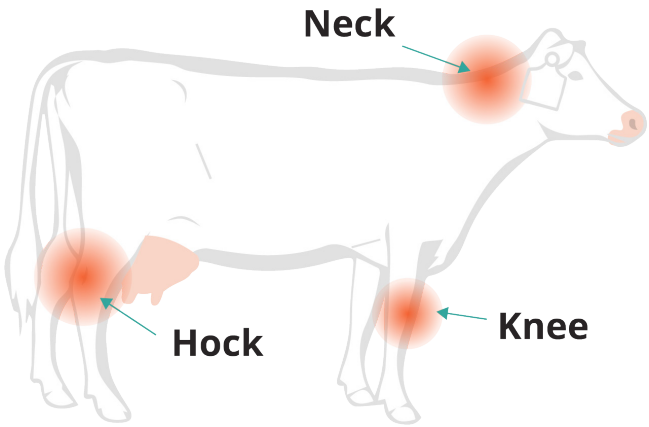
Recommendations for Preventing and Treating Hock, Knee, and Neck Injuries in Cattle

Canada's dairy farming sector is committed to providing excellent cattle care, and part of this means ensuring dairy cattle are comfortable in their environment and their needs are being met. Hock, knee, and neck injuries may be due to poor barn design or maintenance. With proper management, these injuries can be prevented. Injuries remain an important area that Canadian dairy producers can focus on to improve animal care[1-4].



The Benefit of Preventing and Reducing Injuries

Injuries have been shown to negatively impact cattle health and productivity. Farmers and cattle will benefit from low injury rates, as minimizing injuries can[5,6]:

- **Improve health and comfort**
- **Improve production**
- **Improve economic margin per cow**
- **Increase time spent lying**

Treating Hock, Knee, and Neck Injuries

What Does the Research Say?

A study evaluating the healing of hock injuries found that moving cows to sand bedding, bedded packs, or pasture led to faster resolution or healing[7]. This suggests that **using deep bedding or providing outdoor access may be the best method to resolve hock injuries, and likely knee injuries.** Additionally, many of these injuries take time to heal with a study finding that moderate hock injuries will resolve in about 2 months[8].

Pain Control

Your veterinarian is the best source of advice for injury treatment. They can help you to develop a strategy for monitoring, identifying, housing, and providing prompt medical attention (as required by proAction®) to injured animals to maximize the chances of recovery, and reduce pain and suffering.

Some of the more severe injuries can be painful, especially when swelling and ulceration is present where walking and/or shifting weight can cause pain.

Work With Your Veterinarian

You should keep records of any treatments or corrective measures you take so you can analyze their effectiveness. This can also help to tailor monitoring programs for earlier detection, and identify aspects of housing and management that are working well or require improvement.

Assess Your Housing and Environment

The recommendations mentioned above are specific to individual animals, however, if a large proportion of the herd is affected, widespread changes in housing design and management may be warranted. The next section reviews some of the key areas to look into.

Research Results: Stall Design

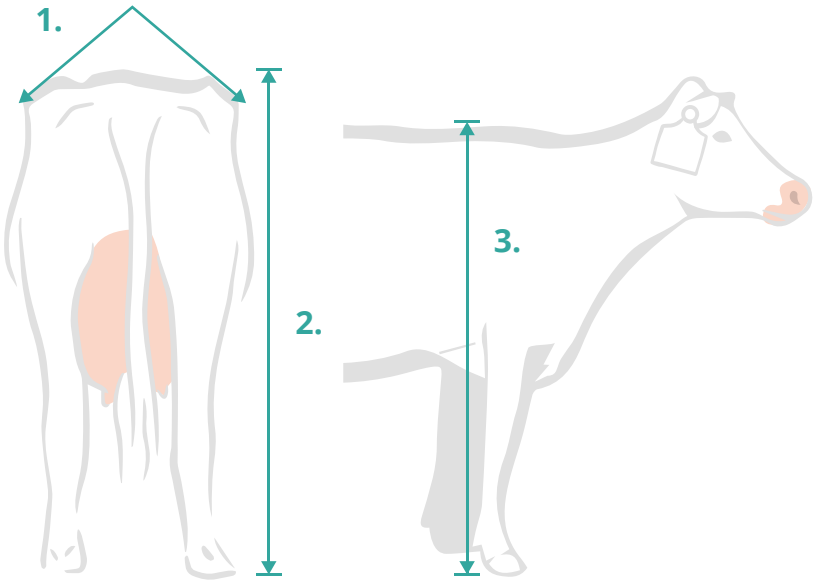
Stall design affects an animal's positioning within the stall, its ability to stand, and the length of time it spends in that stall. The width[3,7] and length[2,3] of the stall impacts the level of hock and knee injuries, while low feed rails will increase the risk of neck injuries[1].

Do your cows fit?

Your stalls should be measured to fit the average mature cow in your herd. You can determine the average size of your herd by measuring 3rd and 4th lactation animals (mature body size) and determining the average of those parameters.

The easiest parameters to measure are:

1. **Hook bone width**
   - Measure the widest portion of an animal's hips
2. **Rump height**
   - Measure from the ground to the top of the tail
3. **Withers height**
   - Measure from the ground to the top of the shoulder



Having these measurements on hand can help to assess your barn design to ensure it is suitable for the size of your herd, or could be used as a guide for making any changes or upgrades to your facility.

The table below highlights how the specific design features can lead to injuries[8].

Stall Design		
HOCKS	**KNEES**	**NECKS**
A stall that is too short, or with a brisket locator that is too high may cause cows to lie with their hocks on rear curbs where bedding may not support their joints. Narrow stalls that cause cows to lie straight prevent side lying which may put pressure on hocks.	Short stalls can contribute to the development of knee injuries; cattle should be able to extend their legs over if they choose instead of lying with their legs tucked under. Brisket locator height can also prevent cattle from extending their forelimbs over, causing them to lie with their legs tucked under. Improperly placed neck and tie rails can affect an animal's ability to stand and lie down with ease — this may cause them to put a lot of pressure on their knees.	Neck injuries can develop when rails and chains are at an improper height and/or length, preventing easy and comfortable access to feed. **This is of particular importance in tie-stall housing, where an animal cannot move to an area where feed is available. Ensure feed is pushed up to be well within reach at all times.** Most commonly, these rails are not installed far enough forward. Neck injuries may also occur when contact occurs while lunging and head bobbing while standing. It is important to ensure the neck rail height is not too low when cows stand.

Ensure that the top rail is not too low in head locks

If you identify neck injuries as a problem in your herd[9,10]:

The head rail should be positioned below, and forward of the withers:

- This measurement should be 0.83 X average rump height of your herd, which is approximately 48-50 inches above the bedding for the average mature Holstein
- In tie stalls, the tie rail should be 14 inches forward of the manger curb. If a chain is used as a tie rail, it should be loose enough to stretch 14 inches forward the manger curb

Ensure that the top rail is not too low in head locks:

- These rails should be higher than the withers of the tallest cows in your herd

Ensure that stall width is appropriate

If you are experiencing hock and/or knee injuries in your herd[9,10]:

Ensure that stall length is appropriate:

- This measurement should be 1.2 X average rump height of your herd, which is approximately 72 inches for the average mature Holstein
- Shorter stalls may be appropriate for first lactation heifers

Ensure that stall width is appropriate:

- This measurement should be 2 X the average hook bone width of your herd, which is approximately 50-52 inches for the average mature Holstein
- Provide an additional 4-6 inches for cows in tie-stalls

Ensure that the brisket locator or curb is positioned appropriately in freestalls:

- This is approximately 72 inches from the alley curb for the average mature Holstein
- Brisket locators and solid fronts should not be more than 4 inches wide, and 4 inches high so that cows can put their forelimbs over

Ensure that the front curb is positioned appropriately in tie-stalls:

- This is approximately 72 inches from the alley curb for the average mature Holstein
- Front curbs should not be more than 8 inches above the bedding in tie-stall settings to allow animals to put their forelimbs over

Ensure that the brisket locator or curb is positioned appropriately in freestalls

Work with your veterinarian and other dairy advisors to design stalls that are right for your herd.

Deep stalls should have 12-18 inches of bedding

Research Results: Stall Base

It is important to ensure an adequate bedding depth is present at all times to prevent the development of injuries caused by friction on potentially hard and abrasive surfaces. Even new mattresses can be rough and need added bedding. If there is not enough bedding material, cows may reduce lying times, and their potential for injury is increased[1,2,3,11].

A Note on Mattresses and Mats: Mattresses and mats still need ample bedding! Aim for 2-3 inches on top of a mattress, and 3 or more inches of bedding on solid mats. When using mattresses or mats as a base it is important to inspect them periodically, as they can become worn. Look for holes, ruts, and thin areas. Certain types of mattresses can also develop areas that can collect moisture and contribute to the development of mastitis.

Stall Base	
HOCKS	**KNEES**
Cows tend to lie on one side, putting pressure on the hock they are leaning on. Ensuring this surface is soft and can conform to her body will decrease some of this pressure when she shifts her weight.	When cows lie with their front legs tucked underneath them, they are putting pressure on these joints. There is pressure on an animal's knees when she stands. Concrete platforms and hard rubber mats are abrasive on these joints when animals are rising.

Research Results: Stall Bedding

One of the most important considerations when preventing hock and knee injuries is bedding depth. Deep bedding, especially deep sand bedding, has been consistently associated with a reduced level of hock and knee injuries[1,2,12]. Ensuring an adequate bedding depth can lead to a reduced prevalence of hock injuries.

Bedding material should be soft and conform to the animal's body. Large particle sand and rough shavings can be abrasive on knees and hocks.

Cleanliness: The frequency, cleanliness, and moisture level of bedding are also important factors affecting the amount of time an animal spends lying in their stalls.

The proAction® program requires that calves, heifers, bulls and cows have clean bedding. Providing bedding keeps animals warm, comfortable, free of injuries, and facilitates cleanliness.

Stall Bedding	
HOCKS	**KNEES**
Provide ample bedding that conforms to the animal's body. This will reduce pressure on their hocks that can contribute to abrasions.	Ensure there is sufficient padding between that animal and the flooring. This will reduce hair loss, swelling, and broken skin.

Ensure your stalls are bedded with ample, loose, soft, clean bedding.

- Mats and mattresses should be covered with **at least 2 inches, with solid mats requiring at least 3 inches of bedding:**
  - This type of stall should have manure and urine removed, and bedding topped up at least twice per day
- Deep bedded stalls should have 12-18 inches of sand:
  - This type of stall should have manure and urine removed at least twice a day, and bedding topped up at least twice per week

Animal Handling

Quiet, Low-Stress Handling:

- Cows that are stressed or moved too aggressively are prone to slipping and falling, leading to an increased risk of knee injuries[1]. Reduce the risk of injury by ensuring that anybody involved in animal handling on your farm practices patience and is familiar with quiet, low-stress handling techniques as required by proAction®. Also ensure anyone working with cattle has ample time to move animals to prevent feeling rushed. This will reduce frustration and impatience with animals that become uncooperative.

Traction:

- Improving traction, whether grooving concrete flooring or adding rubber mats, can be important especially in high traffic areas to maintain traction and hoof health[1]. This can help to prevent the occurrence of injuries, and where rubber flooring is used, reduce the impact of a fall if an animal slips.

Give Vulnerable Animals More Time:

- Ensure that cattle that are older, weak recovering from calving, illness, and/or injury are handled with great care. Ensure that they are able to move quietly at their own pace and do not have to compete for resources.

Stall Bedding

HOCKS AND KNEES

If an animal slips and falls, there is a chance she will injure her joints causing swelling, broken skin, bruising and/or broken limbs.

It is also important to consider that if an animal falls causing a soft tissue injury, she might adjust her gait or the way she rests to avoid causing pain to a particular area. This might add pressure to unaffected knees and/or hocks.

Assess and Monitor

Early identification is key to improve treatment response and maintain productivity.
Similar to lameness, it is important to identify new injuries early so there is a better chance of recovery, and you can react quickly to resolve the underlying issue and prevent further injury. Learn to assess injuries on your farm, evaluate the root cause of injury problems and implement corrective actions.

Your veterinarian can assist you with developing a strategy for treating animals that have been identified as having an injury. This may involve treatment with an anti-inflammatory medication, antimicrobial medication, and/or housing separately on a bedded pack, in a box stall, hospital pen, or other comfortable area conducive to injury recovery. Monitor treatments, responses, and keep records to help understand the pattern of injuries on your farm to help prevent them from recurring.

Additional Considerations for Prevention

Outdoor Access

Research has identified access to the outdoors, especially when tie-stall housing is used, can lead to lower levels of hock injuries[13,14]. If the animals in your herd are at high risk for injury and it is not feasible to change the housing within your barn, you could consider options to allow cattle more exercise or opportunity for movement as a preventative measure and/or corrective action. Consider providing outdoor access at certain stages of production, for a period of time per day or week, or during certain months of the year.

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