

# Effectiveness of manual lymph drainage and continuous cooling following knee TEP



Klinik Lindenplatz

Orthopedic rehabilitation clinic with sports medicine department

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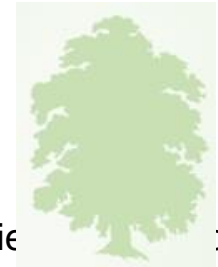
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# Lymph Drainage / Cooling – Why?

## Typical post-OP knee swelling following knee TEP



Patient 73,  
9 days post-OP



Patient 64,  
13 days post-OP



Patient, 60  
3 weeks post-OP



Patient, 75  
4 weeks post-OP

### Problem Area: Knee Swelling

- Ability to bend the knee and mobility compromised
- Wound healing process interrupted:
  - External wound dehiscence, wound edge necrosis
  - Delayed internal soft tissue healing
- Feeling of tightness and severe pain

## Severe post-OP knee swelling following knee TEP

### Rehabilitation following knee TEP

- frequent in almost every second patient
  - Pains
  - Severe knee swelling

### Causes:

- Early transfer to rehabilitation post-OP
  - Acute care hospital - almost complete bed rest
  - Rehab - larger walking distances required
- amongst other causes

# Objective

Adverse effects in rehabilitation following knee TEP

## Primary therapeutic aim

- Reduction in swelling of operated knee joint

## Pilot study to compare effectiveness of two treatment methods

- Continuous cooling
- Lymph drainage

## Patient population / Groups

### **15 patients post knee TEP, randomized**

(8F, 7M, 69.9Y, 1.72m, 86.7kg, BMI 29.4)

- **Cooling group (KÜ, N=8, termination of 2 VPNs)**
  - Cooling (Hilotherm), 25 min., 13-15 ° C
- **Lymph drainage group (LY, N=7)**
  - Manually, 25 min., neck, abdomen (lymph valves), then just Op-leg
- 3 weeks, 5x/week (Mon-Fri), 11 am, lying down
- Identical treatment program



## Cooling Hilotherm Clinic

### Continuous cooling

- Hilotherm Clinic  
constant temperature adjustable, here: 13-15° C



Source: [www.hilotherapie.com](http://www.hilotherapie.com)

## Leg volume measurement

### Leg volume

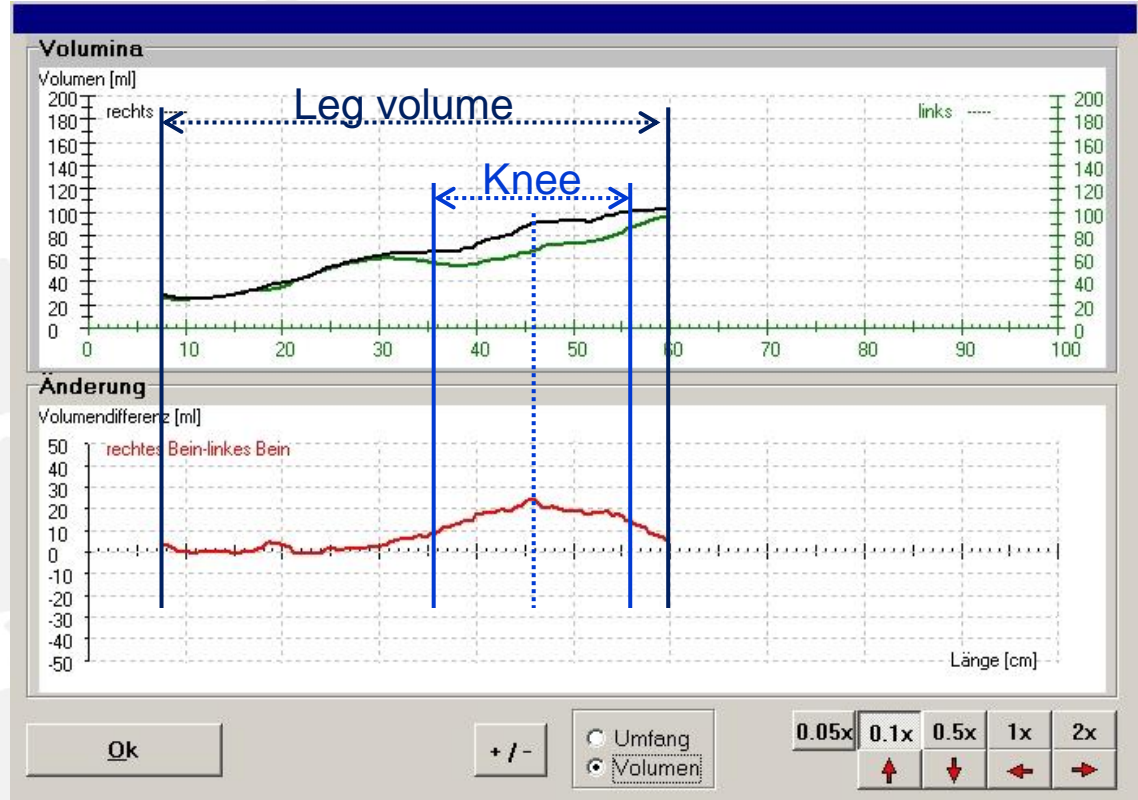
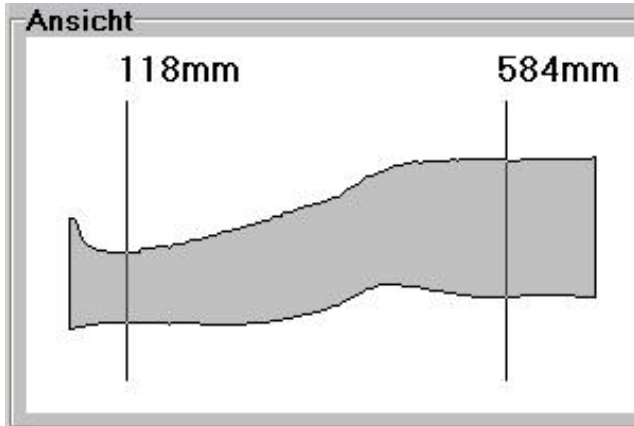
- Perometer (Pero-System)  
accuracy: <1%, (Jöllenbeck & Schönle, 2002)
- Measurement: Foot to mid-thigh
- Times (Mon-Fri)
  - 7 am
  - 11 am, pre & post
  - 3 pm



Source: [www.pero-system.de](http://www.pero-system.de)

# Method

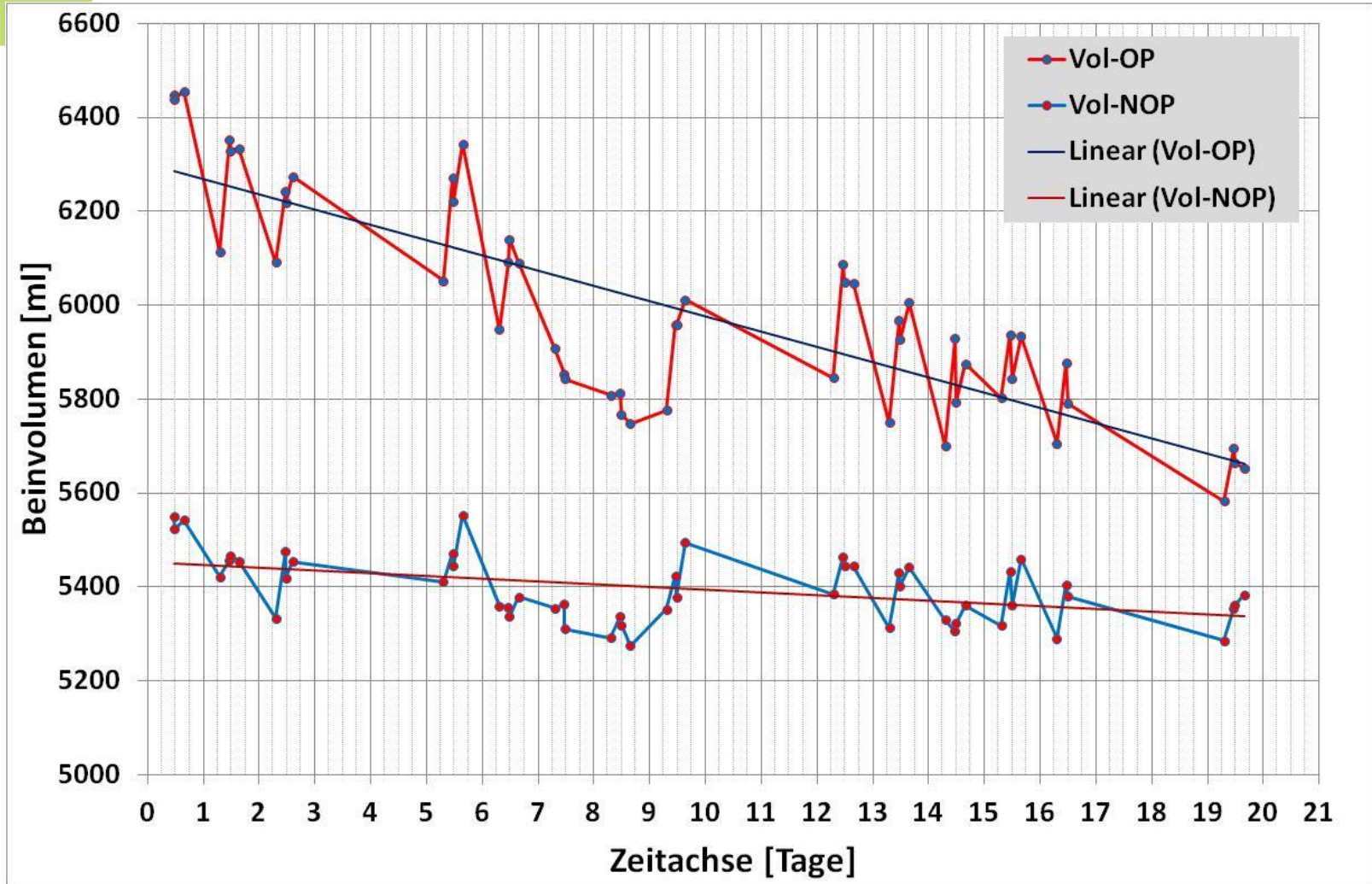
## Measurement leg/knee volume





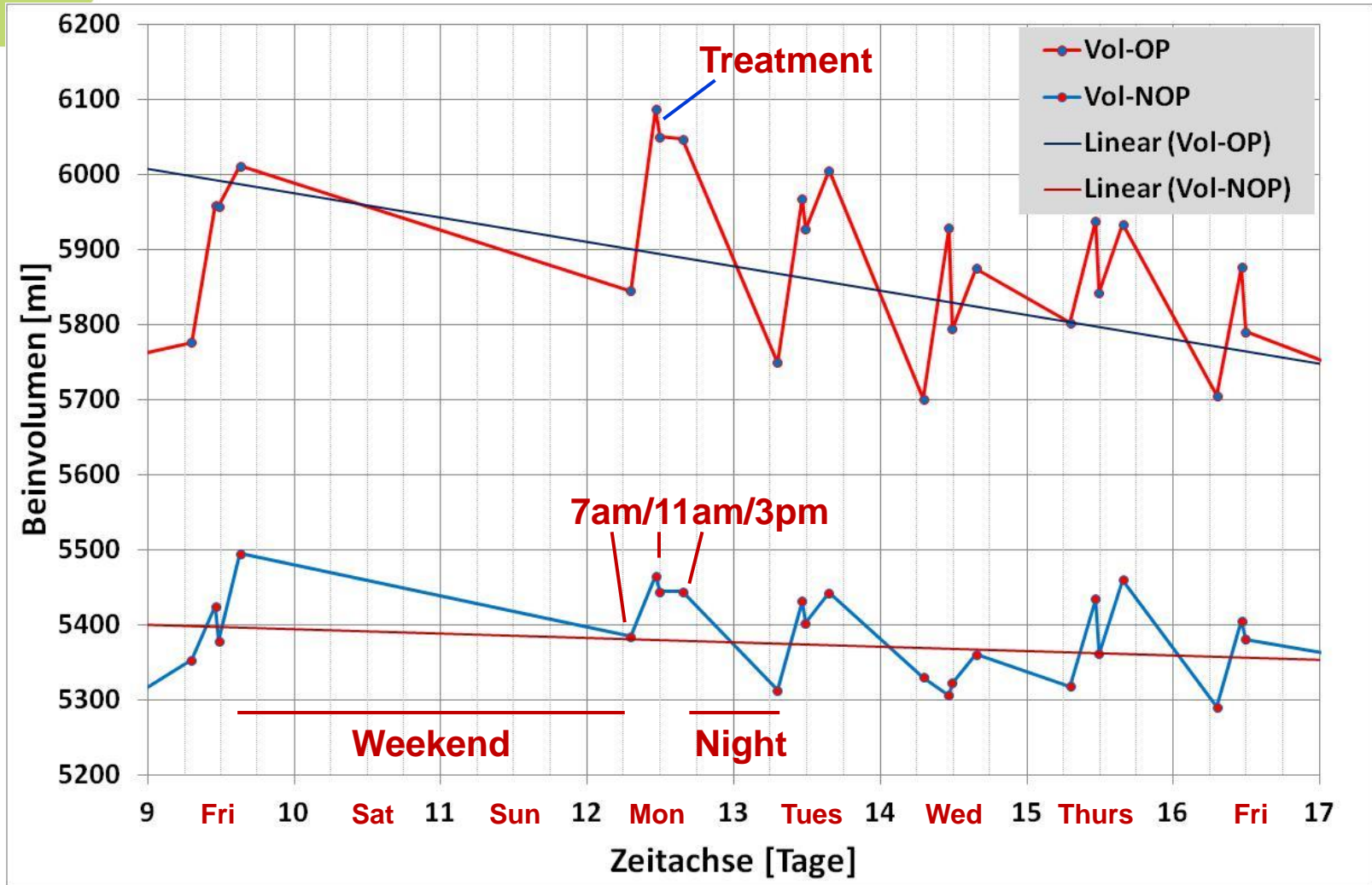
# Results

## Example: Leg volume over measurement period



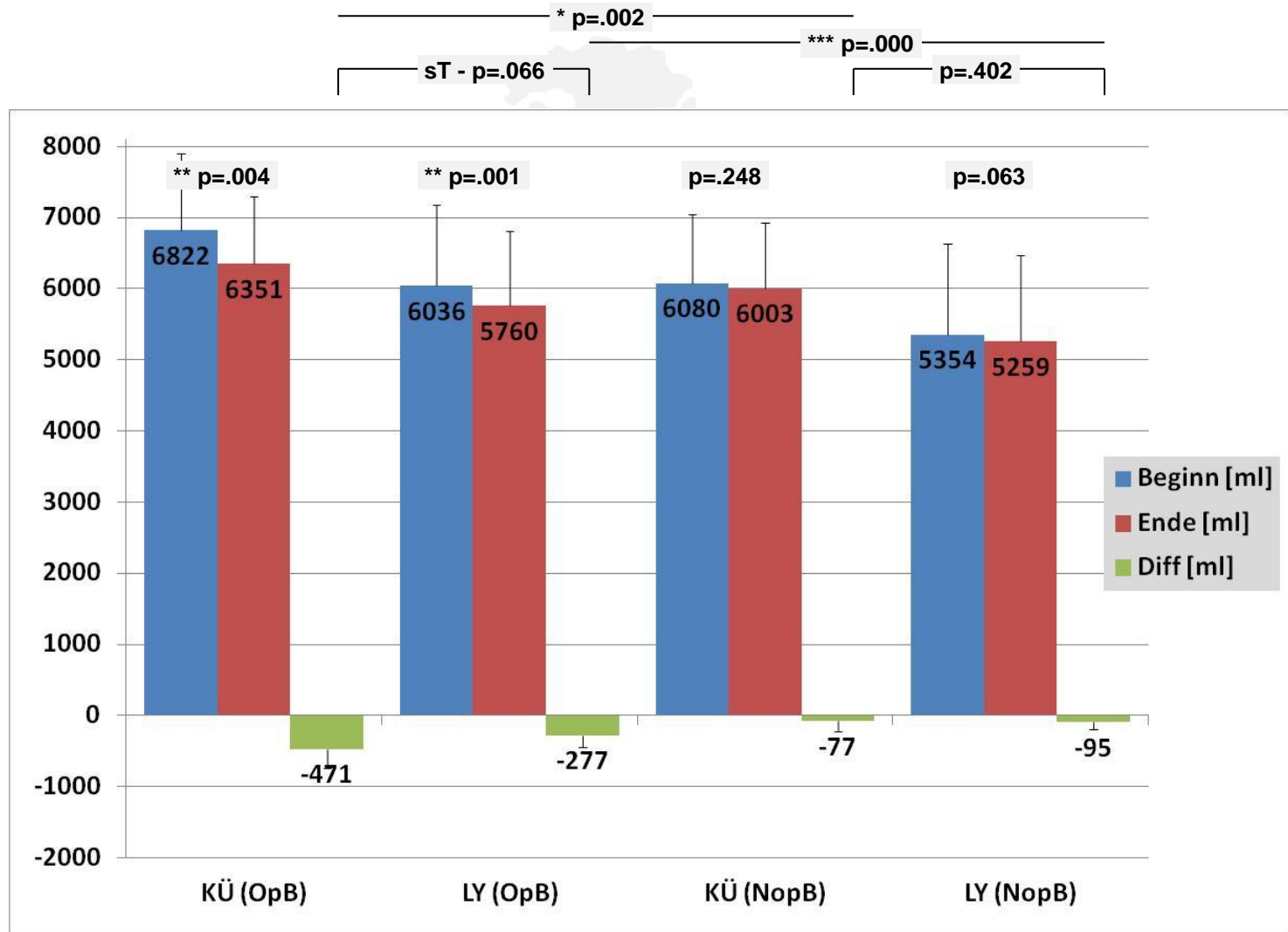
# Results

Example: Section: leg volume over 1 week



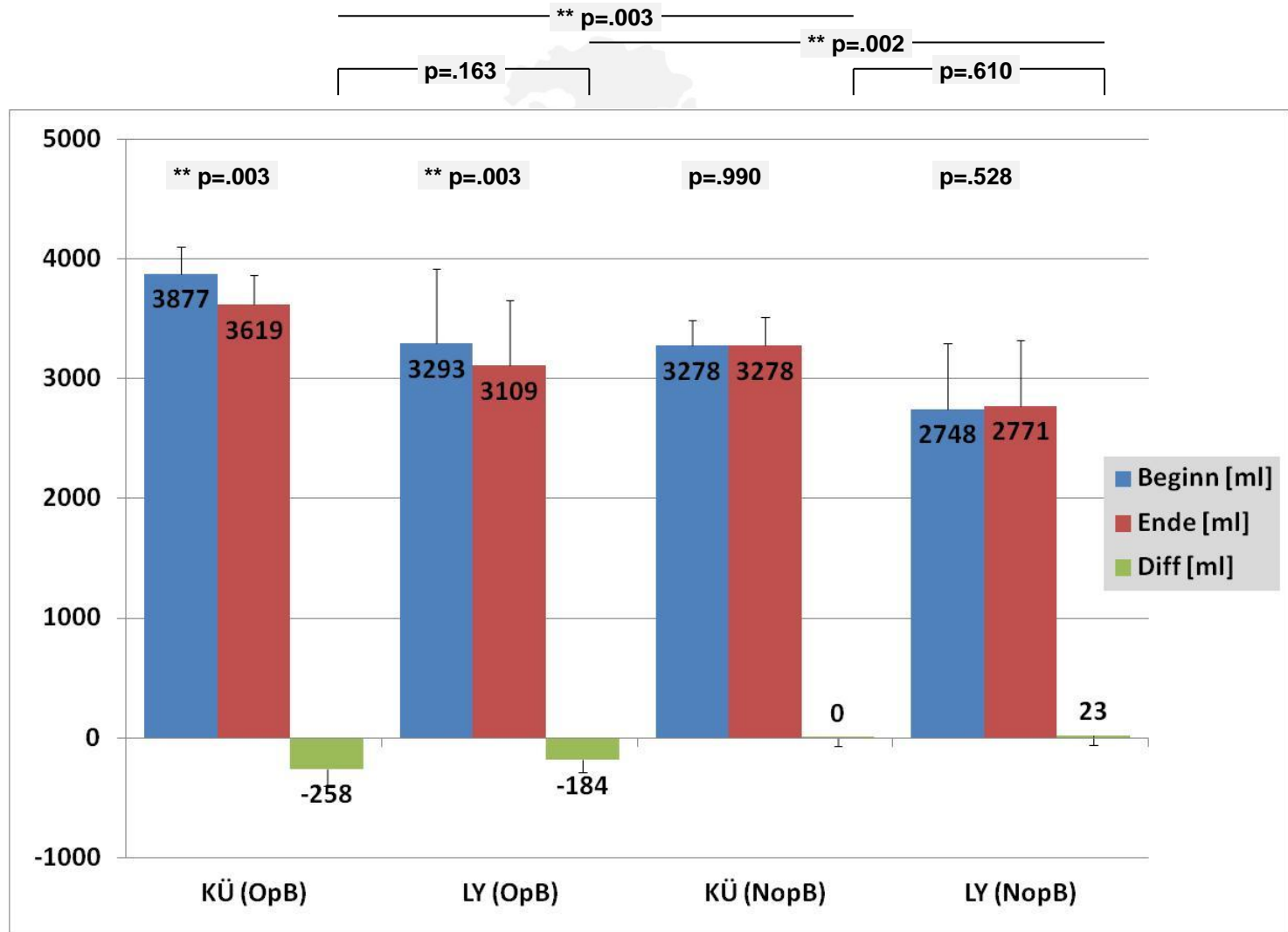
# Results

## Overall change in leg volume (absolute)



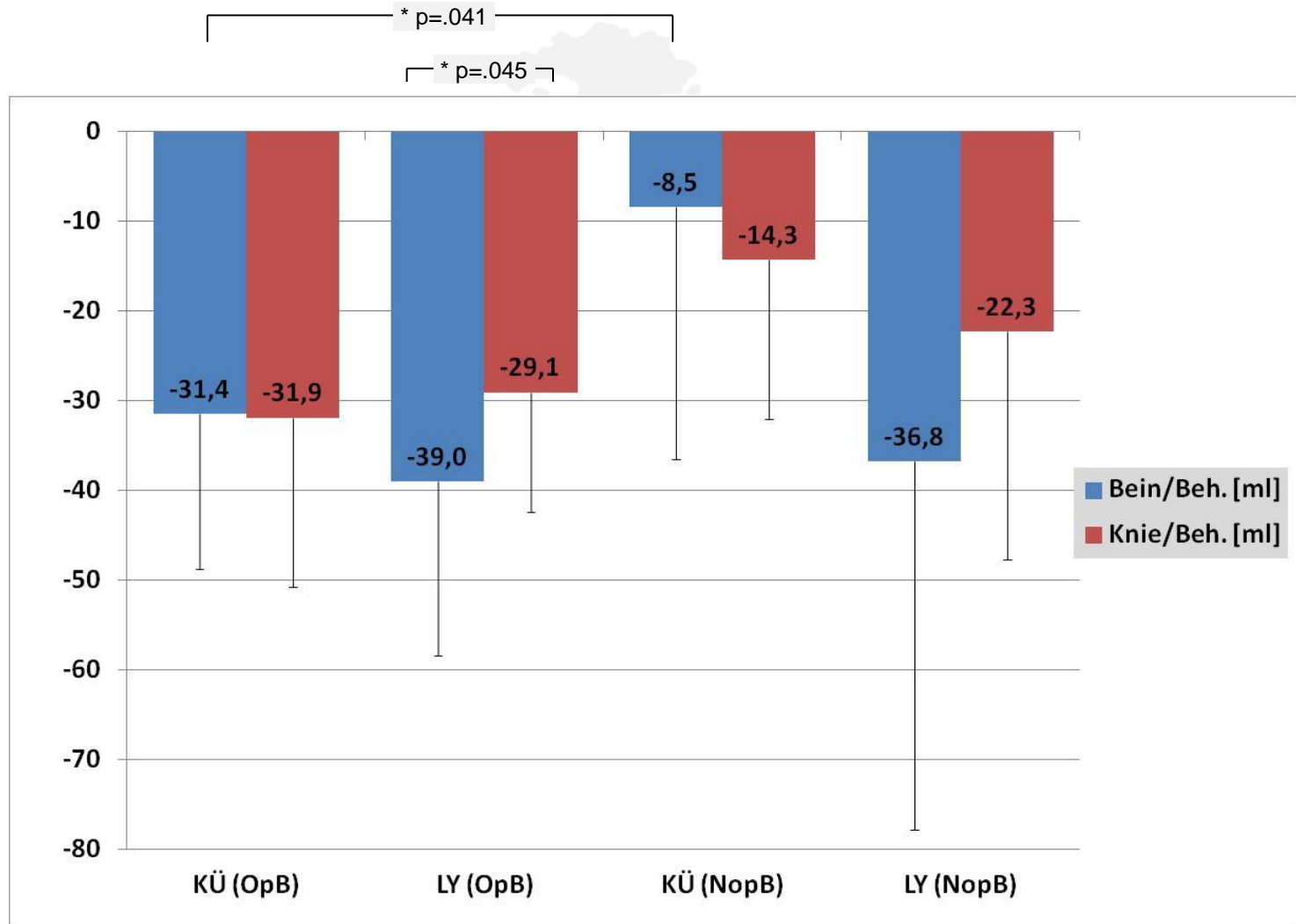
# Results

## Overall change in knee volume (absolute)



# Results

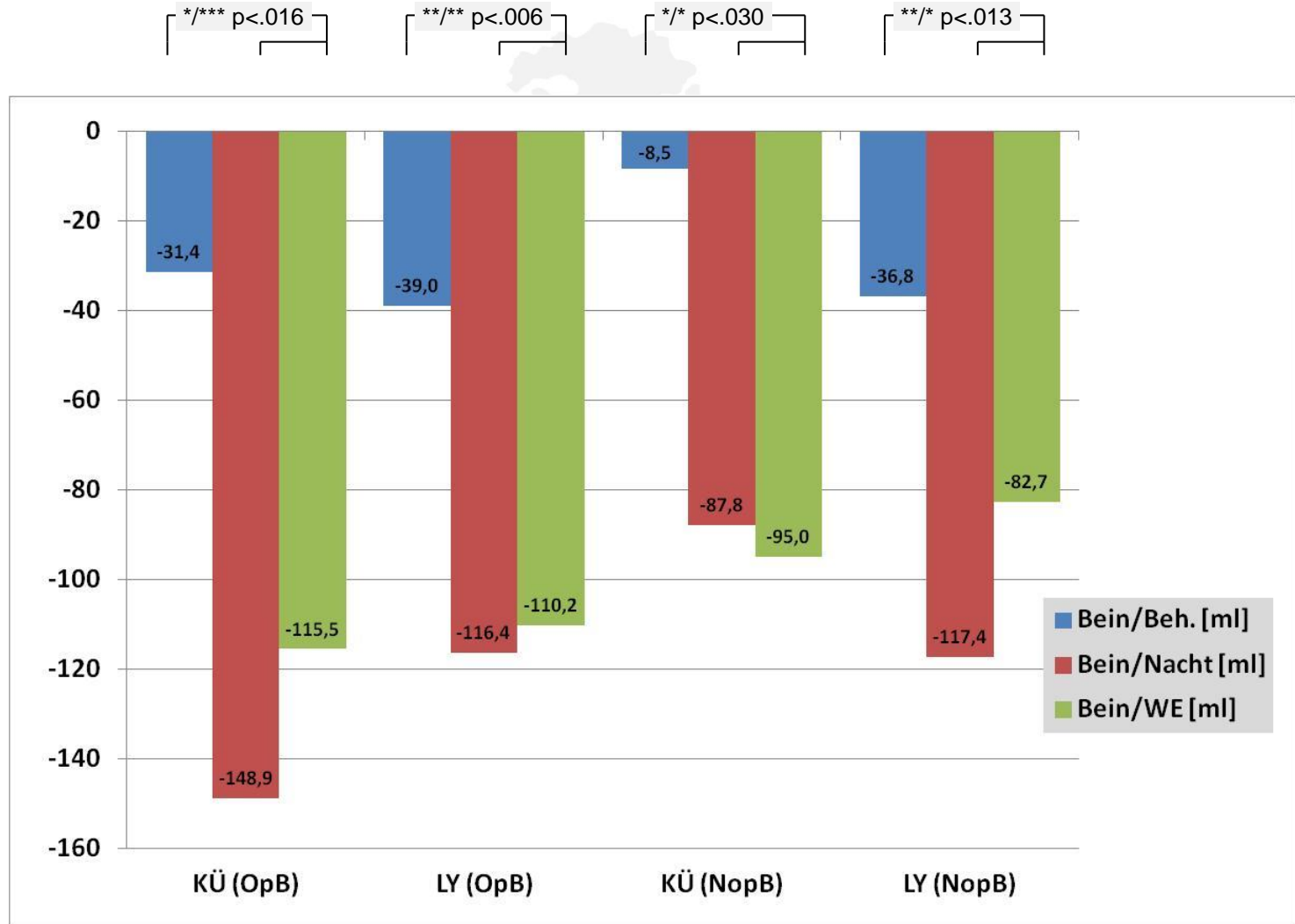
## Leg volume pre-post treatment





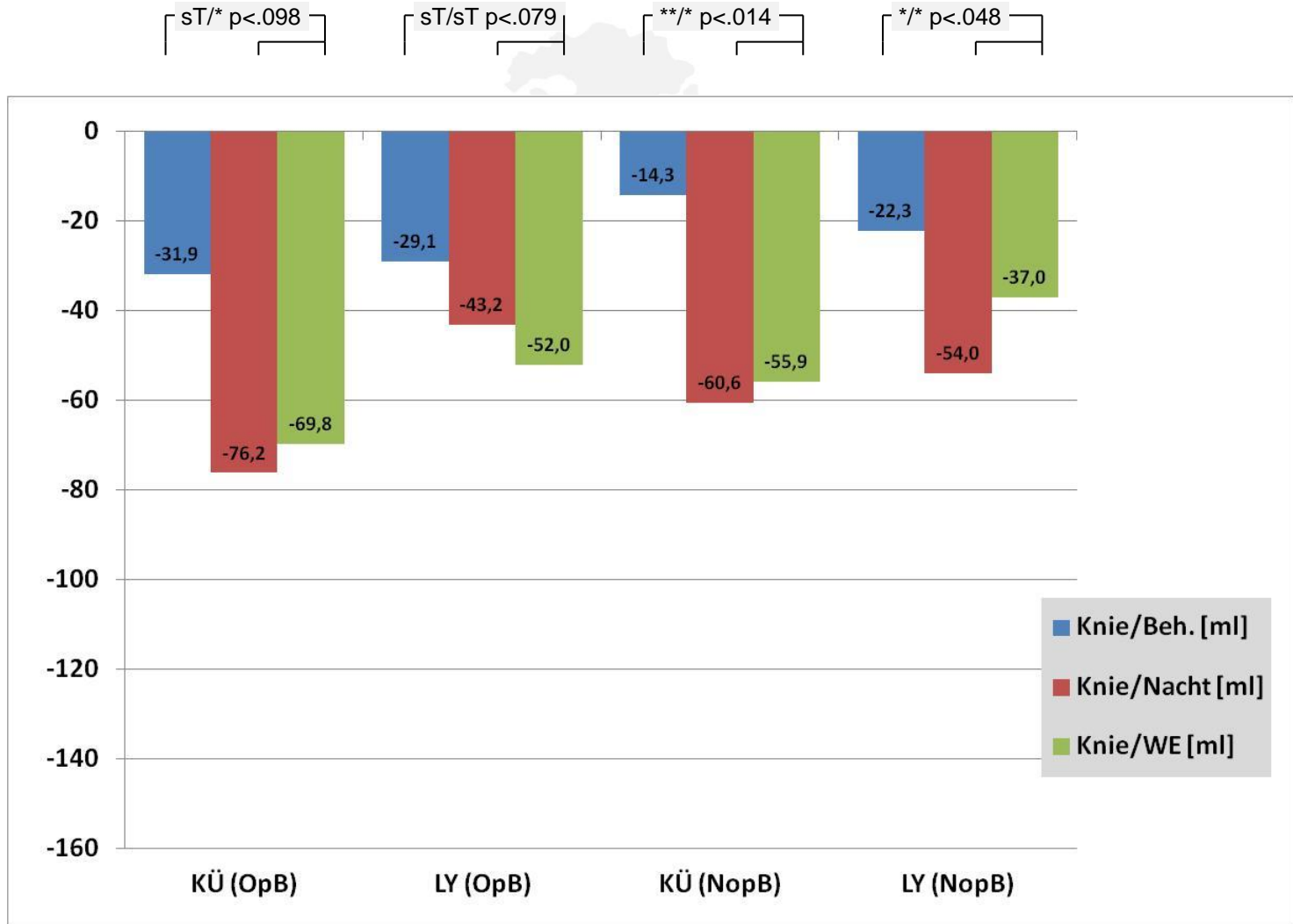
# Results

## Leg volume: Treatment vs. night rest & weekend



# Results

## Knee volume: Treatment vs. night rest & weekend



# Discussion

## Entire treatment period

- Reduction of the leg and knee volume on the operated side
- No reduction in leg and knee volume on non-operated and non-treated side
- Cooling on operated leg not more effective than lymph drainage
- This means that 30 min Hilotherapy has the same effect as 30 min manual lymphatic drainage