Biomechanical study in vitro on the use of self-designed external fixator in diaphyseal III metacarpal fractures in horses

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Abstract

Diaphyseal fractures of the III metacarpal bone represent 22% of all fractures of the long bones in horses. Treatment of such cases is difficult. The most popular solution used in these types of fractures is two plates applied directly to the bone surface, but they are not applicable on contaminated and infected fractures.

External fixators are quite commonly used in human medicine, although in veterinary practice there is no typical stabilizer designed for the treatment of diaphyseal fractures of the III metacarpal bone so far. In this study, an external semicircular fixator of our own design was used and in vitro strength tests were conducted to determine the maximum force which would lead to the destruction of non-fractured bone and fractured bone treated with the stabilizer.

On the basis of the strength tests, we can conclude that the stabilizer can be strong enough to allow the horse to stand up after surgery. It also has many favorable features which make it easy to assemble and to take care of a wound, while being safe enough for the animal at the same time.

Key words: external stabilizer, diaphyseal fractures, III metacarpal bones, bone fractures, equine surgery

Introduction

Diaphyseal fractures of the III metacarpal bone represent 22% of all fractures of the long bones (McClure et al. 1988). If all fractures of the III metatarsal bone are taken into consideration, the number will reach 33% (McClure et al. 1988). Treatment of diaphyseal fractures of the III metacarpal bone in horses is difficult (Auer 2006, Bischofberger et al. 2009, McClure et al. 1988). The main problem is the