Module 7: Application of new technologies to quantify gait in clinical practice

Marie Rhodin, Constanza Gomes Alvarez, Filipe Bragança

Day 1. Biomechanics and Lameness (16th Feb, Thursday)

		Speaker
08h30-9h00	**The horse as an amazing athlete**: Anatomical and biomechanical considerations. Proneness to injuries.	Marie Rhodin
09h00-09h30	**How good are we at rating lameness?** Identification by the audience of the lame limb in videotaped trot-ups.	Marie Rhodin
09h30-10h00	**Subjective gait analysis :** Visual assessment, lameness classification. Inter-rater agreement.	Constanza Gomez Alvarez
10h00-10h30	**An historic review of biomechanics and gait analysis:** from Muybridge's Zoopraxiscope to today's technologies	Constanza Gomez Alvarez
10h30-11h00	COFFEE-BREAK	
11h00-11h45	**Principles of biomechanics:** Concepts and terminology. Phases of the stride terminologies and overlap.	Filipe Bragança
11h45-12h30	**Kinetic and kinematic:** Principles.	Constanza Gomez Alvarez
12h30-13h00	**How is gait asymmetry quantified?** Measurements and algorithms use.	Marie Rhodin
	LUNCH	
14h00-15h30	**Kinetic lameness quantification**: ground reaction forces, pressure mat, force plate, pressure insoles, rein and saddle instrumentation. Equipment: uses, pros and cons, measurement errors, recommendations, interpretation of the outcomes.	Constanza Gomez Alvarez
15h30-17h00	**Kinematic lameness quantification:** Optical motion capture, video recording, slow motion, high speed cameras and IMUs. Equipment: uses, pros and cons, measurement errors, recommendations, interpretation of the outcomes. Which systems are validated.	Filipe Bragança
17h00-17h30	COFFEE-BREAK	
17h30-18h15	**How lunging affects movement and measurements:** Gait symmetry assessment in the circle.	Marie Rhodin

Day 2. Practical applications of objective gait analysis (17th Feb, Friday)

8h30-09h00	**Usefulness of gait analysis systems in depicting true from compensatory lameness:** Withers direction and known patterns.	Marie Rhodin
09h00-09h30	**Gait analysis as a tool to quantify response to anaesthetic blocks and treatment outcomes**	Filipe Serra Bragança
09h30-10h00	**Quantification of back motion**	Constanza Gomez Alvarez
10h00-10h30	**Gait analysis as a tool to quantify holistic techniques' outcomes in horses** (chiropractice, acupuncture, kynesiotaping,..)	Constanza Gomez Alvarez
10h30-11h00	COFFEE-BREAK	
11h00-11h45	**Towards unbiased judging: Quantification of conformation traits and movement in breeding selection**	Filipe Serra Bragança
11h45-12h30	**How head and neck positions affect movement in unridden horses**	Constanza Gomez Alvarez
12h30-13h15	**How rider and tack affect movement in ridden horses**	Marie Rhodin

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LUNCH

14h30-18h30 — **Practical: Gait analysis using three different reference systems** with marker placement on the horse and simple data analysis: Qualysis live demo including Q horse, Equimoves and Lameness Locator. Marker placement on the horse and simple data analysis.

Day 3. Factors affecting movement and adaptation to lameness (18th Feb, Saturday)

Time	Topic	Speaker
08h30-09h15	**Can you tell painless movement asymmetry from painful lameness?** Biological variation and laterality. Future directions.	Marie Rhodin
09h15-09h45	**When gait analysis meets artificial intelligence:** A validated and breakthrough markerless technology capable of assessing lameness by using solely a mobile app	Filipe Bragança
09h45-10h30	**Usefulness and increasing demand of gait quantification in the pre-purchase examination of sport horses**	Filipe Bragança
10h30-11h00	COFFEE-BREAK	
11h00-11h45	**Stride characterisation as a tool to characterise racing ability and premature identification of stress fractures in racing horses**	Mónica Mira
11h45-12h30	**Muscular adaptation to lameness measured by surface EMG**	Filipe Bragança
12h30-13h00	**Making a profit out of gait analysis systems in practice**. Is it possible?	Siamak Glaring
	LUNCH	
14h30-18h30	**Practical: Lameness cases workout with different systems** (Lameness Locator, Equimoves, Sleip and Arioneo) **with outcome interpretation**	