

P-AH-1



Teat Health

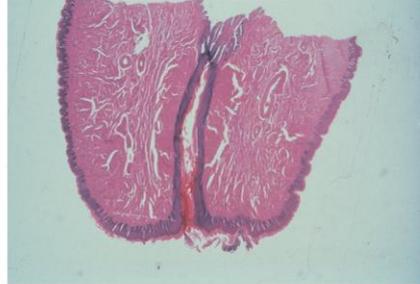
Lennart Petersson
IBA, Millbury, MA

Teat canal and keratin plug prevent transfer of bacteria into the mammary gland.

Healthy teat ends are important!



Integrity of streak canal and keratin plug is critical



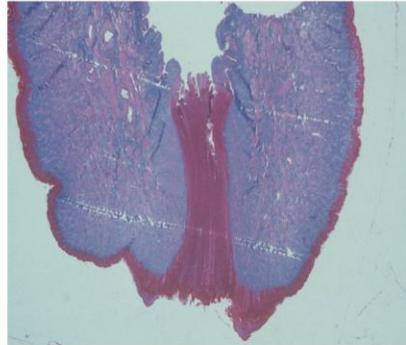
The keratin structure in the streak canal is the major defense mechanism for preventing organism transfer into the mammary gland and it is critical that the health and integrity of the streak canal is the best it can be.

Excessive hyperkeratosis and/or damaged streak canals have been associated with increased SCC and sub-clinical or clinical mastitis.

Excessive hyperkeratosis with a very rough "cracked" teat end

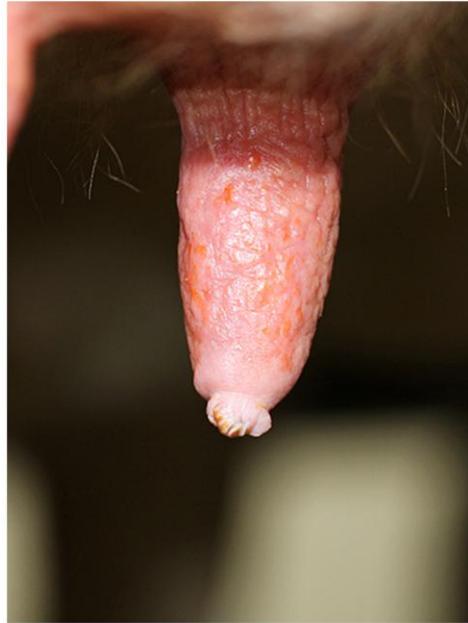


Wide open streak canal



Chapped teat skin and very rough teat end

- ✓ Teat skin health is also very important.
- ✓ Chemical or weather damaged teats provide optimum conditions for bacterial to colonize teat skin surfaces.
- ✓ The presence of bacteria on teat surfaces increases the chance of entry through the streak canal into the mammary gland.



The use of effective teat dips with recommended levels of humectants and emollients will help keep teat skin in good health. The post milking teat dipping would be the most effective time to add the high levels of skin conditioners to achieve expected results.

Hazards to Healthy Teat Ends

Mechanical

Hyperkeratosis – Milking machine induced damage

- Improperly functioning pulsation
- Improper vacuum level
- Machine-on-time/number of milkings per day
- Milking procedures
 - Dry milking (beginning of milking – no milk flow)
 - Over-milking (end of milking – no milk flow)

It is also important to note that the time when organisms will have an opportunity to transfer thru the streak canal and into the mammary gland is **during the time of no milk flow**.

Hazards to Teat Skin Health

Teat skin damage

- **Chemical exposure**
 - Wrong chemicals used for teat dip
 - Improperly formulated teat dips
- **Weather**
 - Cold dry windy
 - Sunburn

Hyperkeratosis – Callus Formation



The extent of hyperkeratosis varies and so does the level of cracking. The greater the hyperkeratosis, the greater the risk of cracking. Cracking has been positively associated with an increase in new clinical cases of mastitis (see slide #10).

Teat Shape and Hyperkeratosis



Tapered teats seem to be more prone to hyperkeratosis and teat end damage in general than teats that are square or round shaped.

Why the concern over hyperkeratosis?

- Cows with “rough” or “cracked” teat ends at the end of lactation have 2.5 times greater risk of mastitis in the next lactation.

(Dingwell et al., Prev Vet Med 63:75-89, 2004)

- A greater degree of teat end callosity (roughness and “cracked”) is associated with higher risk of new intra-mammary infections.

(Neijenhuis et al., 2nd International Symposium on Mastitis and Milk Quality, p. 332-325, 2001)

Field Trial Data: North America



Individual cow new infection rate

Variable	Association	95% CI	p-value	OR
All Quarters close	↓ -1.37	-2.4, -0.34	0.01	0.3
≥1 Quarter cracked	↑ 0.91	0.11, 1.7	0.03	2.5

Effect of herd, breed, parity, dry period length forced into model.

OR = Odds Ratio = Cows with cracked teat ends at the end of lactation are 2.5 times more likely to develop mastitis in the subsequent lactation than those without cracked teat ends.

R. Dingwell et al., University of Prince Edward Island Veterinary School, Canada, 2003

Environment

Chapping – Weather Conditions

- **Drastic temperature swings**
- **Strong winds with temperature changes**
- **Cold weather conditions**
- **Sun burn**

Infectious Exposure

- **Virus related exposure**

A common term used for damages to teat skin during winter weather conditions is “winter lesions”. It seems to resolve as soon as warmer spring conditions occur.

The appearance may seem to be similar to hyperkeratosis but in many cases it appears to be loose skin on the surface.

Skin Condition of Teats and Udders

Good Healthy Skin



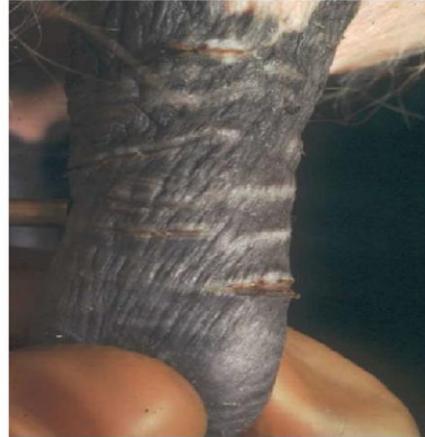
Dry Skin of Teats and Udder



Teat dips with emollients and humectants as skin conditioners are highly recommended with dry skin, particularly on teat skin.

Chapping

- **More severe conditions of dry skin.**
- **Many appear in horizontal plane.**
- **More severe in cold weather.**
- **May also be caused by inflation.**



When inflations are involved with chapping of teat skin, it appears in the area of the mouthpiece opening and where the teat enters the inflation.

Why the concern about drying and chapping?

- **Rough or chapped skin has higher rate of bacterial colonization.**
- **Skin colonization can serve as a source for intra-mammary infections.**
- **Hyperkeratosis or dryness at teat orifice can enhance organism transfer thru the streak canal.**
- **These conditions may limit cow comfort, ease of milking and milk let down.**

Lesions from Frost Damage

- Wind a major factor.
- Leaving parlor with wet teat dip or milk increases risk.
- Fresh cow edema greatly.
- Increases risk.
- Possible to freeze teats at nominal freezing temperatures with or without wind.



Lesions from Frost Damage



Prevention of Freezing Teat Tissue

- **Avoid wind.**
- **Quit teat dipping ??**
 - Cows still are wet from milk.
 - If stop for extended period can get infection build up.
- **Blot teats dry after application of liquid teat dips.**
- **Using “cold weather” dips.**
 - High emollient winter formulas.
 - Dry powdered teat dips.
- **Protecting cows with edema.**
- **Adequate dry bedding in stalls.**

Irritation from Teat Dips



The appearance of the irritation can be different depending on the type of chemicals and how the tissue has reacted to the exposure. The majority of damage will appear at the bottom of the teat.

How to Avoid Dip Irritation

- **Follow label directions on teat dips carefully. Make sure all related containers are properly labeled.**
- **Use teat dips with proven efficacy.**
- **Store teat dips to avoid freezing.**
- **Make sure concentrates and teat dips with several parts are mixed according to label directions.**
- **Store acids and detergents away from teat dips. This to prevent mistakes of using this rather than the teat dip.**

Teat end scoring objectives

- **Evaluate the predominance and severity (%) of damaged teat ends affecting the animals in a herd.**
- **Create a uniform system of scoring.**
- **Determine the level of “rough” or “cracked” teat ends as compared to “smooth rings” around the teat orifice.**

Neijenhuis Scoring System

Scoring scale of 0 to 4.5 is used to express Teat End Condition:

- 0 = No ring**
- 1.0 = Smooth/little pronounced ring**
- 2.0 = More pronounced smooth ring**
- 3.0 = More raised smooth ring**

Rings with “rough” or “cracked” appearance are scored as 1.5, 2.5, 3.5 and 4.5, respectively. In other words, a score of 0.5 is added to the full score based on the appearance of the ring

This will allow for the determination of the prevalence of overall average scores and % of cracked teat ends.

Scoring Method

Score the barrel of the teat separately.

By observation and feel:

- Score the level of drying of teat skin
Normal, Mild, Moderate, Severe
- Score shape of teat **Round, Inverted, Tapered**



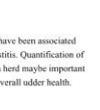
Examples of Smooth Rings



Examples of Rough or Cracked Rings




TEAT CONDITION SCORE

Score			<p>CRACKS Teats with cracks are scored a half point higher, i.e. 1.5 or 3.5</p>	Score	
0					1.5
1					2.5
2					3.5
3					4.5

Cracked teat ends have been associated with incidents of mastitis. Quantification of cracked teat ends in a herd maybe important to help improve overall udder health.


TEAT SHAPES


ROUND - 1


INVERTED / FLAT - 2


TAPERED - 3

An easy way to determine the score is to first define if a teat has cracks or not. If it has cracks, the overall score should end with a .5. The next step is to decide how pronounced the raised ring is. If a ring is not present, you will not find any cracks, hence the score will be 0. A teat end with a smooth ring with a low profile should be scored 1.0. If the same teat with similar ring had cracks at the teat end, the score should be 1.5.

The range of the profile of the rings should be a decision of each scorer. **To help standardize the scores, each scoring from a farm operation should be done by the same person each time.** Follow the guidelines using the score sheet provided in this presentation.

Conclusions

- **Perform regularly scheduled maintenance on milking machine system.**
 - Assure milking system settings are correct and according to liner manufacturer.
 - Institute check points to make sure milking system settings are adhered to on a continuous basis.
- **Be proactive with changes in the use of teat dips if teat conditions deteriorate.**
- **Utilize the large number of formulated teat dips available for all seasonal conditions. Use efficacious teat dips.**
- **Assure full coverage of teats during dipping.**
- **Monitor teat and teat end health continuously.**