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Premium horse feed

marstall feeding knowledge

Helping your horse build muscles

What needs to be done to support muscle building in horses? Engage in effective training, aid your horse with proper feeding, train up and watch the effect!

In order to observe a change in the musculature of a horse, it is essential to be aware of some basic facts. The muscles horse owners wish to train are called skeleton muscles. Skeleton muscles are attached to the horse's bones or cartilages. Viewed under a microscope, they are characterized by horizontal stripes – a fact that sets them apart from the cardiac muscles and the smooth muscle tissue found in internal organs like the intestine.

Horses bred for endurance riding or show jumping show differences in their musculature

There is a distinction between horses that is really surprising: Depending on the horse breed, the animals are equipped with smaller or larger proportions of muscles which, in terms of fibre type, are designed either for more speed strength or for a better endurance performance. Horses that are bred for speed strength, e. g. cutting horses or show jumpers, have large amounts of fast-twitch fibres – a type of muscle fibre that contracts quickly, has an average capillary density, generates energy mainly anaerobically, but may switch from anaerobic to aerobic metabolism during prolonged exertion. In terms of endurance, fast-twitch fibres are surpassed by slow-twitch fibres. Slow-twitch fibres are dominant in horses bred for being able to cover great distances or pulling loads. They rely on a rich

supply on oxygenated blood and enable endurance performances to be carried out without little effort. Slow-twitch fibres are dark red and therefore more “colourful” than fast-twitch fibres. The ratio of fast-twitch fibres to slow-twitch fibres within a muscle group is inherited genetically.

Muscle fibres consist of protein

A look through an electron microscope reveals that the muscle fascicles in a horse's body consist of fibrils, which in turn consist of the two proteins myosin and actin that interact perfectly with each other. When a muscle is flexed, it is shortened because the myosin and the actin are pushing over each other. If a muscle is stretched, the proteins push themselves apart again.

Stimulating a horse's muscles

As for humans, for horses the distinction between aerobic and anaerobic exercise applies. Aerobic exercise means that the body generates the energy needed in the working muscles with oxygen. Aerobic exercise hardly causes any fatigue. The body switches to anaerobic energy production when the horse either runs out of breath or needs to run off quickly. Racehorses, for instance, which only have to show full performance for about 1.2 minutes, rely on anaerobic energy production during races, i. e. they produce energy without oxygen. This is more stressful for the metabolism and can only be achieved by the organism for a short period of time.

Repairing cellular damage

Prolonged energy production in the anaerobic range necessitates — in extreme cases — the repairing of cell damage, for example of micro-cracks in the muscle fibres. Here is another example of an effect caused by peak performance: Tests on horses that accomplished strenuous tracks in endurance riding have proven an increased amount of urea in the animals' blood. This finding relates to the fact that rapid tissue degradation took place in order to obtain glucose from protein. The urea produced must be excreted via the kidneys, which is quite stressful for the horse's entire organism.

Building up a horse's back muscles

In general, the stimulation of muscle growth requires a muscle stimulus to be followed by a period of rest. An example: Intensive training is followed by a day of gentle lunging. The next day is spent with easy riding, then intensive training may be commenced once again. During the period of light exercise a lot of things are happening within the horse's body: The blood circulation in the strained muscles is strengthened, cells regenerate and the muscle regions that were put under strain during the extensive training are getting built up, allowing them to respond better to the next training stimulus. Phases of forward and downward riding are particularly helpful for the back muscles.

Supporting muscle building in horses

Horses need quickly available carbohydrates for muscle activity as well as high-quality sources of protein for muscle building. Carbohydrates are contained in hay, grass and cereal-based feeds. Protein sources can either be supplied via natural substances such as brewer's yeast, linseed meal, alfalfa and soy*.

Alternatively, the horse's feed ration may be supplemented more specifically with a product like marstall Amino-Muskel PLUS, which contains amino acids in the pure form. Amino acids are the building blocks of proteins. Supplementing a horse's ration more specifically with proteins means to know for sure how many of the amino acids required by the horse are guaranteed to be absorbed in the small intestine. There are always natural fluctuations in the digestibility of natural substances. Proper absorption, however, can only take place in the small intestine. Manufacturers are not obliged to indicate how much of the raw protein contained in a foodstuff can be absorbed in the small intestine. marstall includes the amount of raw protein with precaecal digestibility = intestine digestion (marked as pvc) in the declaration of ingredients.

Is feeding large amounts of protein harmful?

The fear of feeding their horses too much protein is still anchored in the minds of many horse owners. A short-term oversupply of 200 % hardly ever results in immediate health problems, but the amount of protein contained in a fodder that cannot be absorbed in the small intestine puts an additional strain on the liver and kidneys. When calculating the amount of protein for a feed ration, it is necessary to watch out for the amount of raw protein with precaecal digestibility contained in a fodder, as this type of protein is extremely useful for the horse and no burden to its metabolism.

How much protein per ration is recommended?

For warmblood horses (600 kg), which represent the majority of all riding horses, 365 g of raw protein with precaecal digestibility (pcv) are recommended for maintenance and 481 g when engaged in light work. A young warmblood horse (19th to 24th month) needs a slightly larger amount (405 g), a lactating warmblood a significantly larger amount, e. g. 1000 g on the 30th day of lactation. These quantities are cited from the "Recommendations for energy and nutrient supply of horses" (GfE, 2014).

Starting to train young horses

Especially young horses in basic training, which have yet to build up the specific musculature of riding horses, and lactating mares need plenty of high-quality protein in their feed rations. A product like marstall Amino-Muskel PLUS, an amino-acid concentrate, has the best effect when it is fed within one hour after training. Otherwise, an increased amino acid intake is recommended before an intensive training session.

Scientific studies have shown, among other things, that ...

- the addition of the essential amino acid lysine alone significantly improved the muscle development in young stallions.
- feeding amino acids resulted in decreased protein degradation (proteolysis) in the muscle during treadmill training.
- branched-chain amino acids increase protein synthesis in the resting muscle and promote protein synthesis during the recovery period.

Muscle building takes time

During muscle building, the cells of the muscles change. Contrary to what might be expected, the number of muscle cells does not increase, but the cells increase in size. Studies have shown that, depending on the breed of horse and the riding discipline, it takes at least 10 days before the first adjustments to the training stimuli become visible in the tissue. Even 34 weeks after beginning training, changes could still be observed. That means that in order to build up and strengthen the horse's muscles in an optimal way, consistent training interspersed with periods of rest needs to be carried out over a long period of time.

Conclusion

Riders who wish to support their horse's musculature via systematic training as well as feeding, are advised to ensure that a sufficient amount of raw protein with precaecal digestibility (pcv) is contained in their horse's feed ration.



* marstall is a member of the Verband Lebensmittel ohne Gentechnik e.V.

(VLOG), an organisation that advocates the production of foodstuffs without genetic engineering. The production at marstall's follows the organisation's standards and the products are VLOG-certified.

Sources:

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