

UNITED STATES  
DEPARTMENT OF VETERANS AFFAIRS



**STANFORD**  
SCHOOL OF MEDICINE  
*Stanford University Medical Center  
Department of Radiology*

## **VA/SMOC Musculoskeletal Rotation Handbook**

*Last updated August 2016*

Welcome to the VA/SMOC MSK Rotation.

During this rotation, you are the fellow and will be expected to plan and protocol all studies, perform all procedures, and follow-up your recommendations w/ clinicians.

You will work w/ both VA attendings (2-3 days/wk) and Stanford attendings (2-3 days/wk) reading cross sectional MSK. Enjoy !

## **VA MSK SERVICE:**

### **Hours:**

**Resident coverage hours are standard with all VA rotations.**

**MON-FRI, 8 AM to 4 PM**

MRI, CT techs and Consultants expect you to be available from 8 AM TO 4 PM (reading room or page)

After 4 PM, Body (Short -Call) Resident covers all VA rotations including GI, Body, Neuro, MSK. Please sign out any Stat cases to be done after 4 pm to the VA Body resident before you leave for the day.

Between 8 AM to 6 PM, you are strongly encouraged to page Bao/Michelle for all questions, including wet read, protocol, procedures, or life decisions (job, children, etc) ☺ **Don't hesitate to page us on academic and vacation days if necessary, we have remote access if needed.**

### **Duties:**

- 1. Don't use the "MSK" worklist**
- 2. Read all MSK related MRI from the MR unread**
- 3. Read all MSK related CT from the CT unread**

**Read studies completed up to 3:00 PM TIMESTAMP EVERYDAY**

**Prelim STAT studies up to 4:00 PM timestamp everyday.**

4. Protocol: Complete paper requisitions by next day and add-ons by schedulers/techs. MSK Attending on Bone Board is always available for assistance if needed.

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### **SCHEDULE:**

**Monday – VA Attending**

**Tuesday – Stanford Attending in PM**

**Wednesday – VA Attending**

**Thursday – Go to SMOC in morning**

**FRIDAY – Stanford Attending in PM**



**EVALUATIONS:**

Medhub by VA and Stanford Attendings

**TEACHING FILES:**

VA - “Interesting MSK” folder under “Public Folders.”

SMOC – Beaulieu joint based folders, MSK attending interesting folders

**REPORTING:**

Please use standard MSK templates in the Allsite main powerscribe directory. These templates may be updated anytime.

## **PROTOCOLS:**

Protocol studies on paper requisitions from techs/schedulers.

### **For each protocol, key points to include:**

1. Which joint ? generally, avoid “whole foot” and “whole pelvis” (rather, do ankle or forefoot or unilateral hip), as appropriate. The large FOV limits evaluation.
2. Which side ?
3. Is contrast needed (regardless of how it is ordered) ? contrast is needed for follow-up tumor. If evaluating a palpable mass for the first time, do an MD check for gad. In osteomyelitis, contrast is not needed in small joints (foot), but useful for large joints (hip/pelvis) as it may outline soft tissue abscess.

Any “cyst”-like lesion on MRI should receive gad.

4. Is a skin marker needed ? (esp if following a palpable mass)
5. **Should this be an arthrogram** ? (esp if concern for labral tear in a young patient). If so, ask Bao/Michelle as the study may be incorrectly ordered and scheduled.
6. Does the patient have metal ? Examples include hardware, plating, and screws (eg ACL reconstruction). Ask Bao/Michelle if metal suppression sequences are necessary, HiBW, STIR, etc.

7. Example:

History: Pain, knee

Protocol: “routine knee”

**8. Wrist, fingers, neurograms, and young patients please request 3T.**

### **Special protocols:**

For “boutique” protocols, please include an example for the technologists from the learning archive.

Examples of “boutique” studies include neurography (eg below), pectoralis tear, sports hernia, pubic pain, sacroiliac pain, biceps tear (proximal and distal), tumors.

elbow neurogram	013113-19427
femoral neurogram	020713-18541
knee neurogram	031513-21734
peroneal neurogram	061114-26427
peroneal neurogram	031013-153
peroneal neurogram	051716-35770
sciatic neurogram	103112-16381
sciatic neurogram	112513-12712
sural nerve neurogram	012914-22838

## **PROCEDURES:**

### **PROTOCOLS FROM CHRIS BEAULIEU AND STANFORD MSK ATTENDINGS:**

Procedures are usually performed on Monday, Wednesday and Thursday. You are expected to know how to do them.

From 0 to 2 procedures. We accommodate all arrival times. **There are no “late” patients in the VA.**

**You are expected to consent patients.**

Be familiar with these 2 common procedures:

1. Basic joint injection.
2. Basic tenogram.

#### **Basic joint injection:**

1. Myelogram tray.
2. Ropivacaine.
3. Omni-300.
4. Magnevist and 1 mL syringe needle.

STEP 1: PREPARE THE LIDOCAINE. Open the tray and fill the 5 mL syringe w/ Lidocaine.

STEP 2: PREPARE THE INJECTION FLUID. In a 20 cc syringe from the myelogram tray, mix the following: 16 cc Ropivacaine, 4 cc Omni-300, and 0.15 cc Magnevist.

**For the Magnevist, please wait for attending.**

STEP 3: PREPARE THE PURE OMNI. Ask for a 3 cc syringe from the tech and fill this with pure Omni-300. This is used as a test injection.

The attending will bring the patient in.

Place the patient in the correct position and mark & prep the skin.

**Basic tenogram:**

1. Myelogram tray.
2. Ropivacaine.
3. Omni-300.
4. 4 mg of Dexamethasone.

STEP 1: PREPARE THE LIDOCAINE. Open the tray and fill the 5 mL syringe.

STEP 2: PREPARE THE INJECTION FLUID. Ask for a 10 cc syringe and mix 5 mL of Omni-300 with 5 mL of Ropivacaine.

STEP 3: PREPARE THE STEROID. Fill 1 cc syringe with 1 cc of Dexamethasone. This is a water soluble steroid. NEVER use Kenalog in a tenogram.

The attending will bring the patient in.

Place the patient in the correct position and mark & prep the skin.

**REFERENCE:**

The flexor hallucis longus: tenographic technique and correlation of imaging findings with surgery in 39 ankles. Na JB, Bergman AG, Oloff LM, Beaulieu CF. Radiology. 2005 Sep;236(3)

**For FHL, also read:** A Novel Approach to Flexor Hallucis Longus Tenography Michael S. Gelbart, Ashesh Parikh, Wincha Chong, and Louis A. Gilula.





## **MSK Procedures Policy (for our schedulers)**

Version 1.00 (7/6/2016)

MSK procedures include arthrograms, tenograms, MSK ultrasound, and aspirations.

Please use the checklist below as a guideline when scheduling MSK procedures.

1. Schedule MSK procedures as early as convenient for the patient, **within 3 weeks if possible**

### **Available slots**

**Monday** – 1 pm, 130 pm, 2 pm, 230 pm, 3 pm

*Tuesday* – 10 am, 1030 am, 11 am, 1 pm, 130 pm, 2 pm, 230 pm (require approval)

**Wednesday** – 10 am, 1030am, 11 am, 1 pm, 130 pm, 2 pm, 230 pm, 3 pm

**Thursday** – 10 am, 1030am, 11 am, 1 pm, 130 pm, 2 pm, 230 pm, 3 pm

*Friday* – 10 am, 1030 am, 11 am, 1 pm, 130 pm, 2 pm, 230 pm (require approval)

2. Limit 2 procedures per day
3. *Tuesday and Friday require approval by radiologist*
4. **If history includes “aspiration,” “infection,” or “hardware”, please discuss with radiologist. These procedures should be done urgently.**
5. Create appointments in VistA under (1) fluoroscopy AND (2) MRI/CT, if appropriate
6. Send Outlook calendar email to radiologists (do not include PHI)

**\* Our priority is patient care. We will make exceptions to rules above so that all patient requests will be honored, including same day procedure requests.**



## **CURRICULUM:**

### Required reading:

**Helms Musculoskeletal MRI** – Available as e-book at Lane Library

This book is divided into joint vs pathology based sections. You are expected to read the anatomy discussions in the joint based chapters, especially “common” joints – **knee, shoulder, and hip**. You should be able to recognize anatomic structures of these 3 major joints by the end of week 1-2.

### Suggested anatomy resources:

e-anatomy  
statdx msk anatomy modules  
xrayhead.com

## Checklist-based Curriculum:

The VA/SMOC MSK MRI rotation curriculum consists of 1-on-1 “mini- lectures” and 2 formal assessments. You are expected to augment with independent studying from the Helms textbook. We’ve implemented a Checklist approach to ensure a standard learning experience, despite differences in Resident schedules (pulls, calls) and Attending assignments (you will work with up to 8-9 Attendings).

For each Checklist item, please ask an MSK Attending to spend 5-10 minutes with you to review teaching cases, a brief didactic lecture, review of an article, etc, for that topic, and then have the MSK Attending sign-off. You are encouraged to work with any Attending for each item depending on available time. Go at your own pace. Go in any order. But aim to complete the Checklist by the beginning of week 4.

### **Initials:**

- \_\_\_\_\_ Review MSK Curriculum with Attending
- \_\_\_\_\_ Learn how to protocol (when to use IV, skin marker, ask for help)
- \_\_\_\_\_ Learn common sequences in MSK MRI and advantages (eg T1, T2, FS, PD, Cube, etc)
- \_\_\_\_\_ Learn how to optimize MRI for MSK hardware  
(sequences & factors that reduce penumbra; MRI appearance of particle disease)
  
- \_\_\_\_\_ Learn basic approach to reading knee MRI
- \_\_\_\_\_ Learn how to evaluate for knee meniscal tear (know: bucket, radial, root, flap)
- \_\_\_\_\_ Learn how to evaluate knee ligaments (eg double bundle anatomy of ACL, best planes)
  
- \_\_\_\_\_ Learn basic approach to reading shoulder MRI
- \_\_\_\_\_ Learn how to evaluate for shoulder labral tear (identify: IGHL, MHL, SGHL)
  
- \_\_\_\_\_ Learn basic approach to reading hip MRI
- \_\_\_\_\_ Learn how to assess hip labrum tear (eg perilabral recess, transverse ligament)
  
- \_\_\_\_\_ Learn basic approach to reading foot/ankle MRI
- \_\_\_\_\_ Learn how to assess ankle ligaments and tendons
  
- \_\_\_\_\_ Learn how to do an arthrogram (discussion only, rationale for each step, etc)
  
- \_\_\_\_\_ Learn how to protocol and evaluate osteomyelitis; pitfalls (eg fat sat); review ~5 cases
- \_\_\_\_\_ Learn most common bone/soft tissue tumors on MRI; review ~5 cases
- \_\_\_\_\_ See common on-call CT cases (hemarthrosis, muscle hemorrhage, infxn, fx’s).

### **Quiz:**

- \_\_\_\_\_ **Mid-term Anatomy Quiz** (30 questions, random structures from knee, shoulder, foot or hip cases will be shown on PACS); you will be asked to name the structure marked by arrow or asked to find a structure and put an arrow on it, result will be recorded
- \_\_\_\_\_ **Final exam Quiz** (30 PPT or PACS unknown cases), results will be recorded