

Gamma Knife® Perfexion™ Physics Course Outline

Washington Hospital Gamma Knife Center
2500 Mowry Ave.
Fremont, CA 94538

3-Day Course

Total CME Credits/Hours = 21.75

Day 1

Location for first three lectures: Taylor McAdam Bell Neuroscience Conference Room

7:45 - 8:00 Welcome and Introduction

8:00 - 8:45 (0.75) Lecture 1: Evolution and Development of Radiosurgery (Dr. Larson)

8:45 – 9:15 (0.5) Lecture 2: WHHS experience with Perfexion™ (Dr. Kunwar or Dr. Larson)

9:15 – 10:00 (0.75) Lecture 3: Technical description of the Perfexion™, emphasizing the basic technical features of Gamma Knife radiosurgery. The new collimator system will be described including source configuration and sector design. Basic workflow will be described to prepare the attendees for Exercise 1, which follows the coffee break. (Dr. Petti)

10:00 – 10:15 *Coffee Break: Transition to GK Suite*

10:15 – 10:30 (0.25) Demonstration 1: Tour of Gamma Knife suite and demonstration of Perfexion™ operation. (GK team)

10:30 – 11:00 (0.5) Exercise 1 (GK Perfexion™ suite, GK team): **Frame, Skull Radii, MRI and CT scans:** The Leksell frame will already be attached to a 3D anthropomorphic skull phantom (CIRS Model 603). In order to allow the attendees to become familiar with the Leksell head frame, MRI and CT fiducial boxes and the hardware required to perform MRI and CT scans, attendees will:

- 2) Perform skull radii measurements
- 3) Perform frame cap test
- 4) Attach MR fiducial box and cradle
- 5) Attach CT fiducial box to frame. If CT room is available, attach CT adapter to CT couch. Practice putting phantom with attached frame onto CT couch adapter.

11:00 – 11:30 (0.5) Demonstration 2: (GK Suite) Demonstrate basic features of LGP8.2 on large screen (to familiarize attendees with basic appearance and features of planning software before they attempt to use it). (P. Petti)

11:30 – 12:30 (1.0) Exercise 3 (GK suite) Workflow for treatment planning:

- 1) Enter the skull radii, which were measured as part of Exercise 1, into GammaPlan
- 2) Develop a treatment plan for the simulated lesion in the CIRS phantom
- 3) Approve and export one of the treatment plans developed by the attendees.
- 4) Set up the phantom on the Perfexion™ unit and deliver a treatment.

12:30 – 13:15 *Lunch (served in conference room)*

13:15 -14:00 (0.75) Lecture 4: (Conference Room) **Treatment Planning:** Basic treatment planning will be discussed, and new features for the Perfexion™ will be described. A discussion of isodose distributions for composite shots and shots with sector blocking will be given. Discuss scan requirements for both CT and MR. (Dr. Petti)

14:00 – 16:00 (2.00) Exercise 4 (GK suite): Treatment planning using the 10 cases that Elekta used in their Technical Training Course in Stockholm and/or additional cases that we have planned here at Washington Hospital that are specific to the Perfexion™. These cases will demonstrate all facets of treatment planning, including planning for multiple metastases, co-registration of imaging studies, image fusion, composite shots, and dynamic sector blocking. (P. Petti)

16:00 – 16:15 *Break*

16:15 – 17:00 (0.75) Exercise 5: (GK suite): **Assessing the Accuracy of MR scans and treatment planning for a simple target.** MR and CT scans will have already been obtained of the CIRS Model 603 phantom. This phantom has features that allow one to evaluate the spatial accuracy of MR and CT scans and also contains a simulated lesion. The attendees will:

- 1) Import the scans into GammaPlan
- 2) Perform measurements to assess the spatial accuracy of the scans.

Total Credits/Hours for Day 1 = 7.75

Day 2

Location for Lectures 5 and 6: Taylor McAdam Bell Neuroscience Conference Room

8:00 – 8:45 (0.75) Lecture 5: Brain Metastases (Dr. Larson)

8:45 – 9:30 (0.75) Lecture 6: Benign Brain Tumors (Dr. Kunwar or Dr. Larson)

9:30 – 9:45 *Coffee break in Lecture Room*

9:45 – 10:15 (0.5) Demonstration 3: TPS Administration (GK Suite): New system administration features of the GammaPlan software (i.e., the roles of “Planner,” “Physics” and “Administrator”). Storage and Retrieval of patient data will also be demonstrated on the large screen in the GK suite. (Paula Petti or Susan Lohman)

10:15 – 10:45 (0.5) Demonstration 4: Pre-Planning, Re-Treatment and Follow-up features of LGP 8.2 (GK suite). These new features will be demonstrated on the large screen in the GK suite (Paula Petti or Susan Lohman).

10:45 – 11:15 (0.5) Exercise 6 (GK Suite): **Clearance Checks:** Practice doing clearance checks and multiple runs using test procedures provided in the Gamma Knife system. (Paula Petti)

11:15 – 11:45 (0.5) Exercise 7 (GK Suite): **Clearance Checks: Practical example:** Attendees will be assigned a treatment plan that includes multiple gamma angles and clearance checks. This plan will be exported to the Gamma Knife, and the attendees will be given an opportunity to practice changing gamma angles, perform clearance checks and change a treatment plan if/when clearance problems arise. The option to define a clearance check at the treatment console will also be demonstrated. (P. Petti)

11:45 – 12:00 (0.25) Exercise 8 (GK Suite): **QA procedure for clearance check tool:** Attendees will have the opportunity to practice executing the procedure provided with the Perfexion™ system for performing QA for the clearance check tool.

12:00 – 12:45 *Lunch served in lecture hall*

12:45 – 13:45 (1.0) Lecture 7: (Conference Room) QA and Radiation Safety Features of Perfexion™ including a discussion of reduced extracranial doses. Distribute daily, weekly, monthly and annual QA

procedures used at WHHS. Attendees will be given the opportunity to practice these procedures after the lecture. (Dr. Petti)

13:45 – 14:15 (0.5) Demonstration 5 (Gamma Knife Suite): Safety features of Perfexion™, including “treatment stop,” “treatment Pause,” manually moving the couch, how to manually place the sectors in the home position and manually close the shielding doors. (P. Petti)

14:15 – 14:45 (0.5) Exercise 9 (Gamma Knife Suite): Attendees will execute WHHS daily and weekly QA (Note that the daily QA includes testing treatment stop and treatment pause, and the weekly QA includes the diode focus test. (P. Petti)

14:45 – 15:00 *Break*

15:00 – 16:00 (1.0) Exercise 10 (Gamma Knife Suite): Review Monthly QA procedures. Demonstrate Test Runs provided on the Perfexion™ system that facilitate monthly QA. Attendees will have the opportunity to setup spherical QA phantom for monthly dosimetry and perform measurements if desired. (P. Petti)

16:00 – 17:00 (1.0) Exercise 11 (Gamma Knife Suite): Review Annual QA procedures. Allow attendees to practice irradiating films (if desired) to test coincidence of radiation focal point with center of patient positioning system. Practice films will be provided and analysis with Excel and ImageJ will be discussed. (P. Petti)

Total Credits/Hours for Day 2 = 7.5

Day 3

7:30 – 15:00

If a patient treatment has been scheduled, attendees will observe the entire treatment process, from frame placement to treatment on the Perfexion™.

Attendees will also have the opportunity to:

- 1) Review QA procedures in more detail (if needed).
- 2) Perform more treatment planning exercises (if needed).
- 3) Have the opportunity to ask questions on any of the material covered.

Total Credits/Hours for Day 3 = 6.5