

FELLOWSHIP IN MUSCULOSKELETAL IMAGING

Goals and objectives

Rotation

The Musculoskeletal Imaging fellowship is a one-year post-residency training program. The program provides clinical experience in the full range of disorders affecting both the adult and pediatric musculoskeletal systems, involving both the axial and appendicular skeleton including; traumatic, neoplastic, infectious, articular, hematologic, metabolic, congenital/developmental, and degenerative disease.

In order to provide this comprehensive experience, the program includes rotations at:

- Joint Department of Medical Imaging (JDMI) at Mount Sinai Hospital and the University Health Network (Toronto Western, Toronto General, Toronto Rehabilitation Institute and Princess Margaret Hospitals)
- The Hospital for Sick Children
- St Michael's Hospital

The rotation is divided into 8 months spent at the JDMI sites, with 4 months rotating to the Hospital for Sick Children and St Michael's Hospital one day each per week, in addition to the JDMI sites.

Clinical responsibilities

Fellows are responsible for coordinating and reporting medical imaging for both inpatients and outpatients at each institution, and work in close consultation with the staff, fellows, and residents in Orthopedic Surgery, Rheumatology, Oncology, and Emergency Medicine, as well as occasionally interacting with other subspecialists in Medicine and Surgery.

The clinical work is physically carried out at Mount Sinai and Toronto Western Hospitals. Reporting for the other sites within JDMI is carried out while at these sites. The working hours are 8am to 5pm. The expectation is to report and issue a verified report on the plain radiographs and cross sectional imaging performed at the relevant sites till 5pm.

In addition the fellows are expected to protocol online and hard copy requisitions daily.

Throughout the day there will often be MRI cases requiring monitoring. If you might be away from the reporting room for an extended period of time (e.g. over lunch) it is worthwhile contacting MRI to ensure there are no monitored cases.

When organizing add on procedures for a day you might be at a different site or or academic it is important to communicate with the radiologist (fellow or staff) that may be performing the procedure.

Mount Sinai Hospital

While at Mount Sinai Hospital, the clinical responsibility is for reporting the plain radiographs, CT and MRI performed at Mount Sinai, Women’s College Hospital, Princess Margaret Hospital and the Rehab Institute. Clinical colleagues can request emergency ultrasound and it is the responsibility of the fellows to co-ordinate with the ultrasound division to arrange the scan.

In addition, there is an abundance of procedures including ultrasound and CT guided biopsies, arthrograms, joint injections and aspirations. The biopsies are usually performed in the morning sessions Monday to Friday. Ultrasound guided injections may also be scheduled during the morning sessions of the week. These procedures are carried out in the radiology procedure care unit (RPCU), and it may be wise to check with the staff at the unit, to plan the day. There are usually no procedures in the afternoon sessions on Monday and Friday. Tuesday and Thursday afternoons are dedicated to arthrograms for MRI, and Wednesday afternoons are usually therapeutic fluoroscopy guided joint injections.

There can be emergency add-on procedures to rule out infection or for image guided aspiration of collections. This can include inpatients at Princess Margaret and Toronto General Hospitals. Due to the geographic location of these hospitals, such emergency procedures are the responsibility of the radiologists working at Mount Sinai.

	MON	TUE	WED	THU	FRI
AM	Reporting	Reporting RPCU procedures	Reporting RPCU procedures	Reporting RPCU procedures	Reporting RPCU procedures
PM	Reporting Tumor boards	Reporting MR Arthrograms	Reporting Injections	Reporting MR Arthrograms	Reporting

Toronto Western Hospital

At Toronto Western, the clinical responsibility is to report plain radiographs, MRI and CT performed at Toronto Western and Toronto General Hospitals.

Ultrasound sessions at Toronto Western are on Tuesday afternoons and all day Wednesday. Wednesday morning ultrasound session is a shoulder list, usually performed by ultrasound technologists, but the fellows are expected to take an active role in scanning, to gain experience.

There are procedures performed at Toronto Western on Tuesday, Thursday and Friday mornings, which include joint injections, arthrograms for MRI, as well as spine intervention, which include nerve root blocks, facet joint injections and sacroiliac joint injections.

As at Mount Sinai hospital, clinical colleagues can request urgent ultrasound and procedures and it is the responsibility of the fellows to co-ordinate the procedure with ultrasound or fluoroscopy.

	MON	TUES	WED	THU	FRI
AM	Reporting	Reporting Fluoro procedures	Reporting Ultrasound	Reporting Fluoro procedure	Reporting Fluoro procedures
PM	Reporting	Reporting Ultrasound	Reporting Ultrasound	Reporting	Reporting

Hospital for Sick Children (HSC)

The rotation to HSC one day a week for 4 months provides an excellent opportunity to gain valuable experience in pediatric musculoskeletal pathologies and imaging. Experience in interpreting and reporting plain radiographs and MRI of pediatric pathology is enabled in this rotation.

Excellent musculoskeletal teaching rounds are provided by the faculty on Wednesdays at lunchtime (12.15-1.15) at the department.

St Michael’s Hospital

Rotation to St Michael’s Hospital enables the fellow to gain valuable experience in musculoskeletal trauma, as it is the regional trauma center in downtown Toronto. CT, MRI and plain radiographs are interpreted and reported.

In addition, there is ample opportunity for procedures including bone biopsies and joint injections and aspirations.

In addition to these sites, musculoskeletal ultrasound scans are performed on Thursdays at 60, Murray Street. The fellow who is rotating between Sinai and Western will be at Murray Street on Thursdays. A Wednesday morning musculoskeletal ultrasound list also takes place at Women's College Hospital, usually performed by one of the staff radiologists.

On calls

The fellows are on-call one week at a time along with a staff radiologist. The on call period is Monday to Monday. Please refer to the call schedule for further information. Any changes to the call schedule should be brought to the attention of the division head, the staff radiologists involved in the call and Kathryn O'Keefe at the earliest.

The fellows are provided with a shared departmental laptop, for purposes of remote reporting. However, if you are reporting from home, it will be worthwhile investing in a larger LCD screen to use as second monitor, as the laptop screen is sub-optimal for reporting plain radiographs.

During the weekdays, the expectation is to report and verify all plain radiographs and CT scans performed in Emergency departments across all JDMI sites. This reporting should be carried out till 10pm. The fellows at Mount Sinai and Toronto Western read the overnight cases first thing the next morning. Hence, the first responsibility for fellows at the two sites is to report and verify the plain radiograph and CT from Emergency performed between 10pm and 8am the next day.

At the weekend, the responsibility is the same as during the working day, but includes the days (8am to 10pm Saturday and Sunday). The reasonable expectation is to have a turn around time for ER cases of 4 hours during the day. During long weekends, the staff and fellow who were on for the week cover the on call on Monday as well.

Please discuss with the staff radiologist you are on call with to plan the week and how to share the workload.

During weekends, there can be occasional requests for emergency joint aspirations to rule out infection. It is the responsibility of the fellow on call to coordinate the procedure with the fluoroscopy technologist at the relevant site.

Education

In addition to the ad-hoc teaching provided by supervising radiologists while reading cases, there are valuable opportunities for radiological and clinico-radiological teaching rounds and meetings, which the fellows are expected to attend.

MON	TUE	WED	THU	FRI
7.00-8.00 am Ortho tumor teaching rounds (PMH)	7.00-8.00 am Ortho city wide sports rounds (WCH) <i>(first Tue of each month)</i>	7.00-8.00 am Ortho arthroplasty rounds (MSH)	8.00-9.00 am MSK resident rounds (MSH/TWH)	7.00-8.00 am Neuro MRI rounds (TWH)
4.00-5.00 pm Bone tumor board (MSH)			7.00-8.00 am Ortho/Plastics Hand and wrist rounds (TWH)	
5.00-6.00 pm Soft tissue sarcoma board (MSH)				

The tumor boards at Mount Sinai Hospital (Mondays 3-5 pm) are a great opportunity to gain more experience in imaging and management of bone and soft tissue sarcomas. The boards also provide excellent interaction with sarcoma surgeons, pathologists and oncologists. The fellows manage the tumor boards, and the board is usually the responsibility of the fellow posted on Sinai rotation. The tumor board patient lists are sent out to everyone usually by Wednesday the previous week, though there may be additions to the list till the last minute!

The fellow doing the tumor boards should aim to finish clinical work by lunchtime on Monday, which gives them the opportunity to prepare the cases after lunch. If the fellow needs any clarification on any of the cases, this should be discussed with one of the staff radiologists prior to the meeting.

The MSK division provides image-based rounds to radiology residents on Thursday mornings (8.00-9.00 am). This is shared between the radiology fellows and staff radiologists. Please refer to the rounds schedule to identify your rounds.

Fellows also provide valuable teaching, supervision and mentoring to the radiology residents on rotation.

The other clinico-radiological meetings provide good opportunity to interact with clinical colleagues, and hence the fellows are expected to attend these as much as possible.

The MSK division fellow rounds are expected to start in July or August. A schedule will be available soon after start of the fellowship. The expectation is for each fellow to present an interesting case/case series that they encountered during the fellowship, followed by a presentation based on literature review of the case pathology. The schedule for rounds will also include lectures by staff radiologists, mainly towards the early part of the year on various topics.

The division also expects the fellows to provide a presentation on a topic of their choice towards the end of the fellowship, during the division rounds.

Research and audit

It is the expectation from the University of Toronto as part of the fellowship that a publication ready original research article will be submitted to the University at the end of the fellowship. From the division point of view, the active participation of the fellows in successful research projects is a vital and essential part of the fellowship.

A research meeting will be held between the staff radiologists and fellows within the first two months of fellowship to discuss research projects and deadlines.

Dedicated research time of one day per week is available to allow the fellows to pursue and complete at least one substantial research project during the year. The fellows share a dedicated office space with their own network terminal and have access to the full range of office equipment and facilities. In addition, there is online access to the University of Toronto library with its extensive array of e-journals, e-references and e-texts.

In addition to research, it is the goal of the division as well as the JDMI to maintain and improve the quality of care that we provide. This provides opportunity for monitoring the care standards within the division. The fellows are encouraged to participate, by performing at least one audit during the course of their fellowship.