**Spine Management Pathway**

*Developed in collaboration with MRI Online and the National Spine Management Group*

**Summary**

18 Mastery Series courses – foundational series of lectures & case review vignettes paired with DICOM images. Each subspecialty topic is broken into short, 5-7 minute clips for easy consumption. Starting with beginner content and advances in difficulty.

Course content is peer-reviewed for content validity by persons that do not have conflicts of interest related to the content and to verify the educational material is evidence-based, fair, balanced, and free from commercial bias. Course work includes didactic lecture as well as review of relevant research with 350 word summary and case submission. Case submission requires analysis of MRI studies related to that particular module.

68 CME hours of AMA PRA Category 1 Credits‚. MRI Online is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians (<https://www.accme.org>). See <https://mrionline.com/imaging-mastery-series-landing-page/> for more detail. Chiropractic curriculum includes additional coursework and hours related to research reviews and case submission for a total of \_\_\_\_\_\_ hours of Chiropractic CE approved through \_\_\_\_\_\_\_\_

**Learning Objectives**

After completing these courses, you will be better able to:

* Apply appropriate search patterns to ensure high quality case assessment
* Identify key anatomical landmarks, variations, and abnormalities on imaging
* Accurately interpret advanced imaging cases
* Formulate definitive diagnoses and limited differentials

**Detailed Curriculum**

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| **Title:**  | MRI Mastery Series: Spine |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | The Spine MRI Course features 27 rare and challenging spine MRI cases. Each one is reviewed in tandem with Dr. Pomeranz and Dr. Malcolm Shupeck. Dr. Shupeck has two decades of experience as a neurosurgeon and another 10 years of experience as a neuroradiologist and brings a unique, and valuable, perspective to assessing spine case. |
| **Length:**  | 4 Hours and 17 minutes, 30 Videos  |
| **Research Reviews:** | 5 Hours – research paper review and 350 word summary |
| **Case Submission**  | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-spine> |
| **TOTAL HOURS** | 15 |

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| **Title:**  | MRI Mastery Series: Degenerative Joint Disease (DJD) |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | In this series, Dr. Dave Yousem provides his perspective on degenerative joint disease (DJD) as a practicing neuroradiologist. He reviews the current nomenclature for disc pathology, some of the common locations for disc herniation and the surgical implications/outcomes of the varying degrees of disc injury. The Degenerative Joint Disease Mastery series provides more than a dozen case reviews of the diagnoses surrounding DJD. |
| **Length:**  | 3 Hours and 18 Minutes, 36 Videos  |
| **Research Review:** | 5 Hours – research paper review and 350 word summary  |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-degenerative-joint-disease-djd> |
| **TOTAL HOURS:** | 15 |

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| **Title:**  | MRI Mastery Series: Intradural Intramedullary Spinal Lesions |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | In this course from Dr. Yousem; MRI Mastery Series: Intradural Intramedullary Spinal Lesions, all of these questions and more will be answered. This entry marks the first in a trilogy of courses discussing spinal lesions. The first segment includes a spectrum of diagnoses related to intradural intramedullary lesions. Intradural extramedullary and extradural lesions will be covered in subsequent releases.Some of the topics included in this course include:* Multiple Sclerosis
* Von Hipple-Lindau Disease
* Lipoma
* Ependymoma
* Vacuolar Myelopathy
* Spinal Acute Disseminated Encephalomyelitis
* Cysticercosis
* Kawasaki Disease
* Dural Arteriovenous Fistulas
 |
| **Length:**  | 2 Hours and 51 Minutes, 43 Videos  |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Review:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | https://mrionline.com/courses/mri-mastery-series-intradural-intramedullary-spinal-lesions |
| **TOTAL HOURS:** | 15 |

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| **Title:**  | MRI Mastery Series: Intradural Extramedullary Lesions (IDEM) |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | In Dr. Yousem’s second part of his spinal lesions series, he dives into Intradural Extramedullary Lesions (IDEM), one of his favorite topics because, in general, it deals with benign entities.Some of the topics included in this course include:* Schwannomas
* Neurofibromatosis Type 1 & 2
* Meningiomas
* Hemangioblastomas
* Lipoma
* Dural Ectasia
* And many more…
 |
| **Length:**  | 2 Hours and 17 Minutes, 42 Videos  |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-intradural-extramedullary-spinal-lesions> |
| **TOTAL HOURS:** | 15  |

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| **Title:**  | MRI Mastery Series: Extradural Lesions |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | In Dr. Yousem’s third part of the spinal lesions series, he dives into the different etiologies of extradural spinal lesions which can compress the dura and mimic intradural lesions. Includes:* Hematomas- Subdural & Epidural
* Diskitis & Osteomyelitis
* Spinal Infections
* Homatopoiesis
* Congential/Developmental Spinal Lesions
* And many more…
 |
| **Length:**  | 1 Hours and 47 Minutes, 34 Videos  |
| **Research Reviews:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | https://mrionline.com/courses/mri-mastery-series-extradural-lesions |
| **TOTAL HOURS:**  | 12  |

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| **Title:**  | Imaging Mastery Series: The Carotid Space |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | Dr. Dave Yousem takes a detailed look at the imaging of the carotid space. While many of the diseases that affect this space tend to be benign, it is important to assess their impact on the structures within the carotid space and understand what implications a particular displacement may have for the final diagnosis. The Imaging Mastery Series: Carotid Space will also examine the anatomy of the head and neck, important differential diagnoses, as well as some pertinent clinical pearls for imaging this space. |
| **Length:**  | 3 Hours and 19 Minutes, 60 Videos  |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/imaging-mastery-series-carotid-space> |
| **TOTAL HOURS:** | 15 |

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| **Title:**  | Emergency Neuroimaging: Head, Neck & Spine |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | The Emergency Neuroimaging course presents the most common presentations in the emergency department and is designed to prepare radiologists to be “on call”. * Orbital Trauma/Inflammation
* Facial/Neck Trauma
* Sore Throat Pain & Fever
* Mass in the Neck
* Cervical Spine Trauma
* Fever, Back Pain
* Other Head and Neck emergencies

The series includes in-depth review of 45 cases (with DICOMS) along with pre- and post-test multiple choice questions to assess learning. |
| **Learning Objectives** | After completing this course, you will be better able to:* Provide high quality imaging services in the emergency care setting
* Accurately interpret imaging cases
* Evaluate the most common presentations on imaging
* Propose appropriate next steps for patient care related to likely diagnoses
 |
| **Length:**  | 7 Hours and 30 Minutes, 115 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **Bibliography (Suggested Reading):** | **See Appendix A** |
| **URL to the course start:** | <https://mrionline.com/courses/emergency-neuroimaging-head-neck-spine/> |
| **TOTAL HOURS:** | 18 |

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| **Title:**  | MRI Mastery Series: Demyelinating Disease |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | With a variety of pathologies and a multitude of presentations, keeping the demyelinating disorders differentiated is challenging at the best of times. Dr. Yousem introduces this series with a look at the anatomy involved in these processes as well as a discussion on imaging technique. We then take a deep dive into case review covering nearly 30 cases. |
| **Length:**  | 4 Hours and 1 minute, 46 Videos  |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-demyelinating-disease> |
| **TOTAL HOURS:** | 15  |

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| **Title:**  | Emergency Neuroimaging: Brain |
| **Course Instructor:** | David M Yousem, MBA, MD |
| **Description:** | The Emergency Neuroimaging course presents the most common presentations in the emergency department and is designed to prepare radiologists to be “on call”. * New Neurologic Deficit
* Head Trauma
* Worst Headache of Life
* Found Down
* Fever & Seizures
* S/P VPS (ventriculoperitoneal shunting), New Lethargy

The series includes in-depth review of 38 cases (with DICOMS) along with pre- and post-test multiple choice questions to assess learning. |
| **Learning Objectives** | After completing this course, you will be better able to:* Provide high quality imaging services in the emergency care setting
* Accurately interpret imaging cases
* Evaluate the most common presentations on imaging
* Propose appropriate next steps for patient care related to likely diagnoses
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| **Length:**  | 7 Hours, 91 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **Bibliography (Suggested Reading):** | **See Appendix A** |
| **URL to the course start:** | <https://mrionline.com/courses/emergency-neuroimaing-brain/> |
| **TOTAL HOURS:** | 20 |

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| **Title:**  | MRI Mastery Series: Nerve Imaging - Entrapment Neuropathy and Tumor Imaging of Nerves |
| **Course Instructor:** | Megan K Mills, MD |
| **Description:** | In this course, Dr. Megan Mills focuses on MRI of nerve pathology with a focus on the upper extremity. The course begins with general MRI protocol of these cases. Followed by looking at the different phases of denervation and then patterns of muscle denervation. Also covered in this course is the anatomy of the nerve pathways as well as a review of a series of nerve imaging cases including impingement syndromes, traumatic injuries, infectious and inflammatory conditions, and tumors. |
| **Length:**  | 1 Hour and 49 Minutes, 43 Videos |
| **Research Review** | 5 Hours – research paper review and 350-word summary |
| **Case Submission** | 5 Hours – 5 MRI cases are submitted during this module |
| **Bibliography (Suggested Reading):** | Andreisek G, Crook DW, Burg D, Marincek B, Weishaupt D. Peripheral neuropathies of the median, radial and ulnar nerves: MR imaging features. RadioGraphics 2006; 26:1267–1287Miller TT, Reinus WR. Nerve Entrapment Syndromes of the Elbow, Forearm, and Wrist. American Journal of Roentgenology. 2010 195:3, 585-594Linda D, Harish S, Stewart B, Finlay K, Parasu N, Rebello R. Multimodality Imaging of Peripheral Neuropathies of the Upper Limb and Brachial Plexus. Radiographics 2010; 30:1373-1400Kim, S.J., et al., MR imaging mapping of skeletal muscle denervation in entrapment and compressive neuropathies. Radiographics, 2011. 31(2): p. 319-32.Mitchell, C. H., Brushart, T. M., Ahlawat, S., Belzberg, A. J., Carrino, J. A., & Fayad, L. M. (2014). MRI of sports-related peripheral nerve injuries. American Journal of Roentgenology, 203(5), 1075-1084. |
| **URL to the course start:** | <https://mrionline.com/courses/nerve-imaging-entrapment-neuropathy-and-tumor-imaging-of-nerves> |
| **TOTAL HOURS:** | 12 |

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| **Title:**  | MRI Mastery Series: Brain Tumors |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | MRI Mastery Series: Brain Tumors tackles one of the most enigmatic topics in neuroradiology; cerebellar masses. Each module in this series is built to cover a specific subset of brain lesions. Mastery Series: Brain Tumors currently offers lectures on meningiomas and non-glial tumors.In this course you can view lectures on best practice protocols, anatomic correlations and diagnostic case review from Dr. Pomeranz and guest lecturer, Dr. Benjamin LeSar.Dr. LeSar is Board certified and completed his Neuroradiology Fellowship at Yale University School of Medicine. He is a member of the Radiological Society of North America, American Roentgen Ray Society, and American College of Radiology |
| **Length:**  | 1 Hour and 49 Minutes, 29 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Review:** | 5 Hours – 5 MRI cases are submitted during this module |
| **Bibliography (Suggested Reading):** | Bonneville F, Sarrazin JL, Marsot-Dupuch K, et al. Unusual lesions of the cerebellopontine angle: a segmental approach. Radiographics. 2001;21(2):419-438. doi:10.1148/radiographics.21.2.g01mr13419Leung RS, Biswas SV, Duncan M, Rankin S. Imaging features of von Hippel-Lindau disease. Radiographics. 2008;28(1):65-323. doi:10.1148/rg.281075052Saloner D, Uzelac A, Hetts S, Martin A, Dillon W. Modern meningioma imaging techniques. J Neurooncol. 2010;99(3):333-340. doi:10.1007/s11060-010-0367-6Starr CJ, Cha S. Meningioma mimics: five key imaging features to differentiate them from meningiomas. Clin Radiol. 2017;72(9):722-728. doi:10.1016/j.crad.2017.05.002Watts J, Box G, Galvin A, Brotchie P, Trost N, Sutherland T. Magnetic resonance imaging of meningiomas: a pictorial review. Insights Imaging. 2014;5(1):113-122. doi:10.1007/s13244-013-0302-4 |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-brain-tumors> |
| **TOTAL HOURS:** | 12 |

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| **Title:**  | MRI Mastery Series: Brain Anatomy |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | In MRI Mastery Series: Brain Anatomy, we bring that crucial skill to the front – identifying important landmarks, examining morphologic relationships and discussing their relevance. The first segment in this series focuses on surface anatomy, sulci and gyri. The second series examines each of the cranial nerves. Some of the features discussed include:Sylvian FissureMiddle Frontal GyrusInferior Parietal LobePars MarginalisParieto-occipital SulcusCerebellar VermisCranial Nerves 1-12and more… |
| **Length:**  | 2 Hours and 56 Minutes, 71 Videos  |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-brain-anatomy> |
| **TOTAL HOURS:** | 15  |

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| **Title:**  | MRI Mastery Series: Neurovascular |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | Introducing MRI Online’s newest Mastery Series on Neurovascular Imaging. This series includes nearly 30 vignettes and offers 3 CME upon completion.Nothing creates a sense of alarm like a Neurovascular case. Findings can range from critical to benign, and the window for intervention is tight. How can you help these patients get the help they need as quickly as possible?In the MRI Mastery Series: Neurovascular, we review over a dozen cases surrounding this topic. Once again we are joined by the esteemed Malcolm Shupeck, M.D., to provide some crucial insight on the management of these time-sensitive cases. |
| **Length:**  | 3 Hours and 10 Minutes, 33 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | <https://mrionline.com/courses/mri-mastery-series-neurovascular> |
| **TOTAL HOURS:** | 15 |

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| **Title:**  | MRI Mastery Series: Hip |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | Hip MRI Anatomy & Diagnoses covered in this Course include: Acetabular Labral InjuriesAthletic pubalgiaAvascular necrosis (AVN)Cam impingementFemoroacetabular impingement (FAI)Labral TearsLegg-Calvé-Perthes disease (LCPD)Osteitis pubisPincer impingementPiriformis muscle syndromeRectus abdominisRectus femorisSlipped capital femoral epiphysis (SCFE)Snapping tendon syndromeAnd much more… |
| **Length:**  | 2 Hour and 15 Minutes, 25 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Review:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | [**https://mrionline.com/courses/mri-mastery-series-hip**](https://mrionline.com/courses/mri-mastery-series-hip) |
| **TOTAL HOURS:** | 15 |

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| **Title:**  | MRI Mastery Series: SLAP Lesions |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | The SLAP Lesions Mastery Course utilizes diagrammatic examples, surgical video and MRI case review to clearly define these injuries. Upon completing this course, you will know SLAP lesions I – X inside and out, and press forward with confidence where others might be tripped up. |
| **Length:**  | 1 Hour and 17 Minutes, 21 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Review:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | [**https://mrionline.com/courses/mri-mastery-series-slap-lesions**](https://mrionline.com/courses/mri-mastery-series-slap-lesions) |
| **TOTAL HOURS** | 12  |

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| **Title:**  | MRI Mastery Series: Shoulder |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | Shoulder MRI Anatomy & Diagnosis covered in this Course include:Adhesive capsulitisAnterior labral periosteal sleeve avulsion (ALPSA)Bankart lesion and bony bankartBiceps ‘reflection’ pulleyBiceps tendonBony humeral avulsion of the glenohumeral ligament (BHAGL)Buford complex (Variant)Complex multi directional microinstabilityCoracoacromial ligamentDislocationGlenohumeral ligamentsGlenoid cartilaginous defectGlenoid cavityGlenoid labrumGlenoid labrum ovoid mass (GLOM) lesionHill-Sachs lesionHumeral avulsion glenohumeral ligament (HAGL)Humeral headImpingementInferior glenohumeral ligament (IGHL)Ligamentous injuriesMiddle glenohumeral ligament (MGHL)Posterior labrum periosteal sleeve avulsion (POLPSA)Reverse humeral avulsion of the glenohumeral ligament (RHAGL)Rotator cuff intervalRotator cuff tearSLAP (superior labrum anterior and posterior) lesionsSuperior glenohumeral ligament (SGHL)Superior labral tear from anterior to posterior (SLAP) lesionSupraspinatus muscleSupraspinatus tendon tearTriceps muscle tearAnd much more… |
| **Length:**  | 6 Hours and 40 Minutes, 68 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | [**https://mrionline.com/courses/mri-mastery-series-shoulder**](https://mrionline.com/courses/mri-mastery-series-shoulder) |
| **TOTAL HOURS:** | 20 |

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| **Title:**  | MRI Mastery Series: Knee |
| **Course Instructor:** | Stephen J Pomeranz, MD |
| **Description:** | Knee MRI Anatomy & Diagnoses covered in this Course include:Anterior Cruciate Ligament (ACL)Arcuate LigamentBucket Handle TearCyclops LesionHorizontal Meniscal TearJumper’s Knee (Infrapatellar Tendinopathy)Lateral collateral ligament (LCL)Lateral MeniscusLigamentsMedial collateral ligament (MCL)Medial patellofemoral ligament (MPFL)Meniscal OssicleMeniscocapsular SeparationMeniscusMorel-Lavallée lesionNeurovascular bundlesOsteochondritis dissecans (OCD)Parrot Beak TearPatellar [Quadriceps] TendonPatellar stabilizersPatellofemoral ChondromalaciaPeroneal Tunnel SyndromePosterior cruciate ligament (PCL)Posterolateral Corner (PLC)Posteromedial Corner (PMC)Quadriceps tendonRadial Meniscal TearRoot TearSegond FractureSinding-Larsen-Johansson syndromeSkeletal relationshipsSynoviumTendons (Posterior and Anterior)Vertical TearAnd much more… |
| **Length:**  | 7 Hours and 27 Minutes, 89 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **Bibliography (Suggested Reading):** | Layered Approach to the Anterior Knee: Normal Anatomy and Disorders Associated with Anterior Knee Pain, Flores et al; RadioGraphics 2018; 38:2069–2101 <https://doi.org/10.1148/rg.2018180048>Is Superolateral Hoffa Fat Pad Edema a Consequence of Impingement between Lateral Femoral Condyle and Patellar Ligament, Campagna et al; Radiology: Volume 263: Number 2—May 2012. <https://doi.org/10.1148/radiol.12111066>.MR Imaging of Patellar Instability: Injury Patterns and Assessment of Risk Factors, Diederichs, et al; RadioGraphics 2010; 30:961–981. <https://doi.org/10.1148/rg.304095755>.MR Imaging–based Diagnosis and Classification of Meniscal Tears, Nguyen, et al; RadioGraphics 2014; 34:981–999. <https://doi.org/10.1148/rg.344125202>Unraveling the Posterolateral Corner of the Knee. Rosas, Humberto; RadioGraphics 2016; 36:1776–1791. <https://doi.org/10.1148/rg.2016160027>Posteromedial Corner of the Knee: The Neglected Corner, Lundquist et al; RadioGraphics 2015; 35:1123–1137; <https://doi.org/10.1148/rg.2015140166>. |
| **URL to the course start:** | [**https://mrionline.com/courses/mri-mastery-series-knee**](https://mrionline.com/courses/mri-mastery-series-knee) |
| **TOTAL HOURS:** | 20 |

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| **Title:**  | Imaging Mastery Series: Pediatric MSK |
| **Course Instructor:** | Mahesh Thapa, MD, MEd, FAAP |
| **Description:** | When it comes to imaging – pediatric patients aren’t just tiny adults. Differences range from the obvious appearance of an open growth plate to the more nuanced signal intensities of ossification centers. Knowing when something is abnormal and when it’s a normal presentation for a patient’s age is part of what makes pediatric imaging so challenging. In Dr. Thapa’s latest series we’ll take a look at cartilage injury and abnormalities in the pediatric community. |
| **Length:**  | 4 Hours and 8 Minutes, 71 Videos |
| **Research Review:** | 5 Hours – research paper review and 350-word summary |
| **Case Submission:** | 5 Hours – 5 MRI cases are submitted during this module |
| **URL to the course start:** | [**https://mrionline.com/courses/imaging-mastery-series-pediatric-msk**](https://mrionline.com/courses/imaging-mastery-series-pediatric-msk) |
| **TOTAL HOURS:** | 15 |