Professor Roger K.W. Smith
MA VetMB PhD DEO FHEA DipECVSMR DipECVS FRCVS
Department of Clinical Sciences and Services, The Royal Veterinary College,
University of London

RCVS and European Specialist in Equine Surgery (Orthopaedics)
Large Animal Associate of the European College of Veterinary Diagnostic Imaging
英国王立獣医大学 馬整形外科教授
英国馬獣医師会 会長

座長：笠嶋　快周（JRA 競走馬総合研究所）

Organisation of BEVA and opportunities for membership
英国馬獣医師会（BEVA）の組織と会員について

英国馬獣医協会（British Equine Veterinary Association : BEVA）は、英国の馬専門医師の専門機関です。私たちは会員に臨床および教育リソースを提供する活動的な組織であり、馬の獣医師の専門職に関連する多数のプロジェクトにも積極的に取り組んでいます。BEVA には約 4,000 人の会員がおり、その大部分は英国在住の馬の獣医師で構成されていますが、看護師、学生（無料登録）も含まれており、国際会員も増えています。ご興味がございましたら、Web サイト、上記の QR コード、membership@beva.org.uk に電子メールを使用してください。

Computer analysis of gait for the diagnosis of equine lameness
馬の跛行を診断するための歩行のコンピューター解析

馬の跛行のコンピュータ支援による客観的な歩行解析は、馬の診療において一般的になりつつあります。私たちは馬の歩き方の幅広い特徴から跛行を認識します。しかし、最も信頼できる測定可能なパラメータは、前肢の跛行の場合は頭部の動きの非対称性、後肢の跛行の場合は骨盤の動きの非対称性でしょう。コンピューターを利用した解析方法では、運動学（カメラベースの動画）技術または慣性センサーを使用して、頭と骨盤の上下の動きの変化を測定します。現在、多数のシステムが市販されていますが、そのすべてに長所と短所があります。本講演では、客観的な歩行分析の原則を説明し、その利点について説明します。

一部の臨床家はシステムの出力に同意しない場合があるため、このテクノロジーは広く受け入れられているわけではありません。しかし、臨床家がその使用に慣れるにつれて、跛行評価の感度と堅牢性がさらに向上し、必須ではないにしても、跛行検査を支援する有用なツールとなることが期待されています。

Application of scintigraphy to equine practice
馬の診療へのシンチグラフィーの応用

ガンマ シンチグラフィーには、代謝活性のある構造を標識するための放射性核種を静脈内に投与することが含まれます。ウマの獣医学において最も一般的な放射性標識はテクネチウム 99 で、これは「骨を求める分子」（bone-seeking molecule、メチルジホスホネート：MDP）に結合しており、骨芽細胞によって取り込まれ、新たに形成された骨基質に組み込まれます。したがって、本検査法は主に整形外科疾患の診断に使用されます。一般的に、1）骨折、2）上肢の跛行、3）診断麻酔（鎮痛）が難しい間歇的あるいは異所性（変動性）跛行および 4）プアパフォーマンスの検査に用いられています。

本講演では、一般的な検査方法の概要を説明し、シンチグラフィーの利点と課題について説明します。

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Professor Roger K.W. Smith MA VetMB PhD DEO FHEA DipECVSMR DipECVS FRCVS
Professor of Equine Orthopaedics, The Royal Veterinary College, London, UK
President, British Equine Veterinary Association

The British Equine Veterinary Association (BEVA) is the professional body for equine practitioners in the United Kingdom. We are an active organisation providing clinical and education resources to the membership, as well as being active in a large number of projects relevant to the equine veterinary profession, including social licence, obesity, PPE and splinting toolkits, well-being and mentoring. BEVA has around 4000 members which, while largely consisting of equine veterinarians resident in the UK, also includes nurses, students (who get free registration) and a growing number of international members (via affiliated organisations). It is a large organisation that is run by an executive team of 16 (with Dr. David Mountford as the CEO) and a Council of 20 members, elected by the membership.

If you are a member of an affiliated national equine veterinary association, you can join BEVA and save **50%** on the membership fee or get membership for **free** as a veterinary student.

Affiliate BEVA membership has many benefits most of which can be accessed via the website – www.beva.org.uk which includes:

- Online access to our journals - Equine Veterinary Journal and Equine Veterinary Education
- Over 300+ hours of online learning resources – also including monthly live webinars (Clinical Catch-ups), Transatlantic Equine Clinics, podcasts, and news updates
- Free access to the BEVA veterinary apps - BEVA 'Buddy', Equine Formulary, guides to clinical techniques and joint injections, diagnostic lab reference tool
- Resources and toolkits for new graduates, including BEVA recognized internships
- Client education resources

If interested, you can apply for membership via the website, or email membership@beva.org.uk, or use QR code below:

Computer analysis of gait for the diagnosis of equine lameness.

Professor Roger K.W. Smith MA VetMB PhD DEO FHEA DipECVSMR DipECVS FRCVS
Professor of Equine Orthopaedics, The Royal Veterinary College, London, UK

Introduction:
Computer-assisted analysis of equine lameness, or objective gait analysis, is becoming common place in equine practice. A number of systems are commercially available, all of which have advantages and disadvantages. This talk will cover the principles and discuss the merits of objective gait analysis.

Principles of objective gait analysis:
We recognise lameness from a wide range of features of the horse's gait. However, the most reliable and measurable) parameter is the asymmetry of movement of the head for forelimb lameness, and pelvis for hindlimb lameness. Computer-assisted methods use kinematic (camera-based) techniques or inertial sensors to measure the changes in up-and-down movement of the head and pelvis. This enables objective evaluation of the impact phase and push-off phases of the weight-bearing stride in each limb. By comparing the lowest position (MinDiff) between the two limbs, an objective value for the impact component of the lameness can be calculated. Similarly, by comparing the highest position of the sensor between the two limbs (MaxDiff), an objective value for the push-off component of the lameness can be calculated. The lame limb can be identified by a difference between the two minima or the two maxima (in millimetres) calculated to give a level for the impact or push-off component of the lameness. To account for a difference in the starting point for the push-off phase of the stride, an 'UpDiff' value can also be calculated which this author believes to be a more reliable representation of push-off lameness. These parameters can not indicate a specific diagnosis but certain conditions affect the two values differently – eg suspensory disease often has greater push-off asymmetry.

Clinical uses:
Objective gait analysis avoids the influence of bias [1] and has proved very useful for the assessment of mild lamenesses (especially in hindlimbs) and for an accurate assessment of the improvement in lameness (or lack thereof) after the use of diagnostic analgesia. 'Threshold' values for objective gait analysis systems have been given for soundness (eg 6-7mm for the head and 3mm for the sacrum), which were derived by comparing values against veterinary expert assessments following induced lameness. This indicates that it is rare to have a completely symmetrical horse. However, it is not the only parameter of lameness and so should be always used in conjunction with visual assessment and interpreted in the light of the possibility of multilimb lameness (bilateral and/or referred) which can give inaccurately reduced (bilateral lameness) or increased (referred) values. Furthermore, the degree of variability both between strides and between subsequent trot-ups are important to bear in mind for the interpretation of any improvement following diagnostic analgesia.

There is not universal acceptance of the technology because some clinicians sometimes disagree with the system output. However, as clinicians become more use to its use, it has become a particularly useful, if not essential, tool to help with lameness examinations as it provides an additional level of sensitivity and robustness for lameness assessment. The ease of use of some of the systems, especially the recent video-based ones, mean that it also has potential use for screening larger numbers of horses, such as prior to racing to help prevent injury.

Systems currently commercially available:
1) Force plates/Pressure mats – can identify different loading of limbs but impractical for clinical use.
2) Inertial sensors

a. Equinosis Lameness locator™ – developed in the USA, which uses three sensors (plus an extra optional one for the rider), placed on the poll, right pastern and tuber sacrale.
b. EquiGait™ – developed at the Royal Veterinary College in the UK, which has five sensors placed on the poll, withers, tuber sacrale and both tuber coxae
c. EquiMoves™ – developed in conjunction with Utrecht University in Holland, which has seven sensors placed at the poll, withers, sacrum and all four distal limbs
d. Equisym™ – developed in conjunction with the CIRALE in France, which has 4 sensors, placed on the poll, withers, right pastern and tuber sacrale.

3) Camera-based
   a. Marker-based kinematic analysis – markers are fixed on specific landmarks and a series of high definition cameras track the movements of these markers in time. Not practical for clinical use.
   b. Video-based – the author has for many years used video cameras to record lamenesses routinely before and after diagnostic analgesia to enable a more objective subjective comparison to be made. Recently, artificial intelligence analysis of anatomical 'markers' from Iphone video (models 12 or above) has been marketed for clinical use (Sleip)

Table 1 - Table of advantages and disadvantages for three commonly used systems in UK equine clinical practice to assess lameness.

System	**Advantages**	**Disadvantages**
Lameness Locator™	Easy to use	Expensive
	Reliable	
	Most validated system	
	Rider sensor analyses rider- versus horse-associated gait asymmetry during ridden lameness exam	
Equigait™	Cheaper than the Lameness Locator™	Needs a separate person to operate
	No limb sensor required	Less reliable
	More parameters given	No automatic interpretation of data, so needs understanding of the values
	Withers sensor indicates referred lameness	
Sleip™	Easy to use, uses Equinosis principles	Objective values less accurate/ believable
	Good at predicting limb and overall level of lameness (mild, moderate, marked, severe)	Analysis occurs in the 'cloud' and so takes a few minutes and dependent on internet speed
	Does not require expensive equipment purchase (based on a subscription service	

Conclusions:
Objective gait analysis is proving to be an extremely useful tool for the evaluation of lameness in the horse. It still requires the clinical acumen of the clinician to use and interpret the data appropriately but has become routine in evaluation of lameness at the Royal Veterinary College. To those sceptical about the benefit, these systems should be considered just as another objective diagnostic tool, and

the following is a relevant quote from Derek Knottenbelt (BEVA Congress 2017) '*Technology won't replace vets… but vets who use technology logically and carefully will replace those who don't.'*

Reference:

1. Arkell, M., et al., *Evidence of bias affecting the interpretation of the results of local anaesthetic nerve blocks when assessing lameness in horses.* Vet Rec, 2006. **159**(11): p. 346-9.

Application of scintigraphy to equine practice

Professor Roger K.W. Smith MA VetMB PhD DEO FHEA DipECVSMR DipECVS FRCVS
Professor of Equine Orthopaedics, The Royal Veterinary College, London, UK

Introduction:
Gamma scintigraphy involves the injection of a radionuclide intravenously to label metabolically active structures. In equine veterinary medicine the most common label is technetium^{99}, linked to a 'bone-seeking' molecule (methyl diphosphonate, or MDP), which is taken up by osteoblasts and incorporated into newly formed bone matrix. It is therefore used primarily for investigating orthopaedic disease.

Technique:
The horse's distal limbs are bandaged overnight to ensure good blood flow distally and, if appropriate, the horse is lunged prior to injection of the radionuclide. 1GBq/100kg is injected via a catheter (using a lead-shielded syringe) into the jugular vein. The horse then has to remain within a controlled environment for the duration of 4 half-lives of the radioactive label (24 hours for (technetium^{99}, or when the horse reaches a locally accepted maximum limit of radioactivity), other than for obtaining the scintigrams, to minimise radiation exposure to personnel. Further investigations (such as follow-up imaging) need to be delayed until the end of this period. This protocol may vary in different regulatory environments.

Two-three hours after injection, the horse is imaged using a gamma camera. The time to acquire the images varies depending on the facility but the author's hospital routinely uses 90 second acquisitions. If the affected region is known, the imaging is limited to this one area. However, more commonly, scintigraphy is used as a screening method for unknown sites of lameness, where it is common to image 'half the horse' (back, pelvis, and hindlimbs) or the whole horse (to include forelimbs, neck and head). Fruosemide is often administered when the bladder (the normal excretion route for the radionuclide) is overlapping areas of interest in the pelvis.

Following the identification of regions of increased radionuclide uptake (IRU), based on a comparison of sides or the expected distribution of radionuclide in the normal horse, other imaging methods (radiography and/or ultrasound) are used to clarify the nature of the injury.

Common uses:

1) Fractures
   Fractures induce marked bony remodelling and so show up very easily on gamma scintigraphy as areas of IRU. Hence it is a particularly valuable imaging modality for detecting stress fractures in racehorses, which can be easily missed using conventional imaging. Gamma scintigraphy can play a particularly important role in the prevention of catastrophic fractures in the racehorse.
2) Upper limb lameness
   Once the distal limb has been eliminated as the site of the lameness through diagnostic analgesia, it can be beneficial to perform gamma scintigraphy because of the limitations of radiography in the proximal limb, especially if the lameness is marked.
3) Intermittent or variable lameness that precludes diagnostic analgesia
4) Poor performance
   While lameness in these cases is usually mild or absent, gamma scintigraphy can reveal sites of IRU in those areas that are difficult to image conventionally (especially the back, ribs, and pelvis). However, areas of increased uptake do not necessarily correlate with the cause of the poor performance and so needs to be substantiated using other imaging techniques and

diagnostic analgesia if possible. Conversely, an absence of uptake does not rule out some conditions (such as sacro-iliac disease). Unfortunately, the frequency with which gamma scintigraphy provides an answer in these cases is low but scintigraphic body screening is often one of the few options remaining to reach a diagnosis or rule out the presence of injury.