

Device-supported cryotherapy with a water sleeve system (Hilotherm^R)

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Setting the scene:

Cryotherapy is an important field in orthopedics and trauma surgery as well as rheumatology, particularly during the postoperative phase. It is recommended in virtually all applicable textbooks and publications:



Bischoff/Heisel/Locher, 2007: Praxis der konservativen Orthopädie Bläsius et al., 2008: Nachbehandlungsfibel Orthopädie und Unfallchirurgie
Heisel/Jerosch, 2006: Schmerztherapie der Halte- und Bewegungsorgane
Heisel/Jerosch, 2007: Rehabilitation nach Hüft- und Knieendoprphese
Stein/Greitemann, 2004: Rehabilitation in Orthopdie und Unfallchirurgie
Thabe, 1997: Praktische Rheumaorthopädie
Wirth/Mutschler, 2007: Praxis der Orthopädie und Unfallchirurgie
Verschiedene AWMF-Leitlinien

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...to name but a few.

Positive effects of cryotherapy:

- Reduction in tissue perfusion with "metabolic damping"
- Muscular relaxation (following initial short-term increase in muscle tone)
- Pain relief
- Helps inhibit bleeding and "edema"

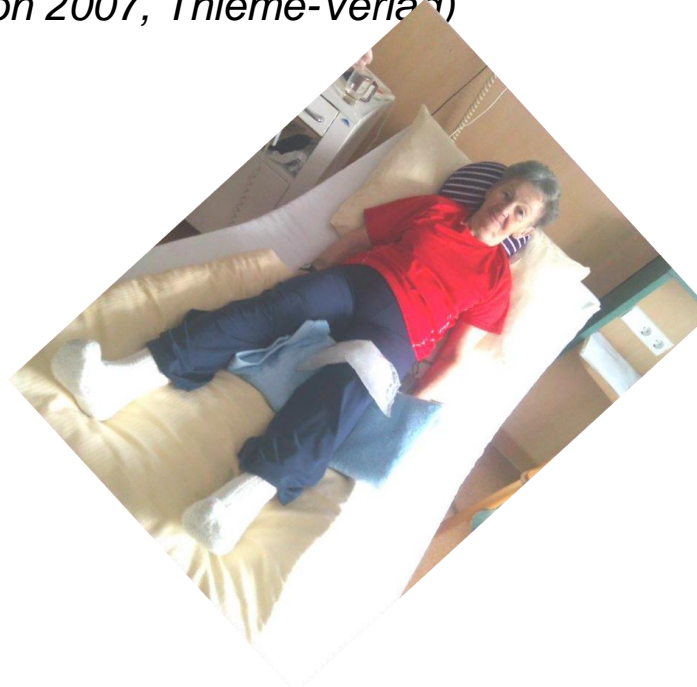
(Heisel/Jerosch, 2006: Schmerztherapie der Halte- und Bewegungsorgane, p. 126, ff.)

- Neurophysiological effects (inhibition of nociceptive fibers)
 - Vasomotor effects (following brief vasoconstriction, vasodilatation with localized hyperemia)
 - Metabolic effects (deceleration of the activity of biochemical processes)
- (Niethard/Pfeil/Bieberthaler, 2009: Orthopädie und Unfallchirurgie, 6th edition, p. 565, ff.)*

Negative effects of cryotherapy by using Ice or Cool Pads

- Disruption of wound or tissue healing
- Damage to peripheral nerves
- Increases the risk of lymphedema

(van den Berg et al, "Physiofachbuch", Angewandte Physiologie Volume 1, 2nd edition 2003, and Volume 3, 2nd edition 2007, Thieme-Verlag)



Cryotherapy:

In sports medicine:

R – Rest – A break from physical activity, hospital examination

I – Ice – Cooling of the affected area with ice, ice water or cooling spray

C - Compression – Applying a bandage with moderate pressure

E – Elevation of the affected extremity

(nach Prof. Dr. Dieter Böhmer)



Setting the scene:

In the present analysis, the effectiveness of a new type of application (cold water sleeve system) should be checked for (pain relief), practicality and patient comfort.



Stationary device for the hospital



Mobile device for the outpatient sector

Background:

In older patients in particular, e.g. with polyneuropathy, conventional cryotherapy measures using ice bags, "Cryo-Cuff" or so-called cold packs are often problematic, since improper application may result in anything from **cold damage** to the formation of necrosis.

Another common problem emerges with application due to using **leaking** ice water bags or **slippage** of the cold packs, which increases the strain on nursing staff.



Cold damage after applying ice bag



Example an ice bag application

Application forms

- Ice bag
- Cold air
- "Cold packs"
- Ice compression
- "Cold towels"
- Cold sprays
- Cold packages with peloids



(AirCast TM)



Method:

Device description:

- Constant-temperature permanent operation (sensors, distilled water)
- Mains supply 230V
- 2l distilled water (to be changed every 6 months)
- Temperature range +10 and +30°C (adjustable in 1°C steps)
- Various sleeves depending on the area of the body
- Allows connection of 2 sleeves (treating two patients at the same time is also possible)



Method:

192 therapeutic applications were standardized and recorded via questionnaire.

The data included information on

- Age
- Gender
- Affected limb
- Number of procedures as well as intensity of the pain on a visual analogue scale (VSA 0-10) before and after each application

Hilotherapie-Protokoll

Patientendaten

Name, Vorname:

Alter:

Diagnose:

präoperativ postoperativ Behandlung ohne OP

Was soll die Hilotherapie bewirken?

Vermeidung von

Schmerzen

Schwellungen

Hämatom

Linderung von

Schmerzen

Schwellungen

Hämatom



Bitte markieren Sie die
therapierte(n) Körperstellen(n)

Verwendete Manschette(n):

Schmerzintensität, mit der ich im Alltag gut zurechtkomme



Schmerzmittel, die ich zur Zeit einnehme:

Method:


The therapy was administered in a standardized form for 20 minutes at a temperature of 10°-15° C. Depending on the area of application, corresponding sleeves were used.




Rheumatic Center

Name: Kübelange

START Datum: Uhrzeit: ENDE Datum: Uhrzeit: Temperatur:


Schmerzempfinden vor der Hirtotherapie 


Schmerzempfinden nach der Hirtotherapie 

Anmerkungen:

Mein heutiger Schmerzbedürfnis
 weniger
 gleichbleibend
 höher

START Datum: Uhrzeit: ENDE Datum: Uhrzeit: Temperatur:


Schmerzempfinden vor der Hirtotherapie 


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Schmerzempfinden nach der Hirtotherapie 

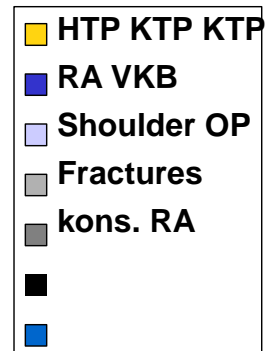
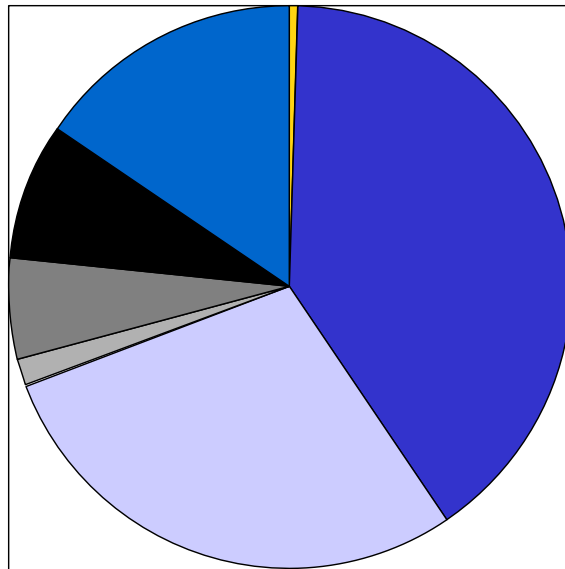
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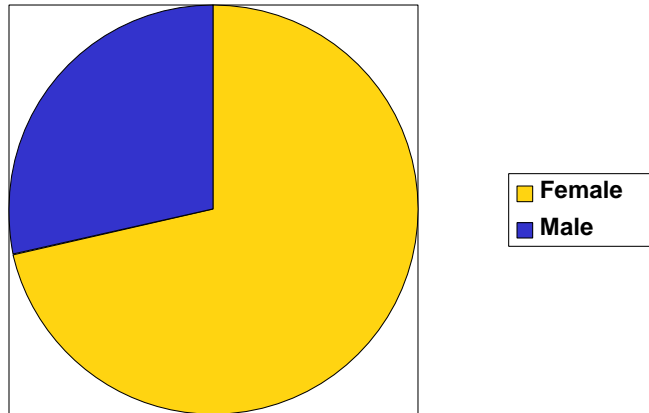


The therapy was applied with the following indications:

- Knee prosthesis operations
- Post-traumatic states
- Shoulder operations
- Applications for the hands and feet of rheumatic patients



Results (N = 192)



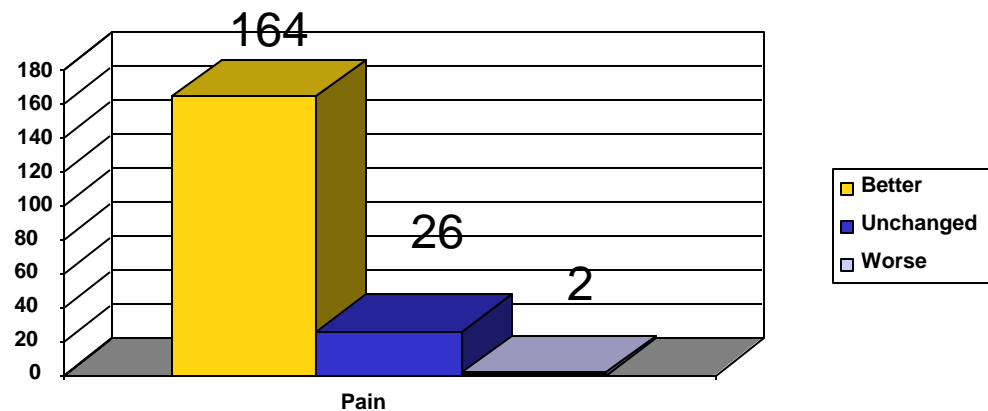
- 71.4 % of those questioned were female
- 28.6 % male,
- 38.5 % of the patients had an underlying inflammatory rheumatic disorder
- Average age 60.5 years (35 – 81)

The application was conducted by the patients themselves, following a briefing by physiotherapists or nursing staff.

Treatment was continued in all cases until full relief from pain or discharge from inpatient treatment.

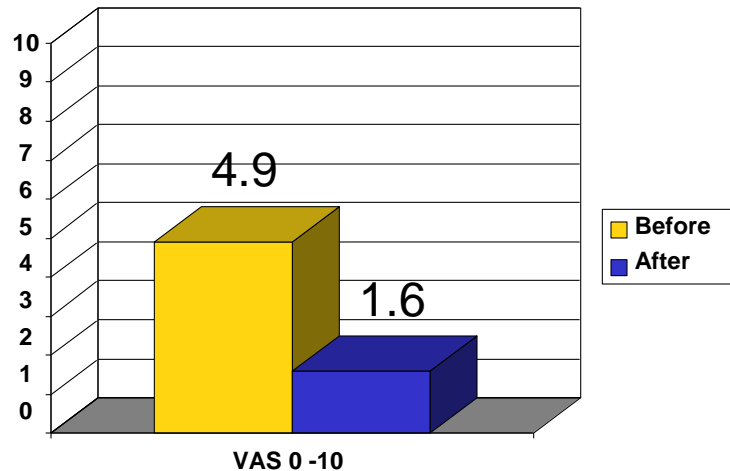
Results (N = 192)

- 192 therapies performed and documented
- In 164 cases, pain intensities were reportedly lower after the therapy than before it
- In 26 cases, the pain intensity was reportedly unchanged
- In 2 therapies, the pain after the therapy was reportedly somewhat more severe than before it



Results (N = 192)

- The average pain intensity as shown on a **visual analogue scale** declined from 4.9 before the 1st therapy to 1.6 after the final therapy.



- Throughout the entire observation period, **no** complications or incompatibilities were observed.
- No patient was forced to abandon the cold therapy due to intensified discomfort.

Results (N = 192)

Quotes from the individual feedback from patients:

- "Very pleasant, I don't need any more painkillers."
- "Redness and excessive warmth on the left declining, pains also subsiding."
- "Redness easing, but knee still overheated."
- "The cold is very soothing incountering the ever-present swelling."
- "I don't need any more painkilling drip."
- "With a motorized sleeve and the cooling device, the hematoma can be eliminated more rapidly."
- "Pain relief around 20 minutes after the cold is applied."
- "Although the cold sensation was unpleasant at first, it improved later."



Results (N = 192)

Business evaluation:

- Relieves the burden on nursing staff
- No fridge needed to store ice bags/packs
- No cold packs/ice bags
- Can be used for WL patients (GOÄ 53)
- "KTL-compatible"



Conclusion:

Advantages:

- Enhanced patient comfort
- High application safety (=> cold damage!)
- Individually adjustable temperature
- Relieves burden on nursing staff
- Available for outpatient and inpatient care

Disadvantages:

- Costs (?)
- Not prescribable



Prospects:

- Development of special sleeves e.g. for hands
- Prototypes currently being tested



Thank you very much for your attention!