**Granting Agency:** National Science Foundation

**Mission:** The mission of the National Science Foundation (NSF) is to promote progress in science through funding research to expand knowledge in science, engineering, and education.

**How my topic matches the mission:** My topic is looking at the way superficial digital flexor tendons heal. This supports the National Science Foundation mission of expanding knowledge in biology.

**Title: The effect of high intensity exercise on superficial digital flexor tendons**

**Abstract:** Superficial digital flexor tendon (SDFT) injuries are common in equine athletes with up to 11% of athletes sustaining these types of injuries which have limited ability to heal, often ending careers. Tendon injuries take a minimum of 6 months to heal with only a 40% chance of returning to the same level (O’Sullivan, 2007). The proposed study will examine the effect of 3 different rehabilitation programs on horses with forelimb tears in the superficial digital flexor. Three experimental groups will include horses living at pasture, horses living in stalls, and horses having pasture and stall time. It is expected that horses having more time moving freely will have faster recovery times.

**Statement of the problem:** Flexor tendons are an important structure for equine athletes, being one of two load bearing tendons used for movement (O’Brien, 2020). SDFT injuries are the most common cause of retirement in equine athletes across all sports (Thorpe, 2010). Between 11-30% of flat racehorses are diagnosed with SDFT injuries, 14% of which are career ending (Tamura, et al., 2018). They have a limited ability to heal properly causing reinjury in up to 80% of cases, often injuring the other leg soon after coming back from their original injury (O’Sullivan, 2007).

**Objective:** The purpose of this study is to examine the effect of different rehabilitation methods on superficial digital flexor tendon integrity.

**Hypothesis:** It is hypothesized that horses with the ability to move more freely at pasture are going to have stronger tendons at the end of the rehabilitation period.

**Methods:**

**Subjects:** Thirty horses with forelimb tears in the superficial digital flexor tendon will be recruited from across the country.

**Design:** Horses will be randomly assigned to three groups. One group will live at pasture for the duration of the study. The second group will spend 10 hours a day in a stall and the remaining 14 hours at pasture. The third group will remain in a stall for 23 hours a day, with 2, 30 minute hand grazing sessions. All groups’ tendons will be ultrasounded every 6 week to track progress.

**Rationale for methods:** An experimental design will allow us to measure the effects of the different rehabilitation programs on tendon strength over time.

**Expected results:** It is expected that horses on stall rest will initially show increased healing, but that those results will slow while the other groups will continue to improve and create stronger tendons.

**Rationale for expected results:** Blood flow is imperative for tendon healing (Fenwick, 2002). While initial rest can help with inflammation, the lack of movement in horses on stall rest will ultimately slow the healing process down and allow other tendons to lose strength, making them more susceptible to injury later on.

**Significance:** Changing the way we rehab tendons can prolong equine athletes careers and overall wellbeing.

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