Quintic Biomechanics Research

FRONTLEGS:

Stride

Stride length is the distance measured from the last point of contact of the hoof with the ground until the first point of contact of the hoof with the ground.

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meters	average
without ConCord	1,55
with ConCord	1,74

Conclusion: The stride length with the ConCord leader is longer than without the ConCord leader.

Standtime

The standtime is the time that the leg is on the ground. This is measured from the first point of contact of the hoof with the ground until the last point of contact of the hoof with the ground..

seconds	average
Without ConCord	0,898
With ConCord	0,815

Conclusion: There is no significant difference between the standtime of the frontleg with or without the ConCord leader.

Protraction angle

The protraction angle measured when the horse places his leg furthest forward.

degrees	Trail 1	Trail 2	Trail 3	average
Without ConCord	22,92	23,16	21,67	**22,50**
With ConCord	23,20	23,67	25,28	**24,05**

Conclusion: With the ConCord leader the frontleg moved forward more than without the ConCord leader.

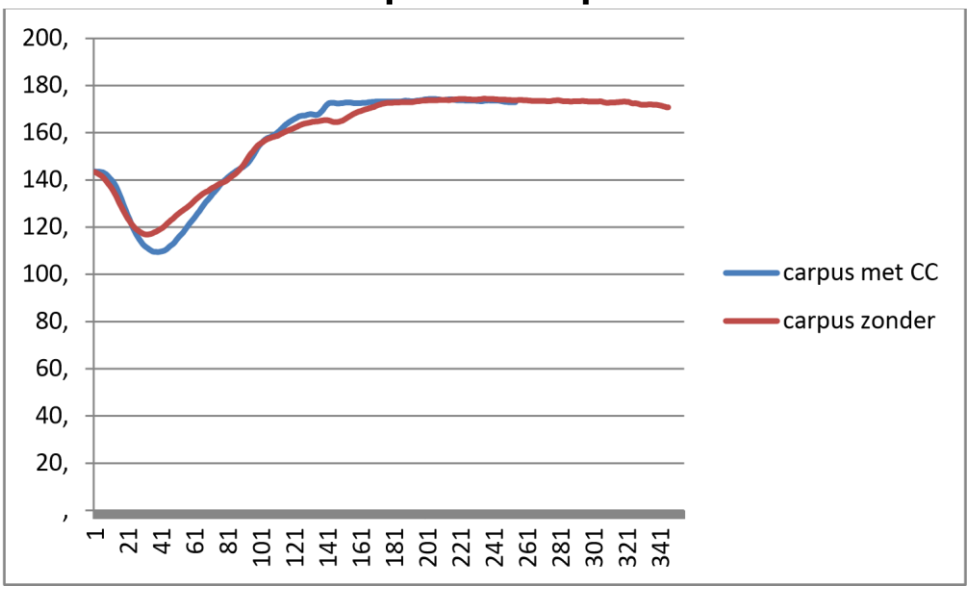
Retraction angle

The retraction angle is measured at the moment when the horse has its leg the furthest back.

degrees	Trial 1	Trial 2	Trial 3	gemiddeld
Without ConCord	12,67	17,41	14,65	**14,91**
With ConCord	20,89	19,62	19,98	**20,16**

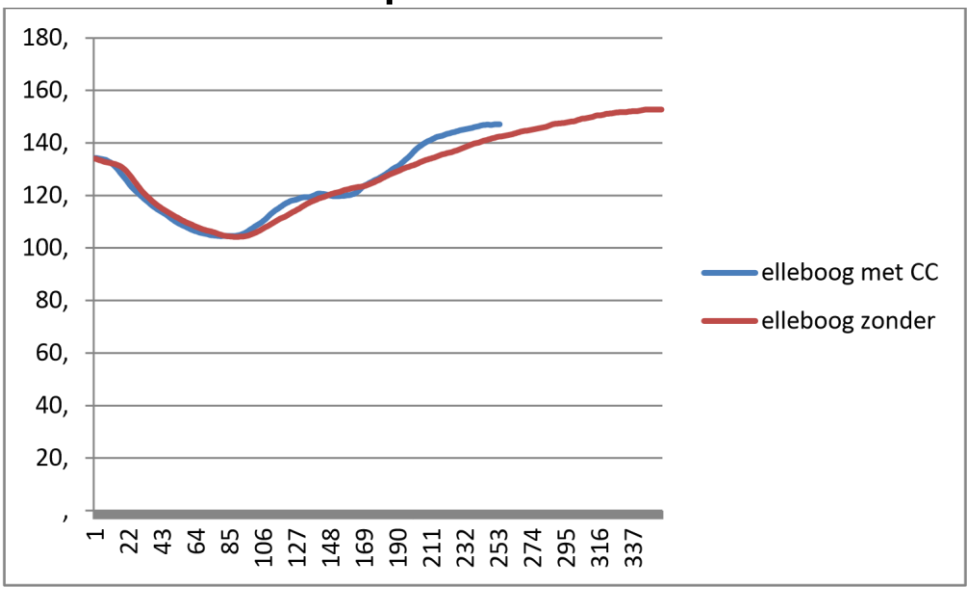
Conclusion: The foreleg is stretched back further with the ConCord Leader, than without.

Result movement amplitude Carpus



Conclusion: With the ConCord Leader, the carpal joint can be bend further unloaded and during training can sooner be fully loaded.

Result movement amplitde elbow



Conclusion: There is no significant difference in the amplitude of the elbow joint with or without using the ConCord Leader.

Hind Legs

Stride

The stride is the distance measured between the last and the first moment of contact of the hoof with the ground.

meters	gemiddeld
Without ConCord	**1,5**
With ConCord	**1,8**

Conclusion: The stride of the hind legs is longer with the ConCord Leader

Standing time

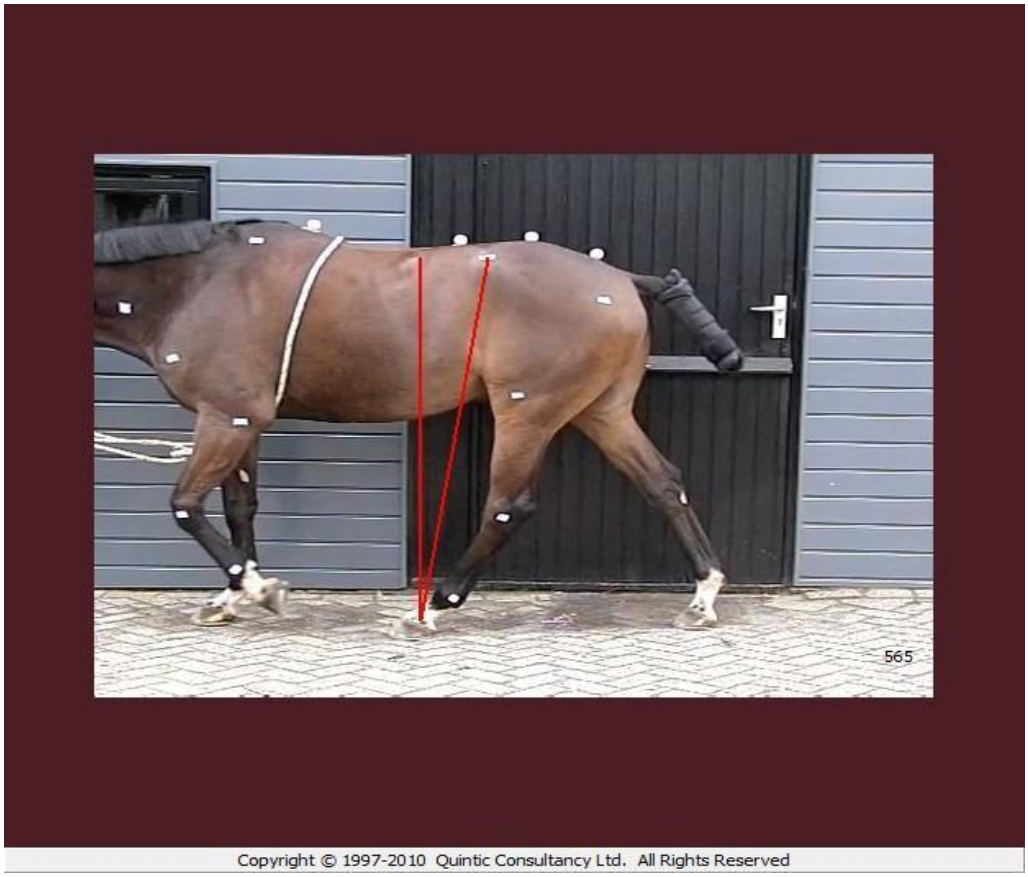
The standing time is the amount of time that the leg touches the ground. This is measured from the first moment of contact of the hoof with the ground until the last moment of contact with the ground.

seconds	gemiddeld
Without ConCord	**0,9**
With ConCord	**0,8**

Conclusion: There is no significant difference in standing time of the hind legs with or without using the ConCord Leader.

Protraction angle

The protraction angle is measured at the moment that the horse places his leg furthest forward.

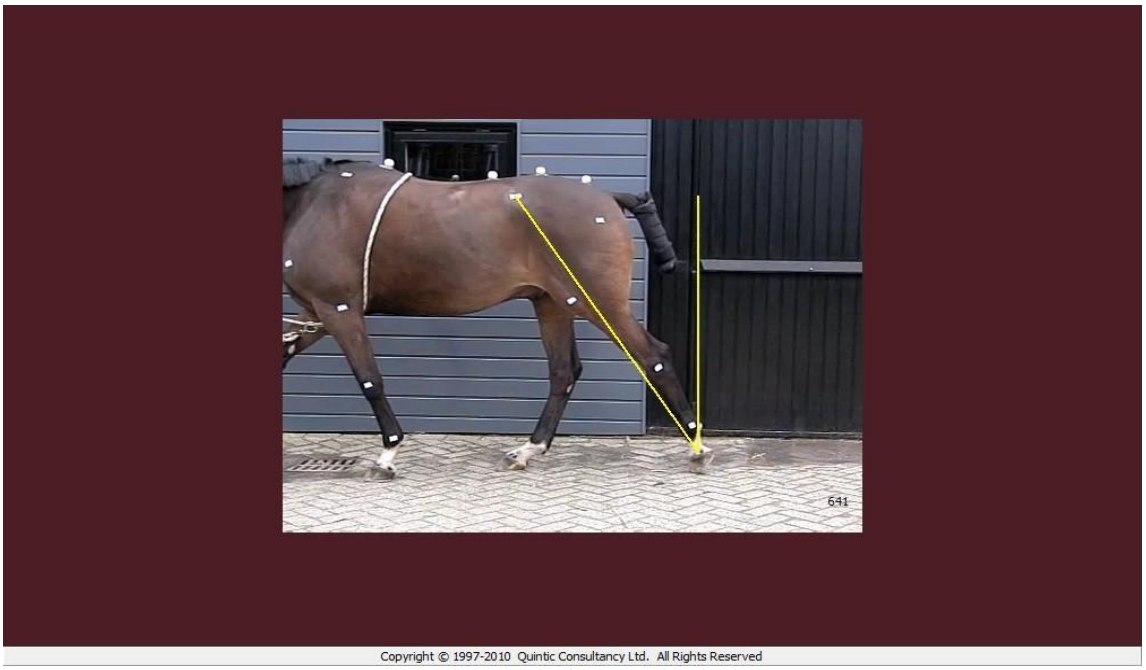


Degrees	Trial 1	Trial 2	Trial 3	gemiddeld
Without ConCord	10,14	9,29	7,22	**8,88**
With ConCord	11,59	13,69	13,10	**12,79**

Conclusion: The hind leg is placed further forward with the ConCord Leader than without.

Retraction angle

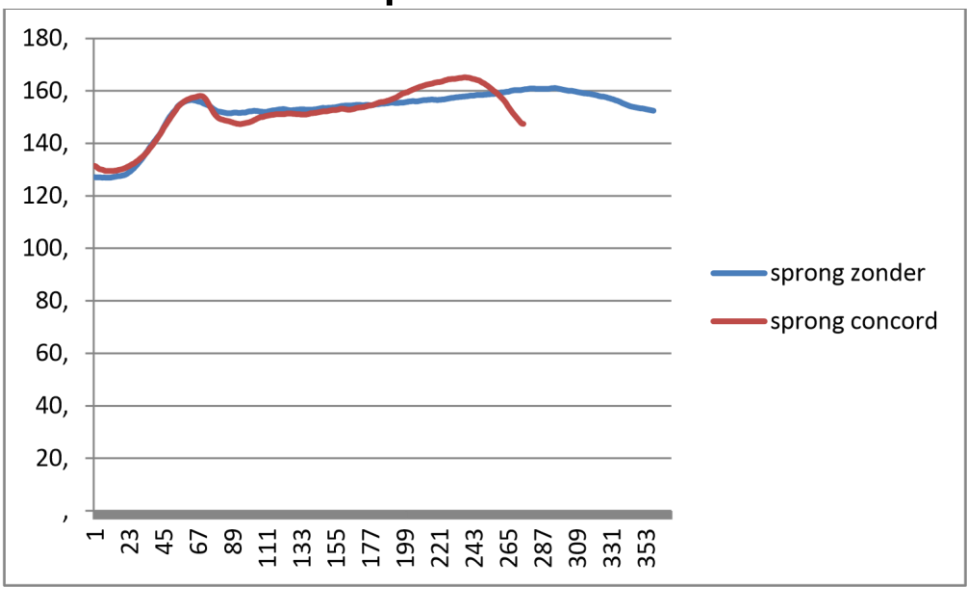
The retraction angle is measured at the moment when the horse has his leg the furthest back.



Degrees	Trial 1	Trial 2	Trial 3	gemiddeld
Without ConCor	28,21	27,26	29,36	**28,27**
With ConCord	33,41	32,57	29,81	**31,93**

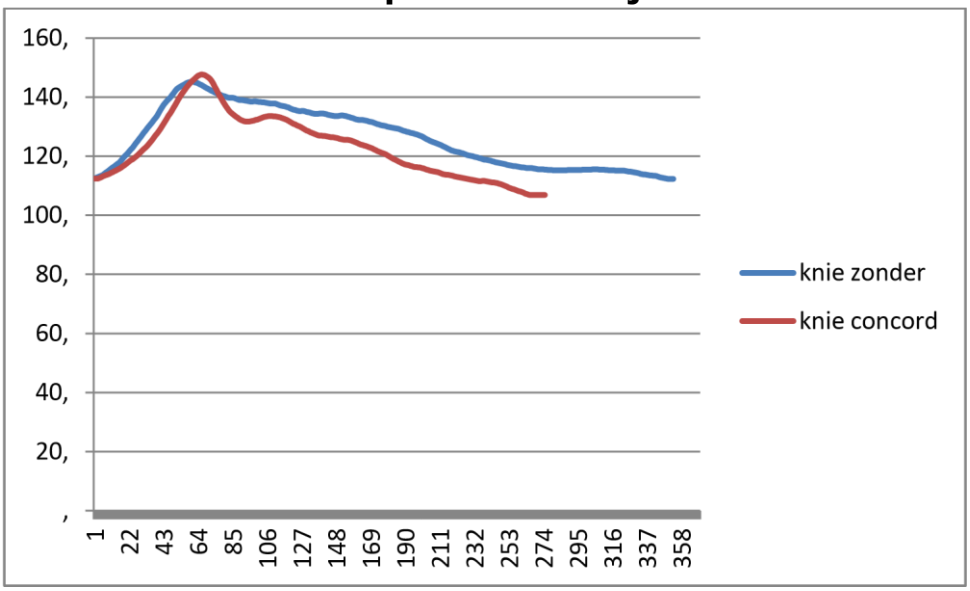
Conclusion: The hind leg stays on its place, while stretched back furthest with the ConCord Leader, than without.

Result movement amplitude hock



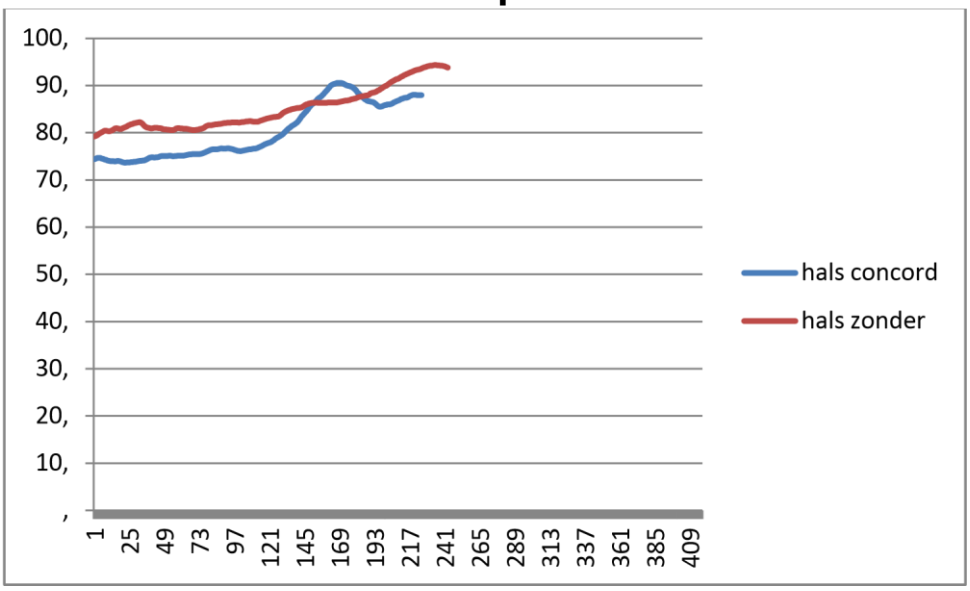
Above graph shows that there is no difference in the motion of the hock with our without the ConCord Leader.

Result movement amplitude knee joints



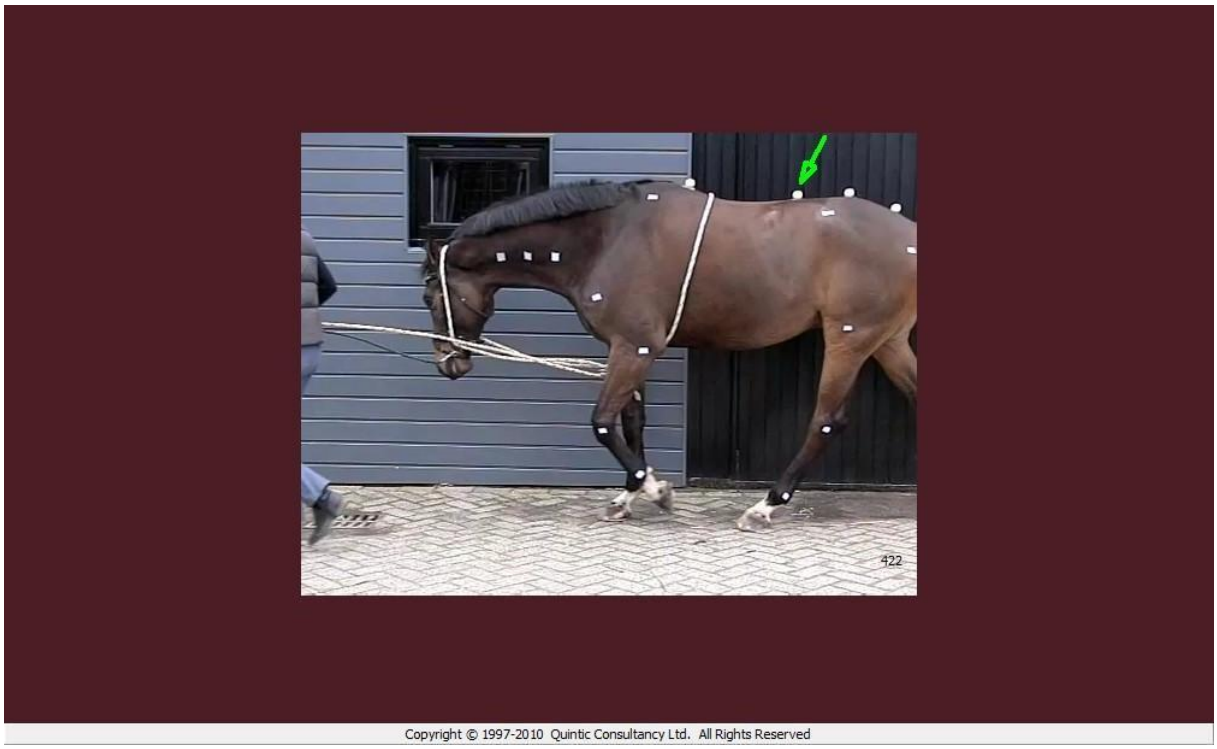
Above graph show that the knee joint can be further bend with the ConCord Leader than without.

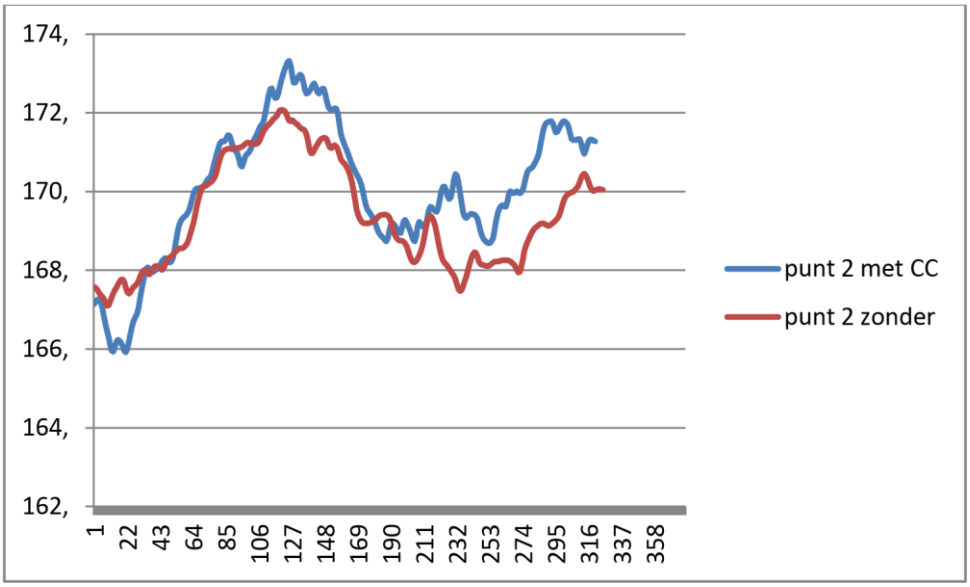
Result movement cervical spine



Conclusion: The horse holds his neck lower with the ConCord Leader than without.

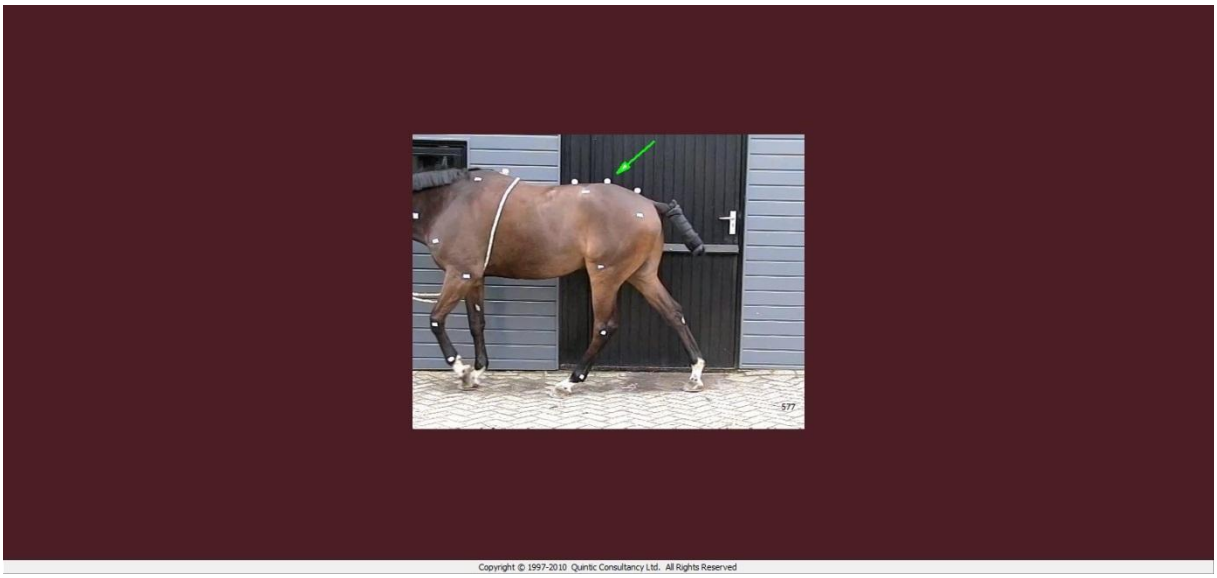
Result movement amplitude lumbar spine

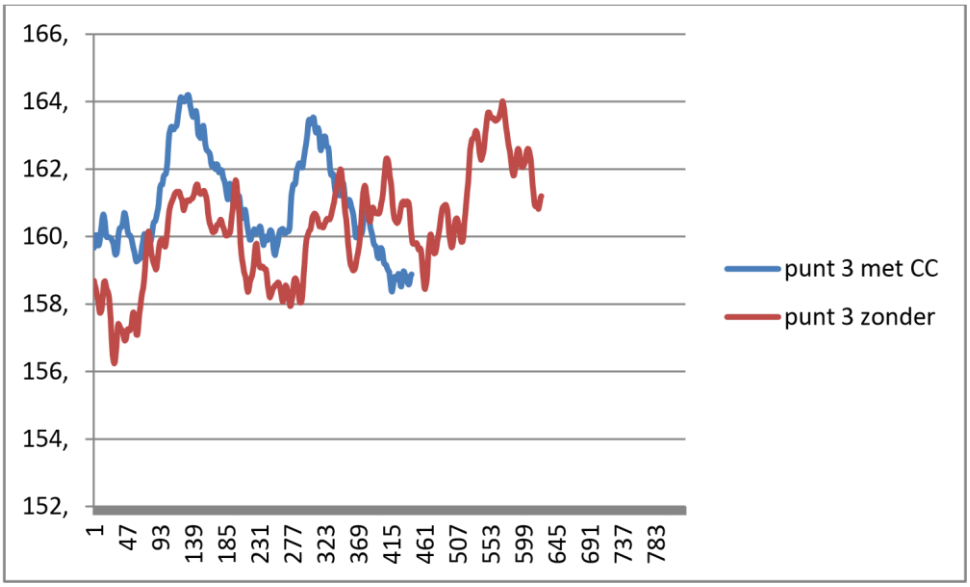




Conclusion: The movement amplitude of the lumbar spine is larger with the ConCord Leader.

Result movement amplitude lumbosacral transition





Conclusion: The horse drops further down in the area of the lumbosacral transition with the ConCord Leader, than without.

CONCLUSI0N

These differences are measured during walking the horse with and without using the ConCord Leader.

With the ConCord Leader:

- **the horse has a longer stride with both his fore and hind legs.**
- **there is no significant difference in standing time with the fore and hind legs**
- **there is an increased protraction and retraction angle with both fore and hind legs.**
- **the elbow joints and the knee joint are bend more unloaded.**
- **the horse holds his neck in a lower position**
- **there is more motion in the lumbar spine**
- **the lumbosacral transition area drops further down**