

# Laminitis - not everything is metabolism-related

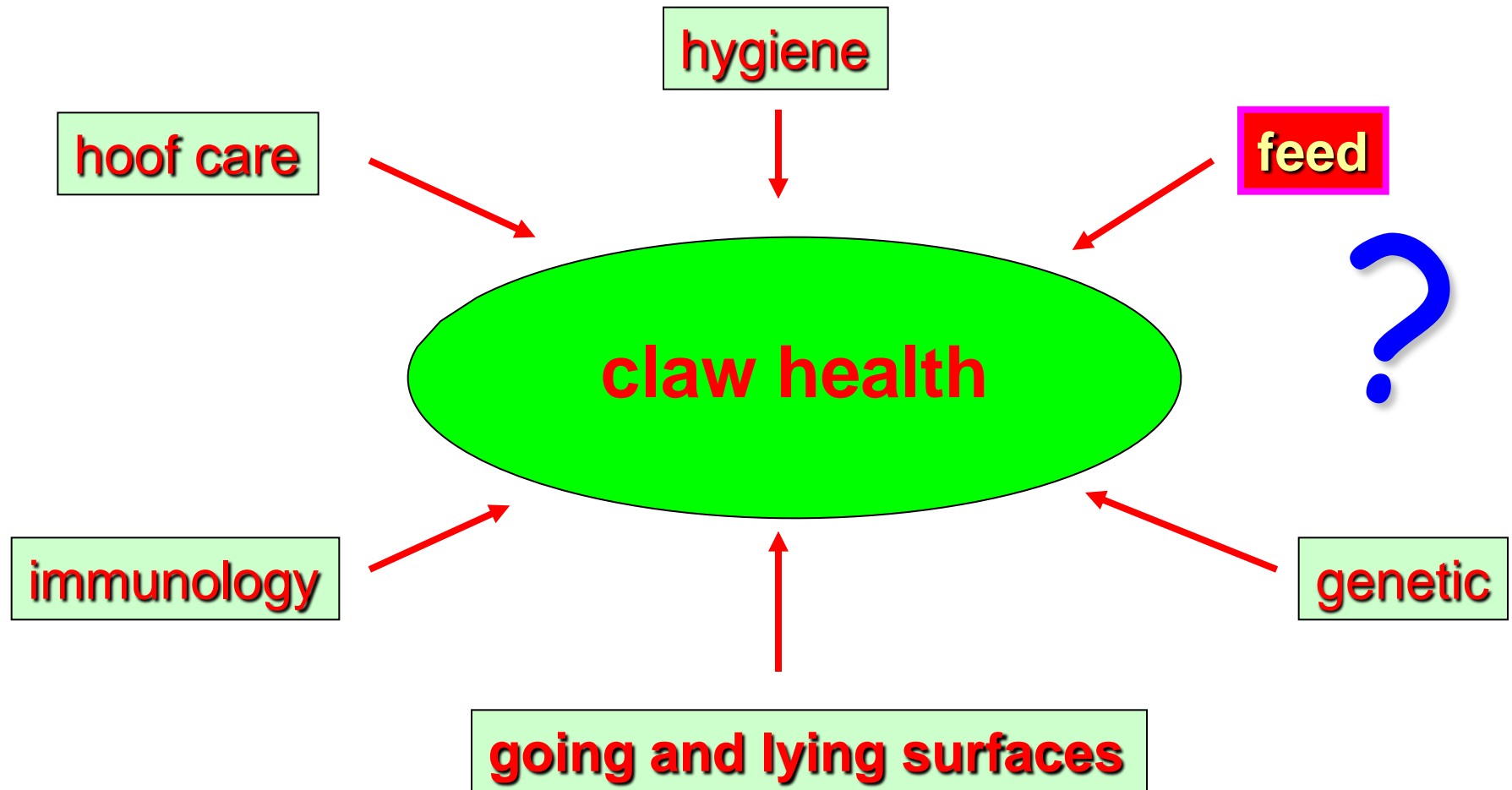
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Wangler (2004):

## Factors influencing the claw health



# Laminitis

- non-infectious disease of the dermis as a result of
- Microcirculation of the dermis with
- Impairment of horn growth



# Laminitis

## acute laminitis

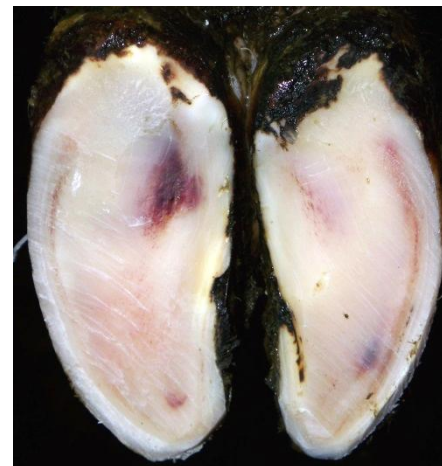
no changes on horn  
shoe are visible, but  
heavy dermis damages



## chronic laminitis

repeated (unnoticed) epi-  
sodes of subclinical la-  
minitis → 6 - 8 weeks:

## Laminitis claw



# Relationships between feeding, ruminal acidosis, bacterial disease and the development of laminitis (Kofler)

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## Feeding

excessive rapidly fermentable carbohydrates, fine textured feed

↑ Lactic acid production



Lowering of rumen pH



death of Gram-negative bacteria  
and release of endotoxins ↓

### bacteria diseases

- Endometritis
- Mastitis



TLR 4



stress environment  
factors:

- Cow comfort
- overcrowded
- social rank

Constriction in the capillaries of the sclera  
and opening of anastomotic



Laminitis

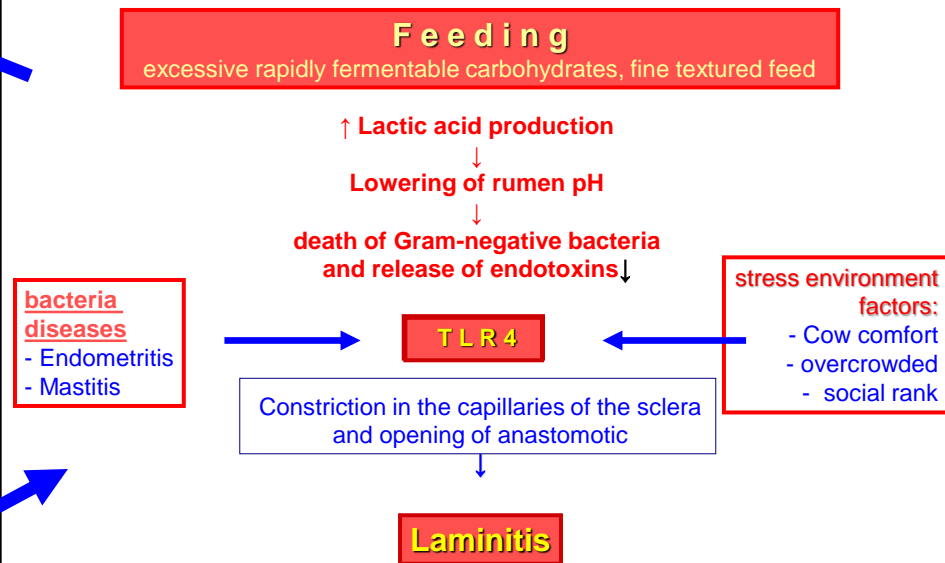
# Objective:

## claw disease

Metabolic disorders



Relationships between feeding, ruminal acidosis, bacterial disease and the development of laminitis (Kofler)



# Experimental design:

## **Metabolic effects:**

### **3 dairy farms**

- different floors:

A cast asphalt, cow mattress

B beton, straw mattress

C rubberized floors

# Score system: claw photographs

0 = no change

1 = slight redness (white line and / or Rusterholz-point)

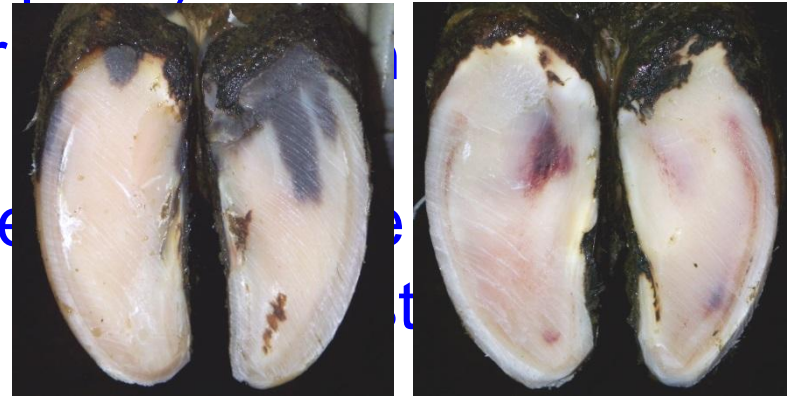
2 = yellow discoloration of the horn

3 = marked redness in specific area

4 = slight reddening of the total

5 = severe reddening in specific area (white line and / or Rusterholz site)

6 = marked redness of the total





# Lameness assessment according

SPRECHER et al. (1997)



gekrümmter Rücken im Stehen



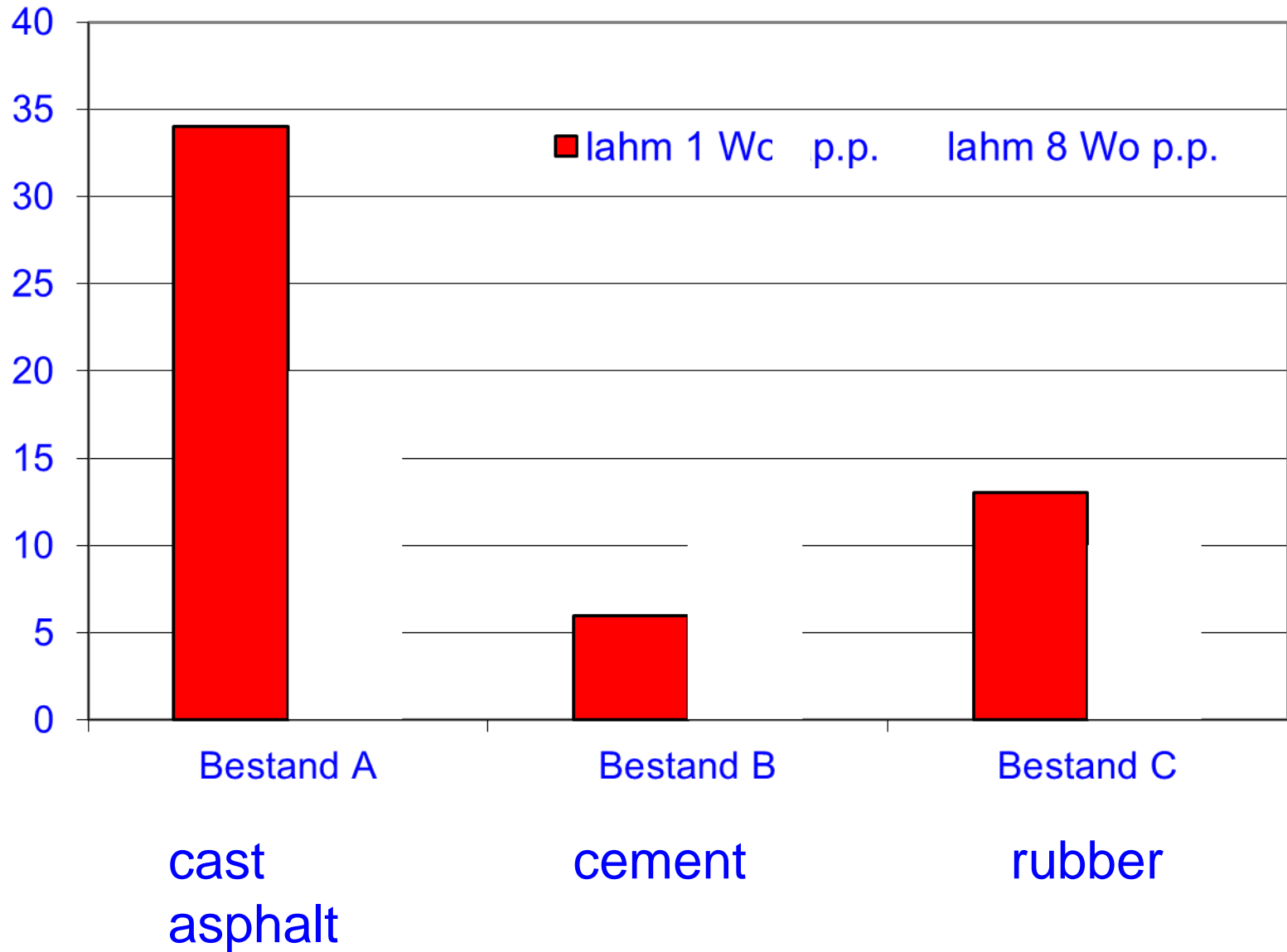
gekrümmter Rücken im Gehen

**Degree of lameness : 3**

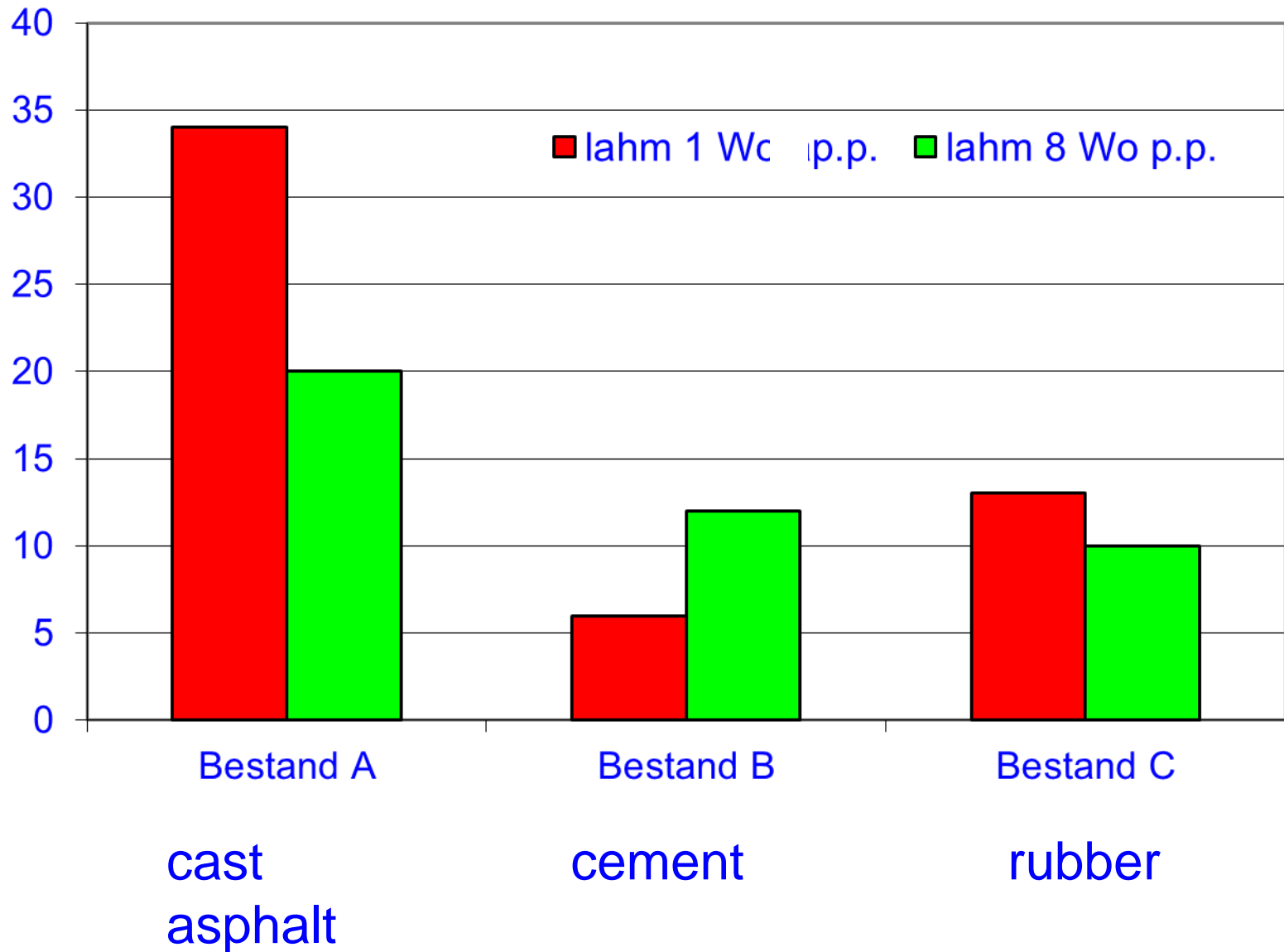
# Results



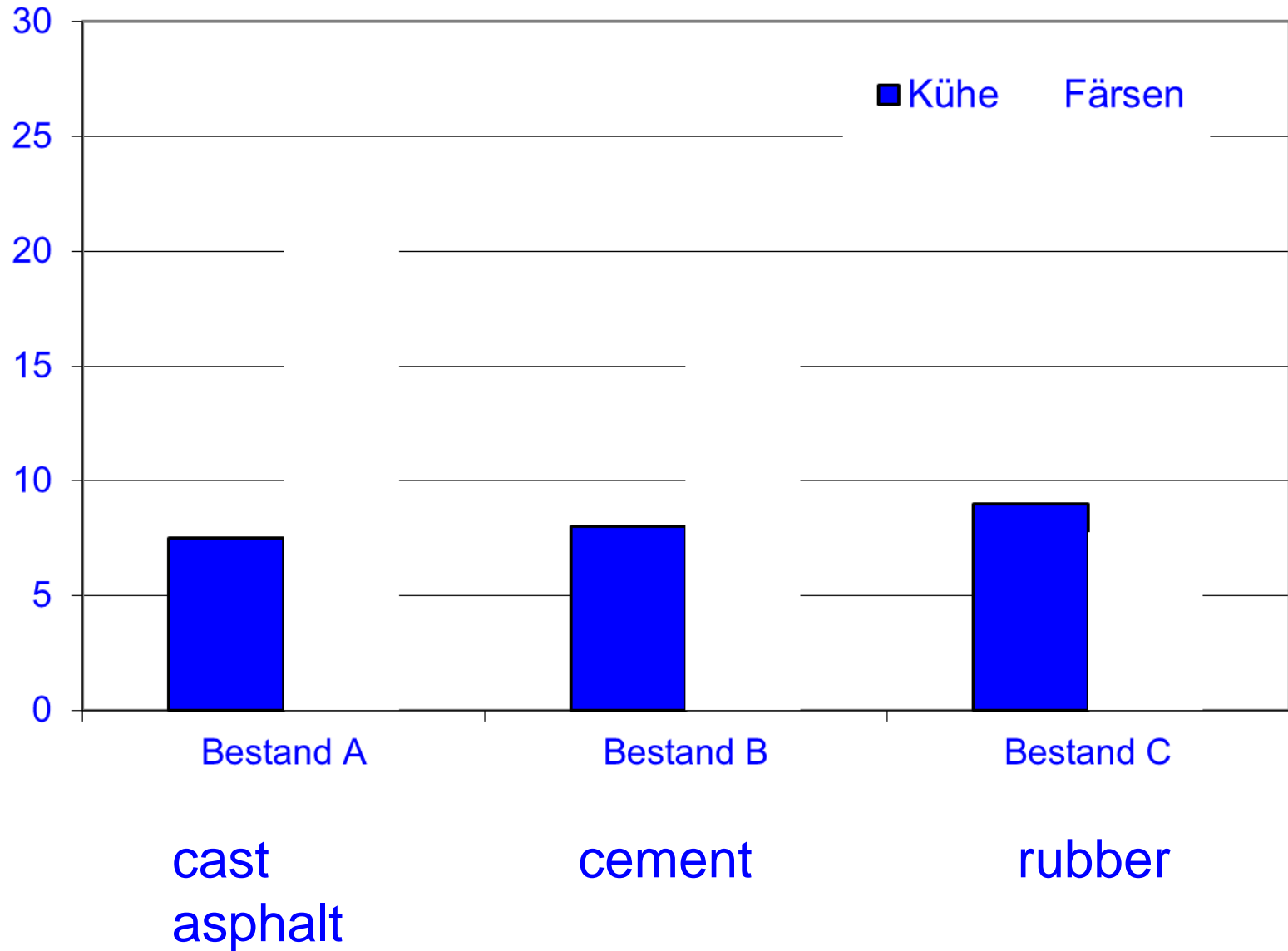
## Development of lameness incidence(%)



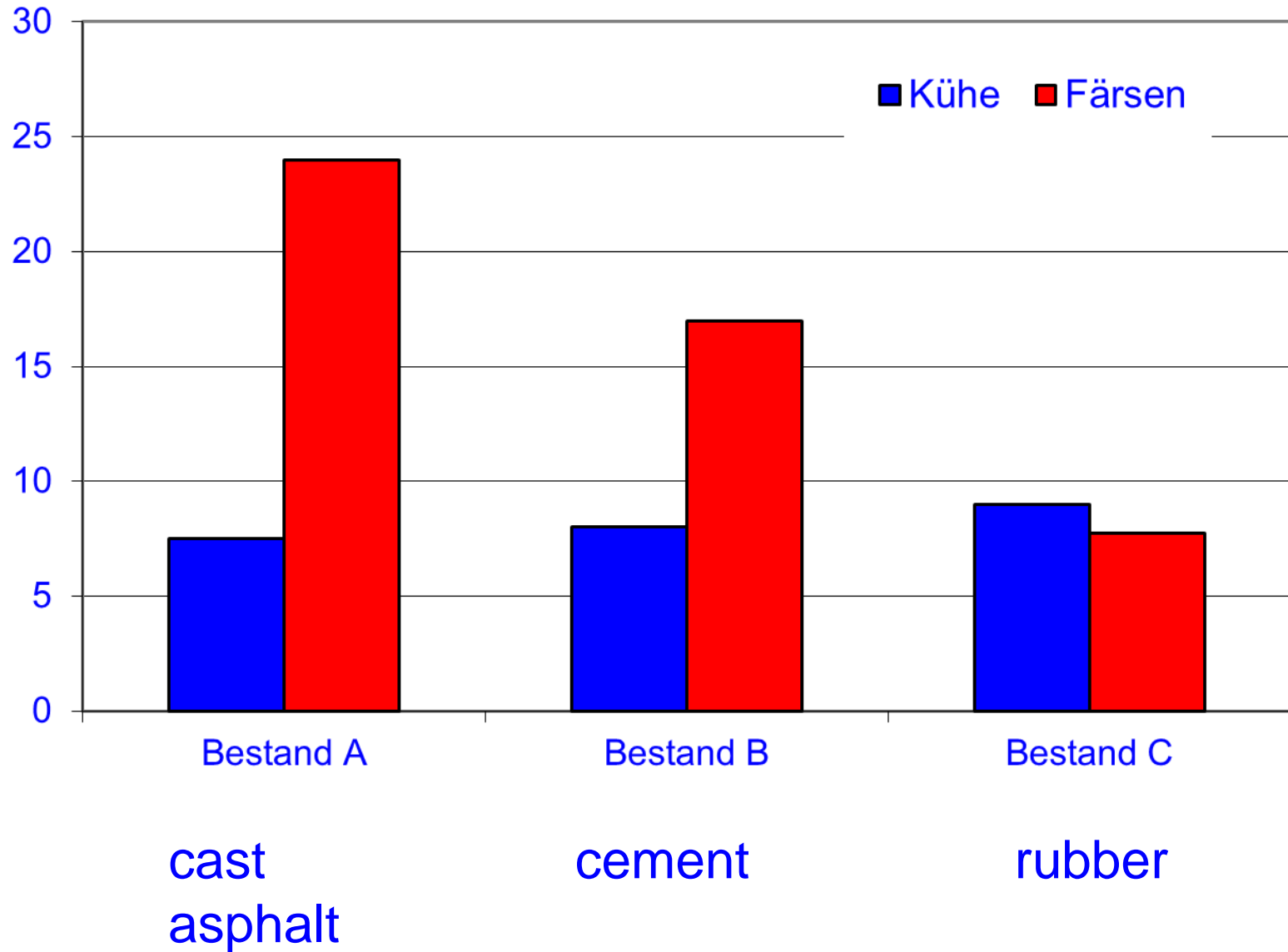
## Development of lameness incidence(%)



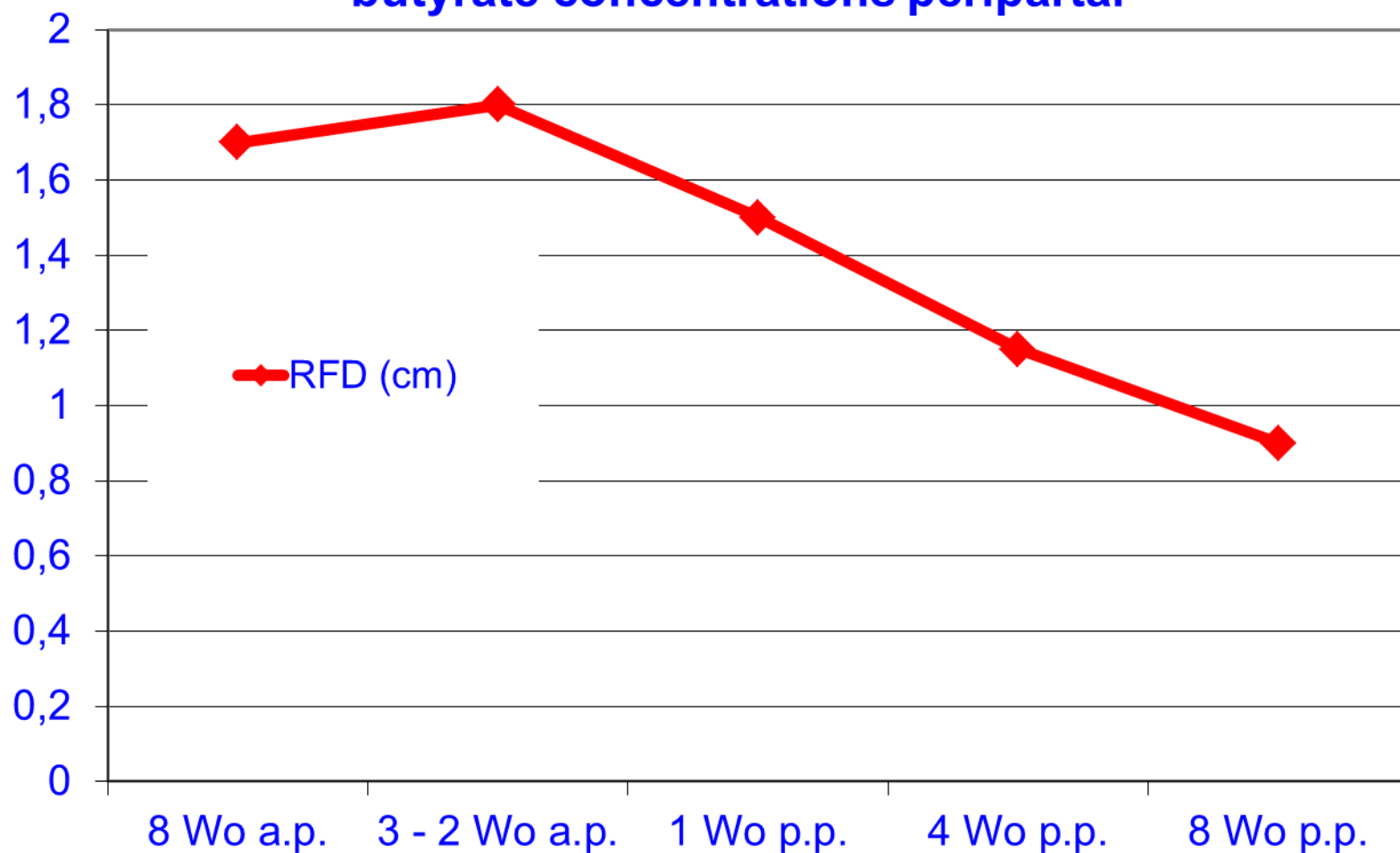
## Claws score increase from the 1st to the 8th week



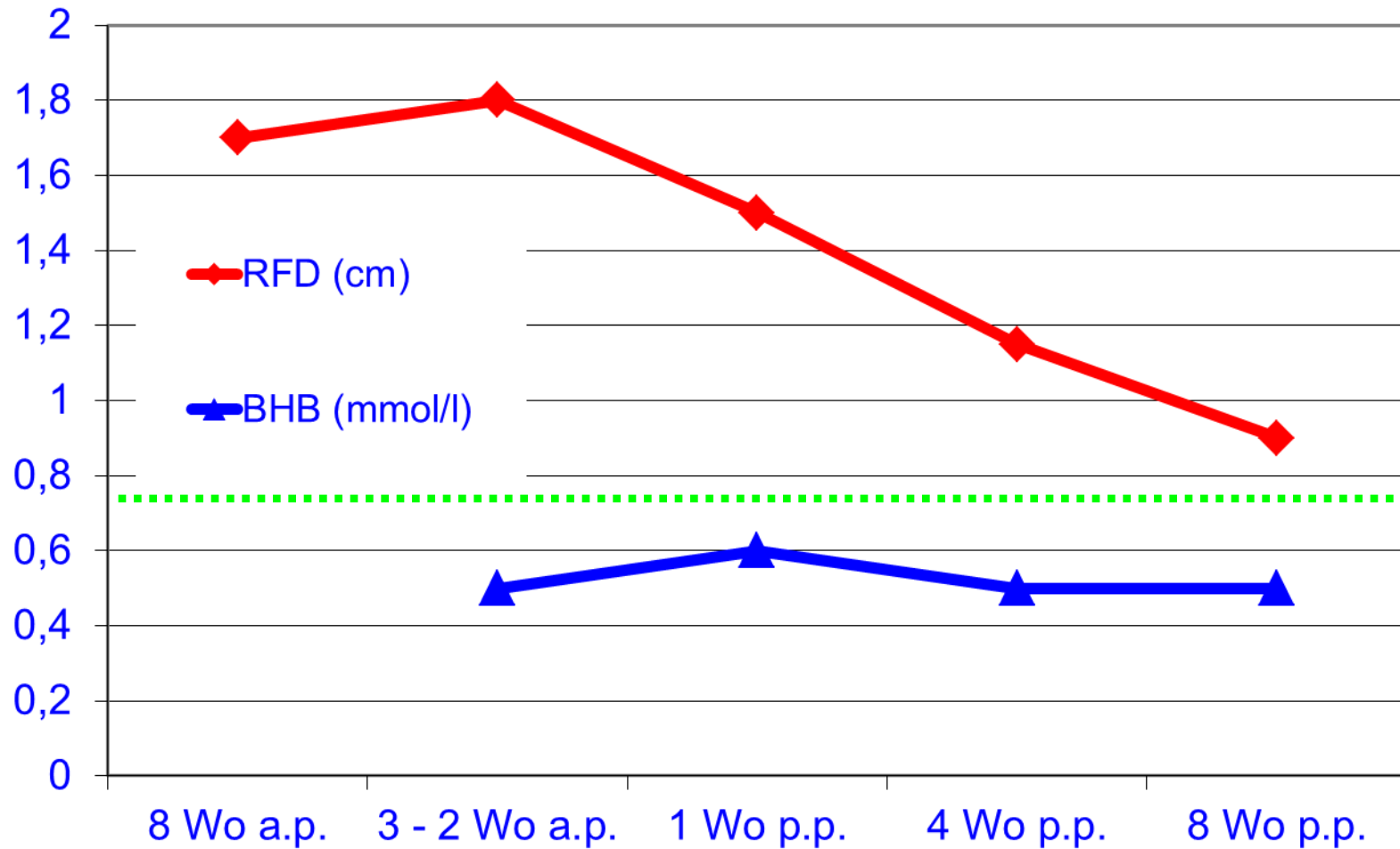
## Claws score increase from the 1st to the 8th week pp



## Back fat thickness, free fatty acids and $\beta$ -OH-butyrate concentrations peripartal

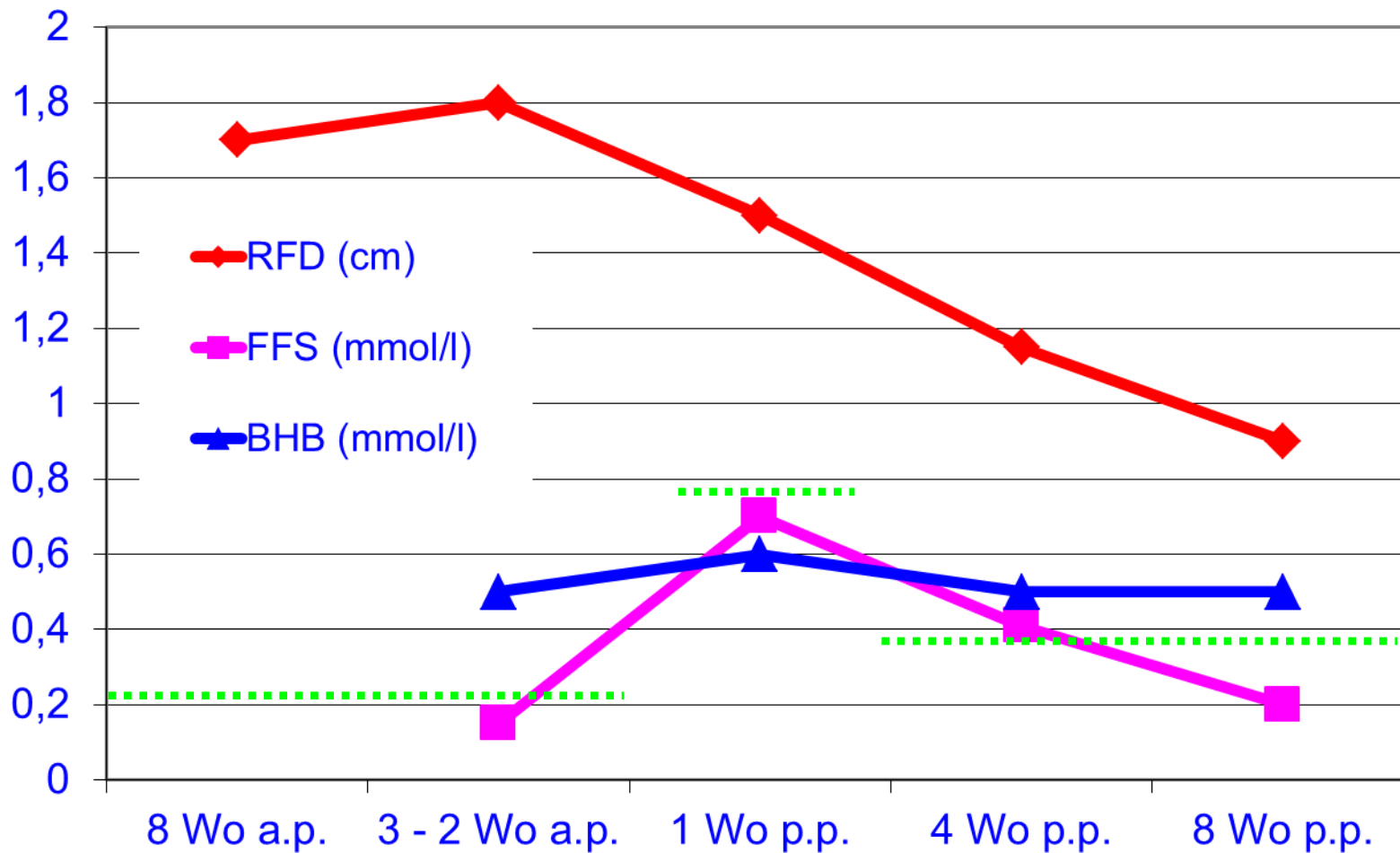


## Back fat thickness, free fatty acids and $\beta$ -OH-butyrate concentrations peripartal

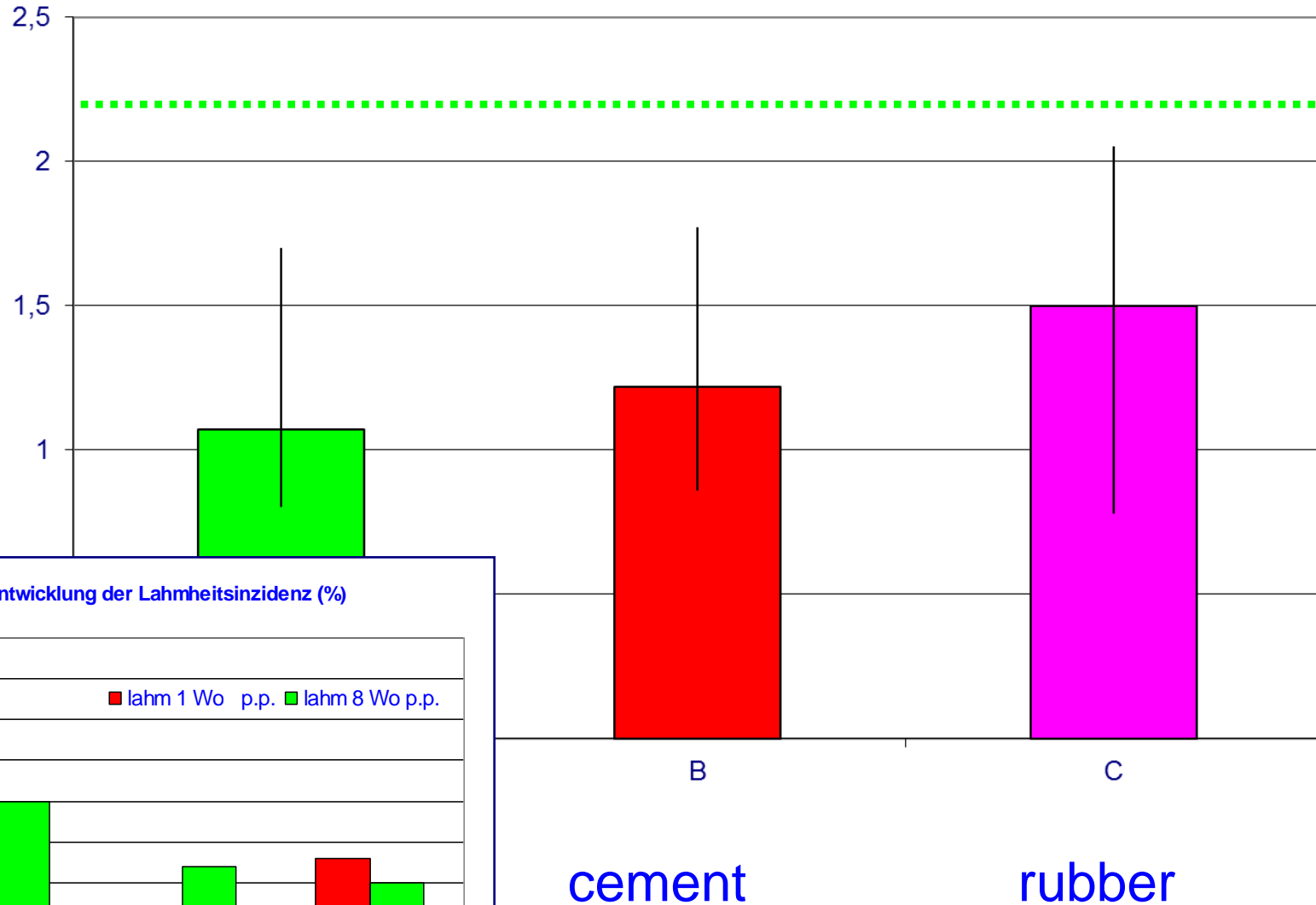




## Back fat thickness, free fatty acids and $\beta$ -OH-butyrate concentrations peripartal

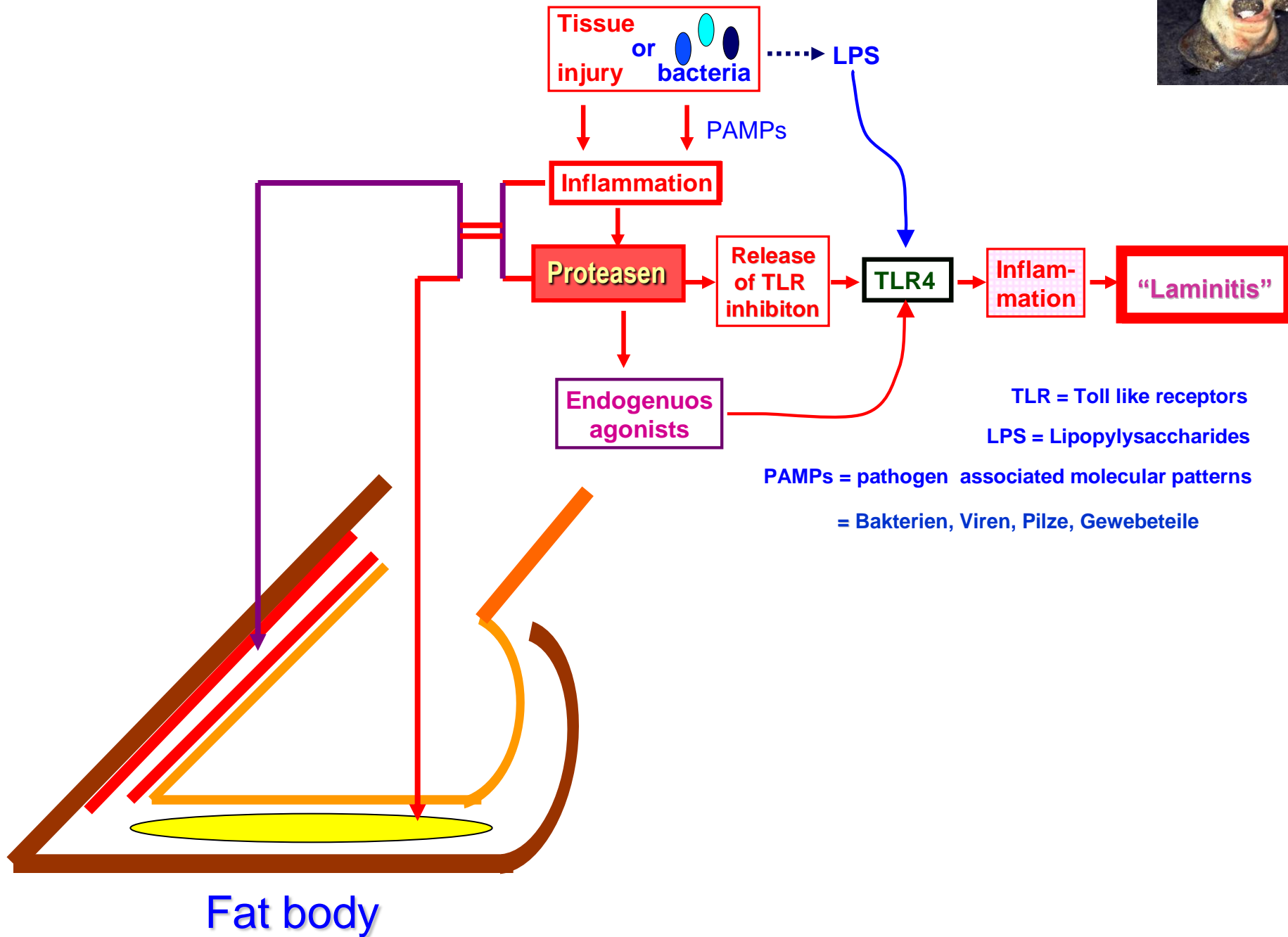


## Lactate concentrations (mmol/l serum) 1 Week p.p. in HF cows in 3 farms

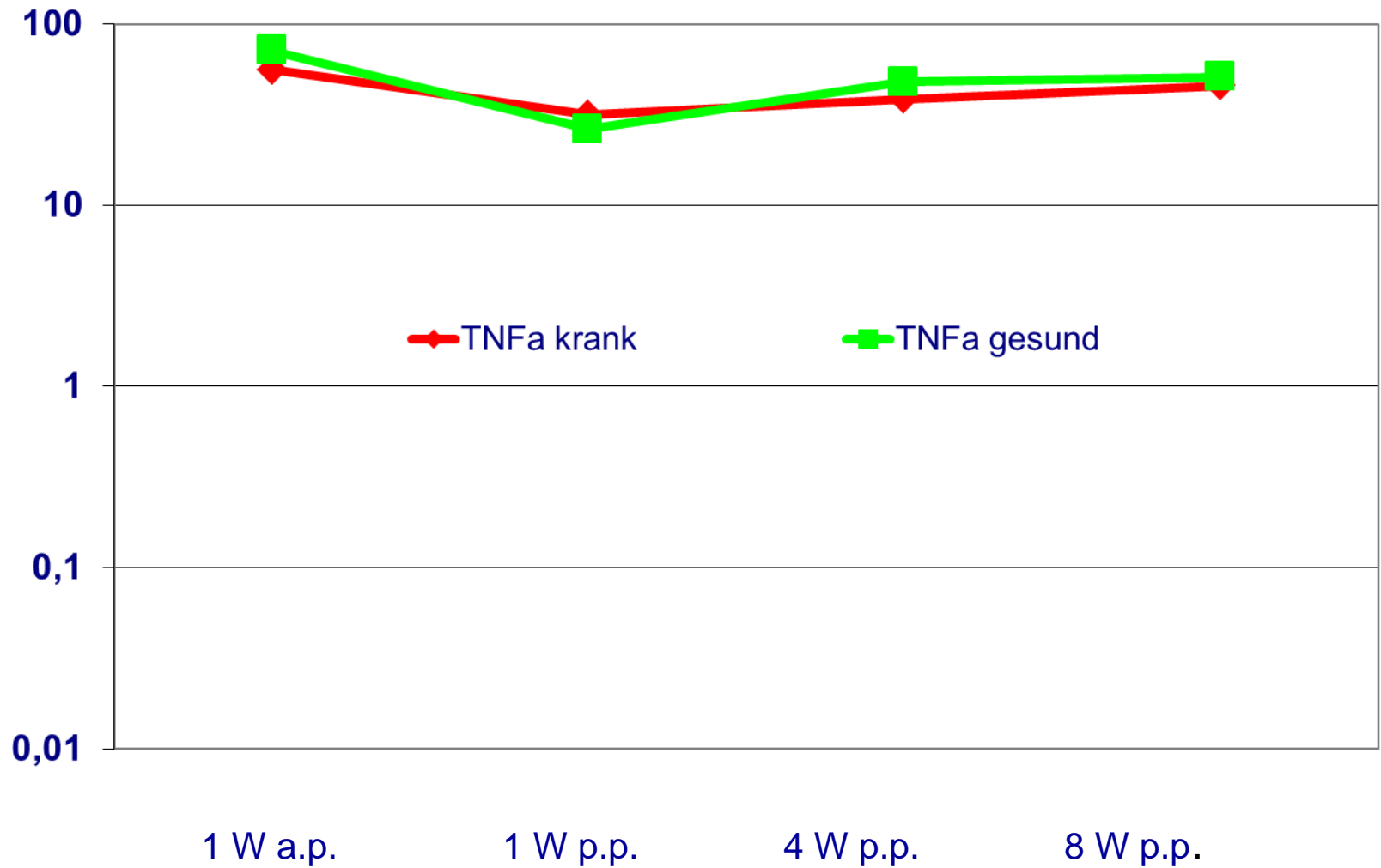


### Entwicklung der Lahmheitsinzidenz (%)

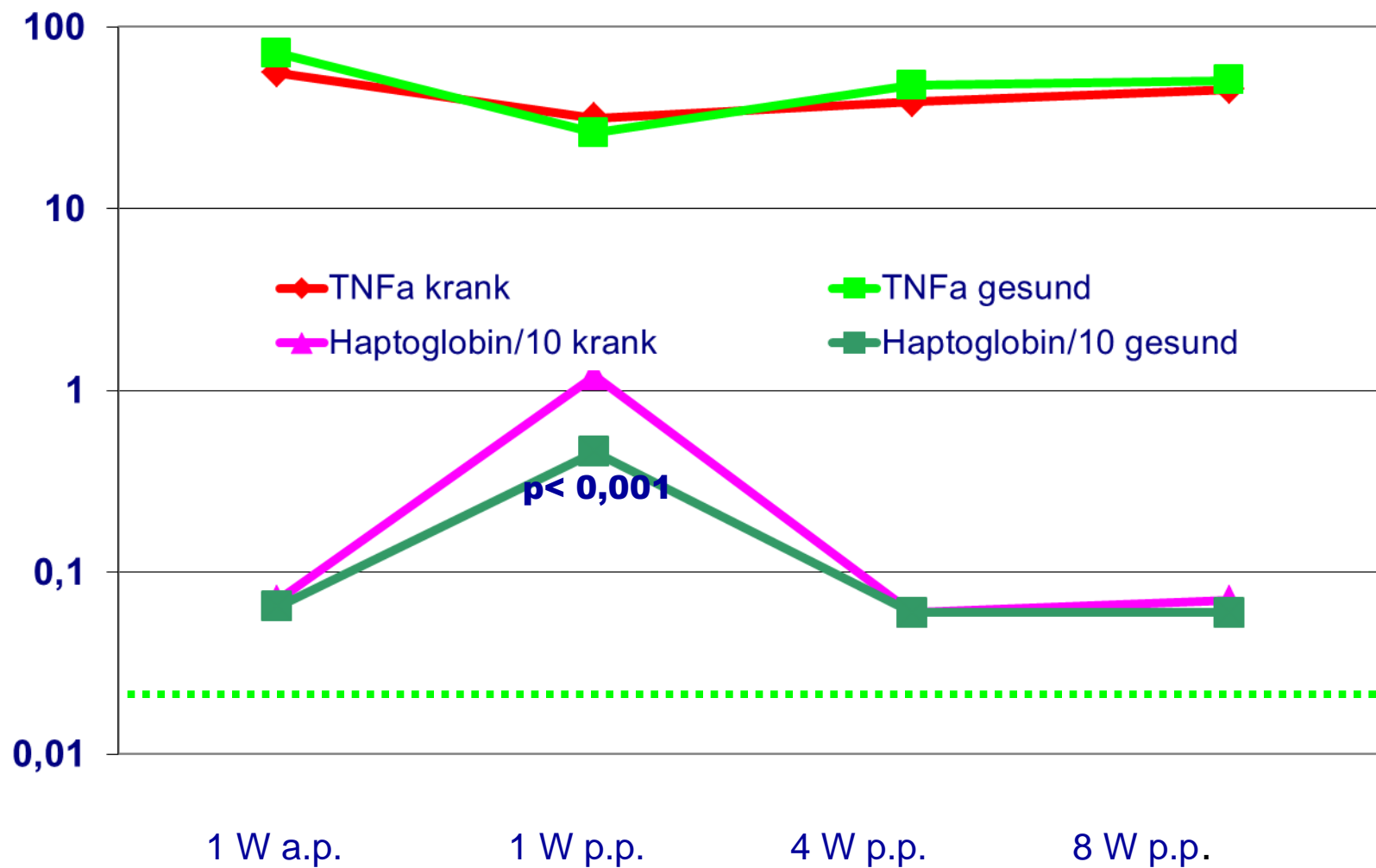




## TNF $\alpha$ (pg/ml) and Haptoglobin (g/l) peripartal in healthy and ill cows



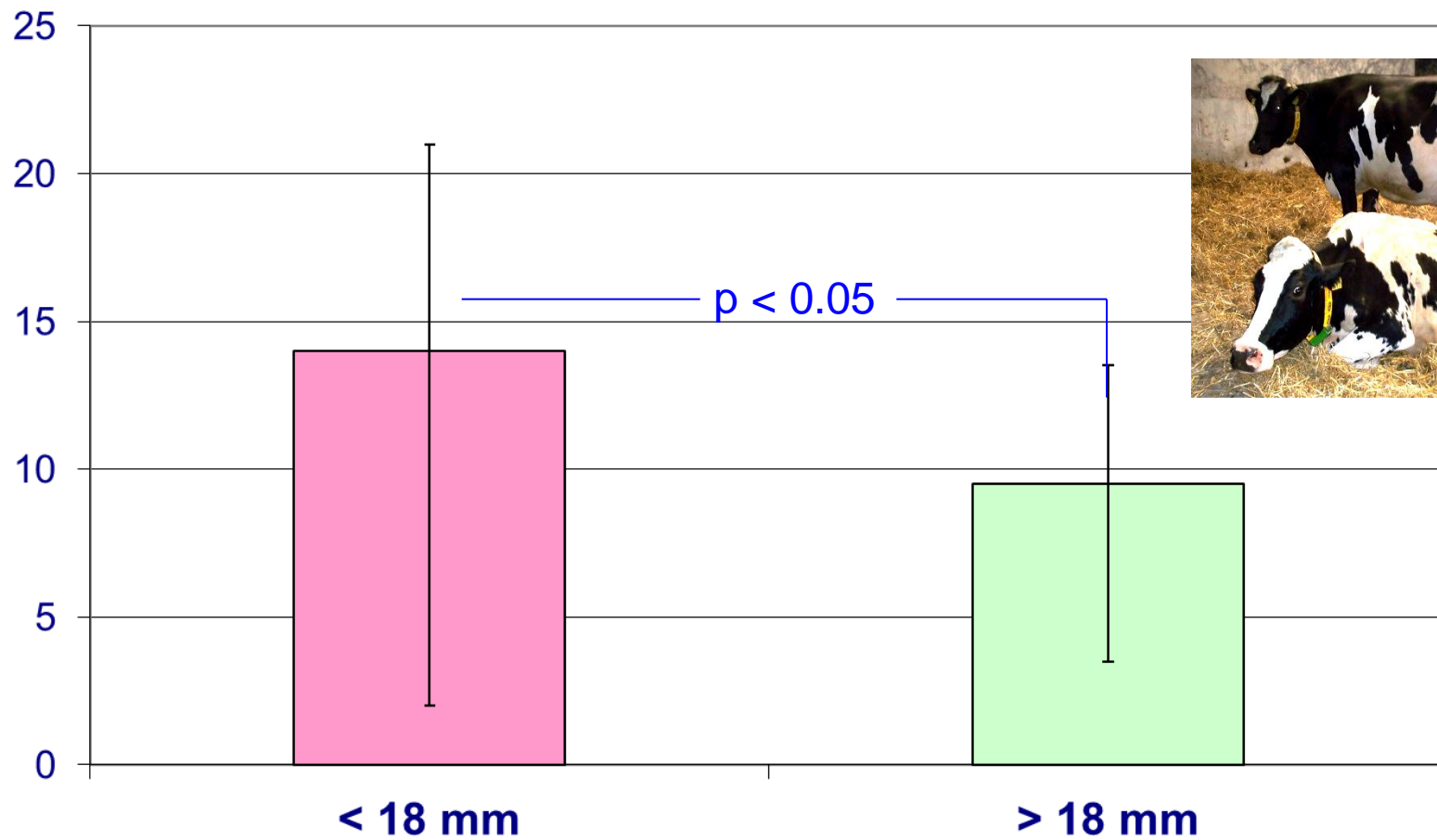
## TNF $\alpha$ (pg/ml) and Haptoglobin (g/l) peripartal in healthy and ill cows



## Body Condition: Claw diseases ?

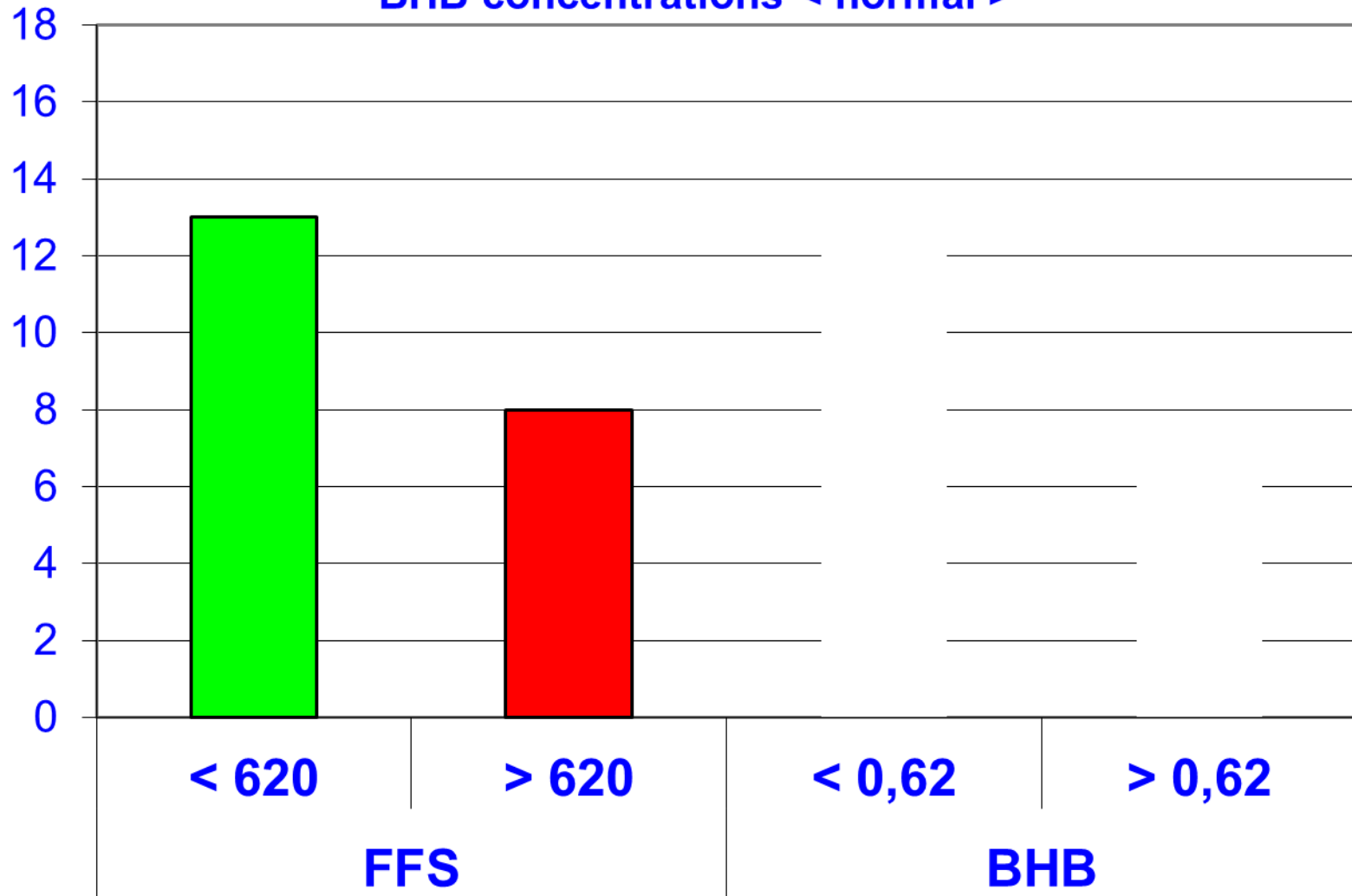


## BFT 2-3 W a.p. and claw score increase 1 - 8 W p.p.



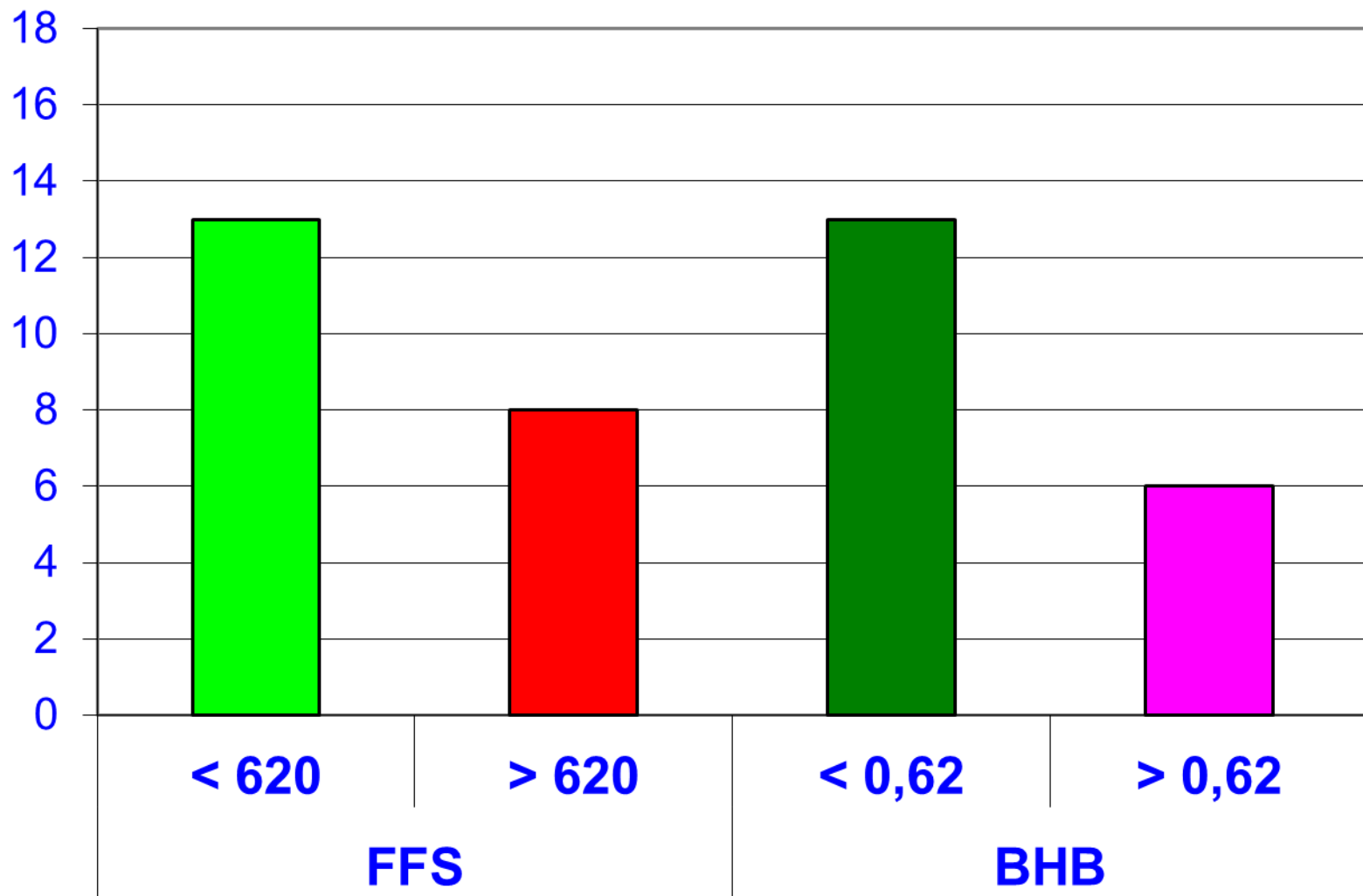
**Claw score increase 1 Wo bis 8 Wo p.p.inei FFA and**

**BHB concentrations < normal >**






**Claw score increase 1 Wo bis 8 Wo p.p. inei FFA and  
BHB concentrations < normal >**



# Metabolic parameters - claw score increase

## correlation coefficients

period	parameter	correlation/ claw score increase	parameter	correlation/ claw score increase
3-2 Wo a.p.	<b>FFA</b>	-0,32**	Protein	-0,26**
1 Wo p.p.		-0,30***		-
1 Wo p.p.	<b>BHB</b>	-0,25*	Glucose	0,23*
4 Wo p.p.		-0,25**		0,18*
8 Wo p.p.		-0,19*		-
1 Wo p.p.	<b>Ca</b>	0,23**		



# Conclusions

- Moderate fat mobilization peripartal alone is not enough to trigger a laminitis
- "Acidosis" - not observed
- Type of flooring was dominant



# Metabolic Check in accumulated claw diseases (2-4 d p.p.; 1-2 W. a.p.; 2-8 W p.p.)

Etiology	Parameter	
„Fat mobilization “ Energy metabolism disorder ("Ketosis")	FFS, BHB, Bilirubin, Cholesterol, Leucocytsn, Haptoglobin	
„SIRS“ (Septikemia) clinic !	Leucocytes, BHB, Bilirubin	
"Protein imbalances"	Protein, urea, Albumin	
Azidosis Alkalosis	density, pH frakt. NABE	
Trace element deficiency	Mn, Cu, Se, Zn (hair)	TEAC
Vitamin deficiency	Biotin	

# Conclusions

- Subclinical laminitis: up to 8 W pp ↑, ↓ lameness incidence
- Heifers: ↑ significantly laminitis than older cows
- Laminitis mainly lateral behind claws
- BFT, FFA, BHB, glucose, lactate concentrations, CK, AST, LDH activities - "relative" diagnostic significance
- stabling (floor!) = most important prophylaxis point!
- claw check - focus FFA pp, NABE

**Thank you for  
your  
attention**

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