

## Heat or Cold Packs for Neck and Back Strain

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Presented: 署中-楊智雯  
Supervisor: VS洪世文  
990510

### Introduction

- ✗ Topical application of heat or cold packs is a common adjunct in the treatment.
- ✗ Numerous reports advocate the use of heat and or ice for soft tissue injury 、 muscle spasms.
- ✗ However, there is very little evidence supporting.
- ✗ A number of studies have evaluated analgesic effects of heat and cold therapy separately; however, few directly compared their efficacy

### METHODS

- ✗ single-center, prospective, randomized clinical trial. from April to July 2008
- ✗ patients were identified by trained research assistants
- ✗ Inclusion: >18y/o 、 neck or back pain < 24 hrs and resulting from minor injury (lifting, pulling, twisting, minor motor vehicle collision)

### METHODS

- ✗ Exclusion: pain was an exacerbation of prior neck or back injury 、 if they had S/S of radiculopathy, neurologic deficits, spinal fracture 、 having contraindication to treatment with NSAIS.

### STUDY PROTOCOL

- ✗ Data included information (age/sex/race), specific information (quality/location of pain, mechanism /duration of injury, medication used)
- ✗ Patients were asked to report level of discomfort by placing vertical
- ✗ mark on 100 mm horizontal VAS (visual analog scale)
- ✗ all patients were given 400 mg of ibuprofen orally

### STUDY PROTOCOL

- ✗ Patients were randomized to 30mins continuous treatment with Cold Pack (maintained average skin of 28.7 F, varying between 19.9 and 34.1F) or electric heating pad (average skin of 132F, varying between 130 and 135.6F)
- ✗ after Tx, patients were asked to rate level of pain by VAS and rate change in pain on verbal rating scale (VRS)

## OUTCOMES AND MEASUREMENTS

- ✦ main outcome measure was the difference in pain severity on VAS
- ✦ Secondary outcome measures include percentage of patients requiring rescue analgesia, degree of pain relief, and future desire for similar packs

## RESULTS

Baseline Characteristics (n = 60)

Characteristics	Heat (n = 31)	Cold (n = 29)	p-value
Age, yr (SD)	38 (±15)	36 (±11)	0.66
Sex, n (% female)	16 (52)	14 (48)	0.8
Location of pain, n (%)			
Neck	4 (13)	11 (38)	0.62
Upper back	6 (19)	1 (3)	
Lower back	19 (61)	15 (52)	
Missing data	2 (7)	2 (7)	
Mean pretreatment VAS, mm (95% CI)	75 (66-83)	72 (65-78)	0.56
Mean post treatment VAS, mm (95% CI)	66 (57-75)	64 (56-73)	0.75

VAS = visual analog scale.

## RESULTS

- ✦ **no differences in VAS pain scores** between heat and cold groups both before and after treatment.
- ✦ Although statistically significant, decrease did not achieve predefined clinically significant reduction in pain (15-mm difference in VAS scores)
- ✦ **no statistical difference in verbal rating scale (VRS)** reporting between groups

Results of Outcome Measures

Outcomes	Heat (n = 31)	Cold (n = 29)	Difference (95% CI)	p-value
Primary				
VAS difference, mm (SD)	9 (±16)	8 (±10)	1 (-5.7 to 7.9)	0.75
Secondary				
Requested rescue medication, n (%)	18 (58)	12 (41)	17 (-8 to 39)	0.2
Administered rescue medication, n (%)	10 (32)	7 (24)	8 (-14 to 29)	0.49
Patient satisfaction, n (%)	25 (81)	22 (76)	5 (-16 to 25)	0.65

VAS = visual analog scale.

## DISCUSSION

- ✦ Clinicians are frequently asked about benefits and timing of ice/heat therapy
- ✦ results of our study demonstrate 30-minute application of heat or cold does not significantly improve the pain

## DISCUSSION

- ✦ heat or cold may alleviate pain of muscle strain through number of physiologic mechanisms:
  1. pain threshold may be increased by application of heat or cold
  2. Cold has been demonstrated to decrease nerve conduction velocity, exerting local anesthetic effect
  3. heat or cold increased small nonmyelinated C-fiber activity that inhibits nonceptive signals within the spinal cord and brain stem
  4. Heating decreases gamma-fiber activity in muscle, reducing the sensitivity of muscle spindle to stretch

## DISCUSSION

- ✗ joint clinical practice guideline from the American College of Physicians (ACP) recommends application of heat as self-care option for shortterm relief of acute low back pain
- ✗ Recent Cochrane review reports moderate evidence supporting use of heat wrap therapy and insufficient evidence for cold treatment of acute low back pain

## DISCUSSION

- ✗ no systematic comparisons of heat versus cold as adjuvant therapy of acute neck or back strain
- ✗ Landen: no difference between hot packs and ice massage
- ✗ We found similar outcome; neither heat nor cold application resulted in a significant change in pain severity.

## LIMITATIONS

- ✗ study did not include control group:
  - positive control group minimize false-negative results, confirming variable (heat or cold) is effective → group that received ibuprofen only
  - negative control group minimize false positive → group received placebo ibuprofen and no thermal therapy. (ACP guideline recommends acetaminophen or NSAIDs as first-line medication. we did not feel that it was ethical to have negative control group )
- The design does not provide ability to differentiate effects of heat vs.cold alone and does not prove additional benefit of these modalities beyond ibuprofen

## LIMITATIONS

- ✗ therapy was prescribed for 30 minutes' duration based on previous literature pertaining to muscle cooling and warming. However, treatment of short duration may not have sufficient time for a noticeable effect
- ✗ Several studies have demonstrated continuous heat therapy was effective in alleviating the pain

## LIMITATIONS

- ✗ Nadler et al.concluded 8 hours of continuous heat therapy (104F) provided higher pain relief scores compared to oral acetaminophen or ibuprofen as a first-line therapy
- Our findings would not extrapolate to repeated or continuous use of thermal therapy
- ✗ BMI may be as important as duration.Johnson et al found a significant correlation ( $r = 0.81$ )
  - ✗ between BMI and intramuscular temperature.
- We did not measure body mass index

## LIMITATIONS

- ✗ It is possible heat or cold may not have direct impact on pain severity, but may assist in time to recovery.Nadler et al demonstrated that continuous low-level heat wrap for 48 hours has long-lasting effects on low back pain, flexibility.
- We did not collect follow up

## CONCLUSIONS

- ✦ addition of 30-minute of heating pad or cold pack to ibuprofen therapy for acute neck or back strain results in **mild yet similar improvement** in the pain severity
- ✦ However, it is possible that **pain relief is mainly result of ibuprofen**
- ✦ Choice of heat or cold therapy should be based on patient/practitioner **preferences and availability**.