In the State Court of DeKalb County
State of Georgia

PAMELA A. HAY Plaintiff — *versus* — ROGER H. FRANKEL, MD STEVEN D. WRAY, MD DAVID M. BENGLIS, MD ATLANTA BRAIN AND SPINE CARE, P.C. JOHN/JANE DOE 1-10, Defendants	CIVIL ACTION FILE NO. 20A83385 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 Pamela Hay on November 15, 2018, and in the days, weeks, and months thereafter.

2. Pursuant to OCGA § 9-11-9.1, the Affidavit of Kalman Blumberg, MD is attached hereto. This Complaint incorporates the opinions and factual allegations contained there.

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.

STATE COURT OF
DEKALB COUNTY, GA.
11/13/2020 3:53 PM
E-FILED
BY: Monique Roberts

Parties, Jurisdiction, and Venue[1]

4. **Pamela A. Hay** is a citizen of Georgia.

5. **Defendant Atlanta Brain and Spine Care, P.C. ("ABS")** is a Georgia Professional Corporation. Registered Agent Name: C T Corporation System. Physical Address: 289 S Culver St, Lawrenceville, GA, 30046-4805. County: Gwinnett.

6. ABS is subject to the personal jurisdiction of this Court.

7. ABS is subject to the subject-matter jurisdiction of this Court in this case.

8. ABS has been properly served with this Complaint.

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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."

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.

OCGA 9-10-31 provides that, "joint tort-feasors, obligors, or promisors, or joint contractors or copartners, residing in different counties, may be subject to an action as such in the same action in any county in which one or more of the defendants reside."

9. ABS 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.

10. Pursuant to OCGA 9-10-31, ABS is subject to venue in this Court because one of their co-defendants is subject to venue here.

11. At all relevant times, ABS was the employer or other principal of one or more of the following: Roger Frankel, MD, Steven Wray, MD, David Benglis, MD.

12. 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.

13. **Defendant Roger H. Frankel, MD,** is a citizen of Georgia, residing in DeKalb County. He may be served with process at his residence: 1126 GOODWIN RD NE, ATLANTA, GA 30324-2716 (DEKALB COUNTY).

14. Dr. Frankel is subject to the personal jurisdiction of this Court.

15. Dr. Frankel is subject to the subject-matter jurisdiction of this Court in this case.

16. Dr. Frankel has been properly served with this Complaint.

17. Dr. Frankel 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.

18. Dr. Frankel is subject to venue in this Court because he lives in this County.

19. At all times relevant to this Complaint, Dr. Frankel acted as an employee or agent of ABS.

20. **Defendant Steven D. Wray, MD,** is a citizen of Georgia. He may be served with process at his residence: 4574 STELLA DR, ATLANTA, GA 30327-3437 (FULTON COUNTY).

21. Dr. Wray is subject to the personal jurisdiction of this Court.

22. Dr. Wray is subject to the subject-matter jurisdiction of this Court in this case.

23. Dr. Wray has been properly served with this Complaint.

24. Dr. Wray 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.

25. Pursuant to OCGA 9-10-31, Dr. Wray is subject to venue in this Court because one of his co-defendants is subject to venue here.

26. At all times relevant to this Complaint, Dr. Wray acted as an employee or agent of ABS.

27. **Defendant David M. Benglis, MD,** is a citizen of Georgia. He may be served with process at his residence: 2431 FIELD WAY NE, BROOKHAVEN, GA 30319-4094 (DEKALB COUNTY).

28. Dr. Benglis is subject to the personal jurisdiction of this Court.

29. Dr. Benglis is subject to the subject-matter jurisdiction of this Court in this case.

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

31. Dr. Benglis 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. Benglis is subject to venue in this Court because he lives in this County.

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

34. **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.

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

General Principles

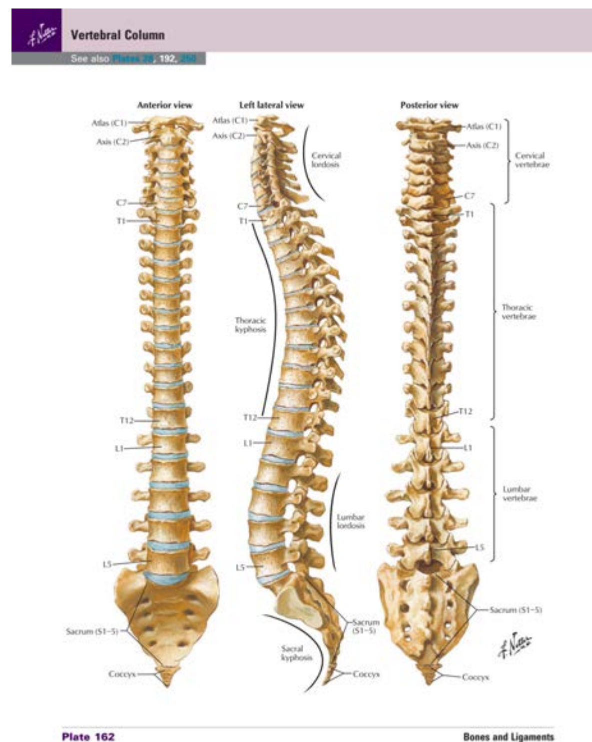
Anatomy of the spine generally

36. The human brain plays a major role in controlling all the functions of the body, and is connected to the rest of the body through the spinal cord.

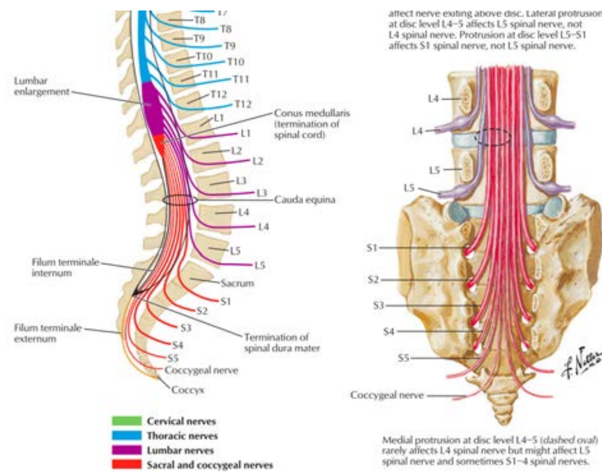
37. The spinal cord runs down the body through a canal in the bony spinal column.

38. The spinal column consists of multiple bony vertebrae separated by spongy intervertebral disks.

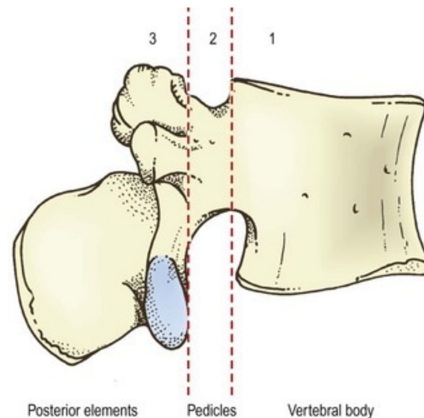
39. The spinal column in the neck, above the ribs, is called the cervical spine. The spinal column at the level of the ribs is called the thoracic spine. The spinal column below the ribs, connecting to the pelvis, is called the lumbar spine.



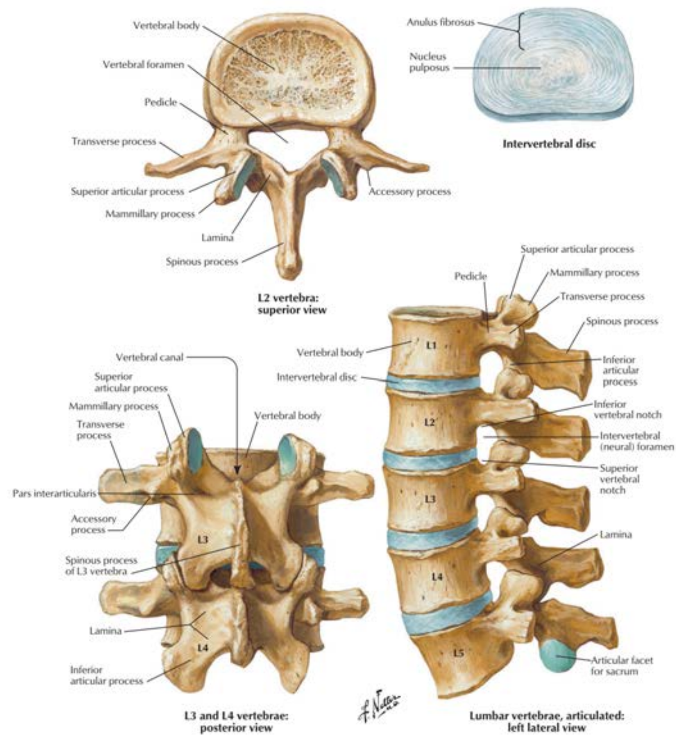
40. Toward the bottom of the thoracic spine, the spinal cord fans out into separate bundles collectively called the "cauda equina."



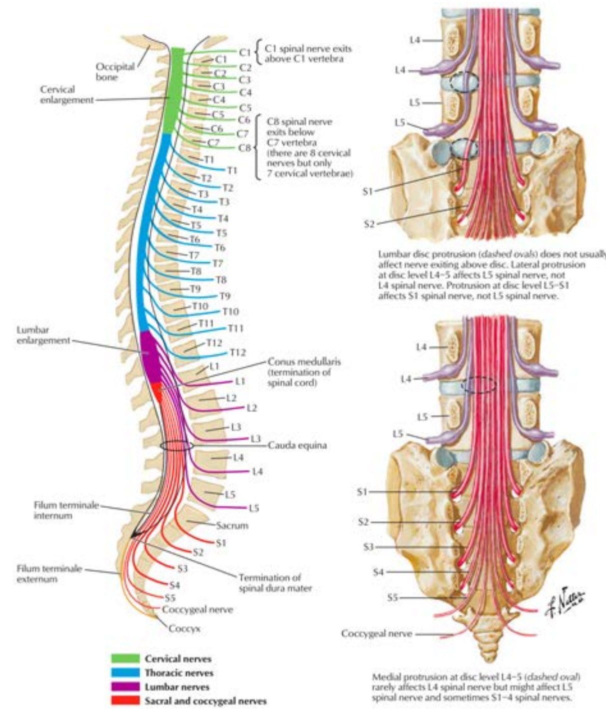
41. Each individual vertebra consists of an anterior vertebral body (in front of the spinal cord), posterior elements (behind the spinal cord), and pedicles (to the sides of the spinal cord).



42. Together, the parts of the bony vertebrae encircle the spinal cord and form the canal through which the spinal cord and cauda equina run. The hole in the middle of each individual vertebra, where the cord or cauda equina passes through, is called the vertebral foramen.



43. At the various levels of the spine, nerve roots from the spinal cord emerge through openings in the spinal column — the intervertebral or neural foramina.

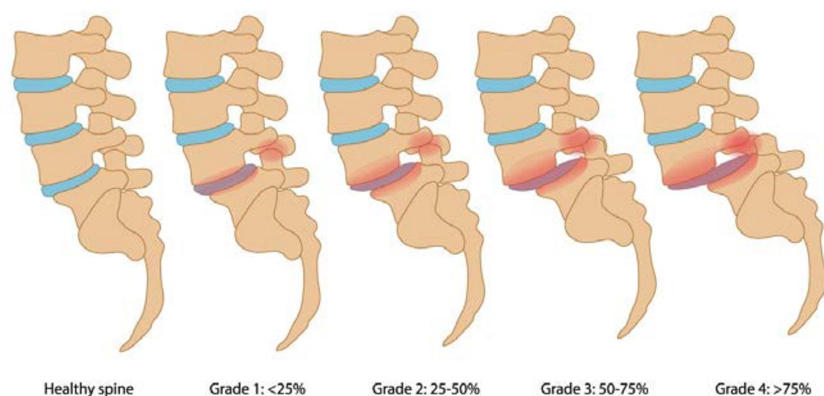


44. Where the nerve roots exit the spinal column, they connect with networks of nerves that run to various organs and tissues of the body — combining to connect the brain to the body as a whole.

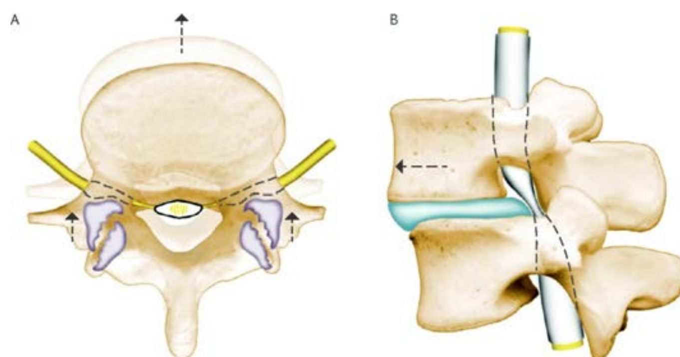
45. The nerves connecting the brain to the body serve multiple functions. Some nerves send sensation signals up to the brain — allowing us, for example, to feel pleasure and pain. Some nerves allow the brain to control muscles, so we can move our bodies intentionally. Some nerves allow the brain to regulate organs without our conscious awareness.

Spondylolisthesis and degenerative disk disease

46. "Spondylolisthesis" refers to a misalignment of two vertebrae — where one vertebra has moved abnormally forward or backward compared to an adjacent vertebra.



47. Spondylolisthesis can narrow the vertebral foramina that form the spinal canal, thereby compressing the spinal cord or cauda equina. Narrowing of an opening for a neural element is called "stenosis."



48. Stenosis can cause pain and neurological deficits — including numbness, tingling, weakness, or impairment of normal organ function.

49. Spondylolisthesis often occurs in tandem with degenerative disk disease.

50. Degenerative disk disease involves the breakdown of the intervertebral disk due to aging and wear and tear.

51. A degenerating disk may flatten and bulge. This may reduce the height between two adjacent vertebrae, narrowing the intervertebral foramina. The

bulging disk may directly impinge on the intervertebral foramina. These changes can compress the nerve roots passing through the intervertebral foramina.

52. A degenerating disk and/or spondylolisthesis may occur in tandem with arthritic changes in the facet joint (also known as the “apophysial joint,” or “zygapophysial joint”) — where the posterior elements of adjacent vertebrae join together to control the movement of the spine.

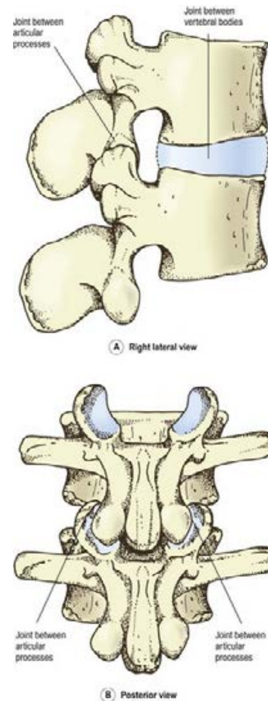
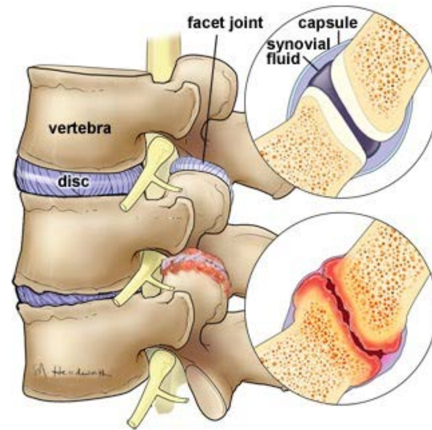


Figure 1.7 The joints between two lumbar vertebrae.

53. Arthritic changes at the facet joint may include abnormal bone growth that impinges on the intervertebral foramina and compresses the nerve roots.



54. Spondylolisthesis and degenerative disk disease, separately or in combination, may cause pain and neurological deficits.

55. A variety of potential surgical operations have been developed to remedy pain and neurological deficits arising from spondylolisthesis and/or degenerative disk disease.

Surgery principles

56. Spine surgeries vary in how extensive or invasive they are, but any spine surgery is a major surgery.

57. Any spine surgery poses significant risks to the patient.

58. Surgery at the spine carries the risk of injuring the neural elements near the site of the surgery.

59. Surgical injury to the spinal cord, cauda equina, or nerve roots can injure the patient catastrophically.

60. Surgical injury to the spinal cord, cauda equina, or nerve roots can cause the patient severe, permanent pain and neurological deficits.

61. To get to the spine, a surgeon must cut through some tissues and move other tissues or organs out of the way.

62. The difficulty of getting to the spine safely varies depending on which part of the spine is involved and which angle (front, back, side, etc.) the surgeon approaches the spine from.

63. Repeated surgeries to the same area of the spine may increase the risk of surgical injury to the patient, in part because of the presence of scar tissue.

64. Spine surgery should be offered to a patient only if more conservative therapies are unable to provide adequate relief.

65. To recommend a specific spine surgery, the surgeon must first identify the specific source of the pain or deficits to be remedied.

66. In recommending a specific spine surgery, the surgeon must carefully consider whether that surgery is likely to be safe and effective for the patient.

67. In performing surgery on the lumbar spine, the surgeon must exercise special caution to avoid nerve root injury from a screw, excessive nerve root retraction, and neural injury due to malpositioned interbody devices.

68. When placed too medially or into a foramen, a screw can cause direct mechanical damage to nerve roots or cord.

69. A malpositioned graft in the canal space may cause cord compression or cauda equina syndrome.

70. In performing a spine surgery, the surgeon must act with meticulous care to avoid damaging the neural elements at or near the surgical site.

71. In placing bone graft cages, screws, or medical devices in or on the spine, the surgeon must act with meticulous care to position the devices properly.

72. Modern operating rooms for spine surgery typically are equipped to take x-ray images of the patient from different angles, without having to move the patient. Some operating rooms are equipped for intraoperative CT scans.

73. A spine surgeon placing a bone graft cage in the spine must confirm proper placement of the device with intraoperative imaging, before fixing the cage in place.

74. A spine surgeon intending to use screws to fix an implant into the spine must ensure that the screws are not long enough to protrude into an intervertebral foramen or into the neural foramen.

75. After fixing a bone graft cage or screws into the spine, the surgeon must confirm proper placement with intraoperative imaging.

76. In using intraoperative imaging to confirm proper placement of medical devices, the surgeon must examine the images carefully and must take additional images if necessary to get a clear view of the position of the screws relative to the foramina.

77. Intraoperative neurological monitoring (IOM) during spinal procedures is used to monitor spinal cord and nerve function and alert the surgeon to any compromise of such.

78. IOM usually involves a combination of somatosensory evoked potentials (SSEP), free-run and stimulated electromyography (EMG), and motor evoked potentials (MEP).

79. Intraoperative EMG lets the surgeon know if a nerve root is irritated.

80. A spine surgeon should use IOM in any surgery involving a significant risk of intraoperative neurological injury detectable by IOM.

81. If intraoperative imaging or neurological monitoring indicates that the surgeon has positioned a device improperly in the spine, the surgeon must remove and/or reposition the device before ending the surgery.

82. Where the surgery causes new injury, it is important to remedy the injury during the surgery, if feasible. Repeat surgeries bring greater risks to the patient, in part because of scar tissue that forms inside the body, each time a surgeon cuts into the body. The scar tissue can make a repeat surgery more difficult and less effective, and the scar tissue can cause other medical problems for the patient.

Post-operative care

83. Postoperative complications are always possible and can be devastating for the patient. The surgeon must ensure diligent monitoring of the patient in the immediate post-operative period and promptly address complications.

84. Before and after spine surgery, the surgeon should perform a careful neurologic examination, to identify any postoperative neurological deficit.

85. A spine surgeon should order post-operative neuro- and vascular monitoring, and make sure that the nursing staff understands the importance of and specifically which groups of muscles or distal pulses need to be monitored.

86. In the event of unexpected postoperative pain, the surgeon should perform a neurologic examination to attempt to localize any new deficits.

87. A spine surgeon must never disregard inappropriate or increasing complaints of pain, as this might be one of the first signs of a possible lurking disaster such as an epidural hematoma.

88. In the event of unexpected postoperative pain, with a normal or unchanged neurologic examination from the preoperative baseline, an imaging study should be obtained immediately to investigate any possible operative complication.

89. Any new neurologic deficit, especially if it is focal and localizes to the operative region, should be immediately evaluated with postoperative imaging.

90. Postoperative investigatory imaging should be obtained in a timely manner, because a reversible condition could be identified. An MRI or CT should be used to determine if the new neurologic deficit is a result of a hematoma, a misplaced implant, or an inadequate decompression.

91. If postoperative imaging reveals a new injury that may be surgically reversible, the surgeon should, if safe, perform an exploratory surgery and, if possible, remedy the new deficit.

92. A surgeon must not wait months to remedy a surgical error that could have been remedied during the initial surgery or later the same day.

Treatment of Pamela Hay

Note: The allegations below contain page references to the medical records provided to the Defendants with this Complaint, and screenshots from the records. We provide these citations and screenshots to make it easier to respond to the allegations. However, we do not intend the citations or screenshots to be construed as part of the allegations themselves, and we do not ask for, or expect, responses to the citations or screenshots.

Prelude: October through mid-November 2018

93. On October 15, 2018, Pamela saw Dr. Roger Frankel, a neurosurgeon affiliated with Piedmont Hospitals.

- PHC 26

Progress Notes by Roger Frankel, MD at 10/15/2018 2:00 PM

Author: Roger Frankel, MD   Service: (none)   Author Type: Physician
Filed: 10/27/2018 7:21 PM   Encounter Date: 10/15/2018   Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 10/15/2018

Chief Complaint
Patient presents with
- Back Pain
  LBP
- Leg Pain
  bilateral leg pain, wprse on the right side

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who was referred to us for neurosurgical consultation by Dr Cui MD. We will share the results with the referring physician. The patient presents with complaints of low back

94. Dr. Frankel performed a neurological examination and reviewed a July 10 lumbar MRI and accompanying report.

- PHC 29-30

Imaging Studies:

MRI of the lumbar spine and report dated 7/10/18 is reviewed. The patient has normal lordosis. She is undergone posterior fusion with instrumentation at L3-4 and L4-5. She has spondylolisthesis at L5-S1 at that

level due to severe facet hypertrophy. There is posterior disc bulging at L2-3.

95. Dr. Frankel diagnosed Pamela with spondylolisthesis and planned to obtain x-rays and a CT scan in order to formulate a surgical plan.

- PHC 30

Assessment:
1. **Spondylolisthesis of lumbar region**

Plan/Impression:

Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient

The patient has adjacent segment deterioration around her previous fusion. We will need to obtain x-rays and a CT scan of the lumbar spine in order to evaluate the area more clearly and make a surgical treatment plan. I will see her back after these are completed.

96. On October 31, 2018, Pamela saw Dr. Frankel again, to review a new lumbar CT.

- PHC 36

Progress Notes by Roger Frankel, MD at 10/31/2018 1:15 PM

Author: Roger Frankel, MD	Service: (none)	Author Type: Physician
Filed: 11/1/2018 10:14 PM	Encounter Date: 10/31/2018	Status: Signed
Editor: Roger Frankel, MD (Physician)		

Date: 10/31/18

Chief Complaint
Patient presents with
- Follow up
  review Imaging

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who returns today after undergoing CT of the lumbar spine. She continues to have continued low back pain radiating down to the buttock and hamstring and calf. This involves her toes as well. She returns to discuss treatment plan

97. Dr. Frankel noted spondylolisthesis at L5-S1, and loss of disc height at L2-L3 and L3-L4. Dr. Frankel concluded that Pamela's symptoms arose from disc collapse and foraminal stenosis at L5-S1. Dr. Frankel recommended a lift at that level.

- PHC 36

Imaging Studies:

CT of the lumbar spine without contrast and report dated 10/30/18 is reviewed. The patient has normal lordosis. She is undergone previous fusion at L4-5. There is spondylolisthesis at L5-S1. She has loss of disc height at L3-4 and L2-3 with some Schmorl's nodes at those levels noted.

Assessment:

1. Spondylolisthesis of lumbar region

Plan/Impression:
Extent of Time: 20 minutes spent with patient of which >50% was spent counseling patient
Orders Placed This Encounter
- traMADol (ULTRAM) 50 mg tablet
  Sig: Take 1 tablet (50 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 90 tablet
  Refill: 0

The patient appears to have symptoms due to disc collapse and foraminal stenosis at L5-S1. We have discussed a lift at that level as the best treatment plan. She would like to proceed forward with this. All questions were answered to her satisfaction.

98. On November 2, 2018, Pamela returned to Dr. Frankel's office. Nurse Practitioner Jane Yoffe wrote a History & Physical, which Dr. Frankel later co-signed.

- PH 12-16

H&P by Jane W Yoffe, NP at 11/2/2018 11:46 AM

Author: Jane W Yoffe, NP	Service: Neurosurgery	Author Type: Nurse Practitioner
Filed: 11/2/2018 11:47 AM	Date of Service: 11/2/2018 11:46 AM	Status: Signed
Editor: Jane W Yoffe, NP (Nurse Practitioner)		Cosigner: Roger Frankel, MD at 11/2/2018 12:22 PM

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who returns today after undergoing CT of the lumbar spine. She continues to have continued low back pain radiating down to the buttock and hamstring and calf. This involves her toes as well. She returns to discuss treatment plan

99. NP Yoffe discussed an ALIF with Pamela.

- PH 15-16

The patient appears to have symptoms due to disc collapse and foraminal stenosis at L5-S1. We have discussed ALIF at that level as the best treatment plan. She would like to proceed forward with this. All questions were answered to her satisfaction.

The natural history of the disease as well as the current surgical and non-surgical treatment options were discussed. The risks and benefits were discussed. These

include (but are not limited to) Bleeding, infection, CSF leak, injury to the nerve root, injury to the spinal cord, vascular injury, failure to fuse, failure of hardware, failure for pain, numbness, or weakness to Improve, retrograde ejaculation in males.

100. According to the records, on November 9, 2018, Pamela again saw NP Yoffe to discuss the surgery treatment plan — a week after a similar visit on November 2.

- PHC 39-43

Progress Notes by Jane W Yoffe, NP at 11/9/2018 11:30 AM

Author: Jane W Yoffe, NP   Service: (none)   Author Type: Nurse Practitioner
Filed: 11/9/2018 12:46 PM   Encounter Date: 11/9/2018   Status: Attested
Editor: Jane W Yoffe, NP (Nurse Practitioner)   Cosigner: Roger Frankel, MD at 11/12/2018 2:07 PM

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who returns today after undergoing CT of the lumbar spine. She continues to have continued low back pain radiating down to the buttock and hamstring and calf. This involves her toes as well. She returns to discuss treatment plan

Imaging Studies:

CT of the lumbar spine without contrast and report dated 10/30/18 is reviewed. The patient has normal lordosis. She is undergone previous fusion at L4-5. There is spondylolisthesis at L5-S1. She has loss of disc height at L3-4 and L2-3 with some Schmorl's nodes at those levels noted.

Assessment:

1. **Spondylolisthesis of lumbar region**

Plan/Impression:
Extent of Time: 20 minutes spent with patient of which >50% was spent counseling patient

Orders Placed This Encounter
- traMADol (ULTRAM) 50 mg tablet
  Sig: Take 1 tablet (50 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 90 tablet
  Refill: 0

The patient appears to have symptoms due to disc collapse and foraminal stenosis at L5-S1. We have discussed ALIF at that level as the best treatment plan. She would like to proceed forward with this. All questions were answered to her satisfaction.

The natural history of the disease as well as the current surgical and non-surgical treatment options were discussed. The risks and benefits were discussed. These include (but are not limited to) Bleeding, infection, CSF leak, injury to the nerve root, injury to the spinal cord, vascular injury, failure to fuse, failure of hardware, failure for pain, numbness, or weakness to Improve, retrograde ejaculation in males.

Surgery: Thursday, November 15, 2018

101. On Thursday, November 15, 2018, Pamela went to Piedmont Hospital at 1968 Peachtree Road NW in Atlanta.

- PH 6

Department

Name	Address
Piedmont Atlanta Hospital 4 North	1968 Peachtree Road, N.W., Atlanta GA 30309-1476

102. Dr. Frankel was to perform an ALIF surgery (anterior lumbar instrumented fusion) and discectomy at the L5-S1 level of Pamela's spine.

- PH 6-7

Admission Information

Arrival Date/Time:		Admit Date/Time:	11/15/2018 0519	IP Adm. Date/Time:	11/15/2018 0557
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:	Neurosurgery	Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital 4 North
Admit Provider:	Roger Frankel, MD	Attending Provider:	Roger Frankel, MD	Referring Provider:	

Final Diagnoses (ICD-10-CM) (continued)

Code	Description	POA	CC
M43.17	Spondylolisthesis, lumbosacral region	Yes	No

ICD Procedures (ICD-10-PCS)

Code	Description	Date	Performing Provider
0SG30A0	Fusion Lumsac Jt w Intbd Fus Dev, Ant Appr A Col, Open	11/15/2018	Roger Frankel, MD
0ST40ZZ	Resection of Lumbosacral Disc, Open Approach	11/15/2018	Roger Frankel, MD

103. Dr. Frankel began the operation at 0758 hours.

- PH 83

Time	Event
0635	Anesthesia Pre Procedure Complete
0729	Anesthesia Start
0729	Patient in Room
0729	Start Data Collection
0739	Induction
0742	Intubation
0742	Patient Ready for Procedure
0758	Procedure Start
0855	Begin Emergence
0904	Procedure End
0910	Extubation
0913	Stop Data Collection
0913	Transport to PACU/Phase 2 Patient transported to PACU/Phase 2 with oxygen and approp (Some patients are recovered in the same area as the procedu transported).
0921	Transfer/Handoff to PACU/Phase 2 per Department Guidelines 1. Identification of patient

104. During the procedure, Dr. Frankel and staff took seven static fluoroscopy images.

- PH 133

X-ray lumbar spine 2 or 3 views [318838832]

Ordering provider: Roger Frankel, MD 11/15/18 0637
Performed: 11/15/18 0805 - 11/15/18 0851
Resulting lab: EMC RAD
Narrative:
EXAMINATION: XR LUMBAR SPINE 2 OR 3 VIEWS

HISTORY: Lumbar spondylosis.

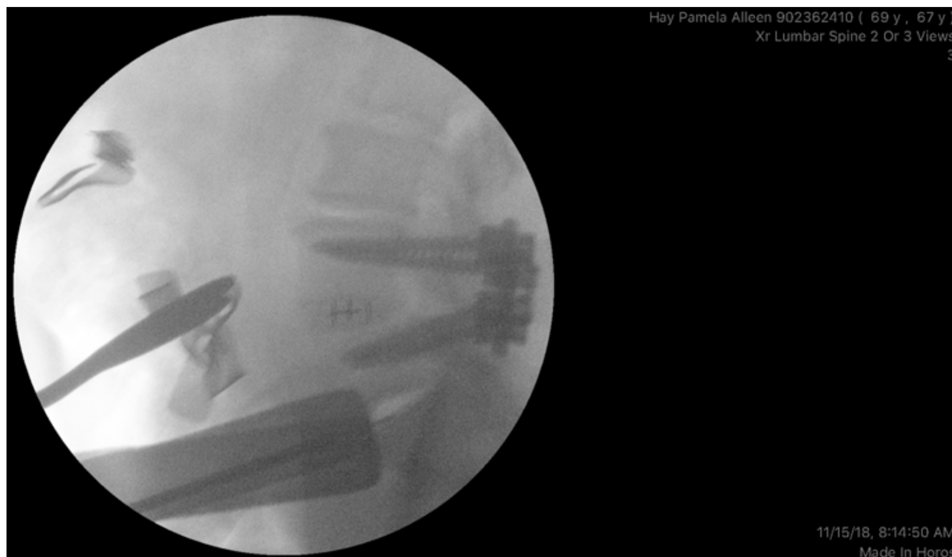
FINDINGS:

7 fluoroscopic spot images obtained during a lumbar fusion procedure.
The total fluoroscopy time is 12 seconds.

105. At 0813 hours (08:13:38 and 08:13:58), Dr. Frankel took two x-ray images showing the anterior exposure.

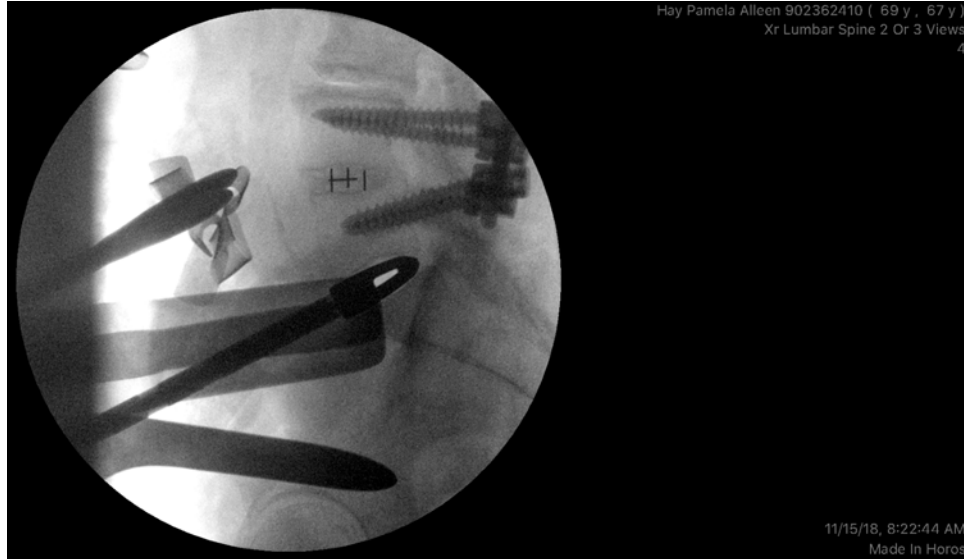
- *See* DICOM images and metadata

106. At 08:14:50 hours, Dr. Frankel took a fluoro image of the spine, before testing or sizing the implant.



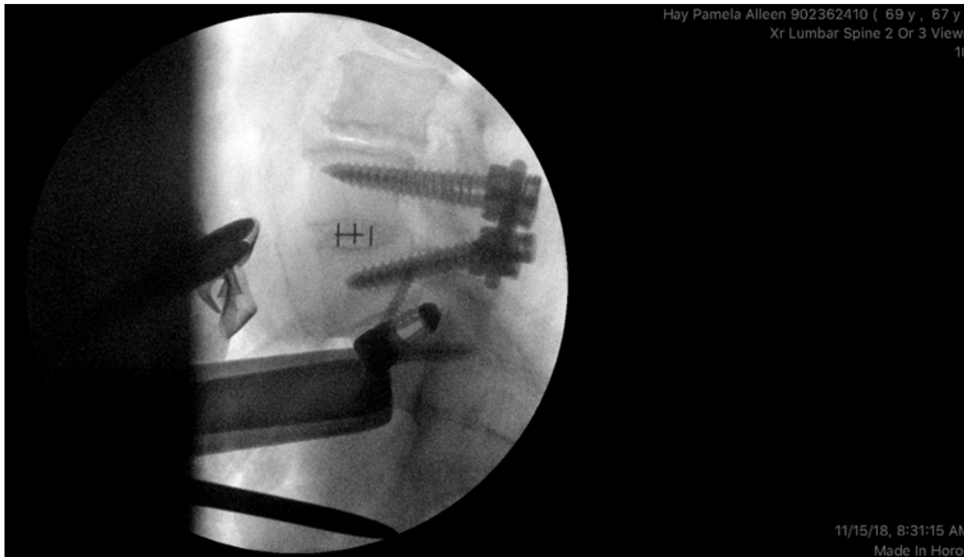
107. About 8 minutes later, at 08:22:44 hours, Dr. Frankel took a fluoro image showing the spacer in the L5/S1 disk space.

- *See* DICOM images and metadata



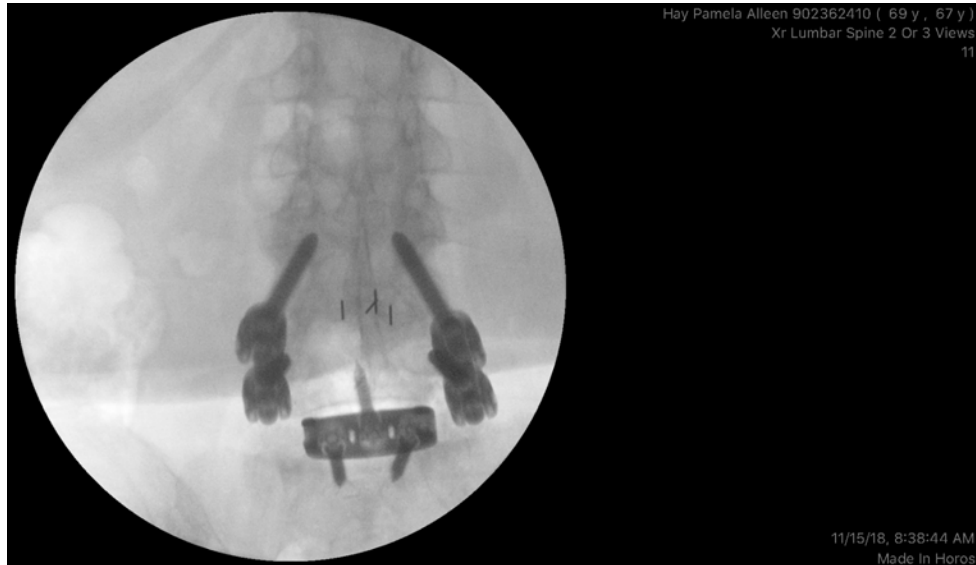
108. Nine minutes after that, the next fluoro image shows the implant with all three screws in place.

- *See* DICOM images and metadata



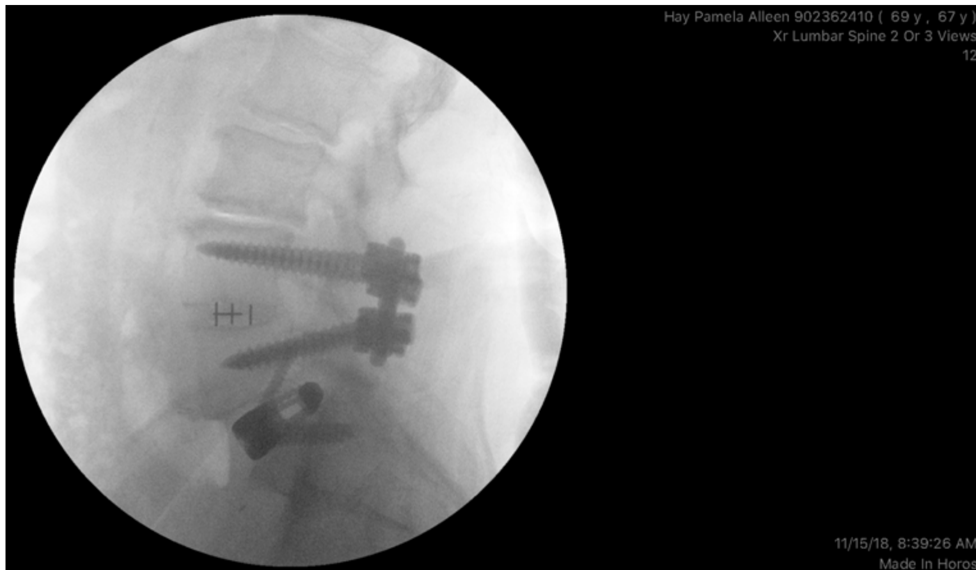
109. At 08:38:44 hours, Dr. Frankel took an AP x-ray showing the implant in place.

- *See* DICOM images and metadata



110. At 08:39:26 hours, Dr. Frankel took the final intra-operative x-ray, again showing the implant and screws in place.

- *See* DICOM images and metadata



111. From the images, it should have been obvious that the cage was placed too posteriorly. It also should have been clear that the screws at least might have invaded the spinal canal.

112. Dr. Frankel was required to take meticulous care in placing the implant and screws. Based only on the x-rays he took, he should have repositioned the implant. But if Dr. Frankel was not sure the hardware was impinging on the spinal canal or the foramina, then he was required at minimum to take additional x-rays to more clearly see the positioning. Had he done so, neurological injury likely could have been avoided.

113. At 0913 hours, hospital staff transported Pamela to the PACU.

- PH 83 (image above)

114. Simultaneously, at 0913 hours, NP Jane Yoffe ordered lumbar x-rays, noting the clinical indication as "Postop evaluation."

- PH 134

X-ray lumbar spine 2 or 3 views in PACU [318873360]
Ordering provider: Jane W Yoffe, NP 11/15/18 0913
Performed: 11/15/18 0935 - 11/15/18 0935
Resulting lab: EMC RAD
Narrative:
CLINICAL HISTORY: Postop evaluation

115. At 0915 hrs, in the post-anesthesia care unit (PACU) Pamela's pain level was a 9 out of 10, and her blood pressure was 189/87.

- PH 499

0915
189/87 -AW
97.8 °F (36.6 °C) -AW
Oral -AW
84 -AW
17 -AW
92 % -AW
Nine pain med given by

116. At 0915 hours, NP Yoffe ordered IV narcotics for Pamela — hydromorphone, 0.2 mg. Nurse Witmer administered the first dose at 0926 hours.

- PH 145-46

HYDROmorphone in 0.9 % NaCl PCA syringe [318626240]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 0915
Dose (Remaining/Total): — (—/—)
Frequency: Continuous
Admin Instructions: LOADING DOSE: 0 mg
PCA PATIENT BOLUS DOSE: 0.2 mg
FOUR HOUR DOSE LIMIT: 4 mg

Status: Discontinued (Past End Date/Time)
Starts/Ends: 11/15/18 0930 - 11/16/18 1437
Route: Intravenous
Rate/Duration: — / —
CONTINUOUS INFUSION RATE: 0 mg/hr
LOCKOUT INTERVAL: 8 minutes
********* HIGH ALERT MEDICATION *********

Line	Med Link Info	Comment
Peripheral IV 11/15/18 Left Hand	11/15/18 0026 by Allison Witmer, RN	

All Meds and Administrations (continued)

Timestamps	Action	Dose / Rate / Duration	Route	Other Information
11/16/18 0716	Handoff	—	Intravenous	Performed by: Princess Johnson, RN Dual Signoff by: Vernetta Younger, RN
11/15/18 1941	Handoff	—	Intravenous	Performed by: Jacquelyn Porter, RN Dual Signoff by: Princess Johnson, RN
11/15/18 1940	New Syringe/Cartridge	—	Intravenous	Performed by: Jacquelyn Porter, RN Dual Signoff by: Princess Johnson, RN Scanned Package: 42852-221-63
11/15/18 0926	New Syringe/Cartridge	—	Intravenous	Performed by: Allison Witmer, RN Dual Signoff by: Christina Tomasello, RN

117. At 0925 hours, Pamela still had a pain score of nine and high blood pressure.

- PH 499

Row Name	1015	1000	0950	0945	0941
Vitals					
BP	153/79 -AFA	170/84 -AW	190/89 anesthesia notified -AW	187/90 -AW	—
Heart Rate	77 -AFA	88 -AW	—	86 -AW	—
Resp	12 -AFA	15 -AW	—	13 -AW	—
SpO2	98 % -AFA	98 % -AW	—	98 % -AW	—
OTHER					
Pain Score	Four -AFA	Seven -AW	Eight -AW	—	Nine -AW

Row Name	0930	0925	0920	0915	0603
Vitals					
BP	(!) 165/98 -AW	186/88 -AW	(!) 183/94 -AW	189/87 -AW	(!) 188/95 -CMA
Temp	97.8 °F (36.6 °C) -AW	—	—	97.8 °F (36.6 °C) -AW	98 °F (36.7 °C) -CMA
Temp Source	Oral -AW	—	—	Oral -AW	Oral -CMA
Heart Rate	86 -AW	86 -AW	86 -AW	84 -AW	104 -CMA
Resp	14 -AW	11 -AW	12 -AW	17 -AW	20 -CMA
SpO2	97 % -AW	96 % -AW	92 % -AW	92 % -AW	94 % -CMA
OTHER					
Pain Score	—	Nine pain med given	—	Nine pain med given by	Five back & leg -CMA

enerated by Alexis Coleman [C110009] at 9/29/20 2:23 PM Page 499

PH 499

- PH 508

Row Name	1100	1000	0930	0915
Neurological				
Neuro (WDL)	—	—	—	—
Level of Consciousness	Alert -AFA	Alert -AW	Alert -AW	Alert -AW
Orientation Level	Oriented X4 -AFA	Oriented X4 -AW	Oriented X4 -AW	Oriented X4 -AW
Cognition	Appropriate judgement;Follows commands AFA	Appropriate judgement;Follows commands AW	Appropriate judgement;Follows commands AW	Appropriate judgement;Follows commands AW
Speech	Clear -AFA	Clear -AW	Clear -AW	Clear -AW
Motor Function/Sensation Assessment	Grip;Dorsiflexion;Plantar flexion AFA	Grip;Dorsiflexion;Plantar flexion AW	Grip;Dorsiflexion;Plantar flexion AW	Grip;Dorsiflexion;Plantar flexion AW
R Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
RLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW
LLE Sensation	Full sensation,No numbness -AFA	Full sensation,No numbness -AW	Full sensation,No numbness -AW	Full sensation,No numbness -AW

- PH 558

Assessment - Thu November 15, 2018 (continued)

Row Name	0950	0941	0930	0925	0915
Pain Assessment					
Pain Assessment Scale Used	—	—	—	0-10 -AW	0-10 -AW
Pain Score	Eight -AW	Nine -AW	—	Nine pain med given bedside by anesthesia -AW	Nine pain med given by anesthesia at bedside -AW
Neurological					
Level of Consciousness	—	—	Alert -AW	—	Alert -AW
Orientation Level	—	—	Oriented X4 -AW	—	Oriented X4 -AW
Cognition	—	—	Appropriate judgement,Follows commands -AW	—	Appropriate judgement,Follows commands -AW
Speech	—	—	Clear -AW	—	Clear -AW
Motor Function/Sensation Assessment	—	—	Grip;Dorsiflexion;Plantar flexion -AW	—	Grip;Dorsiflexion;Plantar flexion -AW
R Hand Grip	—	—	Strong -AW	—	Strong -AW
L Hand Grip	—	—	Strong -AW	—	Strong -AW
R Foot Dorsiflexion	—	—	Strong -AW	—	Strong -AW
L Foot Dorsiflexion	—	—	Strong -AW	—	Strong -AW
R Foot Plantar Flexion	—	—	Strong -AW	—	Strong -AW
L Foot Plantar Flexion	—	—	Strong -AW	—	Strong -AW
RLE Sensation	—	—	Full sensation;No numbness -AW	—	Full sensation;No numbness -AW
LLE Sensation	—	—	Full sensation;No numbness -AW	—	Full sensation;No numbness -AW

118. At 0941 hours, Pamela had a pain level of 9 out of 10.

- PH 499 (image above)

119. In these circumstances, Dr. Frankel was required to examine the x-rays personally and immediately.

120. Again, from both the intraoperative and postoperative images, it should have been obvious that the cage was situated too posteriorly. It also should have been obvious, at minimum, that the screws might be invading the spinal canal. Taking the images together with Pamela's immediate, intense pain, Dr. Frankel should have immediately taken Pamela to the OR to reposition the cage and screws.

121. He did not.

122. At 0948 hours, Dr. Roger Frankel wrote a post-op progress note: "Patient complains of exacerbation of leg pain. Strength good. Will start gabapentin and decadron."

- PH 28

Progress Notes by Roger Frankel, MD at 11/15/2018 9:48 AM

Author: Roger Frankel, MD
Filed: 11/15/2018 9:50 AM
Editor: Roger Frankel, MD (Physician)
Service: Neurosurgery
Date of Service: 11/15/2018 9:48 AM

Neurosurgery Postop

Patient complains of exacerbation of leg pain. Strength good.

Will start gabapentin and decadron.

Roger Frankel, MD

Electronically signed by Roger Frankel, MD on 11/15/2018 9:50 AM

123. Dr. Frankel ordered no imaging to investigate the problem.

- PH 28 (image above)

124. Dr. Frankel did not take Pamela to the Operating Room to reposition the misplaced hardware.

- PH 28 (image above)

125. Dr. Frankel did enter the order for gabapentin.

- PH 142

gabapentin (NEURONTIN) capsule 300 mg [318873378]

Ordering Provider: Roger Frankel, MD
Ordered On: 11/15/18 0948
Dose (Remaining/Total): 300 mg (—/—)
Frequency: 3 times daily
Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Starts/Ends: 11/15/18 1315 - 11/21/18 1900
Route: Oral
Rate/Duration: — / —

126. Dr. Frankel billed for, and was paid for, his services in visiting Pamela in her hospital room.

127. Between 0941 and 1230 hours, Pamela continued to have severe pain, though mitigated by pain medication.

- PH 499

Row Name	1304	1300	1225	1200	1130
Vitals					
BP	150/90 -MG	—	—	127/66 -AFA	139/65 -AFA
Temp	97.3 °F (36.3 °C) -MG	—	—	—	—
Temp Source	Oral -MG	—	—	—	—
Heart Rate	94 -MG	—	—	94 -AFA	90 -AFA
Resp	18 -MG	—	—	11 -AFA	20 -AFA
SpO2	94 % -MG	—	—	95 % -AFA	96 % -AFA
OTHER					
Pain Score	—	Seven -JPA	Zero -AFA	—	—

Row Name	1100	1045	1030	1025	1020
Vitals					
BP	147/81 -AFA	(!) 131/106 -AFA	152/87 -AFA	(!) 160/94 -AFA	157/78 -AFA
Temp	—	97.7 °F (36.5 °C) -AFA	—	—	—
Temp Source	—	Oral -AFA	—	—	—
Heart Rate	76 -AFA	75 -AFA	78 -AFA	78 -AFA	74 -AFA
Resp	12 -AFA	10 -AFA	13 -AFA	14 -AFA	10 -AFA
SpO2	95 % -AFA	91 % -AFA	97 % -AFA	96 % -AFA	93 % -AFA
OTHER					
Pain Score	Four -AFA	—	—	—	—

Row Name	1015	1000	0950	0945	0941
Vitals					
BP	153/79 -AFA	170/84 -AW	190/89 anesthesia notified -AW	187/90 -AW	—
Heart Rate	77 -AFA	88 -AW	—	86 -AW	—
Resp	12 -AFA	15 -AW	—	13 -AW	—
SpO2	98 % -AFA	98 % -AW	—	98 % -AW	—
OTHER					
Pain Score	Four -AFA	Seven -AW	Eight -AW	—	Nine -AW

128. At 0948 hours, NP Yoffe entered an order for a steroid injection (dexamethasone, 4 mg) four times daily for a day.

- PH 138

dexamethasone (DECADRON) injection 4 mg [318873377]

Ordering Provider: Jane W Yoffe, NP

Ordered On: 11/15/18 0948
Dose (Remaining/Total): 4 mg (10/14)
Frequency: 4 times per day

Status: Discontinued (Past End Date/Time), Reason: Substitution/Alternate Therapy Placed
Starts/Ends: 11/15/18 1330 - 11/16/18 1439
Route: Intravenous
Rate/Duration: — / —

129. From 0915 hours to 1300 hours, the nursing flowsheets indicate that Pamela had full sensation and no numbness in her legs.

- PH 506, 508

Row Name	1100	1000	0930	0915
Neurological				
Neuro (WDL)	—	—	—	—
Level of Consciousness	Alert -AFA	Alert -AW	Alert -AW	Alert -AW
Orientation Level	Oriented X4 -AFA	Oriented X4 -AW	Oriented X4 -AW	Oriented X4 -AW
Cognition	Appropriate judgement;Follows commands -AFA	Appropriate judgement;Follows commands -AW	Appropriate judgement;Follows commands -AW	Appropriate judgement;Follows commands -AW
Speech	Clear -AFA	Clear -AW	Clear -AW	Clear -AW
Motor Function/Sensation Assessment	Grip;Dorsiflexion;Plantar flexion -AFA	Grip;Dorsiflexion;Plantar flexion -AW	Grip;Dorsiflexion;Plantar flexion -AW	Grip;Dorsiflexion;Plantar flexion -AW
R Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
RLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW
LLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW

Row Name	1748	1700	1600	1300	1225
L Foot Dorsiflexion	—	—	—	Strong -JPA	Strong -AFA
R Foot Plantar Flexion	—	—	—	Strong -JPA	Strong -AFA
L Foot Plantar Flexion	—	—	—	Strong -JPA	Strong -AFA
RLE Sensation	—	—	—	Full sensation;Pain -JPA	Full sensation;No numbness -AFA
LLE Sensation	—	—	—	Full sensation;Pain -JPA	Full sensation;No numbness -AFA
Neuro Symptoms	—	—	—	None -JPA	—
Neuro Additional Assessments	—	—	—	No -JPA	—

130. At or around 1229 hours, Pamela was taken from the PACU to Room 441, and Nurse Amy Farnam gave an SBAR (Situation-Background-Assessment-Recommendation) report to the floor nurse, Jackie Porter, RN.

- PH 501

SBAR Completed - Thu November 15, 2018

Row Name	1229
OTHER	
Completed?	**SBAR Completed** Report given to Jackie Porter, RN for room 441 -AFA

131. At 1258 hours, NP Yoffe entered an order for methocarbamol — a muscle relaxer and pain-blocker, 750 mg tablet three times daily. Nurse Jacquelyn Porter administered the first dose at 1509 hours.

- *See* https://www.drugs.com/methocarbamol.html
- PH 148

methocarbamol (ROBAXIN) tablet 750 mg [318626261]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 1258
Dose (Remaining/Total): 750 mg (—/—)
Frequency: 3 times daily PRN
Admin Instructions: May discolor urine. Use for muscle relaxation may cause drowsiness

Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Starts/Ends: 11/15/18 1258 - 11/21/18 1900
Route: Oral
Rate/Duration: — / —

11/15/18 1509	Given	750 mg	Oral	Performed by: Jacquelyn Porter, RN Scanned Package: 76385-124-50

132. At the same time, 1258 hours, NP Yoffe also entered an order for oxycodone — a narcotic pain medication, 10 mg tablet every four hours as needed. Nurse Porter administered the first 10 mg dose at 1717 hours.

- PH 154-55

oxyCODONE (ROXICODONE) immediate release tablet 10 mg [318626256]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 1258
Dose (Remaining/Total): 10 mg (—/—)
Frequency: Every 4 hours PRN
Admin Instructions: If the patient is NPO or unable to take PO medication, use an ordered parenteral medication for the appropriate pain level

Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Starts/Ends: 11/15/18 1258 - 11/21/18 1900
Route: Oral
Rate/Duration: — / —

11/15/18 1717	Given	10 mg	Oral	Performed by: Jacquelyn Porter, RN Scanned Package: 0904-6444-61, 0904-6444-61

133. Simultaneously, at 1258 hours, NP Yoffe entered an order for oxycodone 5 mg tablet every four hours as needed. Nurse Princess Johnson administered the first dose under this order at 2117 hours, as a 40 mg dose.

- PH 155-56

oxyCODONE (ROXICODONE) immediate release tablet 5 mg [318626255]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 1258
Dose (Remaining/Total): 5 mg (—/—)
Frequency: Every 4 hours PRN
Admin Instructions: If the patient is NPO or unable to take PO medication, use an ordered parenteral medication for the appropriate pain level

Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Starts/Ends: 11/15/18 1258 - 11/21/18 1900
Route: Oral
Rate/Duration: — / —

11/15/18 2117	Given	40 mg	Oral	Performed by: Princess Johnson, RN Scanned Package: 66993-060-51

134. At 1258 hours, NP Yoffe also entered an order for prednisone, 4 mg tablet every morning. Prednisone is a corticosteroid. One of its functions is to reduce inflammation and pain that may be caused by inflammation. Nurse Vernetta Younger administered the first dose on 11/16/2018 at 0921 hours.

- *See* https://www.webmd.com/arthritis/prednisone-arthritis
- PH 156

predniSONE (DELTASONE) tablet 4 mg [317589282]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 1258
Dose (Remaining/Total): 4 mg (—/—)
Frequency: Every morning

Status: Discontinued (Past End Date/Time)
Starts/Ends: 11/16/18 0900 - 11/19/18 1204
Route: Oral
Rate/Duration: — / —

11/16/18 0921	Given	4 mg	Oral	Performed by: Vernetta Younger, RN Scanned Package: 0054-8739-25, 0054-8739-25, 0054-8739-25, 0054-8739-25

135. At 1748 hours, Pamela complained to Nurse Jacquelyn Porter about worsening numbness in her legs. Nurse Porter made a phone call to Nurse Practitioner named Laura to inform her of Pamela's changing condition. NP Laura provided no new orders, but told Nurse Porter to call if Pamela's neurological condition worsened.

- PH 508

Provider Notification	
Reason for Communication	Review Case Patient complaining of worsening numbness in her legs -JPA
Provider Name	LAURA -JPA
Provider Role	Nurse Practitioner -JPA
Method of Communication	Call -JPA
Response	No new orders -JPA
Notification Time	1801 -JPA
Comment	monitor patient, call if worse or neuro sighns change -JPA

136. If the previous flowsheet notes were accurate (*i.e.,* in saying Pamela had full sensation), then this was a new neurological deficit, and a sign of worsening neurological injury.

137. Despite Nurse Porter's specific comment about the numbness in Pamela's legs and feet, after the shift change, Nurse Princess Johnson recorded "flowsheet" notes indicating that Pamela had "full sensation" in both lower extremities. Nurse Johnson entered these notes at 1930 hours and again at 2330 hours.

- PH 503

138. These notes were incorrect — likely the result of auto-populated text fields or blind copy/paste errors.

139. About 2-1/2 hours after Nurse Porter called NP Laura — at around 2018 hours — Dr. Frankel examined Pamela.

- PH 29 (screenshot below)

140. Dr. Frankel noted that Pamela complained of numbness and tingling in the legs. Pamela had diminished sensation from the mid lower leg down to the feet. This numbness interfered with her ability to balance when she stood up.

- PH 29 (screenshot below)

141. Dr. Frankel wrote that Pamela had mild nerve apraxia "likely" due to manipulation and mild stretch with placement of the intervertebral implant.

- PH 29 (screenshot below)

142. Dr. Frankel's "Plan" was that Pamela would "likely" improve "spontaneously."

- PH 29

Progress Notes by Roger Frankel, MD at 11/15/2018 8:16 PM

Author: Roger Frankel, MD
Filed: 11/15/2018 8:18 PM
Editor: Roger Frankel, MD (Physician)

Service: Neurosurgery
Date of Service: 11/15/2018 8:16 PM

Author Type: Physician
Status: Signed

Neurosurgery

Patient complained of numbness and tingling in the legs. I saw and examined her.

She has normal strength in the quadriceps, hamstrings, tibialis anterior and gastrocnemius muscles bilaterally.
She has diminished light touch from the mid lower leg down to the feet. She did report that this interfered with her ability to balance easily when she stood up.

Impression: Mild nerve apraxia likely due to manipulation and mild stretch with placement of intervertebral implant.

Plan: She will likely improve spontaneously. Gabapentin and steroids will be continued.

Roger Frankel, MD

Electronically signed by Roger Frankel, MD on 11/15/2018 8:18 PM

143. Upon learning that Pamela had developed new neurological deficits, Dr. Frankel should have acted immediately to identify the cause of the deficits.

144. If Dr. Frankel had investigated, he would have learned that the cage and screws were misplaced and were impinging on Pamela's nerve roots and cauda equina.

145. The cage and screws were in fact wrongly positioned.

146. Leaving the cage and screws wrongly positioned for an extended time — days, weeks, months — risked causing serious, permanent harm to Pamela.

147. After reviewing the imaging, Dr. Frankel should have immediately prepared for surgery to reposition the cage and screws if that could be done safely and effectively, or otherwise to fix the problem he had caused by positioning the cage and screws wrongly.

148. At this point — the same day as the ALIF surgery — the cage and screws could have been repositioned safely and effectively.

149. Dr. Frankel did not examine Pamela again for the remainder of this hospitalization, which lasted another six days, until November 21.

Friday, November 16, 2018

150. The morning after the surgery, at about 0618 hours, Dr. Jay Steven Miller examined Pamela. Dr. Miller was the general surgeon who performed the opening for the ALIF that Dr. Frankel performed. Dr. Miller wrote that Pamela had parasthesia — abnormal sensation — in her feet.

- PH 29

Progress Notes by Jay Steven Miller, MD at 11/16/2018 6:18 AM

Author: Jay Steven Miller, MD
Filed: 11/16/2018 6:19 AM
Editor: Jay Steven Miller, MD (Physician)

Service: —
Date of Service: 11/16/2018 6:18 AM

Author Type: Physician
Status: Signed

Subjective:
Interval History: paresthesia feet
hungry

151. At 0908 hours that morning, NP Jane Yoffe examined Pamela. NP Yoffe worked with Dr. Frankel. In her Progress Note, NP Yoffe noted that Pamela had "new numbness to bottom of feet." NP Yoffe wrote that the numbness was "felt to be related to stretching of nerves during surgery."

- PH 30-32

Progress Notes by Jane W Yoffe, NP at 11/16/2018 9:08 AM

Author: Jane W Yoffe, NP
Filed: 11/16/2018 10:08 AM
Editor: Jane W Yoffe, NP (Nurse Practitioner)

Service: Neurosurgery
Date of Service: 11/16/2018 9:08 AM

Author Type: Nurse Practitioner
Status: Signed
Cosigner: Roger Frankel, MD at 11/19/2018 2:57 PM

Atlanta Brain and Spine Care Spine Progress Note
ALIF

Subjective:
POD 1 from L5-S1 anterior lumbar interbody fusion for spondylolisthesis
Systemic or specific complaints yes bilateral leg pain improved from surgery, new numbness to bottom of feet

A/P: Patient is post op from anterior lumbar interbody fusion. Doing well postoperatively. Pt will some new nerve pain/numbness-gabapentin dose increased, and started on steroids last evening-better this am, but still with numbness-felt to be related to stretching of nerves during surgery. Pt has urinated this am-needed to be straight cathed yesterday. Vascular advanced diet to soft this am. Pt is using PCA, though not much. PT is recommending rehab- told pt that case manager application process for rehab.

Plan for PT, pain control, GI/DVT prophylaxis, bowel protocol, IBE, Prophylactic Heparin to start today, OOB with assistance. Increase activity as tolerated. Keep PCA today, pt encouraged to ask for PRN Oxycodone, and only use PCA if pain not well controlled on orals. If pain well controlled on orals, will d/c PCA in am.

Electronically signed by Jane W Yoffe, NP on 11/16/2018 10:08 AM
Electronically signed by Roger Frankel, MD on 11/19/2018 2:57 PM

152. At about 1047 hours on November 16, Physical Therapist Jennifer Lynn Pauley came to Pamela's room to perform an initial assessment. Pamela had significant numbness in both legs and could not feel her feet on the ground.

- PH 70-76

Therapy Note by Jennifer Lynn Pauley, PT at 11/16/2018 10:47 AM (continued)

Assessment: Very pleasant 67 yo F with L5-S1 spondylolisthesis s/p ALIF L5-S1 on 11/15 with Dr. Frankel. Pt with diminished light touch mid lower leg distal to bilateral feet post op; per NSG note: mild nerve apraxia likely due to manipulation and mild stretch with placement of intervertebral implant; started on Gabapentin and steroids. Pt reports h/o R TKR and R TSR as well as L3-4 surgery over past year. PTA, pt was living alone in ranch style home with 3 steps to enter; pt was I with all mobility and ADLs with no DME in use; she cares for her 3 yo grandson 4 days per week; pt owns RW and BSC from previous surgeries; pt has daughters who live nearby but both work during the day.

At time of eval, pt very motivated to work with therapy; she presents with 4+/5 BLE strength but significant numbness BLE. Able to complete bed mobility with CGA; sit to stand with RW mod/max A x 2; able to take a few side steps with max A x 2 due to significant knee buckling; pt with inability to feel her feet on the ground. Pt is at high risk for falls; excellent safety awareness and good insight into her deficits. Reviewed spinal precautions and proper body mechanics in depth. Will benefit from PT to address aforementioned deficits. Recommend SAR; discussed with pt. Plan to follow 7x/week. Thank you for this consult.

153. Neither Dr. Frankel nor any of his neurosurgery partners examined Pamela on November 16.

Saturday, November 17, 2018

154. At about 1033 hours on the morning of November 17, Dr. Steven Wray visited Pamela in her hospital room. Dr. Wray is a neurosurgeon and a partner of Dr. Frankel.

- PH 32 (screenshot below)

155. Dr. Wray noted that Pamela was crying and had paresthesias of her left leg. Dr. Wray wrote that it was "likely" related to restoration of intervertebral height.

- PH 32 (screenshot below)

156. Dr. Wray told Pamela that it is common to have nerve root irritation after ALIF surgery, and that Pamela's symptoms would improve with time.

- PH 32

Progress Notes by Steven Wray, MD at 11/17/2018 10:33 AM (continued)

Tearful and crying this morning not wanting to go to rehab
Has some paresthesias of her left leg likely related to restoration of intervertebral height
I encouraged her that her symptoms will improve with time and that it is common after Anterior Interbody fusion to have some nerve root irritation.
Subjectively it may be a little bit better this morning.

She had a BM yesterday
No Abdominal distention

Plan:
Mobilize as tolerated
PT/OT
Neurontin and decadron

Wray

Electronically signed by Steven Wray, MD on 11/17/2018 10:37 AM

157. Dr. Wray did not examine the intraoperative or postoperative x-rays

- *See* PH 32.

158. Dr. Wray did not investigate the cause of Pamela's neurological deficits, beyond surmising that they might be related to the ALIF surgery.

- *See* PH 32.

159. Dr. Wray did not identify the mal-positioning of cage and screws in the ALIF.

- *See* PH 32.

160. Dr. Wray took no action to ensure that the cage and screws would be promptly repositioned.

- *See* PH 32.

161. Dr. Wray billed, and was paid, for treating Pamela.

162. At this point, the day after the ALIF surgery, the cage and screws could have been repositioned safely and effectively — preventing any permanent injury to Pamela.

Sunday, November 18, 2018

163. At 0820 hours on Sunday, November 18, Dr. Wray visited Pamela in her hospital room.

- PH 33 (screenshot below)

164. Dr. Wray again noted that Pamela was crying and in severe pain. Dr. Wray noted that Pamela was not walking but could stand with assistance from a physical therapist and use a rolling walker.

- PH 33

Progress Notes by Steven Wray, MD at 11/18/2018 8:20 AM

Author: Steven Wray, MD | Service: Neurosurgery | Author Type: Physician
Filed: 11/18/2018 8:24 AM | Date of Service: 11/18/2018 8:20 AM | Status: Signed
Editor: Steven Wray, MD (Physician)

Neurosurgery

Continues to complain of severe Left buttock and leg pain.
Tearful this morning
Hypertensive 192/90 ? Related to pain
Not ambulating but stands with PT utilizing a rolling walker

Will initiate OxyContin 10mg PO q 12 to try and establish a better sustained level of analgesia
Remains on Neurontin 300 TID

Continue PT/OT
Probable eventual IPR

Wray

Electronically signed by Steven Wray, MD on 11/18/2018 8:24 AM

165. Again Dr. Wray did not examine the intraoperative or postoperative x-rays

- *See* PH 33.

166. Again Dr. Wray did not investigate the cause of Pamela's neurological deficits, beyond surmising that they might be related to the ALIF surgery.

- *See* PH 33.

167. Again Dr. Wray did not identify the mal-positioning of cage and screws in the ALIF.

- *See* PH 33.

168. Again Dr. Wray took no action to ensure that the cage and screws would be promptly repositioned.

- *See* PH 33.

169. Again Dr. Wray billed for, and was paid for, treating Pamela.

Monday, November 19, 2018

170. At 0804 hours on Monday, November 19, Dr. David Benglis visited Pamela in her hospital room. Dr. Benglis is a neurosurgeon and a partner of Dr. Frankel.

- PH 33-34 (screenshot below)

171. Dr. Benglis noted Pamela's numbness of legs and feet.

- PH 33-34

Progress Notes by David M Benglis Jr., MD at 11/19/2018 8:04 AM

Author: David M Benglis Jr., MD | Service: Neurosurgery | Author Type: Physician
Filed: 11/19/2018 8:10 AM | Date of Service: 11/19/2018 8:04 AM | Status: Addendum
Editor: David M Benglis Jr., MD (Physician)
Related Notes: Original Note by David M Benglis Jr., MD (Physician) filed at 11/19/2018 8:06 AM

POD 4 from ALIF

C/o numbness in bottom of feet and leg discomfort.

She is improved from Friday.

She thinks she may not need rehab.

172. Dr. Benglis did not examine the intraoperative or postoperative x-rays

- *See* PH 33.

173. Dr. Benglis did not investigate the cause of Pamela's neurological deficits.

- *See* PH 33.

174. Dr. Benglis did not identify the mal-positioning of cage and screws in the ALIF.

- *See* PH 33.

175. Dr. Benglis took no action to ensure that the cage and screws would be promptly repositioned.

- *See* PH 33.

176. Dr. Benglis billed for, and was paid for, treating Pamela.

177. At 1206 hours, NP Jane Yoffe visited Pamela. NP Yoffe noted that Pamela had difficulty walking due to numbness on the bottoms of both feet.

- PH 36

Progress Notes by Jane W Yoffe, NP at 11/19/2018 12:06 PM (continued)

A/P: Patient is post op from anterior lumbar interbody fusion. Doing well postoperatively. Pt will some new nerve pain/numbness. Pt is urinating, tolerating po's, and pain is mostly managed with oral analgesics.PT is recommending rehab- pt having difficulty walking due to numbness on the bottoms of both feet. Pt having high BP's, requiring PRN Hydralazine. Elevated BP's felt to be r/t pain as well as steroids. D/C home prednisone dose, continue Decadron 4 BID

Plan for PT, pain control, GI/DVT prophylaxis, bowel protocol, IBE, OOB with assistance. Increase activity as tolerated.Discussed with Dr Lamb, IMS RE: BP management- Started Hydralazine 10mg BID, continue to monitor closely. Case manager to apply to rehabs today.

Electronically signed by Jane W Yoffe, NP on 11/19/2018 12:14 PM
Electronically signed by David M Benglis Jr., MD on 11/21/2018 7:36 AM

Tuesday, November 20, 2018

178. At 0529 hours on Tuesday, November 20, 2018, Dr. Benglis visited Pamela in her hospital room. Dr. Benglis noted that Pamela was having significant difficulty with balance when walking.

- PH 36

Progress Notes by David M Benglis Jr., MD at 11/20/2018 5:29 AM

Author: David M Benglis Jr., MD | Service: Neurosurgery | Author Type: Physician
Filed: 11/21/2018 5:30 AM | Date of Service: 11/20/2018 5:29 AM | Status: Signed
Editor: David M Benglis Jr., MD (Physician)

Pending rehab placement.

Having significant difficulty with balance when ambulating.

C/o pain in left leg.

Neuro stable otherwise.

Electronically signed by David M Benglis Jr., MD on 11/21/2018 5:30 AM

179. Again, Dr. Benglis did not examine the intraoperative or postoperative x-rays

- *See* PH 33.

180. Again Dr. Benglis did not investigate the cause of Pamela's neurological deficits.

- *See* PH 33.

181. Again Dr. Benglis did not identify the mal-positioning of cage and screws in the ALIF.

- *See* PH 33.

182. Again Dr. Benglis took no action to ensure that the cage and screws would be promptly repositioned.

- *See* PH 33.

183. Again Dr. Benglis billed for, and was paid for, treating Pamela.

184. At 0911 hours, NP Yoffe visited Pamela. NP Yoffe noted that Pamela had ongoing left hip and leg pain, which had required IV pain medication the previous day. NP Yoffe also noted intermittent burning in Pamela's right foot.

- PH 36

Progress Notes by Jane W Yoffe, NP at 11/20/2018 9:11 AM

Author: Jane W Yoffe, NP | Service: Neurosurgery | Author Type: Nurse Practitioner
Filed: 11/20/2018 9:15 AM | Date of Service: 11/20/2018 9:11 AM | Status: Signed
Editor: Jane W Yoffe, NP (Nurse Practitioner) | Cosigner: Roger Frankel, MD at 11/20/2018 10:25 AM

Atlanta Brain and Spine Care Spine Progress Note
ALIF

Subjective:
POD 5 from L5-S1 anterior lumbar interbody fusion for spondylolisthesis
Systemic or specific complaints yes Pt reports having ongoing left hip and leg pain, intermittent burning in right foot, and improvement of bilateral foot numbness she has had since surgery

Wednesday, November 21, 2018

185. In the afternoon of Wednesday, November 21, 2018, Dr. Frankel discharged Pamela to a skilled nursing facility.

- PH 6

Admission Information

Arrival Date/Time:		Admit Date/Time:	11/15/2018 0519	IP Adm. Date/Time:	11/15/2018 0557
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:	Neurosurgery	Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital 4 North
Admit Provider:	Roger Frankel, MD	Attending Provider:	Roger Frankel, MD	Referring Provider:	

Discharge Information

Discharge Date/Time	Discharge Disposition	Discharge Destination	Discharge Provider	Unit
11/21/2018 1500	Skilled Nursing Facility	None	None	Piedmont Atlanta Hospital 4 North

186. Dr. Frankel had mal-positioned a bone-graft cage and screws in Pamela's spine.

187. Dr. Frankel discharged Pamela with that hardware still mal-positioned.

Aftermath & Revision Surgeries

December 2018

188. On December 17, 2018 — about a month after the ALIF surgery — Pamela saw Dr. Frankel again. Pamela continued to suffer neurological pain and numbness in her lower legs. She was using a walker due to pain and unsteadiness.

- PHC 56

Progress Notes by Roger Frankel, MD at 12/17/2018 2:00 PM

Author: Roger Frankel, MD   Service: (none)   Author Type: Physician
Filed: 12/18/2018 12:21 AM   Encounter Date: 12/17/2018   Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 12/17/2018

Chief Complaint

Patient presents with

- Spondylolisthesis of lumbar region.

HPI:

Pamela Alleen Hay is a 67 y.o. year old female who is approximately 1 month post lumbar fusion. Despite a relatively uneventful stand-alone anterior interbody fusion at L5-S1, she has had significant neuropathic pain and numbness in her lower legs. The numbness has improved significantly, but she is using a walker due to pain and some unsteadiness. She has been taking gabapentin which has only partially helped her symptoms. She is still taking oxycodone regularly. There are no problems with wound healing. She also noticed some tingling and clumsiness in her right hand. She returns today with MRI of the lumbar and cervical spine ordered. However only the cervical MRI was done due to some technical difficulties at the imaging facility and she is scheduled for her follow-up scan tomorrow. There is no bowel or bladder difficulty.

Progress Notes by Roger Frankel, MD at 12/17/2018 2:00 PM (continued)

The patient still has significant radiculopathy after her lumbar surgery. I am awaiting her completion of the lumbar MRI. If there is any indication of compression, she may need a posterior foraminotomy and stabilization. Since her upper extremity symptoms have only been present for a few weeks, it is early to order EMG and nerve conduction studies. If she continues to have this left arm symptomatology for another 2 weeks, we can obtain a left upper extremity EMG and nerve conduction study. I will see her back after lumbar imaging is completed.

189. On December 18, 2018, a lumbar MRI was performed.

January 2019

190. On January 3, 2019, Pamela went to the Interventional Radiology department at Piedmont Hospital Atlanta.

- PH 606

Department

Name	Address	Phone	Fax
Piedmont Atlanta Hospital IR Imaging	1968 Peachtree Road, N.W., Atlanta GA 30309-1476	404-605-3371	404-609-6761

191. Pamela was referred there by NP Jane Yoffe, from Dr. Frankel's neurosurgery practice.

- PH 606

Admission Information

Arrival Date/Time:		Admit Date/Time:	01/03/2019 0601	IP Adm. Date/Time:	
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:		Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital IR Imaging
Admit Provider:	James W Berger, MD	Attending Provider:	James W Berger, MD	Referring Provider:	Jane W Yoffe, NP

192. Pamela was there for a myelogram of her lumbar spine.

- PH 607

H&P by Ashley A Fullerton, PA at 1/3/2019 7:00 AM

Author: Ashley A Fullerton, PA | Service: Interventional Radiology | Author Type: Physician Assistant
Filed: 1/3/2019 7:01 AM | Date of Service: 1/3/2019 7:00 AM | Status: Signed
Editor: Ashley A Fullerton, PA (Physician Assistant)

Subjective:

Subjective
Patient's name: Pamela Alleen Hay
67 y.o. female

Preoperative diagnosis: Spondylolisthesis of lumbar regio

Description of Procedure: Lumbar myelogram

193. A myelogram is an x-ray or CT scan of the spinal canal, using contrast dye injected into the spinal column.

194. Radiologist Dr. Michael Lanfranchi interpreted the CT study.

- PH 656-57 (screenshot below)

195. Dr. Lanfranchi noted that: "The L5-S1 interbody cages is positioned more posteriorly than typically seen and extends into the ventral spinal canal/lateral recesses and neural foramina. This could irritate the L5 nerve roots. The fixating L5 extends into the posterior cortex of the posterior L5 vertebral body, and may protrude beyond it. The S1 fixating screws extend beyond the cortex of the S1 segment, protruding into the subarticular zones. These could exert irritate the descending S1 nerve roots. There is mild to moderate bilateral neural foraminal stenosis."

- PH 656-57

L5-S1: The L5-S1 interbody cages is positioned more posteriorly than typically seen and extends into the ventral spinal canal/lateral recesses and neural foramina. This could irritate the L5 nerve roots. The fixating L5 extends into the posterior cortex of the posterior L5 vertebral body, and may protrude beyond it. The S1 fixating screws extend beyond the cortex of the S1 segment, protruding into the subarticular zones. These could exert irritate the descending S1 nerve roots. There is mild to moderate bilateral neural foraminal stenosis.

196. On January 7, 2019, at 1430 hours, Pamela saw Dr. Frankel. Dr. Frankel noted Pamela's continuing leg pain and numbness. He wrote that imaging so far had revealed no obvious source.

- PHC 64

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who underwent ALIF almost 2 months ago. She has had leg pain since surgery with imaging up to this point showing no obvious source. Though she has seen some improvement in pain and numbness, it is still quite severe. Activity worsens her symptoms. She does not report weakness, but does note that there is some distal leg and foot swelling. She returns today after undergoing a CT myelogram of the lumbar spine.

197. Dr. Frankel noted the myelogram report. He wrote that "The patient has screw malposition likely causing her nerve symptoms." He suggested surgery to remove "the anterior screws," but did not identify which screws.

- PHC 64-70 (screenshot below)

198. Dr. Frankel did not think the bone graft cage could safely be removed. He suggested the possibility of a posterior surgery to decompress the neural elements in the foramina, if necessary.

- PHC 64-70

Progress Notes by Roger Frankel, MD at 1/7/2019 2:30 PM

Author: Roger Frankel, MD   Service: (none)   Author Type: Physician
Filed: 1/9/2019 6:18 AM   Encounter Date: 1/7/2019   Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 1/7/2019

Chief Complaint
Patient presents with
- Back Pain
  LBP
- Leg Pain
  left leg
- Numbness
  left leg from foot to knee, right foot
- Leg Swelling
  left leg and foot

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who underwent ALIF almost 2 months ago. She has had leg pain since surgery with imaging up to this point showing no obvious source. Though she has seen some improvement in pain and numbness, it is still quite severe. Activity worsens her symptoms. She does not report weakness, but does note that there is some distal leg and foot swelling. She returns today after undergoing a CT myelogram of the lumbar spine.

Assessment:

1. **Spondylolisthesis of lumbar region**
2. Displacement of internal fixation device of vertebrae, initial encounter (HC)

Plan/Impression:
Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient
Orders Placed This Encounter
- oxyCODONE (ROXICODONE) 5 MG immediate release tablet
  Sig: Take 1-2 tablets (5-10 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 60 tablet
  Refill: 0

The patient has screw malposition likely causing her nerve symptoms. We have discussed this in detail between the patient, her daughter and I. I have recommended surgical intervention to remove the anterior screws and then undergo posterior decompression within the foramina bilaterally and instrumentation extension. Due to the bone growth through the cage, I do not think that it will be safely removable, but foraminotomies should allay the effects of that. She is interested in proceeding forward and we will plan on progressing with surgery as above.

199. On January 17, 2019, Pamela went to Piedmont Hospital Atlanta for another surgery by Dr. Frankel, to address the pain and other deficits caused by the malpositioned L5-S1 hardware.

- PH 683

Admission Information

Arrival Date/Time:		Admit Date/Time:	01/17/2019 0533	IP Adm. Date/Time:	01/17/2019 0955
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:	Neurosurgery	Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital 4 North
Admit Provider:	Roger Frankel, MD	Attending Provider:	Roger Frankel, MD	Referring Provider:	

Discharge Information

Discharge Date/Time	Discharge Disposition	Discharge Destination	Discharge Provider	Unit
01/21/2019 1723	Home-health Care Svc	None	Roger Frankel, MD	Piedmont Atlanta Hospital 4 North

Final Diagnoses (ICD-10-CM)

Code	Description	POA	CC	HAC	Affects DRG
T84.328A [Principal]	Displacement of other bone devices, implants and grafts, initial encounter (HC)	Yes	No		Yes
T84.84XA	Pain due to internal orthopedic prosthetic devices, implants and grafts, initial encounter (HC)	Yes	No		No

200. At 0710 hours on January 17, Dr. Frankel wrote a History & Physical similar to his January 7 Progress Note. Dr. Frankel noted Pamela's "quite severe" pain and numbness.

- PH 690

H&P by Roger Frankel, MD at 1/17/2019 7:10 AM (continued)

- Back Pain
  LBP
- Leg Pain
  left leg
- Numbness
  left leg from foot to knee, right foot
- Leg Swelling
  left leg and foot

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who underwent ALIF almost 2 months ago. She has had leg pain since surgery with imaging up to this point showing no obvious source. Though she has seen some improvement in pain and numbness, it is still quite severe. Activity worsens her symptoms. She does not report weakness, but does note that there is some distal leg and foot swelling. She returns today after undergoing a CT myelogram of the lumbar spine.

201. Dr. Frankel noted again that "The patient has screw malposition likely causing her nerve symptoms." Dr. Frankel reiterated the need to remove "the anterior screws," the danger of removing the bone graft cage, and the possible need for a posterior foraminal decompression surgery.

- PH 696

Assessment:

1. **Spondylolisthesis of lumbar region**
2. Displacement of internal fixation device of vertebrae, initial encounter (HC)

Plan/Impression:
Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient

Orders Placed This Encounter
- oxyCODONE (ROXICODONE) 5 MG immediate release tablet
  Sig: Take 1-2 tablets (5-10 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 60 tablet
  Refill: 0

The patient has screw malposition likely causing her nerve symptoms. We have discussed this in detail between the patient, her daughter and I. I have recommended surgical intervention to remove the anterior screws and then undergo posterior decompression within the foramina bilaterally and instrumentation extension. Due to the bone growth through the cage, I do not think that it will be safely removable, but foraminotomies should allay the effects of that. She is interested in proceeding forward and we will plan on progressing with surgery as above.

202. The operation began at 0805 hours. The operation lasted approximately 34 minutes.

- PH 730

Time	Event
0617	Anesthesia Pre Procedure Complete
0730	Anesthesia Start
0730	Patient in Room
0730	Start Data Collection
0745	Induction
0747	Intubation
0750	Patient Ready for Procedure
0803	upper warm air on
0804	Time Out Performed
0805	Procedure Start
0827	Quick Note Surgeon requested valsalva.
0839	Begin Emergence
0854	Procedure End
0858	Quick Note Paper tape on eyes tore pt's skin
0900	Extubation
0918	Quick Note Pt appeared floppy and complained of not being able to breathe. Rest of reversal given. After waiting the appropriate time pt still complained it was hard to breath. Suggamadex given.
0926	Stop Data Collection
0926	Transport to PACU/Phase 2 Patient transported to PACU/Phase 2 with oxygen and appropriate monitors. (Some patients are recovered in the same area as the procedure and are not physically transported).

203. Dr. Jay Steven Miller performed the anterior exposure surgery.

- PH 697

Op Note signed by Jay Steven Miller, MD at 1/20/2019 10:29 AM

Author: Jay Steven Miller, MD
Filed: 1/20/2019 10:29 AM
Editor: Jay Steven Miller, MD (Physician)
Dictation Time: 1/17/2019 9:18 AM
Trans Time: 1/17/2019 9:43 AM
Service: —
Date of Service: 1/17/2019 12:00 AM
Trans Doc Type: Operative Note
Trans Status: Available
Author Type: Physician
Status: Signed
Trans ID: 11216208

PREOPERATIVE DIAGNOSIS: Degenerative disk disease, status post L5-S1 anterior lumbar interbody fusion, now with the screws in the body of the S1 causing back pain.

POSTOPERATIVE DIAGNOSIS: Degenerative disk disease, status post L5-S1 anterior lumbar interbody fusion, now with the screws in the body of the S1 causing back pain.

NAME OF PROCEDURE: Anterior transperitoneal exposure of the L5-S1 disk space.

SURGEON: Jay Miller, M.D.

NEUROSURGEON AND COSURGEON: Roger Frankel, M.D.

204. Dr. Frankel then removed two of the three anterior screws. He removed the two screws going into the S1 body, but left the one L5 screw in place.

- PH 698-99

Op Note signed by Roger Frankel, MD at 1/18/2019 11:52 AM

Author: Roger Frankel, MD
Filed: 1/18/2019 11:52 AM
Editor: Roger Frankel, MD (Physician)
Dictation Time: 1/17/2019 8:57 PM
Trans Time: 1/18/2019 12:04 AM
Service: Neurosurgery
Date of Service: 1/17/2019 12:00 AM
Trans Doc Type: Operative Note
Trans Status: Available
Author Type: Physician
Status: Signed
Trans ID: 11216394

PREOPERATIVE DIAGNOSIS: Spinal hardware malposition.

POSTOPERATIVE DIAGNOSIS: Spinal hardware malposition.

NAME OF PROCEDURE: Redo anterior lumbar interbody fusion with removal of screws.

SURGEON: Roger H. Frankel, M.D.

retroperitoneal space was opened and the instrumentation identified, the locking screws for the interbody cage were disengaged. The screws were removed that were going down into the S1 vertebra. Valsalva maneuver was performed after the screws were removed and no CSF leakage was noted. The holes were occluded with Gelfoam. A second Valsalva maneuver again revealed no spinal fluid leakage. Closure was performed by Dr. Jay Miller and dictated in his note. The patient was awakened and extubated without difficulty and transferred to recovery room in stable condition, moving all extremities well.

205. Post-operative x-rays showed removal of the S1 screws, with the L5 screw still in place.

- PH 774

X-ray lumbar spine 2 or 3 views in PACU [333692022]

Ordering provider: Jane W Yoffe, NP 01/17/19 0905
Performed: 01/17/19 0937 - 01/17/19 0943
Resulting lab: EMC RAD
Narrative:
TECHNIQUE: 2 views of the lumbar spine.

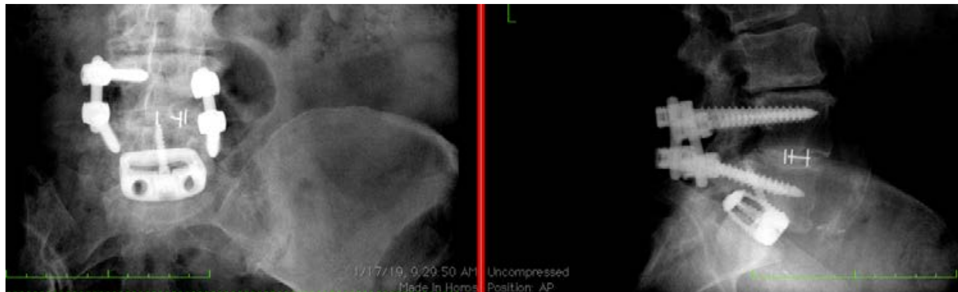
HISTORY: Postoperative evaluation.

COMPARISON: Lumbar spine CT dated 01/03/2019.

FINDINGS:

The fixating S1 screws have been removed. The L5 fixating screw again reaches the posterior margin of the L5 vertebral body. The L5-S1 interbody cage remains posteriorly position in the L5-S1 disc space, with the posterior margin extending into the ventral spinal canal. The interbody device at L4-L5 and posterior stabilization pedicle screws and rods at L4-L5 are stable.

- DICOM images



206. The radiology report noted that the L5 screw reached the posterior margin of the L5 body. The report also noted that the cage extended into the spinal canal.

- PH 774 (image above)

February through April 2019

207. About a month after On February 2, 2019, Pamela saw Dr. Frankel. He wrote that Pamela no longer had any significant radiating pain into the legs, but that she still had moderate numbness.

- PHC 82

Progress Notes by Roger Frankel, MD at 2/20/2019 11:45 AM

Author: Roger Frankel, MD | Service: (none) | Author Type: Physician
Filed: 2/20/2019 12:12 PM | Encounter Date: 2/20/2019 | Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 2/20/2019

Chief Complaint

Patient presents with

- Back Pain
- Numbness
  bilateral leg numbness

HPI:

Pamela Alleen Hay is a 67 y.o. year old female who is one-month post removal of anterior screws. She does not have any significant radiating pain into the legs. She still has numbness going up to the left knee that is moderate and numbness in the right foot that is moderate. There is minimal left lower leg numbness. She does not report any weakness but does feel as though there is coordination difficulty in her legs that limits her balance and walking. She is doing home physical therapy because she cannot get out of the house to go to outpatient physical therapy. She takes gabapentin 1200 mg/day and has been weaning it since her last visit with me. Her leg swelling has significantly improved since her last visit with me. There are no wound healing issues. The patient does have some dull aching in the tailbone area as well as having had one episode of radiating pain in the left leg.

208. On April 8, 2019, Pamela returned to see Dr. Frankel. He wrote that Pamela continued to have numbness and some neuropathic pain in her legs. He wrote that "there has been some increase of discomfort recently which may be due to the nerve recovery." He wrote that he could not explain "the wide-based multi-myotome weakness of her post-operative issues at S1."

- PHC 89-93

Progress Notes by Roger Frankel, MD at 4/8/2019 3:31 PM

Author: Roger Frankel, MD | Service: (none) | Author Type: Physician
Filed: 4/14/2019 10:13 PM | Encounter Date: 4/8/2019 | Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 4/8/2019

Chief Complaint

Patient presents with

- Spondylolisthesis of lumbar region

HPI:

Pamela Alleen Hay is a 67 y.o. year old female who is now 3 months post screw adjustment of her lumbar fusion. She continues to have numbness and some neuropathic pain in the legs. There has been some increase of discomfort recently which may be due to the nerve recovery. She still walks unsteadily because of weakness that she has in both legs. She reports that she has a difficult time pulling her knees up suggesting a hip muscle weakness which is far above her L5-S1 surgery.

Assessment:

1. Spondylolisthesis of lumbar region

Plan/Impression:
Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient
Orders Placed This Encounter

- EMG
  - Standing Status: Future
  - Standing Expiration Date: 4/10/2020
  - Scheduling Instructions:
    - Stephanie Delgaudio-Riemann
- HYDROcodone-acetaminophen (NORCO) 5-325 mg per tablet
  - Sig: Take 1 tablet by mouth every 12 (twelve) hours as needed for Pain.
  - Dispense: 40 tablet
  - Refill: 0
- gabapentin (NEURONTIN) 300 MG capsule
  - Sig: Take 1 capsule (300 mg total) by mouth nightly.
  - Dispense: 30 capsule
  - Refill: 3

The patient continues to have neuropathic pain. However, I cannot explain the wide-based multi-myotome weakness of her postoperative issues at S1. We will obtain EMG and nerve conduction studies to assess what is going on in the upper lumbar nerves. I will see her back when these are completed.

May – October 2019

209. On May 6, 2019, Pamela saw Dr. William Benedict, a neurosurgeon with a medical group separate from Dr. Frankel's.

- WMG 18-23

Progress Notes by Serena H Marcus, NP at 5/6/2019 3:00 PM

Author: Serena H Marcus, NP | Service: (none) | Author Type: Nurse Practitioner
Filed: 5/6/2019 6:38 PM | Encounter Date: 5/6/2019 | Status: Signed
Editor: William J Benedict Jr., MD (Physician)

210. Pamela sought help from Dr. Benedict with persistent pain, numbness, and weakness.

- WMG 19

Referring Physician:
Self-Referral
No address on file

Reason for Referral/ Chief Complaint: Lower extremity numbness and weakness

HPI: This is a 67 y.o. female who presents today complaining of bilateral lower extremity numbness and weakness. Her history is notable for a previous L4-5 laminectomy and fusion procedure by Dr. Robinson in 2004. She states that she did very well following this procedure and recovered without any problems. More recently, she has undergone an L5-S1 ALIF procedure with Dr. Frankel in November 2018. This procedure was performed for lower back and bilateral lower extremity pain. She states that she woke up from surgery with excruciating pain radiating down both legs accompanied with significant numbness and weakness. She was told that there were screws pressing on her nerves, and she underwent an additional procedure with Dr. Frankel in January 2019 for removal of the screws. Following the screw removal, the excruciating leg pain improved, but the numbness and weakness has been persistent. She describes pain in her lumbosacral region and in her tailbone that feels "like a walnut" is being pressed into her spine. She also describes pain radiating into her left buttock and down her left lower extremity that is often shooting in nature. She also describes sharp pain in her toes. She states that she experiences pain with any prolonged sitting, standing, or walking. She also describes numbness and tingling sensations, mainly centered in her lower legs and feet. Her legs feel heavy with ambulation, and she requires a walker for assistance. She notes that immediately following surgery, she frequently experienced bladder incontinence. This has improved to occasional bladder leakage and increased urinary frequency. She denies any perineal numbness or bowel incontinence. Over time, her numbness and weakness has been slowly improving. It has been just within the past few weeks that she has been able to regain enough foot control to drive. She feels severely functionally debilitated due to her symptoms. She underwent physical therapy for several months, and she continues to do exercises at home. She has recently undergone a bilateral lower extremity EMG study, showing bilateral L5-S1 radiculopathies. She presents today for neurosurgical evaluation and recommendations.

211. Dr. Benedict reviewed the January 3 myelogram report.

- WMG 22

Imaging Studies:
- **CT myelogram lumbar spine (1/3/19):** Postoperative changes are noted, consistent with prior history of pedicle screw fusion at L4-5. There is also an L5-S1 interbody cage that is positioned more posteriorly than typically is
seen and the S1 fixating screws extend beyond the cortical margin of the S1 segment into the subarticular zones.

212. Dr. Benedict concluded that Pamela's symptoms were caused by nerve damage due to poor screw placement intraoperatively. He recommended delaying additional surgery, in hope that it would prove unnecessary.

- WMG 23

Assessment:
1. **S/P lumbar fusion**
2. Numbness of bilateral lower extremities
3. Weakness of both legs
4. Chronic pain syndrome

Plan:
The imaging findings as outlined above were reviewed with the patient. We reviewed with her that she appears to be experiencing the sequelae associated with nerve damage due to poor screw placement intraoperatively. She does not require additional surgery at this time. Hopefully over time, her lower extremity numbness and weakness will continue to improve. We have encouraged her to continue

Pamela Alleen Hay presents with neuropathic pain and deficits resulting from poorly placed lumbar anterior instrumentation. She underwent an ALIF at L5-S1 late last year at Piedmont Hospital. She had immediate severe radicular pain, bladder incontinence and lower extremity weakness. CT myelogram imaging would reveal that the S1 screws coursing through the cage, were in the canal and traversing the dura. These were removed and she has slowly recovered. She does not want to see her surgeon, Dr. Frankel again. She will continue care with our practice until fused, though she will be referred out for pain management. All questions answered.

William J. Benedict, Jr., MD, FAANS
WellStar Neurosurgery

213. On May 13, 2019, Pamela saw Dr. Frankel again. He noted that the nerve conduction test revealed L5-S1 abnormalities. He diagnosed Pamela with a lumbar radiculopathy and recommended epidural steroid injections to alleviate symptoms.

- PHC 96

Progress Notes by Roger Frankel, MD at 5/13/2019 2:15 PM

Author: Roger Frankel, MD | Service: (none) | Author Type: Physician
Filed: 5/18/2019 1:38 AM | Encounter Date: 5/13/2019 | Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 5/18/2019

Chief Complaint
Patient presents with
- Spondylolisthesis of lumbar region

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who is now 4 months since her last surgery. Continues to have numbness and dysesthesias in the feet. Swelling is still present and she was found to have left leg chronic DVT. She has been put on Eliquis for this. She does feel that the numbness in her right foot is improved since her last visit with me. She continues to have the more proximal weakness, but EMG revealed only L5-S1 abnormalities. She continues to try to stay active.

- PHC 99

Neurological Exam

Motor

Mild iliopsoas and quadriceps weakness. Mild gastrocnemius weakness. All of these findings are bilateral..

Sensory
Diminished light touch in both legs and S1 distribution..

Imaging Studies:

No results found.

Assessment:

1. **Lumbar radiculopathy**

- PHC 100

The patient is far enough out from surgery that we can now try L5-S1 epidural steroid injections to try to alleviate some of her symptoms. She has been treated by Dr. Rod Duralde in the past. She will continue with gabapentin. I will see her back in 2 to 3 months.

214. On June 10, 2019, Pamela saw Dr. Benedict again.

- WMG 56-62

Progress Notes - Encounter Notes

Progress Notes by William J Benedict Jr., MD at 6/10/2019 2:00 PM

Author: William J Benedict Jr., MD   Service: (none)   Author Type: Physician
Filed: 8/19/2019 4:43 PM   Encounter Date: 6/10/2019   Status: Addendum
Editor: William J Benedict Jr., MD (Physician)
Related Notes: Original Note by William J Benedict Jr., MD (Physician) filed at 8/19/2019 4:42 PM

215. Dr. Benedict reviewed Pamela's symptoms and reviewed a new lumbar CT scan from May 2019.

- WMG 57

Progress Notes by William J Benedict Jr., MD at 6/10/2019 2:00 PM (continued)

BACKGROUND AND INTERIM HISTORY

- Pamela Alleen Hay is a 67 y.o. female who was originally seen in early May 2019. She has a history of an L4-5 posterior interbody fusion performed in 2004 by Dr. Robinson. She did well after the surgery. She subsequently came under the care of Dr. Frankel at Piedmont who performed an L5-S1 anterior lumbar interbody fusion in November 2018. This procedure was done for low back and leg pain. She awoke from surgery with unrelenting radicular leg pain with associated numbness and weakness in her legs. She had a neurogenic bladder and perineal numbness as well. She was not immediately imaged, but delayed CT imaging revealed that the interbody cage at L5-S1 was entering the canal and that both the L5 and S1 screws were within the spinal canal. The S1 screws, traversed the spinal canal. The patient was taken, in January 2019 for a revision procedure and the S1 screws were removed.
- The patient continues to have left leg weakness. Walking is difficult. She has left more than right bilateral leg pain. Her primary pain is the left buttock and radicular leg pain. Her pain is in the S1 distribution, left more than right. She feels as though there is a ball in the coccygeal region, and sitting is painful. When she was evaluated by us in May 2019, she commented on lower extremity edema and an ultrasound would reveal a left lower extremity venous thrombi embolism. She is now on Eliquis.
- The patient completed a repeat CT imaging of the lumbar spine, this is reviewed today with her.

SIGNIFICANT IMAGING AND LABORATORY STUDIES

- CT lumbar spine, 5/30/2019: Posterior placement of the interbody cage at L5-S1 with focal stenosis at that level, due to a malpositioned interbody device. Remaining L5 screw breaks through the cortex and causes mild to moderate central canal stenosis at that level. Diffuse osteopenia, reactive changes in the lower lumbar vertebral bodies, and the previously known L4-5 interbody fusion with implants in good position.

- WMG 58

REVIEW OF SYSTEMS

Review of Systems
Constitutional: Positive for activity change. Negative for chills and fever.
Eyes: Negative for visual disturbance.
Genitourinary: Positive for difficulty urinating **(bladder leakage)**.
Musculoskeletal: Positive for arthralgias **(planned left knee surgery)**, back pain and gait problem. Negative for neck pain and neck stiffness.
Neurological: Positive for weakness and numbness. Negative for dizziness, tremors, seizures, syncope, facial asymmetry, speech difficulty, light-headedness and headaches.

216. Dr. Benedict concluded that the malpositioned cage and screws had injured Pamela's cauda equina, and that the cage was causing stenosis at L5-S1. Dr. Benedict ordered new x-rays to consider a laminectomy at L4-5, to decompress the

nerve roots there. Dr. Benedict concluded that an attempt to revise the cage from an anterior approach would risk serious harm to Pamela.

- WMG 62

- Malpositioned L5-S1 interbody cage with cauda equina injury secondary to malpositioned S1 screws which have been removed.
- Focal stenosis at L5-S1 due to a malpositioned and posterior placed her body cage.

PLAN

Medications, orders, instructions, follow-up:
Orders Placed This Encounter

Procedures
- X-ray Lumbar Spine - 2-3 Views (AP and Lateral)

New Prescriptions
No medications on file

Discontinued Medications
No medications on file

Modified Medications
No medications on file

Return in about 2 months (around 8/10/2019) for review of ordered imaging.

- I had a long discussion with this patient and I reviewed her CT with her. Revision of this cage from anteriorly would be associated with a high risk of injury to the iliac arteries and veins. I have suggested, a laminectomy at L4 and L5. This would treat any element of nerve root compression that might be contributing to the patient's overall pain syndrome. I was clear, that her pain is also related to nerve root injury from the S1 screws that were removed. If she were to have persistent pain, dorsal column stimulation could be considered. The patient will consider my recommendations and she will return in 2 months, sooner with any changes. I have ordered plain films to be done prior to that visit to monitor the fusion.

William J. Benedict, Jr., MD, FAANS
WellStar Neurosurgery

217. On August 19, 2019, Dr. Benedict saw Pamela again.

- WMG 92

Progress Notes by William J Benedict Jr., MD at 8/19/2019 1:00 PM

Author: William J Benedict Jr., MD Service: (none) Author Type: Physician
Filed: 8/19/2019 4:49 PM Encounter Date: 8/19/2019 Status: Signed
Editor: William J Benedict Jr., MD (Physician)

WELLSTAR NEUROSURGERY OUTPATIENT PROGRESS NOTE

218. Pamela was having pain, weakness, and difficulty walking. She had fallen in the bathtub a couple weeks before the office visit.

- WMG 93

- The patient has left leg weakness. Walking is difficult. She has left more than right bilateral leg pain. Her primary pain is the left buttock and radicular leg pain. Her pain is in the S1 distribution, left more than right. She feels as though there is a ball in the coccygeal region, and sitting is painful. When she was evaluated by us in May 2019, she commented on lower extremity edema and an ultrasound would reveal a left lower extremity venous thrombi embolism. She is now on Eliquis.
- The patient completed a repeat CT imaging of the lumbar spine, reviewed at her last visit, when we discussed a laminectomy to decompress the canal around the posteriorly displaced cage. If this failed, a DCS could potentially be of benefit.
- The patient fell about two weeks ago in the bathtub and had films done on 8/9/2019. There is stable implant placement and probable interbody fusion at L5-S1. Her numbness is worse now in the right leg. Her right leg is numb today. She is accompanied by a companion today and we reviewed all postoperative imaging as well as the preoperative myelogram as noted below revealing the location of the sacral screws that were removed. The patient is ready to have something done to help with her pain.

219. Dr. Benedict recommended an L5 laminectomy to decompress the L5-S1 nerve, but he planned to consult with a vascular surgeon to consider the feasibility of another anterior surgery.

- WMG 100

Return in about 1 month (around 9/19/2019).

- I again reviewed the surgical options I have for this patient. The posterior location of the cage at L5-S1 is causing lateral recess stenosis. The L5 screw does enter the canal, however I do not think that a third retroperitoneal exposure would be safe, particularly when considering the risk of vascular injury. I have suggested again, and L5 laminectomy to decompress the L5-S1 lateral recess. If this does not significantly help the patient, a dorsal column stimulator may be of benefit. The patient is going to attempt to obtain her intraoperative images. I did inform her, that they should be available assuming that they were saved.
- I have a call into Dr. Charles Wyble with vascular surgery. His practice has seen the patient for the above described DVT diagnosed in May 2019. His consultation will allow me to determine how long the patient may remain off systemic anticoagulation around surgery. Ideally, I would like her off the Eliquis for 2 days before surgery and 7 days after. I will also ask Dr. Wyble if a third retroperitoneal approach is feasible. I will contact the patient after we have spoken.

William J. Benedict, Jr., MD, FAANS
WellStar Neurosurgery

Electronically Signed by William J Benedict Jr., MD on 8/19/2019 4:49 PM

220. On October 3, 2019, Dr. Benedict performed an L5-S1 laminectomy.

- WMG 3

Surgical

Past Surgical History

Procedure	Laterality	Date	Comments	Source
THYROID SURGERY [SHX805]	—	1969	—	Provider
FOOT SURGERY [SHX648]	Bilateral	1993	—	Provider
WRIST SURGERY [SHX841]	Bilateral	1990	carpal tunnel	Provider
SHOULDER SURGERY [SHX246]	Right	—	replacement	Provider
REPLACEMENT TOTAL KNEE [SUR1224]	Right	—	—	Provider
LUMBAR FUSION [SHX111]	—	2004	L4-5 fusion and laminectomy by Dr. Robinson	Provider
ANTERIOR FUSION LUMBAR SPINE [SUR629]	—	11-2018/ 1/2019	L5-S1 ALIF by Dr. Roger Frankel with Atlanta Brain & Spine thgen revision	Provider
COSMETIC SURGERY [SHX468]	—	—	breast implants	Provider
LAMINECTOMY [SHX219]	—	10/03/2019	L5-S1 laminectomy, Dr. Benedict	Provider

Ongoing pain and limitations

221. Pamela continues to suffer severe pain and neurological deficits that limit her daily activities.

Count 1 – Professional Negligence (all Defendants)

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

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

i. Spine Surgery Task & Requirement — Meticulous placement of hardware in spine:

224. *Standard of care requirement:* The standard of care requires a spine surgeon to take meticulous care in placing bone graft cages, screws, and other hardware in the spine and to ensure the hardware is properly positioned before ending the surgery. Where intra-operative imaging is available, the surgeon must use it to confirm proper placement of hardware before fixing the hardware in place.

225. *Violation*: Dr. Frankel violated this requirement by failing to take steps to confirm proper placement of the ALIF implant and screws before ending the surgery.

226. *Causation*: This violation led Dr. Frankel to inflict new injury on Pamela Hay's spine and neural elements at the L5-S1 level.

227. *Damages*: This violation caused Pamela to suffer additional pain and neurological deficits.

ii. Spine Surgery Task & Requirement — Prompt investigation of unexpected, severe post-surgical pain and any new neurological deficits; prompt revision of surgical defects:

228. *Standard of care requirement:* The standard of care requires a spine surgeon to immediately investigate the source of any unexpected, severe post-surgical pain and any new neurological deficits. This typically (and in Pamela Hay's case) requires radiographic imaging of the surgical area.

229. The standard of care requires the surgeon to personally examine the images (as opposed to relying solely on a radiologist). Where the imaging reveals surgical defects, the standard of care requires the surgeon to act immediately to remedy any surgical error that can be remedied.

230. *Violation*: Dr. Frankel, Dr. Wray, and Dr. Benglis each violated this requirement by failing to investigate the source of Pamela's severe pain and the new or increased numbness in her legs during Pamela's inpatient admission to recover from the November 15, 2018, surgery.

231. Drs. Frankel, Wray, and Benglis also violated this requirement by failing to takes steps to ensure a prompt operation to remedy the mal-positioning of the bone graft cage and the three screws holding it in place.

232. *Causation*: This violation allowed the malpositioned hardware to continue injuring the neural elements at the L5-S1 level. This violation also allowed the bone graft to continue growing, so that by the time Dr. Frankel performed any revision surgery, it was unsafe to remove or reposition the cage. That is, Dr. Frankel's delay converted what might have been a temporary harm into a permanent harm.

233. *Damages*: This violation caused Pamela to suffer additional pain and neurological deficits.

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.

November 13, 2020

Respectfully submitted,

/s/ Lloyd N. Bell
Georgia Bar No. 048800
Daniel E. Holloway
Georgia Bar No. 658026

BELL LAW FIRM
1201 Peachtree St. N.E., Suite 2000
Atlanta, GA 30361
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dan@BellLawFirm.com

STATE COURT OF
DEKALB COUNTY, GA.
11/13/2020 3:53 PM
E-FILED
BY: Monique Roberts

Attorneys for Plaintiff

Affidavit of Kalman D. Blumberg, MD

Regarding Pamela Hay

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Kalman D. Blumberg, MD, who after first being duly sworn, states as follows:

Introduction

1. This affidavit addresses medical negligence in connection with a surgery Dr. Roger Frankel performed on Pamela Hay on November 15, 2018, and with the treatment of Pamela in the post-operative period.

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

3. This affidavit addresses specific matters that Plaintiff's counsel have asked me to address. I have not attempted to identify all standard-of-care violations. 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. 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.

5. 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.

6. If additional information becomes available later, my opinions may change.

7. I understand that Plaintiff's counsel will provide this affidavit to the Defendants and to the Defendants' insurance companies. I also understand

that the Defense will hire medical experts to review this case and to review this affidavit.

8. If anyone on the Defense team believes I have overlooked or misconstrued any relevant information, I invite the Defense to communicate with me by letter, copied to Plaintiff's counsel. The Defense need not wait to take my deposition to communicate with me in writing. I would like to consider any information the Defense wishes to bring to my attention and, if appropriate, to provide a supplemental affidavit addressing such information.

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

Evidence Considered

10. I have reviewed medical records and radiology images pertaining to Pamela Hay from The Emory Clinic, from Piedmont Hospital, and from Wellstar Hospital. I understand that Plaintiffs' counsel will provide the Defense with copies of the medical records I have reviewed. My views are based on the information in these records.

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 principally at issue here occurred from November 15, 2018 through January 2019.

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

a. In November 2018, 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, in 2018 I was licensed by the State of Florida to practice medicine. That's where I was practicing medicine in November 2018.

b. In November 2018, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to — specifically, the area of:

   - Performing an L5-S1 anterior lumbar instrumented fusion surgery (ALIF)
   - Following a spine surgery patient in the hospital during recovery, and addressing post-operative complications
   - Performing surgery to address post-operative complications of spine surgery.

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 2018, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

   Specifically, I completed a four-year residency in orthopedic surgery in 1989 at the Medical College of Virgina. I then completed a one-year fellowship in spine surgery at Thomas Jefferson University Hospital and Pennsylvania Hospital. I am Board Certified in orthopedic surgery.

   I have been practicing as a spine surgeon continuously for many years, and I routinely follow my patients after surgery as the primary attending physician. I routinely evaluate whether the patient needs a consultation with another specialist and either request the primary attend-

ing to order the consultation or (where I am the primary attending) order the consultation myself.

Summary of Opinions & Factual Basis

16. My principal opinions are as follows. I may elaborate on them at deposition.

i. **Spine Surgery Task & Requirement — Meticulous placement of hardware in spine:** The standard of care requires a spine surgeon to take meticulous care in placing bone graft cages, screws, and other hardware in the spine and to ensure the hardware is properly positioned before ending the surgery. Where intra-operative imaging is available, the surgeon must use it to confirm proper placement of hardware before fixing the hardware in place.

Violation: Dr. Frankel violated this requirement by failing to identify the malpositioning of the L5-S1 implant before screwing it into place. He also violated this requirement by failing to identify the malposition of the implant and screws — and failing to remedy it — before ending the surgery.

Causation: This violation led Dr. Frankel to inflict injury on Pamela Hay's spine and neural elements at the L5-S1 level.

Damages: This violation caused Pamela to suffer additional pain and neurological deficits.

ii. **Spine Surgery Task & Requirement — Investigation of post-operative complications, and revision of surgical defects:** The standard of care requires a spine surgeon to immediately investigate the source of any unexpected, severe post-surgical pain and other new neurological deficits. This typically (and in Pamela Hay's case) requires radiographic imaging of the surgical area. The standard of care requires the surgeon to personally examine the images (as opposed to relying solely on a radiologist). Where the imaging reveals surgical defects, the standard of care requires the surgeon to act immediately to remedy any surgical error that can be remedied.

Violation: Dr. Frankel, Dr. Steven Wray, and Dr. David Benglis each violated this requirement by failing to investigate the source of Pamela's severe pain and the new or increased numbness in her legs shortly after awaking from surgery and throughout her hospital stay, and by responding appropriately to the malpositioning of the L5-S1 implant and screws (which they would have identified if they had investigated as required).

Causation: This violation allowed the malpositioned hardware to continue injuring the neural elements at the L5-S1 level. This violation also allowed the bone graft to continue growing, so that by the time Dr. Frankel performed any revision surgery, it was unsafe to remove or reposition the cage. That is, the Defendants' failures to investigate and respond converted what might have been a temporary harm into a permanent harm.

Damages: This violation caused Pamela to suffer additional pain and neurological deficits.

Documents Attached

17. The following documents are attached to this affidavit: (i) a "medical principles" document, (ii) a chronology based on Pamela Hay's medical records, and (iii) a set of timelines based on the records.

18. I understand those documents are intended mainly for the benefit of the insurance adjustors responsible for evaluating this case, and for the lawyers who the insurance company will hire.

19. Plaintiffs' counsel created those documents. I have not edited them.

20. I have reviewed the medical-principles document and generally endorse the statements there. The principles stated there apply generally to this case and should be well known to the Defendants themselves, though not necessarily to the insurance adjustors and lawyers.

21. In forming my substantive views, I have relied on the medical records and the radiology images. I have not relied on the chronology and timelines as evidence. However, the chronology and timelines do serve as useful references for many of the facts reflected in the medical records on which I did rely.

Supporting Literature

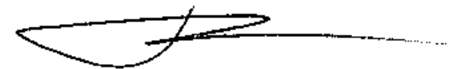
22. The medical issues in this case are not novel or obscure, and should not require research by the Defendants themselves. The medical principles that apply to this case are presumably well known to the Defendants themselves.

23. However, for the benefit of non-medical personnel involved in the Defense (attorneys, insurance adjustors, etc), the literature cited in the attached medical-principles document, while by no means exhaustive, may help in evaluating this case.

Miscellaneous

24. To repeat, this affidavit does not exhaust my opinions and of course does not reflect any opinions I may form later.

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

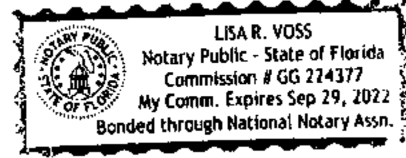


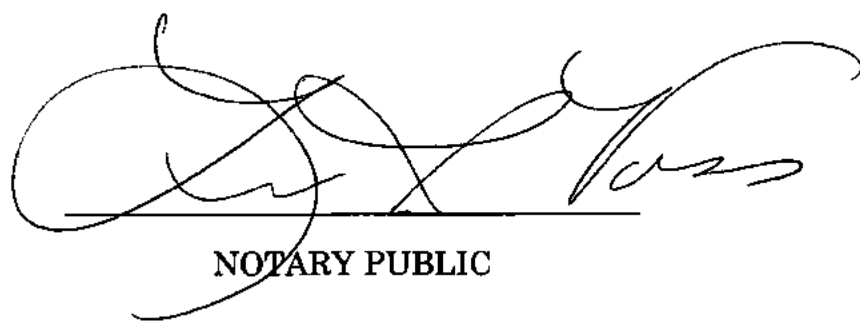
Kalman D. Blumberg, MD

STATE COURT OF
DEKALB COUNTY, GA.
11/13/2020 3:53 PM
E-FILED
BY: Monique Roberts

SWORN TO AND SUBSCRIBED before me

November 12, 2020





NOTARY PUBLIC

My Commission Expires:

CURRICULUM VITAE

Kalman D. Blumberg, M.D.

OFFICE

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License No: ME0056059
NPI: 1346234796

PERSONAL

Born December 23, 1956 in Miami, Florida. Married with three children. Interests and hobbies include boating and fishing.

EDUCATION

Fellowship
Thomas Jefferson University Hospital & Pennsylvania Hospital; Philadelphia, Pennsylvania
Spine Surgery; July 1989 – July 1990

Residency
Medical College of Virginia; Richmond, Virginia
Department of Orthopaedics and Rehabilitation
Orthopaedic Surgery; July 1985 – June 1989

Internship
Medical College of Virginia; Richmond, Virginia
Department of Surgery
General Surgery; July 1984 – June 1985

Doctor of Medicine
University of Miami School of Medicine
Miami, Florida; August 1980 – June 1984

Bachelor of Science, Engineering
Tulane University
New Orleans, Louisiana; August 1978 – May 1980

Technion
Israeli Institute of Technology
Haifa, Israel; July 1977 – July 1978

Exhibit A

EDUCATION (Cont.)

University of Florida
Gainesville, Florida; July 1976 – July 1977

Vanderbilt University
Nashville, TN; July 1974 – July 1975

CERTIFICATION AND LICENSURE

Diplomate, American Board of Orthopaedic Surgery
MOC current 2014
Fellow, American College of Surgeons
Licensed in Florida, Virginia, and Pennsylvania

PROFESSIONAL APPOINTMENTS

Broward General Medical Center
Holy Cross Hospital
Imperial Point Medical Center

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Medical Association
Broward County Medical Association
Broward County Orthopaedic Society
Caducean Society of Greater Fort Lauderdale
Florida Medical Association
Florida Orthopaedic Society
North American Spine Society

NATIONAL PRESENTATIONS

Brooker-Wills vs. Russell-Taylor Femoral Nail; A Prospective Randomized Trail
Scientific Presentation American Academy of Orthopaedic Surgeons; Atlanta, GA, 1988
Poster Exhibit American Academy of Orthopaedic Surgeons; Atlanta, GA, 1988

Brooker-Wills Femoral Nail; Technical Difficulties of Insertion
Orthopaedic Trauma Association Meeting; Baltimore, MD, November 1987

Femoral Intramedullary Rods; Clinical performance and Related Laboratory Testing
American Society for Testing Materials
Cincinnati, OH, May 1987

NATIONAL PRESENTATIONS, Continued

The Pullout Strength of Titanium Alloy MRI Compatible and Stainless Steel MRI Incompatible Gardner-Wells Tongs
Cervical Spine Research Society; San Antonio, TX, November 1990
Scientific Presentation American Academy of Orthopaedic Surgeons; Anaheim, CA, March 1990

PUBLICATIONS AND PRESENTATIONS

"The Brooker-Wills Femoral Nail: Technical Difficulties and Their Avoidance,"
Intramedullary Rods: Clinical Performance and Related Laboratory Testing, ASTM STP 1008, J.P. Harvey, A.U. Daniels and R.F. Games, Eds., American Society for Testing and Materials, Philadelphia, PA., 1989, pp. 119-129.
Kalman D. Blumberg, M.D.; G.A. Hanks,M.D.;
W.C.Foster, M.D.; J.A. Cardea, M.D.

"A Comparison of the Brooker-Wills and Russell-Taylor Nails in Fractures of the Femoral Shaft"
JBJS, No. 7, 72-A, pp. 1019-1024, 1990
Kalman D. Blumberg, M.D.; W.C. Foster, M.D.; J.F. Blumberg, et.al.

"Presentation and Treatment of Pyogenic Vertebral Osteomyelitis"
Symposium on Infections of the Spine, Seminars in Spine Surgery, accepted for publication, Dec. 1990.
Kalman D. Blumberg, M.D. and R.A. Balderston, M.D.

"Infection in Spine Surgery"
An, H., Balderston, R.A. (eds.): Complications of Spinal Surgery, accepted for publication.
Kalman D. Blumberg, M.D. and R.A. Balderston, M.D.

"Cervical Spondylitic Myelopathy, Surgical Indications"
Harry N. Herkowitz (ed.), Spine, 3rd Edition, accepted for publication.
Kalman D. Blumberg, M.D. and F.A. Simeone, M.D.

"The Effects of Mesenchymal Stem Cells on Cervical and Lumbar Fusions"
Poster at Society for Minimally Invasive Spine Surgery Annual meeting Miami, FL 9/2012
And at Orthopedic Research Society Annual Meeting San Antonio, TX 1/2013

HONORS AND AWARDS

Medical Doctor degree with research distinction from
University of Miami School of Medicine

Member of Tau Beta Phi National Engineering Honor Society

Cum laude honors Tulane University

Bachelor of Science Biomedical Engineering with Departmental Honors

RESEARCH

Medical College of Virginia
The Brooker-Wills Femoral Nail:
Technical Difficulties of Insertion
Brooker-Wills vs. Russell-Taylor Femoral Nail: A Prospective Randomized Trail

University of Miami School of Medicine
American Heart Association research grant
Lysyl Crosslinks and Arterial Mechanics
Desmosine and Pyridinoline Densities and the Biophysical Properties of Aortic Elastin and Collagen
Lysyl Crosslinks and heart valve leaflet biomechanics

Tulane University
Correlation of Brain Stem Auditory Evoked Potentials and Intracranial Pressure in Cats

Vanderbilt University
Design and Construction of EMG biofeedback Modules For Use in Rehabilitation of Stroke Patients

LECTURES

"Oh, My Aching Back"
Holy Cross Hospital Community Lecture Series, Ft. Lauderdale, FL
November 1996

Lecture Series, North Ridge Medical Center Community, Ft. Lauderdale, FL
September 1997

"Evaluation and Treatment of Low Back Disease"
Broward Association of Rehabilitation Nurses, Ft. Lauderdale, FL
September 1997

"HIV and Domestic Violence Updates 1997," North Ridge Medical Center
September 1997

"The Spine - Current Concepts of Treatment," Palm Beach, FL
September 1997

"Common Back Disorders," North Ridge Medical Center Community Lecture Series
Ft. Lauderdale, FL, March 1997

"Low Back Disease," Imperial Point Medical Center Lecture Series,
Ft. Lauderdale, FL, December 1996

"Arthritis Can Hit Even (if you're) Young," Tamarac, FL
October 1998

"Spine Surgery," South Florida Case Managers, Hollywood, FL,

"Spine Surgery," B.A.R.N. Association Meeting
Drs. Jeffrey B. Cantor & Kalman D. Blumberg, February 18, 2003

"Spinal Stenosis," North Ridge Medical Center, Ft. Lauderdale, FL
March 24, 2003

"Spinal Stenosis," JM Family Enterprises, Deerfield Beach, FL
October 8, 2003

"Back Pain," Comcast Newsmakers, Ft. Lauderdale, FL
February 20, 2004

"Back Pain," Holy Cross Hospital, Dinner with the Doctors, Ft. Lauderdale, FL
March 10, 2004

"Back Pain," North Ridge Auditorium, Fort Lauderdale, FL
March 24, 2004

"New Techniques in Spine Surgery," Corvel, Ft. Lauderdale, FL
July 28, 2005

"Total Disk Replacement," North Ridge Medical Center, Ft. Lauderdale, FL
October 3, 2005

"Total Disk Replacement," Publix and Seniors, Ft. Lauderdale, FL
January 17, 2006

POST-GRADUATE COURSEWORK / CME

American Academy of Orthopaedic Surgeons Annual Meeting, Orlando, FL
February 1995

AIDS Conference, Ft. Lauderdale, FL, April 1995

Domestic Violence, Ft. Lauderdale, FL, October 1995

Physicians Update: Risk Management, HIV/AIDS and Blood-borne Pathogens,
Ft. Lauderdale, FL, November 1995

Physicians Certification for Workers' Compensation, Ft. Lauderdale, FL
June 1996

Orthopaedic Trauma Association Annual Meeting, Boston, MA, September 1996

THE SPINE: Current Concepts and Treatment, Palm Beach, FL, September 18-21, 1997

Open and Minimally Invasive Surgery of the Lumbar and Thoracic Spine,

Memphis Tennessee, February, 1998.

POST-GRADUATE COURSEWORK / CME, Continued

Coding and Compliance for Spine Practices, Ft. Lauderdale, FL, March 1998

Current Concepts in Spinal Endoscopy, Memphis, TN., July 17, 1999

"15th Annual Meeting" of North American Spine Society, New Orleans, LA
October 25-28, 2000

Controversies & Challenges in Spinal Surgery, Naples, FL., December 9-10, 2000

North American Spine Society, Washington State Convention and Trade Center
November 1-3, 2001

Innovations, Challenges and Controversies in Spine Surgery, Jackson Hole, WY
July 27-28, 2001

"Inflatable Bone Tamp Technology," Kyphon, Sarasota Memorial Hospital, Sarasota, FL, January 11, 2002

"2000 Adult Spine Examination," American Association of Orthopaedic Surgeons, Rosemont, IL, April 29, 2002

"2000 Musculoskeletal Trauma Examination," American Association of Orthopaedic Surgeons, Rosemont, IL, April 29, 2002

"Emerging Concepts in Spine Surgery: Controversies and Challenges in the Spine Surgeon's Practice," Key Largo, FL., May 3-4, 2002

"Minimal Access Spinal Technologies Hands-on Lab", Memphis, TN, May 17, 2002

"ACSS Challenge of the Spine: A Comprehensive Neurosurgical Orthopedic Course," University of Texas Medical Branch, Galveston, TX, October 21, 2002

North American Spine Society, 18th Annual Meeting, San Diego, CA
October 21-25, 2003.

"2nd Annual Dynamic Spine Stabilization," Texas Health Research Institute
November 15, 2003

"Techniques for Fixation in the Cervical and Thoracic Spine," Fort Lauderdale, Florida December 5, 2003

"Innovative Techniques in Spine Surgery," Organization for Spinal Teaching and Research/Spine Technology Education Group, Los Cabos, Mexico, August 4-7, 2004

"Charite' Artificial Disc Comprehensive Training Program," Endo-Surgery Institute, Center for Spine Arthroplasty, Cincinnati, Ohio, November 10, 2004.

"Medical Error Prevention and Root Cause Analysis," CME Resource, February, 2006

POST-GRADUATE COURSEWORK / CME, Continued

"Domestic Violence: The Florida Requirement," CME Resource, February, 2006

"HIV/AIDS: Epidemic Update for Florida," CME Resource, February, 2006

"Eating Disorders," CME Resource, February, 2006

"Vaccinia: The Vaccine That Protects Against Smallpox," CME Resource
February, 2006

"Patients Requiring Permanent Pacemakers," CME Resource, February, 2006

"Hepatitis Viruses," CME Resource, February, 2006

"A Review of Interventional Radiology," CME Resource, February, 2006

"Clinical Management of Atrial Fibrillation" CME Resource, February, 2006

"Care of the Pediatric Trauma Patient, CME Resource," April, 2008

"Clinical Management of Patients with Ventricular Arrhythmias," April, 2008

"HIV/AIDS: Epidemic Update," CME Resource, April, 2008

"Medical Error Prevention and Root Cause Analysis," CME Resource, April, 2008

"Domestic Violence: The Florida Requirement," CME Resource, April, 2008

"Medical Ethics for Physicians," CME Resource, April, 2008

"Sepsis: Diagnosis and Management," CME Resource, April, 2008

"Pain Management, Palliative Care and Treatment of the Terminally Ill, " April, 2008"

2009 Annual Meeting, American Association of Orthopaedic Surgeons, Las Vegas, NV, February 25-28, 2009

Federation of Spine Associations, Las Vegas, NV, February 28, 2009

American Association of Orthopaedic Surgeons, "EMR and Other Technologies – Revolutionary Change in Orthopaedic Practice," June 11-13, 2010

American Association of Orthopaedic Surgeons, "Adult Spine Scored and Recorded Self-Assessment Examination of 2009," August 15, 2010

North American Spine Society – 25th Annual Meeting, Orlando, FL, October 5-9, 2010

Cervical Spine Research Society – Instructional Course, Charlotte, NC, December 1,

POST-GRADUATE COURSEWORK / CME, Continued

2010 Annual Meeting Cervical Spine Research Society, Charlotte, NC, December 2-4, 2010

American Association of Orthopaedic Surgeons, "Musculoskeletal Trauma Scored and Recorded Self-Assessment Examination,"December 5, 2010

American Association of Orthopaedic Surgeons, Board Maintenance of Certification™ Preparation and Review (East), November 17-19, 2011

"Orthbullets MOC Daily Study Plans," CME Resource, September, 2013

"#91331 Medical Error Prevention and Root Cause Analysis," CME Resource, November, 2013

Medical Principles

Case: Pamela Hay

Anatomy of the spine generally

1. The human brain is connected to the body through the spinal cord.
2. The spinal cord runs down the body through a canal in the bony spinal column.
3. The spinal column consists of multiple bony vertebrae separated by spongy intervertebral disks.
4. The spinal column in the neck, above the ribs, is called the cervical spine. The spinal column at the level of the ribs is called the thoracic spine. The spinal column below the ribs, connecting to the pelvis, is called the lumbar spine.
5. Toward the bottom of the thoracic spine, the spinal cord fans out into separate bundles collectively called the "cauda equina."
6. Each individual vertebra consists of an anterior vertebral body (in front of the spinal cord), posterior elements (behind the spinal cord), and pedicles (to the sides of the spinal cord).
7. Together, the parts of the bony vertebrae encircle the spinal cord and form the canal through which the spinal cord and cauda equina run. The hole in the middle of each individual vertebra, where the cord or cauda equina passes through, is called the vertebral foramen.
8. At the various levels of the spine, nerve roots from the spinal cord emerge through openings in the spinal column — the intervertebral or neural foramina.
9. Where the nerve roots exit the spinal column, they connect with networks of nerves that run to various organs and tissues of the body — combining to connect the brain to the body as a whole.
10. The nerves connecting the brain to the body serve multiple functions. Some nerves send sensation signals up to the brain — allowing us to feel pleasure and pain. Some nerves control muscles, allowing us to move our bodies intentionally. Some nerves control organs without our conscious awareness.

Spondylolisthesis and degenerative disk disease

11. "Spondylolisthesis" refers to a misalignment of two vertebrae — where one vertebra has moved abnormally forward or backward compared to an adjacent vertebra.
12. Spondylolisthesis can narrow the vertebral foramina that form the spinal canal, thereby compressing the spinal cord or cauda equina. Narrowing of an opening for a neural element is called "stenosis."
13. Stenosis of a vertebral foramen can cause pain and neurological deficits — including numbness, tingling, weakness, or impairment of normal organ function.
14. Spondylolisthesis often occurs in tandem with degenerative disk disease.
15. Degenerative disk disease involves the breakdown of the intervertebral disk due to aging and wear and tear.
16. A degenerating disk may flatten and bulge. This may reduce the height between two adjacent vertebrae, narrowing the foramina. The bulging disk may directly impinge on the intervertebral foramina. These changes can compress the nerve roots passing through the intervertebral foramina.
17. A degenerating disk and/or spondylolisthesis may occur in tandem with arthritic changes in the joint where the posterior elements of adjacent vertebrae join together to control the movement of the spine. (This joint may be called the "facet joint," "apophysial joint," or "zygapophysial joint.")
18. Arthritic changes at the facet joint may include abnormal bone growth that impinges on the intervertebral foramina and compresses the nerve roots.
19. Spondylolisthesis and degenerative disk disease, separately or in combination, may cause pain and neurological deficits.
20. A variety of potential surgical operations have been developed to remedy pain and neurological deficits arising from spondylolisthesis and/or degenerative disk disease.

Surgery principles

21. Spine surgeries vary in how extensive or invasive they are, but any spine surgery is a major surgery.
22. Any spine surgery poses significant risks to the patient.

23. Surgery at the spine carries the risk of injuring the neural elements near the site of the surgery.
24. Surgical injury to the spinal cord, cauda equina, or nerve roots can injure the patient catastrophically.
25. Surgical injury to the spinal cord, cauda equina, or nerve roots can cause the patient severe, permanent pain and neurological deficits.
26. To get to the spine, a surgeon must cut through some tissues and move other tissues or organs out of the way.
27. The difficulty of getting to the spine safely varies depending on which part of the spine is involved and which angle (front, back, side, etc.) the surgeon approaches the spine from.
28. Repeated surgeries to the same area of the spine may increase the risk of surgical injury to the patient, in part because of the presence of scar tissue.
29. Spine surgery should be offered to a patient only if more conservative therapies are unable to provide adequate relief.
30. To recommend a specific spine surgery, the surgeon must first identify the specific source of the pain or deficits to be remedied.
31. In recommending a specific spine surgery, the surgeon must carefully consider whether that surgery is likely to be safe and effective for the patient.
32. In performing surgery on the lumbar spine, the surgeon must exercise special caution to avoid nerve root injury from a screw, excessive nerve root retraction, and neural injury due to malpositioned interbody devices.
33. When placed too medially or into a foramen, a screw can cause direct mechanical damage to nerve roots or cord.
34. A malpositioned graft in the canal space may cause cord compression or cauda equina syndrome.
35. In performing a spine surgery, the surgeon must act with meticulous care to avoid damaging the neural elements at or near the surgical site.
36. In placing bone graft cages, screws, or medical devices in or on the spine, the surgeon must act with meticulous care to position the devices properly.

37. Modern operating rooms for spine surgery typically are equipped to take x-ray images of the patient from different angles, without having to move the patient. Some operating rooms are equipped for intraoperative CT scans.
38. A spine surgeon placing a bone graft cage in the spine must confirm proper placement of the device with intraoperative imaging, before fixing the cage in place.
39. A spine surgeon intending to use screws to fix an implant into the spine must ensure that the screws are not long enough to protrude into an intervertebral foramen or into the neural foramen.
40. After fixing a bone graft cage or screws into the spine, the surgeon must confirm proper placement with intraoperative imaging.
41. In using intraoperative imaging to confirm proper placement of medical devices, the surgeon must examine the images carefully and must take additional images if necessary to get a clear view of the position of the screws relative to the foramina.
42. Intraoperative neurological monitoring (IOM) during spinal procedures is used to monitor spinal cord and nerve function and alert the surgeon to any compromise of such.
43. IOM usually involves a combination of somatosensory evoked potentials (SSEP), free-run and stimulated electromyography (EMG), and motor evoked potentials (MEP).
44. Intraoperative EMG lets the surgeon know if a nerve root is irritated.
45. A spine surgeon should use IOM in any surgery involving a significant risk of intraoperative neurological injury detectable by IOM.
46. If intraoperative imaging or neurological monitoring indicates that the surgeon has positioned a device improperly in the spine, the surgeon must remove and/or reposition the device before ending the surgery.
47. Where the surgery causes new injury, it is important to remedy the injury during the surgery, if feasible. Repeat surgeries bring greater risks to the patient, in part because of scar tissue that forms inside the body, each time a surgeon cuts into the body. The scar tissue can make a repeat surgery more difficult and less effective, and the scar tissue can cause other medical problems for the patient.

Post-operative care

48. Postoperative complications are always possible and can be devastating for the patient. The surgeon must ensure diligent monitoring of the patient in the immediate post-operative period and promptly address complications.
49. Before and after spine surgery, the surgeon should perform a careful neurologic examination, to identify any postoperative neurological deficit.
50. A spine surgeon should order post-operative neuro- and vascular monitoring, and make sure that the nursing staff understands the importance of and specifically which groups of muscles or distal pulses need to be monitored.
51. In the event of unexpected postoperative pain, the surgeon should perform a neurologic examination to attempt to localize any new deficits.
52. A spine surgeon must never disregard inappropriate or increasing complaints of pain, as this might be one of the first signs of a possible lurking disaster such as an epidural hematoma.
53. In the event of unexpected postoperative pain, with a normal or unchanged neurologic examination from the preoperative baseline, an imaging study should be obtained immediately to investigate any possible operative complication.
54. Any new neurologic deficit, especially if it is focal and localizes to the operative region, should be immediately evaluated with postoperative imaging.
55. Postoperative investigatory imaging should be obtained in a timely manner, because a reversible condition could be identified. An MRI or CT should be used to determine if the new neurologic deficit is a result of a hematoma, a misplaced implant, or an inadequate decompression.
56. If postoperative imaging reveals a new injury that may be surgically reversible, the surgeon should, if safe, perform an exploratory surgery and, if possible, remedy the new deficit.
57. A surgeon must not wait months to remedy a surgical error that could have been remedied during the initial surgery or later the same day.

Supporting Literature

Bridwell, Keith H., and Ronald L. Dewald, eds. *The textbook of spinal surgery*. Lippincott Williams & Wilkins, 2011.

MacKenzie, C. Ronald, Charles N. Cornell, and Stavros G. Memtsoudis, eds. *Perioperative care of the orthopedic patient*. 2d Ed. Springer New York, 2020.

Patel, Vikas V., et al. *Spine surgery basics*. Springer, 2014.

Pinheiro-Franco, João Luiz, et al., eds. *Advanced concepts in lumbar degenerative disk disease*. Springer, 2016.

Rhee, John, et al., eds. *Operative techniques in spine surgery*. 2d Ed. Wolters Kluwer, 2016.

Steinmetz, Michael P., and Edward C. Benzel. *Benzel's Spine Surgery E-Book: Techniques, Complication Avoidance, and Management*. 4th Ed. Elsevier Health Sciences, 2017.

van de Kelft, Erik, ed. *Surgery of the Spine and Spinal Cord: A Neurosurgical Approach*. Springer International Publishing, 2016.

Zdeblick, Thomas A., and Todd Albert. *Master Techniques in Orthopaedic Surgery: The Spine*. 3d Ed. Wolters Kluwer: Lippincott Williams & Wilkins, 2014.

Case Chronology for Experts
Pamela Hay Case

Notes

Please do not rely on this chronology for any substantive purpose. In forming your substantive views, please rely only on the underlying records themselves. We have tried to include many of the facts in this chronology, but it is necessarily incomplete. Additionally, while we have tried to ensure its accuracy, errors may have slipped in.

We provide this chronology only to make it easier to navigate the voluminous records and to provide a concise, chronological reference sheet for at least some of the relevant facts.

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Before the Nov 15, 2018, Surgery

November 2017 through August 2018

1. In November 2017, Pamela Hay — then 66 years old — underwent surgery for a right knee replacement.

- WMG 3 (screenshot below)

Surgical

Past Surgical History

Procedure	Laterality	Date	Comments	Source
THYROID SURGERY [SHX805]	—	1969	—	Provider
FOOT SURGERY [SHX648]	Bilateral	1993	—	Provider
WRIST SURGERY [SHX841]	Bilateral	1990	carpal tunnel	Provider
SHOULDER SURGERY [SHX246]	Right	—	replacement	Provider
REPLACEMENT TOTAL KNEE [SUR1224]	Right	—	—	Provider
LUMBAR FUSION [SHX111]	—	2004	L4-5 fusion and laminectomy by Dr. Robinson	Provider
ANTERIOR FUSION LUMBAR SPINE [SUR629]	—	11-2018/ 1/2019	L5-S1 ALIF by Dr. Roger Frankel with Atlanta Brain & Spine thgen revision	Provider
COSMETIC SURGERY [SHX468]	—	—	breast implants	Provider
LAMINECTOMY [SHX219]	—	10/03/20 19	L5-S1 laminectomy, Dr. Benedict	Provider

2. Some months after that, Pamela began suffering pain in her low back and legs. Pamela tolerated the pain for months, before eventually going to Dr. Di Cui — a physical medicine & rehab doctor — in June 2018.

- TEC 125

Document Type: SPINE NTE
Document Date: June 15, 2018 14:50
Document Status: Auth (Verified)
Document Title: New Patient- Dr. Cui
Performed By: Endsley, Lynelle M on June 15, 2018 15:27
Verified By: Cui, Di on June 15, 2018 16:15
Encounter info: 41531713, TEC, TEC Visit, 6/15/2018 - 6/15/2018

*** Final Report ***

Visit Information
No referring provider documented

Chief Complaint
New pt, eval Lumbar pain

History of Present Illness
This is a new 66 year old female who presents to the clinic with complaints of severe LBP since January and she reports it is progressively worsening. She has a history of spinal fusion at L4/5 approximately 10 years ago. This was for back and leg pain and she reports she has done well since that time. She believes this may have started after her right TKA in Nov, 2017. She does complain of pain in her posterior thighs to the knees and very infrequently she reports pain radiating posteriorly in the left LE to the foot. Her pain is increased with walking and standing. She does not get much rest relief. She does have difficulty sleeping at night due to pain. Her pain today is a 7/10. She is taking Tylenol arthritis 2 tabs in the morning, and Tylenol #3 and Flexeril q HS. Her pain today is 90 % back pain and 10% leg pain. She denies any acute change in bowel or bladder, fever or chills, difficulty with balance or fine motor tasks.

- Dr. Cui bio at https://providers.emoryhealthcare.org/provider/Di+Cui/777924

3. In May 2018, before seeing Dr. Cui for the low back and leg pain, Pamela underwent surgery for a right shoulder replacement in May 2018.

- WMG 3 (screenshot above)

4. On June 15, 2018, Pamela saw Dr. Di Cui to address the low back and leg pain.

- TEC 125 (screenshot above)

5. Years earlier, Pamela had undergone spine surgery for pain in her back and legs. In 2004, Pamela had undergone an L4-5 laminectomy and fusion. Pamela got significant pain relief from that surgery.

- TEC 125 (screenshot above)

6. At the June 15 visit with Dr. Cui, Pamela hoped that lidocaine injections would suffice to alleviate her pain. Dr. Cui administered injections and ordered a lumbar MRI.

- TEC 127

Assessment/ Plan
1. Low back pain M54.5
2. SI (sacroiliac) joint inflammation M46.1
3. S/P lumbar spinal fusion Z98.1
1) Discussed treatment options with the patient including right SI joint injection. Patient wishes to proceed with this and this is going to be scheduled at her convenience.
2) (Proceedure Note) Patient is very painful in the office today and requesting trigger point injections for pain relief in the office today. We have discussed indications risks and benefits of the procedure. Patient wishes to proceed with this and under sterile conditions patient was given injections of lidocaine into areas of point tenderness in the right gluteus medius and near the right SI joint. patient tolerated the procedure well and reported some pain relief prior to leaving the office. Patient advised to ice 20 min off 20 min on PRN pain relief.
3) Due to the degenerative findings on the patient's lumbar fils today at the levels above and below her previous spinal fusion Dr. Cui has ordered an MRI of the lumbar spine for additional diagnostics. We will review the results at f/u
4) Patient may continue with OTC Tylenol, T3 and Flexeril per her PCP.
5) We will plan to see the patient back in f/u 2 weeks after her right SI joint injection to discuss the results, review the results of the lumbar MRI and we will develop additional treatment plan at that time.

7. On July 10, 2018, Pamela had a lumbar MRI. Dr. Amit Saindane interpreted the MRI images.

- TEC 228-29

Document Type:	MRI Spine Lumbar w/+ w/o Contrast
Document Date:	July 10, 2018 14:16
Document Status:	Auth (Verified)
Document Title:	MRI Spine Lumbar w/+ w/o Contrast
Performed By:	Saindane, Amit M on July 10, 2018 14:49
Verified By:	Saindane, Amit M on July 10, 2018 14:49
Encounter info:	56479218178, EUH, Single Visit OP, 7/10/2018 - 7/10/2018

8. Dr. Saindane found no abnormalities in Pamela's conus or cauda equina.

- TEC 229

Conus Medullaris: Terminates at a normal level

Cauda Equina: Normal

Paraspinal Soft Tissues: Normal

9. Dr. Saindane found "minimal" spondylolisthesis at the L2-L3 level and at the L5-S1 level.

- TEC 228

Alignment: Patient is status post posterior instrumented spinal fusion at L4 and L5 with bilateral pedicle screws and posterior rods. There is minimal retrolisthesis of L2 on L3 and minimal anterolisthesis of L4 on L5. Minimal anterolisthesis of L5 on S1.

10. Dr. Saindane found mild loss of disc space height at the L2-L3 level and the L3-L4 level.

- TEC 229

Intervertebral Discs: Multilevel disc desiccation. Expected loss of disc space height at L4/5. Mild loss of disc space height at the L2/3 and L3/4 levels.

11. Dr. Saindane found a small disc protrusion at the L1-L2 level with minimal contact with the descending left L2 nerve root.

- TEC 229 (screenshot below)

12. Dr. Saindane found circumferential disc bulges at the L2-L3 level and at the L3-L4 level, with mild or moderate foraminal narrowing.

- TEC 229 (screenshot below)

13. Dr. Saindane found facet arthropathy at the L2-L3 level, the L3-L4 level, and at the L4-L5 level. Dr. Saindane found "severe" facet arthropathy at the L5-S1 level.

- TEC 229

Individual Levels:

T12-L1: Normal

L1-L2: Left paracentral disc protrusion with minimal contact of the descending left L2 nerve root. No stenosis.

L2-L3: Circumferential disc bulge with facet arthropathy and ligamentum flavum thickening results in narrowing of the subarticular regions bilaterally. Mild right and mild to moderate left neural foraminal narrowing.

L3-L4: Circumferential disc bulge with facet arthropathy and ligamentum flavum thickening with subarticular narrowing and mild central spinal canal stenosis. Moderate bilateral foraminal narrowing.

L4-L5: Facet arthropathy. No stenosis.

L5-S1: Disc uncovering related to anterolisthesis. Severe facet arthropathy and ligamentum flavum thickening. Bilateral subarticular narrowing. No significant spinal canal stenosis centrally. Moderate left-sided neural foraminal narrowing.

14. Dr. Saindane concluded that the prior spine surgery and fusion at the L4-L5 level contributed to some of the abnormalities at the L3-L4 level and the L5-S1 level.

- TEC 229

IMPRESSION:
Postoperative changes from prior L4/5 posterior instrumented spinal fusion. Degenerative changes above and below the levels of fusion results in subarticular narrowing and moderate neural foraminal narrowing at L3/4 and L5/S1 as described above.

15. On July 10, after the MRI, Pamela saw Dr. John G. Heller, an orthopedic spine surgeon.

- TEC 240

Document Type:	SPINE NTE
Document Date:	July 10, 2018 00:00
Document Status:	Auth (Verified)
Document Title:	SPINE NTE
Performed By:	HELLER, JOHN GAYLORD on July 11, 2018 10:15
Verified By:	HELLER, JOHN GAYLORD on July 11, 2018 20:15
Encounter info:	41713446, TEC, TEC Visit, 7/10/2018 - 7/10/2018

- Dr. Heller bio at: https://providers.emoryhealthcare.org/provider/John+G+Heller/778104

16. Pamela was still suffering serious pain in her low back, as well as aching, tingling, and numbness in her left leg.

- TEC 240

Ms. Hay is a pleasant 66 y/o female who presents to the office today for evaluation of low back and bilateral leg pain. She reports a previous L4-5 fusion approximately 10 years ago for low back and leg pain with Dr. Robinson at Piedmont. She got good relief of those symptoms post-op. In November 2017, she began to experience both low back and right buttocks pain after a right knee replacement. Her LBP wakes her from sleep and worsens with standing > 30 minutes. (+) shopping cart sign. She reports left leg paresthesias in a lateral distribution to the foot, but no pain. She denies LE weakness, balance problems, or bowel/bladder incontinence. She also denies recent fevers/chills/night sweats/unexplained weight loss. She is currently taking arthritis-strength Tylenol and tramadol as needed for pain. She has previously seen Dr. Levy for a bilateral SI joint injection (6/29/2018), which she reports provided relief x 1 day. She last completed formal PT 1 year ago. PMH remarkable for HTN, lupus, RA (on prednisone daily), and hypothyroidism. PSH includes right shoulder replacement, right knee replacement, bilateral CTS surgery, thyroid surgery, and surgery for plantar fasciitis. Former smoker, quit 25+ years ago.

CHIEF COMPLAINT
The patient's chief complaint is her left leg. She also has a problem with her lower back.

Lower back - aching pain, tingling, numbness; Worst pain 7/10; Average pain 5/10; Trend: worsening
Left leg - aching pain, tingling, numbness; Worst pain 8/10; Average pain 5/10; Trend: worsening

The left leg pain travels to the knee, outside of foot and lateral lower leg. The pain is distributed Leg 50% - Back 50%.

The patient stated that she has pain 75% of her waking hours. The patient indicated that 0% of her pain is relieved in her most comfortable position.

The patient indicated that she recently experienced the following serious (i.e. red flag) problems: hard to fall asleep, pain awakes from sleep and unbalanced walking.

17. Pamela had tried injections, chiropractic treatment, and acupuncture. She was taking muscle relaxers and pain medications.

- TEC 241

HISTORY OF PRESENT ILLNESS
CAUSE: Gradual with unknown cause with onset 7 months ago. The patient had this problem one other time. The first episode was less than a year ago.
DAILY ACTIVITIES: Retired with light daily activities.
PRIOR SPINE SURGERIES: Back: 1; The most recent back surgery (patient doesn't recall procedure) occurred more than 5 years ago to relieve both back and leg pain. The previous symptoms were somewhat similar. This surgery provided relief for more than 2 years.
Complications: None. The patient was very satisfied with the results.
PRIOR PHYSICAL THERAPY: None
PRIOR INJECTIONS: One injection in the last year with the last injection (+XR) 1-2 weeks ago. The injection provided some relief immediately (100%) lasting one day.
PRIOR TREATMENTS: chiropractic/manipulation and acupuncture
PRIOR STUDIES: X-Ray, MRI
CURRENT SPINE MEDICATIONS:
OTC (daily last week) Side Effects: no side effects
RxNSAID (daily last week) Side Effects: no side effects
Pain Narcotic (daily last week) Side Effects: no side effects
Muscle Relaxant (occasionally last week) Side Effects: no side effects
Anti-Depressant (daily last week) Side Effects: no side effects

18. Dr. Heller performed an examination. His lumbar examination revealed weaknesses in both of Pamela's legs and feet, as well as abnormal deep tendon reflexes in both legs. Dr. Heller performed a sensory exam, which he found normal for the dermatomes associated with spine levels L2 through S1.

- TEC 243

LUMBAR EXAMINATION
Right hip pain with hip flexion supine
TENDERNESS/SPASMS: No significant spasms or tenderness to palpation were noted.
FLEXION/EXTENSION: Normal
LATERAL BENDING/ROTATION: Normal
HIP RANGE OF MOTION: Hip flexion, extension, abduction, adduction, internal rotation and external rotation all normal bilaterally
MOTOR STRENGTH
Left Side Normal: Hip ABDuction, Hip ADDuction, Knee Flexion, Knee Extension, Ankle Plantarflexion, Ankle Eversion
Left Side Weakened: Hip Flexion - 4/5, Ankle Dorsiflexion - 4/5, Great Toe Dorsiflexion - 4/5
Right Side Normal: Hip ABDuction, Hip ADDuction, Knee Flexion, Knee Extension, Ankle Plantarflexion, Ankle Eversion
Right Side Weakened: Hip Flexion - 4/5, Ankle Dorsiflexion - 4/5, Great Toe Dorsiflexion - 4/5
HEEL AND TOE WALKING: Normal bilaterally
MUSCLE ATROPHY: No calf or thigh atrophy bilaterally
DEEP TENDON REFLEXES
Left Side Normal: Babinski normal
Left Side Abnormal: Knee Jerk 1+/decreased, Ankle Jerk 0/absent
Right Side Normal: Babinski normal
Right Side Abnormal: Knee Jerk 0/absent, Ankle Jerk 0/absent
SENSORY INDEX: L2,L3, L4, L5, and S1 all normal bilaterally
STRAIGHT LEG RAISE: Seated, supine and crossed leg SLR normal bilaterally
NERVE TENSION SIGNS: Femoral stretch normal
DISTAL PULSES: Dorsalis pedis and posterior tibial palpable bilaterally
SACROILIAC TEST: Normal

19. Dr. Heller reviewed the MRI images taken the day of his examination, and he agreed with Dr. Saindane's interpretation.

- TEC 243-44

IMAGING INTERPRETATION - 7/10/2018
6/15/2018 Lumbar - AP/Lateral -EMORY HEALTHCARE -Quality Good
I have reviewed the images and agree with the report as dictated. No fractures noted.
Previous L4-5 fusion with multi-level lumbar disc degeneration and L5-S1 degenerative spondylolisthesis

7/10/2018 (Today) Lumbar MRI -EMORY HEALTHCARE -Quality Good

I have reviewed the images and agree with the report as dictated. No fractures noted.
Previous L4-5 fusion
T11-12 disc degeneration
Left L1-2 HNP
Disc bulges at L2-3 and L3-4 with mild-moderate bilateral NFS
L5-S1 facet joint effusions and left-sided disc bulge with NFS

20. Dr. Heller diagnosed Pamela with multi-level lumbar disc degeneration, Grade 1 spondylolisthesis at L5-S1, foraminal stenosis at L4-L5, and stenosis at L3-L4.

- TEC 244

DIAGNOSIS/IMPRESSION
66 y/o female with multi-level lumbar disc degeneration, Grade I L5-S1 degenerative slip, and left NFS below old fusion at L4-5 (TLIF).
L3-4 stenosis.

21. Dr. Heller recommended conservative treatment — injections for pain, and physical therapy. He recommended postponing surgery as long as possible.

- TEC 244

INJECTIONS
I recommended the following injection:
if pain persists or worsens
Bilateral L5-S1 facet injections

TREATMENT PLAN
I recommended the following treatment plan:
Physical Therapy: Aquatics Home Exercise Program and Weight Loss Program

PATIENT SUMMARY

66 y/o female with multi-level lumbar disc degeneration, Grade I L5-S1 degenerative slip, and left NFS below old fusion at L4-5 (TLIF). L3-4 stenosis. Explained her diagnosis and the magnitude of surgical intervention. Recommended weight loss, water aerobics. She could also try bilateral L5-S1 facet injections. Recommend postponing surgery as long as possible.

22. After his July 10 examination of Pamela, Dr. Heller wrote a letter to Dr. Cui. Dr. Heller emphasized that a spine surgery at Pamela's then-current age (nearing 67) would present a more difficult recovery than Pamela had faced after her previous spine surgery in 2004. Dr. Heller emphasized his recommendation to forestall surgery as long as possible.

- TEC 245-47

First and foremost, I wanted Ms. Hay to understand that any decision that she might be making at this stage in her life about back surgery will be completely unlike what she experienced 10 years ago. This is due to the fact that she is 10 years older, has a BMI of 37, and has multiple lumbar

segmental issues. This is not just a simple matter of a 1-level stenosis and degenerative spondylolisthesis as it was a decade ago.

The fact that she feels great in a swimming pool is very important. We talked about how that works in her favor with regard to exercise, weight loss, changes in her nutrition. We also talked about the relationship between obesity and postoperative complications with regard to spine surgery as well as knee replacement surgery. My suggestion to her at this point is to forestall any surgery as long as possible. I recommended trying bilateral L5-S1 facet blocks as a way to facilitate her exercise. I agree that physical therapy would be a good idea for her if it helps her with both the aquatic exercise and a home exercise program. If she does her homework, she can push off the surgery a good long time and optimize the likelihood of success if and when she ends up having to submit.

Best wishes,

John G. Heller, MD
Baur Professor of Orthopaedic Surgery
Department of Orthopaedics

23. On August 2, 2018, Pamela underwent a facet injection for pain control.

- TEC 285

Date: 08/02/18 Time: 11:10 Scheduled Procedure: BIL L5-S1 FACET INJ

Diagnosis: ☐Radiculopathy/Stenosis; ☑Facet Pain/Spondylosis; ☐SI joint Pain; ☐Other:

Procedure: ☐Epidural Steroid Injection; ☐Medial Branch Block; ☑Facet Injection;

24. On August 16, 2018, Pamela saw Dr. Cui again.

- TEC 340

Document Type:	SPINE NTE
Document Date:	August 16, 2018 14:14
Document Status:	Auth (Verified)
Document Title:	Office Visit Note
Performed By:	Cui, Di on August 16, 2018 14:17
Verified By:	Cui, Di on August 16, 2018 14:17
Encounter info:	41753878, TEC, TEC Visit, 8/16/2018 - 8/16/2018

25. The injections had not helped much, and Pamela asked for an outside spine surgery consultation. Dr. Cui agreed to make a referral. Dr. Cui also noted the possibility of a spinal cord stimulator, if further injections did not help Pamela.

- TEC 340, 42

Patient return to clinic after consultation with Dr. Heller, SI joint and facet injections. She felt injections did not help and she request outside surgical spine consultation

Assessment/Plan
1. Low back pain M54.5
2. Lumbar spondylosis M47.816
3. Degenerative lumbar disc M51.36
4. H/O lumbosacral spine surgery Z98.890

Orders:
Misc Non-Medication, Referal to Spine Clinic, See Instructions, # 1 ea, Refer to surgical spine clinic, 0 Refill(s), Substitution Allowed
traMADol, 50 mg = 1 tab(s), PO, q6hr, PRN for pain, # 60 tab(s), May start with half tablet, 1 Refill(s), Substitution Allowed

- Previous MRI/XR visualized and reviewed
- Refer to outside surgical spine per patient request
- Consider a trial of bilateral L5-S1 TFESI
- Medical records reviewed, all spine-related records prepared and given to patient.
- PRN tramadol refill, will need UDS if need regularly
- Consider SCS if non-surgical and if does not improve with ESI

26. On August 30, 2018, Pamela underwent a bilateral L5-S1 transforaminal epidural steroid injection.

- TEC 365

Date of Service: 08/30/18
Encounter No.: 10003204733 TEC VISIT NBR
Attending Physician: Cui, Di
Referring Physician:

Procedure Performed:
1) BILATERAL L5-S1 transforaminal epidural steroid injections with fluoroscopic guidance
2) Moderate Sedation (15 min, CPT 99152)

October through November 14, 2018

27. On October 15, 2018, Pamela saw Dr. Roger Frankel, a neurosurgeon affiliated with Piedmont Hospitals. Dr. Cui had referred Pamela to Dr. Frankel.

- PHC 26

Progress Notes by Roger Frankel, MD at 10/15/2018 2:00 PM

Author: Roger Frankel, MD   Service: (none)   Author Type: Physician
Filed: 10/27/2018 7:21 PM   Encounter Date: 10/15/2018   Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 10/15/2018

Chief Complaint
Patient presents with
- Back Pain
  LBP
- Leg Pain
  bilateral leg pain, wprse on the right side

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who was referred to us for neurosurgical consultation by Dr Cui MD. We will share the results with the referring physician. The patient presents with complaints of low back

- Dr. Frankel bio: https://doctors.piedmont.org/provider/Roger+Herman+Frankel/390400

28. Dr. Frankel performed a neurological examination, noting multiple abnormalities.

- PHC 29

Motor

	Right	Left
Iliopsoas	5	5
Quadriceps	5	5
Hamstring	5	5
Gastrocnemius	5	5
Anterior tibialis	5	5
Extensor hallucis longus	5	5

Sensory
Left: Loss of sensation in the S1 dermatome.

Reflexes

	Right	Left
Patellar	1+	1+
Achilles	0	0
Plantar	Downgoing	Downgoing

Right pathological reflexes: Ankle clonus absent.
Left pathological reflexes: Ankle clonus absent.

Gait
Casual gait: Normal stride length. Antalgic gait.
Normal toe walking. Normal heel walking. Romberg is absent.

29. Dr. Frankel reviewed the July 10 lumbar MRI and accompanying report.

- PHC 29-30

Imaging Studies:

MRI of the lumbar spine and report dated 7/10/18 is reviewed. The patient has normal lordosis. She is undergone posterior fusion with instrumentation at L3-4 and L4-5. She has spondylolisthesis at L5-S1 at that

level due to severe facet hypertrophy. There is posterior disc bulging at L2-3.

30. Dr. Frankel diagnosed Pamela with spondylolisthesis and planned to obtain x-rays and a CT scan in order to formulate a surgical plan.

- PHC 30

Assessment:
1. Spondylolisthesis of lumbar region

Plan/Impression:

Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient

The patient has adjacent segment deterioration around her previous fusion. We will need to obtain x-rays and a CT scan of the lumbar spine in order to evaluate the area more clearly and make a surgical treatment plan. I will see her back after these are completed.

31. On October 31, 2018, Pamela saw Dr. Frankel again, to review a new lumbar CT.

- PHC 36

Progress Notes by Roger Frankel, MD at 10/31/2018 1:15 PM

Author: Roger Frankel, MD | Service: (none) | Author Type: Physician
Filed: 11/1/2018 10:14 PM | Encounter Date: 10/31/2018 | Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 10/31/18

Chief Complaint
Patient presents with
- Follow-up
  review Imaging

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who returns today after undergoing CT of the lumbar spine. She continues to have continued low back pain radiating down to the buttock and hamstring and calf. This involves her toes as well. She returns to discuss treatment plan

32. Dr. Frankel noted spondylolisthesis at L5-S1, and loss of disc height at L2-L3 and L3-L4. Dr. Frankel concluded that Pamela's symptoms arose from disc collapse and foraminal stenosis at L5-S1. Dr. Frankel recommended a lift at that level.

- PHC 36

Imaging Studies:

CT of the lumbar spine without contrast and report dated 10/30/18 is reviewed. The patient has normal lordosis. She is undergone previous fusion at L4-5. There is spondylolisthesis at L5-S1. She has loss of disc height at L3-4 and L2-3 with some Schmorl's nodes at those levels noted.

Assessment:

1. Spondylolisthesis of lumbar region

Plan/Impression:
Extent of Time: 20 minutes spent with patient of which >50% was spent counseling patient
Orders Placed This Encounter
- traMADol (ULTRAM) 50 mg tablet
  Sig: Take 1 tablet (50 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 90 tablet
  Refill: 0

The patient appears to have symptoms due to disc collapse and foraminal stenosis at L5-S1. We have discussed a lift at that level as the best treatment plan. She would like to proceed forward with this. All questions were answered to her satisfaction.

33. On November 2, 2018, Pamela returned to Dr. Frankel's office. Nurse Practitioner Jane Yoffe wrote a History & Physical, which Dr. Frankel later co-signed.

- PH 12-16

H&P by Jane W Yoffe, NP at 11/2/2018 11:46 AM

Author: Jane W Yoffe, NP	Service: Neurosurgery	Author Type: Nurse Practitioner
Filed: 11/2/2018 11:47 AM	Date of Service: 11/2/2018 11:46 AM	Status: Signed
Editor: Jane W Yoffe, NP (Nurse Practitioner)		Cosigner: Roger Frankel, MD at 11/2/2018 12:22 PM

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who returns today after undergoing CT of the lumbar spine. She continues to have continued low back pain radiating down to the buttock and hamstring and calf. This involves her toes as well. She returns to discuss treatment plan

34. NP Yoffe discussed an ALIF with Pamela.

- PH 15-16

The patient appears to have symptoms due to disc collapse and foraminal stenosis at L5-S1. We have discussed ALIF at that level as the best treatment plan. She would like to proceed forward with this. All questions were answered to her satisfaction.

The natural history of the disease as well as the current surgical and non-surgical treatment options were discussed. The risks and benefits were discussed. These

include (but are not limited to) Bleeding, infection, CSF leak, injury to the nerve root, injury to the spinal cord, vascular injury, failure to fuse, failure of hardware, failure for pain, numbness, or weakness to Improve, retrograde ejaculation in males.

35. According to the records, at least, on November 9, 2018, Pamela again saw NP Yoffe to discuss the surgery treatment plan — a week after a similar visit on November 2.

- PHC 39-43

Progress Notes by Jane W Yoffe, NP at 11/9/2018 11:30 AM

Author: Jane W Yoffe, NP | Service: (none) | Author Type: Nurse Practitioner
Filed: 11/9/2018 12:46 PM | Encounter Date: 11/9/2018 | Status: Attested
Editor: Jane W Yoffe, NP (Nurse Practitioner) | Cosigner: Roger Frankel, MD at 11/12/2018 2:07 PM

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who returns today after undergoing CT of the lumbar spine. She continues to have continued low back pain radiating down to the buttock and hamstring and calf. This involves her toes as well. She returns to discuss treatment plan

Imaging Studies:

CT of the lumbar spine without contrast and report dated 10/30/18 is reviewed. The patient has normal lordosis. She is undergone previous fusion at L4-5. There is spondylolisthesis at L5-S1. She has loss of disc height at L3-4 and L2-3 with some Schmorl's nodes at those levels noted.

Assessment:

1. Spondylolisthesis of lumbar region

Plan/Impression:
Extent of Time: 20 minutes spent with patient of which >50% was spent counseling patient

Orders Placed This Encounter
- traMADol (ULTRAM) 50 mg tablet
  Sig: Take 1 tablet (50 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 90 tablet
  Refill: 0

The patient appears to have symptoms due to disc collapse and foraminal stenosis at L5-S1. We have discussed ALIF at that level as the best treatment plan. She would like to proceed forward with this. All questions were answered to her satisfaction.

The natural history of the disease as well as the current surgical and non-surgical treatment options were discussed. The risks and benefits were discussed. These include (but are not limited to) Bleeding, infection, CSF leak, injury to the nerve root, injury to the spinal cord, vascular injury, failure to fuse, failure of hardware, failure for pain, numbness, or weakness to Improve, retrograde ejaculation in males.

Surgery: Thursday, November 15, 2018

36. On Thursday, November 15, 2018, Pamela went to Piedmont Hospital at 1968 Peachtree Road NW in Atlanta.

- PH 6

Department

Name	Address
Piedmont Atlanta Hospital 4 North	1968 Peachtree Road, N.W., Atlanta GA 30309-1476

37. Dr. Frankel, a neurosurgeon, was to perform an ALIF surgery (anterior lumbar instrumented fusion) and discectomy at the L5-S1 level of Pamela's spine.

- PH 6-7

Admission Information

Arrival Date/Time:		Admit Date/Time:	11/15/2018 0519	IP Adm. Date/Time:	11/15/2018 0557
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:	Neurosurgery	Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital 4 North
Admit Provider:	Roger Frankel, MD	Attending Provider:	Roger Frankel, MD	Referring Provider:	

Final Diagnoses (ICD-10-CM) (continued)

Code	Description	POA	CC
M43.17	Spondylolisthesis, lumbosacral region	Yes	No

ICD Procedures (ICD-10-PCS)

Code	Description	Date	Performing Provider
0SG30A0	Fusion Lumsac Jt w Intbd Fus Dev, Ant Appr A Col, Open	11/15/2018	Roger Frankel, MD
0ST40ZZ	Resection of Lumbosacral Disc, Open Approach	11/15/2018	Roger Frankel, MD

38. Dr. Frankel began the operation at 0758 hours.

- PH 83

Time	Event
0635	Anesthesia Pre Procedure Complete
0729	Anesthesia Start
0729	Patient in Room
0729	Start Data Collection
0739	Induction
0742	Intubation
0742	Patient Ready for Procedure
0758	Procedure Start
0855	Begin Emergence
0904	Procedure End
0910	Extubation
0913	Stop Data Collection
0913	Transport to PACU/Phase 2 Patient transported to PACU/Phase 2 with oxygen and approp (Some patients are recovered in the same area as the procedu transported).
0921	Transfer/Handoff to PACU/Phase 2 per Department Guidelines 1. Identification of patient

39. During the procedure, Dr. Frankel and staff took seven static fluoroscopy images.

- PH 133

X-ray lumbar spine 2 or 3 views [318838832]

Ordering provider: Roger Frankel, MD 11/15/18 0637
Performed: 11/15/18 0805 - 11/15/18 0851
Resulting lab: EMC RAD
Narrative:
EXAMINATION: XR LUMBAR SPINE 2 OR 3 VIEWS

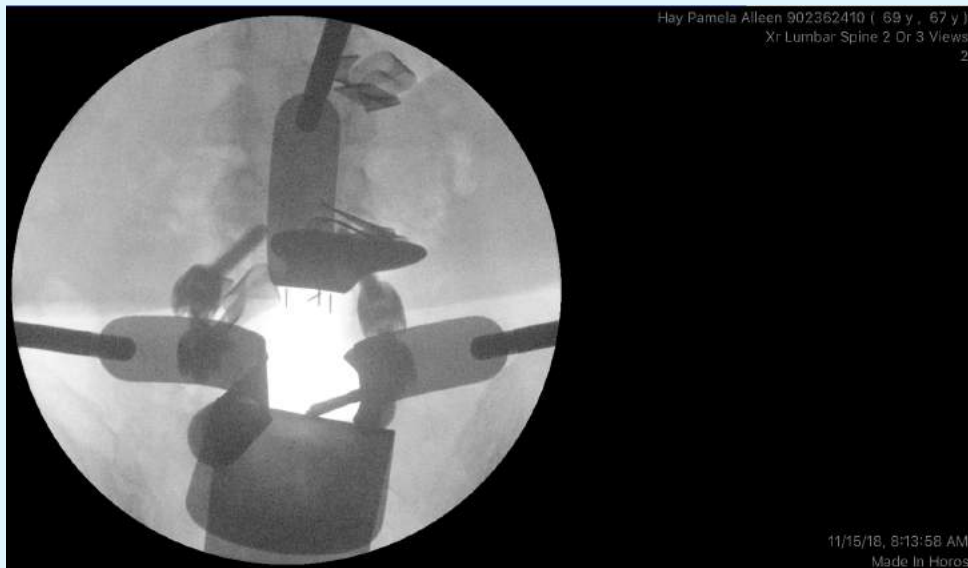
HISTORY: Lumbar spondylosis.

FINDINGS:

7 fluoroscopic spot images obtained during a lumbar fusion procedure.
The total fluoroscopy time is 12 seconds.

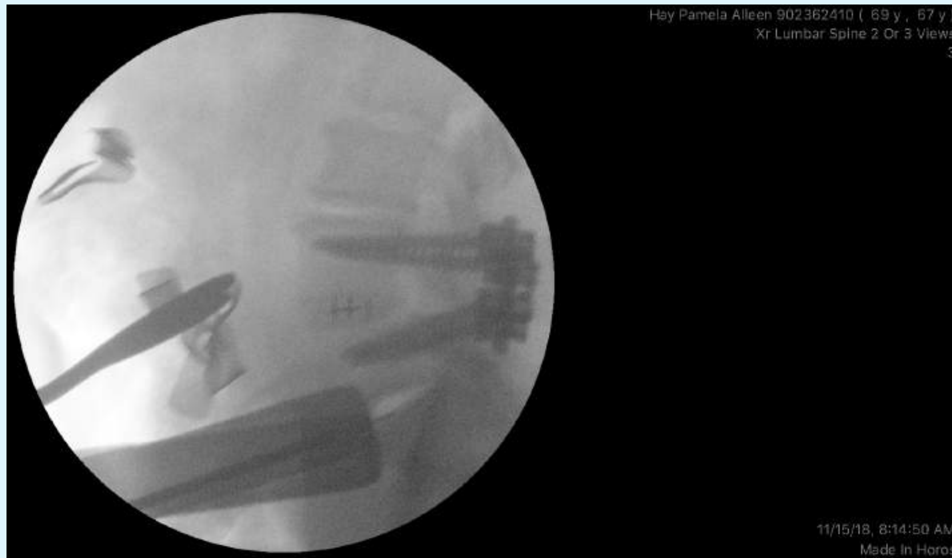
40. At 0813 hours (08:13:38 and 08:13:58), Dr. Frankel took two x-ray images showing the anterior exposure.

- *See* DICOM images and metadata



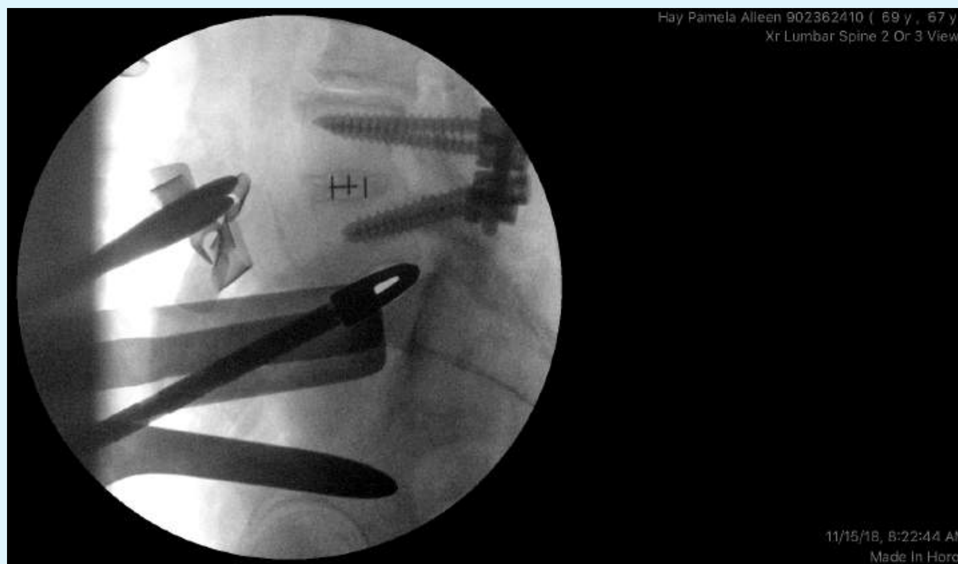
41. At 08:14:50 hours, Dr. Frankel took a fluoro image of the spine, before testing or sizing the implant.

- *See* DICOM images and metadata



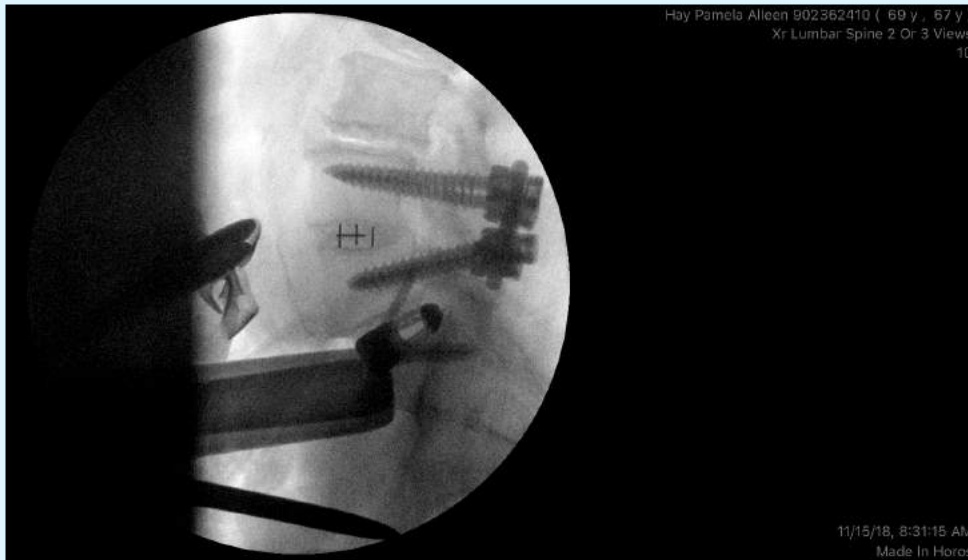
42. About 8 minutes later, at 08:22:44 hours, Dr. Frankel took a fluoro image showing the spacer in the L5/S1 disk space.

- *See* DICOM images and metadata



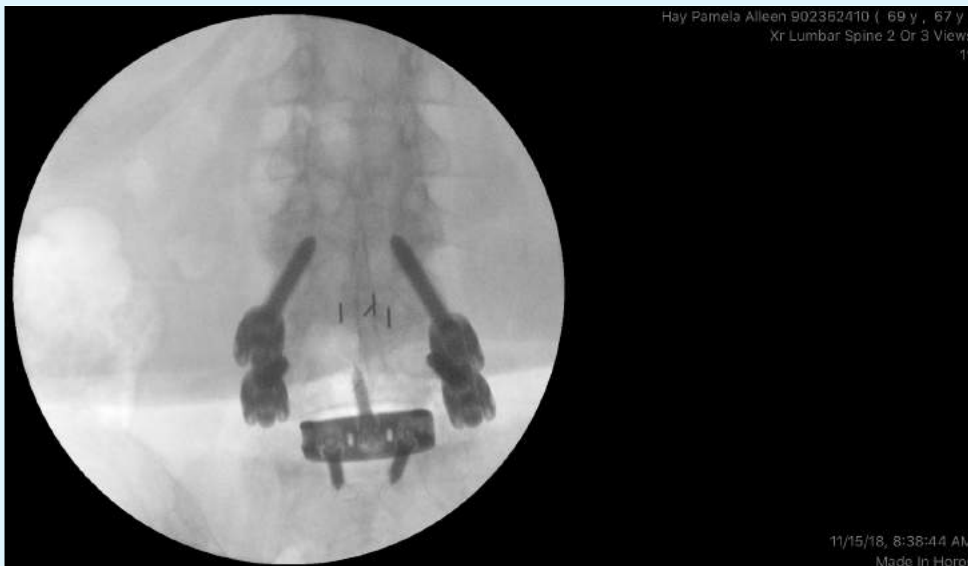
43. Nine minutes after that, the next fluoro image shows the implant with all three screws in place.

- *See* DICOM images and metadata



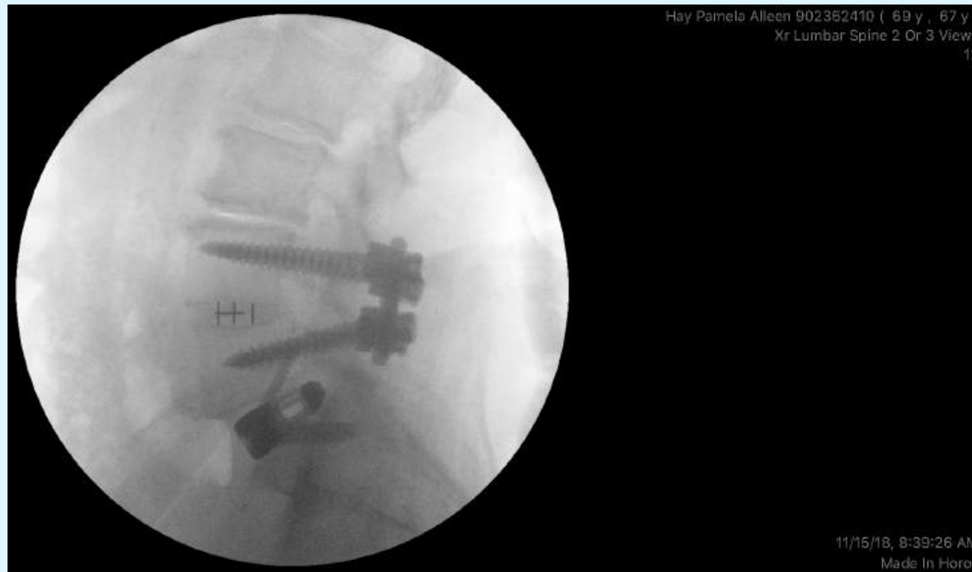
44. At 08:38:44 hours, Dr. Frankel took an AP x-ray showing the implant and screws already fixed in place.

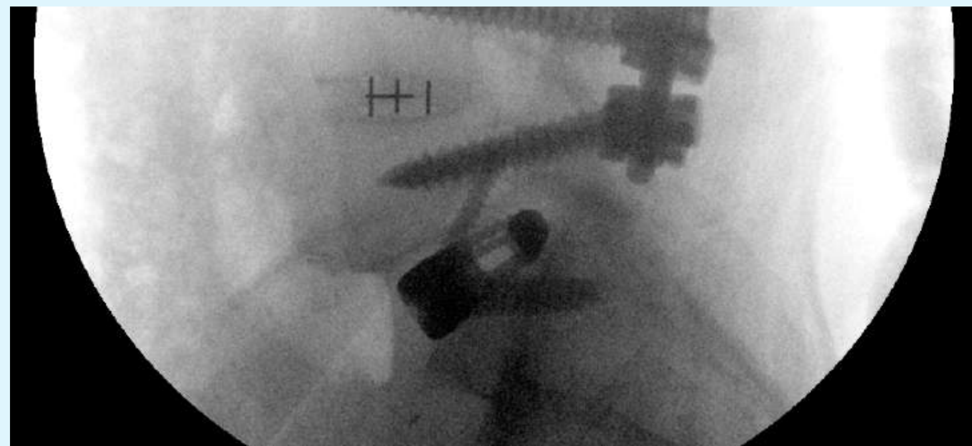
- *See* DICOM images and metadata



45. At 08:39:26 hours, Dr. Frankel took the final intra-operative x-ray, again showing the implant and screws in place.

- *See* DICOM images and metadata





46. At 0913 hours, hospital staff transported Pamela to the PACU.

- PH 83 (image above)

47. Simultaneously, at 0913 hours, NP Jane Yoffe ordered lumbar x-rays, noting the clinical indication as “Postop evaluation.”

- PH 134

X-ray lumbar spine 2 or 3 views in PACU [318873360]
Ordering provider: Jane W Yoffe, NP 11/15/18 0913
Performed: 11/15/18 0935 - 11/15/18 0935
Resulting lab: EMC RAD
Narrative:
CLINICAL HISTORY: Postop evaluation

48. At 0915 hrs, PACU Nurse Allison Witmer recorded initial observations of Pamela. Nurse Witmer recorded that Pamela was awake & alert, her pain level was a 9, her blood pressure was 189/87, she had full strength in her extremities, and she had full sensation without numbness in her legs.

- PH 499

0915

189/87 -AW
97.8 °F (36.6 °C) -AW
Oral -AW
84 -AW
17 -AW
92 % -AW

Nine pain med given by

- PH 508

0915

—
Alert -AW
Oriented X4 -AW
Appropriate judgement;Follows commands -AW
Clear -AW
Grip;Dorsiflexion;Plantar flexion -AW
Strong -AW
Strong -AW
Strong -AW
Strong -AW
Strong -AW
Strong -AW
Full sensation;No numbness -AW
Full sensation;No numbness -AW

49. At 0915 hours, NP Yoffe ordered IV narcotics for Pamela — hydromorphone, 0.2 mg. Nurse Witmer administered the first dose at 0926 hours.

- PH 145-46

HYDROmorphone in 0.9 % NaCl PCA syringe [318626240]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 0915
Dose (Remaining/Total): — (—/—)
Frequency: Continuous
Admin Instructions: LOADING DOSE: 0 mg
PCA PATIENT BOLUS DOSE: 0.2 mg
FOUR HOUR DOSE LIMIT: 4 mg

Status: Discontinued (Past End Date/Time)
Starts/Ends: 11/15/18 0930 - 11/16/18 1437
Route: Intravenous
Rate/Duration: — / —
CONTINUOUS INFUSION RATE: 0 mg/hr
LOCKOUT INTERVAL: 8 minutes
********** HIGH ALERT MEDICATION **********

Line	Med Link Info	Comment
Peripheral IV 11/15/18 Left Hand	11/15/18 0926 by Allison Witmer, RN	—

Timestamps	Action	Dose / Rate / Duration	Route	Other Information

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PH 145

Hay, Pamela Alleen
MRN: 902362410, DOB: , Sex: F
Adm: 11/15/2018, D/C: 11/21/2018

Medications (continued)

All Meds and Administrations (continued)

Timestamps	Action	Dose / Rate / Duration	Route	Other Information
11/16/18 0716	Handoff	—	Intravenous	Performed by: Princess Johnson, RN Dual Signoff by: Vernetta Younger, RN
11/15/18 1941	Handoff	—	Intravenous	Performed by: Jacquelyn Porter, RN Dual Signoff by: Princess Johnson, RN
11/15/18 1940	New Syringe/Cartridge	—	Intravenous	Performed by: Jacquelyn Porter, RN Dual Signoff by: Princess Johnson, RN Scanned Package: 42852-221-63
11/15/18 0926	New Syringe/Cartridge	—	Intravenous	Performed by: Allison Witmer, RN Dual Signoff by: Christina Tomasello, RN

50. At 0925 hours, Nurse Witmer again noted a pain score of nine and high blood pressure.

- PH 499

Row Name	1015	1000	0950	0945	0941
Vitals					
BP	153/79 -AFA	170/84 -AW	190/89 anesthesia notified -AW	187/90 -AW	—
Heart Rate	77 -AFA	88 -AW	—	86 -AW	—
Resp	12 -AFA	15 -AW	—	13 -AW	—
SpO2	98 % -AFA	98 % -AW	—	98 % -AW	—
OTHER					
Pain Score	Four -AFA	Seven -AW	Eight -AW	—	Nine -AW

Row Name	0930	0925	0920	0915	0603
Vitals					
BP	(!) 165/98 -AW	186/88 -AW	(!) 183/94 -AW	189/87 -AW	(!) 188/95 -CMA
Temp	97.8 °F (36.6 °C) -AW	—	—	97.8 °F (36.6 °C) -AW	98 °F (36.7 °C) -CMA
Temp Source	Oral -AW	—	—	Oral -AW	Oral -CMA
Heart Rate	86 -AW	86 -AW	86 -AW	84 -AW	104 -CMA
Resp	14 -AW	11 -AW	12 -AW	17 -AW	20 -CMA
SpO2	97 % -AW	96 % -AW	92 % -AW	92 % -AW	94 % -CMA
OTHER					
Pain Score	—	Nine pain med given	—	Nine pain med given by	Five back & leg -CMA

enerated by Alexis Coleman [C110009] at 9/29/20 2:23 PM Page 499

PH 499

- PH 508

Row Name	1100	1000	0930	0915
Neurological				
Neuro (WDL)	—	—	—	—
Level of Consciousness	Alert -AFA	Alert -AW	Alert -AW	Alert -AW
Orientation Level	Oriented X4 -AFA	Oriented X4 -AW	Oriented X4 -AW	Oriented X4 -AW
Cognition	Appropriate judgement;Follows commands -AFA	Appropriate judgement;Follows commands -AW	Appropriate judgement;Follows commands -AW	Appropriate judgement;Follows commands -AW
Speech	Clear -AFA	Clear -AW	Clear -AW	Clear -AW
Motor Function/Sensation Assessment	Grip;Dorsiflexion;Plantar flexion -AFA	Grip;Dorsiflexion;Plantar flexion -AW	Grip;Dorsiflexion;Plantar flexion -AW	Grip;Dorsiflexion;Plantar flexion -AW
R Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
RLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW
LLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW

- PH 558

Assessment - Thu November 15, 2018 (continued)

Row Name	0950	0941	0930	0925	0915
Pain Assessment					
Pain Assessment Scale Used	—	—	—	0-10 -AW	0-10 -AW
Pain Score	Eight -AW	Nine -AW	—	Nine pain med given bedside by anesthesia -AW	Nine pain med given by anesthesia at bedside -AW
Neurological					
Level of Consciousness	—	—	Alert -AW	—	Alert -AW
Orientation Level	—	—	Oriented X4 -AW	—	Oriented X4 -AW
Cognition	—	—	Appropriate judgement;Follows commands -AW	—	Appropriate judgement;Follows commands -AW
Speech	—	—	Clear -AW	—	Clear -AW
Motor Function/Sensation Assessment	—	—	Grip;Dorsiflexion;Plantar flexion -AW	—	Grip;Dorsiflexion;Plantar flexion -AW
R Hand Grip	—	—	Strong -AW	—	Strong -AW
L Hand Grip	—	—	Strong -AW	—	Strong -AW
R Foot Dorsiflexion	—	—	Strong -AW	—	Strong -AW
L Foot Dorsiflexion	—	—	Strong -AW	—	Strong -AW
R Foot Plantar Flexion	—	—	Strong -AW	—	Strong -AW
L Foot Plantar Flexion	—	—	Strong -AW	—	Strong -AW
RLE Sensation	—	—	Full sensation;No numbness -AW	—	Full sensation;No numbness -AW
LLE Sensation	—	—	Full sensation;No numbness -AW	—	Full sensation;No numbness -AW

51. At 0941 hours, Nurse Witmer again noted a pain level of 9.

- PH 499 (image above)

52. At 0947 hrs, radiologist Dr. Rounak Bafana interpreted the post-op x-rays. He wrote, “Hardware appears well seated.”

- PH 134

FINDINGS:
Immediate postsurgical changes of posterior lumbar fusion at L4-L5 using bilateral transpedicular screws and vertical stabilizing rods. Intervertebral disc prosthesis at L4-L5. There is also anterior interbody fusion hardware at L5-S1. Hardware appears well seated.

Vertebral body heights are maintained. Multilevel degenerative disc disease in the visualized lower thoracic spine. Adjacent level degenerative disc disease at L3-L4. Grade 1 retrolisthesis of L3 on L4 by approximately 7 mm.

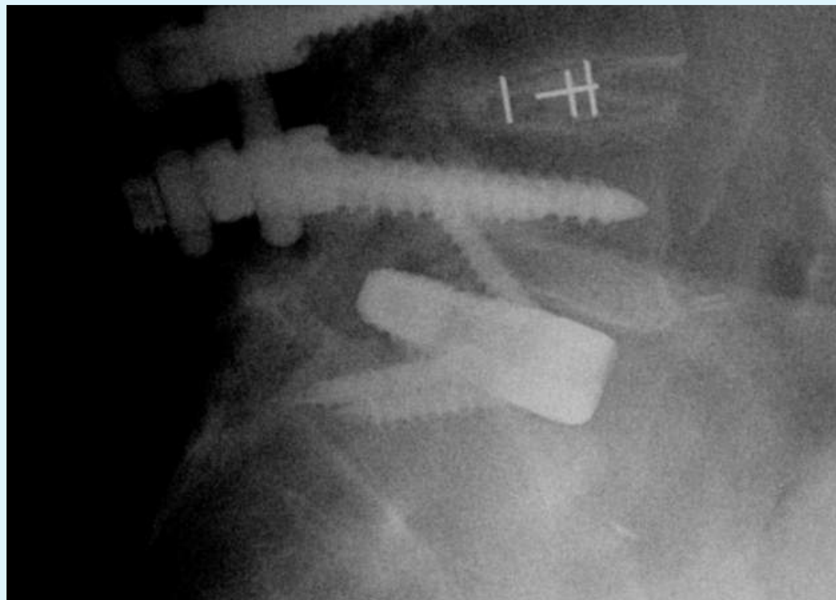
SI joints and pubic symphysis are intact.

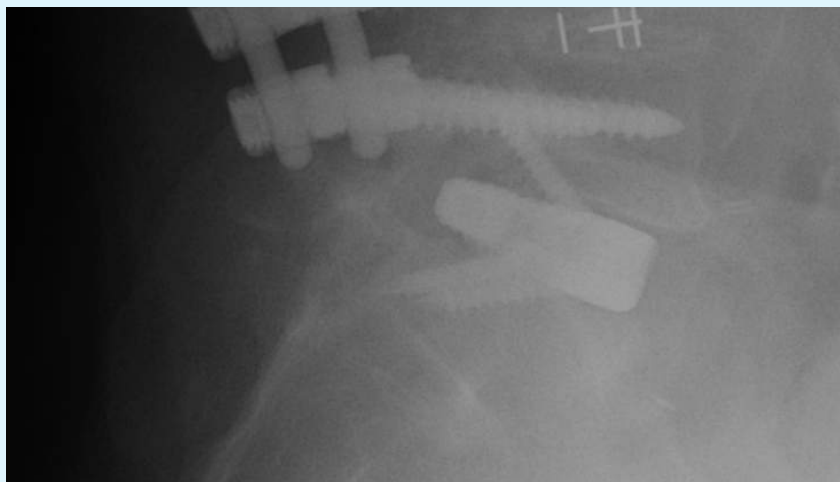
No lytic or blastic lesions. The imaged soft tissues are unremarkable.

Impression:

1. Post surgical changes of posterior lumbar fusion at L4-L5 and anterior interbody fusion at L5-S1 as above.
2. Multilevel degenerative disc disease. Grade 1 retrolisthesis of L3 on L4.

Approved By: Rounak Bafana 11/15/2018 9:47 AM





53. At 0948 hours, Dr. Roger Frankel wrote a post-op progress note: “Patient complains of exacerbation of leg pain. Strength good. Will start gabapentin and decadron.”

- PH 28

Progress Notes by Roger Frankel, MD at 11/15/2018 9:48 AM

Author: Roger Frankel, MD
Filed: 11/15/2018 9:50 AM
Editor: Roger Frankel, MD (Physician)
Service: Neurosurgery
Date of Service: 11/15/2018 9:48 AM

Neurosurgery Postop

Patient complains of exacerbation of leg pain. Strength good.

Will start gabapentin and decadron.

Roger Frankel, MD

Electronically signed by Roger Frankel, MD on 11/15/2018 9:50 AM

54. Dr. Frankel ordered no imaging to investigate the problem.

- PH 28 (image above)

55. Dr. Frankel did not take Pamela to the Operating Room to reposition the misplaced hardware.

- PH 28 (image above)

56. Dr. Frankel did enter the order for gabapentin.

- PH 142

gabapentin (NEURONTIN) capsule 300 mg [318873378]

Ordering Provider: Roger Frankel, MD
Ordered On: 11/15/18 0948
Dose (Remaining/Total): 300 mg (—/—)
Frequency: 3 times daily
Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Starts/Ends: 11/15/18 1315 - 11/21/18 1900
Route: Oral
Rate/Duration: — / —

57. Between 0941 and 1230 hours, Pamela continued to have severe pain, though mitigated by pain medication.

- PH 499

Row Name	1304	1300	1225	1200	1130
Vitals					
BP	150/90 -MG	—	—	127/66 -AFA	139/65 -AFA
Temp	97.3 °F (36.3 °C) -MG	—	—	—	—
Temp Source	Oral -MG	—	—	—	—
Heart Rate	94 -MG	—	—	94 -AFA	90 -AFA
Resp	18 -MG	—	—	11 -AFA	20 -AFA
SpO2	94 % -MG	—	—	95 % -AFA	96 % -AFA
OTHER					
Pain Score	—	Seven -JPA	Zero -AFA	—	—

Row Name	1100	1045	1030	1025	1020
Vitals					
BP	147/81 -AFA	(!) 131/106 -AFA	152/87 -AFA	(!) 160/94 -AFA	157/78 -AFA
Temp	—	97.7 °F (36.5 °C) -AFA	—	—	—
Temp Source	—	Oral -AFA	—	—	—
Heart Rate	76 -AFA	75 -AFA	78 -AFA	78 -AFA	74 -AFA
Resp	12 -AFA	10 -AFA	13 -AFA	14 -AFA	10 -AFA
SpO2	95 % -AFA	91 % -AFA	97 % -AFA	96 % -AFA	93 % -AFA
OTHER					
Pain Score	Four -AFA	—	—	—	—

Row Name	1015	1000	0950	0945	0941
Vitals					
BP	153/79 -AFA	170/84 -AW	190/89 anesthesia notified -AW	187/90 -AW	—
Heart Rate	77 -AFA	88 -AW	—	86 -AW	—
Resp	12 -AFA	15 -AW	—	13 -AW	—
SpO2	98 % -AFA	98 % -AW	—	98 % -AW	—
OTHER					
Pain Score	Four -AFA	Seven -AW	Eight -AW	—	Nine -AW

58. At 0948 hours, NP Yoffe entered an order for a steroid injection (dexamethasone, 4 mg) four times daily for a day.

- PH 138

dexamethasone (DECADRON) injection 4 mg [318873377]

Ordering Provider: Jane W Yoffe, NP	Status: Discontinued (Past End Date/Time), Reason: Substitution/Alternate Therapy Placed
Ordered On: 11/15/18 0948	Starts/Ends: 11/15/18 1330 - 11/16/18 1439
Dose (Remaining/Total): 4 mg (10/14)	Route: Intravenous
Frequency: 4 times per day	Rate/Duration: — / —

59. From 0915 hours to 1300 hours, the nursing flowsheets state that Pamela had full sensation and no numbness in her legs.

- PH 506, 508

Row Name	1100	1000	0930	0915
Neurological				
Neuro (WDL)	—	—	—	—
Level of Consciousness	Alert -AFA	Alert -AW	Alert -AW	Alert -AW
Orientation Level	Oriented X4 -AFA	Oriented X4 -AW	Oriented X4 -AW	Oriented X4 -AW
Cognition	Appropriate judgement;Follows commands -AFA	Appropriate judgement;Follows commands -AW	Appropriate judgement;Follows commands -AW	Appropriate judgement;Follows commands -AW
Speech	Clear -AFA	Clear -AW	Clear -AW	Clear -AW
Motor Function/Sensation Assessment	Grip;Dorsiflexion;Plantar flexion -AFA	Grip;Dorsiflexion;Plantar flexion -AW	Grip;Dorsiflexion;Plantar flexion -AW	Grip;Dorsiflexion;Plantar flexion -AW
R Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Hand Grip	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Dorsiflexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
R Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
L Foot Plantar Flexion	Strong -AFA	Strong -AW	Strong -AW	Strong -AW
RLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW
LLE Sensation	Full sensation;No numbness -AFA	Full sensation;No numbness -AW	Full sensation;No numbness -AW	Full sensation;No numbness -AW

Row Name	1748	1700	1600	1300	1225
L Foot Dorsiflexion	—	—	—	Strong -JPA	Strong -AFA
R Foot Plantar Flexion	—	—	—	Strong -JPA	Strong -AFA
L Foot Plantar Flexion	—	—	—	Strong -JPA	Strong -AFA
RLE Sensation	—	—	—	Full sensation;Pain -JPA	Full sensation;No numbness -AFA
LLE Sensation	—	—	—	Full sensation;Pain -JPA	Full sensation;No numbness -AFA
Neuro Symptoms	—	—	—	None -JPA	—
Neuro Additional Assessments	—	—	—	No -JPA	—

60. At or around 1229 hours, Pamela was taken from the PACU to Room 441, and Nurse Amy Farnam gave an SBAR (Situation-Background-Assessment-Recommendation) report to the floor nurse, Jackie Porter, RN.

- PH 501

SBAR Completed - Thu November 15, 2018

Row Name	1229
OTHER	
Completed?	SBAR Completed Report given to Jackie Porter, RN for room 441 -AFA

61. At 1258 hours, NP Yoffe entered an order for methocarbamol — a muscle relaxer and pain-blocker, 750 mg tablet three times daily. Nurse Jacquelyn Porter administered the first dose at 1509 hours.

- *See* https://www.drugs.com/methocarbamol.html
- PH 148

methocarbamol (ROBAXIN) tablet 750 mg [318626261]

Ordering Provider: Jane W Yoffe, NP	Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Ordered On: 11/15/18 1258	Starts/Ends: 11/15/18 1258 - 11/21/18 1900
Dose (Remaining/Total): 750 mg (—/—)	Route: Oral
Frequency: 3 times daily PRN	Rate/Duration: — / —

Admin Instructions: May discolor urine. Use for muscle relaxation may cause drowsiness

11/15/18 1509	Given	750 mg	Oral	Performed by: Jacquelyn Porter, RN Scanned Package: 76385-124-50

62. At the same time, 1258 hours, NP Yoffe also entered an order for oxycodone — a narcotic pain medication, 10 mg tablet every four hours as needed. Nurse Porter administered the first 10 mg dose at 1717 hours.

- PH 154-55

oxyCODONE (ROXICODONE) immediate release tablet 10 mg [318626256]

Ordering Provider: Jane W Yoffe, NP	Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Ordered On: 11/15/18 1258	Starts/Ends: 11/15/18 1258 - 11/21/18 1900
Dose (Remaining/Total): 10 mg (—/—)	Route: Oral
Frequency: Every 4 hours PRN	Rate/Duration: — / —

Admin Instructions: If the patient is NPO or unable to take PO medication, use an ordered parenteral medication for the appropriate pain level

11/15/18 1717	Given	10 mg	Oral	Performed by: Jacquelyn Porter, RN Scanned Package: 0904-6444-61, 0904-6444-61

63. Simultaneously, at 1258 hours, NP Yoffe entered an order for oxycodone 5 mg tablet every four hours as needed. Nurse Princess Johnson administered the first dose under this order at 2117 hours, as a 40 mg dose.

- PH 155-56

oxyCODONE (ROXICODONE) immediate release tablet 5 mg [318626255]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 1258
Dose (Remaining/Total): 5 mg (—/—)
Frequency: Every 4 hours PRN
Status: Discontinued (Past End Date/Time), Reason: Patient Discharge
Starts/Ends: 11/15/18 1258 - 11/21/18 1900
Route: Oral
Rate/Duration: — / —
Admin Instructions: If the patient is NPO or unable to take PO medication, use an ordered parenteral medication for the appropriate pain level

11/15/18 2117	Given	40 mg	Oral	Performed by: Princess Johnson, RN Scanned Package: 66993-068-51

64. At 1258 hours, NP Yoffe also entered an order for prednisone, 4 mg tablet every morning. Prednisone is a corticosteroid. One of its functions is to reduce inflammation and pain that may be caused by inflammation. Nurse Vernetta Younger administered the first dose on 11/16/2018 at 0921 hours.

- *See* https://www.webmd.com/arthritis/prednisone-arthritis
- PH 156

predniSONE (DELTASONE) tablet 4 mg [317589282]

Ordering Provider: Jane W Yoffe, NP
Ordered On: 11/15/18 1258
Dose (Remaining/Total): 4 mg (—/—)
Frequency: Every morning
Status: Discontinued (Past End Date/Time)
Starts/Ends: 11/16/18 0900 - 11/19/18 1204
Route: Oral
Rate/Duration: — / —

11/16/18 0921	Given	4 mg	Oral	Performed by: Vernetta Younger, RN Scanned Package: 0054-8739-25, 0054-8739-25, 0054-8739-25, 0054-8739-25

65. At 1748 hours, Pamela complained to Nurse Jacquelyn Porter about worsening numbness in her legs. Nurse Porter made a phone call to Nurse Practitioner named Laura to inform her of Pamela's changing condition. NP Laura provided no new orders, but told Nurse Porter to call if Pamela's neurological condition worsened.

- PH 508

Provider Notification	
Reason for Communication	Review Case Patient complaining of worsening numbness in her legs -JPA
Provider Name	LAURA -JPA
Provider Role	Nurse Practitioner -JPA
Method of Communication	Call -JPA
Response	No new orders -JPA
Notification Time	1801 -JPA
Comment	monitor patient, call if worse or neuro sighns change -JPA

66. Despite Nurse Porter's specific comment about the numbness in Pamela's legs and feet, after the shift change, Nurse Princess Johnson recorded "flowsheet" notes indicating that Pamela had "full sensation" in both lower extremities. Nurse Johnson entered these notes at 1930 hours and again at 2330 hours.

- PH 503

67. About 2-1/2 hours after Nurse Porter called NP Laura — at around 2018 hours — Dr. Frankel examined Pamela. Dr. Frankel noted that Pamela complained of numbness and tingling in the legs. Pamela had diminished sensation from the mid lower leg down to the feet. This numbness interfered with her ability to balance when she stood up. Dr. Frankel wrote that Pamela had mild nerve apraxia "likely" due to manipulation and mild stretch with placement of the intervertebral implant. Dr. Frankel's "Plan" was that Pamela would "likely" improve "spontaneously."

- PH 29

Progress Notes by Roger Frankel, MD at 11/15/2018 8:16 PM

Author: Roger Frankel, MD Service: Neurosurgery Author Type: Physician
Filed: 11/15/2018 8:18 PM Date of Service: 11/15/2018 8:16 PM Status: Signed
Editor: Roger Frankel, MD (Physician)

Neurosurgery

Patient complained of numbness and tingling in the legs. I saw and examined her.

She has normal strength in the quadriceps, hamstrings, tibialis anterior and gastrocnemius muscles bilaterally.
She has diminished light touch from the mid lower leg down to the feet. She did report that this interfered with her ability to balance easily when she stood up.

Impression: Mild nerve apraxia likely due to manipulation and mild stretch with placement of intervertebral implant.

Plan: She will likely improve spontaneously. Gabapentin and steroids will be continued.

Roger Frankel, MD

Electronically signed by Roger Frankel, MD on 11/15/2018 8:18 PM

68. Dr. Frankel did not examine Pamela again for the remainder of this hospitalization, which lasted another six days, until November 21.

- *See* records generally

Inpatient Recovery: Nov 16-21, 2018

Friday, November 16, 2018

69. The morning after the surgery, at about 0618 hours, Dr. Jay Steven Miller examined Pamela. Dr. Miller was the general surgeon who performed the opening for the ALIF that Dr. Frankel performed. Dr. Miller wrote that Pamela had parasthesia — abnormal sensation — in her feet.

- PH 29

Progress Notes by Jay Steven Miller, MD at 11/16/2018 6:18 AM

Author: Jay Steven Miller, MD | Service: — | Author Type: Physician
Filed: 11/16/2018 6:19 AM | Date of Service: 11/16/2018 6:18 AM | Status: Signed
Editor: Jay Steven Miller, MD (Physician)

Subjective:
Interval History: paresthesia feet
hungry

70. At 0908 hours that morning, NP Jane Yoffe examined Pamela. NP Yoffe worked with Dr. Frankel. In her Progress Note, NP Yoffe noted that Pamela had "new numbness to bottom of feet." NP Yoffe wrote that the numbness was "felt to be related to stretching of nerves during surgery."

- PH 30-32

Progress Notes by Jane W Yoffe, NP at 11/16/2018 9:08 AM

Author: Jane W Yoffe, NP | Service: Neurosurgery | Author Type: Nurse Practitioner
Filed: 11/16/2018 10:08 AM | Date of Service: 11/16/2018 9:08 AM | Status: Signed
Editor: Jane W Yoffe, NP (Nurse Practitioner) | Cosigner: Roger Frankel, MD at 11/19/2018 2:57 PM

Atlanta Brain and Spine Care Spine Progress Note
ALIF

Subjective:
POD 1 from L5-S1 anterior lumbar interbody fusion for spondylolisthesis
Systemic or specific complaints yes bilateral leg pain improved from surgery, new numbness to bottom of feet

A/P: Patient is post op from anterior lumbar interbody fusion. Doing well postoperatively. Pt will some new nerve pain/numbness-gabapentin dose increased, and started on steroids last evening-better this am, but still with numbness-felt to be related to stretching of nerves during surgery. Pt has urinated this am-needed to be straight cathed yesterday. Vascular advanced diet to soft this am. Pt is using PCA, though not much. PT is recommending rehab- told pt that case manager application process for rehab.

Plan for PT, pain control, GI/DVT prophylaxis, bowel protocol, IBE, Prophylactic Heparin to start today, OOB with assistance. Increase activity as tolerated. Keep PCA today, pt encouraged to ask for PRN Oxycodone, and only use PCA if pain not well controlled on orals. If pain well controlled on orals, will d/c PCA in am.

Electronically signed by Jane W Yoffe, NP on 11/16/2018 10:08 AM
Electronically signed by Roger Frankel, MD on 11/19/2018 2:57 PM

71. At about 1047 hours on November 16, Physical Therapist Jennifer Lynn Pauley came to Pamela's room to perform an initial assessment. Pamela had significant numbness in both legs and could not feel her feet on the ground.

- PH 70-76

Therapy Note by Jennifer Lynn Pauley, PT at 11/16/2018 10:47 AM (continued)

Assessment: Very pleasant 67 yo F with L5-S1 spondylolisthesis s/p ALIF L5-S1 on 11/15 with Dr. Frankel. Pt with diminished light touch mid lower leg distal to bilateral feet post op; per NSG note: mild nerve apraxia likely due to manipulation and mild stretch with placement of intervertebral implant; started on Gabapentin and steroids. Pt reports h/o R TKR and R TSR as well as L3-4 surgery over past year. PTA, pt was living alone in ranch style home with 3 steps to enter; pt was I with all mobility and ADLs with no DME in use; she cares for her 3 yo grandson 4 days per week; pt owns RW and BSC from previous surgeries; pt has daughters who live nearby but both work during the day.

At time of eval, pt very motivated to work with therapy; she presents with 4+/5 BLE strength but significant numbness BLE. Able to complete bed mobility with CGA; sit to stand with RW mod/max A x 2; able to take a few side steps with max A x 2 due to significant knee buckling; pt with inability to feel her feet on the ground. Pt is at high risk for falls; excellent safety awareness and good insight into her deficits. Reviewed spinal precautions and proper body mechanics in depth. Will benefit from PT to address aforementioned deficits. Recommend SAR; discussed with pt. Plan to follow 7x/week. Thank you for this consult.

72. Neither Dr. Frankel nor any of his neurosurgical partners examined Pamela on November 16.

- *See* records generally

Saturday, November 17, 2018

73. At about 1033 hours on the morning of November 17, Dr. Steven Wray visited Pamela in her hospital room. Dr. Wray is a neurosurgeon and a partner of Dr. Frankel. Dr. Wray noted that Pamela was crying and had paresthesias of her left leg. Dr. Wray wrote that it was "likely" related to restoration of intervertebral height. Dr. Wray told Pamela that it is common to have nerve root irritation after ALIF surgery, and that Pamela's symptoms would improve with time.

- PH 32

Progress Notes by Steven Wray, MD at 11/17/2018 10:33 AM (continued)

Tearful and crying this morning not wanting to go to rehab
Has some paresthesias of her left leg likely related to restoration of intervertebral height
I encouraged her that her symptoms will improve with time and that it is common after Anterior Interbody fusion to have some nerve root irritation.
Subjectively it may be a little bit better this morning.

She had a BM yesterday
No Abdominal distention

Plan:
Mobilize as tolerated
PT/OT
Neurontin and decadron

Wray

Electronically signed by Steven Wray, MD on 11/17/2018 10:37 AM

Sunday, November 18, 2018

74. At 0820 hours on Sunday, November 18, Dr. Wray visited Pamela in her hospital room. Dr. Wray again noted that Pamela was crying and in severe pain. Dr. Wray noted that Pamela was not walking but could stand with assistance from a physical therapist and use a rolling walker.

- PH 33

Progress Notes by Steven Wray, MD at 11/18/2018 8:20 AM

Author: Steven Wray, MD | Service: Neurosurgery | Author Type: Physician
Filed: 11/18/2018 8:24 AM | Date of Service: 11/18/2018 8:20 AM | Status: Signed
Editor: Steven Wray, MD (Physician)

Neurosurgery

Continues to complain of severe Left buttock and leg pain.
Tearful this morning
Hypertensive 192/90 ? Related to pain
Not ambulating but stands with PT utilizing a rolling walker

Will initiate OxyContin 10mg PO q 12 to try and establish a better sustained level of analgesia
Remains on Neurontin 300 TID

Continue PT/OT
Probable eventual IPR

Wray

Electronically signed by Steven Wray, MD on 11/18/2018 8:24 AM

Monday, November 19, 2018

75. At 0804 hours on Monday, November 19, Dr. David Benglis visited Pamela in her hospital room. Dr. Benglis is a neurosurgeon and a partner of Dr. Frankel. Dr. Benglis noted Pamela's numbness of legs and feet.

- PH 33-34

Progress Notes by David M Benglis Jr., MD at 11/19/2018 8:04 AM

Author: David M Benglis Jr., MD | Service: Neurosurgery | Author Type: Physician
Filed: 11/19/2018 8:10 AM | Date of Service: 11/19/2018 8:04 AM | Status: Addendum
Editor: David M Benglis Jr., MD (Physician)
Related Notes: Original Note by David M Benglis Jr., MD (Physician) filed at 11/19/2018 8:06 AM

POD 4 from ALIF

C/o numbness in bottom of feet and leg discomfort.

She is improved from Friday.

She thinks she may not need rehab.

76. At 1206 hours, NP Jane Yoffe visited Pamela. NP Yoffe noted that Pamela had difficulty walking due to numbness on the bottoms of both feet.

- PH 36

Progress Notes by Jane W Yoffe, NP at 11/19/2018 12:06 PM (continued)

A/P: Patient is post op from anterior lumbar interbody fusion. Doing well postoperatively. Pt will some new nerve pain/numbness. Pt is urinating, tolerating po's, and pain is mostly managed with oral analgesics.PT is recommending rehab- pt having difficulty walking due to numbness on the bottoms of both feet. Pt having high BP's, requiring PRN Hydralazine. Elevated BP's felt to be r/t pain as well as steroids. D/C home prednisone dose, continue Decadron 4 BID

Plan for PT, pain control, GI/DVT prophylaxis, bowel protocol, IBE, OOB with assistance. Increase activity as tolerated.Discussed with Dr Lamb, IMS RE: BP management- Started Hydralazine 10mg BID, continue to monitor closely. Case manager to apply to rehabs today.

Electronically signed by Jane W Yoffe, NP on 11/19/2018 12:14 PM
Electronically signed by David M Benglis Jr., MD on 11/21/2018 7:36 AM

Tuesday, November 20, 2018

77. At 0529 hours on Tuesday, November 20, 2018, Dr. Benglis visited Pamela in her hospital room. Dr. Benglis noted that Pamela was having significant difficulty with balance when walking.

- PH 36

Progress Notes by David M Benglis Jr., MD at 11/20/2018 5:29 AM

Author: David M Benglis Jr., MD
Filed: 11/21/2018 5:30 AM
Editor: David M Benglis Jr., MD (Physician)

Service: Neurosurgery
Date of Service: 11/20/2018 5:29 AM

Author Type: Physician
Status: Signed

Pending rehab placement.

Having significant difficulty with balance when ambulating.

C/o pain in left leg.

Neuro stable otherwise.

Electronically signed by David M Benglis Jr., MD on 11/21/2018 5:30 AM

78. At 0911 hours, NP Yoffe visited Pamela. NP Yoffe noted that Pamela had ongoing left hip and leg pain, which had required IV pain medication the previous day. NP Yoffe also noted intermittent burning in Pamela's right foot.

- PH 36

Progress Notes by Jane W Yoffe, NP at 11/20/2018 9:11 AM

Author: Jane W Yoffe, NP	Service: Neurosurgery	Author Type: Nurse Practitioner
Filed: 11/20/2018 9:15 AM	Date of Service: 11/20/2018 9:11 AM	Status: Signed
Editor: Jane W Yoffe, NP (Nurse Practitioner)		Cosigner: Roger Frankel, MD at 11/20/2018 10:25 AM

Atlanta Brain and Spine Care Spine Progress Note
ALIF

Subjective:
POD 5 from L5-S1 anterior lumbar interbody fusion for spondylolisthesis
Systemic or specific complaints yes Pt reports having ongoing left hip and leg pain, intermittent burning in right foot, and improvement of bilateral foot numbness she has had since surgery

Wednesday, November 21, 2018

79. In the afternoon of Wednesday, November 21, 2018, Dr. Frankel discharged Pamela to a skilled nursing facility.

- PH 6

Admission Information

Arrival Date/Time:		Admit Date/Time:	11/15/2018 0519	IP Adm. Date/Time:	11/15/2018 0557
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:	Neurosurgery	Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital 4 North
Admit Provider:	Roger Frankel, MD	Attending Provider:	Roger Frankel, MD	Referring Provider:	

Discharge Information

Discharge Date/Time	Discharge Disposition	Discharge Destination	Discharge Provider	Unit
11/21/2018 1500	Skilled Nursing Facility	None	None	Piedmont Atlanta Hospital 4 North

Aftermath & Revision Surgeries

December 2018

80. On December 17, 2018 — about a month after the ALIF surgery — Pamela saw Dr. Frankel again. Pamela continued to suffer neurological pain and numbness in her lower legs. She was using a walker due to pain and unsteadiness.

- PHC 56

Progress Notes by Roger Frankel, MD at 12/17/2018 2:00 PM

Author: Roger Frankel, MD   Service: (none)   Author Type: Physician
Filed: 12/18/2018 12:21 AM   Encounter Date: 12/17/2018   Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 12/17/2018

Chief Complaint

Patient presents with

- Spondylolisthesis of lumbar region.

HPI:

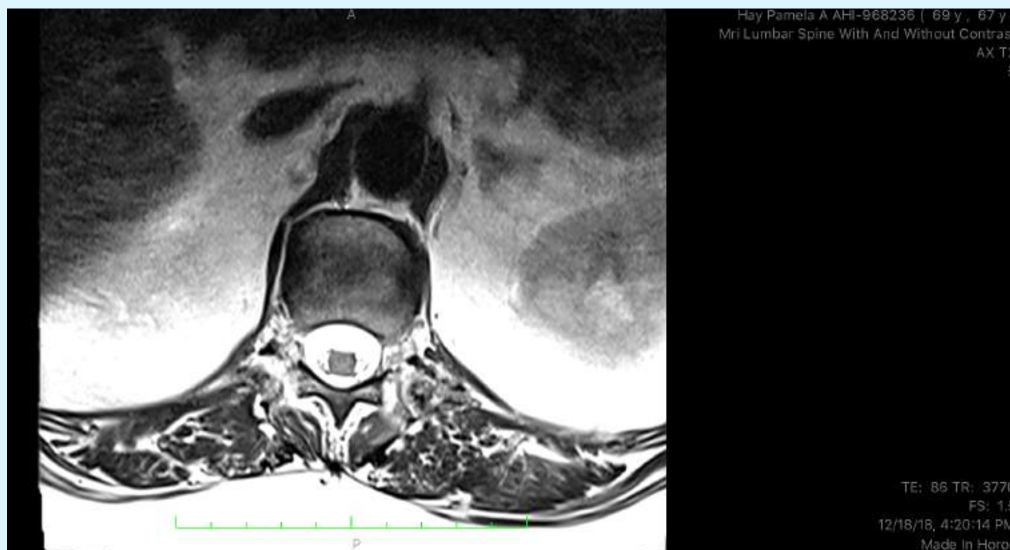
Pamela Alleen Hay is a 67 y.o. year old female who is approximately 1 month post lumbar fusion. Despite a relatively uneventful stand-alone anterior interbody fusion at L5-S1, she has had significant neuropathic pain and numbness in her lower legs. The numbness has improved significantly, but she is using a walker due to pain and some unsteadiness. She has been taking gabapentin which has only partially helped her symptoms. She is still taking oxycodone regularly. There are no problems with wound healing. She also noticed some tingling and clumsiness in her right hand. She returns today with MRI of the lumbar and cervical spine ordered. However only the cervical MRI was done due to some technical difficulties at the imaging facility and she is scheduled for her follow-up scan tomorrow. There is no bowel or bladder difficulty.

Progress Notes by Roger Frankel, MD at 12/17/2018 2:00 PM (continued)

The patient still has significant radiculopathy after her lumbar surgery. I am awaiting her completion of the lumbar MRI. If there is any indication of compression, she may need a posterior foraminotomy and stabilization. Since her upper extremity symptoms have only been present for a few weeks, it is early to order EMG and nerve conduction studies. If she continues to have this left arm symptomatology for another 2 weeks, we can obtain a left upper extremity EMG and nerve conduction study. I will see her back after lumbar imaging is completed.

81. On December 18, 2018, a lumbar MRI was performed.

- DICOM images and metadata



January 2019

82. On January 3, 2019, Pamela went to the Interventional Radiology department at Piedmont Hospital Atlanta.

- PH 606

Department

Name	Address	Phone	Fax
Piedmont Atlanta Hospital IR Imaging	1968 Peachtree Road, N.W., Atlanta GA 30309-1476	404-605-3371	404-609-6761

83. Pamela was referred there by NP Jane Yoffe, from Dr. Frankel's neurosurgery practice.

- PH 606

Admission Information

Arrival Date/Time:		Admit Date/Time:	01/03/2019 0601	IP Adm. Date/Time:	
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:		Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital IR Imaging
Admit Provider:	James W Berger, MD	Attending Provider:	James W Berger, MD	Referring Provider:	Jane W Yoffe, NP

84. Pamela was there for a myelogram of her lumbar spine.

- PH 607

H&P by Ashley A Fullerton, PA at 1/3/2019 7:00 AM

Author: Ashley A Fullerton, PA
Filed: 1/3/2019 7:01 AM
Editor: Ashley A Fullerton, PA (Physician Assistant)
Service: Interventional Radiology
Date of Service: 1/3/2019 7:00 AM
Author Type: Physician Assistant
Status: Signed

Subjective:

Subjective
Patient's name: Pamela Alleen Hay
67 y.o. female

Preoperative diagnosis: Spondylolisthesis of lumbar regio

Description of Procedure: Lumbar myelogram

85. A myelogram is an x-ray or CT scan of the spinal canal, using contrast dye injected into the spinal column.

- RFA
- Expert — Blumberg
- https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/myelogram

86. Radiologist Dr. Michael Lanfranchi interpreted the CT study. Dr. Lanfranchi noted that: "The L5-S1 interbody cages is positioned more posteriorly than typically seen and extends into

the ventral spinal canal/lateral recesses and neural foramina. This could irritate the L5 nerve roots. The fixating L5 extends into the posterior cortex of the posterior L5 vertebral body, and may protrude beyond it. The S1 fixating screws extend beyond the cortex of the S1 segment, protruding into the subarticular zones. These could exert irritate the descending S1 nerve roots. There is mild to moderate bilateral neural foraminal stenosis."

- PH 656-57

L5-S1: The L5-S1 interbody cages is positioned more posteriorly than typically seen and extends into the ventral spinal canal/lateral recesses and neural foramina. This could irritate the L5 nerve roots. The fixating L5 extends into the posterior cortex of the posterior L5 vertebral body, and may protrude beyond it. The S1 fixating screws extend beyond the cortex of the S1 segment, protruding into the subarticular zones. These could exert irritate the descending S1 nerve roots. There is mild to moderate bilateral neural foraminal stenosis.

87. On January 7, 2019, at 1430 hours, Pamela saw Dr. Frankel. Dr. Frankel noted Pamela's continuing leg pain and numbness. He wrote that imaging so far had revealed no obvious source.

- PHC 64

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who underwent ALIF almost 2 months ago. She has had leg pain since surgery with imaging up to this point showing no obvious source. Though she has seen some improvement in pain and numbness, it is still quite severe. Activity worsens her symptoms. She does not report weakness, but does note that there is some distal leg and foot swelling. She returns today after undergoing a CT myelogram of the lumbar spine.

88. Dr. Frankel noted the myelogram report. He wrote that "The patient has screw malposition likely causing her nerve symptoms." He suggested surgery to remove "the anterior screws," but did not identify which screws. He did not think the bone graft cage could safely be removed. He suggested the possibility of a posterior surgery to decompress the neural elements in the foramina, if necessary.

- PHC 64-70

Progress Notes by Roger Frankel, MD at 1/7/2019 2:30 PM

Author: Roger Frankel, MD Service: (none) Author Type: Physician
Filed: 1/9/2019 6:18 AM Encounter Date: 1/7/2019 Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 1/7/2019

Chief Complaint

Patient presents with

- Back Pain
  LBP
- Leg Pain
  left leg
- Numbness
  left leg from foot to knee, right foot
- Leg Swelling
  left leg and foot

HPI:

Pamela Alleen Hay is a 67 y.o. year old female who underwent ALIF almost 2 months ago. She has had leg pain since surgery with imaging up to this point showing no obvious source. Though she has seen some improvement in pain and numbness, it is still quite severe. Activity worsens her symptoms. She does not report weakness, but does note that there is some distal leg and foot swelling. She returns today after undergoing a CT myelogram of the lumbar spine.

Assessment:

1. **Spondylolisthesis of lumbar region**
2. Displacement of internal fixation device of vertebrae, initial encounter (HC)

Plan/Impression:

Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient

Orders Placed This Encounter

- oxyCODONE (ROXICODONE) 5 MG immediate release tablet
  Sig: Take 1-2 tablets (5-10 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 60 tablet
  Refill: 0

The patient has screw malposition likely causing her nerve symptoms. We have discussed this in detail between the patient, her daughter and I. I have recommended surgical intervention to remove the anterior screws and then undergo posterior decompression within the foramina bilaterally and instrumentation extension. Due to the bone growth through the cage, I do not think that it will be safely removable, but foraminotomies should allay the effects of that. She is interested in proceeding forward and we will plan on progressing with surgery as above.

89. On January 17, 2019, Pamela went to Piedmont Hospital Atlanta for another surgery by Dr. Frankel, to address the pain and other deficits caused by the malpositioned L5-S1 hardware.

- PH 683

Admission Information

Arrival Date/Time:		Admit Date/Time:	01/17/2019 0533	IP Adm. Date/Time:	01/17/2019 0955
Admission Type:	Elective	Point of Origin:	Physician Or Clinic Referral	Admit Category:	
Means of Arrival:		Primary Service:	Neurosurgery	Secondary Service:	N/A
Transfer Source:		Service Area:	PIEDMONT HEALTHCARE	Unit:	Piedmont Atlanta Hospital 4 North
Admit Provider:	Roger Frankel, MD	Attending Provider:	Roger Frankel, MD	Referring Provider:	

Discharge Information

Discharge Date/Time	Discharge Disposition	Discharge Destination	Discharge Provider	Unit
01/21/2019 1723	Home-health Care Svc	None	Roger Frankel, MD	Piedmont Atlanta Hospital 4 North

Final Diagnoses (ICD-10-CM)

Code	Description	POA	CC	HAC	Affects DRG
T84.328A [Principal]	Displacement of other bone devices, implants and grafts, initial encounter (HC)	Yes	No		Yes
T84.84XA	Pain due to internal orthopedic prosthetic devices, implants and grafts, initial encounter (HC)	Yes	No		No

90. At 0710 hours on January 17, Dr. Frankel wrote a History & Physical similar to his January 7 Progress Note. Dr. Frankel noted Pamela's "quite severe" pain and numbness.

- PH 690

H&P by Roger Frankel, MD at 1/17/2019 7:10 AM (continued)

- Back Pain
  LBP
- Leg Pain
  left leg
- Numbness
  left leg from foot to knee, right foot
- Leg Swelling
  left leg and foot

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who underwent ALIF almost 2 months ago. She has had leg pain since surgery with imaging up to this point showing no obvious source. Though she has seen some improvement in pain and numbness, it is still quite severe. Activity worsens her symptoms. She does not report weakness, but does note that there is some distal leg and foot swelling. She returns today after undergoing a CT myelogram of the lumbar spine.

91. Dr. Frankel noted again that "The patient has screw malposition likely causing her nerve symptoms." Dr. Frankel reiterated the need to remove "the anterior screws," the danger of removing the bone graft cage, and the possible need for a posterior foraminal decompression surgery.

- PH 696

Assessment:

1. **Spondylolisthesis of lumbar region**
2. Displacement of internal fixation device of vertebrae, initial encounter (HC)

Plan/Impression:
Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient

Orders Placed This Encounter

- oxyCODONE (ROXICODONE) 5 MG immediate release tablet
  Sig: Take 1-2 tablets (5-10 mg total) by mouth every 6 (six) hours as needed for Pain.
  Dispense: 60 tablet
  Refill: 0

The patient has screw malposition likely causing her nerve symptoms. We have discussed this in detail between the patient, her daughter and I. I have recommended surgical intervention to remove the anterior screws and then undergo posterior decompression within the foramina bilaterally and instrumentation extension. Due to the bone growth through the cage, I do not think that it will be safely removable, but foraminotomies should allay the effects of that. She is interested in proceeding forward and we will plan on progressing with surgery as above.

92. The operation began at 0805 hours. The operation lasted approximately 34 minutes.

- PH 730

Time	Event
0617	Anesthesia Pre Procedure Complete
0730	Anesthesia Start
0730	Patient in Room
0730	Start Data Collection
0745	Induction
0747	Intubation
0750	Patient Ready for Procedure
0803	upper warm air on
0804	Time Out Performed
0805	Procedure Start
0827	Quick Note Surgeon requested valsalva.
0839	Begin Emergence
0854	Procedure End
0858	Quick Note Paper tape on eyes tore pt's skin
0900	Extubation
0918	Quick Note Pt appeared floppy and complained of not being able to breathe. Rest of reversal given. After waiting the appropriate time pt still complained it was hard to breath. Suggamadex given.
0926	Stop Data Collection
0926	Transport to PACU/Phase 2 Patient transported to PACU/Phase 2 with oxygen and appropriate monitors. (Some patients are recovered in the same area as the procedure and are not physically transported).

93. Dr. Jay Steven Miller performed the anterior exposure surgery.

- PH 697

Op Note signed by Jay Steven Miller, MD at 1/20/2019 10:29 AM

Author: Jay Steven Miller, MD
Filed: 1/20/2019 10:29 AM
Editor: Jay Steven Miller, MD (Physician)
Dictation Time: 1/17/2019 9:18 AM
Trans Time: 1/17/2019 9:43 AM
Service: —
Date of Service: 1/17/2019 12:00 AM
Trans Doc Type: Operative Note
Trans Status: Available
Author Type: Physician
Status: Signed
Trans ID: 11216208

PREOPERATIVE DIAGNOSIS: Degenerative disk disease, status post L5-S1 anterior lumbar interbody fusion, now with the screws in the body of the S1 causing back pain.

POSTOPERATIVE DIAGNOSIS: Degenerative disk disease, status post L5-S1 anterior lumbar interbody fusion, now with the screws in the body of the S1 causing back pain.

NAME OF PROCEDURE: Anterior transperitoneal exposure of the L5-S1 disk space.

SURGEON: Jay Miller, M.D.

NEUROSURGEON AND COSURGEON: Roger Frankel, M.D.

94. Dr. Frankel then removed two of the three anterior screws. He removed the two screws going into the S1 body, but left the one L5 screw in place.

- PH 698-99

Op Note signed by Roger Frankel, MD at 1/18/2019 11:52 AM

Author: Roger Frankel, MD	Service: Neurosurgery	Author Type: Physician
Filed: 1/18/2019 11:52 AM	Date of Service: 1/17/2019 12:00 AM	Status: Signed
Editor: Roger Frankel, MD (Physician)		Trans ID: 11216394
Dictation Time: 1/17/2019 8:57 PM Trans Time: 1/18/2019 12:04 AM	Trans Doc Type: Operative Note Trans Status: Available	

PREOPERATIVE DIAGNOSIS: Spinal hardware malposition.

POSTOPERATIVE DIAGNOSIS: Spinal hardware malposition.

NAME OF PROCEDURE: Redo anterior lumbar interbody fusion with removal of screws.

SURGEON: Roger H. Frankel, M.D.

retroperitoneal space was opened and the instrumentation identified, the locking screws for the interbody cage were disengaged. The screws were removed that were going down into the S1 vertebra. Valsalva maneuver was performed after the screws were removed and no CSF leakage was noted. The holes were occluded with Gelfoam. A second Valsalva maneuver again revealed no spinal fluid leakage. Closure was performed by Dr. Jay Miller and dictated in his note. The patient was awakened and extubated without difficulty and transferred to recovery room in stable condition, moving all extremities well.

95. Post-operative x-rays showed removal of the S1 screws, with the L5 screw still in place.

- PH 774

X-ray lumbar spine 2 or 3 views in PACU [333692022]

Ordering provider: Jane W Yoffe, NP 01/17/19 0905
Performed: 01/17/19 0937 - 01/17/19 0943
Resulting lab: EMC RAD
Narrative:
TECHNIQUE: 2 views of the lumbar spine.

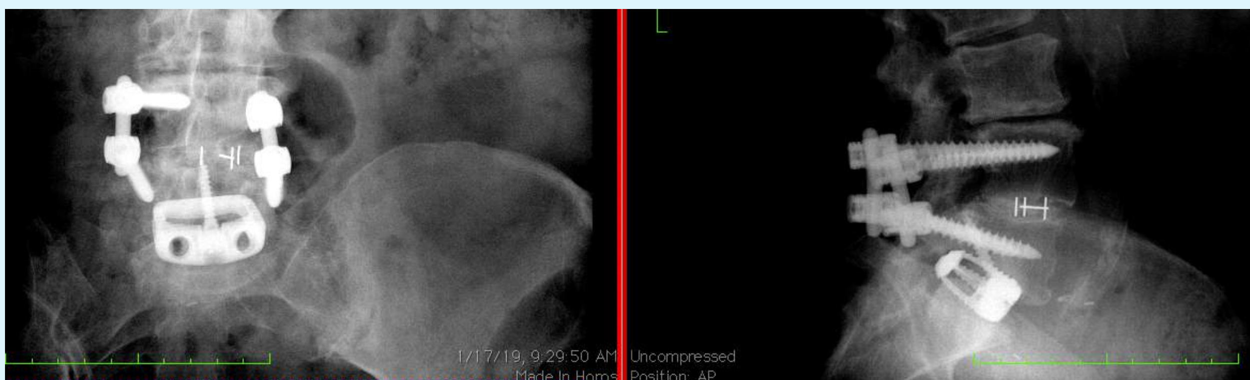
HISTORY: Postoperative evaluation.

COMPARISON: Lumbar spine CT dated 01/03/2019.

FINDINGS:

The fixating S1 screws have been removed. The L5 fixating screw again reaches the posterior margin of the L5 vertebral body. The L5-S1 interbody cage remains posteriorly position in the L5-S1 disc space, with the posterior margin extending into the ventral spinal canal. The interbody device at L4-L5 and posterior stabilization pedicle screws and rods at L4-L5 are stable.

- DICOM images



96. The radiology report noted that the L5 screw reached the posterior margin of the L5 body. The report also noted that the cage extended into the spinal canal.

- PH 774 (image above)

February through April 2019

97. About a month after On February 2, 2019, Pamela saw Dr. Frankel. He wrote that Pamela no longer had any significant radiating pain into the legs, but that she still had moderate numbness.

- PHC 82

Progress Notes by Roger Frankel, MD at 2/20/2019 11:45 AM

Author: Roger Frankel, MD Service: (none) Author Type: Physician
Filed: 2/20/2019 12:12 PM Encounter Date: 2/20/2019 Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 2/20/2019

Chief Complaint
Patient presents with
- Back Pain
- Numbness
  bilateral leg numbness

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who is one-month post removal of anterior screws. She does not have any significant radiating pain into the legs. She still has numbness going up to the left knee that is moderate and numbness in the right foot that is moderate. There is minimal left lower leg numbness. She does not report any weakness but does feel as though there is coordination difficulty in her legs that limits her balance and walking. She is doing home physical therapy because she cannot get out of the house to go to outpatient physical therapy. She takes gabapentin 1200 mg/day and has been weaning it since her last visit with me. Her leg swelling has significantly improved since her last visit with me. There are no wound healing issues. The patient does have some dull aching in the tailbone area as well as having had one episode of radiating pain in the left leg.

98. On April 8, 2019, Pamela returned to see Dr. Frankel. He wrote that Pamela continued to have numbness and some neuropathic pain in her legs. He wrote that “there has been some increase of discomfort recently which may be due to the nerve recovery.” He wrote that he could not explain “the wide-based multi-myotome weakness of her post-operative issues at S1.”

- PHC 89-93

Progress Notes by Roger Frankel, MD at 4/8/2019 3:31 PM

Author: Roger Frankel, MD　Service: (none)　Author Type: Physician
Filed: 4/14/2019 10:13 PM　Encounter Date: 4/8/2019　Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 4/8/2019

Chief Complaint

Patient presents with

- Spondylolisthesis of lumbar region

HPI:

Pamela Alleen Hay is a 67 y.o. year old female who is now 3 months post screw adjustment of her lumbar fusion. She continues to have numbness and some neuropathic pain in the legs. There has been some increase of discomfort recently which may be due to the nerve recovery. She still walks unsteadily because of weakness that she has in both legs. She reports that she has a difficult time pulling her knees up suggesting a hip muscle weakness which is far above her L5-S1 surgery.

Assessment:

1. Spondylolisthesis of lumbar region

Plan/Impression:

Extent of Time: 30 minutes spent with patient of which >50% was spent counseling patient

Orders Placed This Encounter

- EMG
  - Standing Status: Future
  - Standing Expiration Date: 4/10/2020
  - Scheduling Instructions: Stephanie Delgaudio-Riemann
- HYDROcodone-acetaminophen (NORCO) 5-325 mg per tablet
  - Sig: Take 1 tablet by mouth every 12 (twelve) hours as needed for Pain.
  - Dispense: 40 tablet
  - Refill: 0
- gabapentin (NEURONTIN) 300 MG capsule
  - Sig: Take 1 capsule (300 mg total) by mouth nightly.
  - Dispense: 30 capsule
  - Refill: 3

The patient continues to have neuropathic pain. However, I cannot explain the wide-based multi-myotome weakness of her postoperative issues at S1. We will obtain EMG and nerve conduction studies to assess what is going on in the upper lumbar nerves. I will see her back when these are completed.

99. On April 17, 2019, Pamela underwent a motor nerve conduction study.

- WMG 12

BridgeMill Neurological Associates, P.C.
980 Woodstock Parkway / Suite 300
Woodstock, GA 30188
678-494-9545

Name: Hay, Pamela
Address:

Gender: Female
Date of Exam: 17 Apr 19 15:28

Referring Physician: Roger Frankel, M.D.
Examining Physician: Stephanie Riemann, M.D.

Patient History: 67 year old female with back and lower extremity pain.

Motor Nerve Conduction:

Nerve and Site		Latency	Amplitude	Distance	Conduction Velocity
Peroneal.R					
Ankle		5.6 ms	0.1 mV	mm	m/s
Fibula (head)		9.1 ms	0.1 mV	340 mm	97 m/s
Popliteal fossa		11.0 ms	0.1 mV	60 mm	32 m/s

May – October 2019

100. On May 6, 2019, Pamela saw Dr. William Benedict, a neurosurgeon with a medical group separate from Dr. Frankel's.

- WMG 18-23

Progress Notes by Serena H Marcus, NP at 5/6/2019 3:00 PM
Author: Serena H Marcus, NP   Service: (none)   Author Type: Nurse Practitioner
Filed: 5/6/2019 6:38 PM   Encounter Date: 5/6/2019   Status: Signed
Editor: William J Benedict Jr., MD (Physician)

101. Pamela sought help from Dr. Benedict with persistent pain, numbness, and weakness.

- WMG 19

Referring Physician:
Self-Referral
No address on file

Reason for Referral/ Chief Complaint: Lower extremity numbness and weakness

HPI: This is a 67 y.o. female who presents today complaining of bilateral lower extremity numbness and weakness. Her history is notable for a previous L4-5 laminectomy and fusion procedure by Dr. Robinson in 2004. She states that she did very well following this procedure and recovered without any problems. More recently, she has undergone an L5-S1 ALIF procedure with Dr. Frankel in November 2018. This procedure was performed for lower back and bilateral lower extremity pain. She states that she woke up from surgery with excruciating pain radiating down both legs accompanied with significant numbness and weakness. She was told that there were screws pressing on her nerves, and she underwent an additional procedure with Dr. Frankel in January 2019 for removal of the screws. Following the screw removal, the excruciating leg pain improved, but the numbness and weakness has been persistent. She describes pain in her lumbosacral region and in her tailbone that feels "like a walnut" is being pressed into her spine. She also describes pain radiating into her left buttock and down her left lower extremity that is often shooting in nature. She also describes sharp pain in her toes. She states that she experiences pain with any prolonged sitting, standing, or walking. She also describes numbness and tingling sensations, mainly centered in her lower legs and feet. Her legs feel heavy with ambulation, and she requires a walker for assistance. She notes that immediately following surgery, she frequently experienced bladder incontinence. This has improved to occasional bladder leakage and increased urinary frequency. She denies any perineal numbness or bowel incontinence. Over time, her numbness and weakness has been slowly improving. It has been just within the past few weeks that she has been able to regain enough foot control to drive. She feels severely functionally debilitated due to her symptoms. She underwent physical therapy for several months, and she continues to do exercises at home. She has recently undergone a bilateral lower extremity EMG study, showing bilateral L5-S1 radiculopathies. She presents today for neurosurgical evaluation and recommendations.

102. Dr. Benedict reviewed the January 3 myelogram report.

- WMG 22

Imaging Studies:
- **CT myelogram lumbar spine (1/3/19):** Postoperative changes are noted, consistent with prior history of pedicle screw fusion at L4-5. There is also an L5-S1 interbody cage that is positioned more posteriorly than typically is
  seen and the S1 fixating screws extend beyond the cortical margin of the S1 segment into the subarticular zones.

103. Dr. Benedict concluded that Pamela's symptoms were caused by nerve damage due to poor screw placement intraoperatively. He recommended delaying additional surgery, in hope that it would prove unnecessary.

- WMG 23

Assessment:
1. **S/P lumbar fusion**
2. Numbness of bilateral lower extremities
3. Weakness of both legs
4. Chronic pain syndrome

Plan:
The imaging findings as outlined above were reviewed with the patient. We reviewed with her that she appears to be experiencing the sequelae associated with nerve damage due to poor screw placement intraoperatively. She does not require additional surgery at this time. Hopefully over time, her lower extremity numbness and weakness will continue to improve. We have encouraged her to continue

Pamela Alleen Hay presents with neuropathic pain and deficits resulting from poorly placed lumbar anterior instrumentation. She underwent an ALIF at L5-S1 late last year at Piedmont Hospital. She had immediate severe radicular pain, bladder incontinence and lower extremity weakness. CT myelogram imaging would reveal that the S1 screws coursing through the cage, were in the canal and traversing the dura. These were removed and she has slowly recovered. She does not want to see her surgeon, Dr. Frankel again. She will continue care with our practice until fused, though she will be referred out for pain management. All questions answered.

William J. Benedict, Jr., MD, FAANS
WellStar Neurosurgery

104. On May 13, 2019, Pamela saw Dr. Frankel again. He noted that the nerve conduction test revealed L5-S1 abnormalities. He diagnosed Pamela with a lumbar radiculopathy and recommended epidural steroid injections to alleviate symptoms.

- PHC 96

Progress Notes by Roger Frankel, MD at 5/13/2019 2:15 PM

Author: Roger Frankel, MD | Service: (none) | Author Type: Physician
Filed: 5/18/2019 1:38 AM | Encounter Date: 5/13/2019 | Status: Signed
Editor: Roger Frankel, MD (Physician)

Date: 5/18/2019

Chief Complaint
Patient presents with
- Spondylolisthesis of lumbar region

HPI:
Pamela Alleen Hay is a 67 y.o. year old female who is now 4 months since her last surgery. Continues to have numbness and dysesthesias in the feet. Swelling is still present and she was found to have left leg chronic DVT. She has been put on Eliquis for this. She does feel that the numbness in her right foot is improved since her last visit with me. She continues to have the more proximal weakness, but EMG revealed only L5-S1 abnormalities. She continues to try to stay active.

- PHC 99

Neurological Exam

Motor

Mild iliopsoas and quadriceps weakness. Mild gastrocnemius weakness. All of these findings are bilateral..

Sensory
Diminished light touch in both legs and S1 distribution..

Imaging Studies:

No results found.

Assessment:

1. Lumbar radiculopathy

- PHC 100

The patient is far enough out from surgery that we can now try L5-S1 epidural steroid injections to try to alleviate some of her symptoms. She has been treated by Dr. Rod Duralde in the past. She will continue with gabapentin. I will see her back in 2 to 3 months.

105. On June 10, 2019, Pamela saw Dr. Benedict again.

- WMG 56-62

Progress Notes - Encounter Notes

Progress Notes by William J Benedict Jr., MD at 6/10/2019 2:00 PM
Author: William J Benedict Jr., MD Service: (none) Author Type: Physician
Filed: 8/19/2019 4:43 PM Encounter Date: 6/10/2019 Status: Addendum
Editor: William J Benedict Jr., MD (Physician)
Related Notes: Original Note by William J Benedict Jr., MD (Physician) filed at 8/19/2019 4:42 PM

106. Dr. Benedict reviewed Pamela's symptoms and reviewed a new lumbar CT scan from May 2019.

- WMG 57

Progress Notes by William J Benedict Jr., MD at 6/10/2019 2:00 PM (continued)

BACKGROUND AND INTERIM HISTORY

- Pamela Alleen Hay is a 67 y.o. female who was originally seen in early May 2019. She has a history of an L4-5 posterior interbody fusion performed in 2004 by Dr. Robinson. She did well after the surgery. She subsequently came under the care of Dr. Frankel at Piedmont who performed an L5-S1 anterior lumbar interbody fusion in November 2018. This procedure was done for low back and leg pain. She awoke from surgery with unrelenting radicular leg pain with associated numbness and weakness in her legs. She had a neurogenic bladder and perineal numbness as well. She was not immediately imaged, but delayed CT imaging revealed that the interbody cage at L5-S1 was entering the canal and that both the L5 and S1 screws were within the spinal canal. The S1 screws, traversed the spinal canal. The patient was taken, in January 2019 for a revision procedure and the S1 screws were removed.
- The patient continues to have left leg weakness. Walking is difficult. She has left more than right bilateral leg pain. Her primary pain is the left buttock and radicular leg pain. Her pain is in the S1 distribution, left more than right. She feels as though there is a ball in the coccygeal region, and sitting is painful. When she was evaluated by us in May 2019, she commented on lower extremity edema and an ultrasound would reveal a left lower extremity venous thrombi embolism. She is now on Eliquis.
- The patient completed a repeat CT imaging of the lumbar spine, this is reviewed today with her.

SIGNIFICANT IMAGING AND LABORATORY STUDIES

- CT lumbar spine, 5/30/2019: Posterior placement of the interbody cage at L5-S1 with focal stenosis at that level, due to a malpositioned interbody device. Remaining L5 screw breaks through the cortex and causes mild to moderate central canal stenosis at that level. Diffuse osteopenia, reactive changes in the lower lumbar vertebral bodies, and the previously known L4-5 interbody fusion with implants in good position.

- WMG 58

REVIEW OF SYSTEMS
Review of Systems
Constitutional: Positive for activity change. Negative for chills and fever.
Eyes: Negative for visual disturbance.
Genitourinary: Positive for difficulty urinating **(bladder leakage)**.
Musculoskeletal: Positive for arthralgias **(planned left knee surgery)**, back pain and gait problem. Negative for neck pain and neck stiffness.
Neurological: Positive for weakness and numbness. Negative for dizziness, tremors, seizures, syncope, facial asymmetry, speech difficulty, light-headedness and headaches.

- WMG 59-60

Motor Exam
Muscle bulk: normal
Overall muscle tone: normal

Strength
Strength 5/5 except as noted.
Distal left lower extremity, plantar flexion and dorsiflexion are 4/5

<u>Sensory Exam</u>
Right leg light touch: decreased from knee
Left leg light touch: decreased from knee

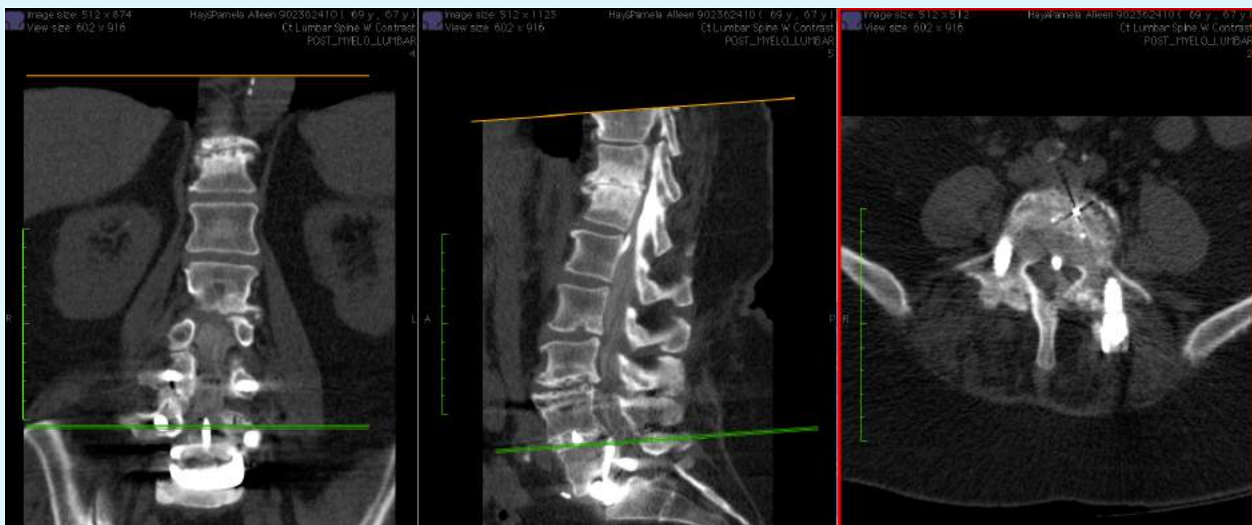
<u>Gait, Coordination, and Reflexes</u>

Gait
Gait: (wide, slaps both feet)

Tremor
Resting tremor: absent

Reflexes
Right patellar: 0
Left patellar: 0
Right achilles: 0
Left achilles: 0

- [*We do not yet have the May 2019 CT scan. The following image is from the 1/3/2019 myelogram*.]



107. Dr. Benedict concluded that the malpositioned cage and screws had injured Pamela's cauda equina, and that the cage was causing stenosis at L5-S1. Dr. Benedict ordered new x-rays to consider a laminectomy at L4-5, to decompress the nerve roots there. Dr. Benedict concluded that an attempt to revise the cage from an anterior approach would risk serious harm to Pamela.

- WMG 62

- Malpositioned L5-S1 interbody cage with cauda equina injury secondary to malpositioned S1 screws which have been removed.
- Focal stenosis at L5-S1 due to a malpositioned and posterior placed her body cage.

PLAN

Medications, orders, instructions, follow-up:
Orders Placed This Encounter

Procedures
- X-ray Lumbar Spine - 2-3 Views (AP and Lateral)

New Prescriptions
No medications on file

Discontinued Medications
No medications on file

Modified Medications
No medications on file

Return in about 2 months (around 8/10/2019) for review of ordered imaging.

- I had a long discussion with this patient and I reviewed her CT with her. Revision of this cage from anteriorly would be associated with a high risk of injury to the iliac arteries and veins. I have suggested, a laminectomy at L4 and L5. This would treat any element of nerve root compression that might be contributing to the patient's overall pain syndrome. I was clear, that her pain is also related to nerve root injury from the S1 screws that were removed. If she were to have persistent pain, dorsal column stimulation could be considered. The patient will consider my recommendations and she will return in 2 months, sooner with any changes. I have ordered plain films to be done prior to that visit to monitor the fusion.

William J. Benedict, Jr., MD, FAANS
WellStar Neurosurgery

108. On August 19, 2019, Dr. Benedict saw Pamela again.

- WMG 92

Progress Notes by William J Benedict Jr., MD at 8/19/2019 1:00 PM

Author: William J Benedict Jr., MD　Service: (none)　Author Type: Physician
Filed: 8/19/2019 4:49 PM　Encounter Date: 8/19/2019　Status: Signed
Editor: William J Benedict Jr., MD (Physician)

WELLSTAR Medical Group
Neurosurgery

WELLSTAR NEUROSURGERY OUTPATIENT PROGRESS NOTE

109. Pamela was having pain, weakness, and difficulty walking. She had fallen in the bathtub a couple weeks before the office visit.

- WMG 93

- The patient has left leg weakness. Walking is difficult. She has left more than right bilateral leg pain. Her primary pain is the left buttock and radicular leg pain. Her pain is in the S1 distribution, left more than right. She feels as though there is a ball in the coccygeal region, and sitting is painful. When she was evaluated by us in May 2019, she commented on lower extremity edema and an ultrasound would reveal a left lower extremity venous thrombi embolism. She is now on Eliquis.
- The patient completed a repeat CT imaging of the lumbar spine, reviewed at her last visit, when we discussed a laminectomy to decompress the canal around the posteriorly displaced cage. If this failed, a DCS could potentially be of benefit.
- The patient fell about two weeks ago in the bathtub and had films done on 8/9/2019. There is stable implant placement and probable interbody fusion at L5-S1. Her numbness is worse now in the right leg. Her right leg is numb today. She is accompanied by a companion today and we reviewed all postoperative imaging as well as the preoperative myelogram as noted below revealing the location of the sacral screws that were removed. The patient is ready to have something done to help with her pain.

110. Dr. Benedict recommended an L5 laminectomy to decompress the L5-S1 nerve, but he planned to consult with a vascular surgeon to consider the feasibility of another anterior surgery.

- WMG 100

Return in about 1 month (around 9/19/2019).

- I again reviewed the surgical options I have for this patient. The posterior location of the cage at L5-S1 is causing lateral recess stenosis. The L5 screw does enter the canal, however I do not think that a third retroperitoneal exposure would be safe, particularly when considering the risk of vascular injury. I have suggested again, and L5 laminectomy to decompress the L5-S1 lateral recess. If this does not significantly help the patient, a dorsal column stimulator may be of benefit. The patient is going to attempt to obtain her intraoperative images. I did inform her, that they should be available assuming that they were saved.
- I have a call into Dr. Charles Wyble with vascular surgery. His practice has seen the patient for the above described DVT diagnosed in May 2019. His consultation will allow me to determine how long the patient may remain off systemic anticoagulation around surgery. Ideally, I would like her off the Eliquis for 2 days before surgery and 7 days after. I will also ask Dr. Wyble if a third retroperitoneal approach is feasible. I will contact the patient after we have spoken.

William J. Benedict, Jr., MD, FAANS
WellStar Neurosurgery

Electronically Signed by William J Benedict Jr., MD on 8/19/2019 4:49 PM

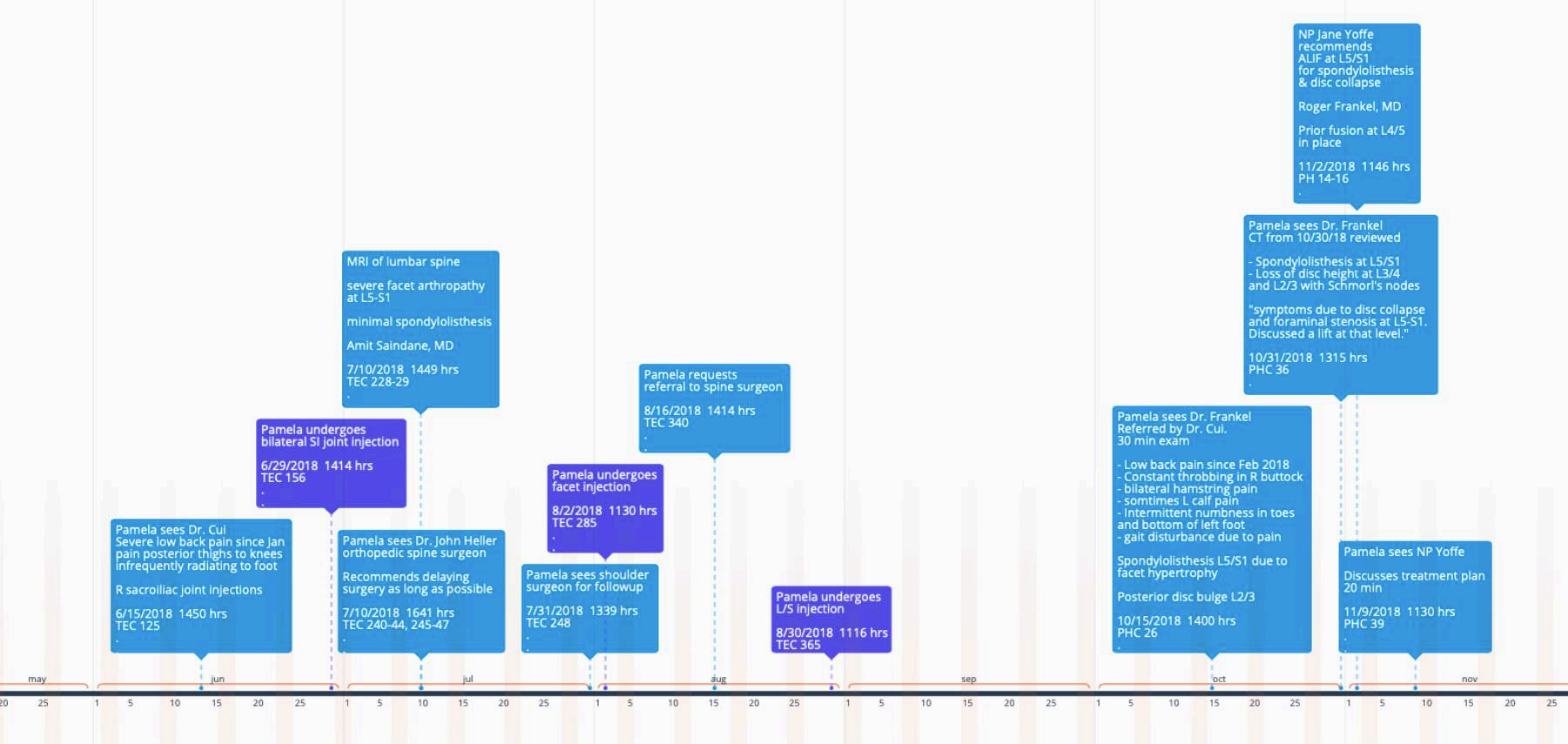
111. On October 3, 2019, Dr. Benedict performed an L5-S1 laminectomy.

- WMG 3

Surgical

Past Surgical History

Procedure	Laterality	Date	Comments	Source
THYROID SURGERY [SHX805]	—	1969	—	Provider
FOOT SURGERY [SHX648]	Bilateral	1993	—	Provider
WRIST SURGERY [SHX841]	Bilateral	1990	carpal tunnel	Provider
SHOULDER SURGERY [SHX246]	Right	—	replacement	Provider
REPLACEMENT TOTAL KNEE [SUR1224]	Right	—	—	Provider
LUMBAR FUSION [SHX111]	—	2004	L4-5 fusion and laminectomy by Dr. Robinson	Provider
ANTERIOR FUSION LUMBAR SPINE [SUR629]	—	11-2018/ 1/2019	L5-S1 ALIF by Dr. Roger Frankel with Atlanta Brain & Spine thgen revision	Provider
COSMETIC SURGERY [SHX468]	—	—	breast implants	Provider
LAMINECTOMY [SHX219]	—	10/03/2019	L5-S1 laminectomy, Dr. Benedict	Provider



NP Jane Yoffe recommends ALIF at L5/S1 for spondylolisthesis & disc collapse
Roger Frankel, MD
Prior fusion at L4/5 in place
11/2/2018 1146 hrs
PH 14-16
Pamela sees Dr. Frankel
CT from 10/30/18 reviewed
- Spondylolisthesis at L5/S1
- Loss of disc height at L3/4 and L2/3 with Schmorl's nodes
"symptoms due to disc collapse and foraminal stenosis at L5-S1. Discussed a lift at that level."
10/31/2018 1315 hrs
PHC 36
MRI of lumbar spine
severe facet arthropathy at L5-S1
minimal spondylolisthesis
Amit Saindane, MD
7/10/2018 1449 hrs
TEC 228-29
Pamela requests referral to spine surgeon
8/16/2018 1414 hrs
TEC 340
Pamela undergoes bilateral SI joint injection
6/29/2018 1414 hrs
TEC 156
Pamela sees Dr. Frankel
Referred by Dr. Cui.
30 min exam
- Low back pain since Feb 2018
- Constant throbbing in R buttock
- bilateral hamstring pain
- somtimes L calf pain
- Intermittent numbness in toes and bottom of left foot
- gait disturbance due to pain
Spondylolisthesis L5/S1 due to facet hypertrophy
Posterior disc bulge L2/3
10/15/2018 1400 hrs
PHC 26
Pamela undergoes facet injection
8/2/2018 1130 hrs
TEC 285
Pamela sees Dr. Cui
Severe low back pain since Jan
pain posterior thighs to knees
infrequently radiating to foot
R sacroiliac joint injections
6/15/2018 1450 hrs
TEC 125
Pamela sees Dr. John Heller
orthopedic spine surgeon
Recommends delaying surgery as long as possible
7/10/2018 1641 hrs
TEC 240-44, 245-47
Pamela sees shoulder surgeon for followup
7/31/2018 1339 hrs
TEC 248
Pamela sees NP Yoffe
Discusses treatment plan
20 min
11/9/2018 1130 hrs
PHC 39
Pamela undergoes L/S injection
8/30/2018 1116 hrs
TEC 365
may
jun
jul
aug
sep
oct
nov

Dr. Frankel Post-op note
exacerbation of leg pain
Strength good.
Start gabapentin & decadron

11/15/2019 0948 hrs
PH 28

Dr. Rounak Bafana reads
lumbar x-ray
Indication: Postop
Anterior interbody fusion
hardware at L5-S1.
Hardware appears well-seated.

11/15/2018 0947 hrs
PH 134

Pamela Hay, 67 years old
Admitted for surgery

- Lumbar spondylolisthesis
- Disc degeneration
- Spinal stenosis, without neurogenic claudication

ALIF surgery

-- No neuro monitoring --

Roger Frankel, MD

Piedmont Atlanta
Hospital 4 North

11/15/2018 0519 hrs
PH6

Alert
Pain score: Nine
legs full sensation
no numbness
Blood Pressure: 189/87
Pain med by anesthesia
Allison Witmer, RN

11/15/2018 0915 hrs
PH 499, 508, 558

To PACU

11/15/2018
0913 hrs
PH 83

Provider notification

"Patient complaining
of worsening numbness
in her legs."

Jacquelyn Porter, RN
NP Laura ________

11/15/2018 1748 hrs
PH 508

"Patient complained of
numbness and tingling
in the legs"

"diminished light touch from
the mid lower leg down to
the feet. She did report that
this interfered with her ability
to balance easily when she
stood up."

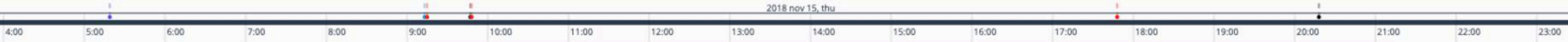
"Impression: Mild nerve apraxia
likely due to manipulation and
mild stretch with placement of
intervertebral implant."

"Plan: She will likely improve
spontaneously."

-- No imaging ordered --

Dr. Frankel

11/15/2019 2018 hrs
PH 29



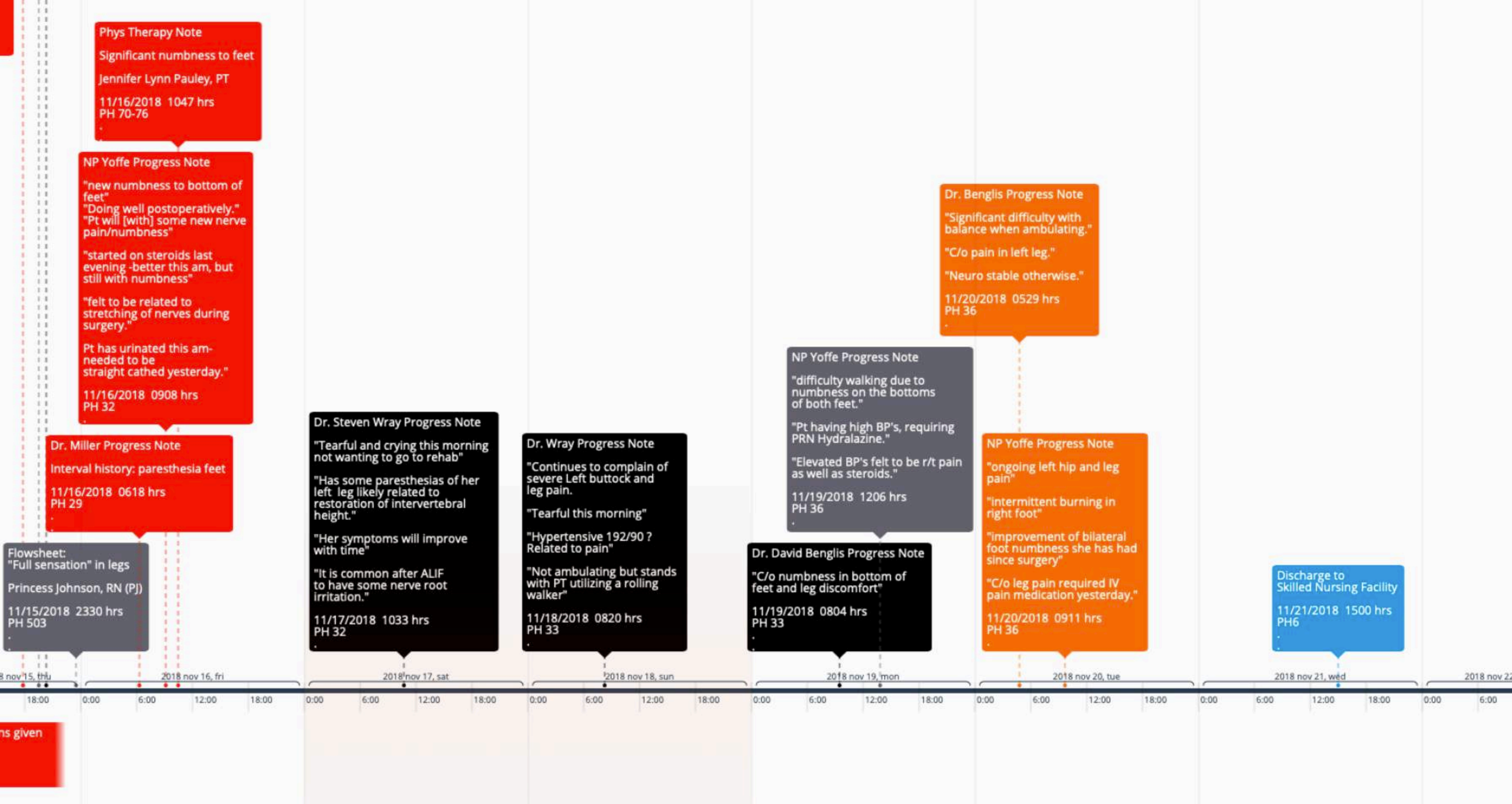
Severe pain post-op; medications given
High blood pressure

11/15/2018 0915 hrs on
PH 499, 508, 558

Flowsheets: Full sensation, no numbness in legs

Allison Witmer, RN (AW) Amy Farnam, RN (AFA) Jacquelyn Porter, RN (JPA)

11/15/2018 0915 - 1300 hrs
PH 506, 508



Phys Therapy Note
Significant numbness to feet
Jennifer Lynn Pauley, PT
11/16/2018 1047 hrs
PH 70-76
NP Yoffe Progress Note
"new numbness to bottom of feet"
"Doing well postoperatively."
"Pt will [with] some new nerve pain/numbness"
"started on steroids last evening -better this am, but still with numbness"
"felt to be related to stretching of nerves during surgery."
Pt has urinated this am- needed to be straight cathed yesterday."
11/16/2018 0908 hrs
PH 32
Dr. Miller Progress Note
Interval history: paresthesia feet
11/16/2018 0618 hrs
PH 29
Flowsheet:
"Full sensation" in legs
Princess Johnson, RN (PJ)
11/15/2018 2330 hrs
PH 503
Dr. Steven Wray Progress Note
"Tearful and crying this morning not wanting to go to rehab"
"Has some paresthesias of her left leg likely related to restoration of intervertebral height."
"Her symptoms will improve with time"
"It is common after ALIF to have some nerve root irritation."
11/17/2018 1033 hrs
PH 32
Dr. Wray Progress Note
"Continues to complain of severe Left buttock and leg pain.
"Tearful this morning"
"Hypertensive 192/90 ? Related to pain"
"Not ambulating but stands with PT utilizing a rolling walker"
11/18/2018 0820 hrs
PH 33
Dr. David Benglis Progress Note
"C/o numbness in bottom of feet and leg discomfort"
11/19/2018 0804 hrs
PH 33
NP Yoffe Progress Note
"difficulty walking due to numbness on the bottoms of both feet."
"Pt having high BP's, requiring PRN Hydralazine."
"Elevated BP's felt to be r/t pain as well as steroids."
11/19/2018 1206 hrs
PH 36
Dr. Benglis Progress Note
"Significant difficulty with balance when ambulating."
"C/o pain in left leg."
"Neuro stable otherwise."
11/20/2018 0529 hrs
PH 36
NP Yoffe Progress Note
"ongoing left hip and leg pain"
"intermittent burning in right foot"
"improvement of bilateral foot numbness she has had since surgery"
"C/o leg pain required IV pain medication yesterday."
11/20/2018 0911 hrs
PH 36
Discharge to Skilled Nursing Facility
11/21/2018 1500 hrs
PH6
2018 nov 15, thu
2018 nov 16, fri
2018 nov 17, sat
2018 nov 18, sun
2018 nov 19, mon
2018 nov 20, tue
2018 nov 21, wed
ns given

Pamela sees Dr. Frankel

Neuro pain & numbness in lower legs
"Numbness has improved significantly"
Using a walker due to pain & unsteadiness
Lumbar MRI ordered but not done yet
Some tingling & clumsiness in R hand

Cervical MRI done; not troubling

Awaiting lumbar MRI
"If ... compression, may need posterior foraminotomy and stabilization."

12/17/2018 1400 hrs
PHC 56
.

Lumbar myelogram
at Piedmont Hospital

"The L5-S1 interbody cage is positioned more posteriorly typically is seen and the S1 fixating screws extend beyond the cortical margin of the S1 segment into the subarticular zones. The hardware could irritate the L5 and S1 nerve roots."

Jane W Yoffe, NP (ordering)
Michael Lanfranchi, MD (radiologist)

1/3/2019 1108 hrs
PH 656

Pamela sees Dr. Frankel

"leg pain since surgery with imaging [] showing no obvious source."
"some improvement in pain and numbness, [] still quite severe."

some distal leg & foot swelling

Anterior screw misplaced.
Recommend removal
w/ posterior decompression.

Too dangerous to remove implant.

1/7/2019 1430 hrs
PHC 64
.

Dr. Frankel H&P

The patient has screw malposition likely causing her nerve symptoms.

I have recommended surgical intervention to remove the anterior screws and then undergo posterior decompression within the foramina bilaterally and instrumentation extension.

Due to the bone growth through the cage, I do not think that it will be safely removable, but foraminotomies should allay the effects of that.

1/17/2019 0710 hrs
PH 696
.

Pamela undergoes surgery to remove anterior S1 screws

Dr. Roger Frankel (spine)
Dr. Jay Steven Miller (general)

1/17/2019 1200 hrs
PH 697
.

Pamela sees Dr. Frankel

1-month post removal of anterior screws

No significant pain radiationg to legs
Moderate numbness to L knee
Moderate numbness to R foot

2/20/2019 1145 hrs
PHC 82
.

2018 dec | 2019 jan | 2019 feb

10 15 20 25 2019 5 10 15 20 25 1 5 10 15 20 25 1

Pamela sees Dr. Frankel

- continues to have numbness & neuropathic pain in the legs.
- increase of discomfort recently may be due to nerve recovery
- still walks unsteadily b/c of weaknessin both legs.
- difficulty pulling knees up, suggesting hip muscle weakness far above L5-S1 surgery.

cannot explain the wide-based multi-myotome weakness of her postoperative issues at S1.

Will obtain EMG and nerve conduction studies to assess upper lumbar nerves.

4/8/2019 1531 hrs
PHC 89

Pamela undergoes motor nerve conduction study

4/17/2019 1528 hrs
WMG 12

Pamela sees Dr. Benedict

Nerve damage from poor screw placement.

No surgery needed now.

5/6/2019 1500 hrs
WMG 19

Pamela undergoes leg venous-duplex test

5/8/2019 1445 hrs
WMG 16

Pamela sees Dr. Frankel

numbness and dysesthesias in the feet.

Swelling still present

Chronic DVT in L leg

Try L5-S1 epidural steroid injections to alleviate symptoms

5/13/2019 1415 hrs
PHC 96

Pamela sees Dr. Benedict

Remaining L5 screw breaks through cortex and causes mild to moderate central canal stenosis.

Malpositioned L5-S1 cage with cauda equina injury secondary to malpositioned S1 screws removed.

Stenosis at L5-S1 due to malpositioned interbody cage.

Revision of cage anteriorly would risk injury

Suggest laminectomy at L4 and L5.

6/10/2019 1400 hrs
WMG 62

2019 mar | 2019 apr | 2019 may | 2019 jun

25 1 5 10 15 20 25 1 5 10 15 20 25 1 5 10 15

Pamela sees Dr. Benedict

Cage at L5-S1 is causing lateral recess stenosis.

The L5 screw does enter the canal, but a third retroperitoneal exposure would be unsafe.

Suggest L5 laminectomy to decompress the L5-S1 lateral recess.

If that fails, a dorsal column stimulator may help.

Patient is going to attempt to obtain her intraoperative images. They should be available assuming they were saved.

8/19/2019 1300 hrs
WMG 100
.

Dr. Benedict performs laminectomy at L5/S1

10/3/2019
WMG 3
.
.

jun | jul | aug | sep | oct

25 1 5 10 15 20 25 1 5 10 15 20 25 1 5 10 15 20 25 1 5 10 15 20 25 1