

Development of a device for retaining good posture of elderly people

**Rika MIURA,^{1,3} M. KAWABE,¹ A. KOJIMA¹, N. ESASHI,¹
A. MITANI Ph.D.², N. KATO Ph.D.³, Y. NAKAJIMA Ph.D.⁴,
T. TANAKA Ph.D.^{3,5}**

1: Non-Profit Organization Piskari

2: Sapporo City University

3: Physical Therapy, Graduate School of Health Sciences,
Hokkaido University of Science

4: Hokkaido Research Organization

5: The University of Tokyo

Efforts content

Outsourcing of Therapeutic riding from Urakawa Town

Children with disabilities



Subjects :

- Down Syndrome
- Cerebral Palsy
- Autism Spectrum Disorders etc...

Elderly for preventive care



Subjects :

- Average age 80 or older
- Living in the town
- Not receiving nursing care certification

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Introduction ~Posture while riding~

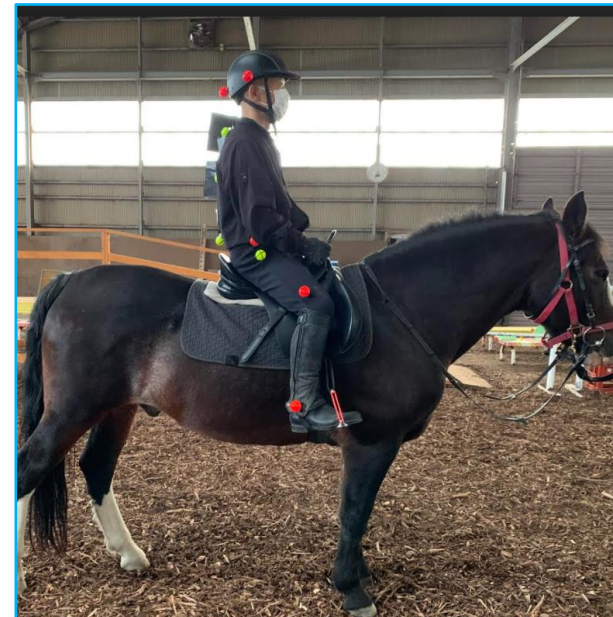


**Elderly people
resulting
in **unstable postural
balance** due to
increased trunk sway
and not to maintain
continuously.**

Methods

Subjects

- The 4 early-stage elderly (2 males and 2 females)
Average age : **68.8 ± 2.2** years old
- ADL (activities of daily living) : Independent
- Horseback riding skills : **Able to drive alone or canter**

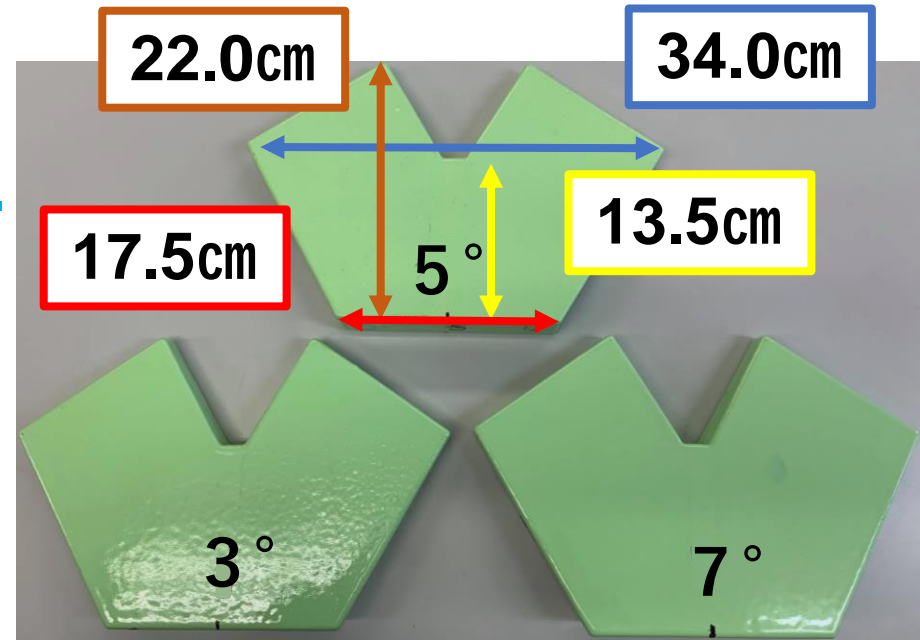
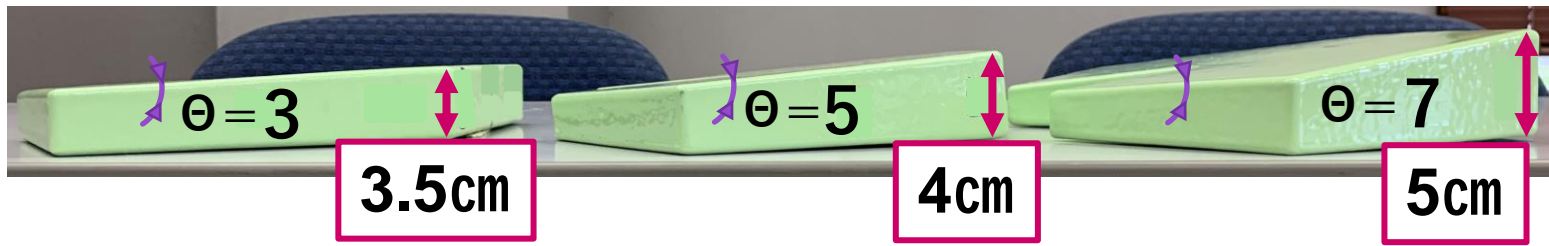


Methods

The device

3 **wedge** angles: 3°, 5°, and 7°.

Made by urethane



Ethical considerations

This study was conducted after obtaining approval from the University of Tokyo's Ethical Review Expert Committee.
(Examination number 20-209).

Methods

The external occipital protuberance

Directly above the earlobes

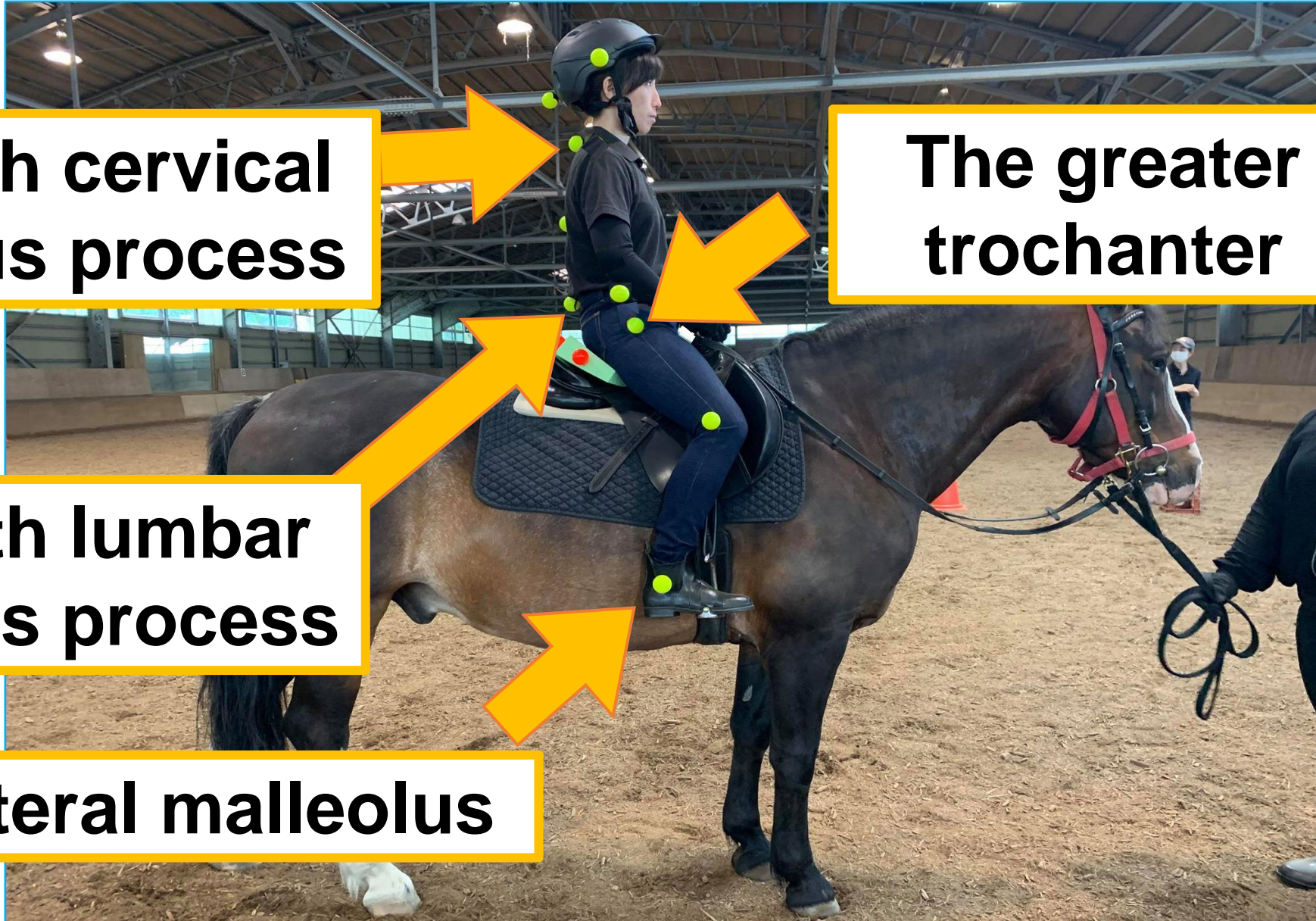
The iliac crest

The 7th thoracic spinous process

The lateral epicondyle of the femur



Methods



**The 7th cervical
spinous process**

**The greater
trochanter**

**The 4th lumbar
spinous process**

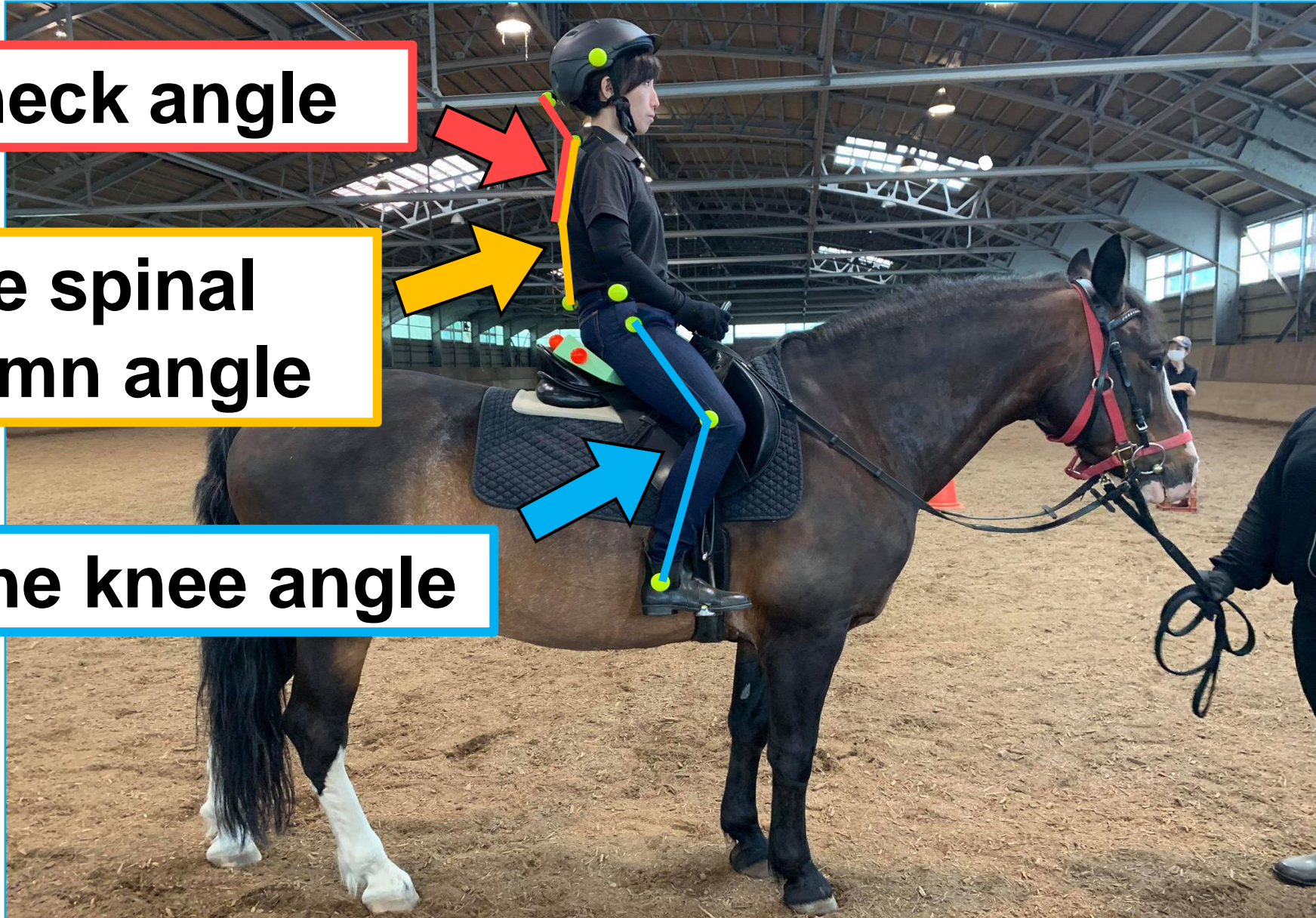
The lateral malleolus

Methods

The neck angle

**The spinal
column angle**

The knee angle



Methods



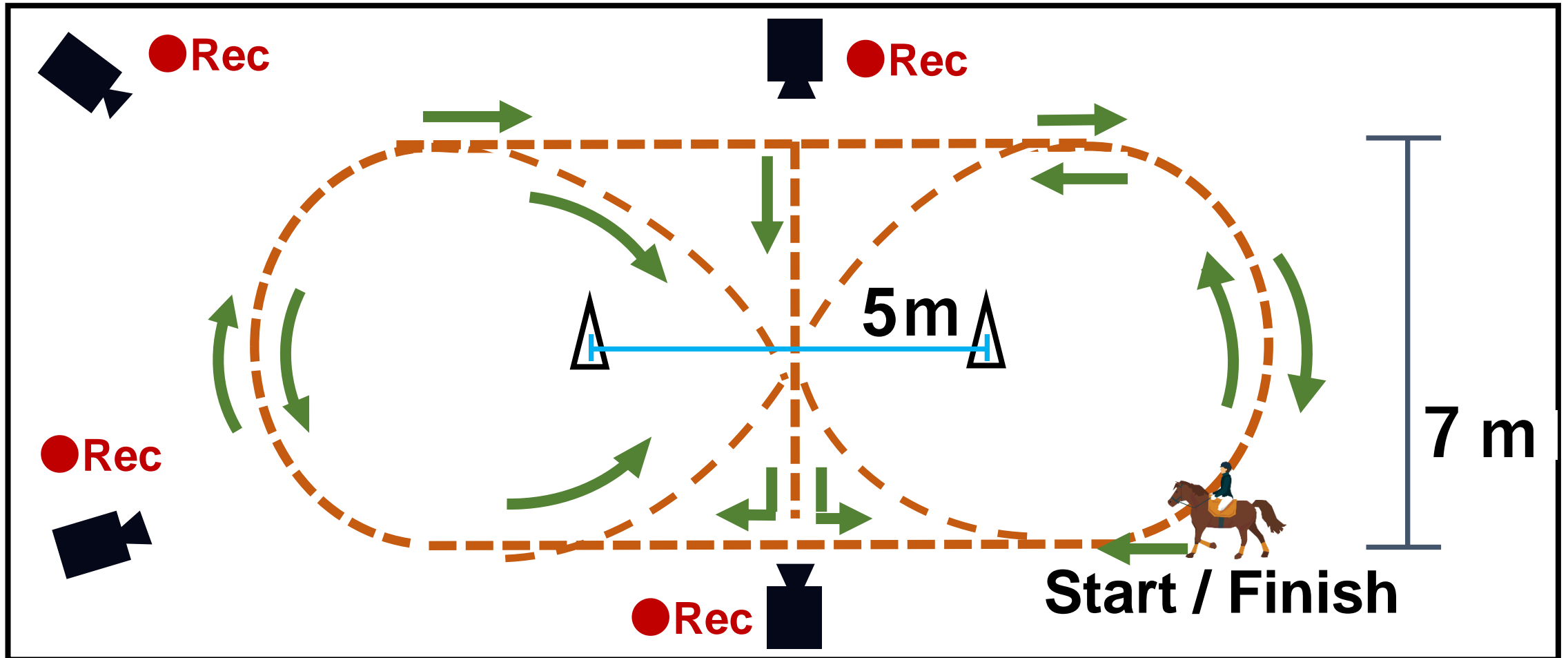
**The upper
cervical-thoracic
spinal column
angle**

Methods



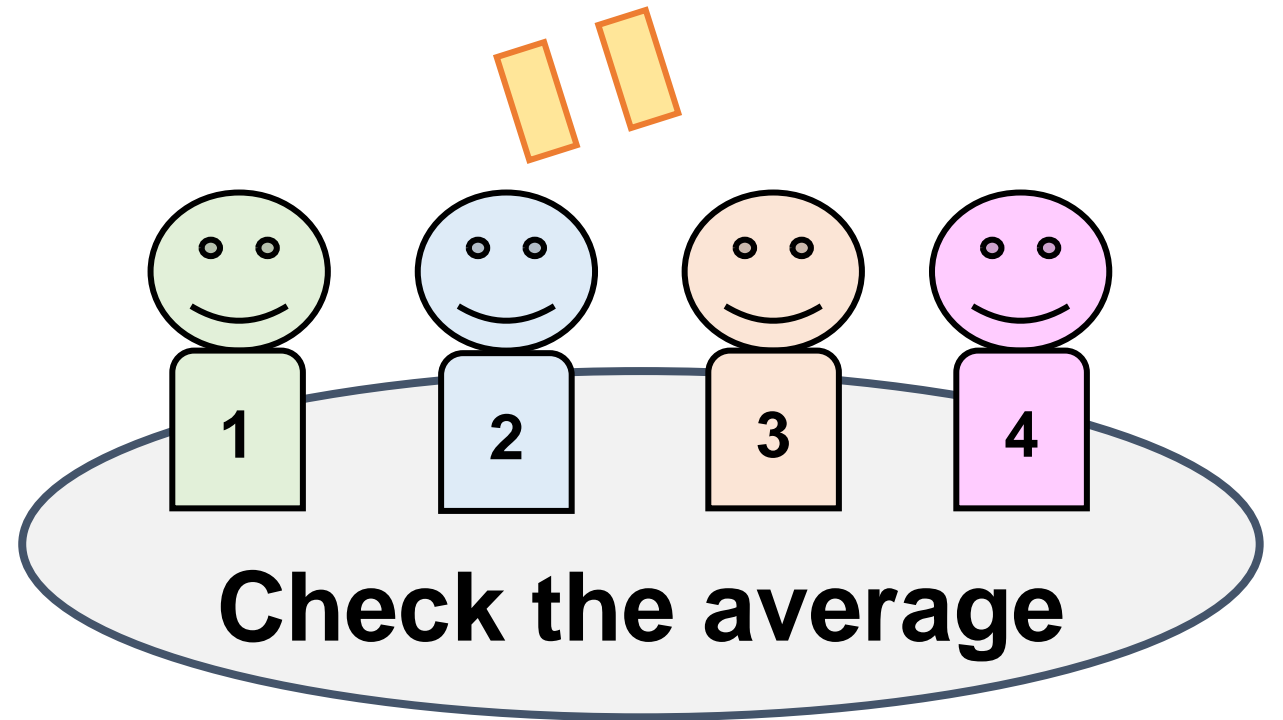
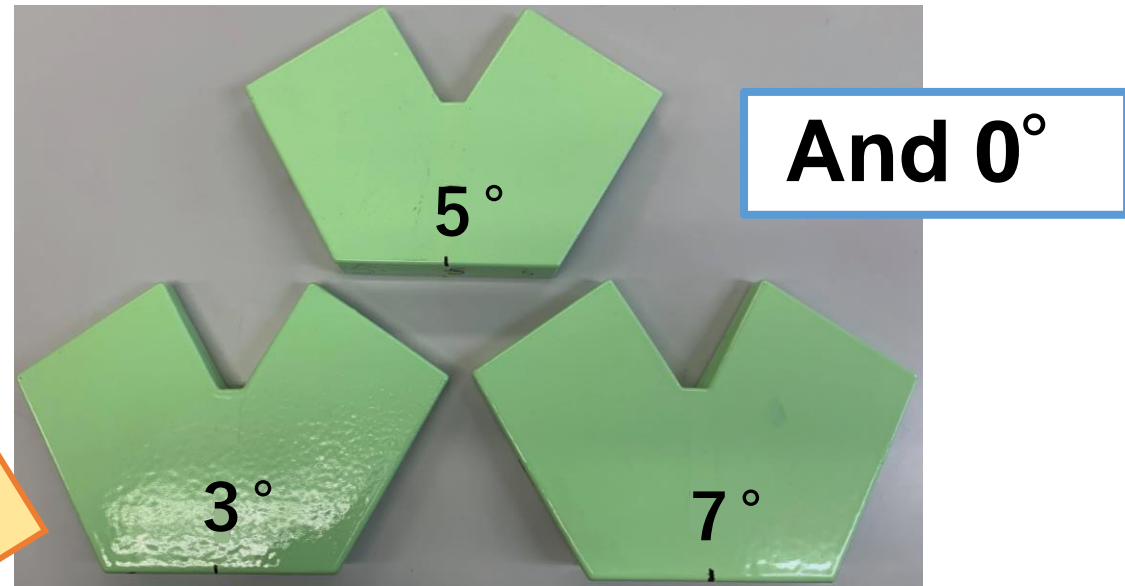
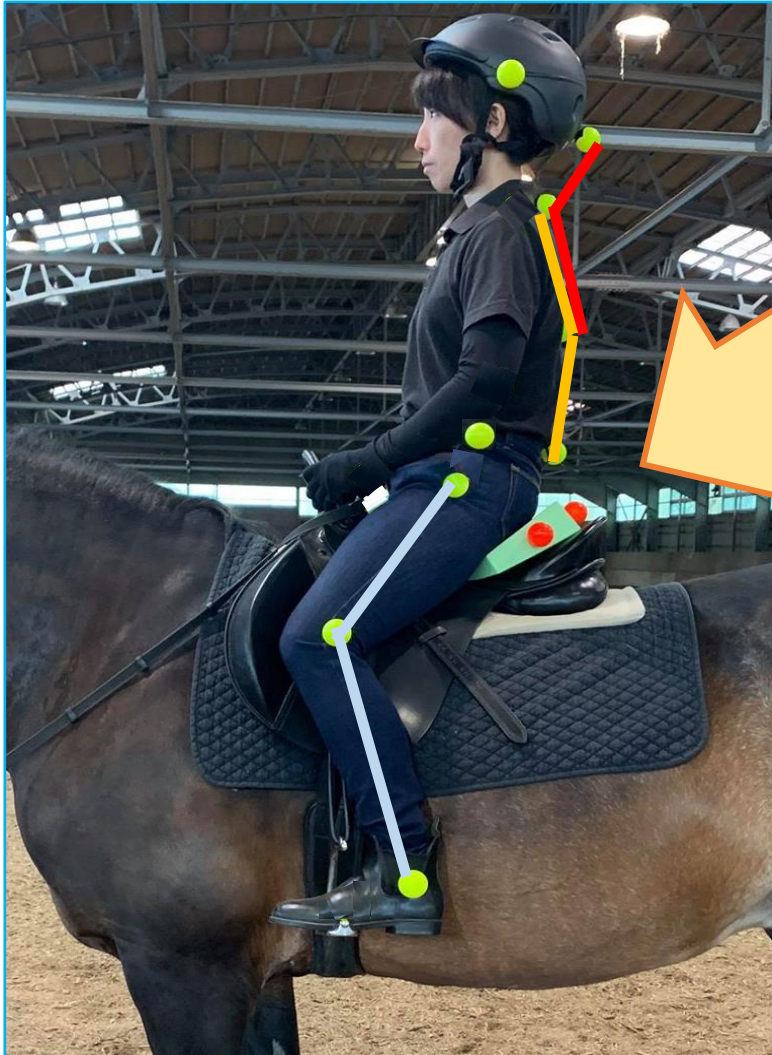
**The lower
thoracic-lumbar
spinal column
angle**

Methods



The movement of joints was analyzed by **Dartfish Japan** motion analysis software.

Methods



Methods

1 stride



× 5

1 trial

The 1 trial was defined as the 5 strides of a horse.

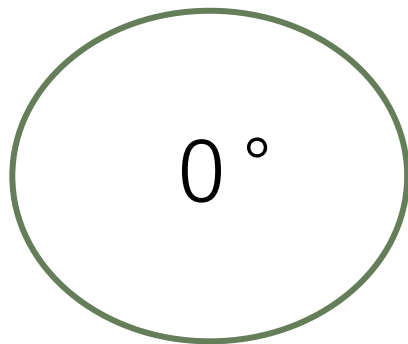
Methods

Statistical analysis

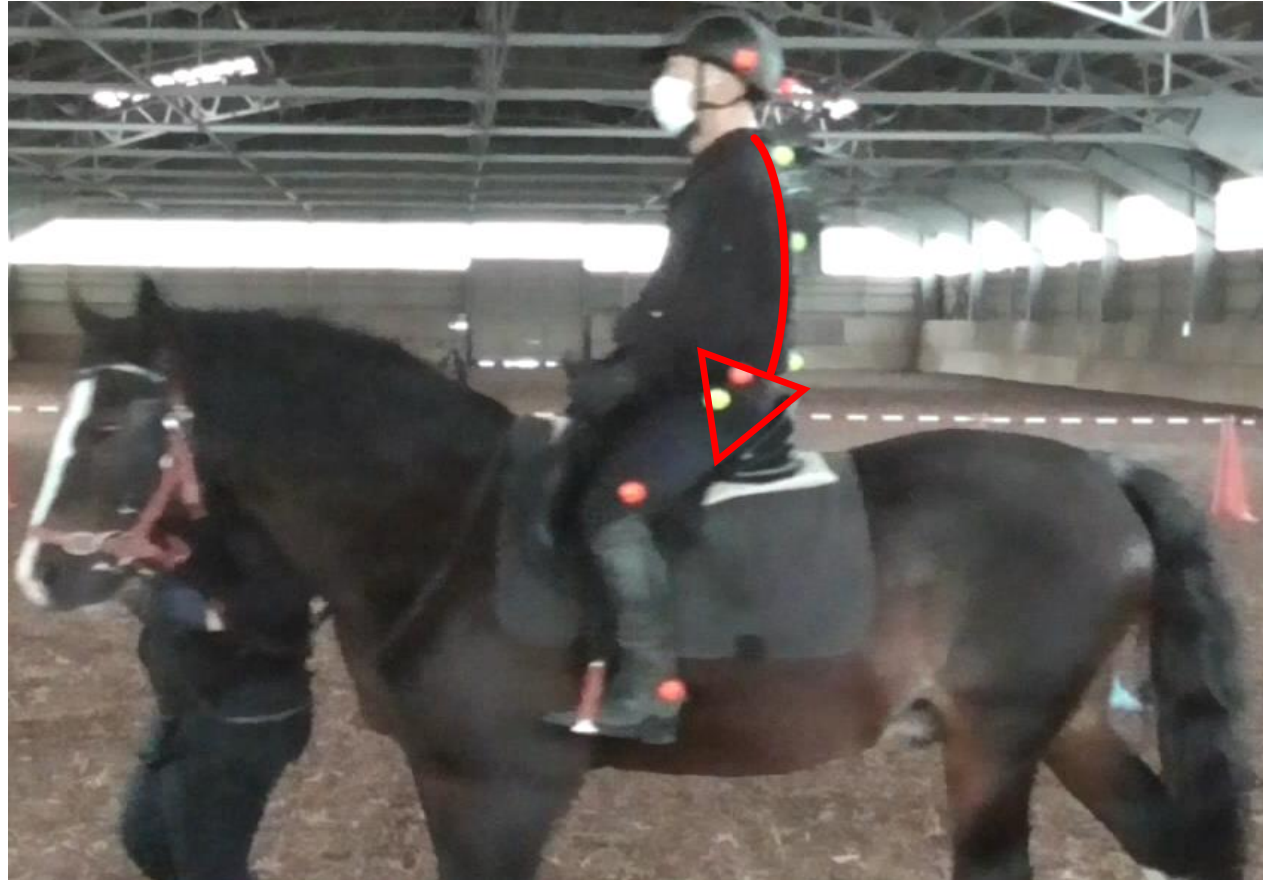
Comparisons between conditions :

One-way ANOVA and multiple comparisons test.

(The level of significance set at 5%)



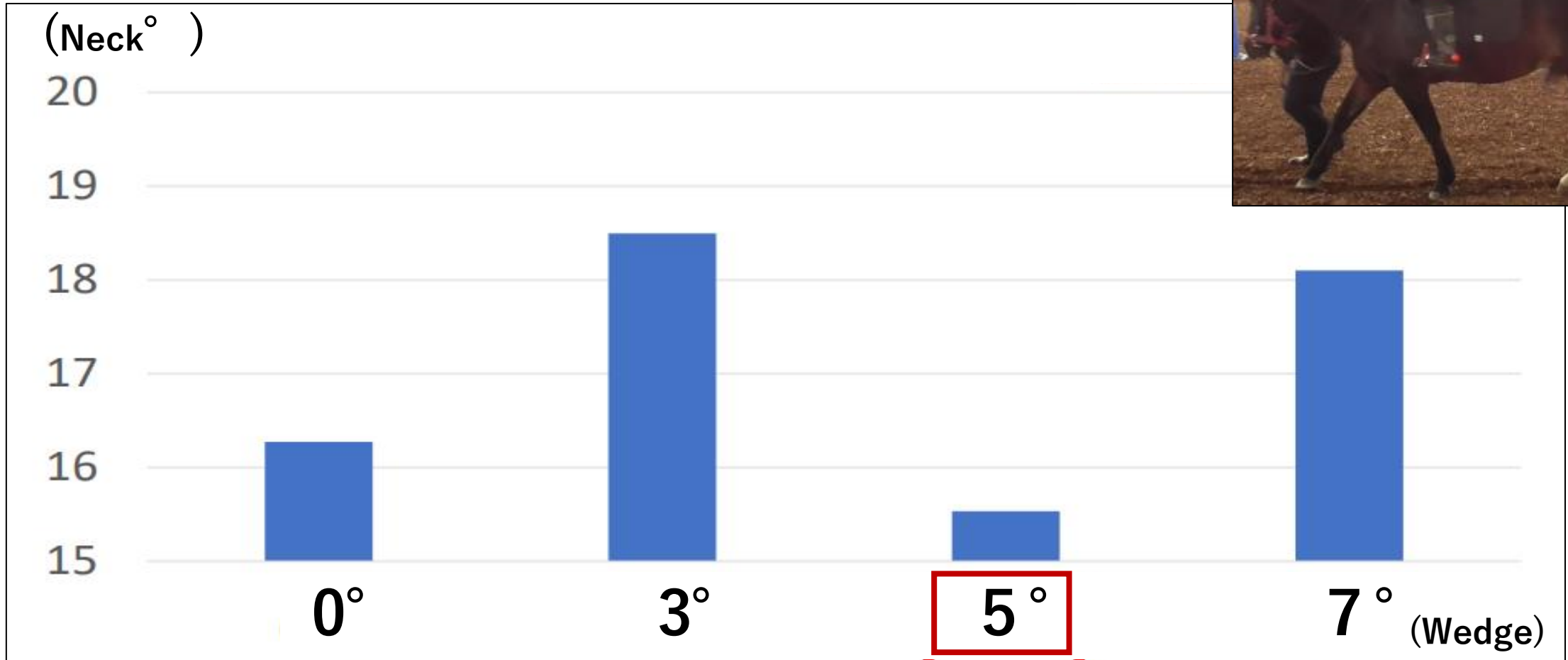
Results



The differences in mean values for the four subjects when not using the wedge and when using each of the 3 wedges were compared.

Results

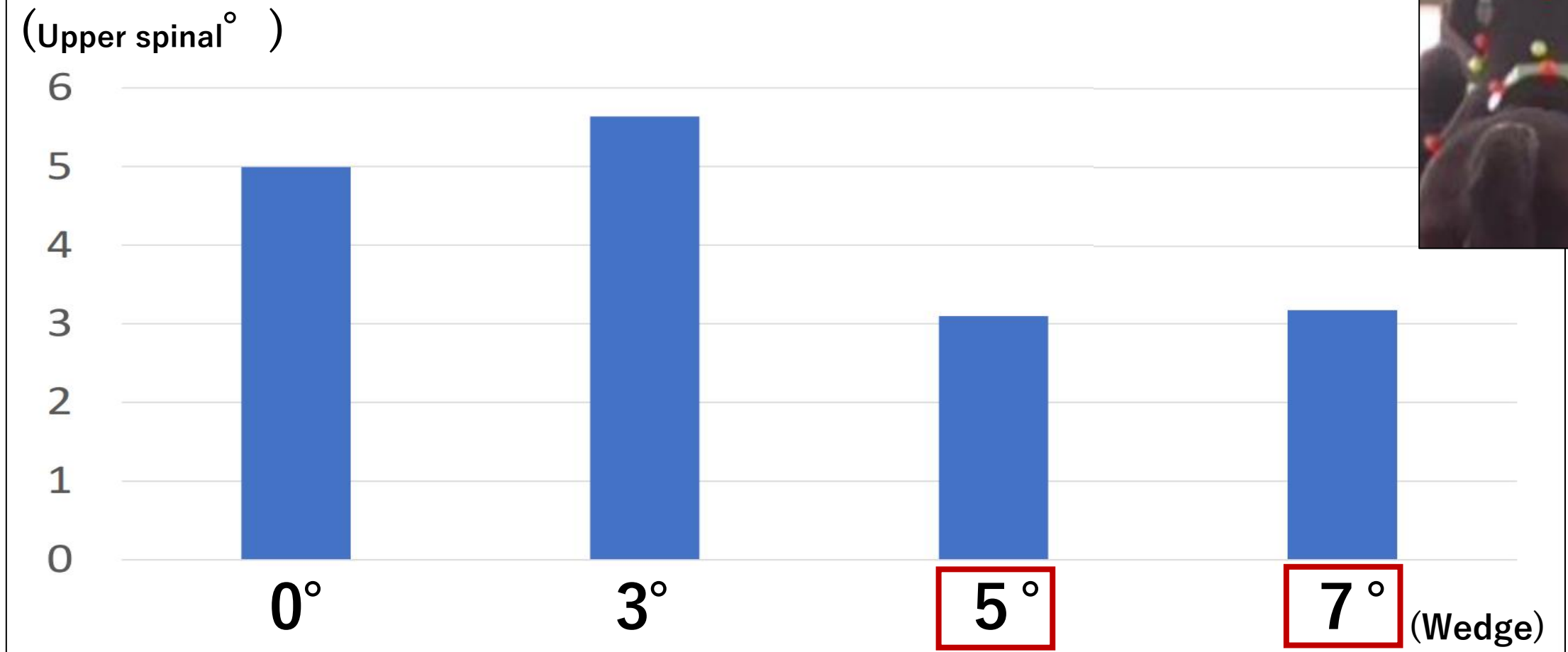
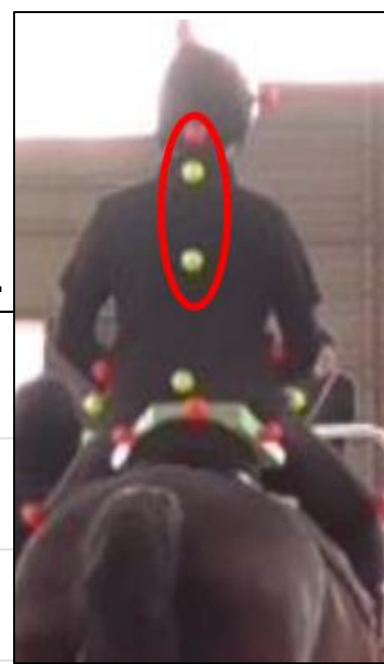
Extension of the neck



Lowest with the **5° wedge**, followed by no wedge (0°).

Results

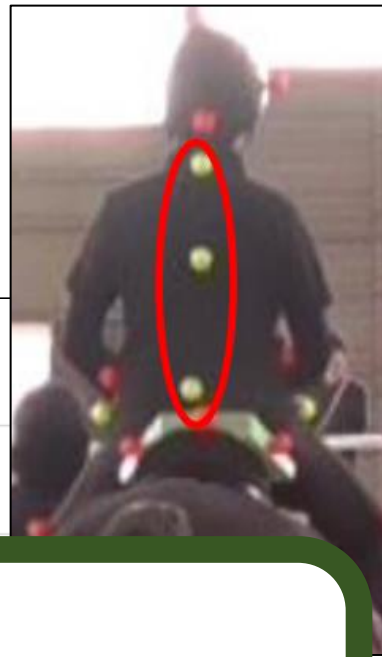
Lateral flexion of the upper spinal



Lowest with the 5^o and 7^o wedges.

Results

Lateral flexion of the lower spinal



(Lower spinal°)

6

5

Movement of the spinal column :
Overall, the 5° wedge was lower than others.

0

0°

3°

5°

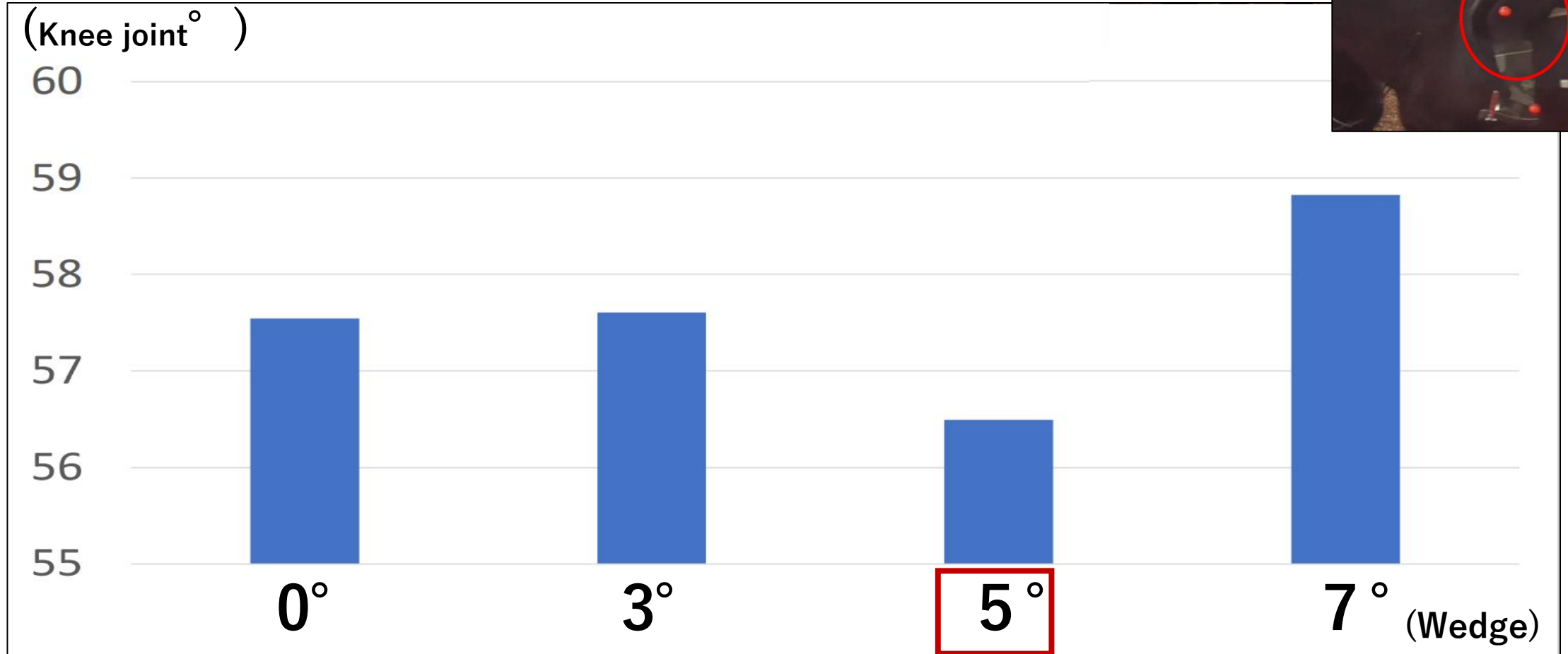
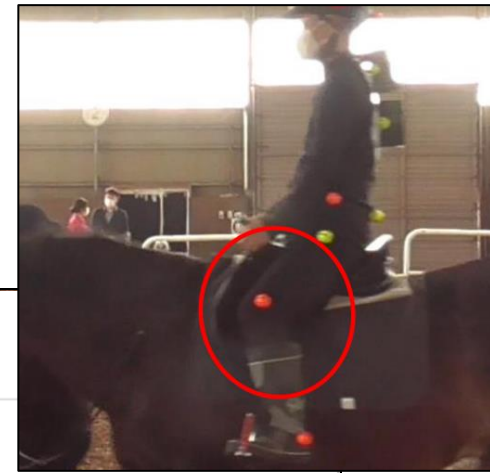
7°

(Wedge)

Lowest with the **5° wedge**, followed by 7° wedge.

Results

Flexion of the Knee joint



Lowest with the 5° wedge.

Discussion



Following
With
the wedge

Precede
Without
the wedge

Discussion



Following
With
the wedge

Precede
Without
the wedge

Results

The results of qualitative motion analysis

- **The pelvic** : Posterior tilt \Rightarrow Anterior tilt
- **The spinal** : neutral position
(between flexion and extension)



5° Wedge angle



0° Wedge angle

Discussion

The results of this study showed that our new wedge may affect for keeping a good sitting posture and improving posture balance.

In near future

Beginner riders of more advanced years.

+

Range of wedge angles $0 \sim 7^\circ$



Thank you very much for your attention.



* The authors have no conflicts of interest directly relevant to the content of this article.

Request to everyone



Contact us
Mail :
r.miura@urakawa-joba.net

**If you have a question,
I would like you to use a chat of ZOOM.**