

Effectiveness of Extra Corporeal Shockwave Therapy (ESWT) in Treating Ankle Sprains: 2023 Update

A Rapid Systematic Review

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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 and/or effectiveness of extra corporeal shock wave therapy (ESWT), either low or high energy, in treating ankle sprains.

Introduction

- In 2015, WorkSafeBC's Evidence-Based Practice Group (EBPG) commissioned a systematic review to investigate the efficacy and/or effectiveness of using extra corporeal shock wave therapy (ESWT) in treating ankle sprains¹.
- The findings concluded that there was no published study showing the benefit of ESWT in treating ankle sprains.
- This current update seeks to review the literature from the last update in 2015 in order to determine if ESWT can be used in the treatment of patients with ankle sprains.

Methods

- A systematic literature search was started on November 6, 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 06, 2023), CINAHL Complete (Search completed November 7, 2023), EBM Reviews - Cochrane Database of Systematic Reviews 2005 to November 1, 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 October 2023, EBM Reviews - Cochrane Central Register of Controlled Trials September 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 7, 2023), and EMBASE.com (Search completed November 8, 2023).
- The search was done by employing combinations of keywords. Additional keywords (i.e. alternate terms for ESWT, ankle ligaments) were added to the search strategy compared to the original 2015 systematic review. 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

- 797 published studies were identified through the search - 239 from MEDLINE, 137 from CINAHL, 147 from CENTRAL, and 274 from EMBASE.
- After duplicates were removed, 625 published studies were identified through the search - 238 from MEDLINE, 45 from CINAHL, 89 from CENTRAL, and 253 from EMBASE.
- Upon examination of the titles and abstracts of these published studies, there were 28 studies thought to be relevant to ESWT use in treating ankle sprains²⁻²⁹; 458 were excluded due to incorrect population, 98 due to incorrect interventions, one due to incorrect outcomes, 39 due to incorrect study design, and six were animal/cell culture studies.
- Of the 28 studies that were retrieved in full, six were excluded due to incorrect population^{6,12,17,22,23,29}, 16 were excluded due to incorrect intervention^{2-5,8-11,13-16,18,20,25,28}, and two were ongoing trials^{24,27}.

- Three systematic reviews on ankle sprains/chronic ankle instability were identified, however, no study using ESWT as a treatment was identified^{19,21,26}.
- A hand search of the references from the studies selected for full text screening revealed one additional study, Soomekhet al., (1999)³⁰, which was identified in our original systematic review¹.
- One new published study, Parchimowicz et al., (2016) was a case report of a 24-year old with Grade 1 ankle sprain. Initially, conservative treatment with ankle foot orthosis, crutches, and RICE (rest, ice, compression, elevation) treatment was administered. Six weeks later, the patient returned with pain in the anterolateral aspect of his foot. Due to poor proprioception due to it being the fourth sprain in two years, shockwave therapy (2000 strokes of 1.5 bar, 10Hz, weekly for 6 weeks) combined with auto stretching of the lateral ligaments was administered. After 6 weeks of the treatment, functional testing showed a full range of motion and no pain during passive plantar flexion.
- Therefore, one additional article was determined to be relevant to this systematic review update.

Discussion

- There are no high quality randomized controlled trials identified, as the one study found was a case report (Appendix 1, level 4).
- There is some very low-quality, low-level evidence pointing toward the efficacy of extra corporeal shockwave therapy for treating ankle sprains.
- Study design and methodological issues were evident, as the only study identified did not have a comparator group, and concomitant therapy (auto stretching of the lateral ligaments) made it difficult to determine the intervention that led to improvement of ankle pain outcomes.
- Furthermore, the included study only looked at short term effects (6 weeks) and showed imprecision as only one patient was involved.

Summary

- As reported in the original 2015 systematic review, there was no published study showing the benefit of extra corporeal shockwave therapy in treating ankle sprains. In this update, one additional study and two ongoing trials were identified. As only one additional article with low quality anecdotal evidence (level of evidence 4. Appendix 1) was found, there is still no conclusive evidence reporting on the efficacy of extra corporeal shockwave therapy in the treatment of ankle sprains. Therefore, there are no changes to the conclusions of the 2015 systematic review.

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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.

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Appendix 2

Search 1. Search strategy for MEDLINE (via OVID)

1	exp Ultrasonic Surgical Procedures/	25001
2	exp Ultrasonic Therapy/	14007
3	Ultrasonics/	26152
4	exp Ultrasonic Waves/	4961
5	High-Energy Shock Waves/	1871
6	Sound/	16097
7	(shockwave or (shock* adj4 wave*)).tw.	14309
8	lithotrip*.tw.	13101
9	ESWT.tw.	1362
10	ECST.tw.	209
11	ECSW.tw.	42
12	ESWL.tw.	3179
13	or/1-12	91834
14	Ankle Sprain/	11131
15	Ankle Injury/	11131
16	Ankle/	12812
17	Ankle Lateral Ligament/	1070
18	Ankle Pain/	0
19	ankle*1.tw.	74175
20	((deltoid or tibiotalar or tibiocalcaneal or tibionavicular or tibiofibular) adj3 ligament\$).tw.	953
21	or/14-20	79547
22	13 and 21	252
23	exp animals/ not humans.sh.	5167250
24	22 not 23	239

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions 1946 to November 6, 2023

Search 2. Search strategy for CINAHL (via EBSCO)

1	MH ("Ultrasonic Surgical Procedures")	188
2	MH ("Ultrasonic Therapy")	2926
3	MH ("Ultrasonics")	2193
4	MH ("Ultrasonic Waves")	0
5	MH ("High-Energy Shock Waves")	0
6	MH ("Sound")	2466
7	TI(shockwave) OR AB(shockwave)	836

8	TI (shock* N2 wave*) OR AB (shock* N2 wave*)	1844
9	TI (lithotrip*) OR AB (lithotrip*)	1838
10	TI (ESWT) OR AB (ESWT)	560
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	10896
15	MH ("Ankle Sprain")	1184
16	MH ("Ankle Injury")	0
17	MH ("Ankle")	6116
18	MH ("Ankle Lateral Ligament")	0
19	MH ("Ankle Pain")	0
20	TI (ankle*) OR AB (ankle*)	34062
21	TI (deltoid ligament) OR AB (deltoid ligament)	318
22	TI (tibiotalar ligament) OR AB (tibiotalar ligament)	24
23	TI (tibiocalcaneal ligament) OR AB (tibiocalcaneal ligament)	11
24	TI (tibionavicular ligament) OR AB (tibionavicular ligament)	15
25	TI (tibiofibular ligament) OR AB (tibiofibular ligament)	196
26	S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25	35433
27	S14 AND S26	137

Search 3. Search strategy for CENTRAL (via OVID)

1	exp Ultrasonic Surgical Procedures/	2816
2	exp Ultrasonic Therapy/	1214
3	Ultrasonics/	403
4	exp Ultrasonic Waves/	250
5	High-Energy Shock Waves/	219
6	Sound/	264
7	(shockwave or (shock* adj4 wave*)).tw.	3269
8	lithotrip*.tw.	2192
9	ESWT.tw.	985
10	ECST.tw.	85
11	ECSW.tw.	5
12	ESWL.tw.	677
13	or/1-12	8166
14	Ankle Sprain/	37
15	Ankle Injury/	17

16	Ankle/	955
17	Ankle Lateral Ligament/	1
18	Ankle Pain/	15
19	ankle*1.tw.	12768
20	((deltoid or tibiotalar or tibiocalcaneal or tibionavicular or tibiofibular) adj3 ligament\$.tw.	35
21	or/14-20	12842
22	13 and 21	147
23	exp animals/ not humans.sh.	2999
24	22 not 23	147

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

1	'ultrasonic surgical procedures'/exp	1293
2	'ultrasonic therapy'/exp	26886
3	'ultrasonics'/exp	234584
4	'ultrasonic waves'/exp	234584
5	'high-energy shock waves'/exp	210
6	shockwave:ti,ab	6530
7	'shock wave':ti,ab	12047
8	'lithotrip*':ti,ab	20535
9	'eswt':ti,ab	1930
10	'ecst':ti,ab	357
11	'ecsw':ti,ab	45
12	'eswl':ti,ab	5473
13	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12	286410
14	'ankle sprain'/exp	3935
15	'ankle injury'/exp	17798
16	'ankle'/exp	47298
17	'ankle lateral ligament'/exp	1260
18	'ankle pain'/exp	4181
19	'ankle*':ti,ab	101796
20	'deltoid ligament':ti,ab	667
21	'tibiotalar ligament':ti,ab	48
22	'tibiocalcaneal ligament':ti,ab	22
23	'tibionavicular ligament':ti,ab	23
24	'tibiofibular ligament':ti,ab	359
25	#14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24	117696

26	'sprain'/exp	6913
27	'strain'/exp	49
28	'sprains':ti,ab	4758
29	'rupture':ti,ab	150437
30	'instability':ti,ab	178302
31	'unstable':ti,ab	115555
32	#26 OR #27 OR #28 OR #29 OR #30 OR #31	433915
33	#13 AND #25 AND #32	274