

FACT SHEET

The effect of shockwave on low back pain

INTRODUCTION

Definition (1)

Low back pain is pain in the lower back, localized in the lower back and/or buttocks.

The pain can be divided into acute and chronic pain.

Acute pain is pain of up to 12 weeks' duration, regardless of whether you have previously had low back pain or not.

Long-term chronic pain lasts more than 12 weeks.

In addition to pain in the lower back and/or buttocks, there may be pain down the legs.

Incidence (1)

Low back pain is one of the most frequent reasons for seeking contact with a general practitioner.

It is estimated that 60-80% of the population will experience an episode of lower back pain during their lifetime. Up to half of all adults have had an episode of lower back pain within the last year.

It is especially people between the ages of 35 and 55 who seek medical attention because of lower back pain. Women and men are equally at risk

During pregnancy, 1 in 5 women experience lower back pain.

Low back pain is the single largest diagnosis for insurance payments, accounting for almost 15% of long-term sick leave and more than 10% of all early retirement.

METHOD

Studies have been sought and selected as follows:

extracorporeal AND shock AND wave OR ESWT OR shockwave AND low AND back AND pain OR LBP

151 results (look for reference section)

149 excluded: review, articles on other treatment

2 Retrieved for abstract review

2 meta-analyses from 2022, 2023

2 downloaded for full text review

Liu K, Zhang Q, Chen L, Zhang H, Xu X, Yuan Z, Dong J. Efficacy and safety of extracorporeal shockwave therapy in chronic low back pain: a systematic review and meta-analysis of 632 patients. *J Orthop Surg Res.* 2023 Jun 24;18(1):455 (2)

Li C, Xiao Z, Chen L, Pan S. Efficacy and safety of extracorporeal shock wave on low back pain: A systematic review and meta-analysis. *Medicine (Baltimore).* 2022 Dec 30;101(52):e32053 (3)

RESULTS

Below is an overview of the method and effect of the included studies.

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13 studies included	The treatment effect is measured:	4 studies with fESWT 9 studies with rESWT		
329 I ESWT 319 in control	Baseline and immediately after beh Baseline, 1 month after last beh Baseline, 1m, 3m after last beh Baseline 4u Baseline 6u, 12u Baseline 1u, 2u, 3u Baseline 1u, 4u Baseline 1u, 2u, 3u, 4u	1 bar = 0.1 mJ/mm2 1MPa = 10 bar		- Visual Analog - Scale, numeric rating scale - Oswestry Disability Index (ODI)

STUDIO	DOSE	CONTROL GROUP	EFFECT	METHOD
Yang (2015) (4)	fESWT 1.5Hz, 2x18-2500 pulses – 2 treatment/week total 6 times	Yes – Celebrex 0.2g 2x daily (NSAIDs)	Significant improvement in favor of fESWT, on pain and function	Condensing osteoitis (SI joint pain). ESWT is performed along the pelvic joints to the extent that pain can be managed. Patient in prone position.
Wu (2016) (5)*	rESWT 8-10Hz 1.8-2.5bar 2000 strokes 4 treatments in total.	Sham rESWT (0bar)	Statistically significant improvement in ESWT group	Acute or subacute nonspecific low back pain
Moon (2017)(6)	fESWT 3Hz 0.09-0.25mj/mm2 2000 pulses 1 session 1,2,4u	Sham fESWT	Statistically significant improvement on NRS scale. Safe and effective treatment	SI pain. Treatment prone along SI joints until pain tolerance
Walewicz (2019)(7)	rESWT 5Hz, 2.5bar 2000 pulses 2 /week For 5 weeks	Sham rESWT	Stable and sustained effect significant in ESWT group	Chronic low back pain(+3m) From lumbal to sacral in most painful places
Celik (2019)(8)*	rESWT 2.5Hz 0.12mj/mm2 (2bar) 1500 pulses 12 treatments	placebo rESWT	Statistically significant improvement on NRS scale in control	Chronic back pain (+3m)
Schneider (2018)(9)	Vibroterapy 15-42Hz 2x/week in 3u	Trigger point therapy lumbar	Benefit with vibrotherapy, but not significant	Chronic low back pain(+3m) Lies on table and gets vibrations through table+MrTP

Efteklharsadat (2020)(10)	rESWT 10-16Hz, 0.01mj/mm ² (approx 2bar) 1500 pulses 1/week x5	Steroid injection	The steroid was more effective in the short term however rESWT was more effective after 4 weeks, statistically significant	QL trigger points. LBP 3m. Patient (pt) prone and only involved side treated with circular movements above trigger point.
Elgendy (2020)(11)	fESWT 5Hz 0.10mj/mm ² 2000 pulses 2x/week for 6 weeks	Exercise therapy	Significant improvement in both groups, however, suffered a predominant improvement in the ESWT group	Nonspecific LBP in 3m Located on ql, glut med, glut max and piriformis
Guo (2021)(12)	rESWT 15Hz until tolerance 4000 pulses 1,2,3,4,12U 4Sessions 1XPR week	Celebrex and eperisone	Significant improvement in the rESWT alone group. Supplementing with NSAIDs or NSAIDs alone is no better	Chronic nonspecific LBP Located prone. 2x1000 on each side of the erector and 2x1000 on each side of the sacrum
Kang (2015)(13)	rESWT 0.15mj/mm ² (approx 3bar) 4Hz 1000pulses 1xpr week in 8u	Conservative treatment	Statistically significant improvement in both groups but greatest in rESWT	Chronic LBP over 6m
Nahas (2018)(14)	rESWT 2bar 10Hz 2000strokes 2sessions per week for 4 weeks	Core exercises	Statistically significant improvement in both groups but greatest in rESWT	Postpartum LBP (3m after childbirth) Prone and with applicator dynamic around the lower back
Taheri (2021)(15)	fESWT 0.15mj/mm ² 4Hz 1500 pulses 1x/week in 4u	Sham fESWT	In the short term (1m) better than sham but similar after 3m	Chronic LBP more than 3m Pt prone and given on painful muscle points lumbar
Zheng (2013)(16)	rESWT 1.6-3bar 8-10Hz 2000 pulses 2XPR week in 2U	Heat therapy	Statistically significant improvement in both groups but greatest in rESWT	Chronic LBP more than 3m Pt is marked by trigger points in the area

*Was not available full text

The authors' own conclusion when comparing all the results found in the included studies:

"This systematic review and meta-analysis revealed that ESWT was effectiveness for relieving pain and disability in LBP patients. The safety of ESWT was still unclear in current meta-analysis. However, due to the small number of included studies, limited quality of available study data and the fact that the data was not meta-analyzed, the results of the review should be interpreted with caution. Due to these limitations, the combined results of this meta-analysis should be cautiously accepted, and high-quality RCTs with long term follow-up and large sample size are needed."

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11 studies	The treatment effect is measured:	4 studies with fESWT 2 studies with rESWT	Endpoints:
632 participants included	Baseline, 3u Baseline, 5u Baseline, 6u	1 bar = 0.1 mJ/mm ²	Visual Analogue Scale (VAS) Oswestry Disability Index (ODI) Beck depression index (BDI) Laitinen Pain Scale (LPS)
5 excluded due to repeats from previous		1MPa = 10 bar	
1 excluded due to lack of reference			

STUDIO	DOSE	CONTROL GROUP	EFFECT	METHOD
Notarnicola 2020 (17)	fESWT 4Hz 2000 impact 0.03mj/mm ² 1/week in 3u	Core Training	Significant improvement after 4u	SI pain. Pt prone with us guidance for clarification of joints.
King 2022 (18)	fESWT ? Hz, 1200pulses 0.1-0.2mj/mm ² 5 treatments total	Laser Therapy LLLT	Significant improvement in ESWT group at VAS	Chronic low back pain(+3m) Prone and palpated after most sore points where the dose is delivered
Han 2015 (19)	fESWT 2.5Hz 1000 strokes 0.01-0.16mj/mm ² 2x/u in 6u	Core training	Significant improvement in ESWT group for all parameters studied.	Chronic low back pain(+3m). Prone QL and SI most sore points
Rajfur 2022 (20)	fESWT 4Hz 1000 strokes 0.15mj/mm ² 2x/u in 5u	Sham ESWT	Significant difference in favor of ESWT group after 1m but not after 3m	Chronic low back pain(+3m). Prone lumbar and sacrum at greatest pain
Elegendy 2022 (21)	rESWT 5Hz 2000 impact 0.1mj/mm ² 2x/ u in 6u	Stretching and Core Training	Improving in both groups, ESWT may be able to improve result in addition to training	Chronic low back pain(+3m). Prone and trigger points
Lee 2014 (22)	rESWT 5Hz 2000 keystroke 0.1mj/mm ² 2x/u in 6u	Control: Heat, ultrasound and electrotherapy, exercises, and McKenzie	Significant pain reduction in the group with ESWT and core training.	Chronic low back pain(+3m) Prone QL and SI most sore points

The authors' own conclusion when comparing all the results found in the included studies:

"ESWT is effective in reducing pain and dysfunction in CLBP patients without increasing the risk of adverse reactions, but it should be performed with caution. However, no significant effect was found on the improvement in mental health. More RCTs are needed to verify the findings in the current study."

CONCLUSION

Chronic low back pain can have many causes and has multiple methods to be treated. The above two meta-analyses illustrates a positive effect using both ESWT modalities on both pain and function with significant improvement. It should be borne in mind that the studies included have small study populations that should be reconsidered to increase, in order to raise the quality of the studies.

There are no side effects of treatment once the diagnosis has been made and red flags are ruled out.

ESWT can therefore be recommended, however, the best results are though achieved by also prescribing exercise therapy.

RECOMMENDATION

Patient prone. Treatment is focused on the most painful points found by palpation of the paraspinals and the gluteals. Note to avoid direct bony landmarks when using radiating ESWT such as spinous process and SIPS. Always only to patient pain tolerance.

Dose of rESWT: 1-2 treatments per week for 4-6 weeks between 2000 - 3000 pulses, between 10-15 Hz, between 2-3 bar

Dose fESWT: 1-2 treatments per week for 4-6 weeks between 1000 - 2000 pulses, between 5-8 Hz, 0.1-0.2mj/mm²

REFERENCES:

1. <https://www.sundhed.dk/borger/patienthaandbogen/knogler-muskler-og-led/symptomer/laendesmerter/>
2. Liu K, Zhang Q, Chen L, Zhang H, Xu X, Yuan Z, Dong J. Efficacy and safety of extracorporeal shockwave therapy in chronic low back pain: a systematic review and meta-analysis of 632 patients. *J Orthop Surg Res.* 2023 Jun 24;18(1):455
3. Li C, Xiao Z, Chen L, Pan S. Efficacy and safety of extracorporeal shock wave on low back pain: A systematic review and meta-analysis. *Medicine (Baltimore).* 2022 Dec 30;101(52):e32053
4. Yang JH. The analgesia effect and safety of extracorporeal shock wave therapy for condensing osteitis. *Chin J Rehabilitated Med.* 2015;30:684–8.
5. Wu K. Clinical trial of extracorporeal shock wave therapy on acute subacute nonspecific low back pain. *Chin J Disaster Med.* 2016;4:81–4.
6. Moon YE, Seok H, Kim SH, et al. Extracorporeal shock wave therapy for sacroiliac joint pain: a prospective, randomized, sham-controlled short-term trial. *J Back Musculoskeletal Rehabil.* 2017;30:779–84.
7. Walewicz K, Taradaj J, Rajfur K, et al. The effectiveness of radial extracorporeal shock wave therapy in patients with chronic low back pain: a prospective, randomized, single-blinded pilot study. *Clin Interv Aging.* 2019;14:1859–69.
8. Çelik A, Altan L, Ökmen BM. The effects of extracorporeal shock wave therapy on pain, disability and life quality of chronic low back pain patients. *Altern Ther Health Med.* 2020;26:54–60.
9. Schneider R. Effectiveness of myofascial trigger point therapy in chronic back pain patients is considerably increased when combined with a new, integrated, low-frequency shock wave vibrotherapy (Cellconnect Impulse): a two-armed, measurement repeated, randomized, controlled pragmatic trial. *J Back Musculoskeletal Rehabil.* 2018;31:57–64.
10. Eftekharsadat B, Fasaie N, Golalizadeh D, et al. Comparison of efficacy of corticosteroid injection versus extracorporeal shock wave therapy on inferior trigger points in the quadratus lumborum muscle: a randomized clinical trial. *BMC Musculoskeletal Disord.* 2020;21:1–11.
11. Elgendy MH, Mohamed MH, Hussein HM. Effect of extracorporeal shock wave on electromyographic activity of trunk muscles in nonspecific chronic low back pain: a randomized controlled trial. *EurAsian J BioSci.* 2020;14.
12. Guo X, Li L, Yan Z, et al. Efficacy and safety of treating chronic nonspecific low back pain with radial extracorporeal shock wave therapy (rESWT), rESWT combined with celecoxib and eperisone (C+ E) or C+ E alone: a prospective, randomized trial. *J Orthop Surg Res.* 2021;16:1–14.
13. Kang J. The Effect of Extracorporeal Shock Wave Therapy on Chronic Low Back Pain Patients due to Myofascial Pain Syndrome. South Korean: Graduate School of Chosun University; 2015.
14. Nahas EM, Ahmed DS, Magda SM, et al. Effect of shock wave therapy on postpartum low back pain. *With J Cairo Univ.* 2018;86:893–901.
15. Taheri P, Khosrawi S, Ramezani M. Extracorporeal shock wave therapy combined with oral medication and exercise for chronic low back pain: a randomized controlled trial. *Arch Phys with Rehabil.* 2021;102:1294–9.
16. Zheng Z-x, Gao Q, Wang J. Effect of pneumatically ballistic extracorporeal shockwave on chronic nonspecific low back pain. *Chin J Rehabil Theory Pract.* 2013;19:666–8.
17. Notarnicola A, Maccagnano G, Moretti L, Salvemini M, Bianchi FP, Covelli I, Tafuri S, Moretti B. Conservative treatment of sacroiliac joint pain with extracorporeal shockwave therapy. *J Biol Reg Homeos Ag.* 2020;34(2):697–703.
18. Kong L, Tian X, Yao X. Effects of extracorporeal shock wave therapy on chronic low back pain and quality of life. *Minerva Surg.* 2022;29(4):883.
19. Han H, Lee D, Lee S, Jeon C, Kim T. The effects of extracorporeal shock wave therapy on pain, disability, and depression of chronic low back pain patients. *J Phys Ther Sci.* 2015;27(2):397–9.

20. Rajfur K, Rajfur J, Matusz T, Walewicz K, Dymarek R, Ptazkowski K, Taradaj J. Efficacy of focused extracorporeal shock wave therapy in chronic low back pain: a prospective randomized 3-month follow-up study. *With Sci Monitor*. 2022;28:E936614.
21. Elgendy MH, Mohamed M, Hussein HM. A single-blind randomized controlled trial investigating changes in electrical muscle activity, pain, and function after shockwave therapy in chronic non-specific low back pain: pilot study. *Ortop Traumatol Rehabil*. 2022;24(2):87–94.
22. Lee S, Lee D, Park J. Effects of extracorporeal shockwave therapy on patients with chronic low back pain and their dynamic balance ability. *J Phys Ther Sci*. 2014;26(1):7–10.

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