



# Evaluation of Cold Compression Therapy for Pain and Oedema management after TPLO

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## INTRODUCTION

- Cryotherapy :
  - Therapeutic application of cold in rehabilitation and physical therapy.
- Cold compression therapy:
  - Association between cold and tissue compression

## INTRODUCTION

- Cryotherapy :
    - Decrease pain
    - Decrease inflammation
    - Reduce oedema
- => Improve functional outcome

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  - Decrease pain
  - Decrease inflammation
  - Reduce oedema

=> Improve functional outcome

Increase efficacy?



COMPRESSION

## INTRODUCTION

- Standard of care in human being



## INTRODUCTION

- In veterinary medicine:
  - Few report
  - Game ready:
    - Expensive
    - No longer available
  - Ice pack compressed with bandage:
    - Time consuming
    - Use only in clinic



## INTRODUCTION

- In veterinary medicine:
  - A specific cold compression cryotherapy brace has been developed for the dog stifle:
    - Easy cold compression therapy
    - Could be performed:
      - Several time a days
      - by the owner



## INTRODUCTION

- In veterinary medicine:
  - Available in three size





## PURPOSE OF THE STUDY

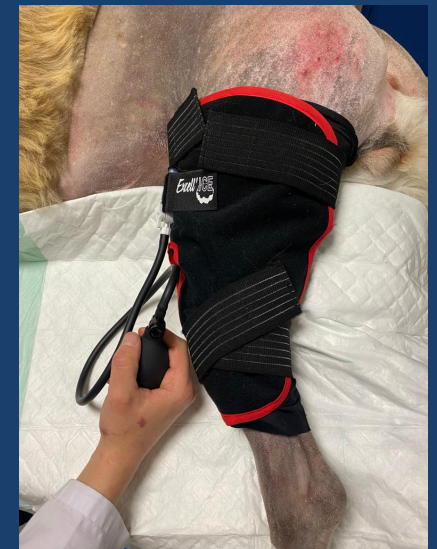
- To compare functional outcome of dogs treated for TPLO and three different cryotherapy postoperative protocols

## HYPOTHESIS

- Cold compression therapy with a specific brace allow a faster recovery with less pain and oedema

## METHODS

- 22 Dogs with unilateral CCL rupture treated by TPLO were randomly assigned to three group
  - Group A: Cold compression therapy with a specific brace



## METHODS

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  - Group B: standard cryotherapy (ice pack)



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  - Group A: Cold compression therapy with a specific brace
  - Group B: standard cryotherapy (ice pack)
  - Group C: no cryotherapy

## METHODS

- TPLO procedure:
  - Same anesthetic protocol with a femoro sciatic nerve bloc
  - Arthroscopic evaluation of the stifle
    - Partial menisectomy if required
  - Standard TPLO with locking plate

## METHODS

- Post operative management:

- Group A: CCT

- 3 times a day
- 20min
- D1, D2, D3



- Group B: standard cryotherapy

- 3 times a day
- 20min
- D1, D2, D3



- Group C: no cryotherapy

## METHODS

- Post operative management:
  - Morphine as necessary for first 3 days
  - Number of morphine injections recorded
  - NSAID for 2w



## METHODS

- Lameness evaluation:
  - Gait analysis
  - Pressure walkway (GaitRite, Biometrics, France®)
  - Once a day
  - D-1, D1, D2, D3

## METHODS

- Oedema evaluation:
  - Limb circumference
  - 4 anatomical areas of the limb
    - femoral diaphysis
    - tibial diaphysis
    - Patella
    - Tarsus
  - Once a day
  - D-1, D1, D2, D3

## METHODS

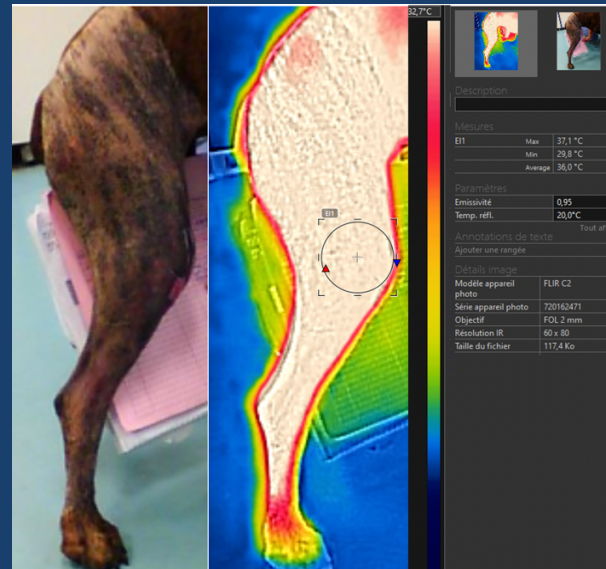
- Pain evaluation:
  - Pain score (4AVet Scale)
    - 3 times a day
    - D-1, D1, D2, D3
  - Number of morphine required

## METHODS

- Pain evaluation:
  - Number of morphine required
  - Pain thresholds
    - Von Frey electronic algometer
    - Before and after each cryotherapy protocol
    - D-1, D1, D2, D3

# METHODS

- Thermography
  - Thermal imaging system
  - Before and after each cryotherapy protocol
  - D-1, D1, D2, D3

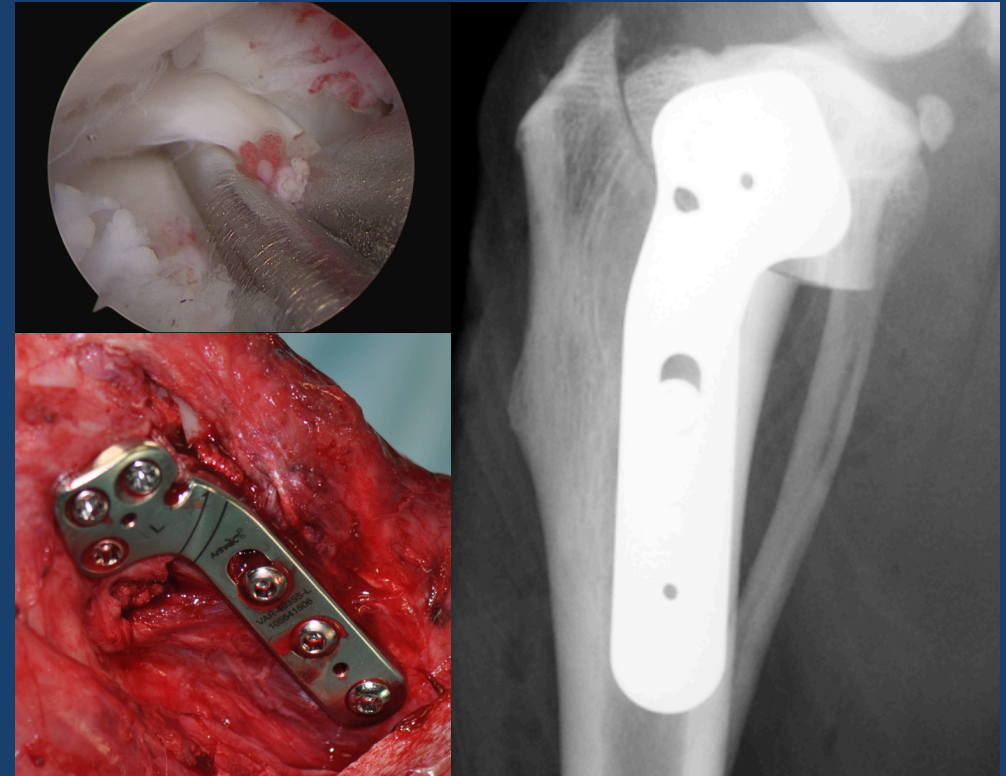


## METHODS

- No parametric test
- $P < 0,05$

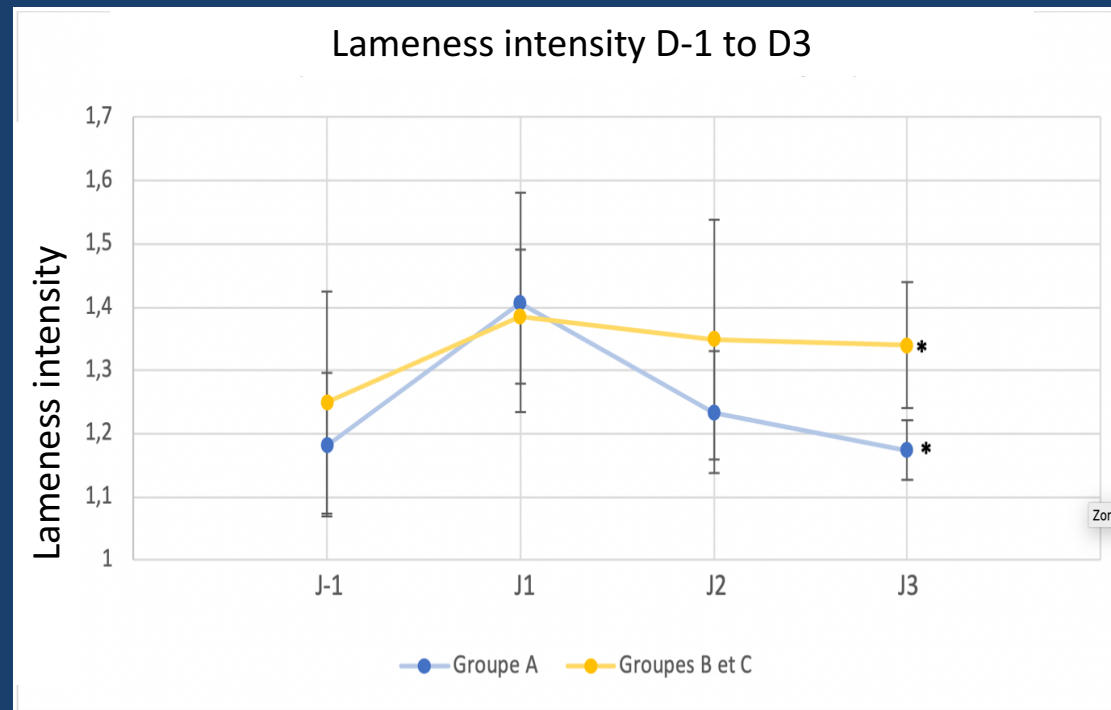
## RESULTS

- 22 dogs
  - Group A: 8
  - Group B: 7
  - Group C: 7
- Preoperative evaluation:
  - no difference among group



# RESULTS

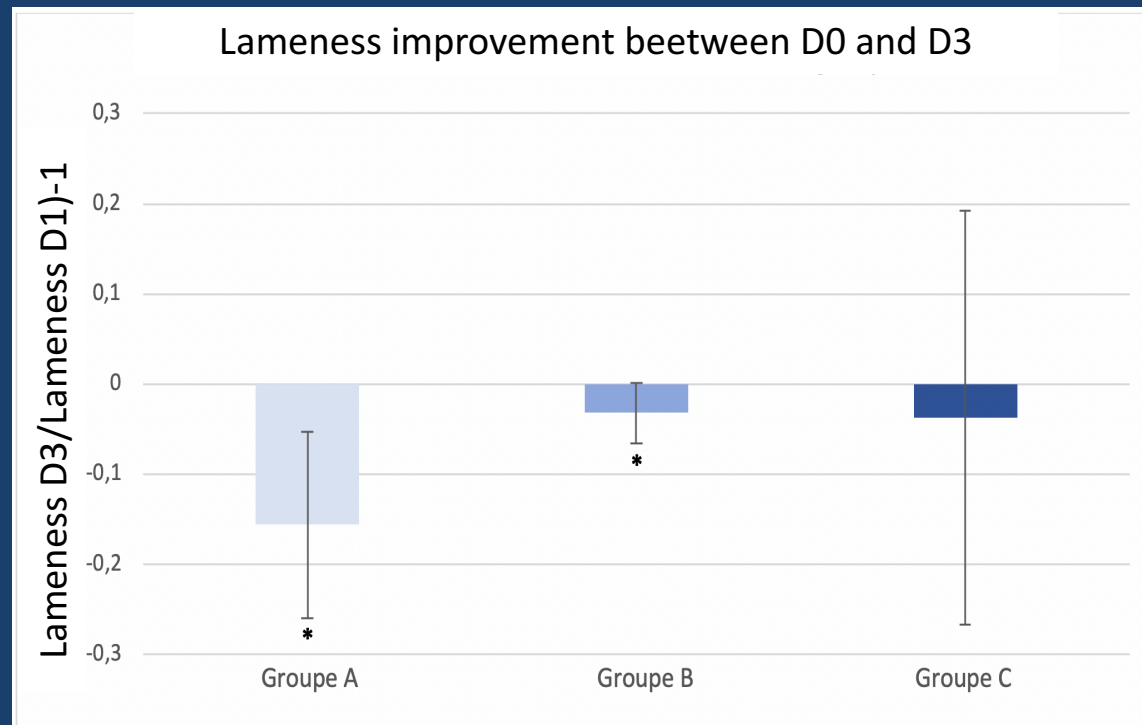
- Lameness intensity





# RESULTS

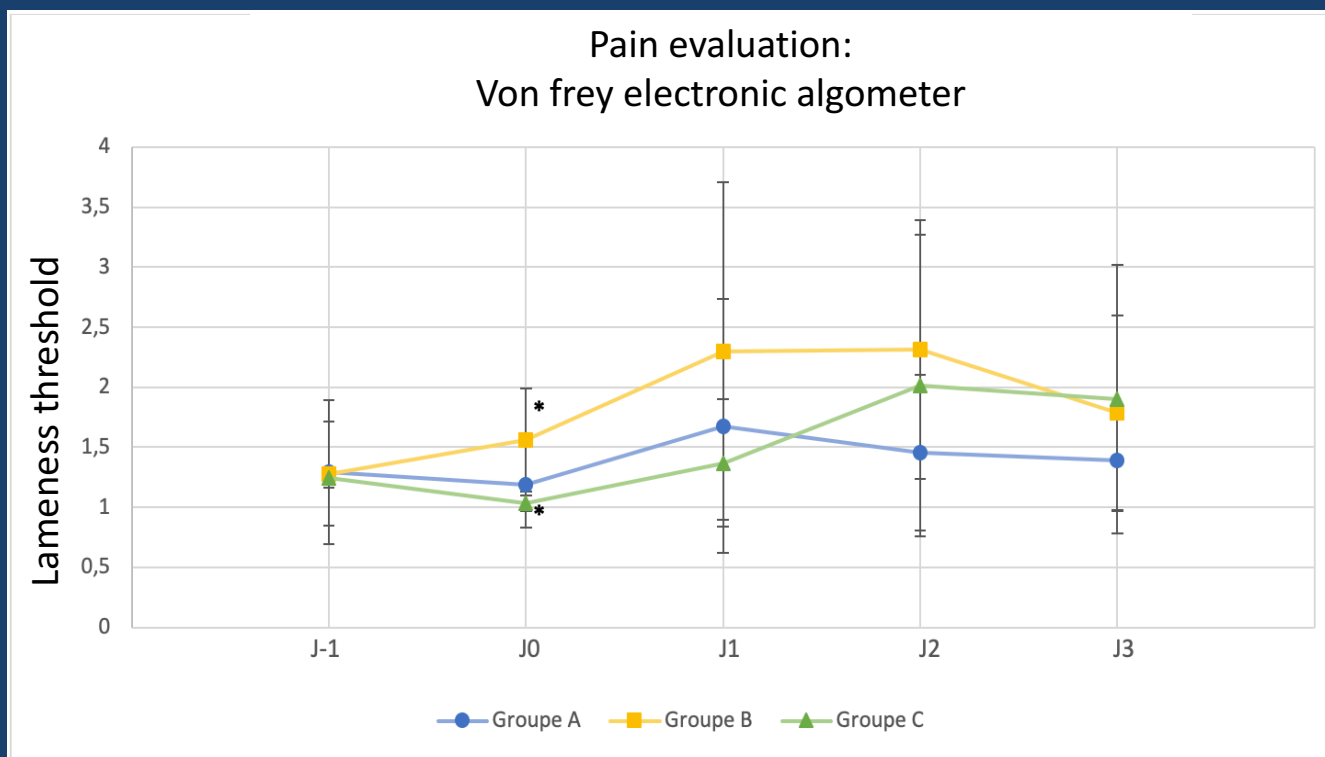
- Lameness improvement



- Group A:
  - 48% less lame
- Group B and C
  - +/- 5% less lame

# RESULTS

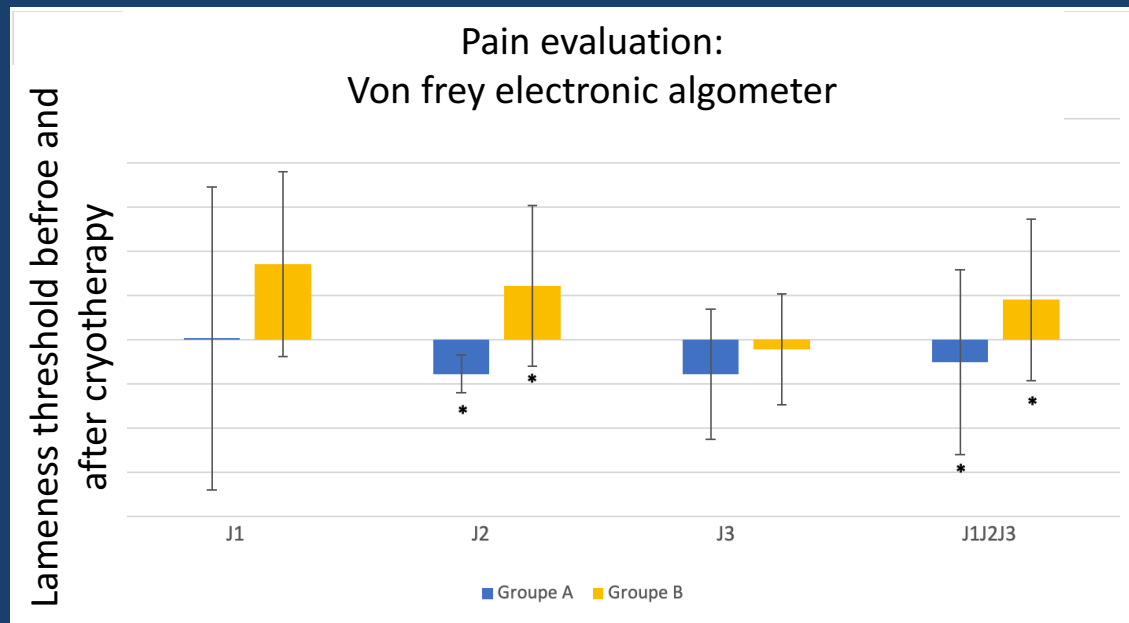
## • Pain



- Group A and B better improvement compare to group C
- Tendency group A less painful

# RESULTS

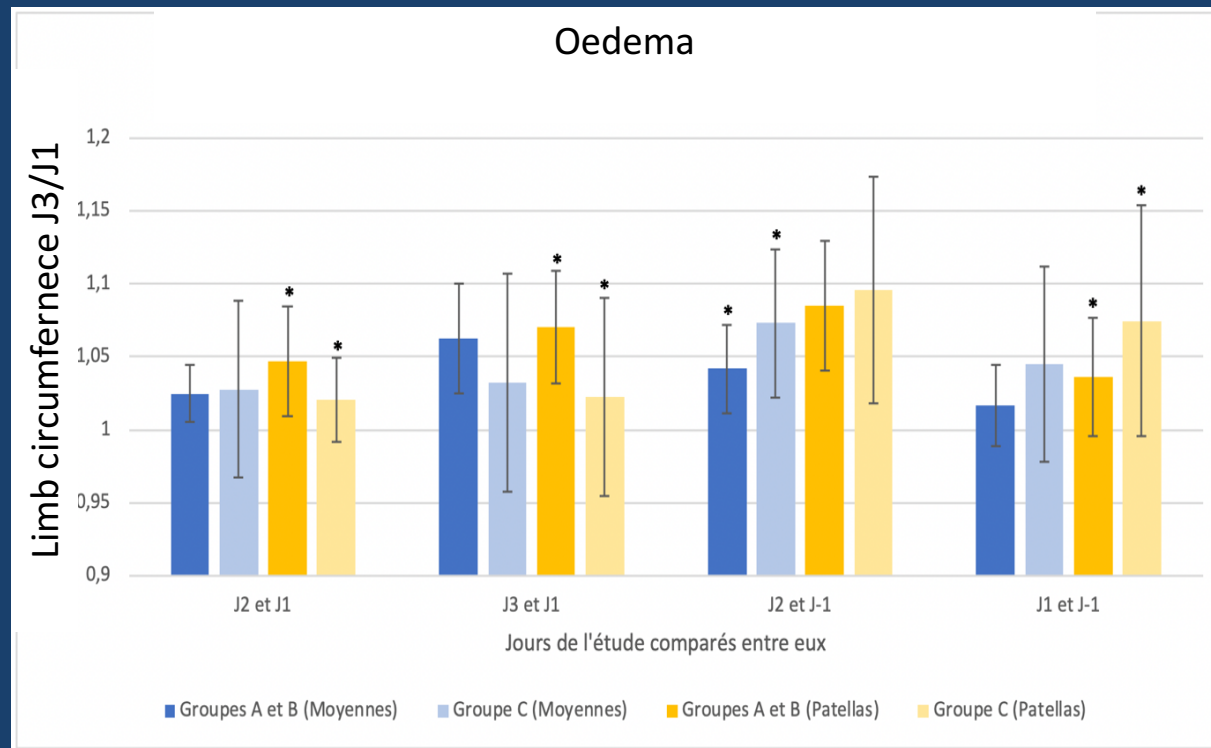
- Pain threshold before and after cryotherapy



- Significant increase of pain threshold in group A compare to groupe B

# RESULTS

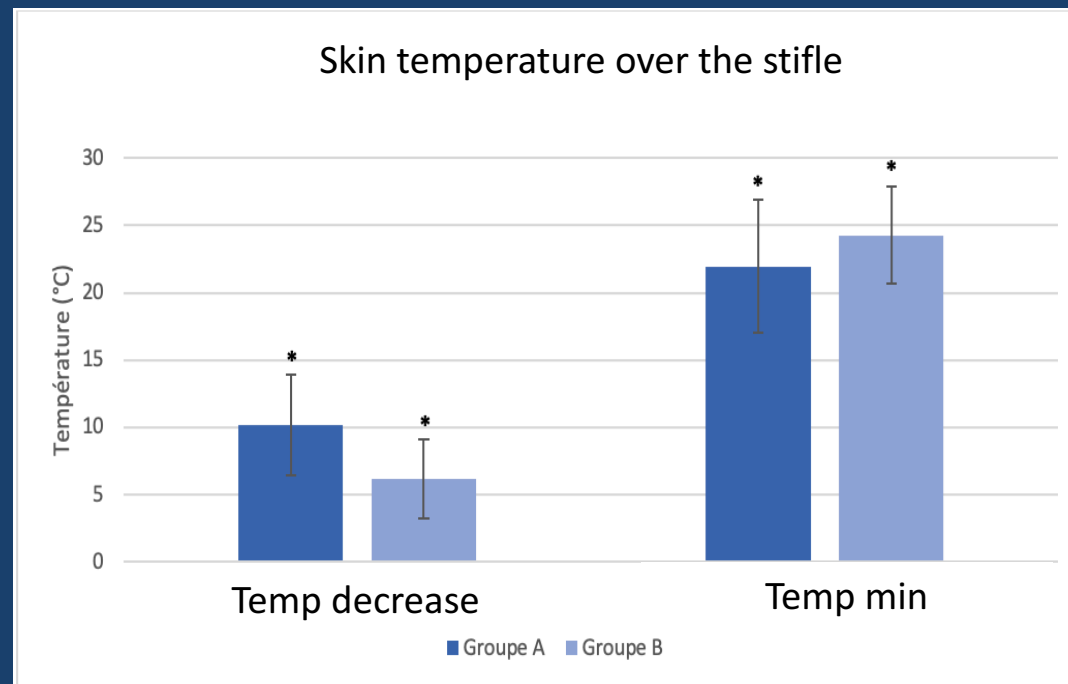
## • Oedema



- Less oedema in group A and B compare to group C

# RESULTS

## • Temperature



- Group A vs group B
  - Decrease of  $T^{\circ}$  more important (10° vs 6°)
  - Lower minimal temperature

## DISCUSSION

- Compared to standard cryotherapy no cryotherapy, cold compression therapy with a specific brace allow:
  - a faster recovery
  - with less pain

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- Compared to standard cryotherapy no cryotherapy, cold compression therapy with a specific brace allow:
  - a faster recovery
  - with less pain
- Less oedema in dogs with cryotherpay compare to control group

## DISCUSSION

- CCT group vs standard cryotherapy:
    - Lower skin temperature reach
    - Decrease of  $T^{\circ}$  more important
    - Higher pain thresholds
- => Increase efficacy of cryotherapy



## DISCUSSION

- Pre operative cryotherapy?

### Comparison of two cold compression therapy protocols after tibial plateau leveling osteotomy in dogs

**Niklas von Freeden<sup>1</sup>; Felix Duerr<sup>2</sup>; Michael Fehr<sup>1</sup>; Christian Diekmann<sup>1</sup>; Cornelia Mandel<sup>1</sup>; Oliver Harms<sup>1</sup>**

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## DISCUSSION

- Static vs dynamic compression?



## DISCUSSION

- Limits
  - Small cases numbers
  - Short term outcome only
  - Static compression without pressure standardisation

## DISCUSSION

- Side effect of cryotherapy:
  - Skin burns are reported in human being
  - Delay normothermia in dogs

### **Cryotherapy Improves Limb Use But Delays Normothermia Early After Stifle Joint Surgery in Dogs**

**Stephanie D. Szabo<sup>1</sup>, David Levine<sup>2</sup>, Denis J. Marcellin-Little<sup>3\*</sup>, Brian K. Sidaway<sup>1,4†</sup>, Erik Hofmeister<sup>1,5†</sup> and Erica Urtuzuastegui<sup>1</sup>**

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 **frontiers**  
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## CONCLUSION

- Specific Cold compression brace
  - Easy to use
  - Cheap
  - Could be use by the owner at home



### • IMPROVE SHORT TERM OUTCOME AFTER TPLO

- Increase number of cases with longer follow up



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# THANK YOU FOR ATTENTION

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