Teat End Health
Assessing and Controlling

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Learning objectives

• Understand the process of performing teat scoring
• Understand the difference between short and long term changes
• Develop a basic grasp of how the results from teat scoring guide the next steps in correcting a problem
Why do we need scoring systems?

- Gives us a true picture of what is happening at the cow level that impacts the risk of mastitis
  - If these scoring systems are performed correctly and consistently they can be an objective measurement
- Helps to identify opportunity areas
  - Is there a problem with the whole system or with an individual person in the system?

Teat Scoring after Unit Detachment

- All teats are scored with 60 seconds of unit detachment using the Teat Club International guidelines

- Two main categories
  - Short/medium term effects
    - Is the cow happy with the way she was milked today?
  - Longer term effects
    - What changes are present that have happened over time?
Teat Scoring after Unit Detachment

Teat Anatomy

- Annular fold
- Gland sinus
- Teat sinus
- Furstenberg’s rosette
- Teat Canal (.31-.47” or 8-12 mm)
- Smooth muscle
Forces on fluids within the teat during pulsation cycles

b phase (open phase)  d phase (closed phase)

Video
Liner Movement During Milking

Short and Medium-term Effects

• Why do they matter?
  • Prolonged closure of teat canal after milking
    - Traditional thought = 30-60 minutes
    - Work from Europe (Neijenhuis, F., 2001) shows it is much longer under certain conditions
  • What does this mean for entry of environmental mastitis causing organisms?

Teat End

Short and Medium-term Effects

- Teat color
- Swelling at the teat base
- Hardness at the teat end
- Hemorrhage

Primarily associated with milking machine faults or poor milking management resulting in long periods of low flow (Teat Club International)
Short and Medium-term Effects

• Teat color Categories
  • Normal
  • Red
  • Blue
  • Dark Skin

Primarily associated with milking machine faults or poor milking management resulting in long periods of low flow (Teat Club International)
Short and Medium-term Effects

- Swelling at Teat Base Categories
  - Normal
  - Visible Mark
  - Swollen

Primarily associated with milking machine faults or poor milking management resulting in long periods of low flow (Teat Club International)
Short and Medium-term Effects

- Hardness at the teat end categories
  - Normal
  - Firm
  - Wedged

Primarily associated with milking machine faults or poor milking management resulting in long periods of low flow (Teat Club International)
Short and Medium-term Effects

Wedging at Teat End

Recent Farm Example Herd

<table>
<thead>
<tr>
<th></th>
<th>GOAL</th>
<th>Initial Teat Scoring</th>
<th>Teat Scoring after vacuum change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent of cows with one or more abnormal teats</td>
<td>Percent of cows with one or more abnormal teats</td>
<td>Percent of cows with one or more abnormal teats</td>
</tr>
<tr>
<td>Teat Color</td>
<td>&lt;20%</td>
<td>69%</td>
<td>40%</td>
</tr>
<tr>
<td>Hardness at Teat End</td>
<td>&lt;20%</td>
<td>69%</td>
<td>28%</td>
</tr>
<tr>
<td>Swelling near Teat Base</td>
<td>&lt;20%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>&lt;10%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
Short and Medium-term Effects

Hemorrhage at Teat End

Teat Club International

Milk Quality Online Course - On Demand
Longer Term Effects

- The changes that have happened over a slightly longer period of time

  - Teat Skin Condition
  - Teat End Hyperkeratosis

Longer Term Effects

- Teat skin condition categories
  - Normal
  - Dry
  - Open Lesion
Longer Term Effects

Teats with Dry Skin

Longer Term Effects

Teats with Open Lesions
Teat Skin Condition Challenges

- Large differences between herds in teat skin condition
  - Many of these are present even through the summer

Teat Skin Condition by Month
Teat Skin Condition by Month

Percent of Cows with Open Lesions on Teats by Month

Longer Term Effects

- Teat end hyperkeratosis categories
  - Normal
  - Smooth
  - Slightly Rough
  - Rough
  - Very Rough

Milk Quality Online Course - On Demand
Normal

A scoring system for test-wood condition (Main et al. 2001)

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (1)</td>
<td>Normal</td>
<td><img src="image1" alt="Normal illustration" /></td>
</tr>
<tr>
<td></td>
<td>The test-wood is smooth with a small, even outline. This is a typical stage for many tests soon after the start of lactation.</td>
<td></td>
</tr>
<tr>
<td>S (2)</td>
<td>Smooth or slightly rough ring</td>
<td><img src="image2" alt="Smooth or slightly rough ring illustration" /></td>
</tr>
<tr>
<td></td>
<td>A smooth ring surrounds the orifice. The surface of the ring is smooth or it may feel slightly rough but grooves of old karstina are not evident.</td>
<td></td>
</tr>
<tr>
<td>R (3)</td>
<td>Rough ring</td>
<td><img src="image3" alt="Rough ring illustration" /></td>
</tr>
<tr>
<td></td>
<td>A rough, crumpled ring with isolated furrows or months of old karstina extending 1-2 mm from the orifice.</td>
<td></td>
</tr>
<tr>
<td>VR (4)</td>
<td>Very rough ring</td>
<td><img src="image4" alt="Very rough ring illustration" /></td>
</tr>
<tr>
<td></td>
<td>A very rough ring with rough furrows or months of old karstina extending 4 mm or more from the orifice. The ring of the ring is rough and cracked, often giving the test-wood a &quot;broken&quot; appearance.</td>
<td></td>
</tr>
</tbody>
</table>

Photo: Utrecht University: Drs A. de Man, Dr Y.H. Schukken & Drs J.P. Koeman
Smooth or Slightly Rough

Photo: Utrecht University: Drs A. de Man, Dr Y.H. Schukken & Drs J.P. Koeman

Very Rough

Photo: Utrecht University: Drs A. de Man, Dr Y.H. Schukken & Drs J.P. Koeman
How Many To Score?

- The Teat Club International says that as a general rule you need to score **80 cows** or **20% of the herd** whichever is greater.

- These cows need to be a haphazard sample of the entire herd representing all lactations and a normal distribution of days in milk.

When is There a Problem?

This is based on percentage of cows with one or more teats in the abnormal category.

- Teat color  > 20% of cows with red or blue teats
- Swelling at the teat base  > 20% of cows with swelling at base
- Hardness at the teat end  > 20% of cows with firm or wedged
- Teat skin condition  > 20% of cows with poor skin condition
- Open lesions  > 5% of cows with open lesions
- Teat-end condition  > 20% of cows with rough or very rough
What should you measure?

- Average claw vacuum at peak flow
- Pulsation under load
- Milkline vacuum during milking
- Full NMC evaluation if >6 months since previous
- Unit alignment scoring
- Milking routine timing
- Milk flow rate analysis
- Milking efficiency and throughput timing
- Facilities – stall maintenance, manure in alleyways, cow comfort
- Teat end cleanliness
- Teat scoring
- Strip yields
- Udder cleanliness

Potential Contribution to Mastitis

- Irregular vacuum fluctuations (liner slips)
- Teat damage
- Transfer of organisms (contagious)

Herd & Farm Management 30%
Milking Machine 20%
Cow 20%
Milking Management 30%

G. Mein et. al, Storm in a Teatcup, NMC 2004
What do you do with the data?

• Used as one piece of the puzzle along with the other milking time data such as:
  • Vacuum and pulsation settings
  • Unit Alignment Scoring
  • Automatic Take-off settings
  • Milking routine timing
  • Milk flow rate analysis
  • Milker performance

Additional Resources

• NMC website which has a picture library for NMC members online or as an app
  • https://www.nmconline.org/