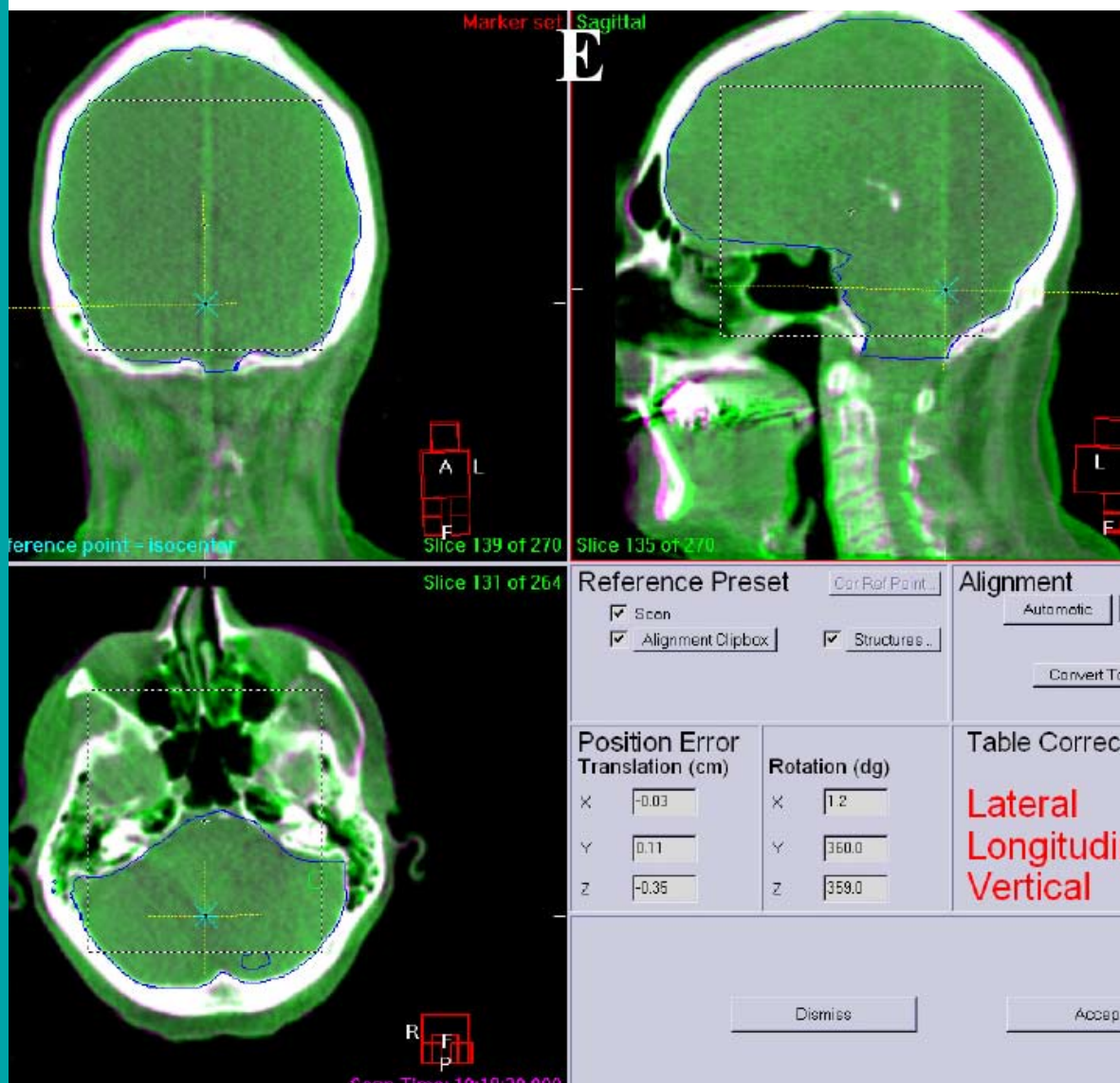


## Case Study



## Re-treatment of a recurrent brain tumor using Elekta Synergy® S

**Institution:** Temple University Hospital, Philadelphia, USA  
**Patient:** 63-year-old male  
**Diagnosis:** NSCLC  
**Plan:** Nine-field IMRT/SRT  
**Image guidance:** VolumeView™ on-line  
**Treatment:** Target – 1200cGy – single fraction

## Re-treatment of a recurrent brain tumor using Elekta Synergy® S

<b>Radiation Oncologist:</b>	Curtis Miyamoto, M.D., Professor & Chairperson
<b>Radiation Oncologist:</b>	Bizhan Micaly, M.D., F.A.C.R., Professor & Associate Chairperson
<b>Instructor, Radiation Oncology:</b>	Nicolas Kuritzky, M.D.
<b>Medical Physicist:</b>	Harold Perera, Ph.D., Ajaya Kumar Devabhaktuni, M.S. and Jen San Tsai, Ph.D.
<b>Neurosurgeon:</b>	Christopher Loftus, M.D., Professor and Chairperson
<b>Dosimetrist:</b>	Roxana Taveira, B.S., C.M.D.

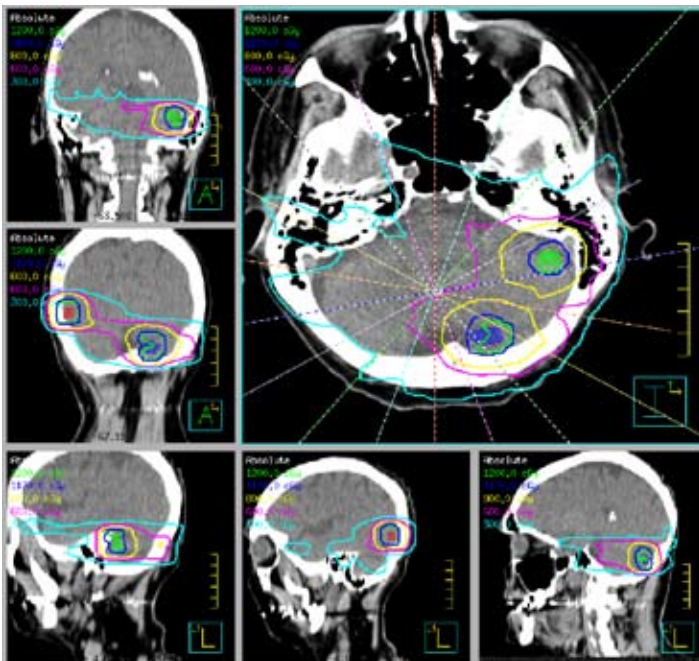
### Patient diagnosis and history

A 63-year-old man with a six-month history of weight loss underwent a chest X-ray which revealed a right upper lobe mass. The patient later had a generalized seizure and was admitted to a local hospital, after which he had an MRI scan which revealed three metastatic lesions.

A CT scan of the chest revealed a 9cm right upper lobe mass with hilar and mediastinal lymphadenopathy. The patient had a fine needle aspirate biopsy of the right upper lobe mass that was compatible with non-small cell carcinoma of the lung (NSCLC). A bone scan revealed increased activity in the T6 vertebral body and the right intertrochanteric area of the right femur.

### Previous radiation therapy

The patient had previously received whole brain irradiation, a total dose of 3500cGy was delivered in 14 fractions through parallel-opposed lateral fields.

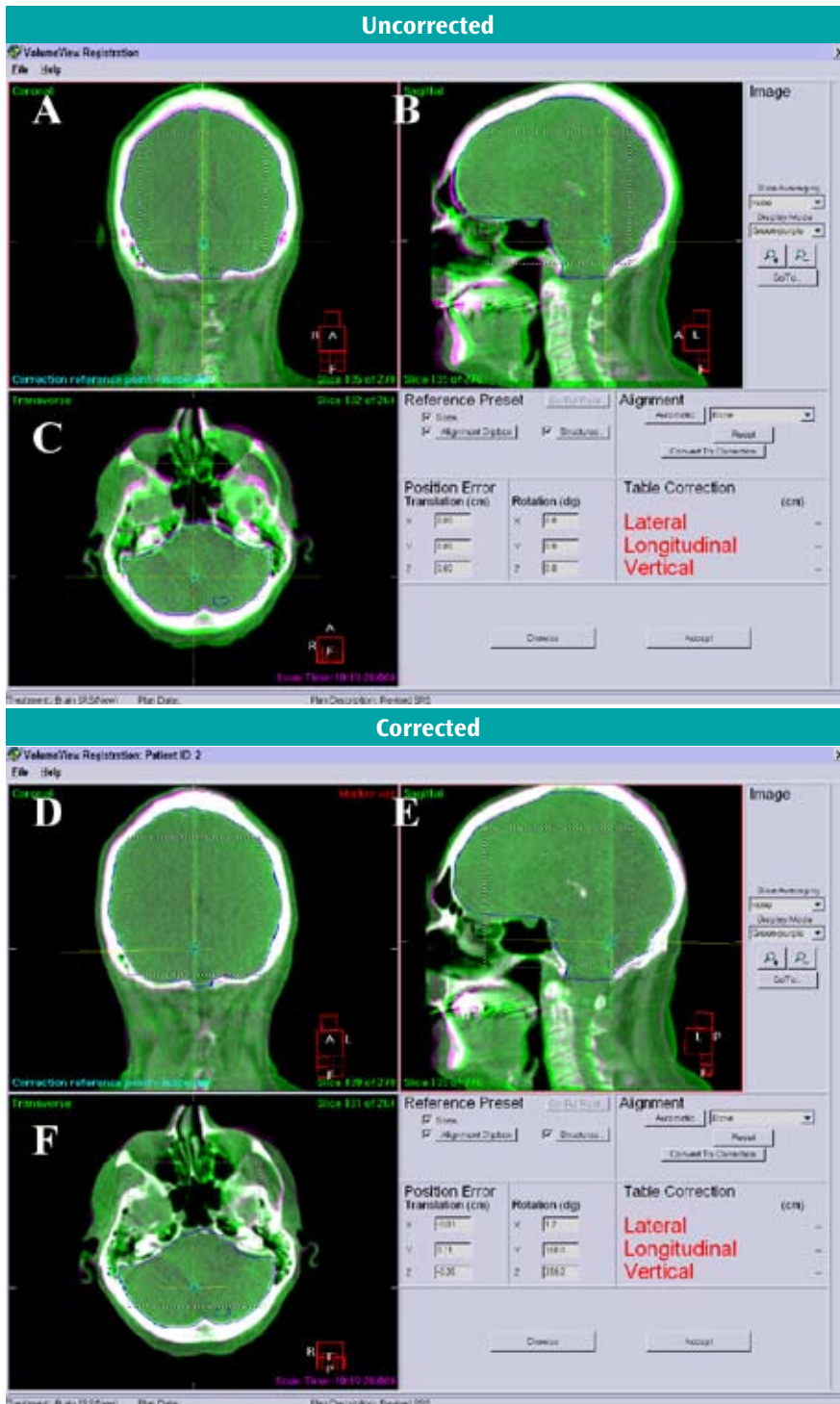


### Treatment

A step-and-shoot IMRT/stereotactic radiation therapy (SRT) plan (figure 1) for simultaneous treatment of multiple brain metastases (two cerebellar and a right temporal). Treatment planning was carried out using Philips Pinnacle®3 IMRT/SRT techniques. The patient was immobilized in a reinforced AcQuaPlast head mask. No sedation was employed.

Figure 1: dose distribution for a seven-field IMRT plan.

The three lesions were treated using a nine-field segmental IMRT technique delivering a single fraction of 1200cGy prescribed to the 100% isodose level. Dose to the eyes was restricted to 100cGy. The mean whole brain dose was 131.1cGy. Positioning was verified utilizing the skull anatomy for registration and Elekta Synergy® S VolumeView™ imaging system. Adjustments were made, and the patient was re-imaged (figure 2). Treatment was then delivered.



**Treatment time<sup>1</sup>**  
**≈ 40 minutes:**

- 6 mins. – patient set-up
- 1 min. – acquisition
- 7 mins. – registration
- 3 mins. – repositioning
- 1 min. – re-imaging
- 2 mins. – re-registration
- 20 mins. – treatment delivery

<sup>1</sup> Including patient set-up

Figure 2: VolumeView™ images taken using Elekta Synergy® S – Images A to C show position prior to registration and correction with structure overlay from the planning reference image Images D to F show coronal, sagittal and axial positioning after correction drawn from the table correction vectors produced by the XVI software.

## Outcome and follow-up

The patient developed no secondary affects as a result of treatment.

## Discussion

IMRT/SRT with image guidance can be safely used to simultaneously treat multiple brain metastases. This shortens the time for treatment and is well tolerated. The whole brain dose is acceptable.

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