TO COMPARE THE EFFECT OF CRYOTHERAPY WITH STRETCHING VERSUS TAPING WITH STRETCHING ON ILIOTIBIAL BAND FRICTION SYNDROME IN LONG DISTANCE RUNNERS
Shivananda S¹, Bharath Raju G², R. Raja³, I. Suresh⁴, A. C. Vinod Kumar⁵, Ravish V. N⁶, Sumanth B⁷, Sachin Mali⁸

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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[1]. 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.[2] It is commonly seen in male than female in the age group of 16-30 years that affects both the side bilateral or unilateral.[3] 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.[4] 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.[4,5]

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
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 per 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
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.

| AGE | Group A | Group B | Total |
|-----|---------|---------|-------|
| 19  | 17      | 17      | 34    |
|     | 56.7%   | 56.7%   | 56.7% |
| 20  | 9       | 9       | 18    |
|     | 30.0%   | 30.0%   | 30.0% |
| 21  | 4       | 4       | 8     |
|     | 13.3%   | 13.3%   | 13.3% |
| Total | 30 | 30 | 60 |
|      | 100.0%  | 100.0%  | 100.0% |
Distribution of subjects according to side involved: In group A and group B there is equal distribution with respect to side involved.

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

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

| 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  | NS      |         |
|                         | Total      | 30.30   | 2.019          | 30.00  | NS      |         |
| HIP FLEXION             | Group A    | 99.83   | 6.086          | 100.00 | 1.077   | .286    |
|                         | Group B    | 101.50  | 5.894          | 100.00 | NS      |         |
|                         | Total      | 100.67  | 5.999          | 100.00 | NS      |         |
| KNEE FLEXION            | Group A    | 119.83  | 5.490          | 120.00 | .246    | .806    |
|                         | Group B    | 119.50  | 4.974          | 120.00 | NS      |         |
|                         | Total      | 119.67  | 5.197          | 120.00 | NS      |         |
| PRESSURE ALGOMETER      | Group A    | .74     | .100           | .75    | .266    | .791    |
|                         | Group B    | .75     | .094           | .75    | NS      |         |
|                         | Total      | .74     | .096           | .75    | NS      |         |
| VISUAL ANALOGUE SCALE   | Group A    | 7.83    | .615           | 8.00   | 1.817   | .074    |
|                         | Group B    | 7.30    | .794           | 7.00   | NS      |         |
|                         | Total      | 7.47    | .724           | 8.00   |         |         |

Parameter: HIP ABDUCTION

| Group | N  | Minimum | Maximum | Mean   | Std. Deviation | Median | ANOVA F value | p value |
|-------|----|---------|---------|--------|----------------|--------|--------------|---------|
| Group A | 39  | 28      | 35      | 30.00  | 1.948          | 30.00  | 188.098      | .000    |
|        | 39  | 30      | 38      | 34.83  | 2.408          | 35.00  |              | HS      |
|        | 39  | 35      | 45      | 39.93  | 3.237          | 40.00  |              |         |
| Group B | 39  | 28      | 35      | 30.60  | 2.078          | 30.00  | 221.668      | .000    |
|        | 39  | 30      | 40      | 35.50  | 2.474          | 35.00  |              | HS      |
|        | 39  | 35      | 45      | 40.67  | 3.407          | 40.00  |              |         |
In group A mean hip abduction before the treatment was 30.0±1.9, at 7\textsuperscript{th} day 34.83±2.4 at 14\textsuperscript{th} day 39.93±3.2 In group B hip abduction before the treatment was 30.6±2.07, at 7\textsuperscript{th} day 35.5±2.4 at 14\textsuperscript{th} day 40.67±3.4.

**Comparison of effect between the groups:**

**Parameter: HIP ABDUCTION**

| Parameter | Group A | Group B | Mean | Std. Deviation | Median | ANOVA F value | p value |
|-----------|---------|---------|------|----------------|--------|---------------|--------|
| change pre to 7th day | 4.83 | 4.00 | 2.551 | 2.006 | 16.11 | .110 | .911 NS |
| change pre to 14th day | 9.93 | 10.07 | 3.532 | 3.248 | 33.11 | .150 | 880 NS |
| change 7th day to 14th | 5.10 | 5.17 | 2.139 | 2.451 | 14.64 | .110 | .911 NS |

**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 |
In group A mean hip flexion before the treatment was 99.83±6.0, at 7th day 113.9±6 at 14th day 123.67±3.6. In group B hip flexion before the treatment was 101.5±5.89, at 7th day 113.3±4.97 at 14th day 123.83±3.64.

**Comparison of effect between the groups:**

| Parameter: HIP FLEXION |
|-------------------------|
|                         | 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  | 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 |
|-------------------------|
|                         | N | Minimum | Maximum | Mean | Std. Deviation | Median | ANOVA F value | p value |
| Group A                 |   |         |         |      |                |        |               |         |
| PRETEST                 | 30| 110     | 130     | 119.83| 5.490           | 120.00 | 189.635       | .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     | 128.63| 4.292           | 130.00 |               |         |        |
| 14TH DAY                | 30| 130     | 145     | 139.50| 4.974           | 140.00 |               |         |        |
In group A mean knee flexion before the treatment was 119.83±5.45, at 7th day 128.67±4.3 at 14th day 139.5±4.4. In group B knee flexion before the treatment was 119.5±4.97, at 7th day 128.83±4.29 at 14th day 139.50±4.97

Comparison of effect between the groups:

| Parameter: KNEE FLEXION | Mean diff | S.D of diff | change (%) | t value | p value |
|-------------------------|-----------|-------------|------------|---------|---------|
| change pre to 7th day   | Group A   | 8.33        | 5.522      | 7.37    | .390    | .597    |
|                         | Group B   | 9.33        | 4.302      | 7.81    | NS      |
| change pre to 14th day  | Group A   | 19.67       | 6.557      | 16.41   | .220    | .829    |
|                         | Group B   | 20.00       | 5.252      | 16.74   | NS      |
| change 7th day to 14th day | Group A | 10.83       | 4.371      | 8.42    | .170    | .866    |
|                         | Group B   | 10.67       | 3.144      | 8.28    | NS      |

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

| Parameter: PRESSURE ALGOMETER | N | Minimum | Maximum | Mean | Std. Deviation | Median | ANOVA F value | p value |
|------------------------------|---|---------|---------|------|----------------|--------|---------------|---------|
| Group A                      | 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           | 1.50   |              |         |
| Group B                      | 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   |              |         |
In group A mean pressure before the treatment was 0.74±0.1, at 7th day 1.19±0.098 at 14th day 1.6±0.081.

In group B pressure before the treatment was 0.75±0.094, at 7th day 1.41±0.09 at 14th day 1.89±0.074.

Comparison of effect between the groups:

Pre post comparison of Pain in group A and group B:
In group A mean Pain before the treatment was 7.63±0.615, at 7\textsuperscript{th} day 5.23 ±0.626 at 14\textsuperscript{th} day 3.2±0.664. In group B Pain before the treatment was 7.3± 0.794, at 7\textsuperscript{th} day 4.63 ± 0.765 at 14\textsuperscript{th} day 1.4±0.621.

Comparison of effect between the groups:
To find the effect of side on the treatment:

| Parameter          | SIDE                | 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      | 1.972 | .293   | 4.73        | 2.550      | -1.448 | .857    |
|                    | RT    | 6.53        | 2.554      | 1.972 | .293   | 4.73        | 2.550      | -1.448 | .857    |
| change pre to 14th day | LT    | 10.07       | 3.854      | 2.038 | .206   | 10.13       | 3.738      | 1.111  | .913    |
|                    | RT    | 9.00        | 3.529      | 1.944 | .507   | 10.00       | 3.229      | 2.229  | .011    |
| change 7th day to 14th day | LT    | 4.73        | 1.438      | .037  | .357   | 5.40        | 2.414      | .815   | .811    |
|                    | RT    | 5.47        | 2.369      | 1.541 | .235   | 5.54        | 2.548      | .740   | .451    |
| HIP FLEXION        |         |               |         |         |         |               |         |         |
| change pre to 7th day | LT    | 12.00       | 5.052      | -1.303 | .184   | 10.07       | 5.178      | 1.100  | .400    |
|                    | RT    | 15.93       | 6.093      | 1.159 | .250   | 13.00       | 5.278      | 1.033  | .400    |
| change pre to 14th day | LT    | 23.00       | 7.030      | -1.456 | .167   | 22.00       | 6.666      | -1.356 | .172    |
|                    | RT    | 25.67       | 6.779      | 1.159 | .250   | 22.00       | 6.666      | -1.356 | .172    |
| change 7th day to 14th day | LT    | 9.40        | 5.044      | -1.420 | .074   | 11.33       | 5.104      | 1.033  | .310    |
|                    | RT    | 10.13       | 3.023      | 1.051 | .292   | 9.07        | 3.618      | .184   | .405    |
| KNEE FLEXION       |         |               |         |         |         |               |         |         |
| change pre to 7th day | LT    | 9.23        | 7.037      | 1.489 | .184   | 10.00       | 4.228      | .845   | .405    |
|                    | RT    | 8.23        | 3.619      | 1.303 | .250   | 8.67        | 4.419      | 1.033  | .400    |
| change pre to 14th day | LT    | 21.67       | 7.237      | 1.727 | .056   | 22.33       | 4.868      | .542   | .735    |
|                    | RT    | 17.67       | 5.500      | 1.577 | .107   | 18.07       | 5.818      | .900   | .100    |
| change 7th day to 14th day | LT    | 12.13       | 4.982      | 1.971 | .089   | 10.33       | 2.289      | -1.674| .751    |
|                    | RT    | 9.39        | 2.200      | 1.100 | .250   | 11.00       | 3.673      | .107   | .751    |
| PRESSURE ALGOMETER |         |               |         |         |         |               |         |         |
| change pre to 7th day | LT    | .45         | .106       | .000  | .100   | .87         | .122       | .003   | .784    |
|                    | RT    | .45         | .099       | .100   | .100   | .87         | .122       | .003   | .784    |
| change pre to 14th day | LT    | .27         | .123       | .138  | .091   | 1.15        | .115       | .000   | .100    |
|                    | RT    | .26         | .140       | .138  | .091   | 1.15        | .115       | .000   | .100    |
| change 7th day to 14th day | LT    | .41         | .125       | .138  | .091   | 1.15        | .115       | .000   | .100    |
|                    | RT    | .41         | .139       | .138  | .091   | 1.15        | .115       | .000   | .100    |
| VISUAL ANALOGUE SCALE |        |               |         |         |         |               |         |         |
| change pre to 7th day | LT    | 2.33        | .017       | .042  | .520   | 2.73        | 1.033      | .350   | .099    |
|                    | RT    | 2.47        | .017       | .042  | .520   | 2.73        | 1.033      | .350   | .099    |
| change pre to 14th day | LT    | 4.47        | .017       | .042  | .520   | 2.73        | 1.033      | .350   | .099    |
|                    | RT    | 4.40        | .017       | .042  | .520   | 2.73        | 1.033      | .350   | .099    |
| change 7th day to 14th day | LT    | 2.13        | .516       | .887  | .382   | 3.20        | 1.084      | -1.185| .855    |
|                    | RT    | 1.58        | .704       | .887  | .382   | 3.20        | 1.084      | -1.185| .855    |

To find the effect of age on the treatment:

| Parameter          | Group A | Group B |
|--------------------|---------|---------|
|                    | Karl pearson correlation coefficient | p value | Karl pearson correlation coefficient | p value |
| AGE with change pre to 7th day |         |         |         |
| HIP ABDUCTION      | .689    | .038    | NS      | .206    | .270    | NS      |
| HIP FLEXION        | -.101   | .312    | NS      | .039    | .637    | NS      |
| KNEE FLEXION       | -.011   | .084    | NS      | .015    | .939    | NS      |
| PRESSURE ALGOMETER | .005    | .326    | NS      | .347    | .051    | NS      |
| VISUAL ANALOGUE SCALE | -.151   | .425    | NS      | .182    | .319    | NS      |
| change pre to 14th day |         |         |         |
| HIP ABDUCTION      | .103    | .300    | NS      | .115    | .540    | NS      |
| HIP FLEXION        | -.035   | .056    | NS      | .179    | .343    | NS      |
| KNEE FLEXION       | .677    | .006    | NS      | .090    | 1.000    | NS      |
| PRESSURE ALGOMETER | .101    | .313    | NS      | .201    | .289    | NS      |
| VISUAL ANALOGUE SCALE | .266    | .473    | NS      | .070    | .715    | NS      |
| change 7th day to 14th day |         |         |         |
| HIP ABDUCTION      | .102    | .395    | NS      | .016    | .933    | NS      |
| HIP FLEXION        | .102    | .395    | NS      | .016    | .933    | NS      |
| KNEE FLEXION       | .102    | .395    | NS      | .016    | .933    | NS      |
| PRESSURE ALGOMETER | .480    | .003    | NS      | -.020   | .918    | NS      |
| VISUAL ANALOGUE SCALE | .264    | .168    | NS      | .242    | .197    | NS      |
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 7th day, 33.1% at 14th day. In group B change was 16.01% on 7th day, 32.9% on 14th 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 7th, pre to 14th and 7th to 14th 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 7th day 113.96±14th day 123.6±3.6.

In group B hip flexion before the treatment was 101.5±5.89, at 7th day 113.3±4.97 at 14th 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 14.9% at 7th day, 23.87% at 14th day. In group B change was 11.66% on 7th day, 22.0% on 14th 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 7th, pre to 14th and 7th to 14th 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 7th day 128.67±4.3 at 14th day 139.5±4.4. In group B knee flexion before the treatment was 119.5±4.97, at 7th day 128.83±4.29 at 14th 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 7th day, 16.4% at 14th day. In group B change was 7.8% on 7th day, 16.7% on 14th 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 7th, pre to 14th and 7th to 14th 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 7th day 1.19±0.098 at 14th day 1.6±0.081.

In group B pressure before the treatment was 0.75±0.094, at 7th day 1.41±0.09at 14th day 1.89± 0.074. This shows that there is a highly significant increase in pressure both in group A and Group B.
as all p <0.01 in group A change was 61.2% at 7th day, 116.6% at 14th day. In group B change was 89.2% on 7th day, 153.5% on 14th 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 7th, pre to 14th and 7th to 14th day as p <0.05 for all the time points. Group B shows significantly higher change at 7th day and 14th 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±0.615, at 7th day 5.23 ±0.626 at 14th day 3.2 ±0.664. In group B Pain before the treatment was 7.3± 0.794, at 7th day 4.63 ± 0.765at 14th day 1.4 ± 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 7th day, 58.0% at 14th day. In group B change was 36.5% on 7th day, 80.8% on 14th 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 7th, But change was significantly higher in group B at 14th 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.\(^{11,49,50,54}\)

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 iliobibial 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\(^{(3)}\) and John C Gose\(^{(1)}\) Based on this data we accept the alternate hypothesis and reject the null hypothesis. These results were significant at P=0.01.
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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AUTHORS:
1. Shivananda S.
2. Bharath Raju G.
3. R. Raja
4. I. Suresh
5. A. C. Vinod Kumar
6. Ravish V. N.
7. Sumanth B.
8. Sachin Mali

PARTICULARS OF CONTRIBUTORS:
1. Professor and HOD, Department of Orthopaedics, KIMS, Bangalore.
2. Assistant Professor, Department of Orthopaedics, KIMS, Bangalore.
3. Associate Professor, Department of Physiotherapy, KIMS, Bangalore.
4. Professor, Department of Orthopaedics, KIMS, Bangalore.
5. Associate Professor, Department of Orthopaedics, KIMS, Bangalore.
6. Associate Professor, Department of Orthopaedics, KIMS, Bangalore.
7. Post Graduate, Department of Orthopaedics, KIMS, Bangalore.
8. Post Graduate, Department of Physiotherapy, KIMS, Bangalore.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Sumanth B,
#275, Sudarshan Nilaya,
2nd Main, 3rd Cross, WOC Road,
Mahalakshmi puram, Bangalore-86
Email: drsumanth.babu25@gmail.com

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