IN THE STATE COURT OF FULTON COUNTY
STATE OF GEORGIA

HENRY L. SO ROATH SO, Plaintiffs, — *versus* — ORTHO SPORT & SPINE PHYSICIANS, LLC ORTHO SPORT & SPINE PHYSICIANS, DECATUR, LLC ORTHO SPORT HOLDINGS, LLC ORTHOPEDIC SURGERY CENTER OF SANDY SPRINGS, LLC HANY M. HELMI, MD APURVE K. JOSHI, MD JEFFREY LEE, DO JOHN/JANE DOE 1-10, Defendants	)	CIVIL ACTION FILE NO. 20-EV-003250 JURY TRIAL DEMANDED

PLAINTIFF'S COMPLAINT FOR DAMAGES

Nature of the Action

1. This medical malpractice action arises out of medical services negligently performed on Henry So in October and November 2019.

2. Pursuant to OCGA § 9-11-9.1, the Affidavit of Milton H. Landers, DO, PhD, is attached hereto as Exhibit 1. This Complaint incorporates the opinions and factual allegations contained in this affidavit.

3. As used in this Complaint, the phrase "standard of care" means that degree of care and skill ordinarily employed by the medical profession generally under similar conditions and like circumstances as pertained to the Defendant's actions under discussion.

Parties, Jurisdiction, and Venue

4. **Henry So** and **Roath So** are citizens of Georgia. Henry and Roath are husband and wife.

5. **Defendant Ortho Sport & Spine Physicians, LLC ("OSSiP")** is a Georgia limited liability company with its Registered Office in Fulton County. OSSiP may be served through their Registered Agent, Yasha Heidari, at 5788 Roswell Road NE, Atlanta, Georgia 30328.

6. OSSiP has been properly served with this Complaint.

7. OSSiP has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

8. Pursuant to OCGA §§ 14-2-510, 14-3-510, and 14-11-1108[1] OSSiP is subject to venue in this Court because (a) it maintains its registered office in Fulton County and (b) the cause of action originated in Fulton County and the corporation has an office and transacts business in that county.

9. At all relevant times, OSSiP was the employer or other principal of one or more of the following: Hany M. Helmi, MD, Apurve K. Joshi, MD, Jeffrey Lee, DO, and the nursing or office staff involved in the treatment of Henry So on November 22, 2019.

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[1] OCGA §§ 14-2-510 and 14-3-510 provide identical venue provisions for regular business corporations and for nonprofit corporations:

> "Each domestic corporation and each foreign corporation authorized to transact business in this state shall be deemed to reside and to be subject to venue as follows: (1) In civil proceedings generally, in the county of this state where the corporation maintains its registered office.… (3) In actions for damages because of torts, wrong, or injury done, in the county where the cause of action originated, if the corporation has an office and transacts business in that county; (4) In actions for damages because of torts, wrong, or injury done, in the county where the cause of action originated."

Note: These same venue provisions apply to Professional Corporations, because PCs are organized under the general "Business Corporation" provisions of the Georgia Code. *See* OCGA § 14-7-3. These venue provisions also apply to Limited Liability Companies, *see* OCGA § 14-11-1108, and to foreign limited liability partnerships, *see* OCGA § 14-8-46.

10. However, if any other entity was a principal of those individuals, each such entity is hereby on notice that but for a mistake concerning the identity of the proper party, the action would have been brought against it.

11. **Defendant Ortho Sport & Spine Physicians, Decatur, LLC ("OSSPiD")** is a Georgia limited liability company with its Registered Office in Fulton County. OSSPiD may be served through their Registered Agent, Yasha Heidari, at 5788 Roswell Road NE, Atlanta, Georgia 30328.

12. OSSPiD has been properly served with this Complaint.

13. OSSPiD has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

14. Pursuant to OCGA §§ 14-2-510, 14-3-510, and 14-11-1108 OSSiP is subject to venue in this Court because (a) it maintains its registered office in Fulton County and (b) the cause of action originated in Fulton County and the corporation has an office and transacts business in that county.

15. At all relevant times, OSSPiD was the employer or other principal of one or more of the following: Hany M. Helmi, MD, Apurve K. Joshi, MD, Jeffrey Lee, DO, and the nursing or office staff involved in the treatment of Henry So on November 22, 2019.

16. However, if any other entity was a principal of those individuals, each such entity is hereby on notice that but for a mistake concerning the identity of the proper party, the action would have been brought against it.

17. **Defendant Ortho Sport Holdings, LLC ("OSH")** is a Georgia limited liability company with its Registered Office in Fulton County. OSH may be served through their Registered Agent, Yasha Heidari, at 5788 Roswell Road NE, Atlanta, Georgia 30328.

18. OSH has been properly served with this Complaint.

19. OSH has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

20. Pursuant to OCGA §§ 14-2-510, 14-3-510, and 14-11-1108 OSH is subject to venue in this Court because (a) it maintains its registered office in Fulton County and (b) the cause of action originated in Fulton County and the corporation has an office and transacts business in that county.

21. At all relevant times, OSH was the employer or other principal of one or more of the following: Hany M. Helmi, MD, Apurve K. Joshi, MD, Jeffrey Lee, DO, and the nursing or office staff involved in the treatment of Henry So on November 22, 2019.

22. However, if any other entity was a principal of those individuals, each such entity is hereby on notice that but for a mistake concerning the identity of the proper party, the action would have been brought against it.

23. **Defendant Orthopedic Surgery Center Of Sandy Springs, LLC ("OSC")** is a Georgia limited liability company with its Registered Office in Fulton

County. OSC may be served through their Registered Agent, Yasha Heidari, at 5788 Roswell Road NE, Atlanta, Georgia 30328.

24. OSC has been properly served with this Complaint.

25. OSC has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

26. Pursuant to OCGA §§ 14-2-510, 14-3-510, and 14-11-1108 OSC is subject to venue in this Court because (a) it maintains its registered office in Fulton County and (b) the cause of action originated in Fulton County and the corporation has an office and transacts business in that county.

27. At all relevant times, OSC was the employer or other principal of one or more of the following: Hany M. Helmi, MD, Apurve K. Joshi, MD, Jeffrey Lee, DO, and the nursing or office staff involved in the treatment of Henry So on November 22, 2019.

28. However, if any other entity was a principal of those individuals, each such entity is hereby on notice that but for a mistake concerning the identity of the proper party, the action would have been brought against it.

29. **Defendant Hany M. Helmi, MD,** is a citizen of Georgia, residing in Fulton County. He may be served with process at his residence: 33 11th St NE Unit 2312, Atlanta, GA 30309.

30. Dr. Helmi has been properly served with this Complaint.

31. Dr. Helmi has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

32. Dr. Helmi is subject to venue in this County because he lives here.

33. At all times relevant to this Complaint, Dr. Helmi acted as an employee or agent of OSSiP.

34. At all times relevant to this Complaint, Dr. Helmi acted as an employee or agent of OSSPiD.

35. At all times relevant to this Complaint, Dr. Helmi acted as an employee or agent of OSH.

36. At all times relevant to this Complaint, Dr. Helmi acted as an employee or agent of OSC.

37. **Defendant Apurve K. Joshi, MD,** is a citizen of Georgia, residing in Fulton County. He may be served with process at his residence: 145 Windsor Cove, Atlanta, GA 30328.

38. Dr. Joshi has been properly served with this Complaint.

39. Dr. Joshi has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

40. Dr. Joshi is subject to venue in this County because he lives here.

41. At all times relevant to this Complaint, Dr. Joshi acted as an employee or agent of OSSiP.

42. At all times relevant to this Complaint, Dr. Joshi acted as an employee or agent of OSSPiD.

43. At all times relevant to this Complaint, Dr. Joshi acted as an employee or agent of OSH.

44. At all times relevant to this Complaint, Dr. Joshi acted as an employee or agent of OSC.

45. **Defendant Jeffrey Lee, DO,** is a citizen of Georgia, residing in DeKalb County. He may be served with process at his residence: 60 Perimeter Center Pl NE, Atlanta GA 30346.

46. Dr. Lee has been properly served with this Complaint.

47. Dr. Lee has no defense to this lawsuit based on undue delay in bringing suit — whether based on the statute of limitations, the statute of repose, laches, or any similar theory.

48. Pursuant to OCGA 9-10-31, Dr. Lee is subject to venue in this Court because his co-defendants, OSSip, OSSPiD, OSH, and OSC, are subject to venue in this Court.

49. At all times relevant to this Complaint, Dr. Lee acted as an employee or agent of OSSiP.

50. At all times relevant to this Complaint, Dr. Lee acted as an employee or agent of OSSPiD.

51. At all times relevant to this Complaint, Dr. Lee acted as an employee or agent of OSH.

52. At all times relevant to this Complaint, Dr. Lee acted as an employee or agent of OSC.

53. **Defendants John/Jane Doe 1-10** are those yet unidentified individuals and/or entities who may be liable, in whole or part, for the damages alleged herein. Once served with process, John/Jane Doe 1-10 are subject to the jurisdiction and venue of this Court.

54. This Court has subject matter jurisdiction, and venue is proper as to all Defendants in this Court.

Facts

General Principles

The spinal cord

55. The spinal column is an intricate, crucial part of the body.

56. The spinal cord contains densely packed nerve fibers that connect the brain to the rest of the body and help enable the brain to regulate and control the body.

57. The spinal cord is important in controlling voluntary body functions that involve the use of muscles — walking, for example, or even standing still while keeping your balance.

58. The spinal cord is important in controlling other body functions that are normally voluntary — for example, urinating or defecating.

59. The spinal cord is important in controlling body functions that are partly or wholly involuntary — for example, breathing, regulating digestion, regulating body temperature, and sexual response.

60. The spinal cord is important in creating sensation, whether painful, pleasurable, or neutral.

61. Injury to the spinal cord can cause loss of sensation (numbness) or pain — sometimes intense, excruciating pain.

62. Injury to the spinal cord can damage body functions such as regulating body temperature, bowel or bladder voiding, or sexual response.

63. Injury to the spinal cord can impair muscle or motor function, for example by harming your ability to walk or to maintain balance.

64. Injury to the spinal cord can be temporary or can last a lifetime.

65. Injury to the spinal cord can occur from a physical impact (for example, from a needle being inserted into the cord).

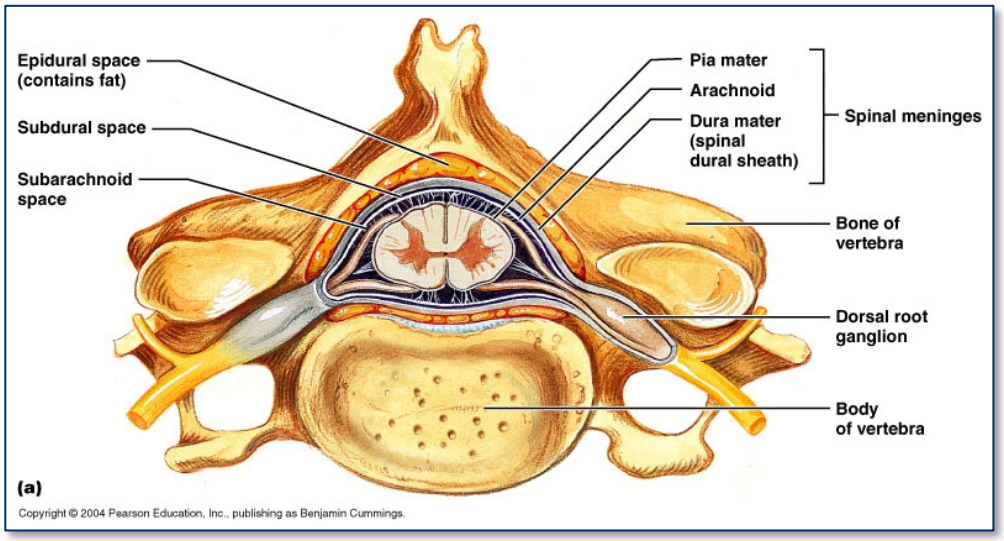
66. Injury to the spinal cord can occur from the mass effect of a substance injected into the spinal cord.

67. Injury to the spinal cord can occur from the chemical impact of harmful substances injected into the cord.

Cervical Epidural Steroid Injection

68. A cervical epidural steroid injection ("CESI") is a shot of medication into the epidural space of the spinal column.

69. The epidural space is a thin area between the bony back part of the vertebrae and the outer membrane that encloses the spinal cord (the dura mater). The epi-dural space is over or upon the dura.

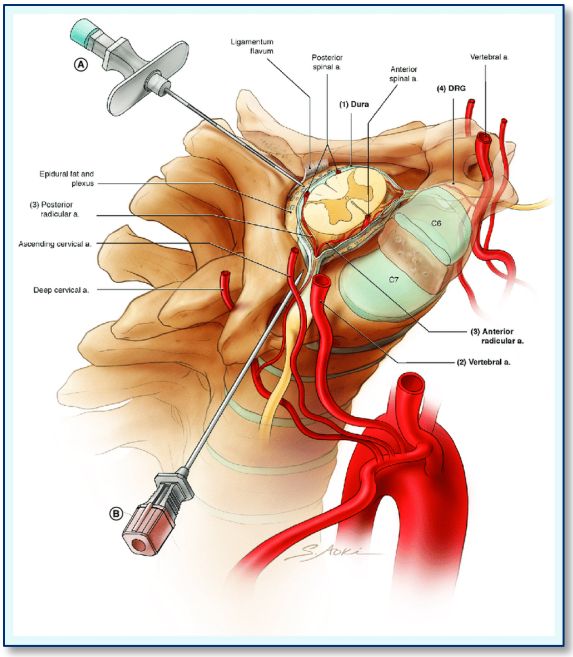


70. Typically, doctors give a CESI to relieve pain in the neck, shoulders, or arms that arises from compression or inflammation of a nerve or nerve root exiting the spinal cord.

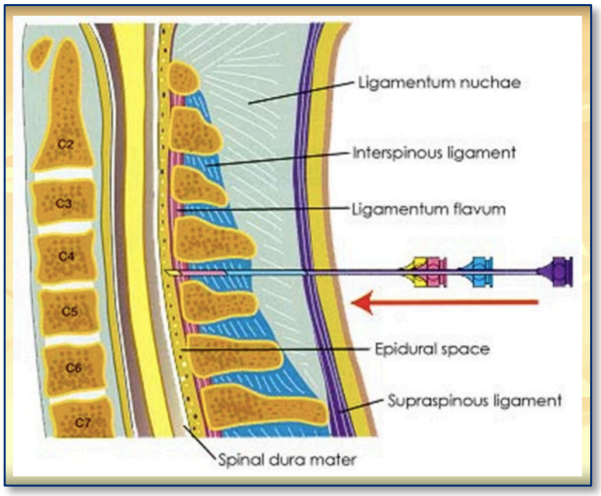
71. The purpose of a CESI is to numb the pinched or inflamed nerve root with anesthetic medication and to reduce inflammation with a steroid medication.

72. In a CESI procedure, the physician sticks a needle in the back or side of the neck.

73. The intention is to stick the tip of the needle into the epidural space, a fraction of an inch from the spinal cord, not inside the dura or spinal cord.



Two approaches for needle: (A) interlaminar or (B) transforaminal



74. The risks of a CESI range from the relatively minor to the catastrophic. In the worst case, a physician might stick the needle all the way into the spinal cord itself and then inject the steroid into the cord — damaging the spinal cord and causing permanent pain, disabilities, or even death.

75. A CESI typically is performed in less than half an hour, but the physicians and facility may bill in excess of $5,000 for a CESI.

76. Because a CESI can cause catastrophic injury, a CESI is properly prescribed for pain only where the pain is serious and intractable, so that it significantly impairs the patient's functioning in daily life.

77. Before prescribing or performing a CESI, the physician must ensure that the patient understands the risks of the procedure.

78. Before performing a CESI, the physician must evaluate the patient's fitness for the procedure. This includes taking the patient's blood pressure, to identify whether the patient is hypertensive.

79. Hypertension in a CESI patient increases the risk of complications.

80. For an elective procedure such as a CESI, if the patient is significantly hypertensive on the day of the procedure, the procedure should be called off until the blood pressure is treated or managed and returns to a normal range.

81. The greatest risk of a CESI arises because the physician cannot, with the naked eye, see where the tip of the needle is.

82. Various aspects of proper technique can reduce the risk of sticking the needle into the spinal cord, but two safety measures are particularly important.

83. The two primary safeguards against sticking the needle into the spinal cord are (a) the patient's ability to cry out in pain if the needle hits the spinal cord, and (b) radiological imaging to show the location of the needle.

84. The patient's ability to cry out requires that the patient remain responsive enough to sense pain.

85. The patient must not be heavily sedated to the point where the patient cannot feel pain.

86. Typically, a topical anesthetic is appropriate, to numb the pain from the needle first breaking the skin.

87. In a routine CESI case, however, a general sedative or anesthetic that renders the patient insensate to pain is inappropriate and dangerous to the patient.

88. A general sedative should not be used for a CESI unless there is a special need for it, specific to the patient.

89. Even in a non-routine case where a stronger sedative may be required, in no event may a patient be sedated to the point that he or she will not feel if the needle pierces the outer membrane of the spinal cord.

90. Where a general sedative is needed, sedating agents that are difficult to dose appropriately for the patient should be avoided, because they pose an unnecessary risk of over-sedation.

91. Propofol is a strong general sedative.

92. For a CESI, propofol poses an unnecessary risk of over-sedation.

93. If a CESI cannot proceed without heavy sedation, the CESI must not proceed.

94. The physician administering the CESI and any other medical providers involved in administering analgesia share responsibility for ensuring that

the patient is not over-sedated — and for postponing the procedure if the patient is too sedated.

95. The second primary safeguard against sticking the needle into the spinal cord is fluoroscopy — a form of radiological imaging that essentially provides live, continuous x-ray images as the physician pushes the needle into the spine.

96. Even with fluoroscopy, images taken from a single view (from the back, for example) can mislead the physician about where the needle is.

97. The physician must therefore obtain at least two views to confirm needle placement (e.g., from the back and from the side).

98. To allow clearer, more useful x-ray images, the physician administering the CESI puts a contrast dye into the syringe.

99. Injection of any substance into the body — particularly in or near the spinal cord — poses a risk to the patient and therefore should be done carefully.

100. Before injecting the full volume of contrast dye, a physician administering a CESI should inject a minimal test dose, to make sure the contrast dye will not be injected into the spinal cord itself.

101. The dispersal pattern of contrast dye differs, depending on where it is injected in the body.

102. So the contrast dispersal pattern provides additional information to identify the location of the needle tip.

103. A physician administering a CESI must understand and pay attention to the pattern of contrast injected.

104. Before injecting the medication, the physician must confirm proper placement of the needle tip by all of the following: (a) response of the alert patient, (b) images of the needle from two different views on fluoroscopy, and (c) the dispersal pattern of the contrast dye.

105. If any of those sources of information are unavailable or do not confirm proper placement of the needle, the physician must not inject the full volume of contrast or the medication.

106. A physician administering a CESI must ensure that he or she has enough time to do the job properly, without being rushed or otherwise facing pressure to take shortcuts.

107. Where a physician intends the patient to be sedated, the physician must ensure enough time has been allotted to the procedure to bring the patient out of an inadvertent overly-sedated state.

Record-keeping and radiology images

108. A physician administering a CESI must obtain and archive enough fluoroscopy images, on at least two imaging planes, to show accurately what was done — where the needle was when injections were made of the test-amount of contrast, the full amount of contrast, and the medication.

109. The physician must also write or dictate an operative note to accurately describe, in detail, the specific procedure.

110. The physician must complete the operative note shortly after the procedure, when the details are fresh in the physician's mind.

111. The archived fluoroscopy images and the operative note protect the patient by providing a detailed record of the procedure in the event of post-operative complications.

112. A physician administering anesthesia must keep records that state in detail what agents were administered, how much, the mechanism of delivery, and the time period over which they were administered.

113. When post-operative complications arise, proper records assist downstream medical providers in timely diagnosing the patient and beginning appropriate treatment.

114. Failure to keep proper records may harm the patient, in the event of post-operative complications, by delaying appropriate diagnosis and treatment.

Responding to post-operative complications

115. When serious post-operative complications arise, the physician who administered the CESI must review the radiology images and the operative note, to help understand the cause and nature of the complications.

116. If the patient must be taken to an Emergency Room because of post-operative complications, the physician who performed the CESI must fully and accurately inform the ER staff of the CESI procedure and any known or likely cause of the complications.

117. In the event of post-operative complications, failure to properly review the records of the CESI and then to properly inform the ER staff may harm the patient by delaying appropriate diagnosis and treatment.

Greater Occipital Nerve Block

118. The greater occipital nerve runs along the back of head and may be involved in various kinds of severe headaches.

119. A nerve block involves an injection of anesthetic medication in the area of the nerve.

120. A greater occipital nerve block is a simple, quick procedure — sometimes taking less than five minutes — but physicians and facilities may bill upwards of $500 for the procedure.

121. A greater occipital nerve block poses risks of (among other things) infection, nerve damage, allergic reaction to the medication, and injection into the greater occipital artery.

122. An occipital nerve block is indicated only for serious, long-term pain.

Henry So's Course of Treatment

123. In April 2019, Henry So was involved in a car crash. He underwent some chiropractic care but continued to have pain in his neck. (OSS 10.)

124. After being advised to consider spine surgery, on October 15, 2019, Mr. So went to Ortho Sport & Spine for a second opinion. Dr. Mark A. Flood examined Mr. So. (OSS 10.)

125. Mr. So described pain in his neck and shoulder area at a level of 6 out of 10.

126. An MRI taken in April of that year showed foraminal stenosis (narrowing of the openings in the vertebrae, where nerve roots exit the spinal column) with impingement of the C7 nerve roots on both the left and right sides. (OSS 10-11.)

> MRI of the cervical spine, 4/23/2019:C4-5 left-sided extrusion with moderate central stenosis. At C5-6 there is a disc protrusion with bilateral foraminal protrusions and severe bilateral foraminal stenosis. At C6-7 there is a central protrusion with moderate spinal stenosis. There is a right-sided disc extrusion resulting in the right neuroforaminal stenosis and impingement on the right C7 nerve root. There is also left foraminal protrusion which extends beyond the margins of underlying osteophytes resulting in moderate to severe left foraminal stenosis and impingement of the left C7 nerve root. There is a right-sided protrusion at C7-T1.

127. Dr. Flood recommended an interlaminar CESI, and perhaps a series of three injections. Mr. So accepted the recommendation. (OSS 11.)

> Notes: The patient is a 63-year-old gentleman that is symptomatic of cervical disc herniations and cervical disc displacement greatest at the C6-7 level, but with multilevel cervical disc abnormalities. The patient is not interested in pursuing surgical intervention at present. Neurologically he is intact, this surgery is not imperative at present, however he does understand that this could be in his near future. We discussed transforaminal and intralaminar cervical epidural steroid injections. At this point, he will see Dr. Lee for an interlaminar cervical epidural steroid injection in hopes of giving more long-term resolution of symptoms. He understands this may be done in a series of 3. The patient will follow-up in 4 weeks to assess the efficacy of the procedure. Patient education including procedure information is provided today.
> Dictated by Melanie W. Clark, NP-C for Dr. Mark Flood, DO.

128. Dr. Flood did not advise Mr. So of the risks of a CESI in general or specifically of the risk of permanent disability from injection of the medication into Mr. So's spinal cord.

129. On October 21, 2019, Mr. So appeared at Ortho Sport & Spine for the scheduled CESI. Dr. Ryan Rosen (not Dr. Mark Flood) saw Mr. So. Dr. Rosen had not seen Mr. So before this visit. Dr. Rosen performed a CESI without documenting his own examination of his patient or independently verifying that a CESI was indicated for Mr. So. (OSS 8-9.)

130. Dr. Rosen performed a CESI on Mr. So at the C7/T1 level, using intravenous sedatives. (OSS 8.)

Notes:
INDICATIONS:
Please see last progress note for details. Patient agrees to proceed with C7/T1 CESI today.

PRE PROCEDURE DIAGNOSIS: Cervical radiculopathy

POST PROCEDURE DIAGNOSIS: Same

PROCEDURE: Cervical C7/T1 ESI with Fluoroscopic Guidance

SEDATION: Monitored IV sedation

131. Dr. Rosen's operative note does not indicate what type or amount of sedative was used on Mr. So. (OSS 8.)

132. Dr. Rosen's operative note provides only a vague description of the CESI procedure. (OSS 8.)

PROCEDURE NARRATIVE:

An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C5 to T1. After negative aspiration, 2 cc of normal saline with 5 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

Patient was monitored for an appropriate length of time before being discharged to home. Vital signs remained stable throughout the procedure and in recovery. There were no complications.

133. On October 28, 2019, Mr. So returned to Ortho Sport & Spine for a follow-up visit. This time, he was seen by Dr. Jeffrey Lee (the third Ortho Sport & Spine doctor in three visits). Mr. So reported that his pain was at a level of 3 out of 10 (as compared with 6 out of 10 on the October 15 visit). (OSS 6-7.)

HPI:
Constitutional:
63 year old male presents with c/o neck pain .
Patient returns today for follow-up office visit. He status post C7-T1 intralaminar steroid injection on October 21, 2019. Patient reports 80% of his neck pain. He describes a mild, achy, discomfort pain center portion of the neck, 3 out of 10 on the VAS pain scale without any sharp radiation to the arms. Aggravating factors are cervical spine rotation. Alleviating factors are the procedure.

134. On November 4, 2019, Mr. So returned for a second follow-up visit. Again he was seen by Dr. Jeffrey Lee. As at the previous visit, Mr. So reported that his neck pain was at a level of 3 out of 10. (OSS 4.)

135. Mr. So also reported frequent headaches, but Dr. Lee did not record the intensity of the headaches. (OSS 4.)

Patient returns today for follow-up office visit. He status post C7-T1 intralaminar steroid injection on October 21, 2019. He is still getting relief from the procedure. He states he feels at least 50% improved, recall last visit he felt 80% relief. He still experiences a right-sided neck pressure and pain with range of motion, 3 out of 10 on the VAS pain scale without any sharp radiation to the upper extremities. Aggravating factors are flexion of his cervical spine and sleep. His pain is worse after sleeping. Alleviating factors has been the procedure. He also admits to a headache usually daily that occurs with his right-sided neck pain localized over the right occipital and parietal regions of the scalp.

136. Dr. Lee recommended another CESI and a greater occipital nerve block. (OSS 5.)

Notes: Recommend a repeat C7-T1 intralaminar epidural steroid injection x1 as he has had 50% relief with the first procedure. Hopefully a second dose of medication this will compound his relief. A right greater occipital nerve block will also be ordered the same day as the epidural steroid injections to hopefully break his headache cycle and improve this pain also. He is dispensed a refill of Dendracin lotion. He will follow-up in 3 weeks.

Dictated by Melissa Hagin, NP-C for Dr. Jeffrey Lee, DO.

137. The medical records do not indicate that Dr. Lee informed Mr. So of the risks of the CESI or of the nerve block. (OSS 4-5.)

138. A CESI was not indicated or justified for 3-out-of-10 neck pain.

139. A greater occipital nerve block was not indicated for headaches of unspecified intensity.

140. Dr. Lee violated the standard by prescribing another CESI.

141. Dr. Lee violated the standard by making the prescription without informing Mr. So of the risks.

142. Dr. Lee violated the standard by prescribing the greater occipital nerve block.

143. Dr. Lee violated the standard by making the prescription without informing Mr. So of the risks.

144. On Friday, November 22, 2019, Mr. So appeared at Ortho for the scheduled CESI. This time he was seen by Dr. Hany M. Helmi. Dr. Helmi was the fourth Ortho Sport & Spine doctor to see Mr. So. (OSS 2.)

145. Dr. Helmi had not seen Mr. So before, but Dr. Helmi did not document that he performed an examination of his new patient. Nevertheless, Dr. Helmi proceeded to perform a CESI and nerve block. (OSS 2-3.)

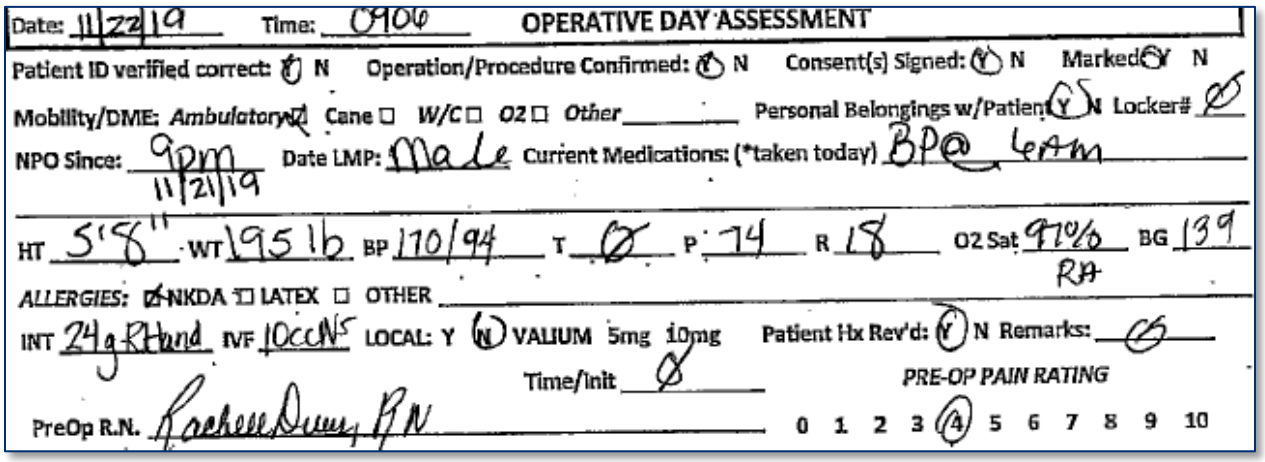
146. Dr. Helmi violated the standard of care by performing the procedures without conducting an examination of his patient to ensure that the procedures were indicated.

147. The records contain no indication that Dr. Helmi ensured Mr. So understood the risks of the procedures. (OSS 2-3.)

148. Dr. Helmi violated the standard of care by performing the procedures without ensuring that Mr. So understood the risks.

149. A nurse (Rachell Dunn?) apparently employed by Ortho Sport & Spine performed an "Operative Day Assessment" of Mr. So, beginning at 0906 hours. (NHA 344.)

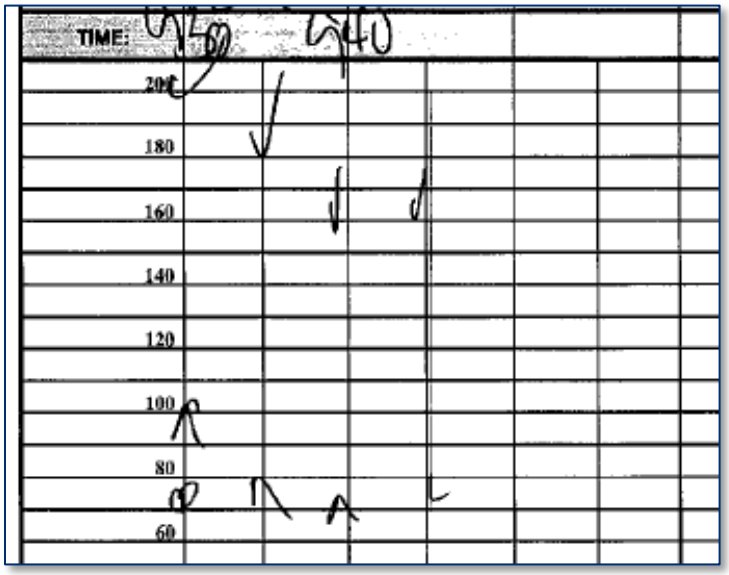
150. The nurse noted that Mr. So's pre-op pain rating was 4 out of 10. (NHA 344.)


Date: 11/22/19 Time: 0900 OPERATIVE DAY ASSESSMENT
Patient ID verified correct: Y N Operation/Procedure Confirmed: Y N Consent(s) Signed: Y N Marked Y N
Mobility/DME: Ambulatory Y Cane ☐ W/C ☐ O2 ☐ Other _____ Personal Belongings w/Patient Y N Locker# Ø
NPO Since: 9pm 11/21/19 Date LMP: Male Current Medications: (*taken today) BP @ 6AM
HT 5'8" WT 195 lb BP 170/94 T Ø P 74 R 18 O2 Sat 97% RA BG 139
ALLERGIES: Ø NKDA ☐ LATEX ☐ OTHER _____
INT 24g R Hand IVF 10cc NS LOCAL: Y N VALIUM 5mg 10mg Patient Hx Rev'd: Y N Remarks: Ø
Time/Init Ø
PreOp R.N. Rochelle Dunn, RN
PRE-OP PAIN RATING
0 1 2 3 4 5 6 7 8 9 10

151. A CESI was not indicated for Mr. So's 4-out-of-10 pain.

152. Dr. Helmi violated the standard of care by performing a CESI on Mr. So despite the operation not being indicated.

153. At 9:30, when anesthesia began, Mr. So's blood pressure was 200/100. (NHA 345).



154. The high range of normal blood pressure is approximately 120/80.

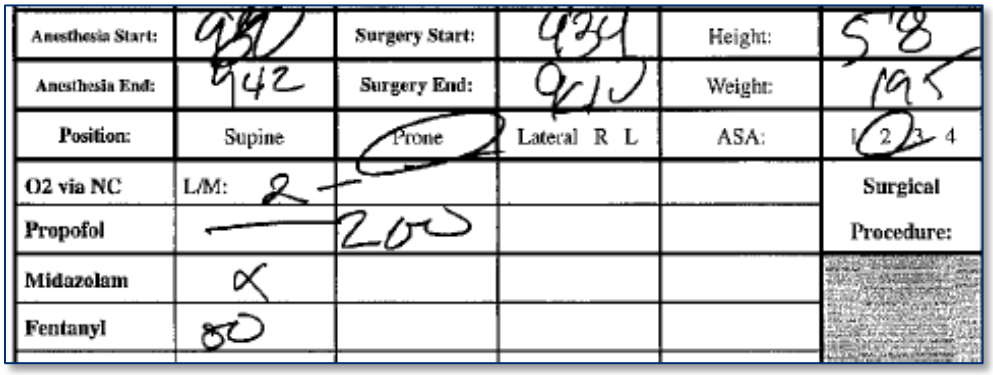
155. Systolic pressure over 180 may be classified as a hypertensive crisis.

156. In light of Mr. So's systolic pressure of 200, he was not medically fit for an elective CESI.

157. Dr. Joshi and Dr. Helmi violated the standard of care by proceeding with the CESI despite Mr. So's abnormally high blood pressure.

158. Anesthesia began at 9:30. Surgery began at 9:34. Surgery ended at 9:40. And anesthesia ended at 9:42. (NHA 345.)

159. Dr. Joshi administered 200 mg of propofol to Mr. So. (NHA 345.)



Anesthesia Start:	930	Surgery Start:	934	Height:	5'8
Anesthesia End:	942	Surgery End:	940	Weight:	195
Position:	Supine	Prone	Lateral R L	ASA:	1 2 3 4
O2 via NC	L/M: 2				Surgical
Propofol	200				Procedure:
Midazolam	2				
Fentanyl	80				

160. Propofol is a general anesthetic.

161. Propofol is a powerful agent, difficult to dose precisely for a given patient, and therefore posing a risk of over-sedation.

162. General anesthesia is generally inappropriate for CESI patients, and there was no need for Mr. So to receive a general anesthetic.

163. Dr. Joshi violated the standard of care by administering a general anesthetic to Mr. So.

164. Dr. Helmi violated the standard of care by performing a CESI on Mr. So while he was sedated by a general anesthetic.

165. Even if a general anesthetic had been appropriate for Mr. So, 200 mg would have been an excessive dose.

166. If a general anesthetic was necessary at all, it would be permissible only for moderate sedation.

167. Under any circumstances, it was vitally important that Mr. So be alert, able to feel pain if his spinal cord was punctured, and able to cry out in pain.

168. Two hundred milligrams of propofol, administered over the course of 12 minutes, was likely enough to render Mr. So completely unconscious.

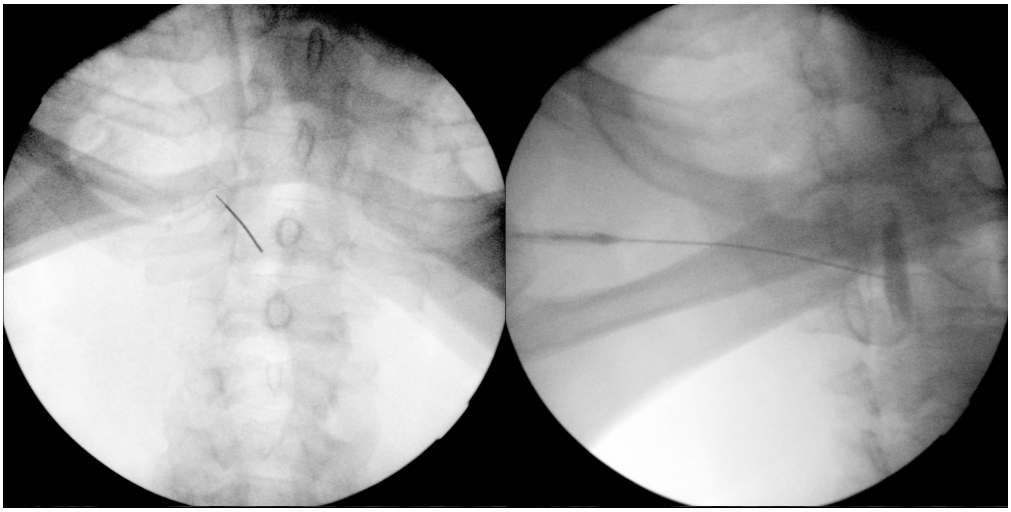
169. Dr. Joshi violated the standard of care by administering an excessive dose of propofol to Mr. So.

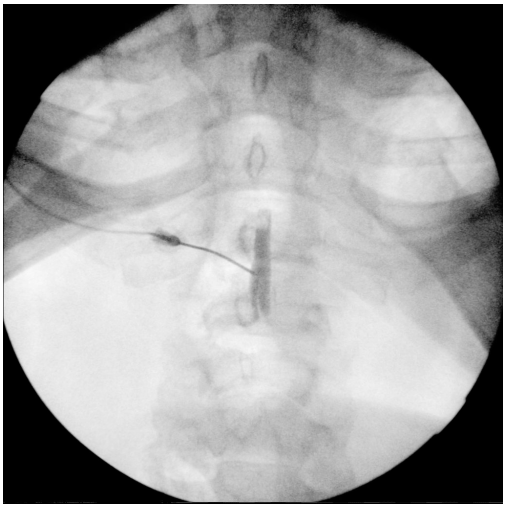
170. Dr. Helmi violated the standard of care by performing a CESI on Mr. So while he was over-sedated.

171. Dr. Joshi's anesthesia record does not indicate clearly the method of delivery of the anesthesia, the time over which it was administered, or the reasons it was indicated. The record is inadequate, and Dr. Joshi violated the standard of care by failing to keep an adequate record.

172. Dr. Helmi's record of the CESI is also inadequate.

173. It appears Dr. Helmi recorded only three fluoroscopy images.





174. These images do not adequately demonstrate the steps Dr. Helmi took in performing the CESI.

175. Dr. Helmi violated the standard of care by choosing to discard the images that would have demonstrated exactly what he did in the operation.

176. The images Dr. Helmi retained directly indicate that the tip of the needle was not in the epidural space. The images indicate that the needle had crossed the midline of the spine and was in the center of the spinal canal, not posterior to the canal.

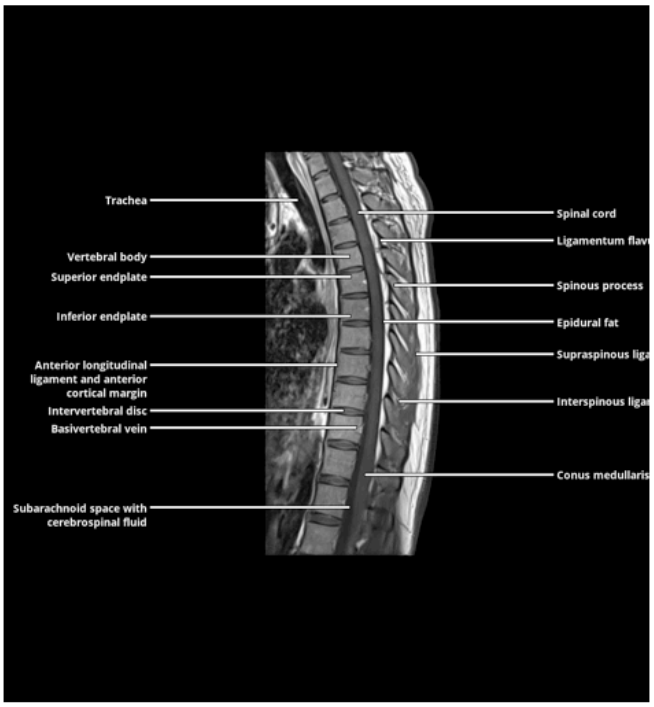
177. These images indicate, however, that Dr. Helmi injected a full volume of contrast into the dural space — not the epidural space. The contrast-dispersal pattern shows sharp, well-defined margins running along the boundaries of the spinal cord.

178. The contrast dispersal pattern should have clearly alerted Dr. Helmi that he had stuck the needle past the epidural space, inside the membranes covering the spinal cord.

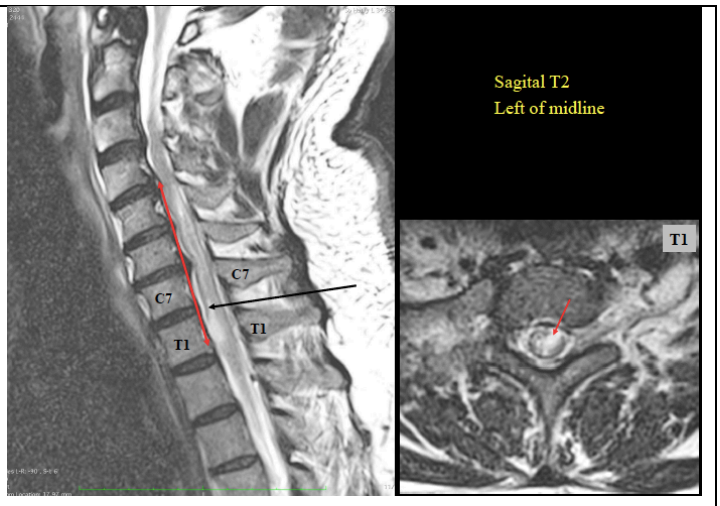
179. Dr. Helmi violated the standard of care by injecting the full volume of contrast before using a test dose of contrast to ensure proper placement of the needle.

180. Dr. Helmi violated the standard of care by ignoring plain evidence that he had stuck the needle into Mr. So's spinal cord.

181. Later that day, after Mr. So was taken to the Emergency Room, MRI images were taken of Mr. So's spine. Those images show that Dr. Helmi injected the steroid medication into Mr. So's spinal cord. The light-colored material within the spinal cord is the steroid/anesthetic medication. (Contrast Mr. So's image on the right with normal spinal cord images on the left.)



First of 3 sagittal T1 MR images of the thoracic spine presented from medial to lateral is



182. The radiologist who interpreted the MRI findings concluded that they showed "abnormal signal within the cord posteriorly with almost a track-like appearance possibly related to the epidural injection," and that the images showed "cord signal hyperintensity … compatible with intramedullary cord injection…." (NHA 577.)

C4-5: Preserved disc space height with a left paracentral disc osteophyte complex which indents the left aspect of the cord and overall moderate to severe canal stenosis. There is abnormal signal within the cord posteriorly with almost a track-like appearance possibly related to the epidural injection. Additionally, there are superimposed facet hypertrophic changes with moderate to severe right-sided foraminal stenosis.

C5-6: Mild disc space narrowing with a mild broad disc and osteophyte complex and superimposed uncovertebral joint hypertrophy with overall severe canal stenosis and at least moderate central canal stenosis, with again seen is abnormal intramedullary cord signal hyperintensity and overall heterogeneous pattern.

C6-7: Narrowed disc space with a broad disc osteophyte complex with uncovertebral joint hypertrophy with severe bilateral foraminal stenosis and at least moderate central canal stenosis, again there is abnormal intramedullary heterogeneous signal within the cord.

C7-T1: Preserved disc space height without high-grade canal compromise or foraminal stenosis, but again abnormal intramedullary cord signal throughout.

T1-T2: Abnormal cord signal hyperintensity which also extends anteriorly along the ventral surface of the cord on the left. There is no high-grade foraminal stenosis.

Postcontrast imaging demonstrates no definite pathologic enhancement.

IMPRESSION:
1. Diffuse abnormal intramedullary cord signal hyperintensity from C4 to the upper thoracic spine with imaging findings compatible with intramedullary cord injection given the history of epidural injection with abnormal cord signal as described, as well as several foci of air and possibly trace hemorrhage. Neurosurgical consultation is recommended.

183. The neurosurgeon who evaluated Mr. So at the hospital also concluded that Dr. Helmi had injected the steroid/anesthetic medication into Mr. So's spinal cord. (NHA 141-44.)

attached to this report. It appears as if the patient had an intra-medullary injection of steroid along with anesthetic agent. There is a possible report of aspiration after this but no intubation or resuscitation was necessary at any time. He feels as if his leg power is improving but he has still significant pain in his arm as well as his right anterior abdominal wall.

184. Dr. Helmi violated the standard of care by injecting the medication without obtaining sufficient fluoroscopic images to confirm proper placement of the needle tip.

185. Dr. Helmi violated the standard of care by injecting the medication despite seeing a contrast dispersal pattern that indicated the needle was in Mr. So's spinal cord.

186. After the operation, Mr. So awoke with severe pain in his abdomen and legs, with loss of sensation normal sensation in his legs, and with difficulty breathing. (OSS 20-21; NHA 60; NHA 38; NHA 39; NHA 141.)

Post procedure pt complained of difficulty breathing, heaviness in his stomach, and paresthesias in his hands and feet. Pt had full sensation in his arms and legs and was able to move all extremities.

BP 179/101
HR 89

02 Sat- 89% on facemask

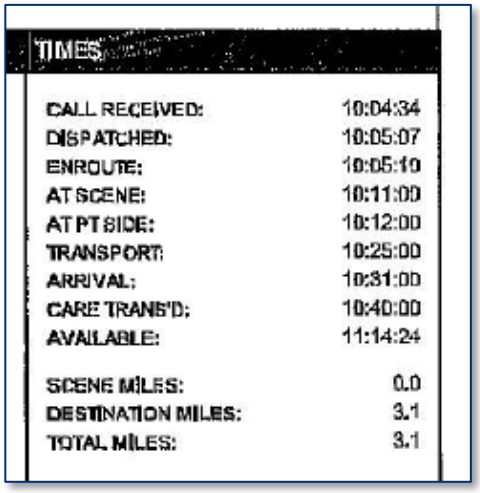
EMS was called and patient was taken to Northside Hospital. Before leaving with EMS the patient was given 10mg of Hydralazine, sublingual nitroglycerin and an albuteral treatment via facemask.

Electronically signed by Hany Helmi , MD on 11/22/2019 at 04:58 PM EST
Sign off status: Completed

History of Present Illness
63-year-old male who was sedated earlier today for his cervical epidural. He awoke from this procedure with severe pain in his arm as well as his abdomen and the inability to move his legs more so than his arms. He was urgently transferred to the Northside emergency department where further evaluation and imaging studies were obtained with results attached to this report. It appears as if the patient had an intra-medullary injection of steroid along with anesthetic agent. There is a possible report of aspiration after this but no intubation or resuscitation was necessary at any time. He feels as if his leg power is improving but he has still significant pain in his arm as well as his right anterior abdominal wall.

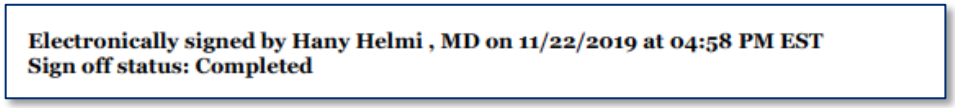
187. Surgery ended at 0940 hours, and an ambulance was called 25 minutes later, at 1004 hours. The EMS arrived at Ortho Sport & Spine at 1011 hours, left

with Mr. So in the ambulance at 1025 hours, and arrived with him at the ER at 1031 hours. (NHA 60.)



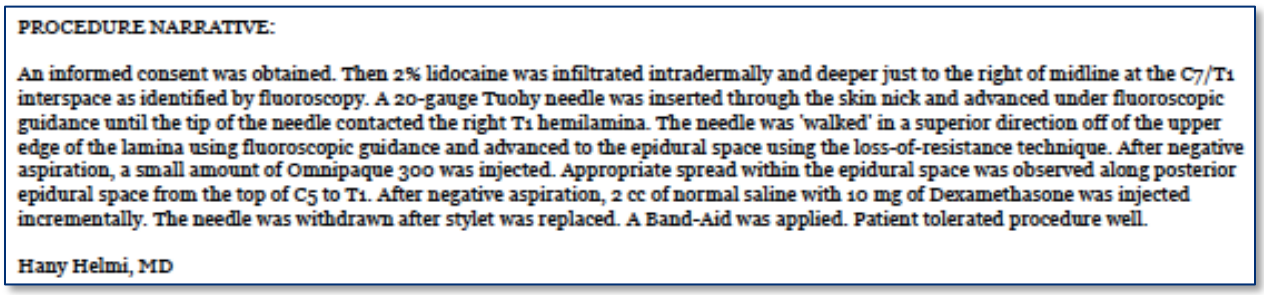
TIMES	
CALL RECEIVED:	10:04:34
DISPATCHED:	10:05:07
ENROUTE:	10:05:19
AT SCENE:	10:11:00
AT PT SIDE:	10:12:00
TRANSPORT:	10:25:00
ARRIVAL:	10:31:00
CARE TRANS'D:	10:40:00
AVAILABLE:	11:14:24
SCENE MILES:	0.0
DESTINATION MILES:	3.1
TOTAL MILES:	3.1

188. Dr. Helmi did not dictate an operative report until nearly seven hours after the operation, at 1658 hours. (OSS 20-21.)



Electronically signed by Hany Helmi , MD on 11/22/2019 at 04:58 PM EST
Sign off status: Completed

189. Dr. Helmi's operative report included only a vague description of the CESI procedure, which is nearly identical to the description in Dr. Rosen's October 21 CESI operative report.(OSS 2; OSS 8.)



PROCEDURE NARRATIVE:

An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C5 to T1. After negative aspiration, 2 cc of normal saline with 10 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

Hany Helmi, MD

PROCEDURE NARRATIVE:

An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C5 to T1. After negative aspiration, 2 cc of normal saline with 5 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

Patient was monitored for an appropriate length of time before being discharged to home. Vital signs remained stable throughout the procedure and in recovery. There were no complications.

Ryan Rosen, MD

190. Dr. Helmi violated the standard of care by failing to promptly write an operative note that adequately described the actual procedure.

191. On the post-procedure sheet, the Ortho Sport & Spine nurse recorded Mr. So's post-op admission pain rating as 0 out of 10, and recorded that Mr. So was discharged home. (NHA 344.)

POST-OP ADMISSION PAIN RATING

(0) 1 2 3 4 5 6 7 8 9 10

Procedure: Cervical ESI/GONB

Remarks:

IVF Ø Oral Ø Output Ø

Discharge O2 Sat: 96% RA

Patient alert and oriented A+Ox4

Absence of Respiratory Distress ☺ Distress

IV removed intact/dressing applied ✓ Catheter intact

Procedure Site and/or dressing checked C/D/I

Discharge instructions given with verbal understanding to: Pt. Verbalized Understanding

Patient discharged HOME ✓ OTHER

via WALK W/C ✓ TIME: 0955

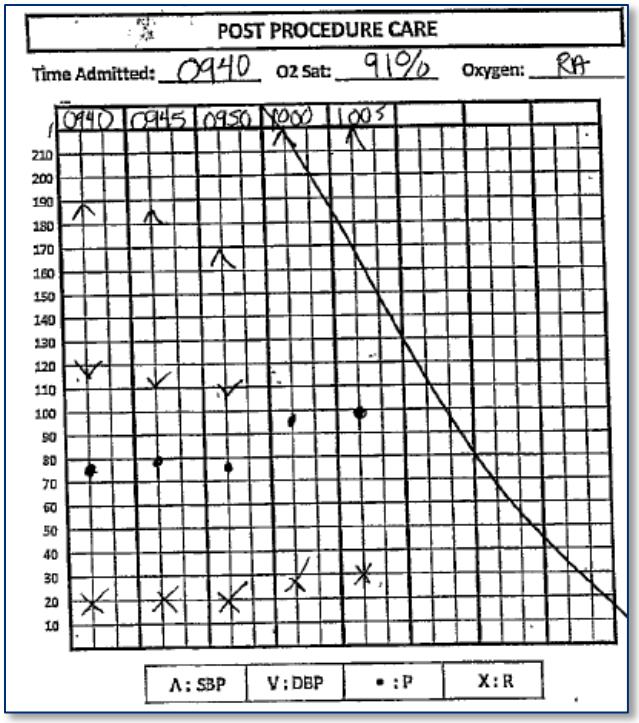
DISCHARGE PAIN RATING

0 1 2 3 4 5 6 7 8 9 10

Rachell Dawn R.N.

M.D

192. The post-procedure care sheet noted Mr. So's blood pressure at 0940 hours as 190/115, and at 0950 hours as 170/110. (NHA 344.)



193. The EMS noted Mr. So's blood pressure at 1020 hours as 182/110 and at 1030 hours as 174/100. (NHA 61.)

TIME	BLOOD PRESSURE	PULSE	RESP	GLASGOW COMA SCALE E	V	M	TOTAL	EKG
10:20	182 / 110 (134)	91	20	4	5	6	15	
10:22								NORMAL SINUS RHYTHM
10:30	174 / 100 (125)	96	20	4	5	6	15	

194. Dr. Helmi and other Ortho Sport & Spine staff conveyed misleading information to the ER physicians.

195. Most importantly, Dr. Helmi did not review the fluoroscopy images and inform the ER staff that he had injected medication into Mr. So's spinal cord. Instead, Dr. Helmi said he suspected Mr. So had suffered cord compression (which differs from injection into the spinal cord). (NHA 132.)

196. Additionally, it appears that Dr. Helmi conveyed the impression that Mr. So began having high blood pressure only after the CESI, which was not true. (NHA 132.)

197. These misimpressions led the ER physician and other hospital staff down false trails. (NHA 132.)

> According to the orthospine doctor patient was under monitored anesthesia care with propofol. After the spinal injection he thinks it was compression of the cervical cord patient's blood pressure was noted to be elevated. He was given nitro. He had low saturations but never required intubation or bagging. The patient was drowsy postprocedure however been brought to the ER he complained of abdominal distention and some breath.
> The ER doctor was concerned about dissecting abdominal aneurysm and obtained a CT a chest abdomen pelvis which was negative for dissection. CT chest noted to have diffuse groundglass opacities. Initial ABG revealed hypoxia with a PO2 of 56.

198. The false trails delayed Mr. So's diagnosis. While Mr. So's symptoms began immediately after waking from the CESI, at approximately 1000 hours, his injury was not identified for more than five hours — not until 1527 hours, when an MRI of Mr. So's neck was taken and read. (NHA 576-77.)

> IMPRESSION:
> 1. Diffuse abnormal intramedullary cord signal hyperintensity from C4 to the upper thoracic spine with imaging findings compatible with intramedullary cord injection given the history of epidural injection with abnormal cord signal as described, as well as several foci of air and possibly trace hemorrhage. Neurosurgical consultation is recommended.
>
> 2. There is no epidural fluid collection.
>
> 3. Severe multilevel degenerative disc disease with underlying canal stenosis from a combination of congenital canal stenosis and acquired degenerative disc disease.
>
> These findings were discussed by phone with Vida M Reklaitis on 11/22/2019 15:27 by Serge Ounanounou M.D., n7352.

199. In responding to his patient's post-operative crisis, Dr. Helmi violated the standard of care either by ignoring the fluoroscopy images from the CESI or misrepresenting what he had done to Mr. So.

200. Dr. Helmi violated the standard of care by conveying erroneous impressions to the physicians who assumed responsibility for diagnosing and treating Mr. So.

201. At some point on November 22, Dr. Helmi talked to Mr. So in the hospital.

202. Dr. Helmi told Mr. So there was no problem with the CESI.

203. Dr. Helmi told Mr. So that his symptoms were a function of pre-existing spine problems.

204. Dr. Helmi told Mr. So that his pain was a good sign — a sign that the injection was working.

205. Dr. Helmi misled Mr. So.

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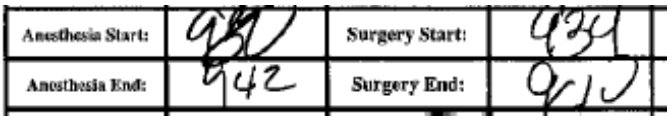
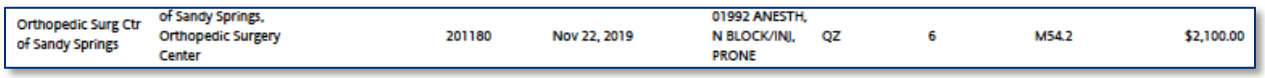
206. Dr. Helmi's CESI and occipital nerve block operations took six minutes. The anesthesia time was 12 minutes. (NHA 345.)



Anesthesia Start:	941	Surgery Start:	931
Anesthesia End:	942	Surgery End:	937

207. For the 12 minutes of anesthesia services, Dr. Joshi and the surgery center charged $2,100. (OSS 25.)



Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201180	Nov 22, 2019	01992 ANESTH, N BLOCK/INJ, PRONE	QZ	6	M54.2	$2,100.00

208. For the six minutes of surgery, Dr. Helmi and the surgery center charged $6,385. (OSS 25.)

Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	64405 ASC N BLOCK INJ, OCCIPITAL	TC	1	M54.2 M54.81	$1,736.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	64479 ASC INJ FORAMEN EPI C/T		1	M54.2 M54.81	$2,048.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	77003 FLUOROGUIDE FOR SPINE INJECT		1	M54.2 M54.81	$450.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	99070 EPIDURAL INJECTION TRAY		1	M54.2 M54.81	$197.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	J1100 ASC INJ DEXETHOSONE SODIM PHOSHATE 1 MG		10	M54.2 M54.81	$1,320.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	J3490 INJECTABLE, MARCAINE 0.5% 1CC		1	M54.2 M54.81	$34.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	Q9967 LOCM 300-399MG/ML IODINE,1ML		1	M54.2 M54.81	$600.00
CLAIM BALANCE								$6,385.00

209. The standard of care violations described above led to Dr. Helmi injecting medication into Mr. So's spinal cord.

210. The spinal cord injection damaged Mr. So's spinal cord.

211. The spinal cord injection caused Mr. So serious, permanent neurological deficits.

212. The delay in diagnosis and treatment limited the extent of Mr. So's recovery.

Count 1 – Professional Negligence (all Defendants)

213. Plaintiff incorporates by reference, as if fully set forth herein, all preceding paragraphs of this Complaint.

214. The Defendants and their agents violated their standards of care as to the following tasks:

a. *Task: Prescribing a Cervical Epidural Steroid Injection*

Jeffrey Lee, DO, violated the standard of care on 11/4/2019 by prescribing a Cervical Epidural Steroid Injection that was not indicated for Mr. So, and by doing so without properly informing Mr. So of the significant risks of such an injection.

b. *Task: Prescribing a Greater Occipital Nerve Block*

Jeffrey Lee, DO, violated the standard of care on 11/4/2019 by prescribing a Greater Occipital Nerve Block that was not indicated for Mr. So.

c. *Task: Evaluating whether to administer a Cervical Epidural Steroid Injection or a Greater Occipital Nerve Block to a new patient*

Hany M. Helmi, MD violated the standard of care on 11/22/2019 by choosing to administer a Cervical Epidural Steroid Injection and a Greater Occipital Nerve Block to Mr. So despite having never seen him before, without taking a history to ensure the procedures were indicated for Mr. So.

d. *Task: Providing analgesia for a Cervical Epidural Steroid Injection*

Apurve K. Joshi, MD, violated the standard of care on 11/22/2019 by over-sedating Mr. So to the point that Mr. So could not feel and respond to painful stimulus if the CESI needle was misplaced.

(The anesthesia provider's signature is difficult to read, but I believe the provider was Dr. Joshi. If that is incorrect, then my criticisms of Dr. Joshi apply to the actual anesthesia provider.)

Dr. Helmi violated the standard of care by allowing his patient to be over-sedated and rendered incapable of responding to painful stimulus, and by proceeding with the injections despite the over-sedation.

e. *Task: Keeping records of analgesia/anesthesia procedures*

Dr. Joshi violated the standard of care on 11/22/2019 by keeping records of the anesthesia procedure that omitted information about how and over what time period the anesthesia was delivered, and by failing to record Mr. So's heart rate.

f. Task: Evaluating the patient's fitness for the operation

Dr. Joshi and Dr. Helmi violated the standard of care on 11/22/2019 by proceeding with the CESI even though Mr. So had very high blood pressure.

g. Task: Administering a Cervical Epidural Steroid Injection

Dr. Helmi violated the standard of care by:

(1) injecting the full volume of contrast without first injecting a small volume of contrast to assure epidural access

(2) injecting the medication without first confirming and documenting proper needle position

(3) ignoring intra-operative images that indicated an injection within the spinal cord.

h. Task: Responding to post-operative complications after a Cervical Epidural Steroid Injection and communicating with Emergency Room physicians

After Mr. So awoke with severe pain, Dr. Helmi violated the standard of care by ignoring the intra-operative records that indicated an injection within the spinal cord, and by failing to tell the ER doctor that the injectate had been injected into Mr. So's spinal cord.

i. Task: Creating an operative note for a Cervical Epidural Steroid Injection

Dr. Helmi violated the standard of care by failing to properly describe the operations but instead (apparently) using copy/paste text that

omitted a description of the index procedure, that gave a vague description of the technique, that does not correlate with the radiology images.

j. Task: Maintaining radiology images for a Cervical Epidural Steroid Injection.

Dr. Helmi violated the standard of care by failing either to take or to archive appropriate intra-operative radiology images.

215. This list may not be exhaustive.

216. The foregoing standard-of-care violations caused Henry So to suffer an injection of medication into his spinal cord.

217. The injection into the spinal cord damaged the nerve fibers in the spinal cord, leading to permanent, serious neurological deficits.

218. The corporate Defendants — OSSiP, OSSPiD, OSH, OSC — are vicariously liable for the negligence of their employees or other agents, because the agents acted within the scope of their agency for the corporate Defendants.

219. Pursuant to OCGA Title 51, Chapter 4, Henry So is entitled to recover from all Defendants for all damages caused by the Defendants' professional negligence.

Count 2 – Loss of Consortium (all Defendants)

220. Plaintiff incorporates by reference, as if fully set forth herein, all preceding paragraphs of this Complaint.

221. As a result of the standard-of-care violations discussed above, Roath So has suffered a loss of consortium.

222. Mrs. So is entitled to recover from all Defendants for the loss of consortium she has suffered.

Count 3 – Expenses of Litigation, pursuant to OCGA 13-6-11 (all Defendants)

223. Plaintiff incorporates by reference, as if fully set forth herein, all preceding paragraphs of this Complaint.

224. In the events discussed above, Dr. Lee, Dr. Helmi, and the staff involved in Mr. So's treatment acted in bad faith.

225. Dr. Lee acted in bad faith by prescribing a CESI that he knew was not indicated, and by not telling Mr. So about the grave risks of a CESI.

226. Dr. Helmi acted in bad faith (a) by performing a CESI that he knew was not indicated, (b) performing a CESI despite knowing Mr. So was in a hypertensive crisis, (c) discarding fluoroscopy images that would adequately reveal the actual steps in the procedure, (d) misinforming both Mr. So and the ER physicians about what happened to Mr. So.

227. Dr. Joshi acted in bad faith by administering general anesthesia that he knew was unnecessary and dangerous to Mr. So.

228. The nursing staff involved in treating Mr. So on November 22, 2019, acted in bad faith by choosing to let the CESI go forward despite Mr. So being in a hypertensive crisis.

229. Each of these individuals engaged in this behavior in part for a monetary motive — because a CESI (and unnecessary, dangerous anesthesia for it) are fast, high-profit procedures.

230. Accordingly, Plaintiffs seek to recover their expenses of litigation, pursuant to OCGA 13-6-11.

Count 4 – Punitive Damages, pursuant to OCGA 51-12-5.1 (all Defendants)

231. Plaintiff incorporates by reference, as if fully set forth herein, all preceding paragraphs of this Complaint.

232. By engaging in the conduct discussed above, the Defendants engaged in willful misconduct, malice, fraud, wantonness, oppression, or that entire want of care which would raise the presumption of conscious indifference to consequences.

233. Accordingly, Plaintiffs are entitled to recover punitive damages pursuant to OCGA 51-12-5.1.

Damages

234. Plaintiff incorporates by reference, as if fully set forth herein, all preceding paragraphs of this Complaint.

235. As a direct and proximate result of the Defendants' conduct, Plaintiff is entitled to recover from Defendants reasonable compensatory damages in an amount exceeding $10,000.00 to be determined by a fair and impartial jury for all damages Plaintiff suffered, including physical, emotional, and economic injuries.

236. WHEREFORE, Plaintiff demands a trial by jury and judgment against the Defendants as follows:

a. Compensatory damages in an amount exceeding $10,000.00 to be determined by a fair and impartial jury;

b. All costs of this action;

c. Expenses of litigation pursuant to OCGA 13-6-11;

d. Punitive damages; and

e. Such other and further relief as the Court deems just and proper.

June 12, 2020

Respectfully submitted,

/s/ Lloyd N. Bell
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Attorneys for Plaintiff

AFFIDAVIT OF MILTON H. LANDERS, DO, PHD REGARDING HENRY SO

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Milton H. Landers, D.O., Ph.D., who after first being duly sworn, states as follows:

Introduction and Limited Purpose of Affidavit

1. I have been asked to provide this affidavit for the limited purpose of Georgia statute OCGA § 9-11-9.1.

2. This affidavit states my views. Plaintiff's counsel drafted this affidavit after consulting with me, and I reviewed the draft and edited it to make sure it correctly states my views.

3. This affidavit does not state all my opinions. This affidavit addresses specific matters that Plaintiff's counsel have asked me to address. I have not attempted to identify every person who may have violated a standard of care. I have not attempted to identify every standard of care violation by any particular person. My silence on a given point is not an endorsement. I have not attempted to state every causation opinion I have. I have not attempted to anticipate or address issues the Defense might raise or that otherwise might arise as the case unfolds.

4. If additional information becomes available later, then of course my opinions may change.

5. As to the matters this affidavit addresses, I have tried to give a reasonably detailed explanation of my views, but I have not attempted an exhaustive discussion. In deposition or trial testimony, I may elaborate with additional details. While I cite evidence from the medical records for various facts, I do not necessarily cite *all* the evidence for a given point.

Exhibit 1

6. I use the term "standard of care" to refer to that degree of care and skill ordinarily exercised by members of the medical profession generally under the same or similar circumstances and like surrounding conditions as pertained to the medical providers I discuss here.

7. I hold all the opinions expressed below to a reasonable degree of medical certainty — that is, more likely than not.

Topics & Opinions

8. This affidavit concerns medical services provided to Henry So on November 4 and November 22, 2019.

9. This affidavit concerns the standards for the following procedures or tasks — standards which were violated as indicated below:

a. *Task: Recommending a Cervical Epidural Steroid Injection*

Jeffrey Lee, DO, violated the standard of care on 11/4/2019 by recommending a Cervical Epidural Steroid Injection that was not indicated for Mr. So, and by doing so without properly informing Mr. So of the significant risks of such an injection.

b. *Task: Recommending a Greater Occipital Nerve Block*

Jeffrey Lee, DO, violated the standard of care on 11/4/2019 by recommending a Greater Occipital Nerve Block that was not indicated for Mr. So.

c. *Task: Evaluating whether to administer a Cervical Epidural Steroid Injection or a Greater Occipital Nerve Block to a new patient*

Hany M. Helmi, MD violated the standard of care on 11/22/2019 by performing a Cervical Epidural Steroid Injection and a Greater Occipital Nerve Block to Mr. So despite having never seen him before, without taking a history and performing a physical examination to

determine whether the procedures were medically indicated or contraindicated for Mr. So.

d. Task: Providing sedation or anesthesia for a Cervical Epidural Steroid Injection

Apurve K. Joshi, MD, violated the standard of care on 11/22/2019 by over-sedating Mr. So to the point that Mr. So could not feel and respond to painful stimulus if the CESI needle was misplaced.

(The anesthesia provider's signature is difficult to read, but I believe the provider was Dr. Joshi. If that is incorrect, then my criticisms of Dr. Joshi apply to the actual anesthesia provider.)

Dr. Helmi violated the standard of care by allowing his patient to be over-sedated and rendered incapable of responding to painful stimulus, and by proceeding with the injections despite the over-sedation.

e. Task: Keeping records of analgesia/anesthesia procedures

Dr. Joshi violated the standard of care on 11/22/2019 by keeping records of the anesthesia procedure that omitted information about how and over what time period the anesthesia was delivered, and by failing to record Mr. So's heart rate.

f. Task: Evaluating the patient's fitness for the operation

Dr. Joshi and Dr. Helmi violated the standard of care on 11/22/2019 by proceeding with the CESI even though Mr. So had very high blood pressure.

g. Task: Administering a Cervical Epidural Steroid Injection

Dr. Helmi violated the standard of care by:

(1) injecting the medication without first confirming and documenting proper needle position using two opposing fluoroscopic views

(2) injecting the full volume of contrast without first injecting a small volume of contrast to assure a safe and probable epidural contrast pattern

(3) ignoring intra-operative images that indicated an injection within the spinal cord.

h. *Task: Responding to post-operative complications after a Cervical Epidural Steroid Injection and communicating with Emergency Room physicians*

After Mr. So awoke with severe pain, Dr. Helmi violated the standard of care by ignoring the intra-operative records that indicated an injection within the spinal cord, and by failing to tell the ER doctor that the injectate had possibly been injected into Mr. So's spinal cord.

i. *Task: Creating post-operative care records*

The staff of Ortho Sport & Spine violated the standard of care by creating inaccurate records of Mr. So's intra-operative and post-operative progress.

j. *Task: Creating an operative note for a Cervical Epidural Steroid Injection*

Dr. Helmi violated the standard of care by failing to properly and accurately describe the procedure but instead (apparently) using copy/paste text that omitted a description of the November 22, 2019, procedure, that gave a vague description of the technique, and that does not correlate with the radiographic images.

k. *Task: Maintaining radiology images for a Cervical Epidural Steroid Injection.*

Dr. Helmi violated the standard of care by failing either to take or to archive appropriate intra-operative radiology images documenting the course of the procedure.

10. I believe the standard-of-care violations noted above caused harm to Mr. So.

Qualifications

11. I am more than 18 years old, suffer from no legal disabilities, and give this affidavit based upon my own personal knowledge and belief.

12. I do not recite my full qualifications here. I recite them only to the extent necessary to establish my qualifications for purposes of expert testimony under OCGA 24-7-702.

13. However, my Curriculum Vitae is attached hereto as Exhibit "A." My CV provides further detail about my qualifications. I incorporate and rely on that additional information here.

14. The acts or omissions at issue here occurred in November 2019.

15. I am qualified to provide expert testimony pursuant to OCGA 24-7-702. That is:

a. In November 2019, I was licensed by an appropriate regulatory agency to practice my profession in the state in which I was practicing or teaching in the profession.

Specifically, I was licensed by the State of Kansas to practice as a physician. That's where I was practicing in November 2019.

b. In November 2019, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to —

specifically, the tasks identified above on which I offer standard-of-care opinions.

c. I had this knowledge and experience as the result of having been regularly engaged in the active practice of the foregoing areas of specialty of my profession for at least three of the five years prior to November 2019, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

Specifically, I am an anesthesiologist and interventional pain-medicine physician, and for many years I have performed each of the tasks identified above on which I offer standard-of-care opinions.

Evidence Reviewed

16. I have reviewed Henry So's medical records from Ortho Sport & Spine, from Northside Hospital Atlanta, and from Polaris Spine & Neurosurgery Center.

Discussion and Factual Basis for Opinions

General Principles

The spinal cord

17. The spinal column and its associated structures are intricate, crucial parts of the body.

18. The spinal cord contains densely packed nerve fibers that connect the brain to the rest of the body and help enable the brain to regulate and control the body.

19. The spinal cord is important in controlling voluntary body functions that involve the use of muscles — walking, for example, or even standing still while keeping your balance.

20. The spinal cord is important in controlling other body functions that are normally voluntary — for example, urinating or defecating.

21. The spinal cord is important in controlling body functions that are partly or wholly involuntary — for example, breathing, regulating digestion, blood pressure, body temperature, and sexual response.

22. The spinal cord is important in creating sensation, whether painful, pleasurable, or neutral/normal.

23. Injury to the spinal cord can cause loss of sensation (numbness) or pain — sometimes intense, excruciating pain.

24. Injury to the spinal cord can damage body functions such as regulating body temperature, bowel or bladder voiding, or sexual response.

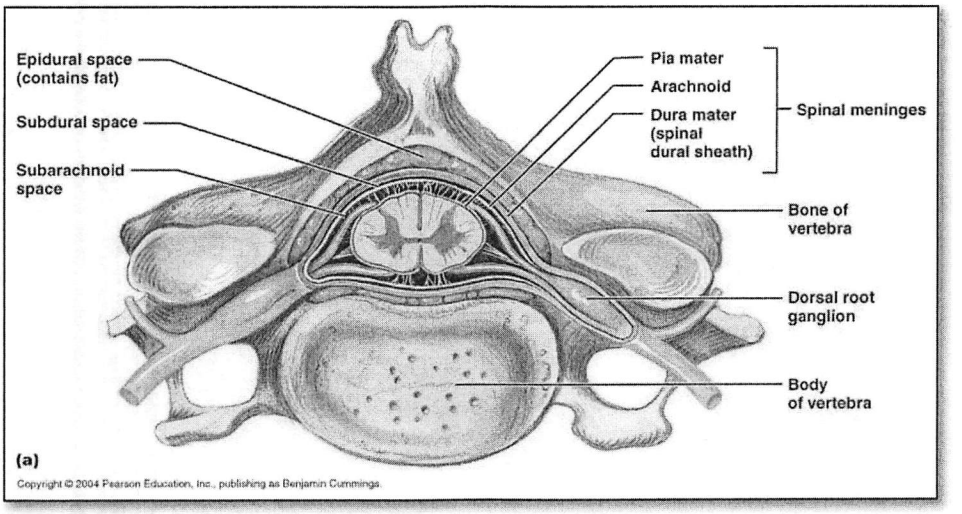
25. Injury to the spinal cord can impair muscle or motor function, for example by harming your ability to walk or to maintain balance.

26. Injury to spinal cord and resulting symptoms can be temporary or can last a lifetime.

27. Injury to the spinal cord can occur from a physical impact (for example, from a needle being inserted into the cord) or from a chemical impact and pressure (for example, from medication being erroneously injected into the cord).

Cervical Epidural Steroid Injection

28. A cervical epidural steroid injection ("CESI") is an injection of medication into the epidural space within the spinal canal. The epidural space is a thin potential space between the bones of the spinal column and the dura, which is the membrane that encloses the spinal cord and spinal fluid. The epidural space is outside and surrounds the dura.

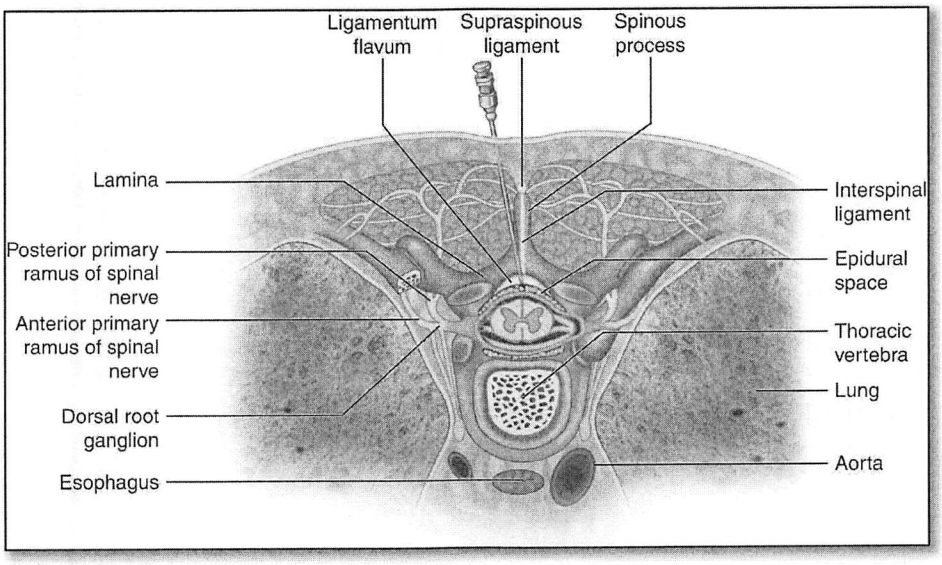


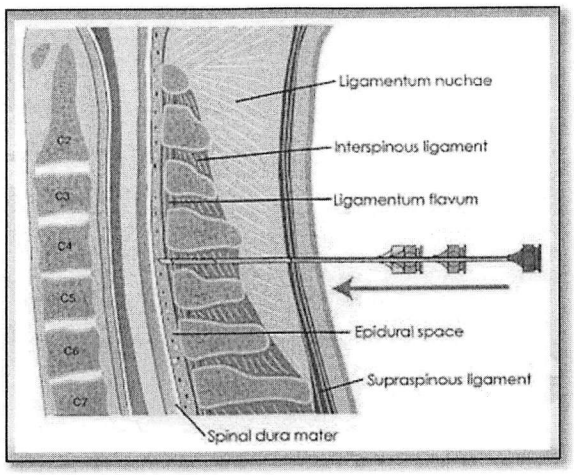
29. Typically, doctors give a CESI to relieve pain in the neck, shoulders, or arms that arises from compression or inflammation of a nerve or nerve root exiting the spinal cord.

30. The purpose of a CESI is to decrease inflammation of an inflamed nerve root with a corticosteroid medication — to reduce the pain.

31. In a CESI procedure, the physician sticks a needle in the back of the neck (in the case of an interlaminar injection).

32. The intention is to place the tip of the needle in the epidural space, a fraction of an inch ventral to the boney lamina, behind the spinal cord, never inside the dura or spinal cord.





33. The risks of a CESI range from the relatively minor to the catastrophic. In the worst case, a physician might advance the needle all the way into the spinal cord itself and then inject a substance into the spinal cord — causing permanent damage to the spinal cord, resulting in permanent pain or disabilities or even death.

34. A CESI typically is performed in less than 10 minutes, but the physicians and facility may bill in excess of $5,000 for a CESI.

35. Because a CESI can cause catastrophic injury, a CESI is properly prescribed for pain only where the pain is significant (higher than 3 out of 10) and chronic or intractable, so that it significantly impairs the patient's functioning in daily life.

36. Before prescribing or performing a CESI, the physician must ensure that the patient understands the benefits and risks of the procedure and treatment alternatives.

37. Before performing a CESI, the physician performing the procedure must evaluate the most recent MRI or CT scan to assure there is an adequate epidural space for access.

38. The physician must also evaluate the patient's fitness for the procedure. This includes taking the patient's blood pressure, to identify whether the patient is hypertensive, and evaluating whether the pain complaint might benefit from this invasive and possibly dangerous procedure.

39. Hypertension in a CESI patient increases the risk of complications such as stroke, because the procedure may further increase blood pressure.

40. For an elective procedure such as a CESI, if the patient is significantly hypertensive on the day of the operation, the operation should be postponed until the patient is evaluated by his or her primary care provider and the blood pressure is evaluated and managed so as to remain in a normal range.

41. The greatest risk of a CESI arises because the physician cannot, with the naked eye, see where the tip of the needle is. Various aspects of proper technique can reduce the risk of inserting the needle into the spinal cord, but two safety measures are particularly important.

42. The two primary safeguards against sticking the needle into the spinal cord are (a) radiographic imaging to show the safe location of the needle prior to injection and (b) the patient's ability to respond vocally or physically to pain if the needle hits the spinal cord.

43. The patient's ability to respond to pain if the needle is misplaced requires that the patient remain responsive enough to sense pain and then vocally warn the injectionist of a possible misplaced needle position.

44. Therefore, the patient must not be sedated to the point where the patient is insensate and unable to immediately respond to any unusual and unexpected pain.

45. Typically, a local anesthetic is appropriate, to numb the pain from the insertion through the skin. In a routine case, however, sedation of any type is not required. Heavy or deep sedation or an anethetic induction dose of intravenous agents that renders the patient unconscious, insensate, and unable to communicate with the physician injectionist are inappropriate and dangerous to the patient, except in the very rare case of a significant, specific, medical indication and comorbidity documented in the medical record that requires deep sedation.

46. Sedation should not be routinely used for a CESI unless there is a special need for it, specific to the individual patient.

47. Even in the rare, non-routine case where a sedative may be required, a patient generally should not be sedated to the point that he or she is not conversant and able to respond to painful stimuli, such as insertion and injection into the spinal cord or other sensitive structures.

48. Even where a general sedative is needed, sedating agents that may be difficult to dose appropriately for the patient should be avoided, because they pose an unnecessary risk of over-sedation.

49. Propofol is a commonly used general anesthetic induction agent in surgical cases and in the context of a CESI poses an unnecessary risk of over-sedation.

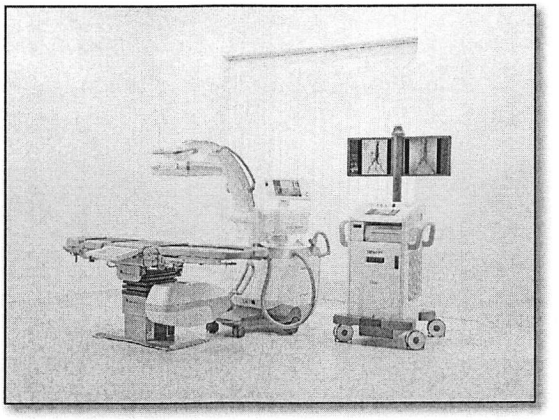
50. If the CESI cannot proceed without heavy sedation, the CESI must not proceed unless justified by documented gross comorbidities.

51. If sedation is contemplated, and the valid medical indication documented in the medical record, informed consent for this additional medical treatment, including the

known specific risks involved, must be obtained and documented in the medical record prior to initiation of the sedation.

52. The physician performing the CESI and a physician or CRNA involved in administering sedation or anesthesia share responsibility for ensuring that the patient is not over-sedated, within the limits of their training and subject to the reasonable direction of the surgeon.

The second primary safeguard against inserting the needle into the spinal cord is fluoroscopy — a form of radiological imaging that essentially provides serial x-ray images as the physician inserts the needle toward and into the spinal canal and continuous "live" imaging during injection of the radiographic contrast medium.



53. Even with fluoroscopy, images taken from a single view (from the back, for example) can mislead the physician about where the needle is. The physician must therefore obtain at least two views in opposing planes to confirm safe needle placement (*e.g.,* from the back and from the side).

54. To confirm that the needle tip is in the epidural space, the physician performing the CESI is required to inject contrast dye through the needle.

55. Injection of any substance into the body — particularly in or near the spinal cord — poses a risk to the patient and therefore should be done with due vigilance.

56. Before injecting the full volume of contrast dye, a physician performing a CESI should inject a minimal test dose, to assure the contrast dye does not evidence a dangerous pattern such as being injected into the spinal cord itself.

57. The dispersal pattern of contrast dye differs, depending on where it is injected. The contrast pattern helps to identify the location of the needle tip, and to assure that the final injectate is covering the suspected pathology causing the pain, so that benefit to the patient is more probable.

58. A physician administering a CESI must understand and interpret the pattern of contrast injection to assure safety.

59. Before the final injection of medication, the physician must confirm proper placement of the needle tip by all of the following: (a) images of the needle from two different views with fluoroscopy to assure it is safe to proceed with any injection, (b) the pattern of the contrast dye indicating a safe pattern and covering the pathology causing the pain, and (c) lack of any pain-response of an alert patient, indicating that the needle position is not dangerous.

60. Generally, if any of those sources of information are unavailable or do not confirm proper placement of the needle, the physician must immediately stop the procedure, reevaluate, and consider repositioning the needle or cancelling the procedure.

61. A physician performing a CESI must ensure that he or she has enough time to do the job properly, without being rushed or otherwise facing pressure to take shortcuts.

62. Where a medical indication for sedation is present and documented, the physician must ensure enough time has been allotted to the procedure and recovery from sedation, especially in the event the patient has been over-sedated.

Record-keeping and radiology images

63. A physician performing a CESI must obtain and archive enough fluoroscopy images, in at least two opposing imaging planes, to show accurately what was done — where the needle was when injections were made of the contrast and of the active injectate.

64. The physician must also write or dictate an operative note accurately describing, in detail, the specific procedure in a step-by-step narrative so that a third party can accurately understand what was done on that specific case.

65. The physician must complete the operative note shortly after the procedure, when the details are fresh in the physician's mind.

66. The archived fluoroscopy images and the operative note protect the patient by providing a clear, detailed record of the procedure enabling an objective review of the procedure in the event of post-operative complications.

67. A physician or other medical personnel administering anesthesia must keep records that state in detail what agents were administered, how much, the mechanism of delivery, and the time period over which they were administered.

68. Similarly, a record must be kept documenting vital signs, level of consciousness, oxygen provided, and other pertinent data.

69. When post-operative complications arise, proper records assist downstream medical providers in timely diagnosing the patient and beginning appropriate treatment as soon as possible.

70. In the event of post-operative complications, failure to keep proper records may harm the patient by delaying appropriate diagnosis and treatment while other less prevalent differential diagnoses are being considered.

Responding to post-operative complications

71. When serious post-operative complications arise, the physician who performed the CESI must review all pertinent radiology images and the operative note, to derive an understanding of the cause and nature of the complications. This information must be communicated in a timely manner to all other physicians caring for the patient.

72. If the patient must be taken to an Emergency Room because of the post-operative complications, the physician who performed the CESI must fully and accurately inform the ER staff of the CESI procedure and known or likely causes of the complications.

73. In the event of post-operative complications, failure to properly review the records of the CESI and then to properly inform the ER staff may harm the patient by delaying appropriate diagnosis and treatment.

Greater Occipital Nerve Block

74. The greater occipital nerve runs along the back of head and may be involved in greater occipital neuralgia causing occipital headaches. The greater occipital nerve (GON) has a variable position with the target identified by palpation of the occipital artery and is usually performed using a "blind" technique, i.e., without ultrasound.

75. The injection requires 5-10cc of local anesthetic injected over a wide area in a fan-like distribution. Because the lesser occipital nerve and cutaneous branches of the third occipital nerve (TON) are also blocked, this injection is neither precise nor selective — making a diagnosis of any specific pain generator questionable unless ultrasound and a minimum volume of local anesthetic are utilized.

76. The relief of occipital pain following GON injection treatment with local anesthetic alone has been noted following case studies, but the exact mechanism and structures being treated cannot be validated using the "blind" technique with large volumes of local anesthetic.

77. A greater occipital nerve block is a simple, quick procedure — taking less than two minutes — but physicians and facilities may bill upwards of $500 for the procedure.

78. A greater occipital nerve block poses risks of (among other things) infection, nerve injury, allergic reaction to the medication, and injection into the greater occipital artery or through the foramen of the greater occipital nerve and through the dura and CSF, causing significant complications, anesthetizing the intracranial structures.

79. Combining a greater occipital nerve block with a concurrent second diagnostic or therapeutic injection, *e.g.*, CESI, negates any diagnostic utility in that pain relief cannot be attributed to either injection.

80. The use of any analgesic in the perioperative period, especially the potent narcotic fentanyl, negates any diagnostic utility of an injection.

81. The use of propofol has been shown to increase the rate of false-negative results during diagnostic injections.

82. Immediately prior to a diagnostic greater occipital nerve injection, objective symptoms and signs of greater occipital nerve tenderness and pain must be documented so that pain intensity by a quantitative pain scale can be compared.

83. Following a motor vehicle accident, the prevalence of neck pain with cervicogenic headache due to facet (zygapophyseal) joint involvement is over 50% and can be objectively diagnosed by a validated, safe, and easily performed test.

Henry So's Course of Treatment

First CESI

84. In April 2019, Henry So was involved in a car crash. He underwent some chiropractic care but continued to have pain in his neck. (OSS 10.)

85. After being advised to consider spine surgery, on October 15, 2019, Mr. So went to Ortho Sport & Spine for a second opinion. Dr. Mark A. Flood examined Mr. So. (OSS 10.)

86. Mr. So described pain in his neck and shoulder area at a level of 6 out of 10. An MRI taken in April of that year showed foraminal stenosis (narrowing of the openings in the vertebrae, where nerve roots exit the spinal column) with impingement of the C7 nerve roots on both the left and right sides. (OSS 10-11.)

HPI:
Constitutional:
The patient is a 63-year-old male that presents with neck pain after injury. The patient states, that on 4/5/2019, was involved in a motor vehicle collision that resulted in immediate spine pain. He enrolled in chiropractic care, which has gave some relief of symptoms, did not result in long-term relief. He had a course of an oral NSAID and steroid without relief. He was then seen by a spine practice/orthopedic surgeon who recommended cervical spine surgery. He presents today for an additional opinion. Symptoms are described posteriorly in the cervical spine radiating into the trapezius and intrascapular region at times. He denies pain radiating into the lower extremities. Aggrevating factors include range of motion, particularly looking over his shoulder when driving. There are no true alleviating factors. Pain is moderate in severity rated 6/10 on a verbal pain scale. The patient denies pain complaints at the time of the injury, and denies previous spine related disorders upon direct questioning.

MRI of the cervical spine, 4/23/2019:C4-5 left-sided extrusion with moderate central stenosis. At C5-6 there is a disc protrusion with bilateral foraminal protrusions and severe bilateral foraminal stenosis. At C6-7 there is a central protrusion with moderate spinal stenosis. There is a right-sided disc extrusion resulting in the right neuroforaminal stenosis and impingement on the right C7 nerve root. There is also left foraminal protrusion which extends beyond the margins of underlying osteophytes resulting in moderate to severe left foraminal stenosis and impingement of the left C7 nerve root. There is a right-sided protrusion at C7-T1.

87. Dr. Flood recommended an interlaminar CESI, and perhaps a series of three injections. Mr. So accepted the recommendation. (OSS 11.)

Notes: The patient is a 63-year-old gentleman that is symptomatic of cervical disc herniations and cervical disc displacement greatest at the C6-7 level, but with multilevel cervical disc abnormalities. The patient is not interested in pursuing surgical intervention at present. Neurologically he is intact, this surgery is not imperative at present, however he does understand that this could be in his near future. We discussed transforaminal and intralaminar cervical epidural steroid injections. At this point, he will see Dr. Lee for an interlaminar cervical epidural steroid injection in hopes of giving more long-term resolution of symptoms. He understands this may be done in a series of 3. The patient will follow-up in 4 weeks to assess the efficacy of the procedure. Patient education including procedure information is provided today.
Dictated by Melanie W. Clark, NP-C for Dr. Mark Flood, DO.

88. The records I have seen from Ortho Sport & Spine do not indicate that Dr. Flood advised Mr. So of the risks of a CESI in general or specifically of the risk of permanent disability from injection of the medication into Mr. So's spinal cord.

89. On October 21, 2019, Mr. So appeared at Ortho Sport & Spine for the scheduled CESI. Dr. Ryan Rosen (not Dr. Mark Flood) saw Mr. So. Dr. Rosen had not seen Mr. So before this visit. Dr. Rosen performed a CESI without documenting his own examination of his patient or independently verifying that a CESI was indicated for Mr. So. (OSS 8-9.)

90. Dr. Rosen performed a CESI (10/21/2019) on Mr. So with the Pre-procedure and post-procedure diagnosis and medical indication stated as "Cervical radiculopathy." (OSS 8.)

PRE PROCEDURE DIAGNOSIS: Cervical radiculopathy

POST PROCEDURE DIAGNOSIS: Same

PROCEDURE: Cervical C7/T1 ESI with Fluoroscopic Guidance

91. The examination preceding the 10/21 CESI was performed on 10/15/2019, by Dr. Mark Flood. Dr. Flood neither documented signs of radiculopathy on his physical, nor

stated a diagnosis of cervical radiculopathy. Dr. Flood documented no symptoms of cervical radicular pain. (OSS 10-11.)

Subjective:

Chief Complaints:

1. Patient is present today complaining of neck pain.

HPI:

Constitutional:

The patient is a 63-year-old male that presents with neck pain after injury. The patient states, that on 4/5/2019, was involved in a motor vehicle collision that resulted in immediate spine pain. He enrolled in chiropractic care, which has gave some relief of symptoms, did not result in long-term relief. He had a course of an oral NSAID and steroid without relief. He was then seen by a spine practice/orthopedic surgeon who recommended cervical spine surgery. He presents today for an additional opinion. Symptoms are described posteriorly in the cervical spine radiating into the trapezius and intrascapular region at times. He denies pain radiating into the lower extremities. Aggrevating factors include range of motion, particularly looking over his shoulder when driving. There are no true alleviating factors. Pain is moderate in severity rated 6/10 on a verbal pain scale. The patient denies pain complaints at the time of the injury, and denies previous spine related disorders upon direct questioning.

Objective:

Vitals: Ht **5 ft 8 in**, Wt **195 lbs**, BMI **29.65 Index**, BP **sitting:145/87**, HR **88 /min**, Ht-cm **172.72**, Wt-kg **88.53**.

Examination:

Lumbar Spine/Lower back:

General appearance:No acute distress, Awake, alert, & oriented Psychiatric: Appropriate mood & affect. Respiratory: Regular rate, non-labored. Cardiovascular: No extremity edema, Normal peripheral pulses.Abdomen: Non-distended. Skin: Intact, no erythema or rash. Musculo: Cervical: Demonstrates full ROM, with pain on lateral rotation to the left and right, but no pain with flexion and extension. Minimal tenderness to palpation of the para-spinals bilaterally. Strength/motor exam is 5/5 in all muscle groups, reflexes are 2+ and equal. There is no sensory deficit.

MRI of the cervical spine, 4/23/2019:C4-5 left-sided extrusion with moderate central stenosis. At C5-6 there is a disc protrusion with bilateral foraminal protrusions and severe bilateral foraminal stenosis. At C6-7 there is a central protrusion with moderate spinal stenosis. There is a right-sided disc extrusion resulting in the right neuroforaminal stenosis and impingement on the right C7 nerve root. There is also left foraminal protrusion which extends beyond the margins of underlying osteophytes resulting in moderate to severe left foraminal stenosis and impingement of the left C7 nerve root. There is a right-sided protrusion at C7-T1.

Assessment:

Assessment:

1. Cervical facet syndrome - M47.812
2. Cervical disc herniation - M50.20 (Primary)

Plan:

1. Cervical disc herniation

Procedure: Cervical ESI (Ordered for 10/29/2019)

Interlaminer Cervical injection C7-T1 Klaes, Mary 10/15/2019 04:32:42 PM >

Notes: Patient Educated with: Cervical TFESI.pdf (Cervical TFESI.pdf) Patient Educated with: Cervical ESI Interlaminar.pdf (Cervical ESI Interlaminar.pdf).

2. Others

Notes: The patient is a 63-year-old gentleman that is symptomatic of cervical disc herniations and cervical disc displacement greatest at the C6-7 level, but with multilevel cervical disc abnormalities. The patient is not interested in pursuing surgical intervention at present. Neurologically he is intact, this surgery is not imperative at present, however he does understand that this could be in his near future. We discussed transforaminal and intralaminar cervical epidural steroid injections. At this point, he will see Dr. Lee for an interlaminar cervical epidural steroid injection in hopes of giving more long-term resolution of symptoms. He understands this may be done in a series of 3. The patient will follow-up in 4 weeks to assess the efficacy of the procedure. Patient education including procedure information is provided today.

Dictated by Melanie W. Clark, NP-C for Dr. Mark Flood, DO.

Follow Up: 4 Weeks

92. In his 10/21 operative report, Dr. Rosen failed to document any evidence of cervical radiculopathy, or cervical radicular pain. (OSS 8.)

Findings:

Notes:
INDICATIONS:
Please see last progress note for details. Patient agrees to proceed with C7/T1 CESI today.

PRE PROCEDURE DIAGNOSIS: Cervical radiculopathy

POST PROCEDURE DIAGNOSIS: Same

PROCEDURE: Cervical C7/T1 ESI with Fluoroscopic Guidance

SEDATION: Monitored IV sedation

PROCEDURE NARRATIVE:

An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C_5 to T1. After negative aspiration, 2 cc of normal saline with 5 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

Patient was monitored for an appropriate length of time before being discharged to home. Vital signs remained stable throughout the procedure and in recovery. There were no complications.

Ryan Rosen, MD

93. Dr. Rosen performed a CESI on Mr. So at the C7/T1 level, using intravenous sedation. (OSS 8.)

94. Dr. Rosen's operative note does not indicate what type or amount of sedative was used on Mr. So. (OSS 8.)

95. Dr. Rosen's operative note provides only a vague description of the CESI procedure. (OSS 8.)

Dr. Jeffrey Lee: October 28 and November 4

96. On October 28, 2019, Mr. So returned to Ortho Sport & Spine for a follow-up visit. This time, he was seen by Dr. Jeffrey Lee (the third Ortho Sport & Spine doctor in three visits). Mr. So reported that his pain was at a level of 3 out of 10 (as compared with 6 out of 10 on the October 15 visit). (OSS 6-7.)

HPI:

Constitutional:

63 year old male presents with c/o neck pain .

Patient returns today for follow-up office visit. He status post C7-T1 intralaminar steroid injection on October 21, 2019. Patient reports 80% of his neck pain. He describes a mild, achy, discomfort pain center portion of the neck, 3 out of 10 on the VAS pain scale without any sharp radiation to the arms. Aggravating factors are cervical spine rotation. Alleviating factors are the procedure.

97. On November 4, 2019, Mr. So returned for a second follow-up visit. Again he was seen by Dr. Jeffrey Lee. As at the previous visit, Mr. So reported that his neck pain was at a level of 3 out of 10. (OSS 4.)

98. Mr. So also reported frequent headaches, but Dr. Lee did not record the intensity of the headaches. (OSS 4.)

Patient returns today for follow-up office visit. He status post C7-T1 intralaminar steroid injection on October 21, 2019. He is still getting relief from the procedure. He states he feels at least 50% improved, recall last visit he felt 80% relief. He still experiences a right-sided neck pressure and pain with range of motion, 3 out of 10 on the VAS pain scale without any sharp radiation to the upper extremities. Aggravating factors are flexion of his cervical spine and sleep. His pain is worse after sleeping. Alleviating factors has been the procedure. He also admits to a headache usually daily that occurs with his right-sided neck pain localized over the right occipital and parietal regions of the scalp.

99. Dr. Lee recommended another CESI and a greater occipital nerve block. (OSS 5.)

Notes: Recommend a repeat C7-T1 intralaminar epidural steroid injection x1 as he has had 50% relief with the first procedure. Hopefully a second dose of medication this will compound his relief. A right greater occipital nerve block will also be ordered the same day as the epidural steroid injections to hopefully break his headache cycle and improve this pain also. He is dispensed a refill of Dendracin lotion. He will follow-up in 3 weeks.

Dictated by Melissa Hagin, NP-C for Dr. Jeffrey Lee, DO.

100. The medical records do not indicate that Dr. Lee informed Mr. So of the risks of the CESI or of the nerve block. (OSS 4-5.)

101. A CESI was not indicated or justified for 3-out-of-10 neck pain.

102. A greater occipital nerve block was not indicated, because the intensity of the pain was not specified, the presence of a right sided headache was documented on only a single office visit (11/4/19), and more prevalent differential diagnoses had not been ruled out.

103. Dr. Lee violated the standard by prescribing another CESI.

104. Dr. Lee violated the standard by making the prescription without informing Mr. So of the risks.

105. Dr. Lee violated the standard by prescribing the greater occipital nerve block.

106. Dr. Lee provided no specific signs of greater occipital neuralgia on his physical examinations of 10/18/19 or 11/4/19.

107. Dr. Lee violated the standard by ordering a CESI without informing Mr. So of the risks.

November 22: Failure to Examine; Greater Occipital Nerve Block

108. On Friday, November 22, 2019, Mr. So appeared at Ortho for the scheduled CESI. This time he was seen by Dr. Hany M. Helmi. Dr. Helmi was the fourth Ortho Sport & Spine doctor to see Mr. So. (OSS 2.)

109. Dr. Helmi had not seen Mr. So before, but Dr. Helmi did not document that he performed a physical examination of his new patient. Nevertheless, Dr. Helmi proceeded to perform a CESI and greater occipital nerve block. (OSS 2-3.)

110. Dr. Helmi violated the standard of care by performing the procedures without updating the History of Present Illness (HPI) conducting a physical examination of his patient to ensure and accurate diagnosis and that the procedures were medically indicated.

111. Dr. Helmi, by combining a greater occipital nerve block with a concurrent second injection, *i.e.*, CESI, negated any diagnostic utility in that pain relief cannot be attributed to either injection.

112. Dr. Helmi's use of the potent analgesic narcotic fentanyl in the perioperative period negates any diagnostic utility of a greater occipital block. Dr. Helmi performed a greater occipital nerve block using I.V. fentanyl. The injection was without any diagnostic or therapeutic potential or medical indication.

113. Dr. Helmi used high dose propofol while performing a greater occipital nerve block. The injection was without any diagnostic or therapeutic potential or medical indication.

114. Dr. Helmi performed a greater occipital nerve injection although there were no signs on physical examination, or symptoms documented on the day of the procedure. Pre- and post-procedure pain could not be compared. Dr. Helmi did an injection without a diagnostic or therapeutic rationale.

115. Dr. Helmi failed to quantify the pain intensity thought to be due to greater occipital neuralgia. In that no pain intensity was recorded, no diagnostic information could be forthcoming, and no indication of therapeutic benefit was possible.

116. Dr. Helmi failed to rule out the most prevalent cause of neck pain with occipital referral and chose to perform a greater occipital nerve injection with no diagnostic or therapeutic potential. Dr. Flood had stated that Mr. So had a primary diagnosis of "Cervical facet syndrome" (10/15/19) and this was also noted by Dr. Jeffrey Lee (10/28/19). Following a motor vehicle accident, the prevalence of cervicogenic headache due to facet (zygapophyseal) joint involvement is over 50% and can be objectively diagnosed by a validated, safe, and easily performed test. Dr. Helmi failed to follow standard of care guidelines for the evaluation of somatic, axial neck pain with referral.

117. The records contain no indication that Dr. Helmi ensured Mr. So understood the risks of the procedures. (OSS 2-3.)

118. Dr. Helmi violated the standard of care by performing the procedures without ensuring that Mr. So understood the risks.

119. Dr. Helmi violated the standard of care by performing the procedures without documenting and ensuring that Mr. So understood diagnostic and treatment alternatives.

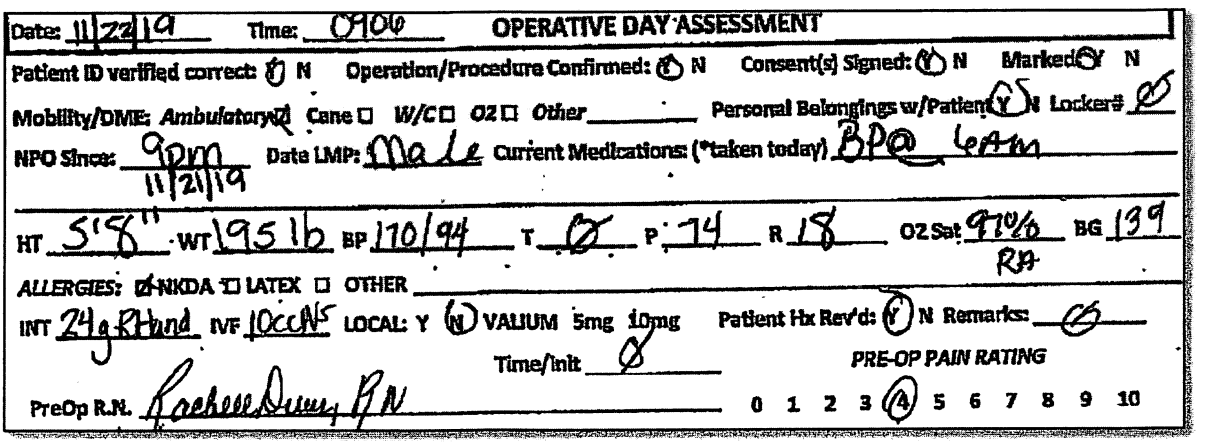
120. In the portion of his operative note that discusses the greater occipital nerve block, Dr. Helmi failed to specify which "occipital nerve" (greater occipital nerve, lesser occipital nerve, or third occipital nerve) he was injecting.

121. Dr. Helmi injected only 2cc of local anesthetic to block the "Occipital nerve" in a single location without identifying the occipital artery, eliciting a paresthesia, or using ultrasound. The usual volume of local anesthetic would be 5-10 cc. There is no objective documentation that he actually injected close to the nerve.

November 22: CESI — Pre-Procedure Assessment

122. A nurse (Rachell Dunn?) apparently employed by Ortho Sport & Spine performed an "Operative Day Assessment" of Mr. So, beginning at 0906 hours. (NHA 344.)

123. The nurse noted that Mr. So's pre-op pain rating was 4 out of 10 but failed to specify which pain this measurement referred to. (NHA 344.)



Date: 11/22/19 Time: 0900 **OPERATIVE DAY ASSESSMENT**

Patient ID verified correct: (Y) N Operation/Procedure Confirmed: (Y) N Consent(s) Signed: (Y) N Marked (Y) N

Mobility/DME: *Ambulatory* (Y) *Cane* ☐ *W/C* ☐ *O2* ☐ *Other*____ Personal Belongings w/Patient (Y) N Locker# Ø

NPO Since: 9pm 11/21/19 Date LMP: Male Current Medications: (*taken today) BP@ 6AM

HT 5'8" WT 195 lb BP 170/94 T Ø P 74 R 18 O2 Sat 97% RA BG 139

ALLERGIES: (Y) NKDA ☐ LATEX ☐ OTHER ____

INT 24g R Hand IVF 10ccNS LOCAL: Y (N) VALIUM 5mg 10mg Patient Hx Rev'd: (Y) N Remarks: Ø

Time/Init Ø

PreOp R.N. Rachell Dunn, RN

PRE-OP PAIN RATING

0 1 2 3 (4) 5 6 7 8 9 10

124. A CESI was questionably indicated for Mr. So's 4-out-of-10 pain.

125. Dr. Helmi used a pre-procedure and post-procedure diagnosis of "cervical radiculopathy" as the medical indication for the CESI. (OSS 2.)

INDICATIONS:
Please see last progress note for details. Patient agrees to proceed with C7/T1 CESI today.

PRE PROCEDURE DIAGNOSIS: Cervical radiculopathy

POST PROCEDURE DIAGNOSIS: Same

PROCEDURE: Cervical C7/T1 ESI with Fluoroscopic Guidance

126. The preceding examinations did not support that diagnosis. Dr.Flood did not indicate a diagnosis of cervical radiculopathy on his consultation of 10/15/19. Dr. Flood had documented no objective signs of radiculopathy on his consultation and specifically rules out this diagnosis on physical examination noting that motor, sensory, and deep tendon reflexes were normal without neurologic deficit. Dr. Flood documented no symptoms of radicular pain. (OSS 10-11.)

127. Similarly, Dr. Lee on his 10/28/19 and 11/4/19 progress notes fails to document symptoms of radicular pain, and fails to indicate objective signs of cervical radiculopathy. On each of these progress notes he uses the diagnosis of "cervical radiculopathy" but provides no evidence. (OSS 4-7.)

Subjective:

Chief Complaints:

1. Patient returns today complaining of neck pain.

HPI:

Constitutional:

63 year old male presents with c/o neck pain .

Patient returns today for follow-up office visit. He status post C7-T1 intralaminar steroid injection on October 21, 2019. Patient reports 80% of his neck pain. He describes a mild, achy, discomfort pain center portion of the neck, 3 out of 10 on the VAS pain scale without any sharp radiation to the arms. Aggravating factors are cervical spine rotation. Alleviating factors are the procedure.

Patient has been released and completed chiropractic and physical therapy treatments. His date of injury was March 2, 2019.

Objective:

Vitals: Ht **5 ft 8 in**, Wt **195 lbs**, BMI **29.65 Index**, BP **146/85 mm Hg**, HR **96 /min**, Ht-cm **172.72**, Wt-kg **88.53**.

Examination:

General Examination:

General:No acute distress. Psych: Pleasant and cooperative. Appropriate mood and affect. Alert and oriented. Musculoskeletal: Pt ambulates with a steady gait. Spine: No masses or atrophy noted on inspection. Patient is nontender to palpate in the midline cervical spine and the adjacent paraspinous muscles. He has mild pain with extension and facet loading. He has greater pain with cervical spine flexion and rotation bilaterally.

Patient cervical spine MRI report previously found at C4-5 and a left-sided extrusion with moderate central stenosis. C5-6 disc protrusion with bilateral foraminal protrusions and severe bilateral foraminal stenosis. C6-7 there is central protrusion with moderate canal stenosis. Right-sided disc extrusion resulting in the right neuroforaminal stenosis and impingement of the right C7 nerve root. Left foraminal protrusion with extension beyond margins of underlying osteophytes with moderate to severe left stenosis and impingement of the left C7 nerve root. Right-sided protrusion at C7-T1.

Assessment:

Assessment:

1. Cervical disc herniation - M50.20 (Primary)
2. Cervical facet syndrome - M47.812
3. Cervical radiculopathy - M54.12
4. Cervicalgia - M54.2

Subjective:

Chief Complaints:

1. Patient returns today complaining of neck pain.

HPI:

Constitutional:

63 year old male presents with c/o neck pain .

Patient returns today for follow-up office visit. He status post C7-T1 intralaminar steroid injection on October 21, 2019. He is still getting relief from the procedure. He states he feels at least 50% improved, recall last visit he felt 80% relief. He still experiences a right-sided neck pressure and pain with range of motion, 3 out of 10 on the VAS pain scale without any sharp radiation to the upper extremities. Aggravating factors are flexion of his cervical spine and sleep. His pain is worse after sleeping. Alleviating factors has been the procedure. He also admits to a headache usually daily that occurs with his right-sided neck pain localized over the right occipital and parietal regions of the scalp.

Objective:

Vitals: Ht 5 ft 8 in, Wt **195 lbs,** BMI **29.65 Index,** BP **136/80 mm Hg,** HR **95 /min,** Ht-cm 172.72, Wt-kg 88.45.

Examination:

General Examination:

General:No acute distress. Psych: Pleasant and cooperative. Appropriate mood and affect. Alert and oriented. Musculoskeletal: Pt ambulates with a steady gait. Strength testing in the upper extremities is 5 out of 5. Spine: No masses or atrophy noted on inspection. Patient is nontender to palpate the midline cervical spine or the adjacent paraspinous muscles. He denies pain with extension or facet loading. He does report pain with forward flexion. Positive Spurling's right reproducing neck pain. Upper extremities neurologic: Sensation is intact light touch.

Review of studies:Patient's previous cervical spine MRI taken found at C4-5 and a left-sided extrusion with moderate central stenosis. C5-6 disc protrusion with bilateral foraminal protrusions and severe foraminal stenosis bilaterally. C6-7 central protrusion with moderate canal stenosis and right-sided extrusion extending into the right foramen and impingement of the right C7 nerve root. Left foraminal protrusion is noted with extension beyond the margins of the underlying osteophytes with moderate to severe left foraminal stenosis and impingement of the left C7 nerve root. There is a right-sided protrusion at C7-T1.

Assessment:

Assessment:

1. Cervical disc herniation - M50.20 (Primary)
2. Cervicalgia - M54.2
3. Cervical radiculopathy - M54.12
4. Headache - R51
5. Occipital neuralgia of right side - M54.81

128. On the Operative Report of 11/22/19, Dr. Helmi fails to document either symptoms or signs in that a history of present illness (HPI) and physical examination are not included. Dr. Helmi attempted to perform a CESI without documenting any medical indication by symptoms or signs. (OSS 2.)

PRE PROCEDURE DIAGNOSIS: Cervical radiculopathy

POST PROCEDURE DIAGNOSIS: Same

PROCEDURE: Cervical C7/T1 ESI with Fluoroscopic Guidance

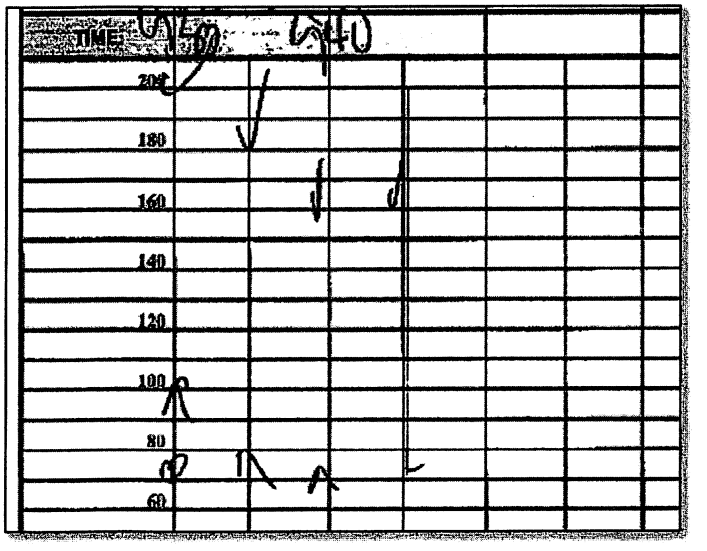
SEDATION: Monitored IV sedation

PROCEDURE NARRATIVE:

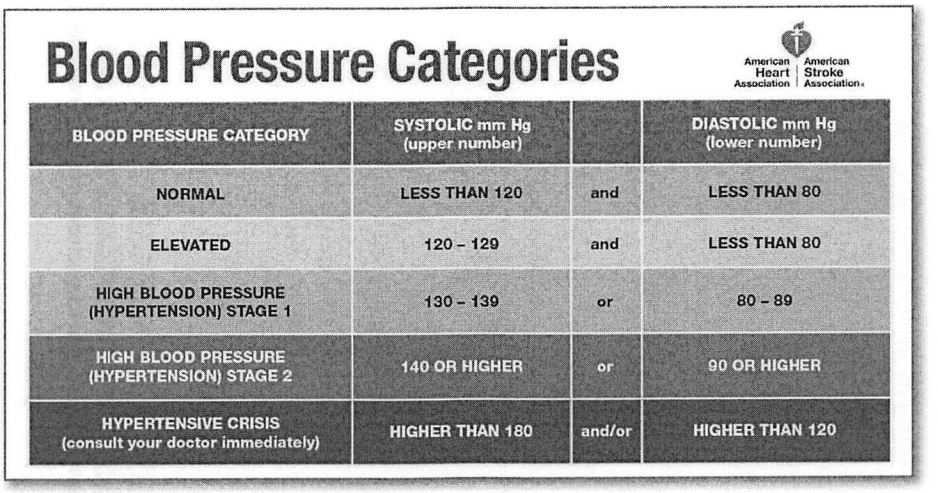
An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C5 to T1. After negative aspiration, 2 cc of normal saline with 10 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

Hany Helmi, MD

129. At 9:30, when anesthesia began, Mr. So's blood pressure was 200/100. (NHA 345).



130. The high range of normal blood pressure may be considered approximately 140/90.



Blood Pressure Categories

American Heart Association | American Stroke Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

131. In light of Mr. So's unexplained systolic pressure of 200 and diastolic of 100, he was not medically fit for an elective CESI.

132. Dr. Joshi and Dr. Helmi violated the standard of care by proceeding with the CESI despite Mr. So's abnormally high blood pressure.

November 22: CESI — Anesthesia

133. Anesthesia began at 9:30. Surgery began at 9:34. Surgery ended at 9:40. And anesthesia ended at 9:42. (NHA 345.)

134. Dr. Joshi administered 200 mg of propofol to Mr. So. (NHA 345.)

Henry , DOB: [redacted]1956, Account No: AB47631

Orthopedic Surgery Center of Sandy Springs
Anesthesia Record

Date:	11/22/19		Anesthesia Provider:	Joshi Hester	Surgical Diagnosis:	Cervical	Radiculopathy
Surgeon:	Oskouei Helmi	Rosen Lee		Other:		Thoracic	Facet Syndrome
Anesthesia Start:	930	Surgery Start:	934	Height:	5'8	Lumbar	Spondylosis
Anesthesia End:	942	Surgery End:	9[illegible]0	Weight:	195	Sacral	Sacroilitis
Position:	Supine	Prone	Lateral R L	ASA:	1 2 3 4	OTHER:	
O2 via NC	L/M: 2				Surgical Procedure:	Cervical	ESI
Propofol	200					Thoracic	TFESI
Midazolam	4					Lumbar	RFA
Fentanyl	50					Sacral	IA Facet
						OTHER:	
					Levels:	C4-7 L3-S1	R L Bilat.
SaO2	100	100					
ETCO2	4	4					
EKG	SR	SR					

135. Propofol is a powerful general anesthetic.

136. Except in rare cases, general anesthesia is generally inappropriate for CESI patients, and there was no need or medical indication documented for Mr. So to receive a general anesthetic.

137. Dr. Joshi violated the standard of care by administering a general anesthetic to Mr. So.

138. Dr. Helmi violated the standard of care by performing a CESI on Mr. So while he was sedated by a general anesthetic.

139. Even if a general anesthetic had been appropriate for Mr. So, 200 mg would have been an excessive dose. Mr. So was 63 years old and 195 pounds (88.45 kilograms). A Monitored Anesthesia Care (MAC) sedation initiation dose of propofol for Mr. So was 0.5 mg/kg (or 44 mg) administered over 3-5 minutes. An anesthesia induction dose of propofol

for Mr. So was 1-1.5 mg/kg — or 88 to 133 mg. The 200 mg of propofol administered to Mr. So likely sufficed to render him completely unconscious.

For propofol dosing information, see https://reference.medscape.com/drug/diprivan-propofol-343100:

MAC Sedation

Initiation

- 0.1-0.15 mg/kg/min IV for 3-5 min; titrate to desired clinical effect; monitor respiratory function; administered as slow infusion or slow injection while monitoring cardiorespiratory function
- Slow injection: 0.5 mg/kg administered over 3-5 min; titrate to clinical response
- Elderly: Do not use rapid bolus dose administration; administer over 3-5 min; reduce dose to approximately 80% of usual adult dose according to their condition, response, and changes in vital signs

Anesthesia

Induction

- <55 years ASA I/II: 40 mg IVP q10sec until onset (2-2.5 mg/kg IV when not premedicated with oral benzodiazepines or intramuscular opioids)
- >55 years or debilitated or ASA III/IV: 20 mg IVP q10sec until onset (1-1.5 mg/kg); do not use rapid bolus because as it will increase likelihood of undesirable cardiorespiratory depression, including hypotension, apnea, airway obstruction, and/or oxygen desaturation

140. If a general anesthetic agent was necessary at all, it would be permissible only for light to moderate sedation. Under any circumstances, it was vitally important that Mr. So be alert, able to feel pain if his spinal cord was punctured, and able to respond to pain.

141. Dr. Joshi violated the standard of care by administering an excessive dose of propofol to Mr. So without a documented medical indication.

142. Dr. Helmi violated the standard of care by performing a CESI on Mr. So while he was over-sedated.

143. Dr. Joshi's anesthesia record does not indicate clearly the method of delivery of the anesthesia, the time over which it was administered, or the reasons it was

indicated. The record is inadequate, and Dr. Joshi violated the standard of care by failing to keep an adequate record.

November 22: CESI — The Procedure & Complications

144. Dr. Helmi's record of the CESI is also inadequate.

145. It appears Dr. Helmi recorded only three fluoroscopy images.

For images and interpretations see Appendix A.

146. These images do not adequately demonstrate the steps Dr. Helmi took in performing the CESI.

147. Dr. Helmi violated the standard of care by failing to archive images necessary to show accurately what was done.

148. The images Dr. Helmi retained, however, show that the tip of the needle was not in the epidural space. The images indicate that the needle had crossed the midline of the spine and was in the center of the spinal canal, not posterior within the spinal canal.

149. The fluoroscopy images indicate that Dr. Helmi injected a full volume of contrast within the confines of the dura, *i.e.*, intrathecal space, not the epidural space. The contrast-dispersal pattern shows sharp, well-defined margins of the contrast dye pattern—indicating that the dye was probably within the spinal cord.

150. The contrast dispersal pattern in Dr. Helmi's CESI differs markedly from the contrast pattern in the prior CESI performed on Mr. So by Dr. Rosen. See Appendix A.

151. The contrast dispersal pattern should have clearly alerted Dr. Helmi that he had advanced the needle past the epidural space, inside the membranes surrounding the spinal cord.

152. Dr. Helmi violated the standard of care by injecting the full volume of contrast before using a test dose of contrast to ensure proper placement of the needle.

153. Dr. Helmi violated the standard of care by ignoring plain evidence that he had stuck the needle into Mr. So's spinal cord.

154. Later that day, after Mr. So was taken to the Emergency Room, MRI images were taken of Mr. So's spine. Those images show that Dr. Helmi injected the steroid medication into Mr. So's spinal cord. The light-colored material within the spinal cord is the steroid medication.

155. The radiologist who interpreted the MRI findings concluded that they showed "abnormal signal within the cord posteriorly with almost a track-like appearance possibly related to the epidural injection," and that the images showed "cord signal hyperintensity ... compatible with intramedullary cord injection...." (NHA 577.)

C4-5: Preserved disc space height with a left paracentral disc osteophyte complex which indents the left aspect of the cord and overall moderate to severe canal stenosis. There is abnormal signal within the cord posteriorly with almost a track-like appearance possibly related to the epidural injection. Additionally, there are superimposed facet hypertrophic changes with moderate to severe right-sided foraminal stenosis.

C5-6: Mild disc space narrowing with a mild broad disc and osteophyte complex and superimposed uncovertebral joint hypertrophy with overall severe canal stenosis and at least moderate central canal stenosis, with again seen is abnormal intramedullary cord signal hyperintensity and overall heterogeneous pattern.

C6-7: Narrowed disc space with a broad disc osteophyte complex with uncovertebral joint hypertrophy with severe bilateral foraminal stenosis and at least moderate central canal stenosis, again there is abnormal intramedullary heterogeneous signal within the cord.

C7-T1: Preserved disc space height without high-grade canal compromise or foraminal stenosis, but again abnormal intramedullary cord signal throughout.

T1-T2: Abnormal cord signal hyperintensity which also extends anteriorly along the ventral surface of the cord on the left. There is no high-grade foraminal stenosis.

Postcontrast imaging demonstrates no definite pathologic enhancement.

IMPRESSION:
1. Diffuse abnormal intramedullary cord signal hyperintensity from C4 to the upper thoracic spine with imaging findings compatible with intramedullary cord injection given the history of epidural injection with abnormal cord signal as described, as well as several foci of air and possibly trace hemorrhage. Neurosurgical consultation is recommended.

156. The neurosurgeon who evaluated Mr. So at the hospital also concluded that Dr. Helmi had injected the steroid/anesthetic medication into Mr. So's spinal cord. (NHA 141-44.)

attached to this report. It appears as if the patient had an intra-medullary injection of steroid along with anesthetic agent. There is a possible report of aspiration after this but no intubation or resuscitation was necessary at any time. He feels as if his leg power is improving but he has still significant pain in his arm as well as his right anterior abdominal wall.

157. Dr. Helmi violated the standard of care by injecting the medication without obtaining sufficient fluoroscopic images to confirm proper and safe placement of the needle tip.

158. Dr. Helmi violated the standard of care by injecting the medication despite seeing a contrast dispersal pattern that indicated the needle was in Mr. So's spinal cord.

159. After the operation, Mr. So awoke with severe pain in his abdomen and legs, with loss of sensation normal sensation in his legs, and with difficulty breathing. In the Post-Procedure care sheet, Mr. So's oxygen saturation level was noted as 91% — versus 100% before the procedure, as noted in the Anesthesia record. (NHA 344-45; OSS 20-21; NHA 60; NHA 38; NHA 39; NHA 141.)

Post procedure pt complained of difficulty breathing, heaviness in his stomach, and paresthesias in his hands and feet. Pt had full sensation in his arms and legs and was able to move all extremities.

BP 179/101
HR 89

OSS 20

12/9/2019 So, Henry | Acc No:AB47631 | DOE | DOS:10/15/2019

02 Sat- 89% on facemask

EMS was called and patient was taken to Northside Hospital. Before leaving with EMS the patient was given 10mg of Hydralazine, sublingual nitroglycerin and an albuteral treatment via facemask.

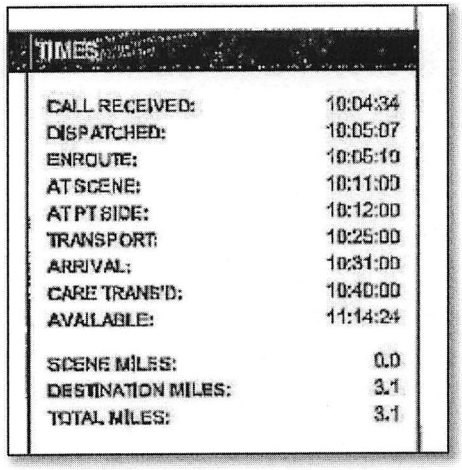
NARRATIVE
6217 DISPATCHED TO 63 Y/O MALE WITH DIFFICULTY BREATHING. ON ARRIVAL FOUND 63 Y/O MALE IN CARE OF PHYSICIAN OFFICE STAFF. THE STAFF ON SCENE ADVISED PATIENT HAD A CERVICAL NERVE BLOCK PERFORMED THIS MORNING, BUT AFTER THE PROCEDURE PATIENT DEVELOPED HYPERTENSION, DIFFICULTY BREATHING, A FEELING OF STOMACH PRESSURE, AND NUMBNESS IN HIS LOWER EXTREMITIES. PATIENT ADVISED THAT THE PROCEDURE WAS TO TREAT HEADACHES. PATIENT CURRENTLY

History of Present Illness
This 63-year-old gentleman with chronic lower abdominal pain presents with sudden onset abdominal distention and pain radiating into the rectum that began soon after receiving a cervical spinal epidural under anesthesia. He also complains of shortness of breath. Patient was noted to be hypertensive. He does normally take blood pressure medicine and was compliant today. Pain radiates into the right leg and he has difficulty moving it. No other associated symptoms. No known history of urinary difficulties. No known history of abdominal aortic aneurysm.

Medical Decision Making
Patient sent from spine center after receiving cervical epidural for back pain which was radiating into his rectum and back. He awoke from the procedure c/o SOB and severe abdominal pain. Noted at that time to have extremely high SBP over 200. He continues to have worsening abdominal distention. In light of patient's history of pain and elevated blood pressure I will rule out dissecting abdominal aneurysm with stat CTA scan. On initial exam,

History of Present Illness
63-year-old male who was sedated earlier today for his cervical epidural. He awoke from this procedure with severe pain in his arm as well as his abdomen and the inability to move his legs more so than his arms. He was urgently transferred to the Northside emergency department where further evaluation and imaging studies were obtained with results attached to this report. It appears as if the patient had an intra-medullary injection of steroid along with anesthetic agent. There is a possible report of aspiration after this but no intubation or resuscitation was necessary at any time. He feels as if his leg power is improving but he has still significant pain in his arm as well as his right anterior abdominal wall.

160. Surgery ended at 0940 hours, and an ambulance was called 25 minutes later, at 1004 hours. The EMS arrived at Ortho Sport & Spine at 1011 hours, left with Mr. So in the ambulance at 1025 hours, and arrived with him at the ER at 1031 hours. (NHA 60.)



TIMES	
CALL RECEIVED:	10:04:34
DISPATCHED:	10:05:07
ENROUTE:	10:05:19
AT SCENE:	10:11:00
AT PT SIDE:	10:12:00
TRANSPORT:	10:25:00
ARRIVAL:	10:31:00
CARE TRANS'D:	10:40:00
AVAILABLE:	11:14:24
SCENE MILES:	0.0
DESTINATION MILES:	3.1
TOTAL MILES:	3.1

161. When the EMS arrived, Mr. So had an IV in place and was receiving oxygen through a nebulizer mask. (NHA 60.)

ON ARRIVAL PATIENT FOUND SEMIFOWLERS ON HOSPITAL BED. PATIENT APPEARS TO BE IN A MODERATE TO SEVERE AMOUNT OF DISTRESS. HEAD TO TOE EXAMINATION REVEALS NO OBVIOUS SIGNS OF TRAUMA. PATIENT HAS IV, EKG, AND OXYGEN VIA NEBULIZER MASK ON ARRIVAL.

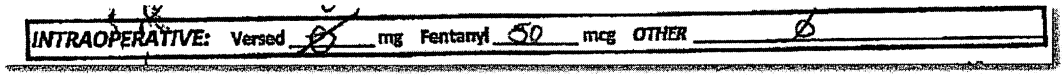
162. When transported by EMS, Mr. So had an elevated respiratory rate of 20 breaths per minute. A normal respiratory rate for adults may range from 12-16 breaths per minute. (*See, e.g.*, https://www.hopkinsmedicine.org/health/conditions-and-diseases/vital-signs-body-temperature-pulse-rate-respiration-rate-blood-pressure.) (NHA 61.)

TIME	BLOOD PRESSURE	PULSE	RESP	GLASGOW COMA SCALE				EKG	SPO2	BLOOD GLUCOSE	PAIN SCALE
				E	V	M	TOTAL				
10:20	182 / 110 (134)	94	20	4	5	6	15				
10:22								NORMAL SINUS RHYTHM			
10:30	174 / 100 (125)	96	20	4	5	6	15				

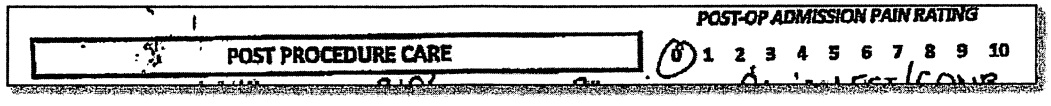
163. Approximately an hour and a half later, at 11:30 AM, Mr. So's arterial blood gas test results showed continued, significant respiratory distress. The pO2 measure indicates the effectiveness of the lungs with ventilation and in pulling oxygen into the blood stream. The normal range was 80-100 mmHg. Mr. So's pO2 measurement at 11:30 was 56. (NHA 550.)

Orderable Name: ABG\COOX\Electrolytes\Lactate	Received Date/Time: 11/22/2019 11:30 EST	Verified Date/Time: 11/22/2019 11:32 EST	Ordering Provider: Reklaitis, Vida M
Accession Number: 19-326-03251			
Test	**Result**	**Units**	**Reference Range**
Time Drawn	11:25:00 *1		
Time Analyzed	11:32:57 *1		
Panel	ABG CMP PNL ART *1		
pH Art	7.401 *1		[7.350-7.450]
pCO2 Art	36.5 *1	mmHg	[35.0-45.0]
pO2 Art	56 C2 *1	mmHg	[80-100]
HCO3 Art	22.7 *1	mmol/L	[22.0-28.0]
Base Excess Arterial	-1.7 *1		[-2.0-2.0]
THb Art	14.7 *1	g/dL	[12.0-16.0]
O2Hb Art	89.00 L2 *1	%	[94.00-100.00]

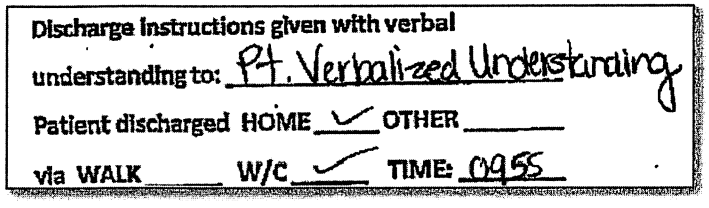
164. The Ortho Sport & Spine "Nursing Pre/Post Procedure Care" sheet contains multiple inaccuracies and inadequacies. It incorrectly indicated that the only intraoperative sedative/anesthetic was Fentanyl. (NHA 344.)



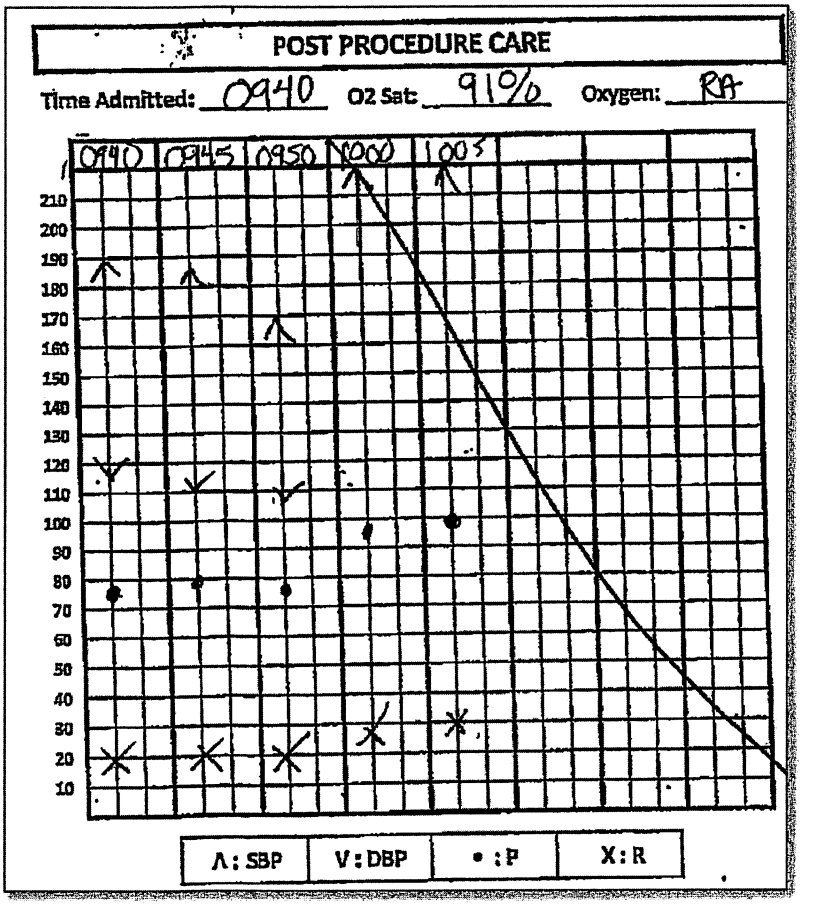
165. The Care sheet states that Mr. So's post-op pain admission rating was zero. This was either meaningless (because it reflected Mr. So's pain level before he awoke from anesthesia) or false. In either case, it was misleading. (NHA 344.)



166. The Care sheet states that Mr. So was discharged Home at 0955. That was incorrect on both points. The Care sheet states that Mr. So verbalized understanding of his discharge instructions. Since Mr. So was taken away in an ambulance, this notation in the Care sheet is at least ambiguous, if not erroneous. (NHA 344.)



167. The Care sheet records systolic blood pressure for 10:00 and 10:05, but not diastolic. (NHA 344.) These blood pressures were recorded after the 0955 time of discharge — evidencing inaccurate documentation.



168. Dr. Helmi did not finalize his operative report until nearly seven hours after the operation, at 1658 hours. (OSS 20-21.)

Electronically signed by Hany Helmi , MD on 11/22/2019 at 04:58 PM EST
Sign off status: Completed

169. Dr. Helmi's operative report included only an inadequate, vague description of the CESI procedure, which is nearly identical to the description in Dr. Rosen's October

21 CESI operative report. Dr. Helmi's operative note incorrectly stated that "Patient tolerated procedure well." (OSS 2; OSS 8.)

PROCEDURE NARRATIVE:

An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C5 to T1. After negative aspiration, 2 cc of normal saline with 10 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

Hany Helmi, MD

PROCEDURE NARRATIVE:

An informed consent was obtained. Then 2% lidocaine was infiltrated intradermally and deeper just to the right of midline at the C7/T1 interspace as identified by fluoroscopy. A 20-gauge Tuohy needle was inserted through the skin nick and advanced under fluoroscopic guidance until the tip of the needle contacted the right T1 hemilamina. The needle was 'walked' in a superior direction off of the upper edge of the lamina using fluoroscopic guidance and advanced to the epidural space using the loss-of-resistance technique. After negative aspiration, a small amount of Omnipaque 300 was injected. Appropriate spread within the epidural space was observed along posterior epidural space from the top of C5 to T1. After negative aspiration, 2 cc of normal saline with 5 mg of Dexamethasone was injected incrementally. The needle was withdrawn after stylet was replaced. A Band-Aid was applied. Patient tolerated procedure well.

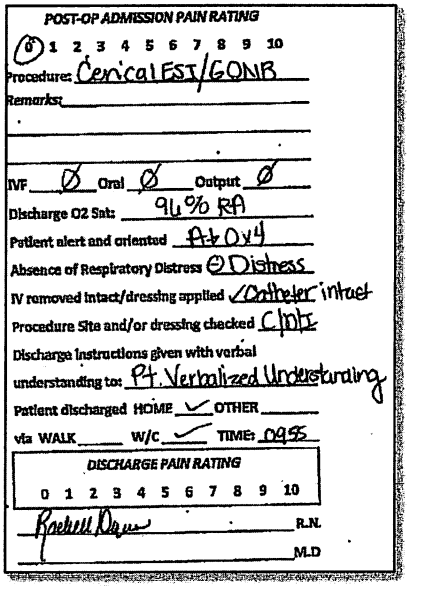
Patient was monitored for an appropriate length of time before being discharged to home. Vital signs remained stable throughout the procedure and in recovery. There were no complications.

Ryan Rosen, MD

170. Dr. Helmi finalized his operative note at 1658 (04:58 PM) over an hour after the radiologist, Dr. Ounanounou, had reported findings "compatible with intramedullary injection" at 1527 (3:27) (NHA 87, NHA 576-77.). Dr. Helmi failed to include the vital information of a spinal cord injection in his documentation.

171. Dr. Helmi violated the standard of care by failing to promptly write an operative note that adequately described the actual procedure and failed to include pertinent information of a serious iatrogenic complication.

172. On the post-procedure sheet, the Ortho Sport & Spine nurse recorded Mr. So's post-op admission pain rating as 0 out of 10, and recorded that Mr. So was discharged home. (NHA 344.)



POST-OP ADMISSION PAIN RATING

0 1 2 3 4 5 6 7 8 9 10

Procedure: Cervical ESI/GONB

Remarks:

IVF Ø Oral Ø Output Ø

Discharge O2 Sat: 96% RA

Patient alert and oriented A+Ox4

Absence of Respiratory Distress ⊖ Distress

IV removed intact/dressing applied ✓Catheter intact

Procedure Site and/or dressing checked C|D|I

Discharge instructions given with verbal understanding to: Pt. Verbalized Understanding

Patient discharged HOME ✓ OTHER

via WALK W/C ✓ TIME: 0955

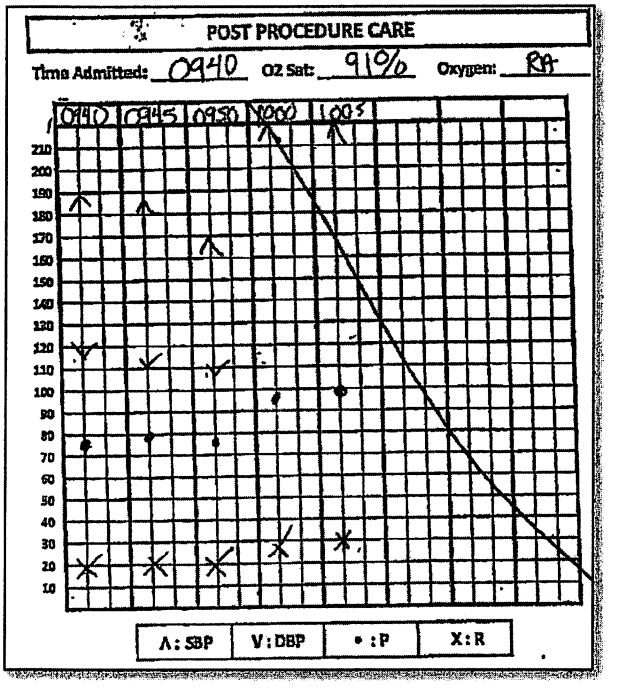
DISCHARGE PAIN RATING

0 1 2 3 4 5 6 7 8 9 10

R.N.

M.D

173. The post-procedure care sheet noted Mr. So's blood pressure at 0940 hours as 190/115, and at 0950 hours as 170/110. At both 1000 hours and 1005 hours, the systolic blood pressure was noted as 220 (with no diastolic reading recorded), with heart rate of approximately 100, and ventilation rate of 30. (NHA 344.)



POST PROCEDURE CARE

Time Admitted: 0940 O2 Sat: 91% Oxygen: RA

0940 0945 0950 1000 1005

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10

A: SBP | V: DBP | • : P | X: R

174. The EMS noted Mr. So's blood pressure at 1020 hours as 182/110 and at 1030 hours as 174/100. (NHA 61.)

TIME	BLOOD PRESSURE	PULSE	RESP	GLASGOW COMA SCALE				EKG
				E	V	M	TOTAL	
10:20	182 / 110 (134)	94	20	4	5	6	15	
10:22								NORMAL SINUS RHYTHM
10:30	174 / 100 (125)	86	20	4	5	6	15	

175. It appears that Dr. Helmi and perhaps other Ortho Sport & Spine staff conveyed misleading information to the ER physicians. Most importantly, Dr. Helmi did not review the fluoroscopy images and inform the ER staff that he had injected medication into Mr. So's spinal cord. Instead, Dr. Helmi said he suspected Mr. So had suffered cord compression from an epidural injection which differs from puncture by a needle and injection into the spinal cord and requires differing treatments. (NHA 132.)

176. Additionally, it appears that Dr. Helmi conveyed the impression that Mr. So began having high blood pressure only after the CESI, which was not true. (NHA 132.)

177. These misimpressions appear to have led the ER physician and other hospital staff down false trails ruling out differential diagnoses which were highly unlikely and likely would not have been considered if the true facts had been known.

178. While Mr. So's symptoms began immediately after waking from the CESI, at approximately 1000 hours, his injury was not identified for more than five hours — not until 1527 hours, when an MRI of Mr. So's neck was taken and read. (NHA 576-77.)

IMPRESSION:
1. Diffuse abnormal intramedullary cord signal hyperintensity from C4 to the upper thoracic spine with imaging findings compatible with intramedullary cord injection given the history of epidural injection with abnormal cord signal as described, as well as several foci of air and possibly trace hemorrhage. Neurosurgical consultation is recommended.

2. There is no epidural fluid collection.

3. Severe multilevel degenerative disc disease with underlying canal stenosis from a combination of congenital canal stenosis and acquired degenerative disc disease.

These findings were discussed by phone with Vida M Reklaitis on 11/22/2019 15:27 by Serge Oumanounou M.D., n7352.

179. In the intervening five hours, the hospital doctors investigated several potential explanations — partly in response to the false impression that Mr. So's blood pressure spiked during the normal course of a CESI. The hospital doctors first investigated a potential dissecting abdominal aneurysm, noting also the possibility of a distended bladder, paralytic ileus, or small bowel obstruction. Later, the hospital doctors investigated potential aspiration pneumonia. Then they investigated possible flash pulmonary edema. Later, hospital staff noted that Mr. So suffered increasing weakness to all extremities. At that point, they ordered the cervical spine MRI — which led them to discover the spinal cord injection about five hours after Mr. So arrived at the ER. (NHA 39.)

Medical Decision Making
Patient sent from spine center after receiving cervical epidural for back pain which was radiating into his rectum and back. He awoke from the procedure c/o SOB and severe abdominal pain. Noted at that time to have extremely high SBP over 200. He continues to have worsening abdominal distention. In light of patient's history of pain and elevated blood pressure I will rule out dissecting abdominal aneurysm with stat CTA scan. On initial exam, right leg felt cooler than left, patient complains of pain to this side. Differential also includes distended bladder, paralytic ileus or small bowel obstruction. Patient sent for emergent dissection protocol CTA. Foley catheter to be placed. Bedside POC reveals normal creatinine 0.8 with elevated blood glucose which is expected status post steroid injection. Patient's hemoglobin is within normal limits. Blood pressure was initially elevated but improved after Dilaudid for pain management.

Reexamination/Reevaluation
-VR-11/22/2019 11:54:54: Sepsis alert fired. Considering sepsis. Blood cultures ordered, IV fluids ordered. Case discussed with radiologist who reviewed CT scan, no evidence for dissecting aneurysm. Pulmonary infiltrates noted bilaterally. ABG reveals significant hypoxia with a PO2 56. Patient put on oxygen and given breathing treatment for wheezing which has developed. Unasyn ordered for potential aspiration pneumonia. Cultures ordered.
-VR-11/22/2019 12:43:52: Seen by Dr. Pal ICU. Oxygen need is improved, now at 3 L per nasal cannula. Felt patient may go to floor. Suspects possible flash pulmonary edema related to blood pressure spike during procedure. IV fluids discontinued due to pulmonary edema. Will treat with Lasix. Admit IMS.

-VR-11/22/2019 13:40:50: Patient seen by Dr. Cestero IMS, noted to have increasing weakness to all of his extremities since arriving to the ED. Will order stat MRI. Case discussed with Dr. Roland Hamilton. Revisit ICU consult

-VR-11/22/2019 15:20:05: Patient's spine doctor Dr Helmi, here to see the patient. Reviewing MRI.

-VR-11/22/2019 15:38:22: Case discussed with Dr. Eaton. She requests a repeat ABG to see if his hypoxia is trending in one direction or another. The patient appears to be much more comfortable clinically. Dr. Helmy has evaluated the patient and his exam reveals the patient is moving all extremities though very weakly and does have sensation. I will ask neurology/neurosurgery to evaluate. Patient to be admitted. MRI reveals abnormality in the C-spine suggesting cord injection.

180. The ER physician then requested a neurology consultation and, at approximately 1609 hours, spoke to neurosurgeon Dr. Max Steuer. (NHA 39.)

> -VR-11/22/2019 16:09:36: Case discussed with Dr. Steuer. He will consult. Patient admitted to ICU.

181. Finally, nearly *eight hours* after Mr. So's spinal cord injury (at 1749 hours) treatment for the injury was ordered — a dexamethasone IV, which would work to reduce inflammation in the spinal cord. (NHA 418.)

Order: dexamethasone (Decadron)		
Order Date/Time: 11/22/2019 17:44 EST		
Order Status: Discontinued	Clinical Category: Medications	Medication Type: Inpatient
End-state Date/Time: 11/25/2019 09:25 EST	End-state Reason: Physician Request	
Ordering Physician: Dobrasz PA,John	Consulting Physician:	
Entered By: Vickers CNP,Stephanie on 11/22/2019 17:44 EST		
Order Details: 6 mg = 1.5 mL, IV Push, Injection, every 6 hr, STAT, First Dose: 11/22/19 5:44:00 PM EST		

182. If Dr. Helmi had investigated Mr. So's post-CESI complications properly, by reviewing the fluoroscopy images, and if Dr. Helmi had then communicated forthrightly with the ER staff, Mr. So's spinal cord injury could have been diagnosed and treated promptly — rather than with a delay of nearly eight hours.

183. In responding to his patient's post-operative crisis, Dr. Helmi violated the standard of care either by ignoring the fluoroscopy images from the CESI or misrepresenting what he had done to Mr. So.

184. Dr. Helmi violated his duty to his patient and the standard of care by conveying erroneous impressions to the physicians who assumed responsibility for diagnosing and treating Mr. So.

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185. I have been told that at some point on November 22, Dr. Helmi talked to Mr. So in the hospital. I have been told that Dr. Helmi said there was no problem with the CESI, that Mr. So's symptoms were a function of pre-existing spine problems, and in fact that Mr. So's pain was a good sign — a sign that the injection was working.

186. If Dr. Helmi said these things, he misled Mr. So.

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187. Since the negligent CESI on November 22, 2019, Mr. So has continued to be followed by Dr. Max Steuer, a neurosurgeon.

188. Dr. Steuer has documented ongoing neurological deficits stemming from the negligent CESI. On March 9, 2020, for example, Dr. Steuer noted "Still with debilitating myelopathic symptoms in the arms and legs affecting every aspect of life." (PSN 13.)

> His history is significant for onset of cervical symptoms after a rear-impact MVA in February 2019 with neck pain. He was treated with an injection on 10/21/19 with some improvement, but a second injection on 11/22/19 was complicated by post procedure quadriparesis. He was transferred by ambulance to Northside hospital where MRI demonstrated abnormal spinal cord signal from C4-5 to T1-2. He is still reporting about 60% improvement in strength with physical therapy. Still with debilitating myelopathic symptoms in the arms and legs affecting every aspect of life, though this has improved since his last visit. He is having numbness throughout the body from the shoulders down, with weakness worse on the left side of the body. He also receives care from Northside Hospital. The PCP is Idopise Umana, M.D. in Braselton, Ga, 770-848-6140.

189. As of June 2020, approximately seven months after the spinal cord injury, Mr. So's remaining neurological deficits and chronic pain are likely permanent.

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190. Dr. Helmi's CESI and occipital nerve block operations took six minutes. The anesthesia time was 12 minutes. (NHA 345.)

Anesthesia Start:	931	Surgery Start:	934
Anesthesia End:	942	Surgery End:	940

191. For the 12 minutes of anesthesia services, Dr. Joshi and the surgery center charged $2,100. (OSS 25.)

Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201180	Nov 22, 2019	01992 ANESTH, N BLOCK/INJ, PRONE	QZ	6	M54.2	$2,100.00

192. For the six minutes of surgery, Dr. Helmi and the surgery center charged $6,385. (OSS 25.)

Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	64405 ASC N BLOCK INJ, OCCIPITAL	TC	1	M54.2 M54.81	$1,736.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	64479 ASC INJ FORAMEN EPI C/T		1	M54.2 M54.81	$2,048.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	77003 FLUOROGUIDE FOR SPINE INJECT		1	M54.2 M54.81	$450.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	99070 EPIDURAL INJECTION TRAY		1	M54.2 M54.81	$197.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	J1100 ASC INJ DEXETHOSONE SODIM PHOSHATE 1 MG		10	M54.2 M54.81	$1,320.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	J3490 INJECTABLE, MARCAINE 0.5% 1CC		1	M54.2 M54.81	$34.00
Orthopedic Surg Ctr of Sandy Springs	of Sandy Springs, Orthopedic Surgery Center	201179	Nov 22, 2019	Q9967 LOCM 300-399MG/ML IODINE,1ML		1	M54.2 M54.81	$600.00
CLAIM BALANCE								$6,385.00

193. The physicians and nurses of Ortho Sport & Spine and the related surgery center committed multiple acts of improper treatment and lack of ordinary diligence. The November 22, 2019, CESI should not have been prescribed, because it was not indicated or medically justified. Once prescribed, the CESI should not have gone forward when Mr. So arrived at the surgery center with elevated blood pressure, without documentation of etiology. Having improperly decided to go ahead with the CESI, the physicians should not have used a general anesthetic induction dose or deep sedation dose. Having chosen to subject Mr. So to a CESI despite all these violations, Dr. Helmi should have at least taken his time, paid attention, and otherwise done the job right. He did not. He failed to take the time to verify safe needle position, and following contrast injection he ignored and failed to accurately interpret a dangerous, non-epidural pattern of contrast — indicating that he had already injected contrast dye into Mr. So's spinal cord. And Dr. Helmi continued with the injection of a large volume of corticosteroid and saline into Mr. So's spinal cord. Then, after Mr. So awoke in severe distress, Dr. Helmi failed to interpret the symptoms of Mr. So's severe pain, breathing difficulty, heaviness in his stomach, and paresthesias in his hands and feet. Dr. Helmi failed to reevaluate the intraprocedure images and determine

that a spinal cord injection had occurred. Dr. Helmi thereby caused unnecessary delay in the diagnosis and treatment of Mr. So, requiring the emergency room physician to rule out other causes of the symptoms and signs noted. Dr. Helmi's lack of candor likely delayed the MRI that ultimately revealed the spinal cord injection and delayed treatment.

194. The spinal cord injection damaged Mr. So's spinal cord.

195. The delay in diagnosis and treatment likely limited the extent of Mr. So's recovery.

196. The spinal cord injection likely caused Mr. So serious, permanent neurological deficits and chronic, intractable pain.

Supporting Literature

197. The following literature, while not exhaustive, supports various points discussed above:

- Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2ndedn. International Spine Intervention Society. San Francisco, 2013
    - International Spine Intervention Society. Sedation. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2nd edn. International Spine Intervention Society. San Francisco, 2013.
    - International Spine Intervention Society. Records. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2nd edn. International Spine Intervention Society. San Francisco, 2013.
    - International Spine Intervention Society. Cervical Medial Branch Blocks. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2nd edn. International Spine Intervention Society. San Francisco, 2013.

  - International Spine Intervention Society. Cervical Medial Branch Thermal Radiofrequency Neurotomy. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2nd edn. International Spine Intervention Society. San Francisco, 2013.

  - International Spine Intervention Society. Cervical Interlaminar Epidural Access. In: Bogduk N (ed). Practice International Spine Intervention Society. Sedation. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2nd edn. International Spine Intervention Society. San Francisco, 2013.

  - International Spine Intervention Society. An Algorithm for the Conduct of Cervical Synovial Joint Blocks. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures. 2nd edn. International Spine Intervention Society. San Francisco, 2013.

- Pain Procedures in Clinical Practice. United Kingdom: Elsevier Health Sciences,ingla, A. K., Vivian, D. G., Lennard, T. A., Walkowski, S. D. (2011).

- Bogduk et al, "Complications of Spinal Diagnostic and Treatment Procedures," Pain Medicine, Volume 9, Issue suppl_1, 1 May 2008 .

- Landers et al, "Original Research Article: On the Geometry of Fluoroscopy Views for Cervical Interlaminar Epidural Injections," Pain Medicine 2012; 13: 58–65.

- Landers, "Case Report: Spinal Cord Injury During Attempted Cervical Interlaminar Epidural Injection of Steroids," Pain Medicine 2018; 19: 652–657.

- Landers, "Letter to the Editor Regarding a Recent Article: Cervical Epidural Depth: Correlation Between Cervical MRI Measurements of

the Skin-to-Cervical Epidural Space and the Actual Needle Depth During Interlaminar Cervical Epidural Injections," Pain Medicine, 20(9), 2019, 1845–1848.

Miscellaneous

198. To repeat, this affidavit does not exhaust my current opinions and of course does not reflect any opinions I may form later as further information becomes available.

199. Again, I hold each opinion expressed in this affidavit to a reasonable degree of medical probability or certainty; that is, more likely than not.

Milton H. Landers, DO, PhD

SWORN TO AND SUBSCRIBED before me

June 9, 2020

Amanda Sinner
NOTARY PUBLIC

My Commission Expires: 9/17/20

AMANDA SINNER
Notary Public - State of Kansas
My Appt Expires 9/17/20

Revised: March 2020

UNIVERSITY OF KANSAS SCHOOL OF MEDICINE
Faculty Curriculum Vitae

I. PERSONAL DATA

First Name **Milton H**

Last name **Landers**

Current Academic Rank Clinical Professor, University of Kansas School of Medicine

Department: Anesthesiology (Wichita)

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Kansas Spine Institute
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Wichita KS 67214

Phone: Office: 316-733-9393:
Cell: 913-991-7956

Fax: 316-733-6116

Email: mlandersdophd@gmail.com

PROFESSIONAL DEVELOPMENT

Undergraduate and Graduate Education

Years (Inclusive)	Degree	Institution
1968-1971	BS- Philosophy	University of Oregon, Eugene, OR
1971-1972	BS- Biology	University of Oregon, Eugene, OR
1973-1974	MS- Biology	University of Oregon, Eugene, OR
1974-1978	Work toward PhD- Animal Science & Zoology	Colorado State University, Ft Collins, CO
1978-1980	PhD- Zoology	University of Vermont, Burlington, VT
1980-1984	DO	University of Health Sciences, Kansas City, MO

Postgraduate Education

Years (Inclusive)	Degree	Institution
1984-1985	Rotating Internship	Oklahoma Osteopathic Hospital, Tulsa, OK
1985-1987	Anesthesiology Residency	Doctors Hospital, Columbus, OH

Academic and Professional Appointments and Activities

Month and Year	Position	Institution
2018	Member- Academic Promotion and Tenure Committee	University of Kansas, School of Medicine
2017-Present	Core Faculty	Department of Anesthesiology, University of Kansas, School of

Exhibit A

		Medicine- Wichita
2013 - present	Clinical Professor	University of Kansas, School of Medicine- Wichita
2010 - 2020	Medical Director	Kansas Spine Institute, Wichita, KS
2005 – present	Private Practice - Interventional Pain	Private Practice, Pain Management Associates, Wichita, KS
2009 – 2013	Clinical Associate Professor	University of Kansas, School of Medicine- Wichita
2005 – 2009	Clinical Assistant Professor	University of Kansas, School of Medicine- Wichita
2002 - 2005	Director, Interventional Pain	Headache and Pain Center, Leawood, KS
2000 - 2002	Interventional Pain physician	Private Practice, Kansas City, MO
1997 - 2000	Interventional Pain physician	Memorial Hospital, Springfield, Il
1997 - 1999	Clinical Assistant Professor	Southern Illinois University SOM
1993 - 1998	Staff Anesthesiologist	Mexico, Mo
1994 - 1997	Staff Anesthesiologist & Director, Interventional Pain	Outpatient surgery center, St Louis, MO
1992 - 1994	Locum tenens	Christian Hospital, St Louis, MO Outpatient Surg Center, St Louis Other venues
1990 - 1992	Anesthesiologist	Heartland Hospital, St Joseph, MO
1991 – 1992	Adjunct Assistant Professor	University of Kansas School of Nursing/Anesthesia, Kansas City, MO
1987 – 1990	Director Pain clinic & Staff Anesthesiologist	USAF Regional Hospital, Elmendorf AFB, Anchorage Alaska
1986	Lecturer	Columbus Technical Institute, Columbus, OH
1978 -1980	Graduate Teaching Fellow	University of Vermont, Burlington, VT
1976-1978	Graduate Teaching Fellow	Colorado State University, Ft Collins, CO
1976	Instructor, Zoology Dept	Colorado State University, Ft Collins, CO
1974-1975	Graduate Research Fellow	Colorado State University, Ft Collins, CO
1973-1974	Graduate Research Fellow	University of Oregon, Eugene, OR

Professional Registration/Licensure

Year	Number	State
2000	28579	Kansas
1985	RIF 69	Missouri

2004	5751234-1204 (lapsed)	Utah
1989	II 2429 (Inactive)	Alaska

Professional Certification(s)

Date	Board / Organization
1991 (#603)	American Osteopathic Board of Anesthesia (AOBA)
1996 (#PM-603)	AOBA – Added Qualification in Pain Management
2013	ISIS Accreditation – Evidence Based Medicine 1 (EBM)- Studies of Treatment
2013	ISIS Accreditation – Evidence Based Medicine 2 (EBM)- Studies of Diagnostic Tests and Strategies

Professional Societies and Affiliations

Date	Organization (including offices held)
1994 – present	Spinal Intervention Society (International Spines Intervention Society) 2009–2011 Board of Director, ad hoc member 2008-2009 Board of Directors, Immediate Past President 2006-2008 President and Chairman of the Board of Directors 2004-2006 Board of Directors, Secretary 2004-2006 Chairman Education Committee 2003-2010; 2013-14 Education Committee 2002-2003, 2010-2018 Standards Committee 1996-present Active Member
2009 – 2013	German Interventional Pain Society, Honorary Member
2005 – 2007	North American Spine Society
2005 – present	Kansas State Medical Society
2005 – present	Sedgwick County Medical Society
2005 – 2019	Sedgwick County Osteopathic Society
1995	American Osteopathic Board of Anesthesia – Resident in Training Examination Committee
1988 – 1989	Alaska Osteopathic Medical Association – Board of Trustees & Founding Member
1982 – present	American Osteopathic Association
1985 – present	American Osteopathic College of Anesthesiologists

Honors and Awards (honorary societies, research awards, teaching and other awards)

Year	Award

2009	International Spine Intervention Society- The Charles Aprill Excellence in Teaching Award
2009	KUSM-Wichita, Department of Anesthesiology- Outstanding Intraoperative Teaching to the CA-3 Anesthesiology Residency Class Award.
2011	ISIS Master Instructor Certificate

II. TEACHING ACTIVITIES

Brief statement of areas of teaching interest:

My teaching interest is in the diagnosis and treatment of pain of spinal origin. The majority of this work involves diagnostic and therapeutic spinal injections, and non-surgical spine interventions, utilizing fluoroscopy. The above involves precise needle placement in and around the spine, and interpretation of imaging studies, i.e. MRI, CT, and fluoroscopic, including evaluation of contrast patterns in regards to the pertinent anatomy and pathology.

My major educational focus involves the training of practicing, board certified physicians in the U.S., Europe and Asia.

I teach the senior anesthesia residents at University of Kansas-Wichita about Interventional Pain. Prior to my volunteering to work with the residents, they had no experience in state of the art interventional pain/non-surgical spine. The one to four month rotation is a combination of observation, daily thought-provoking discussions, didactic presentations, guided reading and interactive computer programs designed to provide an introduction to the sub-specialty. My practice is the only location where this instruction in high level interventional pain is obtainable.

I previously taught fellows, residents and medical students at Southern Illinois University and have served as an adjunct assistant Professor for the University of Kansas, School of Nurse Anesthesia, mainly involved in the peri-operative clinical training of nurse anesthetists.

1. Instruction:

Didactic (e.g.: lectures and formal presentations)

Academic Year	Event	Title	Instruction		Student	
			Type	Hours	No	Type
May 5-6, 2001 New Orleans, LA	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and techniques	Lecture	1	48	Board Certified Physicians
March 9-10, 2002 Dallas TX	Cervical spinal Injection Workshop- ISIS	Cervical Spinal Injections: Indications and Techniques	Lecture	1	48	Board Certified Physicians
March 14-15, 2002 Phoenix AZ	Interventional Pain Workshop- Society for Pain practice management (SPPM)	5 presentations on various aspects of interventional pain	Lecture	3	100	Physicians
April 6-7, 2002 Phoenix AZ	Discography Workshop- ISIS	Discography: Risks and Complications	Lecture	1	48	Board Certified Physicians
May 4-5, 2002	Lumber Spinal Injection	Lumbar Injections: Indications and	Lecture	1	48	Board Certified

New Orleans LA	Workshop- ISIS	Techniques				Physicians
July 19 - 23 2002 Boston MA	Interventional Pain Workshop - SPPM	15 presentations on Interventional Pain	Lecture	7	100	Physicians
Aug. 3-4, 2002 Chicago IL	Cervical Injection Workshop-ISIS	Cervical Spinal Injections: Risks & Complications	Lecture	1	48	Board Certified Physicians
Sept 20-22, 2002 Kansas City MO	Course Director: Interventional Pain Update and Cadaver Course- Society of Pain Practice Management	"Principles and Practice of Diagnostic Injections" "Medial Branch vs. Intra-articular Facet Blocks" "Discography: Principles and Practice" "Discography: Cervical and Lumbar" "Spinal Cord Stimulation: Patient Selection" "Spinal Cord Stimulation: Indications and Contraindications" "Spinal Cord Stimulation: Implantation Techniques" "Spinal Cord Stimulation: Post Implantation Management" "Spinal Cord Stimulation: Hardware" "Nucleoplasty and IDET" "Adding Myelography to Your Practice"	Lectures	5+	100	Physicians
Oct 4 -6, 2002 Memphis TN	Radiofrequency neurotomy workshop- IISIS	Radiofrequency Neurotomy: Risks and Complications	Lecture	1	48	Board certified physicians
Oct 19, 2002 St Louis MO	Smith & Nephew: IDET Training Session	Intradiscal electrothermal therapy: Patient Selection and	Lecture	1	20	physicians

		Technique				
Nov 20-22, 2002 New Orleans LA	Course Director: Interventional Pain Update and Cadaver Course- Society of Pain Practice Management	"Principles and Practice of Diagnostic Injections" "Medial Branch vs. Intra-articular Facet Blocks" "Discography: Principles and Practice" "Discography: Cervical and Lumbar" "Spinal Cord Stimulation: Patient Selection" "Spinal Cord Stimulation: Indications and Contraindications" "Spinal Cord Stimulation: Implantation Techniques" "Spinal Cord Stimulation: Post Implantation Management" "Spinal Cord Stimulation: Hardware" "Nucleoplasty and IDET" "Adding Myelography to Your Practice"	Lectures	5+	100	Physicians
Jan 12, 2003 Burlingame CA	ISIS Advanced Lumbar Spinal Injection Workshop-ISIS	Lumbar Injections: Indications and Techniques	Lecture	1	48	Board certified physicians
Feb 1 - 2, 2003 Phoenix AZ	ISIS Advanced Lumbar-Thoracic Spinal Injection Workshop	Thoracic and Lumbar Injections: Indications and Techniques	Lecture	1	48	Board certified physicians
March 1-2, 2003 Orlando FL	Cervical Spinal Injection Workshop- ISIS	Cervical Spinal Injections: Drugs, Risks and Complications	Lecture	1	48	Board certified physicians
March 5 – 7, 2003	Course Director: Interventional Pain Update and Cadaver	Update on Spinal Cord Stimulation Update on Implantable	Lecture	5	100+	Physicians

	Course- Society of Pain Practice Management	Intrathecal Therapies Discography Spinal Cord Stimulation: Patient Selection				
May 3 - 4, 2003 Memphis TN	Discography Workshop- ISIS	Discography: Drugs, Risks and Complications	Lecture	1	48	Board certified physicians
June 7-8, 2003 Denver CO	ISIS Lumbar Spinal Injection Workshop- ISIS	Lumbar Spinal Injections: Drugs, Risks and Complications	Lecture	1	48	Board certified physicians
June 28-29, 2003 Memphis TN	Cervical Spinal Injection Workshop- ISIS	Cervical Spinal Injections: Drugs, Risks and Complications	Lecture	1	48	Board certified physicians
July 12-13, 2003 Philadelphia PA	Advanced Lumbar-Thoracic SDpinal Injection Workshop - ISIS	Thoracic and Lumbar Spinal Injections: Drugs, Risks, Complication	Lecture	1	48	Board Certified Physicians
July 15-18, 2003 Cambridge MA	Course Director: Interventional Pain Update and Cadaver Course- Society of Pain Practice Management	Cervical Injection Techniques: Interlaminar, Transforaminal, Facet Cervical Discography and IDET Cervical Radiofrequency Neurotomy Techniques Intrathecal Drug Delivery System Spinal Injections: Drugs, Risks and Complication Atlanto-axial Injection Technique Caudal Epidural Technique Lumbar Discography Percutaneous Discectomy;and Nucleoplasty Techniques Lumbar Injections: Interlaminar, Transforaminal, and Facet	Lecture	5+	100	Physicians

Sept 6-7, 2003 Burlingame CA	Cervical Spinal Injection Workshop- ISIS	Cervical Spinal Injections: Indications and Techniques	Lecture	1	48	Board Certified Physicians
Sept 13-14, 2003 Chicago IL	Course director. Interventional Pain Update- SPPM	Multiple presentations on Intentional Pain (See previous lists)	Lecture	5+	100	Physicians
Nov 1-2, 2003 Muenster, Germany	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Drugs, risks and complications	Lecture	1	48	Board certified physicians
Jan 10-11, 2004. Burlingame, CA	Lumbar Spinal Injection Workshop- ISIS	Lumbar spinal injections: Indications and Techniques	Lecture	1	48	Board Certified physicians
Feb 7-8, 2004 Orlando, FL	Discography Workshop- ISIS	Discography: Risks and Complications	Lecture	1	48	Board certified physicians
March 6-7, 2004 Phoenix, AZ	Advanced Lumbar-thoracic spinal Injection workshop- ISIS	Thoracic and Lumbar Spinal Injections: Drugs, risks, complications	Lecture	1	48	Board certified physicians
April 3-4, 2004 Dallas, TX	Cervical spinal injection workshop- ISIS	Cervical Spinal Injections: Drugs, risks, complications	Lecture	1	48	Board certified physicians
May 1-2, 2004 New Orleans, LA	Cervical Spinal Injection workshop- ISIS	Cervical Spinal Injections: Drugs, risks, complications. Cervical spinal injections:Indications and techniques	Lecture	2	48	Board certified physicians
May 22, 2004 Seattle, WA	Intradiscal Electrothermal annuloplasty (IDET) training- Smith & Nephew	Discogenic pain: Diagnosis and Treatment IDET Efficacy	Lectures	2	10	Physicians
June 5-6, 2004 Memphis, TN	Intensive cervical workshop- ISIS	Cervical spinal injections: Indications and Techniques. Cervical spinal injections: Indications and techniques	Lecture	2	24	Board certified physicians
June 19, 2004 St Louis, MO	Radiofrequency neurotomy workshop- Bayliss	Radiofrequency neurotomy: Risks and Complications	Lecture	1	20	Physicians
July 10-11, 2004 Minneapolis, MN	Lumbar spinal injections workshop- ISIS	Lumbar spinal injections: Risks, complications and drugs; Lumbar spinal	Lecture	2	48	Board certified physicians

		injections: Indications and techniques				
July 13-14, 2004 Cambridge, MA	Course director. Interventional pain update- SPPM	Cervical Injection Techniques: Interlaminar, Transforaminal, Facet Cervical Discography and IDET Cervical Radiofrequency Neurotomy Techniques Intrathecal Drug Delivery System Spinal Injections: Drugs, Risks and Complication Atlanto-axial Injection Technique Caudal Epidural Technique Lumbar Discography Percutaneous Discectomy;and Nucleoplasty Techniques Lumbar Injections: Interlaminar, Transforaminal, and Facet	Lectures	6+	100	Physicians
Oct 2-3, 2004 Atlanta, GA	Cervical Spinal Injection workshop- ISIS	Cervical spinal injections: Indications and techniques Cervical Spinal Injections: Drugs, risks and complications	Lecture	2	48	Board certified physicians
Oct 16-17, 2004 Muenster, Germany	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Risks and complications	Lecture	1	48	Board certified physicians
Nov 6-7, 2004 Burlingame, CA	Discography workshop- ISIS	Discography: Drugs, Risks, and complications	Lecture	1	48	Board certified physicians
January 8-9, 2005 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and techniques; Lumbar spinal injections: Drugs, risks, and	Lecture	2	48	Board certified physicians

		complications.				
March 5-6, 2005 Phoenix, AZ	Advanced Lumbar spinal injections with discography workshop- ISIS	Discography: Risks and complications	Lecture	1	48	Board certified physicians
March 19-20, 2005 Munich, Germany	Cervical Spine Injection Workshop- ISIS	Cervical Spinal Injections: Indications and Techniques	Lecture	1	48	Board certified physicians
April 2-3, 2005 Dallas, TX	Cervical spinal injection workshop- ISIS	Cervical spinal injections:Drugs, risks, and complications	Lecture	1	48	Board certified physicians
May 14-15, 2005 Washington DC	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and techniques; Lumbar spinal injections; Drugs, risks, complications	Lectures	2	48	Board certified physicians
June 18-19, 2005 Memphis, TN	Discography workshop- ISIS	Discography: Indications and techniques; Discography: Drugs, Risks, and complications	Lectures	2	48	Board certified physicians
June 24-25, 2005 Memphis, TN	Lumbar spine injection workshop- NASS	Lumbar epidural steroid injections	Lecture	30 min	50	Neuro- and Ortho spine surgeons
Aug 6-7, 2005 Boston, MA	Spinal cord stimulation and Intrathecal therapy workshop- ISIS	Pumps and stims: Matching the modality to the patient	Lecture	1	48	Board certified physicians
Aug 27-28, 2005 Memphis, TN	Radiofrequency neurotomy workshop - ISIS	Radiofrequency neurotomy: Indications and techniques Radiofrequency neurotomy: Risks and complications	Lectures	2	48	Board certified physicians
Sept 10-11, 2005 Memphis, TN	Thoracic Spinal injection workshop- ISIS	Thoracic spinal injections: Drugs, risks, and complications	Lecture	1	48	Board certified physicians
October 1-2, 2005 Burlingame, CA	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Drugs, risks, complications	Lecture	1	48	Board certified physicians
Oct 29-30,	Radiofrequency Neurotomy	Radiofrequency Neurotomy: Risks	Lecture	1	48	Board certified

2005 Muenster, Germany	Workshop- ISIS	and Complications				physicians
Nov 5-6, 2005 Burlingame, CA	Discography workshop- ISIS	Discography: Drugs, risks, and complications	Lecture	1	48	Board certified physicians
Jan 7, 2006 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Drugs, risks, and complications	Lecture	1	48	Board certified physicians
Feb 4, 2006 Phoenix, AZ	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Risks and complications	Lecture	1	48	Board certified physicians
Feb 28, 2006 Wichita, KS	KUSM-Anesthesia Dept residents	Low back and radicular pain: Diagnosis and treatment	Lecture	1	10	Anesthesiology residents
March 11, 2006 Orlando, FL	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Drugs, risks, and complications.	Lecture	1	48	Board certified physicians
March 25, 2006 Vienna, Austria	Cervical spinal injection workshop- ISIS Europe	Lumbar spinal injections: Indications and Techniques	Lecture	1	48	Board certified physicians, residents and fellows
April 1, 2006 Dallas, TX	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Risks and complications	Lecture	1	48	Board certified physicians
May 6, 2006 Pittsburg, PA	Advanced lumbar and thoracic spinal injection workshop- ISIS	Lumbar and Thoracic spinal injections: Risks and complications	Lecture	1	48	Board certified physicians
Aug 6, 2006 Boston, MA	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Risks and complications	Lecture	1	48	Board certified physicians
Sept 10, 2006 Memphis, TN	Cervical and Thoracic Spine Injection Workshop- ISIS	Cervical and Thoracic Spinal Injections: Drugs, Risks and Complications	Lecture	1	48	Board certified physicians
Nov 4-5, 2006 Phoenix	Advanced Lumbar spinal injection workshop-ISIS	Lumbar Spinal Injections: Indications and Techniques Lumbar Spinal Injections: Drugs, Risks, and Complications	Lectures	2	48	Board certified physicians
Jan 6-7, 2007 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Lumbar Spinal Injections: Drugs, Risks, and Complications	Lecture	1	48	Board certified physicians

Feb 3-4, 2007 Phoenix, AZ	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Risks and complications	Lecture	1	48	Board certified physicians
March 10-12, 2007 Orlando, FL	Discography workshop- ISIS	Discography: Risks and complications	Lecture	1	48	Board certified physicians
May 5-6, 2007 Minneapolis, MN	Advanced Lumbar Spinal Injection workshop- ISIS	Advanced Lumbar injections: Indications and Techniques; Advanced lumbar injections: Risks and complications	Lectures	2	48	Board certified physicians
June 10, 2007 Seoul, Korea	Spine intervention workshop- KorSIS	Thoracic discography: Indications and technique Thoracic transforaminal injection: Indications and technique	Lecture	1.5	50	Board certified physicians and fellows
June 16-17, 2007 Bristol, England	Advanced lumbar spinal injection workshop- ISIS Europe	International Spine Intervention Society; The Past, Present and Future off Interventional Pain; Advanced Lumbar Spinal Injection Techniques and Indications	Lectures	2	48	Board certified physicians and fellows
Aug 4-5, 2007 Charlotte, NC	Cervical Spinal Injection workshop- ISIS	Cervical spinal injections: Risks and complications	Lecture	1	48	Board certified physicians
Sept 9, 2007 Memphis, TN	Lumbar Spine Injection Workshop- ISIS	Lumbar Spinal Injections; Risks, Complications and Drugs	Lecture	1	48	Board certified physicians
Oct 14, 2007 Phoenix, AZ	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Theory Radiofrequency neurotomy: Risks and Complications	Lectures	2	48	Board certified physicians
Oct 27-28, 2007 Muenster, Germany	Radiofrequency neurotomy workshop- ISIS Europe	Radiofrequency neurotomy: Theory Radiofrequency neurotomy: Risks and Complications	Lectures	2	48	Board certified physicians and fellows
Jan 19-20, 2008 San Francisco, CA	Lumbar Spinal Injection workshop- ISIS	Lumbar spinal injections: Drugs, risks, complications	Lecture	1	48	Board certified physicians and fellows
Feb 9-10, 2008	Cervical spinal	Cervical spinal	Lecture	1	48	Board certified

Phoenix, AZ	injection workshop- ISIS	injections: Drugs, risks, complications				physicians and fellows
March 8-9, 2008 Orlando, FL	Discography workshop- ISIS	Discography Techniques: Cervical, thoracic, lumbar Discography: Risks and complications	Lecture	2	48	Board certified physicians and fellows
April 5-6, 2008 Plano, TX	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Indications and techniques Radiofrequency neurotomy: Risks and complications	Lecture	2	48	Board certified physicians and fellows
June 6-7, 2008 Memphis, TN	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Anatomy and imaging Cervical spinal injections: Drugs, risks, complications	Lecture	2	48	Board certified physicians and fellows
June 21, 2008 Bristol, England	Cervical spinal injection workshop- ISIS Europe	Cervical spinal injections: Indications and techniques	Lecture	1.5	36	Board certified physicians and fellows
August 9-10, 2008 Burr Ridge, IL	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Indications and Techniques Radiofrequency neurotomy: Risks and complications	Lecture	2	48	Board certified physicians and fellows
Sept 5, 2008 Memphis, TN	Lumbar spinal injections workshop- ISIS	Lumbar Spinal Injections: Indications and Techniques Lumbar Spinal Injections: Risks and Complications	Lectures	2	48	Board certified physicians and fellows
Oct 4-5, 2008 Las Vegas, NV	Discography workshop- ISIS	Discography: Indications and techniques Discography: Complications	Lecture	2	48	Board certified physicians and fellows
Oct 25, 2008 Muenster, Germany	Discography workshop- ISIS Europe	Discography: Indications and techniques	Lecture	2	28	Board certified physicians and fellows
Nov 1, 2008 Phoenix, AZ	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy: Indications and techniques	Lecture	2	48	Board certified physicians and fellows
Jan 9, 2009 San Francisco,	Lumbar spinal injection	Lumbar Spinal Injections: Indications	Lecture	2	48	Board certified physicians and

CA	workshop- ISIS	and Techniques Lumbar Spinal Injections: Drugs, Risks and Complications				fellows
Feb 5, 2009 Phoenix, AZ	Cervical spinal injection workshop- ISIS	Cervical Spinal Injections: Indications and Techniques Cervical Spinal Injections: Drugs, Risks and Complications	Lecture	2	48	Board certified physicians and fellows
Feb 20, 2009 Spartanburg, SC	Discography workshop- ISIS	Discography: Indications and Techniques	Lecture	1.5	48	Board certified physicians and fellows
April 3, 2009 Plano, TX	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and Techniques Lumbar spinal injections: Drugs, Risks and complications	Lecture	2.5	48	Board certified physicians and fellows
Aug 21, 2009 Burr Ridge, IL	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and Techniques Lumbar spinal injections: Drugs, Risks and complications	Lecture	3	48	Board certified physicians and fellows
Sept 11, 2009 Memphis, TN	spinal injection workshop- ISIS	Cervical spinal injections: Indications and Techniques Cervical spinal injections: Drugs, Risks and complications	Lecture	3	48	Board certified physicians and fellows
Oct 25, 2009 Muenster, Germany	Cervical spinal injection workshop- ISIS Europe	Cervical spinal injections: Drugs, Risks and complications	Lecture	1.5	28	Board certified physicians and fellows
Jan 29, 2010 Phoenix, AZ	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and Techniques Lumbar spinal injections: Drugs, Risks and complications	Lecture	3	48	Board certified physicians and fellows
March 19, 2010 Las Vegas, NV	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Indications and Techniques	Lecture	1.5	48	Board certified physicians and fellows
Aug 20, 2010	Lumbar spinal injection	Lumbar spinal injections: Indications	Lecture	2	48	Board certified physicians and

Memphis, TN	workshop- ISIS	and Techniques				fellows
January 7, 2011 Las Vegas, NV	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and Techniques	Lecture	2	48	Board certified physicians and fellows
April 15, 2011 New Orleans, LA	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and Techniques Lumbar spinal injections: Risks and complications	Lecture	3	48	Board certified physicians and fellows
August 27, 2011 New Orleans, LA	Discography workshop- ISIS	Discography: Indications and Techniques	Lecture	2	48	Board certified physicians and fellows
Nov 12, 2011 Amsterdam, Netherlands	Radiofrequency neurotomy workshop- ISIS Europe	Radiofrequency neurotomy: Indications and Techniques Radiofrequency neurotomy : Risks and complications	Lecture	4	35	Board certified physicians and fellows
March 17-18, 2012 Amsterdam, Netherlands	Discography workshop- ISIS Europe	Discography (Cervical, Thoracic and Lumbar): Indications and Techniques	Lecture	2	30	Board certified physicians and fellows
June 8, 2012 New Orleans, LA	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Indications and Techniques Cervical spinal injections: Drugs, Risks and complications	Lecture	3	48	Board certified physicians and fellows
Sept 22-23, 2012 Amsterdam, Netherlands	Lumbar workshop- ISIS Europe	Lumbar Injections: Indications and Techniques Lumbar Injections: Risks, Complications, Drugs	Lecture	2	26	Board certified physicians and fellows
April 5, 2013 New Orleans, LA	Radiofrequency workshop- ISIS	Diagnosis of Cervical and Lumbar pain; Medial branch blocks Lumbar Radiofrequency neurotomy	Lecture	3	48	Board certified physicians and fellows
April 26,, 2013 New Orleans, LA	Lumbar spinal injection workshop- ISIS	Lumbar spinal injections: Indications and Techniques Lumbar spinal injections: Risks and	Lecture	3	48	Board certified physicians and fellows

		complications				
Aug 23, 2013 Providence, RI	Cervical spinal injection workshop- ISIS	Cervical spinal injections: Indications and Techniques Cervical spinal injections: Drugs, Risks and complications	Lecture	3	48	Board certified physicians, residents, and fellows
Nov 9, 2013 Amsterdam, Netherlands	Cervical workshop- ISIS Europe	Cervical Injections: Indications and Techniques	Lecture	2	26	Board certified physicians and fellows
March 22-23, 2014 Amsterdam, Netherlands	Discographyl workshop- ISIS Europe	Discography: Indications and Techniques Discography: Risks and Complications	Lecture	2.5	24	Board certified physicians and fellows
Nov 7-8, 2014 Amsterdam, Netherlands	Lumbar workshop- ISIS Europe	Lumbar Radiographic Anatomy Lumber spinal Injections- Indications & Technique Lumbar Spinal Injections- Risks and Complications	Lectures	3.5	25	Board Certified physicians and fellows
March 5, 2015 Las Vegas, NV	Radiofrequency workshop- ISIS	Indications and Techniques for Cervical and Lumbar RF Neurotomy	Lecture	3	48	Board certified physicians and fellows
Aug 28, 2015 Las Vegas, NV	Radiofrequency workshop- ISIS	Indications and Techniques for Cervical and Lumbar Radiofrequency Neurotomy	Lecture	3	48	Board certified physicians and fellows
Oct 9-10, 2015 Amsterdam, NL	Advanced Lumbar and Thoracic Bio-skills Workshop, ISIS Europe	Lumbar and Thoracic Clinical Imaging Advanced Lumbar and Thoracic Spinal Injections- Indications and Techniques Introduction to Lumbar Radiofrequency Neurotomy Lumbar and Thoracic Spinal Injections- Risks, Complications, Drugs	Lectures	4+	24	Board certified physicians and fellows
Jan 28, 2016 Tampa, FI	Radiofrequency workshop- ISIS	Radiofrequency Neurotomy: Indications and	Lecture	1.5	48	Board certified physicians and fellows

		Techniques for Cervical and Lumbar				
March 12-13, 2016 Tampa, Fl	Discography workshop - SIS	Discography: Indications, Controversies, Technique. Cervical, Thoracic, & Lumbar	Lecture	1.75	48	Board certified physicians and fellows
June 24, 2016 Aurora, Co	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and Techniques for Cervical and Lumbar	Lecture	1.5	48	Board certified physicians and fellows
January 13, 2017 Long Beach, Ca	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and Techniques for Cervical and Lumbar	Lecture	1.5	48	Board certified physicians and fellows
March 12, 2017 Amsterdam, NL	Lumbar spinal injection workshop- ISIS	Lumbar Spinal Injections: Indications and Techniques Spinal Injections: Documentation, Low Back Pain Protocol, Discography, RFN	Lectures	12	26	Board certified physicians and fellows
April 21, 2017 Bethlehem, PA	Cervical spinal injection workshop- SIS	Cervical Interlaminar and Transforaminal Injection- Indications and Technique	Lectures	40 min	48	Board certified physicians and fellows
May 23, 2017 Memphis, TN	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and Techniques for Cervical and Lumbar	Lecture	1.5 hr	48	Board certified physicians and fellows
Nov 10, 2017 Phoenix, AZ	Cervical Bio-skills workshop- SIS	Cervical Interlaminar and Transforaminal Injection- Indications and Technique	Lectures	40 min	48	Board certified physicians and fellows
Jan 12, 2018 Phoenix, AZ	Cervical Bio-skills workshop- SIS	Cervical Interlaminar and Transforaminal Injection- Indications and Technique	Lectures	40 min	48	Board certified physicians and fellows
Feb 9, 2018 Long Beach, Ca	Lumbar Bio-skills workshop- SIS	Lumbar Interlaminar and Transforaminal Injections: Indications and Techniques	Lecture	45 min	48	Board certified physicians and fellows
April 14-15, 2018 Academic Med Center. Amsterdam, NL	Radiofrequency Bio-skills workshop- SIS Europe	Radiofrequency Neurotomy: Anatomy, Indications and Techniques for Cervical and Lumbar	Lecture	2 hrs	30	Board certified physicians and fellows
June, 22, 2018 Chicago, IL	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and	Lecture	1.5 hr	48	Board certified physicians and fellows

		Techniques for Cervical and Lumbar				
October 12, 2018 Phoenix, AZ	Cervical Bio-skills workshop- SIS	Cervical Interlaminar and Transforaminal Injection- Indications and Technique	Lectures	40 min	48	Board certified physicians and fellows
January 11-13, 2019 Long Beach, CA	Discography Bio-skills workshop- SIS	Discography Indications and Techniques: Cervical, Thoracic, Lumbar	Lecture	105 min	48	Board certified physicians and fellows
February 1-3, 2019 New Orleans, LA	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and Techniques for Cervical and Lumbar	Lecture	90 min	48	Board certified physicians and fellows
June 28-30, 2019 Boston MA	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and Techniques for Cervical and Lumbar	Lecture	90 min	48	Board certified physicians and fellows
January 17, 2020 Phoenix, AZ	Radiofrequency Bio-skills workshop- SIS	Radiofrequency Neurotomy: Indications and Techniques for Cervical and Lumbar	Lecture	90 min	43	Board certified physicians and fellows

Nondidactic (e.g.: workshops, labs, and discussion groups)

Academic Year	Course	Title	Instruction		Student	
			Type	Hours	No	Type
Jan 13-14, 2001 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Sacroiliac joint injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
May 5-6, 2001 New Orleans, LA	Lumbar spinal injection workshop- ISIS	Lumbar transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Aug 11-12, 2001 Kansas City, MO	Thoracic spinal injection workshop-ISIS	Thoracic transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
October 13-14, 2001 Memphis, TN	Discography workshop- ISIS	Thoracic discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Jan 5-6, 2002 Burlingame, CA	Lumbar Spinal injection workshop- ISIS	Lumbar transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Feb 9-10, 2002	Advanced Lumbar-	Thoracic transforaminal	Cadaver instruction	8	48	Board certified physicians

Chicago, IL	Thoracic spinal injection workshop- ISIS	injections	with fluoroscopy			
March 9 & 10, 2002 Dallas TX	Cervical Injection Workshop- ISIS	Atlanto-axial (C1-C2) joint injection	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
March 14 & 15, 2002 Phoenix Az	Interventional Pain cadaver Workshop- SPPM	Interventional pain procedures- >15	Cadaver instruction with fluoroscopy	16	100	Physicians
April 6-7, 2002 Phoenix AZ	Discography Workshop- ISIS	Lumbar discography	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
May 4 & 5, 2002 New Orleans LA	Lumber Spinal Injection Workshop- ISIS	Sacroiliac joint injection	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
July 13-14, 2002 Burlingame, CA	Radiofrequency neurotomy workshop- ISIS	Intradiscal electrothermal annuloplasty (IDET)	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
July 19 - 23 2002 Boston MA	Interventional Pain cadaver Workshop - SPPM	Interventional pain procedures- >20	Cadaver instruction with fluoroscopy	16	100	Physicians
Aug. 3-4, 2002 Chicago IL	Cervical Injection Workshop-ISIS	Atlanto-axial (C1-C2) joint injections	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
Sept 20-22, 2002 Kansas City MO	Course Director- Society of Pain Practice Management	Interventional pain procedures >15	Cadaver instruction with fluoroscopy	16	100	Physicians
Oct 4 -6, 2002 Memphis TN	Radiofrequency neurotomy workshop- IISIS	Lumbar medial branch neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Oct 19, 2002 St Louis MO	Smith & Nephew: IDET Training Session	Intradiscal electrothermal annuloplasty (IDET)	Cadaver instruction with fluoroscopy	4	20	Physicians
Nov 20-22, 2002 New Orleans LA	Course director- Interventional Pain Cadaver course- SPPM	Interventional pain procedures >15	Cadaver instruction with fluoroscopy	16	100	Physicians
Jan 11-12, 2003	ISIS Advanced Lumbar Spinal	Lumbar transforaminal	Cadaver instruction	8	48	Board certified physicians

Burlingame CA	Injection Workshop-ISIS	injections	with fluoroscopy			
Feb 1 - 2, 2003 Phoenix AZ	ISIS Advanced Lumbar-Thoracic Spinal Injection Workshop	Thoracic and lumbar injections- an overview	Didacic presentation with discussion	8	48	Board certified physicians
March 1-2, 2003 Orlando FL	Cervical Spinal Injection Workshop- ISIS	Atlanto-axial (C1-C2) joint injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
March 5 – 7, 2003	Course director-Interventional Pain Cadaver Course-SPPM	Spinal cord lead placement and implantation technique	Cadaver instruction with fluoroscopy	10	100+	Physicians
April 5-6, 2003 Memphis, TN	Intensive Lumbar workshop- ISIS	Instruction on all lumbar interventional pain techniques	Cadaver instruction with fluoroscopy	12	24	Board certified physicians
May 3 - 4, 2003 Memphis TN	Discography Workshop- ISIS	Thoracic discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
June 7-8, 2003 Denver CO	ISIS Lumbar Spinal Injection Workshop- ISIS	Sacroiliac joint injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
June 28-29, 2003 Memphis TN	Cervical Spinal Injection Workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
July 12-13, 2003 Philadelphia PA	Advanced Lumbar-Thoracic Spinal Injection Workshop - ISIS	Thoracic transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
July 15-18, 2003 Cambridge MA	Course director. Interventional Pain Update Course with Cadavers. - SPPM	Interventional pain procedures >15	Cadaver instruction with fluoroscopy	16	100	Physicians
Sept 6-7, 2003 Burlingame CA	Cervical Spinal Injection Workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board Certified Physicians
Nov 1-2, 2003 Muenster, Germany	Lumbar spinal injection workshop- ISIS	Lumbar transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians

Jan 10-11, 2004. Burlingame, CA	Lumbar Spinal Injection Workshop- ISIS	Lumbar interventional pain procedures	Didactic-presentation with discussion	8	48	Board Certified physicians
Feb 7-8, 2004 Orlando, FL	Discography Workshop- ISIS	Thoracic discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
March 6-7, 2004 Phoenix, AZ	Advanced Lumbar-thoracic Injection workshop- ISIS	Thoracic transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
April 3-4, 2004 Dallas, TX	Cervical spinal injection workshop- ISIS	Cervicao-thoracic sympathetic block-(Stellate ganglion)	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
May 1-2, 2004 New Orleans, LA	Cervical Spinal Injection workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
May 22, 2004 Seattle, WA	Intradiscal Electrothermal annuloplasty (IDET) training-Smith & Nephew	IDET intradiscal catheter placement	Cadaver instruction with fluoroscopy	4	10	Physicians
June 5-6, 2004 Memphis, TN	Intensive cervical workshop- ISIS	All Cervical spinal injections as requested by attendees	Cadaver instruction with fluoroscopy	12	24	Board certified physicians
June 19, 2004 St Louis, MO	Radiofrequency neurotomy workshop-Bayliss	Lumbar medial branch neurotomy	Cadaver instruction with fluoroscopy	8	20	Physicians
July 10-11, 2004 Minneapolis,MN	Lumbar spinal injections workshop- ISIS	Lumbar interventional pain techniques	Didactic presentation with discussion	8	48	Board certified physicians
July 13-14, 2004 Cambridge, MA	Course director. Interventional pain update-SPPM	Interventional pain procedures >15	Cadaver instruction with fluoroscopy	16	100	Physicians
Oct 2-3, 2004 Atlanta, GA	Cervical Spinal Injection workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Oct 16-17, 2004 Muenster, Germany	Radiofrequency neurotomy workshop- ISIS	Radiofrequency neurotomy of the lumbar medial branches and L5 dorsal ramus	Cadaver instruction with fluoroscopy	8	48	Board certified physicians

Nov 6-7, 2004 Burlingame, CA	Discography workshop- ISIS	Thoracic discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
January 8-9, 2005 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Lumbar interventional pain techniques	Didactic presentation with discussion	8	48	Board certified physicians
March 5-6, 2005 Phoenix, AZ	Advanced Lumbar injection with discography workshop- ISIS	Lumbar discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
March 19-20, 2005 Munich, Germany	Cervical Spine Injection Workshop- ISIS	Atlanto-axial, C1-2 Joint Injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
April 2-3, 2005 Dallas, TX	Cervical spinal injection workshop- ISIS	Atlanto-axial, C1-2 Joint Injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
May 14-15, 2005 Washington DC	Lumbar spinal injection workshop- ISIS	Lumbar interventional pain techniques	Didactic presentation with discussion	8	48	Board certified physicians
June 18-19, 2005 Memphis, TN	Discography workshop- ISIS	Discography: Cervical, thoracic and lumbar	Didactic presentation with discussion	8	48	Board certified physicians
June 24-25, 2005 Memphis, TN	Lumbar spine injection workshop- North American Spine Society (NASS)	Multiple lumbar interventional pain procedures	Cadaver instruction with fluoroscopy	8	50	Neuro- and Ortho spine surgeons
Aug 6-7, 2005 Boston, MA	Spinal cord stimulation and Intrathecal therapy workshop- ISIS	Spinal cord leads and intrathecal catheter placement. Surgical implantation techniques	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Aug 27-28, 2005 Memphis, TN	Radiofrequency neurotomy workshop - ISIS	Radiofrequency neurotomy: cervical, thoracic and lumbar	Didactic presentation with discussion	8	48	Board certified physicians
Sept 10-11, 2005 Memphis, TN	Thoracic Spinal injection workshop- ISIS	Thoracic transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
October 1-2, 2005 Burlingame, CA	Cervical spinal injection workshop- ISIS	Atlanto-axial, C1-C2 joint injections	Cadaver instruction with	8	48	Board certified physicians

			fluoroscopy			
Oct 29-30, 2005 Muenster, Germany	Radiofrequency Neurotomy Workshop- ISIS	Cervical medial branch neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Nov 5-6, 2005 Burlingame, CA	Discography workshop- ISIS	Thoracic discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Jan 7, 2006 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Lumbar interventional pain procedures	Didactic presentation with discussion	8	48	Board certified physicians
Feb 4, 2006 Phoenix, AZ	Radiofrequency neurotomy workshop- ISIS	Third occipital nerve neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
March 11, 2006 Orlando, FL	Cervical spinal injection workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
March 25-26, 2006 Vienna, Austria	Cervical spinal injection workshop- ISIS Europe	Lumbar transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians, residents and fellows
April 1-2, 2006 Dallas, TX	Radiofrequency neurotomy workshop- ISIS	Third occipital nerve neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
May 6-7, 2006 Pittsburg, PA	Advanced lumbar and thoracic spinal injection workshop- ISIS	Thoracic transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
June 17, 2006 Seoul, Korea	Lumbar spinal injections conference- KorSIS & Korean Pain Society	Lumbar sympathetic block	Cadaver instruction with fluoroscopy	8	50	Spine physicians and fellows
Aug 6-7, 2006 Boston, MA	Radiofrequency neurotomy workshop- ISIS	Third occipital nerve neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Sept 10-11, 2006 Memphis, TN	Cervical and Thoracic Spine Injection Workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Nov 4-5, 2006 Phoenix	Advanced Lumbar spinal injection	Lumbar sympathetic block	Cadaver instruction with	8	48	Board certified physicians

	workshop-ISIS		fluoroscopy			
Jan 6-7, 2007 Burlingame, CA	Lumbar spinal injection workshop- ISIS	Lumbar transforaminal injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Feb 3-4, 2007 Phoenix, AZ	Cervical spinal injection workshop- ISIS	Cervical interventional pain procedures	Didactic presentation with discussion	8	48	Board certified physicians
March 10-12, 2007 Orlando, FL	Discography workshop- ISIS	Thoracic discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
March 31-Ap 1, 200f	Radiofrequency neurotomy workshop- ISIS	Lumbar medial branch and L5 dorsal ramus neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
May 5-6, 2007 Minneapolis, MN	Advanced Lumbar Spinal Injection workshop- ISIS	Lumbar discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
June 10, 2007 Seoul, Korea	Spine intervention workshop- KorSIS	Thoracic discography Thoracic transforaminal injections	Cadaver instruction with fluoroscopy	8	50	Board certified physicians and fellows
June 16-17, 2007 Bristol, England	Advanced lumbar spinal injection workshop- ISIS Europe	Sacroiliac joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
Aug 4-5, 2007 Charlotte, NC	Cervical Spinal Injection workshop- ISIS	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Sept 9, 2007 Memphis, TN	Lumbar Spine Injection Workshop- ISIS	Lumbar medial branch and dorsal ramus injections	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Oct 14, 2007 Phoenix, AZ	Radiofrequency neurotomy workshop- ISIS	Lumbar medial branch and L5 dorsal ramus radiofrequency neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians
Oct 27-28, 2007 Muenster, Germany	Radiofrequency neurotomy workshop- ISIS Europe	Cervical radiofrequency neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
Jan 19-20, 2008 San Francisco, CA	Lumbar Spinal Injection workshop- ISIS	Lumbar foraminal access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Feb 9-10, 2008	Cervical spinal injection	Cervical foraminal access	Cadaver instruction	12	48	Board certified physicians and

Phoenix, AZ	workshop- ISIS		with fluoroscopy			fellows
March 8-9, 2008 Orlando, FL	Discography workshop- ISIS	Lumbar discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
April 5-6, 2008 Plano, TX	Radiofrequency neurotomy workshop- ISIS	Lumbar radiofrequency neurotomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
May 31, 2008 Seoul, Korea	Lumbar intervention workshop- KorSIS	S1 Transforaminal Injections Lumbar Medial Branch Blocks Lumbar Radiofrequency Neurotomy Caudal Injections	Cadaver instruction with fluoroscopy	8	50	Board certified physicians and fellows
June 6-7, 2008 Memphis, TN	Cervical spinal injection workshop- ISIS	Cervical Spine: Imaging for Interventional Pain Procedures Cervical foraminal access	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
June 21-22, 2008 Bristol, England	Cervical spinal injection workshop- ISIS Europe	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	36	Board certified physicians and fellows
August 9-10, 2008 Burr Ridge, IL	Radiofrequency neurotomy workshop- ISIS	Spine Imaging for Interventional Pain Procedures Radiofrequency neurotomy of the L5 dorsal ramus	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Sept 6-7, 2008 Memphis, TN	Lumbar spinal injections workshop- ISIS	Lumbar Spine: Imaging for Interventional Pain Procedures Lumbar transforaminal access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Oct 4-5, 2008 Las Vegas, NV	Discography workshop- ISIS	Imaging for Interventional Pain Procedures Lumbar discography	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Oct 25-26, 2008 Muenster, Germany	Discography workshop- ISIS Europe	Thoracic discography	Cadaver instruction with fluoroscopy	8	28	Board certified physicians and fellows
Nov 1-2, 2008	Radiofrequency neurotomy	Lumbar medial	Cadaver instruction	8	48	Board certified physicians and

Phoenix, AZ	workshop- ISIS	branch neurotomy	with fluoroscopy			fellows
Jan 9-10, 2009 San Francisco, CA	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar transforaminal access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Feb 5-6, 2009 Phoenix, AZ	Cervical spinal injection workshop- ISIS	Cervical Imaging for Interventional Pain Procedures Cervical foraminal access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Feb 20-21, 2009 Spartanburg, SC	Discography workshop- ISIS	Imaging for Interventional Pain Procedures Thoracic discography	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
April 3-4, 2009 Plano, TX	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar foraminal access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
June 21-22, 2009 Memphis, TN	Intensive spine intervention workshop- ISIS	Cervical Discography Cervical Transforaminal Access Cervical-Thoracic Sympathetic Gangion Injection	Cadaver instruction with fluoroscopy	12	24	Board certified physicians and fellows
Aug 21-22, 2009 Burr Ridge, IL	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar L5 foraminal access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Sept 11-12, 2009 Memphis, TN	Cervical spinal injection workshop- ISIS	Cervical Imaging for Interventional Pain Procedures Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Oct 25-26, 2009 Muenster, Germany	Cervical spinal injection workshop- ISIS Europe	Atlanto-axial, C1-C2 joint injection	Cadaver instruction with fluoroscopy	8	28	Board certified physicians and fellows
Jan 30-31, 2010 Phoenix, AZ	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar Interlaminar epidural access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
March 20-21	Cervical spinal injection	Cervical Imaging for Interventional Pain	Cadaver instruction	12	48	Board certified physicians and

2010 Las Vegas, NV	workshop- ISIS	Procedures Cervical interlaminar epidural access	with fluoroscopy			fellows
Aug 21-22, 2010 Memphis, TN	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar interlaminar epidural access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
January 8-9, 2011 Las Vegas, NV	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar interlaminar epidural access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
April 16-17, 2011 New Orleans, LA	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar interlaminar epidural access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
August 27-28, 2011 New Orleans, LA	Discography workshop- ISIS	Thoracic disc access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Nov 12-13, 2011 Amsterdam, Netherlands	Radiofrequency neurotomy workshop- ISIS Europe	Radiofrequency neurotomy of the third occipital nerve	Cadaver instruction with fluoroscopy	8	35	Board certified physicians and fellows
March 3-4, 2012 New Orleans, LA	Radiofrequency neurotomy workshop- ISIS	L5 dorsal ramus radiofrequency neurotomy	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
March 17-18, 2012 Amsterdam, Netherlands	Discography workshop- ISIS Europe	Cervical discography	Cadaver instruction with fluoroscopy	8	30	Board certified physicians and fellows
June 8, 2012 New Orleans, LA	Cervical spinal injection workshop- ISIS	Cervical Imaging for Interventional Pain Procedures Cervical interlaminar epidural access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Sept 22-23, 2012 Amsterdam, Netherlands	Lumbar workshop- ISIS Europe	Lumbar Transforaminal Injections	Cadaver instruction with fluoroscopy	8	27	Board certified physicians and fellows

February 9-10, 2013 Long Beach, CA	Cervical spinal injection workshop- ISIS	Cervical Imaging for Interventional Pain Procedures Cervical transforaminal injections	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
April 6-7, 2013 New Orleans, LA	Radiofrequency neurotomy workshop- ISIS	L5 dorsal ramus radiofrequency neurotomy	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
April 27-28, 2013 Memphis, TN	Lumbar spinal injection workshop- ISIS	Lumbar Imaging for Interventional Pain Procedures Lumbar sympathetic block	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Aug 24-25, 2013 Providence, RI	Cervical spinal injection workshop- ISIS	Cervical Imaging for Interventional Pain Procedures Cervical Interlaminar injections	Cadaver instruction with fluoroscopy	12	48	Board certified physicians, residents, and fellows
Oct 26-27, 2013 Memphis, TN	Comprehensive spine intervention workshop- ISIS	All cervical, thoracic, and lumbar interventional pain injections	Cadaver instruction with fluoroscopy	12	24	Board certified physicians and fellows
Nov 9-10, 2013 Amsterdam, Netherlands	Cervical workshop- ISIS Europe	C1-2 (axial-atlanto) joint injection	Cadaver instruction with fluoroscopy	8	27	Board certified physicians and fellows
March 8-9, 2014 Phoenix, AZ	Radiofrequency neurotomy workshop- ISIS	L5 dorsal ramus radiofrequency neurotomy	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
March 22-23, 2014 Amsterdam, Netherlands	Discographyl workshop- ISIS Europe	Cervical Discography	Cadaver instruction with fluoroscopy	8	24	Board certified physicians and fellows
April 25-27, 2014 Memphis, TN	Advanced Lumbar Workshop, ISIS	L5 dorsal ramus, RF cannula placement	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows

October 10-12, 2014 Baltimore, MD	Radiofrequency neurotomy workshop- ISIS	RFN L5 dorsal ramus	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
December 6-7, 2014 New Orleans, LA	Discography workshop	Course director,	Technical questions about discography	14	48	Board certified physicians and fellows
March 6-8, 2015 Las Vegas, NV	Radiofrequency neurotomy workshop- ISIS	RFN with difficult anatomy	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
June 13-14, 2015 Memphis, TN	Comprehensive spine intervention workshop- ISIS	All cervical, thoracic, and lumbar interventional pain injections	Cadaver instruction with fluoroscopy	12	24	Board certified physicians and fellows
Aug 28-30, 2015 Las Vegas, NV	Radiofrequency neurotomy workshop- ISIS	RFN Lumbar	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
Jan 28-29, 2016 Tampa, FL	Radiofrequency workshop- ISIS	RFN: L5 Dorsal Ramus	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
March 12-13, 2016 Tampa, Fl	Discography workshop - SIS	Thoracic Discography	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
June 24, 2016 Aurora, Co	Radiofrequency Bio-skills workshop- SIS	RFN L2-L5	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
September 17-18, 2016 Memphis, TN	Comprehensive spine intervention workshop- ISIS	All cervical, thoracic, and lumbar interventional pain injections	Cadaver instruction with fluoroscopy	12	24	Board certified physicians and fellows
Jan 13-15, 2017 Long Beach	Radiofrequency workshop- ISIS	RFN: L2-L4 MB	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows

March 12, 2017 Amsterdam, NL	Lumbar spinal injection workshop- ISIS	Sacroiliac access	Cadaver instruction with fluoroscopy	2	26	Board certified physicians and fellows
April 22-23, 2017 Bethlehem, PA	Cervical spinal injection workshop- SIS	Cervical Interlaminar Access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
May 24-25, 2017 Memphis, TN	Radiofrequency workshop- ISIS	RFN: L2-L5 MB	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
Nov 11-12, 2017 Phoenix, AZ	Cervical spinal injection workshop- SIS	Cervical Interlaminar Access	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Jan 12, 2018 Phoenix, AZ	Radiofrequency Bio-skills workshop- SIS	Lumbar Radiofrequency neurotomy	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
Feb 9, 2018 Long Beach, Ca	Lumbar Bio-skills workshop- SIS	Lumbar Transforaminal Injection	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
April 14-15, 2018 Academic Med Cenetr. Amsterdam, NL	Radiofrequency Bio-skills workshop- SIS Europe	Lumbar Radiofrequency Neurotomy	Cadaver instruction with fluoroscopy	12	10	Board certified physicians and fellows
June 23-24, 2018 Chicago, IL	Radiofrequency workshop- ISIS	Lumbar Radiofrequency Neurotomy: L2-L5 MB	Cadaver instruction with fluoroscopy	8	48	Board certified physicians and fellows
October13-14, 2018 Phoenix, AZ	Cervical spinal injection workshop- SIS	Cervical Interlaminar Access C7 Medial Branch Block	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
January 11-13, 2019 Long Beach, CA	Discography Bio-skills workshop- SIS	Thoracic Discography	Cadaver instruction with fluoroscopy	12	10	Board certified physicians and fellows

February 1-3, 2019 New Orleans, LA	Radiofrequency Bio-skills workshop- SIS	Lumbar Radiofrequency Neurotomy: L2-L5 MB	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
June 28-30, 2019 Boston MA	Radiofrequency Bio-skills workshop- SIS	Lumbar Radiofrequency Neurotomy: L2-L5 MB	Cadaver instruction with fluoroscopy	12	48	Board certified physicians and fellows
January 18-19, 2020 Phoenic, Az	Radiofrequency Bio-skills workshop- SIS	Lumbar Radiofrequency Neurotomy: L2-L5 MB	Cadaver instruction with fluoroscopy	12	43	Board certified physicians and fellows

Clinical

Year	Hours	Student		Length of Service
		No	Type	
2002-2014	~300	~5	Board certified physicians- Australia, Korea, USA, Europe,	1-5 days Visiting my practice
2006	~300	2	Senior anesthesia residents	1 month each
2007	~300	2	Senior anesthesia residents	1 month each
2008-Present	600+	12/yr	Anesthesia residents (required rotation)	1 month each

Other teaching activities

Date	Title	Place	Teaching Function
1974-1984	Graduate teaching Assistant:	Colorado St University University of Vermont	Provided laboratory instruction in Biology, cell biology, zoology, and animal science to undergraduates
1976	Instructor	Colorado St University Zoology Department	Lectured and instructed undergraduates in a Cell Biology course
1986	Lecturer:	Columbus Technical Institute, Columbus, OH	Lectured on pulmonary physiology and ventilation modalities. Respiratory therapy students
1990-1992	Adjunct Clinical Assistant	University of Kansas, Nurse	Peri-operative training of

	Professor	anesthesia program	nurse anesthetist students
1987-1990	Chief of Anesthesia and Staff anesthesiologist	USAF Regional Hospital, Elmendorf AFB, AK	Responsible for in servicing of the medical staff on matters relating to anesthesia and pain medicine. Training of USAF dentists in airway management and trauma anesthesia
1997-1999	Assistant Clinical Professor	Southern Illinois University, School of Medicine	Instructed medical students, residents and fellows in pain management

2. Development of Educational Materials

Year	Title Description	Intended Audience
2017-18	Discography: Cervical and Lumbar (*Safety Practices for Interventional Spine Procedures*.)	Wide dissemination with future publication in Pain Medicine
2013	Procedural instructional material (Step-by-step directions) for Cervical and Lumbar procedures. Still in use.	Interventional Pain, Board certified physicians and fellows
2003-2010	Rewrote and developed new materials still used in lectures for ISIS interventional pain courses. These included “Indications and Techniques” and “Drugs, Risks and Complications” lectures for the following Bioskills labs. Lumbar Injections Cervical Injections Advanced lumbar injections Thoracic injections Radiofrequency neurolysis Discography Spinal cord simulation and intrathecal therapies	Board certified physicians who wished to gain competence in interventional pain procedures.
2004-2010	Contributed to the development of an examination for prospective ISIS instructors in interventional pain. This involved evaluation of past patient cases along with a “hands on” presentation of needle skills, anatomic knowledge and teaching competence.	To document competency in board certified interventional pain practitioners.
2005-2010	Contributed in an attempt to formulate a competence test in interventional pain regarding general knowledge and technical expertise.	Board certified physicians
2008-2011	Contributed in the planning and development of a series of video educational materials to emphasize the basic fundamentals of interventional pain procedures.	Board certified physicians
2008-present	Developed and initiated within ISIS/SIS courses a	Board certified physicians

	section on fluoroscopic imaging and anatomy presented prior to proceeding with needle placement techniques utilizing real time fluoroscopy with cadavers.	

3. Educational Leadership

2002-2004. Course director for Society of Pain Practice Management. Responsible for organizing courses and supervising ~15 faculty instructing Interventional Pain procedures to ~100 Pain Management physicians. 3-4 courses per year.

2004-2006. International Spine Intervention Society. Chairman Education Committee. Responsibility for 12+ Interventional Pain workshops per year, in USA and abroad, with supervision of the 8 instructors per course. Responsibility for the selection, training, and evaluation of all ISIS instructors. Development of practice guidelines, and incorporation of new procedures and new technology into the ISIS curriculum. Assistance with the organization of the Annual Scientific meeting, and the semi-annual European Scientific meetings. Introduced high quality interventional pain workshops to Europe and Asia. Discussions with other medical specialty societies (American Academy of Pain Medicine, World Institute of Pain, North American Spine Society, Korean Pain Society, Korean Spine Intervention Society, and American Society for Interventional Pain Physicians) regarding training in interventional pain management.

2006-2008. As Chairman of the Board of Directors and President of the ISIS, I continued as an active member of the Education Committee. Instituted stricter requirements for instructors within ISIS, in order to improve educational programs. I acted as course director when the Education Committee Chairman was absent. Developed new instructional guidelines and teaching materials. Several trips to Europe and Asia were made to enhance the spine intervention educational programs in these regions. I was instrumental in the planning of the ISIS 15th and 16th annual scientific meetings, as well as meetings in Antwerp, Seoul, and Portugal.

2008-2009. As Immediate Past President of the ISIS, I took an active part on the Education Committee, acting as course director for the majority of workshops. I continued to play an active role in the selection, training, and evaluation of prospective and existing instructors within the US and overseas. I revised all of the didactic lectures for the spinal injection workshops, and continue the development of new instructional guidelines and materials. As ISIS International Liaison, I continued to help with the development of Interventional Pain workshops in Asia and Europe.

2009-2011. While an Ad Hoc Member of the ISIS Board of Directors, I continued pursuing the goals of elevating the standards of spine care in the U.S. and abroad through development and improvement in educational workshops, written practice guidelines and standards of practice.

2012- present. As a senior member of the ISIS teaching faculty and member of the Education Committee I continue to strive for excellence in the training of interventional pain physicians from all pertinent specialties in the US and abroad.

SERVICE ACTIVITIES

Professional Service:
The diverse area of professional service includes patient care. Applicants should select measures that most clearly and concisely document their accomplishments and the value of these activities to the Medical School and University. Measures of both quantity and quality of activities are required and if necessary, applicants should provide brief descriptions to assist reviewers. Measures of patient care activities include numbers of patients, time allocation in clinical activity, procedures completed, Relative Value Units (RVUs), and value to the School of the clinical service. If the primary quality evaluation is the subjective assessment of peers, this should be available in letters from departmental colleagues, chair, or referees. The significance of professional service in the forms of task forces, committees and similar groups should be explained and the specific role of the applicant clarified.

With the above mentioned educational and societal work, I have always maintained a full time clinical practice during my career. Medical specialty consulting services must have academic credibility and clear service intent and not be performed primarily for personal profit.

I am one of only a handful of interventional pain specialist physician in Kansas and the region, offering comprehensive non-surgical spine-interventional pain services; i.e. all diagnostic and therapeutic procedures on all regions of the spine. I maintain a full time non-surgical spine/interventional pain practice with a regional referral source for spinal diagnostics and minimally invasive spine therapy that includes patients from Wyoming, Utah, Nebraska, Colorado, Missouri, Arkansas, Illinois and Oklahoma.

I consult (telephone and e-mail) with physicians regarding spinal diagnostics and treatments nationally and internationally.

Served as a consultant for the United States Federal Bureau of Investigation, US Department of Justice- Drug Enforcement Administration (DEA), and Office of the U.S. Attorney General concerning fraud and abuse in Interventional Pain Management and Pain Medicine.

Consultant for chart reviews: Kansas Board of Healing Arts, the Alabama Board of Medical Examiners, and private litigation.

Wesley Medical Center, Wichita, Kansas. Interventional Pain Privileges Committee. I have reviewed credentials of physicians requesting Interventional Pain privileges.

Past national leader concerning the issues of poorly trained physicians performing potentially life threatening spinal procedures and of non-physicians practicing the medical specialty of Interventional Pain.

Academic Service:
In academic service the contribution of the candidate to the academic community

Peer Review of scientific articles submitted to the Spine section of *Pain Medicine*.

Member of the ISIS Appropriate Use Criteria Task Force (AUC) tasked to determine, through evaluation of the pertinent literature, the efficacy and responsible use of interventional pain procedures.

Published response in *Interventional Spine* to: ACOEM Guidelines for Chronic Pain**,** cconcerning Interventional Pain treatment for workers injured on the job in California. National implications.

Intersociety Spine Group**:** Founding Member. 2008-2009. National group composed of executive members of the major medical societies with interest in spine treatment. Includes representatives from: North American Spine Society, International Spine Intervention Society, American Orthopaedic Association, American Academy of Physical Medicine and Rehabilitation, American Association of Neuroradiologists.

Neuromodulation Treatment Access Coalition**:** Founding Member**.** 2007-2008. National organization of academics and industry dealing with acceptance, education, and reimbursement of neuromodulation modalities for the treatment of pain. Neuromodulation Ad Hoc Committee.

International Spine Intervention Society: Instructor Competency Examination. One of the primary developers of the only examination to ensure the competency of instructors of interventional pain procedures. Utilized by the International Spine Intervention Society to ensure the highest level of competence in their instructors for courses in the USA, Europe and Asia.

Contributor to: *Practice Guidelines: Spinal Diagnostic and Treatment Procedures*, International Spine Intervention Society. The first and most respected evidence based guideline for the practice of interventional pain. Utilized by clinicians, residencies, fellowships, attorneys, insurance carriers, and others requiring knowledge of diagnostic and treatment techniques and algorithms involving minimally invasive procedures for pain of spinal origin.

Advisory committee for the journal *Pain Medicine.* Boulder, Colorado July 2007. Discussions and plans for implementation of ways to significantly improve this highly respected, peer reviewed journal.

Spine Clinical Guideline Collaborative Project, Chicago, Illinois. 2006-2008. Founding member. Discussions on development of national guidelines and standards for the diagnosis and treatment of spine pain. Organized by North American Spine Society. Included International Spine Intervention Society, American Orthopaedic Association, American Academy of Physical Medicine and Rehabilitation, and several other national medical specialty societies.

National Position Statement on: Prerequisite Training for the Performance of Spine Interventions. International Spine Intervention Society. Helped write and gain support for this document from several national medical societies and the AMA.

As ISIS president, I helped formulate a statement in regards to training requirements in the specialty of interventional pain.

Position Statement on: Medical Treatment Utilization Schedule (MTUS), California's Division of Workers Compensation**.** Concerning Interventional Pain treatment for workers injured on the job in California. Potential national implications.

III. Brief statement of areas of research and scholarly interest, including current projects:

Presently collecting data and preparing papers on:

Efficacy of Lumbar RFN with 16 vs 18 gauge cannulae.

Grants and contracts
(Information must include whether the nominee (name bolded) is the principal investigator or a co-investigator, names of all investigators, title of grant, funding source, dollar amount in direct costs, and years during which grant applies. Co-investigators must specify role). **Provide the cover sheet, abstract and Notice of Award in PDF for all grants or contracts awarded in last five years (submit online).**

1.

Previous Grants and contracts awarded:

Principal Investigator	Investigators	Title of Grant	Funding Source	Direct Costs	Years	Status
NA						

Current Grants and contracts awarded:

Principal Investigator	Investigators	Title of Grant	Funding Source	Direct Costs	Years	Status
NA						

Grants and contracts submitted:

Principal Investigator	Investigators	Title of Grant	Funding Source	Direct Costs	Years	Status
NA						

2. Scholarly Publications

Articles published:

1. **Landers, MH,** Law GRJ, Kienholtz E. The effect of dietary selenium and vitamin E on the immune response in turkeys. Poultry Science.1975;54:1784..

2. **Landers MH,** Happ GM. The effects of the precocenes on vitellogenesis and other juvenile hormone related processes in *Drosophila melanogaster.* American Zoologist.1978;19**:**917

3. **Landers MH,** Happ GM. Precocene inhibition of vitellogenesis in *Drosophila melanogaster.* Experentia.1980; 36:619

4. Black PM, **Landers MH**, Happ GM. Cytodifferentiation in the Accessory Glands of *Tenebrio Molitor*. VIII. Crossed immunoelectrophoretic analysis of terminal differentiation in the postecdysial tubular accessory glands. Developmental Biology.1982; 94:106-115

5. Wilson TG, **Landers MH**, Happ GM. Precocene I and II inhibition of vitellogenic oocyte development in *Drosophila melanogaster*. J. Insect Physiology.1983; 29:249-254

6. Waldman SD, Feldstein GS, Allen ML, **Landers MH**. Cervical implantable narcotic delivery systems in the management of upper body cancer pain. Anesthesia and Analgesia.1987;66:780-782

7. **01 PRA** Bogduk N, Dreyfuss P, Baker R, Yin W, **Landers M**, Hammer M, April C. Complications of spinal diagnostic and treatment procedures. Pain Medicine.2008;9:s11-34

8. **02 PRA Landers M**. Indications of Spinal Injections for Chronic Pain. Pain Medicine. 2008;9: 5-10s

9. **03 PRA Landers M**. Comments on: Penetration of a Cervical Radicular Artery during a Transforaminal Epidural Injection. Pain Medicine. 2010;11:1306-1307. Letter to editor.

10. **04 PRA** Jones RL, **Landers MH.** Has a rare case of paraplegia complicating a lumbar epidural infiltration been reported?. Ann Phys Rehabil Med.2011;54:270. Letter to Editor

11. **05 PRA Landers MH**, Dreyfuss P, Bogduk N. On the geometry of fluoroscopic views for cervical interlaminar injections. Pain Medicine.2012;13: 58-65.

12. **06 PRA Landers MH**, Bogduk N. Geometry and Technique of Cervical Epidural Interlaminar Access: Response to Letter by Dr. Perper. Pain Medicine.2012;13: 1522-1523. Letter to Editor

13. **07 PRA** MacVicar J, King W, **Landers MH**, Bogduk N. The Effectiveness of Lumbar Transforaminal Injection of Steroids: A Systematic Review of Outcomes Studies and Controlled Trials. Pain Medicine. 2013. 14: 14-28

14. **08 PRA Landers MH.** Spinal cord injury during attempted cervical interlaminar epidural injection of steroids. Pain Medicine 19:652-657. 2018

15. **09 PRA Landers MH.** Response to: Letter to the Editor by Dr. Yakov Perper, “On the Spinal Cord Injury During Attempted Cervical Interlaminar Epidural Injection of Steroids”. Pain Medicine, 0(0), 2019, 1–2 doi: 10.1093/pm/pny312

16. **10 PRA Landers MH.** Letter to the Editor Regarding a Recent Article: Cervical Epidural Depth: Correlation Between Cervical MRI Measurements of the Skin-to-Cervical Epidural Space and the Actual Needle Depth During Interlaminar Cervical Epidural Injections. Pain Medicine, 0(0), 2019, 1–3 doi: 10.1093/pm/pnz163

Manuscripts in press:

NA

Manuscripts submitted but not yet accepted:

Invited or non-peer-reviewed articles or reviews:

1. **Landers MH.** Regional Anesthesia in the Pediatric Patient. *Clinical Journal of Doctors Hospital* 3:6-12 (1991).

2. **01 NPRA** Derby R, **Landers MH.** International Spine Intervention Society: History and Philosophy, (Presentation to KorSIS), *Clinical Pain* (Korea)*,2007;s*50-112 (2007).

3. **02 NPRA Landers MH.** Thoracic Spinal Injections: Indications and Techniques, (Presentation to KorSIS). *Clinical Pain* (Korea).2007;s203-233

4. **03 NPRA Landers MH.** Spinal Injections: Risks, Complications and Drugs, (Presentation to KorSIS). Clinical Pain *(*Korea).2007;s50-112

5. **04 NPRA Landers MH,** Bogduk N. International Spine Intervention Society: Response to ACOEM. Interventional Spine.2008; 44-53

6. **05 NPRA Landers MH.** Expert opinion #2 (Colloquium: Subdural Extra-arachnoid flow patterns). Pain Med 18(6):1184-8, 2017.

Books and book chapters:

1. **01 BC Landers MH.** Diskography: In: Waldman SD, ed. Pain Management, Philadelphia, PA: WB Saunders: 2007: 118-144

2. **02 BC Landers MH,** Jones R, Rosenthal R, Derby R. Lumbar Spinal Neuroaxial Procedures. In: Raj PP, Lou L, Erdine S, et al. eds, Interventional Pain Management: Image-Guided Procedures. Philadelphia, PA: Churchill Livingstone: 2008: 322-367

3. **03 BC** Derby R, Wolfer L, Lee JE, **Landers MH**, Kim BJ, Lee SH. Discography. In: Pinheiro-Franco JL, Vaccaro AR, Benzel EC, Mayer H, eds, Conceitos Avancados em Doenca Degenerativa Discal Lombar (Advanced Concepts In Lumbar Degenerative Disk Disease). Brazil: Dilivros: 2010: 81-108

4. **04 BC Landers MH,** Aprill CN. Epidural Steroid Injections: Cervical, Thoracic, and Lumbar: Transforaminal, Interlaminar, and Caudal. In: Lennard TA, ed. Pain Procedures in Clinical Practice, 3rd edition. Philadelphia, PA: Elsevier: 2011. 313-356

5. **05 BC** Vivian D**, Landers, MH.** Discography: Intervertebral Disc Access and Stimulation: Lumbar, Thoracic, and Cervical. In: Lennard, TA ed. . Pain Procedures in Clinical Practice, 3rd edition. Philadelphia, PA: Elsevier: 2011. 418-440

6. **06 BC Landers MH.** Discography. In: Waldman SD ed. Pain Management, 2nd Edition. Philadelphia, PA:, WB Saunders: 2011.116-138

7. **07 BC** Derby R, **Landers MH**, Wolfer LR, Kim PS. Provocation Discography: In: Deer T, Kapural L, Kim P, eds. Diagnosis, Management, and Treatment of Discogenic Pain, Volume 3. Interventional and Neuromodulatory Techniques for Pain Management Series, Philadelphia, PA. Elsevier: 2011: 48-64

8. **08 BC** Derby R, Wolfer LR, **Landers MH.** Discography. In: Pinheiro-Franco JL, Vaccaro AR, Benzel EC, Mayer H, eds, Advanced Concepts In Lumbar Degenerative Disk Disease. Berlin Heidelberg. Springer-Verlag: 2016:

Published abstracts:

1. **Landers, MH**, Law GRJ. Selenium and Vitamin E-their effect on the immune response in turkeys. Todays Research-Tomorrows Colorado. 1975.88:1876

2. **Landers, M.H**., J.H. Postlethwait, A. Handler and J. White. Isolation and characterization of female sterile mutants in *Drosophila melanogaster*. Genetics. 1976. 83:S43

Other scholarly publications- Contributed images

1. Contributed 78 images in 31 chapters to: In: Waldman SD. Atlas of Interventional Pain Management, 2nd Edition, Philadelphia, PA: W B Saunders: 2004

2. Contributed images of Thoracic Transforaminal Injections. Bogduk N. ed. Practice Guidelines for Spinal Diagnostic and Treatment Procedures, San Francisco, CA: International Spine Intervention Society, 2004

3. Contributed 4 images in 2 chapters to: In: Waldman S D, ed. Pain Management, Philadelphia, PA. WB Saunders, 2007

4. Images contributed to: Hammer M, Noe C, Racz G. Spinal Joint Blocks of the Head and Neck. In Raj PP, Lou L, Erdine S, et al, eds., Interventional Pain Management: Image-Guided Procedures, Philadelphia, PA. Churchill Livingstone: 2008

5. Images contributed to: Hammer M, C Noe, et al. Spinal Neuroaxial Procedures of the Head and Neck. In Raj PP, Lou , Erdine ,et al, eds. ., Interventional Pain Management: Image-Guided Procedures, Philadelphia, PA. Churchill Livingstone: 2008

6. Images contributed to: Opper S. Neck Pain. In: Smith H, ed. Current Therapy in Pain. Philadelphia, PA. WB Saunders: 2009.

7. Images, #57 in 25 chapters, contributed to: Waldman, S.D., *Atlas of Interventional Pain Management,* 3nd Edition, Philadelphia, W B Saunders, 2009. (Contributed text and 57 images for 25 chapters).

8. Images contributed to: Waldman SD, ed*. Pain Management, 2nd Edition,* Philadelphia, PA: WB Saunders: 2011.

9. International Spine Intervention Society. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures, 2nd edn. International Spine Intervention Society, San Francisco, 2012. "contributed sections of text, amplifications of draft text, or recommendations about new emphases for the second edition."

10. International Spine Intervention Society. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures, 2nd edn. International Spine Intervention Society, San Francisco, 2012. Images provided for the following chapters: Cervical Interlaminar Epidural Access; Cervical Transforaminal Access; Cervical Medial Branch Blocks; Lumbar Transforaminal Access; Lumbar Interlaminar Access; Lumbar Zygapophysial Joint Access; Sacroiliac Joint Access; Thoracic Disc Access; Thoracic Transforaminal Access; Thoracic Medial Branch Blocks

Presentations and posters.

Scientific papers presented at **national and international meetings**

Landers MH. 10 April 1989, Society of Air Force Clinical Surgeons, "Cervical Epidural Injections for the Treatment of Cervical Radiculopathy", San Antonio, TX. 30 minutes. ~50 Surgical specialists.

Landers MH. 20 September 1989, American Osteopathic College of Anesthesiology, "Cervical Epidural Injections for the Treatment of Cervical Radiculopathy", Palm Springs, CA.30 min. ~100 anesthesiologists.

Landers MH. 17 May 2003. Central Illinois Neuroscience Foundation. "IDET & Nucleoplasty: What, When, and Where". Bloomington, Illinois. 1 hr. ~50 pain physicians.

Landers MH. 9-11 September 2004. International Spinal Injection Society (ISIS) Annual Scientific Meeting, Moderator: "Lumbar Radicular Pain: Diagnosis and Treatment". Maui, Hawaii.

Landers MH. 14-16 July 2005. International Spine Intervention Society (ISIS), Annual Scientific Meeting, Moderator: "Intradiscal Procedures". New York City, NY. ~400 spine physicians.

Landers MH. 21 January 2006, American Osteopathic College of Anesthesiologists, "Diagnosis and Treatment of Low Back and Lumbar Radicular Pain", and "Radiofrequency Neurotomy: Indications and Techniques", Kansas City, Missouri. ~50 anesthesiologists.

Landers MH. 22-23 February 2006. American Academy of Pain Medicine (AAPM), "Interventional Pain: A Procedural Overview with Cadaveric Demonstration", "Spinal Injections: Drugs, Risks, and Complications", and "Complications of Thoracic and Lumbar Spinal Injections". San Diego, California. 8.5 hrs.>200 Pain physicians

Landers MH. 17 June 2006. Korea Spine Intervention Society (KorSIS) and Korean Pain Society, Joint symposium on lumbar spine interventions. "Lumbar Spinal Injections: Risks, Complications and Drugs", and "Lumbar Sympathetic Blockade: Indications and Technique", Asan Medical Center, Seoul, Korea. ~150 spine physicians.

Landers MH. 14 July 2006. International Spine Intervention Society, Annual Scientific Meeting. Moderator "Spinal Cord Stimulation". Salt Lake City, Utah. ~400 spine physicians.

Landers MH. 7 February 2007, American Academy of Pain Medicine (AAPM), Annual Meeting, "Spinal Injections: Indications for Chronic Pain", New Orleans, LA. ~150 pain physicians.

Landers MH. 27-28 April 2007. International Spine Intervention Society - Europe, Semi-Annual Scientific Meeting, "Lumbar Radiofrequency Neurotomy", and "Cervicogenic Headaches: Diagnosis and Treatment", Antwerp, Belgium. ~100 pain physicians and fellows..

Landers MH. 9 June 2007. Korean Spine Intervention Society (KorSIS), Cervical and Thoracic Scientific Meeting, "International Spine Intervention Society; The Past, Present and Future of Interventional Pain", "Cervical and Thoracic Injections: Risks, Complications, and Drugs", and "Thoracic Spinal Injection: Indications and Techniques". Asan Medical Center, Seoul, Korea. !00 spine physicians

Landers MH. 25 June 2007. American Society of Interventional Pain Physicians, Annual Meeting. "ISIS: The Global Voice, and Conscience, of Interventional Pain". Washington, D.C. ~300 pain physicians.

Landers MH. 2 November 2007. Kansas Association of Osteopathic Medicine. Annual Mid-year Conference. "Cervicogenic Headaches: Diagnosis and Treatment". Wichita, Kansas. ~50 physicians.

Landers MH. 27-28 March 2008. Portuguese Spine Society, Portuguese Pain Society, and Portuguese Anesthesia Society Joint Congress. DorVertebraldo Diagnostico a Therapeutica; "Interventional Pain: History and Future", "Cervicogenic Headaches: Diagnosis and Treatment"; "Low Back Pain. ; "Cervical Radiculopathy: Diagnosis and Treatment"; "Cervical and Thoracic Discography: The Evidence". "Cervical radiculopathy: Diagnosis and Treatment". Lisbon, Portugal. 4.5 hrs. ~ 100 Spine Surgeons, Radiologists, Anesthesiologists, and Physiatrists.

Landers MH. 31 May 2008. Korean Spine Intervention Society (KorSIS). "Interventional Pain: History and Future", "Lumbar Transforaminal Injections: Indications and Techniques"; "Lumbar Spinal Injections: Drugs, Risks, and Complications"; "Lumbar Radiofrequency Neurotomy: Theory and Technique". Asan Medical Center, Seoul, Korea. 2 hrs., ~50 Neuro-Spine Surgeons and Physiatrists.

Landers MH. 24 July 2008. International Spine Intervention Society 16th Annual Scientific Meeting. "Whiplash and Cervicogenic Headaches: Case presentation", and "Discography: What to do?"; and, "Discography: The Opposition". Las, Vegas, Nevada, 1 hr., >600 attendees.

Landers MH. 25 July 2008. International Spine Intervention Society 16th Annual Scientific Meeting. Presidential Address. "Interventional Pain: 'Raising the Bar'". Las, Vegas, Nevada, 1 hr., >600 attendees.

Landers MH. 17 January 2009. American Osteopathic College of Anesthesia Annual Midyear Conference, "Cervicogenic Headaches: Diagnosis and Treatment". Kansas City, Missouri, 1 hr., ~50 attendees.

Landers MH. 25 July 2009. International Spine Intervention Society 17th Annual Scientific Meeting. Moderator, "Epidural Injections", Toronto, Canada, 2 hrs., >350 attendees.

Landers MH. 14 July 2010. International Spine Intervention Society 18th Annual Scientific Meeting. Moderator, "The Herniated Disc: Cervical, Thoracic, Lumbar", Maui, Hawaii, 2 hrs., >370 attendees.

Landers MH. 13 August 2011. International Spine Intervention Society 19th Annual Scientific Meeting. Moderator, "Treatments on trial: Cervical transforaminal injections and Lumbar Discography", Chicago, Illinois, 2 hrs., >600 attendees.

Landers MH. 19 July 2012. International Spine Intervention Society 20th Annual Scientific Meeting. Systematic Review of Lumbar Transforaminal Injections of Steroid: What is the correct technique?. Las Vegas, Nevada. 15 minutes. 1000 attendees.

Landers MH. 20 July 2012. International Spine Intervention Society 20th Annual Scientific Meeting. Moderator. A Day in the Life of a Spine Interventionalist: Part 2- Charting the Best Interventional Care. Las Vegas, Nevada. 60 minutes. 1000 attendees.

Landers MH. 19 July 2012. International Spine Intervention Society 20th Annual Scientific Meeting. Geometry of Fluoroscopy Views for Cervical Epidural Injections. Las Vegas, Nevada. 6 minutes. 1000 attendees

Landers, MH. March 1, 2014. Qatar International Orthopaedic Spine Conference. Low Back Pain: Diagnosis and Treatment. Lumbar Discogenic Pain. Doha, Qatar. 1 hrs each. ~100 Orthopedic and Neuro Surgeons Spine

Landers MH. July 2014. International Spine Intervention Society 22nd Annual Scientific Meeting. Charles Aprill: Educational Accomplishments and Personal Attributes. Orlando, Florida. 30 minutes. 1000 attendees

Landers MH. 30 January 2015. Qatar International Pain Conference. Low Back Pain: Diagnosis and Treatment. Lumbar Disacogenic Pain. Doha, Qatar. 30 minutes x2. 500 Pain Physicians and Anesthesiologists.

Landers MH. 20 July 2017. Spine Intervention Society 25nd Annual Scientific Meeting. Image Interpretation of Spinal Injections: Dangerous Vascular Patterns. San Francisco, California, 15 minutes. 500 attendees

Landers MH. 22 July 2017. Spine Intervention Society 25nd Annual Scientific Meeting. Real World Cases (Panel). San Francisco, California. 1 hour. 500 attendees

Nguyen H, Lee F, Christensen M, **Landers M**. 16 November 2017. Change in Outcomes of Radiofrequency Neurotomy in Cervical Spine Switching From 18 Gauge to 16 Gauge Electrode. American Society of Regional Anesthesia, Orlando, FL

Landers MH. 16 August 2018. Spine Intervention Society 26nd Annual Scientific Meeting. Image Interpretation of Spinal Injections: Cervical Intramedulary *vs* Epidural Injection. Chicago, Illinois. 15 minutes. ~500 attendees.

Scientific presentations at local and regional meetings:

Landers MH. 13 October 1988, Elmendorf Regional Medical Center Staff, "Some of My Favorite Pains", Elmendorf AFB, AK. 1 hr; ~30 medical providers

Landers MH. 3 March 1998, Tazwell County Medical Society, "Where Pain Treatments Converge", Pekin, IL. 1 hr, ~30 physicians of all specialties.

Landers MH. 14 October 1998, Logan County Medical Society, "Pharmacological Management of Chronic Pain", Lincoln, IL. 1 hr, ~30 physicians of all specialties.

Landers MH. 15 December 1998, Montgomery County Medical Society, "Pharmacological Management of Chronic Pain", Litchfield, IL. 1 hr, ~30 physicians of all specialties.

Landers MH. 20 January 1999, Coles County Medical Society, “Pharmacological Management of Chronic Pain”, Matoon, IL. 1 hr, ~30 physicians of all specialties.

Landers MH. 12 April 1999, Midwest Rehabilitation Institute, “Pain Management: Diagnostic and Treatment Options, Springfield, IL. 1 hr. ~20, Physiatrists

Landers MH. 23 April 1999, Kansas Association of Osteopathic Medicine, “Advanced Pain Management Techniques”, Overland Park, KS. 1 hr. ~100 physicians, all specialties

Landers MH. 2 September 1999, Illinois Pharmacists Association, “Opioid Addiction in the Pain Patient”, Springfield, IL. 1hr. ~20 pharmacists.

Landers MH. 21 September 1999, McDonough County Medical Society, “Where Pain Treatments Converge”, Macomb, IL. 1 hr. ~30 physicians all specialties.

Landers MH. 25 April 2000, Jackson County Medical Society, “Where Pain Treatment Plans Converge”, DeSoto, IL.1 hr. ~30 physicians all specialties

Landers MH. 23 May 2000, Medical Center of Independence, “Where Pain Treatments Converge”, Independence, MO. 1 hr. Physicians, residents and medical students.

Landers MH. 14 September 2000, Missouri Association of Osteopathic Physicians and Surgeons, Western Section, “Analgesics: Old and New”, North Kansas City, MO. 1 hr. ~50 physicians all specialties.

Landers MH. 19 September 2000, Great Plains College of Occupational Medicine, “Triaging the Pain Patient”, Kansas City, MO. 1 hr. ~30 physiatrists.

Landers MH. 27 September 2000, Research Hospital Medical Staff, “Analgesics: Old and New”, Kansas City, MO. 1 hr. ~30 physicians all specialties

Landers MH. 10 October 2000, Leavenworth County Medical Society, “Analgesics: Old and New”, Leavenworth, KS. 1 hr. ~30 physicians all specialties.

Landers MH. 13 March 2001, American Society of Pain Management Nurses, “Low Back vs Radicular Pain: Diagnosis and Treatment”, North Kansas City, MO. 1 hr. ~20 pain management nurses

Landers MH. 27 March 2001, Golden Valley Hospital Medical Staff, “Where Pain Treatment Pathways Converge”, Clinton, MO. 1 hr. ~30 physicians all specialties.

Landers MH. 30 March 2001, Clay-Platt County Medical Society, “Where Pain Treatment Pathways Converge”, Kansas City, MO. 1 hr. ~30 physicians all specialties.

Landers MH. 3 May 2001, Missouri Association of Osteopathic Physicians and Surgeons, “Where Pain Pathways Converge”, Branson, MO. 1 hr. ~30 physicians all specialties.

Landers MH. 9 May 2001, Fortis Benefits, “Discogenic pain: Diagnosing and Treating”, “IDET: Indications, Patient Selection, Procedure, Outcomes”, Kansas City, MO. 3 hrs. ~20 physiatrists and nurses.

Landers MH. 28 August 2001, Henry County Medical Society, “Low Back Pain: An Update”, Clinton, MO. 1 hr. ~20 physicians all specialties.

Landers MH. 30 August 2001, Pfizer Pharmaceuticals, “Analgesics: Old and New”, Kansas City, MO. 1 hr. ~20 physicians all specialties.

Landers MH. 5 September 2001, Buchanan County Medical Society, “Analgesics: Old and New”, St. Joseph, MO. 1 hr. ~40 physicians all specialties.

Landers MH. 11 September 2001, Kansas Workman's Compensation Association, "Precision Spinal Injections", Overland Park, KS.

Landers MH. 20 November 2001, Northwest Missouri Osteopathic Association, "Analgesics: Old and New", Kansas City, MO. 1 hr. ~20 physicians all specialties.

Landers MH. 10 October 2001, Chilicothe Medical Association, "Analgesics: Old and New", Chilicothe, MO. 1 hr. ~20 physicians all specialties.

Landers MH. 10 November 2001. Kansas Association of Osteopathic Medicine. "Where Pain Pathways Converge", Topeka, KS. 1 hr. ~75 physicians all specialties.

Landers MH. 15 March 2003. Kansas City Pain Management Update, "Spinal Cord Neuromodulation" and " Peripheral Neuromodulation for Occipital Headaches", Leawood, Kansas. 2 hrs, ~50 physicians.

Landers MH. 2 November 2001. Greater Dallas Osteopathic Association. "Analgesics: Old and New", Dallas, TX.1 hr. ~50 physicians all specialties.

Landers MH. 30 April 2005. Association of Operating Room Nurses (AORN), "Interventional Pain: A New Specialty", St. Francis Hospital, Wichita, Kansas. 30 min. ~30 RNs.

Landers MH. 5 December 2005. Sedgwick County Osteopathic Medical Society. "Diagnosis and Treatment of Low Back and Lumbar Radicular Pain". Wichita, Kansas. ~30 physicians all specialties.

Landers MH. 22 April 2006. Kansas Association of Osteopathic Medicine. "Diagnosis and Treatment of Low Back and Lumbar Radicular Pain". Overland Park, Kansas. 1 hr. ~50 physicians all specialties.

Landers MH. 9 November 2015, Sedgwick County Osteopathic Medical Society. "Cervical Pain: Diagnosis and Treatment". Wichita, Kansas. 45 min, ~30 Physicians – all specialties

Landers MH. 14 November 2015. Kansas Association of Osteopathic Medicine. "Low Back and Neck Pain: Diagnosis and Treatment". Wichita, Kansas. 1 hr, ~70 Physicians – all specialties.

Landers MH. 11 October 2018. Kansas Association of Physician Assistants. "Low Back Pain: Diagnosis and Treatment". Wichita, Kansas. 1 hour, ~90 physician assistants.

Invited seminars at other universities:

19 June 2006. "Low Back and Lumbar Radicular Pain: Diagnosis and Treatment", Department of Physical Medicine and Rehabilitation, Kyung Hee University Medical Center, Seoul, Korea. ~40 faculty, fellows and residents.

1 March 2014. "Lumbar and Cervical Spinal Injections". Spine Instructional Course. Hamed Medical Center. Doha, Qatar. 100 Orthopedic and Neurosurgeons

2 March 2014. "Lumbar and Cervical Spinal Injections". Anesthesia Residents, Pain Fellows, and Faculty (~25). Hamed Medical Center. Doha, Qatar.

Other evidence of scholarship

Peer Reviewer for articles submitted to Pain Medicine spine section.

Published response in *Interventional Spine* to: **ACOEM Guidelines for Chronic Pain.** Concerning Interventional Pain treatment for workers injured on the job in California. National implications.

Intersociety Spine Group: Founding Member. 2008. National group composed of executive members of the major medical societies with interest in spine treatment. Includes representatives from: North American Spine Society, International

Spine Intervention Society, American Orthopaedic Association, American Academy of Physical Medicine and Rehabilitation, American Association of Neuroradiologists.

Neuromodulation Treatment Access Coalition: Founding Member. 2007-2008. National organization of academics and industry dealing with acceptance, education, and reimbursement of neuromodulation modalities for the treatment of pain. Neuromodulation Ad Hoc Committee.

International Spine Intervention Society: Instructor Competency Examination. One of the primary developers of the first, and only, examination to assure the competency of instructors of interventional pain procedures. Utilized by the International Spine Intervention Society to assure the highest level of competence in their instructors for courses in the USA, Europe and Asia.

Contributor to: *Practice Guidelines: Spinal Diagnostic and Treatment Procedures*, International Spine Intervention Society. First, and most respected, evidence based guideline for the practice of interventional pain. Utilized by clinicians, residencies, fellowships, attorneys, insurance carriers, and others requiring knowledge of diagnostic and treatment algorithms involving minimally invasive procedures for pain of spinal origin.

Advisory committee for the journal *Pain Medicine.* Boulder, Colorado. 13-15 July 2007. Discussions and plans for implementation of ways to significantly improve this highly respected, peer reviewed journal.

Spine Clinical Guideline Collaborative Project, Chicago, Illinois. 13-15 October 2006. Founding member. Discussions on development of national guidelines and standards for the diagnosis and treatment of spine pain. Organized by North American Spine Society. Included International Spine Intervention Society, American Orthopaedic Association, American Academy of Physical Medicine and Rehabilitation, and several other national medical specialty societies.

National Position Statement on: Prerequisite Training for the Performance of Spine Interventions. International Spine Intervention Society. Helped write and gain support for this document from several national medical societies involved with pain management and AMA.

Position Statement on: Medical Treatment Utilization Schedule (MTUS), California's Division of Workers Compensation. Concerning Interventional Pain treatment for workers injured on the job in California. Potential national implications.