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A Cow in Motion

Are we really providing 'exercise' to dairy cow?

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Introduction & Objectives

Numerous studies point out the benefits (e.g. improved leg health¹, fitness and reproductive performance², behavioral expression³) of providing exercise to dairy cows; however, there is a lack of consensus in existing literature on what 'exercise' for cows is and on how it can be adequately provided to cows in the current dairy industry.

The objective of this review is to re-examine the way in which we define the provision of exercise in dairy cows through an exploration of the quantitative and qualitative ways in which it is presented in existing literature.

Exercise is a Reflection of Locomotor Activity

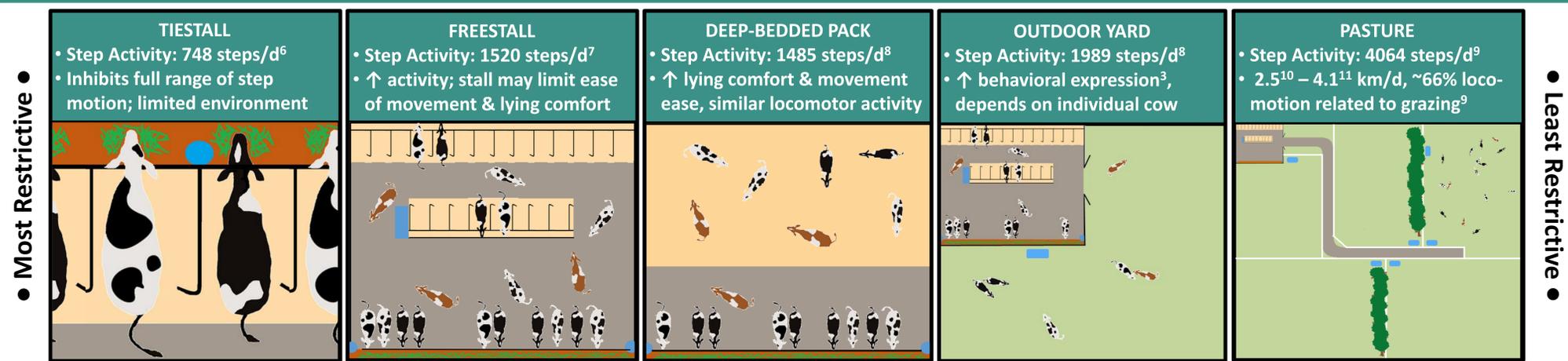


- Early studies connected controlled measures of exercise with physiological benefits, including:
 - Increased fitness and ability to maintain homeostasis when active⁴ and enhanced reproductive performance^{1,2}
- Outcome measures based on specific **speeds, durations, and/or distances** walked by the cow
 - **Experimentally controlled^{2,4}, BUT had low applicability on-farm**
- **Measures** in these studies = **level of locomotor activity**, which can be quantified within different housing systems

Picture source: Wageningen University and Research, www.wur.nl/en/newsarticle/Dairy-cow-exercise-for-a-longer-lifespan.htm

Locomotor Activity and Housing Systems

❖ Technologies make it easier to quantitatively measure locomotor activity in relation to housing system to support qualitative assumptions of exercise level



❖ Housing characteristics (e.g. flooring, space, hardware) impact locomotor activity and can influence activity, leg health, and lying behaviors

Walking Surface	Space and Stall Hardware
<ul style="list-style-type: none"> • Cows are evolutionarily designed for pasture; indoor flooring should offer: <ul style="list-style-type: none"> — Compressibility¹², Traction¹², and Cleanliness¹³ • Good flooring characteristics benefit gait, locomotor activity, and leg health: <ul style="list-style-type: none"> — ↑ gait (e.g. shorter gait cycle, higher walking speed, longer strides)¹⁴ — ↑ joint flexion and cow confidence when walking¹² — ↑ locomotor activity (>1300 steps/d) compared to concrete flooring¹⁵ 	<ul style="list-style-type: none"> • More space leads to: <ul style="list-style-type: none"> — ↑ locomotor activity, regardless of stocking density¹⁶, with cows also more able to express behaviors associated with locomotor activity — Expression of lying postures that benefit joint flexion associated with improved gait quality⁶ • Stall hardware negatively impacts cow rising and lying ability¹⁷ <ul style="list-style-type: none"> — ↓ ease of movement and ↑ risk of lameness¹⁸

Outdoor Access: How much is enough?

- Providing **outdoor access** (e.g. exercise yard, pasture) is the **most common method** implemented in studies investigating the effect of **exercise on dairy cattle**, with level of **benefits to the cow dependent on**:
 - **Duration of application**
 - Recommendation: **1 h/d³ and 3 h/d¹⁹**
 - **Frequency of application**
 - **Shorter applications & consistent frequency** = ↓ lameness and injury²⁰
 - **Higher frequency** of access **reduces the risk of frustration and stress** due to longer periods in more restrictive housing²¹

Individual Motivation and Preference

- **Cow locomotor activity is consistent across time²² and housing system²³**
- Some cows exhibit **lower preference for outdoor access**, impacted by²⁴
 - Nutritional needs
 - Physiological condition
 - Health issues
- **Previous outdoor experience** influences outdoor preference^{24,25}
 - **More exposure = higher use**



Movement Opportunity: A redefinition of 'Exercise' in Dairy Cattle

- 'Exercise' in dairy cow studies combines 1) the **physical exertion of the animal**, 2) the cow's **daily level of locomotor activity**, influenced by housing, and 3) the provision of **housing systems** that facilitate **ease of movement and expression of locomotor activity**
- Locomotor activity is **limited by the cow's housing system and housing characteristics**, offering **different levels of opportunity for movement** to the cow based on the housing system, characteristics within said system, and the provision of outdoor access
- **Movement opportunity** is provided by the producer through housing and/or management, but is **ultimately dependent on the cow** to utilize as she needs or prefers

References



SCAN HERE for references and to access a digital version of the poster on our CowLife McGill Blog!

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