

Introduction

The main purpose of the stretching and mobility exercises during the warm-up is to prevent injuries that may occur in following high-intensity exercises due to the increase in the elasticity of the muscles and tendons (Herda et al., 2013). These changes, which occur rapidly by exercises and cause a decrease in the stiffness of the muscle and tendons, are caused by the acute effects of stretching exercises such as the thixotropic effect, inhibited or excited neural activities or morphological changes in musculotendinous tissues (Behm, 2018; Haussler, 2009; Ryan et al., 2008). Another outcome of the change in elastic properties of musculotendinous tissues after exercises is an increase in the elasticity and the range of motion (ROM) (LaRoche & Connolly, 2006; McNair & Stanley, 1996; Radford et al., 2006).

Method

In this pilot study, passive stretching and mobility exercises were implemented on a healthy horse. Before and after the implementations, walks and trots were performed for 10-meter distances. The acceleration in the withers and feet during the walk and trot were measured for same number of strides in 3-axes at 100Hz data collection rate using inertial measurement units (IMU). Absolute values were used so that negative and positive values were not cancel out each other. In order to determine the number of steps and to ensure synchronization, the trials were recorded at a capturing rate of 100 frames per second.

Figure 1. Sensor placement on the horse.

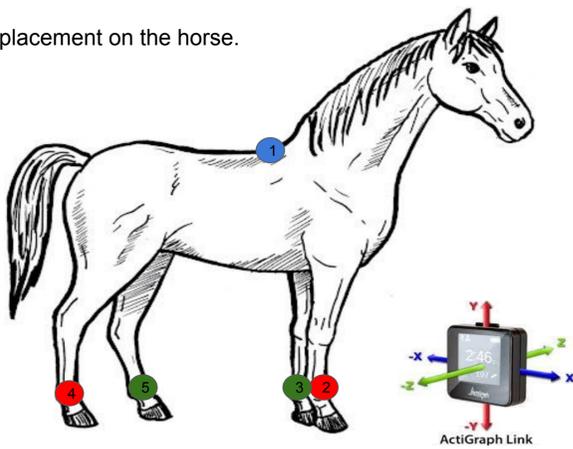


Figure 2. Images from walk, trot trials and implementations.



List of Exercises

Front legs:

Shoulder internal-external rotations, flexion and extension (protraction and retraction).

Rear Legs:

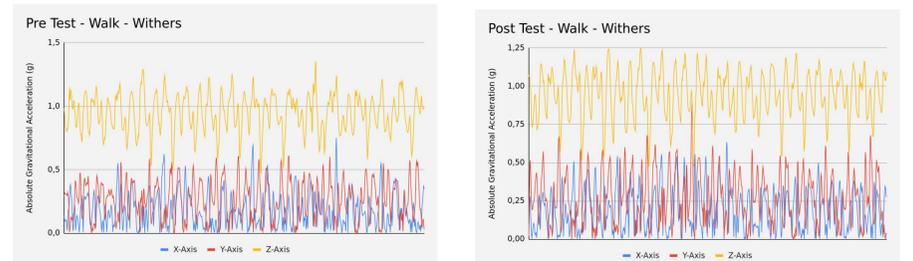
Hip internal-external rotations, flexion and extension (protraction and retraction).

Duration: 2*15 sec for each exercise

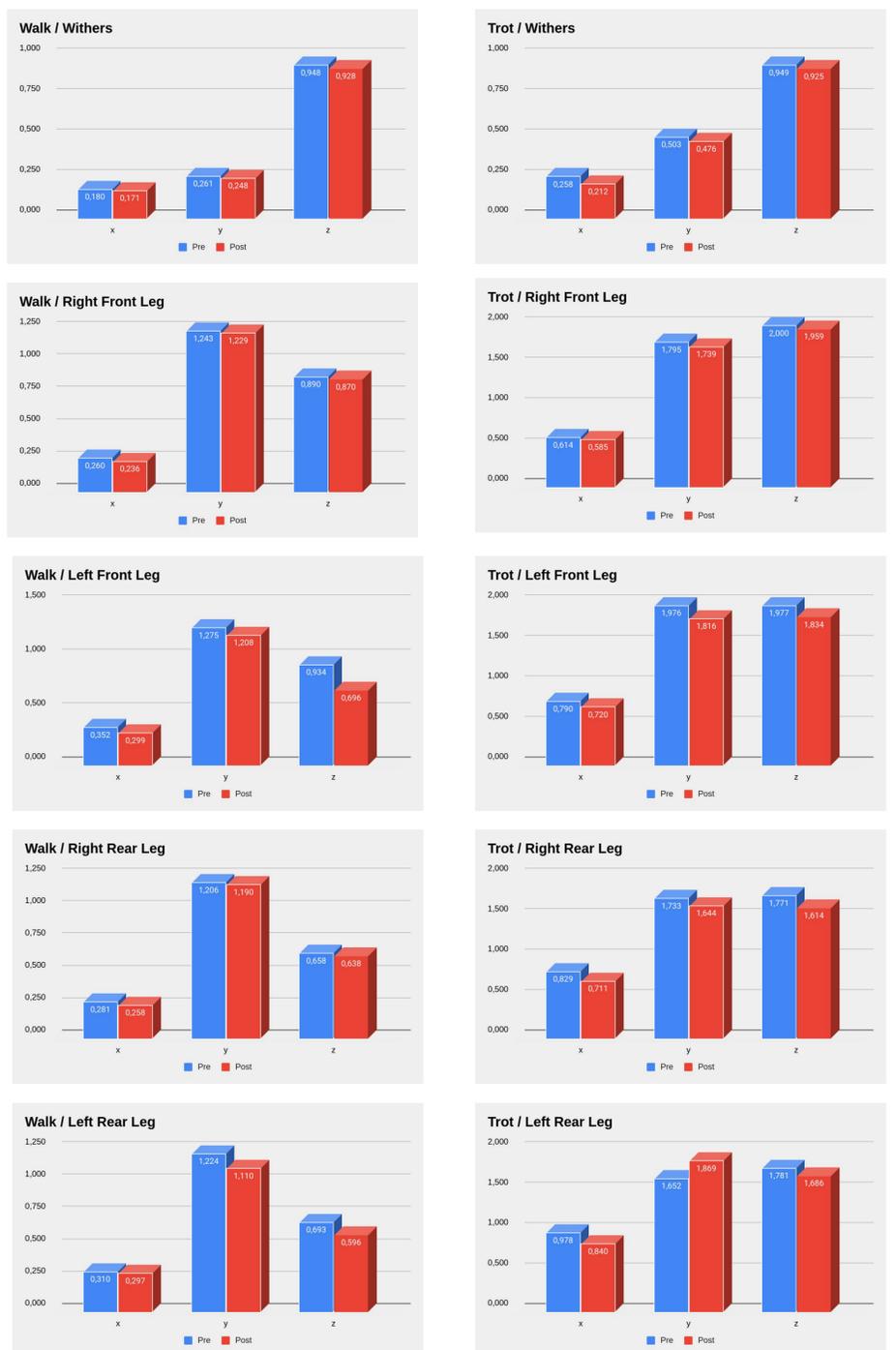
Results

The results showed that the implementation of stretching and mobility exercises caused changes in the horse's walk and trot mechanics. Perhaps the most important of the findings is that the exercises reduced the high-frequency and intense acceleration in all directions in both movements; in other words, they movements smoother were smoother after the exercises.

Figure 3. Row acceleration data recorded by withers' sensor during walking (a sample data).



Figures 4-13. Comparisons of pre and post test acceleration data during walking and trot.



Conclusion

Stretching exercises before the session are important for maintaining the health of the horse, as well as providing the rider or the patient being treated with a less jerky ride. It is thought that this information will be useful, especially in therapies used to eliminate orthopedic problems in the spine.

References

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