

The VitalWrap® System

PORTABLE HEATING, COOLING & COMPRESSION THERAPY

CITATIONS

1. CLIN REHABIL

2003 Sep;17(6):618-23.

Effects of thermal therapy in improving the passive range of knee motion: comparison of cold and superficial heat applications.

Lin YH.

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OBJECTIVE To assess the effect of applying a hot pack followed by a cold pack (COLD) on the passive range of knee flexion in subjects with restricted knee motion, specifically comparing this treatment to the application of a hot pack (HEAT) alone.

DESIGN Seventy-one subjects were randomized into two groups to conduct a clinical randomized before-after trial.

INTERVENTIONS Each subject received either (1) cold pack or (2) hot pack during passive knee joint stretching.

MAIN OUTCOME MEASURE Goniometry was used to measure the passive knee flexion at the baseline (KROM₁), before (KROM₂) and after (KROM₃) applications of a hot pack with/without a cold pack.

RESULTS Repeated ANOVA measurements revealed a marked increase in the passive range of knee flexion in the two study groups ($p < 0.001$). Moreover, the paired t-test displayed statistical increments of knee flexion across the different measurement phases, except for the treatment phase without the cold pack. The range of knee flexion following the treatment with the application of a cold pack significantly exceeded that after treatment without a cold pack.

CONCLUSION Cold pack application had a limited but significant effect during mechanical stretching for restricted knee motion.

Publication Types: Clinical Trial, Randomized Controlled Trial

PMID: 12971706 [PubMed - indexed for MEDLINE]

2. ARCH PHYS MED REHABIL

2003 Mar;84(3):335-42.

Overnight use of continuous low-level heatwrap therapy for relief of low back pain.

Nadler SF, Steiner DJ, Petty SR, Erasala GN, Hengehold DA, Weingand KW.

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OBJECTIVE To evaluate of the efficacy and safety of 8 hours of continuous, low-level heatwrap therapy administered during sleep.

DESIGN Prospective, randomized, parallel, single-blind (investigator), placebo-controlled, multicenter clinical trial.

SETTING Two community-based research facilities.

PARTICIPANTS Seventy-six patients, aged 18 to 55 years, with acute, nonspecific low back pain.

INTERVENTIONS Subjects were stratified by baseline pain intensity and gender and randomized to one of the following treatments: evaluation of efficacy (heatwrap, $n=33$; oral placebo, $n=34$) or blinding (unheated wrap, $n=5$; oral ibuprofen, $n=4$). All treatments were administered for 3 consecutive nights with 2 days of follow-up.

MAIN OUTCOME MEASURES Primary: morning pain relief (hour 0) on days 2 through 4 (0-5-point verbal responsescale). Secondary: mean daytime pain relief score (days 2-4, hours 0-8), mean extended pain relief score (day 4, hour 0; day 5, hour 0), muscle stiffness, lateral trunk flexibility, and disability (Roland-Morris Disability Questionnaire).

RESULTS Heatwrap therapy was significantly better than placebo at hour 0 on days 2 through 4 for mean pain relief ($P=.00005$); at hours 0 through 8 on days 2 through 4 for pain relief ($P<.001$); at hour 0 on day 4 and at hour 0 on day 5 for mean pain relief ($P<.001$); on day 4 in reduction of morning muscle stiffness ($P<.001$); for increased lateral trunk flexibility on day 4 ($P<.002$); and for decreased low

back disability on day 4 ($P=.005$). Adverse events were mild and infrequent.

CONCLUSIONS Overnight use of heatwrap therapy provided effective pain relief throughout the next day, reduced muscle stiffness and disability, and improved trunk flexibility. Positive effects were sustained more than 48 hours after treatments were completed.

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PUBLICATION TYPES: Clinical Trial, Multicenter Study, Randomized Controlled Trial

PMID: 12638100 [PubMed - indexed for MEDLINE]

3. ARCH PHYS MED REHABIL

2003 Mar;84(3):329-34.

Continuous low-level heatwrap therapy for treating acute nonspecific low back pain.

Nadler SF, Steiner DJ, Erasala GN, Hengehold DA, Abeln SB, Weingand KW

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OBJECTIVE To evaluate the efficacy of 8 hours of continuous low-level heatwrap therapy for the treatment of acute nonspecific low back pain (LBP).

DESIGN Prospective, randomized, parallel, single-blind (investigator), placebo-controlled, multicenter clinical trial.

SETTING Five community-based research facilities. **PARTICIPANTS:** Two-hundred nineteen subjects, aged 18 to 55 years, with acute nonspecific LBP.

INTERVENTION Subjects were stratified by baseline pain intensity and gender and randomized to one of the following groups: evaluation of efficacy (heatwrap, $n=95$; oral placebo, $n=96$) and blinding (oral ibuprofen, $n=12$; unheated back, wrap $n=16$). All treatments were administered for 3 consecutive days with 2 days of follow-up.

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MAIN OUTCOME MEASURES Primary: day 1 mean pain relief (0- to 5-point verbal response scale). Secondary: muscle stiffness (101-point numeric rating scale), lateral trunk flexibility (fingertip-floor distance), and Roland-Morris Disability Questionnaire over 3 days of treatment and 2 days of follow-up.

RESULTS Heatwrap therapy was shown to provide significant therapeutic benefits when compared with placebo during both the treatment and follow-up period. On day 1, the heatwrap group had greater pain relief (1.76+/-1.10 vs 1.05+/-1.11, P <.001), less muscle stiffness (43.1+/-1.21 vs 47.6+/-1.21, P=.008), and increased flexibility (18.6+/-4.44 cm vs 16.5+/-4.45 cm, P=.001) compared with placebo. Disability was also reduced in the heatwrap group (5.3 vs 7.4, P=.0002). Adverse events were mild and infrequent.

CONCLUSION Continuous low-level heatwrap therapy was shown to be effective for the treatment of acute, nonspecific LBP.

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PUBLICATION TYPES: Clinical Trial, Multicenter Study, Randomized Controlled Trial

PMID: 12638099 [PubMed - indexed for MEDLINE]

4. SPINE

2002 May 15;27(10):1012-7.

Continuous low-level heat wrap therapy provides more efficacy than ibuprofen and acetaminophen for acute low back pain.

Nadler SF, Steiner DJ, Erasala GN, Hengehold DA, Hinkle RT, Beth Goodale M, Abeln SB, Weingand KW.

Department of Physical Medicine and Rehabilitation, UMDNJ-NJ Medical School, the; Research Testing Laboratories, Newark, NJ 07103, USA. sfnadler@cs.com

STUDY DESIGN A prospective, randomized, single (investigator) blind, comparative efficacy trial was conducted.

OBJECTIVE To compare the efficacy of continuous low-level heat wrap therapy (40 C, 8 hours/day) with that of ibuprofen (1200 mg/day) and acetaminophen (4000 mg/day) in subjects with acute nonspecific low back pain.

SUMMARY OF BACKGROUND DATA The efficacy of topical heat methods, as compared with oral analgesic treatment of low back pain, has not been established.

METHODS Subjects (n = 371) were randomly assigned to heat wrap (n = 113), acetaminophen (n = 113), or ibuprofen (n = 106) for efficacy evaluation, or to oral placebo (n = 20) or unheated back wrap (n = 19) for blinding. Outcome measures included pain relief, muscle stiffness, lateral trunk flexibility, and disability. Efficacy was measured over two treatment days and two follow-up days.

RESULTS Day 1 pain relief for the heat wrap (mean, 2) was higher than for ibuprofen (mean, 1.51; P = 0.0007) or acetaminophen (mean, 1.32; P = 0.0001). Extended mean pain relief (Days 3 to 4) for the heat wrap (mean, 2.61) also was higher than for ibuprofen (mean, 1.68; P = 0.0001) or acetaminophen (mean, 1.95; P = 0.0009). Lateral trunk flexibility was improved with the heat wrap (mean change, 4.28 cm) during treatment (P <= 0.009 vs acetaminophen [mean change, 2.93 cm], P <= 0.001 vs ibuprofen [mean change, 2.51 cm]). The results were similar on Day 4. Day 1 reduction in muscle stiffness with the heat wrap (mean, 16.3) was greater than with acetaminophen (mean, 10.5; P = 0.001). Disability was reduced with the heat wrap (mean, 4.9), as compared with ibuprofen (mean, 2.7; P = 0.01) and acetaminophen (mean, 2.9; P = 0.0007), on Day 4. None of the adverse events were serious. The highest rate (10.4%) was reported in the ibuprofen group.

CONCLUSION Continuous low-level heat wrap therapy was superior to both acetaminophen and ibuprofen for treating low back pain.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 12004166 [PubMed - indexed for MEDLINE]

5. J RHEUMATOL

2002 Feb;29(2):331-4.

Local ice therapy during bouts of acute gouty arthritis.

Schlesinger N, Detry MA, Holland BK, Baker DG, Beutler AM, Rull M, Hoffman BI, Schumacher HR Jr.

Department of Medicine and New Jersey Medical School-University of Medicine and Dentistry of New Jersey, Newark, USA.

OBJECTIVE To evaluate the effect of local application of ice on duration and severity of acute gouty arthritis. **METHODS:** Nineteen patients with acute gout were enrolled and randomized into 2 groups. Group A (n = 10) received topical ice therapy, oral prednisone

30 mg PO tapered to 0 over 6 days and colchicine 0.6 mg/day. Group B was the control group (n = 9), given the same regimen but without the ice therapy. The patients were followed for one week.

RESULTS The mean reduction in pain for those patients treated with ice therapy was 7.75 cm (on 10 cm visual analog scale) with standard deviation +/- 2.58 compared with 4.42 cm (+/- SD 2.96) for the control group. Using a Wilcoxon rank-sum test there was a significant difference (p = 0.021) in pain reduction between the ice therapy and control groups. Joint circumference and synovial fluid volume also tended to be more effectively reduced after one week of therapy in the ice group compared with controls, but these did not achieve statistical significance.

CONCLUSION The group treated with ice had a significantly greater reduction in pain compared with the control group. Although the clinical improvement was impressive, due to the small sample size we could not show statistically significant improvement in all the variables that tended to suggest that effect was more than simply analgesic. Cold applications may be a useful adjunct to treatment of acute gouty arthritis.

PUBLICATION TYPES: Clinical Trial, Controlled Clinical Trial, Randomized Controlled Trial

PMID: 11838852 [PubMed - indexed for MEDLINE]

6. J HAND THER

2001 Jul-Sep;14(3):208-15.

A randomized prospective study to assess the efficacy of two cold-therapy treatments following carpal tunnel release.

Hochberg J.

A prospective randomized study was performed comparing the efficacy of controlled cold therapy (CCT) with the efficacy of ice therapy in the postoperative treatment of 72 patients with carpal tunnel syndrome.

Immediately after surgery, patients applied either a temperature-controlled cooling blanket (CCT) or a standard ice pack over their surgical dressings. Pain was assessed by visual analog scale and swelling by wrist circumference preoperatively, immediately after surgery, and on postoperative day 3. Patients kept log books of daily treatment times. Narcotic use (of Vicodin ES) was determined by pill count at day 3 and by daily log book recordings. Patients who used CCT showed significantly greater reduction in pain, edema (wrist circumference), and narcotic use at postoperative day 3 than

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did those using ice therapy. This study indicates that after carpal tunnel surgery, the use of CCT, compared with traditional ice therapy, provides patients with greater comfort and lessens the need for narcotics.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 11511016 [PubMed - indexed for MEDLINE]

7. CRIT CARE NURS CLIN NORTH AM

2001 Jun;13(2):221-32.

Nonpharmacologic treatment of pain.

Titler MG, Rakel BA.

Research, Quality and Outcomes Management, Department of Nursing and Patient Care Services, University of Iowa Hospitals and Clinics, Iowa City 52242, USA.

Nonpharmacologic interventions for pain treatment are important complementary therapies but are not substitutes for pharmacologic management of pain. Use of nonpharmacologic pain treatments in critical care settings is helpful to decrease pain, but the challenge remains for nurses to have the knowledge, time, and skill to use these interventions in a busy daily practice with severely ill patients. Although numerous studies testing the effectiveness of nonpharmacologic interventions for pain management are available, the varying methods and interventions used in these studies make it difficult to draw conclusions. Further research on the use of these interventions for pain reduction is necessary to determine the most effective treatments and the conditions under which they should be used.

PUBLICATION TYPES: Review, Review, Tutorial

PMID: 11866404 [PubMed - indexed for MEDLINE]

8. AM J SPORTS MED

1999 May-Jun;27(3):357-62.

The effect of cryotherapy on intraarticular temperature and postoperative care after anterior cruciate ligament reconstruction.

Ohkoshi Y, Ohkoshi M, Nagasaki S, Ono A, Hashimoto T, Yamane S.

Department of Orthopaedic Surgery, Hakodate Central General Hospital, Japan.

The objective of this study was to elucidate how cryotherapy after anterior cruciate ligament reconstruction affects intraarticular temperature and clinical results. A prospective and randomized study was performed on 21 knees of 21 patients. The ligament reconstruction was performed by single-incision arthroscopy using autogenous hamstring tendon. On completion of the surgery, thermosensors were implanted in the suprapatellar pouch and the intracondylar notch, and the intraarticular temperature was monitored while the joint was cooled. Cooling was performed in one group at 5 degrees C (N = 7) and in another at 10 degrees C (N = 7), for 48 hours. A control group (N = 7) did not undergo cryotherapy. The cooled groups showed three temperature phases: a low-temperature phase immediately after the ligament reconstruction, followed by a temperature-rising phase and a thermostatic phase. The control group had no low-temperature phase and immediately entered a thermostatic phase. During the low-temperature phase in the treated groups, the temperature of the suprapatellar pouch and of the intercondylar notch were significantly lower than the body temperature. The pain score and the number of times an analgesic had to be administered were both significantly lower in the 10 degrees C group than in the control group. Blood loss was significantly less in the 5 degrees C group than in the control group.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 10352774 [PubMed - indexed for MEDLINE]

9. ARTHROSCOPY

1998 Mar;14(2):130-5.

Continuous-flow cold therapy for outpatient anterior cruciate ligament reconstruction.

Barber FA, McGuire DA, Click S.

Plano Orthopedic and Sports Medicine Center, Texas 75093, USA.

This prospective, randomized study evaluated continuous-flow cold therapy for postoperative pain in outpatient arthroscopic anterior cruciate ligament (ACL) reconstructions. In group 1, cold therapy was constant for 3 days then as needed in days 4 through 7. Group 2 had no cold therapy. Evaluations and diaries were kept at 1, 2, and 8 hours after surgery, and then daily. Pain was assessed using the VAS and Likert scales. There were 51 cold and 49 noncold patients included.

Continuous passive movement (CPM) use averaged 54 hours for cold and 41 hours for noncold groups (P=.003). Prone hangs were

done for 192 minutes in the cold group and 151 minutes in the noncold group. Motion at 1 week averaged 5/88 for the cold group and 5/79 the noncold group. The noncold group average visual analog scale (VAS) pain and Likert pain scores were always greater than the cold group. The noncold group average Vicodin use (Knoll, Mt. Olive, NJ) was always greater than the cold group use (P=.001). Continuous-flow cold therapy lowered VAS and Likert scores, reduced Vicodin use, increased prone hangs, CPM, and knee flexion. Continuous-flow cold therapy is safe and effective for outpatient ACL reconstruction reducing pain medication requirements.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 9531122 [PubMed - indexed for MEDLINE]

11. AM J SPORTS MED

1996 Mar-Apr;24(2):193-5.

The use of cold therapy in the postoperative management of patients undergoing arthroscopic anterior cruciate ligament reconstruction.

Edwards DJ, Rimmer M, Keene GC.

SPORTSMED SA, Adelaide, Australia.

In this prospective, randomized study we assessed the use of cold therapy after arthroscopic anterior cruciate ligament reconstruction. Seventy-one patients were randomly allocated, without the knowledge of the single surgeon, to one of three groups: Group I had an ice water-filled CryoCuff fitted in the operating theater after surgery, Group II had room temperature water in the CryoCuff, and Group III patients had no CryoCuff. Patients were well matched for age, sex, and associated surgery. An independent observer measured blood loss, analgesic use, range of motion, and visual analog pain scores postoperatively. There were no differences between any of the three groups regarding the variables measured.

The use of cold therapy devices as an adjunct to the postoperative management of these patients must be questioned.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 8775119 [PubMed - indexed for MEDLINE]

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12. KNEE SURG SPORTS TRAUMATOL ARTHROSC

1996;4(4):200-5.

Postoperative analgesic effects of an external cooling system and intra-articular bupivacaine/morphine after arthroscopic cruciate ligament surgery.

Brandsson S, Rydgren B, Hedner T, Eriksson BI, Lundin O, Sward L, Karlsson J.

Department of Orthopaedics, Ostra University Hospital, Goteborg, Sweden.

The aim of this study was to evaluate the analgesic effect of an external cooling system with or without the combined effect of intra-articularly administered bupivacaine/morphine after arthroscopic anterior cruciate ligament (ACL) reconstruction. Fifty patients with isolated ACL insufficiency operated on under general anaesthesia were randomized to three different postoperative treatment groups. Group I was treated with the cooling system during the first 24 h after surgery and an intra-articular injection of 20 ml of physiological saline given at the completion of surgery; in group II, the cooling system was combined with an intra-articular injection of 20 ml bupivacaine 3.75 mg/ml and 1 mg of morphine at the end of the operation; while group III (placebo group) received an intra-articular injection of 20 ml of physiological saline at the completion of surgery. Pain was assessed using a visual analogue scale (VAS) at 1, 2, 4, 6, 24 and 48h postoperatively. Supplementary analgesic requirements were registered. In group I 80% (16/20) and in group II 90% (18/20) of the patients were satisfied with the postoperative pain control regimen (NS). This was significantly better than in group III, where 30% (3/10) were satisfied.

The pain scores were significantly lower in the two treatment groups compared with the placebo group during the entire postoperative period. The pain score was significantly lower in group II than in group I at 24 and 48 h after surgery.

The supplementary analgesic requirements were also lower in the two treatment groups compared with the placebo group. No complications due to the use of the cooling system or the intra-articular injections of bupivacaine/morphine were observed. The external cooling system used in this study provides an effective method of obtaining pain relief after arthroscopic surgery. The combination with an intra-articular injection of morphine and bupivacaine results in a slightly greater analgesic effect than the cooling system alone.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 9046503 [PubMed - indexed for MEDLINE]

13. CLIN ORTHOP

1993 Dec;(297):174-8.

The role of cold compression dressings in the postoperative treatment of total knee arthroplasty.

Levy AS, Marmar E.

Department of Orthopaedic Surgery, Albert Einstein Medical Center, Philadelphia, Pennsylvania 19141.

A prospective randomized study was performed to evaluate the role of cold compressive dressings in the postoperative treatment of total knee arthroplasty (TKA). Eighty consecutive unilateral and ten bilateral primary total knee replacements were evaluated in terms of blood loss, pain relief, and range of motion. Patients in the cold compression group demonstrated an average of 548 ml in suction drainage, whereas those in the control group averaged 807 ml. This resulted in an average 3.1 mg hemoglobin drop in the cold compression group and 4.7 mg in the control group. When body habitus and weight were taken into account in the cold compression group, an average total blood loss of 1298 cc was calculated, with 744 ml arising from soft tissue extravasation. The corresponding total blood loss calculated average was 1908 ml in the control group, with 1101 ml attributed to soft tissue extravasation. Total injectable morphine per kilogram per initial 48 hours averaged 0.53 mg in the cold compression patients and 0.69 mg in the control patients. In the cold compression knees, range of motion averaged 86 degrees before operation, 53 degrees on postoperative day (POD) 7, and 77 degrees on POD 14. In the control knees, range of motion averaged 88 degrees before operation, 44 degrees on POD 7, and 65 degrees on POD 14. The use of cold compression in the postoperative period of TKA results in a dramatic decrease in blood loss. In addition, mild improvements are seen in early return of motion and injectable narcotic pain needs in the postoperative period.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 7902225 [PubMed - indexed for MEDLINE]

14. Z RHEUMATOL

1993 Sep-Oct;52(5):289-91.

The influence of heat and cold on the pain threshold in rheumatoid arthritis.

Curkovic B, Vitulic V, Babic-Naglic D, Durrigl T.

Department of Rheumatology and Rehabilitation, University Hospital, Rebro, Zagreb, Croatia.

Superficial heat and cold are commonly used therapeutic methods in patients with rheumatoid arthritis. Both procedures have analgesic effect. In 30 inpatients with rheumatoid arthritis the pain threshold was measured before and after warm bath and ice massage. Rheumatoid patients had significantly lower pain threshold compared to the healthy subjects in normal circumstances. Heat and cold remarkably raise the pain threshold right after the application. The pain threshold is also raised 10 and 30 min after cryotherapy, but not after the warm bath. Between investigated groups there were no statistically significant differences in the pain threshold values in any observed time. We consider that both methods have a reasonable place in the therapy of rheumatoid arthritis.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 8259720 [PubMed - indexed for MEDLINE]

15. ARCH EMERG MED

1989 Mar;6(1):1-6.

Clinical benefits of early cold therapy in accident and emergency following ankle sprain.

Sloan JP, Hain R, Pownall R.

Accident and Emergency Department, University Hospital, Nottingham, England.

One hundred and forty-three patients presenting with ankle sprains within 24 h of injury were entered into a double blind study. Treatment consisted of a standardized regime of high dose non-steroidal anti-inflammatory medication and an elastic support for all patients, who were then randomly allocated to two groups. One group received immediate cold therapy, the other received simulated therapy. Assessments made at 7 days showed a trend in favour of the group receiving cold therapy, although this did not reach significance. It is concluded that cold therapy

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together with compression may have a beneficial effect but that a single application in the accident and emergency department is not justified when a background therapy of non-steroidal anti-inflammatory medication is given.

PUBLICATION TYPES: Clinical Trial, Randomized Controlled Trial

PMID: 2712981 [PubMed - indexed for MEDLINE]

16. CLIN SPORTS MED

1985 Jul;4(3):431-8.

The use of physical agents in rehabilitation of athletic injuries.

Hillman SK, Delforge G.

The competitive athlete's motivation to return to activity following injury presents a challenge to the sports medicine specialist to utilize the most effective rehabilitation procedures available. Safe return to competition necessitates maximal restoration of those components of physical fitness affected by injury (such as muscular strength, power, endurance). Various forms of superficial heat and cold application, deep heat modalities, and electrical currents have been used to supplement therapeutic exercise in this process.

In recent years, the therapeutic benefits of cold for the control of exercise-induced edema and as a prelude to performance of prescribed exercise have been widely recognized. Although short wave and microwave diathermy appear to have lost much of their appeal as deep tissue heating modalities, the thermal and mechanical effects of ultrasound continue to make it a widely used modality in sports medicine. Adaptation of alternating electrical currents for use in transcutaneous nerve stimulation has given the sports medicine clinician a useful modality for pain management. The more recently developed "Russian" electrical stimulator provides a promising modality for muscle re-education and restoration of muscular strength.

PMID: 3874709 [PubMed - indexed for MEDLINE]

17. CLIN PODIATRY

1984 Aug;1(2):301-13.

Therapeutic modalities and procedures.

Part I: Cold and Heat. Helfand AE, Bruno J.

Therapeutic cold, or cryotherapy, has the cooling of the tissues as its primary effect. Based on the mode of application and duration of exposure, the basic physiologic effects are sedation, refrigeration, and the possibility of tissue destruction. Therapeutic heat is usually applied for two physical effects: superficial heat and deep heat. Hyperemia, sedation, and analgesia are the primary effects.

PMID: 6536394 [PubMed - indexed for MEDLINE]

18. PAIN

1984 Mar;18(3):239-48.

Analgesic effect of vibration and cooling on pain induced by intraneural electrical stimulation.

Bini G, Cruccu G, Hagbarth KE, Schady W, Torebjork E.

Psychophysical experiments were carried out on 16 human subjects to determine how low intensity mechanical and thermal skin stimuli interfere with the sensation of pain. Moderate or intense pain was induced by low frequency (2 Hz) electrical stimulation within cutaneous fascicles of the median nerve at wrist level, and vibration, pressure, cooling or warming were applied for short periods (usually 20-60 sec) within or outside the skin area to which the pain was projected. Vibration within the area of projected pain reduced the sensation of pain more efficiently than vibration outside that area. Moderate pain was sometimes completely inhibited but intense pain was only moderately reduced.

Pressure and cooling produced some pain relief whereas mild warming had an ambiguous effect. Since the painful input derived from stimulation of fibres in the nerve trunk, and not from peripheral nociceptors, the pain suppressing effects of vibration and cooling are not explicable in terms of lowered excitability of the nociceptive nerve endings in the skin. Instead, the results indicate that activity in low threshold mechanoreceptive and cold sensitive units suppresses pain at central (probably segmental) levels.

PMID: 6203084 [PubMed - indexed for MEDLINE]

19. COLD- AND HOT-PACK CONTRAST THERAPY: SUBCUTANEOUS AND INTRAMUSCULAR TEMPERATURE CHANGE.

Journal of Athletic Training.
32(3):238-41, 1997 Jul-Sep. (24 ref)

Abbreviated Source: J ATHLETIC TRAIN.
32(3):238-41, 1997 Jul-Sep. (24 ref)

Accession Number, 1998003357.

Special Fields Contained Fields available in this record: abstract, cited references.

Myrer JW, Measom G, Durrant E, Fellingham GW.

Brigham Young University, Provo, UT
84603-2717.

ABSTRACT

OBJECTIVE To investigate the temperature changes in subcutaneous and intramuscular tissue during a 20-minute cold and hot-pack contrast therapy treatment. Design end Setting: Subjects were randomly exposed to 20 minutes of contrast therapy (5 minutes of heat with a hydrocollator pack followed by 5 minutes of cold with an ice pack, repeated twice) and 20 minutes of cold therapy (ice pack only) in a university laboratory. Subjects: Nine men and seven women with no history of peripheral vascular disease and no allergy to cephalexin hydrochloride volunteered for the study. Measurements: Subcutaneous and intramuscular tissue temperatures were measured by 26-gauge hypodermic needle microprobes inserted into the left calf just below the skin or 1 cm below the skin and subcutaneous fat, respectively. Results: With contrast therapy, muscular temperature did not fluctuate significantly over the 20-minute period compared with the subcutaneous temperature, which fluctuated from 8 degrees C to 14 degrees C each 5-minute interval. When subjects were treated with ice alone, muscle temperature decreased 7 degrees C and subcutaneous temperature decreased 17 degrees C over the 20-minute treatment. Conclusions: Our results show that contrast therapy has little effect on deep muscle temperature. Therefore, if most of the physiologic effects attributed to cold and hot contrast therapy depend on substantial fluctuations in tissue temperature, contrast therapy needs to be reconsidered as a viable therapeutic modality.

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20. CONTRAST THERAPY AND INTRAMUSCULAR TEMPERATURE IN THE HUMAN LEG.

Journal of Athletic Training. 29(4):318-22, 376-7, 1994 Dec. (36 ref)

Abbreviated Source: J ATHLETIC TRAIN. 29(4):318-22, 376-7, 1994 Dec. (36 ref)

Accession Number, 1996021958.

Special Fields Contained: Fields available in this record: abstract, cited references.

Myrer JW. Draper DO. Durrant E.

Brigham Young University, Provo, UT 84602.

ABSTRACT

Contrast therapy, although having a long history of use in sports medicine and physical therapy, remains insufficiently researched. We investigated the thermal effects of contrast therapy on intramuscular temperature. We randomly assigned 28 college students to either a control or a contrast group, eight women and six men per group. We shaved and cleansed a 4- x 4-cm area of skin over the right medial calf and inserted a microprobe to a depth of 1 cm below the skin and subcutaneous fat in the center of the gastrocnemius. Each control subject immersed the treatment leg in a hot whirlpool (40.6 degrees C) for 20 minutes. Each contrast subject first immersed the treatment leg in a hot whirlpool (40.6 degrees C) for 4 minutes then into a cold whirlpool (15.6 degrees C) for 1 minute. Contrast subjects repeated this sequence three additional times. We recorded intramuscular temperatures every 30 seconds over the entire treatment time for both groups. The control group had a temperature increase of 2.83 + or - 1.14 degrees C over the 20-minute treatment. The contrast group temperature increased 0.39 + or - 0.46 degrees C from baseline to the end of the treatment. The largest temperature change from the end of one contrast immersion to the end of the next was only 0.15 + or - 0.10 degrees C. None of the differences between the end of one immersion to the end of the next were significant. Conversely, all differences between the same time periods in the control group had significant temperature increases. Apparently contrast therapy, as studied, is incapable of producing any significant physiological effect on the intramuscular tissue temperature 1 cm below the skin and subcutaneous tissue. We recommend that further research be done to examine the effects of longer periods in both

the hot and cold environments on the intramuscular temperature of the human leg. Further investigation of intra-articular or periarticular temperature change produced by contrast therapy should also be undertaken.

21. SUPERFICIAL HEAT AND COLD: HOW TO MAXIMIZE THE BENEFITS.

Physician & Sportsmedicine. 22(12):65-72, 74, 1994 Dec. (27 ref)

Abbreviated Source: PHYSICIAN SPORTSMED. 22(12):65-72, 74, 1994 Dec. (27 ref)

Accession Number 1995007229.

Kaul MP. Herring SA.

Institution Department of Physical Medicine and Rehabilitation, Veterans Administration Medical Center, Portland, Oregon.

Local Messages

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