Effectiveness of radial shock-wave therapy for calcific tendinitis of the shoulder: single-blind, randomized clinical study.

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BACKGROUND AND PURPOSE: Radial shock-wave therapy (RSWT) is a pneumatically generated, low- to medium-energy type of shock-wave therapy. This single-blind, randomized, "less active similar therapy"-controlled study was performed to evaluate the effectiveness of RSWT for the management of calcific tendinitis of the shoulder. SUBJECTS: Ninety patients with radiographically verified calcific tendinitis of the shoulder were tested. METHODS: Subjects were randomly assigned to either a treatment group (n=45) or a control group (n=45). Pain and functional level were evaluated before and after treatment and at a 6-month follow-up. Radiographic modifications in calcifications were evaluated before and after treatment. RESULTS: The treatment group displayed improvement in all of the parameters analyzed after treatment and at the 6-month follow-up. Calcifications disappeared completely in 86.6% of the subjects in the treatment group and partially in 13.4% of subjects; only 8.8% of the subjects in the control group displayed partially reduced calcifications, and none displayed a total disappearance. DISCUSSION AND CONCLUSION: The results suggest that the use of RSWT for the management of calcific tendinitis of the shoulder is safe and effective, leading to a significant reduction in pain and improvement of shoulder function after 4 weeks, without adverse effects.

Publication Types:

- Evaluation Studies
- Randomized Controlled Trial

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Extracorporeal shock wave therapy for chronic calcific tendinitis of the shoulder: single blind study.

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OBJECTIVE: To evaluate the clinical and radiological response of chronic calcific tendinitis of the shoulder to extracorporeal shock wave therapy (ESWT) in a single blind study. METHODS: 70 patients showing chronic, symptomatic, calcifying tendinitis of the shoulder were examined. A single blind randomised study was performed with 35 patients undergoing a regular treatment (group 1) and 35 a simulated one (group 2). Pain and functional assessment was carried out according to Constant and Murley. Variations in the dimension of the calcification were evaluated by anteroposterior x ray films. RESULTS: A significant decrease of pain and a significant increase in shoulder function was seen in group 1. Examination by x ray showed partial resorption of the calcium deposits in 40% of cases and complete resorption in 31% of cases in group 1. In the control group no significant decrease of pain and no significant increase in shoulder function was seen. No modifications were observed by x ray examination. CONCLUSION: Because of its good tolerance, safety, and clinical radiological response, ESWT can be considered as an alternative treatment for chronic calcific tendinitis of the shoulder.

Publication Types:

- Clinical Trial
- Randomized Controlled Trial

PMID: 12594112 [PubMed - indexed for MEDLINE]

Extracorporeal shock wave therapy for the treatment of chronic calcifying tendonitis of the rotator cuff: a randomized controlled trial.

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CONTEXT: Extracorporeal shock wave therapy (ESWT) has been used to treat calcific tendonitis of the shoulder, but trials of ESWT for this purpose have had methodological deficiencies and thus there is limited evidence for its effectiveness. OBJECTIVE: To determine whether fluoroscopy-guided ESWT improves function, reduces pain, and diminishes the size of calcific deposits in patients with chronic calcific tendonitis of the shoulder. DESIGN, SETTING, AND PARTICIPANTS: Double-blind, randomized, placebo-controlled trial conducted between February 1997 and March 2001 among 144 patients (of 164 screened) recruited from referring primary care physicians, orthopedic surgeons, and sports physicians in 7 orthopedic departments in Germany and Austria. INTERVENTIONS: Either high-energy ESWT, low-energy ESWT, or placebo (sham treatment). The 2 ESWT groups received the same cumulative energy dose. Patients in all 3 groups received 2 treatment sessions approximately 2 weeks apart, followed by physical therapy. MAIN OUTCOME MEASURES: The primary end point was the change in the mean Constant and Murley Scale (CMS) score from baseline to 6 months after the intervention. Secondary end points were changes in the mean CMS scores at 3 and 12 months, as well as changes in self-rated pain and radiographic change in size of calcific deposits at 3, 6, and 12 months. RESULTS: Of 144 patients enrolled, all completed treatment as randomized and 134 completed the 6-month follow-up. Both high-energy and low-energy ESWT resulted in significant improvement in the 6-month mean (95% confidence interval [CI]) CMS score compared with sham treatment (high-energy ESWT: 31.0 [26.7-35.3] points; low-energy ESWT: 15.0 [10.2-19.8] points; sham treatment: 6.6 [1.4-11.8] points; P<.001 for both comparisons). Patients who received high-energy ESWT also had significant 6-month CMS improvements compared with those who received low-energy ESWT (P<.001). We found similar results for both the 3-month and 12-month CMS comparisons, as well as for self-rated pain and radiographic changes at 3, 6, and 12 months. CONCLUSIONS: Both high-energy and low-energy ESWT appeared to provide a beneficial effect on shoulder function, as well as on self-rated pain and diminished size of calcifications, compared with placebo. Furthermore, high-energy ESWT appeared to be superior to low-energy ESWT.

Publication Types:

- Clinical Trial
- Multicenter Study
- Randomized Controlled Trial

PMID: 14625334 [PubMed - indexed for MEDLINE]

[Radial shock wave therapy in calcifying tendinitis of the rotator cuff--a prospective study]

[Article in German]

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AIM: The aim of the study is to evaluate the influence of radial shock wave therapy (RSWT) on the course of calcifying tendinitis of the rotator cuff. MATERIAL AND METHODS: 35 patients with a mean age of 47.5 years suffering from calcifying tendinitis stage Gaertner 2 with a mean size of 16.6 mm in typical location (true-ap view) for a mean of 28 months were treated by low-energy RSWT three times. The acromio-humeral distance averaged 10.4 mm measured at the true-ap view. All patients were clinically and radiologically followed-up at 4 weeks, 3, 6 and 12 months after the last treatment. RESULTS: The Constant score improved significantly ($p < 0.0001$) during the first 4 weeks after RSWT from a mean of 68.5 to a mean of 80.5 points and remained approximatively constant at 3, 6 and 12 months follow-up. After 4 weeks 25.7% of the patients had no pain, 54.3% reported about pain relief. In the course of the follow-up a significant improvement of pain was observed: up to 80.8% painless and 19.2% pain relief 12 months after RSWT. Radiologically 4 weeks after RSWT the X-ray examination showed in 17.6% no calcific deposit, in 20.5% a disintegration and in 61.5% no changes of the calcific deposit. At further follow-up we found a complete resorption of the calcific deposit in 75% up to 12 months after RSWT and 25% had no change in calcific deposit. Overall three patients (8.5%) had to undergo surgical treatment 3-7 months after RSWT. CONCLUSION: The low-energy RSWT leads within the first 4 weeks to a significant pain relief and an improvement of shoulder function. In consideration of the long history, the size and the spontaneous resorption rate of the calcific deposit, an inductive effect of RSWT on the resorption of the calcific deposit can be assumed.

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Radial shock wave therapy for lateral epicondylitis: a prospective randomised controlled single-blind study.

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AIM: Despite the lateral epicondylitis or tennis elbow is a common cause of pain in orthopaedic and sports medicine, the results of the different modalities of conservative treatment are still contradictory. The pourpose of this study was to evaluate the efficacy of radial shock wave therapy (RSWT) in the treatment of tennis elbow. METHODS: In a prospective randomized controlled single-blind study, of 75 eligible patients, 62 with tennis elbow were randomly assigned to study group and control group. There were 31 patients in the study group and 31 patients in the control group. Both groups had received a treatment a week for 4 weeks; the study group had received 2000 impulses of RSWT and the control group 20 impulses of RSWT. All patients were evaluated 3 times: before treatment, at the end of treatment and to 6 months follow-up. The evaluation consisted of assessments of pain, pain-free grip strength test, and functional impairment. RESULTS: Statistical analysis of visual analogue scale (VAS), disabilities of the arm, shoulder, and hand (DASH) questionnaire and pain-free grip strength test scores has shown, both after treatment and to the follow-up at 6 months, significant difference comparing study group versus control group ($P < 0.001$). Statistical analysis within the groups, showed always statistically significant values for the study group. Also the control group showed statistically significant differences for some analyzed parameters. Nevertheless such differences resulted to be more statistics that not clinics as it showed the percentage of satisfied patients in the study group (87% post-treatment; 84% follow-up) in comparison with that of the control group (10% post-treatment; 3% follow-up), and the number needed to treat (NNT) that is of 1.15 at post-treatment and of 1.25 to the 6 months follow-up. CONCLUSION: The use of RSWT allowed a decrease of pain, and functional impairment, and an increase of the pain-free grip strength test, in patients with tennis elbow. The RSWT is safe and effective and must be considered as possible therapy for the treatment of patients with tennis elbow.

Publication Types:

- Clinical Trial
- Randomized Controlled Trial

PMID: 16175767 [PubMed - indexed for MEDLINE]

Randomized, placebo-controlled, double-blind clinical trial evaluating the treatment of plantar fasciitis with an extracoporeal shockwave therapy (ESWT) device: a North American confirmatory study.

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Despite numerous publications and clinical trials, the results of treatment of recalcitrant chronic plantar fasciitis with extracorporeal shockwave therapy (ESWT) still remain equivocal as to whether or not this treatment provides relief from the pain associated with this condition. The objective of this study was to determine whether extracorporeal shock wave therapy can safely and effectively relieve the pain associated with chronic plantar fasciitis compared to placebo treatment, as demonstrated by pain with walking in the morning. This was set in a multicenter, randomized, placebo-controlled, double-blind, confirmatory clinical study undertaken in four outpatient orthopedic clinics. The patients, 114 adult subjects with chronic plantar fasciitis, recalcitrant to conservative therapies for at least 6 months, were randomized to two groups. Treatment consisted of approximately 3,800 total shock waves (+/-10) reaching an approximated total energy delivery of 1,300 mJ/mm(2) (ED+) in a single session versus placebo treatment. This study demonstrated a statistically significant difference between treatment groups in the change from baseline to 3 months in the primary efficacy outcome of pain during the first few minutes of walking measured by a visual analog scale. There was also a statistically significant difference between treatments in the number of participants whose changes in Visual Analog Scale scores met the study definition of success at both 6 weeks and 3 months posttreatment; and between treatment groups in the change from baseline to 3 months posttreatment in the Roles and Maudsley Score. The results of this study confirm that ESWT administered with the Dornier Epos Ultra is a safe and effective treatment for recalcitrant plantar fasciitis. (c) 2005 Orthopaedic Research Society. Published by Wiley Periodicals, Inc. J Orthop Res.

Publication Types:

- Multicenter Study
- Randomized Controlled Trial

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Repetitive low-energy shock wave application without local anesthesia is more efficient than repetitive low-energy shock wave application with local anesthesia in the treatment of chronic plantar fasciitis.

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BACKGROUND: It remains unclear whether application of local anesthesia (LA) interferes with clinical efficacy of extracorporeal shock wave therapy (ESWT) for chronic plantar fasciitis. Aims: To evaluate the effect of local anesthesia on the clinical outcome after repetitive low-energy ESWT for chronic plantar fasciitis. METHODS: Eighty-six patients with chronic plantar fasciitis were randomly assigned to receive either low-energy ESWT without LA, given weekly for three weeks (Group I, n=45; 3 x 2000 pulses, total energy flux density per shock 0.09 mJ/mm2) or identical ESWT with LA (Group II, n=41). Primary outcome measure was: Reduction of pain from baseline to month 3 post-treatment in a pain numeric rating scale [0-10 points] during first steps in the morning, evaluated by an independent blinded observer. Calculations were based on intention-to-treat. RESULTS: No difference was found between the groups at baseline. At 3 months, the average pain score was 2.2+/-2.0 points for patients of Group I, and 4.1+/-1.5 points for patients of Group II. The mean between-group difference was 1.9 points (95% CI: [1.1-2.7 points]; P<.001). Significantly more patients of Group I achieved 50% reduction of pain compared to Group II (67% vs 29%, P<.001). CONCLUSION: ESWT as applied should be done without LA in patients suffering from chronic heel pain. LA applied prior treatment reduced the efficiency of low-energy ESWT.

Publication Types:

- Clinical Trial
- Randomized Controlled Trial

PMID: 16023010 [PubMed - indexed for MEDLINE]

[Extracorporeal shockwave therapy in the treatment of chronic insertional Achilles tendinopathy]

[Article in German]

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PURPOSE: The purpose of this study was to determine the efficacy of extracorporeal shock wave therapy (ESWT) for the treatment of adults with chronic insertional Achilles tendinopathy. METHODS: 68 patients with chronic insertional Achilles tendinopathy were enrolled in this study. A total of 35 patients were treated with a single dose of ESWT (3000 shocks of 0.20 mJ/mm(2), ESWT group), while 33 patients were treated with traditional non-operative measures (control group). RESULTS: At 3 months post treatment, the mean VAS for the control and ESWT groups were 2.9 and 7.2 respectively. Using the Roles and Maudsley scale, 39% of the control patients and 51% of the ESWT patients were assigned an excellent or good result. CONCLUSIONS: ESWT as applied is a safe and effective treatment for chronic insertional Achilles tendinopathy.

Publication Types:

- Clinical Trial
- Controlled Clinical Trial

PMID: 15909176 [PubMed - indexed for MEDLINE]

[Influence of local anesthesia and energy level on the clinical outcome of extracorporeal shock wave-treatment of chronic plantar fasciitis]

[Article in German]

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BACKGROUND: The efficacy of low energy extracorporeal shock wave treatment (ESWT) for chronic plantar fasciitis is discussed controversially. It is unclear whether the simultaneous application of local anesthesia (LA) interferes with clinical outcome. METHODS: 60 patients with a chronic plantar fasciitis were enrolled in a triple-arm (20 patients per group), prospective randomized and observer-blinded pilot trial. The patients were randomly assigned to receive either active ESWT without LA (;3 x 1 500 shocks, total energy flux density [EFD] per shock 0.09 mJ/mm(2) [Group A]), ESWT with LA (3 x 1 500 shocks, EFD 0.18 mJ/mm(2) per shock [Group B]) or ESWT with LA (3 x 1 500 shocks, EFD 0.09 mJ/mm(2) [Group C]). Main outcome measures were: pain during first stepps in the morning (measured on a 0-10 point visual analogue scale) and number of patients with > 50 % reduction of pain and no further therapy needed, measured at 6 weeks after the last ESWT. RESULTS: Group A improved in the VAS from 6.4 (SD: 1.7) to 2.2 (SD: 2.6) points, group B from 6.7 (SD: 1.5) to 4.1 (SD: 2.4) points, group C from 6.2 (SD: 1.6) to 3.8 (SD: 2.5) points. A reduction of pain of at least 50 % was achieved in 60 % of group A, in 36 % of group B and in 30 % of group C. Group A without LA showed a significantly higher improvement in the VAS and subjective evaluation than groups B ($p = 0.007$) and C ($p = 0.016$). CONCLUSION: At 6 weeks success rates after low-energy ESWT with local anesthesia were significantly lower than after identical low-energy ESWT without local anesthesia. Higher energy levels could not balance the disadvantage of this effect. LA significantly influenced the clinical results after low energy ESWT in a negative way. Blinding patients by LA in ESWT studies must therefore be considered a systematic error in study design.

Publication Types:

- Clinical Trial
- Randomized Controlled Trial

PMID: 15849646 [PubMed - indexed for MEDLINE]

Medium-energy shock wave therapy in the treatment of rotator cuff calcifying tendinitis.

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To evaluate the results of the treatment with medium-energy extracorporeal shock wave therapy (ESWT) in rotator cuff calcifying tendinitis. Fifty-four non-consecutive patients, who were referred to our institute for rotator cuff calcifying tendinitis, were managed with a standardized protocol in four sessions of medium-energy (0.11 mJ/mm2) ESWT administered with an electromagnetic lithotriptor. Pain was evaluated at the end of each session, functional state of shoulder was assessed at 1 and 6 months after the end of procedure. All patients underwent radiographs and sonography imaging. No systemic or local complications. Thirty-eight patients (70%) reported satisfactory functional results. Radiographs and sonographs showed a disappearance of calcium deposit in 29 patients (54%) and in 19 patients (35%) it appeared to be reduced more than a half. A correlation was found between residual calcium deposit and the clinical outcome, but some patients showed a reduced pain without modification of calcium deposit. These results were unmodified at 6 months follow-up. Our protocol of medium-energy ESWT provides good results overall about pain modulation.

Publication Types:

- Clinical Trial

PMID: 15800753 [PubMed - indexed for MEDLINE]

Extracorporeal shock wave therapy in calcific tendinitis of the shoulder.

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OBJECTIVE: To investigate clinical (pain, mobility) and radiological (resolution of calcium deposits) efficacy of different energy levels of extracorporeal shock wave therapy (ESWT) in calcific tendinitis of the shoulder. DESIGN AND PATIENTS: There were 90 study subjects with radiographically verified calcific tendinitis of one shoulder, mean age 52+/-6 years (range 29-65 years; females:males=55:35), all of whom had had symptoms for at least 6 months and substantial restriction of shoulder mobility and pain that required taking anti-inflammatory drugs. Calcium deposits were of type I or type II (clearly circumscribed and dense) and ranged from 1 cm to 3 cm in diameter. Subjects were divided into three groups to receive ESWT at one of two energy levels (E1=0.15 mJ/mm2, E2=0.44 mJ/mm2) or sham treatment. Treatment was given at 6 weekly intervals until symptoms resolved, five treatments had been given or the subject dropped out of the programme. RESULTS: All subjects in groups E1 and E2 completed the programme. Those in group E1 had significantly less pain during treatment but more treatments than those in group E2, and at 6 month follow-up had residual calcification and recurrence of pain (87%). Subjects in group E2 had no residual calcification or recurrence of pain. Sham treatment had no effect. There were no side effects except a small number of haematomas (2 in E1, 6 in E2; maximum size 2 cm). CONCLUSION: ESWT in calcific tendinitis of the shoulder is very effective. It does not have significant side effects at an energy level of E=0.44 mJ/mm2, which can therefore be recommended.

PMID: 15480643 [PubMed - indexed for MEDLINE]

Extracorporeal shockwave treatment is effective in calcific tendonitis of the shoulder. A randomized controlled trial.

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BACKGROUND: Calcific tendonitis of the shoulder is often associated with chronic pain and impairment of function. Extracorporeal shockwave therapy (ESWT) is considered to be a treatment option. We compared the effects of two different ESWT regimens. METHODS: 43 patients (57 shoulders) with symptomatic calcific tendonitis of the shoulder for more than six months were included in a double-blinded study. Thirty-one shoulders were treated at the area of maximum pain with application of 2 x 2000 impulses of 0.28 mJ/mm2 at an interval of two weeks (treatment group) and 26 shoulders with 2 x 2000 impulses of < 0.07 mJ/mm2 at an interval of two weeks (control group), without pretreatment analgesia. Shoulder function (Constant score) and pain (visual analogue scale, VAS) were assessed before treatment and at one week, three months and seven months after treatment. Shoulder X-rays were performed at the 3- and 7-month follow-up visits. RESULTS: Improvement in Constant score was significantly higher in the treatment group at all follow-up visits ($p < 0.05$). Seven months post-treatment, calcifications dissolved completely in 19% of the treatment group and 8% of the control group, and a > 50% reduction was observed in 19% and 8% respectively. With regard to reduction of pain, there was significant improvement in the treatment group compared with the control group at the 1-week follow-up ($p < 0.05$). However, at the 3-month and 7-month visits, no significant between-group difference in pain could be detected. CONCLUSION: As applied, ESWT with an energy flux density of 0.28 mJ/mm2 led to a significantly greater improvement in shoulder function and a slightly higher, nonsignificant, rate of > 50% disintegration of calcific deposits compared with the control group. However, this did not result in reduction of pain.

Publication Types:

- Clinical Trial
- Randomized Controlled Trial

PMID: 15471181 [PubMed - indexed for MEDLINE]

Long-term effects of extracorporeal shockwave therapy in chronic calcific tendinitis of the shoulder.

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Various short-term studies have demonstrated the effectiveness of extracorporeal shockwave therapy in the treatment of calcific tendinitis. To evaluate the long-term effects and any complications, the 4-year outcome was determined in a prospective study of 115 patients. One session (group A, n = 56) or two sessions (group B, n = 59) of high-energy shockwave therapy were administered to each patient. The 6-month results showed that the level of success achieved in pain relief and the Constant score was energy-dependent and that there were significant differences in radiologic changes between the groups. By 4 years after shockwave therapy, 20% of the entire patient population had undergone surgery on the involved shoulder. The effects of extracorporeal shockwave therapy not followed by any other therapy within the first 6 months were evaluated in 59% (n = 68) of the original 115 patients. Subjectively, 78% of patients in group A and 87% in group B thought the shockwave treatment had been successful. The Constant score increased from a mean of 45 before treatment to 88 in group A and 85 in group B after treatment. Radiologic changes were found in 93% of patients in each group. In conclusion, the failure rate after ESWT is high, but for 70% of the patients in this study, the treatment was successful and no long-term complications were seen.

PMID: 12378167 [PubMed - indexed for MEDLINE]

Antibacterial effects of extracorporeal shock waves.

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Despite considerable knowledge about effects of extracorporeal shock-wave therapy (ESWT) on eukaryotic tissues, only little data are available concerning their effect on prokaryotic microorganisms. The objective of the present study was to determine the bactericidal activity as a function of energy flux density and shock-wave impulse number. Standardised suspensions of Staphylococcus aureus ATCC 25923 were exposed to different impulse numbers of shock waves with an energy flux density (ED) up to 0.96 mJ mm(-2) (2 Hz). Subsequently, viable bacteria were quantified by culture and compared with an untreated control. After applying 4000 impulses, a significant bactericidal effect was observed with a threshold ED of 0.59 mJ mm(-2) ($p < 0.05$). A threshold impulse number of more than 1000 impulses was necessary to reduce bacterial growth ($p < 0.05$). Further elevation of energy and impulse number exponentially increased bacterial killing. ESWT proved to exert significant antibacterial effect in an energy-dependent manner. Certain types of difficult-to-treat infections could offer new applications for ESWT.

Publication Types:

- Evaluation Studies

PMID: 15653238 [PubMed - indexed for MEDLINE]

Shock wave therapy as an innovative technology in skeletal disorders: study on transmembrane current in stimulated osteoblast-like cells.

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Extracorporeal shock wave treatment (ESWT) is successfully used in various musculoskeletal disorders and pathologies. Despite the increasing use of this kind of therapy, some aspects of its mechanism of action are still unclear. In vitro bone cell behavior under ESWT were previously investigated by the present author and MG63 osteoblast-like cells showed an enhancement in proliferation and in the osteoblast differentiation after therapy with a low-energy flux density. The aim of the present study was to evaluate the effect of ESWT on the permeabilization of cell membrane. We characterized physiological changes in the MG63 associated with ESWT generated by an ESW device and patch clamp recording was performed to study ion channels. Experiments were carried out using the whole-cell recording configuration of the patch-clamp technique and the ionic current measurements were performed on cell samples of ESW treated and control groups. The patch-clamp technique showed the effect of ESWT on the amplitude of transmembrane currents. The treatment with ESW enhanced the transmembrane current as well the voltage dependence of Ca-activated and K channels that mediate these currents: the differences between treated cells and control at 80mV were over 1000 pA ($p<0.05$). These modifications of ion channels activity positively influence cell proliferation (MTT test, $p<0.0001$) without interfering with the normal synthesis activity of stimulated osteoblasts.

PMID: 16211535 [PubMed - indexed for MEDLINE]

Chronic plantar fasciitis: acute changes in the heel after extracorporeal high-energy shock wave therapy--observations at MR imaging.

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PURPOSE: To prospectively evaluate with magnetic resonance (MR) imaging the acute changes in the heel associated with extracorporeal shock wave therapy (ESWT). MATERIALS AND METHODS: Institutional clinical study review board approved the study, and informed consent was obtained. MR imaging was performed within 24 hours before and after ESWT on 18 feet of 12 patients (eight women and four men; age range, 33-63 years; average, 49.9 years) with chronic plantar fasciitis. ESWT was applied to the most painful point on the plantar surface of the heel, with a total of 1500 shocks at 18 kV. The MR imaging protocol consisted of sagittal and coronal T1- and T2-weighted images with and without fat saturation. The images were reviewed to assess the post-ESWT changes in soft-tissue and bone marrow edema, the thickness of the proximal plantar fascia, and the presence of a heel spur. Paired t test was used for the statistical analysis. RESULTS: Soft-tissue edema, which was present in 16 (89%) of 18 heels before ESWT, had increased in severity in 12 (75%) heels after ESWT. Calcaneus bone marrow edema at the insertion site was observed in eight heels before ESWT. After ESWT, the extant of bone marrow edema had increased in one heel and had newly developed in another heel. The heel spur seen in nine (50%) feet was not affected by ESWT. In 17 (94%) heels, the proximal plantar fascia was abnormally thick, with thickness not significantly changed with use of ESWT ($P > .05$). CONCLUSION: Increase in soft-tissue edema is the most common acute response associated with ESWT. (c) RSNA, 2004.

PMID: 15564391 [PubMed - indexed for MEDLINE]

[Tissue-induced changes of the extracorporeal shockwave]

[Article in German]

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Extracorporeal shock wave therapy has been applied very frequently for more than 2 decades. Excellent results in clinical application and research led to widespread use of this noninvasive procedure. Until now the actual mode of action and biochemical pathways after extracorporeal shock wave therapy (ESWT) remain unknown. A small number of technical parameters could be determined after improved technical methods and sensor devices had been designed. It is also still unclear how these technical findings apply to the clinical setting. Therefore, we investigated the influence of musculocutaneous tissue on shock wave focus. A tissue thickness of 15 mm significantly influenced focus characteristics. We found distinct spreading and slight lateral deviation of the focus. In the same way, the peak positive pressure was significantly reduced after the shock waves had passed the musculocutaneous model. The study demonstrates that in vitro results could not be transferred directly to clinical or in vivo conditions. The clinical application of extracorporeal shock waves should be modified in intensity and number of shock waves depending on individual anatomic conditions, indication, and location.

PMID: 12219658 [PubMed - indexed for MEDLINE]