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Weaning age, feeding program affect calf gain

THE most popular age at which to wean calves in the U.S. was eight weeks, followed by six, seven, 12 or 10 weeks of age, according to the National Animal Health Monitoring System's "Dairy 2007" report.

What does that say about how the weaning age of calves is determined? Either calves count in two-week intervals (except for seven weeks), or it is a management decision. With the advent of automatic milk replacer/milk feeders, more options and different strategies can be followed for weaning calves.

In 2010, I reviewed a study done in British Columbia (Sweeney et al., 2010) and found that a gradual weaning process over a 10-day period resulted in greater or more uniform bodyweight gain before and after weaning than shorter or longer weaning periods when calves were weaned at 41 days of age and fed whole milk.

In a more recent trial (de Passille et al., 2011), 54 female Holstein calves averaging 93 lb. were fed four liters of colostrum within six hours after birth. Within 24 hours of birth, calves were moved into individual sawdust-bedded pens and bottle fed six liters per day of whole milk with free access to water in buckets.

At four to six days of age, calves were moved into sawdust-bedded pens with a partially slatted floor that held a group of up to nine calves. Calves were fed pasteurized waste milk and some pasteurized saleable milk (3.97% fat, 4.10% protein and 3.30% lactose from bulk tank samples) at 104°F. The calves also had free-choice access to a texturized (not identified as to the extent of texture) calf starter with 17.9% crude protein on a dry matter basis.

Two automatic feeders controlled by one computer provided both milk and calf starter and weighed free-choice intakes of both a grass hay (90.8% dry matter, 15.1% crude protein, 51.1%

Bottom Line

with
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neutral detergent fiber and 33.6% acid detergent fiber) and water. Calves were weighed once weekly.

After balancing for birth weight and age, calves were assigned to one of three treatments when moved into group pens. For the low-milk early-weaned (LMEW) treatment, six liters of milk were provided per day until day 38, and then milk allowance was gradually decreased until the completion of weaning on day 47. For the high-milk early-weaned (HMEW) treatment, 12 liters of milk were provided per day until weaning began on day 39, with full weaning on day 47. For the high-milk later-weaning (HMLW) treatment, 12 liters of milk were provided until day 80, with gradual weaning until full weaning on day 89.

Full data were available for 51 calves. Digestible energy intakes were calculated using 1.58 Mcal/lb. for starter, 1.09 Mcal/lb. for hay and 2.54 Mcal/lb. for milk. Statistical analyses were done separately for the periods of days 0-38, days 39-46 for both early-weaned treatments, days 81-88 for the late-weaned treatment, seven days postweaning for all treatments and seven days for the late-weaned treatment.

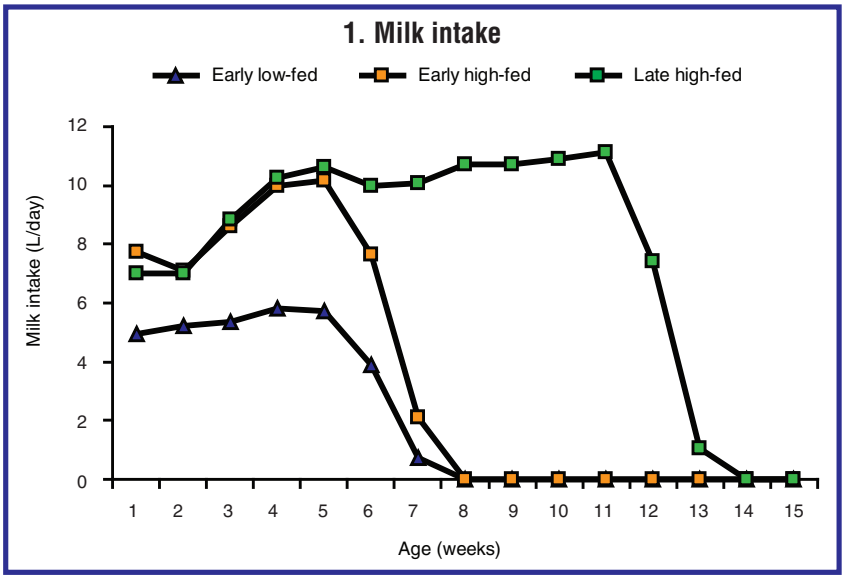
Milk intake was similar for both high-milk feeding treatments for five weeks (Figure 1) but then decreased as the early weaning process began for HMEW. At that point, milk intake was nearly 11 liters per day, which was about double the LMEW treatment. Milk intake on the HMLW treatment continued to be around 11 liters per day until day 80, when that treatment's weaning process began.

Starter intake (Figure 2) was low and similar among all treatments for about the first three to four weeks, after which starter intake in both early-weaning treatments began to increase — more so for the LMEW treatment, which might be expected. After both early-weaned treatments were fully weaned, starter intake increased at a much greater rate until slowing down at 10 weeks.

During the period from six to 10 weeks, LMEW starter intake was greater than HMEW. This also would be expected since less energy from lower milk feeding resulted in more starter intake.

Milk intake was negatively correlated ($r = -0.61$, $P < 0.001$) with starter intake.

The water intake pattern (Figure 3) was nearly identical to the starter intake pattern in a ratio of about 4:1. I have found this ratio in a number of calf trials, indicating how critical water intake is in order for calves to optimize starter



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intake.

Hay intake (Figure 4) was low but similar among treatments and negatively correlated with milk ($r = -0.61$, $P < 0.001$) and water intake ($r = -0.42$, $P = 0.003$), while it had a weak correlation ($r = 0.21$, $P < 0.10$) with starter intake.

The number of daily visits to the milk feeder (Figure 5) was greatest for LMEW calves, most likely reflecting that they wanted to consume more milk. The peak number of visits increased, especially for both HMEW and HMLW treatments when the weaning process began, but dropped rapidly when the weaning process was completed.

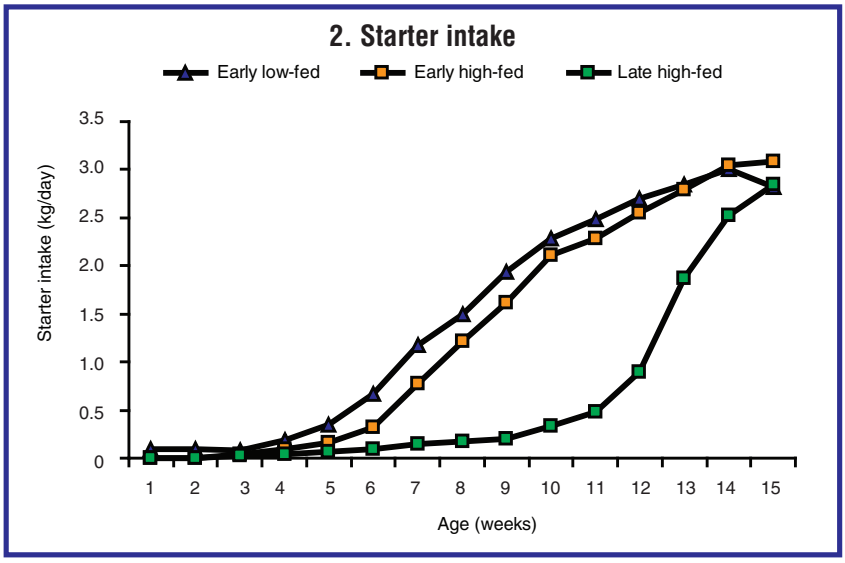
Tabular values for intakes and weight gain were all expressed as a percentage of bodyweight, which made it difficult to make absolute comparisons since calves fed the high milk level averaged 13% more bodyweight than calves fed the low milk level. The most significant value was digestible energy intake for days 10-38, which was 80.7 kcal/kg of bodyweight for calves fed low milk versus 105.2 kcal/kg of bodyweight for calves fed high milk ($P < 0.001$).

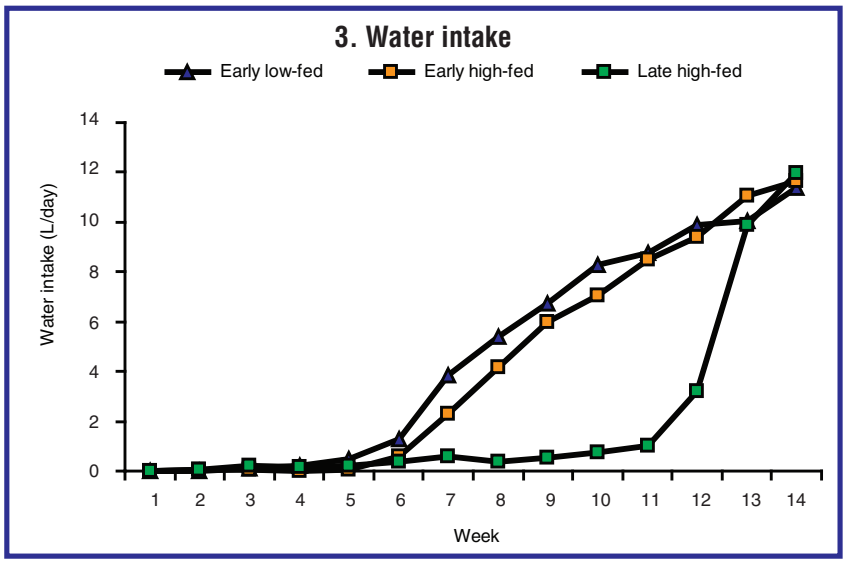
Other key observations were:

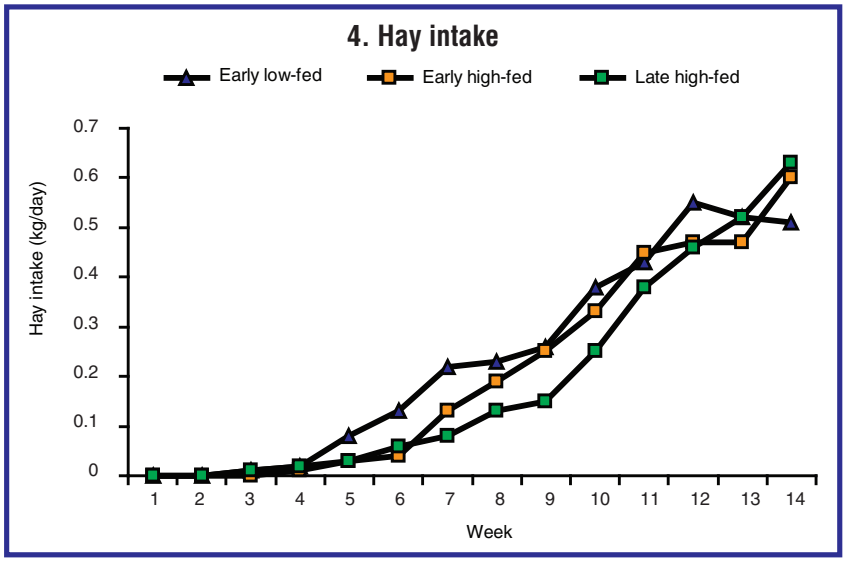
- During their weaning period (days 74-80), HMLW calves drank less milk but ate more starter and hay and had greater digestible energy intakes and weight gain — corrected for bodyweight differences due to age — than HMEW calves (days 36-42).
- HMLW calves had greater intakes of starter, hay, water and digestible energy during the immediate postweaning period (days 80-89) than HMEW calves did during their postweaning period (days 36-42).
- There was considerable variation in bodyweight gain, especially during and after weaning. This might be ameliorated by having individual calf weaning schedules.
- Calves on the LMEW treatment had lower digestible energy intakes than calves fed high milk before weaning, but the latter calves struggled more with lower bodyweight gains and had some weight loss during weaning. The researchers suggested that delaying weaning until 12-13 weeks eliminated this decrease in digestible energy intake, and calves showed fewer signs of hunger in the immediate postweaning period.

I found that the most confounding aspect of this study (though it is not just limited to this study) was the inclusion of hay feeding. The researchers had concerns about feeding hay because it could reduce starter intake. They cited a study by Khan et al. (2010) that found that starter intake was only slightly reduced when hay was also fed, with no association with lower weight gains.

The "Dairy 2007" survey found that on average, U.S. dairies could not wait to feed hay (beginning at around 25 days of age), waited until more than a week of age to begin feeding starter and waited even longer (more than two weeks) to begin feeding water. With a good texturized starter, there is no need to feed hay or any value in doing so until at least weaning or two weeks later if earlier





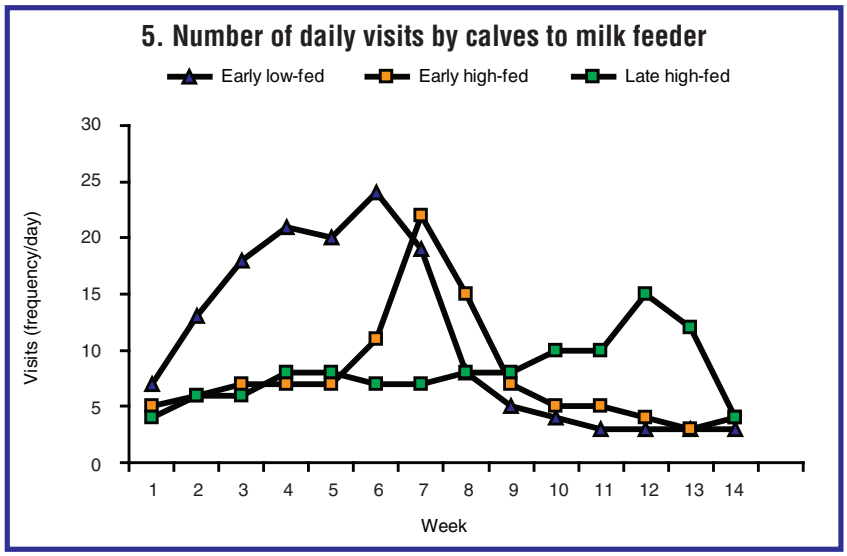


weaning is practiced.

The Bottom Line

Weaning early at 47 days on a low-milk feeding program led to calves compensating by eating more starter and having similar digestible energy intakes compared to early weaning on a high-milk feeding program. Feeding a high milk level and delaying weaning to 84-91 days resulted in greater weight gain at 38 days than low-milk level programs but also resulted in lower weight gains during days 74-80 for both early- and late-weaning high-level milk feeding programs.

Low-level milk feeding and earlier weaning resulted in more signs of hunger than high-level milk feeding. However, that would entail not weaning until 12-13 weeks, although the average U.S. dairy calf weaning age is eight weeks.



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