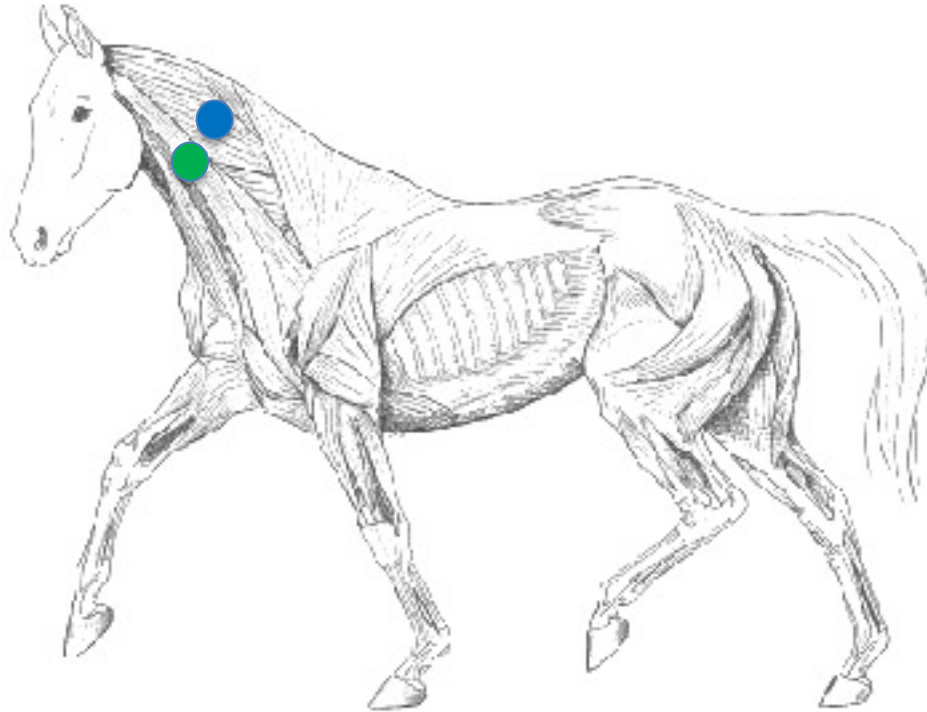




Muscle/Ligament Assessment - Sentio ApS

Date: May 2019

Muscle: *m.Splenius* ■ & *m.Brachiocephalicus* ■



STUDY: A total of 12 Icelandic horses were fitted either with a standard bridle or the Quantum, and then exercised in a training arena at the walk, trot or tölt and canter or fast (tölt/pace). Both *m. Splenius* and *m. Brachiocephalicus* were measured using a CURO unit and assessed in terms of their acoustic myography signal.

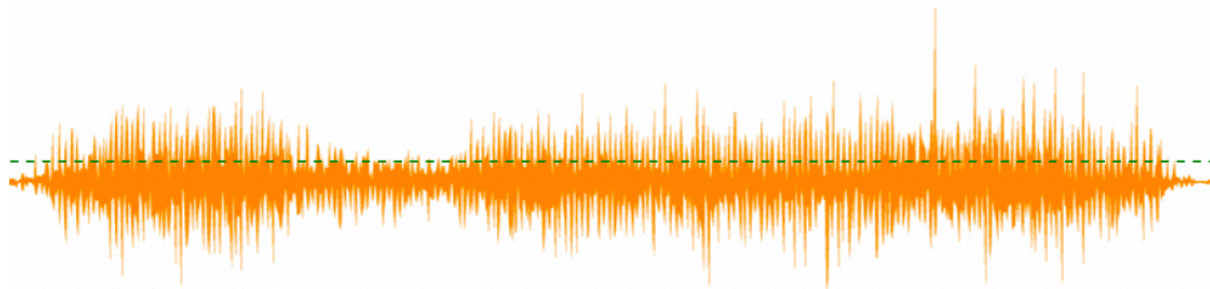
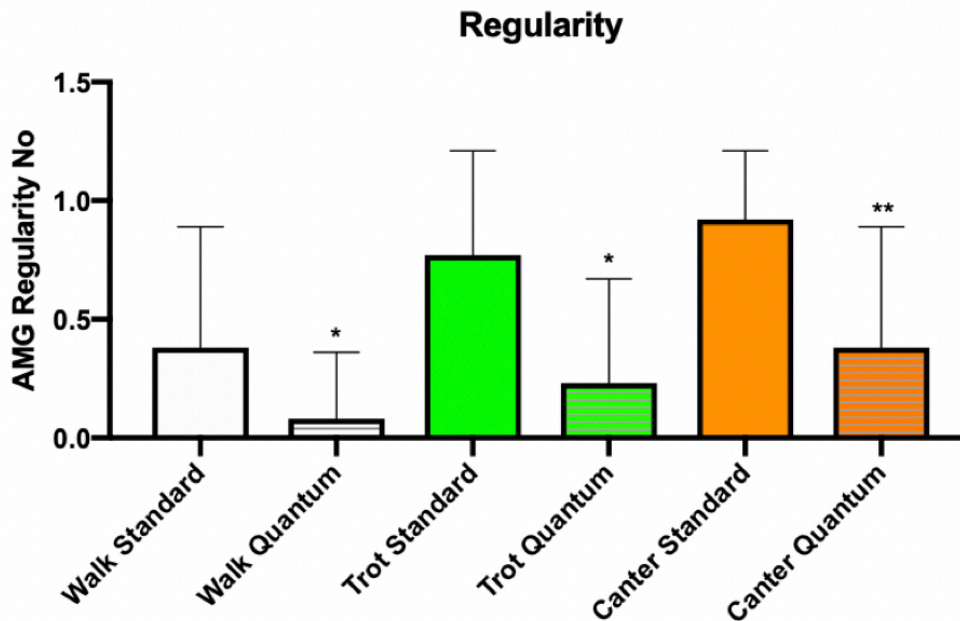
The recorded AMG signals for each muscle were analyzed for their regularity at each gait, and for the number of spikes that occurred with each gait for both the standard and Quantum bridles. Regularity reveals the ability of the horse to perform each gait with a consistent and stable use of its muscles, thus an irregular signal is one where a muscle is used more intensely and then less intensely during a period of physical activity. Spikes were noted as being AMG signals of high amplitude and of short duration, representing a sudden and powerful muscle contraction associated with discomfort and or pain in a muscle.

The measurements involving the standard bridle and the Quantum were randomized, the same rider was used to perform the training routine, and all measurements were made under the same conditions over the period of 1 day.

The results are shown on the subsequent pages in graphic form alongside any statistical significance, where the Quantum is compared with the standard bridle. P-values of 0.05 (*), 0.01 (**), and 0.001 (***) are denoted on the graphs.



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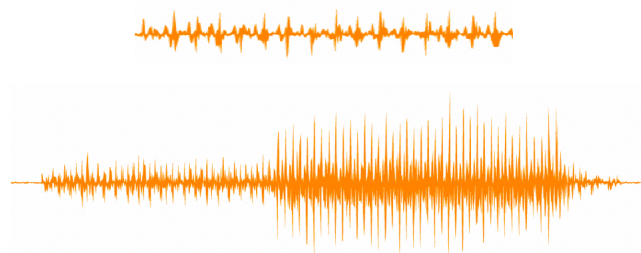


An irregular recording

The Quantum was found to result in a significantly more regular muscle pattern for both muscles and for all (3-5) gaits compared with the standard bridle – the difference at the canter was especially significant.

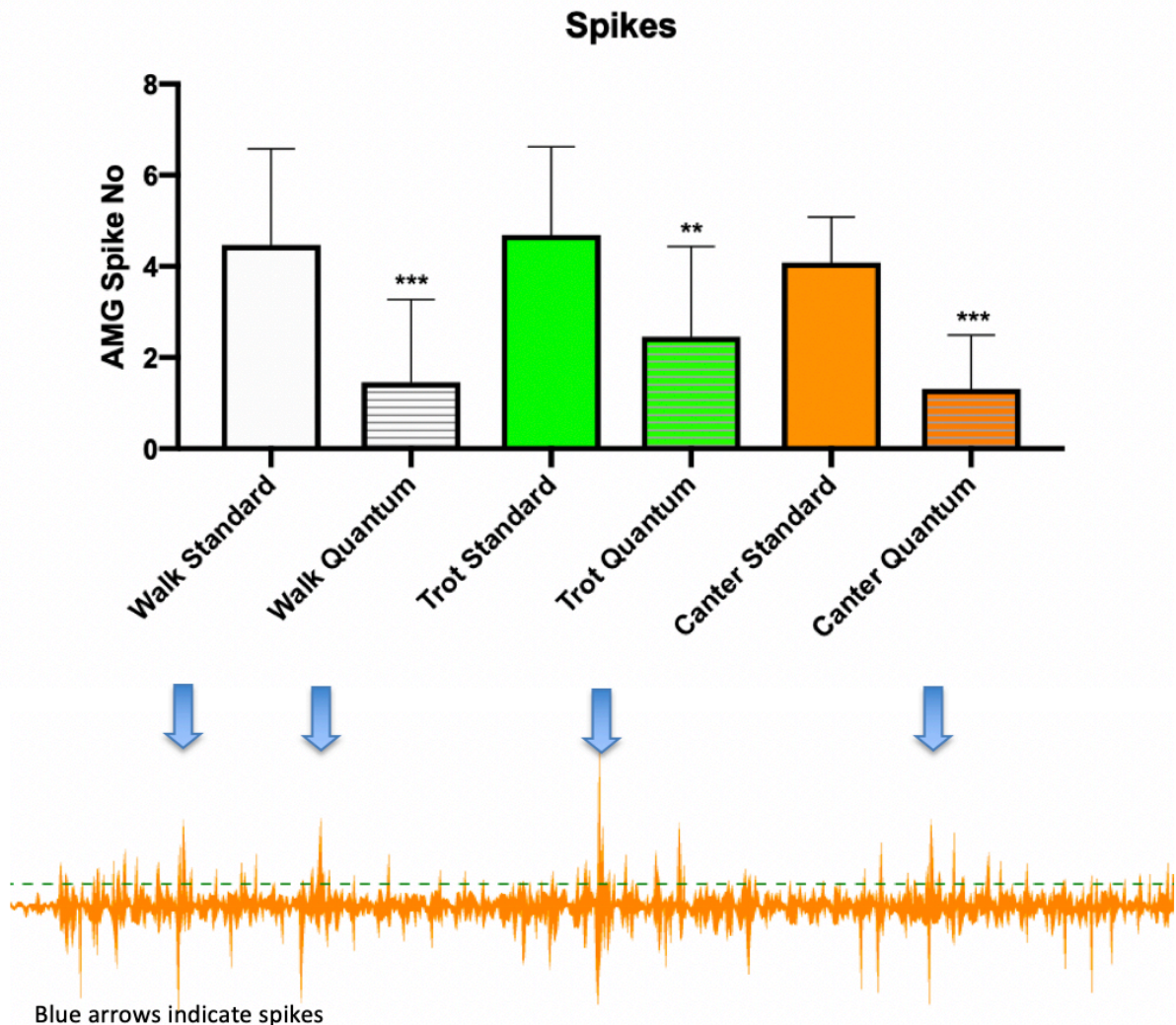
It was also observed that the Quantum resulted not only in regular patterns of muscle activity, but also a faster turn of speed for the gaits measured compared with the standard bridle.

Regular muscle activity is essential when competing for dressage or other equine sports competitions, where sudden changes in posture, range of motion or direction may contribute to a low score. An example of regular muscle activity and a transition from one gait to another is shown below.



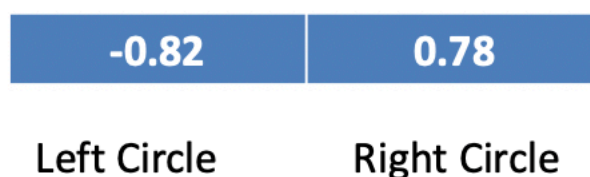


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The Quantum was found to induce significantly fewer spikes for both muscles and for all (3-5) gaits compared with the standard bridle – most of these differences were highly significant.

In addition, the balance between the use of the left- and right-sides of the neck muscle Splenius was assessed using the AMG software, and this revealed that lateral flexion of the neck muscle was not only significantly better than that with the standard bridle, it was also very even. The data show more or less the same degree of muscle activity for a left-hand circle as for a right-hand circle. Note the balance score of -0.82 for the left-hand circle and +0.78 for the right-hand circle, which indicates that the Quantum bridle is allowing the horse to use its head as a counter balance in canter.





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SUMMARY: An overall assessment of the Quantum, using acoustic myography recordings, reveals that horses not only exhibit a much more regular muscle activity during periods of physical activity, but that their muscle contractions are also associated with fewer sudden uncomfortable/painful muscle reactions, and that their muscle use is highly balanced – all compared with a standard bridle.

This study was undertaken by Veterinary Students Emilie Gertz (emilie_gertz@live.dk) and Katia Gebara (kg_p@outlook.dk), in collaboration with Dr. Adrian Harrison (D.Phil. cantab) from the Faculty of Health & Medical Sciences, Copenhagen University.