Manual therapy and taping techniques for iliotibial band syndrome(itbs)

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A few observation and much reasoning lead to error;
many observations and a little reasoning to truth.

-Nobel Laureate Alexis Carrel
(RenownedVascular surgeon and Author)

PROLOGUE

Shailja(name changed)a18 year-old female athlete complained of intermittent pain of 3 months duration, located on the **lateral aspect of the right knee.**There was no reported history of trauma to the lower limb. She complained of **episodes of burning pain, lasting 10 to 15 minutes** several times a week. In the lateral aspect of the knee invariably **"creaks"** were felt. **Walking upstairs** and **running** were mentioned as **major precipitating and aggravating factors.** On examination**, tenderness over the left lateral femoral epicondyle** was found. **Palpation** of the same area also revealed a **peculiar creak** which was felt when the **knee was actively flexed to 35^0.**

The patient showed normal passive and active ranges of motion at the right knee joint, but **mild to moderate pain occurred between $20^0$and 50^0 of active and passive flexion.**Postural analysis revealed bilateral Genu varum, pronation of the feet, lateral pelvic tilt towards the right side and lack of pelvis shift with the right lateral flexion of the trunk. **Muscle testing showed shortness of the right tensor fasciae latae (Ober's test position).** McMurray's test,tests for joint stability and all "standard" orthopaedic tests of the knee joint were unremarkable. Neurological and pertinent radiographicsigns were all normal.A diagnosis of **Iliotibial band syndrome** was made.

Treatments consisted of 15 to 20 minutes of **cryotherapy**applied to the local point of tenderness at the right femoral epicondyle,**stretching of the tensor fasciae latae** by **Muscle Energy Techniques** and support provided by taping techniques.The patient was asymptomatic after 4 treatments in a week period.

ILIOTIBIAL BAND: ANATOMY AND PATHOMECHANICS (Fig.1)

The **iliotibial band (ITB) or tract** is a **lateral thickening of the fascia lata in the thigh.**It consists of **dense connective tissue** that assists**stance stability** and is capable of **resisting large varus torques at the knee** (Kirk KL et al, 2000,Hamill J et al, 2008). The ITB proximally splits into superficial and deep layers, enclosing tensor fasciaelatae and anchoring this muscle to the iliac crest (Standring, 2004). The ITB also provides an insertion for the **tensor fascia lata and**

gluteus maximus musclesproximally(Kaplan EB, 1958). Distally the ITB is generally viewed as a bandof dense fibrous connective tissue that passes **over the lateral femoral epicondyle and attaches to Gerdy's tubercle on the anterolateral aspect of the tibia.**

The iliotibial band is an independent stabilizer ofthe lateral knee joint, essential for erect posture. The iliotibialband has 2 significant attachments, one the**lateral epicondyle of femur and the other Gerdy tubercle** (Kaplan, 1958; Fairclough et al.,2006). Thefirst iliotibial band attachment is into the distal femur at theupper edge of the lateral epicondyle(Vieira EL et al., 2007). The histologicmakeup is consistent with tendon and has a layer of adiposetissue underneath the iliotibial band attachment area(Fairclough et al. 2006; Fairclough et al.,2007). The **adipose tissue contains pacinian corpuscles**, is **highly vascular**, and may be the site of the inflammation that causespain during compression. The second attachment of theiliotibial band is the insertion into the **Gerdy tubercle of the tibia** and serves as a **ligament in structure and function.**The Gerdy tubercle attachment is **tensed during tibia internal rotation** as the knee flexes during the weight-acceptancephase of gait(Fairclough J et al.2006; Fairclough J et al.,2007; Kelly A et al.1994).**Internal tibial rotation explains the occasional connection between toeing in and iliotibial band strain**(Reischl et al.,1999).

Fairclough et al (2006) described a **mechanism of compression of the iliotibial band against the lateral epicondyle that occurs at 30° of knee flexion.** Their anatomic descriptionincluded the observation that **compression of the adipose tissue at the lateral epicondyle of the femur caused pain and inflammation but that no anterior–posterior movement of the band moving over the epicondyle took place**, simply anapproximation of the iliotibial band into the lateral epicondyleas the knee internally rotated during flexion from anextended position. The investigators presented an anatomicalviewpoint that contradicts the commonly held theory of afriction syndrome . Fairclough et al (2006) described frictionas an unlikely cause of ITBS, because the band insertsdeeply and strongly into the femur. The functional anatomymay be relevant because **a fat pad and pacinian corpuscle compressionmechanism** may have different mechanoreceptorimplications compared with a friction syndrome, althoughinflammation remains the primary concern.

CLINICAL PRESENTATION OF ITBS(Fig.2)

The **first detailed case on ITBS** was published by **Renne in 1975.** The subjects studiedwere **military recruits** whose running and training activities had increased rapidly. Hallmarksof ITBS were pain on **weight bearing at 30° of knee flexion and the exacerbation of pain after having run more than 2 miles or having hiked more than 10 miles.**

ITBfriction syndrome is an **overuse injury well recognized as a common cause of lateral knee pain.** It is particularlycommon in **runners and cyclists,** though it also occursin **weightlifters, skiers and soccer players** (Orava, 1978;Noble, 1979; Orchard et al. 1996). The incidence is reported to beas high as **12% of all running-related, overuse injuries**(Fredericson & Wolf, 2005).

The following are the **clinical presentations** of **ITB friction syndrome**

1.Patients typically present with **tenderness over the lateral femoral epicondyle(Fig.3)**.

2.A**Sharp, burning pain** when the practitioner presses on the **lateral epicondyle during knee flexion and extension** (Ekmanet al. 1994).

3. The **pain is particularly acute** when the**knee is at 30° of flexion** (Orchard et al. 1996; Fredericson& Wolf, 2005).
4. The **symptoms are felt**usually in the**weight-bearing positions.**
5. The **pain gets accentuated with overtraining.**
6. There are significant **deficit in hip abductor strength, mostly of gluteus medius** muscle. (Fredericson et al, 2000)

7.Clinically the **ITB is found to be tight**(Miller et al.,2007). Confirmation done by **Ober Test(Fig. 4).**

The Ober testis commonly performed to assess iliotibial band length. Gose and Schweizer(1989)describe the Ober test as follows: (1) position the patient on side, lying with the tested leg up; (2) with the knee flexed to 90° and the pelvis stabilized, position the hip in a flexed and abducted posture; (3) extend the hip to achieve adequate extension so that the iliotibial band is over or behind the greater trochanter; and(4) allow the thigh to fall into adduction . The iliotibial band restriction is designated as follows: **(a) minimal (adducted past the horizontal but not fully to the table), (b) moderate (adducted to the horizontal), and (c) maximal (patient is unable to adduct to the horizontal).**

8. The **Noble compression test(Fig.5)**produces the **pain**.
Noble compression test is used to**provocate symptoms by compressing the iliotibial band at the lateral epicondyle with 30° knee flexion.** The patient ispositioned with the knee at 90° flexion, and compression isapplied just proximal to the lateral epicondyle as the kneeis extended toward full extension. The **30° flexion is the impingement zone** specific to the iliotibial band and lateralfemoral epicondyle as described in cadaver studies by bothOrchard et al(1996) and Fairclough et al(2006).

MANUAL THERAPY AND TAPING TECHNIQUES FOR ILIOTIBIAL BAND SYNDROME(ITBS)

1.Positional Release Technique for ITBS (Fig.6)

The technique is applied in case of **irritable condition.**
Subject's position:-The subject is in side lying position.
Clinician's position:-The clinician stands at the posterior aspect of the subject.

Procedure:-1. The clinician places the thumb at the painful area located in close vicinity to the lateral epicondyle. 2. The clinician places subject's ITB in relaxed position (subject's knee in 60 degrees of flexion, Hip 30 degrees of abduction and 20 degrees of lateral rotation). 3. Mild pressure(directed anterior, medial and inferio)r in comfort zone is applied by the clinician's thumb for 90 seconds.
4. The technique is performed 3-4 times.
Clinical Significance: Thepositional releasetechniquerelaxes the irritability by acting at the spinal cord level.

In addition to the PRT at the irritable area, **focussed cryotherapy** can be applied by **tennis ball wrapped in socks** and kept in freezer**(Fig.7).**

2. Muscle Energy Technique for ITB(Fig.8)
Subject's position:- The subject is in side lying position (affected side placed up).
Clinician's position:-The clinician stands at the posterior aspect of the subject.
Procedure:- 1.The subject is asked to flex the non affected side hip close to the chest.
2. The clinician stabilises the affected side pelvis, abducts the hip for 40 degrees and extends the hip. 3. The clinician brings the hip further towards adduction.
4. Once the barrier is reached the subject is asked **to bring the hip for flexion and abduction** while the clinician is applying the resistance($1/3^{rd}$ of the muscular effort with isometric contraction). 5. The contraction is held for 6-10 seconds and repeated for 6-10times.

Clinical Significance: MET facilitates the lengthening of the tight IT band, so that it minimises excessive stress at the lateral epicondyle of femur.

3. Myofascial Release Technique for lower ITB(Fig.9)
Subject's position:-The subject is in side lying position.
Clinician's position:-The clinician stands at the posterior aspect of the subject.
Procedure:- 1. The clinician places the lateral aspect of the thumb 2 inches superior to the lateral epicondyle of the femur. 2.
The clinician applies the force medial and slides down along the ITband towards the Gerdy's tubercle. 3.
The sequence is repeated 6-10 times.
Clinical Significance:MFR facilitates to release the contracted collagens in ITBS.

4.Taping Techniques for ITBS (Fig.10,11,12)
Subject's position:- The subject is in side lying position with hip and knee both placed in 30 degrees of flexion.
Clinician's position:-The clinician stands at the posterior aspect of the subject.
Procedure:-1. The clinician places cut piece of ethaflex(2inches length and ½ inch width) at the distal part of ITB.
2. The paper underwrap is applied to secure the ethaflex.
3. The rigid brown tape is applied on top of the underwrap.
Clinical Significance: The rigid tape reinforced with the ethaflex provides adequate support to the compromised distal part of the IT band.

Alternately elastic **kinesiology tape** is applied. A 3 inch long kinesiology tape(2inches width) is taken. The edges are rounded off and an incision is given in the middle. The tape is stretched further by 10 percent and applied to the distal part of the IT band**(Fig.13)**

5.Self Stretching (Fig.14)

Subject's position:- The subject is in standing position.

Procedure:-1. The subject holds the dorsal aspect of the foot and the knee is fully flexed.

2. The hip is taken for 20 degrees of adduction and 20 degrees of extension.

3. The stretch is felt at the distal part of the ITB.

4. The stretch is maintained for 6-10 seconds and repeated for 6-10 times.

Clinical Significance: Self stretching elongates tight Iliotibial band.

6.Exercises to Recruit the Gluteals(Medius and maximus)

As per the observations of Fredericson et al, 2000 the hip abductors are weak in ITBS. Therefore the exercises facilitating the **recruitment and strengthening of the Gluteus medius and maximus** must be demonstrated and the subject is instructed to perform on regular basis.
The following are the important exercises.

A.Resisted clam shell is a beginning-level exercise forgluteal muscle recruitment(Fig.15)

B.Resisted hip abduction and bridge is a beginninglevelexercise that facilitates gluteal recruitment(Fig.16).

C.Resisted hip extension, external rotation, and abductioncomprise a beginning-level exercise that facilitatesgluteus maximus and gluteus medius recruitment(Fig.17)

D.Resisted staggered squat is an intermediate exerciseto facilitate gluteal muscles and an alternative functionalstance(Fig.18)

CONCLUSION:

Iliotibial Band Syndromeremains a commonand challenging dysfunction in many athletes; but,through early diagnosis and proper biomechanical movementanalysis, appropriate skilful manual therapy interventions can be implementedto decrease pain and to improve function.

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