EFFECTS OF BILAYER GELATIN/BETA TRICALCIUM PHOSPHATE SPONGES LOADED WITH MESENCHYMAL STEM CELLS, CHONDROCYTES, BMP-2, AND PRP ON OSTEOCHONDRAL DEFECTS OF THE TALUS IN HORSES

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WHAT IS OSTEOCHONDROSIS?

- AKA Osteochondrosis Dessecans
- Failure of complete endochondral ossification during bone growth
- May cause joint inflammation, changes in articular surface, bone chips, bone cysts, etc.
TERMS TO KNOW

- Talus- bone in the hock joint
- PRP- platelet rich plasma
- MSCs- mesenchymal stem cells
- Chondrocytes- cartilage building and maintenance cells
- BMP-2- causes cell differentiation
- Bilayer-gelatin/ beta-tricalcium phosphate sponges- basis for building bone matrix
- QCT- quantitative computed tomography- measures bone mineral density
IMPORTANCE IN EQUINE LAMENESS

- Prevalent throughout the entire industry
- Difficult to treat
  - Steroid Injections
  - Scoping
  - NSAIDS
WHAT IS THE MAIN QUESTION?

- Is bone scaffolding a possible solution to treating osteochondrosis in horses?

- Why bilayer?
  - AC and SB
  - Treat both areas of the joint.
WHAT IS THE HYPOTHESIS?

“This study is aimed to evaluate the efficacy of bilayer scaffolds: a gelatin/ beta-tricalcium sponge loaded with chondrocytes, MSCs, and PRP and a GT sponge loaded with MSCs and BMP-2 for the repair of osteochondral defects of the talus in horses.” (Seo et al.)
What do these radiographs show?

- (A and B)- radiographs of the induced defect after surgery
- (C and D)- radiographs of the defects at 4 months
FIGURE 2

- (A)- appearance of the tarsal defect of test group A (treated) at 4 months after surgery
- (B)- appearance of defect on untreated test group B

- Notice a difference between A and B?
FIGURE 3

AC View

- (A)- appearance of defects at 4 months after surgery from test group A
- (B)- defect at 4 months on test group B

SB View

- (C and D)- defects from test group A and test group B
FIGURE 4

- What does Safranin-O stain for?
  - Positive for cartilage

(A and B) - Safranin-O staining of test group A and test group B shows that test group A has more Safranin-o positive cells

- What is the staining used in C and D for?
  - Type 2 collagen

(C and D) - appearance of defects in test group A and B using immunostaining
RESULTS

- All horses recovered from surgery and completed the study
- Test group showed decrease in tarsal defect severity compared to control group in all assays- Radiographs, Quantitative Computed Analysis, Macroscopic, and Histologic
CONCLUSION AND LIMITATIONS

- Bone scaffolding is a possible treatment for osteochondrosis in horses

- PRP growth factor concentration not measured

- Assumption that left and right hind joint is the same

- Short time period- only 4 months

- Horses euthanized, cannot see the long term effects of bilayer scaffolding
QUESTIONS?
SOURCES

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