Evidence-Based Practice Group
Answers to Clinical Questions

Effectiveness of Extra Corporeal Shockwave Therapy (ESWT) in Treating Greater Trochanteric Bursitis

A Rapid Systematic Review

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WorkSafeBC

About this report

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About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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Objectives

- To determine whether there is any evidence on the efficacy or effectiveness of extra corporeal shock wave therapy (ESWT), either low or high energy, in treating greater trochanteric bursitis.

Methods

- A systematic literature search was started on November 27, 2023.
- This literature search was conducted on commercial medical literature databases, including, Medline Epub Ahead of Print, Medline In-Process & Other Non-Indexed Citations, Medline Daily Update available through the Ovid platform (1946 to November 22, 2023), CINAHL Complete (Search completed November 27, 2023), EBM Reviews - Cochrane Database of Systematic Reviews 2005 to November 15, 2023, EBM Reviews - ACP Journal Club 1991 to October 2023, EBM Reviews - Database of Abstracts of Reviews of Effects 1st Quarter 2016, EBM Reviews - Cochrane Clinical Answers November 2023, EBM Reviews - Cochrane Central Register of Controlled Trials October 2023, EBM Reviews - Cochrane Methodology Register 3rd Quarter 2012, EBM Reviews - Health Technology Assessment 4th Quarter 2016, and EBM Reviews - NHS Economic Evaluation Database 1st Quarter 2016 (Search completed November 27, 2023), and EMBASE.com (Search completed November 27, 2023).
- The search was done by employing combinations of keywords. Full search strategies can be found in Appendix 2.
- No limitations on date of publication were implemented in any of these searches.
- A manual search was also planned and conducted on the references of the articles that were retrieved in full.

Results

- Search results:
    - 227 published studies were identified through the search - 41 from MEDLINE, 21 from CINAHL, 22 from CENTRAL, and 143 from EMBASE.
    - After duplicates were removed, 161 published studies were identified through the search - 40 from MEDLINE, 5 from CINAHL, 11 from CENTRAL, and 105 from EMBASE.
    - Upon examination of the titles and abstracts of these published studies, there were 46 studies thought to be relevant to ESWT use in treating greater trochanteric bursitis[1-46]; 22 were excluded due to incorrect population, 68 due to incorrect interventions, 24 due to incorrect study design, and one was a duplicate study.
    - Of the 46 studies that were retrieved in full, one was excluded due to incorrect population[37], two were excluded due to incorrect intervention[1,2], eight were excluded due to incorrect outcomes[3,13,17,19,30-32,47], six were excluded due to incorrect study design[8,14,23,28,39,42], and one was an ongoing trial[33].
    - Seventeen systematic reviews on greater trochanteric bursitis/chronic ankle instability were identified[4,5,9,11,12,15,18,20-22,24,26,27,36,43,48,49].

- A hand search of the references from the studies selected for full text screening revealed two additional studies[50,51], and one guideline of interest[49].
- Therefore, there are sixteen new published studies that are relevant to this systematic review[6,7,10,16,25,29,34,35,38,40,41,44-46,50,51].

- Study Characteristics:
  - A description of study characteristics of included studies is available in Table 1.
  - There were seventeen systematic review/meta-analyses[4,5,9,11,12,15,18,20-22,24,26,27,36,43,48,49], eight randomized controlled trials (RCTs)[6,7,16,34,35,41,45,50], four case series[38,40,44,46], one case control study[10], and three retrospective studies[25,29,51].
  - Six studies compared ESWT therapy to minimal or no intervention[10,34,35,41,45,50], four studies compared ESWT therapy to other types of active therapy[6,7,10,16,50], and seven are single-arm studies[25,29,38,40,44,46,51].
  - Most of the treatment protocols for the ESWT therapy interventions were similar in terms of treatment frequency but were quite varied in the dosage of therapy.
  - Treatment frequency was fairly consistent with twelve studies treating three sessions a week[6,7,16,29,34,35,38,41,44-46,50], two studies treating one session a week[10,25], one study treating five sessions a week[51], and one study treating up to 12 total sessions[40].
  - Dosage of therapy varied greatly as one study administered 1800 pulses at 4 Hz[7], one study administered 2000 pulses at 10Hz, one study administered 2000 pulses at 10Hz, one study administered 2000 pulses at 10Hz[10], one study administered 2000 pulses at 12Hz[6], three studies administered 2000 pulses at 20Hz[44-46], one study administered 2000 pulses at 4Hz[34], two studies administered 2000 pulses at 5Hz[35,41], one study administered 2000 pulses at 8Hz[50], one study administered 2000 pulses at an unknown Hz[51], two studies administered 2500 pulses at an unknown Hz[16,25], one study administered 600 pulses at 1Hz[40], and two studies where unknown dosage[29,38].
  - The type of shockwave therapy also varied as eight studies used radial shock wave therapy (RSWT)[6,10,40,44-46,50,51], five studies used focused shock wave therapy (FSWT)[7,16,34,35,41], and three studies did not report type of shockwave therapy[25,29,38].

- Study Quality:
  - Overall, study quality was medium-low: two studies showed medium-high quality[16,45], four studies showed moderate quality[6,7,34,50] while the other ten had low study quality[10,25,29,35,38,40,41,44,46,51].
  - Study quality was downgraded to low due to lower levels of evidence, methodological limitations and imprecision.
  - Seven studies were non-comparative studies (level of evidence 3-4. Appendix 1)[25,29,38,40,44,46,51].
  - All but one study reported at least some risk of bias due to performance bias as only one of the trials were fully double blinded[45].

    - Study quality was lowered due to imprecision for several studies because most studies had a low number of participants in the included studies (n < 100)6,7,10,25,29,34,38,40,41,46,51.
- Outcomes:
    - A description of pain outcomes of included studies is available in Table 2.
    - Outcomes of interest included pain outcomes. Ten studies used visual analog scale (VAS)[6,10,16,25,29,35,38,41,46,50], two studies used painDETECT[44,45], three studies used Numeric Rating Scale (NRS)[7,34,40], and one was a generic pain score[51].
    - For all 16 studies which measured pain outcomes, ESWT therapy demonstrated a reduction of pain scores compared to pre-intervention levels.
    - For the four studies with ESWT therapy vs. minimal or no intervention, three studies demonstrated a statistically significant decrease of pain[10,35,41] while one studies demonstrated unclear or no statistically significant difference[45].
    - For the five studies comparing ESWT therapy to other types of active treatment, only one study demonstrated a statistically significant decrease of pain[7] while three studies demonstrated unclear or no statistically significant difference[6,16,34,50].
    - Furthermore, at one month after treatment corticosteroid therapy worked better or the same as ESWT in two studies[6,50]. At intermediate term outcomes (3-6 months), ESWT demonstrated statistically significant decrease in pain compared to corticosteroids[6,16,50].
    - Only two studies had long term outcomes (≥12 months)[16,50], with only one study showing improvement in pain outcomes. However in that study[50], ESWT was better at 12 month compared to corticosteroids while no change compared to exercise.
    - A description of functional outcomes of included studies is available in Table 3.
    - For the 14 studies which measured functional outcomes, ESWT therapy demonstrated an increase of functional scores compared to pre-intervention levels.
    - For the four studies with ESWT therapy vs. minimal or no intervention, three studies demonstrated a statistically significant increase of functional outcomes[10,35,41] while one study demonstrated unclear or no statistically significant difference[45].
    - For the five studies comparing ESWT therapy to other types of active treatment, only one study demonstrated a statistically significant increase of functional outcomes at one timepoint (12 months)[16] while four studies demonstrated unclear or no statistically significant difference[6,7,34,50].

Discussion

- There is some moderate-low quality, low-level evidence pointing toward the efficacy of extra corporeal shockwave therapy for treating greater trochanteric bursitis, particularly compared to minimal or no treatment.
- However, when compared to active treatment, ESWT generally has no significant difference for both pain and functional outcomes.

- As expected, based on the literature, corticosteroids have a positive effect on short-term pain outcomes (1 month after therapy), but these effects did not remain in the intermediate or long term.
- Across all studies, there was no standard protocol for ESWT therapy regarding the methods such as dosage and type of shockwave therapy.
- Furthermore, only two studies looked at long term effects (>12 months).

Summary

- In this review, there is some moderate-low evidence, pointing towards the use of ESWT in treating greater trochanteric bursitis patients, particularly compared to minimal or no treatment. However, due to the comparable pain and functional outcomes from the use of other active treatments, and the lack of long-term studies, that evidence should be interpreted with caution. Therefore, there is still no conclusive evidence reporting on the efficacy of ESWT in the treatment of greater trochanteric bursitis.

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Tables

Table 1 - Description of studies identified for treatment of greater trochanteric bursitis.

Primary Study.	N	Primary Population	Experimental Group (n)	Comparison Group(s) (n)	Intervention dosage/frequency	Time-points	Outcome
Furia et al, 2009	10	Mix of athletes/nonathletes: 52% ESWT recreational athletes, 45% control recreational athletes	ESWT (33)	Multimodal therapy (MT) (N=33)	Treatment: 1 session, 2000 pulses @ 10 Hz, EFD: 0.18 mJ/mm2 Control: traditional nonoperative measures for min. 6 months	12 m	VAS, Harris Hip Score (HHS), RM score
Rompe et al, 2009	30	Patients with refractory unilateral GTPS	ESWT (111)	CS injections (75), Exercise (strengthening and stretching) (75), Standard of Care (33)	Treatment: 3 sessions weekly, 2000 pulses @ 8 Hz, EFD: 0.12 mJ/mm2 Control: Injection group: single injection of 5 mL of 0.5% Mepivacain, 1 mL of Prednisolone; Home training group: progressive slow repetitive exercises twice a day, daily for 12 weeks	15 m	VAS, Recovery at 4 months
Ribee et al, 2014	36	Patients with a radiological diagnosis of bursitis/ enthesopathy	ESWT (28)		Treatment: 3 sessions weekly	3 m	VAS
Sultan et al, 2015	10	Refractory GTPS	ESWT (59)		Treatment: 5 sessions weekly	3 m	Pain Score
Wheeler et al, 2016	30	Patients with GTPS	ESWT (45)		Treatment: 3 sessions weekly, 2000 pulses @ 20 Hz; structured home exercise programme	6 m	VAS, Oxford Hip Score (OHS)
Maffulli et al, 2018	36	Patients with trochanteric bursitis	ESWT (40)		Treatment: 1 session, 2500 pulses @ NR Hz, EFD: 0.18 mJ/mm2	24 m	VAS, LEFD, EQ-5D

Primary Study.	N	Primary Population	Experimental Group (n)	Comparison Group(s) (n)	Intervention dosage/frequency	Time-points	Outcome
Seo et al, 2018	10	Patients with chronic GTPS and MRI-confirmed gluteal tendinopathy	ESWT (38)		Treatment: 12 sessions, weekly, 600 pulses @ 1 Hz, EFD: 0.10 mJ/mm2	1 w, 27 m	NRS, RMS
Carlisi et al, 2019	66	Patients with GTPS with gluteal tendinopathy	F-ESWT (26)	Ultrasound therapy (UST) (24)	Treatment: 3 sessions, weekly, 1800 pulses @ 4 Hz, EFD: 0.05 to 0.15 mJ/mm2 Control: 1.5 W/cm2 in sessions of 10 minutes each daily.	2 m, 6 m	NRS, LEFS
McLintock et al, 2020	229	Patients with gluteal tendinopathy	ESWT (15)		Treatment: 3 sessions, weekly	3 m	VAS
Ramon et al, 2020	28	Patients with chronic GTPS	ESWT + Exercise (53)	Exercise + Sham ESWT (50)	Treatment: ESWT 3 sessions, weekly, 2000 pulses @ 5 Hz, EFD 0.20 mJ/mm2 + Home exercise programme consisting of progressive slow repetitive exercises. Control: Home exercise programme consisting of progressive slow repetitive exercises. + ESWT 3 sessions, weekly, 2000 pulses @ 5 Hz, EFD 0.01 mJ/mm2	2 m	VAS, HHS, LEFS
Shi et al, 2021	59	Patients with GTPS	ESWT (38)	Control (24)	Treatment: ESWT 3 sessions, weekly, 2000 pulses @ 5 Hz + eccentric exercises. Control: Eccentric exercise	6 m	VAS, HHS
Wheeler et al, 2022	45	Patients with GTPS	ESWT (260)		Treatment: ESWT 3 sessions, weekly, 2000 pulses @ 20 Hz, ~2.8 bar pressure Control: Eccentric exercise	3 m, 6 m	NAHS, OHS, PainDETECT
Wheeler et al, 2022	40	Patients with chronic GTPS	ESWT (57)	Control (Sham ESWT) (63)	Treatment: ESWT 3 sessions, weekly, 2000 pulses @ 20 Hz, ~2.8 bar pressure Control: ESWT 3 sessions, weekly, 500 pulses @ 20 Hz, 1.4 bar pressure	6 w, 3 m, 6 m	NRS, NAHS, OHS, PainDETECT

Primary Study.	N	Primary Population	Experimental Group (n)	Comparison Group(s) (n)	Intervention dosage/frequency	Time-points	Outcome
Caglar Yagci et al, 2023	38	Patients with GTPS	ESWT (32)	CS injection (28)	Treatment: ESWT 3 sessions, weekly, 2000 pulses @ 12 Hz Control: 40 mg triamcinolone acetonide injection	3 w, 3 m	VAS, WOMAC
Heaver et al, 2023	50	Patients with GTPS	ESWT + exercise (53)	CS injection + exercise (51)	Treatment: ESWT 3 sessions, weekly, 2500 pulses, 0.15–0.35mJ/mm2 + Home exercise programme consisting of progressive slow repetitive exercises. Control: 8 mg methylprednisolone ultrasound-guided injection, once + Home exercise programme consisting of progressive slow repetitive exercises.	3 m, 12 m	VAS, HHS
Notarnicola et al, 2023	15	Patients with GTPS	F-ESWT (15)	ECCT (15), F-ESWT to EC (7), EC to F-ESWT (7)	Treatment: 3 sessions, weekly, 2000 pulses @ 4 Hz, EFD: 0.03 - 20.17 mJ/mm2 Control: Eccentric therapeutic exercise consisting of 30 min sessions of stretching and strengthening exercises, 5 days a week for 4 weeks	2 m, 4 m, 6 m	NRS, LEFS, RM

Abbreviations: CONCT: concentric training, CSI corticosteroid injection, ECCT: eccentric training, ESWT: extracorporeal shockwave therapy, EX: exercise, F-ESWT: focused extracorporeal shockwave therapy, GTPS: greater trochanter pain syndrome, HHS: Harris Hip Score, LEFS: Lower Extremity Function Scale, NAHS: Non Arthritic Hip Score, NRS: numeric rating scale, OHS: Oxford Hip Score, PRP: platelet-rich plasma, R-ESWT: radial extracorporeal shockwave therapy, RM: Roles and Maudsley score, VAS: visual analogue scale, US: ultrasound, WOMAC: Western Ontario and McMaster Universities Arthritis Index.

Table 2 - Description of pain outcomes for the treatment of greater trochanter bursitis.

Primary Study	n	Outcomes
Furia et al, 2009	66	**VAS (-):** ESWT yielded significantly improved outcomes at all time points compared to placebo
Rompe et al, 2009	229	**VAS (=):** ESWT significantly more effective than home training and steroid at 4 mo, ESWT equal to home training and better than corticosteroid injection at 15 mo
Ribee et al, 2014	28	**VAS (-):** Average pre-treatment score was 6.068, with an average reduction of 3.068. 22 out of 28 patients had an improvement (78.6%). 5 (17.9%) had a complete resolution. 6 patients (21.4%) had no improvement, with 3 (10.7%) having worse pain at that time.
Sultan et al, 2015	59	**Pain Score (-/=):** Two-thirds had improvement in their symptoms with a significant drop of 6 points in their pain score ($p<0.05$); however, symptoms recurred in 60% at a mean of 4 months.
Wheeler et al, 2016	45	**VAS (=):** Proportion of patients reporting themselves as pain free (VAS = 0) or virtually pain-free (VAS of 0 or 1) at six-weeks was 7% and 11% respectively, at three-months the figures were 9% and 18% respectively, and at six-months was 19% and 33% respectively. Average reduction in VAS from 6.3 at baseline, to 4.1 at six-weeks, 3.8 at three-months, and 3.5 at six months post-ESWT. OHS decreased significantly from baseline to six-weeks, and baseline to three months, or baseline to six-months
Maffulli et al, 2018	40	**VAS (-):** Significant reduction over time of the VAS score ($p<0.0006$). EQ-5D pain score had a reduction over time ($p<0.0003$)
Seo et al, 2018	38	**NRS (-):** Initial NRS (5.9 ± 1.6) significantly decreased at immediate (2.5 ± 1.5, $p< 0.01$) and long-term follow-up (3.3 ± 3.0, $p< 0.01$), respectively. The overall success rates of ESWT for immediate and long-term follow-up were 83.3% and 55.6%, respectively.
Carlisi et al, 2019	50	**NRS (-):** Significant pain reduction over time for the study group and the control group. f-ESWT group was significantly more effective than UST ($P < 0.05$) at the 2 months (2.08 vs 3.36, $p=0.020$) and at the 6 months (0.79 vs 2.03, $p=0.047$). LEFS score: both group improved over both time points, but no statistical differences in the comparisons between groups
McLintock et al, 2020	15	**VAS (=):** 8 patients (53%) improved better, 7 patient (47%) had no difference.
Ramon et al, 2020	103	**VAS (-):** The mean VAS score at 2 months was significantly better in the F-ESWT group (2.0 ± 2.1) than in the control group (4.7 ± 2.1; $p < 0.001$). All secondary outcomes at all follow-up intervals were significantly better in the F-ESWT group, except for the LEFS score at 1 month after treatment ($p = 0.25$).

Primary Study	n	Outcomes
Shi et al, 2021	53	**VAS (-):** At 1 month after treatment, there were no significant differences in VAS (F=1.338, P=0.244;). At 2 months after treatment, VAS score in observation group (3.20+/-0.81) was lower than that of control group (3.87+/-0.61, P=0.002), there were no significant differences in hip Harris score score between observation group (81.93+/-2.43) and control group (82.12+/-2.34, P=0.770), the treatment success rate in observation group (58.62%, 17 / 29) was higher than that of control group (29.16%, 7 / 24) (P=0.032). At 6 months after treatment, VAS score in observation group (2.24+/-0.68) was lower than that of control group (3.12+/-0.53, P<0.001), hip Harris score score in observation group (85.10+/-1.75) was higher than that of control group (83.66+/-1.78)(P=0.005), there were no significant differences in treatment success rate between observation group (82.75%, 24 / 29) and control group (62.50%, 15 / 24)(P=0.096).
Wheeler et al, 2022	260	**painDETECT (=):** At 6-months follow-up, very weak correlations for improvements in self-reported "average pain" and 'worst pain" were found for baseline values of the ODI and painDETECT questionnaires
Wheeler et al, 2022	120	**painDETECT (=):** There were statistically significant within-group improvements in pain for 6 w, 3 m and 6m. However, there were no statistically significant improvement between the groups at any of the follow-up periods, for pain or any of the outcome measures studied. This indicates that 3 sessions of shockwave therapy performed at weekly intervals at the "recommended dose" had "minimal dose" rESWT protocol, which used one-quarter of the number of shocks at about half of the pressure (approximately one-eighth of the "dose") for patients with chronic GTPS.
Caglar Yagci et al, 2023	60	**VAS (=):** Significant improvement in the VAS and WOMAC scores at three weeks in both groups and this improvement sustained up to three months. However, there was no significant difference in any time period between the groups (change over time p=0.001, the difference between the groups p>0.05). For SF-36 pain subscale, at three months, pain was found to be improved in both groups, with no significant difference between the groups (p>0.05).
Heaver et al, 2023	104	**VAS (-/=):** At 3 months, pain, function and QoL scores had improved in both groups but were not statistically significant. At 12 months, the group receiving shock wave treatment had a greater improvement in pain (visual analog scale (VAS) 37.1 versus 55.0) and function
Notarnicola et al, 2023	44	**NRS (=):** A statistically significant difference in the comparison of NRS scores between times (p < 0.0001); no statistically significant differences were observed in the comparison between groups (p = 0.358) and in the interaction between times and groups (p = 0.511). Same results for LEFS and RM respectively.

Abbreviations: CONCT: concentric training, CSI corticosteroid injection, ECCT: eccentric training, ESWT: extracorporeal shockwave therapy, EX: exercise, F-ESWT: focused extracorporeal shockwave therapy, GTPS: greater trochanter pain syndrome, HHS: Harris Hip Score, LEFS: Lower Extremity Function Scale, NAHS: Non Arthritic Hip Score, NRS: numeric rating scale, OHS: Oxford Hip Score, PRP: platelet-rich plasma, R-ESWT: radial extracorporeal shockwave therapy, RM: Roles and Maudsley score, VAS: visual analogue scale, US: ultrasound, WOMAC: Western Ontario and McMaster Universities Arthritis Index.

Table 3 - Description of functional outcomes for the treatment of greater trochanter bursitis.

Primary Study	n	Outcomes
Furia et al, 2009	66	**HHS (-):** Significantly higher mean Harris hip scores in the ESWT group compared to the non-operative therapy group at 12 month follow-up (79.9 vs 57.6, p < 0.001).
Rompe et al, 2009	229	**Recovery (-/=):** Corticosteroid injection and home training were significantly less successful than was shock wave therapy at 4-month follow-up. Corticosteroid injection was significantly less successful than was home training or shock wave therapy at 15-month follow-up.
Ribee et al, 2014	28	**Recovery (-):** 22 out of 28 patients had an improvement (78.6%). 5 (17.9%) had a complete resolution. 6 patients (21.4%) had no improvement, with 3 (10.7%) having worse pain at that time.
Sultan et al, 2015	59	**Functional Score (NR):** Not Reported.
Wheeler et al, 2016	45	**NAHS/OHS (-):** Decreased significantly from baseline to six-weeks, and baseline to three months, or baseline to six-months
Maffulli et al, 2018	40	**LEFS (=):** No significant reduction over time of the LEFS score (p<0.029).
Seo et al, 2018	38	**RMS (-/=):** The overall success rates of ESWT for immediate and long-term follow-up were 83.3% and 55.6%, respectively.
Carlisi et al, 2019	50	**LEFS (=):** Both groups improved over both time points, but no statistical differences in the comparisons between groups
McLintock et al, 2020	15	**Functional Score (NR):** Not Reported.
Ramon et al, 2020	103	**LEFS (-/=):** No difference at 1 month after treatment (p = 0.25), but significant improvement at 2, 3, 6 months.
Shi et al, 2021	53	**HHS (-):** hip Harris score in observation group (85.10+/-1.75) was higher than that of control group (83.66+/-1.78)(P=0.005).
Wheeler et al, 2022	260	**NAHS/OHS (-/=):** improved significantly from baseline at 3 months and 6 months , (p<0.001);

Primary Study	n	Outcomes
Wheeler et al, 2022	120	**NAHS/OHS (=):** There was statistically significant improvements seen in members of the intervention group and the control group from the within-group analyses for all of the different hip-related measures that were examined at all time points studied and compared with baseline values. However, there are no differences found with the validated hip PROMS that were used: NAHS (P= 0.118), or OHS (P=0.065) between groups
Caglar Yagci et al, 2023	60	**WOMAC (=):** Significant improvement in WOMAC score at three weeks in both groups and this improvement sustained up to three months. However, there was no significant difference in any time period between the groups (change over time p=0.001, the difference between the groups p>0.05).
Heaver et al, 2023	104	**HHS (-/=):** At 3 months, HHS had improved in both groups but were not statistically significant. At 12 months, the ESWT group had significantly improved scores compared to the injection group; HHS 69.7 vs 57.5 (p = 0.002, 95% CI, −20.0 to −4.6).
Notarnicola et al, 2023	44	**LEFS (=):** Statistically significant difference in the comparison of LEFS between times (p < 0.0001), while no statistically significant difference was observed in the comparison between groups (p = 0.207) and in the interaction between times and groups (p = 0.393).

Abbreviations: CONCT: concentric training, CSI corticosteroid injection, ECCT: eccentric training, ESWT: extracorporeal shockwave therapy, EX: exercise, F-ESWT: focused extracorporeal shockwave therapy, GTPS: greater trochanter pain syndrome, HHS: Harris Hip Score, LEFS: Lower Extremity Function Scale, NAHS: Non Arthritic Hip Score, NRS: numeric rating scale, OHS: Oxford Hip Score, PRP: platelet-rich plasma, R-ESWT: radial extracorporeal shockwave therapy, RM: Roles and Maudsley score, VAS: visual analogue scale, US: ultrasound, WOMAC: Western Ontario and McMaster Universities Arthritis Index.

Appendix 1

WorkSafeBC — Evidence-Based Practice Group levels of evidence (adapted from 1-6)

1	Experimental, randomized controlled trial (RCT), systematic review RCTs with or without meta-analysis.
2	Evidence from controlled trials without randomization (quasi-experimental studies) or systematic reviews of observational studies.
3	Evidence from cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments.
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees based on scientific evidence.

References

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2. Houston TP, Elster AB, Davis RM et al. The US Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition. AMA Council on Scientific Affairs. American Journal of Preventive Medicine. May 1998;14(4):374-376.
3. Scottish Intercollegiate Guidelines Network (2001). SIGN 50: a guideline developers' handbook. SIGN. Edinburgh.
4. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ. Aug 5, 2003;169(3):207-208.
5. (2014). Canadian task force on preventive health care procedure manual. Downloaded from https://canadiantaskforce.ca/methods/ in May 12, 2022.
6. (2021). US Preventive Services Task Force. Procedure Manual. Downloaded from https://www.uspreventiveservicestaskforce.org/uspstf/about-uspstf/methods-and-processes/procedure-manual , in May 12 2022.

Appendix 2

Search 1. Search strategy for MEDLINE (via OVID)

1	exp Ultrasonic Surgical Procedures/	25056
2	exp Ultrasonic Therapy/	14035
3	Ultrasonics/	26174
4	exp Ultrasonic Waves/	4972
5	High-Energy Shock Waves/	1873
6	Sound/	16124
7	(shockwave or (shock* adj4 wave*)).tw.	14364
8	lithotrip*.tw.	13134
9	ESWT.tw.	1372
10	ECST.tw.	209
11	ECSW.tw.	42
12	ESWL.tw.	3182
13	or/1-12	92008
14	gluteal tendinopathy/	0
15	greater trochanteric pain syndrome/	0
16	gluteal bursitis/	0
17	trochanteric bursitis/	0
18	lateral hip pain/	0
19	gluteal tendon tears/	0
20	"gluteal tendinopathy".tw.	88
21	"gluteal bursitis".tw.	1
22	"trochanteric bursitis".tw.	287
23	"lateral hip pain".tw.	179
24	"gluteal tendon tears".tw.	24

25	"greater trochanteric".tw.	553
26	or/14-25	900
27	13 and 26	41
28	exp animals/ not humans.sh.	5173743
29	27 not 28	41

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions 1946 to November 22, 2023

Search 2. Search strategy for CINAHL (via EBSCO)

1	MH ("Ultrasonic Surgical Procedures")	188
2	MH ("Ultrasonic Therapy")	2936
3	MH ("Ultrasonics")	2194
4	MH ("Ultrasonic Waves")	0
5	MH ("High-Energy Shock Waves")	0
6	MH ("Sound")	2475
7	TI(shockwave) OR AB(shockwave)	838
8	TI (shock* N2 wave*) OR AB (shock* N2 wave*)	1850
9	TI (lithotrip*) OR AB (lithotrip*)	1840
10	TI (ESWT) OR AB (ESWT)	563
11	TI (ECST) OR AB (ECST)	42
12	TI (ECSW) OR AB (ECSW)	5
13	TI (ESWL) OR AB (ESWL)	268
14	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13	10919
15	MH ("gluteal tendinopathy")	0
16	MH ("greater trochanteric pain syndrome")	0
17	MH ("gluteal bursitis")	0

18	MH ("trochanteric bursitis")	92
19	MH ("lateral hip pain")	0
20	MH ("gluteal tendon tears")	0
21	TI (gluteal tendinopathy) OR AB (gluteal tendinopathy)	71
22	TI (gluteal bursitis OR AB (gluteal bursitis)	12
23	TI (trochanteric bursitis) OR AB (trochanteric bursitis)	124
24	TI (lateral hip pain) OR AB (lateral hip pain)	147
25	TI (gluteal tendon tears) OR AB (gluteal tendon tears)	15
26	TI (greater trochanteric) OR AB (greater trochanteric)	306
27	S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26	554
28	S14 AND S27	21

Search 3. Search strategy for CENTRAL (via OVID)

1	exp Ultrasonic Surgical Procedures/	2822
2	exp Ultrasonic Therapy/	1217
3	Ultrasonics/	403
4	exp Ultrasonic Waves/	250
5	High-Energy Shock Waves/	219
6	Sound/	264
7	(shockwave or (shock* adj4 wave*)).tw.	3294
8	lithotrip*.tw.	2199
9	ESWT.tw.	996
10	ECST.tw.	85
11	ECSW.tw.	5
12	ESWL.tw.	679

13	or/1-12	8202
14	gluteal tendinopathy/	0
15	greater trochanteric pain syndrome/	1
16	gluteal bursitis/	0
17	trochanteric bursitis/	0
18	lateral hip pain/	0
19	gluteal tendon tears/	0
20	"gluteal tendinopathy".tw.	42
21	"gluteal bursitis".tw.	0
22	"trochanteric bursitis".tw.	29
23	"lateral hip pain".tw.	44
24	"gluteal tendon tears".tw.	0
25	"greater trochanteric".tw.	101
26	or/14-25	143
27	13 and 26	22
28	exp animals/ not humans.sh.	2984
29	27 not 28	22

Search 4. Search strategy for EMBASE (via Embase.com)

1	'ultrasonic surgical procedures'/exp	1299
2	'ultrasonic therapy'/exp	27081
3	'ultrasonics'/exp	236193
4	'ultrasonic waves'/exp	236193
5	'high-energy shock waves'/exp	210
6	shockwave:ti,ab	6552
7	'shock wave':ti,ab	12083

8	'lithotrip*':ti,ab	20617
9	'eswt':ti,ab	1937
10	'ecst':ti,ab	357
11	'ecsw':ti,ab	45
12	'eswl':ti,ab	5481
13	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12	288296
14	'gluteal tendinopathy'/exp	26
15	'greater trochanteric pain syndrome'/exp	148
16	'gluteal bursitis'	1
17	'trochanteric bursitis'/exp	81
18	'lateral hip pain'	243
19	'gluteal tendon tears'	29
20	'gluteal tendinopathy':ti,ab	110
21	'gluteal bursitis':ti,ab	1
22	'trochanteric bursitis':ti,ab	403
23	'lateral hip pain':ti,ab	230
24	'gluteal tendon tears':ti,ab	29
25	'greater trochanteric':ti,ab	689
26	#14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25	1243
27	#13 AND #26	143