

FACTORS AFFECTING BONE HEALTH IN HORSES



Bone is a dynamic tissue that is constantly changing to maximize its strength in the face of changing demands. The basic structure found in bone includes three types of cells and an extracellular matrix, a substance that lies outside the cell and

gives bone its overall strength.

Three cell types:

Osteoblasts - these are the direct formation and

Bone hardening (mineralization);

Osteoclasts - have an opposite function.

Osteoblasts break down or reabsorb bone;

Osteocytes seem to control the level of osteoblasts.

And osteoclast activity - these cells can sense changes in bone load and initiate an appropriate modeling or remodeling response.

Bone modeling is the term given to the growth (longitudinal) and shaping of bones. This process allows the bone to maintain its shape and proportions as it grows. Bone is important as it adapts to increased functional demands such as exercise.

Musculoskeletal injuries are the most common cause of poor performance in horses, so bone health is undoubtedly important for performance. Nutrition and exercise are the leading factors affecting bone health in the literature.



In summary:

- Bone mineral content (a measure of the amount of mineral in a bone) is an important issue
- It is the determinant of bone strength at the developmental stage of an animal's life. Important factors thought to have a significant effect on bone mineral content include exercise and nutrition.
- • Exercise should promote bone modeling, improve skeletal strength, and theoretically reduce the likelihood of exercise-related skeletal injury.
- • In addition to the reduction in the bone mineral content of horses, it has been observed that tying the horses to the stables may also affect the bone strength in the studies carried out. In a study, when one of the 2 separate horse groups that trot and gallop 5 days a week for 8 weeks, one went to the paddock and the other was kept indoors in the barn, it was observed that the bone mineral content of those kept in the barn decreased.
- • Long-term breaks in optional or compulsory exercise will cause a decrease in bone mass and strength. Therefore, the normal increase in bone volume and density is necessary to minimize the risk of excessive stress on the bone.

- Regarding nutrition: Calcium and phosphorus make up 70% of the mineral content of bone, and an adequate amount of these minerals is critical for maintaining bone mineral content and strength. Foals with developing bones are more affected by insufficient calcium or phosphorus or non-optimal ratios of these minerals than adult horses. It has not been shown that supplemental use of calcium (above current recommendations) increases bone mineral density in horses. However, it is clear that adequate intake of calcium is effective in preventing the decrease in bone mineral content during exercise or rest. Therefore, the combination of calcium balance and exercise, which is important in improving bone mineral level, is indisputable. Vitamin D plays a vital role in regulating calcium and phosphorus metabolism and plays an important regulatory role in bone metabolism and strength. In addition, vitamins B6, C and K have been shown to be an integral part of bone health as they participate in the synthesis of matrix components such as collagen and osteocalcin and the formation of collagen crosslinks.



Nutritional intakes of potassium, protein, and lutein have been significantly associated with bone mineral density, and copper deficiency has been shown to reduce collagen cross-linking and decrease mineralization.

Other factors that affect bone health can be growth, sex, aging, genetics, immunity, hormones and cytokines.

In conclusion, studies show that it may be possible, through strategic nutritional manipulations and management practices, to increase or maintain bone mass and maintain bone strength.



AGG HORSE NUTRITION CONSULTANCY

Turkey phone: +90 542 5337576 E-mail: atbeslenmesi@gmail.com

Netherlands phone: +31 625395468 email: aggequinenutrition@gmail.com