LABORATORY FUNCTION

INTRODUCTION

Electrodiagnostic studies begin at 8:00 a.m. and 1:00 p.m., Monday, Tuesday, Thursday, and Friday, and 8:30 a.m. and 1:00 p.m. on Wednesday. Residents are expected to arrive on time. Patients are escorted to an EMG room by anyone available and changed into a hospital gown. The responsible physician for the case briefly reviews the patient’s chart and the EMG requisition. The physician performs a focused history and neuromuscular examination. Any patient with a skin temperature of less than 32°C should be warmed using hydrocollator packs, being careful not to injure any patient with decreased sensation. Further history can be obtained during the warming period if necessary.

The patient’s name, registration number, electrical diagnosis and the name of the physician performing the EMG are recorded in the computer. The electrodiagnostic interpretation is summarized by the physician on a yellow outpatient referral form or inpatient notes as appropriate, although the computer generated complete report should be attached to the chart immediately after the examination.

Electrodiagnostic studies are scheduled by the EMG appointment clerks. The physician should not schedule patients unless it is cleared with the clerks or the technicians to avoid scheduling conflicts inconvenient for the patients and staff.

The technicians complete the billing forms according to the number of motor and sensory nerve conduction studies performed per extremity and the number of extremities and paraspinous muscles studied by needle examination.

REPORT GENERATION

Electrodiagnostic study information is entered during the study directly into the computer. Record skin temperatures and make note of any technical problems or special studies in the note. The formal report consists of four sections:

1. Nerve conduction study results
2. Needle examination results
3. A summary of the electrodiagnostic data obtained
4. Your interpretation

Nerve conduction values included in the formal report format are the amplitude, distal latency, conduction velocity, and late response latencies. Needle examination results include listings of the insertional activity.

The summary portion of the report should contain a brief description of the study done and the findings. It is intended to be a summary and there is no need to repeat all of the data included in the first two sections of the report. Any special studies which were included that
did not appear in the first two sections should be described here. Technical difficulties should also be noted in the summary.

The interpretation should include your final conclusions. The interpretation should comment upon or answer any specific questions asked by the referring physician. Since the interpretation is often the only section of the report that is read in detail, use it to draw attention to all abnormalities found, their relationship to the temporal course of the disease, and assist the referring physician in generating a differential diagnosis which is consistent with the electrodiagnostic findings.

Each study is assigned an EMG Diagnostic Code using the system in Appendix B, Section 7.1. The codes serve as references kept on file for future review if desired. A sample NCS/EMG worksheet and formal report is also included in Appendix B.

STAFF NOTE

The physician faculty is responsible for performing studies and supervising the residents and fellows. They are available for questions and assistance at all times. Residents starting in the Laboratory will observe staff or fellows. Once they begin performing the complete study, they should review the case with the staff physician once the nerve conduction studies are completed. The staff will assist the resident in planning a logical needle examination study. This step may be eliminated once the staff and resident feel comfortable allowing more independence. Upon completion of the needle examination, the resident writes the summary and interpretation. The staff is responsible for reviewing the report and must co-sign all reports. Patients should be asked to wait in the examining room in the hospital gown until the staff is satisfied that further study is not warranted.

The staff is also responsible for teaching, examining the residents and in evaluating performance.

EMG TECHNICIAN ROLE

The technicians are responsible for performing and teaching nerve conduction studies, technique and instrumentation. They occasionally will work independently performing nerve conduction studies, although the staff is legally responsible for all studies performed in the Laboratory. The residents should always work with a technician when performing nerve conduction studies on their own cases. During more advanced training months, residents may on occasion perform nerve conduction studies alone.

The staff or technicians will administer a nerve conduction study examination to the residents before they are allowed to serve as technicians for other more senior residents. The residents may “tech” for the staff or fellows prior to this examination. The technicians arrange for transportation of inpatients, schedule inpatient studies, assist in bedside studies, and put patients in and out of the EMG rooms. They maintain equipment and order supplies. The technicians also stock supplies.
Always remember that the technicians keep the Laboratory running and deserve your complete cooperation.

**RESIDENT RESPONSIBILITIES**

Residents are expected to arrive promptly at 8:00 a.m. and 1:00 p.m. Monday through Friday (or immediately after Neuromuscular Conference on Wednesday) whether or not they are observing or performing studies. Exceptions are made for required attendance at lectures or assigned clinics. Residents should avoid taking vacation time during their EMG training period since this significantly interferes with successful completion of requirements and the limited time available to perform studies.

Residents will spend the first week observing nerve conduction and needle examination studies. During this period you will learn the proper application of electrodes for nerve conduction stimulation and recording. During the first week, residents should view the videotape on nerve conduction principles. At the end of the first week, the technicians will test your skill at applying electrodes for routine nerve conduction studies.

Next, the residents will serve as technicians for others, working with the technicians, staff or fellows. Junior residents should not initially work together. During this period, the residents will also review the charts and examine the patients to develop their approach to an electrodiagnostic problem. While serving as a technician, the resident should take time to learn equipment operation and is required to take a machine test at the end of the third week. Once they successfully complete this examination, they are allowed to operate the machine while the technicians or senior staff place electrodes.

Early in the month and as often as you may feel necessary, you should view the videotape by Jasper Daube, M.D. on the needle examination. In the fourth week, you will take a videotape examination identifying various forms of insertional, spontaneous and motor unit activity. This is followed by a multiple-choice exam based on your interpretation of the videotape. You will also take an anatomy test and multiple-choice written examination covering technique, instrumentation, anatomy and neuromuscular pathology.

Once you have completed these examinations successfully, you will perform needle examinations. It is highly recommended that you keep a list of cases and their diagnoses for future reference and that you request the charts and follow-up on these cases. This gives the residents feedback on their studies and provides instruction in the evolution and resolution of many neuromuscular problems.

By the end of the third month, the residents should demonstrate their ability to trigger on a motor unit and measure motor unit action potentials. When you return to the Laboratory for further experience, you may perform some studies independently without technical support.

Residents will be assigned to the Neuromuscular Clinic and other departmental clinics while in the EMG Laboratory. The EMG schedule will reflect your absence during these periods.
## RESIDENT/FELLOW EXAMINATION SCHEDULE

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<thead>
<tr>
<th>ON LABORATORY DAY:</th>
<th>YOU WILL TAKE THIS EXAMINATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Nerve Conduction / Technician</td>
</tr>
<tr>
<td>15</td>
<td>Machine</td>
</tr>
<tr>
<td>18 – 20</td>
<td>Anatomy</td>
</tr>
<tr>
<td>20 – 22</td>
<td>Written Examination</td>
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<tr>
<td></td>
<td>EMG videotape</td>
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