

Good Udder Conformation – the Key to Maintain Milk Quality and Longevity with the Challenge of High Production and *Automatic Milking Systems*

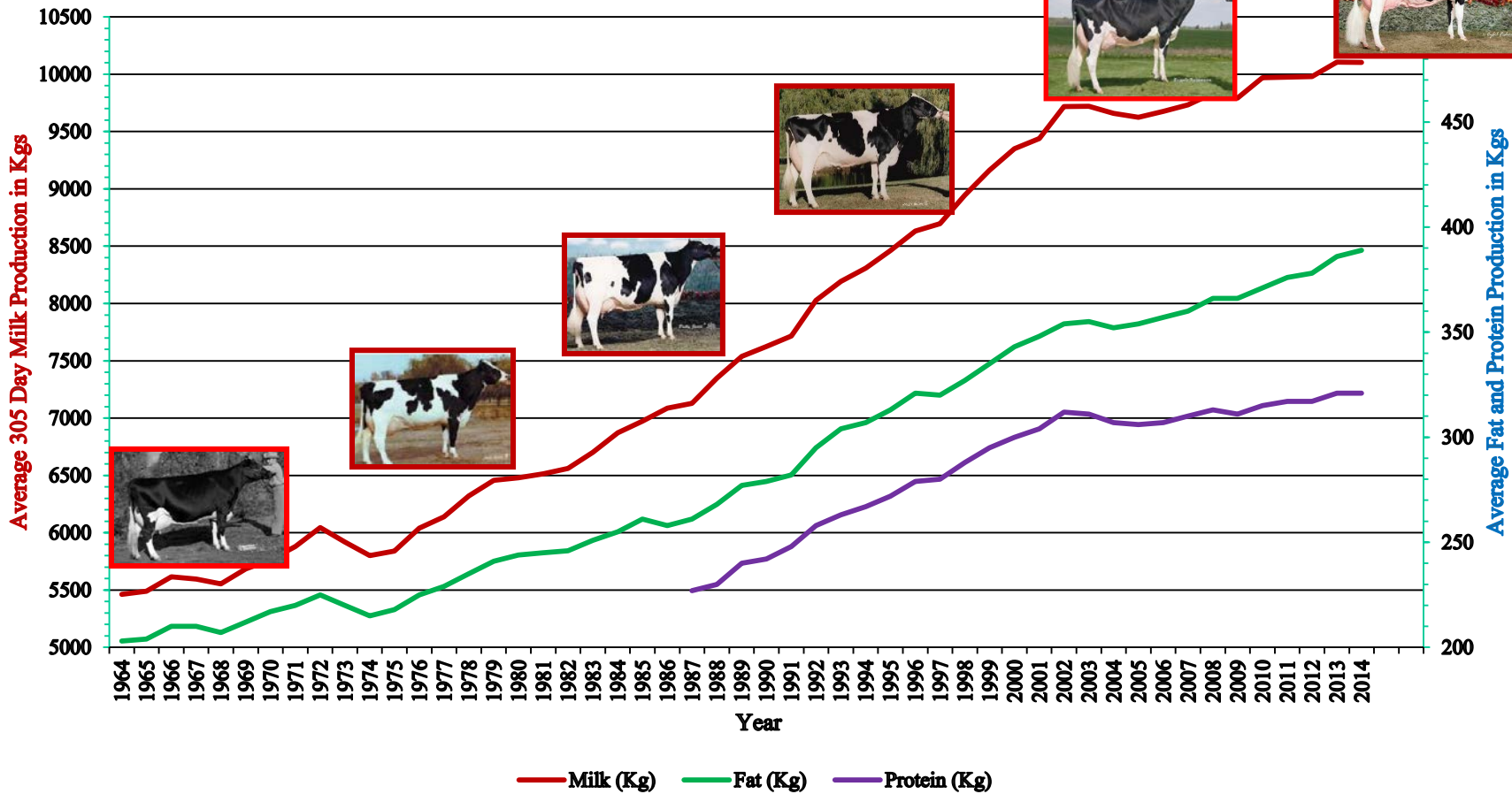


Functional Conformation Conference
Gothenburg, Sweden

Dr. Gordon Atkins – Feb 6 - 7, 2020

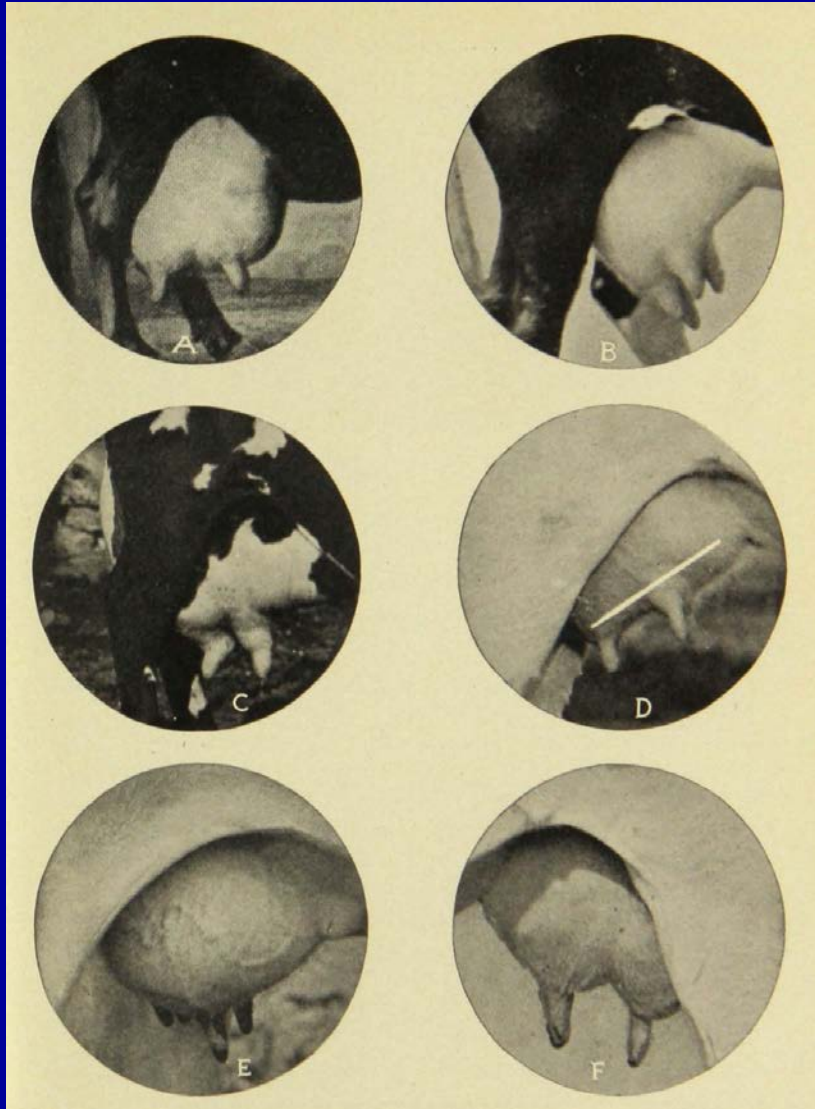


Average 305 Day Milk, Fat & Protein Production for Canadian Holsteins (of all Ages) on Supervised Test

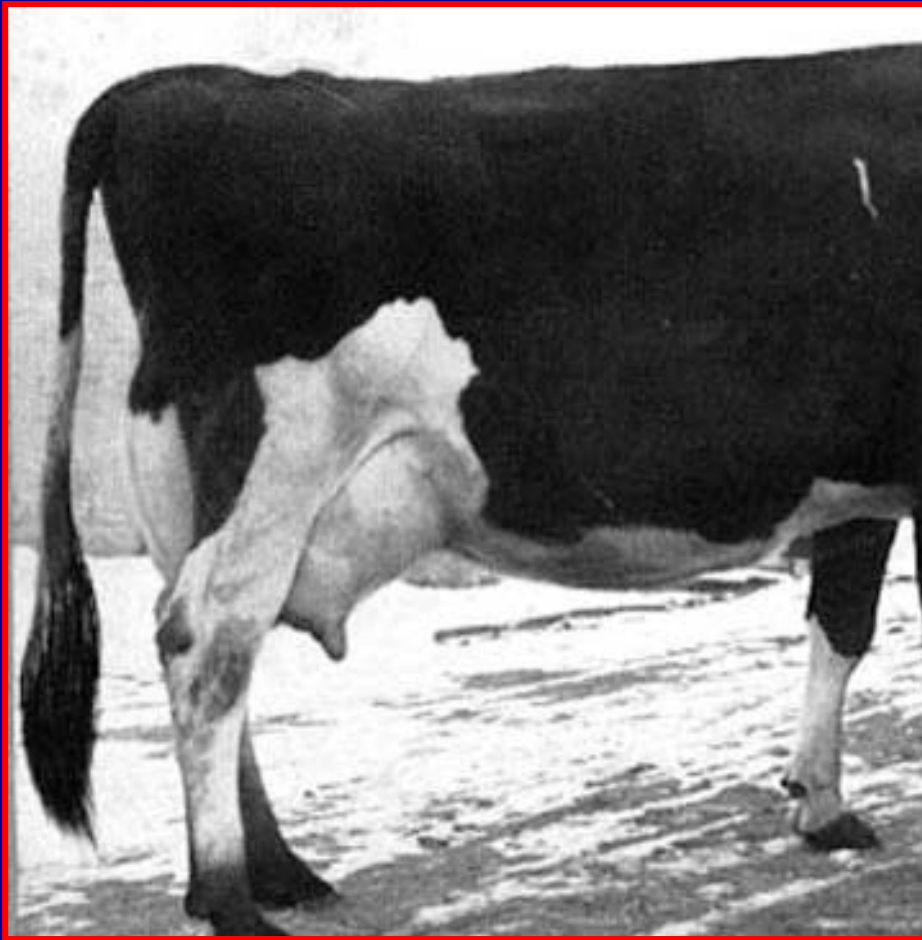


Data Source – Agriculture and Agri-Food Canada

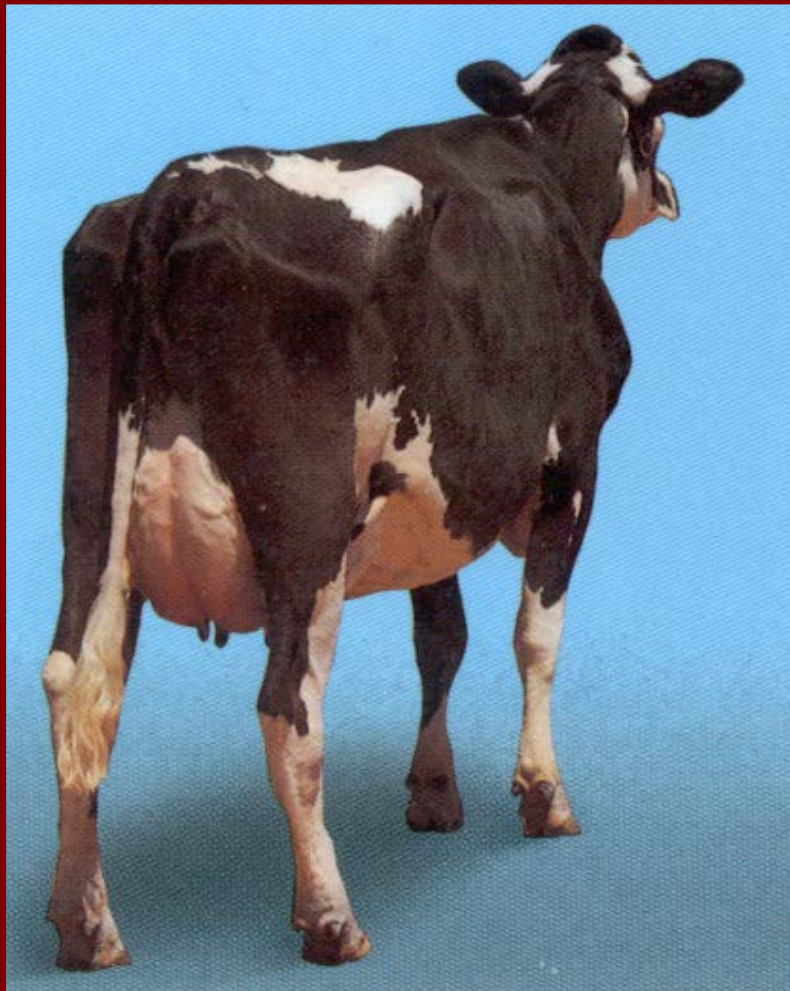
Udder Conformation has Experienced Unprecedented Progress



Increased Production Required Improved Conformation



Capacity was Achieved Through Increased Length and Width Rather than Depth

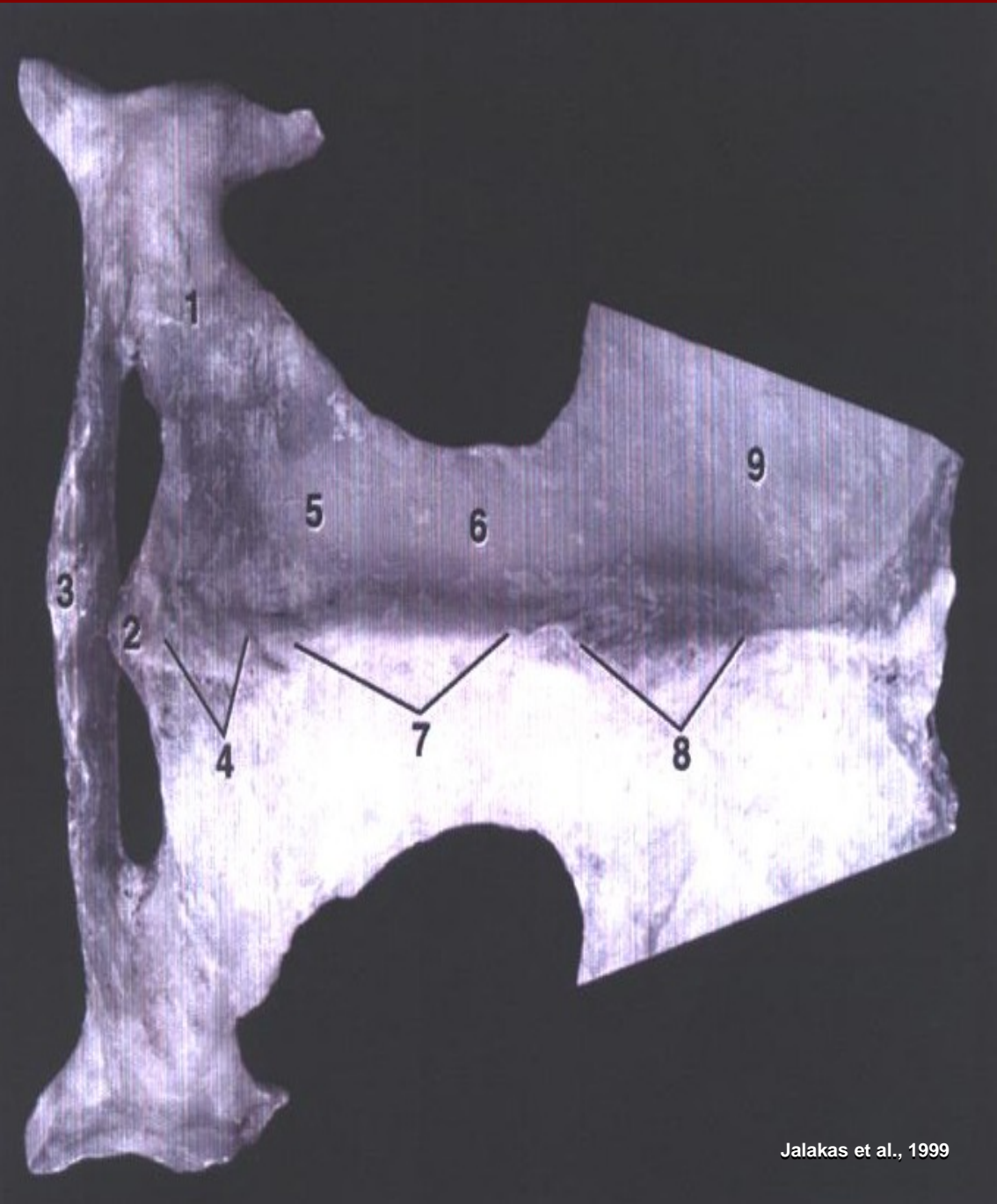
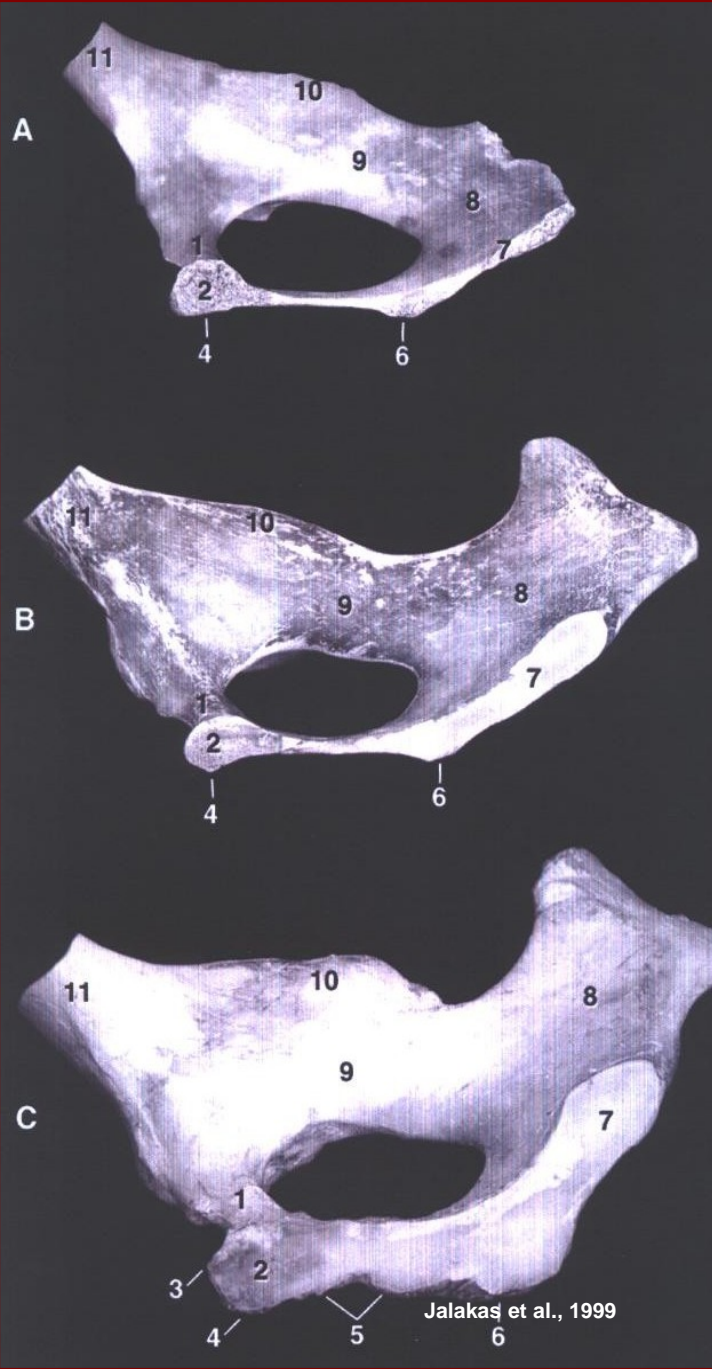




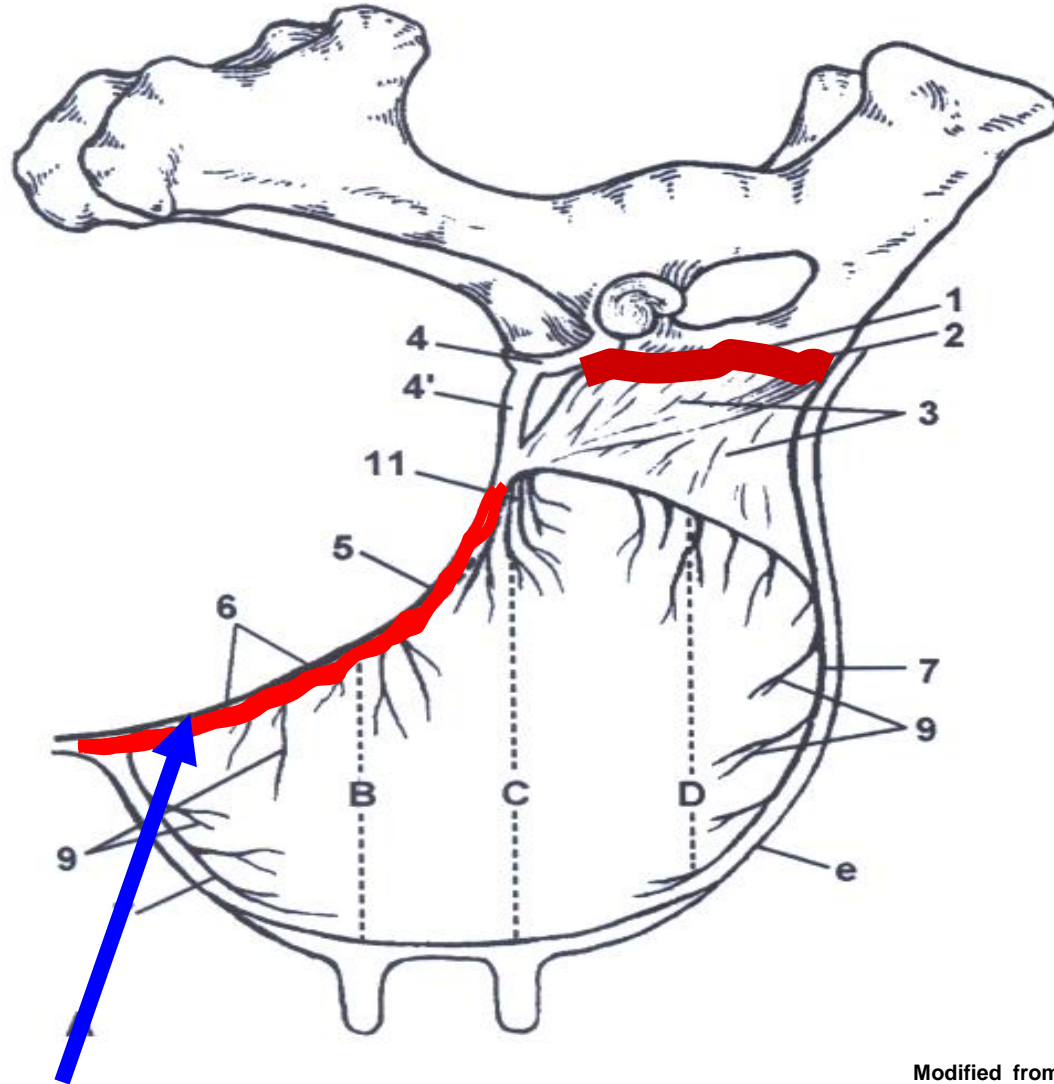
How Has the Canadian Classification System Changed?

| Section | Pre'90 | 1993 | 1998 | 2019 |
|-------------------|--------|------|------|-----------------------|
| ■ Mammary System | 40% | 40% | 40% | 40% |
| ■ Feet & Legs | 12% | 16% | 20% | 28% |
| ■ Dairy Character | 16% | 14% | 12% | Dairy Strength 20% |
| ■ Frame/Capacity | 22% | 20% | 18% | |
| ■ Rump | 10% | 10% | 10% | 12% |

Holstein Canada 2015

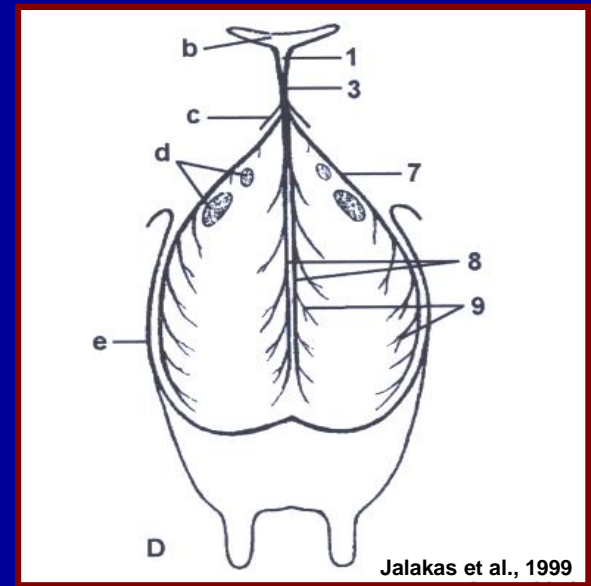
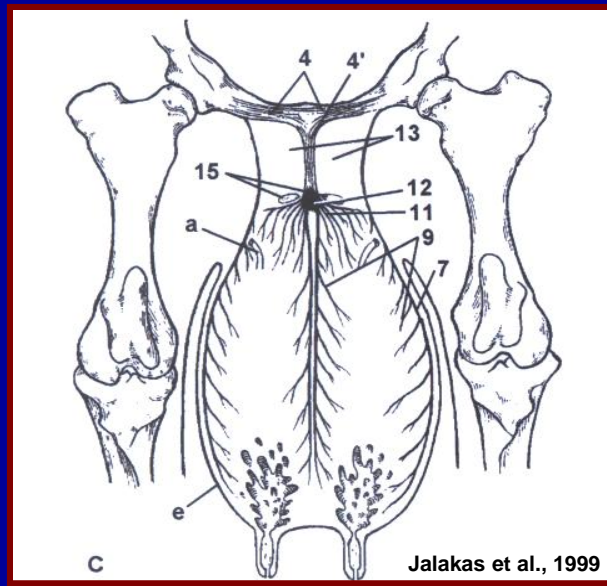
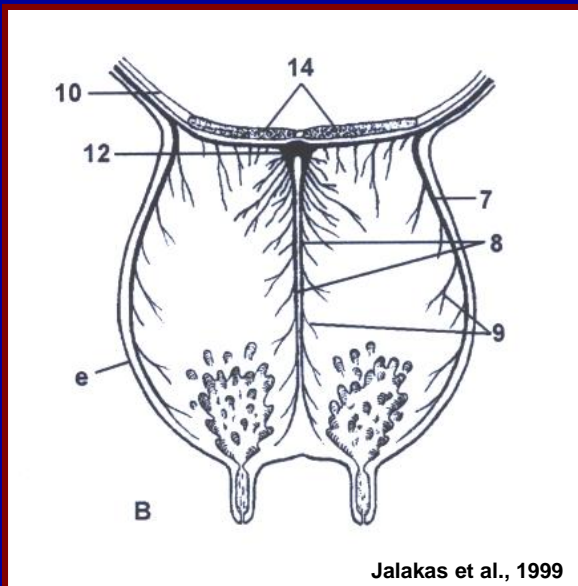
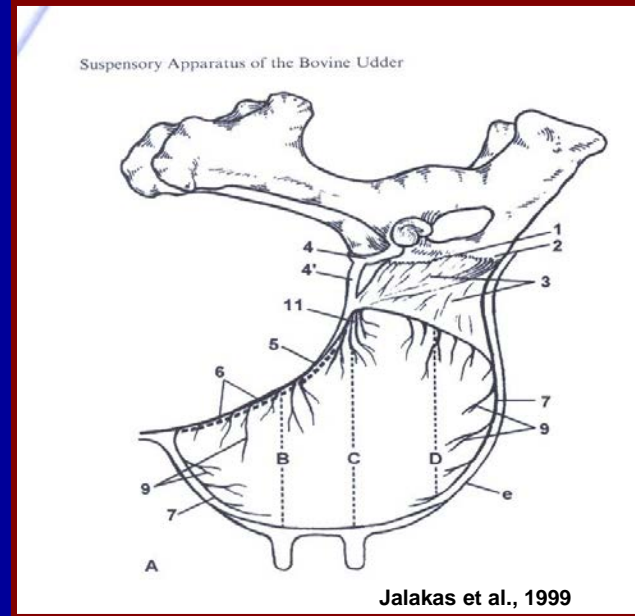
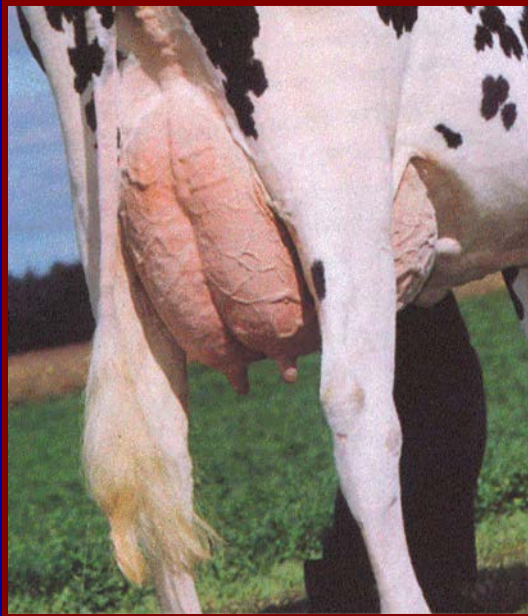


Mammary System



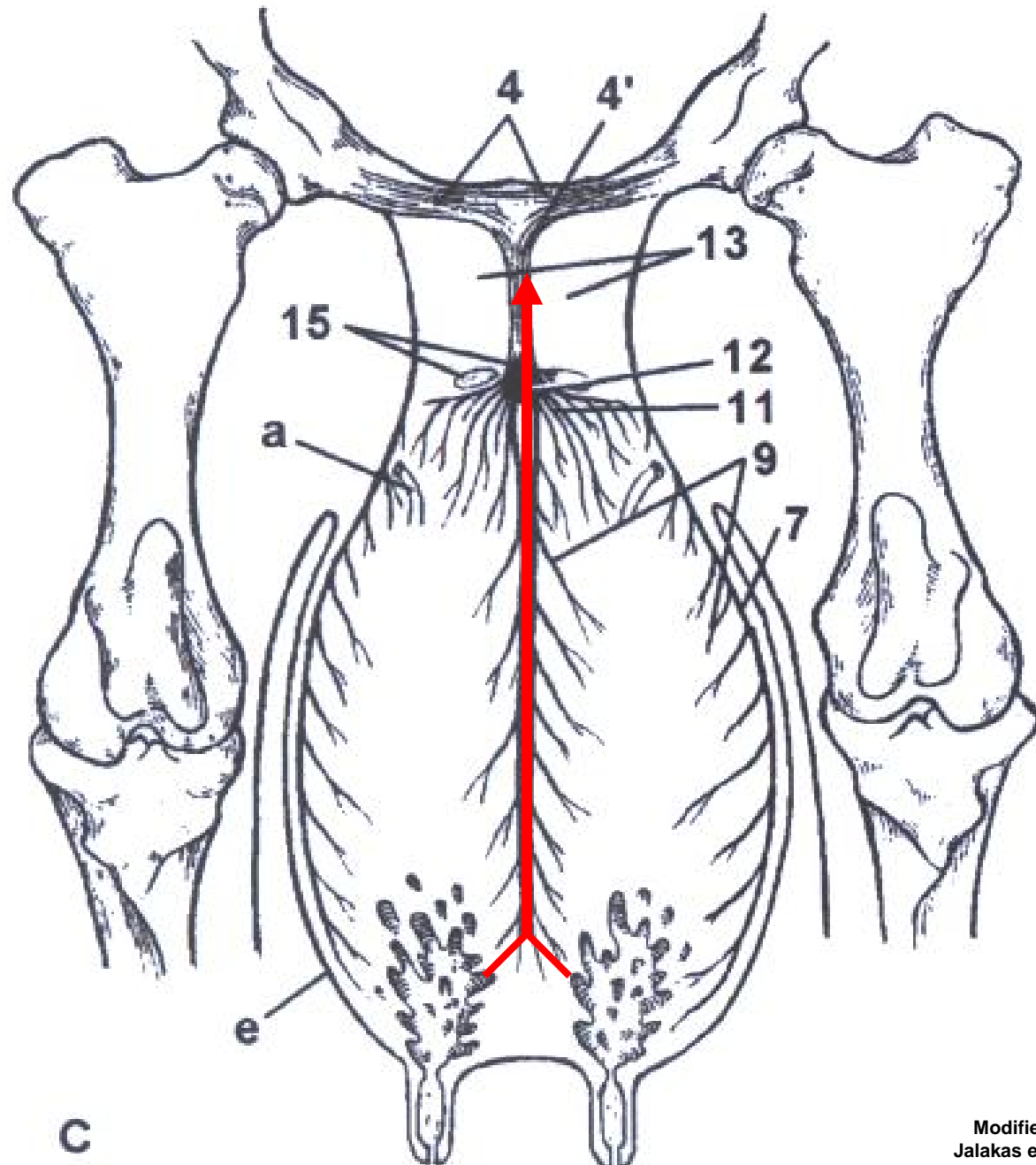
Modified from
Jalakas et al., 1999

Udder Conformation







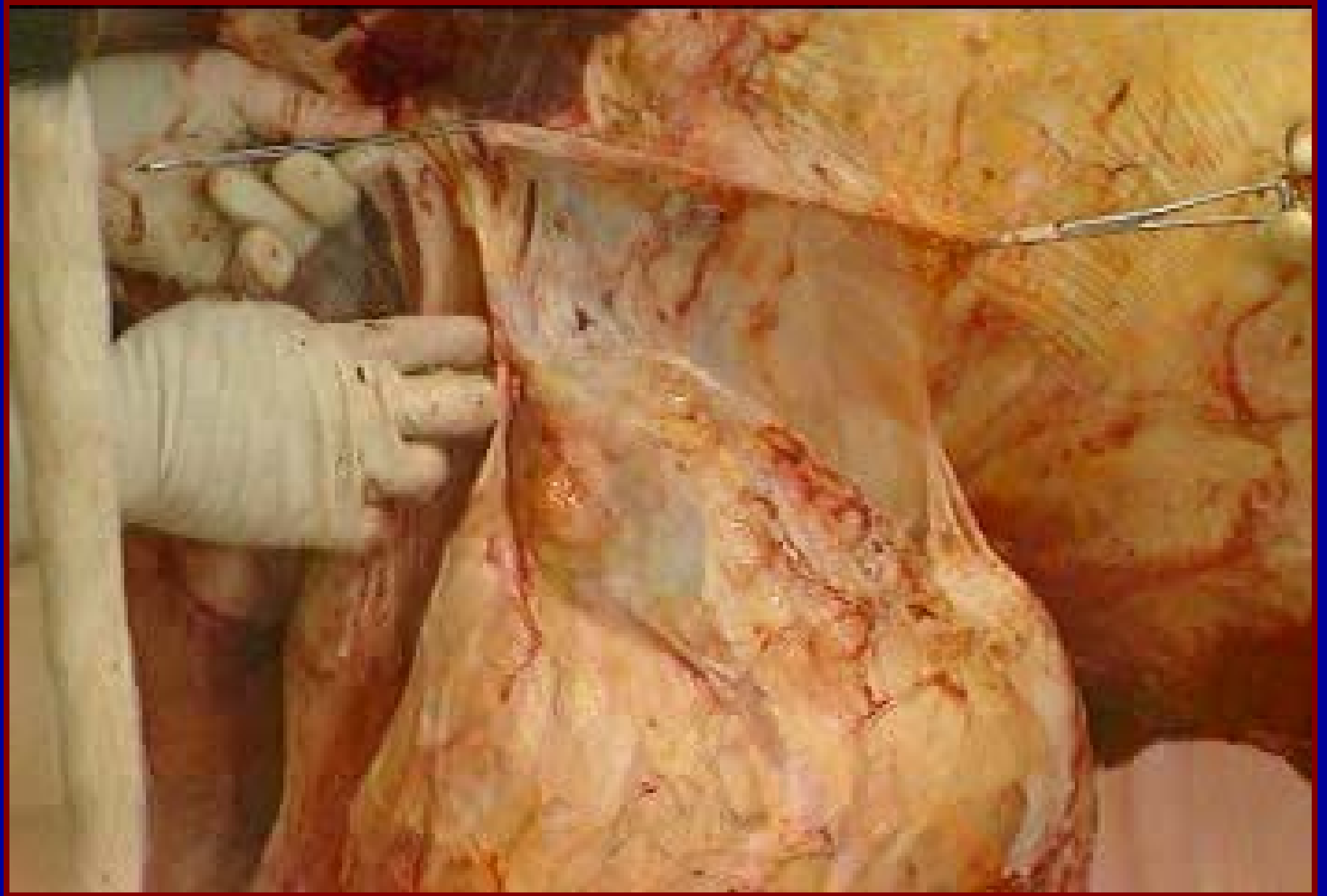


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Modified from
Jalakas et al., 1999



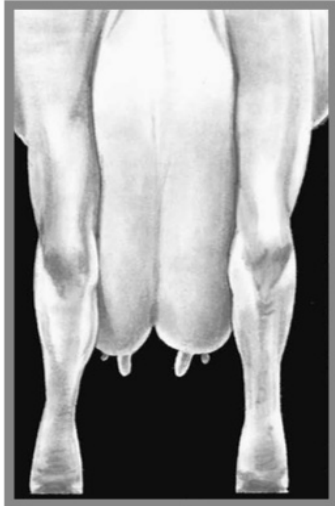








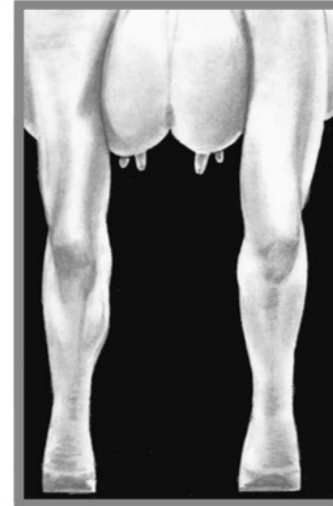
Udder Depth



Very deep udder floor
well below hocks

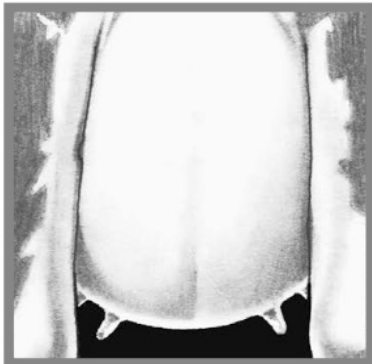


Udder floor
above hocks

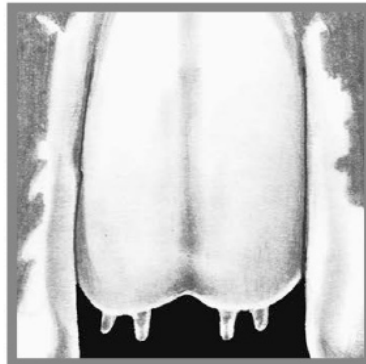


Extreme height of udder
floor above hocks

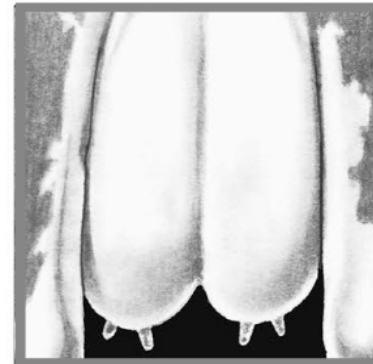
Udder Cleft



Weak cleft



Intermediate



Extremely strong cleft

Udder Cleft & Rear Udder Width



MAMMARY SYSTEM (40%)

UDDER FLOOR (Tilt of udder floor)



1 TILT



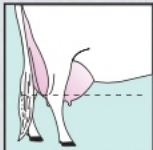
5 INTERMEDIATE



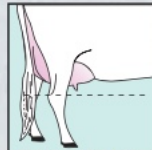
9 REVERSE TILT

IDEAL
5-6
WEIGHT
4%

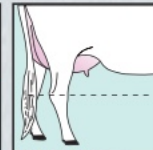
UDDER DEPTH (From hock to floor of udder)



1 DEEP



5 INTERMEDIATE



9 SHALLOW

IDEAL
5-6
WEIGHT
12%

UDDER TEXTURE (Softness and expandability)



1 FLESHY



5 INTERMEDIATE



9 SOFT

IDEAL
9
WEIGHT
14%

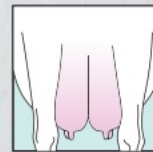
MEDIAN SUSPENSORY (Depth of cleft (fore/rear))



1 WEAK



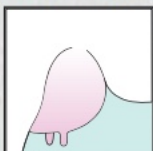
5 INTERMEDIATE



9 STRONG

IDEAL
9
WEIGHT
14%

FORE ATTACHMENT (Attachment to abdominal wall)



1 WEAK



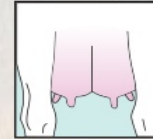
5 INTERMEDIATE



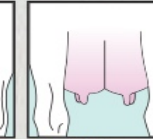
9 STRONG

IDEAL
9
WEIGHT
18%

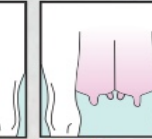
FRONT TEAT PLACEMENT (Teat placement from centre of quarter)



1 WIDE



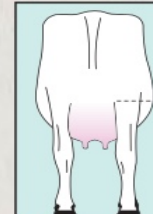
5 CENTRE



9 CLOSE

IDEAL
6
WEIGHT
5%

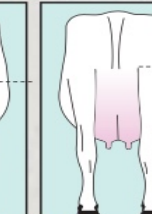
REAR ATTACHMENT HEIGHT (Milk secreting tissue to base of vulva)



1 LOW



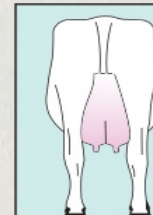
5 INTERMEDIATE



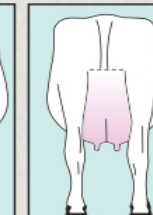
9 HIGH

IDEAL
9
WEIGHT
10%

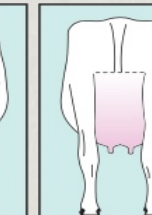
REAR ATTACHMENT WIDTH (Width at milk secreting tissue)



1 NARROW



5 INTERMEDIATE



9 WIDE

IDEAL
9
WEIGHT
12%

REAR TEAT PLACEMENT (Teat placement from centre of quarter)



1 WIDE



5 CENTRE



9 CLOSE

IDEAL
5-6
WEIGHT
7%

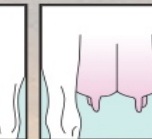
TEAT LENGTH (Average length of rear teats)



1 SHORT



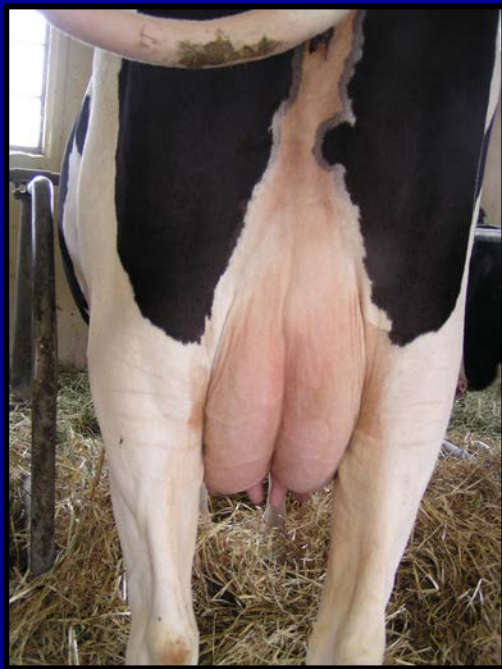
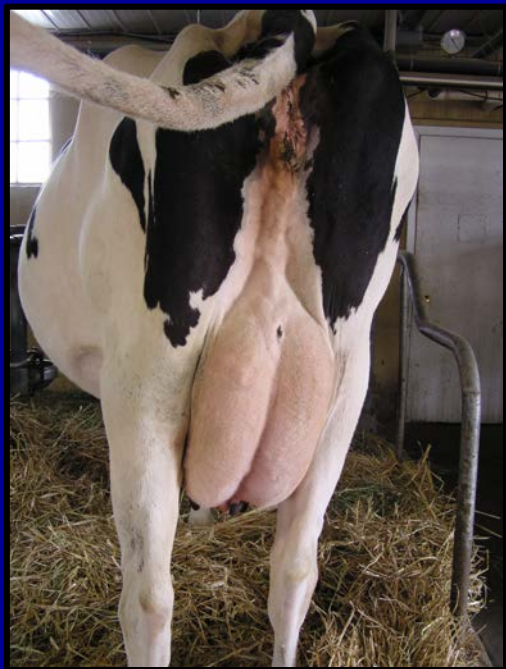
5 INTERMEDIATE



9 LONG

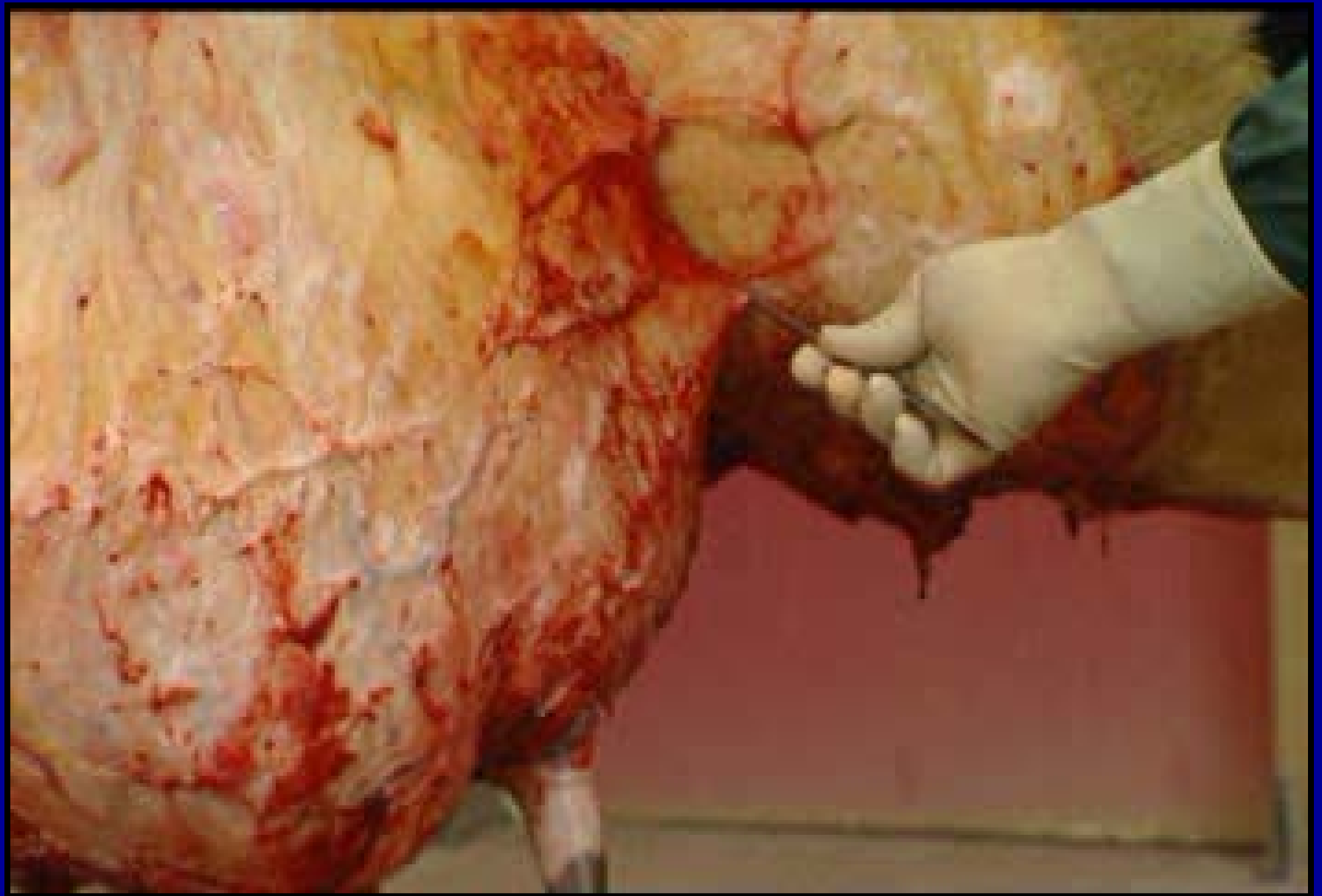
IDEAL
5
WEIGHT
4%

Rear Udder Width



Fore Udder Attachment









Rear Teat Placement



Udder Quality



Udder Quality

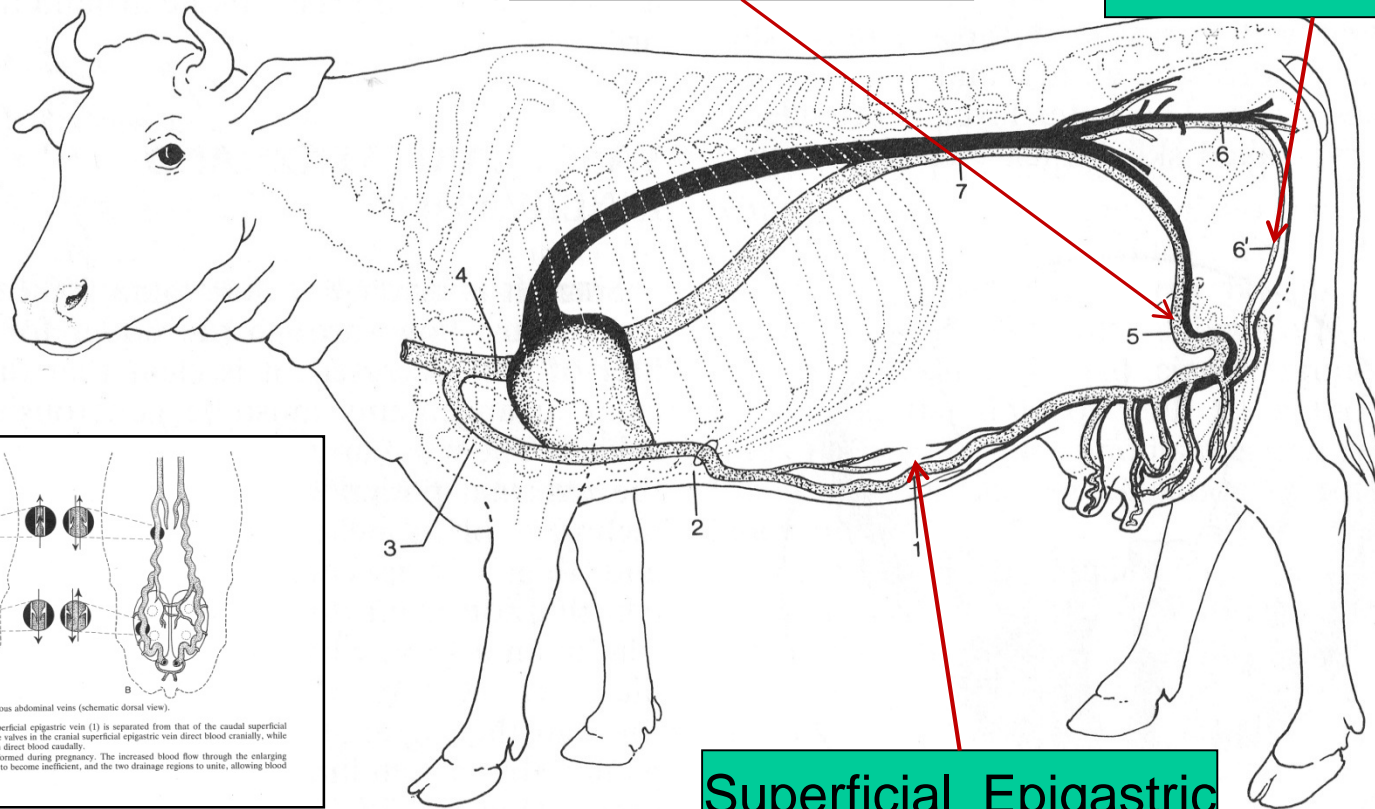




Mammary Circulatory System

External Pudendal

Internal Pudendal



Superficial Epigastric
(anastomosis of cranial and caudal)

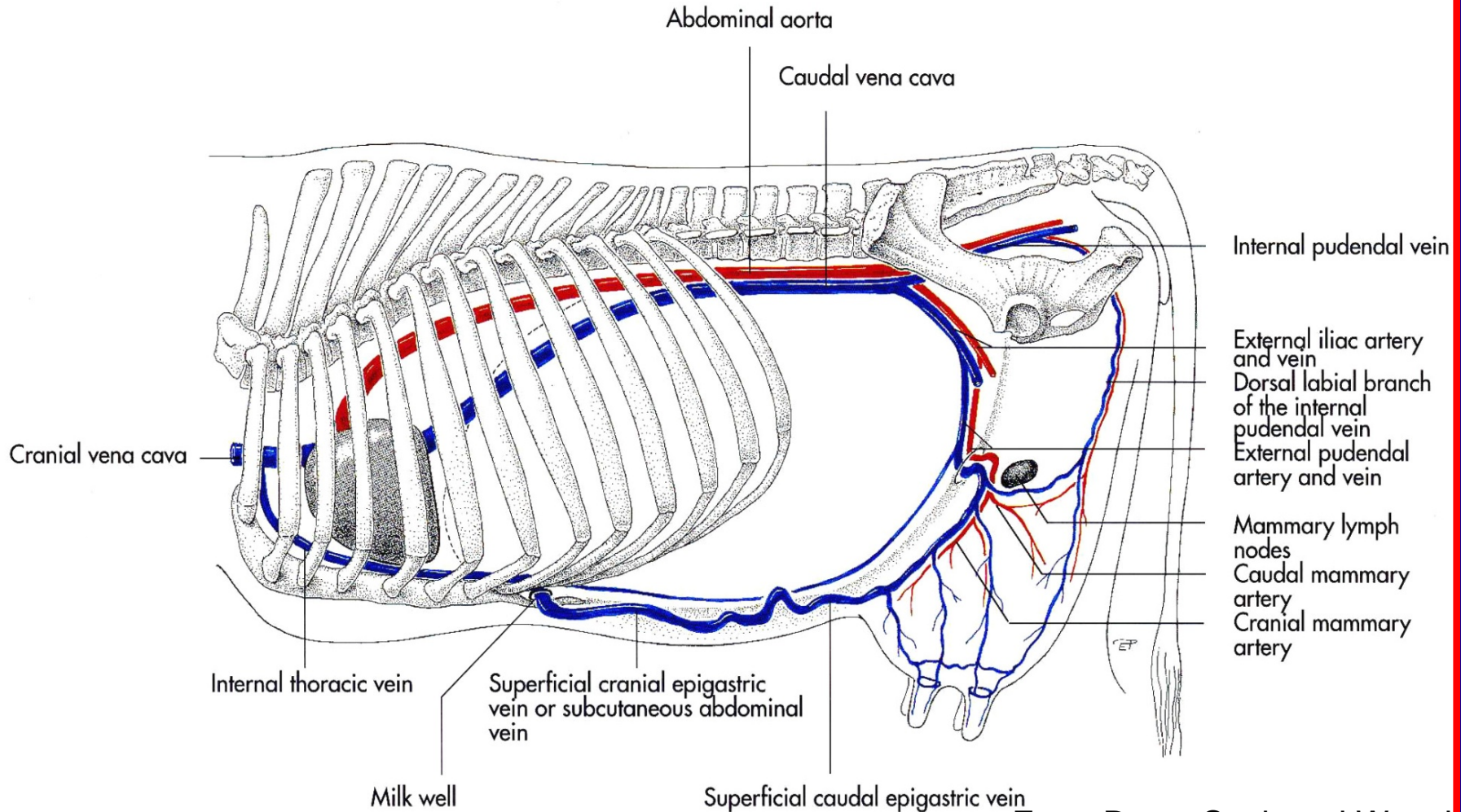
FIGURE 31-7. The venous drainage of the udder.

1, Subcutaneous abdominal (milk) v.; 2, milk "well"; 3, internal thoracic v.; 4, cranial vena cava; 5, external pudendal v.; 6, internal pudendal v.; 6', ventral perineal v.; 7, caudal vena cava.





Mammary Circulatory System



From Dyce, Sack and Wensing

Front Teat Length



1-1/4 inches or smaller

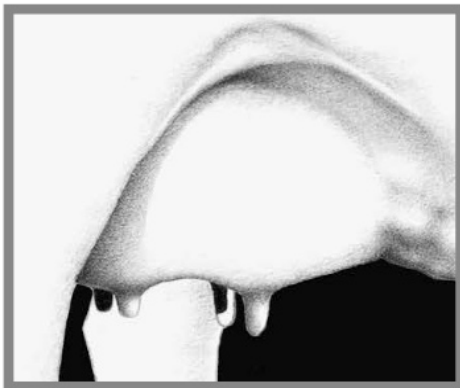


2-1/4 inches

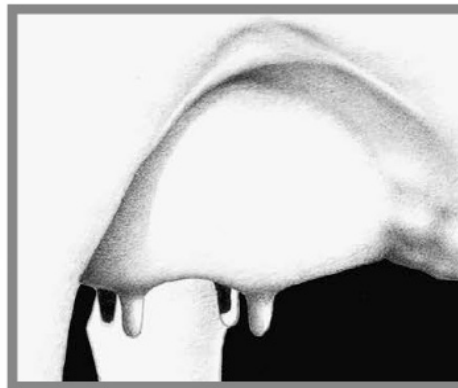


3-1/4 inches or longer

Rear Teat Length



1-1/4 inches or smaller

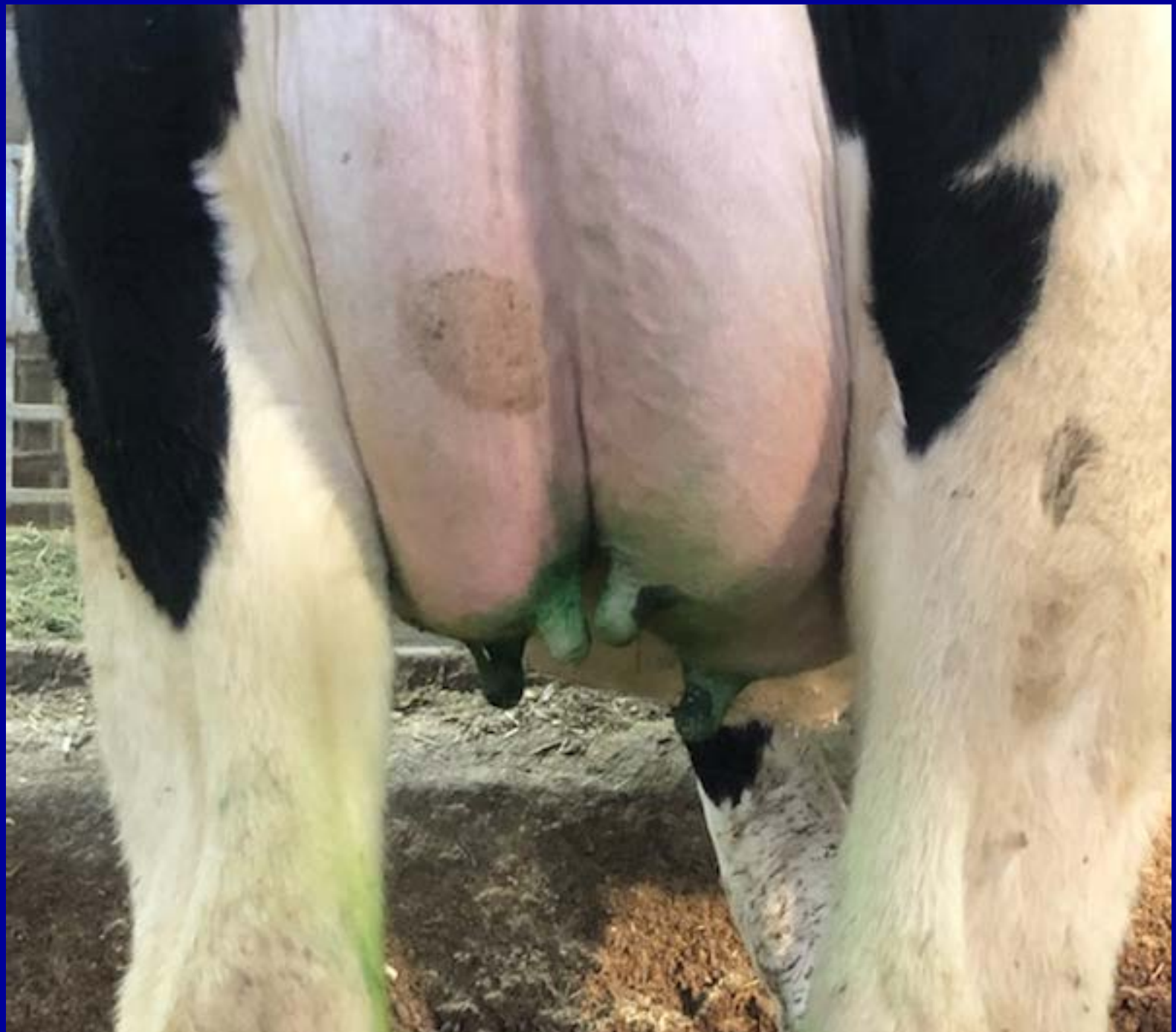


2-1/4 inches

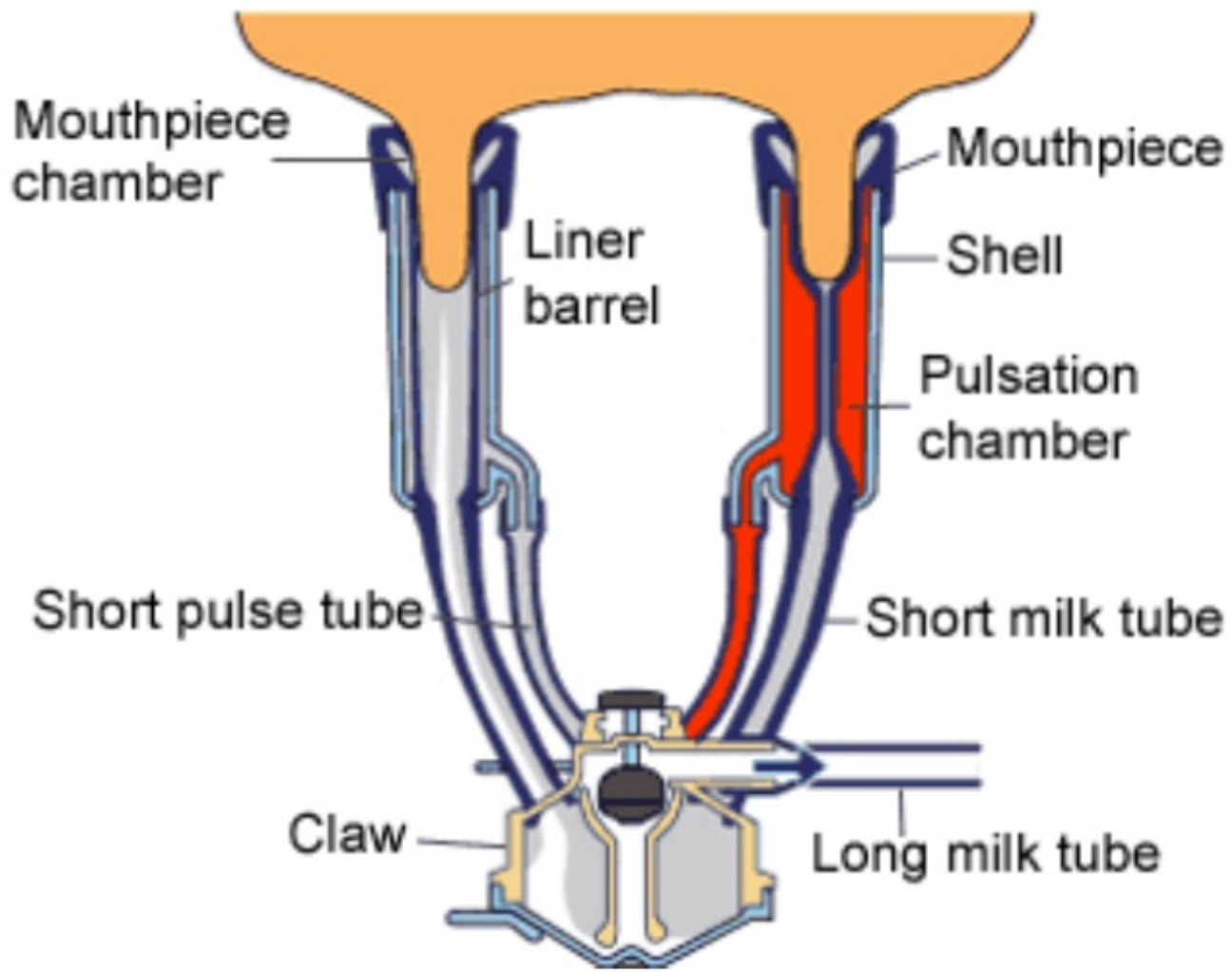


3-1/4 inches or longer

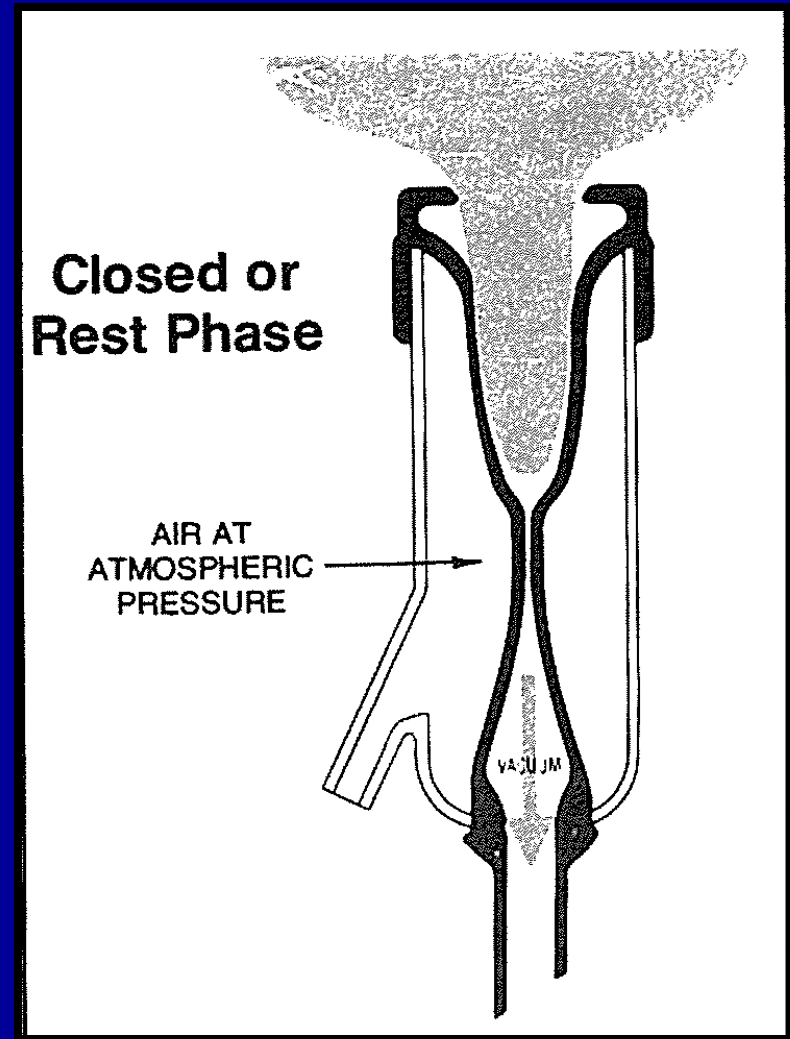
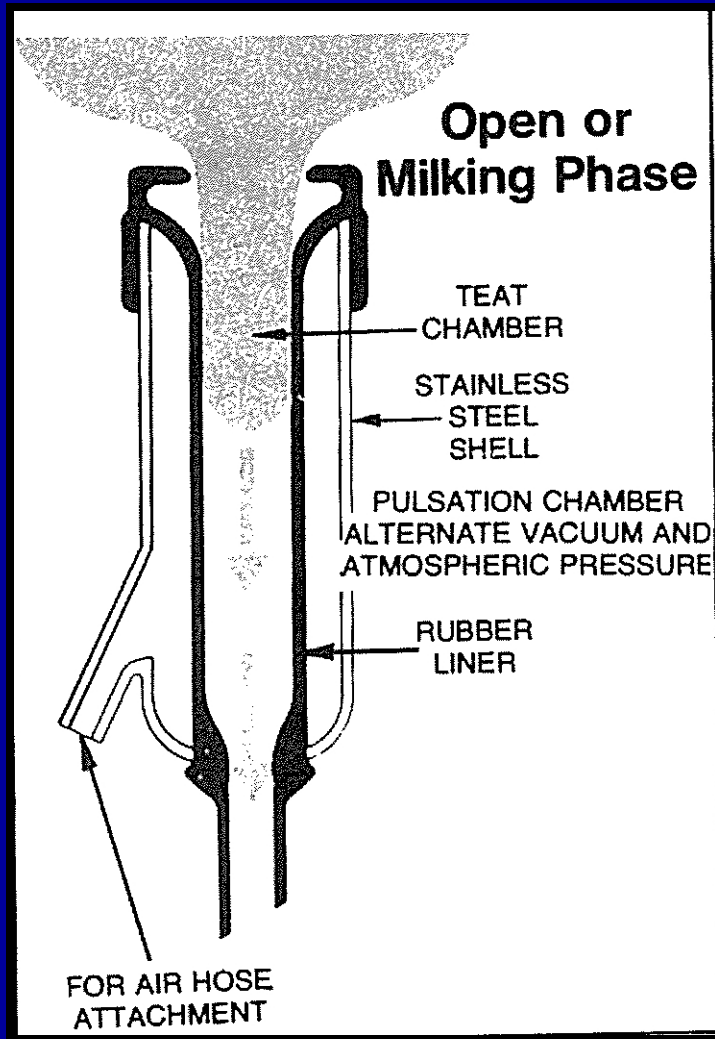




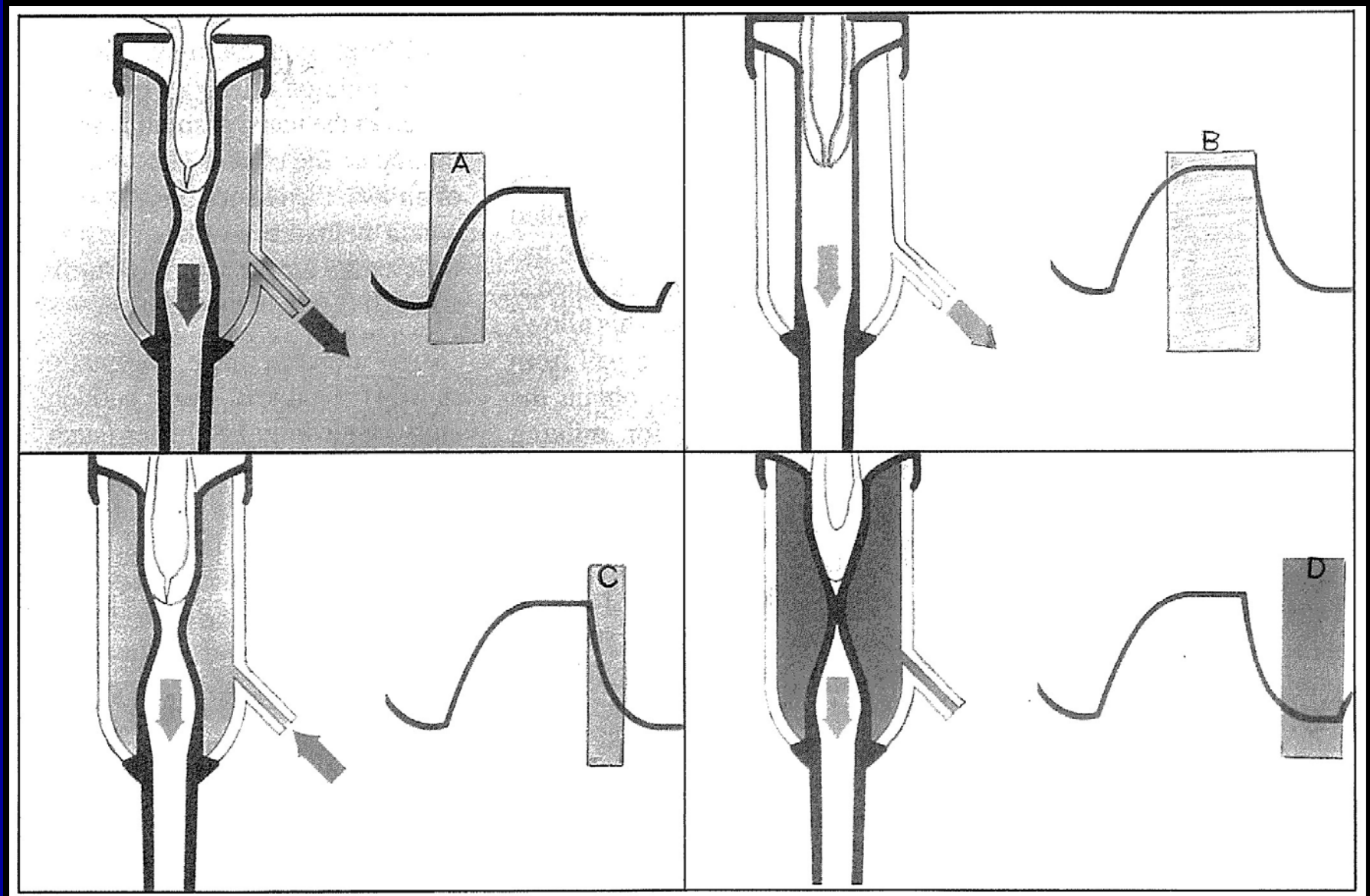


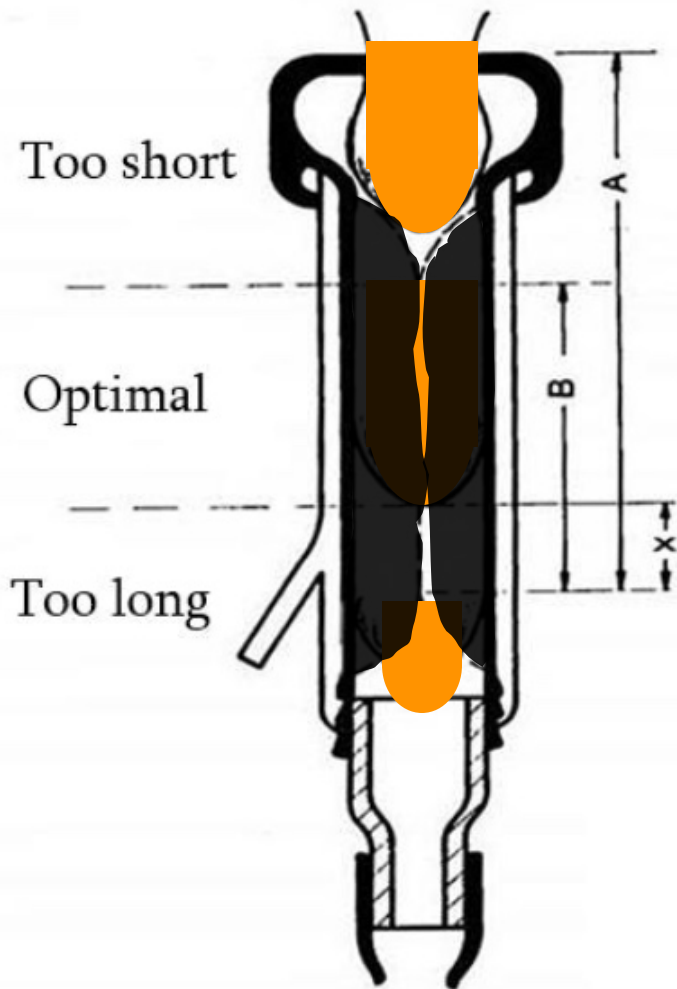


Milking Equipment Function



Milking Equipment Function





A = effective length of the liner

B = effective collapse length

$A - X$ = max. teat penetration for effective pulsation

$A - B$ = min. teat penetration for effective pulsation











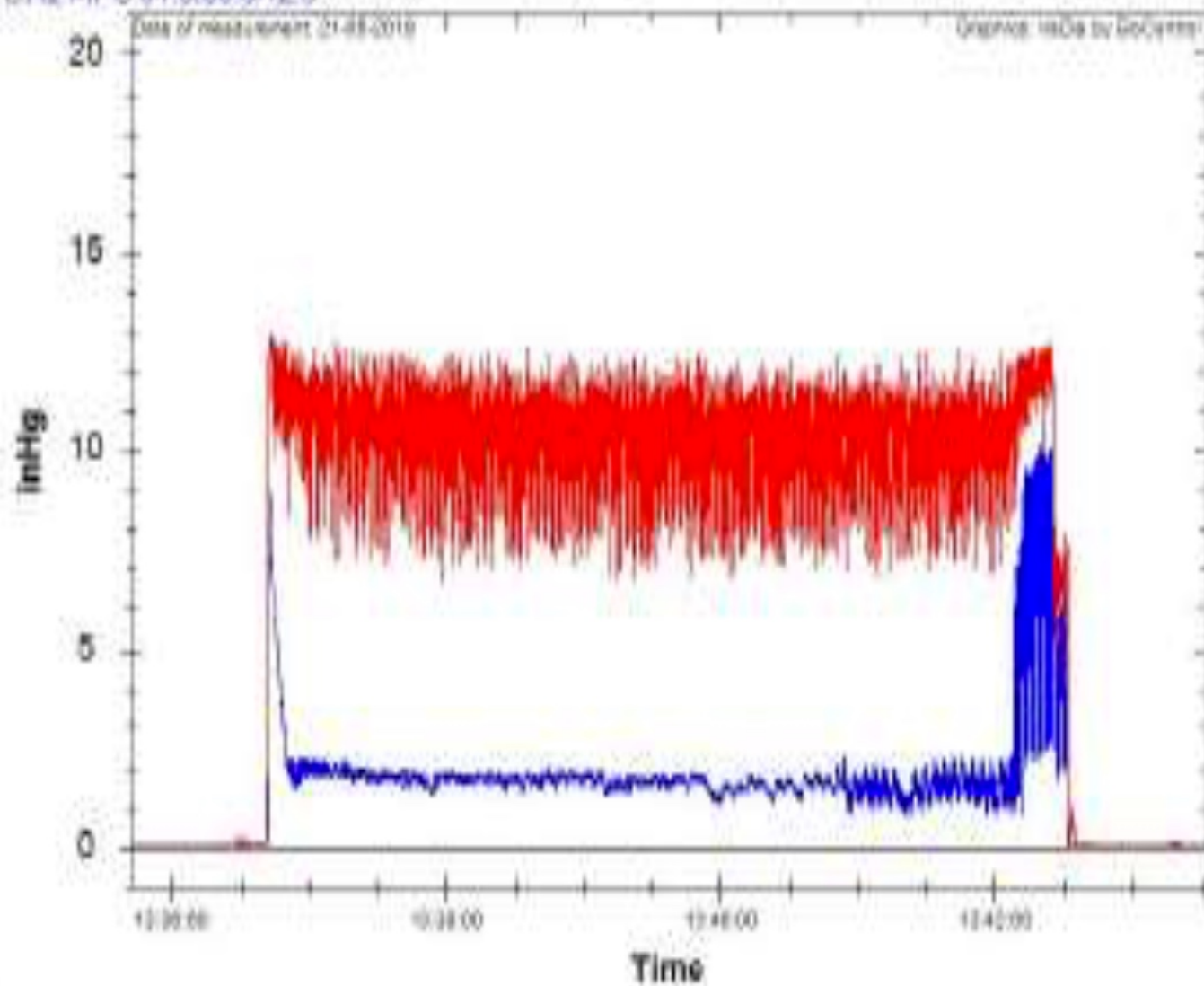




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CH2 MPC 01.500.0/12.3

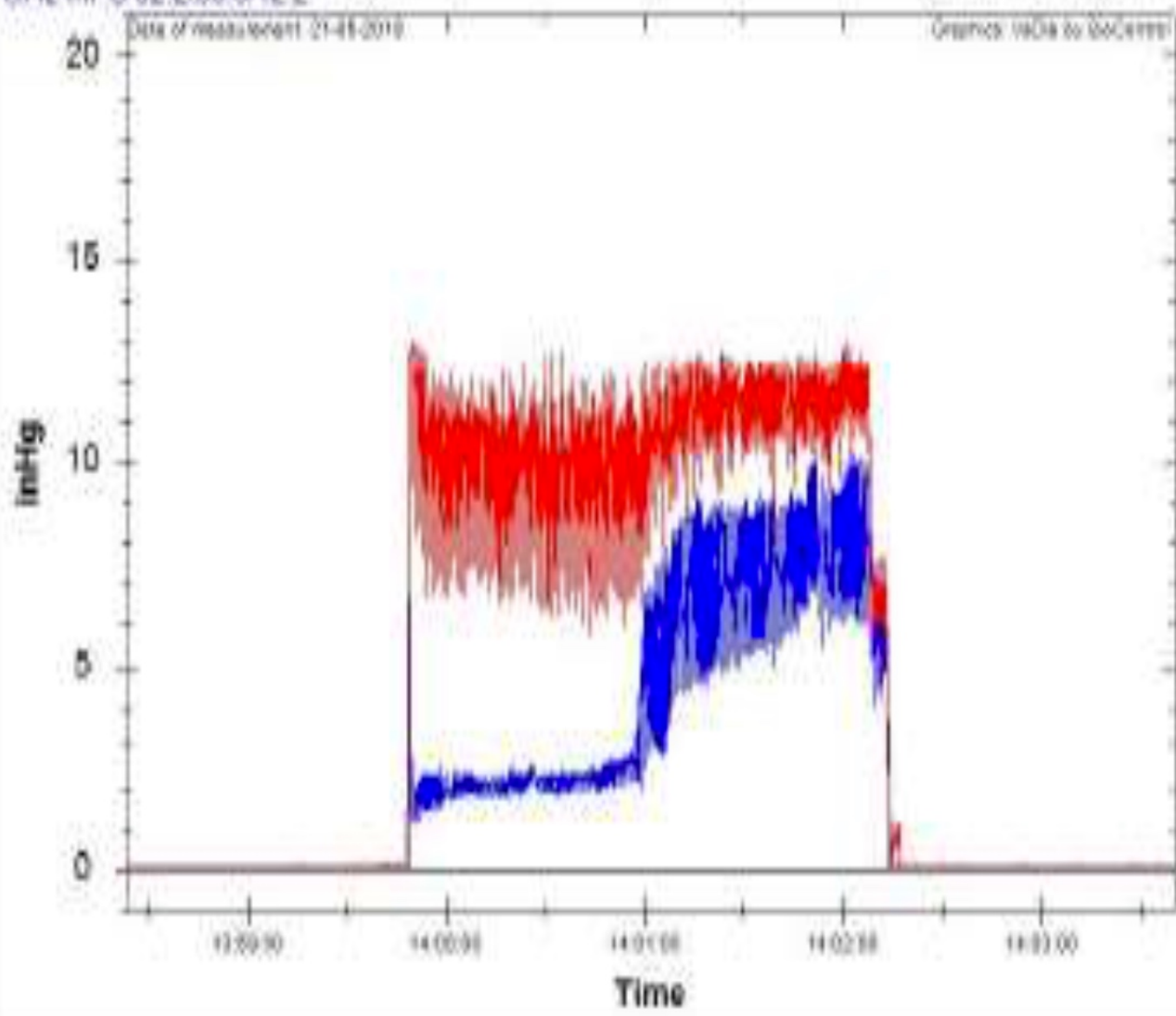
M51.vd5



CH1 SMT 04 0/00 0/13.0

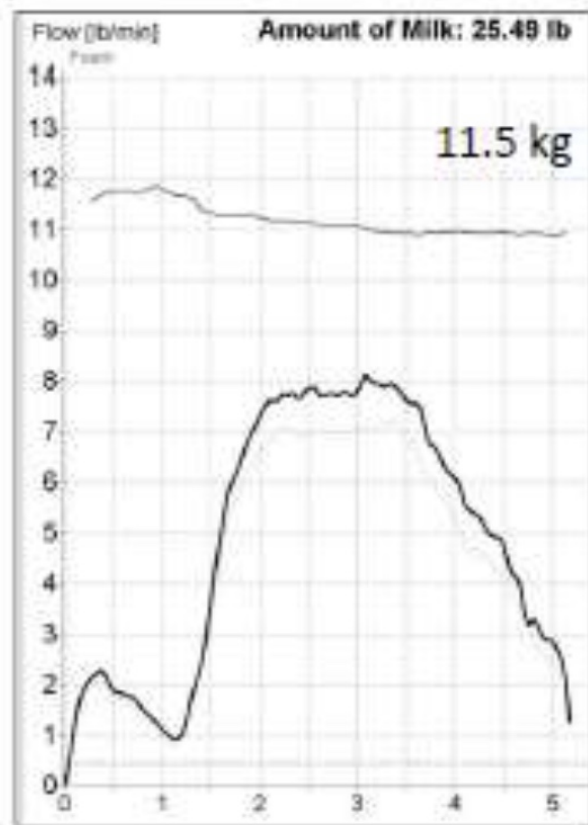
CH2 MPC 02 2/00 0/12.2

MST vd5



Milk Flow Rate Analysis

- Lactocorder[®] graphs provide excellent visuals



- 90 seconds longer to harvest same amount of milk