Mastitis in Dairy Cattle

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Mastitis

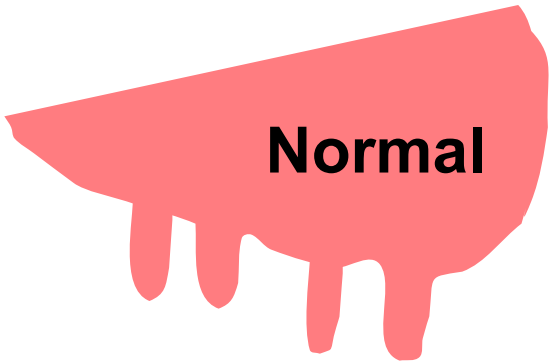
- An inflammation of the milk secreting tissues of the udder, caused by microbial infections in one or more quarters.
- Affects 25 to 30 percent of all quarters
- The most costly disease of dairy cattle
  - $200 /cow/year

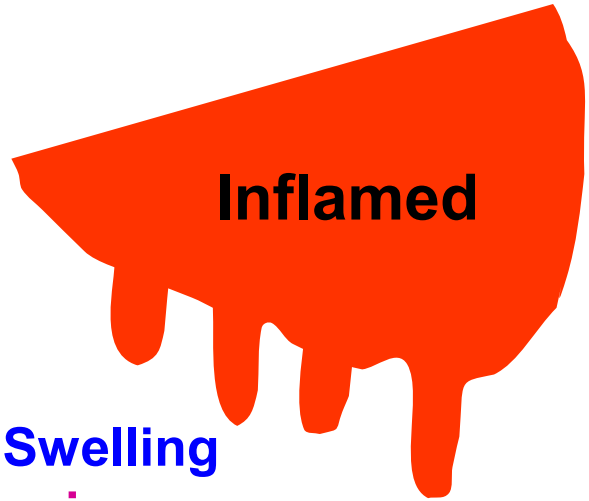
What's mastitis ?

- Inflammation of one or more quarters of the udder

Mammae = breast

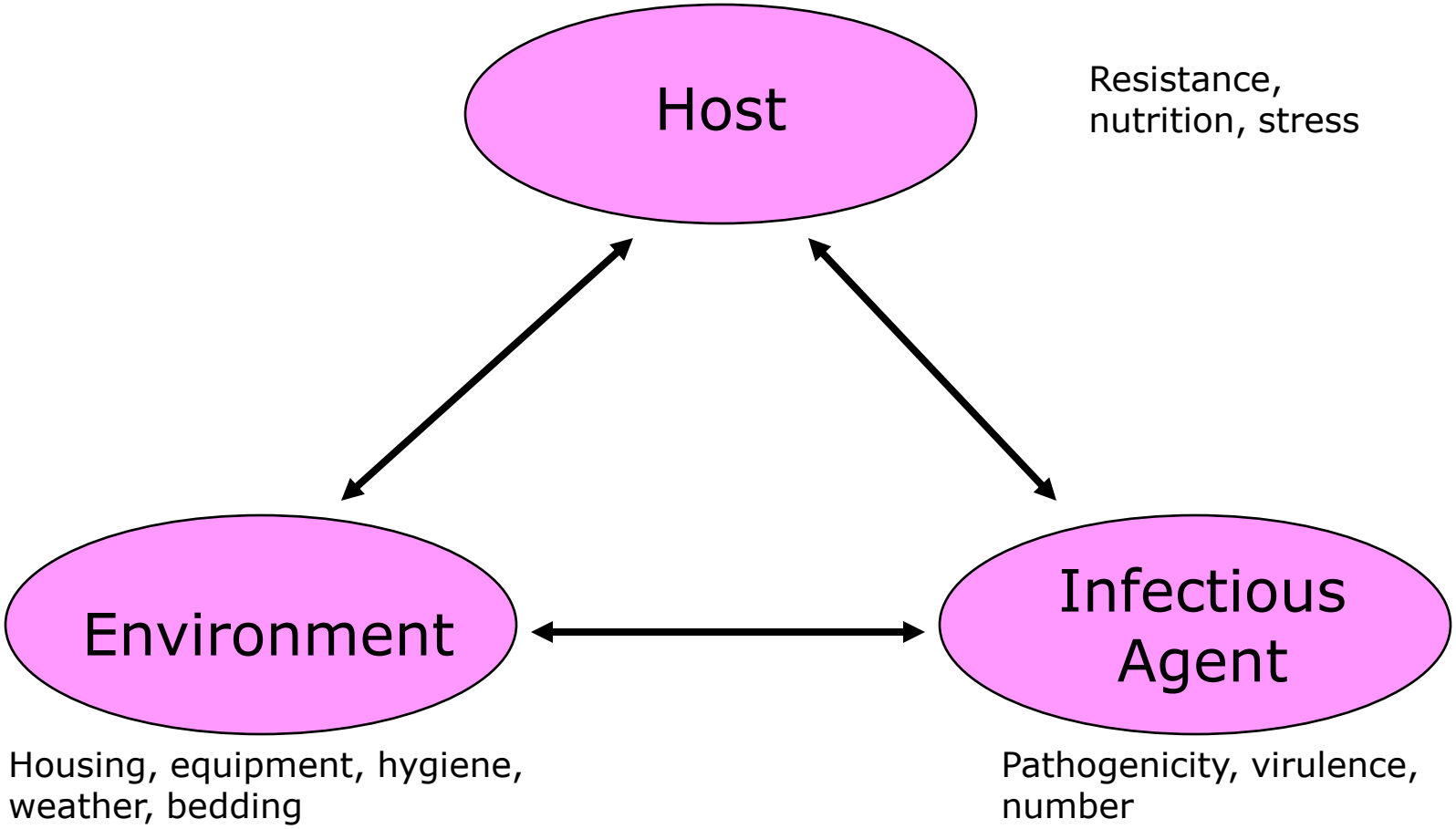
-itis = Latin suffix for inflammation



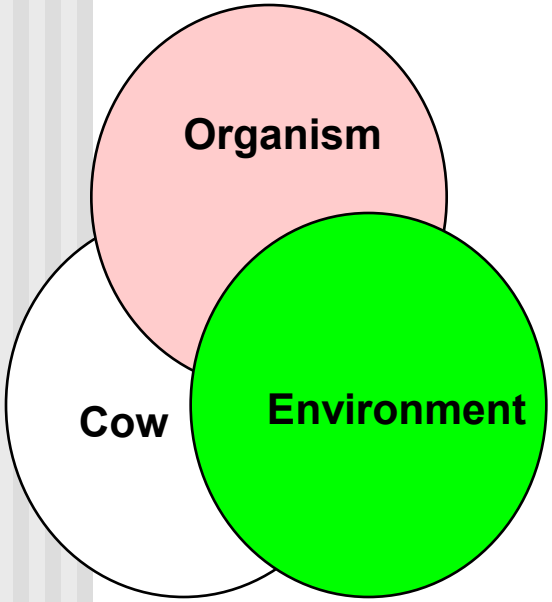


Swelling
pain
warm
redness

Determinants of Mastitis



How does mastitis develop ?



- **Cow**
  - **Predisposing conditions**
    - **Existing trauma (milking machine, heat or cold, injury)**
    - **Teat end injury**
    - **Lowered immunity (following calving, surgery)**
    - **Nutrition**
- **Organisms**
- **Environment**

Mastitis Infection

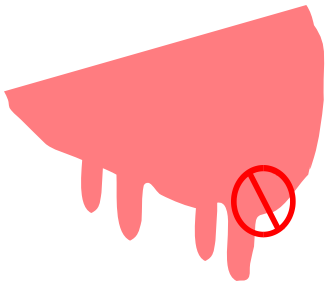
- Almost always caused by bacteria that generally enter through the teat canal.
- The environment inside the udder is warm and moist with plenty of available nutrients, so bacteria multiply rapidly.

What causes mastitis ?

- Bacteria (~ 70%)
- Yeasts and molds (~ 2%)
- Unknown (~ 28%)
  - physical
    - trauma
    - weather extremes

What are the health concerns of mastitis ?

- **Animal health**
  - **Loss of functional quarter**
  - **Lowered milk production**
  - **Death of cow**
- **Human health**
  - **Poor quality milk**
  - **Antibiotic residues in milk**



Types of Mastitis

- Contagious
- Environmental

Mastitis Causing Bacteria

- Contagious
  - Strep ag
  - Staph Aureus
  - Mycoplasma
- Environmental
  - Strep species
  - Coliforms
  - Coagulase Neg. Staph
  - Many other bacteria

Contagious Mastitis

- Primary habitat bacteria live on/in the udder and teat lesions
- Poor survival of bacteria in the environment
- Is spread from cow to cow, primarily during milking by milk-contaminated fomites at milking, sponge, milker's hands, milking machine
- *Staphylococcus aureus, Streptococcus agalactia*, *Mycoplasma bovis* and sometimes streptococcus uberis are contagious mastitis causing organisms.
- Usually chronic, subclinical mastitis

Organisms

- Contagious microorganisms
  - *Staphylococcus aureus*
  - *Streptococcus agalactiae*
  - *Mycoplasma bovis*
  - *Corynebacterium bovis*
- Environmental microorganisms
  - Environmental streptococci
  - Coliform
- Opportunistic microorganisms
  - *Staphylococcus spp.*
- Others
  - *Pseudomonas aeruginosa*
  - *Actinomyces pyogenes*
  - *Nocardia* Species

Coliform Mastitis

(Udder score)


'01 5 23

Mastitis Clinical Syndromes

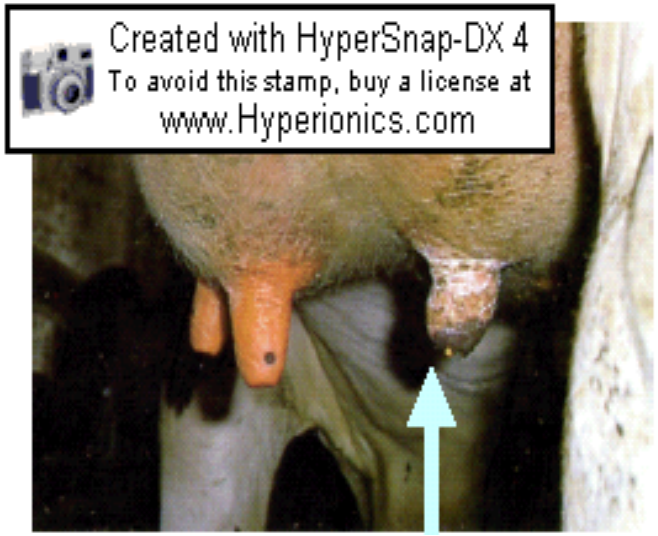
- Peracute Mastitis: sudden onset, severe inflammation of the udder, and serous milk- Systemic illness often precedes the symptoms manifested in the milk and mammary gland.

- Acute Mastitis: sudden onset, moderate to severe inflammation of the udder, decreased production, and occurrence of serous milk/fibrin clots, Systemic signs are similar but less severe than for the peracute form.

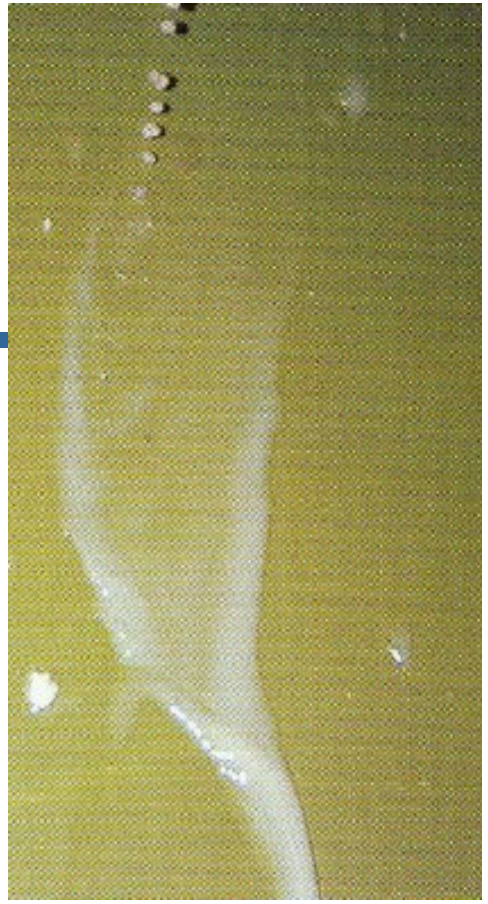
Mastitis Clinical Syndromes

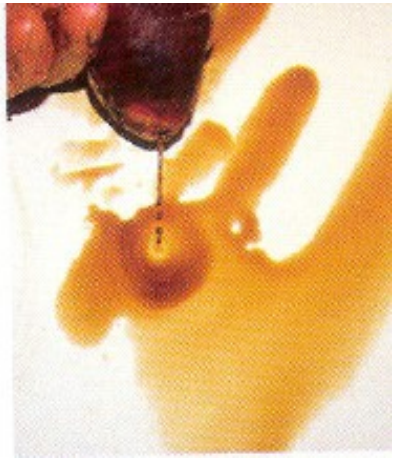
- Subacute Mastitis: mild inflammation, no visible changes in udder, but there generally are small flakes or clots in the milk, and the milk may have an off-color. There are no systemic signs of illness.
- Chronic Mastitis: chronic mastitis may persist in a subclinical form for months or years with occasional clinical flare-ups. Treatment usually involves treating the clinical flare-ups, or culling the cow from the herd.

Abnormal Udder



Chronic mastitis





Mastitis Clinical Syndromes

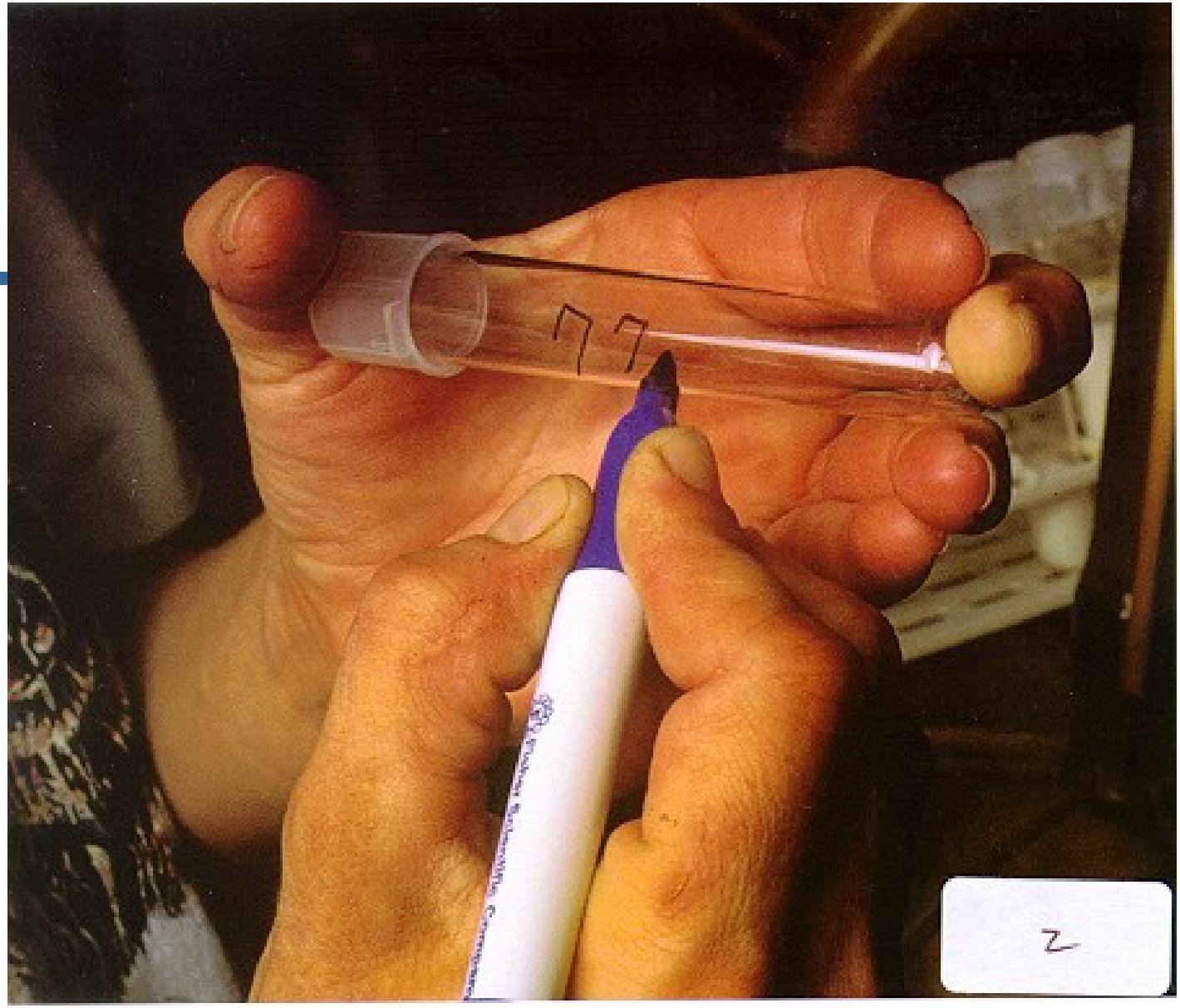
- Subclinical Mastitis: the most common form of mastitis, more common than clinical mastitis.
- No gross inflammation of the udder and no gross changes in the milk.
- Decreased production and decreased milk quality.
- Elevated SCC.

Detecting Subclinical Mastitis

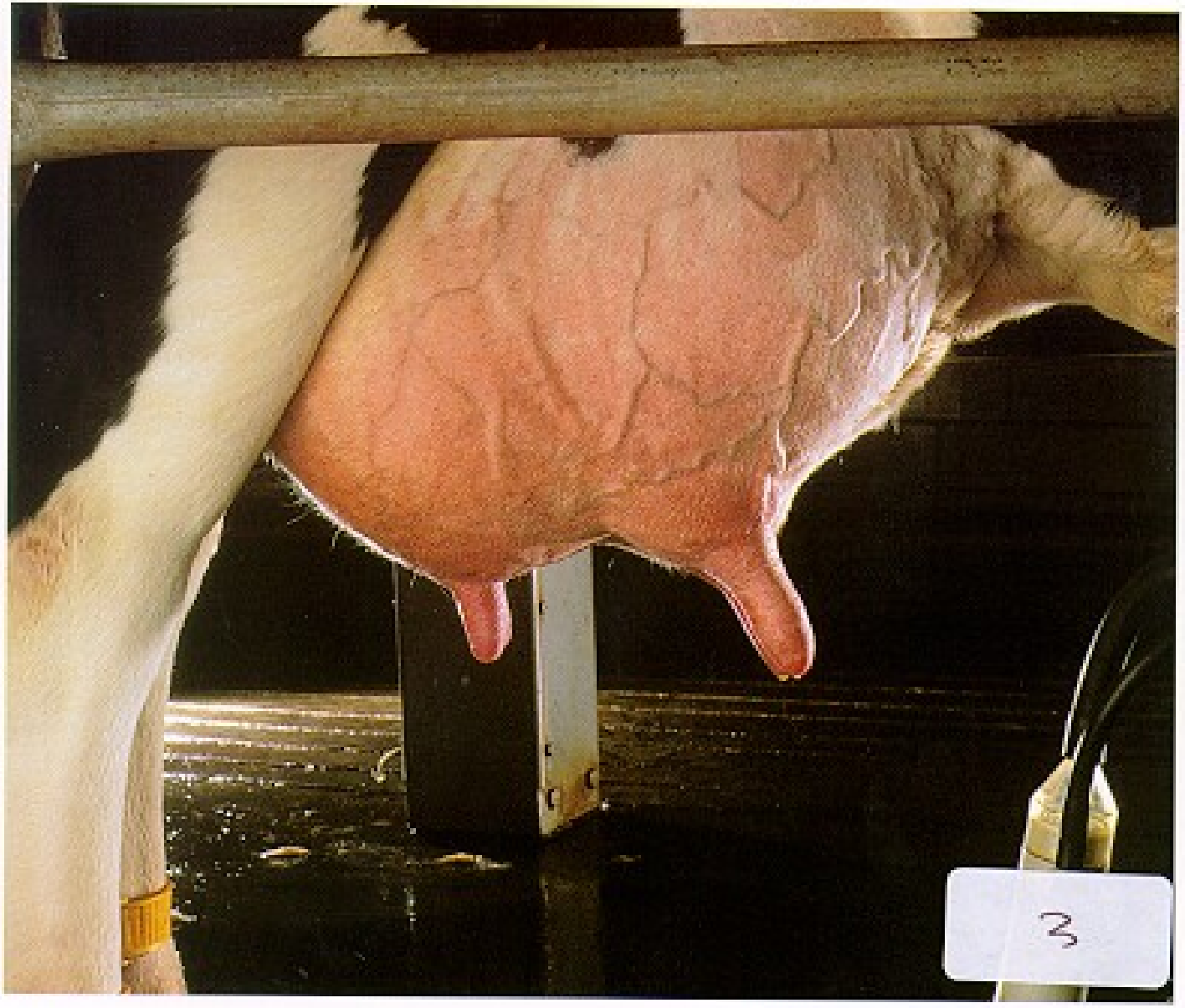
- Increased Somatic Cells
  - Bulk Tank SCC
  - Individual Cow SCC
  - CMT
- Sterile Milk Culture
  - Find mastitis causing organisms
- Antibody ELISA

What are Somatic Cells ?

- White blood cells that are found in milk come for the blood stream
- The function of white blood cells is to fight off infections that enter the body of the cow
- At all times somatic cells (white blood cells) are present in the udder at low levels

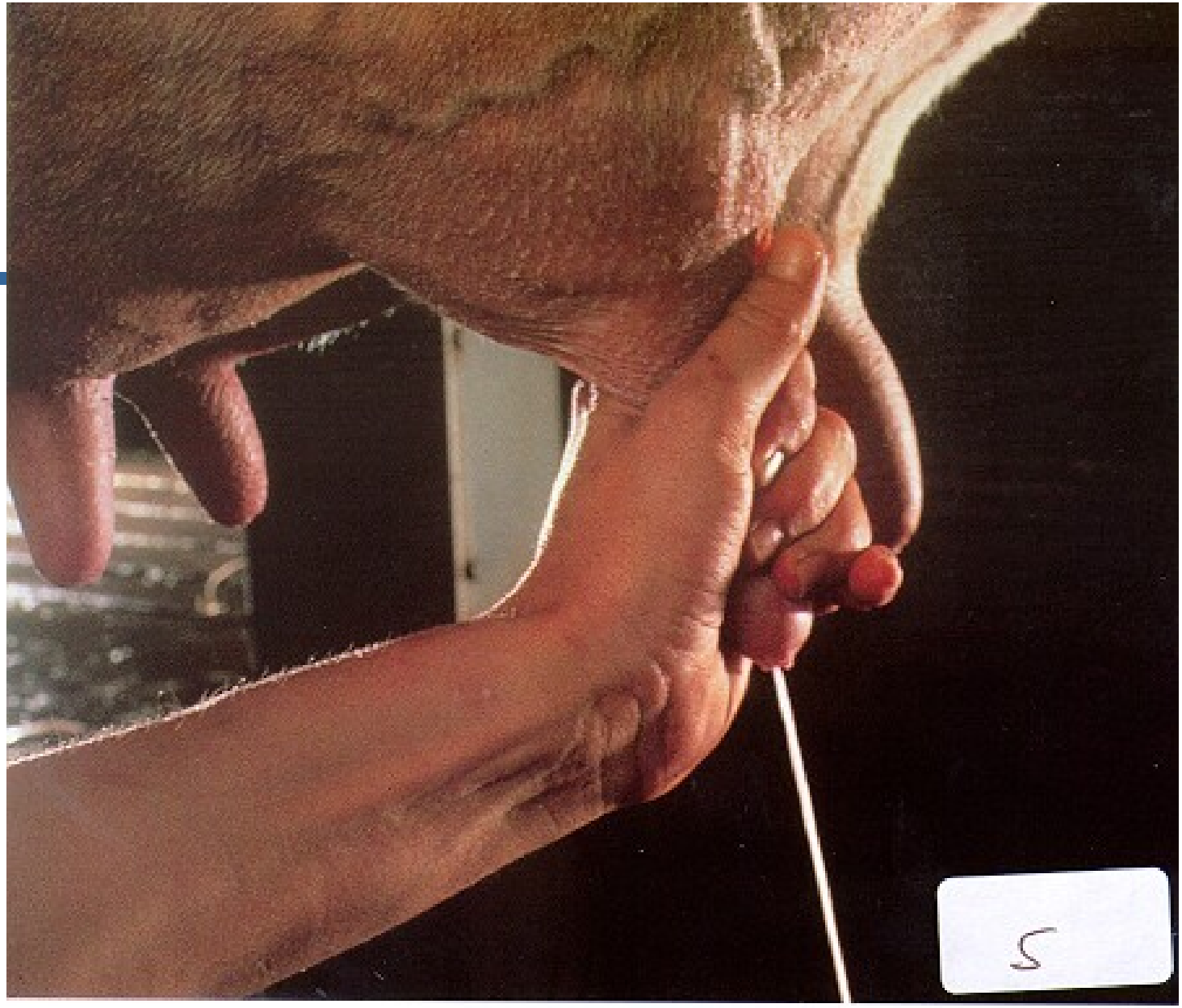


1. Label sterile tube with cow identification, date, and quarter sampled using a permanent marker.

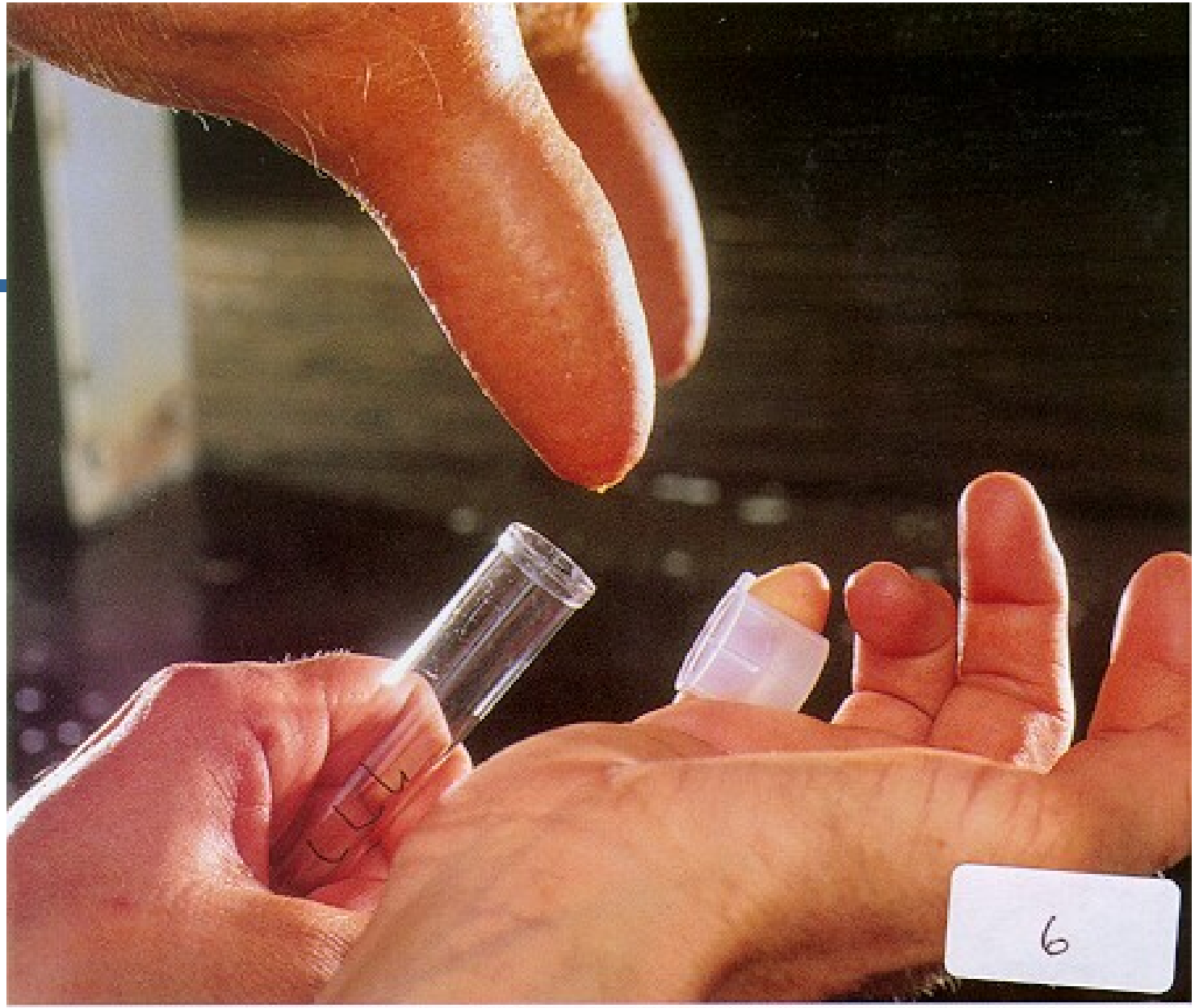


2. Udder should be clean and dry.

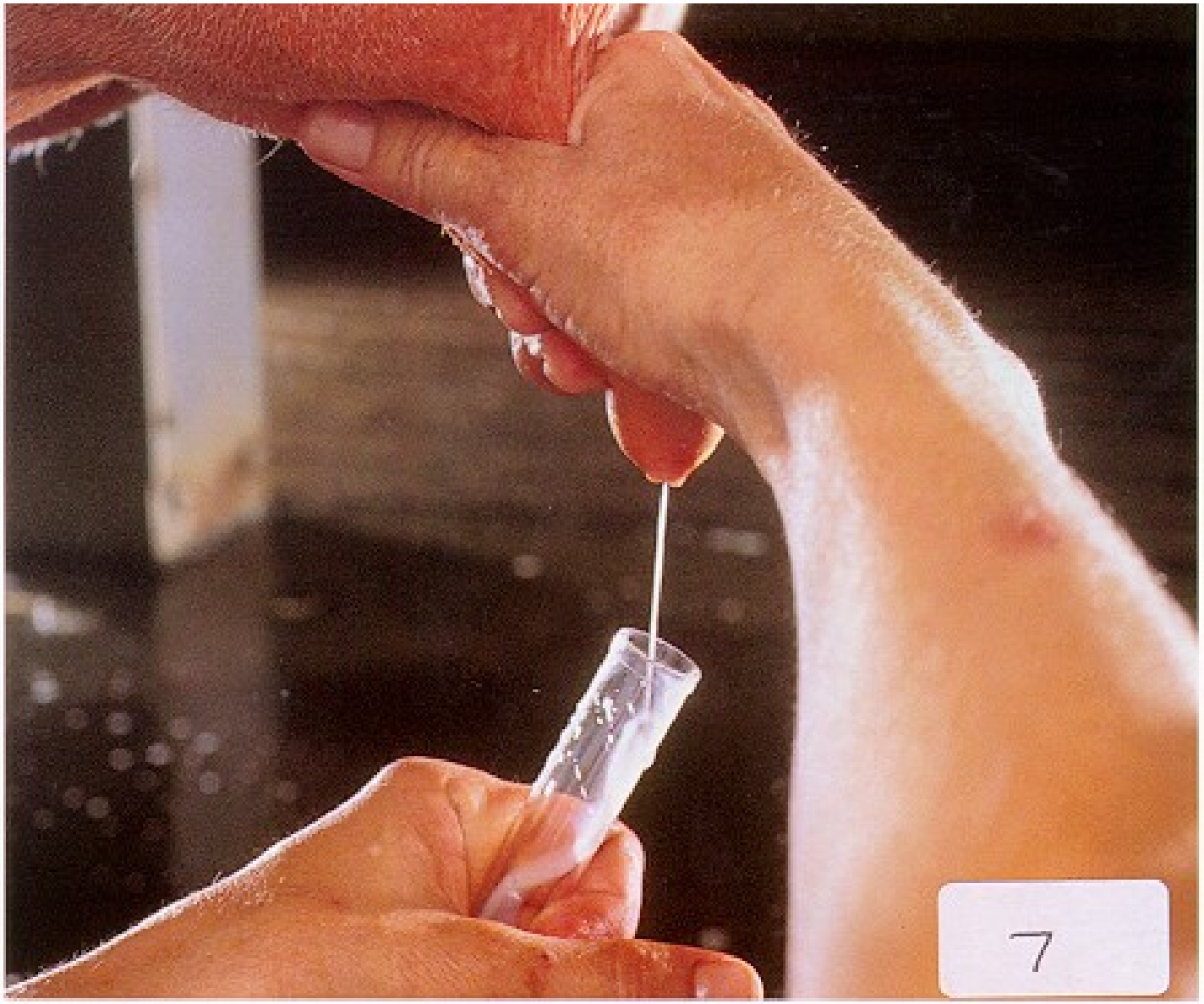
3. Scrub the end of each teat with a gauze pad or cotton ball soaked in 70% alcohol. Sanitize teats farthest away first, then nearest teats.



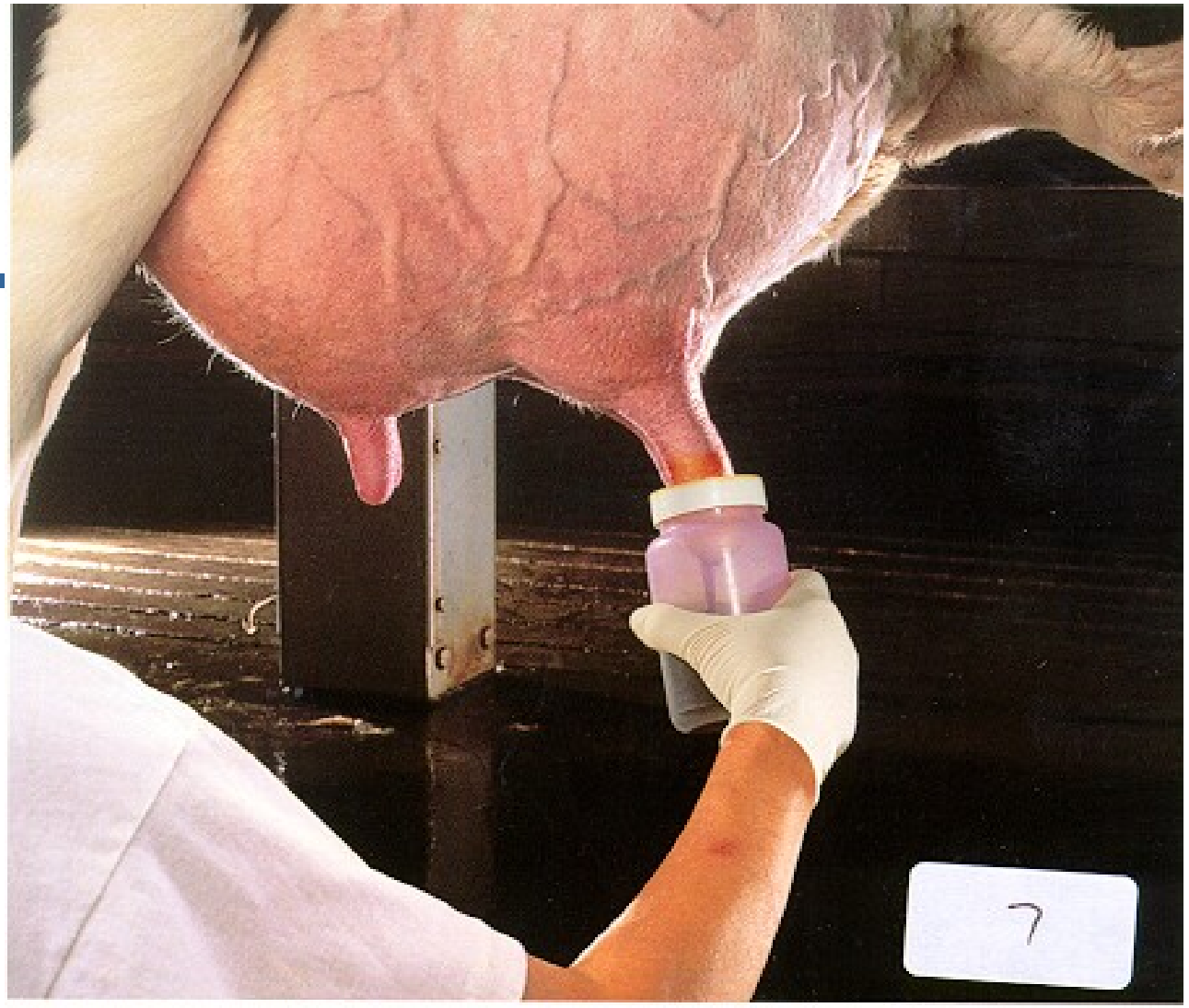
4. Beginning with the nearest teat to be sampled, remove 1-2 streams of milk from each teat.



5. Hold the sterile sample tube and remove the cap without contaminating it.

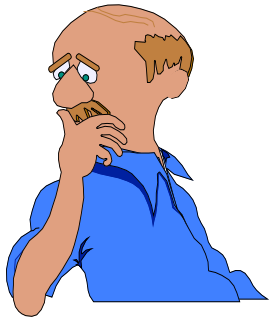


6. Hold tube at an angle to prevent debris from entering the tube. Do not allow the tube to touch the end of the teat. Squirt several streams of milk into the tube. Do not fill tube completely.



6. Dip or spray teats in a germicidal, post-milking teat dip.

How is mastitis diagnosed ?



- Physical examination
  - **Signs of inflammation**
  - **Empty udder**
  - **Differences in firmness**
  - **Unbalanced quarters**
  - **Culture**

- Cowside tests
  - **California Mastitis test**

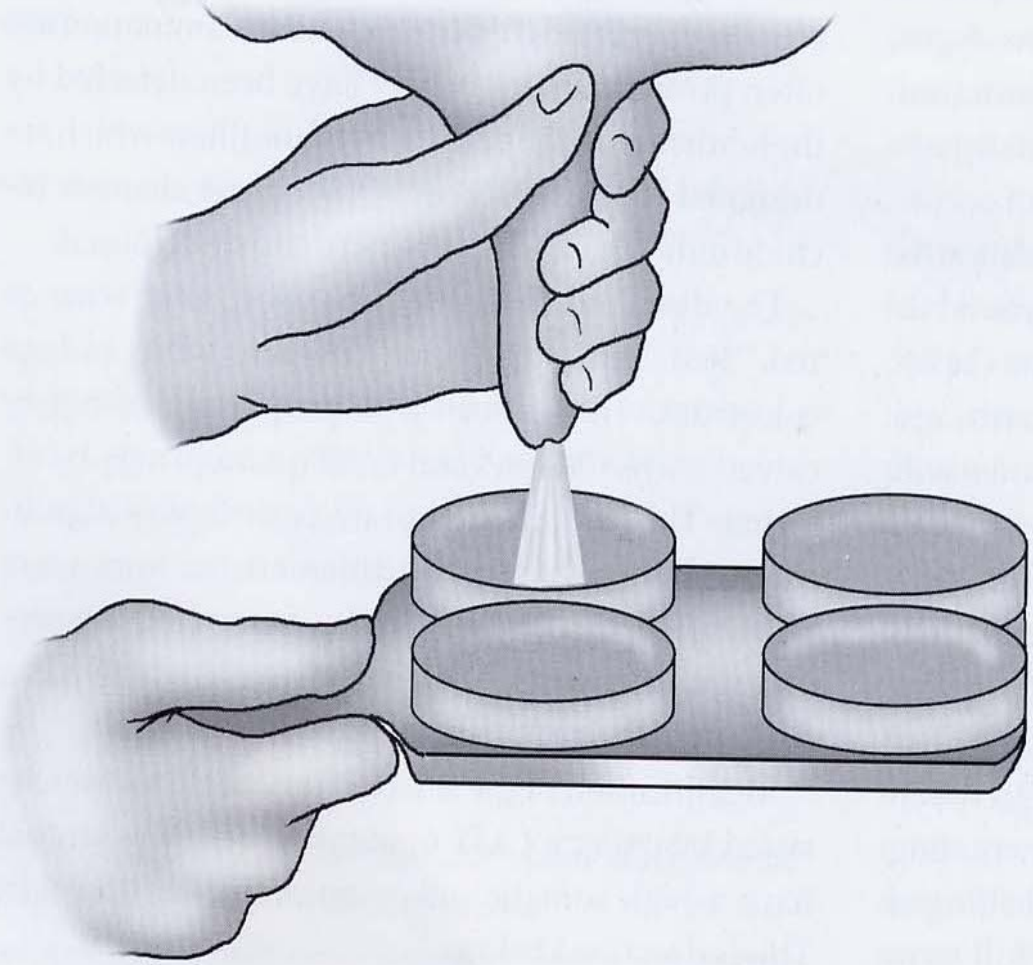


Figure 12.13 Milk sampling for the Californian milk test.

Detection of Mastitis

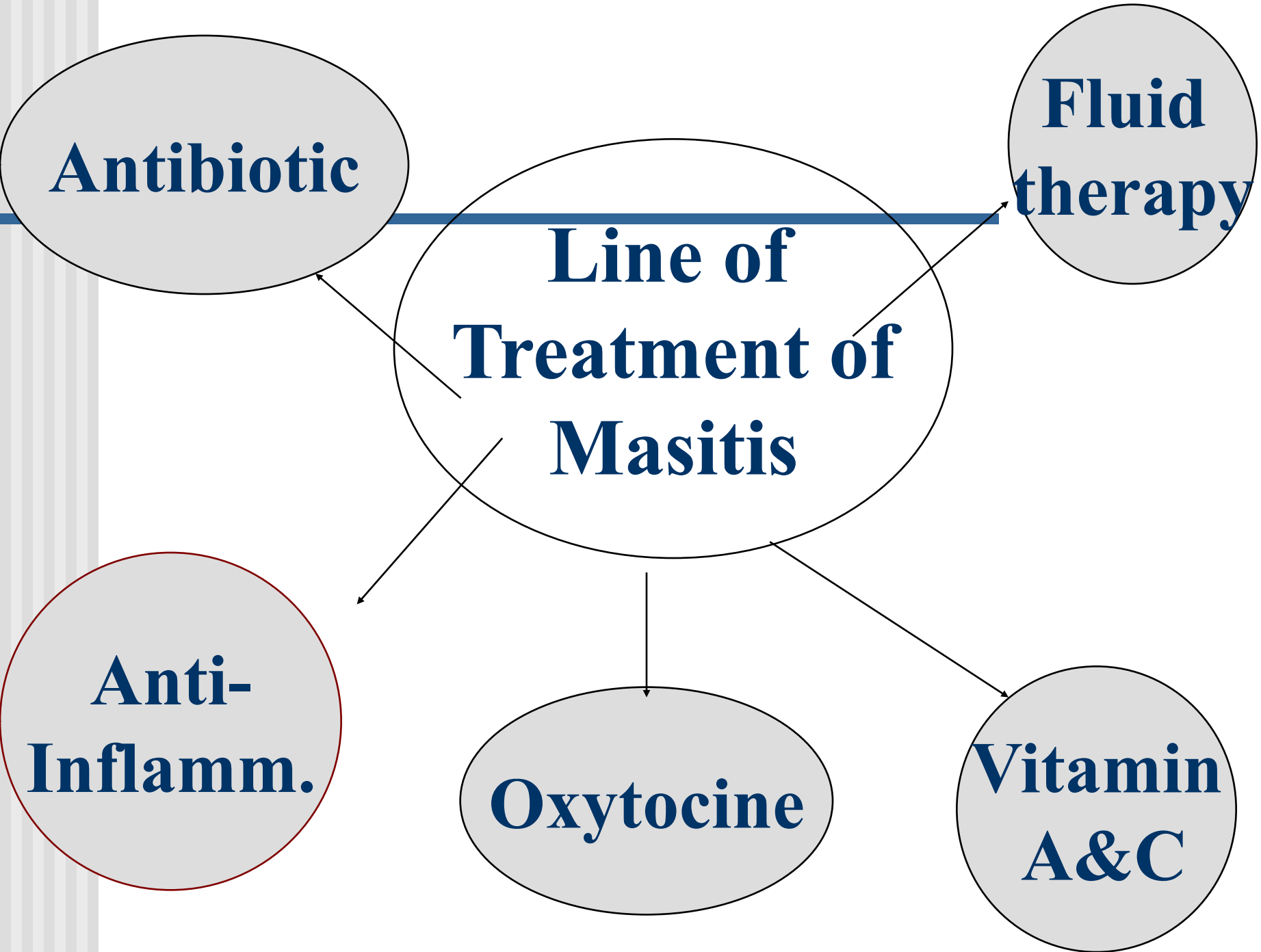
- **Visualization and palpation of the udder**
- **Detection of Somatic Cells**
  - California Mastitis Test

- **N-acetyl-ß-D-glucosaminidase (NAGase)**
  - a lysosomal enzyme which increases in milk when mastitis is present

California Mastitis Test (CMT)

- The CMT reagent reacts with somatic cells present in milk to form a gel.
- A plastic paddle having four shallow cups marked A, B, C and D for easy identification of the individual quarter.
- Approximately 1/2 teaspoon (2 cc) of milk is poured. An equal amount of the CMT reagent is added to the milk.
- A circular rotating to thoroughly mix the contents. Score in approximately ten seconds while still rotating.
- Read the test quickly as the reaction tends to disintegrate after about 20 seconds.
- Rinse the paddle thoroughly with water and it is ready for the next test.

Rupture of the suspensory ligament


Antibiotic
Fluid therapy
Line of Treatment of Masitis
Anti-Inflamm.
Oxytocine
Vitamin A&C

Systemic	Local
Cefotaxim	Mastilex (Gent +Cephalo
Amoxycilline +Clavunic acid	Snylox
Penicilline+Streptomycine Pentomycin	Neomastipra
Flurfinicol	Tetradelta or Lincosin
Gentamycin	Mastilex (Gent +Cephalo.)

Systemic	Local
Marbocil	No
Oxyte-teracycline (oxy 5%)	Oxy

2-Bloody milk dut to leptospira

Clinical Signs

C*flaccid udder & flappy
*the blood come from all quarter
*no inflammation of the udder
*has bloody urine

treatment :

- **1-Antibiotic**
- R/Cefotaxime inj. 15ml/100 Kg I/V for 3 days
- Or R/Streptomycine 5Gm I/M for 14 days
- **2-I/M mammary infusion of epinephrine** alone or with saline (1 - 2 amp.)
- **2-I/V injection of Cal-D-Mag** → 50-100 cm
- **3- I/M injection of Vit.K**→ amri K 1 amp. / 70 kg B.wt
- **4-Phosphorus preperation:**
- R/Phosphosal 25Ml I/M for 5 days

3-bloody milk due to truma:

* blood only without milk

***treatment of trumatic bloody milk:**

1-I/ mammary infusion of epinephrine alone or with saline (1 - 2 amp.)

2-I/V injection of Cal-D-Mag → 50-100 cm

3- I/M injection of Vit.K→ amri K 1 amp. / 70 kg B.wt

4- cold application

4- supportive treatment :

*I/V injection of glucose 25% → 1-2 liter

*I/V injection of Avil → 1 amp./70 kg B.wt

*local application of cold fomentation (ice bag) on the udder(in acute cases)

Mastitis Prevention

- Proper Milking Techniques
  - Procedures, training, monitoring
- Keep cows clean!
  - Proper Bedding
    - Sand is the best bedding
    - Organic bedding (sawdust, etc.) must be dry
    - Stall sized to fit cows
    - Tail docking
- Nutrition
  - Vitamins and minerals
- Milk contagious cows last
- Maintain milking equipment

Control of Contagious Mastitis

- Dip teats in germicide after pre and post milking
- Treat quarters with dry cow antibiotics at end of lactation
- Milking order
- Individual cloth/paper towels to wash/dry teats
- Clean hands, gloves
- Cull persistently infected cows
- Minimize teat end lesions

Control of Environmental Mastitis

- More difficult to control than the contagious pathogens
- ID source and remove (bedding, ponds, mud)
- Clip udders
- Milk only clean dry teats
- Clean parlor, stalls, bedding
- Pre-dip teats with germicide before milking – No water
- Keep cows standing after milking - feeding
- Sterile infusion techniques (alcohol swab)