Effect of rubber covered slats on indicators of comfort and lameness in group housed sows

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The flooring dilemma

Advantages

(for the producer)

Disadvantages

(for the pig)

Resolving the flooring dilemma

- Straw bedding – many benefits *(Tuyttens, 2005)*
- But labour/cost, availability, hygiene issues
- Growing interest in rubber flooring for pigs
- More yielding/compressible and lower thermal conductivity than concrete *(Boe et al., 2007; Platz et al, 2008)*
- Greater area of contact between claw and floor *(Flower et al., 2007)* and protective → less claw lesions
- **Better comfort and reduced lameness for sows?**

Rubber flooring and sow welfare

- Lower lesion scores
- Less slipping
- Greater ease of changing posture
- More frequent posture changing

(Boyle et al., 2000; Tuyttens et al., 2008; Elmore et al., 2010)

- Short term studies/sows in crates
- Long term impact of rubber on claw lesions and lameness in group housed sows not known

Aim

To evaluate the long term effects of rubber slat mats on indicators of comfort and lameness in group housed sows

Study 1: Longitudinal study of the effect of rubber slat mats on indicators of sow welfare and lameness

- 2000 sow commercial herd
- 164 replacement gilts → 2 parities
- Oct. '10 – Mar. '12

Rubber; n=80 gilts

Concrete; n=84 gilts

Calderon-Diaz et al., 2013. JAS 19: 1-15

Lameness and limb lesions

Service | 24 to 72h post mixing | 50 to 70 d of gestation | 2 wk prior farrowing

Lameness ***(as per Main et al., 2000):***

0 = Normal

1 = Pig appears stiff

Non-lame

2 = Shortened stride

3 = No weight bearing on affected limb

4 = Affected limb elevated off floor

5 = Pig does not move

Lame

Limb lesions

Claw lesions

Score 0 = normal to 3 = severe injury (FeetFirst – Zinpro)


Toe overgrowth


Heel overgrowth/ erosion


White line disease


Heel-sole crack


Dew claw injuries

- Logistical regression by methods of SAS v. 9.3

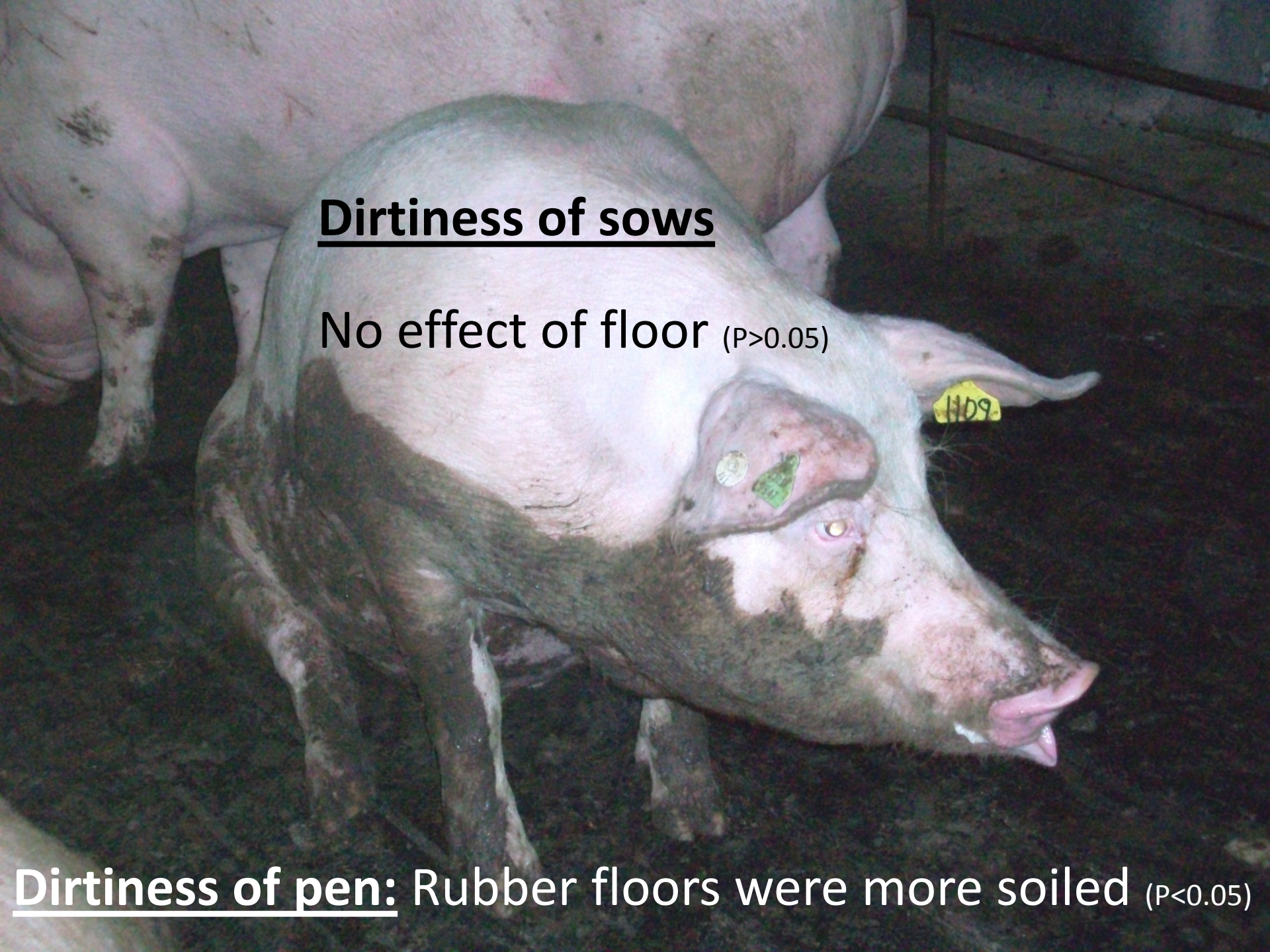
Risk associated with lameness and claw lesions in sows on rubber *vs.* concrete slats during two parities

Variable	Parity 1		Parity 2	
	OR[1]	CI[2]	OR	CI
Reference category: concrete flooring				
Lameness	0.32[a]	0.21-0.50	0.56[a]	0.35-0.91
Toe overgrowth	3.81[a]	1.17-9.28	3.17[a]	1.34-7.47
Dew claw overgrowth	1.05	0.34-3.26	1.60	0.64-4.01
Heel overgrowth/erosion	1.21	0.58-2.54	0.99	0.45-2.21
Heel sole crack	6.77[a]	1.95-23.49	6.68[a]	2.99-14.92
White line damage	3.01	0.72-12.52	4.85[a]	1.73-13.54
Cracks in the wall	3.18[a]	1.52-6.64	0.78	0.32-1.88
Dew claw injuries	1.48	0.43-5.02	0.74	0.32-1.71

Risk associated with limb lesions of sows on rubber *vs.* concrete slats during two parities

Variable	Parity 1		Parity 2	
	OR[1]	CI[2]	OR	CI
Reference category: concrete flooring				
Callus	1.53	0.94-2.51	2.20[a]	1.34-3.61
Swelling	0.52[a]	0.34-0.82	0.43[a]	0.27-0.70
Wound	0.50[a]	0.31-0.80	0.53[a]	0.34-0.84
Bursitis	0.99	0.62-1.58	0.91	0.56-1.49
Severe lesions	0.65	0.35-1.21	0.75	0.38-1.49

- No relationship between claw lesions and lameness ($P>0.05$)
- Limb lesions associated with increased risk of lameness ($P<0.001$)



Dirtiness of sows

No effect of floor ($P>0.05$)

Dirtiness of pen: Rubber floors were more soiled ($P<0.05$)

Key findings

Sows on rubber at lower risk of

1. Lameness
2. Swellings and wounds

Sows at higher risk of

3. Claw lesions; these were mild and not related to lameness *(Fitzgerald et al., 2010; Gregoire et al., 2013)*
4. Rubber floors more likely to be dirty – risk factor for claw lesions

Study 2: Effect of rubber flooring on the behaviour of group housed sows

Concrete; n= 8 groups

Rubber; n= 8 groups

Calderon-Diaz et al., submitted to AABS

Measurements

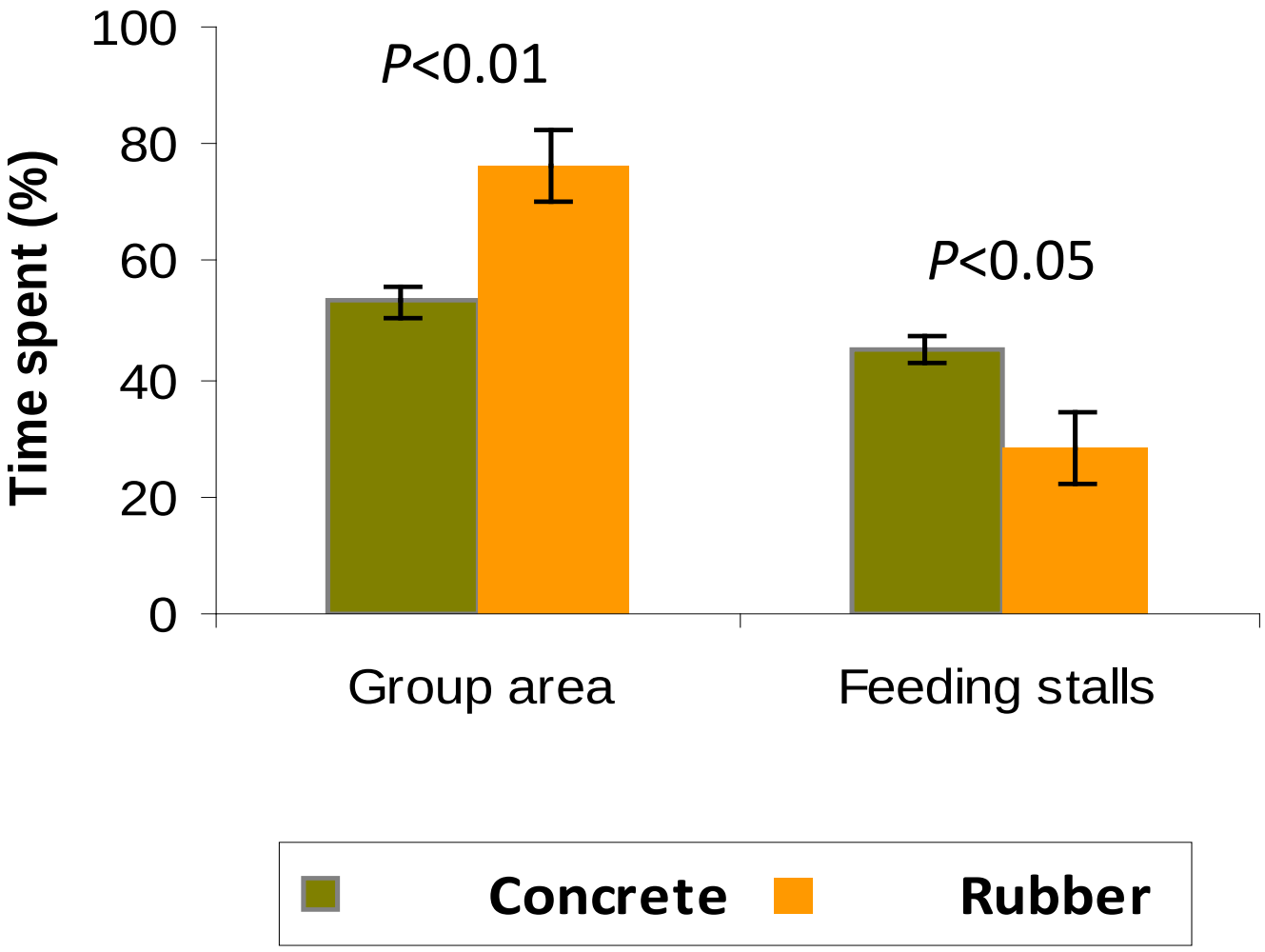
- Sow behaviour recorded on video for 24h on days 1, 8, 25, 50 and 75 after entering the trial
- Recordings sampled every 10 mins
  - Postural and spatial behaviour
  - Posture changing index

- Analysis by mixed model equations (SAS 9.3)

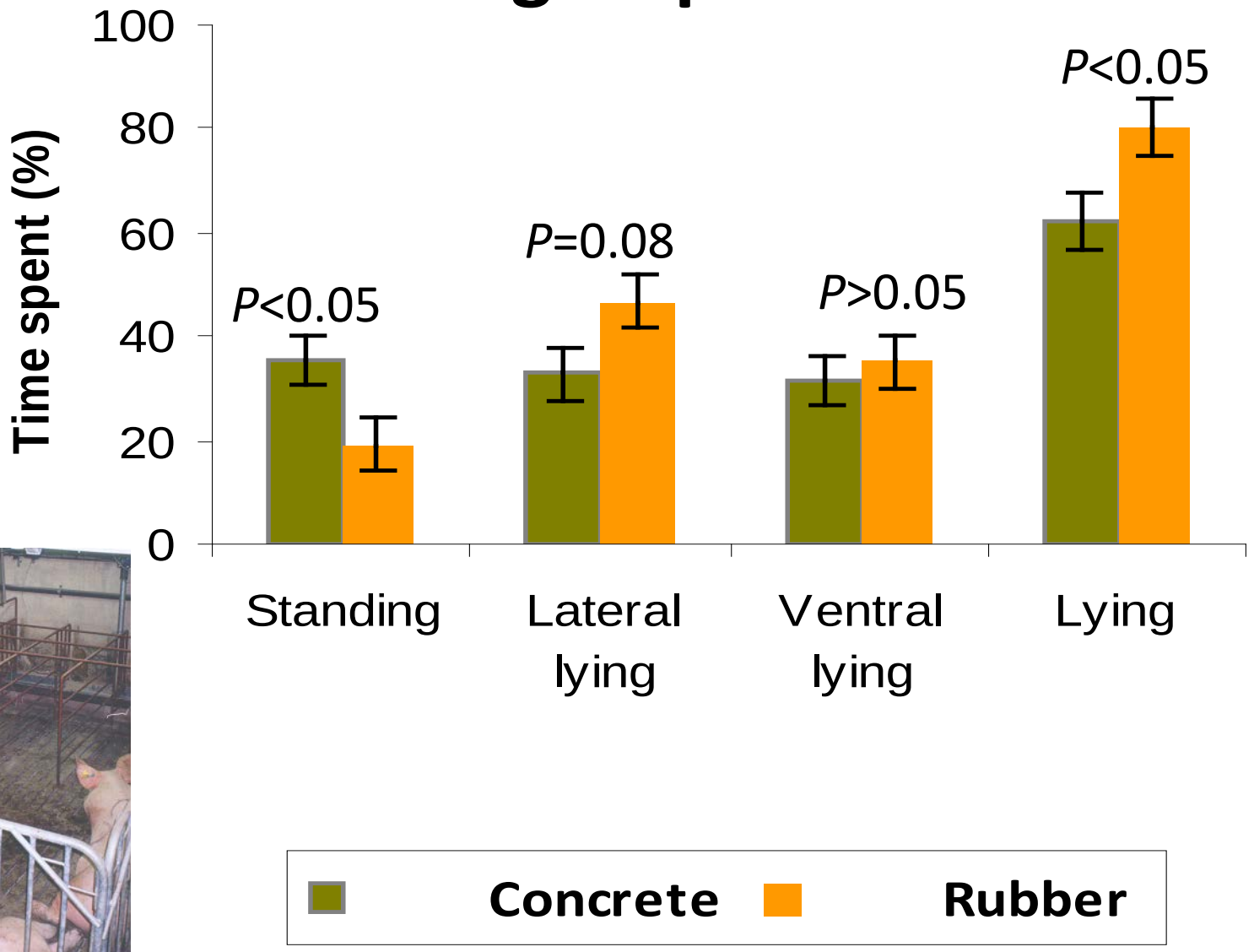
Results

- No effect of floor type on
  - Overall time spent in the different postures (P>0.05)
  - No. posture changes (P>0.05)

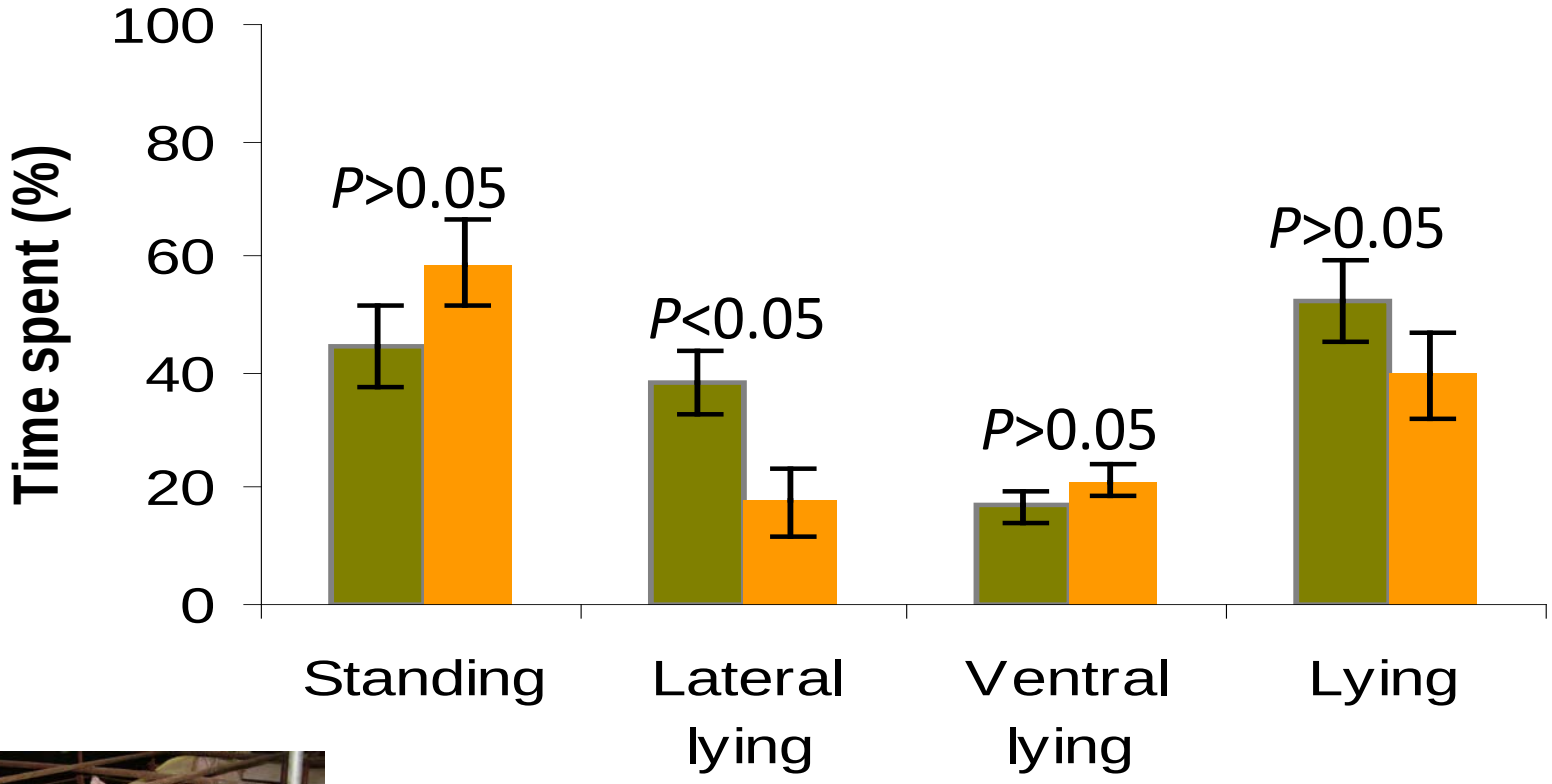
Effect of flooring on the time (%) spent in different pen locations



Effect of flooring on postural behaviour in the group area



Effect of flooring on postural behaviour in the feeding stalls



Key findings

Sows with rubber flooring:

1. More time in the group area
2. More time (lateral) lying in the group area – indicator of comfort *(Tuyttens et al., 2008)*

Reflects preference of sows for a comfortable place to lie

Discussion

- Rubber flooring reduced lameness; consistent with findings for dairy cows
- Lameness not related to claw lesions
  - Poor relationship between severity scores and degree to which lesions penetrate the corium?
  - High variability in location, types and severity of different lesions so difficult to relate to a locomotion score *(Gregoire et al., 2013)*
  - Other causes/reasons for lameness e.g. OCD

Discussion

- Sow preferred to lie on rubber: more comfortable (Study 2)
- Less pressure/strain on joints and bony prominences
- Linked to more frequent posture changing *(e.g. Elmore et al., 2010)*
- Resolution of shoulder ulcers in sows on rubber *(Zurbrigg, 2006)*
- Reduction in lameness on rubber mediated by better comfort while lying rather than by protection offered foot while standing
- Limb lesions appear to reflect this relationship

Conclusion

Rubber flooring has the potential to improve sow welfare through improved comfort/limb health and reduced lameness

Acknowledgements

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