

5-1-2022

## The Occupational Therapy Approach to Pain Treatment: A Pain Curriculum

Rosalee Howell

*University of Nevada, Las Vegas*

Follow this and additional works at: <https://digitalscholarship.unlv.edu/thesesdissertations>



Part of the [Occupational Therapy Commons](#), and the [Pain Management Commons](#)

---

### Repository Citation

Howell, Rosalee, "The Occupational Therapy Approach to Pain Treatment: A Pain Curriculum" (2022). *UNLV Theses, Dissertations, Professional Papers, and Capstones*. 4350. <http://dx.doi.org/10.34917/29649935>

This Doctoral Project is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Doctoral Project in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Doctoral Project has been accepted for inclusion in UNLV Theses, Dissertations, Professional Papers, and Capstones by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact [digitalscholarship@unlv.edu](mailto:digitalscholarship@unlv.edu).

THE OCCUPATIONAL THERAPY APPROACH TO PAIN TREATMENT

A PAIN CURRICULUM

By

Rosalee A. Howell

Bachelor of Science – Occupational Therapy  
York College – City University of New York  
1997

Master of Business Administration – Healthcare Management  
Jones International University  
2007

A doctoral project submitted in partial fulfillment  
of the requirements for the

Post-professional Occupational Therapy Doctorate

Department of Brain Health  
School of Integrated Health Sciences  
The Graduate College

University of Nevada, Las Vegas  
May 2022

Copyright by Rosalee A. Howell, 2022

All Rights Reserved



## **Doctoral Project Approval**

The Graduate College  
The University of Nevada, Las Vegas

April 7, 2022

This doctoral project prepared by

Rosalee Howell

entitled

The Occupational Therapy Approach to Pain Treatment : A Pain Curriculum

is approved in partial fulfillment of the requirements for the degree of

Post-Professional Occupational Therapy Doctorate  
Department of Brain Health

Donna Costa, DHS, OTR/L, FAOTA  
*Graduate Coordinator*

Jefferson Kinney, Ph.D.  
*Graduate Program Chair*

Kathryn Hausbeck Korgan, Ph.D.  
*Vice Provost for Graduate Education &  
Dean of the Graduate College*

## **Abstract**

It is within the scope of the occupational therapy profession to treat patients experiencing pain. The holistic approach used to assess and treat patients to improve functional performance is vital in treating pain. The focus is to decrease the detrimental impact of pain on the patient's mental health, enhancing their ability to function in social and vocational roles. However, education is not adequately addressed in occupational therapy programs and is vital in preparing clinicians to meet the patient's needs effectively.

This Doctoral Capstone was developed to highlight the importance and the benefit of education in preparing clinicians to treat patients experiencing pain confidently. The curriculum focused on identifying methods of assessment and treatment and environmental and social factors that may exacerbate the condition. Occupational therapists will be responsible for using evidence-based practice to ensure the most effective methods are used to promote the best outcomes.

## Acknowledgements

I want to thank Dr. Donna Costa, Program Director, for guiding me through the development of this course. Dr. Dona Costa and Dr. Janeene Sibla both served as members of my graduate committee, and I appreciate all the direction provided through the process. I would be remiss if I did not mention Dr. Donna Marie Krause for all the opportunities she provided to present to her classes. She was a continued source of encouragement and support throughout my academic journey. All my professors who shared such great content and were willing to assist were Dr. Amy Lamb, Dr. Jana Cason, Dr. Janis Davis, and Dr. Jonathan Legarte. My family and friends have been a constant source of encouragement, always ready with assurance that I would be able to finish this task. My daughter, Rosedaveia, provided technological assistance shared her opinions on assignments, despite the time constraint to complete her many school responsibilities. I must also extend my appreciation to my cohort, who provided great insight into our course discussions, and was ready with humor when we faced deadlines that seemed almost impossible.

Talina, Nicole, and Hosia, we made it!

## Table of Contents

Abstract.....	iii
Acknowledgements .....	iv
Table of Contents .....	v
Section One: Introduction.....	1
Literature Review .....	2
Pain Curriculum in Healthcare Programs.....	3
Section Two: Efficacy of Treatment Approaches for Pain.....	5
Pain Neuroscience Education .....	5
Pain Neuroscience Education for Children .....	6
Meditative Techniques .....	7
Physical Agent Modalities.....	7
Cognitive Behavioral Therapy .....	8
Physical Activity and Exercise.....	8
Section Three: Factors Contributing to the Pain Crisis and .....	9
the Role of Occupational Therapists .....	9
Social Determinants of Health.....	9
Health Disparity.....	10
Pain Stigma.....	11
Centers for Medicare and Medicaid Services Pain Crisis Response .....	11
Management of pain symptoms with Coronavirus disease 2019 (COVID-19) .....	12

The American Occupational Therapy Association (AOTA) position on pain .....	13
Section Four: The Capstone Process .....	14
Problem Statement.....	14
Choosing the Capstone Project.....	14
Curriculum development .....	15
The Person-Environment Occupation (PEO) Frame of Reference .....	16
Timeline for Developing the Modules .....	17
Writing Case studies.....	18
Teaching Pedagogy .....	19
Case-based Learning .....	19
Student-centered Teaching .....	20
Class Instruction and Course Modifications.....	21
Writing Test Questions.....	21
Student Assessment of Course and Teacher Evaluation .....	22
Section Five: Discussion .....	26
Proposed Course Improvement .....	26
Clinical Implications for Occupational Therapy Practice .....	27
Conclusion.....	28
Appendix A: Goals for the Capstone.....	30
Appendix B: ACOTE Standards .....	31
Appendix C: Course Outline .....	33
Appendix D: Instructor Evaluation .....	37



Appendix E: Course Evaluation .....	38
Appendix F: Pain Knowledge Assessment.....	39
Appendix G: Revised Course Outline .....	40
Appendix H: Neuroanatomy of Nociceptive System PowerPoint Lecture .....	41
Appendix I: Neuroanatomy of Pain Test Questions .....	53
Appendix J: Activity Pacing PowerPoint Lecture.....	55
Appendix K: Exercise and Manual Therapy .....	62
Appendix L: Guest Lecture Certificate .....	74
References .....	75
Curriculum Vitae .....	83

## **Section One: Introduction**

Opioid addiction has become an epidemic, and healthcare professionals struggle to address chronic pain in our patient population, expanding options to include alternative treatment approaches. Chronic pain has a significant impact on the quality of life of individuals. For example, it limits work leisure activities and can lead to a decline in mental health. (Centers for Disease Control and Prevention [CDC], 2020). Adults seeking healthcare due to pain are estimated to be 11 – 40 % of the population, approximately 50 million individuals at greater than \$50 billion annually (Dahlhamer et al., 2018). In addition, there are reports that about 1.7 million children experience moderate to severe pain daily (Robins et al., 2016). Such high numbers of adults and children in our population make finding effective treatment methods of great import.

Pain in children is a common occurrence that is not readily recognized or treated (Friedrichsdorf & Goubert, 2020). Though children may experience pain and are often treated with similar methodologies as adults, there has been limited research on these treatment interventions. Therefore, a Cochrane systematic review was completed to assess the impact of psychological therapy approaches (behavioral and cognitive therapy) on pain in adolescents and children. The study focused on the patient's pain report for mixed conditions, headaches, and their impact on functional performance. The research revealed that psychological therapies provided immediate pain relief and reduced the inability to function after children and adolescents received treatment for up to 12 months (Fisher et al., 2018).

## **Literature Review**

The pain crisis in the United States has a profound impact on individuals due to the challenge of obtaining adequate care. As a result, an Inter-Agency Task Force (Task Force) was assembled by The United States Department of Defense, the United States Department of Veterans Affairs with the Office of National Drug Control Policy to deal with the opioid crisis. A lack of adequate services to meet the needs of individuals experiencing pain resulted in the overuse of opioid prescriptions to manage reports of pain. The resultant devastating impact on individuals' social, emotional, and physical states reporting acute and chronic pain was the catalyst for the Task Force. (Langjahr, 2019).

The Task Force was designed to develop best practices for meeting the demand for care of the general population experiencing acute and chronic pain. The loss of lives over the past two decades attributed to prescribed opioids, heroin, and synthetic opioids is staggering, resulting in the collaboration between agencies forming the Task Force to address the pain crisis. The Task Force identified the importance of individualized assessment and treatment of pain for treatment to be effective. The Task Force reported that the approach to pain must be multidisciplinary and multimodal, including medications, nerve blocks, physical therapy, and other modalities considered effective in treating pain. The emphasis was placed on assessment and goal development to achieve an improved quality of life (QOL), activities of daily living (ADLs), and improved functionality (Langjahr, 2019).

Improving education on pain for clinicians and patients was deemed necessary in the fight to address the pain crisis. Increasing knowledge of pain across the clinical training continuum was emphasized as an effective measure to combat the pain crisis. In addition, the

Task Force highlighted the importance of improving education by including cutting-edge research on the best practices for treating pain. This executive summary of the Task Force's findings was promising in specifying the measures to be employed and must be adapted to achieve positive results (Langjahr, 2019).

### **Pain Curriculum in Healthcare Programs**

The importance of pain education has been emphasized in literature for more than two decades. Educational programs with a pain curriculum are vital for preparing clinicians to meet the growing needs of the patient population to promote a positive change in the treatment of pain. However, there has been a limited focus in undergraduate and professional programs on expanding the curriculum on pain to address this growing concern (Thompson et al., 2018). Though pain is mentioned in the coursework of different disciplines, it is not the primary focus. A consensus report completed by the National Academies of Sciences, Engineering, and Medicine cited the importance of Interprofessional education and an interdisciplinary treatment approach when addressing patients' pain (Bain et al., 2019). In a summit identifying elements of a pain program for health professionals, essential components included focusing on pain recognition, contextual factors' effects on pain, and treatment approaches within the health professional's scope of practice (Fishman et al., 2013).

Though pain management education programs are promoted in the research literature on pain treatment, less emphasis has been placed on the effectiveness of the individual treatment strategies for pain. In a scoping review of pain management education programs (PMEPs), the research examined how the education provided to surgical nurses would positively impact patients' pain. The studies reviewed were conducted in the United States of America, and pain management topics were covered for approximately one hour within the curriculum. The PMEPs

were determined effective in improving the nurses' knowledge of pain and providing patient care. In addition, some studies evaluated the patient's satisfaction with the pain management provided, the cost of treatment, length of stay, pre-and postoperative pain relief. The studies showed an improvement in all areas, with patients reporting greater satisfaction with pain management strategies noting decreased time for pain relief after surgical procedures (Chatchumni et al., 2020).

## **Section Two: Efficacy of Treatment Approaches for Pain**

### **Pain Neuroscience Education**

Pain Neuroscience Education (PNE) is an approach used to lower the pain response of patients through the use of education, which may change the patient's perception of pain, thus improving their engagement in functional tasks (Robins et al., 2016). Pontin (2021) completed a study to demonstrate the effects of this method gathered data from 24 patients experiencing chronic pain with a mean age of 57 years over one year. The patients participated in a pain program that included information on the body's response to pain and topics on acceptance, sleep, relaxation methods, negative thoughts, relationships, and functional activities. The participants were assessed using several instruments before and after the intervention to determine its impact. The Tampa Scale for Kinesophobia (TSK) addressed pain and intensity of symptoms; the Illness Perception Questionnaire (Brief-IPQ); the Pain Catastrophizing Scale (BP-PCS); the Short-Form Health Survey (SF-36), and The Central Sensitization Questionnaire (BP-CSI). The data analysis revealed overall improvement assessed in perceived disability and pain level areas. In addition, quality of life measures showed significant improvement, demonstrating the positive impact of the intervention. Though the results were overall positive, the research sample was small compared to the population experiencing pain. Furthermore, there was no control group in the experiment. Consequently, the study results lend to more opportunities for more extensive research on the topic (Pontin et al., 2021).

PNE has reduced patients' fear-avoidance behaviors improving their participation in other activities. Siddall (2021) conducted a systematic review, researching PubMed, MEDLINE, CINAHL, and Cochrane Central Register of Controlled Trials (CENTRAL); research studies

were reviewed to include those comparing the effects of PNE and exercise therapy. The focus of the study was to determine whether PNE and exercise combined were more effective in treating chronic pain than exercise offered independently. A total of 5 studies were included in the review, and the effects on pain, disability, and kinesophobia were considered. The results showed more positive outcomes for PNE and exercise combined than exercise offered alone for patients experiencing chronic musculoskeletal pain. The research findings are viewed cautiously due to variations in intervention timeframes and analysis of results. However, there were positive implications for combining PNE with exercise for improved patient outcomes (Siddall et al., 2021).

### **Pain Neuroscience Education for Children**

Children and adolescents experience chronic pain, affecting school attendance and participation in leisure activities. In addition, the pain experience can result in children's inability to build and maintain relationships with peers and result in poor academic performance (Pas et al., 2018). Consequently, effective pain management strategies are essential to support their participation in age-appropriate activities.

Pain neuroscience education (PNE) is utilized to educate adult patients about pain, improving their response and ability to cope with pain. The success with PNE led to the development of a similar program for children called the pain neuroscience education program for children (PNE4Kids). The program explains the neurophysiology of pain, the body's adaptive response to persistent pain, and how to apply the information in daily activities. However, the program's effectiveness has not been explored, and studies are encouraged to validate the approach's efficacy in the pediatric and adolescent population (Pas et al., 2018).

### **Meditative Techniques**

Patients who experience chronic pain frequently report difficulty getting adequate sleep, which increases pain sensitivity (Staffe et al., 2019). Relaxation has been recommended as a technique used to decrease anxiety and improve sleep patterns and address pain. Systematic research on studies to evaluate whether relaxation does decrease pain was completed. Several studies showed that the pain was reduced while the technique was used, and the practice needed to be continued for more significant benefits. Other studies reported relaxation with exercise as more effective (Vambheim et al., 2021).

Aromatherapy uses essential oils absorbed by the skin, stimulates the olfactory system, and is used to treat pain. Lakhan et al. (2016) performed a systematic review and reported that aromatherapy effectively reduced pain reports from different body parts. The studies were conducted in different parts of the world, and the techniques were not limited to aromatherapy, but some included elements of massage. However, the positive effects cannot be denied, and the negligible cost of using this method (Lakhan et al., 2016).

### **Physical Agent Modalities**

Physical agent modalities that treat pain include cold packs, heating packs, ultrasound, shortwave diathermy, electrical stimulation, paraffin, and whirlpool. The choice of modality is determined by the patient's medical history, as some modalities may be contraindicated and based on the type of pain the patient reports (Nall, 2019). A study was performed by Nall (2019) with seven patients using electrical stimulation, ultrasound, and shortwave diathermy for acute and chronic pain. All experienced a reduction in pain symptoms, though each experienced pain



reduction for varying timeframes. In addition, patients needed pain medication, but the time between taking the medications was extended (Nall, 2019).

### **Cognitive Behavioral Therapy**

Cognitive Behavioral Therapy (CBT) is a psychological intervention designed to challenge negative thought patterns that lead to undesirable behaviors and can be used to treat patients with chronic pain. According to Ehde et al. (2014), CBT is effective in helping patients adjust to chronic pain, positively impacting social and psychosocial function. According to Williams et al. (2012), after a Cochrane review, it was determined that CBT had some positive effects on the pain experience (Williams et al., 2012). The intent of CBT is not to produce a pain-free experience for the patient but to produce a realistic view of the pain experience resulting in improved functional performance.

### **Physical Activity and Exercise**

Physical activity and exercise have been recommended by physicians to treat back pain since the 1980s, where previously, rest was recommended (Waddell, 1987). The Cochrane Review (Geneen et al., 2017) examined research regarding pain with a wide variety of activities, including yoga, Pilates, tai chi, balance training, aerobic exercises, core or balance training programs, and motor control exercises. According to Geneen et al. (2017), the pain was not reduced due to the interventions, but improved functional performance and quality of life were reported.

## **Section Three: Factors Contributing to the Pain Crisis and**

### **the Role of Occupational Therapists**

#### **Social Determinants of Health**

Identifying measures that impact health is vital to developing practical solutions, but what happens when the most affected individuals cannot attain services? The social determinants of health consider a person's childhood development, income, education, housing, gender, employment, social support, and their impact on their health. Many of these social factors are influenced by upstream systems outside the individual's control but contribute to their limited resources (Williams et al., 2008). Those living within a lower socioeconomic status live in areas with limited resources and higher exposure to factors that cause health impairment (Wang & Geng, 2019). These factors include living in areas with high crime rates resulting in increased stress levels that significantly impact the health of residents in these communities (Woolf, 2019).

Many people live in communities with grocery stores that do not offer a wide variety of foods such as fresh fruit and vegetables to meet the nutritional needs of the residents (Woolf, 2019). Though areas like these, called food deserts, have declined, non-white residents are 30 percent more likely to reside in food deserts than white residents (Karpyn et al., 2012). As a result, the quality of life for non-whites is lower, resulting in being prone to more pain, decreased health, and high mortality rates (Karpyn et al., 2012). Clinicians are apt to make recommendations to patients about improvements needed to positively impact their health without adequate knowledge of the social factors that make implementing these choices a considerable challenge. In addition, the lack of awareness of practitioners about their patients' limited resources and environmental limitations may lead to the misleading perception of patient non-compliance. As a result, the clinician's perception of patient compliance may inadvertently

be communicated, creating a lack of trust in the clinical interaction (Andermann, 2016).

Ultimately, the clinician views the patient as non-compliant, and the patient views the clinician as judgmental and not committed to their care.

### **Health Disparity**

There are many factors contributing to disparities in healthcare. Healthcare accessibility differs in communities predominantly housing residents of a lower socioeconomic status. These areas are often plagued with poor housing accommodations, with residents having trouble with indoor temperature modulation, mold, and other factors impacting their health (Rolfe et al., 2020). The environment commonly has poor air quality from industry and exhaust emissions from vehicles traveling through the neighborhoods (Hajat et al., 2015). These communities lack features such as safe parks, grocery stores stocked with various foods, and well-equipped schools. (Kim et al., 2016). As a result, residents in these areas are at a higher risk for hypertension, diabetes, stroke, and pain (Tahir et al., 2019) and are less likely to obtain adequate healthcare because of a lack of available medical facilities (Nguyen et al., 2019). Residents in communities with poor access to health care are frequently unable to work because of common untreated ailments. Many residents in these communities are primarily uninsured or have Medicaid, and many physicians are unwilling to accept this insurance for reimbursement. Many physicians are located in more affluent areas with privately insured residents (Schnake-Mahl & Sommers, 2017).

Significant differences have been noted in treating chronic pain between ethnic groups. In a literature review, between 2000 and 2020, the studies revealed that non-Hispanic patients had not been prescribed opioids as frequently as non-Hispanic patients (Morales & Yong, 2020). In addition, Black patients were less likely to receive a prescription for opioids to manage pain than

non-Hispanic White patients. Health providers who stereotype patients by race and socioeconomic status are ineffective when providing treatment, resulting in poor patient outcomes. Healthcare professionals need the education to improve their awareness of implicit and explicit biases that influence medical treatment. It is crucial to enhance future interventions and provide equal and effective treatment for patients in all racial groups (Morales & Yong, 2020).

### **Pain Stigma**

There is a stigma associated with individuals experiencing chronic pain, severely impacting the patient's ability to seek treatment and achieve positive treatment outcomes. The patients experience negative perceptions from healthcare providers, social support systems, and the community. A lack of understanding of the pain experience is noted in the clinician's response to the patient's chronic pain report (Cohen et al., 2011). The expectation of the clinician that the traditional methods for treating pain should be adequate results in care providers responding with a lack of urgency and dismissing patient reports. The incorrect assessment of the patients' pain experience often results in pain being under-assessed and under-treated by the clinician. In addition, patients may react by over-or under-reporting their pain, compounding the inadequate treatment they receive from these professionals (Sosio & Demean, 2021).

### **Centers for Medicare and Medicaid Services Pain Crisis Response**

The Centers for Medicare and Medicaid Services (CMS) of the US Department of Health and Human Services have responded to the pain crisis by approving payments for alternative treatment approaches to address chronic pain. For example, acupuncture was approved effective January 20, 2020, for limited sessions to manage chronic back pain. In some limited capacity, occupational and physical therapy and chiropractors are also approved to address patients' pain.

However, CMS has not approved reimbursement for many alternative approaches such as yoga, tai-chi, mindfulness therapy, massage therapy, Qigong, and meditation. Some private insurance will reimburse for limited visits to a chiropractor, massage therapist, acupuncturist, and other approaches, but a co-payment is required (Langjahr, 2019).

In its initiative to combat the opioid crisis, CMS has a prevention model of educating providers about drug utilization by encouraging safeguards that increase communication between providers and pharmacists on prescription refills. In addition, CMS is educating providers about non-pharmacological treatment approaches to opioid prescriptions for treating pain to reduce the reliance on prescription drugs in pain management (CMS Opioid Roadmap: Strategy to Fight the Opioid Crisis, 2020).

### **Management of pain symptoms with Coronavirus disease 2019 (COVID-19)**

In the United States of America, approximately 20 percent of the population experience chronic pain (Dahlhamer et al., 2018). During the COVID-19 pandemic, members of the population of lower socioeconomic status were more susceptible to the disease because of poor housing conditions and work environments with less protective measures in place, placing them at a severe health risk. In addition, members of the population working in environments with less protection, contracting the COVID-19 virus, suffered job loss, increasing the number of people experiencing a financial crisis. While chronic pain is already viewed with stigma, negatively impacting the effective treatment of the condition, clinicians and researchers attempted to alert policymakers of the impact the COVID-19 pandemic had on this vulnerable population (Dassieu et al., 2021). The residual pain and the impact on psychosocial performance were of grave concern.

The global pandemic caused by COVID-19 resulted in patients experiencing residual pain. Patients report joint pain, muscular pain, and neuropathic pain requiring a multimodal approach to managing the pain experience. While muscular and joint pain may respond to traditional and non-traditional pain relief methods, neuropathic pain is not as responsive. Furthermore, because of the challenge of addressing neuropathic pain, patients may be in danger of experiencing psychosocial disorders like depression. Consequently, healthcare professionals must be diligent in assessing and treating patients with COVID-19 to prevent or decrease the risks associated with pain because of this disease (Widyadharma et al., 2020).

### **The American Occupational Therapy Association (AOTA) position on pain**

The American Occupational Therapy Association (AOTA), in its position statement, shared the impactful role occupational therapy (OT) practitioners play in the treatment of pain. The white paper definitively outlines why OT practitioners can treat independently and contribute to effective measures collaboratively with interprofessional teams. Occupational therapists use a holistic approach in assessing and treating patients, engaging the patients in meaningful occupations to combat pain effects (Role of Occupational Therapy in Pain Management, 2021).

The AOTA position paper outlines occupational therapists' intervention strategies and modalities to treat patients experiencing pain. The report asserts that an OT practitioner can effectively use our skills to promote their ability to meet this population's needs. The importance of continuing education in pain management was encouraged to promote the best outcomes for our patient population (Role of Occupational Therapy in Pain Management, 2021).

## **Section Four: The Capstone Process**

### **Problem Statement**

Based on the literature review and ongoing lack of education for undergraduate and professional programs, it was determined that an educational course addressing pain would be advantageous to the entry-level occupational therapy doctorate program at the University of Las Vegas. This course on assessing and treating pain is a step towards preparing occupational therapy students to share viable options to improve functional performance with patients. Entry-level occupational therapy (OT) students must use evidence-supported interventions to provide a more pragmatic approach to pain intervention. However, the question is, will educating entry-level OT students on pain assessments and non-pharmacological pain management strategies help treat and manage patients' pain?

### **Choosing the Capstone Project**

During the first semester of the post-professional doctoral program, the instructors' encouraged thinking about topics for a capstone project. Our cohort was encouraged to consider topics of interest that positively impact our profession. Initially, I considered addressing students' clinical reasoning skills and completed a few guest lectures covering this topic. However, in the third semester of the doctoral program, during the Social Determinants of Health course, OCT 706, a class discussion highlighted the crisis of opioid dependency in the population. My interest was piqued and led to a change of direction to addressing effective strategies for treating pain and reducing reliance on the pharmacological approach.

Consultation with faculty members to make the change was successful but required intense research to facilitate the capstone defense promptly. Multiple search engines including but not limited to Google Scholar, Wiley Online Library, Pub Med, and Research Gate, to

research treatments for pain using non-pharmacological means, and the efficacy of these approaches were reviewed. In addition, I reviewed the curriculum listed on some school websites was completed to determine if there were any classes exclusively on the treatment of pain. Unfortunately, I could not locate courses focused on the anatomy, assessment, and treatment of pain. As a result, I determined it was essential to develop a course to prepare entry-level occupational therapy students to assess and treat patients with a complaint of pain.

### **Curriculum development**

The capstone project is titled "The Occupational Therapy Approach to Pain Treatment: A Pain Curriculum." The capstone defense was presented to the graduate committee members, Dr. Janeene Sibla and Dr. Donna Costa, in November 2021, at which time I received committee approval. Writing a curriculum was a daunting process, but I focused on developing a curriculum that would adequately prepare students to address the pain experience of the patient population. I began the process by creating goals for the program and defining the course objectives (Appendix A). Then, I reviewed the Accreditation Council for Occupational Therapy Education (ACOTE) standards to meet the program's educational requirements (Appendix B). The material needed to cover the multi-contextual factors that impact pain to improve the students' understanding of their role in assessing and treating the condition. Research on pain and its impact on functional performance was reviewed from multiple websites, including but not limited to Research Gate, Pub Med, Academic Search Premier, and Google Scholar, and an outline of the modules was formulated from the research (Appendix C). The course content was purposefully designed to inform students of pain mechanisms and the factors impacting patients' pain experience and challenge their clinical reasoning related to pain management through case



application. As a result, the order of the modules was changed multiple times with the intent to have the material flow seamlessly to the next topic.

### **The Person-Environment Occupation (PEO) Frame of Reference**

The theoretical approach used in developing this capstone is the Person, Environment, and Occupation Frame of Reference (PEO). The theory of PEO focuses on the interaction between the listed domains, which are interdependent and change across the lifespan. (Occupational Therapy & Arthritis | Arthritis NSW, 2021) The model is the framework for communication between the therapist and patient, resulting in a thorough assessment of the patient's occupational performance and influencing the choice of interventions. The model has guided interventions across the age continuum in pediatric settings, rehabilitative services, and mental health. The application of the PEO Model is multi-faceted, but it helps therapists identify, explain, and implement interventions with functional applications (Strong et al., 1999).

The PEO model considers the person's view of the interconnectedness of their experience, environmental interaction, and their occupation. The person's perception of the quality of the experience changes over their lifespan as it is affected by age, health, and immediate environment. The PEO model operates on the assumption that the person and the environment are interdependent, and individual behaviors are not separate from the environment in which the behavior takes place (Maclean et al., 2012). The PEO considerations can guide therapeutic interactions leading to a collaboration between therapist and patients to improve functional performance (Strong et al., 1999).

The PEO model effectively assesses individuals' challenges in achieving optimal function within various environmental contexts. Using this model, the occupational therapist can evaluate a person's environment and determine how their interaction within the environment impacts their

functional performance. Analyzing how the person's function is affected by interacting within the environment is essential in identifying and implementing the appropriate intervention. The curriculum was designed to educate the occupational therapy students on pain due to its prevalence as a diagnosis for patients seeking medical intervention. Pain education and strategies addressed children and adults with methods and techniques to mitigate its effects and improve functional performance in their environment. The expectation is that patients will report less pain after education and treatment from therapists familiar with the course material.

### **Timeline for Developing the Modules**

The modules for the course were developed using the textbook and the studies amassed from the research on the topic of pain (See Table 1). The textbook was chosen in collaboration with a member of my graduate committee, Dr. Donna Costa, to complement the course materials. The textbook *Pain: A textbook for health professionals* was last updated in 2014 and was the most comprehensive book on the topic that could be found. Therefore, it was helpful to review the book's contents and include current research available on pain. The course outline was modified, and book chapters were assigned to provide the students with a reference from which they were tested (See Appendix D).

Compiling the research and the information from the text into a PowerPoint presentation was challenging. It was not the same as the guest speaking presentations, where I used the topic of the presentation and shared what I thought was pertinent. The information needed to resonate with the students as vital points for recall and essential to clinical practice.

**Table 1: Curriculum Development Timeline**

Curriculum Development Timeline	Start date	End date
Idea Development	08/01/2021	08/01/2021
Choosing a Capstone Topic	09/02/2021	09/02/2021
Capstone Topic Defense	10/22/2021	12/02/2021
Collaboration with Graduate Committee Member and Mentor on content	09/01/2021	11/21/2021
Creating Goals/Objectives	09/04/2021	09/10/2021
Research - Literature Review	09/10/2021	03/30/2022
Creating Course Content	12/05/2021	01/23/2022
Writing Case Studies	12/05/2021	01/23/2022
Approval of Content	01/25/2022	01/25/2022
Class Instruction Begins	01/24/2022	01/24/2022
Capstone Presentation	04/05/2022	04/05/2022

### **Writing Case studies**

Developing critical thinking, clinical reasoning, and clinical judgment will lead occupational therapy students to become competent and effective clinicians. The terms are used interchangeably at times, but according to Victor-Chil (2013), there are differences in these concepts worth highlighting. First, critical thinking skills is used to evaluate the information available. Clinical reasoning is defined as using critical thinking skills in clinical situations to address patients' areas of concern. Finally, clinical judgment is the action taken to synthesize critical thinking and clinical reasoning to the clinical problem (Victor-Chil, 2013).

Upon completing a module for the course, an activity for applying the material was included. The task was carefully chosen to provide practice and determine how it could be best applied to meet patient needs. The application is provided to increase the students' comfort with the task and its relevance in the patients' treatment. The case studies were derived from my

interactions with past patients. More details on the medical history and test results allowed students to use critical thinking skills to create solutions. These opportunities for clinical applications are staged to allow the students to build confidence in using the strategies and influence the frequency with which the skills are implemented in fieldwork and future clinical practice (Allen & Toth-Cohen, 2019).

### **Teaching Pedagogy**

I placed much consideration on how to present the information to keep the students engaged while keeping in mind that they had a variety of learning styles. According to Hu (2020), effective instructors are cognizant of the many learning styles of students and vary the style of presentation to accommodate the students. In addition, making connections between theory and practice was essential to engagement in the classroom and for students to see the relevance of the shared information (Hu, 2020). Instructors with a strong command of the topic who allow students to share their opinions in class and opportunities to apply the knowledge demonstrate effective teaching.

Hu (2020) developed a study to understand what college students considered effective teaching. As a result, 14 participants in the study volunteered to share their views on teaching effectiveness in a video-recorded interview by responding to open-ended questions about effective teaching. The students shared similar beliefs that effective teachers use teaching methods adapted to meet the students' learning needs. In addition, they are engaging and approachable and allow students to share their opinions in class (Hu, 2020).

### **Case-based Learning**

Case-based learning was utilized in the classroom to ensure the proper application of theoretical material to practical applications. Case studies were used to practice the concepts

taught in the class for greater ease of application in a clinical setting. The students asked questions, and I guided the inquiry with open-ended questions to achieve the solution. This process engaged the entire class to respond and provide input to achieve a solution and, as a result, facilitated the development of their clinical reasoning skills.

Case-based learning (CBL) merits integration in the classroom as it fosters student engagement and is more enjoyable than the traditional lecturing format (Williams, 2005). CBL has been closely related to problem-based learning (PBL), an open inquiry approach with the student or group of students completing research independent of guidance to determine the problem and solution. In a comparison study, medical students and faculty members compared their perception of problem-based learning, and case-based learning, used in their curriculum. In the first through the program's third year, the medical students shifted from PBL (open inquiry) to CBL (guided inquiry). Ten months after the shift in learning approach, the faculty and students completed a 24-item questionnaire comparing the CBL and PBL approaches. Of the 255 students who completed the survey, 189 students chose CBL, and of the 26 faculty members, 18 chose CBL. The medical students believed CBL provided more opportunities to apply the skills they learned in practice settings. Faculty members chose CBL, citing that it was more effective and required less time for students to derive a solution (Srinivasan et., 2007).

### **Student-centered Teaching**

Student-centered teaching stresses the importance of the student in the learning experience and the consideration of their learning styles. To embrace this approach, I had to ensure that the student's prior knowledge of the topic was considered. I made some assumptions when covering topics like the "Neuroanatomy of Pain," knowing that Neuroanatomy was already addressed in the curricula. Questioning strategies were used to encourage class communication

and redirect questions so students could obtain their answers. Using scenarios in class to allow students to use critical reasoning effectively stimulated class discourse.

### **Class Instruction and Course Modifications**

I quickly learned that modifications of assignments would be needed as the course progressed. Time passed quickly, and the information planned for a class was not always covered because extended time was needed on the topic, resulting in more than one week to cover the material thoroughly. In addition, case studies were not always completed as assigned due to time constraints, resulting in group tasks being reassigned for individual completion. These adjustments meant I had to modify planned material for future sessions to ensure that pertinent topics were covered. Nevertheless, the focus remained to provide a rigorous program that increased the students' understanding of pain, the factors contributing to the pain experience, and pain management strategies (Bingolbali & Bingolbali, 2015).

### **Writing Test Questions**

Testing is a method used to assess students' understanding and application of learned material. However, the student's understanding of the material cannot be assessed accurately if the testing material is not well written. I have had little practice in writing test questions and sought resources to assist me in completing the task. I discovered the pros and cons of writing different questions and the benefits to the students when a variety of questions are used. True/False questions are easy to correct and require the recall of specific information. Multiple-choice questions are also easy to correct, test the recall of specific information, analyzing details and applications of the principles taught in the course. Short answer questions are easy to correct as the student must recall the information to have the correct response. Finally, essay questions are not easy to grade, but they allow students to demonstrate their understanding of the material.

As a result, I used all four types of questions in the quiz to provide an advantage to all students who may perform better with a specific type of questioning. In addition, it provided a clearer picture of the students who understood the information on the quiz.

### **Student Assessment of Course and Teacher Evaluation**

After week three, I issued the students an evaluation sheet to determine their perception of the course and whether my instruction style met their needs. Of the 35 students in the class, 30 students returned their evaluation sheets. I was eager to receive feedback so adjustments could be made in the course as needed. My main concern was to ensure the students would better understand the patients' pain experience and how these views can impact the patient/clinician collaboration process.

The classroom assessment was completed without forms of identification to provide a feeling of safety and comfort when completing the assessment. A few students collected all the completed evaluation forms at the end of the class and placed them face down on my desk. At the beginning of the class, I asked the students to be as honest as possible to help me improve the course content and adapt my teaching style to meet their needs. I hoped that the anonymity and my plea were enough to get the honest feedback I sought.

The instructor evaluation was favorable in all areas, so the students perceived a strong connection with my teaching style and connected the theoretical principles with practical examples (Figure 1). However, opportunities existed for improvement, particularly in time management. Adequate time was seldom left to allow for the group activities initially planned to practice the skills taught in class. In addition, there was not enough time to answer students' questions in class. Collaboration after class or texting chains were developed to answer questions and provide feedback on the content of the class, " The Neuroanatomy of Pain."

**Figure 1: Instructor Evaluation**

<b>Instructor Evaluation</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Dis-agree</b>	<b>Strongly Disagree</b>
Demonstrates an understanding of the subject matter by explaining concepts clearly	27	3		
Connect what is to be learned to student's prior knowledge and experience	27	3		
Use instructional strategies that help students	27	3		
Provides students with an opportunity to apply information and relate it to course intent	27	3		
Assess student learning and adapt teaching to student needs	23	7		
Provide constant feedback, and opportunities for questions to clarify work material	24	6		
Develop and effectively manage a collaborative classroom and encourages all students to participate	25	5		

Evaluation of the modules though favorable, demonstrated opportunities for improvement (Figure 2). The organization of the course material and adequate time to discuss the information was cited as areas in need of improvement. The survey used a 4-point Likert Scale to gauge the students' opinion of the class, and though they could share their opinion, it did not allow them to state how to make improvements. I was able to get ideas of how to improve the organization of the course work from questions that the students asked about reviewing for quizzes or tests. The



students wanted more congruence between the lectures and the text to determine where to focus when reviewing for tests. The creation of testing material should have been included when I prepared lecture content, making it easier at the time of student assessment. In addition, the responses from the survey implied that the students would have benefited from more time discussing and completing case studies in class to practice the skills introduced.

The students were also issued an assessment form to identify new concepts that they would use in their future practice. The responses for a large majority were very detailed, demonstrating some understanding and receptiveness to the course material. Some highlighted an understanding of how their perceptions of the patient and their pain are essential for an effective patient/clinician collaboration.

**Figure 2: Module Evaluation**

<b>Module Evaluation</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Dis-agree</b>	<b>Strongly Disagree</b>
The relevance of the course material to professional practice was explained	27	3		
The course material was organized	17	11	2	
The objectives reflected the material taught in the class	19	11		
The material was relevant for future professional application	24	6		
The information was organized and easy to follow	25	5		
There was opportunity to apply the information from the Module	21	7	2	
There was adequate time to discuss the information in the module	17	12	1	

## **Section Five: Discussion**

### **Proposed Course Improvement**

I have learned from this experience that teaching a course to future clinicians is two-fold, learning content and application of content. This pain course required much personal reflection. The student must become more attuned to their own implicit and explicit biases that will negate their intent to help patients improve. An important factor is an awareness of the social determinants of health and the health disparity that results in the challenge patients face in being compliant with recommendations. In addition, the student must be provided the opportunity to discuss these factors that are not in harmony with meeting the patient's goal in the classroom. Case studies to allow utilization of the skills discussed in the course, practicing assessments, writing goals, and planning treatments are integral to developing comfort in using the taught strategies.

It would be necessary to tailor the content in the lectures to an hour and allow more time for skills practice that would generate more student questions. Practice is essential for these students as they may be entering fieldwork with clinicians that are not knowledgeable in treating pain. The student will be able to implement these skills more readily if they have a sense of comfort with the topic and ease with utilizing the tools. This comfort would allow a more seamless transition from theory to practical application in clinical practice.

The text currently used for this course covers a wealth of information needed to provide well-rounded knowledge for the clinician. The text material should be streamlined to specific chapters and can be supplemented with research material that may reflect more updated resources where applicable. Using current research would also support students referring to more current information garnished from research in their practice. In addition, I would simplify the

information on pain transmission and inhibition and provide more opportunities to practice the explanation of the process using the PNE approach used to improve patients' understanding of pain.

### **Clinical Implications for Occupational Therapy Practice**

Occupational therapists' foundational principles are based on improving functional performance, where the person experiencing pain has the most deficit. With the increased number of patients seeking medical care due to chronic pain, the opportunity to address this concern is vital to ensure the patients maintain productive lives. Occupational therapists must increase their knowledge of pain to confidently address the patients' concerns providing more effective strategies to improve the quality of their lives. It is well documented that the quality of life of patients experiencing chronic pain is significantly lower than that of the population at large (Hadi et al., 2018). Chronic pain impacts patients' professional and personal lives, relationships, and social life, affecting mood and sleep. These disturbances are disruptive and lead to depression. Occupational therapists are prepared to assess the patient holistically, addressing social and psychosocial factors. Addressing the patient's experience with pain and relating it to contextual factors that are equally affected will significantly benefit our patients. Our documentation chronicling the impact of interventions will aid in validating methodologies used in treatment.

## **Conclusion**

The pain crisis has resulted in strategic initiatives outlined by multiple healthcare regulatory bodies to meet the exponential need of the general population. With over 50 million people seeking healthcare intervention to address pain, costing the healthcare system over 50 billion dollars annually, it has the attention of the healthcare community. Unfortunately, though the literature has outlined this crisis for more than two decades, our healthcare system and educational institutions have lagged in our preparation to meet the needs of our patient population. Consequently, heavy reliance on prescription medications, heroin, and synthetic opioids has resulted in a crisis of epic proportions leaving our healthcare system floundering to overturn the devastating effects on our patient population.

The educational system continues to be slow in preparing healthcare professionals for assessing and managing pain symptoms. The literature has supported the development of pain curricula in health professional programs to prepare practitioners better to evaluate and treat patients and reduce reliance on opioids to manage pain. However, healthcare providers have a limited understanding of the mechanisms of chronic pain because minimal education on the topic is offered in professional programs. In addition, most undergraduate and postgraduate health programs' curricula have a narrow focus on pain in the coursework. The lack of emphasis on pain is evident as there is limited focus on competencies related to pain during the accreditation process of healthcare professionals.

The Center for Medicare and Medicaid Services (CMS) is slowly expanding reimbursement to cover non-pharmacological approaches to chronic pain. However, the opioid crisis has highlighted the importance of a multimodal approach that includes alternative therapies to treat pain. In addition, research continues to stress the importance of education of health

professionals to be better prepared to educate patients on pain management strategies. For this reason, the pain course would be timely in preparing entry-level occupational therapy students to assess and provide interventions while addressing the patients' quality of life and functional performance.

The designed curriculum for the capstone educated entry-level occupational therapy doctoral students on pain due to its prevalence as a diagnosis for patients seeking medical intervention. The students considered the interwoven environmental factors that influence the person's pain perception to identify treatment strategies to improve functional performance. The education on pain addressed children and adults with methods and techniques to mitigate the effects of pain and improve functional performance in their environment.

Though education is a critical factor, documentation to support the benefits of pain management strategies is needed to validate the approaches employed. Continued research will be required to determine the strategies' effectiveness and to validate their continued use as practical tools for pain management. Occupational therapists are expected to be lifelong learners and are dedicated to expanding our knowledge on effective evidence-based practice interventions to promote the best outcomes (Briggs, 2012). We must also validate our practice by documenting the effectiveness of our interventions. Most importantly, collaboration should exist between disciplines to address the patient's pain, thus highlighting the importance of interdisciplinary collaboration.

## **Appendix A: Goals for the Capstone**

On completion of the course curriculum, entry-level occupational therapy doctoral (OTD) students will:

1. Demonstrate an understanding of the neuroscience of pain.
2. Identify non-pharmacological strategies for pain.
3. Compare the benefits of different non-pharmacological strategies for use within a case study application.
4. Choose and utilize assessment tools for evaluating pain from a simulated activity and case study.
5. Demonstrate an understanding of documenting a pain assessment and goals for treatment from a case study or simulated activity.

### **Objectives**

Entry-level occupational therapy doctoral students will be able to:

1. Apply the principle of neuroscience in case studies or simulated activities.
2. Select the appropriate non-pharmacological strategies for use in a case study or simulated activity.
3. List the pros and cons of using a chosen activity from a case study example.
4. Identify the benefits of using specific pain tools for pediatric or adult population.
5. Develop pain goals from a simulated activity or a case study.

## **Appendix B: ACOTE Standards**

### ***B.1.2. Sociocultural, Socioeconomic, Diversity Factors, and Lifestyle Choices***

Apply, analyze, and evaluate the role of sociocultural, socioeconomic, and diversity factors, as well as lifestyle choices in contemporary society to meet the needs of persons, groups, and populations. Course content must include, but is not limited to, introductory psychology, abnormal psychology, and introductory sociology or introductory anthropology.

### ***B.1.3. Social Determinants of Health***

Demonstrate knowledge of the social determinants of health for persons, groups, and populations with or at risk for disabilities and chronic health conditions. This must include an analysis of the epidemiological factors that impact the public health and welfare of populations.

### ***B.1.4. Quantitative Statistics and Qualitative Analysis***

Demonstrate the ability to use quantitative statistics and qualitative analysis to interpret tests and measurements for the purpose of establishing and delivering evidence-based practice.

### ***B.3.2. Interaction of Occupation and Activity***

Apply, analyze, and evaluate the interaction of occupation and activity, including areas of occupation, performance skills, performance patterns, context(s) and environments, and client factors.



### ***B.3.3. Distinct Nature of Occupation***

Explain to consumers, potential employers, colleagues, third-party payers, regulatory boards, policymakers, and the general public the distinct nature of occupation and the evidence that occupation supports performance, participation, health, and well-being.

### ***B.3.4. Balancing Areas of Occupation, Role in Promotion of Health, and Prevention***

Apply, analyze, and evaluate scientific evidence to explain the importance of balancing areas of occupation; the role of occupation in the promotion of health; and the prevention of disease, illness, and dysfunction for persons, groups, and populations.

### ***B.3.5. Effects of Disease Processes***

Analyze and evaluate the effects of disease processes including heritable diseases, genetic conditions, mental illness, disability, trauma, and injury on occupational performance.

### ***B.3.6. Activity Analysis***

Demonstrate activity analysis in areas of occupation, performance skills, performance patterns, context(s) and environments, and client factors to formulate the intervention plan.

### ***B.5.2. Advocacy***

Identify, analyze, and advocate for existing and future service delivery models and policies, and their potential effect on the practice of occupational therapy and opportunities to address societal needs.

## Appendix C: Course Outline

### 1. Introduction

- Statistical information of pain reported in the population.
- The Occupational therapy role in chronic pain management
- A summary of the American Occupational Therapy Association (AOTA) position paper on pain.
- Movement improves functional Performance
- Educational programs on pain management.

### 2. Pain Theory Models and Pain Beliefs

- Review the various models and their contributions to increasing knowledge of the pain process.

#### i). Specificity Theory

#### ii) Pattern Theory

#### iii) Gate Control Theory

#### iv). Neuromatrix Model

#### vi). Biopsychosocial Model

- The impact of cultural beliefs on functional performance.

### 3. Social Determinants of Health (SDOH) and its Contributions to Patients Experiencing Pain

- The impact of demographic, psychological and socioeconomic factors on reports of chronic pain.

- The impact of income, educational level and employment on the patients' report of pain.
- How Improving knowledge of SDOH helps healthcare professionals promote more positive outcomes for their patients.

#### 4. Neuroanatomy of Pain

- The Nociceptive Process
- The Ascending Tract
- The Descending Tract
- The Neuropsychology of pain – Acute to Chronic pain

#### 5. Pain Assessment Tools and Documentation

##### i) Adults

- Patient interview
- Review various tools used to assess pain
- Documentation

#### 6. Pain Neurophysiology Education (PNE)

- What is PNE?
- Explaining the pain mechanism to Adult patients
- Avoiding pain triggers
- Patient response to pain neurophysiology education

## 7. Traditional approaches to Pain Intervention in Occupational therapy

- Review different types of pain interventions and the research to support their effectiveness.
- Exercise
- Manual Therapy
- Physical Modalities
- Thermal Modalities

## 8. Complementary Treatment for Pain

- Review alternative approaches for pain and their effectiveness
- Yoga & Tai Chi
- Acupuncture
- Aromatherapy
- Music Therapy
- Meditation

## 9. Pain in Children

- Parent and patient interview
- Assessment tools
- Documentation
- Explaining the pain mechanism to pediatric patients

## 10. Pain in the Elderly population

- Chronic Pain
- Pain Assessment
- Treatment strategies
- Assessing the patient with Dementia
- Impact of implementing pain management strategies

### Appendix D: Instructor Evaluation

<b>Instructor Evaluation</b>	Strongly Agree	Agree	Dis-agree	Strongly Dis-agree
Demonstrates an understanding of the subject matter by explaining concepts clearly				
Connect what is to be learned to student's prior knowledge and experience				
Use instructional strategies that help students				
Provides students with an opportunity to apply information and relate it to course intent				
Assess student learning and adapt teaching to student needs				
Provide constant feedback, and opportunities for questions to clarify work material				
Develop and effectively manage a collaborative classroom and encourages all students to participate				

### Appendix E: Course Evaluation

<b>Course Evaluation</b>	Strongly Agree	Agree	Dis-agree	Strongly Dis-agree
The relevance of the course material to professional practice was explained				
The course material was organized				
The objectives reflected the material taught in the class				
The material was relevant for future professional application				
The information was organized and easy to follow				
There was opportunity to apply the information from the Module				
There was adequate time to discuss the information in the module				

## Appendix F: Pain Knowledge Assessment

### Pain Knowledge Assessment

1. Identify one strategy that can be implemented when treating a patient with pain that you learned from the course.

2. What skill have you learned from the course that improved your ability to work with patients experiencing pain.

3. Identify an assessment tool or a treatment intervention introduced in the course that you did not know previously.



## **Appendix G: Revised Course Outline**

### **The Occupational Therapy Approach to Pain Treatment: A Pain Curriculum**

Week 1/Module 1	Intro to Pain and Social Determinants of Pain
Week 2/Module 2	Neurophysiology of Pain
Week 3/Module 3	Pain Neuroscience Education
Week 4/Module 4	Pain Assessment (Adults and Children)
Week 5/Module 5	Pain Assessment and Administer the Pain Catastrophizing Scale to Peers
Week 6/Module 6	Psychological Interventions for Pain
Week 7/Module 7	Activity Pacing and Case Study
Week 8/Module 8	Virtual Reality for Pain
Week9/Module 9	Pain Pharmacology, PAMS for Pain and Medication Management
Week10/Module 10	Neuropathic pain, CPRS and Cancer Pain
Week 11/Module	Exercise and Manual therapy for pain
Week 12/Module	Chronic Low Back Pain

## Appendix H: Neuroanatomy of Nociceptive System PowerPoint Lecture

### Overview

Pain is a signal alerting the body of possible harm.

- The response – to protect from further injury.
- Pain signals are transmitted by sensory nerve endings called nociceptors (pain receptors) that make contact with a painful or noxious (harmful) stimuli.
- The nerve impulse moves from the sensory nerve ending to the spinal cord where this impulse is quickly sent to the brain via nerve tracts in the spinal cord and brainstem.
- The brain processes the information and responds with a motor response to stop the action causing the pain.

### Types of Afferent Neurons

There are three types of afferent neurons in the nociceptive pathway:

- Primary sensory neurons
- Secondary sensory neurons
- Tertiary sensory neurons

### Afferent neuron

- Afferent neurons (takes information from the the sensory receptors of the skin and other organs to the central nervous system (brain and spinal cord))

### Efferent Neurons

- Motor neurons that carry neural impulses away from the central nervous system and towards muscles to cause movement.

## Interneurons

- Interneurons relay the signals between afferent and efferent neurons.
- Primary sensory neuron (afferent neuron).

## Secondary sensory neuron.

- Located in the spinal cord or brain stem
- Transmits the painful sensation to the thalamus

The thalamus processes the nociceptive information before transmitting the information to the somatosensory areas of the cerebral cortex

## Tertiary sensory neurons

- Locates pain and assess the intensity of the pain transmitted.
- Transmits pain sensation from the thalamus to the somatosensory areas of the cerebral cortex.

The somatosensory area located in the postcentral gyrus of the parietal lobe and lies behind the primary motor cortex of the frontal lobe.

## Nerve fibers associated with pain

1. Unmyelinated C fibers
2. Myelinated A-delta fibers

## Unmyelinated C fibers

- They are small and conduct impulses very slowly.
- Nerve endings spread over a large area.
- Difficult to pinpoint pain location

They respond to:

Thermal - heat or cold

Mechanical - overstretch of a muscle fiber, over-rotation of a joint

Chemical - change occurring as a result of taste (gustatory) or smell (olfactory) receptors.

#### Unmyelinated fibers

- Do not contain a myelin sheath
- Slower conduction of nerve impulses
- Gray in color
- Most axons are short
- Do not consist of nodes of Ranvier
- Found in the CNS (brain and spinal cord) and in the post-sympathetic nerve fibers of the PNS (nerves and ganglia outside the brain and spinal cord).
- Can lose nerve impulse during conduction

#### Myelinated A-delta fibers

- Conduct impulses quickly.
- Respond to mechanical stimulus (pressure).
- Produce pains sensation that is localized (maximum pain experienced in a specific area).
- Pain is experienced quickly and is usually sharp.

#### Myelinated fibers

- Insulated by myelin sheath (fatty white substance)
- White in color
- Most of peripheral nerves is myelinated
- Transmission of nerve impulses occur through nodes of Ranvier so transmission is fast (high speed)
- They have longer axions

- There is less loss of impulse during conduction of nerve impulses

#### Myelinated & Unmyelinated Nerve fibers

- Both found in the nervous system
- Myelinated – contain myelin insulation
- Unmyelinated- does not contain myelin insulation

#### Anatomy of a Neuron (Nerve cell)

Cell body (Soma) - Nucleus found in the soma; protein synthesis occurs; proteins are made

Dendrites - Receives and processes incoming information (excitatory or inhibitory)

Axon - Carries nerve impulses away from the body.

Myelin - insulating substance that helps to convey nerve impulses quickly.

Axon terminal - Found at the end of axons with stored neurotransmitters to communicate with other neurons

Nodes of Ranvier – non-myelinated portions of the nerve fiber

Synapse – the site where nerve impulses between two nerve cells take place.

#### The Spinothalamic Tract

- The most important central pain pathway
- Originates in the spinal cord
- Extends to the thalamus
- Carries nociceptive, temperature, crude touch and pressure from skin to somatosensory area of the thalamus.
- Responsible for quick withdrawal response. (Al-Chalabi et al., 2021)

## The Spinoreticular Tract

- Involved in nociceptive processing.
- Responsible for increasing our level of arousal/alertness in response to pain or temperature.
- Stimulated similarly to the spinothalamic tract by sensory fibers but ascends and ends in the brainstem.

The Spinothalamic, spinoreticular and the spinomesencephalic tract make up the anterolateral system which is responsible for perception of pain starting from the nociceptors of our skin.

## Pain Mechanism

Pain can be caused by:

- Mechanical
- Chemical or Inflammatory
- Thermal
- Mechanical origin
- Acute trauma, injury or overuse; may be constant, intermittent or variable
- Affected by movement and position

When you have pain that comes and goes or changes with different movements and/or positions it is mechanical.

- Ex. Stretching your calf muscles, release it the pain goes away.

## Thermal origin

- Excessive heat or cold

## Pain Mechanism

- Chemical or Inflammatory origin

- Arthritis, or other inflammatory disorders.
- Constant but responds to therapy, rest, positioning and gentle movement

Managing condition usually includes the use of medication.

Body's response is to release chemicals from the blood to start the healing process.

Neuroimaging to help understand pain

- CT (computed tomography)
- MRI (magnetic resonance imaging)
- PET (positron emission tomography)

Allowed researchers to look into the brain and study the brain and learn how pain affects different parts of the brain.

Research has shown structural pathological changes in the brain of patients who experienced chronic low back pain. (Kong et. al. 2013)

The Ascending Pathway

- Primary sensory neuron responds to noxious stimuli (stepping on a nail with the left foot); transmitting impulses to Dorsal Horn.
- The primary neuron synapses with the Secondary Neuron, by releasing Substance P in the synaptic cleft.
- Substance P stimulates the Secondary Neuron which crosses to the right side of the spinal cord and goes up the Spinothalamic tract through the Brain stem to the Thalamus.

- The secondary neuron synapses with the tertiary neuron which takes the information to the somatosensory areas of the cerebral cortex to the right side.

#### Descending pain pathway

- Dorsal Horn of Spinal cord is important
- Gate control for pain (Called the Substantia Gelatinosa)

#### Ascending pathway

- Primary sensory neuron responds to noxious stimuli transmitting impulses to Dorsal Horn and synapses with Secondary Neuron, releasing Substance P in the synaptic cleft. Substance P stimulates the Secondary Neuron to spread the impulses to the Thalamus via the Spinothalamic tract.

#### Descending Pathway

- The descending pathway passes through the brainstem which is comprised of the Midbrain, Pons and Medulla.

#### Important areas of the descending pathway include:

- Periaqueductal Gray matter – Midbrain
- Nucleus Raphe Magnus of the Medulla

When they are working correctly, the neurons from the Gray matter travel down to the Nucleus Raphe Magnus in the Medulla and synapse with a 2nd neuron which is a Serotonergic/ Noradrenergic, travelling down to the Dorsal Horn of the Spinal Cord to inhibit the communication between the 1st and 2nd afferent sensory neurons of the Ascending pathway which help to control the pain signals going up the Ascending Pathway.

#### Dorsal Horn

- The Serotonergic and noradrenergic chemical perform two actions:



- 1) Bind receptors on the presynaptic neuron (1st /primary afferent sensory neuron in the Dorsal Horn and inhibit the release of Substance P.
- 2) Stimulate a small neuron (called an interneuron) in the Dorsal Horn (also called the Substantia Gelatinosa).

The interneuron is an opioid neuron. When it is stimulated it releases the opioid within it. It is called Enkephalin.

### Enkephalin

Enkephalin does two things:

- 1) Inhibit presynaptic neuron from releasing Substance P.
- 2) Inhibit post synaptic neuron from depolarizing (firing an electrical impulse), therefore stopping the continuous transmission of impulses to the Thalamus.

### Review Questions

- A) List the three tracts that make up the anterolateral system?
- Spinothalamic, spinoreticular and spinomesencephalic tracts.

- B) What is the function of the myelin sheath?

- Receive an electrical signal from other neurons.
- Deliver signals via neurotransmitters to other neurons.
- Provide support and nutrients for neurons.
- Speed up the rate of transmission within a neuron.
- Connect and hold a neuron together.

- C) While walking barefoot in the park, Anne stubbed the left big toe on a rock. Describe clearly how the nociceptors transmits the signal to the brain, clearly labeling the type of neurons that participate in the process.
- Afferent Primary Sensory neuron receives the stimuli and transmits the impulse to the Dorsal Horn of the spinal cord (left side)
  - The 2nd motor neuron receives the transmission at the Dorsal Horn and crosses to the right side of the spinal cord and travels to the Thalamus via the Spinothalamic Tract.
  - The 3rd motor neuron receives the information from the 2nd motor neuron and transmits the information to the right side of the Somatosensory cortex of the brain.

## Glossary

Afferent: Travelling from the periphery to the spinal cord (dorsal horn).

Depolarize: Loss of difference in charge between the inside and outside of the cell.

Dorsal horn: The route into the spinal cord that (most) sensory nerves take towards the back of the cord.

Interneuron: Connect two brain regions (they are not direct sensory or motor neurons).

Nerve: A bundle of axons (the long conduction cables of neurons), can include a number of different types of neurons.

Neuron: a cell that, when excited by a stimulus, produces an electrical or chemical signal (often used interchangeably with nerve).

Neurotransmitters: chemicals that carry signals between one nerve cell and another (amino acids or proteins that provide the key to receptor locks).

Nociceptor: a peripheral sensory neuron that can respond to noxious stimuli.

Noxious (stimulus): harmful or potentially harmful stimulus - can be immediately harmful or harmful if left for a relatively long time (for example high temperature or long-lasting medium-high temperature).

Primary afferent fiber: a term used for all sensory neurons arriving in the dorsal horn but usually meaning those carrying pain signals (A-delta and C fibers).

Stimulus: something that causes a physiological response (single stimulus, plural stimuli).

Synapse: small space between one nerve cell and another across which an electrical or chemical signal is passed.

Synaptic cleft: The tiny space between two nerve cells across which the neurotransmitter diffuses.

Terminal: an ending, usually the end of the sensory nerve in the spinal cord.

Threshold: the lowest stimulus intensity that evokes pain.

Visceral: of the (internal) organs.

## References

- Al-Chalabi, M., Reddy, V., & Gupta, S. (2021). Neuroanatomy, Spinothalamic Tract. In [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov). StatPearls Publishing.  
<https://www.ncbi.nlm.nih.gov/books/NBK507824/?report=reader>
- Contributor, N. T. (2015, September 21). Pain management 1: physiology - how the body detects pain stimuli. Nursing Times. <https://www.nursingtimes.net/clinical-archive/pain-management/pain-management-1-physiology-how-the-body-detects-pain-stimuli-21-09-2015/>
- Hasudungan, A. (2013). Nociceptors - An Introduction to Pain. In YouTube.  
<https://www.youtube.com/watch?v=fUKlpuz2VTs>
- Kong J, Spaeth RB, Wey H-Y, et al. (2013). S1 is associated with chronic low back pain: A functional and structural MRI study. *Molecular Pain* 9:43. Doi:10.1186/1744-8069-9-43. Retrieved January 22, 2022 from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3765748/>.
- PAIN! Physiology - The Ascending Pathway, Descending Pain Pathway and the Substantia Gelatinosa. (n.d.). [Www.youtube.com](http://www.youtube.com). Retrieved November 21, 2021, from <https://youtu.be/5c8maFAhqIc>
- Steeds, C. E. (2013). The anatomy and physiology of pain. *Surgery (Oxford)*, 31(2), 49–53. <https://doi.org/10.1016/j.mpsur.2012.11.005>

## Appendix I: Neuroanatomy of Pain Test Questions

1. Unmyelinated nerve cells provide information on the exact location of an injury.

- a) True
- b). False

2. What is the function of the Descending pain pathway?

---

3. Where do the primary sensory neurons synapse with secondary sensory neurons?

---

4. Cliff is chasing a frog across the playground and twists his left ankle. Outline in detail the pathway for pain transmission to the brain. Please include the neurons (motor, sensory, myelinated, or unmyelinated) in the transmission process.

5. What are two functions of Enkephalin?

- a). \_\_\_\_\_
- b). \_\_\_\_\_

6. \_\_\_\_\_ neurons transmit signal from the brain to the spinal cord.

- a) Afferent motor
- b) Afferent sensory
- c) Efferent sensory
- d) Efferent motor

7. Unmyelinated nerve cells provide information on the exact location of an injury.

- a) True
- b). False

8. What is the function of the Descending pain pathway?

---

9. Where do the primary sensory neurons synapse with secondary sensory neurons?

---

10. Cliff is chasing a frog across the playground and twists his left ankle. Outline in detail the pathway for pain transmission to the brain. Please include the neurons (motor, sensory, myelinated, or unmyelinated) in the transmission process.

11. What are two functions of Enkephalin?

- a). \_\_\_\_\_
- b). \_\_\_\_\_

12. \_\_\_\_\_ neurons transmit signal from the brain to the spinal cord.

- a) Afferent motor
- b) Afferent sensory
- c) Efferent sensory
- d) Efferent motor

## Appendix J: Activity Pacing PowerPoint Lecture

### Objectives

At the end of this module, you will be able to:

1. Define activity pacing.
2. Implement activity pacing in a plan of treatment.
3. Determine the baseline for an activity and develop a progressive activity plan.
4. Write short-term and long-term goals for patient's treatment plan from case studies.
5. Educate patient in a role-play case scenario, on the techniques/strategies of activity pacing and its benefits.

### Activity pacing defined

Activity pacing is the adjustment made to activity levels in the pursuance of attaining a modified goal. (Pacing and Goal Setting - Pain Management - painHEALTH, 2021)

### Purpose of activity pacing

To help achieve the modified goals **NOT** to avoid activity.

Two parts to activity pacing:

Energy conservation (participate in activities that have personal value for example spending time with family, taking part in a recreational activity that is enjoyable).

Activities are graded to gradually increase task performance to the person's activity tolerance and reduce disability. (*Pacing and Goal Setting - Pain Management - painHEALTH, 2021.*



## **The Effect of a Tailored Activity Pacing Intervention on Pain and Fatigue for Adults with Osteoarthritis**

In a study by Murphy et. al., (2010), the study examined the effects of activity pacing on reducing pain and fatigue of 32 patients with knee or hip osteoarthritis. They were of mixed age and gender and assigned to random groups receiving either a tailored or general activity pacing program. They met with an OT for two one-on-one sessions for a total of 1.5 hours over a 2-week period. Both groups received education on general principles of activity pacing, but the tailored group, the recommendations were based on the patient's personalized report of activities and education targeted the activity and impact on their symptoms. All participants had similar functional abilities and activity level.

### **Results**

There was a baseline assessment and 10-week follow up. The participants wore a wrist accelerometer (any device that measures activity – Apple watch). Both groups reported pain reduction and there was no significant difference in the pain reduction of both groups.

**Note:** The tailored group reported a greater positive impact on their fatigue level.

### **How to manage pain using activity pacing**

1. Use as a planned strategy.
2. Add a graded activity designed to increase the level of activity.
3. Use activity measurements to grade performance (time, repetitions, distance)
4. Do **NOT** use pain as the means to measure engagement in task performance.

### **Does pain equal harm?**

- If a tissue has been injured, pain can linger after the tissue has healed.
- A complete assessment to determine the origin of the pain is required to properly address

pain in treatment.

- Since many factors can exacerbate the pain experience, a thorough assessment is required to implement the appropriate treatment method.

### **Case Example**

#### **Case Study A**

A 38-year-old male with complaints of chronic low back pain and leg pain, was involved in a car accident 3 years prior. Patient reports that before his accident he walked 5 miles daily and walked without an assistive device. He now walks with a front-wheeled walker and is able to walk 50 feet before taking a rest break. He uses a manual wheelchair for community mobility. Patient recently had Magnetic Resonance Imaging (MRI) of his lower but there were no findings that explained the reason for his pain.

### **Case Example**

#### **Case Study B**

Phyllis is 68 years of age and had elective knee surgery 3 days ago. Phyllis reports pain of 7/10 at rest and 10/10 during transfers. Pain medication effectively reduces pain level to 4/10 at rest and Phyllis can tolerate the pain at this level.

#### **When is activity pacing used in treatment?**

Activity pacing is beneficial in the treatment of both acute and chronic pain. Understanding the origin of the pain is imperative in providing the best treatment and achieving positive outcomes.

#### **When is activity pacing used in treatment?**

Activity pacing is beneficial in the treatment of both acute and chronic pain but understanding the origin of the pain is imperative in providing the best treatment and achieving positive outcomes.

### **Step One - Determine the baseline**

- Determine the baseline for task performance. (How long can the patient do the task before experiencing a pain flare). **Note: -It is normal to experience pain after activity , lasting for about 20-30 minutes. This is not a pain flare.**
- Collaborate with the patient to identify the symptom that limits their activity the most. The baseline for task performance is set on this activity. (Example: - fatigue, pain).
- Write the frequency or the distance in which the patient performs the task before feeling fatigue.
- For each activity performed, take 3 measures over 3 days.
- Take an average of the measures. (Add the 3 measures together then divide that number by 3).
- Reduce that average by 20 % or multiple by .80 to determine the number of times or distance the task should be performed the first week.

### **Step two - Perform the task.**

### **Step three - Increase performance by 10% each week.**

### **Step four - Use SMART goals to increase activity level.**

### **Step five - Manageable Chunks**

- Perform activities in small chunks – facilitates improved activity tolerance.
- Change positions, adjust posture (sitting, walking, standing).
- Following these steps decreases opportunity for pain flares.

### **Step Six - Planned rest breaks**

### **Setting Goals**

- Prioritize goals – things that are determined to be most important (personal)

- Complete tasks that are most important (personal)

Examples -: relationship with partner, spending time with children, read, cook for family, personal health).

**Note:** Plan activities to avoid performing too many tasks at once and becoming exhausted.

### **Record important tasks**

- Write down tasks and organize in order of importance.
- The task with the highest priority will be the focus of the day for completion.

### **Distribute Tasks to reduce Stress**

## **Case Studies**

### **Case Study 1 – David**

David is 38 years old and an electrician. He gets low back pain at the end of the day. He needs to sit for at least an hour to do his invoices on his laptop in the evenings. He is usually able to watch TV and read books without a pain flare, as he gets up at least every 30 minutes to move about. What would be your recommendations using activity pacing, to reach his goal of 1 hour to complete his activity?

### **Daily walk**

David decides that as his back pain is improving, he would like to work on his health and start a daily walk.

**Baseline:** David thinks he would be able to walk 30 minutes, but as he hasn't done this for a while he walks 10 minutes on Day 1 without a pain flare. On Day 2, he walks 20 minutes, with an increase in pain for 2-3 hours, so this is too much. On Day 3, he walks 14 minutes with some increase in his pain for 20 minutes.

## **Case Study 2: Fred**

Example 2. Fred is a 48 years old farmer with low back pain. His pain increases after he walks more than 20 minutes. Fred is usually able to walk once per day because of his long recovery period. Fred has been advised to walk 30-40 minutes every day to improve his health. What is the best recommendation for activity pacing for Fred?

Write a SMART Goal for each case study application.

## References

- Antcliff, D., Keeley, P., Campbell, M., Woby, S., Keenan, A.-M., & McGowan, L. (2018). Activity pacing: moving beyond taking breaks and slowing down. *Quality of Life Research*, 27(7), 1933–1935. <https://doi.org/10.1007/s11136-018-1794-7>
- Antcliff, D., Keenan, A.-M., Keeley, P., Woby, S., & McGowan, L. (2021). Testing a newly developed activity pacing framework for chronic pain/fatigue: a feasibility study. *BMJ Open*, 11(12), e045398. <https://doi.org/10.1136/bmjopen-2020-045398>
- Murphy, S. L., Lyden, A. K., Smith, D. M., Dong, Q., & Koliba, J. F. (2010). The Effect of a Tailored Activity Pacing Intervention on Pain and Fatigue for Adults with Osteoarthritis. *The American Journal of Occupational Therapy: Official Publication of the American Occupational Therapy Association*, 64(6), 869–876. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3655423/>
- Pacing and Goal Setting – Pain Management – painHEALTH. (2021, July 19). Government of Western Australia, Department of Health. <https://painhealth.csse.uwa.edu.au/pain-module/pacing-and-goal-setting/>

## **Appendix K: Exercise and Manual Therapy**

### **Exercise and Manual Therapy**

#### **Objectives**

At the end of this module, the student will be able to:

Identify the benefits of manual and exercise therapy.

Identify considerations to designing an exercise program.

List the factors affecting adherence to an exercise program.

Identify the psychosocial factors to be addressed before implementing manual therapy.

List the benefits of manual therapy.

Apply knowledge of pain to complete a case study.

#### **Exercise**

Used for chronic musculoskeletal pain (pain lasting longer than 12 weeks – lasting longer than normal tissue healing time (Geneen & Moore, 2017)

- Most common types back, neck, knee, hand.

Many years ago, recommended treatment was rest and inactivity.

Exercise benefits:

- Physical health
- Mental health
- Improved physical function

Evidence for exercise therapy

Geneen & Moore (2017), completed a Cochrane Database of Systematic Reviews, selecting randomized controlled trials (RCTs) of painful conditions using exercise or physical activity as an intervention.

Studies included a variety of conditions (osteoarthritis, low back pain, intermittent leg cramps, dysmenorrhea (period pains), neck pain.

Interventions: Land and water-based exercises focused on building strength, flexibility, range-of-motion, core or balance training, yoga, Pilates and tai chi.

Results – Some positive reports of pain reduction and the evidence suggests pain improvement (reducing severity) and improved physical function and thus quality of life.

### **Exercise defined**

- Planned physical movement
- Posture, activities to prevent impairment
- Enhance functional fitness and wellbeing

### **Question**

What are some goals that may be attained by assigning therapeutic exercises to a patient experiencing pain?

### **Goal of therapeutic exercise for musculoskeletal pain**

- Reduce pain
- Improve function
- Increase muscular strength
- Endurance or motor control
- Improve range of motion or flexibility
- Help with coordination or balance

### **Goals**

What is the first step to developing goals for a patient?



Collaboration

**Goals are created in collaboration with the patient.**

Considerations for Developing an Exercise Program

### **Exercise Program Design Variables**

Considerations when designing a program

1. Specificity - Exercise targets the muscle intended.
2. Overload - Exercise beyond a normal level to have an effect.
3. Adaptation - Muscle will adjust to the overload if increased until it reaches its capacity.
4. Individuality - Program must be designed specifically to meet the individual needs and capabilities.
5. Reversibility – Effects are easily lost when exercise stops and occurs within the similar timeframe it takes to train the system.

Patient Psychological factors

Psychological factors that predict patient participation in exercise program-:

- Motivation
- Self-efficacy (belief in capacity to execute behaviors necessary to produce specific results)

Patient education to address unhelpful beliefs, promote confidence and motivation to exercise, will be necessary prior to engagement in the program.

Clinical Guidelines for Low Back Pain

- Exercise is most widely used for this condition.
- Systematic Review completed by Krenn et al (2017) reviewed the guidelines for managing this condition included patient education, physical activity and manual therapy.

- Positive results found with implementation with limited reports of harm from participation.
- Best results obtained when program is individualized to each patient, supervised and over longer time periods.

#### Clinical Guidelines for Knee Pain

- Exercise improves function and reduce pain.
- It can improve physical performance, including walking distance and stair climbing, muscle strength, increase ROM in joints, walking speed and self-efficacy.
- A review of more than 50 Randomized Controlled Trials (RCTs) in knee osteoarthritis (OA )supports the use of land-based exercise therapy for reducing symptoms and deficits (Skou et al., 2018).
- Best results obtained from at least 3 x week of exercise participation with at least 2 sessions supervised (30-60 min. duration).

#### Clinical Guidelines for Hand Pain

- Mostly associated with OA of the hand and guidelines derived from expert consensus and systematic review.
- Some evidence derived from research done on knee OA.
- Best outcomes from patient education about joint protection along with exercise (ROM and strengthening).
- Heat therapy prior to exercise is recommended.
- In a RCT of patients with RA, the control group was provided with education on compensatory strategies, assistive device and joint protection. The experimental group received the education and a 8-week exercise program. Both the control group and

exercise group improved functional performance, but the exercise group increased grip strength. Both groups did not report a reduction in pain (Ellegaard et al., 2019).

#### Factors Affecting Consistent Exercise Performance

- Patient forgets to complete exercises.
- Patient's attitude toward exercise (ex. patient views performing exercises as harmful)

#### Factors that Affect Compliance with Exercise

World Health Organization (WHO) categorize factors influencing exercise compliance:

1. Health system/health care team factors (Practitioner knowledge)
2. Social/economic factors (family dysfunction, illiteracy)
3. Condition-related factors (co-morbid factors)
4. Patient-related factors (Self-efficacy, forgetful)
5. Therapy-related factors (length of treatment, previous treatment failures)<sup>1</sup>,

#### Strategies to attain Exercise Compliance

1. Setting realistic goals
2. Individualized exercise program
3. Supervision of exercises
4. Providing refresher sessions
5. Develop exercise program as a part of functional tasks
6. Grading the increase of physical activity

#### Manual Therapy

- Manual therapy has the longest history as an approach used for pain.
- Used to achieve musculoskeletal relief from pain.

-The use of hands, instead of a machine or device for joint manipulation and application of pressure to relieve tension on muscle, spasms and improve joint function (Daul, 2019).

### Biopsychosocial Effects of Pain

Biopsychosocial effects must be addressed before manual therapy is implemented.

- Fear of movement
- Beliefs about cause of the limitation
- Supportive family and friends
- Good coping strategies (good emotional support, reasonable expectations.

### Effects of Manual Therapy

- Has an analgesic effect, mediating nociceptive information.
- Information from stretching mechanoreceptors join with nociceptors to take information to the somatosensory areas of the Cerebral cortex.

Studies in 2006 (George et al. compared the change in thermal sensitivity at distant and local sites in response to lumbar extension and bike exercise. Higher pain tolerance was noted with combined treatment than exercise alone. Suggesting that pain inhibition can be evident from passive or active applied movement.

There are some studies that have begun to explore this benefit further.

How does Manual Therapy work?

Gross explanation:

- Receptors that respond to stretching join with the nociceptors in the afferent system, transmitting information to the Cerebral cortex.

- In the Descending pathway (pain modulation) the cortical projections into the Periaqueductal Gray (PAG) matter in the Midbrain originates from the Cerebral Cortex (Somatosensory areas).

### The Descending Pathway

Important areas of the descending pathway include:

- Periaqueductal Gray matter – Midbrain
- Nucleus Raphe Magnus of the Medulla

When they are working correctly, the neurons from the Gray matter travel down to the Nucleus Raphe Magnus in the Medulla and synapse with a 2<sup>nd</sup> neuron which is Serotonergic/ Noradrenergic, traveling down to the Dorsal Horn of the Spinal Cord to inhibit the communication between the 1<sup>st</sup> and 2<sup>nd</sup> afferent sensory neurons of the Ascending pathway which help to control the pain signals going up the Ascending Pathway.

### Periaqueductal Gray Area

- Mediates the transmission of nociceptive information.
- Dorsal PAG – modifies the pain response inhibiting substance P at the source of the pain at the periphery (noradrenergic).
- Ventral PAG – recuperative response 20-45 minutes after strategy is utilized (serotonergic).

Benefit has been linked with application of force applied which differ between clinicians — theory.

### Pleasure and Pain of Manual Therapy

- Initial pain experienced may be tolerated due to the expected benefits after treatment.

- Reduction of pain - releases dopamine motivating improved behaviors (postural adjustments, increasing movement and frequency of movement).
- Light touch deemed as pleasurable conveying a positive message to the brain positively impacting the descending pathway of the brain that inhibits the pain transmission.

Further research is underway to explore the benefits that manual therapy provides and to hopefully offer more explanation of the effects.

#### Promoted Effects of Manual Therapy

- Offers pain relief immediately.
- Reduces patient's fear of movement.
- Reduces anxiety.
- Promotes tissue healing.

## References

- Daul, R. (2019). *Manual Physical Therapy for Pain Relief*. Spine-Health. <https://www.spine-health.com/treatment/physical-therapy/manual-physical-therapy-pain-relief>
- Ellegaard, K., von Bülow, C., Røpke, A., Bartholdy, C., Hansen, I. S., Rifbjerg-Madsen, S., Henriksen, M., & Wæhrens, E. E. (2019). Hand exercise for women with rheumatoid arthritis and decreased hand function: an exploratory randomized controlled trial. *Arthritis Research & Therapy*, *21*(1). <https://doi.org/10.1186/s13075-019-1924-9>
- Hubert Van Griensven, Strong, J., & Unruh, A. M. (2014). *Pain : a textbook for health professionals*. Churchill Livingstone Elsevier.
- Krenn, C., Horvath, K., Jeitler, K., Zipp, C., Siebenhofer-Kroitzsch, A., & Semlitsch, T. (2020). Management of non-specific low back pain in primary care – A systematic overview of recommendations from international evidence-based guidelines. *Primary Health Care Research & Development*, *21*. <https://doi.org/10.1017/s1463423620000626>
- Skou, S. T., Pedersen, B. K., Abbott, J. H., Patterson, B., & Barton, C. (2018). Physical Activity and Exercise Therapy Benefit More Than Just Symptoms and Impairments in People With Hip and Knee Osteoarthritis. *Journal of Orthopaedic & Sports Physical Therapy*, *48*(6), 439–447. <https://doi.org/10.2519/jospt.2018.7877>

## **Assignment Objectives**

At the end of the assignment students will:

Demonstrate the ability to interview patients and collaborate on goals.

Choose an appropriate assessment tool to determine patient needs and guide intervention.

Explain the pain process

Choose measures for treating the pain by assessing patient's attitude to treatment approach.

Collaborate with patient on how to assess treatment effectiveness.

### **Case Study**

John is a 54-year-old assigned female at birth (AFAB) retired firefighter. John fell through the floor of a burning building 2 years ago, fracturing both arms and legs, ribs and back. John continues to report excruciating pain, walking with a rolling walker, and frequently using a wheelchair. An X-ray, MRI, CT scan and bone scan was completed and reported no injuries that would explain John's report of pain.

The patient has been referred to occupational therapy because of functional deficits: an inability to don shoes and socks, relying on the spouse to perform the tasks. John is now frequently incontinent because of the extended time to perform transfers and does not participate in community events or leisure activities which is placing a strain on the relationship. John and spouse walked 5 miles each day prior to the accident.

### **Assessment**

1. Introduction
2. Occupational therapy role
3. Develop a support
4. Patient goal for treatment



5. Medical history (past and current)
6. Patient's areas of perceived deficit
7. Musculoskeletal assessment
8. Psychosocial factors (depression, sleep, eating habits, leisure, social/family support, motivation).
9. Patient's assessment of cause of pain
10. Goal Collaboration
11. Referral if appropriate

### **Assignment**

#### **Case study**

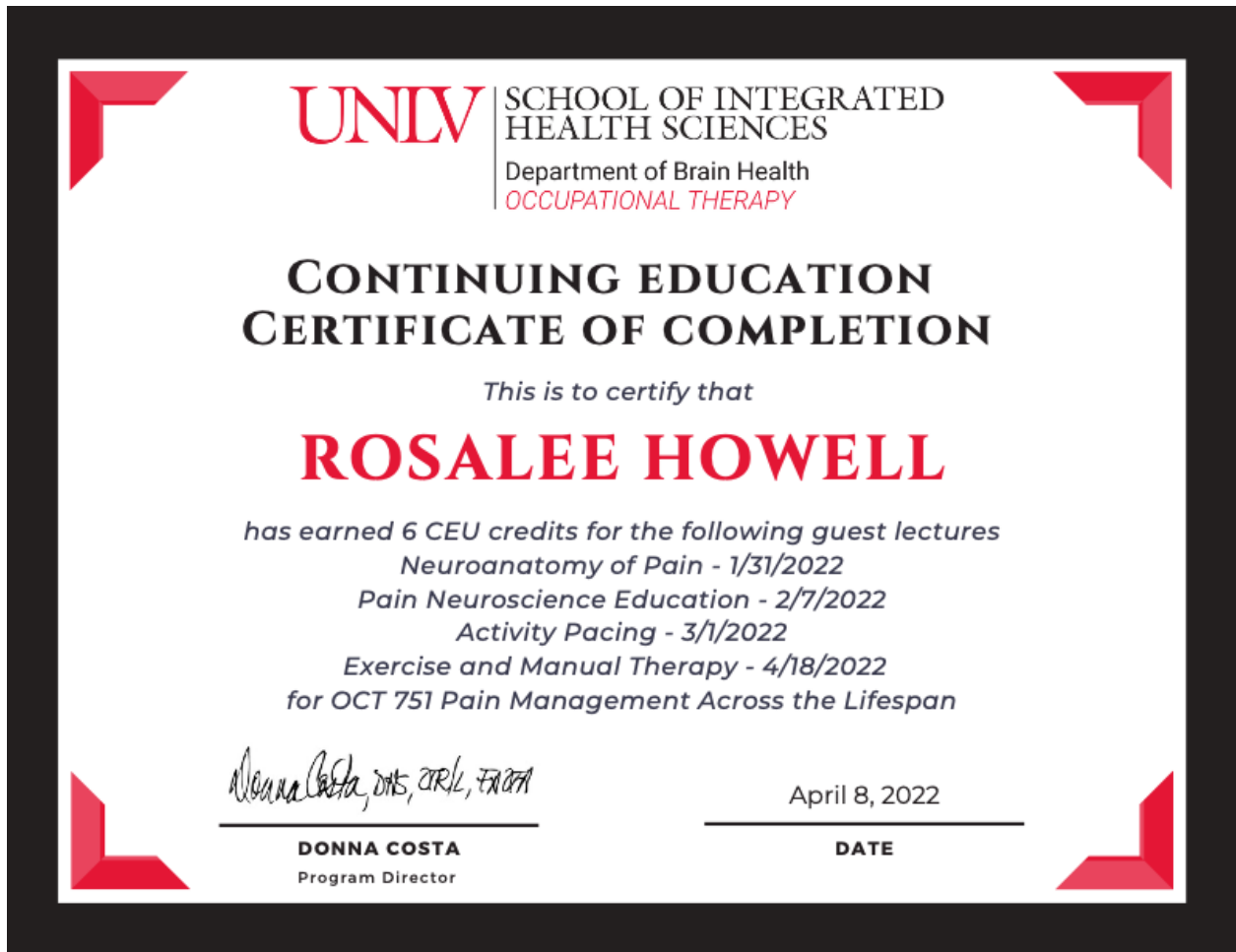
Jane is 31 years of age and has a 3-year-old daughter. Jane was involved in a car accident 1 year ago and continues to experience neck and back pain. She has not worked since her car accident and has been unable to care for her daughter. Her mother has since moved in the home to assist in the care of her daughter and granddaughter. Jane's husband is in pharmacology sales and travels 2 weeks out of each month.

Jane has limited range of motion to neck and trunk secondary to reports of pain. She had occupational and physical therapy for 6 months after her accident but continues to report debilitating pain of 9/10 without medication. She needs assistance with LB dressing, toileting and showering and all home IADLs. She has not had any imaging since the ones taken after the accident. Jane states that the pain has increased in the last month. She reports tingling and numbness in both arms that prevents her from maintaining her grasp on objects.

## **Treatment**

1. What are the long-term goals?
2. What are the short-term goals?
3. How would you approach treatment? Explain the reason for your approach.

Appendix L: Guest Lecture Certificate



## References

- Allen, D. D., & Toth-Cohen, S. (2019). Use of case studies to promote critical thinking in occupational therapy students. *Journal of Occupational Therapy Education*, 3(3).  
<https://doi.org/10.26681/jote.2019.030309>
- Andermann, A. (2016). Taking action on the social determinants of health in clinical practice: A framework for health professionals. *Canadian Medical Association Journal*, 188(17-18), E474–E483. <https://doi.org/10.1503/cmaj.160177>
- Bain, L., Norris, S., & Stroud, C. (2019). *The role of nonpharmacological approaches to pain management PROCEEDINGS OF A WORKSHOP*.  
[https://www.ncbi.nlm.nih.gov/books/NBK541702/pdf/Bookshelf\\_NBK541702.pdf](https://www.ncbi.nlm.nih.gov/books/NBK541702/pdf/Bookshelf_NBK541702.pdf)
- Bingolbali, E., & Bingolbali, F. (2015). *Faculty of Education; ERME* (p. 17).  
<https://hal.archives-ouvertes.fr/hal-01289421/document>
- Briggs, E. (2012). Evaluating the impact of pain education: How do we know we have made a difference? *British Journal of Pain*, 6(2), 85–91.  
<https://doi.org/10.1177/2049463712449961>
- Centers for Disease Control and Prevention. (2020, December 2). *Products - data briefs - number 390 - November 2020*. Retrieved February 23, 2022, from  
<https://www.cdc.gov/nchs/products/databriefs/db390.htm>
- Chatchumni, M., Eriksson, H., & Mazaheri, M. (2020). A scoping review of pain management education programs (PMEPs): Do they prepare nurses to deal with patients' Postoperative pain? *Pain Research and Management*, 2020, 1–7. <https://doi.org/10.1155/2020/4062493>
- CMS opioid roadmap: Strategy to fight the opioid crisis [PDF]. (2020, June). Retrieved February 27, 2022, from <https://www.cms.gov/About-CMS/Agency-Information/Emergency/Downloads/Opioid-epidemic-roadmap.pdf>

- Cohen, M., Quintner, J., Buchanan, D., Nielsen, M., & Guy, L. (2011). Stigmatization of patients with chronic pain: The extinction of empathy. *Pain Medicine*, *12*(11), 1637–1643.  
<https://doi.org/10.1111/j.1526-4637.2011.01264.x>
- Dahlhamer, J., Lucas, J., Zelaya, C., Nahin, R., Mackey, S., DeBar, L., Kerns, R., Von Korff, M., Porter, L., & Helmick, C. (2018). Prevalence of chronic pain and high-impact chronic pain among adults — United States. *MMWR. Morbidity and Mortality Weekly Report*, *67*(36), 1001–1006. <https://doi.org/10.15585/mmwr.mm6736a2>
- Fisher, E., Law, E., Dudeney, J., Palermo, T. M., Stewart, G., & Eccleston, C. (2018). Psychological therapies for the management of chronic and recurrent pain in children and adolescents. *Cochrane Database of Systematic Reviews*.  
<https://doi.org/10.1002/14651858.cd003968.pub5>
- Fishman, S. M., Young, H. M., Lucas Arwood, E., Chou, R., Herr, K., Murinson, B. B., Watt-Watson, J., Carr, D. B., Gordon, D. B., Stevens, B. J., Bakerjian, D., Ballantyne, J. C., Courtenay, M., Djukic, M., Koebner, I. J., Mongoven, J. M., Paice, J. A., Prasad, R., Singh, N., & Sluka, K. A. (2013). Core competencies for pain management: Results of an interprofessional consensus summit. *Pain Medicine*, *14*(7), 971–981.  
<https://doi.org/10.1111/pme.12107>
- Friedrichsdorf, S. J., & Goubert, L. (2020). Pediatric pain treatment and prevention for hospitalized children. *PAIN Reports*, *5*(1), e804.  
<https://doi.org/10.1097/pr9.0000000000000804>
- Gatchel, R. J., McGeary, D. D., McGeary, C. A., & Lippe, B. (2014). Interdisciplinary chronic pain management: Past, present, and future. *American Psychologist*, *69*(2), 119–130.  
<https://doi.org/10.1037/a0035514>
- Geneen, L. J., Moore, R. A., Clarke, C., Martin, D., Colvin, L. A., & Smith, B. H. (2017). Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. *Cochrane Database of Systematic Reviews*, *4*(4).  
<https://doi.org/10.1002/14651858.cd011279.pub3>

- Germossa, G. N., Hellesø, R., & Sjetne, I. S. (2019). Hospitalized patients' pain experience before and after the introduction of a nurse-based pain management programme: A separate sample pre and post study. *BMC Nursing, 18*(1). <https://doi.org/10.1186/s12912-019-0362-y>
- Hadi, M. A., McHugh, G. A., & Closs, S. J. (2018). Impact of chronic pain on patients' quality of life: A comparative mixed-methods study. *Journal of Patient Experience, 6*(2), 133–141. <https://doi.org/10.1177/2374373518786013>
- Hajat, A., Hsia, C., & O'Neill, M. S. (2015). Socioeconomic disparities and air pollution exposure: A global review. *Current Environmental Health Reports, 2*(4), 440–450. <https://doi.org/10.1007/s40572-015-0069-5>
- Hogans, B. B., & Gallagher, R. M. (2018). A global year for pain education: Progress, trends, and the way forward. *Pain Medicine, 19*(8), 1507–1511. <https://doi.org/10.1093/pm/pny102>
- How to be patient with yourself and others in a changing World.* (2020, July 10). Therapy Changes. <https://therapychanges.com/blog/2020/07/how-to-be-patient-with-yourself-and-others-in-a-changing-world/>
- Hu, C. (2020). Understanding college students' perceptions of effective teaching. *International Journal of Teaching and Learning in Higher, 2020*(2), 318–328. <https://files.eric.ed.gov/fulltext/EJ1286303.pdf>
- Hubert Van Griensven, Strong, J., & Unruh, A. M. (2014). *Pain: A textbook for health professionals*. Churchill Livingstone Elsevier.
- IASP Interprofessional Pain Curriculum Outline.* (n.d.). International Association for the Study of Pain (IASP). Retrieved April 7, 2022, from <https://www.iasp-pain.org/education/curricula/iasp-interprofessional-pain-curriculum-outline/>

- Karpyn, A., Young, C., & Weiss, S. (2012). Reestablishing healthy food retail: Changing the landscape of food deserts. *Childhood Obesity*, 8(1), 28–30.  
<https://doi.org/10.1089/chi.2011.0113>
- Kim, H.-J., Min, J.-Y., Kim, H.-J., & Min, K.-B. (2016). Parks and green areas are associated with decreased risk for hyperlipidemia. *International Journal of Environmental Research and Public Health*, 13(12), 1205. <https://doi.org/10.3390/ijerph13121205>
- Lakhan, S. E., Sheaffer, H., & Tepper, D. (2016). The effectiveness of aromatherapy in reducing pain: A systematic review and meta-analysis. *Pain Research and Treatment*, 2016, 1–13.  
<https://doi.org/10.1155/2016/8158693>
- Langjahr, A., Esq. (2019). CMS initiative regarding pain-management issues. *U.S. Pharmacist*, 44(3), 36–37.
- Maeng, D., Baylor, K., Bulger, J. B., & Han, J. (2018). Impact of a multidisciplinary pain management program on patient care utilization and cost of care. *Journal of Pain Research*, Volume 11, 2375–2383. <https://doi.org/10.2147/jpr.s177231>
- Maclean, F., Carin-Levy, G., Hunter, H., Malcolmson, L., & Locke, E. (2012). The usefulness of the Person-Environment-Occupation Model in an acute physical health care setting. *British Journal of Occupational Therapy*, 75(12), 555–562.  
<https://doi.org/10.4276/030802212x13548955545530>
- McLean, S. F. (2016). Case-Based learning and its application in medical and health-care fields: A review of worldwide literature. *Journal of Medical Education and Curricular Development*, 3, JMECD.S20377. <https://doi.org/10.4137/jme.cd.s20377>
- Morales, M. E., & Yong, R. (2020). Racial and ethnic disparities in the treatment of chronic pain. *Pain Medicine*, 22(1), 75–90. <https://doi.org/10.1093/pm/pnaa427>

- Nall, K. (2019). Use of physical agent modalities for pain management in long-term facilities. *Integrated Studies*. <https://digitalcommons.murraystate.edu/bis437/239>
- Nguyen, AB, C. A., Chernew, PhD, M. E., Ostrer, AB, I., & Beaulieu, PhD, N. D. (2019). Comparison of healthcare delivery systems in low- and high-income communities. *AJMC*, 7(4). <https://www.ajmc.com/view/comparison-of-healthcare-delivery-systems-in-low-and-highincome-communities>
- Occupational Therapy & Arthritis | Arthritis NSW*. (2021, February 9). [www.arthritisnsw.org.au](http://www.arthritisnsw.org.au). <https://www.arthritisnsw.org.au/occupational-therapy-arthritis/>
- Pas, R., Meeus, M., Malfliet, A., Baert, I., Oosterwijk, S. V., Leysen, L., Nijs, J., & Ickmans, K. (2018). Development and feasibility testing of a Pain Neuroscience Education program for children with chronic pain: Treatment protocol. *Brazilian Journal of Physical Therapy*, 22(3), 248–253. <https://doi.org/10.1016/j.bjpt.2018.02.004>
- Pontin, J., Gioia, K., Dias, A., Teramatsu, C., Matuti, G., & Mafra, A. (2021). The positives effects of a pain education program on patients with chronic pain: Observational study. *Brazilian Journal Of Pain*. <https://doi.org/10.5935/2595-0118.20210026>
- Position Statement - Role of occupational therapy in pain management. (2021). *American Journal of Occupational Therapy*, 75(Supplement\_3, 7513410010). <https://doi.org/10.5014/ajot.2020.75s3001>
- Robins, H., Perron, V., Heathcote, L., & Simons, L. (2016). Pain neuroscience education: State of the art and application in pediatrics. *Children*, 3(4), 43. <https://doi.org/10.3390/children3040043>
- Role of occupational therapy in pain management. (2021). *The American Journal of Occupational Therapy*, 75(Supplement\_3). <https://doi.org/10.5014/ajot.2021.75s3001>



- Rolfe, Steve, et al. "Housing as a social determinant of health and wellbeing: Developing an empirically-informed realist theoretical framework." *BMC Public Health*, vol. 20, no. 1, 20 July 2020, [bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09224-0](https://doi.org/10.1186/s12889-020-09224-0), 10.1186/s12889-020-09224-0.
- Schnake-Mahl, A. S., & Sommers, B. D. (2017). Health care in the suburbs: An analysis of suburban poverty and health care access. *Health Affairs*, *36*(10), 1777–1785.  
<https://doi.org/10.1377/hlthaff.2017.0545>
- Siddall, B., Ram, A., Jones, M. D., Booth, J., Perriman, D., & Summers, S. J. (2021). Short-term impact of combining pain neuroscience education with exercise for chronic musculoskeletal pain. *Pain*, *Publish Ahead of Print*.  
<https://doi.org/10.1097/j.pain.0000000000002308>
- Sosio, D., PhD, ABPP, & Demean, A., PhD, RYT. (2021). Behavioral medicine: How clinicians can reduce the stigma attached to chronic pain. *Practical Pain Management*, *21*(1).
- Srinivasan, M., Wilkes, M., Stevenson, F., Nguyen, T., & Slavin, S. (2007). Comparing problem-based learning with case-based learning: Effects of a major curricular shift at two institutions. *Academic Medicine*, *82*(1), 74–82.  
<https://doi.org/10.1097/01.acm.0000249963.93776.aa>
- Staffe, A. T., Bech, M. W., Clemmensen, S. L. K., Nielsen, H. T., Larsen, D. B., & Petersen, K. K. (2019). Total sleep deprivation increases pain sensitivity, impairs conditioned pain modulation and facilitates temporal summation of pain in healthy participants. *PLOS ONE*, *14*(12), e0225849. <https://doi.org/10.1371/journal.pone.0225849>

- Strong, S., Rigby, P., Stewart, D., Law, M., Letts, L., & Cooper, B. (1999). Application of the person-environment-occupation model: A practical tool. *Canadian Journal of Occupational Therapy*, 66(3), 122–133. <https://doi.org/10.1177/000841749906600304>
- Tahir, M. J., Schreiner, P. J., Nasrallah, I. M., Elbejjani, M., Wellons, M. F., Bryan, R. N., & Launer, L. J. (2019). Abstract 027: The menopausal transition and cerebrovascular reactivity in the coronary artery risk development in young adult study. *Circulation*, 139(Suppl\_1). [https://doi.org/10.1161/circ.139.suppl\\_1.027](https://doi.org/10.1161/circ.139.suppl_1.027)
- Thompson, K., Johnson, M. I., Milligan, J., & Briggs, M. (2018). Twenty-five years of pain education research—What have we learned? Findings from a comprehensive scoping review of research into pre-registration pain education for health professionals. *Pain*, 159(11), 2146–2158. <https://doi.org/10.1097/j.pain.0000000000001352>
- Vambheim, S. M., Kylo, T. M., Hegland, S., & Bystad, M. (2021). Relaxation techniques as an intervention for chronic pain: A systematic review of randomized controlled trials. *Heliyon*, 7(8), e07837. <https://doi.org/10.1016/j.heliyon.2021.e07837>
- Victor-Chmil, J. (2013). Critical thinking versus clinical reasoning versus clinical judgment. *Nurse Educator*, 38(1), 34–36. <https://doi.org/10.1097/nne.0b013e318276dfbe>
- Waddell, G. (1987). 1987 Volvo award in clinical sciences: A new clinical model for the treatment of low-back pain. *Spine*, 12(7), 632–644. <https://doi.org/10.1097/00007632-198709000-00002>
- Wang, J., & Geng, L. (2019). Effects of socioeconomic status on physical and psychological health: Lifestyle as a mediator. *International Journal of Environmental Research and Public Health*, 16(2), 281. <https://doi.org/10.3390/ijerph16020281>

- Widyadharma, I. P. E., Sari, N. N. S. P., Pradnyaswari, K. E., Yuwana, K. T., Adikarya, I. P. G. D., Tertia, C., Wijayanti, I. A. S., Indrayani, I. A. S., & Utami, D. K. I. (2020). Pain as clinical manifestations of COVID-19 infection and its management in the pandemic era: A literature review. *Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, 56(1). <https://doi.org/10.1186/s41983-020-00258-0>
- Williams, A. C., Eccleston, C., & Morley, S. (2012). Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database of Systematic Reviews*, 2012(11), Article No. CD007407. [doi:10.1002/14651858.CD007407.pub3](https://doi.org/10.1002/14651858.CD007407.pub3)
- Williams, B. (2005). Case based learning – A review of the literature: Is there scope for this educational paradigm in prehospital education? *Emergency Medicine Journal*, 22(8), 577–581. <https://doi.org/10.1136/emj.2004.022707>
- Williams, D., Costa, M., Odunlami, A., & Mohammed, S. (2008). Moving upstream: How interventions that address the social determinants of health can improve health and reduce disparities. NIH Public Access. *J Public Health Manag Pract*, 14, 8–17. <https://doi.org/10.1097/01.PHH>
- Woolf, S. H. (2019). Necessary but not sufficient: Why health care alone cannot improve population health and reduce health inequities. *Annals of Family Medicine*, 17(3), 196–199. <https://doi.org/10.1370/afm.2395>
- Writing Effective Test Questions*. (n.d.). School of Medicine Faculty Development. <https://facdev.ucr.edu/writing-effective-test-questions>

## Curriculum Vitae

Rosalee Howell OTR/L  
Roseh325@gmail.com

### Professional Summary

Experienced occupational therapist of 24 years with strong communication and team building skills. Combined experience of 10 years in healthcare management, successful management of >30 employees and improving relationships and communication within an interdisciplinary team.

### Work Experience

#### **12/21 – Present Patient Assessment Standards Coordinator (Back-up) – Encompass Health Rehab Hospital of Desert Canyon, Las Vegas NV**

- Assists in the data collection on the IRF-PAI.
- Ensures that there is supporting documentation.
- Coordinates the assembly of the documentation and submission to the appropriate entities in a timely manner.
- Support all staff on how to accurately document as it relates to the IRF-PAI.
- Collaborate with CNO and DTO to ensure compliance with outlined guidelines by CMS.

#### **08/16 - Present Therapy Team Lead – Encompass Health Rehab Hospital of Desert Canyon, Las Vegas NV**

- Evaluates patients and provides skilled occupational therapy intervention, monitor and document patient's response.
- Clinical instructor for Occupational Therapy Level 1 and Level 2 Students.
- Schedule patients for treatment sessions and, manage schedules of patient with other service providers.

- Assists Director with identifying qualified personnel for open positions in the department.
- Assists Director with management of FTE and budget.
- Developed a system to provide oversight and support to fieldwork students and clinical instructors.
- Manage competency evaluations and write performance evaluations for staff directly supervised.
- Program Champion of Joint Commission Accredited Oncology Program.
- Presenter at Quality Council on strategies to improve metrics for Oncology Program, improving compliance of Dietary and HADS assessment compliance by 50% in 1 month.
- Developed Community Connections program to provide education to general community on health related topics.
- Committee member for Diversity, Equity, and Inclusion to promote a collaborative and equitable work experience for all employees.

**2012 - 2016 Occupational Therapist /Director of Rehab, Protocol Agency, Calabasas CA**

- Evaluation, treatment, and discharge planning.
- Developed and supervised contracture management and wheelchair positioning program.
- Therapists' overall efficiency improved by 20%.

**1/2011- 10/2011 Occupational Therapist, Onward Healthcare, Boca Raton FL**

- Evaluation and treatment of individuals with physical, psychological, and learning deficits.
- Collaboration with interdisciplinary team about discharge planning and placement.
- Recommendations for DME upon discharge.

**3/2010 - 12/2010 Occupational Therapist, Gentiva Health Services - Home Health, Deland FL**

- Evaluation and treatment of adults in home environment.
- Recommendations for durable medical equipment
- Received a letter of commendation from the CEO of the company within 6 months of my employment for excellent patient care and patient outcomes.

**12/2009 - 06/2012 Occupational Therapist, Ridgecrest Nursing - SNF, Deland, FL**

- Evaluation, development of plan of care and discharge planning.
- Wheelchair positioning and seating.

**04/2009 - 11/2009 Director of Rehab, Select Medical Rehab/Longwood Health Care, Longwood FL**

- Therapy efficiency improved by 15%.
- Discharge Documentation completed within 72 hours, improvement by 75%.
- Contracture Management Program and splint modification.
- Contracture development decreased in facility by 50% within first year of implementation of Contracture management program.

**01/2008 -04/2009. Director of Rehab, Salus Rehab/Deltona Health Care**

- Developed wheelchair positioning program resulting in a decreased rate of falls from wheelchair by 75%.
- Collaborated with Chief Nursing Officer to develop Restorative Nursing Program.
- Mentor for newly hired Rehab Directors.

**12/2007 - 03/2011 Occupational Therapist, Florida Fish Memorial Hospital**

- Evaluation of adults and pediatric patients in an acute care setting.
- Provide recommendations for next level of care.

**09/2006 - 11/2007 Director of Rehab, People first Rehab/Westminster Care of Orlando**

- Member of marketing team - presented to Hospitalists on facility programs.
- Developed Cardiac, wheelchair positioning, contracture management program.
- Instrumental in therapy gym redesign; recommended therapy equipment to meet the needs of newly developed programs.
- Developed program for assessment and treatment of long-term residents to decrease contracture development, pressure ulcers and promote functional performance.
- Collaborated with Charge nurse in the Memory-care department, on structured activities including exercise and cognitive games to promote functional performance.
- Educated Nursing on strategies to manage patients in Memory Care Unit.
- Developed Restorative Nursing Program and documentation for the program.

**10/03 - 12/2010 Occupational Therapist, RG Therapy Services (Pediatric)**

- Assessment and treatment of children 0-21 years of age.
- Recommendations for wheelchair seating and positioning devices.
- Education of family/caregivers of treatment strategies for carryover of skills.

**05/2003 - 10/2003 Occupational Therapist, Central Florida Therapy Solutions (Pediatric)**

- Assessment and treatment of children 3-9 years of age.
- Education of family/caregivers on strategies to improve fine motor skills and social interaction using Applied Behavior Analysis.

**09/1997- 04/2003. Occupational Therapist, Comprehensive Health Care (Pediatric)**

- Assessment and treatment of children 5-12 years of age in the school system.
- Educated teachers/caregivers on activities to improve grasp patterns and handwriting.

**Academic Qualifications and Certifications**

- Bachelor of Science in Occupational Therapy from York College, Queens, N.Y (08/1992 – 06/1997)
- Master of Arts in Business Administration from Jones University, Centennial, CO (12/2005-04/2007)
- Occupational Therapy Doctoral Student of The University of Nevada Las Vegas (UNLV), Las Vegas, NV (Expected 5/2022)
- Certified Occupational Therapist by NBCOT (09/1997 - Present)
- Lymphedema Certification - Norton School of Lymphedema (10/2019)



## **Accomplishments**

- Co-presenter at NOTA on Oncology and Rehabilitation (2018).
- Presentation on “Clinical Reasoning Skills,” to Occupational Therapy Doctoral students of UNLV in OCT 726 – Occupational Therapy Practice I with Adults/Older Adults. (10/6/2020)
- Presentation on “Effective Communication For Inclusive Care,” & “The Occupational Profile” to Occupational Therapy Doctoral students of UNLV in OCT 733 – Occupational Therapy Practice II Adults & Older Adults. (1/26/2021)
- Presentation on “The Occupational Therapist’s role in wheelchair seating and mobility” in OCT 726, Occupational Therapy Doctoral Students of UNLV. (10/4/2021)
- Presentation on “The Neuroanatomy of Pain” to Occupational Therapy Doctoral Students of UNLV in OCT 751 – Pain management Across the Lifespan (1/31/2022)
- Presentation on “Pain Neuroscience Education” to Occupational Therapy Doctoral Students of UNLV in OCT 751 – Pain Management Across the Lifespan (2/7/2022).
- Presentation on “Activity Pacing” to Occupational Therapy Doctoral Students of UNLV in OCT 751 – Pain Management Across the Lifespan (3/1/2022).
- Presentation on “Exercise and Manual Therapy” to Occupational Therapy Doctoral Students of UNLV in OCT 751 – Pain Management Across the Lifespan (4/18/2022).

## **Licensure**

Nevada Board of Occupational Therapy (Expires 6/30/2022)

## **References**

Furnished on request.