

DHMC MUSCULOSKELETAL RADIOLOGY ROTATION GUIDANCE

Welcome to the musculoskeletal radiology (MSK) section at Dartmouth-Hitchcock Medical Center! This document should guide you through your rotations and enhance your educational experience.

FACULTY

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GENERAL EXPECTATIONS

PREPARATION

- Review this document prior to each MSK rotation
- Acquire the textbooks from the resident library OR electronically from the Geisel Biomedical Library for the assigned readings. Reading assignments are included in a separate document.

TYPICAL SCHEDULE

- Plan on 0745-1700, excepting when there are scheduled resident conferences/meetings.
- During first year rotations, two full days per week will be dedicated to MSK fluoroscopic-guided procedures to acquire proficiency for call. You will learn to access joints of all sizes (eg, shoulder, knee, hip, ankle, wrist etc), with and without hardware in place.
- PGY3-5 will have one day per week of MSK fluoroscopic guided procedures (all types of joints) to maintain proficiency for call.
- The remaining days, you will do diagnostic MSK. Advanced procedures can be performed as clinical and education needs suggest.

LECTURES

- Residents shall attend the required residency lectures as scheduled by the Program Director.
- Residents are encouraged to participate in Sarcoma Tumor Boards and Radiology/Rheumatology conferences.

DIAGNOSTICS

- Studies are to be read from “North MSK All” worklist, STAT exams first, then oldest studies unless specifically directed by faculty to tighten your focus.
- First years will focus on XR and CT.
- PGY2-4 will have staged introduction to MRI and US as well as continuing XR and CT interpretation.
- Assign your reports to “MSK Drafts.” Your attending faculty will read you out at least twice per day.
- STAT studies should be interpreted as they appear on the list, and they should be checked out with a faculty within one hour.
- Case volume expectations are not negotiable. 40 exams interpreted per day is the bare minimum to successfully complete each rotation. This is a low number compared to expectations at other programs. Compliance will be documented in each rotation’s MedHub evaluation.
- Pediatrics cases may be checked out with Dr. S. Foster if he is assigned to Peds, Plain Film or PM General. If he’s on fluoro or ultrasound, check first.

PROTOCOLING

- MSK protocol lists include: MHMH MSK, MHMH MSK Procedures, and MHMH MSK US
- Some Outreach sites will have hard-copy protocols.
- First years will go through protocols with faculty, emphasizing STAT studies.
- Independent protocoling of studies by residents will progress throughout training. Faculty should review complicated protocols with the resident prior to final protocoling.

PROCEDURES

- Fluoroscopic guided aspirations, steroid injections and arthrograms have minimum numbers to not only be confident and proficient to perform on call, but also as requirements for graduation. These numbers and joint distribution are provided under separate cover.
- Preview the procedure schedule in advance to make sure you understand the procedure to be performed, how the patient should be positioned and any potential contraindications in the patient record. Review any questions or concerns with faculty.

ASSESSMENT

You will receive a MedHub evaluation for each block of time you spend in MSK. The following achievements will be documented in the evaluations to help you and the Clinical Competency Committee track your learning progress:

- Average daily case volume during the rotation.
- Procedure proficiency/safety evaluation (PGY2 only)
- RadExam (assigned by the Program Coordinator, to be completed before the final day of each rotation)
- End of rotation oral exam (last week of the rotation per academic year)
- Review of strengths and opportunities for improvement

If, for scheduling reasons, your MSK experience is in separate blocks during a given academic year, you will take one oral exam during your final MSK block. If you are on vacation the final week of the year's rotation, an alternate time will be arranged for your oral exam. You are responsible for the learning topics assigned each academic year. It is to your advantage, both for the Core Exam and life as a radiologist, to keep on schedule.

RESOURCES

- Society of Skeletal Radiology Core MSK Lecture Series: <https://radiologycorelectures.org/msk/>
- Clyde **Helms**, Fundamentals of Skeletal Radiology 5th ed.
- Anne **Brower**, Arthritis in Black and White 3rd ed.
- Felix **Chew**, Skeletal Radiology: The Bare Bones 3rd ed.
- Nancy **Major** MD, Mark **Anderson** MD et al, Musculoskeletal MRI, 3rd ed.
- Electronic editions of Helms, Brower and Major/Anderson are available through the Geisel biomed library.
- Hard copies of each textbook are available in the MSK library. Please return them after your rotation so they are available for the next rotation.

FIRST YEAR MSK ROTATIONS

GOAL – Establish a solid foundation in musculoskeletal imaging and fluoroscopic-guided procedures to prepare for call and more advanced imaging interpretation.

LEARNING OBJECTIVES –

- Build a robust, descriptive musculoskeletal vocabulary
- Review radiographic anatomy for spine, pelvis and extremities
- Develop a consistent search pattern and dictation technique for radiographs and CT
- Establish fluoroscopic guided procedure competence
- Learn the basics of protocoling STAT cross sectional imaging
- Review basic interpretation of MRI for septic joint/osteomyelitis

FOCUS TOPICS –

- Musculoskeletal trauma on XR and CT
- Describe findings and patterns of arthropathy
- Self-learning reading and video topics on basics of bone tumor, infection and orthopedic hardware XR interpretation

SECOND YEAR MSK ROTATIONS

GOAL – Develop a practical knowledge of physics and expand imaging interpretation to include MRI and US. Continue to refine search patterns and production of organized, actionable reports for the referring clinicians.

LEARNING OBJECTIVES –

- Refresh knowledge, interpretation and dictation skills gained during the first year rotation(s).
- Maintain proficiency in fluoroscopic guided procedures
- Learn the standard MRI sequences used in MSK imaging
- Practice using your physics knowledge in MSK imaging; for example, identify common imaging artifacts and how to optimize MRI, CT and US images
- Expand interpretation of MRIs, typically knee and shoulder. Continue to interpret infection cross-sectional imaging.
- Do the initial review of tech-produced US images with the tech and faculty, then real-time with tech and/or faculty.

FOCUS TOPICS–

- Continued interpretation of XR and CT
- Learn basics of MSK US imaging
- Introduce knee and shoulder MRI
- Self-learning with reading and video lecture assignments on congenital musculoskeletal disorders, bone and soft tissue tumors, metabolic bone disease and other bone marrow disorders.

THIRD YEAR MSK ROTATIONS

GOAL – Maintain proficiency in the procedures and imaging interpretation as established during prior rotations. By January of the third year of residency, you should have completed (at least once) all the required reading assignments for the first through third year rotations in preparation for your subsequent Core Exam studying. There should be no expectation of early release for Core Exam studying.

LEARNING OBJECTIVES –

- Refresh knowledge, interpretation and dictation skills gained during the first and second year rotation(s) for XR, CT, US and MRI.
- Maintain proficiency in fluoroscopic guided procedures
- Expand MRI interpretation to include the remaining joints (elbow, wrist/hand, hips/pelvis and foot/ankle)
- If not already started, practice searching for and reporting pertinent positives and negatives for tumor imaging

FOCUS TOPICS –

- Continued interpretation of XR, CT, US and MRI
- Expanded reading and video lecture assignments for MRI of remaining large joints and muscle abnormalities.

FOURTH YEAR MSK ROTATIONS

GOAL – The final year of residency should be geared toward becoming an effective, efficient general radiologist. This includes reviewing a high volume of exams; interpreting the full spectrum of musculoskeletal imaging; producing accurate, actionable imaging reports for referring clinicians; confidently protocoling cross-sectional exams and performing basic musculoskeletal procedures.

LEARNING OBJECTIVES –

- Refresh knowledge, interpretation and dictation skills gained during the first, second and third year rotation(s) for XR, CT, US and MRI.
- Maintain proficiency in fluoroscopic guided procedures. If you anticipate doing basic ultrasound or CT guided procedures in your practice following residency, gain some experience with pre-procedure evaluation and interventional MSK techniques.
- Expand MRI interpretation to include tumor and rheumatologic disorders
- Refine differential diagnoses

FOCUS TOPICS –

- None. Interpret the full spectrum of MSK imaging, refreshing topics through self-learning as needed.
- Function as a junior fellow/staff, managing workflow, dispositioning cross-sectional protocols, taking provider consultations and serving as the first point of contact for junior residents.