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The Menisci The Meniscus *Surgery of the Meniscus* **Sports-Related Injuries of the Meniscus, An Issue of Clinics in Sports Medicine - E-Book** *Meniscus of the Knee* **Meniscus tears Engineering the Knee Meniscus In Defence of the Meniscus** The Patellofemoral Joint **Musculoskeletal Diseases 2021-2024** *Sports-related Injuries of the Meniscus The Management of Meniscal Pathology* **In Vivo Tissue Engineering of the Knee Joint Meniscus The Role of the Meniscus in the Tear Film** The Structure-Function Relationship in Knee Menisci *Articular Cartilage Lesions Complications in Canine Cranial Cruciate Ligament Surgery* Arthroscopic Meniscal Repair *Finite Element Analysis of the Effect of Low-speed Rear End Collisions on the Medial Meniscus* Knee Arthroscopy **The Role of the Meniscus in Knee Joint Load Transmission Morphomatric Analysis of Medial Meniscus Cadaveric Study Modeling Analysis of Meniscus of Knee Joint During Soccer Kicking** Role of Meniscus Micromechanics in Joint Function and Osteoarthritis **Advances in Knee Ligament and Knee Preservation Surgery Proteoglycans from the Meniscus of the Human Knee** *Do Not Give Up Your Favorite Sport Because of Meniscus Lesion of the Knee Meniscal Damage, Partial Medial Meniscectomy, and the Development of Osteoarthritis* Characterization of the Meniscus for Future Tissue Engineering Efforts **Biomechanical Characterization of the Meniscus and Its Attachments Through Experimentation and Simulation Partial Replacement of the Meniscus of the Knee Using a Biodegradable Scaffold Transport Properties in Porcine Meniscus Fibrocartilage Effect of Age and Fiber Orientation on Localized Tensile Failure Behavior in Human Meniscus Knee Meniscus** *Cartilage Restoration* **Knee Meniscus Correlation of Biomechanical Alterations Under Gonarthritis Between Overlying Menisci and Articular Cartilage Trauma and Orthopaedic Classifications** *The role of the meniscus in the healing process, following excision of the articular surfaces of the mandibular joint in rabbits* **1374 - Effect Of Complete Radial Tear Of The Lateral Meniscus On Tibiofemoral Contact Mechanics In The Lateral Knee Compartment: Comparison Among The Different Tear Sites**

Introduction: External compressive load applied to the knee joint is distributed by the menisci on tibiofemoral contact surface. The menisci decrease the tibiofemoral contact pressure by increasing the tibiofemoral joint congruity 1,2). It was demonstrated that complete radial tear of the lateral meniscus (LM) deteriorated its load distributional function in the lateral knee compartment 3). However, the influence of the radial tear location on the deterioration of the load distribution by the LM remains unclear. Therefore, the objective of this study was to compare the effect of complete radial tear of the LM on tibiofemoral contact mechanics in the lateral knee compartment among the different tear sites using a porcine knee model. Our hypothesis was that the effect of complete radial tear of the LM on tibiofemoral contact mechanics would differ among the different tear sites.Methods: Thirty fresh-frozen porcine knees were used. The study protocol was reviewed and determined not to require the oversight by the institutional review board of Osaka University Hospital. A 6-degree-of-freedom (DOF) robotic system including a velocity-control 6-axis manipulator with a universal force/moment sensor (UFS) was utilized. This system enables to manipulate a natural three-dimensional motion of the knee joint, prescribing the force/moment acting on the joint at zero except for the operatoru2019s intended direction by calculating the acquired data through the UFS.

Each knee was thawed at room temperature for 24 hours prior to testing, and all the muscles except for the popliteus were removed. The femoral and tibial ends were fixed in cylindrical molds of acryl resin and connected firmly to the manipulator in a 6-DOF robotic system. Pressure film sensor (K-Scan system, Tekscan Inc.) was inserted beneath the LM though the minimum incision of the anterior capsule to analyze the tibiofemoral contact pressure and area in the lateral knee compartment. First, 300 N of axial compressive load was applied to the intact knee at 15, 30, 60, 90 and 120u00b0 of flexion, respectively, while the peak contact pressure and contact area were recorded. Next, porcine knees were divided into three groups of 10 knees, and complete radial tear of the LM was created at the middle portion (group M), posterior portion (group P), or posterior root (group R) using a scalpel from the extra-knee joint. The radial tear location was the midpoint between the anterior and posterior root in the group M, the midpoint between the group M point and the posterior root in the group P, and the insertions of the meniscofemoral ligament and posterior tibial attachment in the group R. Then, the same test was again performed on the knee with complete radial tear of the LM, and the peak contact pressure and contact area were recorded. The peak contact pressure and contact area in the lateral knee compartment under 300 N of axial compressive load were compared among the four meniscal states (intact, group M, group P, and group R). Statistical analyses were performed by the Kruskal-Wallis test for one-way factorial analysis of variance (ANOVA) by ranks and the Steel-Dwass test for post-hoc multiple comparison. P-values less than 0.05 were considered statistically significant.Results: The peak contact pressure in the lateral knee compartment significantly increased in the knee with complete radial tear of the LM compared to the intact state (p Attempting to bridge the gap between the science and art of cartilage restoration, Cartilage Restoration: Practical Clinical Applications combines an overview of clinical research and methodologies with clinical cases to help guide the orthopedic treatment and care of patients presenting with cartilage issues. With chapters written by internationally-renowned orthopedic surgeons, topics include an overview of current surgical options, debridement and marrow stimulation, autograft plug transfer, allografts, cell therapy, and meniscal issues. Cartilage Restoration is a valuable resource for orthopedic surgeons, residents, and fellows. Osteoarthritis (OA) is the most prevalent joint disorder with risk factors that include aging and joint injury. OA is characterized as the degeneration of articular cartilage, but invariably affects other joint tissues, including subchondral bone, menisci, synovium, ligaments, tendons, and muscles. Of these tissues, the meniscus, in particular, plays a critical role in the knee joint, providing load bearing and transmission, shock absorption, smooth articulation, and joint stability. These biomechanical functions are dependent upon the hierarchical structure and composition of the meniscus at the tissue level, as well as homeostatic mechanisms maintained at the cell and molecular level. The importance of the meniscus is emphasized by the fact that meniscal degeneration and injuries as well as partial/total meniscectomy contribute to the development and/or progression of OA. However, the precise relationship between meniscus degeneration and aging, injury, and OA is poorly understood. Previous studies have examined the macroscopic and microscopic meniscus structure, composition, and biomechanical properties independently, but do not provide a global understanding of meniscus degeneration. This dissertation investigates the structure-function relationship of the meniscus in humans and mice during aging, injury, and OA using multidisciplinary biological and engineering tools and techniques across multiple scales, from tissue to molecular level. Age-dependent changes in the nanobiomechanical properties of the extracellular matrix of human meniscus were characterized by atomic force microscopy (AFM), which revealed distinct nanobiomechanical profiles of healthy, aged, degenerated, and OA tissue. A semi-quantitative histopathological grading system was developed to assess degenerative changes in the structure and composition of menisci from mice models of normal aging, injury, and OA. This histopathological grading system was applied to understand changes in and the function of autophagy in mice menisci during aging and

injury. Lastly, qualitative and quantitative ultrashort echotime (UTE) magnetic resonance imaging (MRI) was used to assess morphological and functional properties in menisci as well as determine the potential for identifying early biomarkers of meniscus degeneration and progression. This multiscale study of the structure--function relationship in the meniscus provides insight into diagnostics and treatment of meniscus injuries and degeneration for the prevention or slowing of the progression of OA. Discover how proper preparation, technique, and new suturing tools can make this demanding procedure faster and easier. Begin with the basic science of meniscal repair. Then study the leading surgical alternatives. Your expert contributors address the results as well as the complications of each technique. This book is a comprehensive journey through the pathogenesis and treatment of meniscal pathology. It details the elements that are necessary to properly understand, diagnose, and treat meniscal tears, ranging from vertical tears to radial tears and root avulsions. Treatment techniques are thoroughly described and illustrated, with presentation of the latest evidence on outcomes. The algorithmic treatment of meniscal tears has undergone a rapid transformation. We have progressed from the initial treatments involving removal of the meniscus using an open technique, to the performance of partial meniscectomies and complex meniscal repairs by means of an arthroscopic technique. The current treatment goal is to maintain the biology and mechanical integrity of this vital knee structure, an aim too often disregarded by past generations of surgeons. An explosion of new knowledge, coupled with advances in arthroscopic and surgical technology, has paved the way for wider application of approaches that help to preserve the meniscus, in the hope of preventing or delaying the development of knee arthritis. This book will have utility for all clinicians who treat meniscal lesions and will serve as a valuable resource for years to come. The most important function of the articular menisci of the knee is to transmit and even out the strain put on the knee joint especially in association with a more intensive exertion, such as running or jumping. They also are important regarding the stability of the knee as well as lubrication of the joint and nourishment of the cartilage surface. Typical symptoms of a meniscal injury include pain at the joint line as well as swelling, locking and giving way of the knee. Earlier, when open surgery was applied, the whole meniscus was removed. This led to premature osteoarthritis in all patients within 10 years. Nowadays, meniscal tears are treated endoscopically, and as little as possible of the meniscal tissue is removed. The meniscus is sutured back in place whenever possible. Meniscus lesions of the knee are a frequent traumatic event in many sports. Direct consequence is reducing physical activity. Conventional medicine proposes surgery. Conservative therapy, as outlined in this text, can be fully applied in most cases, and improves functional end result. This book, published in cooperation with ESSKA, provides an exhaustive review of the meniscus and its pathology, covering all aspects from the basic science of the normal meniscus to clinical and imaging diagnosis, meniscus repair and meniscectomy, outcomes and complications, postoperative management, and emerging technologies. The book opens by examining in depth aspects such as anatomy, histology, physiology, biomechanics, and physiopathology. Clear guidance is offered on arthroscopy and the classification of meniscal lesions, with consideration of the full range of meniscal pathology, including traumatic lesions, degenerative lesions, root tears, meniscal cysts, and congenital lesions. Choice of treatment in different settings is explained, and the various surgical techniques – meniscectomy, meniscal repair, and reconstruction with allografts – are described in detail with the aid of accompanying videos and with presentation of long-term results. The concluding chapter takes a look into the future of meniscus reconstruction, for example through regeneration using mesenchymal stem cells. This open access book focuses on imaging of the musculoskeletal diseases. Over the last few years, there have been considerable advances in this area, driven by clinical as well as technological developments. The authors are all internationally renowned experts in their field. They are also excellent teachers, and provide didactically outstanding chapters. The book is disease-oriented and covers all relevant imaging

modalities, with particular emphasis on magnetic resonance imaging. Important aspects of pediatric imaging are also included. IDKD books are completely re-written every four years. As a result, they offer a comprehensive review of the state of the art in imaging. The book is clearly structured with learning objectives, abstracts, subheadings, tables and take-home points, supported by design elements to help readers easily navigate through the text. As an IDKD book, it is particularly valuable for general radiologists, radiology residents, and interventional radiologists who want to update their diagnostic knowledge, and for clinicians interested in imaging as it relates to their specialty. This issue of Clinics in Sports Medicine, Guest Edited by Peter R. Kurzweil, MD, focuses on Sports-Related Injuries of the Meniscus. Articles in this issue will include: Indications for meniscus repair: traumatic tears do better; Biologic enhancement of meniscal repair; Repairing the Unrepairable Meniscus; Posterior Horn Tears – all-inside suture repair; Meniscal Repair – Inside-out sutures; Meniscal Root tears – Recognizing and Repairing; Meniscal Repair – outside-in suture; Meniscal Repair with the Newest Fixators – which are best?; Treating post-meniscectomy pain with Meniscal implants; Meniscus Repair in Children; and Getting Athletes Back to Sports after Meniscus Repair. Abstract: Just like menisci, articular cartilage is exposed to constant and varying stresses. Injuries to the meniscus are associated with the development of gonarthritis. Both the articular cartilage and the menisci are subject to structural changes under gonarthritis. The aim of this study was to investigate biomechanical alterations in articular cartilage and the menisci under gonarthritis by applying an indentation method. The study assessed 11 menisci from body donors as controls and 21 menisci from patients with severe gonarthritis. For the simultaneous examination of the articular cartilage and the menisci, we only tested the joint surfaces of the tibial plateau covered by the corresponding menisci. Over the posterior horn of the meniscus, the maximum applied load--the highest load registered by the load cell--of the arthritic samples of 0.02 ± 0.02 N was significantly greater ($p = 0.04$) than the maximum applied load of the arthritis-free samples of 0.01 ± 0.01 N. The instantaneous modulus (IM) at the center of the arthritic cartilage covered by the meniscus with 3.5 ± 2.02 MPa was significantly smaller than the IM of the arthritis-free samples with 5.17 ± 1.88 MPa ($p = 0.04$). No significant difference was found in the thickness of the meniscus-covered articular cartilage between the arthritic and arthritis-free samples. Significant correlations between the articular cartilage and the corresponding menisci were not observed at any point. In this study, the biomechanical changes associated with gonarthritis affected the posterior horn of the meniscus and the mid region of the meniscus-covered articular cartilage. The assessment of cartilage thickness as a structural characteristic of osteoarthritis may be misleading with regard to the interpretation of articular cartilage's biomechanical properties This book provides detailed guidance on knee arthroscopy that reflects the very latest advances in this ever-changing field. Among the techniques covered are reconstruction of the anterior and posterior cruciate ligaments, meniscal repair and transplantation, cartilage repair by means of osteochondral allograft transplantation and autogenous osteochondral transfer, medial patellofemoral ligament reconstruction, and high tibial osteotomy. In each case, clear descriptions of technique are supported by a wealth of high-quality illustrations, with identification of potential pitfalls and how to avoid them. In addition, the latest knowledge is presented on anatomy and biomechanics. The book is written by recognized experts in sports injuries and knee disorders. It will serve as an up-to-date reference for the experienced knee surgeon and an ideal source of information for all who wish to broaden their knowledge of and improve their skills in knee arthroscopy, whether general orthopaedists, orthopaedic trainees, or sports medicine physicians. The overall goal of this dissertation is to determine, through a mechanical perspective, how meniscal damage occurs and how subsequent partial meniscectomy can lead to the development of osteoarthritis. Individuals who suffer meniscus injuries suffer both short-term and long-term consequences, from painful joint-locking to premature osteoarthritis. This thesis provides

potential mechanisms behind degenerative damage to the posterior horn of the medial meniscus. Once this damage has occurred, this thesis provides an explanation for the changes that occur during walking after partial medial meniscectomy and then suggests a mechanism for why these subjects are at risk for developing premature osteoarthritis. Patterns of regional variation in transverse plane meniscal displacement during positions representative of normal gait were studied using cadaveric knees in a test bed developed to be compatible with magnetic resonance imaging (MRI). The results demonstrated that during the stance phase of walking, the lateral meniscus appears to displace with the femoral condyle while the medial meniscus, especially at the posterior horn, displaced minimally. The relatively low movement of the medial posterior horn suggests that this region sustains substantial cyclic stress to restrain the normal posterior displacement of the medial femoral condyle at heel strike of each gait cycle. These results help explain the chronic patterns of damage to the posteromedial horn. Gait analysis of subjects who had undergone partial medial meniscectomy revealed that during stance phase, these subjects had tibias that were externally rotated by 3.2° compared to their healthy contralateral limbs. Their operated limbs also exhibited reduced peak flexion and extension moments compared to their healthy limbs. The altered rotational position found likely causes changes in tibiofemoral contact during walking and could cause the type of degenerative changes found in the articular cartilage following meniscal injury. A joint level numerical model was developed to look further at the results from the first two studies. This 3D FE model looked at the effects of the previously noted tibial rotational shift and an increased adduction moment on the meniscal strains during a simulated portion of the gait cycle. The increased adduction moment resulted in increased strains of both the anterior and posterior horn of the medial meniscus. The external tibial rotational shift resulted in decreased strains in the posterior medial horn and increased strains in the anterior medial horn. The lateral meniscus exhibited much lower strains than the medial meniscus and minimal changes under the various loading conditions. It appears that the shift towards external tibial rotation seen clinically after partial medial meniscectomy is not likely to cause medial meniscal damage and therefore, the kinematic shift might be a result of the surgery. Finally, the FE model was then used to look at the effects of varying levels of partial medial meniscectomy on the rotational resistance of the tibia during a portion of the stance phase of gait. Additionally, the stresses and contact pressures in the articular cartilage of the knee were determined. The results showed that the more meniscal tissue that was removed, the greater the loss of rotational stability that was provided by the geometry. Additionally, the location of removal of meniscal tissue was important as the central rim resulted in a greater loss of rotational stability than removal from the anterior or posterior horns. Similarly, the more meniscal tissue that was removed, the higher the increase in contact pressures and stresses within the articular cartilage. Thus, the results indicate that it may simply be the resulting change in meniscal geometry after partial medial meniscectomy that results in the kinematic shift towards external tibial rotation we see in individuals who have undergone partial meniscectomy. The combination of the change in contact location along with the potential increase in cartilage stresses seen post-meniscectomy may place these individuals at higher risk for developing premature osteoarthritis. Taken together, the results of these studies provide potential mechanisms for the development of damage to the medial meniscus and then the subsequent changes that may lead to the development of premature knee osteoarthritis after partial meniscectomy. Additionally, the insights provided by this work have direct implications into treatments for meniscal injuries in order to prevent degenerative changes in articular cartilage. While the management of meniscal pathology is addressed in many large sports medicine textbooks, this dedicated book on the topic is a major addition to the information currently available for orthopedic surgeons and sports medicine specialists, residents and fellows. As symptomatic meniscal tears remain among the most common musculoskeletal problems that are seen and treated, this up-to-date book on the

evaluation and management of meniscal pathology, focused on current techniques and available evidence in the literature, is therefore extremely useful. To that end, The Management of Meniscal Pathology: From Meniscectomy to Repair and Transplantation is a comprehensive resource reviewing all aspects of managing symptomatic meniscal pathology. It is structured to proceed logically through an understanding of the anatomy and biomechanical importance of the meniscus in normal knee kinematics to the evaluation and treatment of meniscal tears and meniscal insufficiency. The chapters dedicated to the surgical management of meniscal pathology - including partial meniscectomy, meniscus repair, meniscal root repair and meniscal allograft transplantation - include step-by-step descriptions of various operative techniques, including pearls and pitfalls for the reader in addition to classic case examples. Non-operative approaches, as well as novel and emerging strategies and materials, are also highlighted, providing a well-rounded presentation of available techniques and outcomes. The knee meniscus was once thought to be a vestigial tissue, but is now known to be instrumental in imparting stability, shock absorption, load transmission, and stress distribution within the knee joint. Unfortunately, most damage to the meniscus cannot be effectively healed by the body. Meniscus tissue engineering offers a possible solution to this problem by striving to create replacement tissue that may be implanted into a defect site. With a strong focus on structure-function relationships, this book details the essential anatomical, biochemical, and mechanical aspects of this versatile tissue and reviews current meniscus tissue engineering strategies and repair techniques. We have written this text such that undergraduate students, graduate students, and researchers will find it useful as a first foray into tissue engineering, a cohesive study of the meniscus, or a reference for meniscus engineering specifications. Table of Contents: Structure-Function Relationships of the Knee Meniscus / Pathophysiology and the Need for Tissue Engineering / Tissue Engineering of the Knee Meniscus / Current Therapies and Future Directions The knee meniscus is a complex structure that has been the focus of important and extensive research for many years. The most common areas of study include meniscal structure, meniscal tears, regeneration, and the biomechanical and anatomical forces endured by the meniscus. Although much research has been done regarding these tissues, more is needed in order to fully understand the role that menisci plays in the function and pathophysiology of the human knee. The fibrocartilaginous meniscus plays an essential role in distributing the majority of the load and maintaining not only congruency, but also lubrication in the knee joint. Degeneration of the knee meniscus is commonplace, yet its pathophysiology has not been fully explained. Because the meniscus is a nearly avascular tissue which lacks blood vessels for the delivery of nutrients, one area of study needing further research is the transport of fluids and solutes through meniscal tissues. In this dissertation, custom experimental methods are used to characterize the transport of solutes and fluids in meniscus fibrocartilage. For each study, we investigated the effects of mechanical strain, tissue anisotropy, and tissue region on the transport behavior in porcine meniscus tissue. Using a direct permeation experiment, hydraulic permeability was investigated to determine its strain- and/or direction-dependent behavior in porcine meniscus fibrocartilage. Our measured permeability values (1.53-1.87?10-15 m4/Ns) are similar to those in the literature for meniscus tissues. Results indicate that hydraulic permeability is anisotropic, being significantly greater in the circumferential direction than in the axial. Additionally, it was found that with increased compressive strain, there was a significant decrease in hydraulic permeability for all groups studied. Strain-dependent and anisotropic (i.e., direction-dependent) transport of glucose in porcine meniscus fibrocartilage was investigated using customized chambers to measure the diffusion and partition coefficients. Results indicate that both diffusivity and partitioning of glucose in porcine menisci significantly decrease with increasing compressive strain. Furthermore, diffusivity of glucose was found to be anisotropic, being significantly greater in the circumferential direction than the axial at all strain levels. Using the results from the partitioning and diffusion of glucose, we were able to calculate the effective

diffusivity of porcine meniscus fibrocartilage. Finally, the strain-dependent and anisotropic electrical conductivity and relative ion diffusion was investigated in porcine meniscus fibrocartilage using a four-wire method. Results indicate that the conductivity and diffusion of ions in the meniscus significantly decreases with increasing compressive strain. Additionally, the conductivity and diffusion of ions was found to be significantly anisotropic, being greater in the circumferential directions than the axial direction at all strain levels. To our knowledge, this is the first study to quantitatively characterize the effects of strain, anisotropy, and region on transport properties in meniscus tissues. In particular, this is first study to measure glucose or ion diffusivity, glucose partitioning, or electrical conductivity in meniscus. The findings of this dissertation greatly enhance the knowledge of fluid and solute transport in the knee meniscus. Given that nutrient transport is critical for meniscus survival, this information can provide important insight into the functions and mechanisms of meniscus disease and even help identify effective treatment solutions for osteoarthritis. Filling a gap in the current literature, Complications in Canine Cranial Cruciate Ligament Surgery provides revision strategies for correcting the complications associated with surgical repair techniques for cranial cruciate ligament rupture, one of the most common causes of a hind limb lameness in dogs. Presenting step-by-step instructions for numerous surgical correction techniques, this practical guide covers articular, extra-articular and osteotomy repair techniques as well as non-surgical management, physical rehabilitation, clinical decision making, and more. The book begins with an overview of cranial cruciate ligament tear, diagnosis, and treatment goals, followed by a discussion of methods for minimizing surgical site infection and complications. Subsequent chapters describe the potential complications of a particular technique and explain how to identify, evaluate, and correct the complication. Throughout the book, hundreds of high-quality clinical photographs show the appearance of complications and demonstrate each step of the corrective procedure. This authoritative guide: Provides step-by-step techniques for surgical corrections of common complications Emphasizes surgical decision making and specific strategies for surgical correction Contains revision strategies for identification of intra-operative complications Covers evaluation and identification of post-operative complications Features more than 400 photographs and clinical images Part of the state-of-the-art Advances in Veterinary Surgery series, Complications in Canine Cranial Cruciate Ligament Surgery is an invaluable resource for surgical residents, veterinary surgeons, and general practice veterinarians alike. Reviews concepts on the biological, biochemical and biomechanical properties of the meniscus, its role in the function of the knee and the clinical management of meniscal injuries. Specialists assess the clinical experience with meniscectomy versus repair, discuss laser therapy and more. The meniscus is important in many aspects of knee function. The placement of meniscus where been located between the two bones of femur and tibia gives an advantage towards the knee joint. It is when the load been transmitted across the joint in order to give maximal congruency towards the joint. This study will focuses on two objectives which are to observe the effects towards the knee joint which having various cases of meniscus and also to observe the functionality of the meniscus which is wedges in shape. The method used in this study is a simulation of knee joint which is consisting of three main parts, femur, tibia and meniscus. In order to observe what the effects towards the knee joint, various cases is being simulated which are knee joint with healthy meniscus compared with knee joint with various of torn meniscus and a simulation of full leg with and without knee pad with existence of external impact. The boundary condition of force parameter is calculated from the ball velocity after being kicked where the comparison between the two types of kicking result with instep kicking got high impact force and distributed force than inside kicking. The highest distributed force then is used for the simulation. Simulation result shows that a healthy meniscus transmits load across the joint in a uniform state within the range of 0.3 MPa and 0.4MPa. For torn meniscus, the result shows that it is failed to transmit the load across the

joint. Thus an excessive stress is recorded across the surface of the tibia. The highest stress recorded is 0.5 MPa. For second simulation, 1000 N is used as an external force exerted to the leg surface. Result shows that the external force applied on the surface of the leg will give an effect towards the internal part of the knee joint where causing the knee joint to bend and meniscus to be compressed. Comparison between the full leg with and without knee pad shows that full leg without knee pad is having large of knee joint bending and meniscus be compressed more than full leg with knee pad. From these to simulation, an observation can be made where the placement of the meniscus between the femur and tibia is to maintain the congruency between the bones and to prevent an excessive stress happen to the joint. Drs. Cole and Malek, recognized leaders in the field, wrote this cutting-edge text to fill the void in the literature regarding the management of articular cartilage disease and meniscal deficiency. The book enables orthopedic surgeons to develop an evidence-based decision-making framework that guides the management of articular cartilage lesions. Carefully chosen contributors provide readers with a practical background in articular lesions, patient assessment, and management strategies. Subsequent chapters address the gamut of current surgical techniques, from arthroscopy and debridement to unicondylar arthroplasty, in a step-by-step manner. More than 500 detailed illustrations, many in color, help readers understand and master treatments. Case studies, which include preoperative planning and postoperative outcomes, reinforce the decision-making process. Nearly every permutation and treatment option is covered, making this text a prime resource for surgeons committed to exercising sound judgement. This guide focuses on the normal meniscal mechanism, body and function. Meniscal pathology and therapy are depicted in detail, followed by a presentation of long-term experience of meniscal transplantation and a look into the future of meniscal surgery. This issue of Clinics in Sports Medicine, Guest Edited by Peter R. Kurzweil, MD, focuses on Sports-Related Injuries of the Meniscus. Articles in this issue will include: Indications for meniscus repair: traumatic tears do better; Biologic enhancement of meniscal repair; Repairing the Unrepairable Meniscus; Posterior Horn Tears - all-inside suture repair; Meniscal Repair - Inside-out sutures; Meniscal Root tears - Recognizing and Repairing; Meniscal Repair - outside-in suture; Meniscal Repair with the Newest Fixators - which are best?; Treating post-meniscectomy pain with Meniscal implants; Meniscus Repair in Children; and Getting Athletes Back to Sports after Meniscus Repair. "The knee meniscus is a soft fibrous tissue that is subjected to large and repetitive loading, and is frequently torn. Tears of the meniscus are painful and cause knee instability, which contributes to the development of osteoarthritis, an irreversible and debilitating condition. Meniscus tears commonly occur from single high-magnitude loads that disrupt the highly aligned fibrous network, with a higher incidence of meniscus tears occurring in older populations. The objective of this study is to determine the effect of age and fiber alignment on the localized failure behavior of the lateral human knee meniscus during tensile loading. Testing consisted of a single quasi-static pull to failure while imaging with a high-speed camera. Digital image correlation was used to calculate the magnitude of the principal strains local to the failure initiation site, and the angle of the failure plane. Tests were performed on specimens from "young" and "aged" donors under 40 and over 65 years old, respectively, and loaded along or perpendicular to the preferred fiber axis. Results showed that the local first principal strains at failure were two to three-fold greater than the clamp-to-clamp strains. Age of the donor tissue had no significant impact on any of the stresses, strains, or failure planes measured. Testing perpendicular and along the fibers had failure strains of 129% and 34% respectively, and failure plane angles of 20° and 44°, respectively. These results indicate that failures initiate in the ground substance when loaded along the fiber direction, as the failures occur closest to the plane of maximum shearing of the ground substance at 45°, rather than maximum axial elongation of the fibers. For the first time, this study has measured the failure plane of the meniscus relative to the reinforcing fibers, and has measured the principal strains of the human lateral meniscus using a full field approach. This

is also the first study to investigate the effect of age on the failure properties of the human lateral meniscus. Results from this experimental study can be used to develop and validate mathematical models that describe and predict meniscus failure, and thereby give insight into methods to treat and prevent this prevalent injury."--Boise State University ScholarWorks. "The Medial Meniscus or MM is one of the main components in the knee joint. It functions as a weight transmitter from the femur to the tibia. It is also important for controlling knee movement and preventing dislocation. It is relatively more fixed and receives higher pressure than the lateral meniscus. These features make the MM more subjected to tears due to traumatic injuries therefore understanding its features is important. The MM thickness shows to increase the chance of MM injures by narrowing the joint space. This draws the attention to the MM thickness as an important factor to understand in details. Our purpose in this study was to evaluate the MM thickness. We measured the thickness of the MM at three sites of each menisci the anterior horn, the meniscal body, and the posterior horn. We found no significant difference between the thicknesses of the three sites among all subjects. The average thickness of the MM among all subjects including two males and four females are 2.73 mm for the anterior horn, 2.66 mm for the meniscal body, and 3.22 mm for the posterior horn. " -- Abstract. This comprehensive book offers an overview of the latest advances in knee ligament and knee preservation surgery, including cartilage, meniscus, and osteotomy procedures. Designed to offer practical guidance on the management of complex knee problems, it presents clinical scenarios as well as recommendations by leading international experts. Written in collaboration with ISAKOS and drawing on a variety of perspectives it is invaluable tool for orthopedic and sports medicine surgeons. This illustrated textbook is an essential and invaluable guide to young clinicians and researchers of Trauma and Orthopaedics, reporting all classification systems which are currently utilised in the clinical setting. It includes classifications relevant to both Elective Orthopaedic Practice and Orthopaedic Trauma. Clear graphic illustrations accompany the description of all different classification schemes in a comprehensive manner, together with a structured presentation of existing clinical evidence. In this manner each chapter of the different anatomical sites and pathologies assists the decision making of the readers regarding treatment strategy as well as informed consent of their patients. It is envisaged that this textbook will be a point of reference not only to the surgeons in training (residents) but also to senior surgeons and academic clinicians. The meniscus, a crescent-shaped fibrocartilage located between the femur and tibia ends of the knee, is an essential component of knee joint, responsible for stability, load transmission and lubrication. The unique biomechanical function of the meniscus is endowed by its hierarchically structured extracellular matrix (ECM). The knee meniscus has very limited self-healing capabilities, especially in the inner avascular, proteoglycan-rich zone. Currently, the mechanical knowledge of meniscus is mostly limited to the tissue level, so it is unclear how such unique ECM structure across multiple length scales endows the tissue with its specialized mechanical properties. The first part of the dissertation studied the anisotropy and heterogeneity of the micromechanical properties of the meniscus ECM in normal joint function as well as during maturation by using innovative atomic force microscopy (AFM) based nanomechanical tools. The systematic structure-mechanics understanding of the meniscus can serve as benchmark for understanding meniscus biomechanical function, documenting disease progression and designing tissue repair strategies. Injuries in the meniscus often lead to the development of post-traumatic osteoarthritis (PTOA) which is the most prevalent form of osteoarthritis (OA) among the younger population. Among different types of PTOA repair and amelioration, small molecule treatment has been considered as one target since it plays a critical role not only in signaling pathway, but also in extracellular matrix. The second part of the dissertation was to investigate the role of decorin, a major small leucine rich proteoglycan (SLPR), in meniscus dysfunction induced PTOA progression. After destabilization of medial meniscus (DMM) surgery, decorin knockout mice underwent

accelerated aggrecan loss and cartilage damage, signifying increased susceptibility to OA. Since decorin and biglycan are two structurally similar SLRPs, the inducible knockout of decorin / biglycan or both has been studied to delineate the roles of decorin and biglycan during OA progression. By using the inducible knockout mice, mice can develop normally before the surgery, thus the decorin's role during OA progression can be isolated from biological development. By deleting decorin or biglycan expression at the time of DMM surgery, decorin appears to play a more dominating role than biglycan, as illustrated by its more severe phenotype in inducible knockout model and elevated expression in wild type cartilage under OA condition. These results underlined decorin for serving as an indispensable constituent to the structural and functional integrity of cartilage ECM, and set a basis for developing decorin-based cartilage regeneration and repair strategies. The principal aim of this title is to provide the arthroscopic orthopaedic surgeon with a clear, concise account of the anatomy, pathology, conservative and operative surgical techniques in the management of meniscal pathology. Meniscal lesions are extremely common, and arthroscopic meniscal surgery is one of the most common orthopaedic surgical procedures performed. The art of meniscal surgery involves many steps, with ever-evolving techniques and implants. This book has been prepared during a period of widespread debate on, and evolution in, the conservative, surgical, and biological techniques for managing meniscal lesions. This text will help consolidate the current evidence to enable the development of optimal management plans for meniscal injuries.

Menisci And Articular Cartilage
- Trauma And Orthopaedic Classifications
- The Role Of The Meniscus In The Healing Process Following Excision Of The Articular Surfaces Of The Mandibular Joint In Rabbits
- 1374 Effect Of Complete Radial Tear Of The Lateral Meniscus On Tibiofemoral Contact Mechanics In The Lateral Knee Compartment Comparison Among The Different Tear Sites