



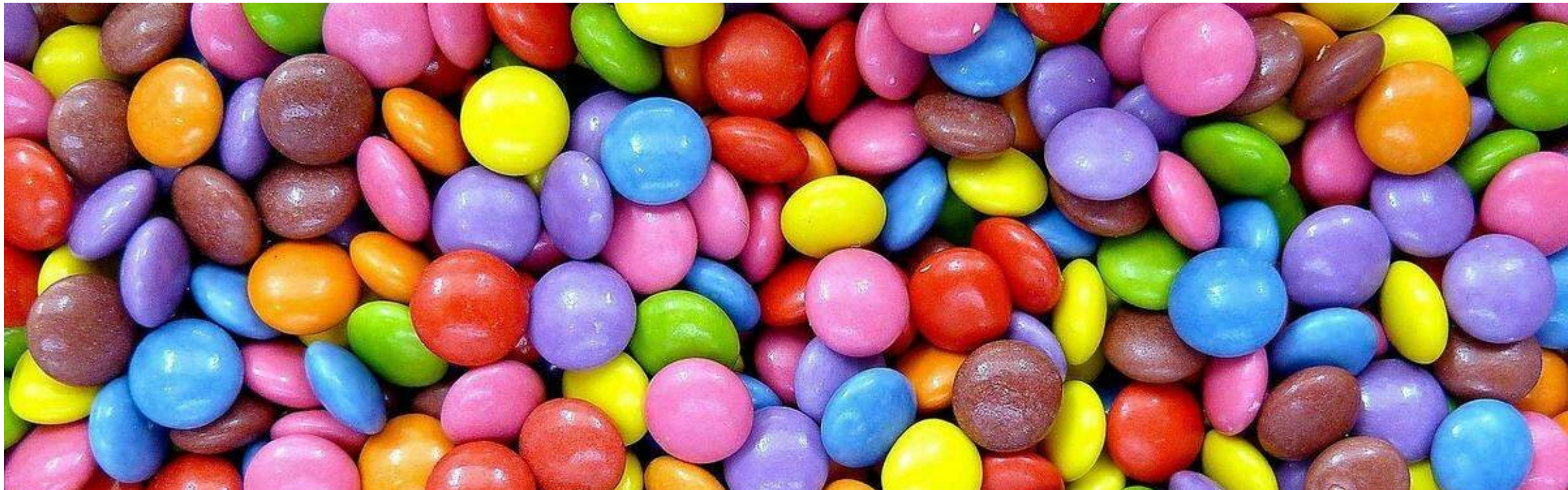
Smartes aus der Pferdemedizin

Corsin Heim

Klinik für Pferdechirurgie



Smart(i)es aus der Pferdemedizin



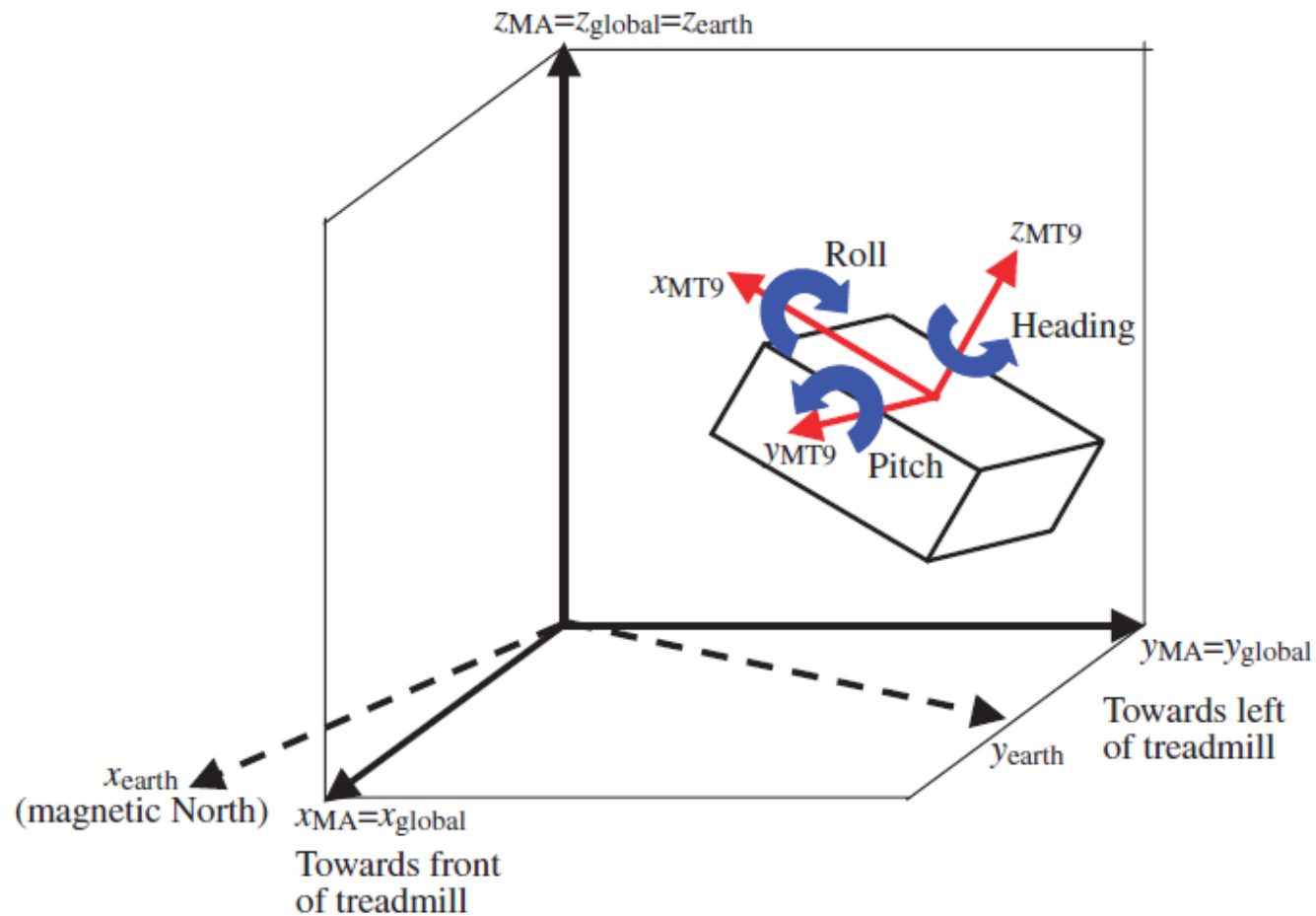
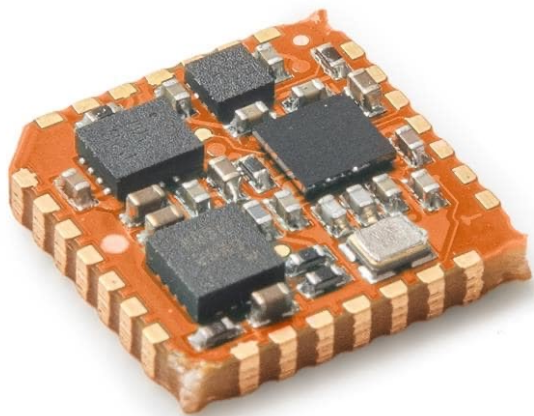


Smart(i)es aus der Pferdemedizin



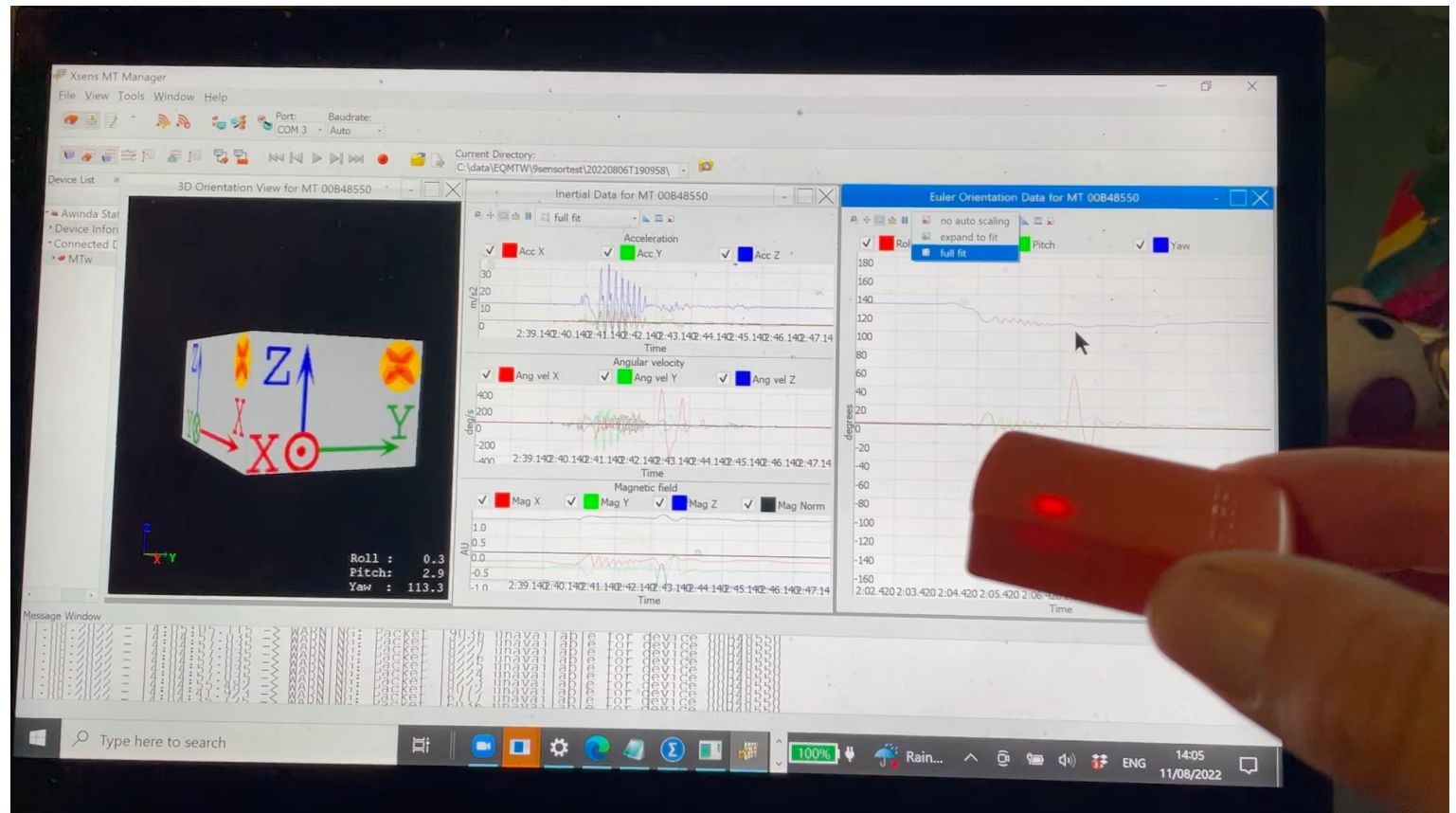
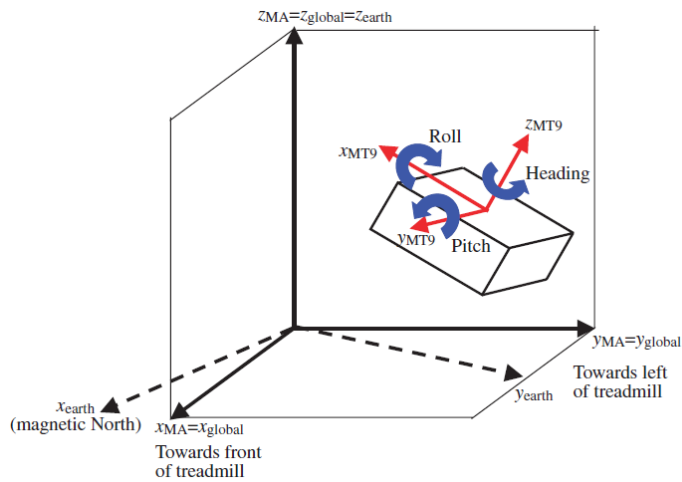


Inertial measurement units (IMUs)/ Sensoren



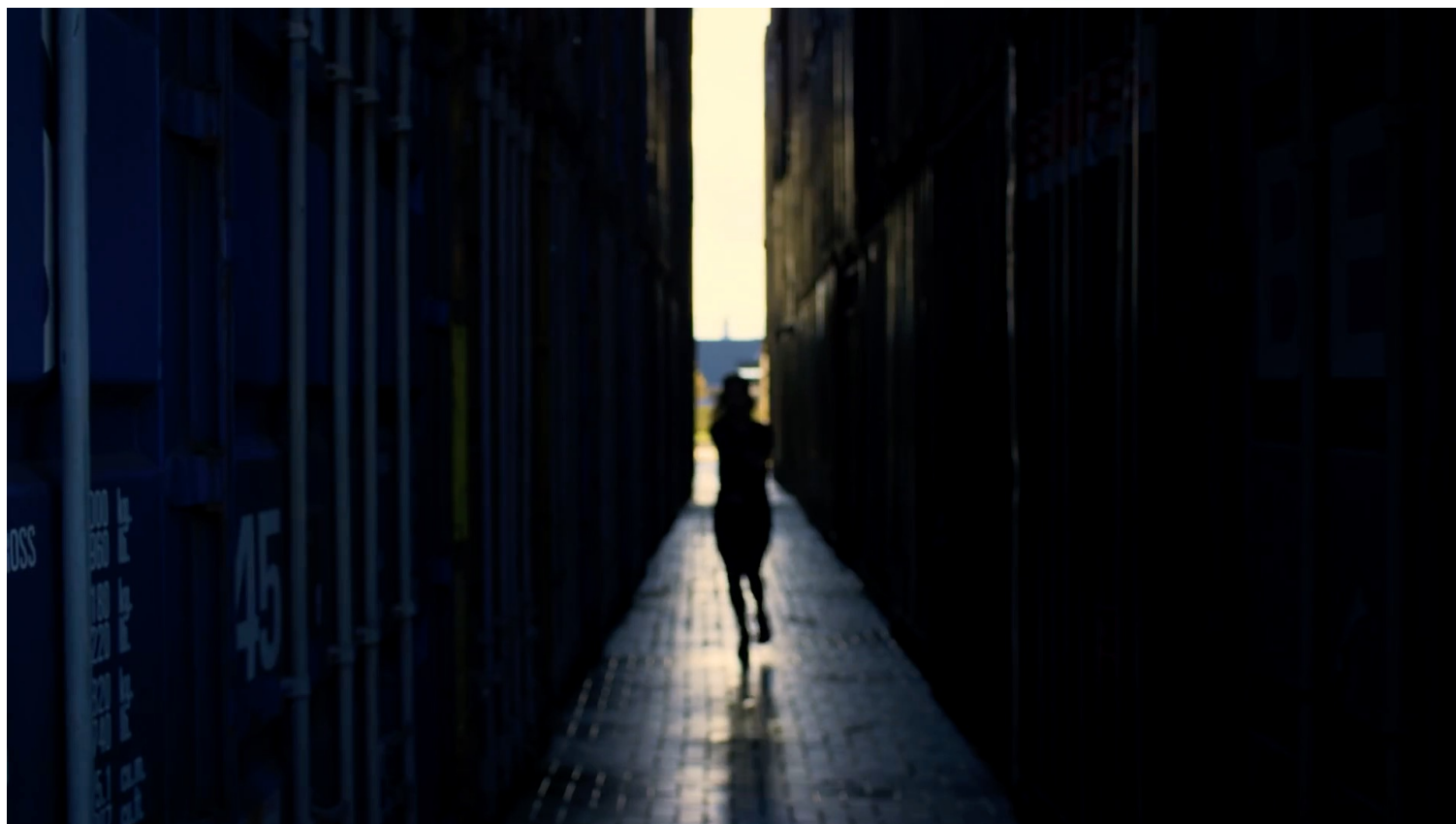


Inertial measurement units (IMUs)/ Sensoren





Inertial measurement units (IMUs)/ Sensoren





Inertial measurement units (IMUs)/ Sensoren





IMUs/ Sensoren:





IMUs/ Sensoren:





General Articles

Repeatability of subjective evaluation of lameness in horses

K. G. KEEGAN*, E. V. DENT, D. A. WILSON, J. JANICEK[†], J. KRAMER, A. LACARRUBBA, D. M. WALSH[‡], M. W. CASSELLS[‡], T. M. ESTHER[‡], P. SCHILTZ[§], K. E. FREES[§], C. L. WILHITE[§], J. M. CLARK[§], C. C. POLLITT[¶], R. SHAW[¶] and T. NORRIS^{*}

**AAEP Lahmheitsgrad > 1.5:
93% Übereinstimmung**





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**AAEP Lahmheitsgrad < 1.5:
62% Übereinstimmung**





Erkennung einer Lahmheit

Visuelle Ganganalyse

- Tiefe Übereinstimmung bei geringgradigen Lahmheiten
- Erkennung durch Auge:
- 25% Asymmetrie nötig
- **20 mm MnD/ MxD/ UpD**

Comparison of a body-mounted inertial sensor system-based method with subjective evaluation for detection of lameness in horses

Kevin G. Keegan, DVM, MS; David A. Wilson, DVM, MS; Joanne Kramer, DVM; Shannon K. Reed, DVM, MS; Yoshiharu Yonezawa, PhD; Hiromitchi Maki, PhD; P. Frank Pai, PhD; Marco A. F. Lopes, MV, PhD

IMUs/ Sensoren

- Höhere Sensitivität und zuverlässige Wiederholbarkeit
- Erkennung durch IMU:
- **VGlDm: MnD > 8 mm, MxD > 8**
- **HGlDm: MnD > 5 mm, MxD > 8**

Comparison of an inertial sensor system of lameness quantification with subjective lameness evaluation

M. J. McCracken*, J. Kramer, K. G. Keegan, M. Lopes, D. A. Wilson, S. K. Reed, A. LaCarrubba and M. Rasch

Erkennung einer Lahmheit

Visuelle Ganganalyse

- Tiefe Übereinstimmung bei geringgradigen Lahmheiten

- Erkennung durch
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IMUs/ Sensoren

- Höhere Sensitivität und
- geringere Fehlerrate

Erkennung durch IMU:

MnD > 8 mm, MxD > 8

MnD > 5 mm, MxD > 8



Erkennung einer Lahmheit

Visuelle Ganganalyse



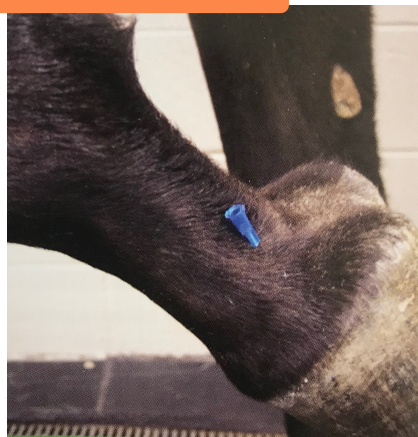
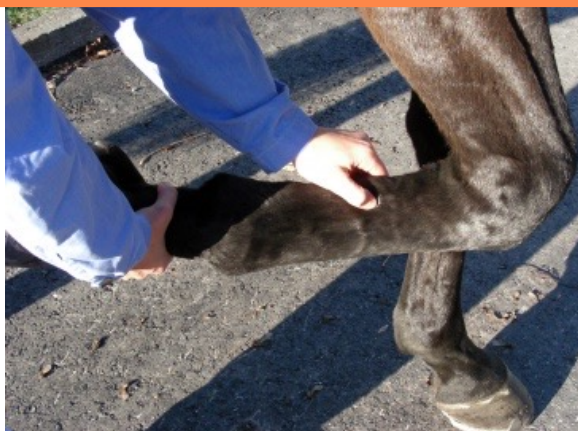
IMUs/ Sensoren



Erkennung einer Lahmheit

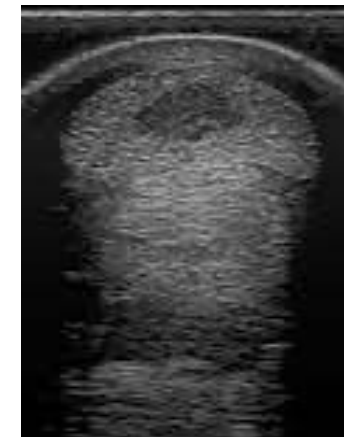
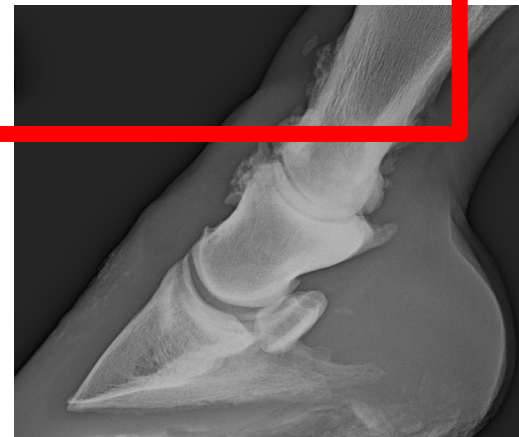
Objektive Ganganalyse

- **VGldm: MnD > 8 mm, MxD > 8**
- **HGldm: MnD > 5 mm, MxD > 8**
- **Betroffene Gliedmassen & Schweregrad der jeweiligen Lahmheiten**



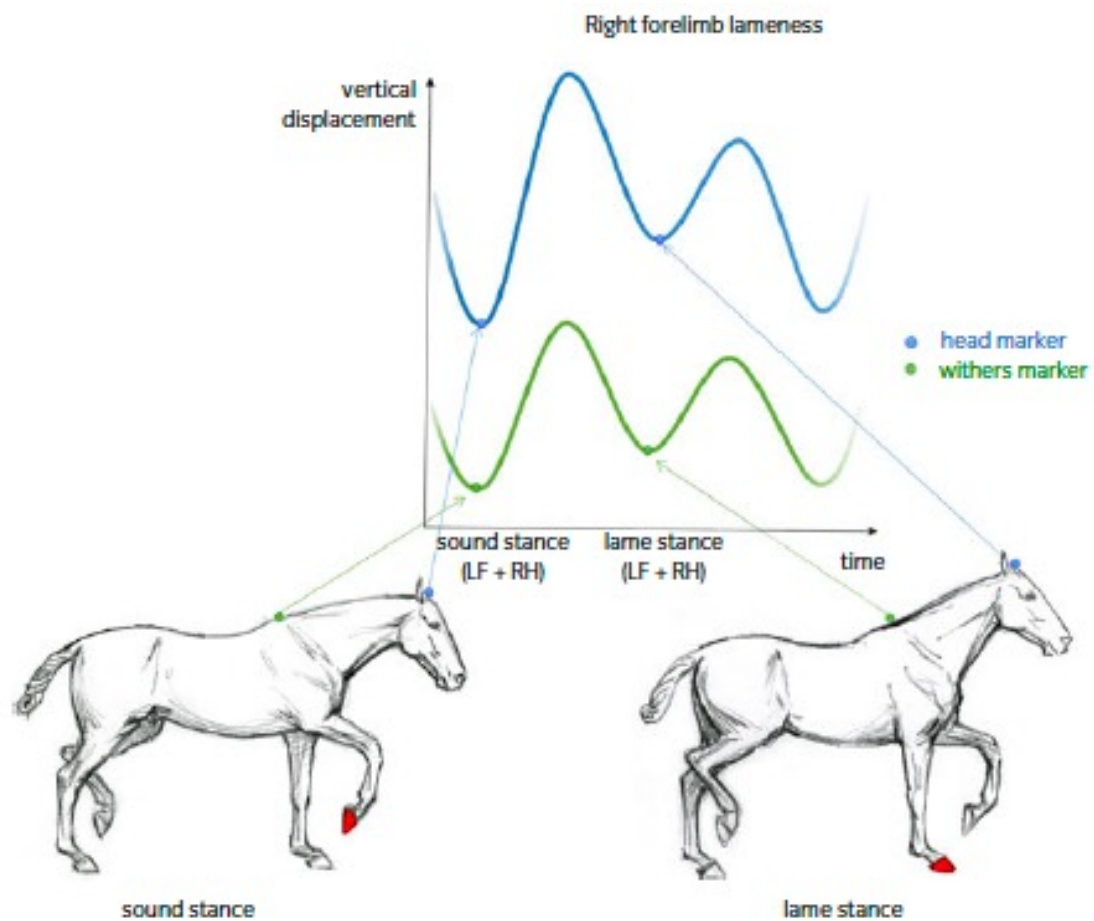
Klinische Ganganalyse

- **Diagnose Lahmheitsursache**
- Klinische Untersuchung beteiligter Gliedmasse
- Diagnostische Anästhesien
- Bildgebung
- **Therapie**

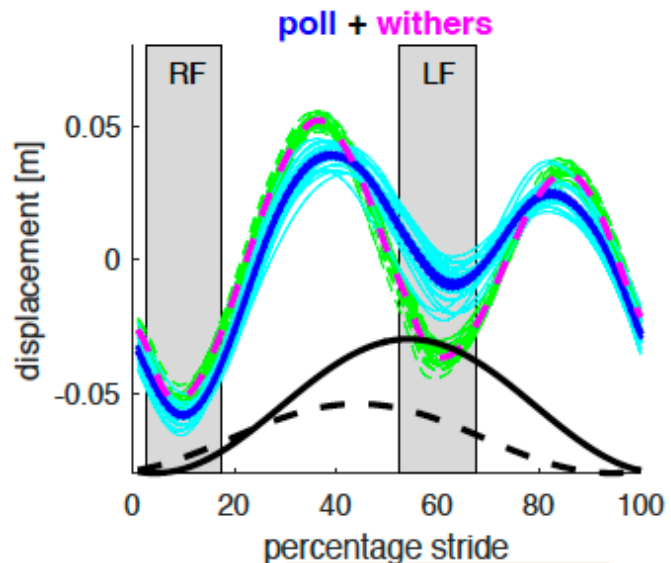




Vorderhandlahmheit



Vorderhandlahmheit (AAEP Lahmheitsgrad > 1.5)

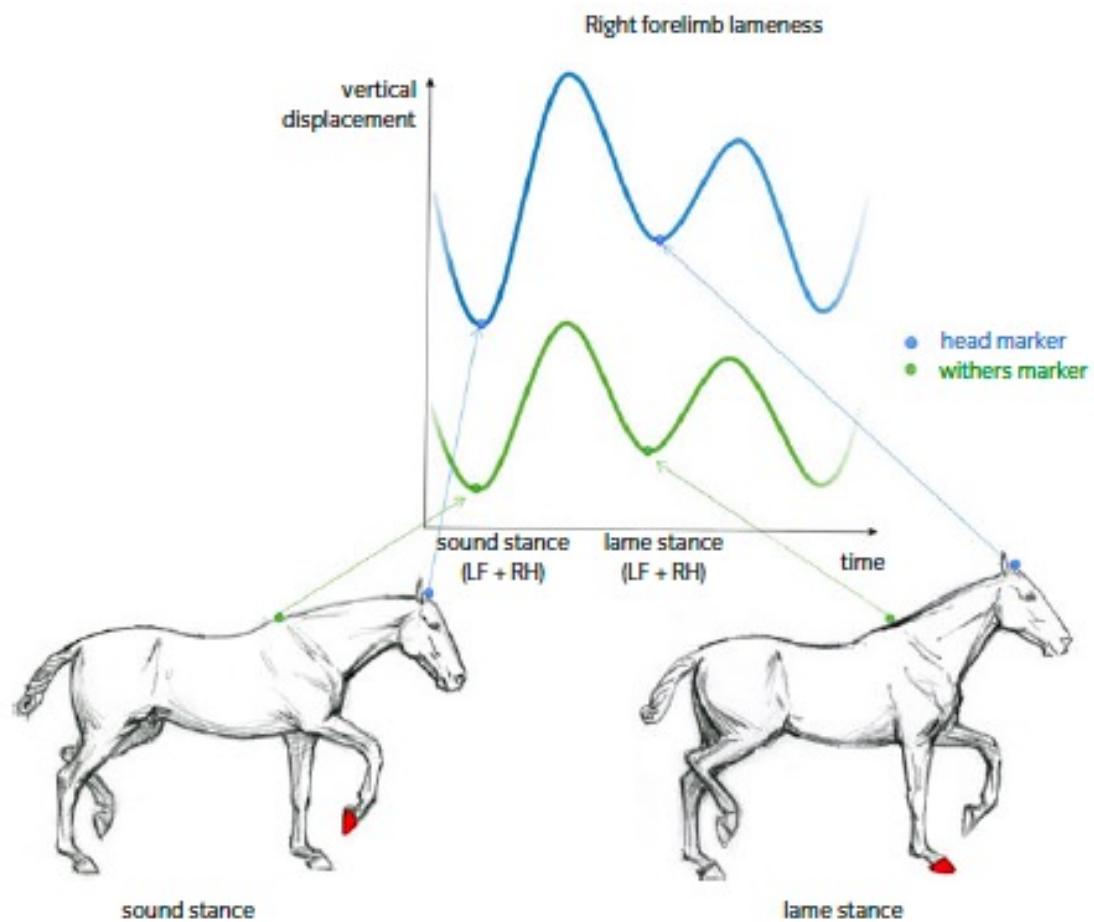


| | MnD | MxD | UpD | ROM |
|--------|--------|--------|--------|-----|
| Poll | 52L | 15L | 64L | 98 |
| L/RA | 100/ 0 | 25/ 4 | 100/ 0 | |
| Wither | 16L | 20L | 37L | 105 |
| L/RA | 100/ 0 | 100/ 0 | 100/ 0 | |



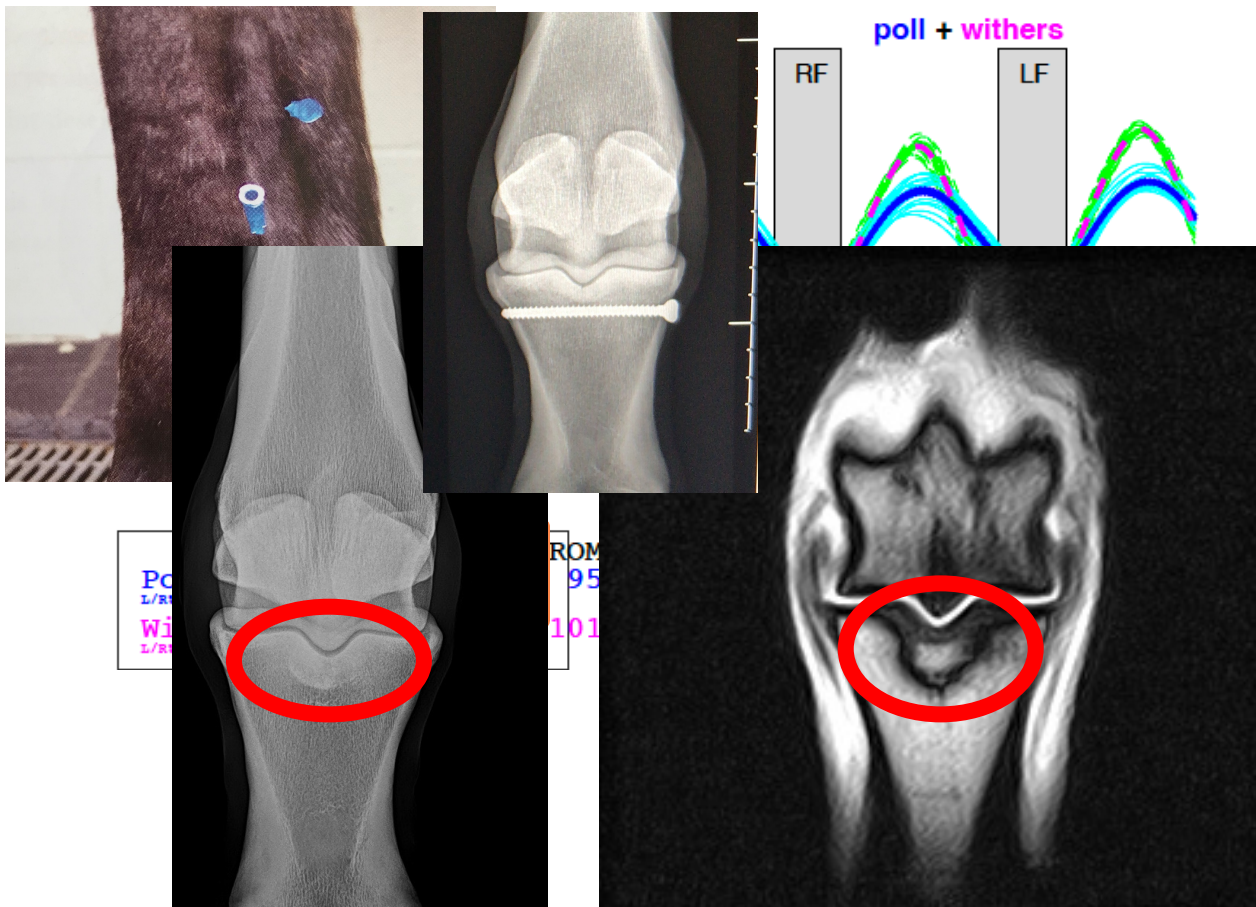


Vorderhandlahmheit



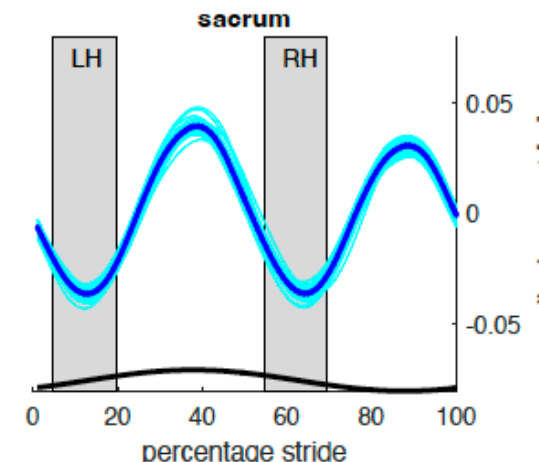
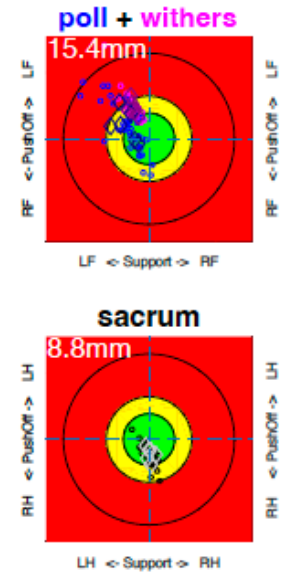
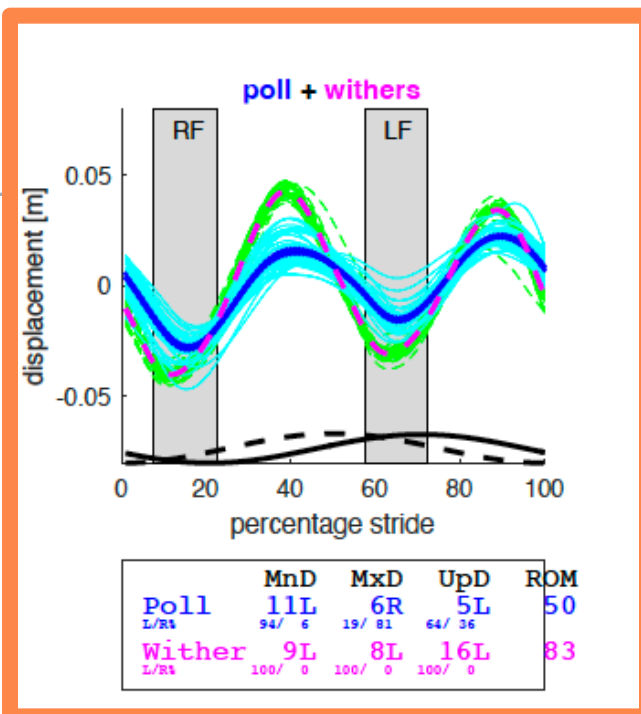


Vorderhandlahmheit (AAEP Lahmheitsgrad < 1.5)

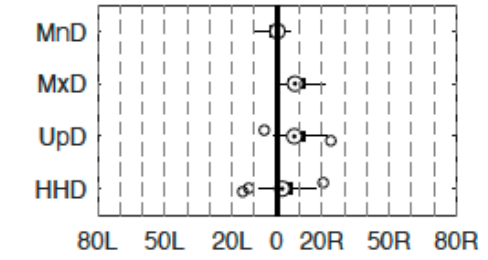
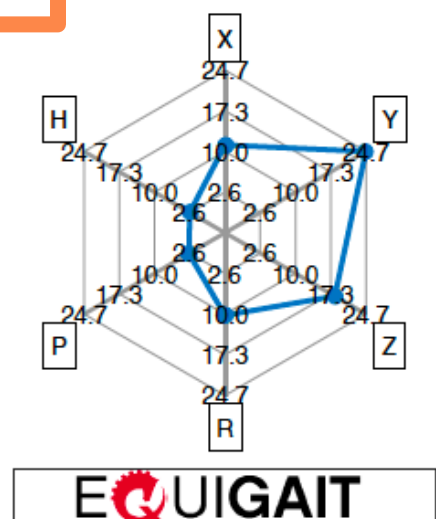
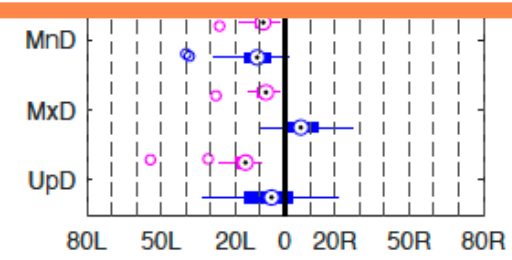




EQUIGAIT

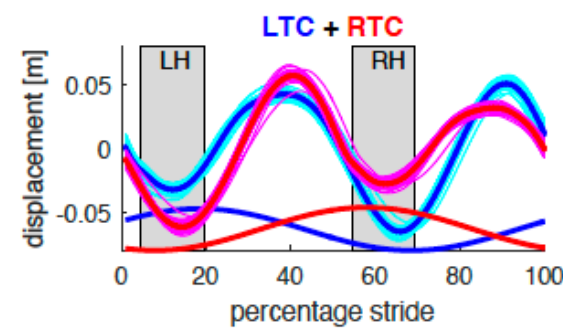


| | MnD | MxD | UpD | ROM |
|--------|--------|-------|-------|-----|
| Pelvis | 0R | 8R | 8R | 77 |
| L/ah | 47/ 53 | 0/100 | 6/ 94 | |
| HHD | 2R | | | |
| L/ah | 31/ 69 | | | |
| L-S | XYZ | 10 | 25 | 18 |
| | RPH | | | |



trot hard straight
NA
NA

Trial Numbers: 1 2 3 4 11 12
Number of Strides: 36
Average Stride Time: 734 ms

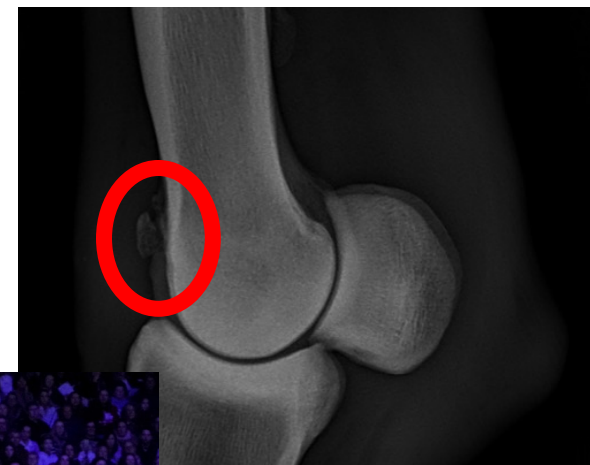




Smart(i)es aus der Pferdemedizin

Einsatz von **IMUs/ Sensoren** zur objektiven Ganganalyse bei der Lahmheitsuntersuchung des Pferdes

- Leichtgradige Lahmheiten
- Komplizierte Lahmheiten
- Kompensatorische Lahmheiten
- Klinische Relevanz bekannter Befunde
- Überwachung/ Prophylaxe





**Universität
Zürich** UZH

Departement für Pferde

Fragen