Pass The Un-passable

DABNM
CRASH COURSE

http://intraoperativeneuromonitoring.com

What this course is NOT…

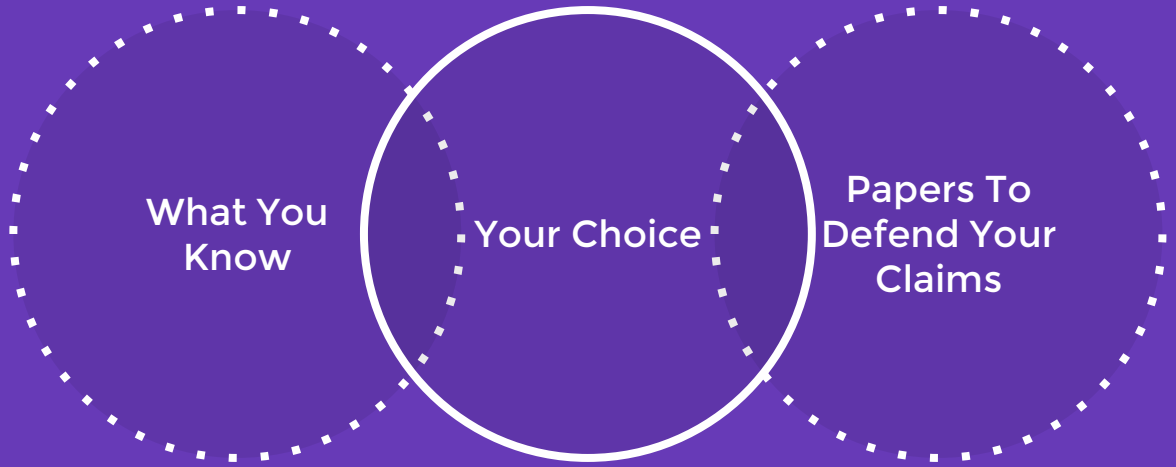
- **A review of the literature**
- **Resource list**
- **Canned answers**
- **Prewritten case notes**
- **The questions I was asked**

1.

Case Selection

Just a piece of advice

Give Yourself More Than A Punchers Chance



Pick 2. Choose Wisely.

I. Spine

- A Scoliosis
- B Thoracic Stabilization
- C Lumbosacral Pedicle Screw Fusion
- D Cervical Fusion
- E Spinal Cord Tumor
- F Tethered Cord

II. Vascular

- A Carotid Endarterectomy
- B Intracranial Aneurysm
- C Thoraco-Abdominal Aortic Aneurysm

III. Intracranial

- A CP Angle/Post Fossa Tumor
- B Large Skull Base Tumor
- C Pituitary Tumor
- D Intracranial Lesion/Tumor
- E Micro-Vascular Decompression of a Cranial Nerve

IV. Intraoperative Diagnostics

- A Brachial Plexus/Peripheral Nerve
- B Epilepsy Electrocorticography
- C Functional Neurosurgery

2.

Case Submission

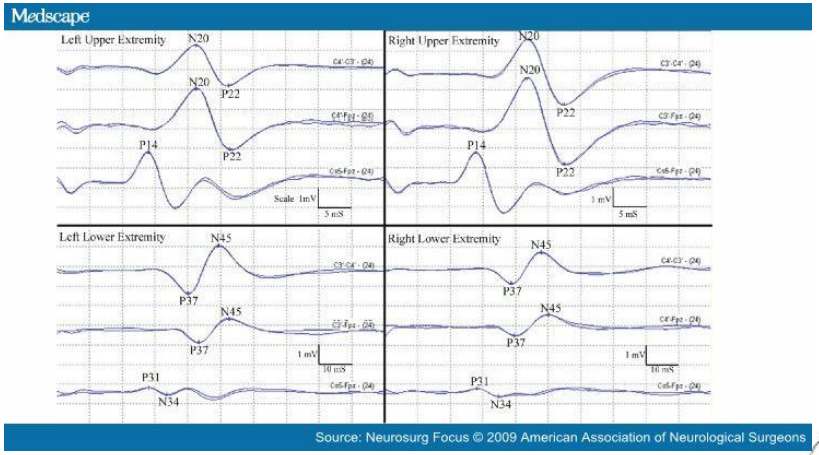
Don’t Fail The Test Before You Even Walk Through The Door!

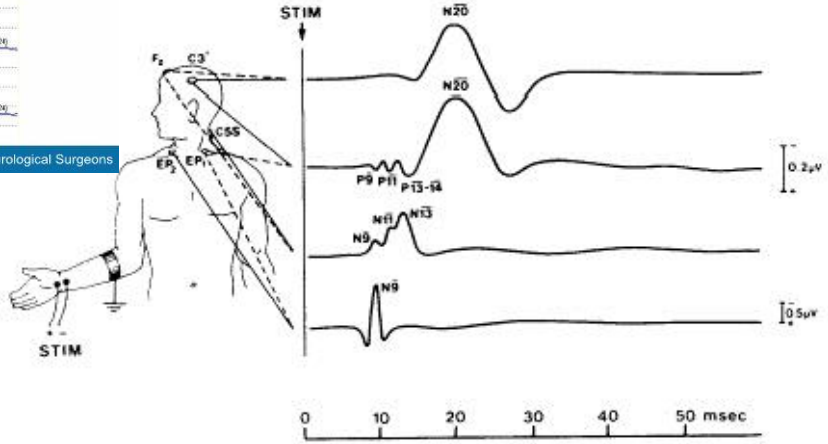
FORCE THEIR HAND

One way: You would be very smart to hand in a bulletproof case. Force them to come up with “what if” scenarios.

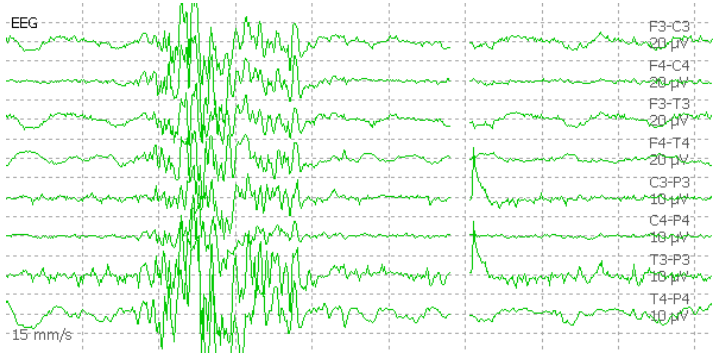
Another way: If there are weaknesses, find them and rehearse your defense.

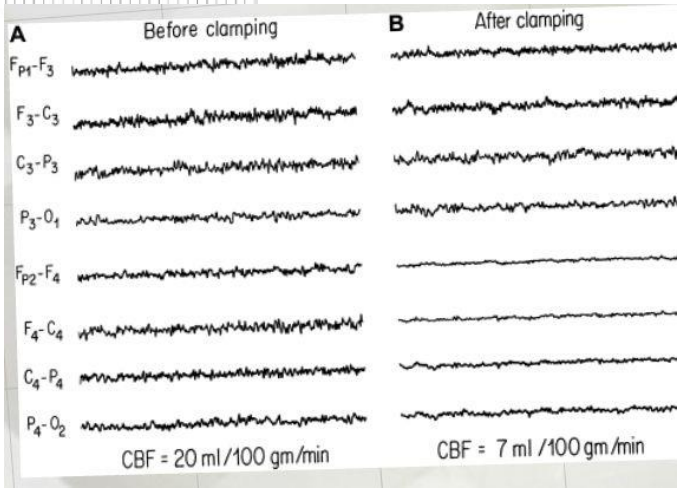
Which Case To Use?





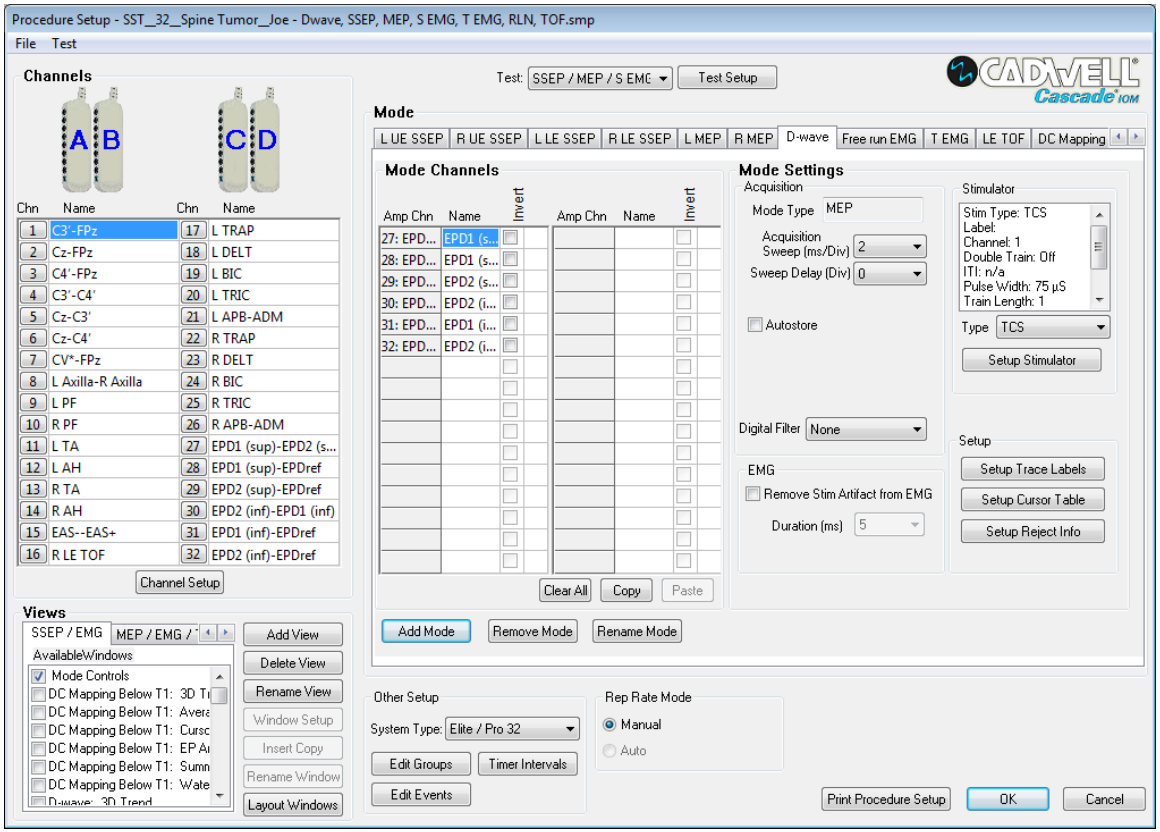
Which Change To Use?





Do A Complete WHY Check...

What is the single worst answer you can give?


Procedure Setup - SST_32_Spine Tumor_Joe - Dwave, SSEP, MEP, S EMG, T EMG, RLN, TOF.smp
File Test
Channels
A B C D
Chn Name Chn Name
1 C3'-FPz 17 L TRAP
2 Cz-FPz 18 L DELT
3 C4'-FPz 19 L BIC
4 C3'-C4' 20 L TRIC
5 Cz-C3' 21 L APB-ADM
6 Cz-C4' 22 R TRAP
7 CV*-FPz 23 R DELT
8 L Axilla-R Axilla 24 R BIC
9 L PF 25 R TRIC
10 R PF 26 R APB-ADM
11 L TA 27 EPD1 (sup)-EPD2 (s...
12 L AH 28 EPD1 (sup)-EPDref
13 R TA 29 EPD2 (sup)-EPDref
14 R AH 30 EPD2 (inf)-EPD1 (inf)
15 EAS--EAS+ 31 EPD1 (inf)-EPDref
16 R LE TOF 32 EPD2 (inf)-EPDref
Channel Setup
Views
SSEP / EMG
MEP / EMG /
AvailableWindows
Mode Controls
DC Mapping Below T1: 3D T
DC Mapping Below T1: Avera
DC Mapping Below T1: Cursc
DC Mapping Below T1: EP Ar
DC Mapping Below T1: Summ
DC Mapping Below T1: Wate
D-wave: 3D Trend
Add View
Delete View
Rename View
Window Setup
Insert Copy
Rename Window
Layout Windows
Test: SSEP / MEP / S EMG
Test Setup
CADWELL Cascade IOM
Mode
L UE SSEP R UE SSEP L LE SSEP R LE SSEP L MEP R MEP D-wave Free run EMG T EMG LE TOF DC Mapping
Mode Channels
Amp Chn Name Invert Amp Chn Name Invert
27: EPD... EPD1 (s...
28: EPD... EPD1 (s...
29: EPD... EPD2 (s...
30: EPD... EPD2 (i...
31: EPD... EPD1 (i...
32: EPD... EPD2 (i...
Clear All Copy Paste
Add Mode Remove Mode Rename Mode
Mode Settings
Acquisition
Mode Type MEP
Acquisition Sweep (ms/Div) 2
Sweep Delay (Div) 0
Autostore
Digital Filter None
EMG
Remove Stim Artifact from EMG
Duration (ms) 5
Stimulator
Stim Type: TCS
Label:
Channel: 1
Double Train: Off
ITI: n/a
Pulse Width: 75 µS
Train Length: 1
Type TCS
Setup Stimulator
Setup
Setup Trace Labels
Setup Cursor Table
Setup Reject Info
Other Setup
System Type: Elite / Pro 32
Edit Groups
Timer Intervals
Edit Events
Rep Rate Mode
Manual
Auto
Print Procedure Setup
OK
Cancel

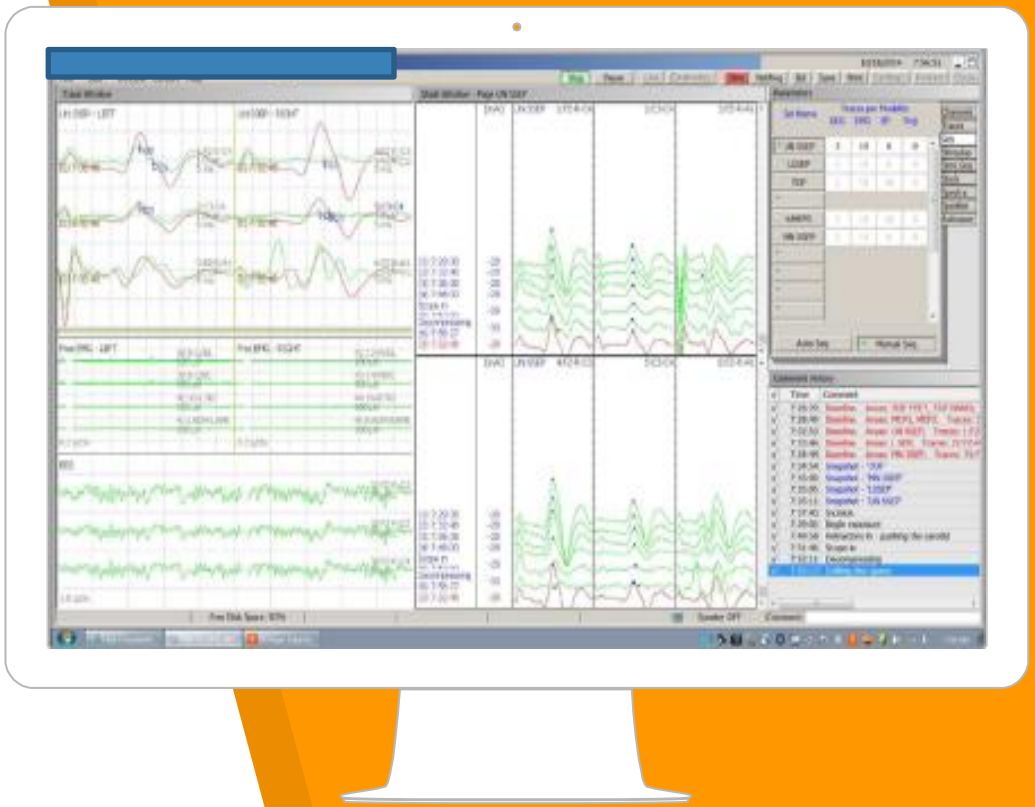
Give Them Data. Don't Give Them A Reason To Doubt You.

- Intro
- Snapshots for every update of live traces (10-15 min, more if there's a problem)
- Snapshot for every triggered response
- Waterfall and/or summary
- Numeric Values/Tables (use markers)
- Comments on traces
- Remote oversight transcripts
- Case note

This is your opportunity to show them the high level of monitoring you're performing.

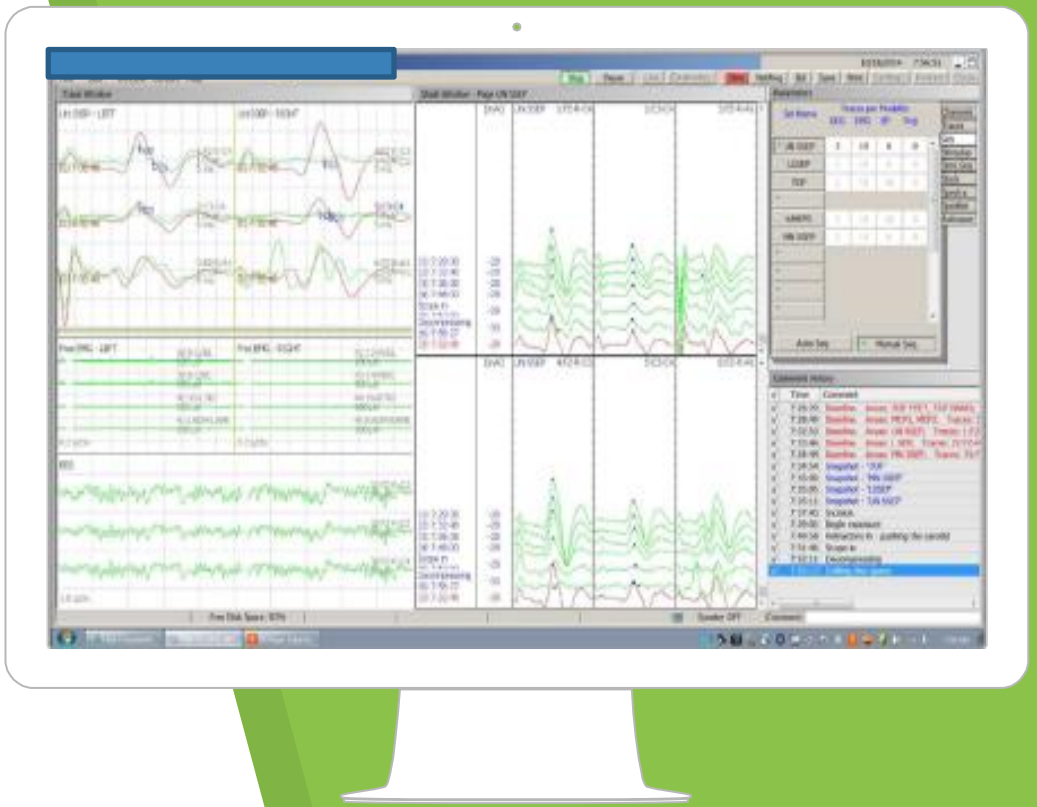
COMMENTS
SUGGESTIONS

- Show diligent note taking that proves you had all appropriate conversations, can prove awareness of surgical procedure, anesthetic levels and your modalities.
- Document an appropriate history, review of pertinent diagnostic findings, patient complaints, etc.
- Make note on assessment of BSL and closing data
- Notes should be every 10-15 minutes
- Notes should be every time a conversation relative to the case happens



COMMENTS SUGGESTIONS

- Notes should be every time the surgery moves to the next stage till the end (gross neuro exam)
- Notes should be every time there's something noteworthy from a monitoring standpoint (a change, change in parameters, bad impedance, etc.)
- Every 30 minutes do an anesthetic update
- Every 30 minutes do a neuromonitoring update on all modalities watched that past 30 minutes
- Make mapping comments as they happen along with triggered events.
- Make a comment at the end of mapping.



Type of Surgery: Cauda Equina Surgery

Type of monitoring: Intraoperative monitoring using upper and lower extremity somatosensory evoked potentials (SSEP), motor evoked potentials (MEP), H-reflex, bulbocavernosus reflex (BCR), free-run electromyography (free-run EMG), triggered electromyography (tEMG) and train-of-four (TOF).

Setup: The neuromonitoring equipment met all regulatory biomechanical safety inspections. Placement of all

and abductor hallucis brevis of the foot. For H-reflex, stimulation of the posterior tibial nerve using needle electrodes placed in the popliteal fossa. A monophasic, rectangular pulse was delivered by a constant current stimulator. CMAPs were recorded using needle electrodes from the soleus. For BCR, a monophasic, rectangular pulse was delivered by surface electrodes placed at the clitoris and labia majora. CMAPs were recorded from both the left and right external anal hemisphincter. For free-run EMG and tEMG, electrical activities of muscles

Baseline Assessment: An impedance check was performed prior to running baseline data. All electrodes soft bite block was appropriately placed by the anesthesiologist between the molars to prevent a bite injury. TOF of 4/4 was recorded prior to incision to assist the anesthesiologist/CRNA in determining the appropriate level of muscle relaxation. Preoperative baseline for SSEP were taken in the prone position on the surgical table after induction. For SSEP, a stimulus intensity approximately 3 times the motor threshold was used. In general, all waveforms displayed reasonably appropriate morphologies, and were reasonably well-formed and reliable. Intermittent [illegible] was present and required aggressive filtering. For MEPs, a stimulating intensity was chosen to produce a [illegible] CMAP with minimal pain. MEPs were represented in all extremities. For BCR, a multipulsed, supramaximal stimulating intensity was chosen to produce a reasonably reliable CMAP. BCR were reproducible in both left and right external anal hemisphincters. For H-reflex, a submaximal stimulating intensity was chosen to produce a maximal reflex response before or at the start of a muscle response. H-reflexes were reliable in both lower extremities. [redacted] artifact.

Mapping Summary: [redacted]

Monitoring Summary: [redacted]

The alarm criteria for significant changes in H-reflexes was a greater than 90% in reduction in amplitude. There were no significant changes in the H-reflexes following the positioning of the patient or throughout the surgical procedure in bilateral upper and lower extremities.

The alarm criterion for significant changes in BCR was the presence or absence (i.e. all-or-none) of the CMAPs. However, any persistent change in amplitude would also be reported. There were no significant changes in the BCR following the positioning of the patient or throughout the surgical procedure in all extremities.

[redacted]

3.

Collecting Study Material

Experience.
Textbooks.
Conferences.
Articles.

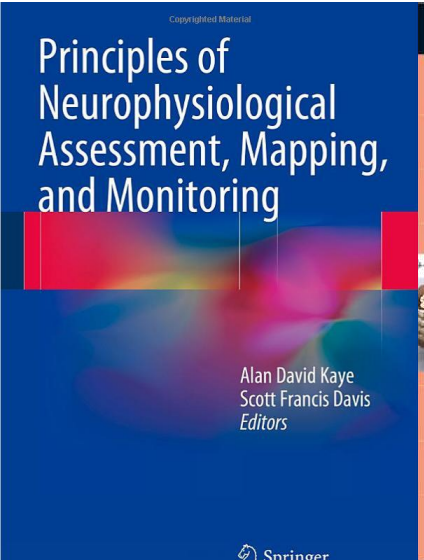
How To Find Study Material

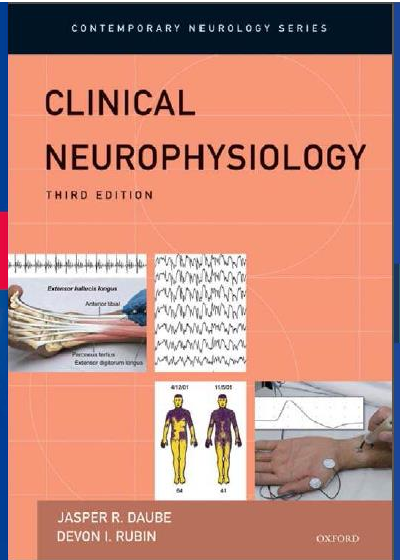
Position Papers

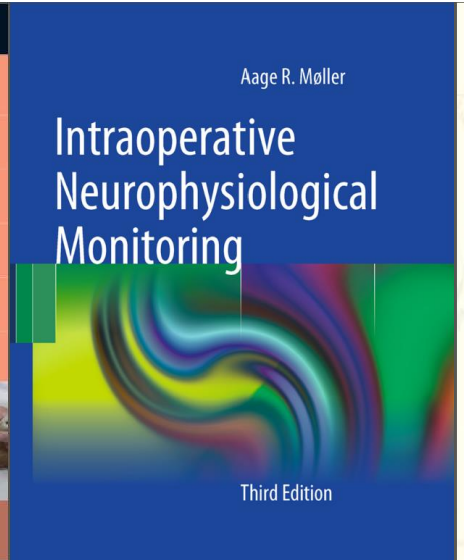
Disclaimer: These statements are based on information presented at scientific meetings, published in the current scientific and clinical literature, and presented in previously published guidelines and position statements of various clinical societies. These documents may not include all possible methodologies and interpretive criteria, nor are they intended to exclude any new alternatives. ASNM provides general information and education materials as a service in promotion of its nonprofit and tax-exempt status.

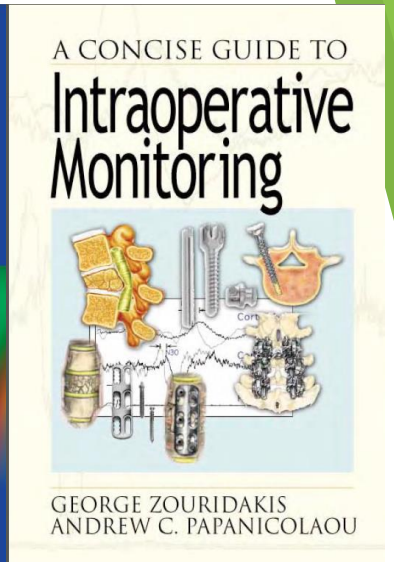
How To Find Study Material

Starting at the beginning







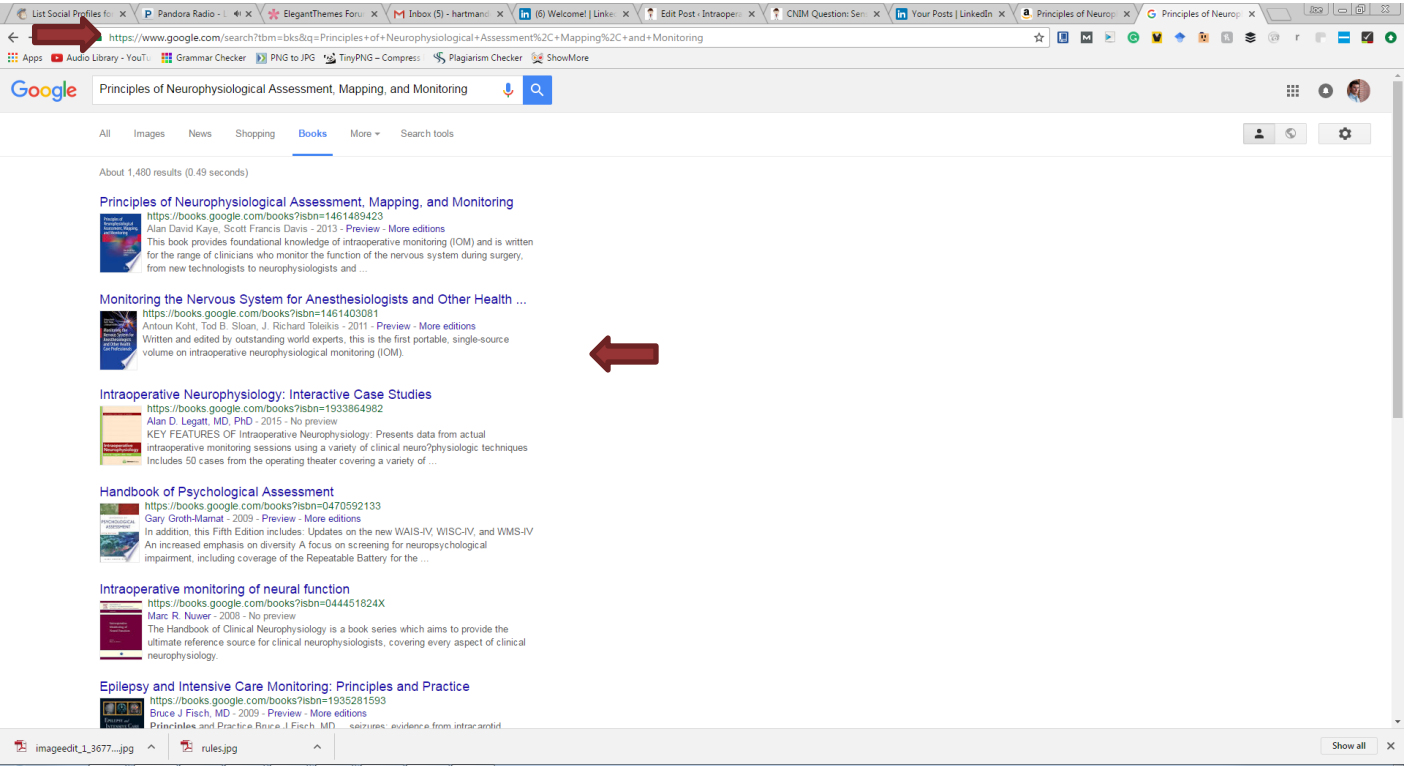


How To Find Study Material

Start at the beginning

How To Find Study Material

Google Books for free content and leads to more articles or books



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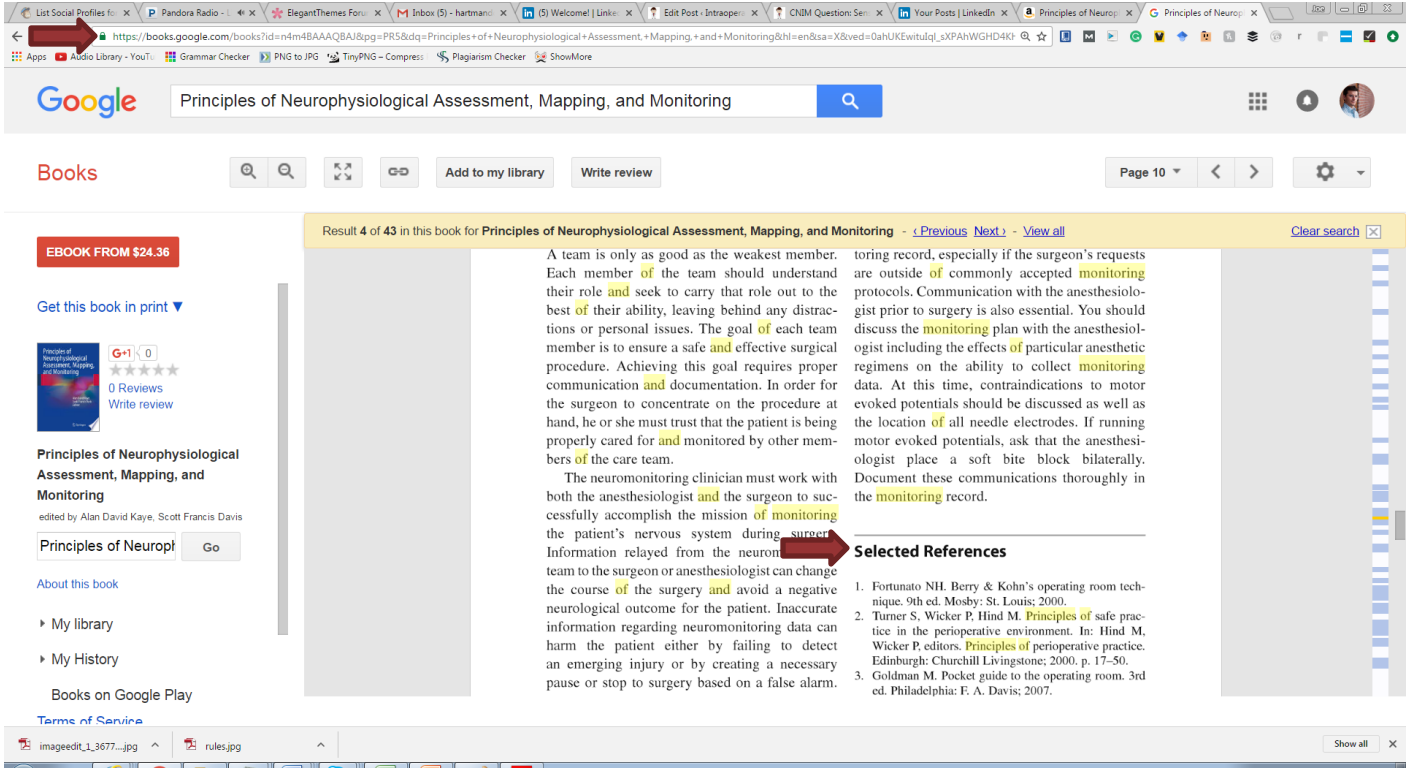

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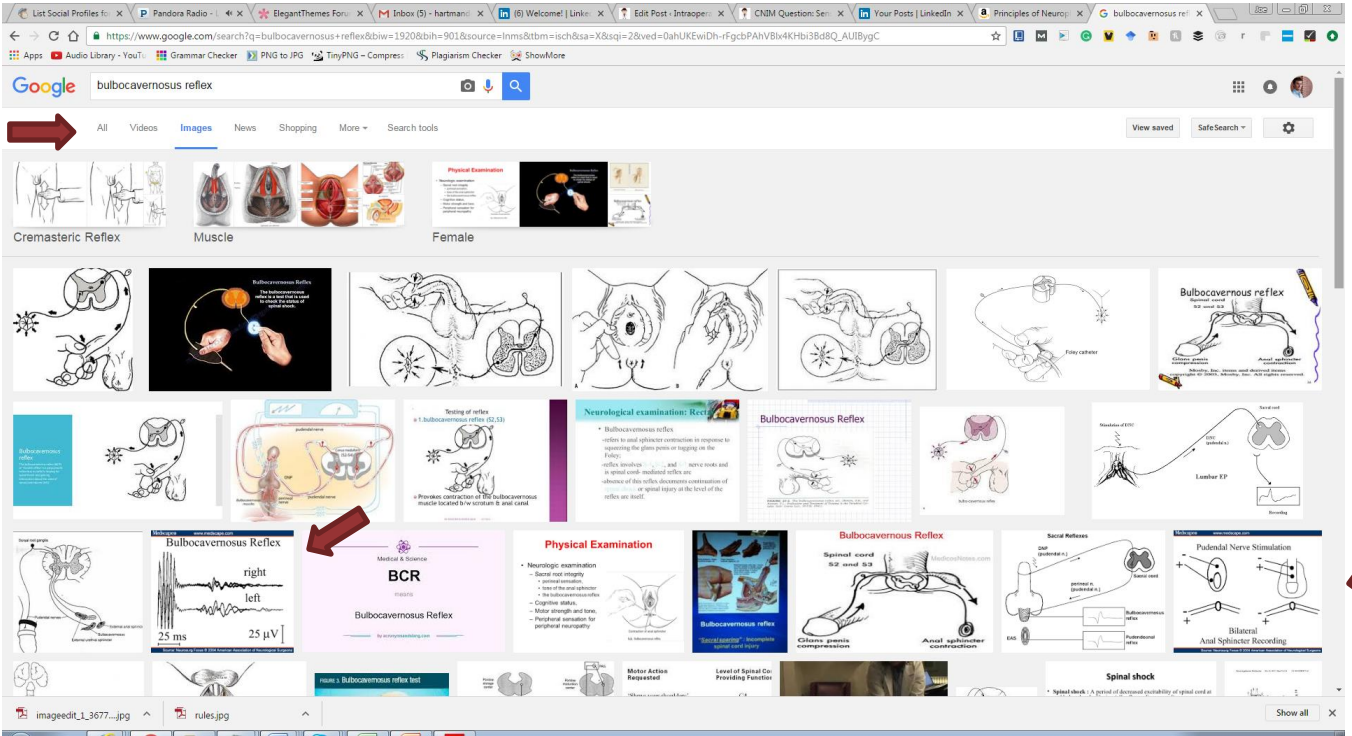
Google Images for free content and leads to more articles or books



How To Find Study Material

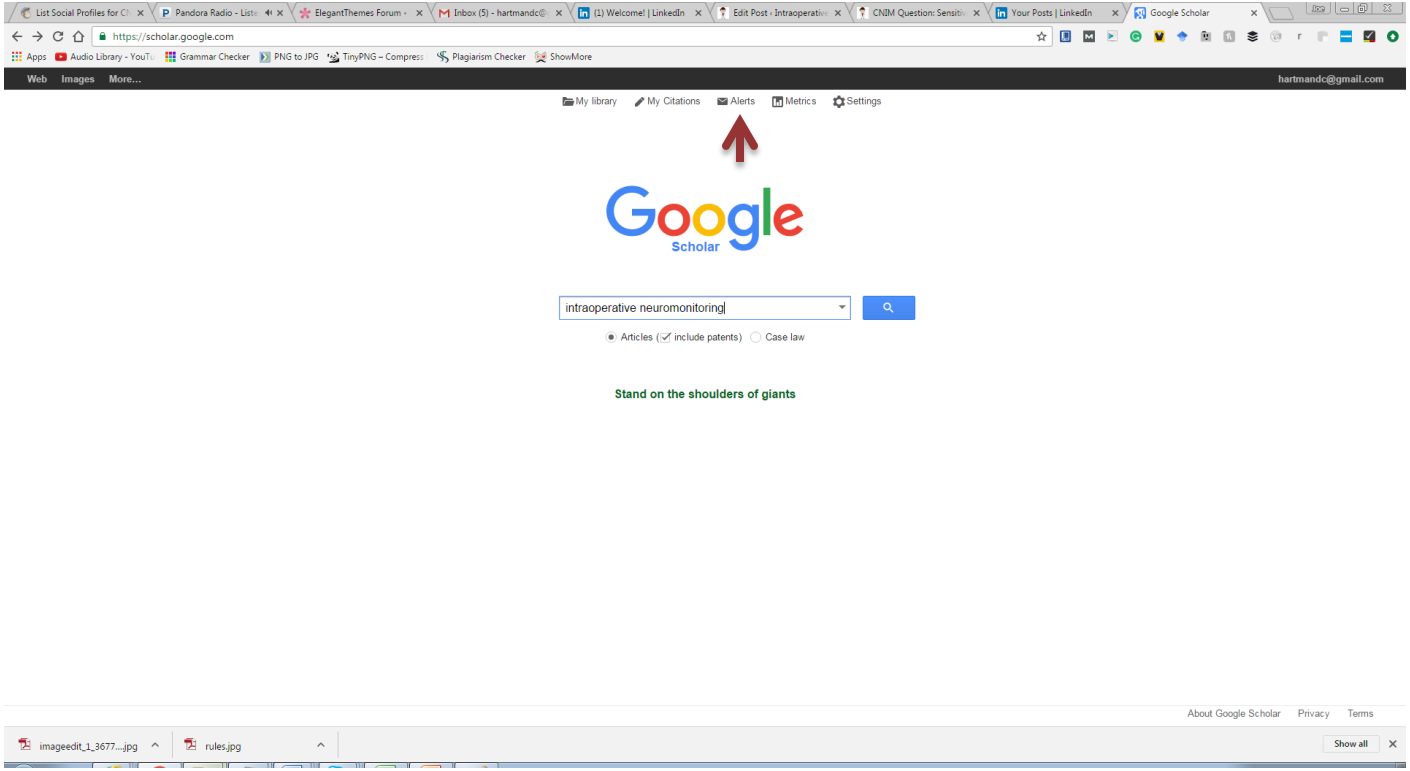
Conference lectures are a great resource for review of the literature, as well as what's new in the field.

How To Find Study Material

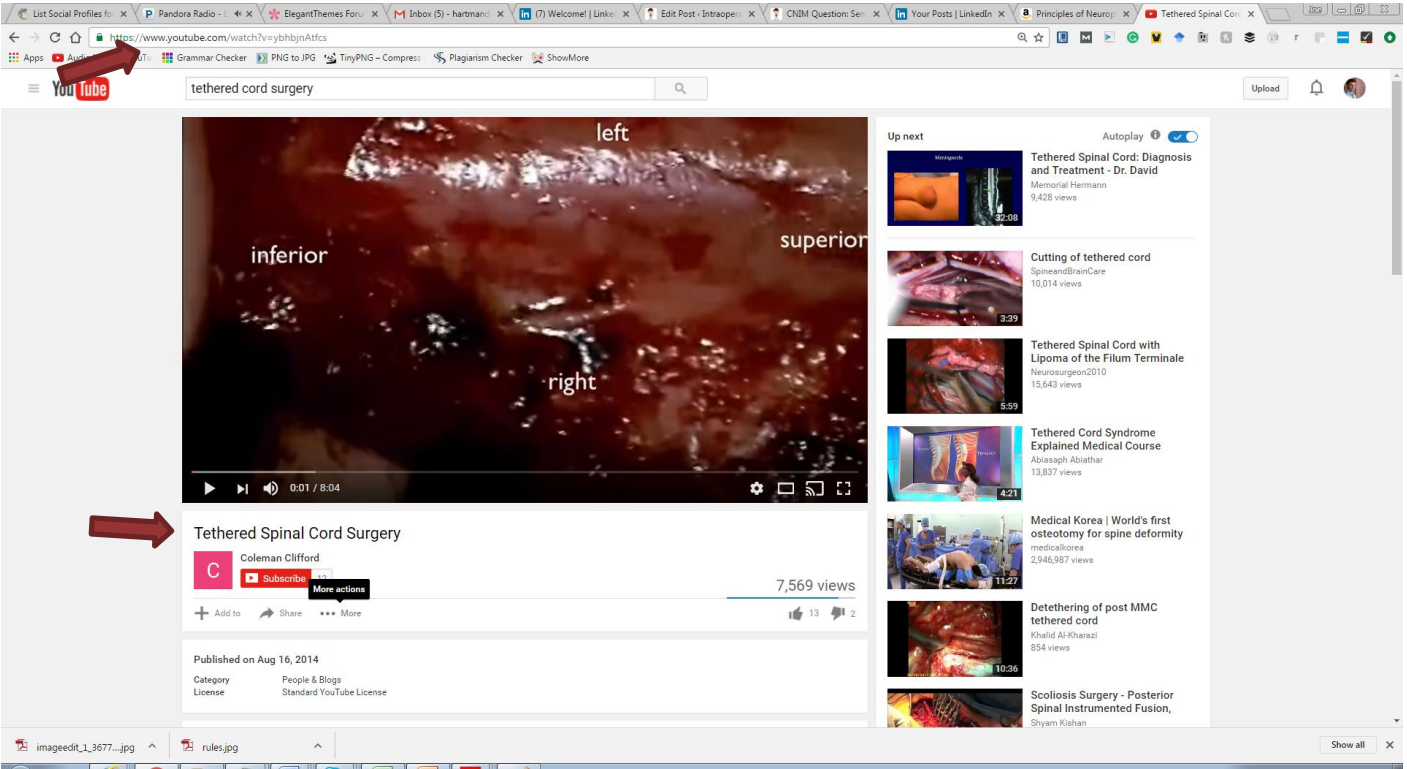
Go back to Google with all your references. You can use the filetype: operator in Google Search to limit results to a specific file type.

- **Filetype:pdf**
- Filetype:ppt or Filetype:pptx
- Filetype:doc or Filetype:docx
- Filetype:txt
  - Use these with general terms (“motor evoked potentials”)
  - Use these with authors (JR Hartman)
  - Use these with article titles (Intraoperative motor evoked potential monitoring – A position statement by the American Society of Neurophysiological Monitoring)

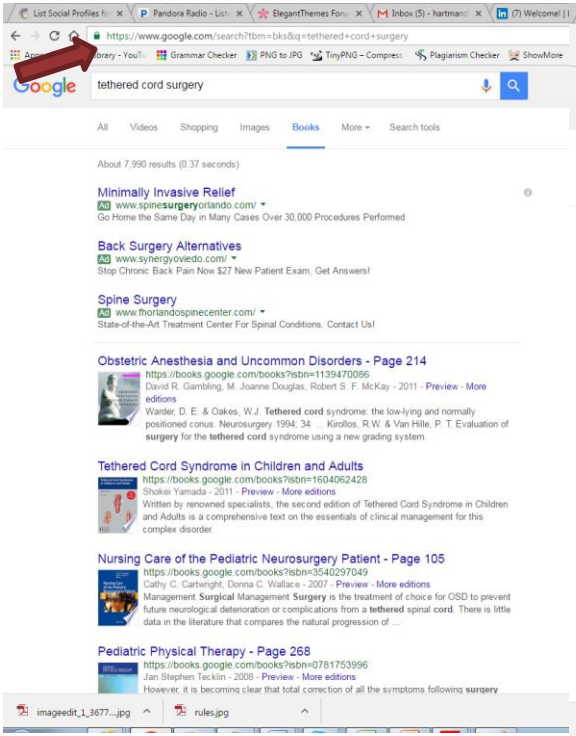
How To Find Articles!

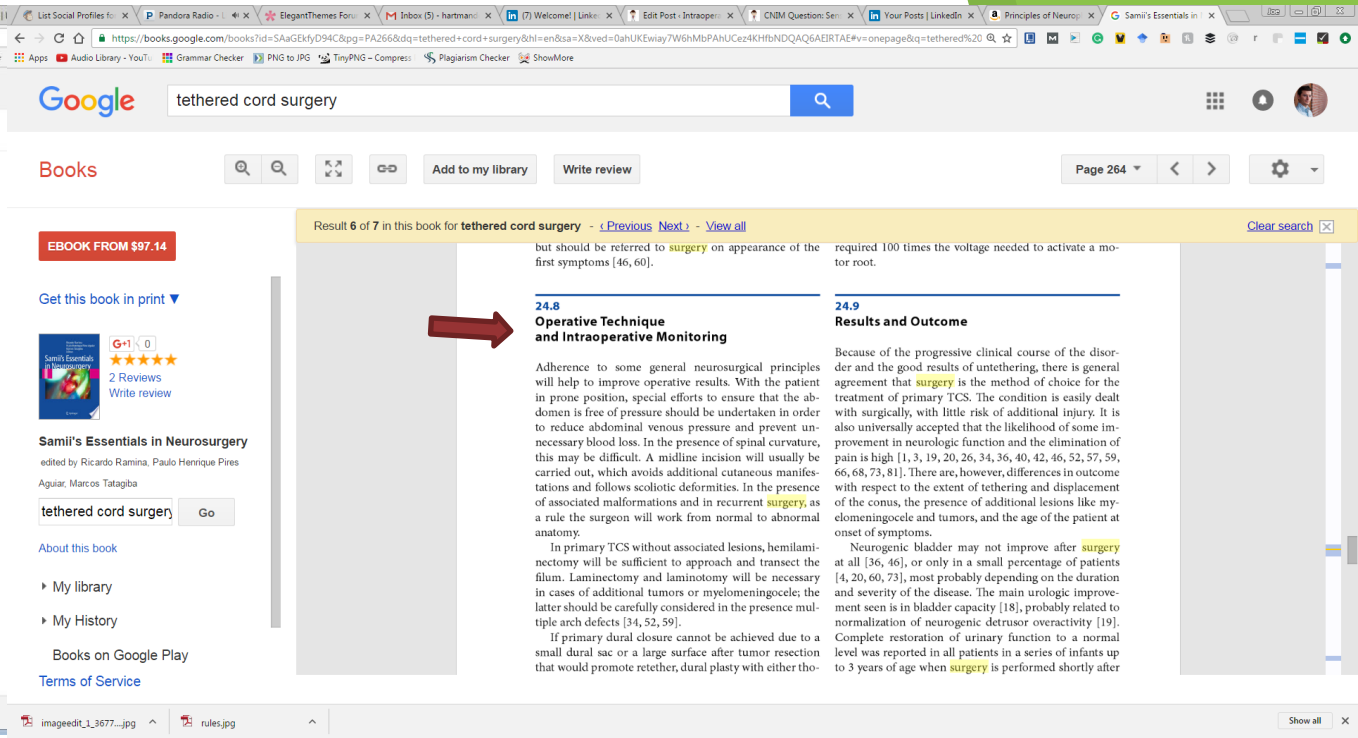


Use Youtube.com to learn about the surgery



Use Google Books to learn about the surgery





4.

Answering Questions

Experience.
Textbooks.
Conferences.

How To Answer Questions

- Merlin Method – predict what question they are going to ask by knowing what is spoke about in the literature. Then ask open ended questions and curve ball questions.
- Give the right answer + acknowledge weakness to your answer + dispute those weaknesses + justify why your answer is right = the right "enough" answer.
- Avoid their traps. They're there on purpose.
- Practice as if you were shooting your own Joe v Joe video.

http://intraoperativeneuromonitoring.com/neuromonitoring-study-guides/

5.

Miscellaneous Advice

Take It Or Leave It.

Build Your Library…

- Collect as many articles as you can.
- Read through those articles with a highlighter and pen.
- Write your own questions off the information given in the article.
- Use the content of the article for the answer. Copy and past that answer, and then rewrite it a little to be a little more conversational or best answer the question you came up with. This will make it easier to remember.
- Keep it all in a master word doc that is broken up into reasonable sections.
- Use cntrl+f to compare responses. Find differences, similarities and trends.

Build Your Library (cont)…

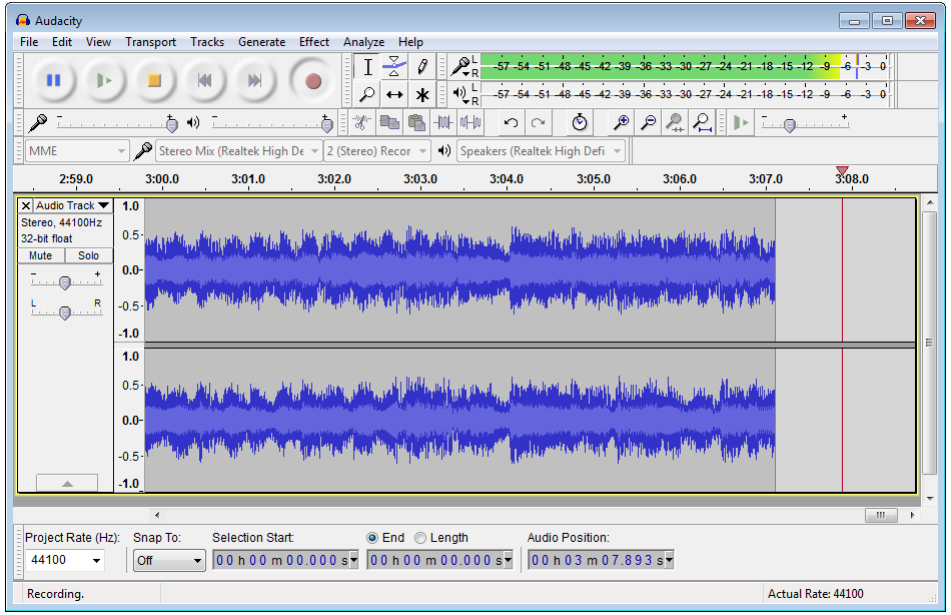
- Rearrange your questions as if they fell into a sequence of questions.
- Find images to help put in long term memory
- In the last section, rearrange the order.
  - Usually you're giving an answer and telling them (author, year). Make a section that starts with (author, year) and you talk about what was presented in that paper and other high points.

Build Your Library… (shortcuts)

- Find good review of the literature articles.
- Make sure you know the paper everyone references over the obscure article from the 60's
- For articles that are images, you are not able to copy and paste the test. If you believe it is taking too long to type out, use a service like http://www.convert-jpg-to-pdf.net/ to convert the image to pdf. Big time saver.

Reherse, Reherse, Reherse

http://www.audacityteam.org/



Know Your Role!

Find all articles offered by associations. These should include recommendations for monitoring, scope of practice, code of ethics, position statements, etc.

Understand the role of D.ABNM and how you would handle situations.

Thinking has to be that of a manager/leader of a group. You need to work through scenarios where you are needed to give expertise.

“To Become, Act As If…”

Phone a friend…

- Find someone that you can ask for help.
- See what they think about your answers to questions with no real “right” answer.
- Have them grill you to no end.
- Have them tear your submitted case to shreds.
- See what they’ve got for study material.
- Be on the look out for others preparing for the exam. Start a study group (people in your company, start a post on the forum, look to see who’s asking questions)

Be A Creap…

- Find the names of the examiners.
- Looks for any publications they have.
- See if you can find any lectures given at conferences.
- Look to find them in online conversations. Blog comments, Linkedin groups, forum post, etc.
- Utilize “confirmation bias”

Good Luck!

CREDITS

Special thanks to all the people who made and released these awesome resources for free:

SENTIENT™
Intraoperative Neuromonitoring & Neurodiagnostics