

# Table of contents

About the Editor xi

Foreword to the Second Edition xiii  
*Kenneth A. Johnson*

Foreword xv  
*R. Randy Basinger, ACVS Foundation*

Preface xvii  
*Peter Muir*

Acknowledgements xix  
*Peter Muir*

Contributing Authors xxi

## I Structure and Function 1

Introduction 1  
*Peter Muir*

1 Morphology and Function of the Cruciate Ligaments 3  
*Hilde de Rooster and Eithne Comerford*

2 Biomechanics of the Cruciate Ligaments 13  
*Susannah J. Sample*

3 Cruciate Ligament Remodeling and Repair 21  
*Connie S. Chamberlain, Erin E. Crowley, and Ray Vanderby Jr.*

4 Meniscal Structure and Function 31  
*Antonio Pozzi and James L. Cook*

5 Biomechanics of the Normal and Cranial Cruciate Ligament-Deficient Stifle 39  
*Antonio Pozzi and Stanley E. Kim*

## II Etiopathogenesis of Cruciate Ligament Rupture 45

Introduction 45  
*Peter Muir*

6 Histology of Cruciate Ligament Rupture 47  
*Kei Hayashi*

7 Genetics of Cruciate Ligament Rupture 57  
*Lauren A. Baker and Peter Muir*

8 Cruciate Ligament Matrix Metabolism and Development of Laxity 65  
*Eithne Comerford*

9 Morphological Risk Factors for Cruciate Ligament Rupture 73  
*Eithne Comerford*

10 Role of Nitric Oxide Production and Matrix Protease Activity in Cruciate Ligament Degeneration 81  
*David E. Spreng and Simone Forterre*

11 Role of Antibodies to Collagen Type I and II 89  
*Hilde de Rooster and Eithne Comerford*

12 Synovitis Precedes Stifle Instability Associated with Cruciate Ligament Rupture 93  
*Jason A. Bleedorn*

13 Role of Synovial Immune Responses in Stifle Synovitis 101  
*Peter Muir*

### **III Clinical Features 107**

Introduction 107  
*Peter Muir*

14 Epidemiology of Cruciate Ligament Rupture 109  
*Lauren A. Baker and Peter Muir*

15 History and Clinical Signs of Cruciate Ligament Rupture 115  
*Peter Muir*

16 Partial Rupture of the Cranial Cruciate Ligament 119  
*Peter Muir*

17 Caudal Cruciate Ligament Rupture 123  
*Peter Muir*

18 Stress Imaging of the Stifle 127  
*Stanley E. Kim*

19 Stifle Ultrasonography 135  
*Cristi R. Cook*

20 Computed Tomography (CT) of the Stifle 141  
*Ingrid Gielen and Henri van Bree*

21 Magnetic Resonance Imaging of the Stifle 155  
*Peter V. Scrivani*

22 Risk Prediction of Cruciate Ligament Rupture using Stifle Diagnostic Imaging 165  
*Peter Muir*

## **IV Surgical Treatment 169**

Introduction 169

*Peter Muir*

23 Arthroscopy and Arthrotomy of the Stifle 171

*Brian S. Beale, Donald A. Hulse, Antonio Pozzi, and Peter Muir*

24 Joint Lavage 185

*Peter Muir*

25 Extracapsular Stabilization 189

*Selena Tinga and Stanley E. Kim*

26 Intra-Articular Repair for Cranial Cruciate Ligament Rupture in the Dog 201

*Jeffery J. Biskup and Michael G. Conzemius*

27 Tibial Plateau Leveling Osteotomy 217

*Susan L. Schaefer*

28 Tibial Tuberosity Advancement 227

*Randy J. Boudrieau*

29 Closing Cranial Wedge Ostectomy and Triple Tibial Osteotomy 243

*Simon C. Roe*

30 Treatment of Excessive Tibial Plateau Angle 253

*Michael P. Kowaleski*

31 Surgical Management of Cruciate Ligament Rupture Combined with Patella Luxation 261

*Anke Langenbach and Denis J. Marcellin-Little*

32 Biomechanics of the Cranial Cruciate Ligament-Deficient Stifle Treated by Tibial Osteotomies 271

*Antonio Pozzi, Stanley E. Kim, and Selena Tinga*

33 Arthroscopic Follow-Up after Surgical Stabilization of the Stifle 279

*Brian S. Beale and Donald A. Hulse*

34 Cranial Cruciate Ligament Debridement 291

*David E. Spreng*

35 Surgical Treatment of Concurrent Meniscal Injury 295

*Samuel P. Franklin, James L. Cook, and Antonio Pozzi*

36 Meniscal Release 301

*Antonio Pozzi and James L. Cook*

37 Progression of Osteoarthritis after Stifle Stabilization Surgery 307

*Susannah J. Sample*

38 Clinical Outcomes after Surgical Treatment of Cruciate Ligament Rupture 313  
*Mary Sarah Bergh and Steven C. Budsberg*

39 Success and Failure after Stifle Stabilization Surgery 317  
*Michael G. Conzemius and Richard B. Evans*

40 Diagnosis and Management of Orthopaedic Infection after Stifle Surgery 323  
*Noel M.M. Moens*

## **V Medical Management of Cruciate Ligament Rupture 331**

Introduction 331

*Peter Muir*

41 Medical Therapy for Stifle Osteoarthritis 333  
*Steven C. Budsberg*

42 Rehabilitation for Dogs with Cruciate Ligament Rupture 343  
*Denis J. Marcellin-Little and Courtney J. Arnoldy*

## **VI Future Directions 353**

Introduction 353

*Peter Muir*

43 Clinical Research Design and Patient-Oriented Outcomes 355  
*Dorothy Cimino Brown*

44 Total Knee Replacement in the Dog 363  
*Matthew J. Allen, William D. Liska, and Valentina Brioschi*

45 Regenerative Medicine and Cranial Cruciate Ligament Repair 371  
*Gabriel S. Perrone, Martha M. Murray, and Patrick Vavken*

46 Disease-Modifying Medical and Cell-Based Therapy 379  
*Susannah J. Sample and Peter Muir*

Index 385