\_1

Parameter: VISUAL ANALOUGE SCALE

Group	(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	change (%)		
						p	
Group A PRETEST	@7THDAY	@14THDAY	2.400	.103	31.44	.000	HS
		@14THDAY	4.433	.104	58.08	.000	HS
	@7THDAY	@14THDAY	2.033	.112	38.85	.000	HS
Group B PRETEST	@7THDAY	@14THDAY	2.667	.168	36.53	.000	HS
		@14THDAY	5.900	.162	80.82	.000	HS
	@7THDAY	@14THDAY	3.233	.177	69.78	.000	HS

In group A mean Pain before the treatment was  $7.63 \pm 0.615$ , at 7<sup>th</sup> day  $5.23 \pm 0.626$  at 14<sup>th</sup> day  $3.2 \pm 0.664$ . In group B Pain before the treatment was  $7.3 \pm 0.794$ , at 7<sup>th</sup> day  $4.63 \pm 0.765$  at 14<sup>th</sup> day  $1.4 \pm 0.621$ .

### Comparison of effect between the groups:

Parameter: VISUAL ANALOUGE SCALE

		Mean diff	S.D of diff	change (%)	t value	p value	
	Group B	2.67	.922	36.53			
change pre to 14th day	Group A	4.43	.568	58.08	7.640	.000	HS
	Group B	5.90	.885	80.82			
change 7th day to 14th da	Group A	2.03	.615	38.85	5.720	.000	HS
	Group B	3.23	.971	69.78			

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**To find the effect of side on the treatment:**

Parameter	SIDE	Group								
		Group A				Group B				
		Mean	Std. Deviation	t value	p value	Mean	Std. Deviation	t value	p value	
HIP ABDUCTION	change pre to 7th day	LT	5.33	2.554	1.072	.293	4.73	2.120	-.449	.657
		RT	4.33	2.554		NS	5.07	1.944		NS
	change pre to 14th day	LT	10.07	3.654	.203	.840	10.13	3.378	.111	.913
		RT	9.80	3.529		NS	10.00	3.229		NS
change 7th day to 14th day	LT	4.73	1.438	-.937	.357	5.40	2.414	.515	.611	
	RT	5.47	2.669		NS	4.93	2.549		NS	
HIP FLEXION	change pre to 7th day	LT	12.60	5.692	-1.363	.184	10.67	3.716	-1.400	.172
		RT	15.53	6.093		NS	13.00	5.278		NS
	change pre to 14th day	LT	22.00	7.020	-1.455	.157	22.00	5.606	-.335	.740
		RT	25.67	6.779		NS	22.67	5.300		NS
change 7th day to 14th day	LT	9.40	5.604	-.426	.674	11.33	5.164	1.033	.310	
	RT	10.13	3.623		NS	9.67	3.519		NS	
KNEE FLEXION	change pre to 7th day	LT	9.33	7.037	.489	.628	10.00	4.226	.845	.405
		RT	8.33	3.619		NS	8.67	4.419		NS
	change pre to 14th day	LT	21.67	7.237	1.727	.095	20.33	4.806	.342	.735
		RT	17.67	5.300		NS	19.67	5.815		NS
change 7th day to 14th day	LT	12.33	4.952	1.971	.059	10.33	2.289	-.574	.571	
	RT	9.33	3.200		NS	11.00	3.873		NS	
PRESSURE ALGOMETER	change pre to 7th day	LT	.45	.106	.000	1.000	.67	.122	.303	.764
		RT	.45	.099		NS	.66	.118		NS
	change pre to 14th day	LT	.87	.123	.138	.891	1.15	.119	.000	1.000
		RT	.86	.140		NS	1.15	.125		NS
change 7th day to 14th day	LT	.41	.125	.138	.891	.47	.103	-.319	.752	
	RT	.41	.139		NS	.49	.125		NS	
VISUAL ANALOUGE SCALE	change pre to 7th day	LT	2.33	.617	-.642	.526	2.73	1.033	.390	.699
		RT	2.47	.516		NS	2.60	.828		NS
	change pre to 14th day	LT	4.47	.640	.316	.754	5.93	.884	.203	.841
		RT	4.40	.507		NS	5.87	.915		NS
change 7th day to 14th day	LT	2.13	.516	.887	.382	3.20	1.082	-.185	.855	
	RT	1.93	.704		NS	3.27	.884		NS	

**To find the effect of age on the treatment:**

			Correlations						
			Group						
			Group A			Group B			
Parameter			Karl pearson correlation coefficient	r value	p value		Karl pearson correlation coefficient	r value	p value
AGE with	change pre to 7th day	HIP ABDUCTION	.089	.638	NS	.205	.276	NS	
		HIP FLEXION	-.191	.312	NS	.039	.837	NS	
		KNEE FLEXION	-.001	.994	NS	.015	.939	NS	
		PRESSURE ALGOMETER	.185	.328	NS	.347	.061	NS	
		VISUAL ANALOUGE SCALE	-.151	.425	NS	.188	.319	NS	
	change pre to 14th day	HIP ABDUCTION	.163	.390	NS	.115	.546	NS	
		HIP FLEXION	-.035	.855	NS	.179	.343	NS	
		KNEE FLEXION	.077	.686	NS	.000	1.000	NS	
		PRESSURE ALGOMETER	.191	.313	NS	.201	.288	NS	
		VISUAL ANALOUGE SCALE	.136	.473	NS	-.070	.715	NS	
	change 7th day to 14th day	HIP ABDUCTION	.162	.393	NS	-.016	.933	NS	
		HIP FLEXION	.193	.306	NS	.177	.350	NS	
		KNEE FLEXION	.117	.537	NS	-.020	.916	NS	
		PRESSURE ALGOMETER	.048	.803	NS	-.151	.425	NS	
		VISUAL ANALOUGE SCALE	.264	.158	NS	-.242	.197	NS	

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**Interpretation of Results:** In this study 60 subjects with ITBFS and who fell in the inclusion criteria were selected. They were allotted randomly in 2 groups, namely group A and group B consisting of 30 subjects in each group to compare the effectiveness of icing and stretching versus taping and stretching in long distance runners suffering from ITBFS in reduction of pain intensity and improving range of motion. The parameters used for this study were VAS and Pressure Algometer for pain intensity and universal goniometer to measure the range of motion. They were measured day 1 as pre-treatment, day 7 and day 14.

The data were analyzed using repeated measures of ANOVA to find the significance of the intervention used within the group and Karl Pearson correlation coefficient for between the group. For analysis of age side and gender for all the subjects there was no significant difference seen within the groups. When Comparison of groups before the treatment done for hip abduction, hip adduction, knee flexion, pressure algometer and VAS, there is no significant difference between group A and group B with respect to all the parameters as p value for all the parameters > 0.05 Hip abduction, hip flexion and knee flexion were analyzed using rANOVA.

While Pre post pairwise comparison of Hip abduction in Group A and Group B, high significant increase in hip abduction is seen both in group A and Group B as all p <0.01. In group A change was 16.1% at 7<sup>th</sup> day, 33.1% at 14<sup>th</sup> day. In group B change was 16.01% on 7<sup>th</sup> day, 32.9% on 14<sup>th</sup> day. So both the groups are effective. But comparison of effect between the groups. The amount of change in group A and Group was not significantly different at pre to 7<sup>th</sup>, pre to 14<sup>th</sup> and 7<sup>th</sup> to 14<sup>th</sup> day as p >0.05 for all the time points. So group A and group B are equally effective for Hip abduction While Pre post pairwise comparison of Hip flexion in group A and group B, group A mean hip flexion before the treatment was 99.83±6.0, at 7<sup>th</sup> day 113.9±6 at 14<sup>th</sup> day 123.67±3.6.

In group B hip flexion before the treatment was 101.5±5.89, at 7<sup>th</sup> day 113.3±4.97 at 14<sup>th</sup> day 123.83± 3.64 which shows that there is a highly significant increase in hip flexion both in group A and Group B as all p <0.01. In group A change was 14.09% at 7<sup>th</sup> day, 23.87% at 14<sup>th</sup> day. In group B change was 11.66% on 7<sup>th</sup> day, 22.0% on 14<sup>th</sup> day. So both the groups are effective. But Comparison of effect between the groups the Amount of change in group A and Group B was not significantly different at pre to 7<sup>th</sup>, pre to 14<sup>th</sup> and 7<sup>th</sup> to 14<sup>th</sup> day as p >0.05 for all the time point. So group A and group B are equally effective for Hip flexion.

While pre post pair-wise comparison of knee flexion in group A and group B, group A mean knee flexion before the treatment was 119.83±5.45, at 7<sup>th</sup> day 128.67±4.3 at 14<sup>th</sup> day 139.5±4.4. In group B knee flexion before the treatment was 119.5±4.97, at 7<sup>th</sup> day 128.83±4.29 at 14<sup>th</sup> day 139.50± 4.97, this shows that there is high significant increase in knee flexion both in group A and Group B as all p <0.01. In group A change was 7.37% at 7<sup>th</sup> day, 16.4% at 14<sup>th</sup> day. In group B change was 7.8% on 7<sup>th</sup> day, 16.7% on 14<sup>th</sup> day. So both the groups are effective. But Comparison of effect between the groups.

The amount of change in group A and Group B was not significantly different at pre to 7<sup>th</sup>, pre to 14<sup>th</sup> and 7<sup>th</sup> to 14<sup>th</sup> day as p >0.05 for all the time points. So group A and group B are equally effective for knee flexion. Pressure algometer and VAS analysed using rANOVA While Pre post pair-wise comparison of pressure in group A and group B group A mean pressure before the treatment was 0.74±0.1, at 7<sup>th</sup> day 1.19±0.098 at 14<sup>th</sup> day 1.6±0.081.

In group B pressure before the treatment was 0.75±0.094, at 7<sup>th</sup> day 1.41±0.09 at 14<sup>th</sup> day 1.89 ± 0.074. This shows that there is a highly significant increase in pressure both in group A and Group B

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as all  $p < 0.01$  in group A change was 61.2% at 7<sup>th</sup> day, 116.6% at 14<sup>th</sup> day. In group B change was 89.2% on 7<sup>th</sup> day, 153.5% on 14<sup>th</sup> day. So both the groups are effective.

**Comparison of effect between the groups:** Amount of change in group A and Group was significantly different at pre to 7<sup>th</sup>, pre to 14<sup>th</sup> and 7<sup>th</sup> to 14<sup>th</sup> day as  $p < 0.05$  for all the time points. Group B shows significantly higher change at 7<sup>th</sup> day and 14<sup>th</sup> day compare to pre-treatment. So group B is better than group A. While Pre post pair-wise comparison of Pain in group A and group B, group A mean Pain before the treatment was  $7.63 \pm 0.615$ , at 7<sup>th</sup> day  $5.23 \pm 0.626$  at 14<sup>th</sup> day  $3.2 \pm 0.664$ . In group B Pain before the treatment was  $7.3 \pm 0.794$ , at 7<sup>th</sup> day  $4.63 \pm 0.765$  at 14<sup>th</sup> day  $1.4 \pm 0.621$ .

This shows that there is highly significant decrease in pain, both in group A and Group B as all  $p < 0.01$ . In group A change was 31.4% at 7<sup>th</sup> day, 58.0% at 14<sup>th</sup> day. In group B change was 36.5% on 7<sup>th</sup> day, 80.8% on 14<sup>th</sup> day. So both the groups are effective.

**Comparison of effect between the groups:** Amount of change in group A and Group B was not significantly different at pre to 7<sup>th</sup>, But change was significantly higher in group B at 14<sup>th</sup> day compare to group A. So group B is better than group A. For analysis of effect of side on treatment showed no significant difference between the groups. Between the groups analysis was done and Karl Pearson correlation coefficient which showed no significant difference for age between the groups as the P value is greater than 0.05

**DISCUSSION:** The chief objective of this study was to compare the effectiveness of stretching and taping versus ice and stretching in ITBFS in long distance runners for reducing pain and improving range of motion by measuring with the help of VAS and pressure algometer and universal goniometer respectively. Overall 60 subjects were selected suffering from ITBFS allocated in 2 groups randomly and who fell in the inclusion criteria. 30 samples in group A were treated with icing and stretching while the other 30 in group B were treated with taping and stretching.

Pre-treatment values of pain and range of motion were assessed on day 1, day 7 and day 14. Age wise distribution in group A and group B majority of patients 56.7% age group were 19 years, 30% of patients were lying in 20 years and 13.3% of patients were lying in the age of 21 years respectively. Further in group A and group B, there is equal distribution of subjects with respect to the side involved. In group A 15 right and 15 left side were taken and group B 15 right and 15 left side samples were taken respectively.

The statistical analysis done using repeated ANOVA and Karl Pearson correlation coefficient, both the groups showed reduction in pain levels but group B showed highly significant difference than group A. Pressure algometer and VAS showed significant difference between the groups. Group B in which taping and stretching was given showed high significant reduction in pain than group A. It is consistent with the previous studies which states that the patients will have a greater reduction in pain and performance after kinesiology taping technique. <sup>(11,49,50,54)</sup>

The goniometry showed an increase in range of motion assessed within the groups showed highly significant increase in both the groups. The stretching for the Iliotibial band, hip flexor, extensors and knee flexors musculature regained the desired range of motion, reduced friction and improved flexibility, which has been shown by Joshua Dubin<sup>(3)</sup> and John C Gose<sup>(1)</sup> Based on this data we accept the alternate hypothesis and reject the null hypothesis. These results were significant at  $P = 0.01$ .

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**CONCLUSION:** Pre post comparison shows highly significant improvement in group B than group A in hip abduction. Group A shows significant improvement than group B in hip flexion. Group B shows highly significant improvement in knee flexion than group B. There is significant improvement seen in pressure algometer in group B than group A. There is significant improvement seen in visual analog scale in group A than group B.

There was significant improvement seen in pain levels and range of motion after giving taping and stretching in group B than seen in icing and stretching given in group A. Thus we accept the alternate hypothesis and reject the null hypothesis. Therefore there was effectiveness seen in taping and stretching than in icing and stretching in reducing the pain levels and improving range of motion in runners suffering from iliotibial band friction syndrome.

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