Clinical Case Report Competition
West Coast College of Massage Therapy
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First Place Winner
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Is lengthening the tensor fascia lata and gluteus maximus through massage therapy effective treatment for iliotibial band syndrome: A case report
Acknowledgements

Rick Girardeau – Case Advisor
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Abstract

Iliotibial Band Syndrome (ITBS) is a friction syndrome that predominantly afflicts runners and cyclists. Previous studies have assessed the validity of treatment of the band itself, injections of corticosteroids to the surrounding area, and surgical excision of the segment of the band causing the friction. The course of treatment in this case study was designed to explore the efficacy of lengthening the tensor fascia lata (TFL) and gluteus maximus through massage therapy to treat ITBS. The treatment of one 25 year old runner who presented with ITBS was documented. Over the course of five treatments trigger point release and contract-relax stretching, supplemented with a home care regimen of stretching and heat, were evaluated. It was found that the range of motion was equalized between the pathological and non-pathological hip, pain was decreased, and special testing results became negative for ITBS on the affected side. This demonstrates that trigger point release and stretching of the TFL and gluteus maximus is an appropriate and effective treatment for ITBS.

Key Words: Iliotibial Band Syndrome, Massage Therapy, Trigger Point, Contract-relax Stretch
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Introduction

Iliotibial Band Syndrome (ITBS) or Iliotibial Band Friction Syndrome (ITBFS) is believed to be an overuse friction syndrome of the iliotibial band (ITB) rubbing over the lateral femoral condyle (Ellis, Hing, & Reid, 2007; Noehren, Davis, & Hamill, 2007). This friction is caused by increased stress and a tight ITB (Gunter & Schwellnus, 2004). This leads to pain on the lateral aspect of the knee and can cause pain at the lateral aspect of the hip as well. Fairclough et al. (2007) counter this belief with the theory that the ITB does not move over the femoral condyle, but that the pain is produced by compression of “richly-vascularised and innervated loose connective tissue that may contain Pacinian corpuscles” (p. 75). Regardless of the cause, the resulting pain at the knee is often greatest “at, or slightly below 30° of knee flexion during foot strike and the early stance phase of running” (van der Worp, van der Horst, de Wijer, Backx, & Nijhus-van der Sanden, 2012, p. 970). The current standard treatment of ITBS with manual therapy is to treat the band of fascia itself with the use of frictions as well as rest from physical activity and, if the case is severe enough, local corticosteroid or cortisone injections are also used (Gunter & Schwellnus, 2004; Holmes, Pruitt, & Whalen, 1993; Lavine, 2010). If this conservative treatment proves to be ineffective there is a surgical option to remove the portion of the ITB that is rubbing over the condyle, and thus remove the cause of friction (Fredericson & Wolf, 2005; Holmes et al., 1993; Noble, 1979). Manual treatment of the ITB alone is inadequate because it only treats the location of pain and excludes the location of dysfunction (Fairclough et al., 2007; Lavine, 2010). The biomechanical cause is still being debated (Ellis et al., 2007; Fairclough et al., 2007; Grau et al., 2011; Gunter & Schwellnus, 2004; Lavine, 2010; Noehren et al., 2007) but regardless of whether the cause is friction or compression, the pain is a result of the muscles that insert to the ITB being overly shortened or tight. Musclino (2010) indicates that all
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of the muscle fibers from tensor fascia lata (TFL) (p. 486) and a portion of the muscle fibers from gluteus maximus (p. 506) insert into the ITB. In the population that is predominantly affected by ITBS (cyclists and runners) (Ellis et al., 2007; Gunter & Schwellnus, 2004; Holmes et al., 1993; Lavine, 2010; Noble, 1979; Noehren et al., 2007; van der Worp et al., 2012) these muscles are overused, leading to tightening and shortening of these muscles, placing increased stress on the ITB (Ellis et al., 2007; Fairclough et al., 2007; Fredericson et al., 2000; van der Worp et al., 2012). This case study is designed to explore whether lengthening the TFL and gluteus maximus through massage therapy and associated home care will effectively reduce the signs and symptoms of ITBS.

In this case study, the verbal analogue scale (VAS) (0-no pain, 10-worst pain imaginable) was used pre-treatment. Between treatments the patient was asked to record VAS before and during her exercise throughout the weeks spanned by this study. This is a qualitative method of evaluating effectiveness that was used in one of the cited studies on conservative treatment (Gunter & Schwellnus, 2004) as well as in a study reporting on the surgical option of treating ITBS (Ellis et al., 2007). Additionally, three special tests accepted as indications of ITBS were used, including Ober Test, Noble’s Test, and Figure 4 Test also known as Patrick Test (Fredericson et al., 2000; Fredericson & Wolf, 2005; Grau et al., 2011; Gunter & Schwellnus, 2004; Holmes et al., 1993; Pettitt & Dolski, 2000; Lavine, 2010; Noble, 1979; van der Worp et al., 2012) (figure 1a-d). Ober Test and Figure 4 Test are quantitative measures that check the laxity of the ITB while Noble’s Test is a qualitative measure based on reports of pain. Range of motion (ROM) was also measured in degrees using a goniometer (figure 2) to determine whether the muscles have been effectively lengthened.
The subject for this case study was located through discussion with a colleague. The patient is a 25 year old Caucasian female with an acceptable fitness baseline that included running three times per week. The patient presented with pain on the lateral aspect of the right hip and thigh going from the iliac crest to halfway down the lateral aspect of the thigh as well as pain over the lateral femoral condyle upon exertion. There was a gradual onset of pain over the previous three months. This presentation, combined with positive special tests that indicate ITBS (Ober, Noble’s, and Figure 4), led to the conclusion that the individual suffered from ITBFS; although this was not confirmed by a medical doctor. The patient received a medical diagnosis of trochanteric bursitis of the right hip approximately one month earlier, which commonly presents alongside ITBS (Lavine, 2010). The patient experienced the greatest amount of pain, recorded as 10/10 on the VAS, after exercise; as well as in the morning hours or after extended periods of
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hip flexion, i.e. walking up stairs or going up a hill. The pain would last, on average, 3-4 hours after onset. The patient reported the least amount of pain to be 4/10 on the VAS; and described the pain as being dull and achy. She was never without pain. The patient has a history of injury to the low back at L5-S1 in 2007 with bruising but no fracture. In June of 2013, the patient also had a left upslip of the pelvis, which was corrected with massage therapy. The patient also had injury to the right knee with the impact from medial to lateral, which was self-diagnosed as a Grade 1 strain. The patient has also sprained both ankles (left, two times; right, three times). All sprains were inversion sprains, and the most recent sprain to the right ankle was a third degree sprain. The patient was prescribed two tablets of extra strength Advil™ per day and had ceased exercise for the four weeks prior to treatment to allow the trochanteric bursitis to heal.

The patient was observed to have a moderate to significant anterior pelvic tilt due to weak abdominal muscles. She also presented with an exaggerated Fick angle which became slightly more pronounced in her gait. Her running gait was not observed.

Upon palpation, the left buttock felt slightly adhered, of normal body temperature with few trigger points palpated. The patient did not report any tenderness. Upon palpation of the pathological (right) hip there was significant tension in the TFL as well as in the gluteus maximus. There was no significant difference in temperature and several trigger points were palpated. The patient did report tenderness upon palpation of the TFL as well as the gluteus maximus.

For the movement assessment, a goniometer was used to assess the ten movements available at the hip (flexion, extension, abduction, adduction, horizontal abduction, horizontal adduction, internal rotation in extension, external rotation in extension, internal rotation in flexion, and external rotation in extension). The non-pathological hip had a greater ROM than the
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pathological hip in all active movements except extension and abduction (figure 3). With passive ranges of motion, the non-pathological hip only maintained a significantly greater ROM than the pathological hip in external rotation in flexion (figure 4); however, the pathological hip had significantly greater ROM than the non-pathological hip in abduction and adduction. These movements were measured upon initial assessment, at the second treatment prior to treatment, and at the fifth treatment after the treatment was given.

**Figure 3. Bilateral comparison of the active ROM on initial assessment**
The patient reported no neurological abnormalities, signs or symptoms.

There are numerous studies that utilize the Noble’s and Ober tests as benchmark tests to differentially diagnose and establish the presence of ITBS (Fredericson et al., 2000; Fredericson & Wolf, 2005; Grau et al., 2011; Gunter & Schwellnus, 2004; Holmes et al., 1993; Noble, 1979; Pettitt & Dolski, 2000; van der Worp et al., 2012). In Noble’s test “with the knee flexed to 90° pressure is applied to the lateral epicondyles or one to two centimeters proximal to it and the knee gradually extended” (Noble, 1979, p. 51). A positive sign for this test is severe pain over the lateral epicondyle at 30° flexion (Noble, 1979). Ober test, as described by Magee (2008), has the patient lying on their side and with passive abduction and extension of the superior leg, the leg is then slowly lowered. If the leg remains abducted, the test is considered positive for ITB contracture (p. 693-694). Lavine (2010) writes that there is insufficient evidence to conclude that a positive Ober test equates to the presence of ITBS. Due to this lack of evidence this test is being used in concert with the Noble’s and Figure 4 tests to establish the presence of ITBS. On initial evaluation, the patient tested negative for all tests on the unaffected (left) side and positive for all tests on the affected (right) side.
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Due to the cause of pain being the tension of the TFL and gluteus maximus, throughout the course of the treatment our goals were to lengthen these muscles thereby reducing the tension on the ITB. This in turn would reduce the pathology at the knee (friction or compression) thereby relieving the pain.

At the initial assessment appointment, the patient was given home care of stretching the TFL and gluteus maximus three times a day (figure 5). One of these sets of stretching was to be preceded by application of heat for 3 to 5 minutes to aid the muscular stretch. This home care regimen was to be followed throughout the course of treatment. The treatments all adhered to the same course of treating the unaffected side first with an application of heat to the general buttock and light Swedish massage (effleurage). This was followed with isolation of the TFL and applying point pressure to any trigger points palpated; the same was repeated with the gluteus maximus. The treatment was ended by a reaplication of heat with a contract/relax stretch to the muscles according to trigger point release protocol (Simons, Travell, & Simons, 1999, p. 140-141). This was then repeated on the affected side. The treatments were between 20 and 30 minutes of hands-on time dependent on the number of trigger points palpated in each muscle. (See Appendix A)

Figure 5. Stretches for home care. A: TFL, B: General gluteal muscles, C: Gluteus maximus
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Due to the elastic and contractile nature of musculature, there was an initial month between treatment one and two, after which the frequency was adjusted to twice a week for the remaining treatments. This was to allow the patient opportunity to stretch in accordance with the prescribed home care and lengthen the musculature.

Results

From the initial intake on November 25, 2013 through to the second treatment on January 10, 2014 the patient remained positive on the right (affected) side for all three special tests. On January 14, 2014 (third treatment) the patient was negative for both Ober and Noble’s but remained positive for the Figure 4 Test. At the fourth treatment, on January 17, 2014, the patient tested negative on all three special tests on the right side and remained negative to the end of the course of treatment (Table 1).

<table>
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<tr>
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<th>Tx 4</th>
<th>Tx 5 Pre</th>
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<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
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<tr>
<td>Noble’s Test</td>
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<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
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<tr>
<td>Figure 4 Test</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
<td>(-) (+)</td>
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</tr>
</tbody>
</table>

Table 1. Special testing results

The patient was asked to journal her maximum, minimum and average VAS as well as whether or not she exercised and the exertional VAS during the exercise. There was a slight decrease in all recorded VAS between November 25, 2013 and January 14, 2014. After this point there was significant drop off in VAS through to the end of the course of treatment (figure 6). There is missing data between January 6, 2014 and January 14, 2014 because the patient did not have a form to record data during this time period.
Figure 6: Daily verbal analog scale of pain over the course of treatment

As discussed earlier, in both active and passive ranges of motion, there was an initial discrepancy between the left (non-pathological) hip and the right (pathological) hip. These measurements were repeated at the second treatment on January 10, 2014 and there was no significant narrowing of the gap in the ROM between the two limbs. The final time these measurements were taken, at the end of the fifth treatment on January 21, 2014, there was a significant alignment in the ranges of motion between the limbs (figure 7, 8). In some cases, the measurements were identical. Resisted ROM was performed at the initial intake on November 25, 2013 as well as after the final treatment on January 21, 2014. At the initial assessment, the right leg rated no higher than 4 on any ROM except external rotation in flexion (figure 9). After the full course of treatment, only two ranges of motion (internal rotation in extension and in flexion) were graded at 4. All others were graded at 5—full strength (figure 10). All raw ROM data are shown in Table 2.
Figure 7. Bilateral comparison of active ROM post treatments

Figure 8. Bilateral comparison of passive ROM post treatments
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Figure 9. Bilateral comparison of resisted ROM on initial assessment

Figure 10. Bilateral comparison of resisted ROM post treatments
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<td></td>
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<td>Prom</td>
<td>Rrom</td>
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<tr>
<td></td>
<td>L</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td>Flexion</td>
<td>84</td>
<td>74</td>
<td>111</td>
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<td>Extension</td>
<td>17</td>
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<tr>
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<tr>
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<td>58</td>
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<td>Abduction</td>
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<td>37</td>
<td>41</td>
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<td>Adduction</td>
<td>25</td>
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<td>29</td>
</tr>
<tr>
<td>Horizontal Abduction</td>
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<tr>
<td>Horizontal Adduction</td>
<td>17</td>
<td>9</td>
<td>31</td>
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</table>

Table 2. Raw ROM data

Discussion

Given the initial discrepancy in ROM between the affected and unaffected sides, and the lack of a capsular pattern of restriction, there is adequate evidence that the TFL and the gluteus maximus were shorter and tighter on the affected side. This, in concert with the post-treatment equality of ROM between the affected and unaffected sides, suggests that the gluteus maximus and TFL were successfully lengthened through this course of treatment (figure 11, 12). The current standard of treatment often prescribed for ITBS is stretching, abstinence from activity and NSAID use. As is shown by the steep decline in pain, as well as the negative special testing on the affected side, an increase in frequency of therapeutic massage treatments is vital to reducing ITBS.
In future studies, a larger sample size of individuals diagnosed with ITBS, as well as a control group should be considered. In addition to this, the diagnosis of ITBS would be strengthened by confirmation from an appropriate medical professional, such as an MD or ND, and would increase the veracity of the results found. Further study of this hypothesis should also include a
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more in-depth observational segment. Evidence has shown that there is a link between running biomechanics in the foot, knee, and hip and the presence of ITBS (Fredericson et al., 2000; Grau et al., 2011; Noehren et al., 2007). For this reason, the patients should be observed thoroughly while standing, walking, and running; paying particular attention to these areas. In these observations, as well as the assessment and measurement of ROM, practitioner error should be minimized by multiple readings taken by multiple practitioners or using technological tools such as photography and videography. Incidental findings in this case study also show that there needs to be more study regarding the correlation between frequency of treatment and the efficiency of recovery.

Conclusion

Given that the patient’s gluteus maximus and TFL were lengthened, a decrease in pain was reported and the special testing on the affected side changed, this case study demonstrates that trigger point release and contract/relax stretching is an effective treatment for ITBS. The patient also gave the feedback at the end of the final treatment that it “feels so much better. I don’t even think about the pain anymore.” Massage therapists treating those with ITBS should incorporate trigger point release of the TFL and gluteus maximus as well as stretching in their course of treatment.
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SYNDROME

References


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# Appendix A

## Treatment Summary

<table>
<thead>
<tr>
<th>Technique</th>
<th>Duration</th>
<th>Tissue applied to</th>
<th>Immediate effect</th>
<th>Immediate assessment</th>
</tr>
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<tbody>
<tr>
<td>Heat (Hydrocollator)</td>
<td>3 min</td>
<td>Right general buttock (including TFL)</td>
<td>Hyperemia</td>
<td>Visual</td>
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<tr>
<td>Swedish Massage</td>
<td>2 min</td>
<td>General Right buttock</td>
<td>Limited relaxation of muscles</td>
<td>Patient feedback and palpation</td>
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<td>3 min</td>
<td>Left general buttock (including TFL)</td>
<td>Hyperemia</td>
<td>Visual</td>
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<tr>
<td>Swedish Massage</td>
<td>2 min</td>
<td>General left buttock</td>
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<td>Patient feedback and palpation</td>
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<td>TrP point pressure</td>
<td>10 min</td>
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<td>TrP release</td>
<td>Patient feedback (via scale of 5), and palpation</td>
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Patient feedback: “Feels much looser”.

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Patient feedback: “Feels much better”
### Date: January 14, 2014

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Patient feedback: “Feels so good”

### Date: January 17, 2014

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Patient feedback: “Feels much better”

### Date: January 21, 2014

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<th>Duration</th>
<th>Tissue applied to</th>
<th>Immediate effect</th>
<th>Immediate assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat</td>
<td>2 min</td>
<td>Left general buttock</td>
<td>Hyperemia</td>
<td>Visual</td>
</tr>
<tr>
<td>TrP point pressure</td>
<td>3 min</td>
<td>Left TFL</td>
<td>Decrease trigger points</td>
<td>Palpation</td>
</tr>
<tr>
<td>Trigger point pressure</td>
<td>4 min</td>
<td>Left glute max</td>
<td>Decrease trigger points</td>
<td>Palpation</td>
</tr>
</tbody>
</table>
LENGTHENING TENSOR FACIA LATA AND GLUTEUS MAXIMUS FOR ILIOTIBIAL BAND  23 SYNDROME

<table>
<thead>
<tr>
<th>Heat</th>
<th>2 min</th>
<th>Gen right glute</th>
<th>Hyperemia</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger point pressure</td>
<td>5 min</td>
<td>Right TFL (3 points)</td>
<td>Decrease trigger points</td>
<td>Palpation</td>
</tr>
<tr>
<td>Trigger point pressure</td>
<td>7 min</td>
<td>Right glute max (4 points)</td>
<td>Decrease trigger points</td>
<td>Palpation</td>
</tr>
<tr>
<td>Stretch (contract/relax)</td>
<td>1 min ea</td>
<td>bilateral glute max</td>
<td>Sig creep R&gt;L</td>
<td>Movement</td>
</tr>
<tr>
<td>Stretch (contract/relax)</td>
<td>1 min ea</td>
<td>bilateral TFL</td>
<td>Sig creep R&gt;L</td>
<td>Movement</td>
</tr>
<tr>
<td>Total duration</td>
<td>27 min</td>
<td>Hand on time</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patient feedback: “Feels so much better. I don’t think about the pain anymore”