

Effect of Radial Shock Wave Diathermy on Various Musculoskeletal Disorders

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Abstract

This paper discusses the value of radial shock wave diathermy in treatment of various musculoskeletal disorders. Radial shock-wave therapy (RSWT) is a pneumatically generated, low- to medium-energy type of shock-wave therapy.

Shockwaves have been used for 15 years as an alternative treatment for musculoskeletal disorders. The treatment consists of mechanical acoustic waves that are transmitted through liquid and gaseous media. Their biological effect comes from the mechanical action of (mechanical) ultrasonic vibrations on tissues.

Shockwaves can be focal or radial. Focal shockwaves have high tissue penetration power (10 cm) and impact force (0.08–0.28 mj/mm²). They produce mechanical and biological effects of greater intensity, including destruction of fibrosis and stimulation of neovascularization in treated tissues.

Keywords: Radial shockwave diathermy & musculoskeletal disorders.

Introduction

Shockwave therapy can be used to treat wide variety of musculoskeletal condition, in particular those involving areas where connective tissue is attached to the bone.[1] Shockwaves can be focal or radial. Focal shockwaves have high tissue penetration power (10 cm) and impact force (0.08–0.28 mj/mm²). They produce mechanical and biological effects of greater intensity, including destruction of fibrosis and stimulation of neovascularization in treated tissues. Radial shockwaves are pneumatic waves that are generated by air compressors. They transmit radially, with lower penetration (3 cm), less impact (0.02–0.06 mj/mm²) and limited biological effect. They have been shown to be

effective for treating musculoskeletal disorders that are more superficial, with clinical results that are similar to those of focal shockwaves.[1] The effect of radial shockwaves is less intense, but they have been shown to cause disintegration of fibroses and calcifications and increase blood circulation at the treated location.

Common sites that can be successfully treated are:

Foot – planter fasciitis, heel spurs, achillis tendonitis

Knee – patellar tendinitis, jumpers knee, shin pain

Elbow – Tennis or Golfers elbow

Shoulder – rotator cuff tendinitis & calcification

Hip – trochantric bursitis

Muscles- various trigger point throughout the body & muscle tension

Bone – Stress fracture & Non union

Nerves – Morten Neuroma[2]

Shockwave therapy is the recent development that is used successfully by health care providers that specialized in

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musculoskeletal disorder.

Advantages of RSWD[3]

Quickly reduces pain

No medication is needed

Avoid surgery or anesthesia

No side effect

No risk of allergies

Accelerated healing

Effective for chronic conditions

Shockwave therapy accelerate the healing process by activating the body self healing power particularly in cases where the body has been unable to do its own. It stimulates metabolism and enhance blood circulation which enables damage tissue to regenerate and eventually heal. The body responds by increasing the blood circulation and metabolism in the impact area which in turn accelerates the body's own healing processes. The shockwaves break down injured tissue and calcifications.

The treatment relieves pain by producing an analgesic effect on the treatment area. The high energy acoustic waves that are transmitted through the surface of the skin are spread radially (Spherically) into the body and the body responds with increase metabolic activity around the area of pain. This stimulate and accelerate the healing process and especially useful for those suffering from chronic heel, shoulder, knee, elbow & back pain .

Studies

Various studies in which radial shockwave diathermy is used for various musculoskeletal disorders

Liu s, zhail *et al* conducted a study on radial extracorporeal pressure pulse therapy for primary long bicipital tenosynovitis a prospective randomized controlled therapy in may 2012 in their study 79 adults with long wave tenosynovitis were randomly received either active (1500pulses , 8hz, 3 bars) or sham

treatment through four sessions that were held once a week. All of these adults were assessed before treatment and at the time interval of 1, 3, and 12 months since the completion of the treatment. And they have found that mean scores of VAS shows significant & sustained reduction from the 5.67 ± 1.32 at baseline to 2.58 ± 1.49 at one month, 1.83 ± 1.25 at three months and 1.43 ± 0.94 at 12th month from the baseline were as sham group's mean VAS was 6.04 ± 0.97 before treatment and stabilized at 5.57 ± 0.84 at 12 months.[4]

Wang *et al* conducted a study on effect of extracorporeal shockwave therapy in musculoskeletal disorders. Which was published in journal of orthopedic surgical research in 2012 and they have found that ESWT (Extracorporeal shockwave diathermy) shows positive & beneficial effects of the therapy the success rate ranged from 65% to 91% and the complications are low and negligible.[5]

Henk van der Worp, Johannes Zwerver, Inge van den Akker-Scheek and Ron L Diercks conducted a study in 2011 on Tendinopathy of Patella Shockwave) it is a two-armed randomised controlled trial in which the effectiveness of focussed shockwave therapy and radial shockwave therapy are directly compared. Outcome assessors and patients are blinded as to which treatment is given. Patients undergo three sessions of either focused shockwave therapy or radial shockwave therapy at 1-week intervals, both in combination with eccentric decline squat training. Follow-up measurements are scheduled just before treatments 2 and 3, and 1, 4, 7 and 12 weeks after the final treatment. The main outcome measure is the Dutch VISA-P questionnaire, which asks for pain, function and sports participation in subjects with patellar tendinopathy. Secondary outcome measures are pain determined with a VAS during ADL, sports and decline squats, rating of subjective improvement and overall satisfaction with the treatment. Patients will also record their sports activities, pain during and after these activities, and concurrent

medical treatment on a weekly basis in a web-based diary. Results will be analysed according to the intention-to-treat principle. Radial shockwave generators generate waves that are very different from those generated by focused shockwave generators. Radial shockwaves lack the characteristic features of shockwaves such as a short rise-time, a high peak pressure and non-linearity.[6] Another difference is that radial shockwaves have a more superficial effect on tissue, compared to focused shockwaves which reach a maximal energy in the focus that is located deeper into the tissue.[7] Since the exact working mechanism of shockwave therapy is not well understood, this difference does not imply that radial shockwave therapy is less effective than focused shockwave therapy.[8] Each therapy may even have a different working mechanism.[9]

It is not known whether there is a difference in effectiveness between these therapies as treatment for PT. Therefore, the aim of this study is to directly compare the effects of focused shockwave therapy and radial shockwave therapy on patellar tendinopathy in a blinded randomised controlled trial.[10]

Angelo Cacchio, studied the Effectiveness of Radial Shock-Wave Therapy for Calcific Tendinitis of the Shoulder: Ninety patients with radiographically verified calcific tendinitis of the shoulder were tested. 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. 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.[11]

Giuseppe Mangone, Radial extracorporeal shock-wave therapy in rotator cuff

calcific tendinitis An observational study was carried out in the period between October 2008 and September 2009 in our outpatient clinic with 62 patients, divided into 3 groups: group A 36 patients treated only with RESWT, group B 26 patients treated only with HPLT and group C 16 patients with only short term improvement with HPLT retreated with RESWT. Patients were evaluated with Constant-Murley scale before and after treatment (immediately, 1 month and 3 months) for mean constant score, pain and range of movement. Data were examined statistically with SPSS. Criteria for inclusion and exclusion were defined.

Patients treated with HPLT have shown good clinical results but have returned to original syndrome 1 month after treatment. RESWT has given improvement after treatment extended in time (3 months) in terms of pain and recover of functionality with a limited number of applications.[12]

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