With hundreds of illustrations, dozens of charts, and links to online videos of explanatory case studies, readers are given a complete course in observing, identifying, and decoding equine lameness. Dr. Grisel helps you interpret what is seen, plain and simple (no need for medical knowledge of equine anatomy and pathology). Whether first-time horse owner or seasoned professional, you are guaranteed to come away with a detailed, systematic, and comprehensive method for a happier, healthier equine partner.

“Dr. Bob Grisel’s work systematically shows us extremely accurate observations he has made in all forms of lameness. This work, in my opinion, is not only a valuable text to the layman as the title implies, but also to all veterinarians performing lameness diagnosis of horses.”

NORMAN W. RANTANEN
DVM, MS, DACVR

“This book, incorporating detailed videos and illustrations, will be a valuable resource to all horse owners, enabling them to recognize lameness in the early stages in order to promote the greatest potential for healing.”

ED DARNEY
Dabney Gentle Horsemanship

“I have always considered myself lucky to know Bob Grisel, as well as to have had him as my veterinarian. It is wonderful that he has written a book we all, riders and horse owners, can be guided by.”

JESSICA RANSEHOUSEN
Three-Time Olympic, Former Chief of Equine UC Davis Team-Two Olympic Games, Four Times Bronze Medalist, U.S. Hall of Fame Inductee, and Winner of the USEF Lifetime Achievement Award

Dr. Bob Grisel began his equine veterinary training at the age of 13, when he worked for a racetrack veterinarian near his home in southern Florida. He dedicated the next 30 years of his life to learning about sport horse medicine and surgery. After graduating from the University of Florida’s College of Veterinary Medicine, he moved to southern California where he received extensive training in equine surgery and radiology. Upon completing a residency in equine surgery with an emphasis on arthroscopy, Dr. Grisel was recruited by Oregon State’s College of Veterinary Medicine where he spent time on the large animal teaching staff. His surgical interests focused on performance-related problems, and he developed and published many surgical techniques designed to better treat the equine athlete. Dr. Grisel was offered an equine surgical position in the Atlanta area while working the 1996 Olympic Games, and shortly after relocating to Georgia, he built The Atlanta Equine Clinic, an equine diagnostic, surgical, and emergency care facility located in Braselton. In 2005, Dr. Grisel left the hospital facility to focus on equine sports medicine and has since developed a reputation for his meticulous and accurate diagnostic ability, as well as for his effective treatment strategies for performance-related problems in the horse. He is regularly consulted on issues concerning lameness and pre-purchase examinations worldwide (www.atlantaequine.com).
Contents

Acknowledgments ........................................... ix

Introduction ........................................... 1

Glossary ................................................ 3

SECTION I

Our Responsibility to the Performance Horse ................. 13

1 The Responsibility of the Horse Owner in Successful Management of Equine Lameness ............... 16

2 The Responsibility of the Veterinarian in Successful Management of Equine Lameness ............... 18

SECTION II

What Is Lameness? ....................................... 21

3 The Definition of Lameness ......................... 22

4 The Art of Seeing Lameness ......................... 23

5 Obscure (Hidden) Lameness ......................... 26

   Bilateral Lameness ................................. 26

   Multifactorial Lameness ......................... 27

   Axial Lameness ................................. 28

6 The Issue of Visual Subjectivity Among Observers ................. 30

SECTION III

Forms of Lameness ................................... 33

Reference Chart: Common Forms of Lameness ............... 33

7 Primary versus Secondary Lameness ....... 36

   Common Forms of Secondary Lameness ............... 38

8 Painful versus Non-Painful Lameness .......... 41

9 Weight-Bearing versus Non Weight-Bearing Lameness ....... 43

10 Authentic versus Artificial Lameness ................. 46

   The Concept of Diagonal Synchrony ................. 47

11 Axial versus Peripheral Lameness ................. 50

   The Head and Neck ........................................... 50

12 Consistent versus Intermittent Lameness ................. 52

   Reference Chart: Intrinsic Causes of Tripping in the Horse ................. 53

   Reference Chart: List of Equine Skeletal Myopathies ................. 56

   Neurologic Lameness ........................................... 57

   Shifting Lameness ........................................... 59

© G. Robert Grisel and Trafalgar Square Books
Reference Chart: Visual Markers for Neurologic Disease in the Horse...60
Rein Lameness .......................... 63
Behavioral Lameness ..................... 64
Reference Chart: Common Causes of Poor Behavior in the Symmetrically Moving Horse...65

13 Unique Lameness .......................... 70
Reference Chart: Classification of Unique Gait Deficits .................. 71

SECTION IV
Pertinent Equine Anatomy ............... 73

14 Terminology Relating to the Horse’s Movement .................. 74
Reference Chart: Basic Classification of Equine Joints ........ 75
Movement of the Limb and Foot ...... 77
Movement of the Axial Anatomy .... 83

15 The Relationship Between Anatomy and Expression of Gait ........ 85
Reference Chart: The Correlation Between Anatomic Function and the Nature of Associated Lameness ........ 89

16 The Stay-Apparatus ..................... 91
The Stay-Apparatus of the Hind Limb .... 92

Reference Chart: Extrinsic Influences on the Behavior of the Hind Stay-Apparatus .... 97
Reference Chart: Classic Symptoms Associated with Mild Interference of the Hind Stay-Apparatus .... 98
The Stay-Apparatus of the Forelimb ........ 101

17 Anatomic Behavior of the Lower Limb ........ 105
The Flexor Apparatus ........ 106
The Check Apparatus ........ 109
The Suspensory Apparatus ........ 109
Breakover ................................. 111

18 Basic Axial Anatomy ........ 114
Axial Bones ............................... 116
Axial Joints ................................. 118
Axial Muscles ............................... 121
Axial Ligaments ........................... 125

19 Altered Muscle Anatomy and Function ........ 126
Reference Chart: Intrinsic (Muscular) Causes for Biomechanical Lameness .... 127
Fibrotic Myopathy ....................... 128

© G. Robert Grisel and Trafalgar Square Books
SECTION V
The Fundamentals of Productive Observation .......................... 135
20 The Game Plan ....................................................... 136
  Choosing the Approach ........................................... 136
  Choosing the Gait .................................................. 137
  Choosing the Venue ............................................... 138
Reference Chart: Setting for Basic Visual Lameness Assessment .... 139
21 Rules of Effective Lameness Assessment ............................ 140
  Basic Rules of Observation ....................................... 140
22 Key Visible Elements of the Equine Gait ............................. 145
  Asymmetry in Axial Movement ................................... 145
  Asymmetry in the Quality of Stride ................................ 150
  Asymmetry in Limb Gesturing ..................................... 152
  Asymmetry in Foot Dynamics ..................................... 153

SECTION VI
The Method of Visual Lameness Assessment ............................ 157
  Reference Chart: Basic Lameness Evaluation Protocol .......... 158
23 Identifying the Affected Areas ..................................... 161
  Identifying the Lame Limb(s) ..................................... 161
  Detecting Forelimb Lameness ...................................... 162
  Detecting Hind-Limb Lameness .................................... 163
  Detecting Axial Lameness .......................................... 165
  Detecting Complicated Lameness .................................. 168
  Breed Considerations ............................................... 168
  Reference Chart: Basic Gaits of the Horse ......................... 169
24 Determining the Nature of Lameness ................................. 170
  Weight-Bearing Lameness ......................................... 170
  Non Weight-Bearing Lameness ..................................... 171
  Combination Lameness ............................................. 172
  Highlighting the Nature of Lameness During Assessment ......... 173
25 Determining the Severity (Degree) of Lameness ..................... 177
  Standardized Grading of Lameness ................................. 178
  Reference Chart: American Association of Equine Practitioners (AAEP) Grading Scale ........................................ 178
26 Determining Extrinsic Influences on Lameness ....................... 183
  Temporal and Thermic Variations ................................ 183
  Footing .................................................................. 184
  Direction .............................................................. 185
  Gradient .............................................................. 187

© G. Robert Grisel and Trafalgar Square Books
Gait ........................................ 188
Velocity ................................. 190
Form of Restraint ......................... 190
Reference Chart: Extrinsic Influences on the Nature of Lameness .......... 194

27 Identifying Distinctive Features of the Gait. ............................... 195
  Suggestive Traits .................................. 195
  Symptomatic Traits ............................... 195
Reference Chart: Lameness Traits That Are Suggestive ................ 196
Reference Chart: Lameness Traits That Are Symptomatic ............... 197
Pathognomonic Traits ......................... 199
Reference Chart: Lameness Traits That Are Pathognomonic ............. 200

28 Confirming the Primary Component(s) of Lameness ..................... 202
  Manifestations of Referred Lameness ............................... 203
Reference Chart: Step-by-Step Lameness Assessment of the Horse. . 206

SECTION VII

The Gait Signature ....................... 211
29 Designation of the Horse’s Gait Signature ............................. 212

Reference Chart: Sample Classification of Gait Characteristics .......... 212

30 Correlating the Gait Signature with Likely Sources of Lameness .... 214
  Reference Chart: Sample Correlation of Gait Deficits with Veterinary Diagnoses . 216

SECTION VIII

Applying Our Observations to the Diagnostic Process ................. 219
31 Visual Observation as Part of the Diagnostic Workup ................. 220
32 Building and Sharing Your Gait Signature Library ..................... 222
  Video Archiving ..................................... 222
  Written Reports ..................................... 222
  Include the Diagnosis ................................ 223
  Sharing Records .................................... 223
33 The Future of Visual Assessment and Gait Signature Characterization in the Diagnosis and Management of Equine Lameness .... 224
  References ......................................... 227
  Video Quick Reference Library ....... 229
  About the Author ................................. 233
  Index ............................................. 234

© G. Robert Grisel and Trafalgar Square Books
10 Authentic versus Artificial Lameness

From a visual standpoint, all gait deficits are “real” in that they alter movement and produce lameness. Some deficits, however, exist for the sole purpose of helping the horse to adjust for a shift in body weight or balance that occurred as a result of a problem somewhere else. Without constant incitement from the primary issue, this secondary “adjustment” would instantly resolve. Since it is nothing more than a visible product of another lameness, we denote this type of gait deficit as artificial or referred.

Referred lameness is secondary by definition. Even though it isn’t considered to be “real” and doesn’t factor into the treatment strategy, its existence dramatically facilitates our ability to accurately assess the poorly performing horse. Like all secondary issues, referred gait deficits provide valuable insight into the nature of the primary problem.

Referred deficits, although seemingly obscure, are fairly easy to predict in the lame horse. Proper identification and classification of the primary component usually exposes the basis behind any referred elements. And, as previously mentioned, acute characterization of a referred component can correspondingly lead us to likely primary instigators.

It is important to note that primary deficits will typically generate referred deficits of comparable nature. In the event that referred lameness manifests, the observer will usually find that:

- A primary weight-bearing lameness in the forelimb generates a referred weight-bearing lameness in the contralateral hind limb.
- A primary non weight-bearing lameness in the forelimb generates a referred non weight-bearing lameness in the contralateral hind limb.
- A primary combination lameness in the forelimb generates a referred combination lameness in the contralateral hind limb.
- A primary weight-bearing lameness in the hind limb generates a referred weight-bearing lameness in the ipsilateral forelimb.
• A primary non weight-bearing lameness in the hind limb generates a referred non weight-bearing lameness in the contralateral forelimb.

• A primary combination lameness in the hind limb generates a referred combination lameness in the ipsilateral forelimb.

The Concept of Diagonal Synchrony

The walk and trot each comprise a two-beat stride pattern in which the horse’s weight is distributed evenly between diagonal pairs of limbs. The left hind and right front limbs comprise one diagonal pair, whereas the right hind and left front limb constitute the other (fig. 10.1). The horse maintains similar movement (i.e. synchrony) between the two limbs comprising each diagonal pair at these gaits. In other words, the diagonal pair of limbs move at the same time and in the same way (VL 10a). The left pelvic (LH) and right thoracic (RF) limbs maintain concurrent weight-bearing and non weight-bearing (flight) phases of the stride. The right pelvic (RH) and left thoracic (LF) limbs do the same. This form of coordinated movement is known as diagonal synchrony.

The horse will attempt to maintain diagonal synchrony whether it is sound or lame.

Stride-to-stride gait compensation is necessary at the walk and trot to support the horse’s weight and maintain balance. This is an important consideration during lameness assessment, because what affects the movement of one limb will also affect the movement of the contralateral limb on the other end of the horse (VL 10b). For example, application of a toe extension to the left hind foot as a means of delaying limb breakover and lengthening stride will generate a similar gait adjustment of the right forelimb. And as you might expect, the limbs constituting the other diagonal pair will adapt in reciprocal
fashion so that the horse can remain stabilized during movement.

During lameness evaluation, the practitioner must determine whether the origin of each gait deficit is primary in nature or a result of the horse’s attempt to maintain synchrony with its diagonal counterpart. In the latter case, lameness would be considered to be artificial or referred.

Referred lameness manifests dissimilarly between the front and hind limbs. This is due to a number of factors, most of which discriminate the horse’s general physique. Since horses are inherently front-end heavy, it is much easier for them to transfer weight in a hind-to-fore direction (fig. 10.2 A). Hind limb asymmetry, even when very mild, can dramatically influence how the horse loads the front end (VL 10c). In many instances, the degree of secondary/referred forelimb lameness exceeds that of its primary hind limb complement.

By contrast, horses are only marginally effective at transferring weight from the front

### 10.2 Dissimilar Transfer of Weight Between the Front and Hind End

A. Since horses naturally bear more load on their front end, it is relatively easy for them to transfer weight from the hind end in a forward direction (toward the front end).

B. Dissimilarly, horses are not very proficient at transferring weight in a backward direction (from the front end toward the back end).
to the back end (fig. 10.2 B). For this reason, forelimb weight-bearing lameness only generates visible hind limb asymmetry when it is pronounced (VL 10d). Moreover, the components of the lameness that get transferred tend to be those associated with stride length rather than load burden. Since the driving motive is usually to maintain balance (rather than shift weight), fore-to-hind referrals are almost always expressed in the contralateral hind limb. This is useful knowledge to the observer, who can surmise that any demonstrative weight-bearing lameness in the hind limb is probably authentic, since it is rare for referred deficits to manifest in this way.

It is important to keep in mind that the severity of the referred component may exceed that of its parent source. In fact, recognition of secondary and/or artificial lameness is often what prompts the horse owner to solicit veterinary intervention in the first place. Examiners who visually separate front and back halves of the animal, evaluate each half individually and actively seek potential relationships between coexisting deficits, will both clarify their assessment and enhance the quality of their interpretation.