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Assessment of skinfold thickness as a factor related to chronic progressive lymphoedema in Belgian draught horses

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Overview

- Introduction: chronic progressive lymphoedema (CPL)
- Skinfold thickness and CPL
- Materials and methods
- Results
- Discussion
- Future perspectives

Introduction CPL

CHRONIC

Lasting, incurable

PROGRESSIVE

Worse as time progresses, fast/slow/steady state?

LYMPHOEDEMA

Tissue swelling: capillary filtration ↔ lymph drainage

Exact cause not known:

- Primarily a lymph system disorder
- Role of skin elasticity
- Genetic background

Introduction CPL

- Term ‘CPL’ & recognition of 3 affected breeds = 2003

- Clinical symptoms in draught horses = deformation & disability of the lower limbs
  - Starts at an early age (± 2 years)
  - Skin alterations (O_2, immunity↘)
  - Progressive detoriation
  - 4 legs possible - hind legs mostly worse
  - Both sexes - stallions mostly worse

CLINICAL EXAMINATION is the most practical method to diagnose CPL in the field → Veterinary scoring table

Introduction CPL

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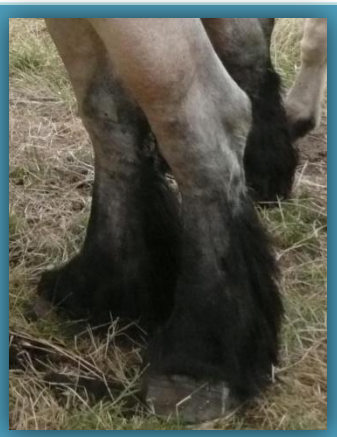
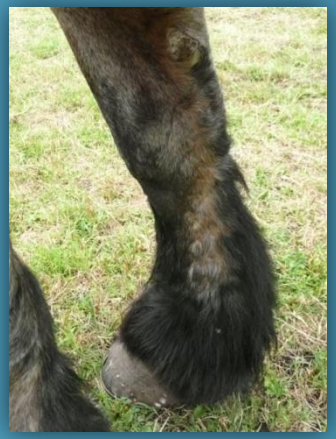
Veterinary scoring table – CPL

Class	AA=1	A=2	B=3	C=4	D=5
Status	Perfect	Mild	Moderate	Severe	Extreme





In this experiment:
CPL negative = AA,
CPL positive = A, B, C, D

Skinfold thickness and CPL

CPL = generalised disease with major skin changes

- Factors related with CPL prevalence (sex, age, cannon bone circumference, anti elastin antibodies, …)
- Are there ‘easy to measure’ components that give an indication about CPL/skin condition in horses?

In humans: skinfold capilers and ultrasone can detect lymphoedema (Roberts et al.. 1995; Van der Veen et al., 2001; Mellor et al.. 2004)

Skinfold thickness and CPL

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Problem

- CPL diagnosis sometimes difficult
- Variability in age of onset and clinical presentation
- Predictions are virtually impossible

Hypothesis

- Skinfold thickness measurements can detect oedema in draught horses
- Skinfold thickness is related to clinical CPL scores, age and sex

Materials and methods

- Privately owned Belgian draught horses, healthy except for CPL lesions

- Veterinary examination
  - Firm palpation 4 limbs
  - From knee/hock to hoof
  - 5 groups

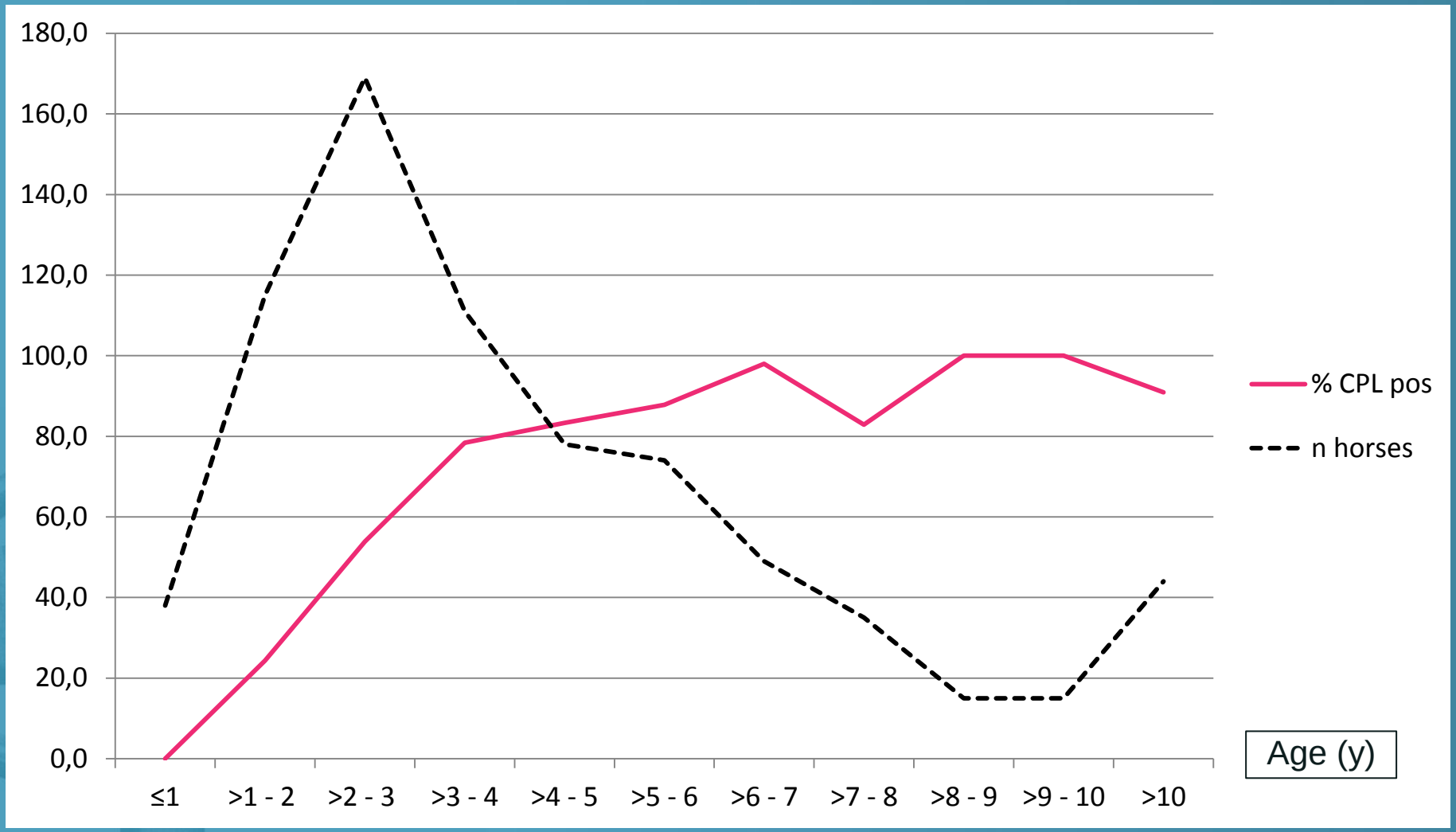
Harpenden skinfold Caliper

- Skinfold thickness (3x each horse)
  - Neck (left, reference points = scapula and neck vertebrae)
  - Caliper jaws perpendicular to the neck
  - Skinfold slightly pulled away from underlying tissue

- Animal information (Royal Belgian draught horse studbook)

Results – CPL

Total number (n) and % CPL positive Belgian draught horses in function of age (y) (n = 749)



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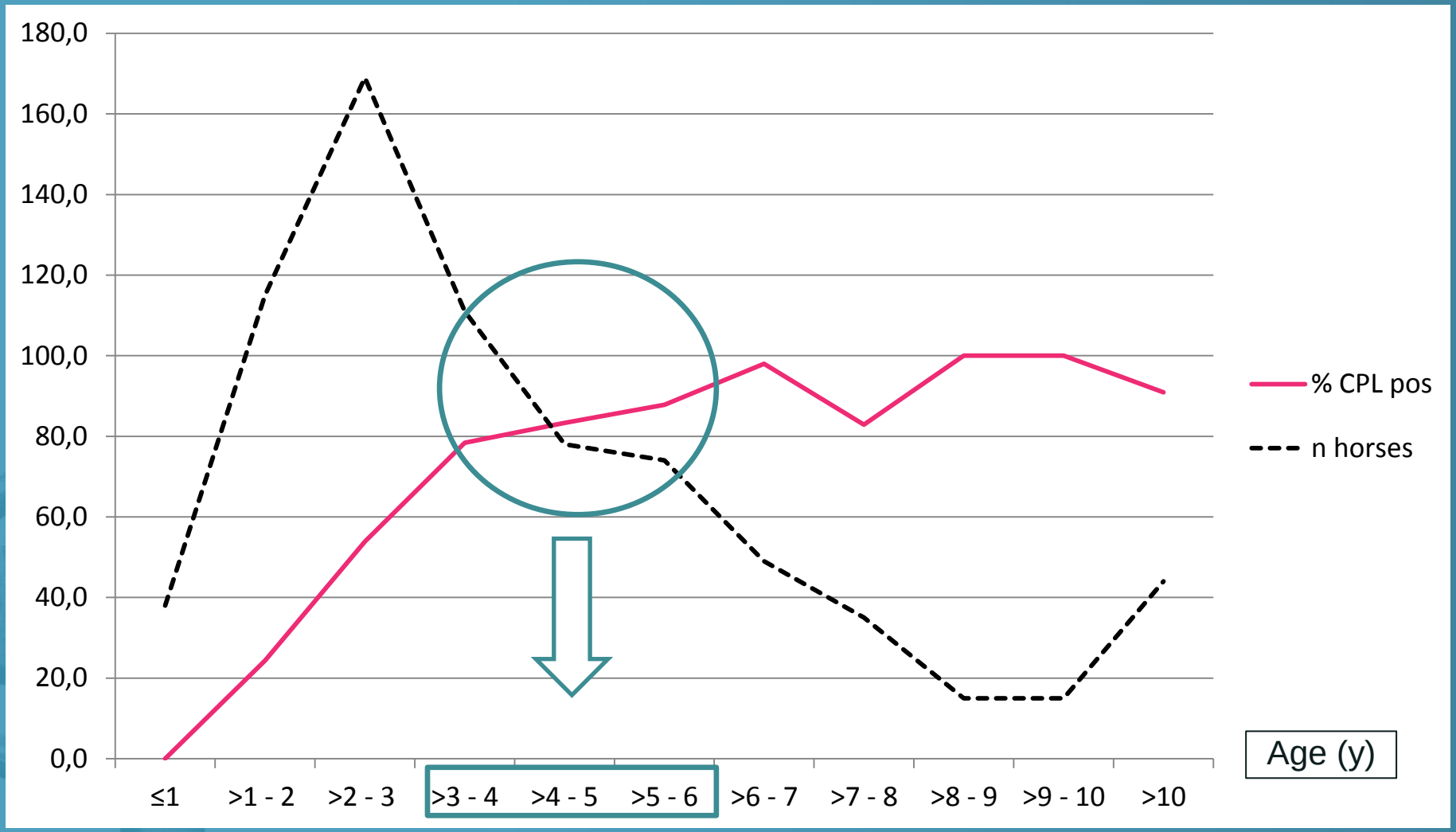
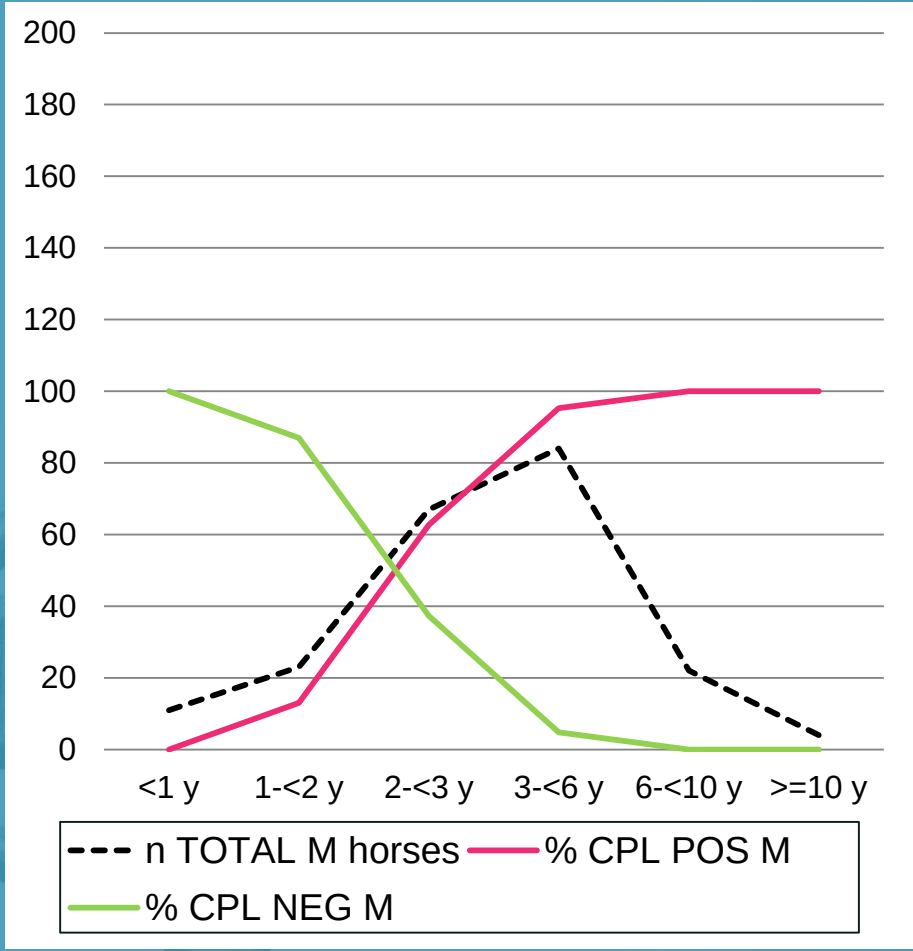
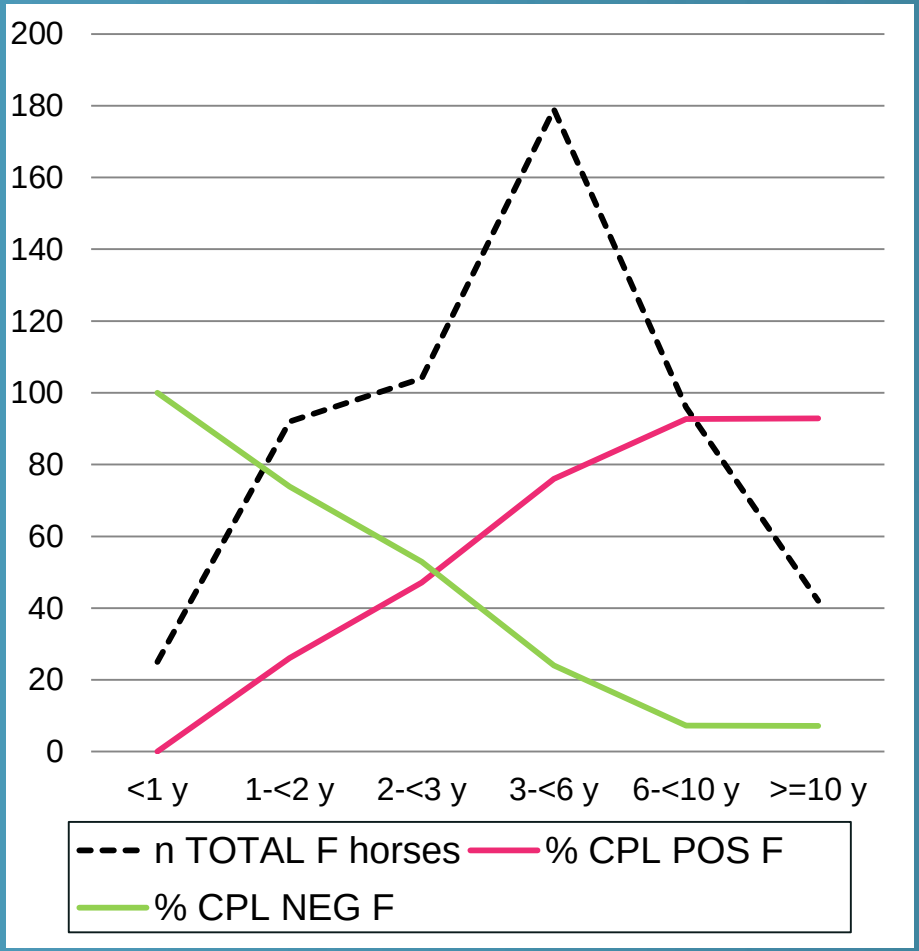


Results – CPL

Total number and % CPL positive and negative stallions in function of age (y) (n = 211)



Total number and % CPL positive and negative mares in function of age (y) (n = 538)



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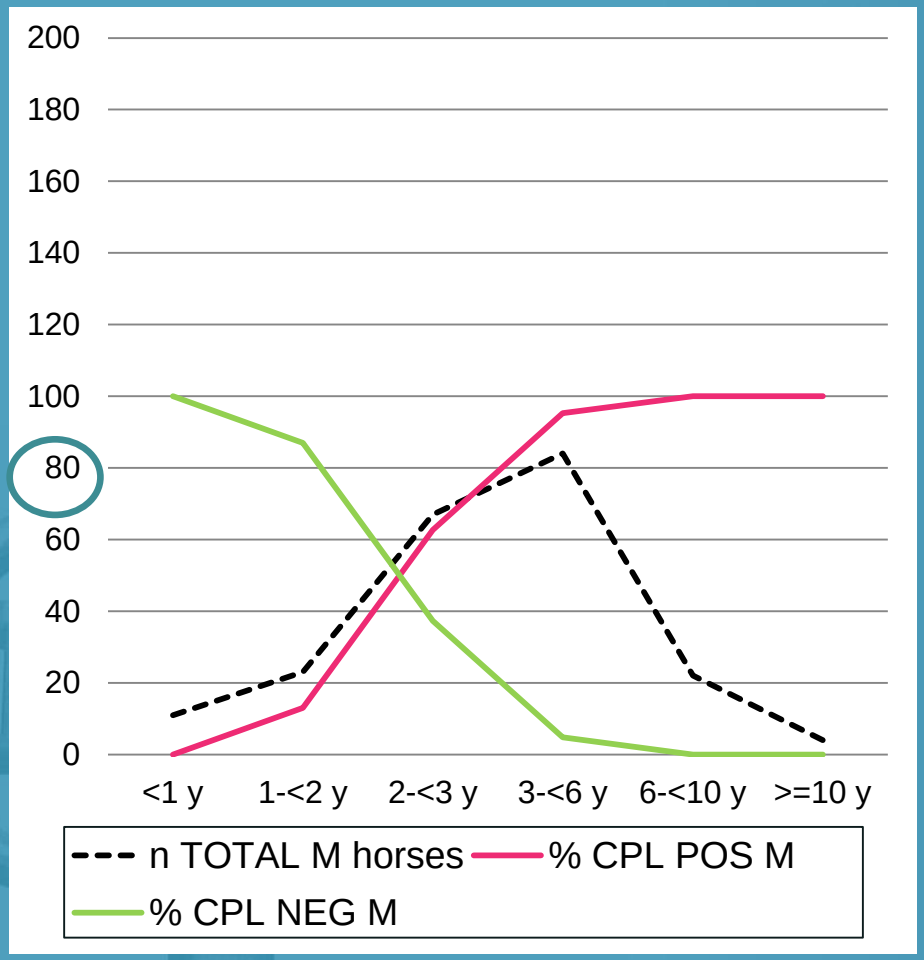

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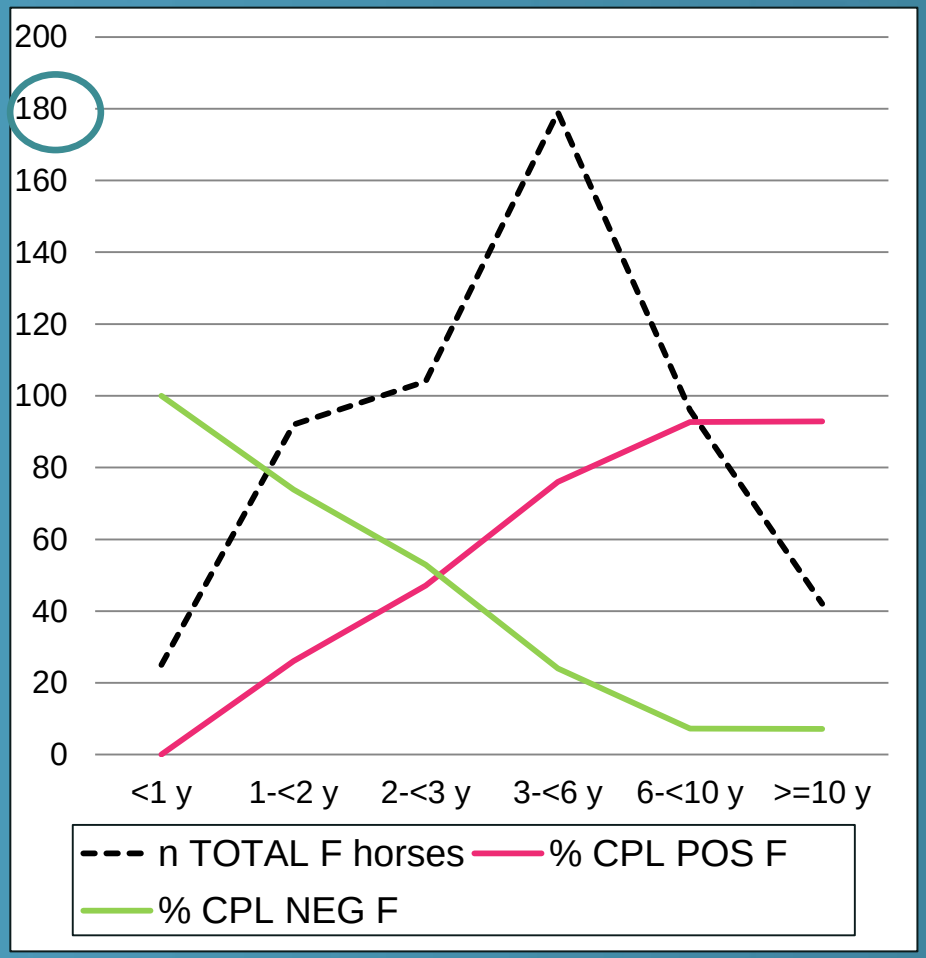

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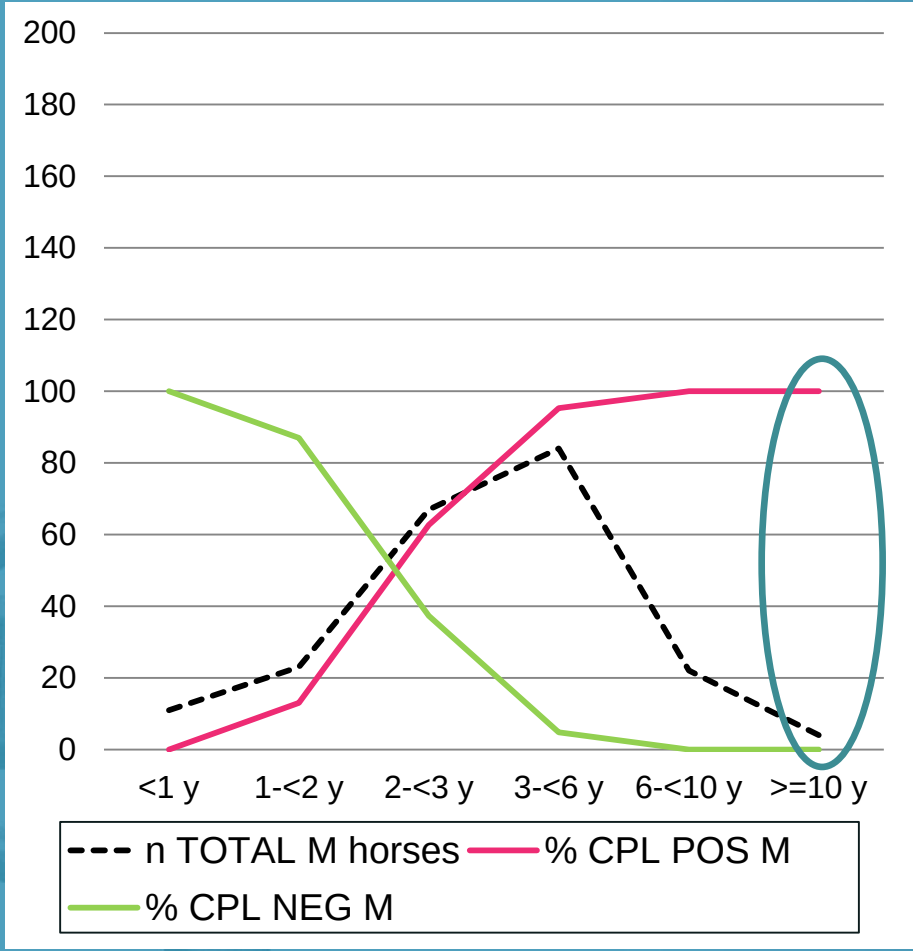

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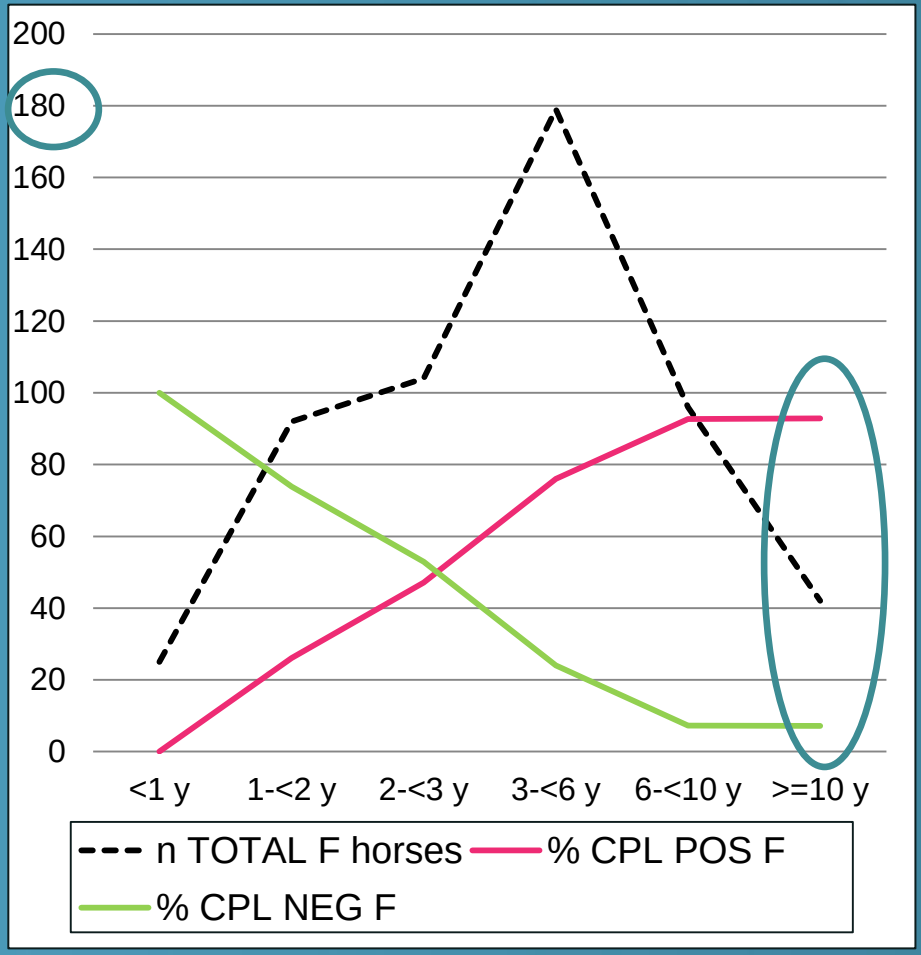
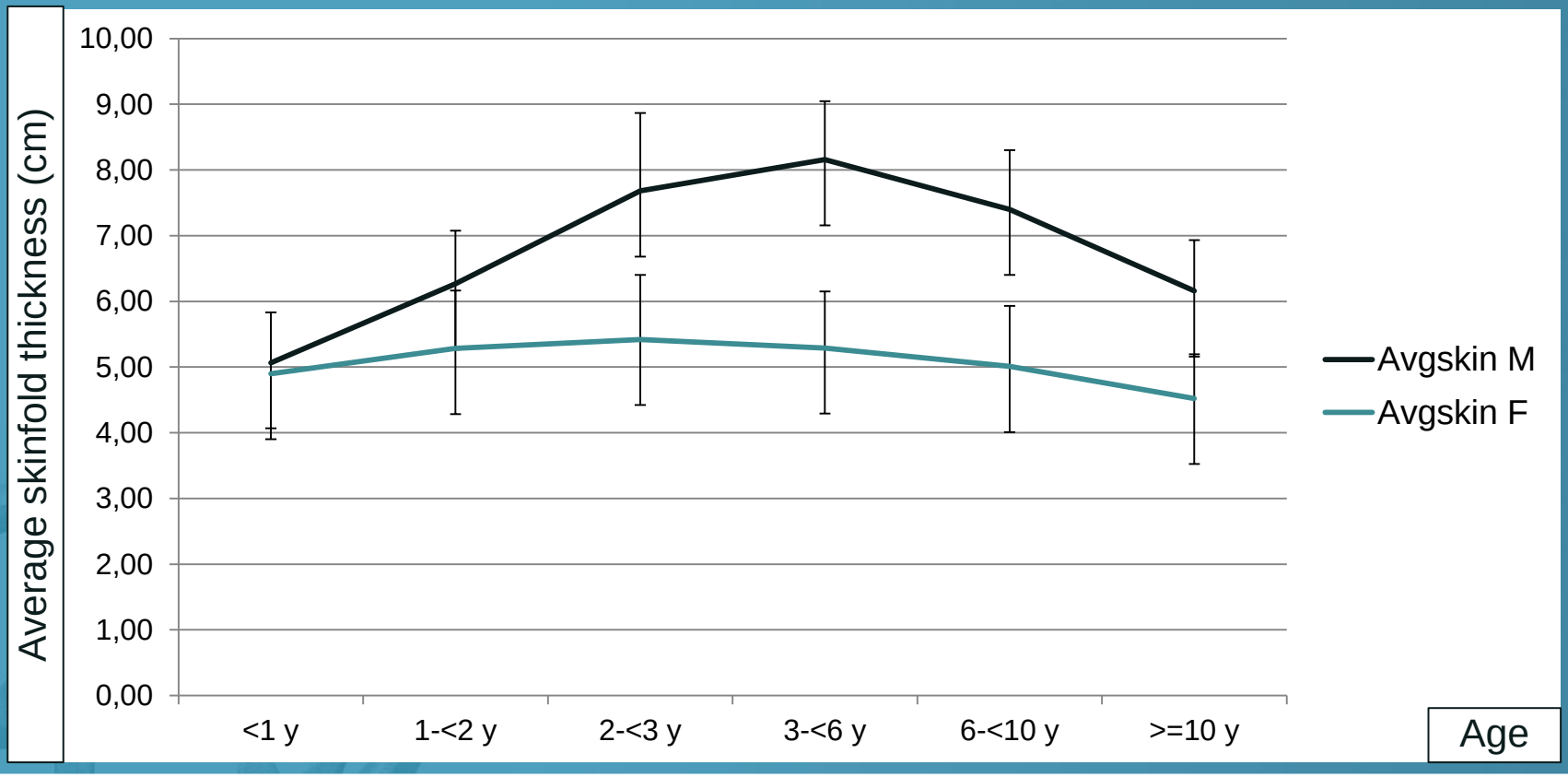


Results – Skinfold thickness

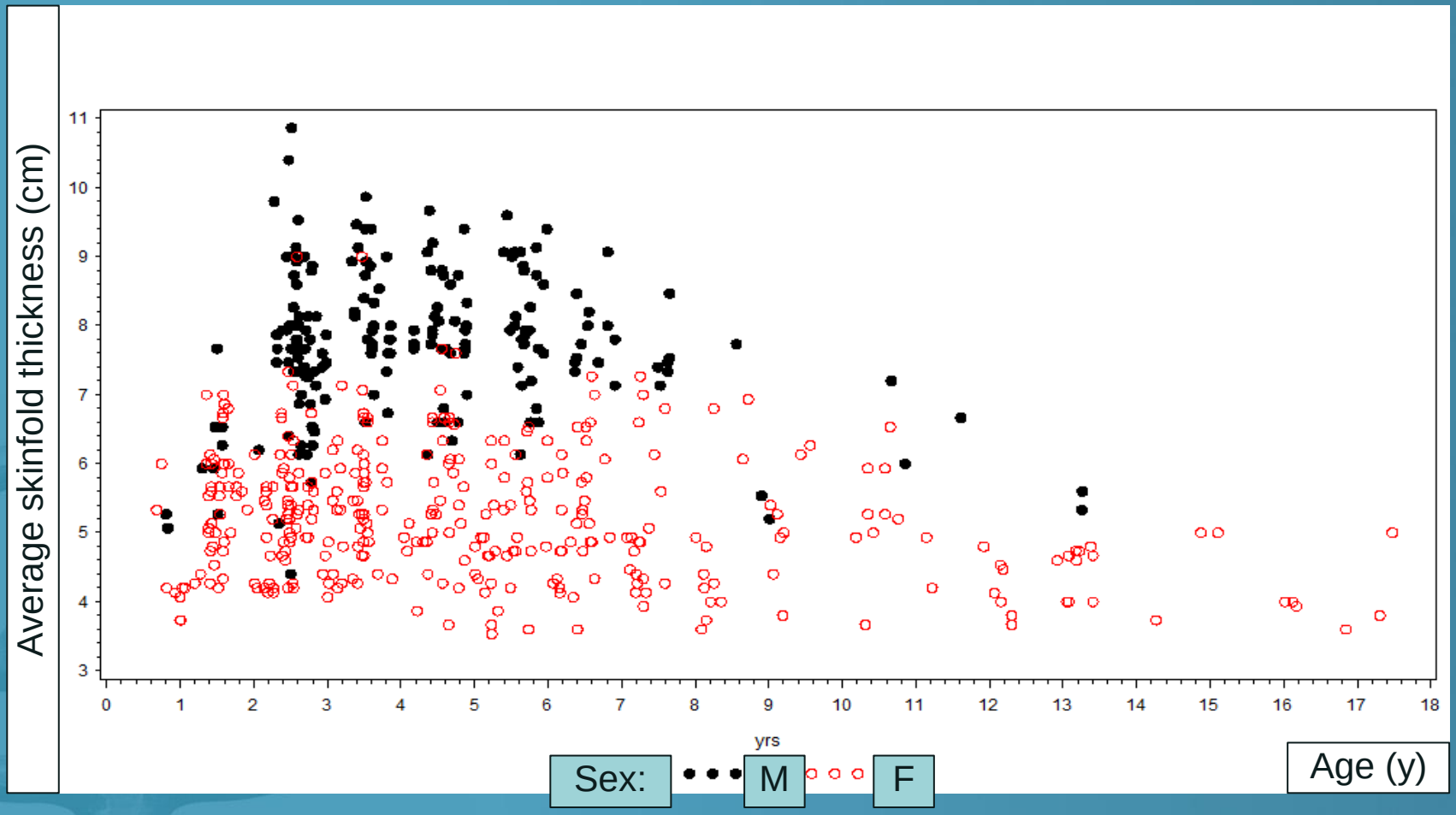
Average skinfold thickness (cm) for stallions (M) and mares (F) in function of age (y) (n = 420)



- In humans: Avgskin men < women (Marini et al., 2007; Olds, 2009; Tesedo-Nieto et al., 2011)
- In deer: Avgskin has a seasonal influence (Fernandez-de-Meira, 2011)

Results – Skinfold thickness

Average skinfold thickness per horse (cm) for stallions (M) and mares (F) in function of age (y) (n = 420)



Results – CPL and skinfold thickness

Parameter	Estimated value (CPL total)	P value
Mean ntotal	9.15	
R^2	0.39	
Avgskin	0.61	0.0010
Stallions	-1.07	0.5186
Mares	1.38	0.2037
yrs*stallions	1.43	<0.0001
yrs*mares	0.82	<0.0001

(General linear model – Sas9.2)

Results – CPL and skinfold thickness

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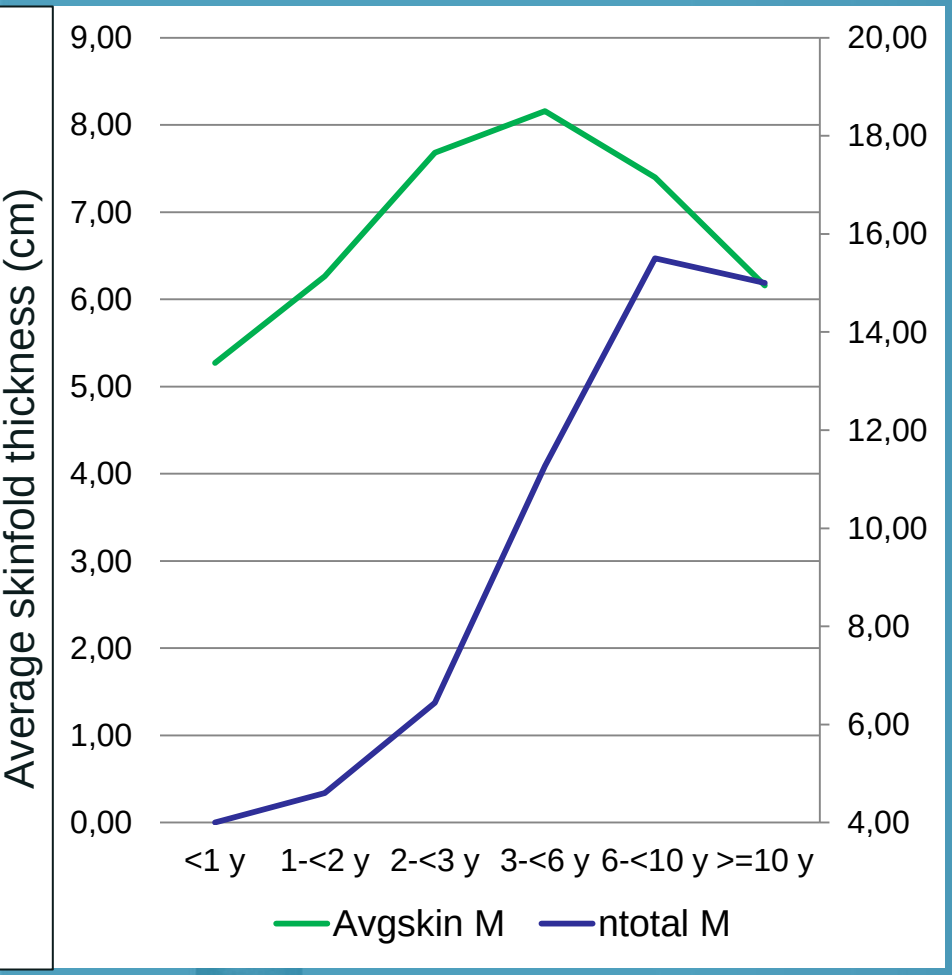
(General linear model – Sas9.2)

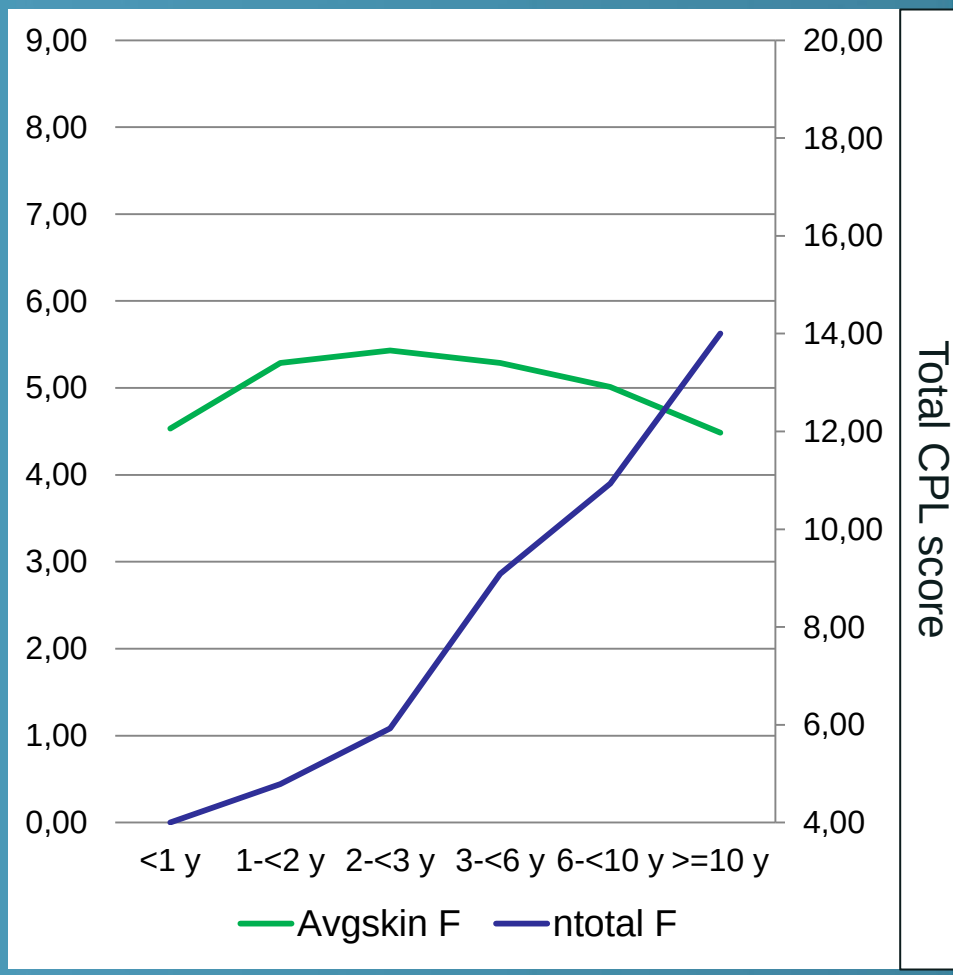
- Stallions: later onset – quicker progression of lesions
- Mares: sooner onset – slower progression of lesions

Results – CPL and skinfold thickness

Average skinfold thickness (cm) and total CPL score of stallions in function of age (y)



Average skinfold thickness (cm) and total CPL score of mares in function of age (y)



Discussion & future perspectives

- Clinical symptoms of CPL in Belgian draught horses are significantly related to:
  - Skinfold thickness
  - Sex and age
- Skinfold thickness measurements could confirm CPL diagnosis in the field
  - Remeasuring of young horses
  - Measurement of related horses
- Additional results: relationship CPL and height & weight of stallions (→ n=76) → more animals necessary

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THANK YOU FOR YOUR ATTENTION

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