

What's going on with lameness these days?

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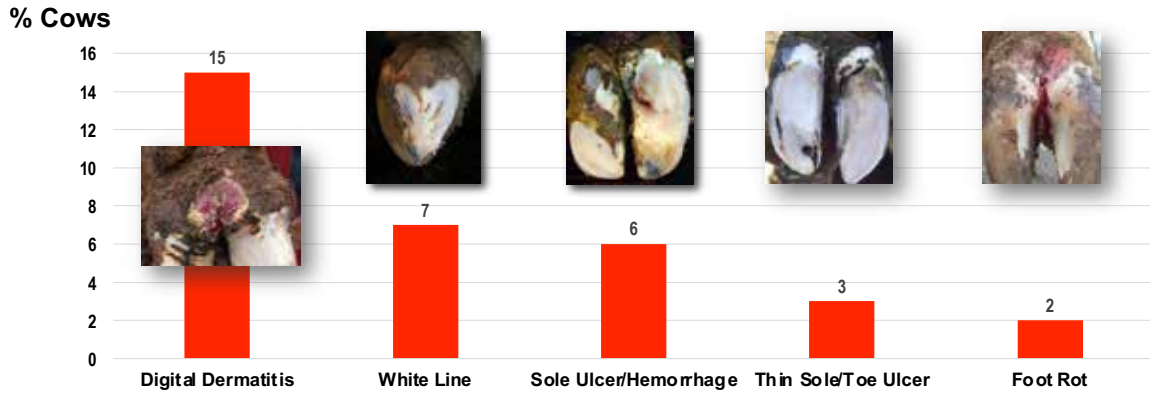
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Healthspan vs Lifespan

- **Lifespan** = the total duration a cow lives, which should be driven by profitability and depends on breeding strategy
- **Healthspan** = the period of a cow's lifespan when she is in free of illness or chronic conditions (which helps drive profitability!), but depends on health!
- Aim for healthspan = lifespan!

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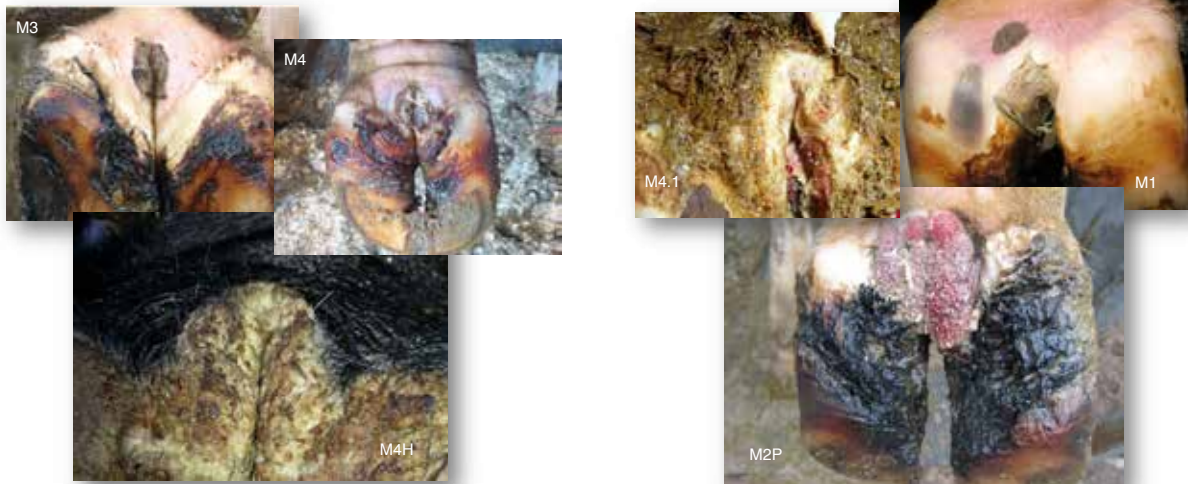
Median Lesion Incidence Rate



207 US dairy herds, mean herd size 2,517 cows (range 173 to 20,175) 2018-2021

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Digital Dermatitis Stages



Inactive DD

Active DD

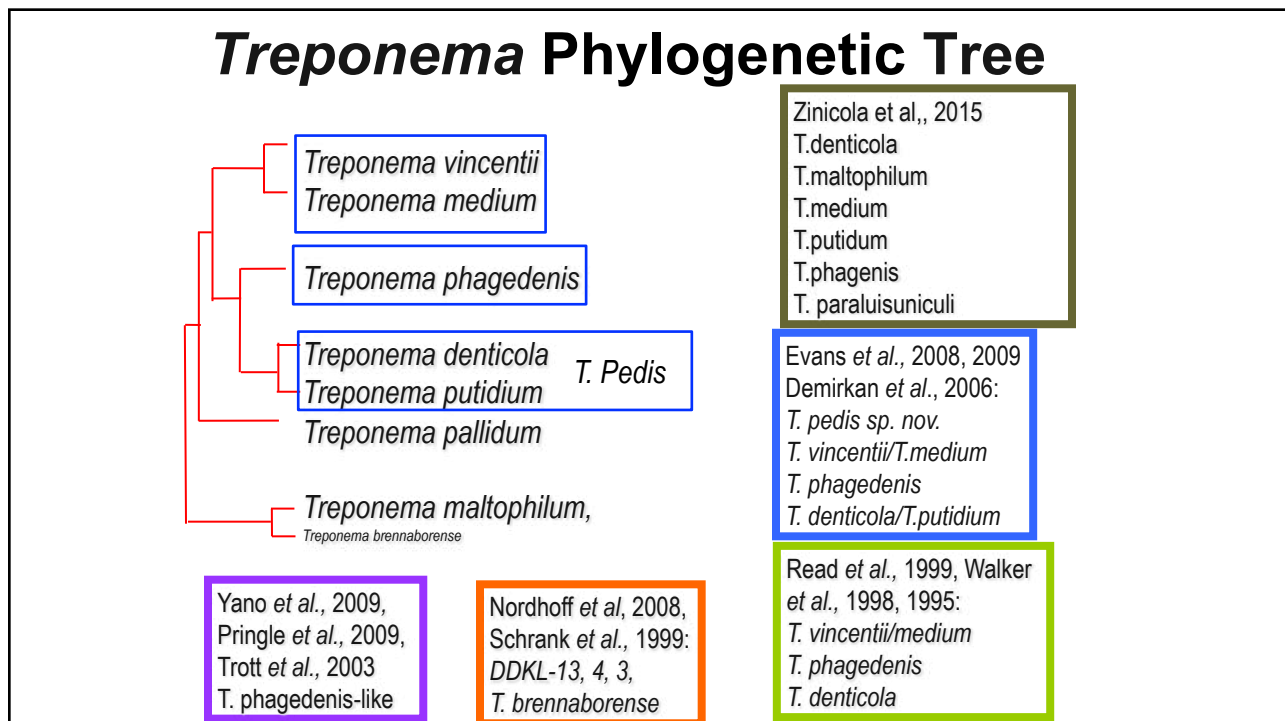
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- Hygiene (Rodriguez-Lainz et al. PVM 28:117, 1996)
- Infectious agents – *Treponema spp* (Gomez et al. JDS 95:1821, 2012)
- Genetics (Schopke et al., JDS 98:1-11, 2015)
- Skin integrity – trace minerals (Gomez et al. JDS 97:6211, 2014)
- Inflammation/immune modulation (Anklam et al., 2025)

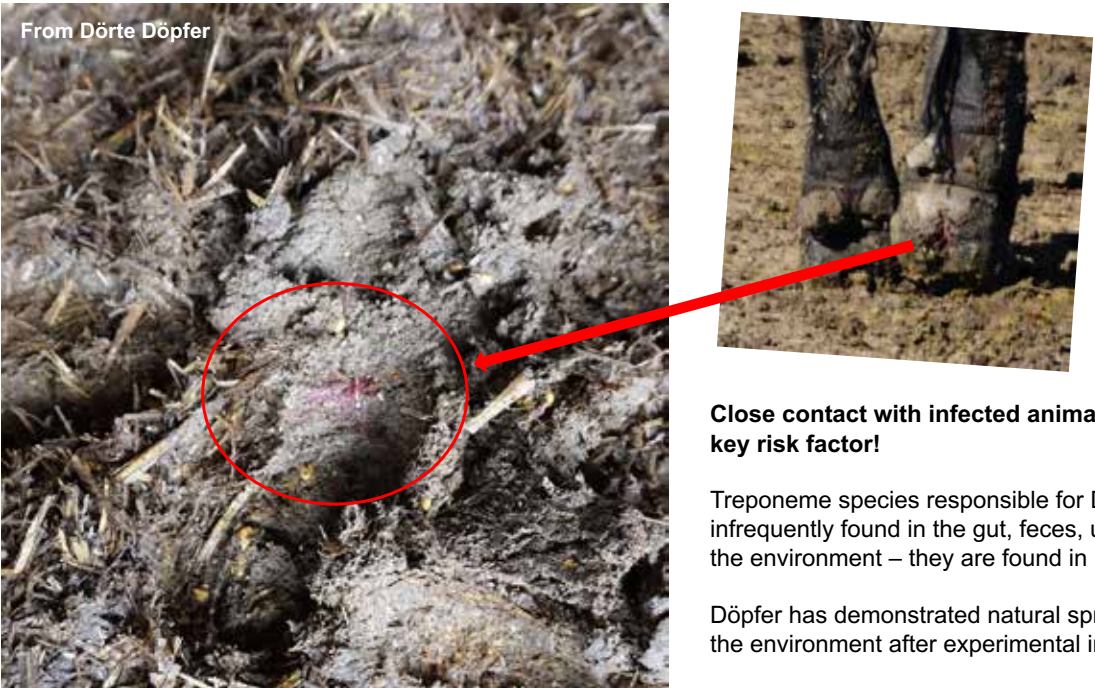
Multifactorial, polymicrobial disease with an essential bacterial component (Treponemes), creating lesions that are characterized by destructive inflammation with neutrophil infiltration and release of chemotactic and antimicrobial factors that perpetuate lesion growth and expansion

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From Dörte Döpfer



Close contact with infected animal is the key risk factor!

Treponeme species responsible for DD are infrequently found in the gut, feces, urine and the environment – they are found in lesions!

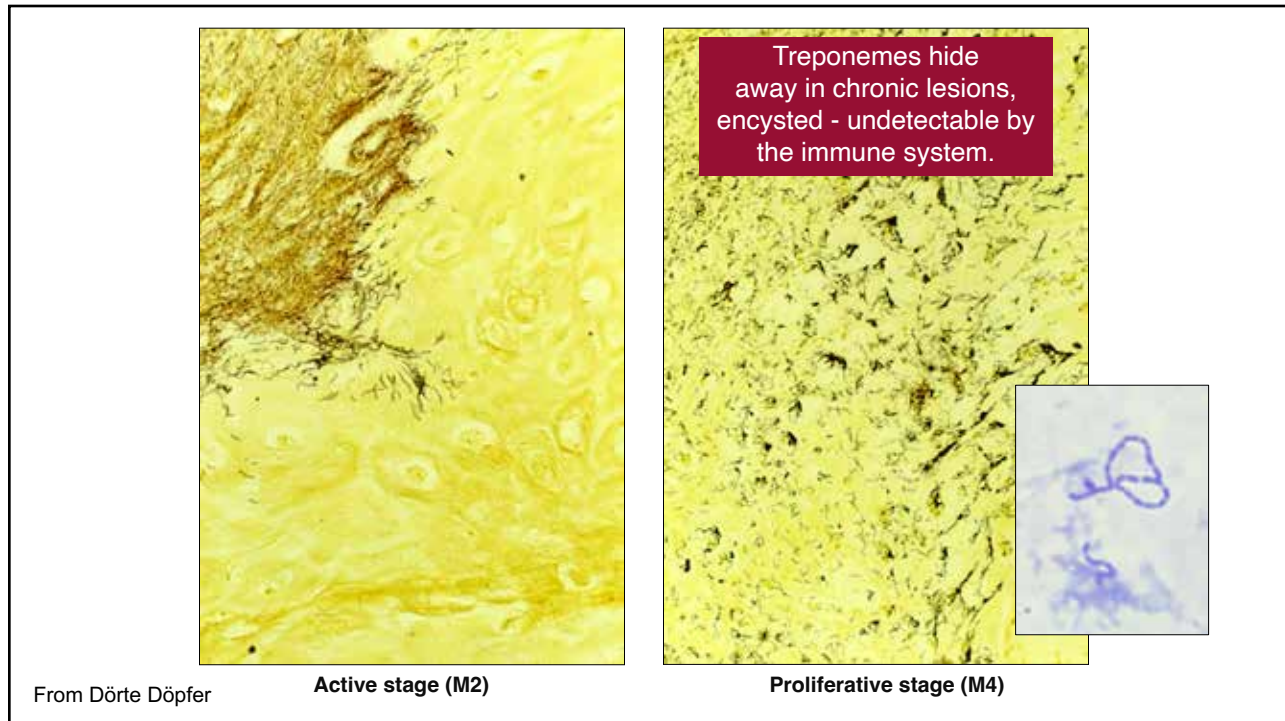
Döpfer has demonstrated natural spread within the environment after experimental infection

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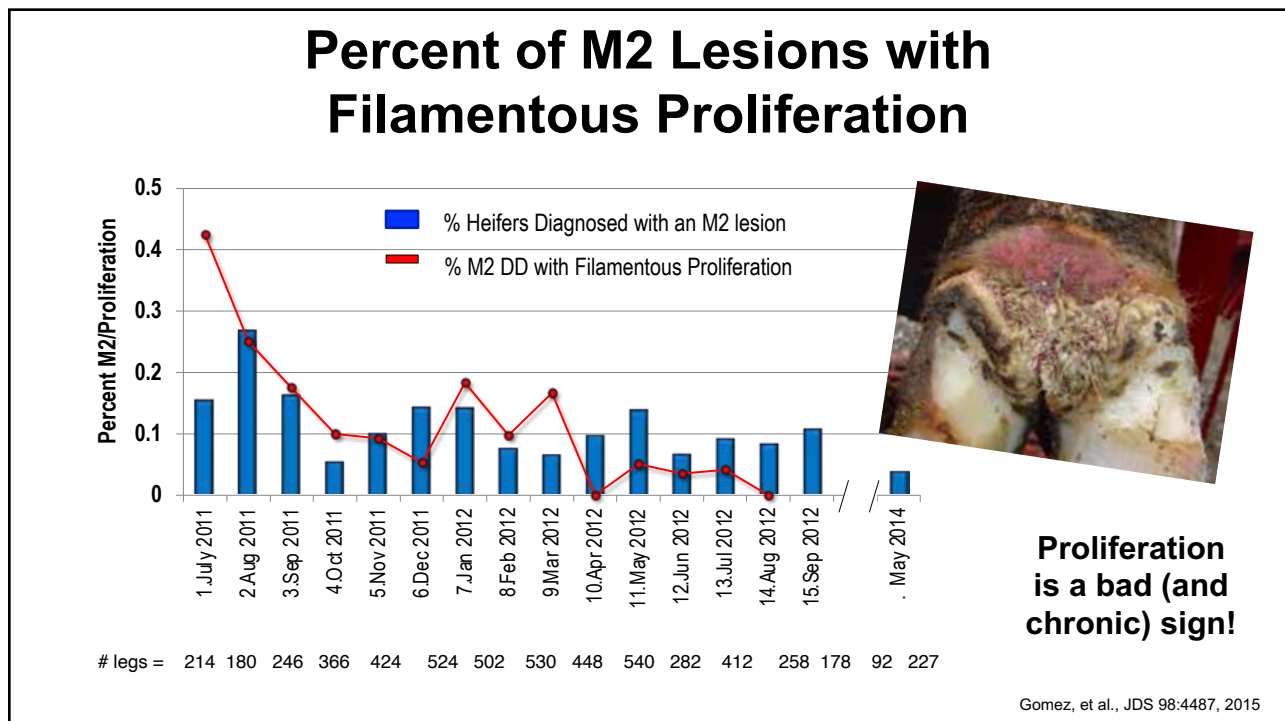
Hydropic Maceration Required!



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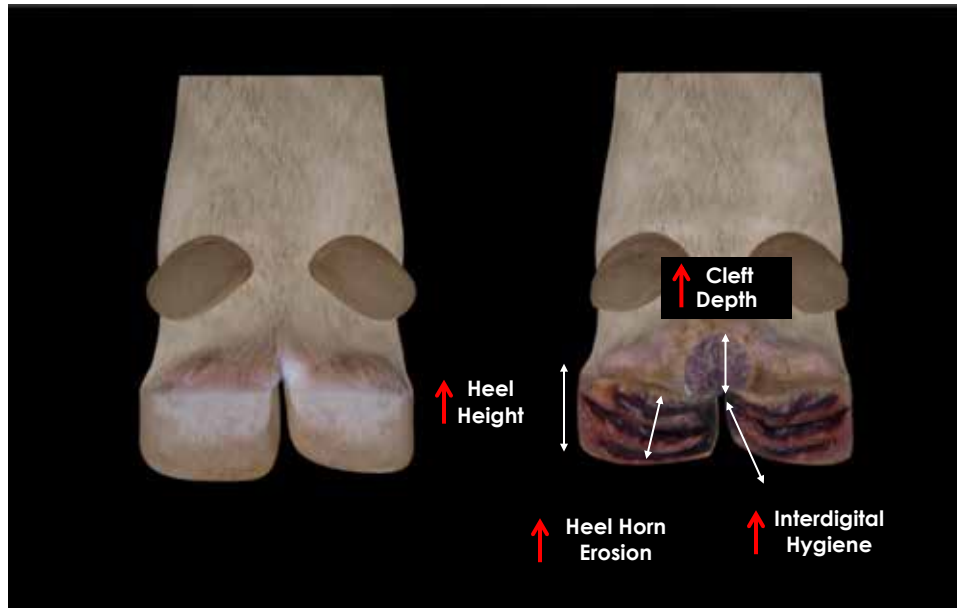


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Hoof Conformation Changes (Gomez et al. JDS 98:927, 2015)



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DD occurrence during the first lactation by DD experience during the rearing period

	DD during the rearing period		
	No DD (Type I)	1 DD case (Type II)	>1 DD case (Type III)
% First Lactation Heifers Suffering a DD event	13.7	45.6*	67.6*

Preventive strategies have to start in the heifer pen!

Gomez, et al., JDS 98:4487, 2015

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So, what can we do?

- Surveillance and topical treatment to cure active lesions before they become chronic
- Footbath to maintain chronic lesions in an inactive state
- Feed supplements to enhance skin integrity and immune response
- Breeding to enhance resistance to infection and chronicity
- Vaccination to enhance immunity?

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It starts in the heifer pen!

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Treatment Steps

1. Identify the affected animal
2. Sort her out of the pen
3. Move her to a chute
4. Lift the foot and treat it
5. Return her to the pen of origin

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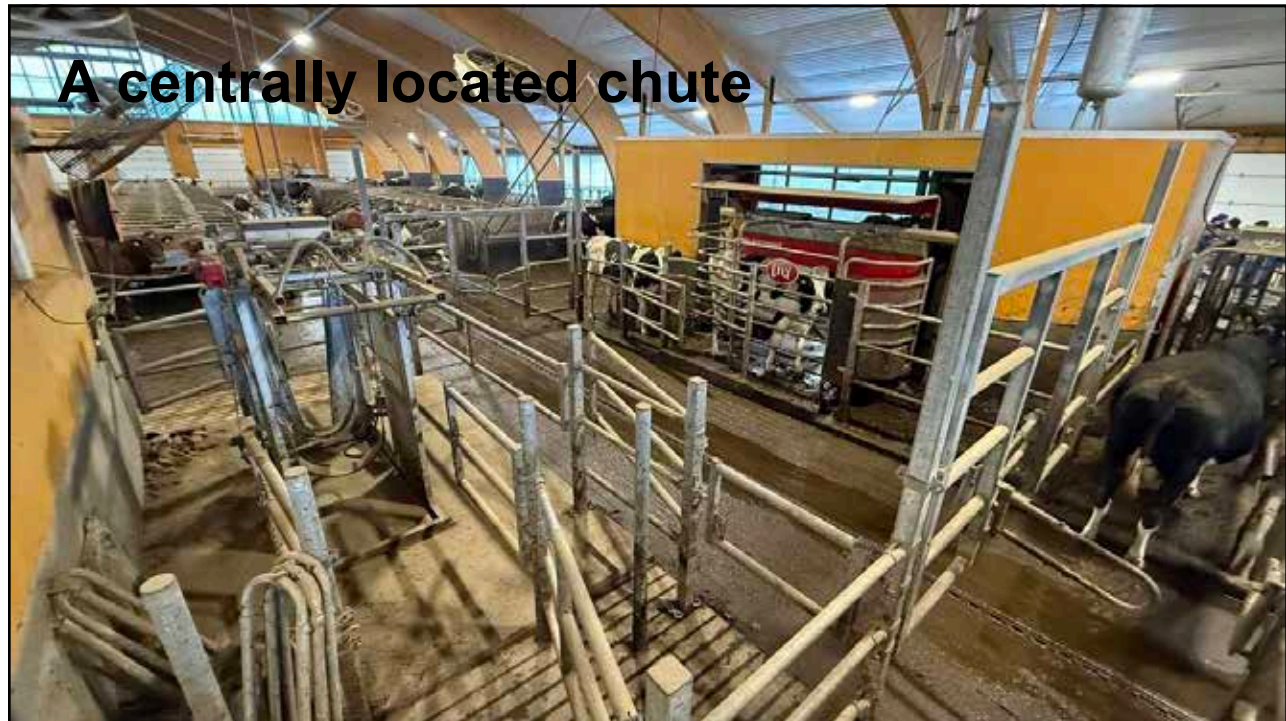
Artificial Intelligence helps with early and systematic detection of DD



From Dr. Dörte Döpfer

Computer Vision for DD prediction cow-side

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A centrally located chute

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Footbath Best Management Practice

- Use a well-designed footbath with adjacent mixing facility
- Footbath 4 milkings per week and adapt based on outcome to achieve a minimum frequency to maintain control
- Use an antibacterial with evidence of efficacy against DD and footrot
 - No higher than 5% CuSO₄ (aim ~2%) and monitor soil copper levels
 - No higher than 4% formalin (aim 1.5-2%) and avoid in very cold weather
 - Use of acidifier to pH no lower than 3.0
- Use the bath as long as it is effective ~ 150-300+ cow passes
- Don't forget to include all life stages of the cow (at reduced frequency)

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The Ideal Footbath – 2-3 immersions per foot



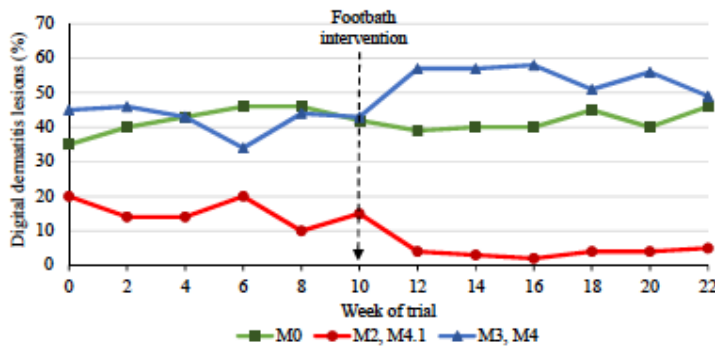
- 10-12' (3-3.7 m) long
- 24" (0.6 m) wide sloped to 3' (1 m) at 3' (1 m) high
- 10" (25 cm) high step

Cook et al., Vet.J. 193, 669-673, 2012

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Standardized Footbath Management

(Solano et al., 2017)

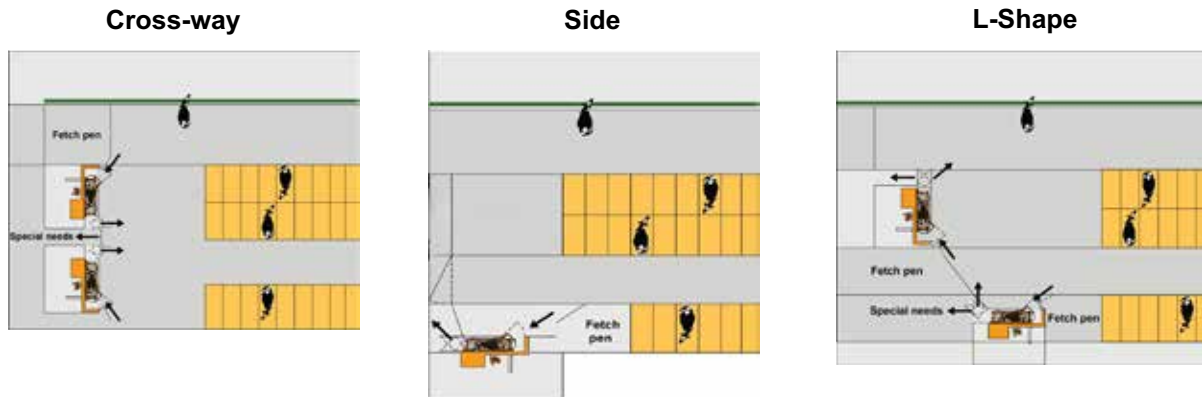


Change in active (M2, M4.1) DD lesions and healthy feet (M0) in high prevalence farms (6 farms with DD>15%) after footbath intervention

- 9 farms over 22 weeks using 5% copper sulfate
- Standardized footbath design – 10' (3.0m) long
- Standardized footbath frequency to 4 milkings per week and replaced the solution every 200 cow passes
- Significant decrease in active lesions from 22% to 14%
- Percent healthy feet increased from 39% to 48%

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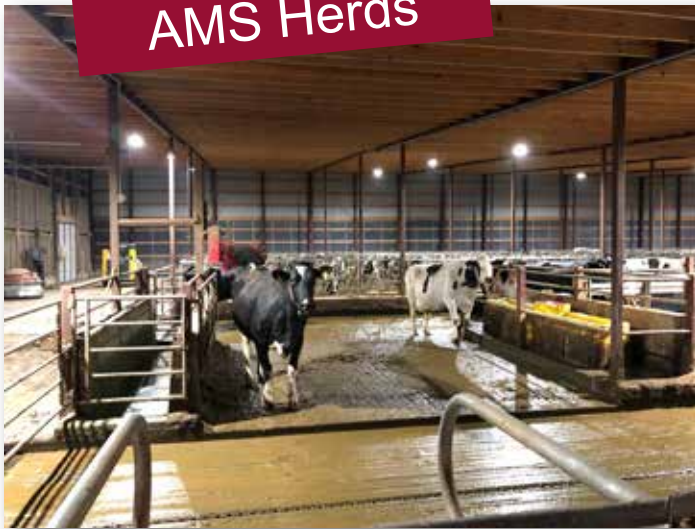
The AMS Footbath Challenge



The most common AMS layouts recommended create significant challenges for footbath location and use!

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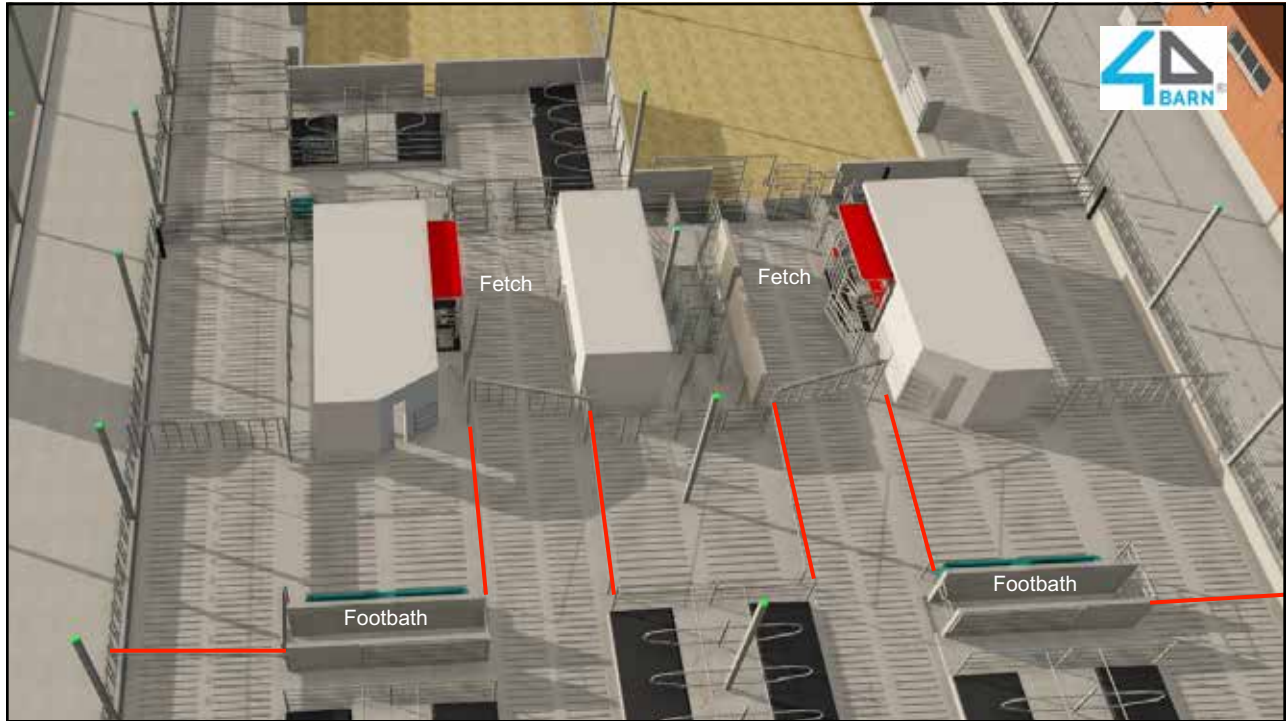
Footbaths and AMS Herds



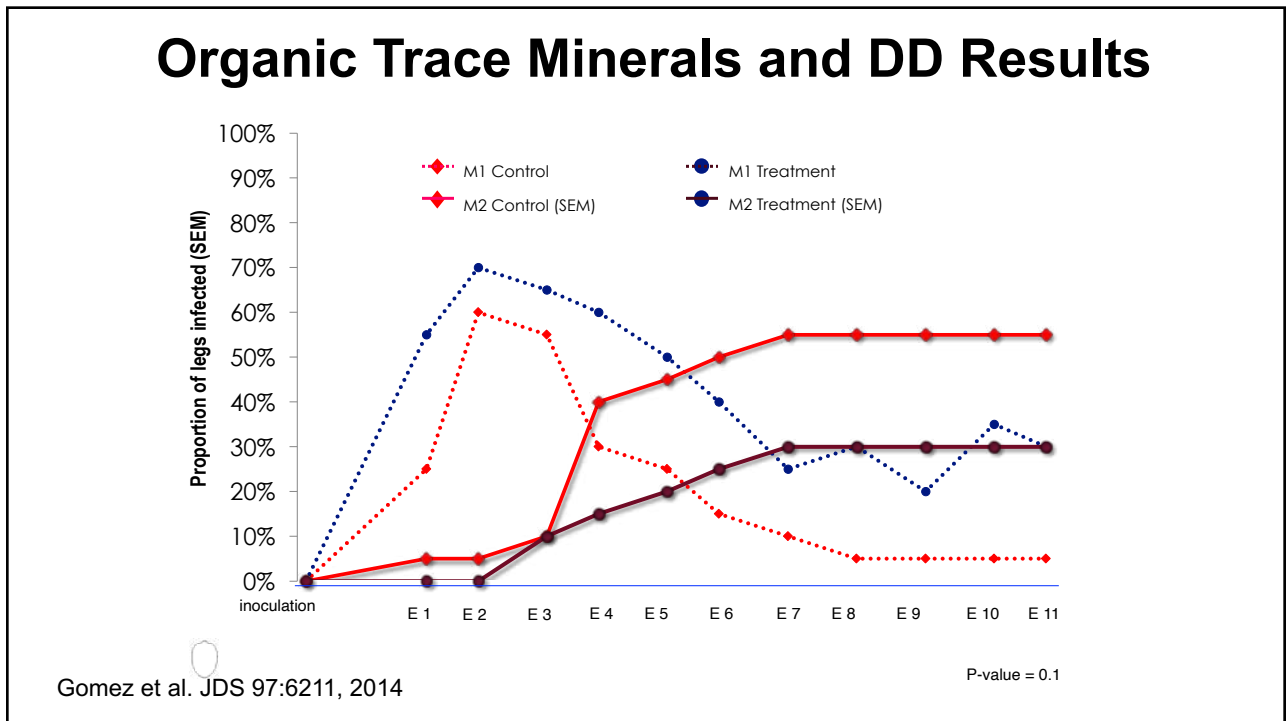
This is not the solution!

Only 27% of AMS herds footbath >3X week!

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- Fermentation product fed on commercial robot dairy in PMR for 5 months vs control without additive
- 968 total lactating cows enrolled
- **Relative risk for control cows developing an active ulcerated DD lesion rather than no lesion or an inactive lesion was 1.8 times that of test cows, and the transition was more rapid**

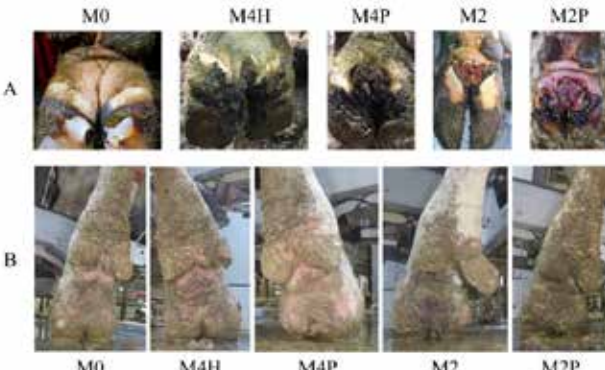
Applied Animal Science 38:98–109
<https://doi.org/10.15232/aaas.2021-02229>
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ARPAS

HEALTH: Original Research

Effects of supplementing a *Saccharomyces cerevisiae* fermentation product on the prevention and control of digital dermatitis in lactating dairy cows

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Applied Animal Science 41:47–64
<https://doi.org/10.15232/aaas.2024-02967>
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ARPAS

HEALTH: Original Research

Evaluation of *Saccharomyces cerevisiae* fermentation product on the prevention of digital dermatitis using an experimental infection model in cattle

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Outcome	Control Group	Treatment Group
M2 incidence (steer level)	92% (22/24)	60% (15/25)

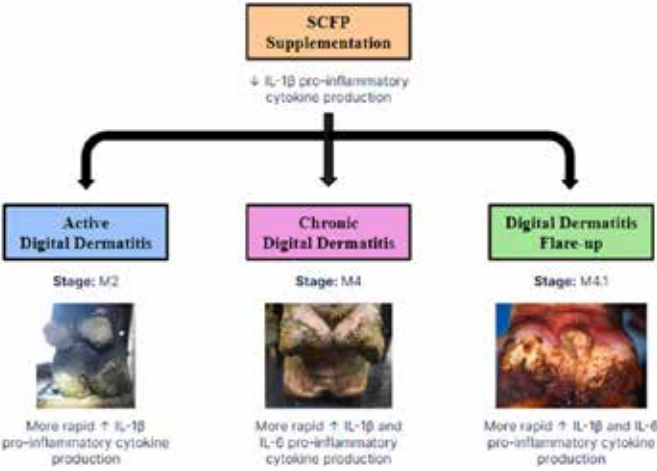
Relative Risk for Treatment steers 0.65 (0.46 to 0.92 95% CI) vs Control

Experimental DD infection trial: 2 groups of 25 steers grouped into treatment vs control (1 control lost from trial due to foot rot)

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Article
The Effect of *Saccharomyces cerevisiae* Fermentation Product Supplementation on Pro-Inflammatory Cytokines in Holstein Friesian Cattle Experimentally Inoculated with Digital Dermatitis
 Marlee Henige ^{1,*}, Kelly Anklam ¹, Matthew Aviles ¹, Julia Buettner ¹, Summer Henschel ¹ , Ilkyu Yoon ² , Jeffrey Wheeler ², George Dawson ², Jodi McGill ³ and Dörte Döpfer ¹

Evidence of immune modulation decreasing pro-inflammatory state prior to infection and then triggering a more rapid response post-infection



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    graph TD
      A[SCFP Supplementation] --> B[Active Digital Dermatitis  
Stage: M2]
      A --> C[Chronic Digital Dermatitis  
Stage: M4]
      A --> D[Digital Dermatitis Flare-up  
Stage: M4.1]
      A --- E[↑ IL-1β pro-inflammatory cytokine production]
      B --- F[More rapid ↑ IL-1β pro-inflammatory cytokine production]
      C --- G[More rapid ↑ IL-1β and IL-6 pro-inflammatory cytokine production]
      D --- H[More rapid ↑ IL-1β and IL-6 pro-inflammatory cytokine production]
  
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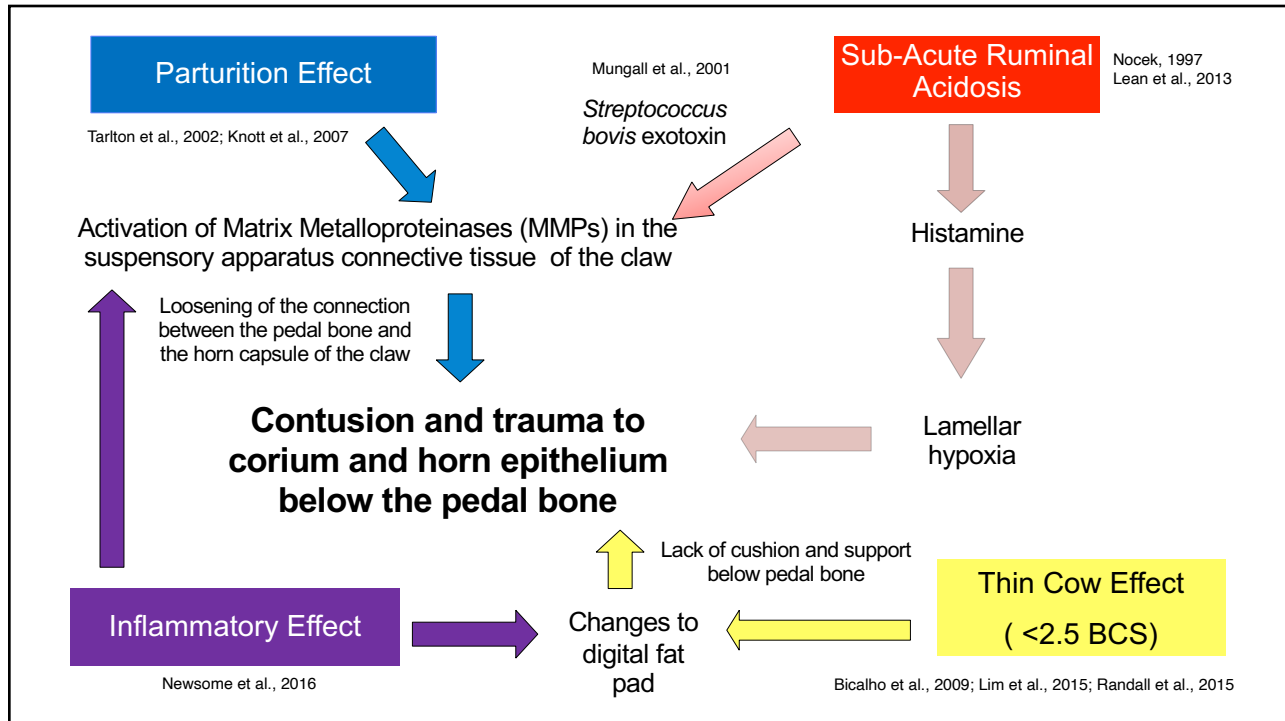
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Sole Ulcers

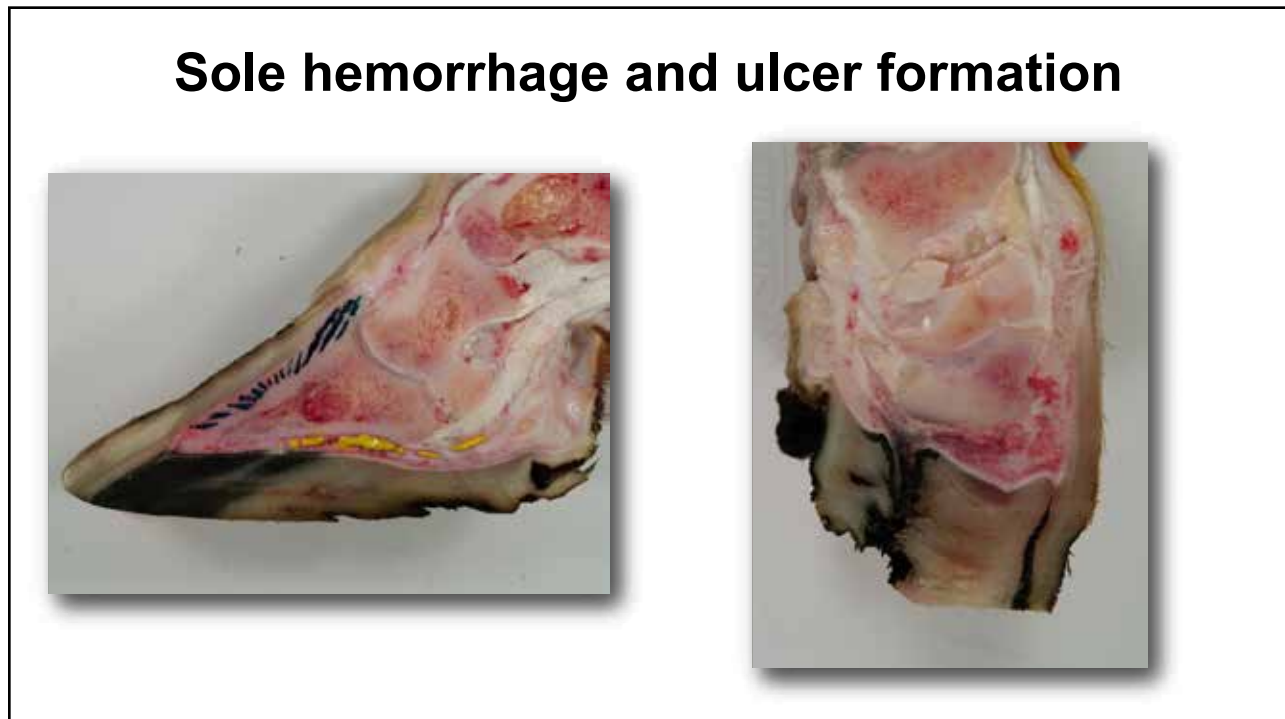
Standing Up Disease



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Linking bone development on the caudal aspect of the distal phalanx with lameness during life

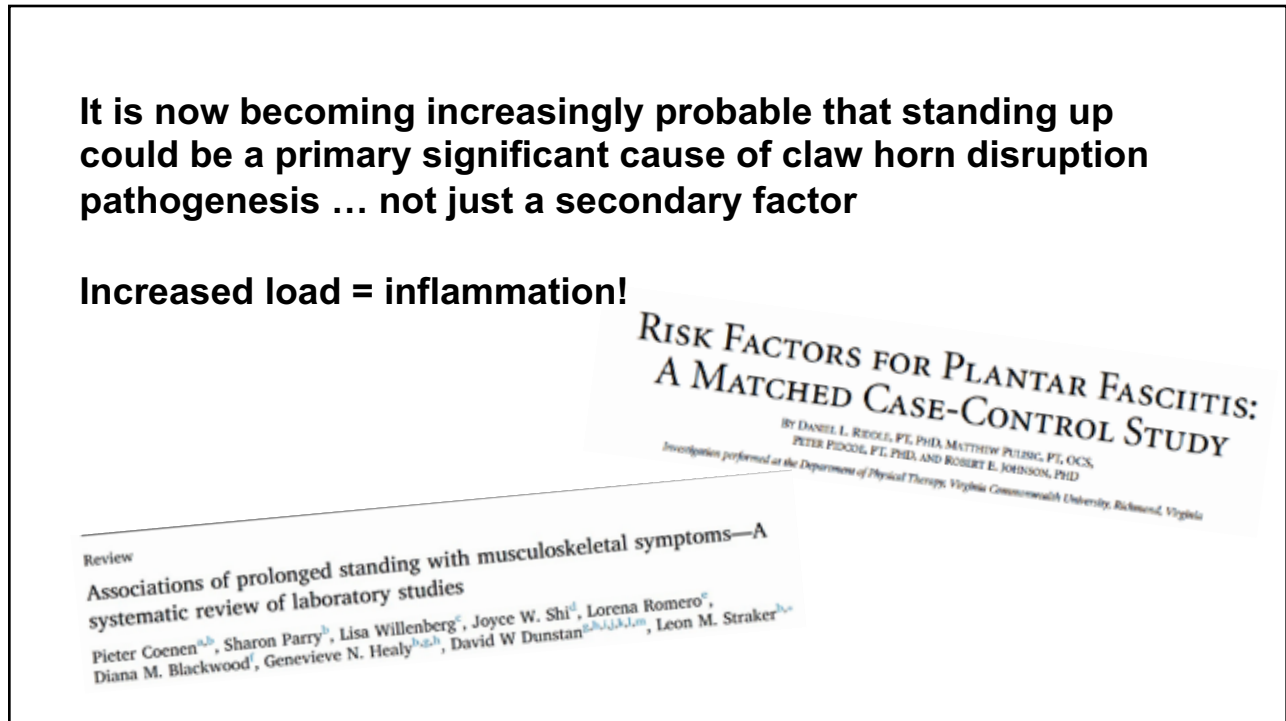
J. Dairy Sci. 99:4512–4526
<http://dx.doi.org/10.3168/jds.2016-10262>
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²Small Veterinary College, Haskins Road 1, Don, South Yorkshire, Sheffield, S18 1TA, United Kingdom
³Sheffield Hallam College, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 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3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 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3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 3849, 3850, 3851, 3852, 3853, 3854, 3855, 3856, 3857, 3858, 3859, 3860, 3861, 3862, 3863, 3864, 3865, 3866, 3867, 3868, 3869, 3870, 3871, 3872, 3873, 3874, 3875, 3876, 3877, 3878, 3879, 3880, 3881, 3882, 3883, 3884, 3885, 3886

It is now becoming increasingly probable that standing up could be a primary significant cause of claw horn disruption pathogenesis ... not just a secondary factor

Increased load = inflammation!



35

Effects of acute lying and sleep deprivation on metabolic and inflammatory responses of lactating dairy cows
 K. L. Proudfoot,^{1*} J. A. Kull,² P. D. Krawczel,³ J. M. Bewley,⁴ B. F. O'Hara,⁵ K. D. Donohue,⁶ and G. M. Pighetti^{7*}

Measured relative abundance of proinflammatory cytokine mRNA (TNF, IL1B, IL6) from leukocytes before and after **24 h Lying Deprivation** and **24 h Human Disturbance** = Allowed to Lie Down but Deprived of Sleep

Lying deprivation, but not sleep deprivation alone, increased TNF and IL1B and cows entered a **proinflammatory state**

Cytokine	Group	Day -1	Day 0
TNF	Lying	~2.3	~3.4
	Human	~2.5	~2.8
IL1B	Lying	~1.1	~1.6
	Human	~1.3	~1.3
IL6	Lying	~1.4	~2.0
	Human	~1.7	~1.7

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Lying Deprivation, Inflammatory Markers and Hoof Health

- **Lying deprivation promotes a proinflammatory state** (elevated TNF, IL1B) (Proudfoot et al., 2021)
- Elevated **blood IL6 and TNF** (trend) in **lame vs non-lame post-partum cows** housed in tiestalls -8 to +4 weeks (Zhang et al., 2015)
- Compared with healthy cows, **elevated levels of plasma IL6, TNF in 'laminitic' cows** (Zhang et al., 2020)
- Trace mineral (Zn, Mn, Cu, Co) amino acid complexes fed during the transition period (-30d to +30d) decreased heel horn erosion and **decreased expression of TNF and IL1B in the corium** compared to inorganic trace minerals (Osorio et al., 2016)
- Proinflammatory cytokines (TNF, IL1B, IL6) **upregulate matrix metalloproteases** (MMPs) that impair the integrity of the suspensory apparatus through collagenase activity (Dufour, 2015)

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Hoof Trimming

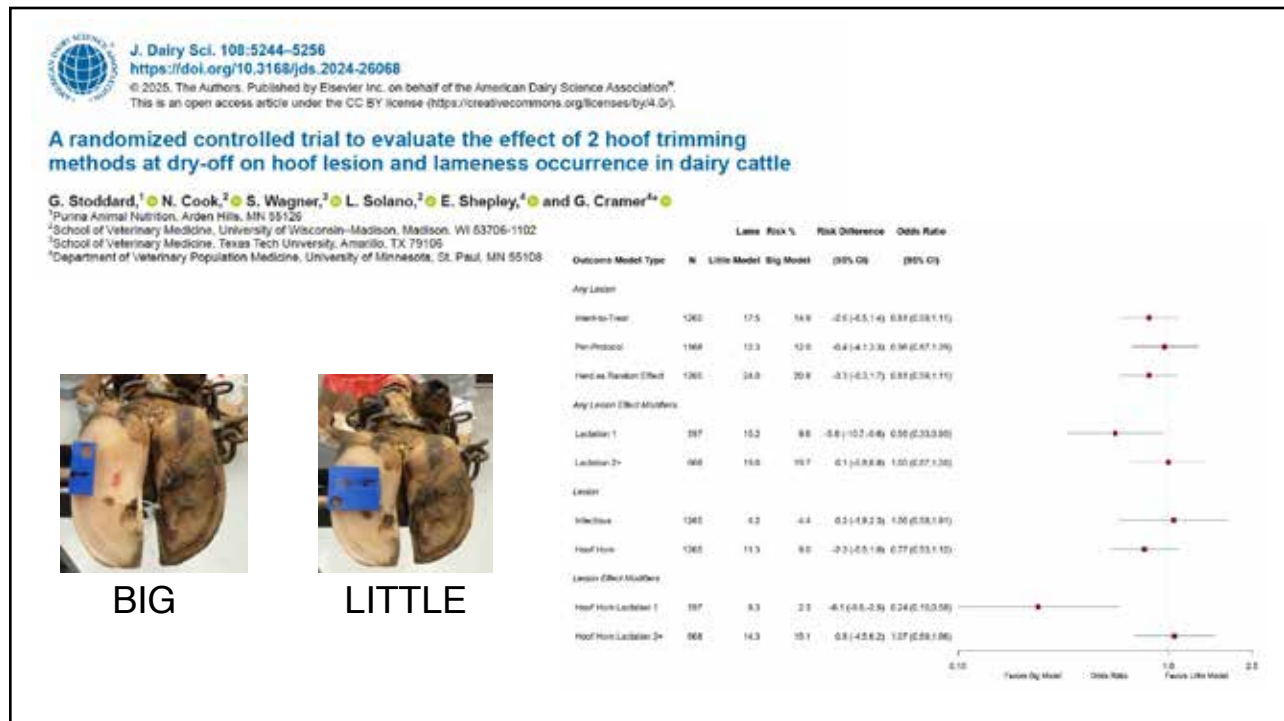
Restore a more upright claw angle ($\sim 52^\circ$)

Balance weight between the inner and outer claw

Effect lasts 4-6 months

Don't over trim!

38



39

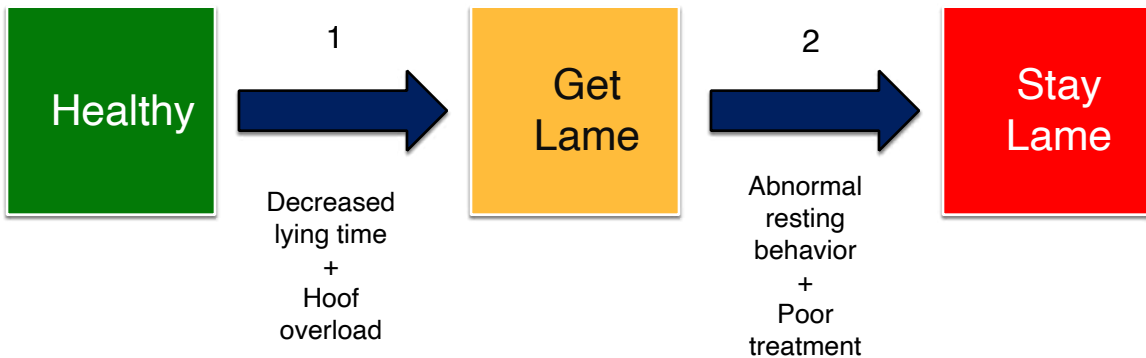
Herd Level Factors Reducing Lameness Risk

Literature Review Since 2003

- Less time standing on concrete (Bell et al., 2009)
- Deep bedded comfortable stalls rather than mats or mattresses (Bran et al., 2019; Chapinal et al., 2013; Cook, 2003; Dippel et al., 2009; Espejo et al., 2006; Rouha-Mulleder, et al., 2009; Solano et al., 2015; Matson et al., 2022),
- Less restrictive neck rail locations, low rear curb heights, lower brisket locators, and absence of lunge obstructions, wider stalls (Espejo and Endres, 2006; Chapinal et al., 2013; Dippel et al., 2009; Rouha-Mulleder, et al., 2009; Westin et al., 2016),
- Lower stocking density (Sadiq et al., 2020) and <3h/d waiting to be milked (Jewell et al., 2019)
- Use of manure removal systems other than automatic scrapers (Barker et al., 2010),
- Use of non-slippery, non-traumatic flooring rather than slats (Barker et al., 2010; Bran et al., 2019; Sarjokari et al., 2013; Solano et al., 2015a),
- Access to pasture or an outside exercise lot (Chapinal et al., 2013; Hernandez-Mendo et al., 2007; Oehm, et al., 2022; Popescu et al., 2013; Rouha-Mulleder, et al., 2009)
- Use of a divided feed barrier (rather than a post and rail system) (Sarjokari et al., 2013),
- Wider feed alleys (Sarjokari et al., 2013; Westin et al., 2016) and increased feed space per cow (Matson et al., 2022)
- Access to a trim-chute for treatment and use of an effective footbath program (Pérez-Cabal and Alenda. 2014)
- Prompt recognition and treatment of lameness (Barker et al., 2010)

40

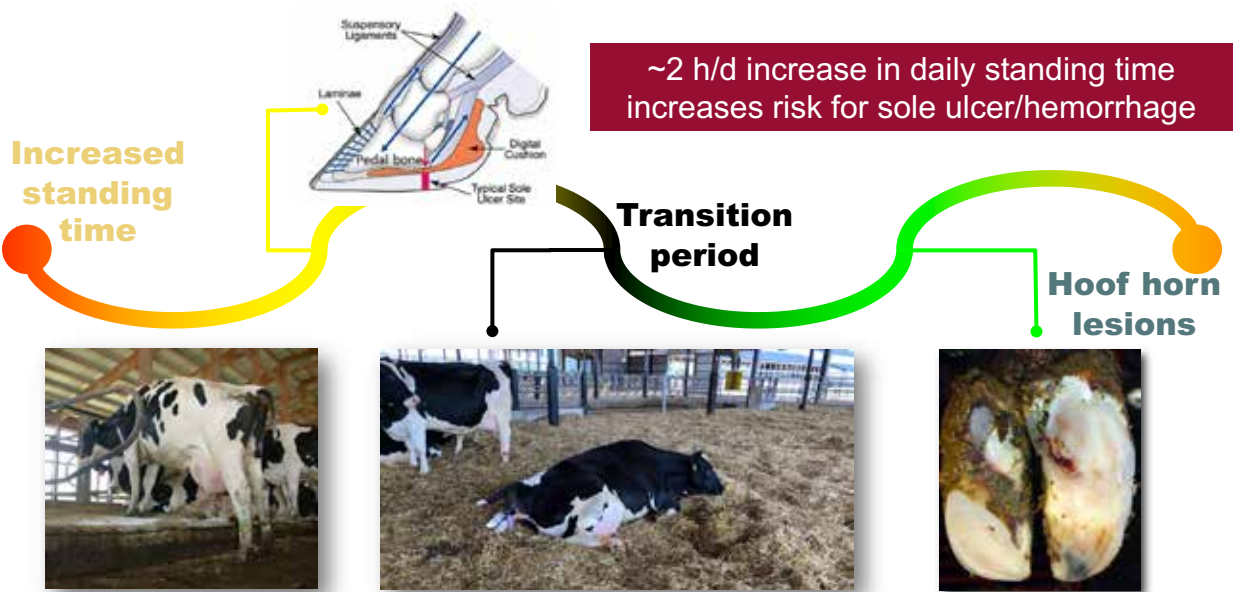
Get Lame – Stay Lame: The Dual Roles of Cow Comfort



Modified from Cook and Nordlund, 2009

41

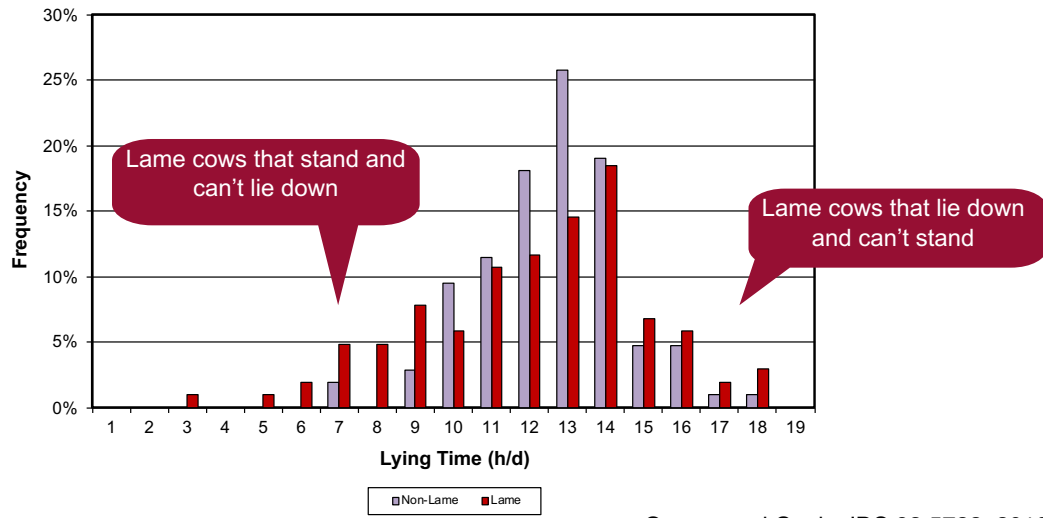
Get Lame: Standing and hoof lesion development



Chapinal et al., 2009; Proudfoot et al., 2010; Sepúlveda-Varas et al., 2014; Omontese et al., 2020; Eriksson et al., 2021

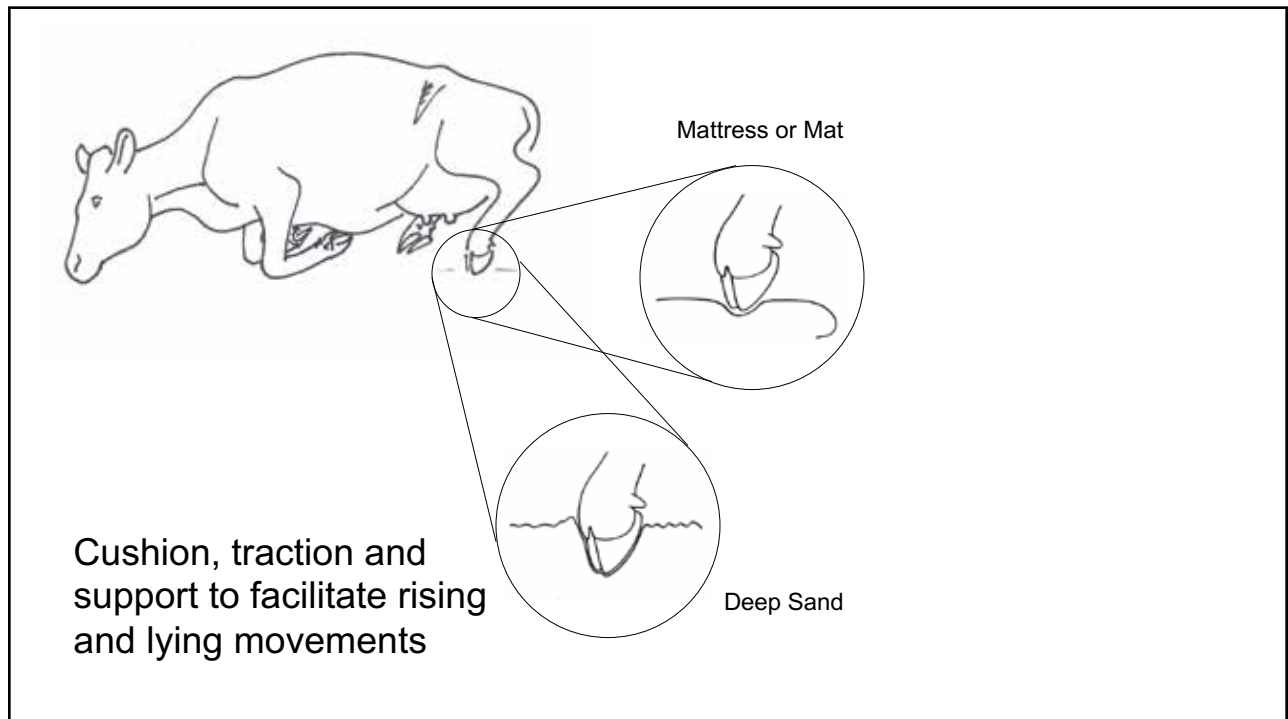
42

Effect of Lameness on Lying Time - Bidirectional



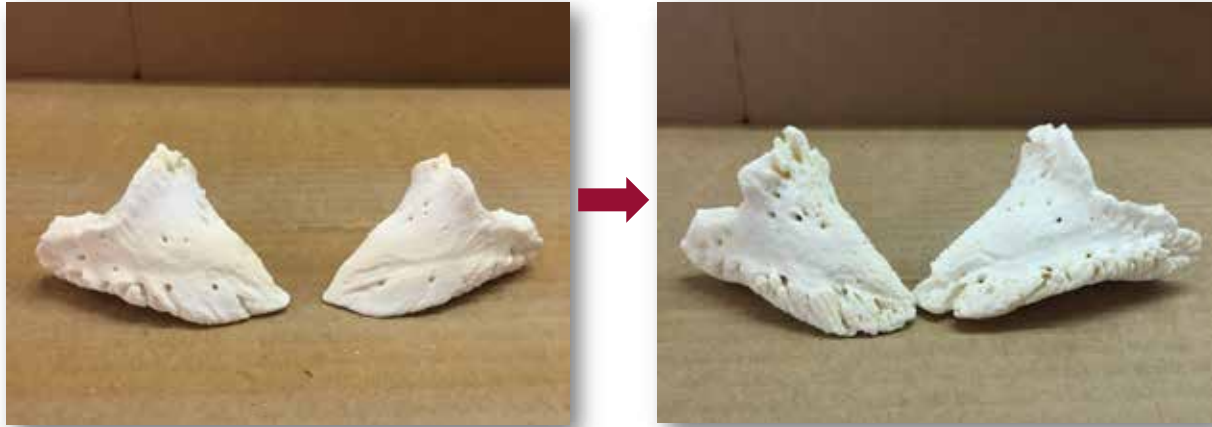
Gomez and Cook, JDS 93:5722, 2010

43



44

Stay Lame: Prior lameness increases risk of future lameness



~80% of lameness cases are attributable to a previous lameness event
 A case of lameness lasts 2-5 wks longer in older cows versus 1st parity cows

Newsome et al., 2016; Randall et al., 2018; Sahar et al., 2022

45

Incidence of Foot Lesions by Parity and Lesion History

Lesion	Parity	Lesion Status	Lactation Adjusted Incidence			P-value
			2	3	≥4	
WLD	1	0	6	11	15	<0.01
		1	20	21	24	
	2	0		9	13	<0.01
		1		20	18	
	3	0			10	<0.001
		1			21	
SU	1	0	12	20	26	<0.001
		1	44	32	23	
	2	0		15	24	<0.001
		1		40	30	
	3	0			18	<0.001
		1			41	

Oikonomou, Cook and Bicalho JDS 96:3712, 2013

46

Poor flooring + Poor handling = White Line Lesion



47



Fix the handling issues first!

48

Signs of Poor Flooring

- Traumatic – rough and uneven
- Abrasive – rough but even
- Slippery – smooth, infrequent grooving



Traumatic



Abrasive



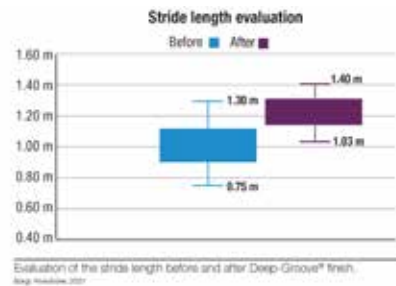
Slippery

49

Better Concrete



3/4" (1.9cm) wide
 1/2" (1.3cm) deep
 3 1/4" (8.25cm) OC



50

Leave concrete 5 days before cutting grooves and 30 days before cows walk on it



TR 330 DEEP GROOVE™ DRUM ASSEMBLY

- Create safe and sound flooring, even with additional insulation
- Reduce concrete spalling, long-term health benefits, reduce maintenance
- Fully grooved steel provides no protrusion
- Ultra-deep groove pattern, as proven by the University of Wisconsin - Madison, the Dairyland Initiative

SPECIFICATIONS

Production per hour:
100-200 sq ft (17-33 sq m) per hr*

Production per acre (100 ft x 100 ft):
20,000-40,000 sq ft (1,800-3,700 sq m)

Weight: 2,000 lbs (900 kg)

*Production based on 100 ft x 100 ft

DEEPCO

Global Drumming

	100 ft	150 ft
Price	\$1,750	\$2,400
Weight	1,500 lbs	2,400 lbs
Capacity	100-200 sq ft	150-300 sq ft

.60-.80 cents per sq ft

Cut grooves into preformed concrete

<http://www.trakriteglobal.com/>

51



Planned Pasture Access

(Chapinal et al., 2013; Hernandez-Mendo et al., 2007; Popescu et al., 2013; Rouha-Mulleder, et al., 2009)

Some of the cows, some of the time

52

Rubber transfer lanes will reduce hoof wear to and from the parlor



53

Peer reviewed studies documenting effect of rubber flooring in the freestall pen on lameness



2

- Vanegas et al., JDS 89:4251, 2006
- Ouweltjes et al., JDS 94:705, 2011



5

- Vokey et al., JDS 84:2686, 2001
- Boyle et al., Appli Anim Behav Sci 106:1, 2007
- O'Driscoll et al., JDS 92:4249, 2009
- Fjeldaas et al., JDS 94:1243, 2011
- Eicher et al., JDS 96:3639, 2013

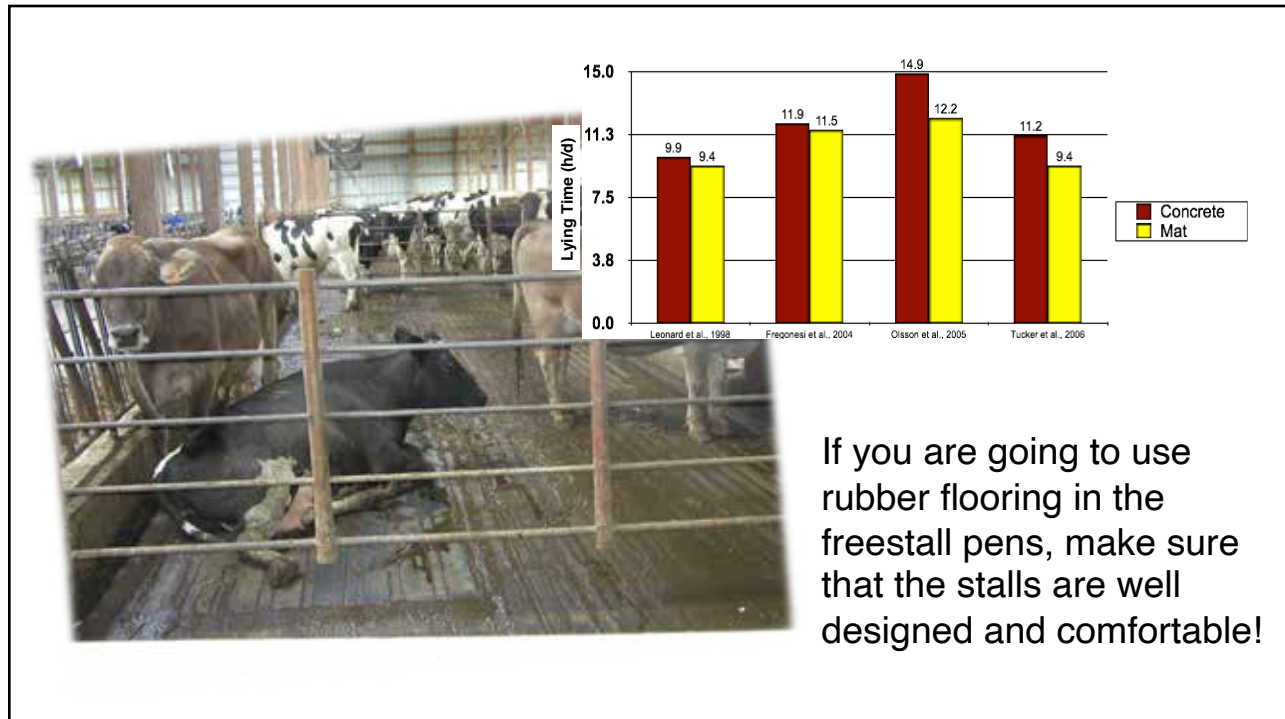


2

- Kremer et al., JDS 90:4603, 2007
- Ahrens et al., JDS 94:2341, 2011

Rubber flooring is expensive, it wears out, and the evidence for lameness improvement is unconvincing!

54



55

The best flooring surface is one that the cow isn't standing on for more than 12 h/d!

56

**Cows need to rest
when they want to,
for as long as they
need to**

- A comfortable resting place of appropriate dimensions with soft deep bedding
- Ensure sufficient time for rest
 - Minimize time milking <3.5 h/d
 - Minimize competition <1.2 cows per stall
- Provide adequate heat exchange and target MCAS

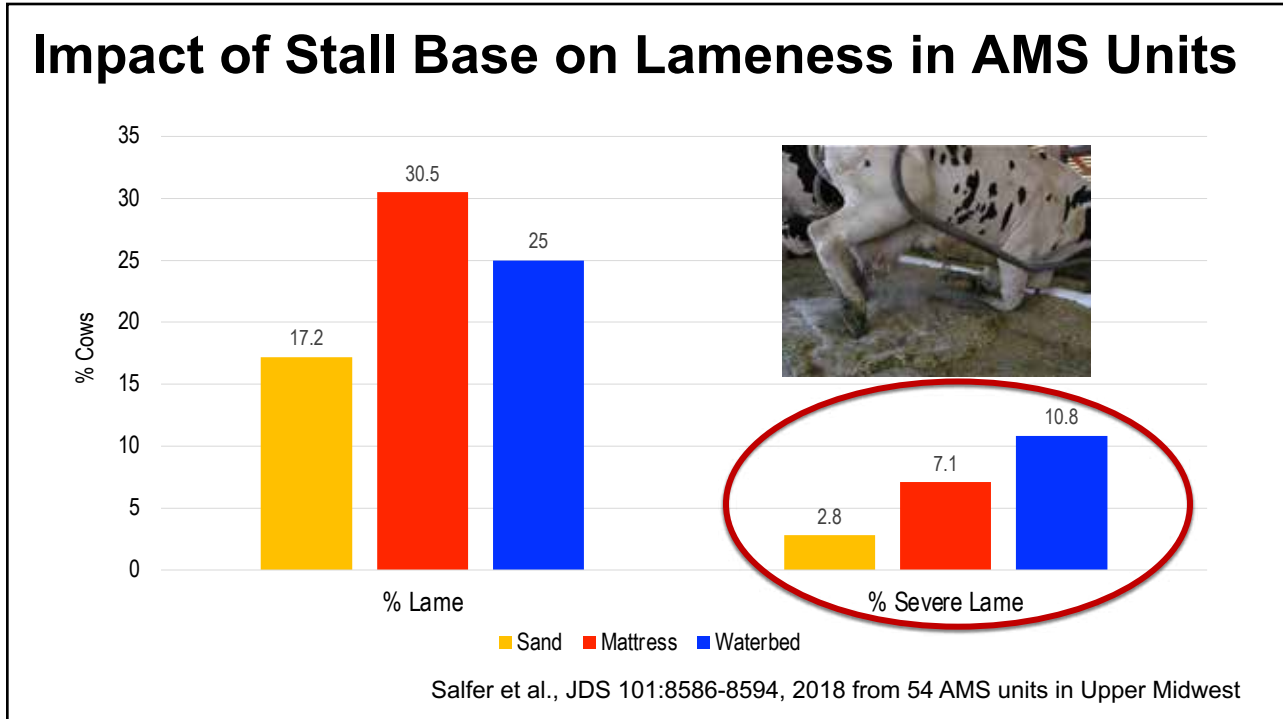
57



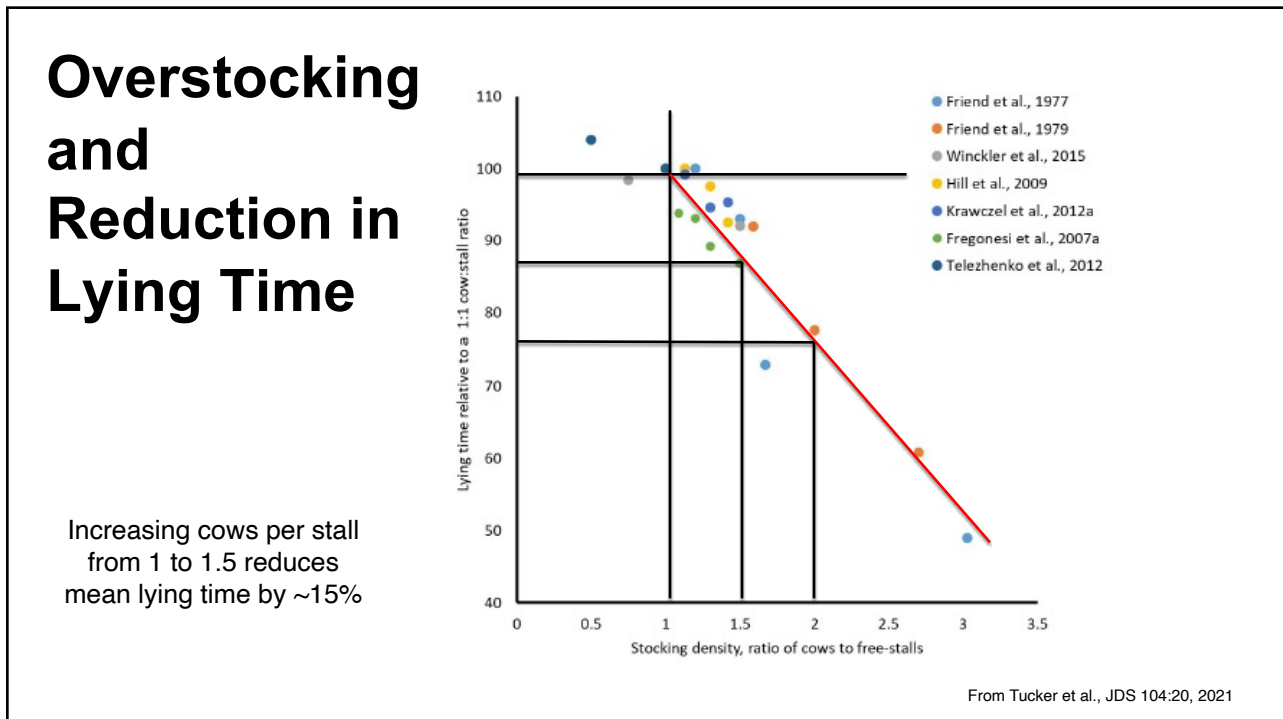
Surface is #1!

Sand
Manure solids
Sawdust
Straw/Lime

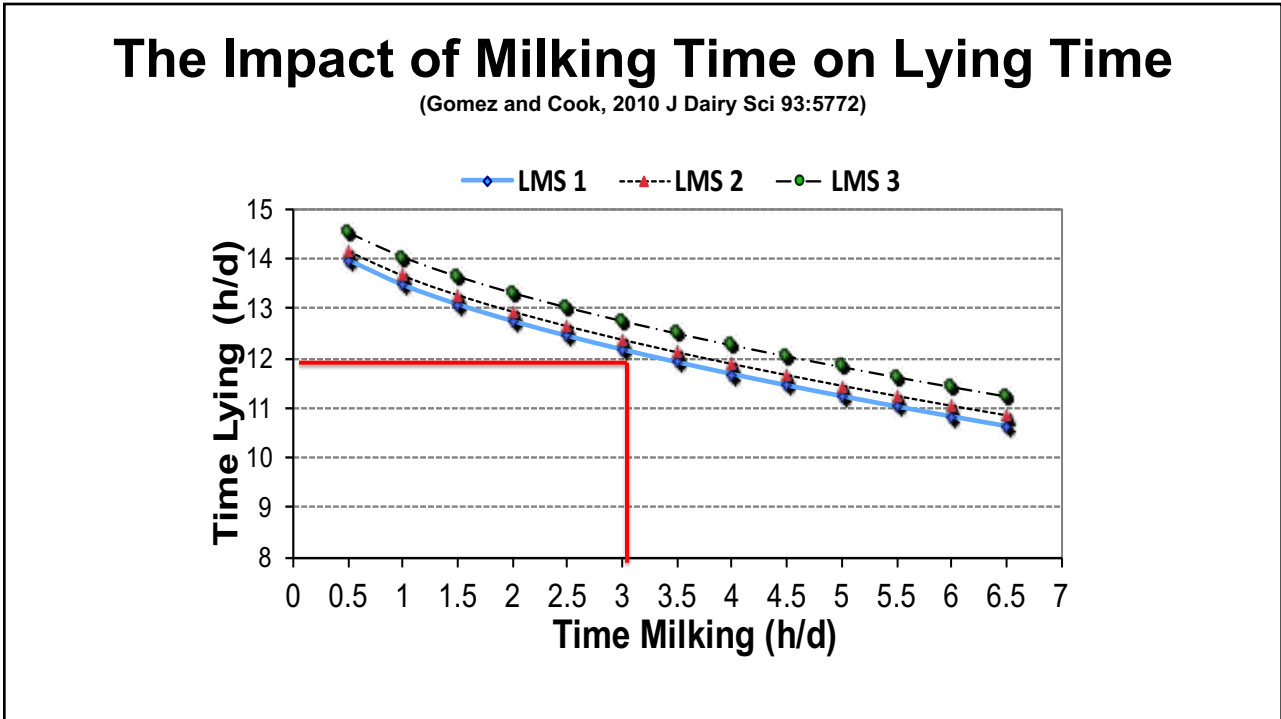
58



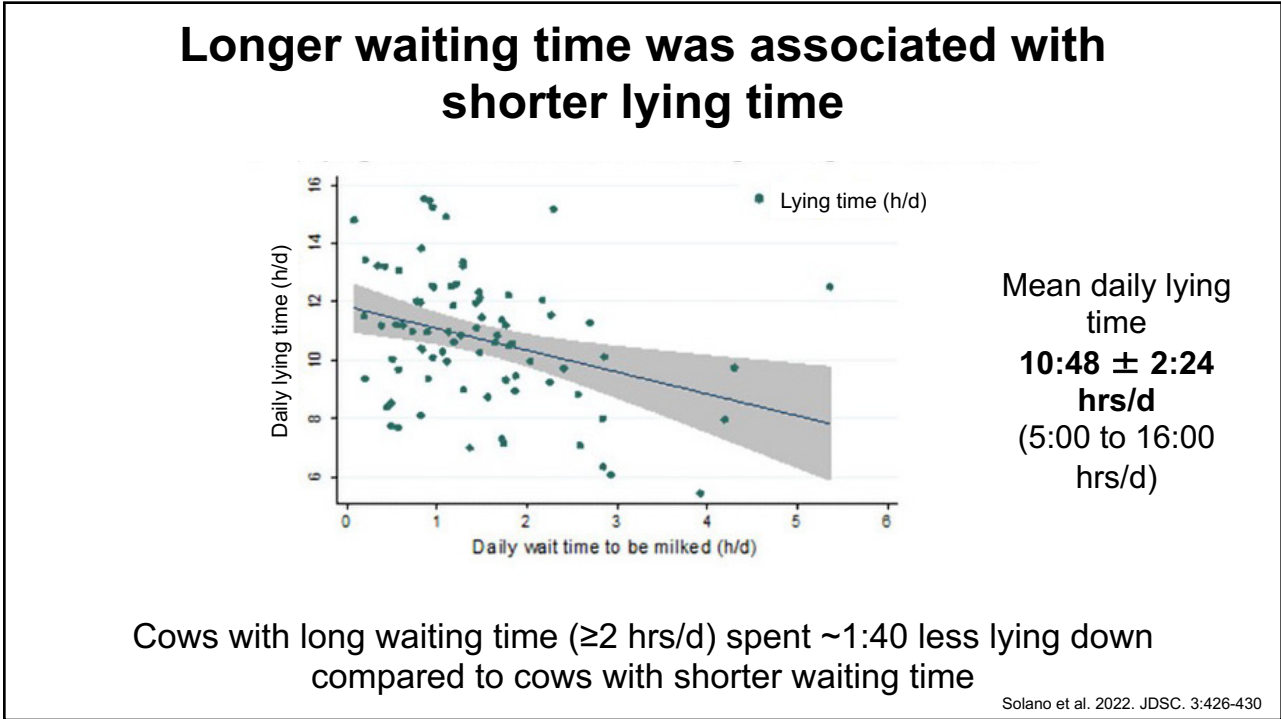
59



60

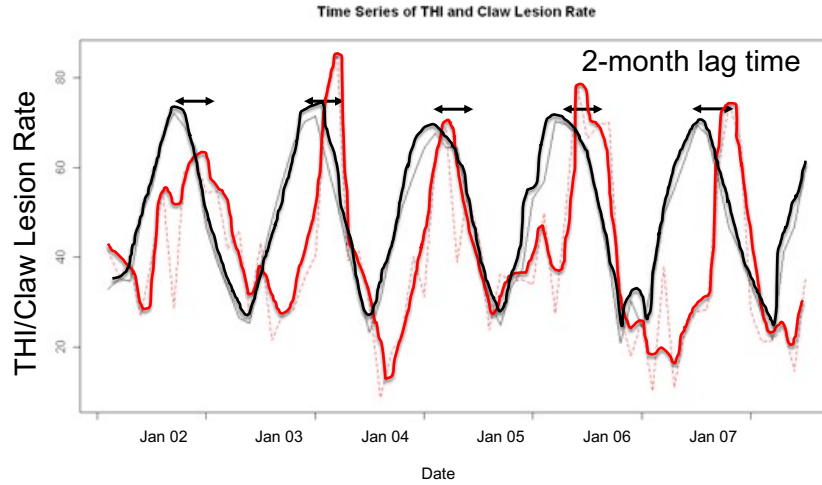


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62

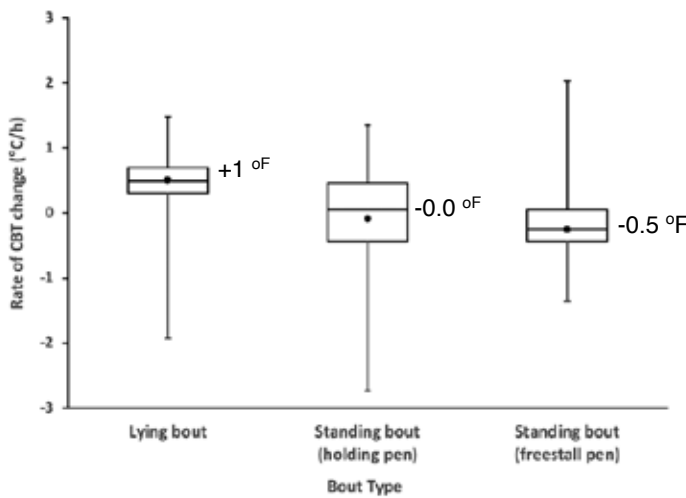
Time Series of Temperature Humidity Index and Claw Lesion Rate



Cook et al., Proc. 14th Int. Lame. Symp. 2006

63

Rate of Temperature Change by Position



2 farms
 20 cows for 6 days
 6 lying bouts per day
 3 standing bouts per day (stall)
 3 standing bouts per day (parlor)

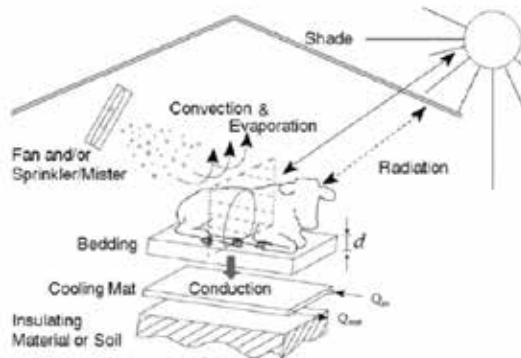
Cows cool while standing in the pen at half the rate that they accumulate heat while lying down

Nordlund et al. J. Dairy Sci. 102:6495, 2019

64

Cooling Strategies for Cows

- Use ventilation and air movement
 - Exhaust the heat and humidity
 - Create air movement to maintain a favorable heat loss gradient
- Use water:
 - To soak the cow
 - To cool the air
 - Misting
 - Evaporative Cooling Pads
- Use conduction:
 - Conductive cooling mattress



65

Effect of different air speeds at cow resting height in freestalls on heat stress responses and resting behavior in lactating cows in Wisconsin

Kimberly J. Reuscher,¹ Nigel B. Cook,² Tadeu E. de Silva,¹ Mario R. Mondaca,¹ Karen M. Litcherhand,¹ and Jennifer M. C. Van Os,¹

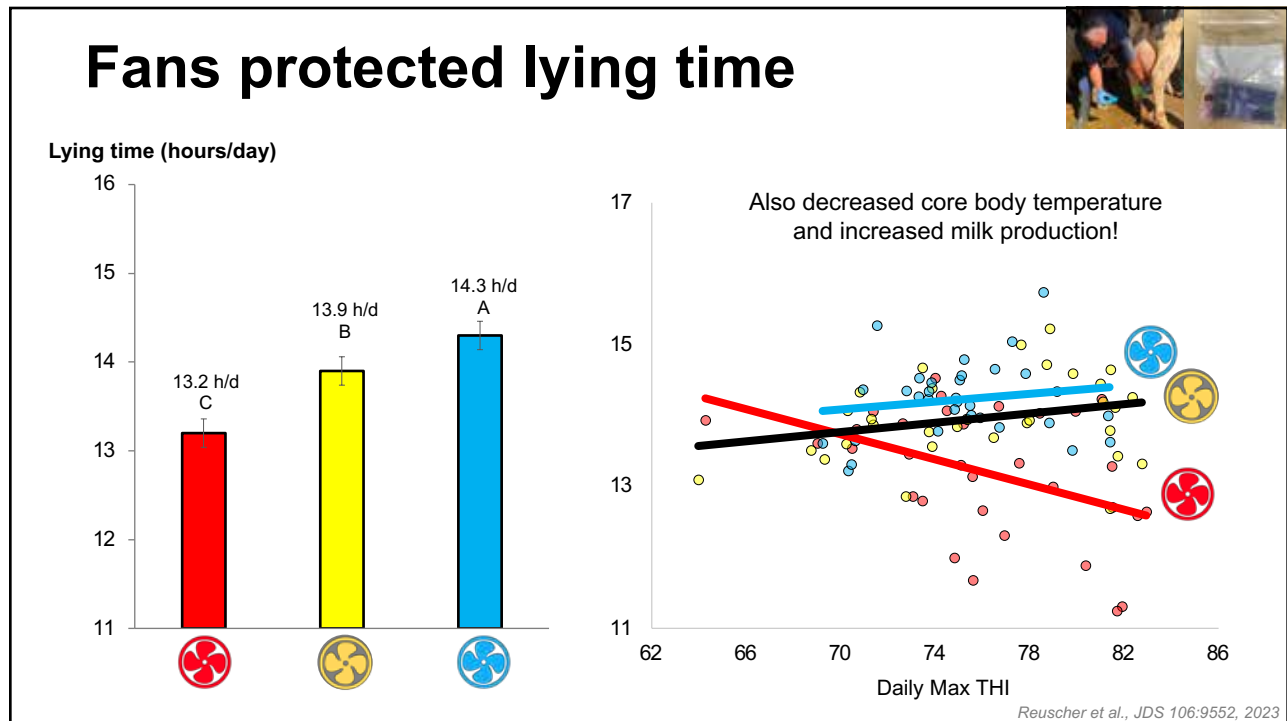
¹Department of Animal and Dairy Sciences, University of Wisconsin-Madison, Madison, WI 53706
²Department of Medical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, Madison, WI 53706

Does increasing air speed help cows rest?

- Manipulate airspeeds at cow height using 2 x 51" (1.3m) diameter Munters Aerotech VFD fans
- 8 groups of 16 cows (128 total)
- 2 pens concurrently running one of 3 treatments (control (80, 0.4), low (335, 1.7) and high (472 ft/min, 2.4 m/s) fan speed)
- 3-day acclimation period + 4 full 24-hour periods of data collection per treatment (in a balanced order)

airspeeds measured at 0.5 m (18") high

66



67

Minimum Cooling Airspeed (MCAS)

Defined as a minimum of 200 ft/min
measured at resting height of 1.5 ft.

Aim for >90% stalls

68

Growing interest in mechanically ventilated, climate-controlled barns



69

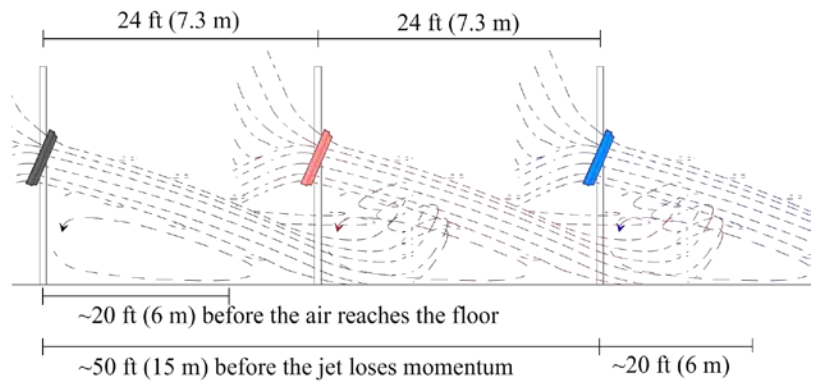
Fan Spacing and Angle

(Typical 48-55" (122-140 cm) diameter panel fans)



~20 ft (6 m)
before the air reaches the floor

~50 ft (15 m)
before the jet loses momentum



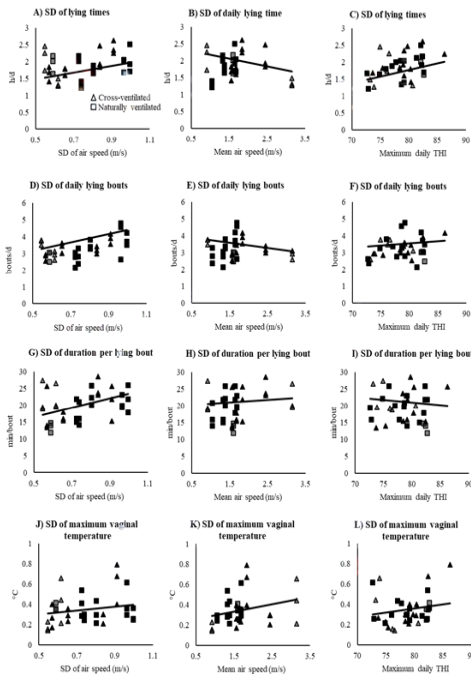
Target one fan per stall platform spaced 24-30' (7-9 m) apart
activated at ~68°F (20°C)

70

The air needs to be directed DOWN!



71



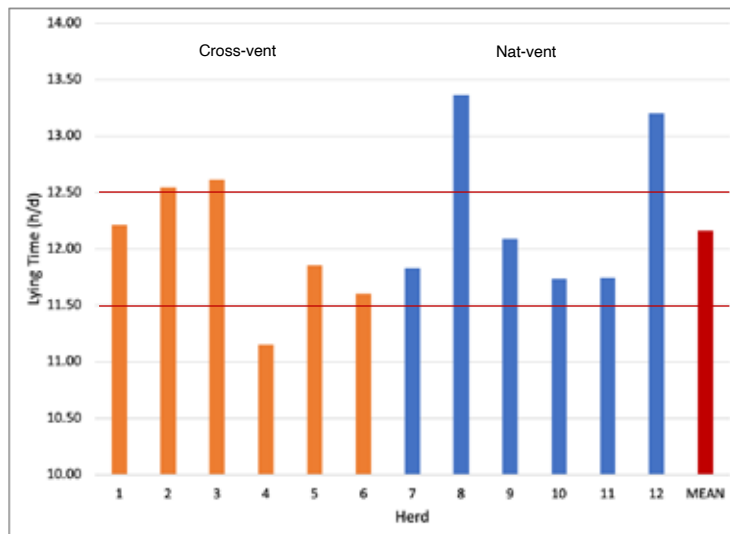
As within-facility variability in air speeds increased, the variability in daily lying time increased.

As the average air speeds increased, the variability in lying time decreased.



72

An Achievable Target for Rest - Actual

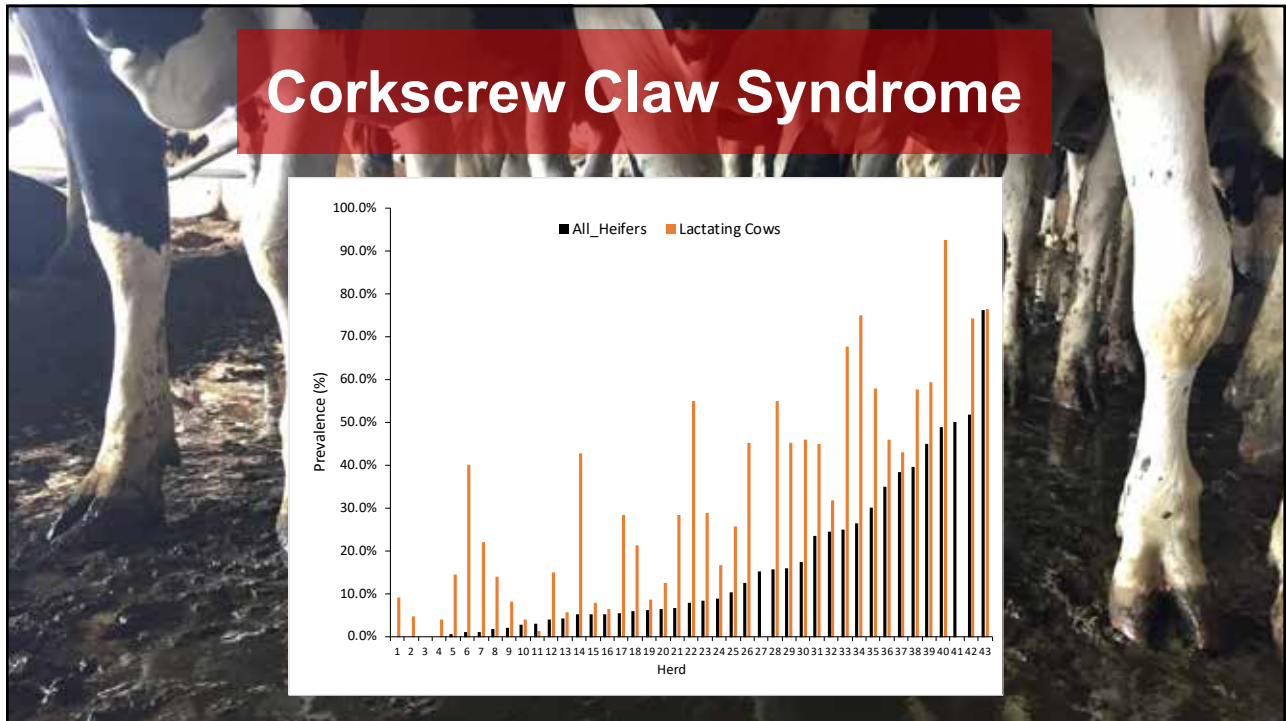


- 12 high producing 3 x milking sand bedded freestall housed Wisconsin dairy herds
- Visited summer 2021
- 6 cross-vent, 6 nat vent
- Data from 24-30 cows per herd for 3 days
- Mean lying time all herds 12.1 h/d (SD 2.0)
- Aim for a mean of 11.5-12.5 h/d

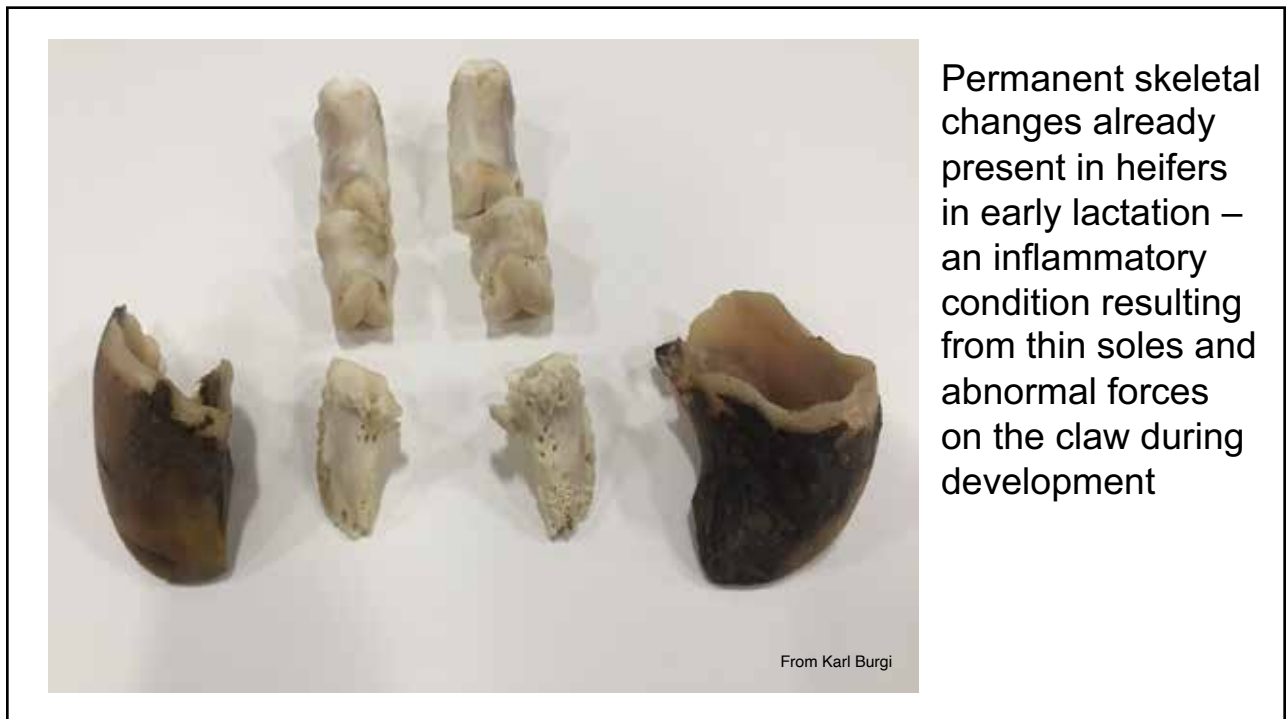
73

...and just when we thought we had it all worked out ...

74



75



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Commonly associated risk factors



Back Transformed Least Squares Means SE			
Effect	Group	Estimate	SE
Bedding type breeding pen	none	4.26%	0.24%
	other	6.18%	0.16%
	rsand	45.36%	0.82%
	sand	21.50%	0.17%


Differences between recycled sand and sand, recycled sand and none, recycled sand and other, sand and none and sand and other all significant at $P < 0.05$

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Heifer Housing Recommendations (Different from Cows!)

1. Bedded pack housing preferred where possible up til pregnant
2. Deep bed freestalls with organic bedding vs sand (avoid recycled sand!). Move to sand bedding in prefresh
3. Use post and rail or slant bar bunks where possible rather than headlocks – use a race and chute!
4. Use rubber flooring at the feed bunk (high compressibility for grip)
5. Provide outdoor access – feeding/pasture

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LifeStep Hoof Lesion Intervention Plan: Suggested Actions



Life Cycle Stage	Hoof Lesion Oriented Action		
	Digital Dermatitis	White Line Disease	Sole Ulcer
Replacement Heifers	<ul style="list-style-type: none"> Surveillance and treatment of animals with active lesions In-feed mineral supplementation heifer groups at least 60 days before emergence of lesions Footbath program to control chronic lesions Actions to improve hoof hygiene: stocking density, manure removal frequency 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Low stress handling! Provide comfortable flooring with low risk for trauma and slipping 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Deep loose bedded comfortable stalls or bedded pack Stocking at no more than 1.2 heifers per stall or sufficient bedded pack space Heat abatement for hot climates to reduce heat stress Routine hoof-trimming to rebalance weight distribution prior to calving
First Lactation Heifers	<ul style="list-style-type: none"> Surveillance and treatment of animals with active lesions Footbath program to control chronic lesions Actions to improve hoof hygiene: stocking density, manure removal frequency Routine hoof-trimming in early/mid-lactation 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Low stress handling! Provide comfortable flooring with low risk for trauma and slipping Mid-lactation trim to rebalance weight distribution 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Deep loose bedded comfortable stalls or bedded pack Stocking at no more than 1.2 heifers per stall or sufficient bedded pack space Heat abatement for hot climates to reduce heat stress Mid-lactation trim to rebalance weight distribution
Lactating Cows	<ul style="list-style-type: none"> Surveillance and treatment of animals with active lesions Footbath program to control chronic lesions Actions to improve hoof hygiene: stocking density, manure removal frequency Routine hoof-trimming in early/mid-lactation 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Low stress handling! Provide comfortable flooring with low risk for trauma and slipping; consider rubber flooring in parlor, in holding area and along transfer lanes If thin soles are a risk consider reducing milk frequency and house lame cows close to the parlor Mid-lactation trim to rebalance weight distribution In-feed mineral and biotin supplementation to enhance hoof horn quality 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Deep loose bedded comfortable stalls or bedded pack Sufficient resting area to match the size of the cow Stocking at no more than 1.2 heifers per stall or sufficient bedded pack space Less than 3 h/d out of the pen milking per day Heat abatement for hot climates to reduce heat stress Mid-lactation trim to rebalance weight distribution Minimize BCS loss in early lactation
Dry Cows	<ul style="list-style-type: none"> Surveillance and treatment of animals with active lesions Footbath program to control chronic lesions Actions to improve hoof hygiene: stocking density, manure removal frequency Routine hoof-trimming at dry off to identify and treat cows with active lesions 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Low stress handling! Provide comfortable flooring with low risk for trauma and slipping Dry off trim to rebalance weight distribution In-feed mineral and biotin supplementation to enhance hoof horn quality 	<ul style="list-style-type: none"> Surveillance and treatment of lame cows Deep loose bedded comfortable stalls or bedded pack Sufficient resting area to match the size of the cow Stocking at no more than 1.2 heifers per stall or sufficient bedded pack space Heat abatement for hot climates to reduce heat stress Dry off trim to rebalance weight distribution

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SCAN ME

QUESTIONS?

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