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# Efficacy of Treatment of Trochanteric Bursitis: A Systematic Review

**David P Lustenberger, BS**[*], **Vincent Y Ng, MD**[*], **Thomas M Best, MD, PhD**[†], and **Thomas J Ellis, MD**[*]

[*]Department of Orthopaedic Surgery, The Ohio State University Sports Medicine Center, The Ohio State University, Columbus, Ohio

[†]Department of Family Medicine, The Ohio State University Sports Medicine Center, The Ohio State University, Columbus, Ohio

## Abstract

**Objective—**Trochanteric bursitis (TB) is a self-limiting disorder in the majority of patients and typically responds to conservative measures. However, multiple courses of nonoperative treatment or surgical intervention may be necessary in refractory cases. The purpose of this systematic review was to evaluate the efficacy of the treatment of TB.

**Data Sources—**A literature search in the PubMed, MEDLINE, CINAHL, and ISI Web of Knowledge databases was performed for all English language studies up to April 2010. Terms combined in a Boolean search were greater trochanteric pain syndrome, trochanteric bursitis, trochanteric, bursitis, surgery, therapy, drug therapy, physical therapy, rehabilitation, injection, Z-plasty, Z-lengthening, aspiration, bursectomy, bursoscopy, osteotomy, and tendon repair.

**Study Selection—**All studies directly involving the treatment of TB were reviewed by 2 authors and selected for further analysis. Expert opinion and review articles were excluded, as well as case series with fewer than 5 patients. Twenty-four articles were identified. According to the system described by Wright et al, 2 studies, each with multiple arms, qualified as level I evidence, 1 as level II, 1 as level III, and the rest as level IV. More than 950 cases were included.

**Data Extraction—**The authors extracted data regarding the type of intervention, level of evidence, mean age of patients, patient gender, number of hips in the study, symptom duration before the study, mean number of injections before the study, prior hip surgeries, patient satisfaction, length of follow-up, baseline scores, and follow-up scores for the visual analog scale (VAS) and Harris Hip Scores (HHS).

**Data Synthesis—**Symptom resolution and the ability to return to activity ranged from 49% to 100% with corticosteroid injection as the primary treatment modality with and without multimodal conservative therapy. Two comparative studies (levels II and III) found low-energy shock-wave therapy (SWT) to be superior to other nonoperative modalities. Multiple surgical options for persistent TB have been reported, including bursectomy (n = 2), longitudinal release of the iliotibial band (n = 2), proximal or distal Z-plasty (n = 4), osteotomy (n = 1), and repair of gluteus medius tears (n = 4).

**Conclusions—**Efficacy among surgical techniques varied depending on the clinical outcome measure, but all were superior to corticosteroid therapy and physical therapy according to the VAS

Corresponding Author: Thomas J. Ellis, MD, Department of Orthopaedics, The Ohio State University, 2050 Kenny Rd, Columbus, OH 43221, thomas.ellis@osumc.edu.

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and HHS in both comparison studies and between studies. This systematic review found that traditional nonoperative treatment helped most patients, SWT was a good alternative, and surgery was effective in refractory cases.

### Keywords

trochanteric bursitis; corticosteroid injection; conservative treatment; shock wave therapy

## INTRODUCTION

Trochanteric bursitis (TB) is a common problem seen by sports medicine practitioners, affecting as many as 5.6 patients per 1000 adults.[1] Sometimes described as "greater trochanteric pain syndrome," TB is characterized by chronic lateral hip pain exacerbated by active abduction, passive adduction, and direct palpation.[1,2] The iliotibial band (ITB) and fascia lata act as a lateral tension band to resist tensile strains on the concave aspect of the femur[3] and is often implicated as the source of TB. Gluteus medius tears, also referred to as the "rotator cuff tears of the hip," are found in up to 22% of elderly patients and may also be an underlying cause of lateral hip pain.[4] Although the incidence of TB is highest in middle-aged to elderly adults,[5] the etiology is multifactorial and TB can affect patients of all ages.

First described in the 1930s,[6] TB typically responds to conservative measures, such as activity modification, physical therapy (PT), weight loss, corticosteroid injection, and nonsteroidal anti-inflammatory medications (NSAIDs). A cure rate with such conservative interventions, administered independently or in combination, can be expected to exceed 90%.[7] Nevertheless, recurrence is common, and patients frequently undergo multiple courses of nonoperative treatment, experiencing only temporary and incomplete pain relief. For severe refractory cases, multiple small case series in the recent literature have described surgical options for TB. Surprisingly, there are relatively few high-level studies examining the efficacy of operative and nonoperative treatment of this often minimized yet troublesome condition. The purpose of this study was to perform a systematic review of the literature on patient satisfaction and functional outcome after different treatment modalities for TB and refractory TB.

## METHODS

A literature search of the PubMed, MEDLINE, CINAHL, and ISI Web of Knowledge databases was performed for all English language studies up to April 2010. All studies directly involving the treatment of TB were reviewed by 2 authors (D.L. and T.J.E.) and selected for further analysis. Expert opinion and review articles were excluded, as well as case series with fewer than 5 patients. The data from each study were extracted by 2 authors (D.L. and V.Y.N.).

After a thorough search of multiple medical databases (Figure 1), 24 articles met the inclusion criteria and were included in this systematic review. According to the system described by Wright et al,[8] 2 studies, each with multiple arms, qualified as level I evidence, 1 as level II, 1 as level III, and the rest as level IV. The average length of follow-up ranged from 4 months to 4 years. The mean age for patients in all studies was 53 years (range, 12–88 years). There were 970 hips treated in 950 patients (180 men and 706 women, excluding 1 study that did not report gender distribution[9]).

Using Excel (Microsoft, Redmond, Washington), a worksheet was compiled with all relevant data. The pertinent details of these studies were juxtaposed in tabular form to facilitate further review and analysis.

# RESULTS

## Nonoperative Management

Nine studies examined the effect of injection as the primary treatment modality (Table 1). The mean duration of symptoms before treatment in this group ranged from 7.1 weeks to 4.4 years. Most patients received only a single injection, but up to 33% required a second administration[16] and some as many as 5 injections.[10] All studies used a mixture of corticosteroid and local anesthetic except[1,13] which used methylprednisolone or triamcinolone only. Three studies of injection alone measured outcomes using the visual analog pain scale (VAS)[9,12,17] with a mean improvement of 2.8. Cohen et al[9] compared the fluoroscopically guided injection with the traditional bedside injection and found no difference. In patients with concomitant sciatica and lower back pain, Sayegh et al[6] demonstrated an improvement in the Oswestry Disability Index for as many as 4 years. Subjective improvement and achieving a return to the patient's baseline activity level ranged from 49% to 100%. Injections were relatively free of complications except for 1 study in which a low incidence of skin irritation, swelling, and a temporary increase in local pain were reported.[17]

Two studies used a multimodal conservative approach (Table 2). Furia et al[11] found that after a course of rest, PT, ultrasound, steroid injections, ice, and heat, 66% and 83% of patients were able to return to sports and labor-intensive occupations, respectively, after approximately 3 months. In patients with TB after total hip arthroplasty, Iorio et al[15] reported that all patients eventually experienced sufficient resolution after a combination of different treatment modalities. As part of a larger study, Rompe et al[17] assigned 76 patients to 6 weeks of a home training program consisting of piriformis and ITB stretching, gluteal strengthening, straight leg raises, and assisted squats. Only 34% were able to return to normal activity, 40.8% had significant improvement, defined as "completely recovered" or "much improved" on the Likert scale, and pain improved on average 1 point on the VAS.[17]

Low-energy shock-wave therapy (SWT) was examined in 2 studies[11,17] (Table 2). Compared with the primary outcome of other conservative measures, SWT had a superior VAS and Harris Hip Score (HHS) improvement. The mean overall VAS improvement was 3.9 (7.0 vs 3.1) for the primary outcome. Furia et al[11] reported a 30.3 mean increase in HHS after the treatment. Shock-wave therapy allowed 64% to 76% of patients to return to normal physical activity in the studies by Furia et al[11] and Rompe et al,[17] respectively. Minimal complications were reported, such as temporary erythema and skin irritation. However, in the study by Rompe et al,[17] the difference in pain and recovery at 1 month and 15 months of follow-up was not found to be statistically significant when comparing SWT with the home training group. In addition, the study by Furia et al[11] showed that SWT was superior to the traditional therapy used in the control group. However, no standardization of such traditional therapy occurred in the control group. In the study, traditional nonoperative therapies were defined as relative rest, anti-inflammatory medications, ice, gluteal and tensa fascia lata muscle stretching and strengthening, PT modalities, iontophoresis, a corticosteroid injection, and a local anesthetic injection.[11] However, no explicit delineated program for the control group is described. These study limitations weaken but do not negate the argument that SWT is superior to home or traditional therapy.

## Operative Management

All but 6 studies on the surgical treatment of TB involved either direct lengthening or release of the ITB and fascia lata. Govaert et al[14] described a trochanteric reduction osteotomy after which 92% of patients showed "great" or "very great" improvement of their symptoms. Of note, nearly half had a previous unsuccessful longitudinal release of the ITB

and bursectomy. Wiese et al[18] performed an endoscopic bursectomy without addressing the ITB and reported a mean VAS improvement of 3.4 (7.2 vs 3.8). There were 4 case series of gluteus medius repair as the main goal of surgery. The only one to offer comparative outcome scores had a failure rate of 31% (5 of 16) due to rerupture or infection but reported a VAS improvement of 5 (7 vs 2) in the remaining cases.[29] Three studies reported high success rates (88%–100%) of pain relief and only a single complication, persistent abductor weakness due to denervation of the gluteus medius.[26–28]

There were 3 predominant methods of relaxing the ITB: proximal Z-plasty, proximal longitudinal release, and distal Z-plasty. Both types of proximal procedures included bursectomy and local debridement. All studies reported a significant improvement of symptoms or satisfaction rates of 72% to 100%. Because multiple various outcome measures were used, it was difficult to compare the results of different surgical methods. Including those studies that used the VAS, mean improvement was greatest for distal Z-plasty (7.0) compared with proximal Z-plasty (5.6) and longitudinal release (4.1). When the HHS improvement was considered, proximal Z-plasty (36) was slightly superior to longitudinal release (32) and distal Z-plasty (30). Only minor surgical complications were reported; several patients had hematoma or seroma, and 1 required removal of the hardware after osteotomy.

## DISCUSSION

Lateral hip pain is a common complaint addressed by orthopedists, sports medicine specialists, and primary care physicians. Although it can arise from numerous different underlying acute and chronic pathologies, it is frequently diagnosed as TB and almost universally treated initially with conservative measures. Nevertheless, it can be a frustrating syndrome to patients and clinicians alike, and many are unaware of the availability and efficacy of more advanced therapeutic options. The challenging nature of accurately diagnosing TB as a cause of lateral hip pain is undeniable. The studies included in this systematic review, due to clinician-to-clinician variability and a lack of universal explicit criteria, did not have the same diagnostic accuracy for pinpointing TB as a source of lateral hip pain. This lack of universality in diagnosis is a limitation when comparing results between the studies.

This systematic review summarizes and clarifies several important points regarding the treatment of TB. The majority of patients with TB are treated with nonoperative modalities. For most patients, a single corticosteroid injection provides a tangible improvement in symptoms and decrease in pain from a moderate to a low level. Older studies from the 1980s tend to report better subjective responses to injection than more recent articles but typically lack validated clinical outcome scores. In some cases of TB, multiple injections and other modalities, such as PT, ultrasound, and NSAIDs, are necessary. Although 2 of the studies in this review found benefit from SWT, other conservative therapies, such as home exercise programs, have scant evidence for efficacy in the literature. Future research should be directed toward addressing this paucity of validated data supporting conservative therapies. Low-energy SWT has been shown to be superior to corticosteroid injection and home therapy and may be the next step for patients who fail conservative management. However, it has not been examined specifically in this refractory group. On the other hand, surgical treatment has demonstrated success in these patients. There are several options to consider; the least invasive is endoscopic bursectomy, and the most invasive is open osteotomy. Repairing tears to gluteus medius and gluteus minimus has also been shown to be quite beneficial in managing recalcitrant lateral hip pain, and the possibility of such tears as an underlying etiology warrants careful consideration. However, in the reported series, concomitant bursectomy or ITB windowing procedures were performed. This makes it

difficult to determine the contribution of the gluteal muscle repair to the overall improvement from the surgery. The most common procedures focus on relieving the tension of the ITB with either longitudinal release or Z-plasty.

To the authors' knowledge, this is the first systematic review of the treatment of TB despite a plethora of case series in the literature. There is a paucity of high level of evidence studies focusing on surgical modalities, and the variation in outcome measure tools preclude easy comparison across multiple studies. According to the VAS, the efficacy of treatment of TB is graded as follows, in ascending order: home therapy only, multimodal conservative therapy including injection, injection alone, bursectomy alone, low-energy SWT, longitudinal ITB release, proximal Z-plasty, and distal Z-plasty. Likewise, using the HHS, the efficacy is graded as follows: multimodal conservative therapy, including injection, distal Z-plasty, low-energy SWT, longitudinal release, and proximal Z-plasty. With only 1 of the 4 studies included in this review reporting outcome scores, repair of the abductor tendons was difficult to compare with other techniques but subjectively was successful in most patients and may be useful to combine with the treatment of ITB. This systematic review finds that although TB is one of the most common pain syndromes in adults, more clinical data are required to improve the methods of treatment.

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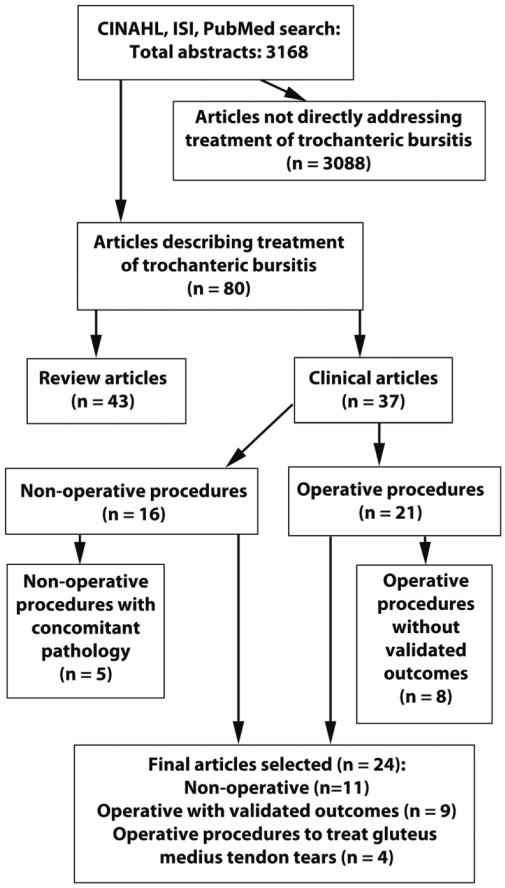


**Figure 1.**

## Table 1

| Author/Year | Treatment | Level of Evidence | Mean Age (Range), y | Males/Females/No. Hips Treated | Symptom Duration Before Study | Mean No. Injections Before Study | Length of Follow-up | Baseline Score | Follow-up Score | Patient Satisfaction | Complications |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SWT vs Traditional Modalities (Corticosteroid Injection and/or Conservative Therapy)** | | | | | | | | | | | |
| Rompe et al[17]/2009 | Arm 1: Home training program<br>Arm 2: Repetitive low-energy radial SWT<br>Arm 3: Single CS inj | I, Randomized controlled clinical trial | 46<br>47<br>50 | 23/53/76<br>23/55/78<br>21/54/75 | >6 mo | NR | 4 mo | VAS 6.2; Likert 4<br>VAS 6.3; Likert 4<br>VAS 5.8; Likert 4 | VAS 5.2; Likert 2.8<br>VAS 3.2; Likert 2.6<br>VAS 4.5; Likert 2.6 | 34% RTA<br>64% RTA<br>49% RTA | Increased pain (1 d:9%, >1 d: 20%); radiating pain (6%)<br>Increased pain (1 d: 10%, >1 d: 2%); radiating pain (4%); skin irritation (33%); swelling (3%)<br>Increased pain (1 d: 10%, >1 d: 25%); radiating pain (9%); skin irritation (3%); swelling (9%) |
| Furia et al[11]/2009 | Arm 1: Low-energy extracorporeal SWT<br>Arm 2: Rest, PT, U/S, CS inj, ice/heat | III, Case-control study | 51 (18–71)<br>50.2 (18–74) | 11/22/33<br>11/22/33 | 13.7 mo<br>14 mo | At least 1 | 12 mo | VAS 8.5; HHS 49.6; R/M 4<br>VAS 8.5; HHS 50.4; R/M 5 | VAS 2.7; HHS 79.9; R/M 2<br>VAS 6.3, HHS 57.6; R/M 2.9 | 13/17 return to sports; 10/15 return to sports; 5/6 return to labor | Pain during treatment (2); erythema (2)<br>None |
| **CS inj as Primary Modality** | | | | | | | | | | | |
| Raman et al[16]/1982 | Single CS inj (33% two) | IV, Case series | NR (NR) | 1/14/15 | >1 y | None | 16 wk | NR | NR | 100% pain free | NR |
| Shbeeb et al[12]/1996 | Single CS inj | IV, Case series | 66.2 (NR) | 13/62/75 | NR | None | 26 wk | VAS 64.7 | VAS 32.3 | 54/68 improved | NR |
| Rasmussen and Fano[13]/1985 | 1 or 2 CS inj | IV, Case series | 57.9 (16–82) | 7/29/36 | 19.5 mo | None | 23.2 mo | NR | NR | 66% excellent; 33% improved; 25% relapse at mean 10 mo | None |
| Cohen et al[9]/2009 | Arm 1: Fluoroscopically guided single CS inj<br>Arm 2: Single CS inj | I, Randomized controlled clinical trial | NR (“most mid-50’s”) | “Most women”/32 | 3.3 y<br>4.4 y | NR | 3 mo | VAS 5.1<br>VAS 4.6 | VAS 2.7<br>VAS 2.2 | 50% had positive global perceived effect<br>53% had positive global perceived effect | NR |

| Author/Year | Treatment | Level of Evidence | Mean Age (Range), y | Males/Females/No. Hips Treated | Symptom Duration Before Study | Mean No. Injections Before Study | Length of Follow-up | Baseline Score | Follow-up Score | Patient Satisfaction | Complications |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SWT vs Traditional Modalities (Corticosteroid Injection and/or Conservative Therapy)** | | | | | | | | | | | |
| Schapira et al[23]/1986 | CS inj (48 single; 13 two; 4 three) | IV, Case series | NR (34–79) | 24/48/65 | NR | NR | 2 y | NR | NR | 100% rapid and prolonged improvement | None |
| Sayegh et al[16]/2004 | Single CS inj after failing “conservative therapy” | II, Prospective comparative study | 49.6 (24–84) | 0/150/163 | 7.1 wk | NR | Up to 4 y | ODI 68.9 | ODI 3.8 (1 mo), 5.8 (1 y), 41.6 (4 y) | NR | NR |
| Karpinski and Piggott[2]/1985 | Single CS inj (1 two), ultrasound, massage | IV, Case series | 43 (12–59) | 4/11/15 | 22 mo | None | 36 mo | NR | NR | 12/15 improved; 3 little/ no relief | NR |
| Farmer et al[10]/2010 | Single CS inj (7 two, 3 four, 1 five), NSAIDs and PT as needed | IV, Case series | 60 (32–88) | 9/13/25 | 8.5 mo | None | NR | NR | NR | 20/25 resolved symptoms | 2/2 of the 5 with persistent symptoms resolved after bursectomy |
| **CS inj or Other Conservative Interventions** | | | | | | | | | | | |
| Iorio et al[15]/2006 | CS inj alone (9), PT/US/HP (6), CS inj/PT/US/ HP (4), PT/ NSAID/HP (2), Obs (2), NSAID alone (1) | IV, Case series | 73.5 (58–87) | 7/17/24 | NR | None | 3 y | NR | NR | All resolved sufficiently; no further treatment needed | NR |

CS inj, corticosteroid injection; HP, home program; HQI, health quality index; NR, not reported; Obs, observation; ODI, Oswestry Disability Index; OH, Oxford hip score; R/M, roles and maudsley score; RTA, return to activity; US, ultrasound; VAS, visual analog scale.

**Table 2**

| Author/Year/Intervention | Mean Length of Follow-up | Baseline Score | Follow-up Score | Patient Satisfaction | Complications |
|---|---|---|---|---|---|
| Sayed-Noor et al[25]/2009/distal ITB Z-plasty | 27 mo | HQI 34; EQ-5 D questionnaire 0.26 | HQI 60; EQ-5 D 0.67 | 7/12 improved; 4/12 gradual improvement; 1/12 no improvement | None |
| Trochanteric osteotomy | | | | | |
| Govaert et al[14]/2003/trochanteric osteotomy | 23.5 y | MDP 15.8 | MDP 27.5 | 6/12 very great improvement; 5/12 great; 1/12 fair | Hematoma/calcification (1), gluteal pain (1), fell/ displaced trochanter (1), ROH (1) |
| Gluteus medius repair with other selected interventions | | | | | |
| Kagan[26]/1999/gluteus medius repair (fasciotomy in 4) | 42 mo | NR | NR | All satisfied; full pain relief | Weakness, denervation of gluteus medius (1) |
| Lequesne et al[27]/2008/gluteus medius repair, bursectomy (gluteus minimus repair in 5) | 29.4 mo | NR | NR | 7/8 complete pain relief; 1/8 partial pain relief | None |
| Voos et al[28]/2009/endoscopic gluteus medius repair, bursectomy (8 labral debridement, 1 labral repair, 1 greater trochanter exostectomy, 1 pincer lesion debridement, 1 ITB release, 2 psoas tendon release) | 25 mo | NR | HHS 94; Hip outcome score 93 | All complete resolution of pain; 1 with new groin pain | None |
| Davies et al[29]/2009/gluteus medius, minimus repair, bursectomy | 12 mo | Excluding failures: VAS 7; MDP 10.5; OH 21.4; SF-36 (Phys 28.4, Ment 54.9) | Excluding failures: VAS 2; MDP 15; OH 38; SF-36 (Phys 40.2, Ment 59.4) | 11/16 significant improvement in hip symptoms; 5/16 surgical failures | Reruptures (4), deep infection (1) |

All listed studies are level IV Evidence Case Series.

CS Inj, corticosteroid injection; HP, home program; HQI, health quality index; JOA, Japanese Orthopaedic Association; Ment, mental portion; MDP, Merle D'Aubigne Postel score; NR, not reported; Obs, observation; ODI, Oswestry Disability Index; OH, Oxford hip score; Phys, physical portion; PT, physical therapy; R/M, Roles and Maudsley score; ROH, removal of hardware; SF-36, short form 36; US, ultrasound.