

CREATION OF A VISUAL RESOURCE TO AID IN THE EVALUATION OF
MUSCLE TRIGGER POINTS IN PATIENTS WITH CHRONIC PELVIC PAIN

APPROVED BY SUPERVISORY COMMITTEE

Lewis E. Calver, M.S., Chair, Associate Professor
Biomedical Communications Graduate Program

Richard Howdy, M.A., Instructor
Biomedical Communications Graduate Program

Barbara Hoffman, M.D., Assistant Professor, UTSWMC,
Department of Obstetrics and Gynecology

DEDICATION

I would first like to thank Barbara Hoffman, M.D., my content expert, for all of her guidance and patience throughout this process. I would also like to thank my committee members, Lew Calver and Rich Howdy for all of their time, assistance, and illustrative advice.

I would also like to thank my dear friends and classmates, Erin Frederikson, Maya Chapalkhar, and Anne Matuskowitz for all of their support, encouragement, and friendship throughout graduate school.

Most of all, thank you to my family for their love and support.

CREATION OF A VISUAL RESOURCE TO AID IN THE EVALUATION OF
MUSCLE TRIGGER POINTS IN PATIENTS WITH CHRONIC PELVIC PAIN

by

MARIE R. SENA

THESIS

Presented to the Faculty of the Graduate School of Biomedical Sciences

The University of Texas Southwestern Medical Center at Dallas

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

The University of Texas Southwestern Medical Center at Dallas

Dallas, Texas

March, 2008

Copyright

by

MARIE R. SENA, 2008

All Rights Reserved

CREATION OF A VISUAL RESOURCE TO AID IN THE EVALUATION OF
MUSCLE TRIGGER POINTS IN PATIENTS WITH CHRONIC PELVIC PAIN

Marie R. Sena, M.A.

The University of Texas Southwestern Medical Center at Dallas, 2008

Supervising Professor: Lewis E. Calver, M.S.

The goal for this thesis project was to create a visual resource that provides a logical, sequential approach to pelvic muscle examination in patients with chronic pelvic pain. The subject of this resource is trigger points within the muscles of the pelvic floor. This visual resource would serve as a teaching tool for an Obstetrics and Gynecologic resident or as a review and a reference guide for the practicing clinician by combining valuable information about pelvic muscle examinations into a visual resource that is easily accessible.

TABLE OF CONTENTS

ABSTRACT	v
LIST OF FIGURES	viii
LIST OF APPENDICES	ix
CHAPTER 1-INTRODUCTION	1
THESIS RESEARCH PROBLEM	1
BACKGROUND	1
GOALS AND OBJECTIVES	3
IMPORTANCE	4
PURPOSE.....	5
LIMITATIONS	5
CHAPTER 2-LITERATURE REVIEW	6
WRITTEN REFERENCES	6
MULTIMEDIA REFERENCES	12
CONCLUSION	13
CHAPTER 3-METHODOLOGY	15
CONCEPT DEVELOPMENT	15
TARGET AUDIENCE	15
PRE-PROJECT PLANNING	16
STORYBOARDS	18
ILLUSTRATIONS	20
PRODUCTION OF POCKET RESOURCE	24
PRODUCTION OF DVD	32

CHAPTER 4-RESULTS	38
SURVEY AND QUESTIONNAIRE DEVELOPMENT	38
QUESTIONNAIRE RESULTS	40
LIST OF STATEMENTS	41
EVALUATION OF RESPONSES	42
CHAPTER 5-CONCLUSIONS AND RECOMMENDATIONS	46
PROJECT SUMMARY	46
DISCUSSION	47
SUGGESTIONS FOR FURTHER RESEARCH	47
BIBLIOGRAPHY	64
VITAE	65

LIST OF FIGURES

FIGURE 2-1 TRANSVAGINAL PALPATION REFERENCE	7
FIGURE 2-2 REFERRED PAIN PATTERNS REFERENCE	8
FIGURE 2-3 MYOFASCIAL PAIN AND DYSFUNCTION REFERENCE	9
FIGURE 2-4 LEVATOR ANI MUSCLE COMPLEX REFERENCE	10
FIGURE 2-5 EXAMINATION WITH LIVE VOLUNTEER	11
FIGURE 2-6 EXAMPLES OF POCKET GUIDES COVERS AND CONTENT	13
FIGURE 3-1 PHOTOS FROM CADAVER STUDY	17
FIGURE 3-2 PHOTOS FROM CLINICAL OBSERVATION	17
FIGURE 3-3 POCKET GUIDE STORYBOARD	19
FIGURE 3-4 DVD STORYBOARD.....	20
FIGURE 3-5 PRELIMINARY SKETCH SHOWING ANATOMY	21
FIGURE 3-6 PRELIMINARY SKETCH	22
FIGURE 3-7 FINAL SKETCH	22
FIGURE 3-8 FINAL ILLUSTRATION.....	24
FIGURE 3-9 FIRST POCKET RESOURCE PROTOTYPE	25
FIGURE 3-10 REVISED POCKET RESOURCE STORYBOARD.....	26
FIGURE 3-11 SECOND POCKET RESOURCE PROTOTYPE.....	27
FIGURE 3-12 FINAL POCKET RESOURCE.....	29
FIGURE 3-13 SEQUENTIAL ILLUSTRATIONS.....	32
FIGURE 3-14 OVERLAPPING FILES FOR ANIMATION.....	33
FIGURE 3-15 APPLYING OPACITY EFFECTS.....	34

FIGURE 3-16 ANIMATING TEXT	35
FIGURE 3-17 EDITING VIDEO.....	36
FIGURE 3-18 APPLYING “DIP TO WHITE” EFFECT.....	36
FIGURE 4-1 SUMMARY OF SURVEY RESPONSES	42

LIST OF APPENDICES

APPENDIX A PRELIMINARY SURVEY.....	49
APPENDIX B SELECTED DVD STILLS.....	50
APPENDIX C SELECTED SPREADS FROM POCKET RESOURCE	52
APPENDIX D QUESTIONNAIRES	54
APPENDIX D COMPLETED QUESTIONNAIRES	55

CHAPTER ONE

Introduction

Thesis Research Problem

Chronic pelvic pain is a complicated disorder that may stem from a variety of causes and requires an extensive physical diagnostic examination. In order to correctly diagnose chronic pelvic pain, clinicians are in need of an excellent visual resource that correlates internal and external pelvic anatomy. However, the current resources utilized to study chronic pelvic pain can be confusing, and very few of them contain illustrations that actually show how to perform the examination. The goal for this thesis project was to create a visual resource that provides a logical, sequential approach to pelvic muscle examination in patients with chronic pelvic pain. This visual resource would serve as a teaching tool for an Obstetrics and Gynecology resident or as a review and a reference guide for the practicing clinician by combining valuable information about pelvic muscle examinations into a visual resource that is easily accessible.

Background

Chronic pelvic pain is a common gynecologic problem. There is no universally accepted definition of chronic pelvic pain. However, many investigators define chronic pelvic pain as noncyclic pain that persists for 6 or more months. It localizes to the pelvis,

to the infraumbilical anterior abdominal wall, or to the lumbosacral back or buttocks.

This pain leads to degrees of functional disability.

Causes of chronic pelvic pain fall within a broad spectrum, but endometriosis, symptomatic leiomyomas, interstitial cystitis, and irritable bowel syndrome are commonly diagnosed. However, myofascial pain syndromes involving the pelvic floor muscles may also be causative.¹ For this reason, the American College of Obstetricians and Gynecologists recommends an assessment of the musculoskeletal system prior to laparoscopy or hysterectomy for chronic pelvic pain.

Myofascial pain syndrome stems from a hyperirritable area within a muscle that leads to persistently contracted fibers. Pain, weakness, or autonomic reactions can result. The primary reactive area within the muscle is termed a *trigger point* (TrP) and is identified as a palpable taut, ropy band. Myofascial trigger points can affect any muscle, and those involving muscles of the pelvic floor can be sources of chronic pelvic pain. Trigger points are thought to form as the end of a metabolic crisis within a muscle. Dysfunction of a neuromuscular endplate can lead to sustained acetylcholine release, persistent depolarization and sarcomere shortening, and creation of a taut muscle band. Affected fibers compress capillaries and decrease local blood flow. The resulting ischemia leads to release of substances that activate peripheral nerve nociceptors, and in turn cause pain. A persistent barrage of nociceptive signals from TrPs may eventually lead to central sensitization and the potential for neuropathic pain. Signals may spread segmentally within the spinal cord to cause localized or referred pain. Trigger points can

also initiate somatovisceral responses such as vomiting, diarrhea, and bladder spasm, which may add confusion to the diagnosis.¹

Goals and Objectives

The goal for this thesis project was to create a visual resource that provides a logical, sequential approach to pelvic muscle examination in patients with chronic pelvic pain. I chose to develop a pocket resource book that would encompass all of the information that was necessary to cover pelvic muscle examination. I chose to create a pocket resource book because of its convenience and portability. A compact reference guide would be readily accessible to the clinician and could easily be carried in a lab coat pocket. The clinician could access essential information without being forced to search through various textbooks. After additional research, I decided to also provide a multimedia version of the pocket resource book. This would be in the form of a DVD. This DVD would be a helpful accompaniment to the pocket resource book because it allows the same information to be accessed through computer. This may be preferable to those who prefer to learn through a multimedia program.

To achieve this goal several objectives were pursued. The first objective of this thesis was to work with Barbara Hoffman, M.D., Assistant Professor in the Department of Obstetrics and Gynecology at the University of Texas Southwestern Medical Center.

¹Hoffman BL: Pelvic Pain. In Schorge JO, Schaffer JI, Halvorson LM, et al (eds) Williams Gynecology, New York, McGraw-Hill, (In press)

Dr. Hoffman's expertise was critical to evaluate and improve upon current resources, organize the improved content in a meaningful and logical manner, and produce a clinically relevant product.

The second objective was to design and develop a series of illustrations and a meaningful text that would be compiled into the pocket resource book. This book would be a reference that the clinician could place in a lab coat pocket and utilize while in the clinic. The third objective was to design and develop a DVD that would include illustrations, animations, and corresponding text to be used as a multimedia resource for the clinician. The final objective was to present both resources to residents and clinicians to review and evaluate their responses concerning the project. Their responses would determine whether the final product met the goals and objectives set for this project.

Importance

To perform an accurate physical examination, physicians must be able to palpate externally and simultaneously visualize the internal structures that they are palpating. To do this, they are in need of an excellent visual resource that effectively correlate the external palpation with the internal anatomy. A visual reference that shows proper examination technique and correct pelvic anatomy can greatly assist in the effectiveness of the exam. This project achieves significant importance by combining valuable information about pelvic muscle examinations into a visual resource that is easily accessible to the practitioner whether they are in front of a computer or in the clinic.

Purpose

The visual resources created for this thesis would serve three main purposes. First, they would serve as a teaching tool to instruct Obstetrics and Gynecology residents who may not have the clinical experience to thoroughly understand the pelvic muscle examination for chronic pelvic pain. Second, they would serve as a review and a quick reference guide for the practicing clinician. Third, they would allow the practitioner to utilize the DVD or pocket resource booklet format according to their own personal preferences.

Limitations

This thesis project is limited to content regarding the examination of the pelvic muscles in women with chronic pelvic pain.

CHAPTER TWO

Literature Review

To create visual resources for an effective training and reference tool, a thorough review of currently available literature was crucial. Several publications were found to deal exclusively with chronic pelvic pain, while another publication was found to deal exclusively with myofascial pain and trigger points. A multimedia presentation specific to pelvic anatomy and muscle palpations was also found. It was also necessary to research published pocket guides that related to medical subjects.

Written Resources

Pelvic Pain Diagnosis and Management

Pelvic Pain Diagnosis and Management is a popular publication in the study of chronic pelvic pain. This book offers a thorough breakdown of the causes of pelvic pain, diagnosis, and treatment. A chapter in Pelvic Pain Diagnosis and Management entitled “Abdominal Wall and Pelvic Myofascial Trigger Points” offers multiple diagrams and illustrations detailing trigger points and their locations and in depth descriptions of proper examination technique. However, very few figures were found that actually illustrated the pelvic muscle palpation (Figure 2-1). It was decided that these few illustrations could be improved upon by adding color, clarifying the actual exam motions, and choosing a clinical orientation for the illustration.

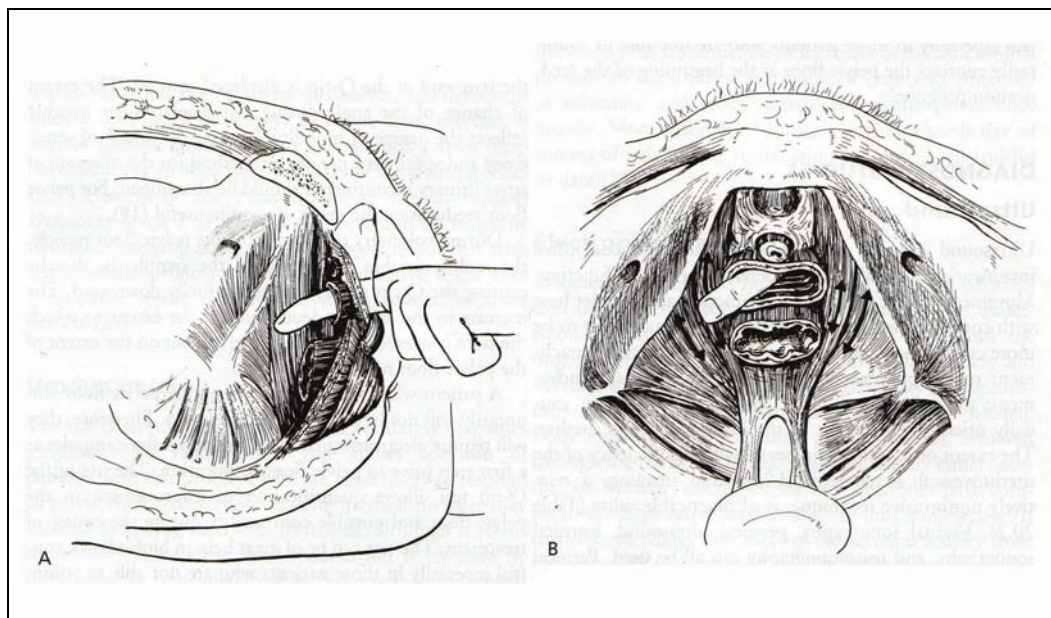


Figure 2-1. Illustration showing transvaginal palpation of the pelvic floor muscles.
Reprinted from chapter 20 in: *Pelvic Pain: Diagnosis and Management*, Copyright 2000.

Chronic Pelvic Pain: An Integrated Approach

Chronic Pelvic Pain: An Integrated Approach is another standard in understanding chronic pelvic pain. Like Pelvic Pain Diagnosis and Management, it offers a wealth of information about the causes, diagnosis, and treatment of chronic pelvic pain. A chapter in Chronic Pelvic Pain: An Integrated Approach entitled “Myofascial Syndromes” discusses myofascial syndromes and trigger points, but also offers very few visual aids (Figure 2-2). No illustrations diagramming the pelvic muscle examination were found in this publication.

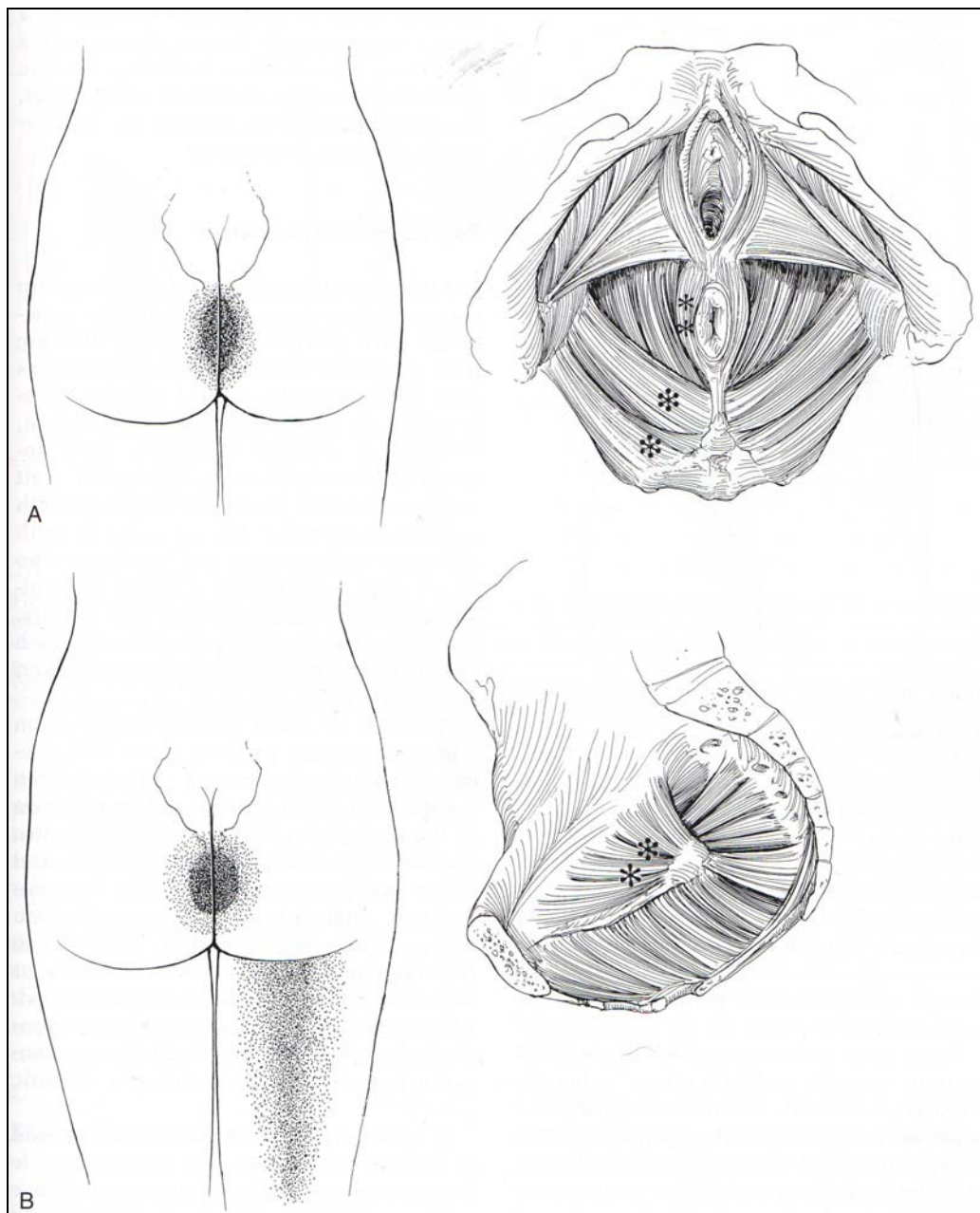


Figure 2-2. Schematic illustration representing trigger points and corresponding referred pain areas. Reprinted from chapter 26 in: *Chronic Pelvic Pain : An Integrated Approach*, Copyright 1998.

Myofascial Pain and Dysfunction: The Trigger Point Manual

This publication is entirely dedicated to muscle trigger points and their corresponding referred pain areas. Both Pelvic Pain Diagnosis and Management and Chronic Pelvic Pain: An Integrated Approach referenced this book. Illustrations in this publication addressed trigger points and referred pain areas only (Figure 2-3).

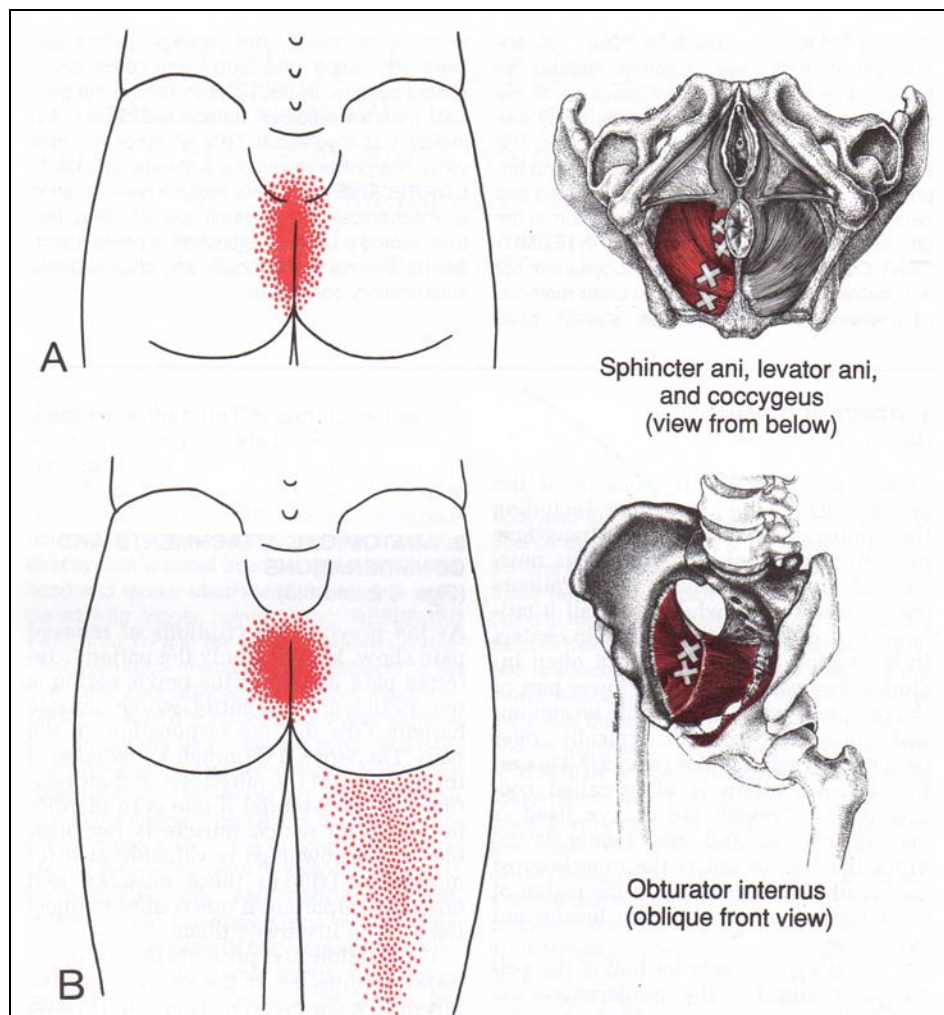


Figure 2-3. Schematic illustration representing trigger points and corresponding referred pain areas. Reprinted from chapter 6 in: *Myofascial Pain and Dysfunction: The Trigger Point Manual*, Copyright 1992.

Multimedia References

Examination of the Pelvic Floor and Pelvic Wall Muscles in the Evaluation of Chronic Pelvic Pain

Examination of the Pelvic Floor and Pelvic Wall Muscles in the Evaluation of Chronic Pelvic Pain is a DVD resource that was created at UT Southwestern Medical Center. This video attempts to demonstrate pelvic muscle anatomy and muscle palpation technique through the use of illustrations (Figure 2-), 3D animation, cadavers, and live examinations performed on volunteers (Figure 2-4).

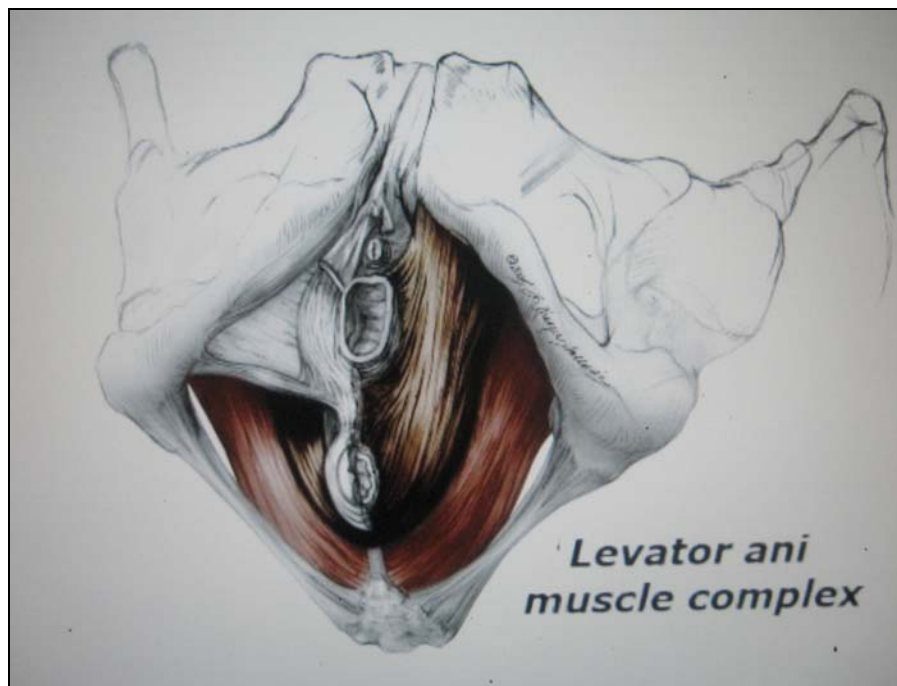


Figure 2-4. Illustration showing the levator ani muscle complex. From Examination of the Pelvic Floor and Pelvic Wall Muscles in the Evaluation of Chronic Pelvic Pain, DVD.



Figure 2-5. Screenshot showing the demonstration of the palpation of the pubococcygeus muscle on a live volunteer. From Examination of the Pelvic Floor and Pelvic Wall Muscles in the Evaluation of Chronic Pelvic Pain, DVD.

While this DVD has many visual aids to help explain the examination of pelvic muscles, it was decided that improvements could be made in several ways. First, it could be made more uniform by utilizing consistent visual elements instead of fluctuating between 3D animation, illustration, cadavers, and live demonstration. Second, while it was helpful to view the physical exam from a clinical perspective, it would be of more assistance for the viewer to simultaneously view the pelvic muscular anatomy. Lastly, the topic of trigger points and referred pain areas should be included in the visual content.

Pocket Guide Resources

A search for medically-related pocket guides was performed to reference content, size, and styles of presentation. The majority of the pocket guides were clinical in nature, and were designed to be helpful in diagnosing or for handy reference (Figure 2-6). Most had a vertical orientation and were specific to one area of discipline. Examples of some of the pocket guides that I found are, *The Pocket Guide for Obstetrics and Gynecology*, *The Pocket Guide to Midwifery Care*, *The Pocket Guide to Urology*, and *Nurse's Pocket Guide: Diagnoses, Prioritized Interventions, and Rationales*.

The pocket guides could be improved in several ways. Several pocket guides tried to include too much information in their content, leaving the pocket guide looking cramped and forcing the text to be quite small. This defeated the purpose of a pocket resource, since the body of the book became overwhelming. The color palette and graphic design styles could also be improved. Several pocket guides used many different typefaces and inconsistent colors, leaving the pocket resource guide looking disjointed and unprofessional. After analyzing the styles and formats of several pocket guides, I decided on a style and for my pocket guide. First, the pocket guide must have a clean look to it with consistent typefaces and a minimal color palette. Second, it must be as brief as possible while also containing all the information necessary to perform a pelvic muscle examination. This meant carefully analyzing the text and arranging text and illustrations in a way that would make good use of negative space.

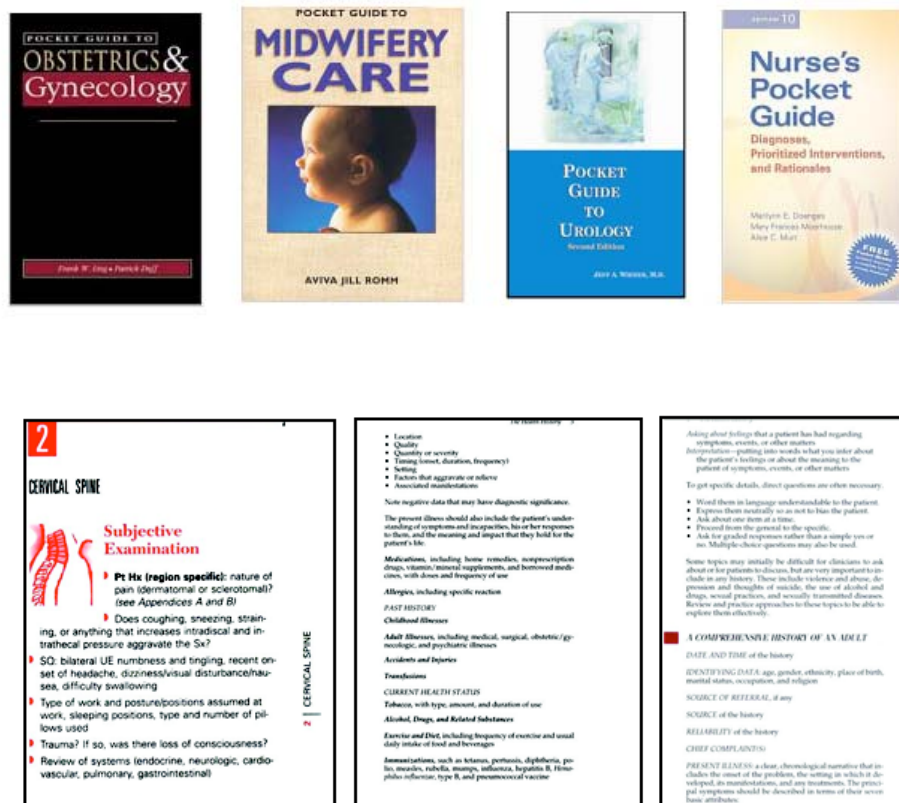


Figure 2-6. Examples of pocket guide covers and contents

Conclusion

While there are various publications focusing on the subject of chronic pelvic pain and myofascial syndrome, it was found that there are few visual resources addressing pelvic muscle examination. Although detailed descriptions of proper examination technique exist, a corresponding visual aid would greatly assist in the learning process. Researching pocket guides has proved useful in determining the scope

of topic that a pocket guide can reasonably cover and for comparing design themes and presentation styles.

The literature review has proven the original thesis problem to be accurate: The current resources utilized for the evaluation of chronic pelvic pain are disjointed and must be pieced together from various textbooks. More comprehensive and clear resources are needed.

CHAPTER THREE

Methodology

Concept Development

The goal of this project was to create a useful visual resource for pelvic muscle examination that would serve as an easily accessible reference and teaching tool. To accomplish this goal, a series of objectives were developed that would determine the process for completing the project. After determining the necessary written and illustrated content for the visual resources, two storyboards were developed: one for the pocket resource book, and one for the DVD. After the storyboards were developed, the necessary illustrations and animations were completed and integrated into the pocket resource and the DVD. Finally, both resources were presented to a small representative audience from which feedback was reviewed.

Target Audience

A target audience was identified in order to develop a project that would successfully meet their needs. The target audience for this project was obstetrics and gynecology residents who are learning about chronic pelvic pain and practicing clinicians in the field of Obstetrics and Gynecology who are looking for an efficient review of pelvic muscle examination.

Pre-Project Planning

Meetings

In initial meetings with Barbara Hoffman, M.D., decisions were made about the necessary information based upon what was lacking in the current resources. It was decided that illustrations describing pelvic anatomy, referred pain patterns of muscle trigger points, and palpation of the pelvic floor muscles must be included in the project. In subsequent planning meetings with the thesis advisory committee, I decided that an electronic version of the project should also be created to take advantage of the option to create animations. The final version of the visual resource would consist of a pocket resource book and a DVD.

Cadaver and Clinic Study

In order to fully understand pelvic floor anatomy, it was crucial to explore the pelvic muscles of human cadavers. With the expertise of Marlene Corton, M.D., Associate Professor of Obstetrics and Gynecology at the University of Texas Southwestern Medical Center, Dr. Hoffman and I researched dissected female pelvises in order to better understand pelvic musculature (Figure 3-1). Dr. Hoffman then demonstrated proper pelvic exam technique on the cadavers so that I would be able to document the correct finger placement and the correct internal pelvic anatomy.



Figure 3-1. Photos from cadaver study.

It was also crucial to observe several actual pelvic muscle examinations in an Obstetrics and Gynecology clinic. Dr. Hoffman performed pelvic muscle examinations on numerous patients, which assisted me in understanding hand movements and external pelvic anatomy (Figure 3-2).



Figure 3-2. Photos from clinical observation .

Storyboards

Determining the Text

Before layout and design could begin, the text that would accompany the illustrations and animations needed to be developed. The text consisted of a brief introduction that explained the purpose of the visual resource and background information about chronic pelvic pain. A brief discussion of pelvic muscle anatomy and bony landmarks was included, followed by step-by-step instructions for actually performing the exam. These instructions would accompany their corresponding illustration or animation.

Pocket Resource Storyboard

The overall layout and sequence of the pocket resource book was determined by constructing a storyboard. The pocket resource was laid out using page spreads, each page describing its appropriate illustration and accompanying text (Figure 3-3).

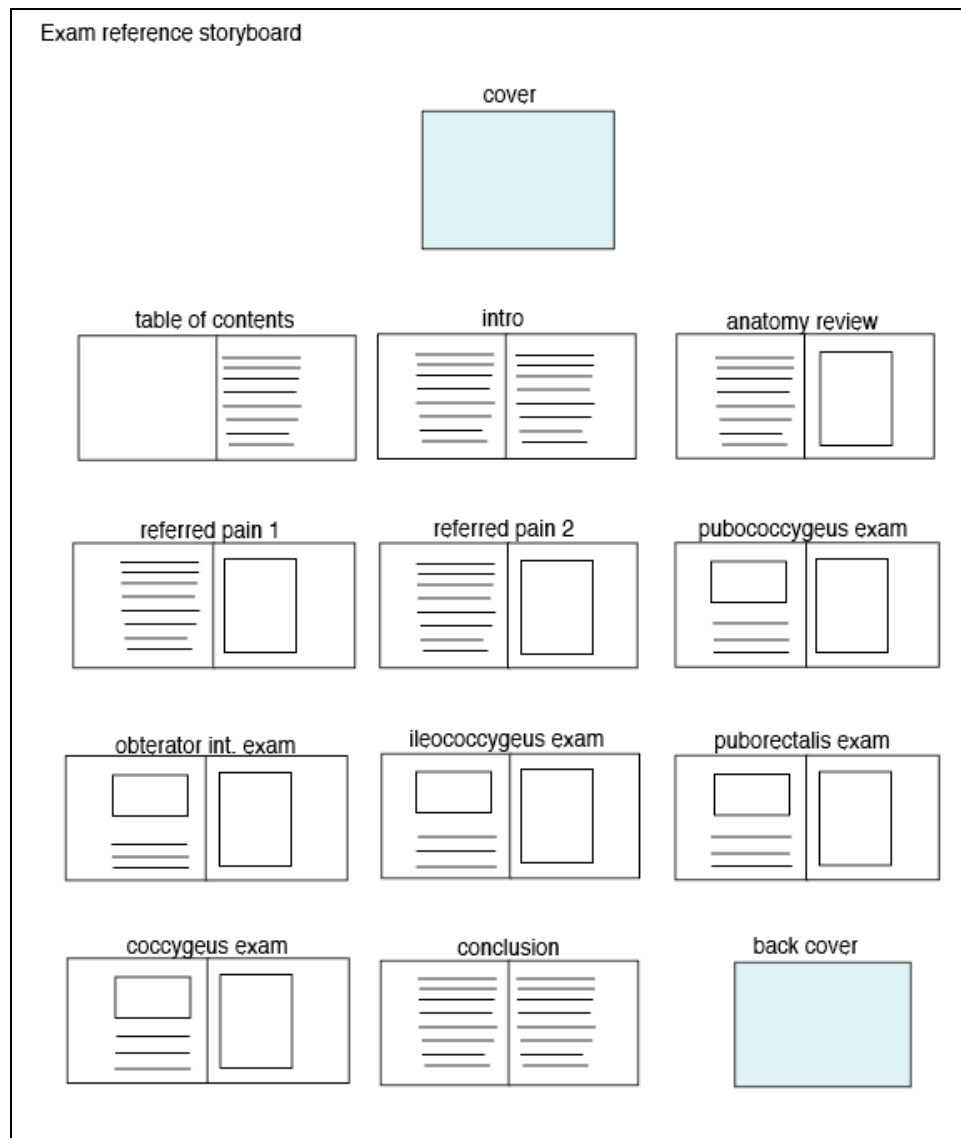


Figure 3-3. Storyboard illustrating the layout of the pocket resource book.

DVD Storyboard

To keep the content of the DVD resource as similar as possible to the pocket resource, the same general layout was followed. However, with the inclusion of

animations and the option of fading lines of text, it was necessary to make small changes to the overall storyboard design. (Figure 3-4).

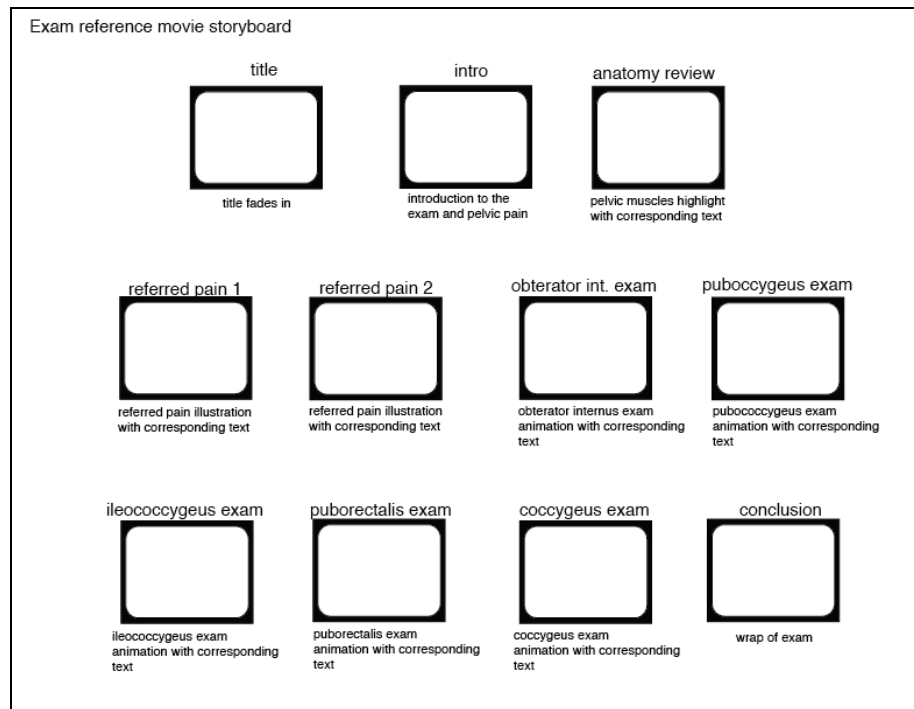


Figure 3-4. Storyboard illustrating the layout of the DVD visual resource.

Illustrations

The literature review and observation in the anatomy lab and clinic, helped to determine the necessary visual elements for this project. The crucial elements in need of illustrating were overall pelvic muscle anatomy, referred pain patterns caused by muscle trigger points, and palpation of the pubococcygeus (recommended pubovisceral²), puborectalis, iliococcygeus, coccygeus, and obturator internus muscles (Figure 3-5).

²Federative Committee on Anatomical Terminology (FCAT), Terminologia Anatomica. New York, NY: Thieme Medical Publishers, 2000.

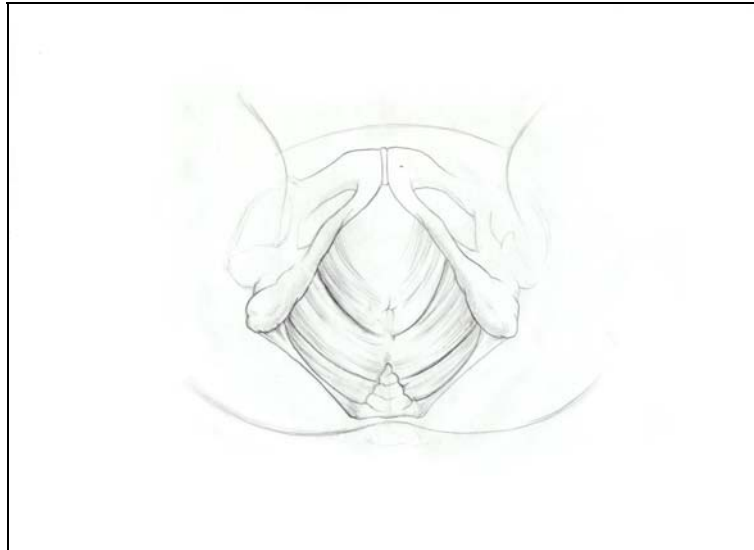


Figure 3-5. Preliminary sketch showing anatomical structures.

Because the muscles of the pelvis are quite complex and difficult to visualize, it was crucial to keep the illustrations as consistent as possible. For this reason, all illustrations would be drawn from the clinician's viewpoint. Cadaver and clinical observation, review of pelvic anatomy books, and meetings with content advisors helped in the composition of initial sketches (Figure 3-6, 3-7).

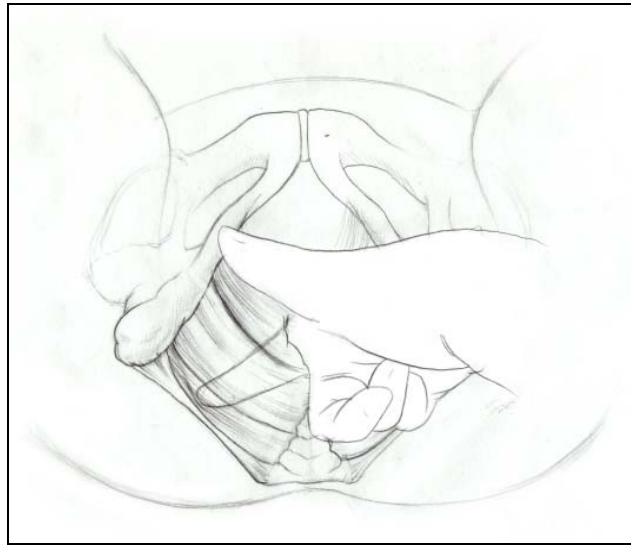


Figure 3-6. Preliminary sketch illustrating rectal examination of the coccygeus muscle.

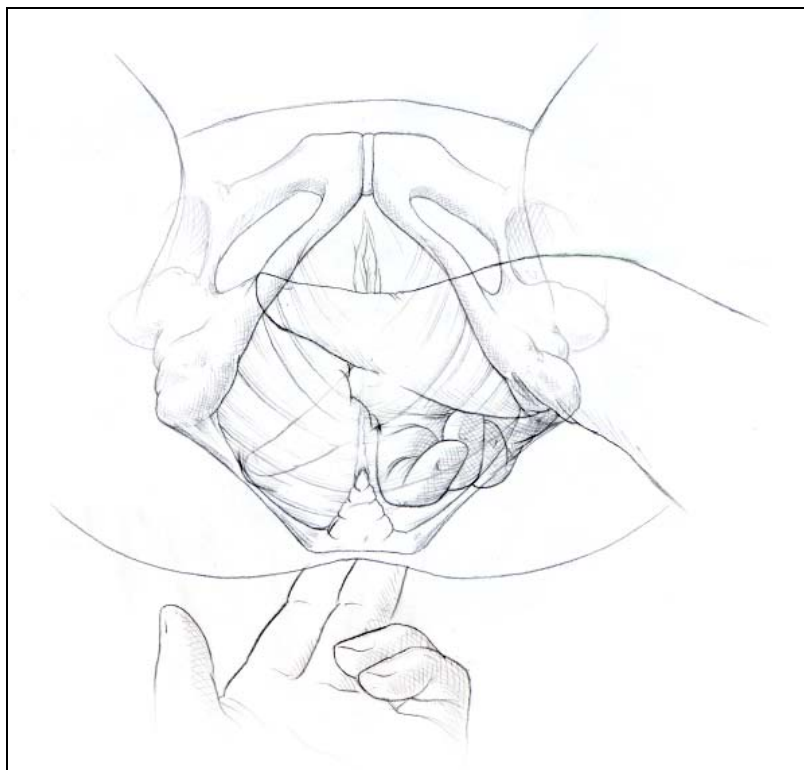


Figure 3-7. Final sketch illustrating palpation of the coccygeus muscle.

Each illustration would show palpation of one muscle. The examining finger would be shown palpating an area of this muscle, while an arrow would illustrate the direction that the palpating finger should travel along the muscle belly. The technique of ghosting was used in order to create illustrations from a clinician's viewpoint that still showed underlying structures and finger penetration depth. Examining fingers would be visible as shadowy structures that can be seen through the surface layer. In order to simplify the identification of the pelvic muscles, a color was assigned to each muscle. A schematic line drawing of the pelvic muscles with each colored muscle would be shown as an inset as an accompaniment to the full color illustration.

Color, cast shadows, and highlights were added using Adobe Photoshop® (Figure 3-8).

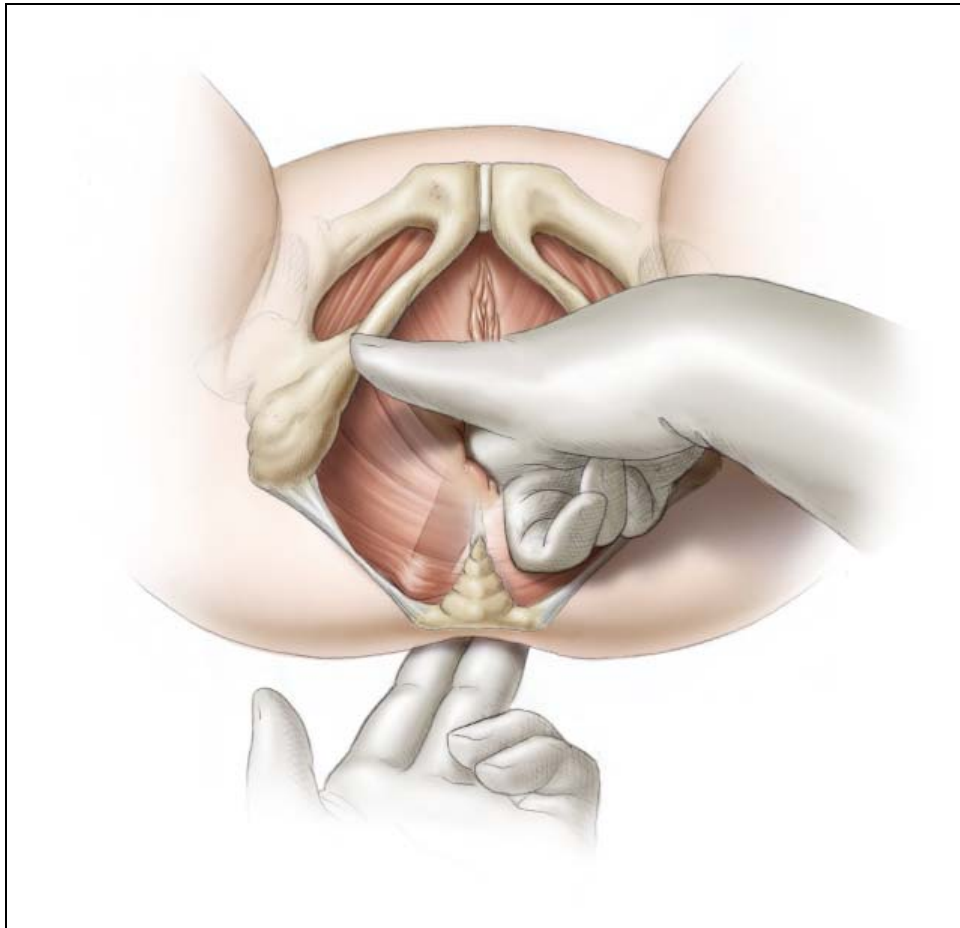


Figure 3-8. Final colorized illustration showing palpation of the coccygeus muscle.

Production of the Pocket Resource

Prototypes

Before final construction of the pocket resource could begin, several prototypes of the pocket resource were produced. The first prototype that was oriented in a horizontal format with a spiral binding that could fit comfortably in a lab coat pocket (Figure 3-9).

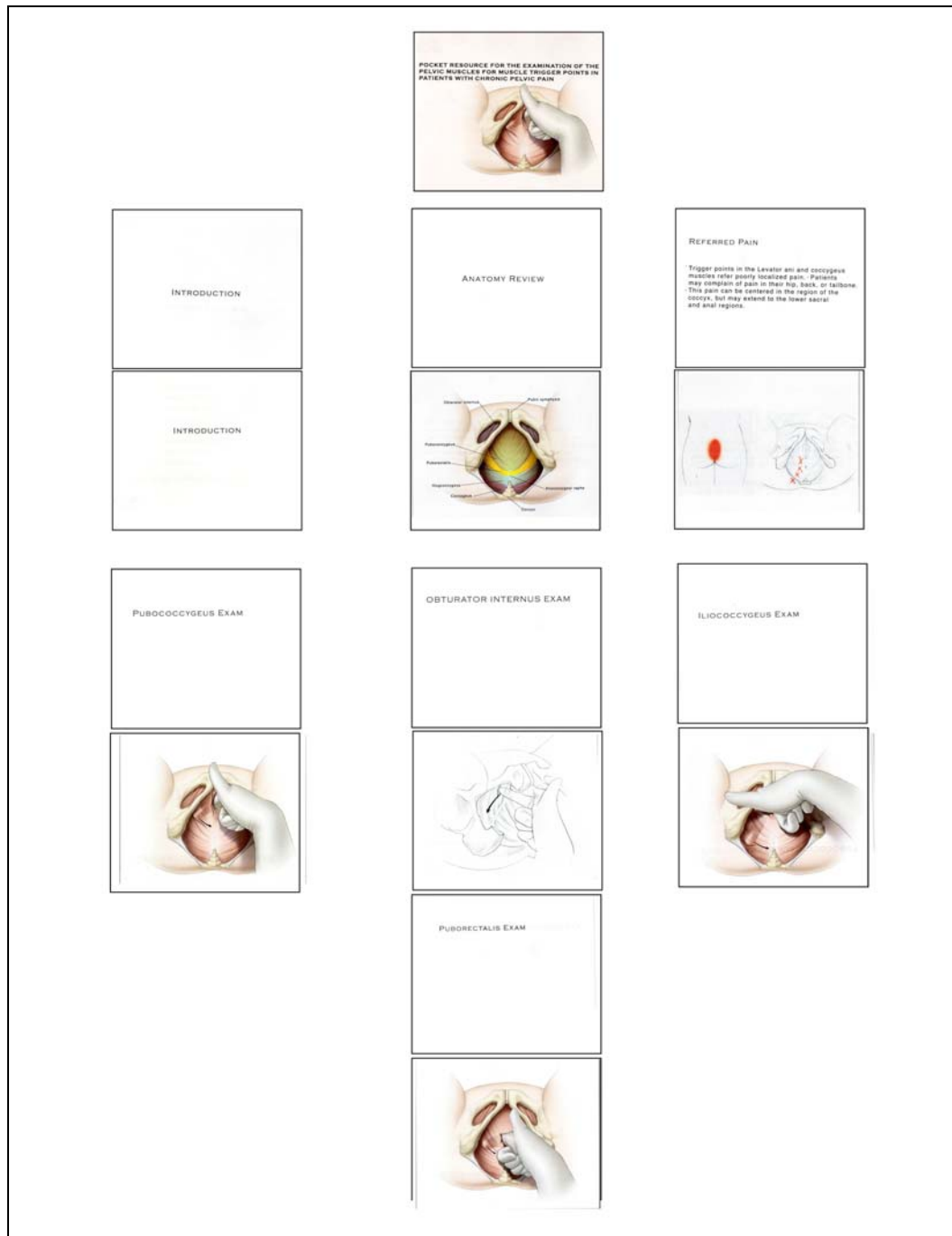


Figure 3-9. First prototype of the pocket resource book.

Upon review, it was determined that the pocket resource could be made considerably more compact by utilizing the space more efficiently and changing it to a vertical format. These improvements required revisions to the original storyboard (Figure 3-10).

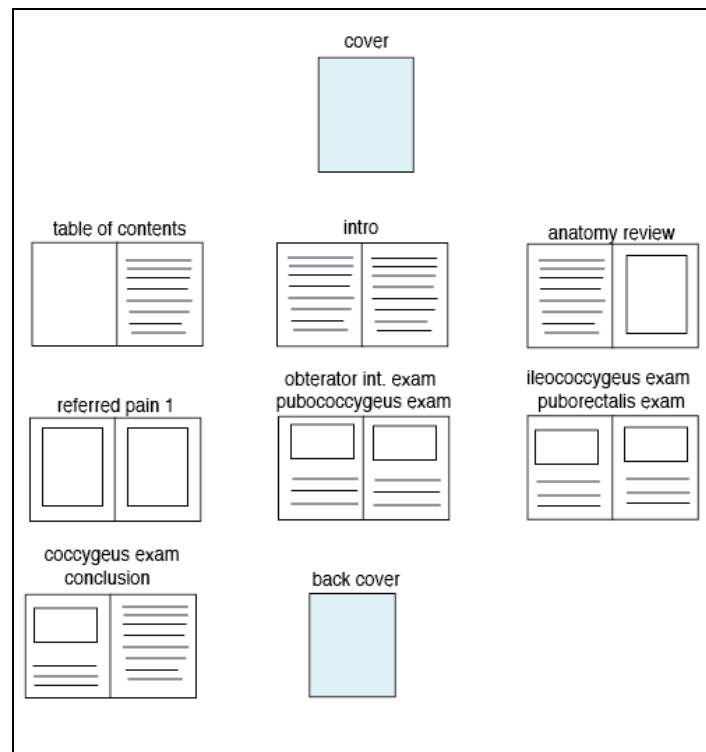


Figure 3-10. Revised storyboard for the pocket resource book.

The second prototype took into account these revisions, and was considerably shorter, vertical format, and bound with a saddle stitch (Figure 3-11).

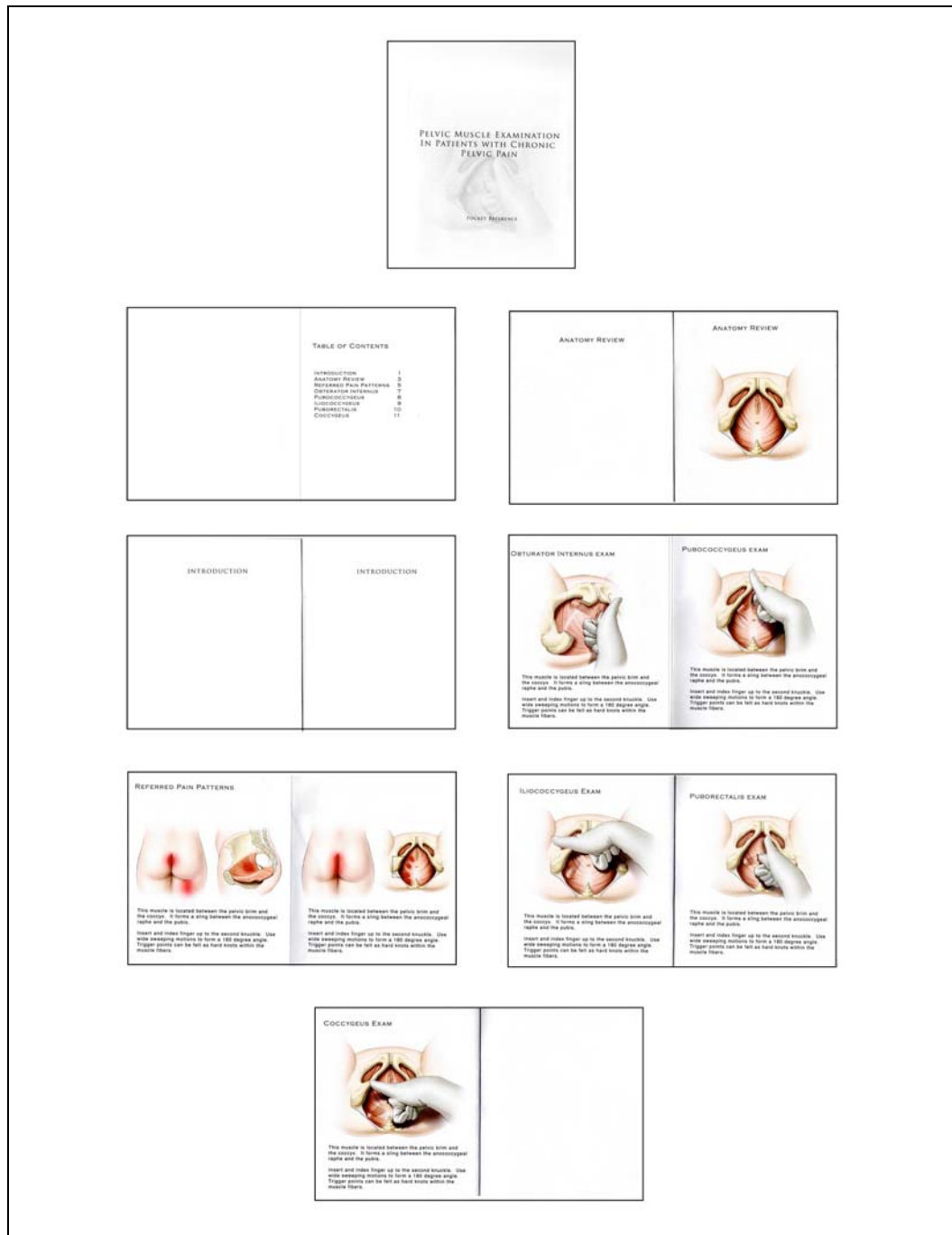


Figure 3-11. Second prototype of pocket resource book.

Final Construction

Several revisions to the second prototype were needed. A small schematic line drawing was also added to the upper right area of each examination page. The muscle being palpated was then shown using a specific color in the schematic illustration. This was added to emphasize the location of the pelvic muscle. After making these revisions, final construction of the pocket resource could begin. Each page spread was printed at 300 dpi in CMYK mode on Epson® Photo Quality Ink Jet Paper. Each spread was then trimmed to its appropriate size, creased in half, and stapled with a saddle stitch (Figure 3-12).

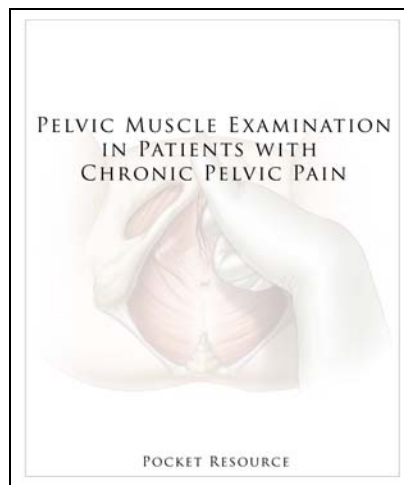


TABLE OF CONTENTS

INTRODUCTION	1
ANATOMY REVIEW	3
REFERRED PAIN PATTERNS	5
OBTURATOR INTERNUS EXAM	7
PUBOCOCCYGEUS EXAM	8
ILIOCOCCEUS EXAM	9
PUBORECTALIS EXAM	10
COCYGEUS EXAM	11

INTRODUCTION

Chronic pelvic pain is a common gynecologic problem and its estimated prevalence in reproductive-aged women is 15%. There is no universally accepted definition of chronic pelvic pain. However, many investigators define chronic pelvic pain as noncyclic pain that persists for 6 or more months. It localizes to the pelvis, to the intraumbilical anterior abdominal wall, or to the lumbosacral back or buttocks. This pain leads to degrees of functional disability.

Causes of chronic pelvic pain fall within a broad spectrum, but endometriosis, symptomatic leiomyomas, interstitial cystitis and irritable bowel syndrome are commonly diagnosed. However, myofascial pain syndromes involving the pelvic floor muscles may also be causative. For this reason, the American College of Obstetricians and Gynecologists recommends an assessment of the musculoskeletal prior to laparoscopy or hysterectomy for chronic pelvic pain.

Myofascial pain syndrome stems from a hyper-irritable area within a muscle that leads to persistently contracted fibers. Pain, weakness, or autonomic reactions can result.

The primary reactive area within the muscle is termed a **trigger point (TrP)** and is identified as a palpable taut,ropy band. Myofascial trigger points can affect any muscle, and those involving muscles of the pelvic floor can be sources of chronic pelvic pain.

The incidence of myofascial disease is unknown, but in an evaluation of 500 patients with chronic pelvic pain, one investigator found 7% of patients primarily had trigger points as a source of their pain.

Many providers have educational deficits in thoroughly assessing women for myofascial pain syndromes of the pelvic floor muscles. This series of illustrations attempts to provide a logical sequential approach to this examination.

ANATOMY REVIEW

In preparation for examination, clinicians should have a fundamental understanding of the attachments and locations of pelvic floor muscles.

The muscles of the pelvic floor are critical in providing support for pelvic viscera and the maintenance of the urinary and anal sphincters and prevention of uterine prolapse. The pubococcygeus, puborectalis, and iliococcygeus muscles form the levator ani. In combination with the coccygeus muscle, the levators form the pelvic diaphragm.

Pubococcygeus

The most medial and anterior portion of the pubococcygeus muscle attaches to the dorsal surface of the pubic bone and forms a sling around the urogenital tract and constricts the vagina.

Puborectalis

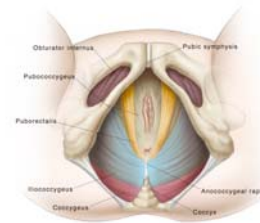
The puborectalis muscle forms the posterior portion of the pubococcygeus. Its fibers originate from the pubic bone and form a sling around the rectum.

Iliococcygeus

The iliococcygeus muscle makes up the posterior section of the levator ani muscle group. It arises from the ischial spine and anchors above to the tendinous arch of the levator ani and attaches to the coccyx and the anococcygeal raphe. It forms a sling between the ilium and the coccyx.

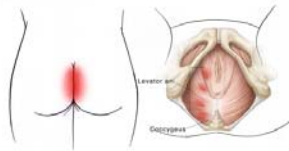
Coccygeus

The coccygeus is a triangular muscle that originates from the ischial spine and attaches on the lateral surfaces of the coccyx and the lowermost portion of the sacrum.

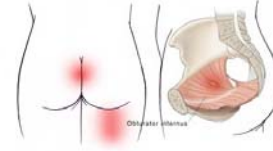
**Obturator internus**

The **obturator internus** is a fan-shaped muscle that attaches to the inner pelvic brim and forms the margins of the obturator canal. It lies superior to the tendinous arch of the levator ani and exits the pelvis through the lesser sciatic foramen to attach to the greater trochanter of the femur.

REFERRED PAIN PATTERNS



- Trigger points in the **levator ani** and **coccygeus** muscles refer poorly localized pain.
- Patients may complain of pain in their hip, back, or tailbone. This pain can be centered in the region of the coccyx, but may extend to the lower sacral and anal regions.



- Trigger points in the **obturator internus** muscles may result in pain in the anococcygeal region.
- The pain may also extend to the upper portion of the posterior thigh.

OBTURATOR INTERNUS EXAM



- In examining the **obturator internus** muscle, the clinician identifies the tendinous arch of the levator ani as the inferior border of this muscle.
- The examining finger should be swept superiorly from the tendinous arch to appreciate the muscle fibers of the obturator internus.

PUBOCOCYGEUS EXAM



- To examine the **pubococcygeus** muscle, the examining finger is inserted into the vagina approximately 3 to 4 cm. The tips of the examining finger are then curved back toward the examiner to contact the pubococcygeus muscle.
- During examination the clinician starts at the pubic bone and sweeps with a downward-outward pressure against the muscle fibers of this muscle extending toward the midline. Special attention to the identification of taut orropy muscle fibers should be the focus.

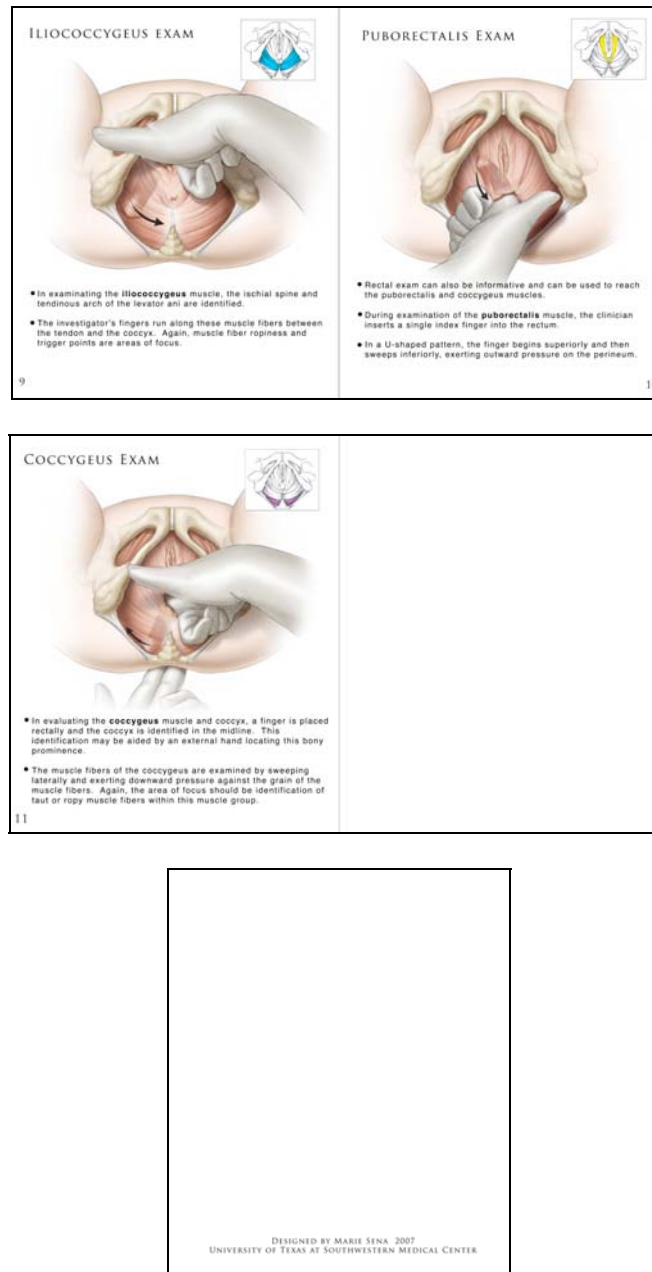


Figure 3-12. Final version of the pocket resource book.

Production of DVD

Assembly in Adobe ® AfterEffects®

Using the storyboard produced for the DVD, a series of animated clips were created in AfterEffects®. First, a project file was created, and then a separate composition file was created for each animated clip. Each animated clip used text, still illustrations, and animations to convey the same content as the pocket resource book.

Animations

Animations were produced by first illustrating three sequential steps of a muscle palpation (Figure 3-13).

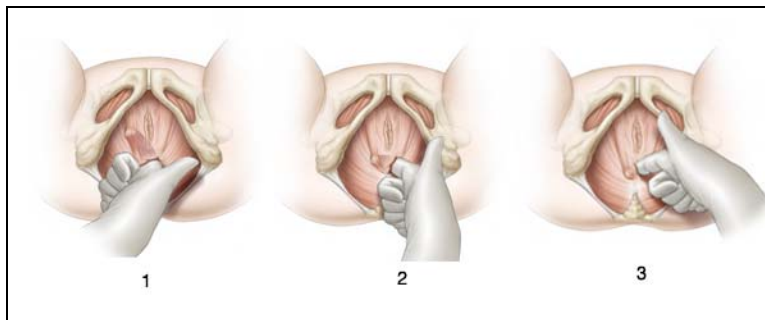


Figure 3-13. Three illustrations depicting three different stages of the palpation of the pubococcygeus muscle.

These illustrations were then saved as separate files and imported into AfterEffects®.

Each file was placed in an overlapping manner on a separate layer (Figure 3-14).

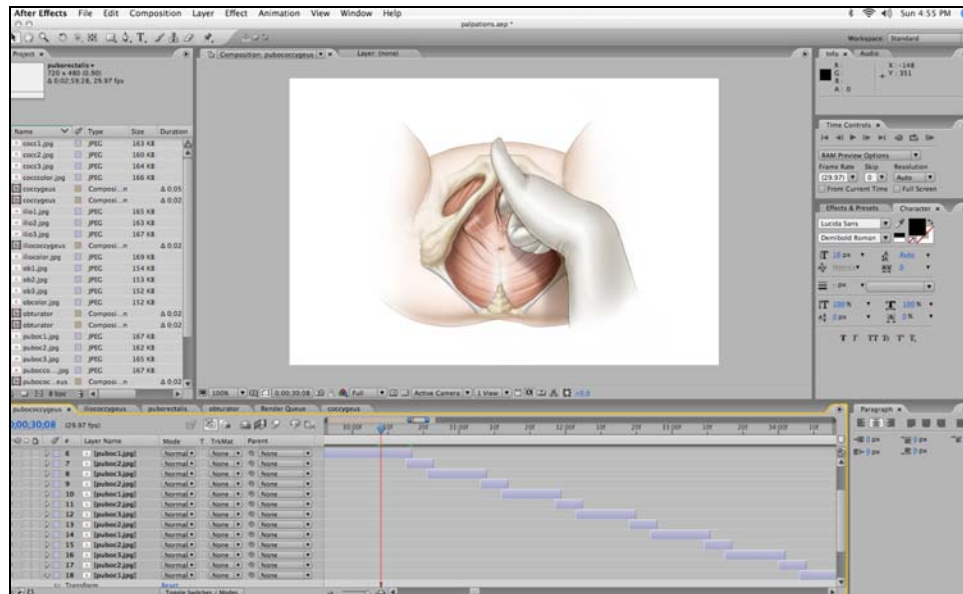


Figure 3-14. Screenshot showing overlapping illustration files in Adobe® AfterEffects®.

An opacity effect was then applied to the three frames at the end of each layer in order to allow a smooth transition to the layer beneath it (Figure 3-15).

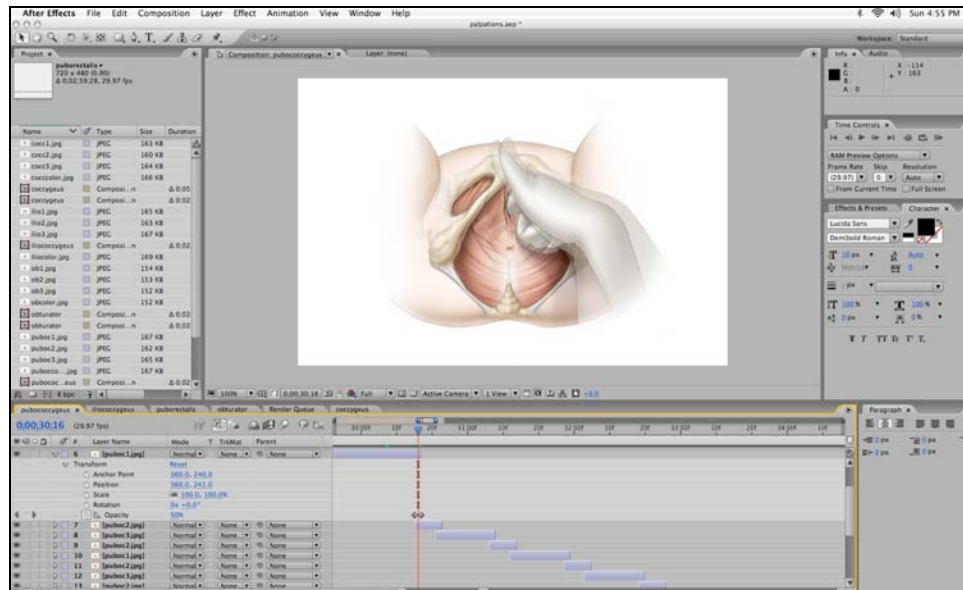


Figure 3-15. Screenshot showing an opacity effect being applied to an illustration layer in Adobe® AfterEffects®.

When played in real time, the layers behave similar to pages in a flip book, creating an animated movement using still illustrations.

Fading Text

Fading lines of text were created by first creating a text layer and typing in the desired text (Figure 3-16).

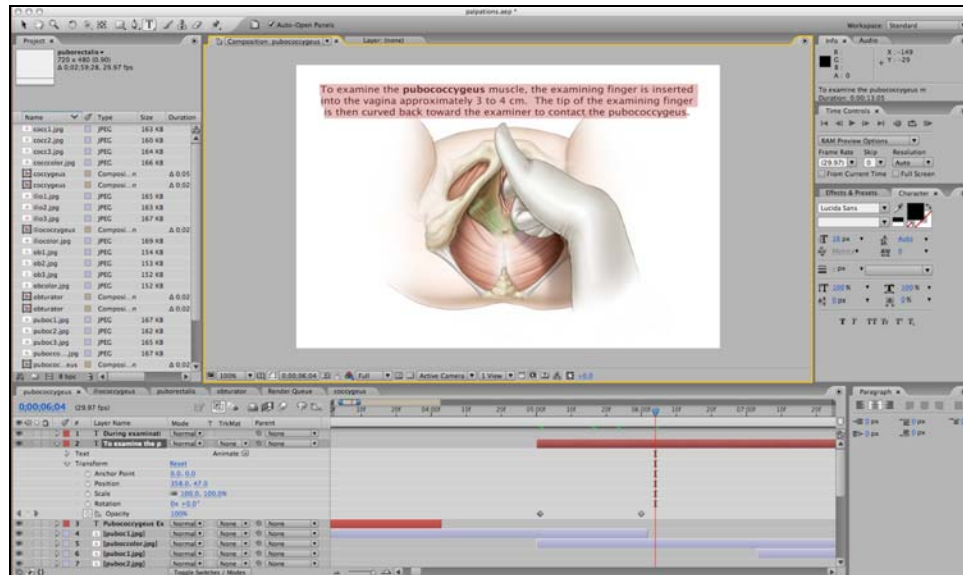


Figure 3-16. Screenshot showing addition of text to an animated clip in Adobe® AfterEffects®.

The text was then adjusted according to the time that it is supposed to appear and disappear and an opacity effect was added to make the text fade on and off the screen.

Final Editing in Adobe® Premiere®

Once all the animation clips were completed in Adobe® AfterEffects®, they were exported as Quicktime movies to the computer desktop and then imported to Adobe® Premiere® for final editing. Each movie clip was arranged according to their proper location in the final movie (Figure 3-17).

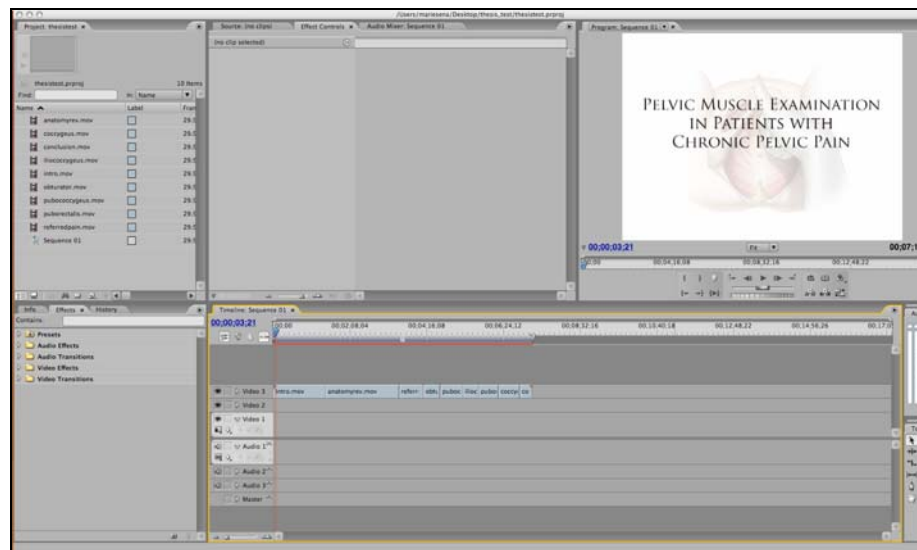


Figure 3-17. Screenshot showing arrangement of movie clips in Adobe® Premiere®.

A simple “dip to white” effect was applied to the ends and beginnings of each clip to facilitate smooth fades from one movie clip to the next (Figure 3-18).

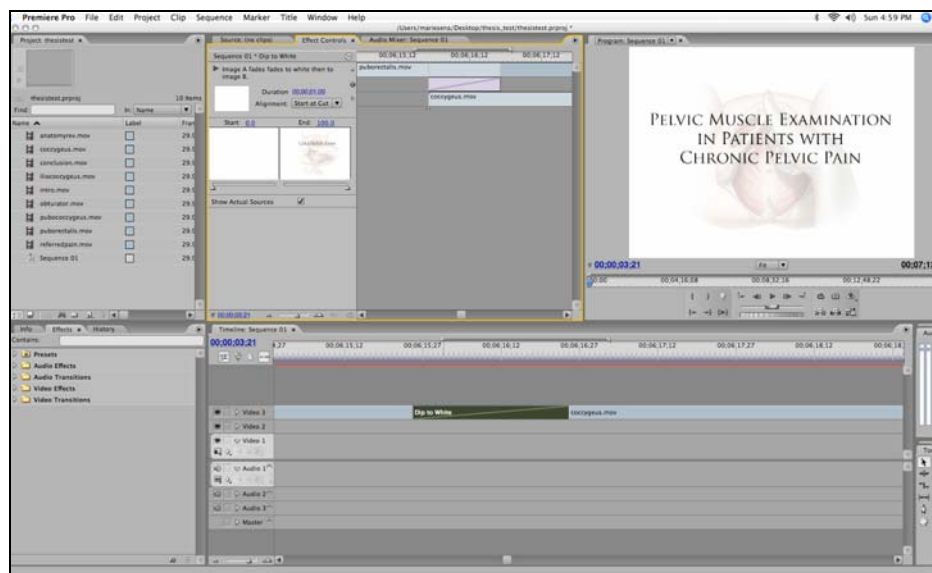


Figure 3-18. Screenshot showing “dip to white” effect applied to a movie clip.

Burning to DVD

After the movie was edited satisfactorily, it could be burned to a DVD. The completed movie was exported as an uncompressed Quicktime movie file from Premiere® to the desktop and then burned to DVD. Because this thesis was completed using a Macintosh computer platform, a DVD-R disc was used. From Premiere®, the movie file was exported to Adobe® Encore®.

CHAPTER FOUR

Results

Survey and Questionnaire Development

The final product was shown to a target audience at Lake West Women's Center in Dallas, an obstetrics and gynecology clinic where pelvic muscle examinations are performed regularly by clinicians and nurse practitioners and are taught to first through fourth-year residents. The target audience consisted of four nurse practitioners and five first through fourth year residents, which is a favorable sampling because of varying experience, age differences, and learning styles.

Before any of the audience viewed the resources, they were asked to complete a preliminary survey (See Appendix A). The survey was created using a 5-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD) and consisted of seven statements. Those taking the survey were asked to indicate their level of agreement with each statement that concerned their familiarity with pelvic muscular anatomy, trigger points, and pelvic muscle examinations. Most of the audience indicated some level of familiarity with the concepts of muscle trigger points their role in source of chronic pelvic pain. Answers were varied concerning the level of understanding of pelvic muscle anatomy and how the audience felt about thoroughly performing a pelvic muscle exam. Below are the statements that were presented to the audience followed by their responses.

●I have a thorough understanding of female pelvic floor muscular anatomy.

—2 Agreed, 5 Neutral, 2 Disagreed

It is easy for me to visualize and correctly identify pelvic muscles during a physical examination.

—2 Agreed, 6 Neutral, 1 Disagreed

●I am familiar with the concept of pelvic floor muscle dysfunction as a source of chronic pelvic pain.

—3 Strongly Agreed, 4 Agreed, 1 Neutral, 1 Disagreed

●I am familiar with the concept of muscle trigger points as a source of chronic pelvic pain.

—3 Strongly Agreed, 4 Agreed, 2 Neutral

●I am familiar with referred pain patterns associated with muscle trigger points.

—5 Agreed, 2 Neutral, 2 Disagreed

●I can correctly identify muscle trigger points within pelvic floor muscles.

—2 Agreed, 2 Neutral, 5 Disagreed

●I feel I can obtain a thorough clinical evaluation when assessing women with chronic pelvic pain.

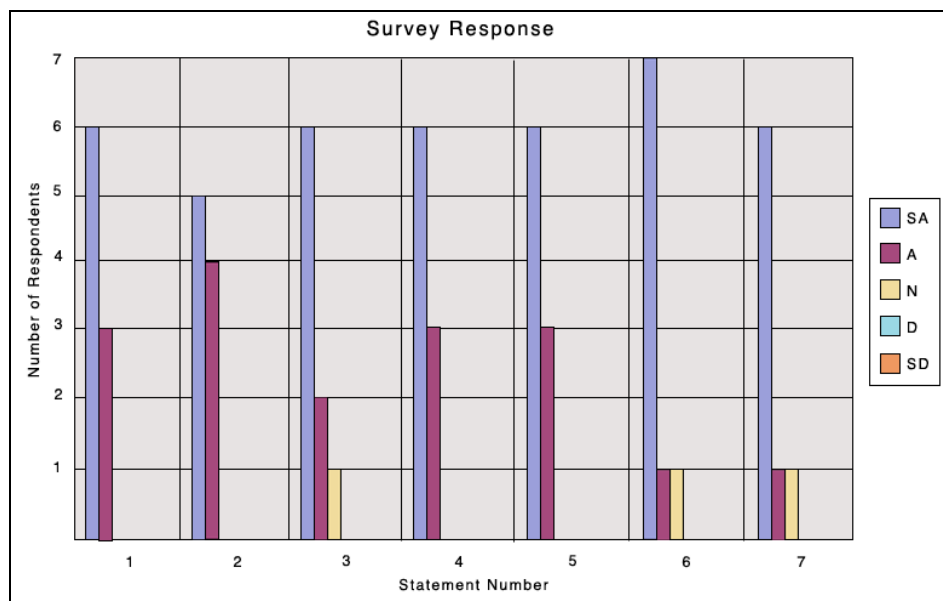
—1 Strongly Agreed, 2 Agreed, 5 Neutral, 1 Disagreed

Most respondents remained neutral or agreed with the statements, with few strongly agreeing or disagreeing with any statement. This indicates that respondents were familiar with the subject, but perhaps not solidly confident. Once the preliminary survey was completed, the audience was shown both the pocket resource book and the DVD.

After the audience had a chance to interact with both resources, they were asked to complete a questionnaire consisting of seven statements and two questions about the pocket resource and the DVD. The questionnaire consisted of nine statements about the pocket resource and the DVD. The questionnaire was created using a 5-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD) (See Appendix D). The audience was asked to indicate their level of agreement with each statement by checking the appropriate box. The respondents were asked to rate the effectiveness of each resource and choose which one they preferred. Towards the end of the survey, they were asked whether or not they would use the visual resources to prepare for a pelvic muscle examination. Finally, they were asked what specific changes they would suggest to improve the project. Each statement was followed by space for additional comments.

Questionnaire Results

The nine questionnaire respondents were either first through fourth year obstetrics and gynecology residents who were familiar with the pelvic muscle examination or nurse practitioners who regularly perform pelvic muscle examinations in the clinic (See Appendix E). This was a favorable sampling because the respondents had varying degrees of experience in the field. A graph was created using data from the survey to show the response to the project (Figure 4-1). SA means Strongly Agree, A means Agree, N means Neutral, and SD means Strongly Disagree.



List of Statements

- 1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain.*
 - 2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter.*
 - 3. The illustrations clearly conveyed the movements required for pelvic muscle palpation.*
 - 4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain.*
 - 5. The DVD flowed in a logical sequence and thoroughly covered the subject matter.*
 - 6. The animations were helpful in conveying the movements required for pelvic muscle palpation.*
 - 7. I would use this resource to prepare for a pelvic muscle examination.*
-

Figure 4-1. Summary of survey responses.

Evaluation of Responses

Statement 1: The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain.

6 Strongly Agreed, 3 Agreed.

This statement was about the effectiveness of the pocket resource book as a reference.

The response to this statement was positive, indicating that all of the respondents believe that the pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain.

Statement 2: The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter.

5 Strongly Agreed, 4 Agreed.

The positive response indicated that the respondents found the pocket resource book logical and thorough.

Statement 3: The illustrations clearly conveyed the movements required for pelvic muscle palpation.

6 Strongly Agreed, 2 Agreed, 1 Remained Neutral.

This statement was included in order to determine whether the finger movements involved in the pelvic muscle examination were effectively illustrated in the pocket

resource book. It can be concluded that the majority of the respondents felt that the illustrations clearly conveyed movement, while one respondent remained neutral.

Statement 4: The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain.

6 Strongly Agreed, 3 Agreed.

The positive response to this statement indicates that the DVD was believed to be an effective reference.

Statement 5: The DVD flowed in a logical sequence and thoroughly covered the subject matter.

6 Strongly Agreed, 3 Agreed.

The intention in creating the DVD was to retain the same written information as the pocket resource book, but to incorporate animation. The overall response to this statement was positive, although two of the respondents who agreed commented on the speed of the DVD. One respondent added: “Maybe slower”, while the other respondent commented: “Moved a little fast, it would be good if it could pause, rewind.”

Statement 6: The animations were helpful in conveying the movements required for pelvic muscle palpation.

7 Strongly Agreed, 1 Agreed, 1 Remained Neutral.

The response to this statement was positive overall, but varied. Most strongly agreed that the animations were helpful in helping them understand exam technique, while one remained neutral.

Statement 7: I would use this resource to prepare for a pelvic muscle examination.

6 Strongly Agreed, 1 Agreed, 1 Remained Neutral.

This statement was important because the project is meant to be used as a teaching tool and a reference in the clinic. The majority of the responders strongly agreed or agreed, while one remained neutral.

Question 1: Which of the two resources did you prefer, the pocket resource, or the DVD?

3 chose the pocket resource book, 4 chose the DVD, 1 chose both.

The fairly even response to this question is a positive because it means that both aspects of the project were useful. Practitioners who choose to utilize this project could decide which resource fits with their learning style and personal preference.

Question 2: What specific changes would you suggest to improve this project?

Several respondents replied to this question. Several of the responses requested that narration be added instead of text. Comments relating to the addition of narration are as follows:

“Sound or voice-over for auditory learners.”

“Music or narration.”

“Animation voice-over or a real exam by an M.D. at the end. Great job.”

The remainder of the respondents' comments are shown below:

"Concise, good flow."

"Maybe talk about symptoms, presentation, and complaints more."

"Can you get a more 3D appearance to the video. Sometimes it is hard to tell just looking if the finger is in the vagina or the rectum."

"Wonderful!"

The overall response from the respondents was positive and their suggestions were positive. Comparison of the results of the questionnaire to the results of the preliminary survey indicates that this model may be useful to people with varying levels of clinical experience and familiarity with chronic pelvic pain.

CHAPTER FIVE

Conclusions and Recommendations

Project Summary

This project attempted address a need for the creation of a comprehensive guide for the examination of pelvic muscles in women with chronic pelvic pain. The goal for this project was to create two visual resources, one in booklet form and one in DVD form, that would thoroughly detail the information needed to give a pelvic muscle examination. Proper exam technique, pelvic anatomy, and referred pain patterns would be shown through illustrations, animations, and clear and concise literature.

In order to achieve this goal, several objectives were met. Under the instruction of Dr. Hoffman, the necessary content for building a resource for pelvic muscle examination was determined. A literature review was conducted to determine what resources were currently available and what information was lacking. A preliminary survey was conducted to gauge the target audience's familiarity with pelvic anatomy and performing pelvic muscle examinations. Next, storyboards for each visual resource were constructed, along with an accompanying script that was designed to be clear, concise, and thorough. The necessary illustrations were created and integrated into the pocket resource book, and animations were created and integrated into the DVD. Finally, both completed visual resources were shown to the target audience. A survey was then conducted and the responses were reviewed and evaluated to test the effectiveness of the project.

Discussion

Several methods of presentation were tested in this project. First, all illustrations were created by using the clinician's viewpoint. The goal in doing this was to help correlate external landmarks and internal anatomy for the viewer and to make the illustrations consistent. Secondly, the visual resource had to be presented in a way that was convenient for the user. Therefore, two modes of distribution were created: the pocket resource book and the DVD. The goal in creating two visual resources was to allow the user to choose which method best suited his or her preferences and learning style. The response to the survey question "Which of the resources did you prefer, the pocket resource book or the DVD" yielded almost equal votes for each resource. This result was encouraging because it indicated that both of the resources were useful and needed. The majority of responders replied that they would use this resource to prepare for a pelvic muscle exam, indicating a need and a desire for this type of resource.

Suggestions for Further Research

One of the concerns of several of the survey respondents was that there was no narration to the DVD resource. Adding narration could enhance the DVD by shortening the actual running time and allowing auditory learners to absorb the content with greater ease. Addition of narration could easily be performed by utilizing a recording and editing program such as Adobe Soundbooth. Another concern expressed by two respondents was that the DVD was too fast. In order to address this particular concern,

the DVD could be produced in an interactive format. This would allow users to choose specific parts of the presentation and replay animations at their convenience.

This project could be integrated into a larger model that addresses other aspects of the pelvic exam for chronic pelvic pain. While this project specifically addressed trigger points and muscle palpation, there are many more parts to the physical examination for chronic pelvic pain. Some of these other areas include palpation of the soft tissues and membranes of the uterus, bladder, adnexa, and rectovaginal septum. Others include examinations for defects in posture or sitting position. This project could theoretically be expanded to create a guide for the entire exam for chronic pelvic pain, and could be incorporated into a website that would make viewing the necessary information convenient for users. This project could be tested by a larger audience in order to more effectively evaluate which model is more effective in actual learning, the pocket guide or the DVD.

APPENDIX A
Preliminary Survey

Creation of a Visual Resource to Aid in the Evaluation of Muscle Trigger Points in Patients with Chronic Pelvic Pain
Pre-Project Survey

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I have a thorough understanding of female pelvic floor muscular anatomy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. It is easy for me to visualize and correctly identify pelvic muscles during a physical examination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I am familiar with the concept of pelvic floor muscle dysfunction as a source of chronic pelvic pain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I am familiar with the concept of muscle trigger points as a source of chronic pelvic pain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I am familiar with referred pain patterns associated with muscle trigger points.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I can correctly identify muscle trigger points within pelvic floor muscles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I feel I can obtain a thorough clinical evaluation when assessing women with chronic pelvic pain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

APPENDIX B

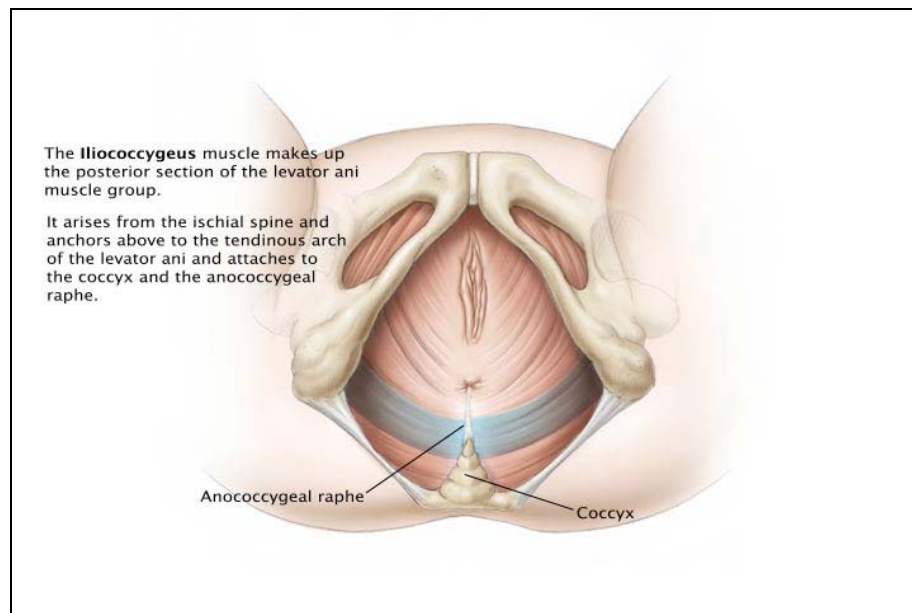
Selected DVD Resource Stills

Chronic pelvic pain is a common gynecologic problem. There is no universally accepted definition of chronic pelvic pain. However, many investigators define chronic pelvic pain as noncyclic pain that persists for 6 or more months.

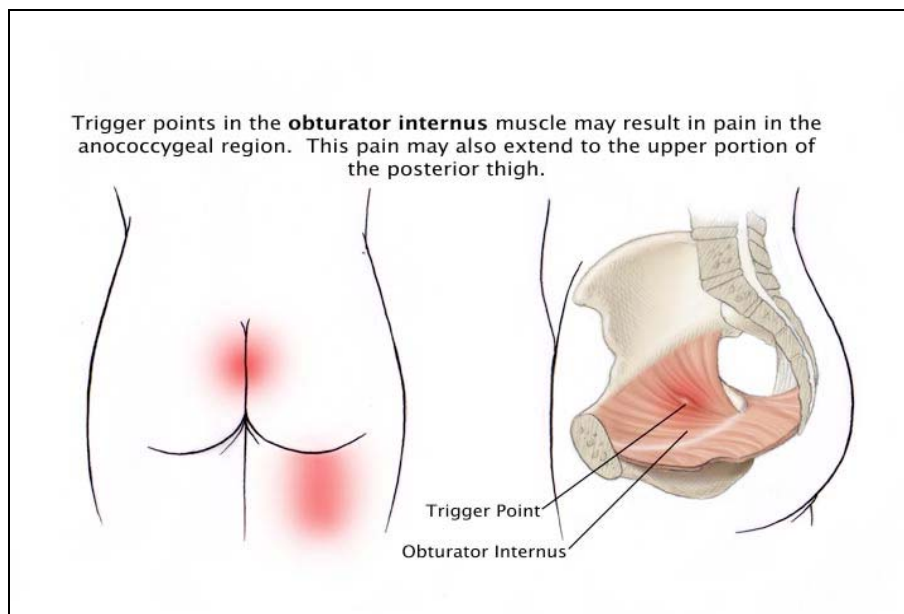
Causes of chronic pelvic pain fall within a broad spectrum, but endometriosis, symptomatic leiomyomas, interstitial cystitis and irritable bowel syndrome are commonly diagnosed. However, myofascial pain syndromes involving the pelvic floor muscles may also be causative.

For this reason, the American College of Obstetricians and Gynecologists recommends an assessment of the musculoskeletal system prior to laparoscopy or hysterectomy for chronic pelvic pain.

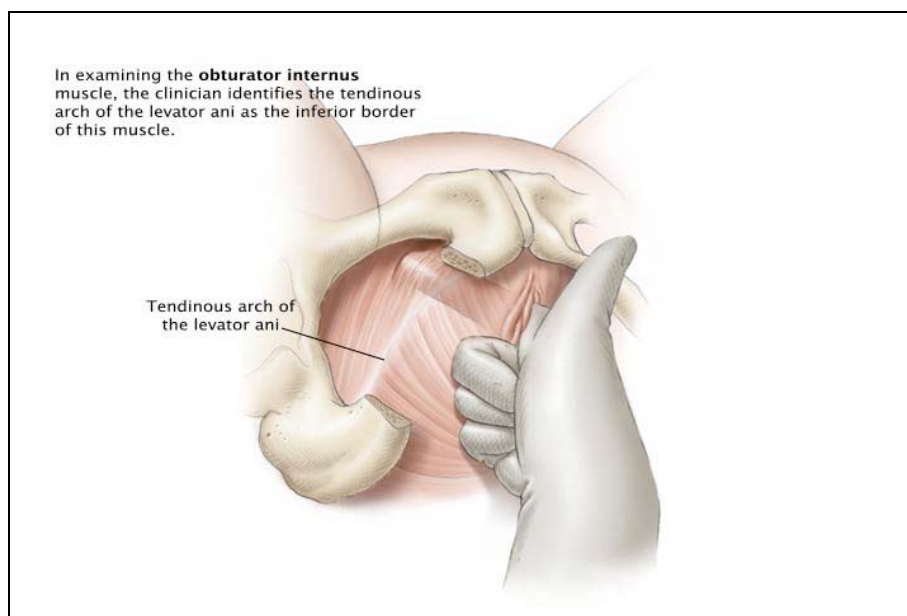
Still taken from *Introduction*



Still taken from *Anatomy Review*

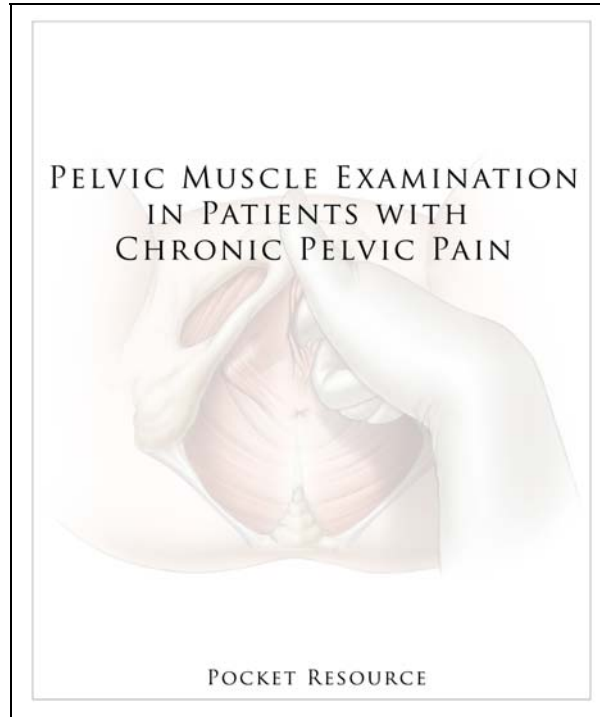


Still taken from *Referred Pain*



Still taken from *Obturator Internus Examination*.

APPENDIX C
Selected Spreads from Pocket Resource Book

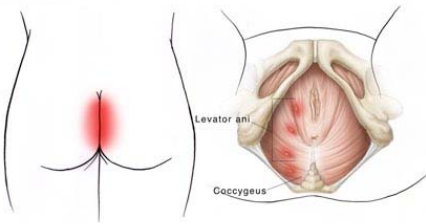


Cover of the Pocket Resource Book

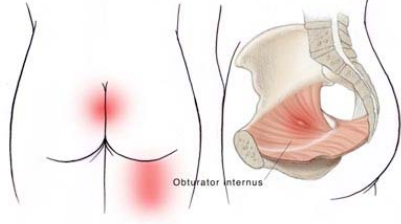
<p>INTRODUCTION</p> <p>Chronic pelvic pain is a common gynecologic problem and its estimated prevalence in reproductive-aged women is 15%. There is no universally accepted definition of chronic pelvic pain. However, many investigators define chronic pelvic pain as noncyclic pain that persists for 6 or more months. It localizes to the pelvis, to the infraumbilical anterior abdominal wall, or to the lumbosacral back or buttocks. This pain leads to degrees of functional disability.</p> <p>Causes of chronic pelvic pain fall within a broad spectrum, but endometriosis, symptomatic leiomyomas, interstitial cystitis and irritable bowel syndrome are commonly diagnosed. However, myofascial pain syndromes involving the pelvic floor muscles may also be causative. For this reason, the American College of Obstetricians and Gynecologists recommends an assessment of the musculoskeletal prior to laparoscopy or hysterectomy for chronic pelvic pain.</p> <p>Myofascial pain syndrome stems from a hyper-irritable area within a muscle that leads to persistently contracted fibers. Pain, weakness, or autonomic reactions can result.</p> <p>1</p>	<p>The primary reactive area within the muscle is termed a trigger point (TrP) and is identified as a palpable taut, rope band. Myofascial trigger points can affect any muscle, and those involving muscles of the pelvic floor can be sources of chronic pelvic pain.</p> <p>The incidence of myofascial disease is unknown, but in an evaluation of 500 patients with chronic pelvic pain, one investigator found 7% of patients primarily had trigger points as a source of their pain.</p> <p>Many providers have educational deficits in thoroughly assessing women for myofascial pain syndromes of the pelvic floor muscles. This series of illustrations attempts to provide a logical sequential approach to this examination.</p> <p>2</p>
---	--

Introduction spread

REFERRED PAIN PATTERNS



- Trigger points in the **levator ani** and **coccygeus** muscles refer poorly localized pain.
- Patients may complain of pain in their hip, back, or tailbone. This pain can be centered in the region of the coccyx, but may extend to the lower sacral and anal regions.

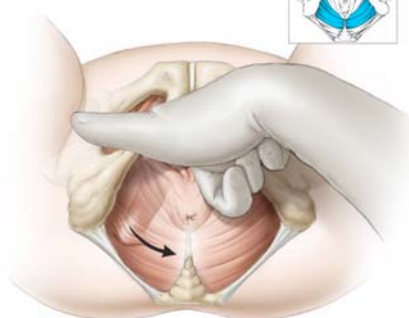


- Trigger points in the **obturator internus** muscles may result in pain in the anococcygeal region.
- The pain may also extend to the upper portion of the posterior thigh.

5 6

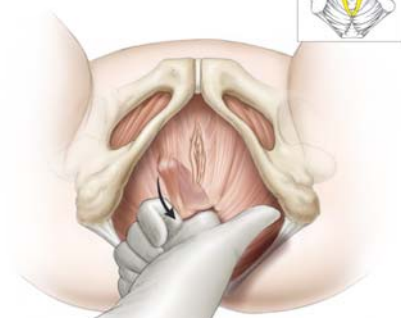
Referred Pain Patterns spread

ILIOCOCYGEUS EXAM



- In examining the **iliococcygeus** muscle, the ischial spine and tendinous arch of the levator ani are identified.
- The investigator's fingers run along these muscle fibers between the tendon and the coccyx. Again, muscle fiber ropiness and trigger points are areas of focus.

PUBORECTALIS EXAM



- Rectal exam can also be informative and can be used to reach the puborectalis and coccygeus muscles.
- During examination of the **puborectalis** muscle, the clinician inserts a single index finger into the rectum.
- In a U-shaped pattern, the finger begins superiorly and then sweeps inferiorly, exerting outward pressure on the perineum.

9 10

Iliococcygues Exam and Puborectalis Exam spread

APPENDIX D

Questionnaire

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project?					
<i>Comments:</i>					
<i>Additional comments:</i>					

APPENDIX E

Completed Questionnaires

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input checked="" type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project? <i>Comments:</i>	wonderful!				
<i>Additional comments:</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input checked="" type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project? <i>Comments:</i>					
<i>Additional comments:</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input checked="" type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project?					
<i>Comments:</i>					
<i>Additional comments:</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input type="checkbox"/>	Both <input checked="" type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project?					
<i>Comments:</i> <u>Sound</u>					
<i>Additional comments:</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input checked="" type="checkbox"/>	DVD <input type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project?					
<i>Comments: Can you get more 3D appearance to the video. Sometimes it is hard to tell just looking if the finger is in the vagina or the rectum</i>					
<i>Additional comments:</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource	DVD	Both	Neither	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. What specific changes would you suggest to improve this project?					
<i>Comments:</i>	Sound → voice over or same age and/or gender narrators				
<i>Additional comments:</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments: maybe slower</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input checked="" type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project? <i>Comments:</i>	music or narration				
<i>Additional comments:</i> maybe talk about symptoms & presentation of complaint more?					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments: Moved a little fast, would be good if could pause, remind</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD? <i>more hands on, can write/underline</i>		Pocket Resource <input checked="" type="checkbox"/>	DVD <input type="checkbox"/>	Both <input type="checkbox"/>	Neither <input type="checkbox"/>
9. What specific changes would you suggest to improve this project? <i>Comments:</i>					
<i>Additional comments: concise, good flow</i>					

Instructions: Please check the box that corresponds to your level of agreement with the statement to the left. Please feel free to provide additional comments in the spaces provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The pocket resource book is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The pocket resource book flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The illustrations clearly conveyed the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The DVD is an effective reference for pelvic muscle examination for patients with chronic pelvic pain. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The DVD flowed in a logical sequence and thoroughly covered the subject matter. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The animations were helpful in conveying the movements required for pelvic muscle palpation. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would use this resource to prepare for a pelvic muscle examination. <i>Comments:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Which of the two resources did you prefer, the pocket resource, or the DVD?	Pocket Resource <input type="checkbox"/>	DVD <input type="checkbox"/>	Both <input checked="" type="checkbox"/>	Neither <input type="checkbox"/>	
9. What specific changes would you suggest to improve this project? <i>Comments:</i>	<p>Animation voice over or real exam by an MP as a demo @ the end</p> <p>Correct job.</p>				
<i>Additional comments:</i>					

BIBLIOGRAPHY

- Examination of the Pelvic Floor and Pelvic Wall Muscles in the Evaluation of Chronic Pelvic Pain. DVD. UT Southwestern Medical Center at Dallas.
- Federative Committee on Anatomical Terminology (FCAT), Terminologia Anatomica. New York, NY: Thieme Medical Publishers, 2000.
- Hoffman BL: Pelvic Pain. In Schorge JO, Schaffer JI, Halvorson LM, et al (eds) Williams Gynecology, New York, McGraw-Hill, (In press).
- Howard, Fred M., et al., eds. Pelvic Pain: Diagnosis and Management. Philadelphia, PA: Lippincott Williams & Wilkins, 2000.
- Pabst, R., and Putz, R. Sobatta Atlas of Human Anatomy. 12th ed. Baltimore, MD: Williams & Wilkins, 1997.
- Platzer, Werner, and Reiffenstuhl, Gunther. Atlas of Vaginal Surgery: Surgical Anatomy and Technique, Vol. I. Munich, Germany: Urban and Schwarzenberg, 1974.
- Steege, John F., Metzger, Deborah A., and Levy, Barbara S., eds. Chronic Pelvic Pain: an Integrated Approach. Philadelphia, P: W.B. Saunders Company, 1998.
- Travell, Janet G., and Simons, David G. Myofascial Pain and Dysfunction: The Trigger Point Manual, Vol.II. Baltimore, MD: Williams & Wilkins, 1992.
- Jantos M.: Understanding Chronic Pelvic Pain. Pelviperineology Vol. 26 N.2 June 2007 66-68

VITAE

Marie Rose Sena was born in Santa Fe, New Mexico, on October 23, 1982, the daughter of Laura M. Sena and Phillip A. Sena. After graduating from Santa Fe High School in Santa Fe, New Mexico in 2001, she entered Iowa State University in Ames, Iowa, where she received the degree of Bachelor of Art in Biological and Pre-Medical Illustration in 2005. Immediately upon graduating, she entered the Graduate School of Biomedical Communications at the University of Texas Medical Center. She was awarded the degree of Master of Arts in December, 2006.

Permanent Address: 4140 Cheyenne Circle
Santa Fe, NM
87507