

A Comprehensive Patient Education Video  
for Radiosurgery of the Central Nervous System

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## Dedication

There are certain people that have changed the course of my life

Ed Lyle

Sister Lynne Madison

Scott Howard

Ryan Hoffman

Sal Zambito

Mike Wilson

And then there were the ones that saved my life

Mom and Dad... This one's for you.

I can never be able to repay you but I will forever try.

## *God*

*Grant me the Serenity to accept the things I cannot change*

*Courage to change the things I can*

*And the Wisdom to know the difference*

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I would finally like to thank my mentor, my support, my sounding board and my friend,

Mike Wilson

A Comprehensive Patient Education Video  
for Radiosurgery of the Central Nervous System

by

THOMAS JEFFERY FELS

THESIS

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The University of Texas Southwestern Medical Center at Dallas

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

BIOMEDICAL COMMUNICATIONS

The University of Texas Southwestern Medical Center at Dallas

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by

Thomas Jeffery Fels

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A Comprehensive Patient Education Video  
for Radiosurgery of the Central Nervous System

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**ABSTRACT**

The purpose of this thesis project was to produce a comprehensive patient education video describing the concept of radiosurgery and the terms associated with its use. This video will be viewed by patients recently diagnosed with a brain or spinal disorder who are contemplating radiosurgery, specifically the use of the Gamma Knife® or the CyberKnife®. Much of the information presented online does not provide a comprehensive overview of all of the potential risks involved in radiosurgery and damage to healthy tissue that may occur.

By viewing this program that includes 3D and 2D animation, illustration, and written description, the patient will be informed of what is involved in radiosurgery including the possible strengths and weaknesses of radiosurgery. This video was designed to help the patients better understand the process of radiosurgery and how it may affect their life. This will assist doctors with consistent information that may be difficult to portray verbally to each patient. Consistent information in the form of a video can supplement communication between patient and physician. The patients may then be able to make informed decisions on whether they would like to use this technology in their radiation therapy.

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## LIST OF DEFINITIONS

Adobe® Photoshop CS3® - professional software designed for picture creation and editing in preproduction

Adobe® Illustrator CS3® - professional software designed for picture creation and editing in preproduction

3D Studio Max® - 3D animation software designed for modeling and creating 3D animating in preproduction

Poser® - professional software designed for creating and staging 3D figure models in preproduction

Adobe® After Effects CS3® - professional software designed for video editing and post production

Adobe® Premiere CS3® - professional software designed for video and audio editing in post production

Camtasia® - professional software designed for creating audio narration and audio editing in post production

Quicktime® – common video viewing file format

Adobe® Encore CS3® - professional software designed producing CD and interactive DVD discs in post production

.JPEG- common picture viewing file format

.WAV- common audio file format

Targa- common picture viewing file format

CNS- central nervous system

# Chapter One

## Introduction

### Thesis Problem

The use of radiosurgical devices such as the Gamma Knife® and the CyberKnife® can be an intimidating decision to make for someone recently diagnosed with a disorder of the central nervous system. Eighty-six percent of the patients in an English study wanted to have all possible information about diagnosis, treatment, treatment outcomes, side effects and quality of life (1). An extraordinary amount of treatment advice from books, the media, and the Internet is available to patients today, although much of it is confusing or conflicting (2). Explaining the definitions of radiation and radiosurgery, benefits, risks and limitations of radiosurgery, and the factors that are considered when choosing a therapy treatment will offer a comprehensive overview for patients to assist them during their decision making process. The present information online does not offer a comprehensive overview, including potential risks, of the use of radiation to treat cancer and other disorders.

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(1) Jenkins, V. "Information Needs of Patients with Cancer; Results from a Large Study in UK Cancer Centres" British Journal of Cancer 84.1 (2001) 48-51

(2) Gomella, L. "The Use of Video-Based Patient Education for Shared Decision- Making in the Treatment of Prostate Cancer" Seminars in Urologic Oncology 18. 3 (2000) 182-187

Doctors must fill in the missing information of possible risks and side effects in order for the patient to have an understanding of their treatment options. In a study with cancer patients, 54% said they were not informed adequately [of the risks involved in their treatment] (4). Animated video can deliver comprehensive patient information in a visual way reinforcing ideas with auditory narration to help patients better understand the complex concepts of radiosurgery and the risks associated with its use. Cancer-related computer based patient education was found to provide a greater depth of content, and better able to satisfy a broad range of educational needs compared to other media (5). A video can be viewed by patients while waiting for a doctor in a consultation appointment so as to offer patients an opportunity for open dialogue and questions during the consultation. Can an informational patient education video be created that will to assist doctors with patient education?

### **Goal of the Project**

The goal of this thesis project was to produce a comprehensive informational patient education video describing the concept of radiosurgery and the terms associated with its use. The video is intended for patients recently diagnosed with a brain or spinal disorder who are

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(4) Chen, X. "Impact of the Media and the Internet on Oncology; Survey of Cancer Patients and Oncologists in Canada" Journal of Clinical Oncology 19 (2001) 4291-4297

(5) Mank, A "An Interactive CD-ROM to Inform Patients About Stem Cell Transplantation" Patient Education and Counseling 73 (2008) 121-126

contemplating radiosurgery, specifically the use of the Gamma Knife® or the CyberKnife®. This video was designed to be viewed by patients at the physician's office during or before a consultation appointment with their doctor. A narrated video was produced that explains in three dimensional examples certain aspects of radiosurgery that are often difficult for a neurosurgery doctor to communicate to a patient verbally. Bruce Mickey M.D., a leading surgeon in the field of neurosurgery at the University of Texas Southwestern Medical Center's Neurological Department, was the content expert that assisted me in the production of this video to be a supplemental tool to his consultation appointments about radiosurgery with his patients.

### **Objectives of the Project**

In order for me to achieve the goal outlined, I defined a number of objectives. The first objective was to discover if comprehensive information was already available to patients. A review of information online helped me define what information was readily available. The next objective was to understand what the patients wanted to learn from a patient education video on radiosurgery. I interviewed and conducted a questionnaire survey of recent past patients to find out what they would like to see in a patient education video on radiosurgery. This face to face interactivity with the patients helped shape the direction of much of the design and format much of the content in this video. The last objective was to create the content of the video, by storyboarding, producing animations and timing the animations to a narration.

The goals of the animations were:

- 1) explain radiation and the use of radiation in treatment of disease
- 2) depict how radiation affects DNA of both healthy and abnormal tissue
- 3) explain radiosurgery as a method of radiation therapy
- 4) depict the possible risk of collateral damage to nearby healthy tissue
- 5) explain factors that doctors consider before performing radiosurgery

## **Background**

Deciding on a treatment plan for treatment of a brain disorder can be a stressful and overwhelming task for a patient recently diagnosed. Tumors and other disorders that lie deep inside the cranium are difficult to remove during invasive surgical resection without damage to healthy surrounding tissues. Effective surgical treatment of deep brain lesions, intracranial aneurysms, arteriovenous malformations, and cranial base tumors requires exposure that frequently can be obtained only by direct brain retraction. Cerebral edema, infarction, and hemorrhagic transformation, which are frequently delayed findings, are significant complications of these procedures (6).

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(6) Andrews, R "A Review of Brain Retraction and Recommendations for Minimizing Intraoperative Brain Injury" Neurosurgery 33.6 (1993) 1052-1064

New advancements in radiation therapy and radiosurgery have created the possibility to treat brain masses and disorders without opening the cranial cavity. Owing to the high risk of surgical resection and low efficacy of medical treatment, radiosurgery can be proposed [to patients] upfront (7). A comprehensive informational media piece for patient education on radiosurgery could allow patients to feel better informed during their decision making process and open up a dialog between patients and their doctor. Patients may then be able to make informed decisions about the use of this technology during their radiation therapy.

### **Significance of Comprehensive Information**

Before radiation treatment is administered to treat cancer of the central nervous system (CNS), doctors must inform the patient of certain potential risks that may be associated with the use of radiation. Most information presented online concerning these procedures does not offer a comprehensive view of the strengths *and* weaknesses of these radiosurgery tools. I had found different websites that offered certain aspects of radiosurgery, yet I did not find one source that included a comprehensive patient education overview online that included all of these aspects of radiosurgery together in a multimedia video. Most of the information available was presented in text form and still images. For this reason, comprehensive information in the

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(7) Fuentes, S. "Brainstem Metastases: Management using Gamma Knife (2005)



format of visual and auditory media could be a useful supplement to doctors to assist communicating all aspects of radiosurgery and possibly open meaningful dialog with patients. This video addresses the need for a comprehensive overview by explaining to patients how radiation is used to treat disease during radiosurgery and what the effects radiation has on other tissues near a disorder.

### **Limitation of the Project**

The scope of this project was limited to radiosurgery in its general conceptual ideas. This project consists of thirteen minutes of animated video. All the video material was limited to the final production format of a single DVD-ROM disk that could play on both Mac and PC platforms, television and DVD players.

### **Evaluation**

After completion of the patient education video, I distributed copies to the original participants of the preliminary questionnaire, two neurosurgeons and two radiosurgery technicians. The distributed video included a follow-up questionnaire with an attached self addressed envelope for collection of feedback. I reviewed the formative evaluations and made subsequent changes to the video for improvement.

This document chronicles the process of answering my thesis question, “Can an informational patient education video be created to offer comprehensive information to assist doctors with patient education?” with a review of literature, methodology, evaluation results and conclusion.

## **Chapter Two**

### **Literature Review**

My literature review for this project had three objectives. First I needed to determine what kind of material was available to patients when researching the use of radiosurgery as a radiation therapy method. Second, I reviewed current patient education material available to the public. Third, I reviewed literature on how to create patient education. When researching cancer related treatments, many patients turn to the Internet for information (5). Consequently, much of my research was done on the Internet due to the vast availability it provides to patients for research medical topics. In addition, I searched the online medical research database Pub Med through the UT Southwestern main library website search engine.

#### **Current available information**

Before planning an outline of ideas and a script, it was important to know what references were available online for patient education and what information was being presented. My method for researching online material was based on both design content and written content. I used key words in an internet search engine to find the information present to the general public. The words I used were; Gamma Knife®,

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(5) Mank, A “An Interactive CD-ROM to Inform Patients About Stem Cell Transplantation” Patient Education and Counseling 73 (2008): 121-126

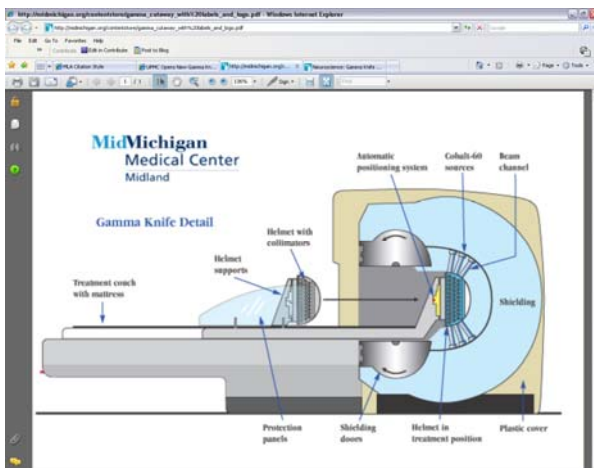
CyberKnife®, stereotactic, radiosurgery, radiation, radiation therapy, brain, central nervous system, whole brain radiation, cancer, and patient education video. I researched fifteen hospital websites discussing either the Gamma Knife®, the CyberKnife® or general radiosurgery. All fifteen sites offered a brief description of radiosurgery and a description of what a patient might expect on the day of the procedure. Many websites included information about definitions and frequently asked questions, yet did not give a detailed description of any risks or limitations of radiosurgery. The University of California San Francisco Medical Center website states in one of its secondary pages that the Gamma Knife® can deliver a “high dose of radiation precisely to its target, while causing little or no damage to surrounding tissue” (3). This statement implies little or no damage or side effects in the use of this device. The website only references factors of the possible risks of radiosurgery as it states that “when you are being considered, your physician is consulted to be certain that all variables affecting your therapy are taken into consideration” (3). This leaves patients inadequately informed of potential risks.

The MidMichigan Health website (8) contains a secondary page with subheadings of “How does the gamma knife work?” with a PDF attachment of an illustration that only labels pieces of the Gamma Knife® device. (Figure 2-1). It only describes topics

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(8) [http://midmichigan.org/contentstore/gamma\\_cutaway\\_with%20label.pdf](http://midmichigan.org/contentstore/gamma_cutaway_with%20label.pdf) ( online) accessed Jan 2008

(3) <http://www.ucsfhealth.org/adult/special/g/11201.html> (online) accessed Jan 2008



**Figure 2-1.** Gamma Knife® illustration (8)

such as “proven safety” and “providing new hope”. The content in the subheadings of this website neither gives a real explanation of how radiation is used in radiosurgery nor does it explain the risks involved in radiosurgery such as collateral damage or acute radiation injury. This website leaves patients with a one-sided view of this method of treatment and inadequately informed of potential risks. Only three websites offered a list of complications from radiosurgery after the procedure in their frequently asked questions portion of the website (9,10,and 11). These three sites did not explain why or how these complications may occur.

Six websites had video links on the home page. The Florida Hospital Gamma Knife Center (12) website offered a two minute animation the Gamma Knife®, geared

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(9) <http://gammaknifesanantonio.com/Physicians/Profile.asp?PhysicianID=3> ( online) accessed Jan 2008

(10) [http://www.elekta.com/patient\\_us\\_radiation\\_therapy.php](http://www.elekta.com/patient_us_radiation_therapy.php) ( online) accessed Jan 2008

(11) <http://www.irsa.org> ( online) accessed Jan 2008

(12) <http://www.gamma-knife-surgery.com/> ( online) accessed Jan 2008

more towards vendors of the Gamma Knife®. This video was not narrated. The Stanford University Medical Center (13) website had two minute news footage filmed in March of 2002 from the television show “Marvels of Modern Medicine” briefly describing the CyberKnife® as a radiation therapy method, yet it was more for consumer interest than patient education. The website [www.gammaknife.org](http://www.gammaknife.org) (14) contained a video that was intended to be watched by a patient before undergoing surgery using the Gamma Knife®. This was narrated video footage that described the process during the day of the procedure. This same video is also used on the Johns Hopkins Medicine home page (15) and the Elekta company secondary page (10). Dr. Mickey commented that “the information in this video is not entirely accurate because the Gamma Knife® is not ‘non-invasive’. It sounds as if there are no side effects.” I found one website, [www accuray.com](http://www accuray.com) (16) that used an animated narrated video format in its approach to discussing a radiosurgery. This video did a thorough job explaining how the CyberKnife® device delivers radiation, yet it did not offer a comprehensive overview of radiosurgery including possible risks and limitations

The website with the most comprehensive information for patients that I found was the International Radiosurgery Association (11) website. This site contained many of

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(13) <http://www.stanfordhospital.com/clinicsmedServices/COE/cyberknife/> ( online) accessed Jan 2008

(10) [http://www.elekta.com/patient\\_us\\_radiation\\_therapy.php](http://www.elekta.com/patient_us_radiation_therapy.php) ( online) accessed Jan 2008

(14) [www.gammaknife.org](http://www.gammaknife.org) ( online) accessed Jan 2008

(15) [www.radonc.jhmi.edu](http://www.radonc.jhmi.edu) ( online) accessed Jan 2008

(16) <http://www accuray.com> ( online) accessed Jan 2008

(11) <http://www.irs.org> ( online) accessed Jan 2008

the aspects that I included in this thesis project video. It offered possible side effects and complications of radiosurgery in the frequently asked questions portion. It described the methods of delivery of radiation such as fractionated radiation therapy and whole brain radiation therapy. It included definitions of medical terms in a tertiary page. It offered suggestions on the decision making process for the patient. The limitation of this website was that the information was only presented in print. There were few images or photos available for a patient to understand the concepts the website was describing. A physician must then use whatever resources available to explain the risks and limitations to a patient that may already be scared about their prognosis. A patient education video describing the concepts of radiation and radiosurgery, benefits, risks and limitations could be an effective tool for physicians to explain a comprehensive overview of radiosurgery.

### **Patient Education Resources**

On October 2, 2007, I consulted the Creative Director of Krames patient education, a leading publishing company of patient education material in San Bruno, CA. to research visual material presently created for patient education in doctor's offices. I studied a stack of patient education pamphlets from the Krames archives as examples of how the information is presently being distributed. I found that most material from Krames has a style of representation that is soft and non-threatening. Nearly all material has portraiture of patients interacting with medical staff in a calm soothing setting. The layouts were clean, sophisticated and not cluttered with superfluous designs.

One issue I needed to address was that the literacy rate of most patient education material should be at a seventh grade level. Krames guideline standard is to use the Flesch-Kincaid Readability Tests to check that the comprehension level of their material at or below a seventh grade level. Wikipedia online encyclopedia (24) defines the Flesch-Kincaid Readability Tests as a formula “designed to indicate comprehension difficulty when reading a passage of contemporary academic English.” Microsoft Word Processing has the Flesch-Kincaid readability formula built into the Spelling and Grammar tool of the toolbar in that program. I used this tool as I wrote the script to keep my word comprehension as low as possible. My challenge was to write a script that can be an easily understood from the often complicated information supplied to me. I needed to write the script in as simple of a language as possible while effectively describing the content without scaring or confusing the patient.

Another source of information for the creation of patient education material was the book Patient Education by Kate Lorig and associates. This book helped define a needs assessment for a patient education video as it stated one “way of conducting a needs assessment is through an interview...adding some open-ended or semi-structured questions to your structured interview” (17).

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(24) [http://en.wikipedia.org/wiki/Flesch-Kincaid\\_Readability\\_Test](http://en.wikipedia.org/wiki/Flesch-Kincaid_Readability_Test)

(17) Lorig, Kate Patient Education: a practical approach 3<sup>rd</sup> ed. , London (2001)



### **Patient Education material development**

In the article “Applying the Science of Learning: Evidence-Based Principles for the Design of Multimedia Instruction”, I found four principles to assist me on the creation of a video for the particular audience of patient education. The four principles in this article were; the temporal contiguity principle, the modality principle, the pretraining principle, and the multimedia principle.

The temporal contiguity principle states that people learn better when corresponding narration and animation are presented simultaneously (18). According to the modality principle, people learn better from graphics with spoken text rather than graphics with printed text (18). These principles helped me determine how to integrate the different pieces of multimedia such as voice over narration and 3D and 2D animation into the video rather than just using text to describe the images.

The pretraining principle is that people learn better from narrated animation when they already know the names and characteristics of essential components. The theoretical rationale is that learners who are already familiar with the names, locations, and behavior of each component can devote more of their cognitive capacity to building a cause and effect

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(18) Mayer, R “Applying the Science of Learning: Evidence-based Principles for the Design of Multimedia Instruction” American Psychologist Nov. (2008)

model of the system (18). This video offers definitions of medical terms and phrases that may not be familiar to the patient. This principle was important as I built on smaller ideas about radiation and radiation therapy to describe the complex concept of radiosurgery.

The multimedia principle states that people learn better from words and pictures than from words alone...people learn more deeply when they build connections between verbal representation and a pictorial representation of the same material (18). This principle backed up my theory that a multimedia video could assist doctors in better patient education.

One of the common errors in planning any new program is not considering the needs of all those involved. Although it is evident that client needs are important, we often forget the needs of other interested parties (17). My task was to successfully illustrate the complex information that physicians must describe while customizing this information to the needs of patients. When used in this fashion, good materials add depth to the patient-physician interaction, help patients formulate their questions and concerns more clearly, and aid clinicians in providing more appropriate and responsive feedback (2).

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(18) Mayer, R “Applying the Science of Learning: Evidence-based Principles for the Design of Multimedia Instruction” American Psychologist Nov. (2008)

(17) Lorig, Kate Patient Education: a practical approach 3<sup>rd</sup> ed. , London (2001)

(2) Gomella, L. “The Use of Video-Based Patient Education for Shared Decision- Making in the Treatment of Prostate Cancer” Seminars in Urologic Oncology 18. 3 (2000) 182-187

### **Evaluation of literature**

In my evaluation of the literature, I found that there are available resources on the internet for patients to gather information, yet much of it does not fully address the issues of the risks involved in radiosurgery as a therapy option. My research into patient education development at Krames helped me define what information I needed to include and/or exclude from a comprehensive patient education video to be as effective as possible. I found that most material printed for patient education has a calm soothing style of representation when explaining the medical issue. The content was written in a broad simple language so that all patients can comprehend the information. Krames adheres to a Flesch-Kincaid standard as does Microsoft Word program tools. Articles from Pub Med database supplied evidence that video based patient education material is a beneficial supplement to doctor/patient dialogue. These articles assisted me on how to create an effective patient education video by defining methods of presenting content material.

### **Conclusion**

Based on my literature review, I concluded that an animated, narrated patient education video that portrays in three dimensional examples how radiation is used to treat disease and an explanation of the risks and limitations involved with this type of treatment, was needed to assist in patient education.

## **Chapter Three**

### **Methodology**

#### **Development of Thesis Concept**

From my literature review I concluded that an animated, narrated video that portrays a full comprehensive view of how radiation is used to treat disease and the risks and limitations involved with this radiosurgery was needed to assist doctors in patient education. I determined a list of objectives to complete in order to achieve this goal of producing a comprehensive informational patient education video describing the concept of radiosurgery and the terms associated with its use. The first objective was to determine if comprehensive patient education information was already available to patients concerning radiosurgery. The next objective was to understand what the patients wanted to learn from a patient education video on radiosurgery and what information doctors might need to portray to patients. The last objective was to write a script, storyboard, produce animations and time the animations to a written narration.

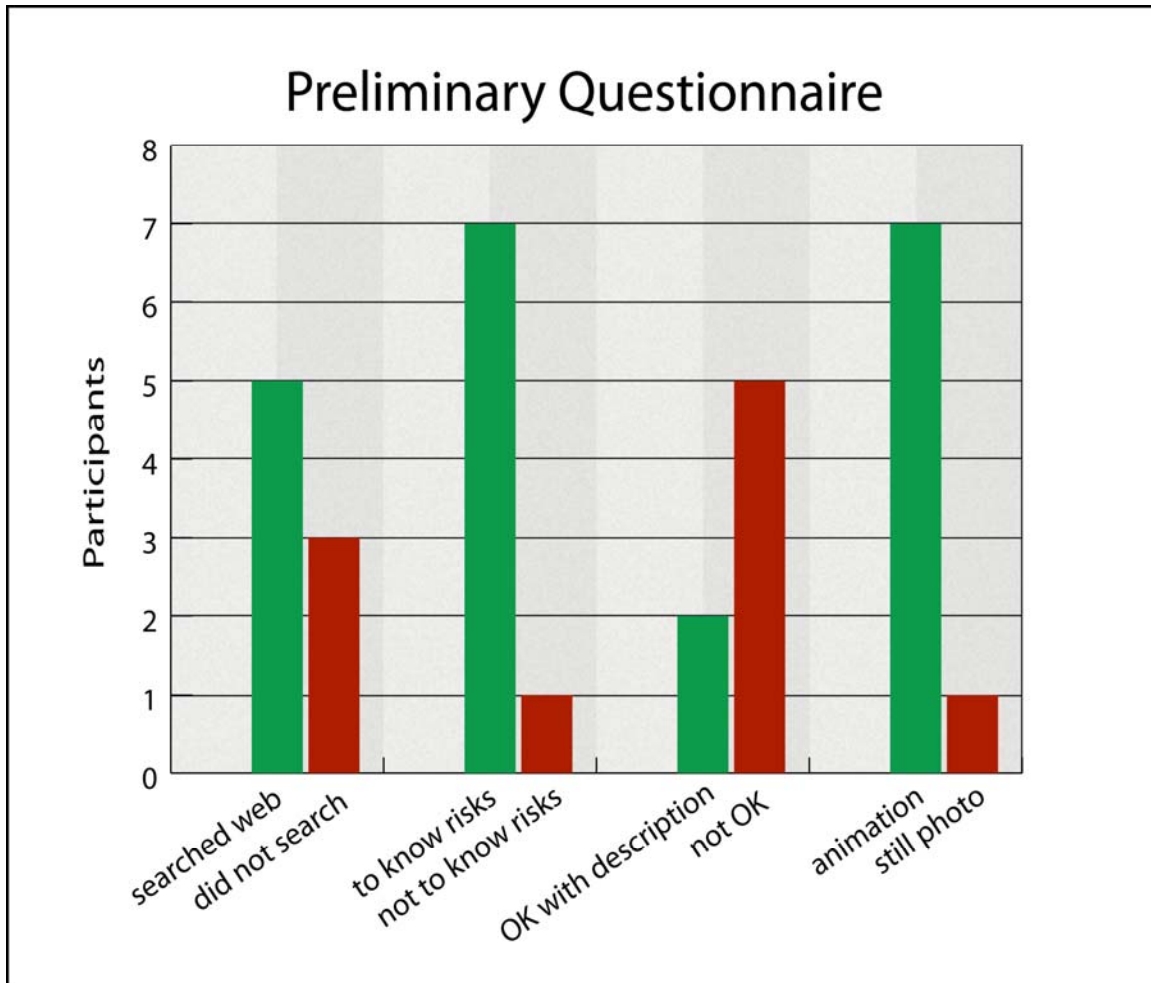
#### **Target Audience**

I had concluded from my literature review that there was available information online, yet it was spread out among many sources, and most information available was inadequate in its description of the risks and limitations of radiosurgery. The next objective was to understand what patients wanted to learn from a patient education video on radiosurgery

and what information doctors might need to portray to patients. The target audience for this thesis project was patients recently diagnosed with a neurological disorder in the central nervous system (CNS) who were contemplating the use of two common radiosurgical devices, the Gamma Knife® and the CyberKnife®. To fulfill my second objective, I sent a preliminary questionnaire with six open ended questions to eight recent patients who have used the Gamma Knife® and the CyberKnife®.

#### *Preliminary Questionnaire*

To fulfill my second objective, I sent a preliminary questionnaire with six open ended questions to eight recent patients who have used the Gamma Knife® and the CyberKnife®. On October 11, 2007, I mailed a questionnaire to five recent patients that have used radiosurgery in their therapy treatment. When possible, these questionnaires were given in a face to face interview. I interviewed three patients face to face in the Gamma Knife clinic at UT Southwestern on October 24, 2007 just before they underwent treatment. With the questionnaire, I gathered information on how many of them currently understood potential risks and limitations associated with their treatment, what information had they possibly come across before they underwent treatment as well as what means of media would be most helpful to them in understanding radiosurgery (see Appendix A)



**Figure 3-1.** Questionnaire results

The results (Figure 3-1) showed that many participants had researched radiosurgery, the Gamma Knife® or the CyberKnife® online before their treatment. Five patients found positive information about the procedure from websites yet had to dig for information about the potential risks and limitations of radiosurgery. Seven patients expressed the desire to know what the potential risks and side effects were in the use of radiation therapy. Two patients expressed that they were comfortable enough with the description of risks and limitations of radiosurgery from their doctor, yet did not necessarily understand them completely. Seven patients wanted to see either video footage of a person on the day of the procedure or an animation describing the concept of radiosurgery. A general opinion from these questionnaires was the desire for a soothing, calming feeling about the video and its content. I used the useful feedback from the questionnaires to help me edit the advanced concepts of radiation therapy provided to me in a manner that patients could understand while offering this information to accommodate the patient in an accurate yet non-threatening way.

### **Script Development**

The last objective was to write a script, storyboard, produce animations and time the animations to the written script. Much of the medical content information of the script was provided by Dr. Mickey. He described how radiation was used to treat disease and how it is effective in radiosurgery treatment. After reviewing the results from the preliminary questionnaire, I created a script outline with the information provided by Dr. Mickey and the questionnaire results (see Appendix B).

### *Delivery Method*

The main idea behind using an animated video for delivering patient information was to offer an easier way to understand the complex concepts of radiosurgery in a visual manner while reinforcing these ideas with auditory narration. Physicians have the task of explaining complex radiosurgical concepts, risks, and limitations to every patient in a verbal form. Video technology enables the delivery of consistent information in a non-threatening format in which anxiety-producing topics can be presented to individuals and groups (2). Video should be used in conjunction with personal follow-up to answer a patient's concerns and questions and to provide the necessary link between generic educational material and a patient's unique situation (2). A consistent comprehensive video using three-dimensional and two-dimensional animation can assist them in explaining these complex ideas to all patients before they choose a radiation therapy.

### *Outline and Flow Chart*

It was initially intended that patients would be able to choose from five separate interactive buttons on the initial menu screen. I developed an outline as the basis to write a script and a DVD flow chart for these five buttons.

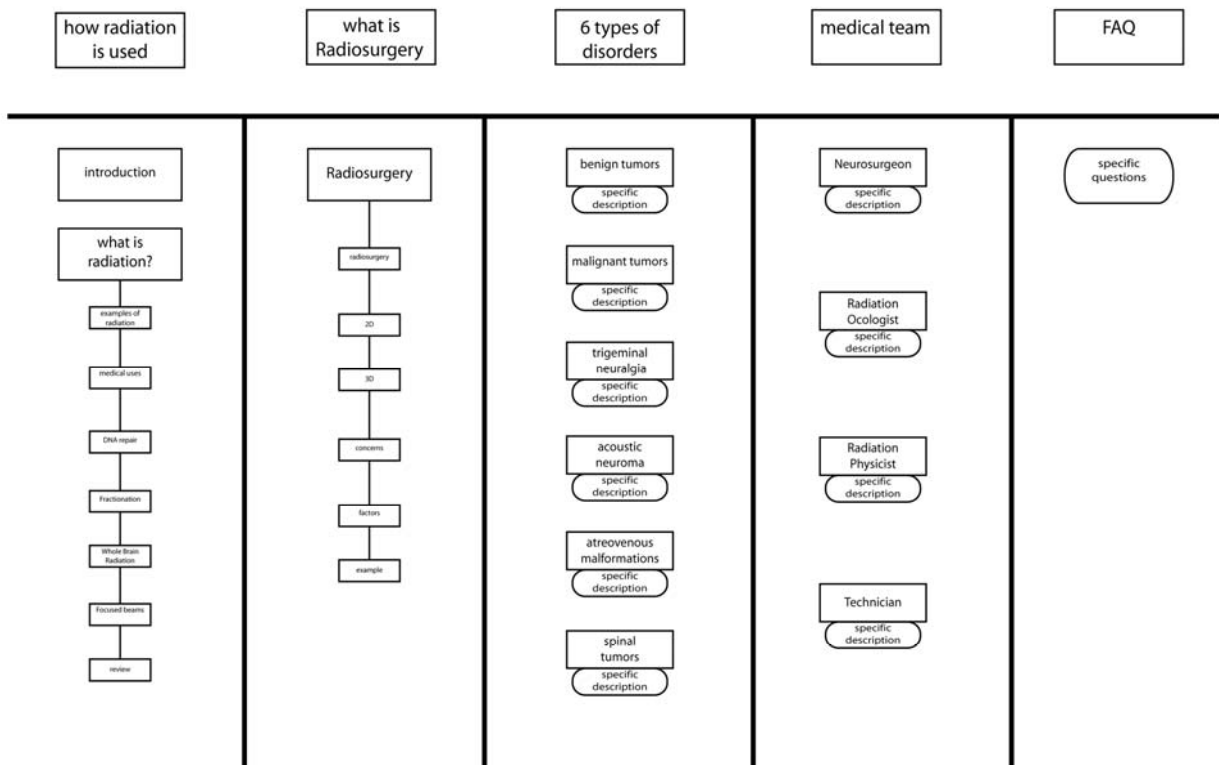
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(2) Gomella, L. "The Use of Video-Based Patient Education for Shared Decision- Making in the Treatment of Prostate Cancer" Seminars in Urologic Oncology 18. 3 (2000) 182-187



The flow chart separated the buttons into five sections: “How radiation is used”, “What is Radiosurgery”, “Six Disorders Treated”, Medical Team”, “Frequently Asked Questions”

( Figure 3-2).



**Figure 3-2.** DVD flow chart

The first section “How radiation is used” had two objectives. The first objective was to define relevant medical terms used in radiation therapy. The second objective used the pretraining principle (18) of building on these simple definitions in order to set the stage for a description of radiosurgery. I broke down this section into seven paragraphs in order to achieve these objectives.

The video and narration describe:

- 1) definition of radiation
- 2) definition of radiology and radiation oncology
- 3) how radiation affects living cells
- 4) definition of fractionated radiation therapy
- 5) definition of whole brain radiation therapy
- 6) improvements on the delivery of radiation
- 7) a review of previous six paragraphs

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(18) Mayer, R “Applying the Science of Learning: Evidence-based Principles for the Design of Multimedia Instruction” American Psychologist Nov. (2008)

The second section “What is radiosurgery” had three objectives. The first objective was to explain how radiation was used during radiosurgery. The second objective used the multimedia principle (18) of combined narration and animation to describe how radiation affected the healthy tissue near a tumor or disease. The third objective was to outline the three main factors that doctors considered before the use of radiosurgery as a radiation treatment option. I broke down this section into six paragraphs in order to achieve these objectives.

The video and narration describe:

- 1) definition of radiosurgery
- 2) a two-dimensional example of the affects on tissue around a target
- 3) a three-dimensional example of the affects on the space around a target
- 4) concerns and limitations with radiosurgery
- 5) three factors doctors consider before treatment
- 6) a common example of these three factors in use

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(18) Mayer, R “Applying the Science of Learning: Evidence-based Principles for the Design of Multimedia Instruction” American Psychologist Nov. (2008)

Initially the third, fourth and fifth sections (“Six Disorders Treated”, “Medical Team”, and “Frequently Asked Questions” respectively) were going to be animated and narrated. The third section “Six Disorders Treated” had two objectives. The first objective was to portray the close proximity of a tumor or disease process to an important nearby structure in the brain or spinal cord. The second objective was to give a written description of possible side effects that may occur after the treatment of six disorders often treated with radiosurgery.

Six illustrations were drawn to describe six disorders:

- 1) Pituitary Tumors
- 2) Metastatic Cancer
- 3) Arteriovenous Malformations
- 4) Meningiomas
- 5) Acoustic Neuromas
- 6) Trigeminal Neuralgias

The fourth section “Medical Team” had one main objective to show the patient the titles and description of the members of their medical team. The fifth section “Frequently Asked Questions” had one main objective to answer questions that are often asked by patients about radiation and radiosurgery.

After detailed review, I decided that the content of this DVD would be better suited for patient comprehension if condensed into a one video and not into five buttons. Whether patient education is given in five, ten-, or fifteen minute blocks or in several hour-long classes you never have enough time to teach everything. Thus it is important to set priorities (17). I decided to combine all the components of section one and section two into one shorter video. Section three, four and five will still be printed and included in a patient education module to be given to the patient at a consultation appointment, yet they were omitted here from this thesis project.

### **Storyboards**

My next task was to create storyboards for the animations. The storyboard process began with a very loose style of brainstorming on note cards (Figure 3-3) because of the ease of adding and removing certain frames from any particular button storyboard. After preliminary storyboard note card ideas were approved in the note card stage, I created traditional storyboard sheets to show animation processes and video transitions (Figure 3-4).

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(17) Lorig, Kate Patient Education: a practical approach 3<sup>rd</sup> ed. , London (2001)

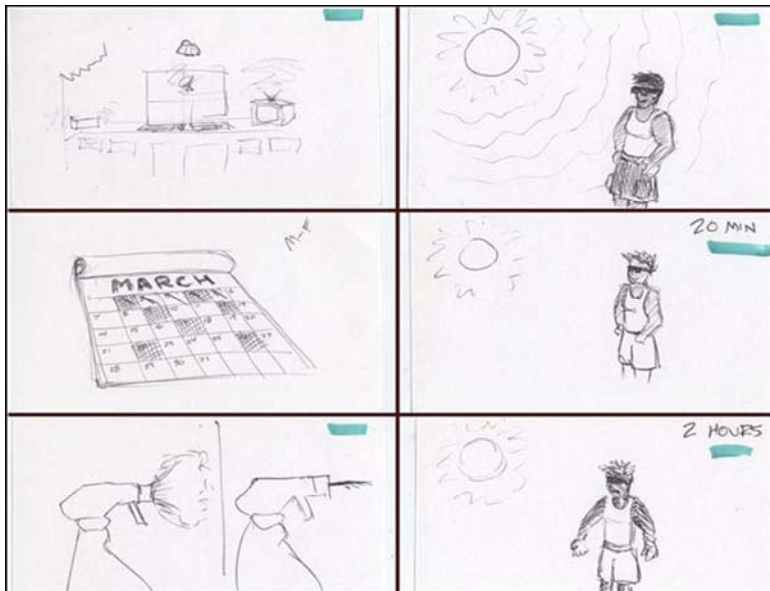


Figure 3-3. Scanned images of storyboard note cards Button One

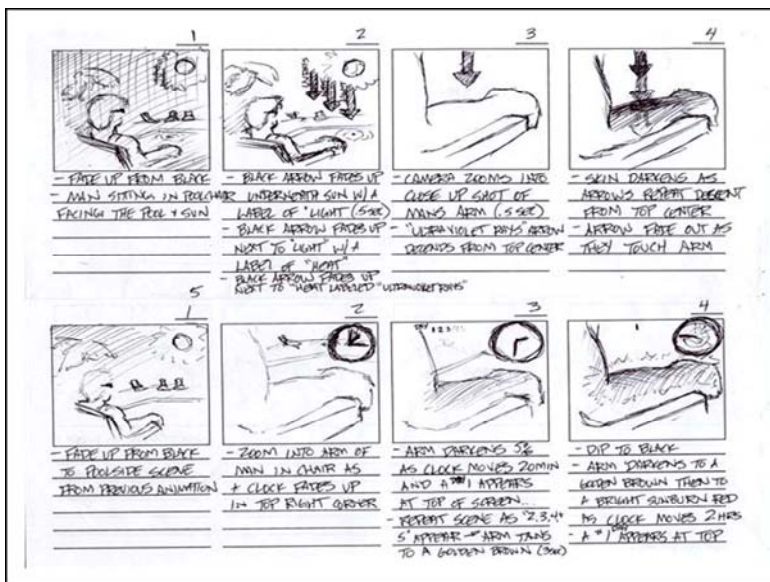
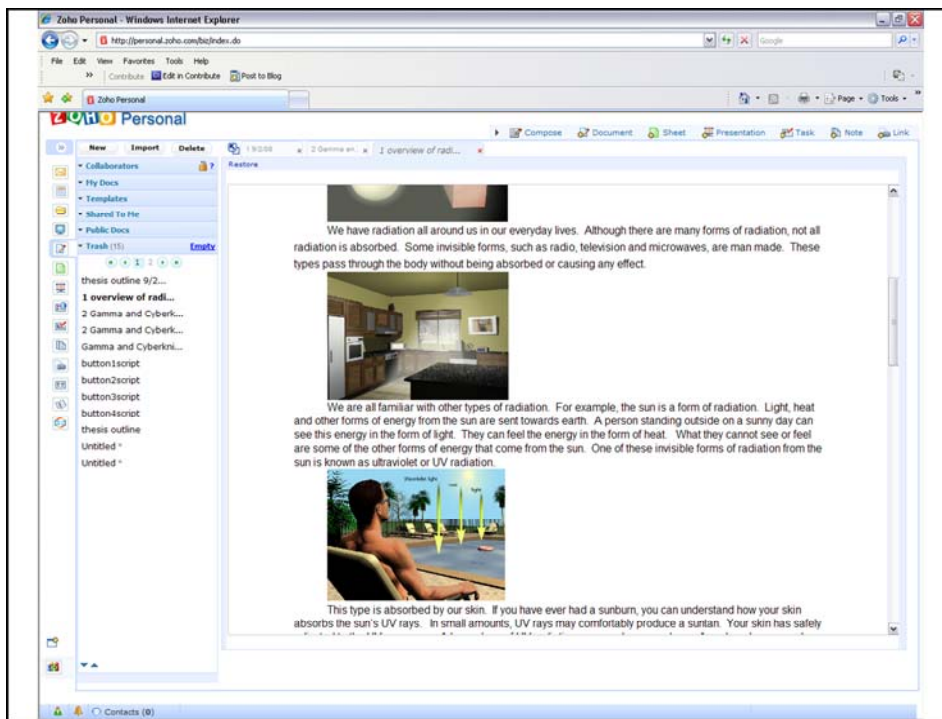


Figure 3-4. Scanned images of storyboard Button One

Due to schedule availability, Dr. Mickey introduced another method for sharing with <http://www.zoho.com> (19). Using the online document sharing site I was able to share information in written text and storyboard picture ideas to edit the outline and script for the DVD buttons online and comment on the storyboard pictures added to each paragraph each week (Figure 3-5).



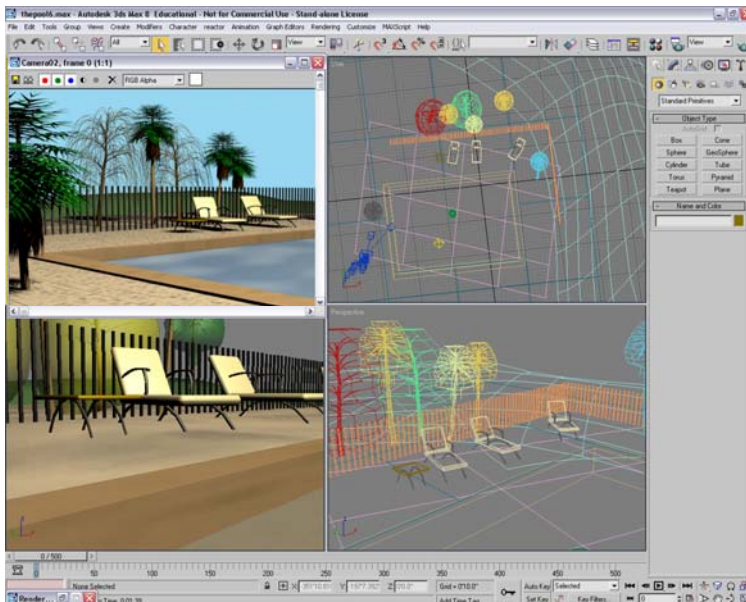
**Figure 3-5.** Screenshot from Zoho.com storyboard sharing

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(19) <http://www.zoho.com> ( online) accessed Jan 2008

## **Building models and illustrations**

Based on the storyboards, I created 3D models and illustrations in various professional design programs. Due to the target audience, much of the content in the initial portion of the video refers to common experiences such as a kitchen scene (Figure 3-7), a poolside scene (Figure 3-8), radiology X-ray room (Figure 3-9), etc... along with other medical models such as the brain (Figure 3-10). A number of questionnaire participants had mentioned that they would like a comforting soothing feel to this video. It was my design challenge to balance the high-tech, modern concepts with a comforting familiar design. I built these 3D models in 3D Studio Max®. (Figure 3-6). I exported the animations from 3D Studio Max as a targa still sequence to be imported into Adobe® After Effects CS3®.



**Figure 3-6.** 3D Studio Max Screenshot

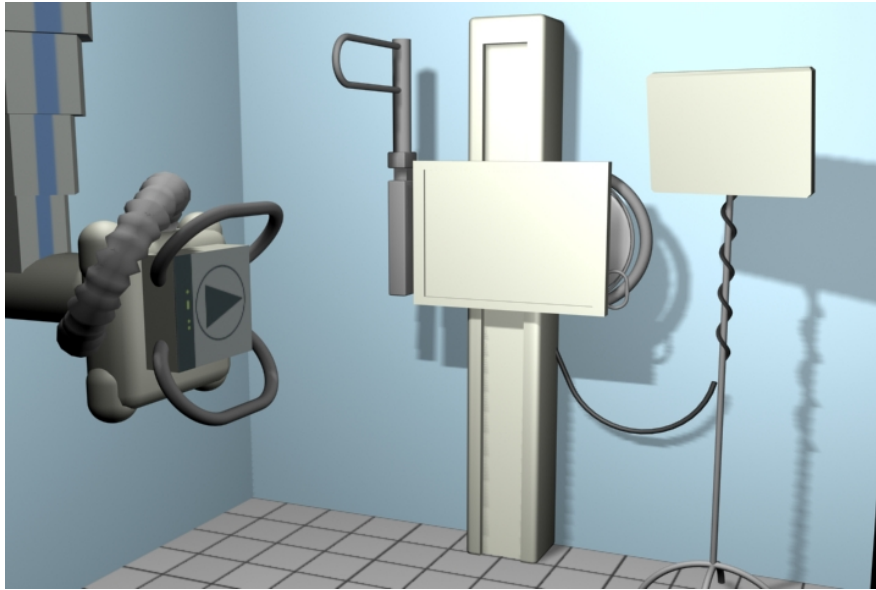




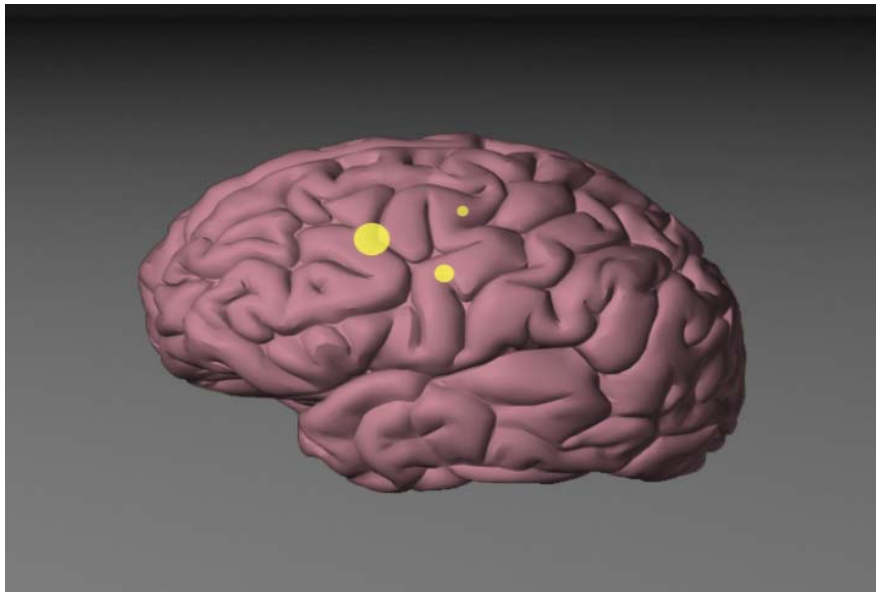
**Figure 3-7.** 3D Studio Max kitchen Model



**Figure 3-8.** 3D Studio Max poolside model



**Figure 3-9.** 3D Studio Max X-ray machine model



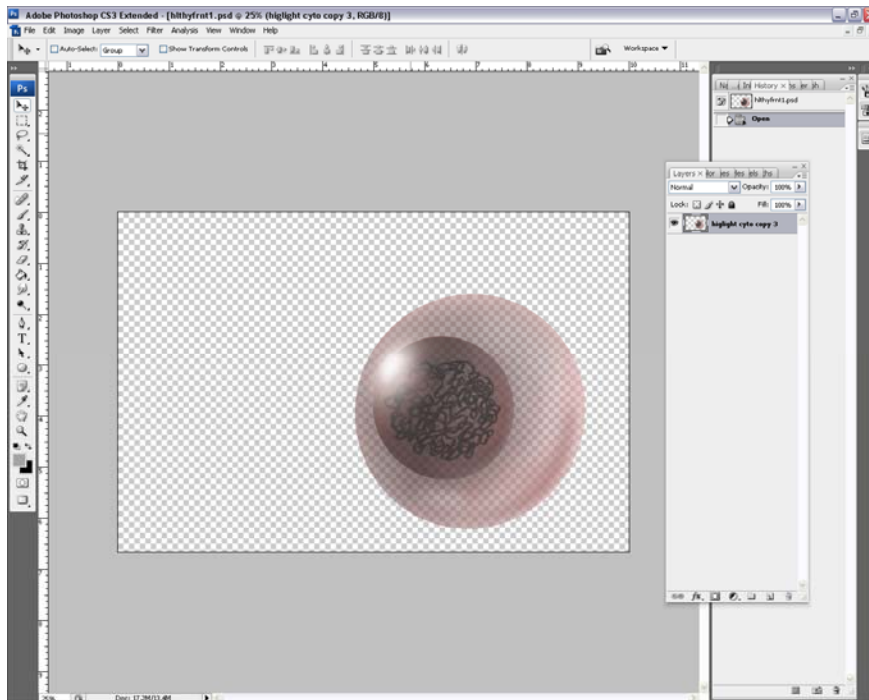
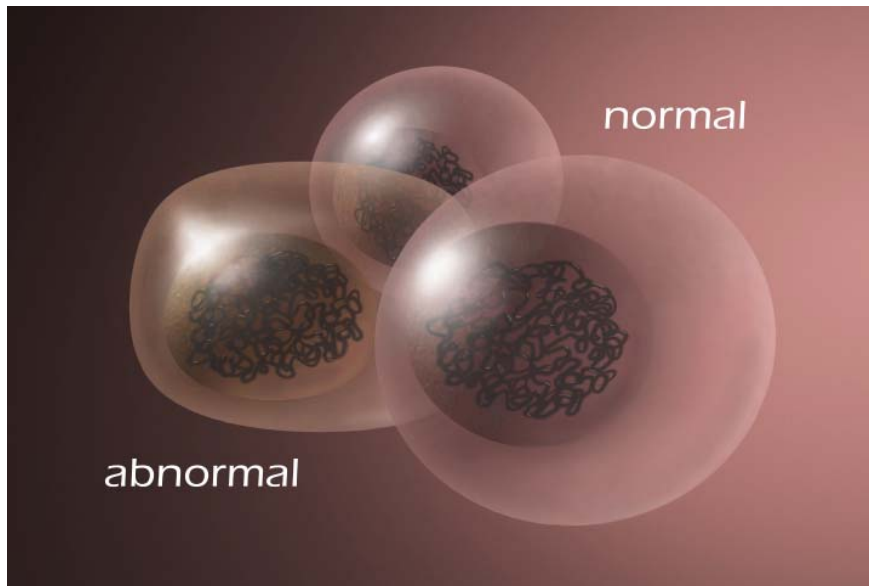
**Figure 3-10.** 3D Studio Max brain model

I also used figure posing 3D program Poser® to create the necessary figures I needed for each respective scene (Figure 3-11). I set up a particular pose of a figure that I created in Poser and rendered this image out as .JPEG file. I brought this file into Adobe® Photoshop CS3® to be imported for edited preproduction in After Effects CS3 .



**Figure 3-11.** Poser Screenshot of figure model

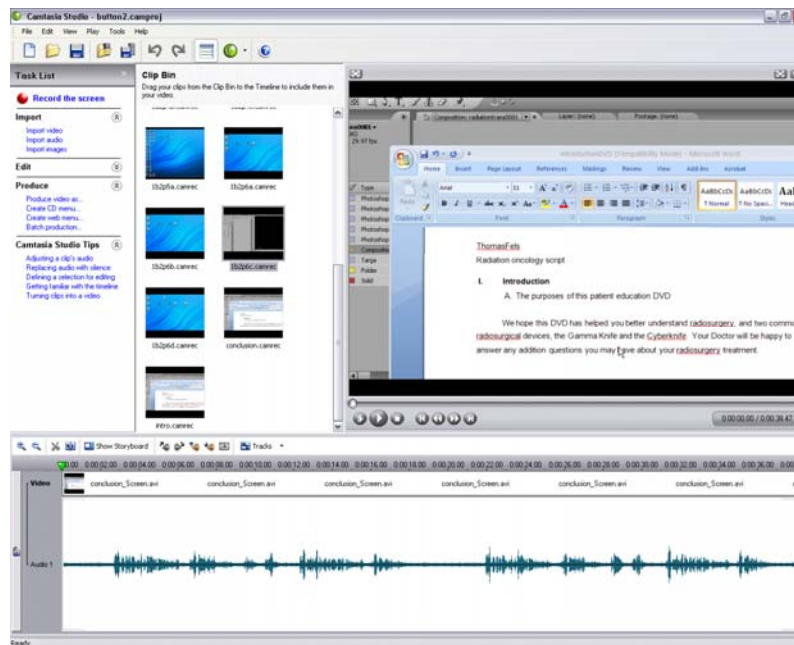
I created illustrations of abnormal and healthy cells using layer transparency in Photoshop CS3 (Figure 3-12). I used these illustrations throughout the duration of the video to describe the effects of radiation.



**Figure 3-12.** Photoshop CS3 cell illustration and transparency

## Narration

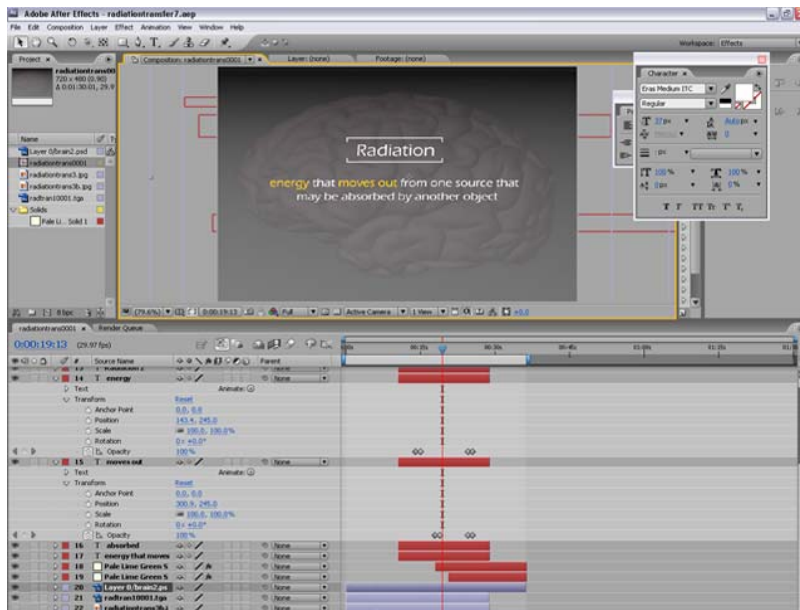
Before I could edit the models in After Effects CS3, I needed to narrate the content information of the script I had written. I used Camtasia® software to record the script narration. I exported the Camtasia files out as .WAV audio files (Figure 3-13). I then imported these .WAV audio files into Adobe® Premiere CS3®. I created one Premiere CS3 file for each paragraph of the script to be edited and to document important animation timing points in the script.



**Figure 3-13.** Camtasia® Screenshot of .WAV audio files

## Animation

After completing the models and illustrations and the audio files were timed, I created files in After Effects CS3. These After Effects files included multiple layers of titles, labels, definitions, models, illustrations and background colors. These layers were then timed and animated to correspond to the timing points in the narration of the .WAV audio file of its respective paragraph. (Figure 3-14)



**Figure 3-14.** After Effects CS3 Screenshot of animated multiple layers

I exported the animations from After Effects as a targa sequence to be imported into Premiere CS3. Each paragraph of the script has a Premiere file with a .WAV audio laid over a targa sequence video (Figure 3-15) to be edited for post production. I exported the animation from Premiere CS3 as a Quicktime® movie file with H246 video compression at a resolution of 720 x 480 pixels. I rendered thirteen Quicktime movies (one movie for each paragraph in the script). I imported all the Quicktime movies into one Premiere CS3 file to add transitions between them. I exported this Premiere CS3 file as a Quicktime® movie with H246 video compression at a resolution of 720 x 480 pixels that lasted seventeen minutes and fifty second.



**Figure 3-15.** Premiere CS3 Screenshot



My last step in production was to import the final Quicktime movie file into Adobe® Encore CS3® for post production and DVD burning. I added chapter points in Encore (Figure 3-16) so that the viewer is able to move backwards or forward when watching the video. In my first attempt to burn the DVD, I came across an error message that stated I had a problem with one of my files. While troubleshooting this problem, internet blog references of the error message let me know that there was not any specific reason for this error in Adobe® Encore CS3®. I eventually decided to burn the DVD in Adobe® Encore CS2®. The final video for evaluation was seventeen minutes and fifty seconds long.



**Figure 3-16.** Encore CS2 Screenshot



## **Chapter Four**

### **Evaluation and Revision**

#### **Development of Survey**

I sent out a completed DVD to the eight previous questionnaire participants, four radiosurgery medical professionals in order to receive feedback from both the group distributing the video and group who would use the video for information. The survey included eight questions using a 5-point Likert scale ranging from 1( strongly disagree) to 5 (strongly agree) and an additional open ended section for comments. Participants were asked to mark the number that best corresponded to the way they felt about the statement. All answers and comments were kept anonymous. Evaluation packets containing one DVD with cover letter, a survey and a self addressed return envelope were mailed. This was a formative evaluation to help improve the quality of this video. I used the feedback from this video for further editing and improvements. A structure has been put in place to distribute this survey to patients at UT Southwestern that have viewed this video during their consultation appointment. A larger summative evaluation will be taken in one year.

## **Results of Survey**

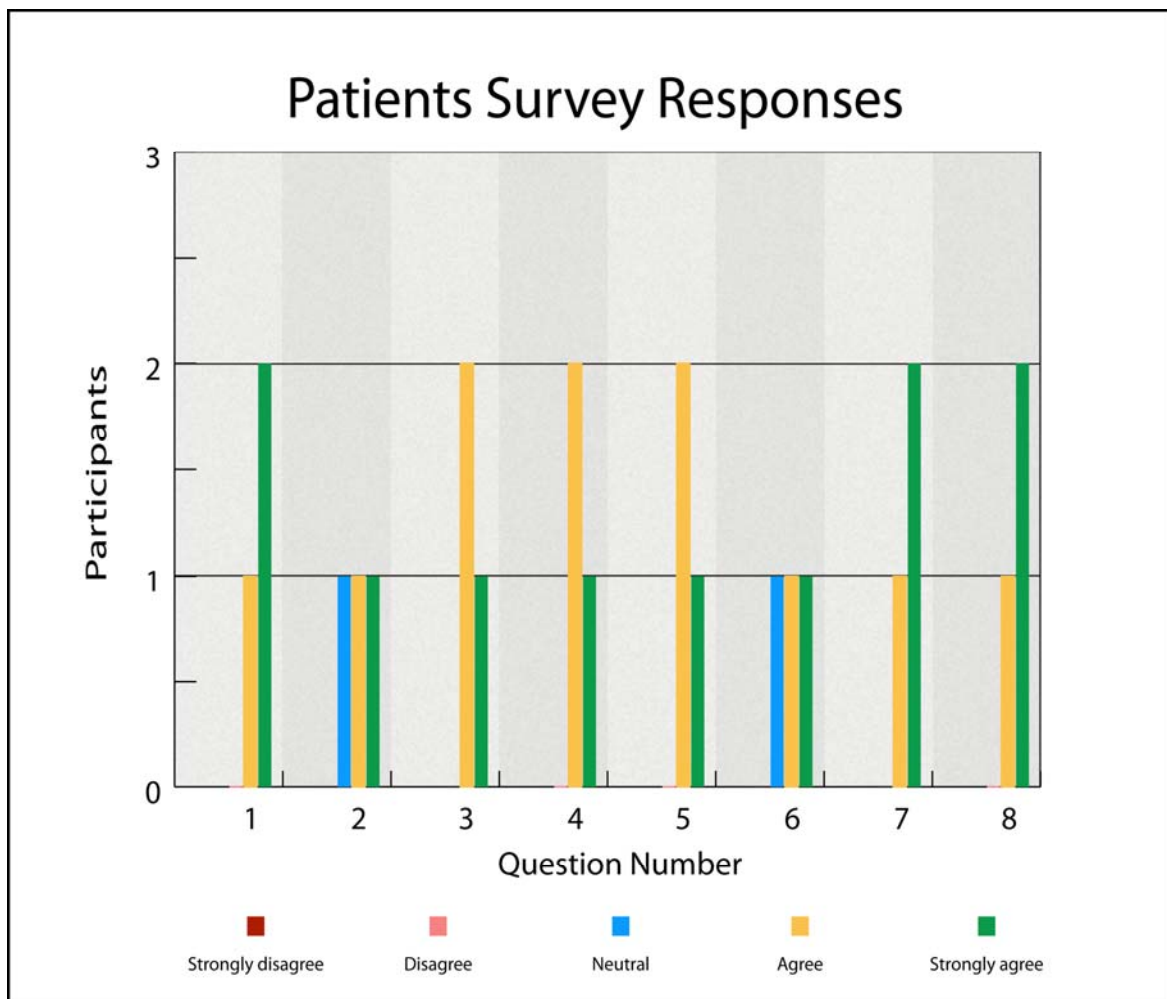
The results from the surveys were entered into a chart. I separated the results into two categories, patient responses (Figure 4-2) and professional responses (Figure 4-2). I documented the additional comments provided from each anonymous survey. Three surveys were returned to me from the eight patients. Three surveys were returned to me from the four professionals. Two patients had passed away since the original questionnaire was taken.

## **List of Questions**

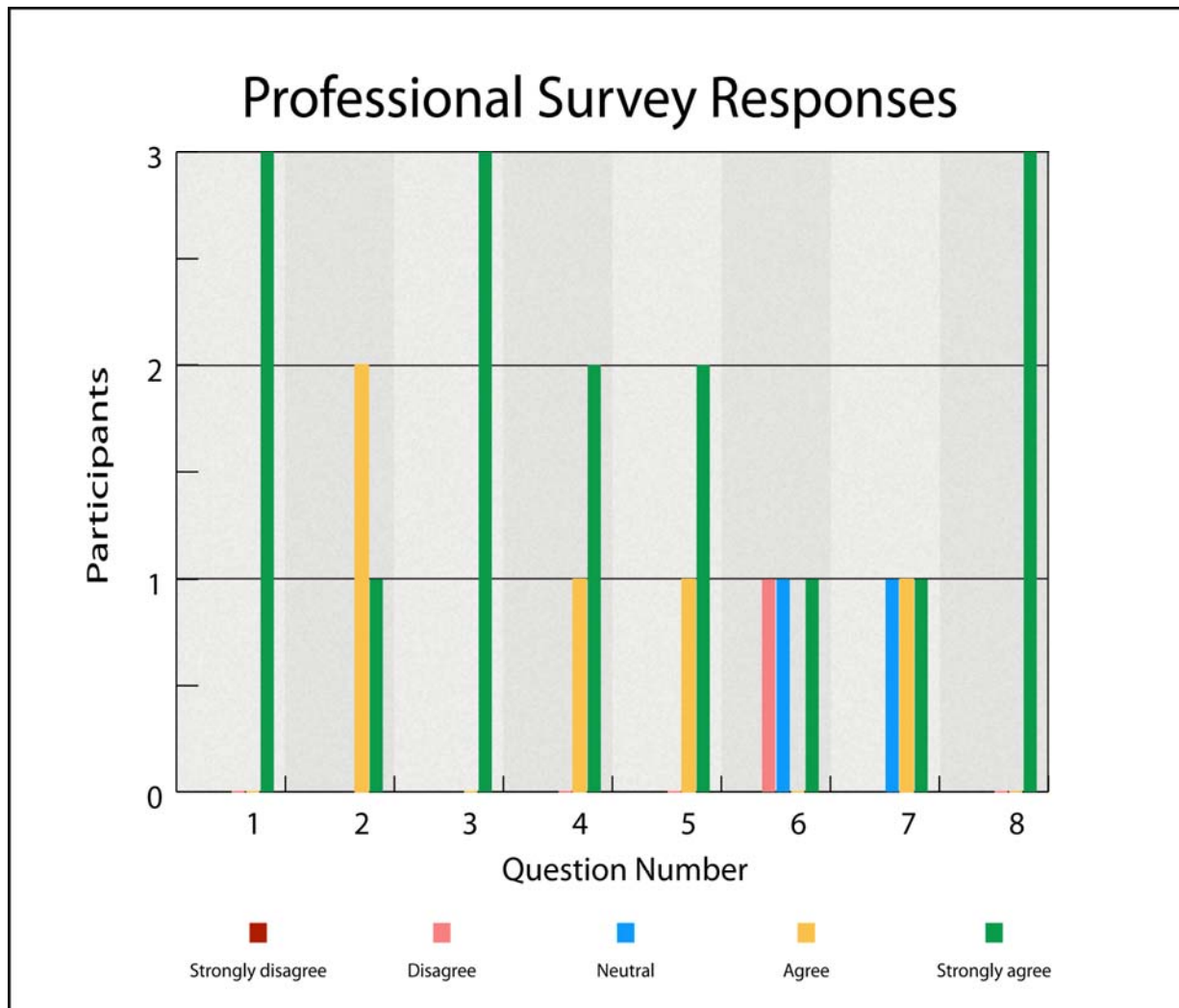
- 1. Do you feel you understand radiosurgery more after watching this video?*
- 2. Do you feel this video format was easy to use?*
- 3. Do you feel this video has opened up dialog with your doctor for you to ask questions?*
- 4. Do you feel this video has effectively explained that there are some risks and limitations to radiosurgery?*
- 5. Do you feel this video was an appropriate in the way it portrayed some of the risks and limitations with radiosurgery?*
- 6. Do you feel that the length of this video was an appropriate amount of time to view?*
- 7. Do you feel that this video had an appropriate use of animation photos and language?*
- 8. Do you feel this video was helpful to you?*

### Survey Responses

The same survey was sent to two categories of people. I needed feedback from both the professionals who would be distributing the video and the patient who would use the video for information. The results were divided into these two categories.



**Figure 4-1.** patient survey chart



**Figure 4-2.** professional survey chart

**1. Do you feel you understand radiosurgery more after watching this video?**

Patient response:

*1 agreed, 2 strongly agreed*

This question was used to determine if the viewers felt they had improved their knowledge about the concept of radiosurgery. This was one of the main goals in the creation of this video. The purpose of patient education is to inform the patient of some piece of knowledge that the caregiver wants them to know. The responses from this question were positive. This showed most of the patients felt they had improved their knowledge about radiosurgery from this video.

Professional response:

*3 strongly agreed*

The response to this question was very positive. This may be due to the fact that the professional participants had prior knowledge of radiosurgery before they viewed this video. The video may have improved their understanding of those concepts, yet it would seem to be biased since they are in the field of radiation and radiosurgery.

**2. Do you feel this video format was easy to use?**

Patient response:

*1 neutral, 1 agreed, 1 strongly agreed*

This question was used to determine if the format of the video was appropriate for easy patient education usage. Since patient education relies on the participation and attention of the patient, it is important to remove as many obstacles that may restrict the patient from getting the necessary knowledge that the caregiver wants them to

know. The response to this question was positive. The neutral response showed that this format was usable yet could be improved upon. Some suggestions for this were offered in the additional comments section from the patients' surveys.

Professional response:

*2 agreed, 1 strongly agreed*

The response to this question was positive. The response showed that this format was easy to use for the professional participants. Since patient education relies on the participation of the patient, it is important that the professional remove as many obstacles that may restrict the patient from getting the necessary knowledge. This showed that the professionals would feel comfortable offering this video to patients.

**3. Do you feel this video has opened up dialog with your doctor for you to ask questions?**

Patient response:

*2 agreed, 1 strongly agreed*

This question was used to determine if the viewer felt comfortable to be included in the process of decision making during their radiation therapy. This video was not meant to answer every question a patient may have for a doctor, but it was intended to invite a patient to ask questions. The more knowledge about the concerns, risks and limitations a patient has, the more opportunity they may have to ask questions

when they arise. The response from this question was positive. It is inconclusive if the positive response is due to the fact that these patients already had an open dialog with their doctor because they had already gone through treatment, yet this response still showed that patients felt comfortable to ask questions.

Professional response:

*3 strongly agreed*

The response from the professionals to this question was very positive. There may have been some bias because the professionals they want a tool like this to be effective because they want patients to have this information. This video was intended to invite a patient to ask questions. The positive response does suggest that the professional may have felt they can open up leading dialog with the patient better now that this information has been presented to them.

**4. Do you feel this video has effectively explained that there are some risks and limitations to radiosurgery?**

Patient response:

*2 agreed, 1 strongly agreed*

As a comprehensive patient education video, this thesis project attempted to portray both the benefits and risks of radiosurgery. This question was used to determine if the video was balanced in its explanation of both the benefits and risks of

radiosurgery. The response to this question was very positive. One of the main goals of this video was to explain the potential risks and limitations of radiosurgery. The response showed that patients felt this video portrayed risks effectively.

Professional response:

*1 agreed, 2 strongly agreed*

The response to this question was very positive. One of the main goals of this video was to explain the potential risks and limitations of radiosurgery. The response showed that this video portrayed the risks and limitations effectively according to the professional participants. The positive response showed that the video portrayed the information the professionals wanted to offer to the patient.

**5. Do you feel this video was an appropriate in the way it portrayed some of the risks and limitations with radiosurgery?**

Patient response:

*2 agreed, 1 strongly agreed*

Patient education is difficult in that it must explain hard to understand and sometimes uncomfortable topics in a manner that is comprehensible and not threatening to the patient. This question was used to determine if the video was received well in its explanation of both the benefits and risks of radiosurgery. The



response to this question was very positive. This showed that the patient was not threatened by the descriptions of risks and limitations in this video.

Professional response:

*1 agreed, 2 strongly agreed*

Patient education is difficult in that it must explain hard to understand and sometimes uncomfortable topics in a manner that is comprehensible and not threatening to the patient. This question was used to determine if the video was received well in its explanation of both the benefits and risks of radiosurgery. The response to this question was very positive showing that the information portrayed to the patient was relevant and effective according to the professional.

**6. Do you feel that the length of this video was an appropriate amount of time to view?**

Patient response:

*1 neutral, 1 agreed, 1 strongly agreed*

When explaining a new topic to someone who has recently received difficult news such as a brain disorder, it is important that a patient education video does not overwhelm the viewer with too much information in a long video. This question was used to determine if the video was too long for the viewer to remain interested. The response to this question was in the middle. No patients disagreed that the

video was in inappropriate, I determined that the length of this video was too long for a consultation appointment. Subsequent editing was done to the video.

Professional response:

*1 disagreed, 1 neutral, 1 strongly agreed*

This question was used to determine if the video was too long for the viewer to remain interested. The response to this question was also in the middle. This question was important because the professionals offer patient education to many patients and may well understand the capacity a patient may have during a consultation appointment. All three professionals commented that the video may be too long for a consultation appointment.

**7. Do you feel that this video had an appropriate use of animation, photos and language?**

Patient response:

*1 agreed, 2 strongly agreed*

This question was created from the original questionnaire that asked what kinds of media a patient might like to see in a video such as this. This statement was used to determine if the video had portrayed the concepts of radiosurgery in a manner that was received well and comprehended. The response to this question was positive. The preliminary questionnaire had determined that many patients would like to see

animation and still photos. The response showed that patients felt this video was effective in its composition of animation, photos and language.

Professional response:

*1 neutral, 1 agreed, 1 strongly agreed*

This question was used to determine if the video had portrayed the concepts of radiosurgery in a manner that was received well and comprehended. The response to this question was positive. The neutral answer coincided with an additional comment from a professional to simplify the language to fifth to seventh grade level. Professionals are distributing patient education to a large quantity of people. A broader use of language means more opportunity for all patients to comprehend the information presented.

**8. Do you feel this video was helpful to you?**

Patient response:

*1 agreed, 2 strongly agreed*

This question was used to determine if the video served its purpose of educating the patient as they make a decision for their radiation therapy. The response to this question was very positive, and it showed that the patients were pleased with the overall outcome of the video as a useful tool for them during their radiation therapy.

Professional response:

*3 strongly agreed*

This question was used to determine if the video served a purpose of being helpful to the professional as they assist patients in their decision for radiation therapy.

The response to this question was very positive. This response showed that the professional participants were pleased with the overall outcome from the video as a useful tool in a comprehensive patient education supplement to radiation therapy.

**Additional patient comments**

*One patient commented:*

- A bit long, generally good
- Shorter and to the point. Maybe it assumes that the general public is less than more aware of these issues...but just as well, the assumption may be right.

*Another patient commented:*

- It's clear, concise and easy to understand

**Additional professional comments**

*One professional commented:*

- I think the video could be narrated at a lower grade level of understanding (possibly 5-7th grade level).

- Along those lines I would suggest removing the word DNA when talking about the radiation's effect on the cells. You could just state that the radiation injures the cells and that it's repeated effects cause the cells to die.
- When you use the terms MR and CT scans you could give a very brief explanation of these- special imaging techniques which allow the doctor to get the best view of the tumor.
- When you use the term CNS- you could say the brain, spinal cord and nerves of the body.
- On the whole this work is excellent- I especially liked: how you relate fractionated therapy and the sunburn, the crossfire technique for the multiple beams of radiation, how you explain the units of radiation (total amount given) and the concept of tolerance of the cells and distance needed to treat.
- I think the disc is excellent and will be a great educational tool for our patients.

*Another professional commented;*

- First of all I was quite impressed with the quality of the movie. I thought it was made by one of the manufacturers of the machines!
- I really thought that your explanation of how radiation affects normal cells and cancer cells was clear and easily understood.
- The sun analogy was very effective. In the radiosurgery section, the graphics work showing the beams crossing/converging was also well done as was the description of the common forms of radiation.
- I'm not sure that the part about whole brain radiation possibly being phased out due to better imaging techniques is quite accurate. We use it to treat suspected microscopic disease in cases where we think the patient might end up with numerous brain mets--too many to treat stereotactically.
- Secondly, we teach patients that the term radiosurgery refers to a single stereotactic treatment, most typically used with the Gammaknife machine. The

Cyberknife machine can be done in a single radiosurgery treatment, but is often used for fractionated radiation treatments. Maybe using the term "Stereotactic Radiation" when describing both the Gammaknife and the Cyberknife instead of "Radiosurgery" would be more accurate.

- I remembered how the cancer patients, in particular, are often overwhelmed, fatigued and anxious at a consultation visit. I think their attention span may be shorter than this 17 min. video. Maybe reducing it to about 11-13 minutes, somehow?
- We could send it home with them, but it sure would be a nice base of knowledge to work off of when we do the consultation!
- I think this would make an excellent video to use in teaching new radiation oncology or neurosurgery nurses, at it's current length.

## **Evaluation**

The surveys were to evaluate the effectiveness of the video to determine if the goals and objectives of the thesis project had been met. The results of the surveys showed that the majority of the survey participants found the video to be useful and information about the mechanisms, risks and limitations of radiosurgery. Most participants strongly agreed that the video had an appropriate use of animation for this patient education video. A general consensus among many participants was that the video could be shorter than eighteen minutes long. This was a formative evaluation to help improve the quality of this video. I made revisions to the video using the feedback I received from the formative evaluations. I edited the video in certain spots to shorten the length of the video. I restructured a portion of the video where the concepts of radiation therapy transitioned to radiosurgery. I omitted two

definitions that were not necessary in understanding radiosurgery. I took out the introduction page where patients could choose to view either the first half or the second half or the whole movie all together. Instead of this introduction menu, I added chapter points in Encore so that patient could fast forward or rewind between chapters. A structure has been put in place to distribute this survey to patients at UT Southwestern that have viewed this video during their consultation appointment. I concluded that this comprehensive patient education video fulfilled the goals set out for this thesis project. A larger summative evaluation from the structure put in place at UT Southwestern will be conducted in one year to again evaluate if the video has fulfilled the goals set forth for this thesis project.

## **Chapter Five**

### **Conclusion and Recommendation**

#### **Project Summary**

The thesis research problem that I attempted to solve was to offer a more comprehensive patient education video concerning the risks and limitations of radiosurgery than was presently available to patients recently diagnosed with a disorder of the central nervous system. In order to solve this problem, I established a goal to fulfill with certain objectives. The goal of this thesis project was to produce a comprehensive informational patient education video describing the concept of radiosurgery and the terms associated with its use.

I set out some objectives to fulfill this thesis goal. The first objective was to find out if comprehensive information was already available to patients. The next objective was to understand what the patients wanted to learn from a patient education video on radiosurgery. The last objective was to create the content of the video, by storyboarding, producing animations and timing the animations to a narration. I researched literature and online material to discover what information was available. I interviewed patients and patient education professionals to learn what to incorporate in a patient education video. I created a narrated script, models, illustrations, and animations for production of the video.



I edited these components into a movie format and burned it on a DVD. Last I sent this video and a survey out to twelve people involved in the patient education process to review its effectiveness. Six participants responded to the survey. This survey was used to determine if this video met the objectives that were set out for this thesis project.

## **Discussion**

This thesis project was originally planned to be an interactive DVD module for patients to take home after a consultation appointment. Many changes were made during the initial phases of development of this project in the formulation of the script and outline. Due to limitations of availability and time restraints for the production of this project, many concessions were made to improve the effectiveness of certain parts, and the concept of an interactive DVD with five buttons changed into one short video.

The video sent out to the twelve participants was originally eighteen minute long. The feedback from the participants let me know that this test video was too long. Some participants suggested condensing the information even more. I made some important editing decisions to shorten the video to thirteen minutes. This was as far as I could trim the video while still including all the necessary information that Dr. Mickey wanted to explain to a patient. The changes made to the format of this project offered to patients a more effective product to be used in a doctor's office during consultation appointments. Having one video in a doctor's office would also cut down on price of

production since handing out a DVD video to every patient contemplating radiosurgery could get quite expensive.

Some of the professionals suggested in their comments that the video language could be simplified to a fifth grade level. This was also suggested by the creative director of Krames Patient Education Production Company. This suggestion is a great one, yet it offered a unique challenge in the writing of this script. The concepts of this video were complex ideas about radiosurgery. I used simple examples such as the sun and water bottles to explain certain definitions about radiosurgery. I also used principles of design to portray these ideas in a simplified manner that would repeat, strengthen and confirm the ideas I had defined in the examples. The strategies I used seemed to be a good solution for explaining a complex idea like radiosurgery in a simple manner.

These decisions seemed to be a good choice for this project since many of the participants commented that the video used appropriate language and animations. One patient suggested that the ideas may be assuming too little from the viewer. Since the goal of the video was to ultimately discuss complex concepts of radiosurgery, I decided to weigh on the cautious side by assuming the viewer did not know any other information before viewing the video.

The overall responses to this video were positive. The majority of participants answered that they agreed or strongly agreed that this video had both improved their knowledge concerning radiosurgery and viewed this as a helpful video. This suggests that the video had fulfilled its goal in offering a comprehensive patient education video that offered useful knowledge. Since this survey did not allow for the patients to view the video before their radiosurgery treatment, it is inconclusive if the effectiveness of this video would have been improved if viewed before radiosurgery.

### **Recommendations**

One concern of this thesis project was the small number of test subjects involved in the preliminary questionnaire. The number of questionnaires was based on the number of people actually participating in radiosurgery during the period of development in late 2007. Some patients cancelled their appointment before I could interview them. This produced a rather small sample size for the preliminary questionnaire. Due to the nature of this thesis project, some of the original participants in the questionnaire had passed away during the year and a half of production of this video. This made the test sample even smaller. In order to obtain a broader scope of feedback from patients, a structure has been put in place to distribute the same survey from this thesis project along with the video as it is being watched in the doctor's office over the next year. This will offer more feedback and enlarge the sample size for a summative evaluation I will evaluate one year from now.

This video was meant to describe radiosurgery in a general, universal way to include many different types of radiosurgery devices such as the Gamma Knife® and CyberKnife®. I might recommend another video with further description of a particular machine (such as the Gamma Knife®) to be produced separately. Since there are many different machines that perform the task of radiosurgery in different ways, this comprehensive video could be used in conjunction with a more specific video concerning the device a patient might actually use. If a patient has a tumor on the vertebrae T5 or in the pancreas, for example, they might get an additional video about the CyberKnife® since the Gamma Knife® can only treat disorders in the head region.

The brainstorm ideas for this project were to create a module care packet for the patient that included printed handouts in addition to the comprehensive video. I might recommend this printed material to include an interchangeable insert with descriptions and pictures of the medical team that will be assisting the patient during their procedure. I might also recommend a written description and illustrations of the disorders treated with radiosurgery to show the proximity of the disorder to important nearby structures. This would supplement the information in the comprehensive video about the risks and limitations of radiosurgery.

## APPENDIX A - QUESTIONNAIRE

Dear \_\_\_\_\_

I am working with Mr. Thomas Fels, a medical illustration graduate student, to create an informational brochure for patients considering treatment with the use of either the Gamma Knife or CyberKnife. As he begins work on this project, Mr. Fels would like to know what information past patients believe is important in their decision making process. He has prepared the following questionnaire for you, and I would appreciate your help in completing it and returning it to him in the envelope provided.

Thanks in advance for your help.

Sincerely,  
Mickey/Whitworth

1. Had you researched this treatment online before you received treatment?\_\_\_\_\_ If so ,  
what information had you found? \_\_\_\_\_  
\_\_\_\_\_
2. What were some thoughts or concerns you had before undergoing treatment with this  
procedure? \_\_\_\_\_  
\_\_\_\_\_
3. What information would you have found useful before your treatment?  
\_\_\_\_\_  
\_\_\_\_\_
4. Had you been informed of some of the possible risks associated in the use of this procedure?  
\_\_\_\_\_ If so, what were your thoughts on these risks? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. What would seem more important for you to know, how these procedures works or the  
strengths and weaknesses of the procedure? And why? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. What would you rather see of this procedure: a 3D animation, cartoon animation, actual  
video, or still pictures? \_\_\_\_\_

## APPENDIX B - SCRIPT OUTLINE

### DVD Outline Button 1 How is radiation used to treat disease?

1. definition of radiation is all around us
  - a. everyday examples of radiation
  - b. Sun analogy : invisible UV radiation
  - c. Transmission/absorption of radiation. explain role of fair skin
2. definition of radiology and radiation oncology
3. how radiation affects living cells
  - a. DNA repair: normal vs. abnormal
4. Fractionated Therapy definition
  - a. sunburn analogy
5. Whole Brain Radiation Therapy definition
  - a. at low doses - fractionated
6. Focused Radiation Therapy definition
  - a. at higher doses – one fraction
  - b. water bottle analogy
7. review of ideas

### DVD Outline Button 2 Two common radiosurgical devices

1. Radiosurgery definition
2. a two dimensional example of how radiation affects the tissue

3. a three dimensional example of how radiation affects the space
4. concerns and limitations with radiosurgery
5. three factors doctors consider before treatment
6. a common example of these three factors in use.

DVD Outline Button 3 Six Types of Disorders Treated with Radiosurgery

- |                      |                                |
|----------------------|--------------------------------|
| A. Acoustic neuroma  | D. Metastatic cancer           |
| B. Pituitary adenoma | E. Arteriovenous malformations |
| C. Meningioma        | F. Trigeminal neuralgia        |

DVD Outline Button 4 The Medical Team

- A. Neurosurgeon or Otologist
- B. Radiation Oncologist
- C. Radiation Physicist
- D. Technician

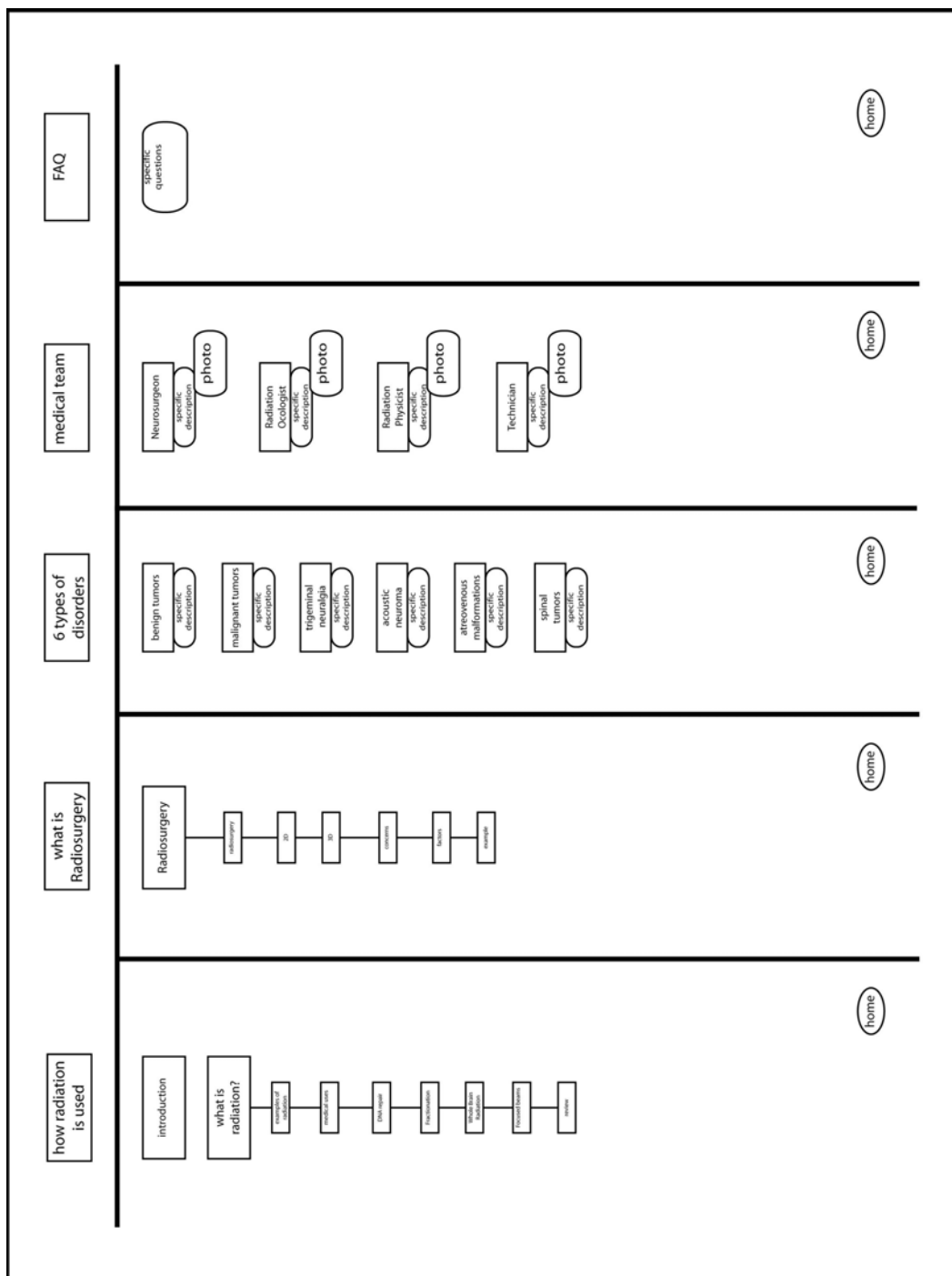
DVD Outline Button 5 Frequently Asked Questions

1. What is the difference between the Gamma Knife and the CyberKnife?
2. What is the difference between radiosurgery and chemotherapy?
3. How do I know if the Gamma Knife or CyberKnife is right for me?
4. What are some side effects to radiation therapy?
5. What are some benefits to radiosurgery?
6. What are some complications with radiosurgery?

7. Will I lose my hair?
8. How long does the procedure take?
9. How long until I know if therapy has worked?
10. Does the attachment of the Gamma frame hurt?
11. Does any of the procedure hurt?
12. Is it safe?
13. What is my recovery time look like?
14. Do these devices use a knife?



## APPENDIX C - DVD FLOW CHART



## APPENDIX D - PARTICIPANT EVALUATION

1. Do you feel you understand radiosurgery a bit more after watching this video ?

strongly disagree      disagree      neutral      agree      strongly agree

☐                      ☐                      ☐                      ☐                      ☐

2. Do you feel this video format was easy to use ?

strongly disagree      disagree      neutral      agree      strongly agree

☐                      ☐                      ☐                      ☐                      ☐

3. Do you feel this video has opened up dialog with your doctor for you to ask questions about radiosurgery ?

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4. Do you feel this video has effectively explained that there *are* some risks and limitation to radiosurgery ?

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5. Do you feel this video was appropriate in the way it portrayed some of the risks associated with radiosurgery ?

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6. Do you feel that the length of this video was an appropriate amount of time to view ?

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☐                      ☐                      ☐                      ☐                      ☐

7. Do you feel that this video had an appropriate use of animation, photos and language ?

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☐                      ☐                      ☐                      ☐                      ☐

8. Do you feel that this video was helpful to you ?

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