HTCC
HAND THERAPY CERTIFICATION COMMISSION

The Hand Therapist Peer Mentoring Manual
2nd Edition

Tell me and I forget. Teach me and I remember.
Involve me and I learn.

Benjamin Franklin

Introduction

The Hand Therapist Peer Mentoring Manual combines peer mentoring and experiential learning, which current educational research indicates can improve knowledge retention, problem solving, and learning out comes (Svinicki & McKeachie, 2014). Using the Hand Therapy Certification Commission Test Blueprint for Hand and Upper Limb Patients as a framework, the Hand Therapist Peer Mentoring Manual has been developed, evaluated by content experts, and revised, resulting in a tool that can be used by occupational therapists and physical therapists seeking to gain the advanced knowledge and clinical skills required for the specialty of hand therapy. Based upon the concepts of peer mentoring and experiential learning, active learning modules have been designed for use by therapists in their current work environment. Our hope is that this manual will facilitate learning within your own clinical practice, to assist with preparation for the Hand Therapy Certification Exam, and will promote professional development through a mentoring relationship between therapists who work side by side or who connect through the use of technology. Regardless of how you choose to use this manual, the emphasis on peer mentoring and experiential learning is designed to positively impact your personal and professional learning goals.

The Hand Therapy Certification Commission would like to thank Karol Young OTD, OTR/L, CHT who developed the original version of this manual. The manual is adapted from her original material and isused with permission. HTCC seeks to support Certified Hand Therapists and aspiring Certified Hand Therapists in their professional development efforts and makes this manual available as a public service.

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The Hand Therapy Certification Commission, Inc., (HTCC) is a nonprofit corporation established in 1989 for the purpose of sponsoring a voluntary credentialing program for occupational therapists and physical therapists who specialize in upper extremity rehabilitation. The mission of the Hand Therapy Certification Commission, Inc. is to support a high level of competence in hand therapy practice and to advance the specialty through a formal credentialing process.

This manual is adapted from material developed by Karol Young OTD, OTR/L, CHT and is used with permission. HTCC seeks to support Certified Hand Therapists and aspiring Certified Hand Therapists in their professional development efforts and makes this manual available as a public service. This manual is provided “as is” for general educational purposes and should not be considered as authoritative medical or legal guidance or a substitute for consultation with qualified professionals. HTCC makes no representations or warranties, express or implied, with respect to this information and specifically disclaims all warranties to the fullest extent permitted by law (including, but not limited to, merchantability or fitness for a particular purpose).

What is peer mentoring?

Peer mentoring is a mentoring relationship that occurs between two or more individuals who are sharing the same experience either through work, academia, or within a community setting. Peer mentors usually have a common interest, and choose to be in a mentoring relationship, in order to learn more about a specific topic, process, or to orient to a new situation (Zachary, 2012). Peer mentoring can occur within the programming of a classroom or corporation, or can be less structured, meeting the mutually agreed upon goals of the individuals. Peer mentoring is known to provide a supportive learning environment, allowing individuals to process information within small groups. This process has also been found to improve confidence, competence, communication skills, and outcomes on test scores (Harmer, Huffman & Johnson, 2011; Milner & Bossers, 2005; Nolinske, 1999; Schwellnus & Carnahan 2014; Seacomb, 2008). Considering these benefits, the Hand Therapist Peer Mentoring Manual uses the concepts of peer mentoring to aid in the growth and development of occupational and physical therapists, as they advance their knowledge and skills in upper limb rehabilitation.

What is experiential learning?

In 1938, John Dewey published his hallmark ideas on the importance of experience in the learning process. According to Dewey, learning should occur through experience, or doing, with reflection upon the outcomes of the experience (Dewey, 1938). David Kolb, a social psychologist, expounding upon Dewey's ideas, explains the learning cycle as; having an experience, reflecting upon the experience, analyzing the experience within context, and applying the experience to future situations (Kolb, 1984). Experiential learning is considered advantageous for knowledge retention, skill development, and the application of new information to real situations, and therefore, has been used to develop this manual (Dewey, 1938; Coker, 2010; Lambert, 2012). Active learning modules have been designed to promote reflection upon the experiences the learner has, within their own clinical practice. Using the clinic as the classroom, therapists are able to apply concepts learned to the actual patient-therapist encounter, and relate their interventions to patient outcomes. Since reflection upon experience is an import ant part of experiential learning, the mentor will act as a facilitator of learning through guided prompts and questions. It is also recommend ed that the mentee keep a journal to assist in processing information while developing new insights and understanding (Barkley, 2010; Mann, Gordan & MacLeod, 2009). Experiential learning principles, guide the Hand Therapist Peer Mentoring Manual and structure learning opportunities, in order to promote reflection, and provide support in the application of experience to practice.

What is the HTCC Test Blueprint for Hand and Upper Limb Patients?

The Hand Therapy Certification Commission (HTCC) periodically surveys therapists regarding their practice settings and structures the Hand Therapy Certification Examination based upon the results of that survey and the resultant Delineation of Hand Therapy (ASHT, 2011; HTCC, 2008, 2014. 2019). The content for the exam includes the knowledge and tasks with in the domains of hand therapy and is entitled the HTCC Test Blueprint for Hand and Upper Limb Patients. The learning modules in this manual have been organized using the practice domains, knowledge areas, diagnoses, and tools and treatment techniques described in the test blueprint, which can be found at HTCC.org. Additional references will be referred to within this text, and can be found at the end of each learning module and under the section entitled "helpful resources".

How should I use this manual?

This manual has been designed to assist the therapist in gaining the knowledge and advanced clinical skills required for the specialty of hand therapy. This manual has also been designed for use between two therapists who desire to engage in cooperative learning and the mentoring relationship. Whether working within the same clinic, or working in separate locations, therapists are able to use this tool to identify learning objectives and to meet those objectives through the following learning modules. Use of technology such as FaceTime® or Skype® may also enhance the learning process. Completion time is based upon the individual goals of the therapist, and can take any where from months to one year. Time spent working through the manual is to be determined between therapists. The resources mentioned are also a guide and may be used as suggested throughout the mentoring process. Consider the Hand Therapist Peer Mentoring Manual as a starting point, and a systematic guide to facilitate learning and the mentoring relationship. The use of this manual is only limited by your creativity.

Note: Before sharing patient names or other protected health information, please be sure to make yourself aware of any HIPPA or other privacy restrictions applicable to you.

The Mentoring Relationship

Ladyshewsky (2010) believes that the advancement of a therapist's clinical competencies can be attributed to many of the mentoring relationships that occur between the novice and advanced practitioner. A mentor is defined as a "knowledgeable and experienced guide, a trusted ally and advocate, and a caring role model" (CCSF, 2014). Mentoring among peers is often used in educational, community, and corporate settings, to aid in individual growth and development (Culbertson, 2014; Nolinske, 1995). In the literature, "training", "man aging" and "coaching" are also used to describe the peer mentoring process (Schwellnus & Carnahan, 2014). While some experts believe peer mentoring and peer coaching have distinct definitions with varied expectations, others define peer mentoring using concepts inclusive of peer coaching (Miller, 2011; Milner & Bossers, 2004; Ladyshewsky, 2010; Schwellnus & Carnahan, 2014). Within the context of this manual, the term peer mentoring will be used to refer to the relationship between the certified hand therapist, aiding in the professional development of, an occupational or physical therapist with less experience.

Peer mentoring is known to provide a supportive learning environment, allowing individuals to process information within small groups. In a systematic review performed by Stone, Cooper and Cant (2013), the benefits of peer learning in nursing education were examined. The results of the 18 studies included in the review indicated that peer learning increases confidence, increases competence and decreases anxiety. Peer mentoring has also been shown to improve communication and test scores. Within the Hand Therapist Peer Mentoring Manual, there is an emphasis on collaborative, non-competitive, and supportive learning in order to facilitate the exchange of ideas, and allow therapists to engage in knowledge transfer.

Engagement in a mentoring relationship has been advocated by many hand therapy professionals (McAuliffe, 2003; Michlovitz, 2009; Novak & Mackinnon, 2000). In her Nathalie Barr lecture given at the American Society of Hand Therapists (ASHT) meeting in 2008, Sue Michloitz, PT, PhD, CHT, encouraged therapists to engage in education and mentoring relationships, to promote the growth and advancement of our specialized profession. While the Hand Therapist Peer Mentoring Manual addresses learning and skill development of the mentee, engaging experienced therapists in the mentorship process will also offer an avenue for staying current in the best evidence, and facilitate participation in lifelong learning; thus promoting leadership, education, and the advancement the of the specialty of hand therapy.

The Sample Mentoring Contract

The mentoring contract is a document that is used to define parameters and guidelines for the mentoring experience. A mentoring contract allows for open discussion regarding expectations and desired outcomes, and is a tool for use in clarifying roles within the mentoring relationship. The logistics of the mentoring relationship such as meeting places, times, duration and contact information should be included. Confidentiality, trust and commitment to the mentoring relationship should also be discussed (Zachary, 2012). The men tor and mentee should complete a mentoring contract at the first mentoring meeting agreeing and signing the terms of the agreement. Below is a sample of a mentoring contract.

This contract is being made between (the mentee) _____ and (the mentor)_____ on (date)_____. Both individuals are entering into this relationship on a voluntary basis for the purpose of educational and professional development.

We agree to the following terms:

1. Meeting content will be kept confidential unless otherwise stated for learning purposes.
2. The mentoring relationship will last for the following:_____.
3. Meetings will be held in a mutually agreed upon location: weekly monthly other:_____ for a mutually agreed upon time.
4. Contact between meetings should occur via: telephone e-mail text other:_____.
5. Should meetings have to be cancelled they will be cancelled with at least 24 hour notice.
6. The mentor and mentee agree to provide honest and open communication and feedback to one another.
7. The agreed upon role of the mentor is (for example: answer questions, facilitate learning opportunities, give advice, promote professional development) _____ _____ _____.
8. The agreed upon role of the mentee is (communicate learning needs, pose questions for clarification, suggest topics for discussion, to complete assigned learning activities): _____ _____ _____ _____ _____.

The Sample Mentoring Contract

(Continued)

9. The end of the mentoring partnership will end at an agreed upon time when the following objectives have been met:
   A._____
   B._____
   C._____
10. If for any reason this mentoring relationship is not effective, we agree to honest communication about closure and will use the results as a learning opportunity.

Mentee's Signature:_____

Date:_____

Mentor's Signature:_____

Date:_____

Additional Samples of Mentoring Contracts:

https://coachingforleaders.com/wp-content/uploads/2014/09/Sample-Mentoring-Agreement.pdf

http://beamentor.org/main/mentoringtools/coordfrms/Our%20Mentoring%20Agreement.PDF

Learning Styles

Learning styles are individualized for each person and can be grouped into common ways that people learn (Gardner, 1993). There are a variety of learning styles and, although a student may have a dominant learning style, preferences for learning can change and may be de pendent upon subject matter. The seven common learning styles are; visual preference for using pictures and images, auditory a preference for using sound and music, verbal a preference for speaking and writing, kinesthetic a preference for using senses and touch, logical a preference for using reasoning and structure, social a preference for learning in groups and solitary a preference for independent study (edutopia.org).

The mentor and mentee may already be aware of their learning style, or they may struggle with what is the best way for them to obtain new information. In order to facilitate learning, it may be helpful to review learning styles in the first mentoring session. There are several learning style quizzes that can be taken online, free of charge. Below are some additional resources that may assist you in determining your learning style.

Books:

Blackwell. J.O. (2012).Engage: The trainer's guide to learning styles. San Francisco: John Wiley and Sons.

Kolb, D. (2013). Learning style inventory workbook. Philadelphia: The Hay Group.

Websites:

http://www.learningstylesonline.com/inventory#online

http://www.educationplanner.org/students/selfassessments/learningstyles.shtml

http://www.simplypsychology.org/learningkolb.html

Communication Styles

Mentoring relationships require effective communication. As mentor and mentee work together to understand each other and promote knowledge transfer, the method and efficacy of communication is important. Communication not only includes verbal skills, but the ability to read nonverbal cues such as facial expressions and body language. Silence, reflection and effective listening are also important components to communication (Zachary, 2012).

Individuals are made up of a variety of personal experiences and cultures, which also contribute to communication style. As you work together within the context of the Hand Therapist Peer Mentoring Manual, consider the way you communicate, and the effect communication can have on the mentoring relationship. Provide opportunities for clarification, understanding one another's communication style. It is recommended that communication styles be discussed at the first mentoring meeting. Below are several resources that can assist in assessing and understanding communication styles.

Books:

McKay, D. (2019). *Effective communication skills: How to talk to anyone. A practical guide to boost your conversation and writing skills in the workplace, improve charisma and build healthy interpersonal relationships.*

Wyatt, W. (2014). *Communication skills: The ultimate guide to improve your communication skills and get your ideas across.* Kindle Edition January 2014.

Zachary, L. (2012). *The mentor's guide: Facilitating effective learning relationships.* San Francisco: Jossey-Bass.

Zachary, L. (2009). *The mentee's guide: Making mentoring work for you.* San Francisco: Jossey-Bass.

Websites:

http://www.goodtherapy.org/tests/interpersonalcommunicationskills.html#

https://www.forbes.com/sites/markmurphy/2015/08/06/which-of-these-4-communication-styles-are-you/#55295ae43ad

The Self-Assessment and Establishing Learning Goals

The Hand Therapy Certification Commission (HTCC) has developed a self-assessment that allows the learner to appraise their current level of knowledge in the area of hand therapy. For the purpose of the Hand Therapist Peer Mentoring Manual, the mentee will complete the self assessment and the results will be used to establish learning objectives.

The four areas evaluated are:

1. Anatomy and Physiology of the Upper Extremity

2. Upper Extremity Diagnoses and Conditions

3. Intervention Techniques, and

4. Knowledge Areas of the Upper Extremity

The self-assessment is available as a free download in the "Mentoring" section of the HTCC website (www.htcc.org).

Once the self assessment has been completed, the results can be analyzed and a professional development plan, with learning objectives, can be established. The results of the selfassessment will guide the learner toward knowledge and skill areas that need to be enhanced or acquired. The HTTC web site provides the instructions and forms for completing the professional development plan with a learning objective time line (https://www.htcc.org/mentoring/htcc-self-assessment). Upon completion of the selfassessment, the mentor and mentee are now ready to further discuss learning objectives and focus their attention on the appropriate learning modules.

Web Sites:

https://www.htcc.org/certify/exam-preparation/preparation-materials

https://www.htcc.org/certify/exam-preparation/exam-blueprint

Module One: Basic Science and Fundamental Knowledge

Topics to be covered:

- Surface anatomy of the upper extremity
- Anatomy and physiology of connective tissue
- Anatomy and physiology of the skeletal system
- Anatomy and physiology of the muscular system
- Anatomy and physiology of the nervous system
- Anatomy and physiology of the vascular and lymphatic system
- Development of agespecific upper limb function
- Kinesiology and biomechanics relative to the upper limb
- Pathomechanics and pathophysiology relative to the upper limb
- Etiology and pathology of medical conditions that may manifest with signs or symptoms in the upper limb
- Histology of bone and soft tissue healing and repair
- Physiology and psychology of pain
- Properties of heat, water, light, electricity and sound as they apply to physical agent modalities and electrodiagnostic tools
- Psychological reactions to impairment
- Research design and statistics
- Principles of evidence based practice
- Physical properties of orthotic and prosthetic materials

Learning Objectives

Upon completion of this learning module the therapist will be able to:

- ✓ Identify and palpate the musculoskeletal structures of the upper extremity beginning at the posterior cervical triangle progressing distally into the shoulder, elbow, forearm, wrist, and hand.
- ✓ Describe the phases of wound healing and tissue maturation as they apply to soft tissues structures.
- ✓ Compare the phases of bone healing to soft tissue healing.
- ✓ List the muscles of the upper extremity and their associated motions and innervations.
- ✓ Draw and label the brachial plexus including nerve/muscle innervations.
- ✓ Review the anatomy of a peripheral nerve and define the stages of nerve compression and associated outcomes.
- ✓ Label the arterial, venous and lymphatic vessels in the upper extremity.
- ✓ Explain the patterns of grasp and prehension associated with normal development.
- ✓ Understand the physiological effects heat, cold, light, electricity, and sound have on healthy tissues.
- ✓ Consider the affects systemic diseases have on upper extremity hand function
- ✓ Discuss tenodesis and the balance between the intrinsic and extrinsic muscles in the hand.
- ✓ Explain normal joint forces in the wrist and the importance of the triangular fibrocartilage complex (TFCC) for providing stability at the distal radial ulnar joint (DRUJ).
- ✓ Compare the normal versus functional arc of motion in the elbow.
- ✓ Review the normal function of the structures that comprise the finger dorsal hood creating balance between the interossei,lumbricals, EDC, FDP and FDS
- ✓ Appreciate the role the clavicle and scapula play on glenohumeral joint motion.
- ✓ Explore the difference between acute and chronic pain
- ✓ Formulate a PICO (Patient, Intervention, Comparison, Outcome) question and complete a literature search.
- ✓ Summarize a research article and appraise levels of evidence.
- ✓ Use current evidence to influence practice patterns.

Learning Objectives
(Continued)

- ✓ Analyze the limitations to evidenced based practice within individual practice settings.
- ✓ Explore the properties of thermoplastic materials and how they impact orthotic and prosthetic design.

Reference for Review

Mentee is to review a variety of references:

Resource:	Chapters:
Skirven, T.M., Osterman A.L., Fedorczyk, J., Amadio, P.C., Feldscher, S.B. & Shin, E.K. (2020). Rehabilitation of the hand and upper Extremity. (7th ed.). Philadelphia: Elsevier.	Chapters: 1-4, 12, 13, 14, 15, 21, 29, 40, 48, 83, 93, 99, 101, 105, 106, 118
Wietlisbach, C. (2020). Cooper's fundamentals of hand therapy: Clinical reasoning and treatment guidelines for common diagnoses of the upper extremity. (3rd ed.). Philadelphia: Elsevier.	Chapters: 1-4, 7,9,11,12
American Society of Hand Theapists. (2012). Test prep for the CHT exam. (3rd ed.). Mount Laurel: ASHT.	Chapters 1, 32
Hansen, J. (2014) Netter's clinical anatomy. (3rd ed.). Philadelphia: Saunders.	Shoulder, elbow, forearm, wrist and hand
Portney, L. & Watkins, M. (2009) Foundations of clinical research. Upper Saddle River: Prentice Hall.	Chapters: 1, 13, 14, 15, 19,24, and 35
Bracciano, A. (2008). Physical agent modalities: Theory and application for the occupational therapist. New York: Slack. OR Bellew, J., Michlovitz, S. & Nolan T. (2016). Modalities for therapeutic intervention. (5th ed.). Philadelphia: F.A.Davis Company.	

Suggested Learning Activities for Mentee

- Begin journaling and include any questions that may arise for discussion with your mentor. Include diagnoses, treatment interventions and reflect on efficacy of treatment and patient outcomes. Make note of any questions for your mentor. Use the template (Re source 1.1) as needed.
- Complete a surface exam on a family member, child, and individuals of different sizes. What structures are easy or difficult to pal pate?
- Draw anatomical structures on yourself with colored markers and tubigrip, or on a piece of paper when explaining diagnoses to your patients or others.
- Identify a patient who has a soft tissue injury (laceration, tendon repair, burn) and make a chart of the phases of wound healing. Identify a patient who has a healing fracture and use a calendar to chart the phases of their bone healing. Consider a patient who is 2 weeks s/p a crush injury to the index finger with soft tissue and bone involvement. Ask yourself what structures will heal first and why?
- Create a chart (Resource 1.2) of the muscles in the upper extremity, and their associated actions and nerve innervations. Use the chart to classify low verses high nerve injuries.
- Using the muscle nerve template (Resource 1.2) as a guide, delete some of the information and quiz yourself by filling in the blanks.
- Find a Youtube™ video on the brachial plexus and illustrate the brachial plexus. Practice drawing the brachial plexus for coworkers and have them grade you for accuracy.
- Consider a patient with nerve compression and a patient with nerve laceration with grafting/repair. Use the table (Resource 1.3) to determine the prognosis for each patient's motor and sensory return. Which will come first? List the order of sensory return from deep pressure to static 2 point.
- Review the arterial anatomy of the upper extremity. Determine which artery provides the primary blood supply to the hand. Find a Youtube™ video on how to perform the Allen's test and perform the Allen's test on several individuals (observe the radial and ulnar arterial flow into the hand).
- Contact a pediatric occupational therapist and observe several treatments addressing hand use in developmental play and hand writing.
- What modalities have you used to decrease inflammation, decrease pain, and increase soft tissue mobility? Create a list of modalities you have used along with diagnosis you were treating. What parameters were used and why? For each modality listed, consider an alternative modality that would have a similar affect.

Suggested Learning Activities for Mentee
(Continued)

- Reflect on a patient with loss of finger flexion. How do you differentiate between intrinsic tightness and joint stiffness. Reflect on a patient with loss of finger extension. How do you differentiate between joint stiffness and extrinsic tightness.
- Watch the Dorsal Apparatus video from https://bracelab.com/clinicians-classroom to assist in understanding the relationship of the structures over the dorsum of the finger.
- Explain how the position of the wrist influences finger motion and propose tendon transfers for a patient with radial nerve palsy. How would the position of the wrist affect therapy after these tendon transfers?
- Create a case study involving a fall to the outstretched hand with continued ulnar sided wrist pain. What would be the course of treatment?
- Have you ever wondered why elbows get stiff so quickly? Review elbow anatomy and measure the elbow range of motion in your coworkers. Make note of normal ROM. Immobilize a coworkers elbow and have them attempt to perform functional activities. What arc of motion is needed to perform basic activities of daily living?
- Observe the posture of all your patients on any given day. Consider the affects forward shoulders have on the ability to reach overhead. Then observe a patient s/p rotator cuff repair as he/she begins active motion. Explain how patients compensate for weakness or muscle imbalance in their rotator cuff muscles? What type of HEP would be helpful in improving scapular stabilization?
- Watch the following video on pain (Pain Explained in 5 Minutes) and apply the concepts to a patient who you are currently treating: https://www.youtube.com/watch?v=DEPK_b2p0JU
- Make a list of systemic diseases that are often seen in the general population; diabetes, lupus, hypothyroidism, kidney failure, coro nary artery disease. Investigate those diseases and the impact they have on the integument, vascular, and musculoskeletal structure of the hand and upper extremity. How do the medications used to treat these conditions impact tissue healing?
- Identify an area of interest or a clinical question regarding a diagnosis and treatment. From this idea, establish a PICO (Patient, Intervention, Comparison, Outcome). To formulate a PICO question, be specific on the patient population, an intervention, a comparison and an outcome. Use the following PICO question as a guideline: For a 65 year old female with carpal metacarpal (CMC) joint arthri tis in the dominant hand, is the use of a custom fabricated therm plastic thumb stabilization splint more effective than a prefabricat ed neoprene splint in decreasing pain during writing tasks? (Young & Zizik, 2011).

Suggested Learning Activities for Mentee
(Continued)

- Use the terms included in your PICO question; CMC joint arthritis, hands, splinting, arthritis, thermoplastic orthosis, perform an online literature search using CINHAL, MEDLINE, Journal of Hand Therapy, Cochrane Library and Google Scholar. See how many articles you can find that relate to this topic. Use the worksheet (Resource 1.4) to assist with organizing your search.
- Choose one article to read and appraise. A CAP worksheet can be found at: https://www.aota.org/~/media/Corporate/Files/Practice/EvidenceExchange/CAP_Worksheet.docx
- Compare the difference between qualitative and quantitative data collection. Find an article that uses each method and consider how both can be important in gathering information that informs evidence based practice.
- Define and review statistical terms (Resource 1.5). Explain the role of mean, median and mode in a normal distribution or bell shaped curve.
- Present one article review to coworkers for discussion and explain how the information may affect practice patterns. Discuss the current limitations to evidenced based practice with your coworkers and/or mentor.

Suggested Prompts for the Mentor

- Determine the difference between low temperature plastic material and high temperature plastic material. Cut small squares of a variety of low temperature plastics found in the clinic. Heat them and compare their properties. Consider which material would be used for a volar wrist orthosis after a distal radius fracture and which material would be best for a finger extension orthosis after mallet injury.
- Review journal with mentee as needed and provide clarification and resources for questions.
- Assist the mentee with obtaining access to on-line data bases for completion of literature searches.
- Facilitate discussion using questions such as: What do you know? What would you like to know more about? Has any of this information changed your practice patterns?
- Have mentee reflect upon current patient caseload and how this information impacted current treatment, and plans for future treatment.
- Review learning objectives and discuss areas of strengths and/or weaknesses pertaining to information covered in this module.
- Present a case study from your own clinical experience and then ask the mentee to present a case study that correlates to the topics in this module.
- Model the role of a mentor; demonstrate an interest in learning, think out loud as you process questions, anticipate questions on complicated topics and breakdown activities (Barkley, 2010).

Before moving on to module two compare your learning objectives from the self-assessment to the learning objectives of this module. The goal of this module is to review and establish an understanding of the fundamental knowledge and scientific knowledge base required within the practice of hand therapy, and to establish a sound foundation for treating conditions of the upper extremity. Have your learning objectives been met? If there are any unanswered questions or areas that require more time, explanation, or practice, take the time to review in a mentoring session. You may need additional resources or additional time to review.

Resource 1.1

Journaling Template

Date:

Diagnosis being treated:

Patient presented with:

What treatment approaches have been used?

What is working?

What part of treatment is a challenge?

What can be done at the next treatment session or when I have a similar patient?

What requires further exploration?

Questions for my mentor:

Resource1.2

Muscle action and nerve innervation of the shoulder, elbow, wrist and hand:

Muscle	Action	Innervation
Serratus Anterior	Scapular abduction and upward rotation	Long Thoracic Nerve
Trapezius (upper fibers)	Scapular elevation	Accessory Nerve/ Cranial Nerve XI (eleven)
Levator Scapulae	Scapular elevation	C3-C5/Dorsal Scapular Nerve
Trapezius (middle fibers)	Scapular adduction	Accessory Nerve/ Cranial Nerve XI (eleven)
Trapezius (lower fibers)	Scapular depression and adduction	Accessory Nerve/ Cranial Nerve XI (eleven)
Rhomboids	Scapular adduction and downward rotation	Dorsal Scapular Nerve
Anterior Deltoid	Shoulder flexion and scaption	Axillary Nerve
Middle Deltoid	Shoulder abduction and scaption	Axillary Nerve
Posterior Deltoid	Shoulder horizontal abduction and extension	Axillary Nerve
Coracobrachialis	Shoulder flexion	Musculocutaneous Nerve
Supraspinatus	Shoulder flexion, abduction and scaption	Suprascapular Nerve
Lattisimus Dorsi	Shoulder extension	Thoracodorsal Nerve
Teres Major	Shoulder extension	Subscapular Nerve
Pectoralis Major	Shoulder horizontal adduction	Medial and Lateral Pectoral Nerves
Infraspinatus	Shoulder external rotation	Suprascapular Nerve
Teres Minor	Shoulder external rotation	Axillary Nerve
Subscapularis	Shoulder internal rotation	Upper and Lower Subscapular Nerves
Brachialis	Elbow flexion	Musculocutaneous Nerve
Brachioradialis	Elbow flexion engages when load is applied, a weak pronator/supinator with resistance	Radial Nerve Nerve
Biceps Brachii	Primary elbow supinator, elbow flexor when forearm supinated	Musculocutaneous Nerve
Triceps Brachii	Elbow extension	Radial Nerve
Aconeus	Assists with elbow extension	Radial Nerve
Pronator Teres	Primary pronator, elbow flexion when hand is loaded	Median Nerve
Pronator Quadratus	Un-resisted pronation	Anterior Interosseous Nerve (Median)
Supinator	Secondary supinator	Posterior Interosseous Nerve (Radial)
Flexor Carpi Radialis	Wrist flexion	Median Nerve
Palmaris Longus	Wrist flexion	Median Nerve
Flexor Carpi Ulnaris	Wrist flexion	Ulnar Nerve
Extensor Carpi Radialis Longus	Wrist extension	Radial Nerve

Muscle	Action	Innervation
Extensor Carpi Radialis Brevis	Wrist extension	Radial Nerve (PIN)
Extensor Carpi Ulnaris	Wrist extension in supination Wrist UD in pronation	Radial Nerve (PIN)
Flexor Pollicis Brevis (FPB)	Thumb MP flexion	Two heads/Median Nerve to the superficial head and Ulnar Nerve to the deep head
Flexor Pollicis Longus (FPL)	Thumb IP flexion	Median Nerve (AIN)
Extensor Pollicis Brevis (EPB)	Thumb MCP extension	Radial Nerve (PIN)
Extensor Pollicis Longus (EPL)	Thumb IP extension	Radial Nerve (PIN)
Abductor Pollicis Brevis (APB)	Thumb abduction	Median Nerve
Abductor Pollicis Longus (APL)	Thumb abduction	Radial Nerve (PIN)
Adductor Pollicis	Thumb adduction	Ulnar Nerve
Opponens Pollicis	Thumb opposition	Median Nerve
Opponens Digiti Minimi	Small finger opposition	Ulnar Nerve
Abductor Digiti Minimi	Small finger abduction	Ulnar Nerve
Flexor Digiti Minimi Brevis	Small finger MP joint flexion	Ulnar Nerve
Lumbricals	MCP joint flexion/IP extension	1st and 2nd Median Nerve 3rd and 4th Ulnar Nerve
Flexor Digitorum Superficialis (FDS)	PIP joint flexion	Median Nerve
Flexor Digitorum Profundus (FDP)	DIP joint flexion	Median Nerve (AIN to index and long) Ulnar Nerve (to ring and small fingers)
Extensor Digitorum (EDC)	MCP joint extension	Radial Nerve (PIN)
Extensor Digiti Minimi	Small finger extension	Radial Nerve (PIN)
Extensor Indices Propreis	Index extension	Radial Nerve (PIN)
Dorsal Interossei	Finger abduction	Ulnar Nerve
Palmar Interossei	Finger adduction	Ulnar Nerve

Adapted from Young (2014).

Resource 1.3

Seddon staging (1943)	Sunderland staging (1978)	Anatomical Description	Exam Findings	Outcomes
Neuropraxia	Level I	Injury due to pressure or stretch. Structure of nerve is intact	Subjective reports, motor weakness may be present	Reported symptoms should resolve in days to weeks
Axonotmesis	Level II: Wallerian degeneration Level III: Regeneration may not occur at original end organs	Internal structure of nerve is intact however, axons are damaged and Wallerian degeneration occurs	Positive: Tinel, NCS and EMG	Nerve regenerates at 1mm per day. Poor prognosis if target muscle is not reached by 18 months
Neurotmesis	Level IV: Neuroma in continuity Level V: Complete nerve transection	Structure of nerve is destroyed (cutting, scarring or prolonged compression)	Positive: TInel, NCS and EMG	Surgical intervention is required

Adapted from: Rehabilitation of the Hand and Upper Extremity (2011).

Resource 1.4

PICO Question

Patient:
Intervention:
Comparison:
Outcome:
Terms to Search:

Resource 1.5

Define the following terms:

1. Hypothesis
2. Null hypothesis
3. Parametric statistics
4. Nonparametric statistics
5. Qualitative data
6. Quantitative data
7. Interval
8. Nominal
9. Ordinal
10. Ratio
11. Bell shaped curve
12. Mean
13. Median
14. Mode
15. Interrater reliability
16. Intrarater reliability
17. T test
18. ß level
19. Type I error
20. Type II error
21. *a* level
22. Independent variable
23. þ value
24. Content validity
25. Construct validity

References and Additional Resources for Module One:

Barton, N. (1983).Guide to terminology for hand surgery: Report of the nomenclature committee. *Journal of Hand Surgery, 8, 814-828.*

Donatelli, R.A. (2012). *Physical therapy of the shoulder.* (5th ed.). St. Louis: Elsevier.

Goldberg, S. (1986). Clinical neuroanatomy made ridiculously simple. Miami: Medmaster.

Klienman, W.B. (2007). Stability of the distal radioulnar joint: Biomechanics, pathophysiology, physical diagnosis and restoration of function. What we have learned the past 25 years. *The Journal of Hand Surgery,7, 1086-1106.*

LaStayo, P.C. & Lee, M.J. (2006). The forearm complex: Anatomy, biomechanics and clinical considerations. *Journal of Hand Therapy, 19, 137-145.*

Law, M., & MacDermid, J. (2008). *Evidence-based rehabilitation: A guide to practice.* Thorofare: Slack.

MacDermid, J. (2004). An introduction to evidence-based practice for hand therapists. *Journal of Hand Therapy, 17, 105-117.*

Szabo, R. (2008) Show me the evidence. *Journal of Hand Surgery, 33, 150-156.*

Valdes, K. & Von der Heyde, R. (2012). Attitudes and opinions of evidence-based practice among hand therapists: A survey study. *Journal of Hand Therapy, 25, 288-296.*

Young, K. & Zizik, D. (2011). The use of a thumb stabilization orthosis is an effective treatment for decreasing pain in females with CMC joint arthritis in the dominant hand. Unpublished CAT, Thomas Jefferson University, Philadelphia, PA.

Young, K. (2014). The elbow, wrist and hand.Unpublished Power Point Presentation. Greenville: Proaxis Therapy.

Websites:

Critically Appraised Topics: http://www.otcats.com/topics/index.html http://www.ethics.va.gov/education.asp

AOTA Evidence Exchange: www.aota.org

World Federation of PT databases: https://www.wcpt.org/node/29620#pt-specific

Perform a search for Youtube™ videos on:

- Brachial Plexus
- Allen's Test
- Hand Dissection
- Shoulder Dissection

Module Two: Assessing Upper Limb and Relevant Patient Characteristics

Topics to be covered:

- Obtaining and reviewing history including medical, surgical, pharmacologic, imaging, neuro diagnostics, and co-morbidities
- Conducting patient, family and/or caregiver interviews pertaining to hand therapy needs
- Performing an upper limb screen and systems review
- Selecting, performing and interpreting assessment of: accessory motions, ADL/IADL function, dexterity and coordination, edema and swelling, functional capacity and work site, muscle function (MMT, tone, imbalance, atrophy), pain, patient-reported outcomes, posture, ROM, sensibility, special signs and tests of the upper extremity, strength (dynamometry), sympathetic status, tightness (intrinsic, extrinsic, capsular), vascular status, wounds
- Interpreting examination findings based on basic science, fundamental knowledge, and knowledge of conditions of the upper limb in order to diagnose, validate a diagnosis and/or consider differential diagnosis
- Assessing the need for orthotic or prosthetic intervention
- Identifying complications associated with medical condition(s)

Learning Objectives

Upon completion of this learning module the therapist will be able to:

- ✓ Complete a comprehensive upper extremity evaluation including range of motion, manual muscle testing, grip/prehension strength, sensory, edema, pain, and wound/soft tissue assessment.
- ✓ Perform a thorough intake including history a
- ✓ Demonstrate competence with differential diagnoses and provocative testing in the upper extremity.
- ✓ Perform a thorough intake including history and assessment of symptoms.
- ✓ Identify the standardized and non-standardized assessments used in the clinic.
- ✓ Verbalize the importance of establishing patient centered, functional, and occupation based goals.
- ✓ Apply the outcomes of pharmacology, lab values, diagnostic imaging, and electrodiagnostic test results to the patient evaluation.

Learning Objectives
(Continued)

- ✓ Justify the use of specific assessments for operative and nonoperative diagnoses.
- ✓ Accurately assess individuals with the following diagnoses:
  - Soft tissue adhesions
  - Capsular tightness
  - Amputations
  - Arthritis and rheumatic disease
  - Congenital anomalies
  - Crush injuries/trauma
  - Cumulative trauma disorders
  - Cysts and tumors
  - Developmental disabilities
  - Dislocations and subluxations
  - Dupuytren's disease
  - Edema
  - Factitious disorders
  - Fractures
  - Infections
  - Ligamentous injury and instability
  - Lymphedema
  - Muscular strains, tears and avulsions
  - Nerve injuries and conditions (e.g. neuropathies, palsies, nerve repairs)
  - Neuromuscular diseases (e.g. MS, ALS, MD)
  - Pain (e.g. complex regional pain, fibromyalgia)
  - Replantation and revascularization
  - Spinal cord and central nervous system (CNS) injuries
  - Tendon Injuries and conditions (e.g. lacerations, transfers, tendonosis, ruptures)
  - Thermal and electrical injuries
  - Vascular disorders
  - Wounds and scars

Reference for Review

Mentee is to review a variety of references:

Resource:	Chapters:
Skirven, T.M., Osterman A.L., Fedorczyk, J., Amadio, P.C., Feldscher, S.B. & Shin, E.K. (2020). Rehabilitation of the hand and upper Extremity. (7th ed.). Phildelphia: Elsevier.	Chapters: 5-14, 16-20, 22-27, 30-33, 35-38, 41-47, 50-58, 59-64, 66-69, 73-82, 85-92, 111-120, 122-125
Wietlisbach, C. (2020). Coopers' fundamentals of hand therapy: Clinical reasoning and treatment guidelines for common diagnoses of the upper extremity. (3rd ed.). Philadelphia: Elsevier.	Chapters: 4,5, 17-39
American Society of Hand Therapists. (2012). Test prep for the CHT exam. (3rd ed.). Mount Laurel: ASHT.	Chapters: 2-11, 14-22, 24-29, 31
Hansen, J. (2014) Netter's clinical anatomy. (3rd ed.). Philadelphia: Saunders.	Shoulder, elbow, forearm, wrist and hand
American Society of Hand Therapists. (2015). Clinical assessment recommendations. Mount Laurel: ASHT.	Entire book. Portions on website at ASHT.org

Suggested Learning Activities for Mentee

- Continue journaling and include any questions that may arise for discussion with your mentor. Include diagnoses, evaluations per formed and results of patient assessments. Reflect on efficacy of use of evaluation tools and evaluation skills. Make note of any questions for your mentor.
- Design a template for an initial evaluation including sections for patient history, medical history, tests, observation, visual inspection, palpation, edema, range of motion (ROM), manual muscle testing (MMT), grip and pinch strength testing, pain and sensation. Com pare this evaluation template to one you are currently using or one that you have used in the past. Would you consider this evaluation comprehensive and inclusive of important information?
- Develop a list of open-ended questions that will help you assess the physical, psychological and economic status of your patient and consider the impact this information will have on patient outcomes. (For example: Could you tell me more about the type of work do you do? I am interested to know what you enjoy doing in your free time? Would you tell me more about your last doctor's appointment?)
- Choose five diagnoses with which you are not familiar. What standard tests would you perform to determine or confirm the diagnosis? What special tests or provocative tests would you use? What symptoms are you looking for? What are you ruling out? How will you document and communicate these outcomes to the patient and physician? Create a chart to organize your evaluation plan (Resource 2.1).
- Complete a sensory evaluation on two people without sensory complaints; a young laborer and on an older individual with a sedentary job. Consider the effects of swelling, callouses and tissue integrity as you compare the outcomes of their sensory testing.
- Recall a patient with a nerve lesion in continuity and a patient with a nerve laceration. How did their sensory exams differ? How did their motor exams differ? Which one might be referred for a nerve conduction study and why? Compare the clinical symptoms of the patient with the nerve lesion in continuity to the outcome of their nerve conduction study.
- Contact a neurologist in your community and request the opportunity to observe a nerve conduction study. Prior to the observation make a list of questions that would appropriate to ask the neurologist who is testing for nerve compression in the upper extremity.
- Create a checklist list of special testing used in diagnosing conditions of the shoulder, elbow, wrist and hand. Rank your

Suggested Learning Activities for Mentee

(Continued)

comfort level in performing each of those tests. Have a movie night in order to familiarize yourself with these tests. Watch Youtube™ videos and practice provocative testing on a family member or friend.

- Organize the anatomical structures of the wrist by location: radial dorsal zone, central dorsal zone, ulnar dorsal zone, radial volar zone and ulnar volar zone. What provocative tests could be per formed in order to address symptoms in each area? (See Resource 2.2). Create a similar chart for the elbow and shoulder.
- Appraise your level of knowledge regarding the diagnosis list within this module's learning objectives. Make a list of diagnoses that you are not familiar with. Locate a therapist or physician within your community that evaluates and/or treats patient with these diagnoses and ask to observe in the clinic to gain exposure to patients with these diagnoses.
- Complete an exam for differentially diagnosing shoulder stiffness, elbow pain, radial wrist pain, hand weakness and a proximal inter phalangeal (PIP) joint contracture. What would the evaluation look like if the patient is in the clinic? What would the evaluation look like if it was being completed via telemedicine or virtually?
- Locate a copy of the Mayo Elbow Performance Index (MEPI), the Disabilities of Arm, Shoulder and Hand Questionnaire (DASH) and the Patient Rated Elbow Evaluation (PREE). Administer one of these outcomes measures to three separate patients with the diagnosis of elbow dysfunction or pain. Compare the three outcomes as they measure changes in function and pain. Does one appear more sensitive or predictive of patient outcomes than the other?
- Develop a case study of an individual with adhesive capsulitis in the shoulder. List the symptoms you would expect to see upon evaluation. How would you differentiate between adhesive capsulitis and impingement in the shoulder? What provocative tests would you use?
- Formulate a way to perform a quick and easy upper quarter screen on family members, coworkers and patients. Make sure to screen for cervical conditions. What are you looking for? What are you ruling out? What would you do if you identified a problem through this screen?
- Choose a diagnosis and explain how the therapy evaluation would differ for a patient receiving non-operative treatment versus postoperative treatment for that diagnosis. What evaluation components would be the same? Which ones would differ and why? Reflect upon patients that you have seen with this diagnosis.
- Define your individual life roles and compare them to the life roles of a patient you are currently treating. Consider the impact upper extremity dysfunction has on life roles and how that should be ad dressed upon an initial evaluation.

Suggested Prompts for the Mentor

- Review journal with mentee as needed and provide clarification and resources for questions.
- Facilitate discussion using questions such as: What do you know? What would you like to know more about? Has any of this information changed your practice patterns?
- Have mentee reflect upon current patient caseload and how this information impacted current evaluation techniques, and plans for performing future evaluations.
- Assume a diagnosis and role play to have the mentee complete an evaluation in order to identify the diagnosis.
- Formulate a list of questions that require critical thinking and problem solving such as:
    - What muscle would you test to rule out high versus low injuries to the radial, medial and ulnar nerves?
    - What position would you test interosseous function, extrinsic flexors of the hand, intrinsic tightness, oblique retinacular ligament tightness (ORL), ulnar collateral ligament (UCL) of the thumb?
    - What is the importance of active verses passive motion?
    - What is normal 2 point discrimination and what functional test would you use for sensation?
    - How does having a support system affect patient outcomes? Do you have an insurance consultant or charity program at your facility? Who is that contact person?
    - What affect will other medical conditions such as diabetes, heart disease, depression, and osteoarthritis have on patient evaluation and outcomes? How will you address this at the initial visit?
    - Why does the incidence of rotator cuff pathological increase over the age of 40? What role does tendon tensile strength and joint degeneration play in this diagnosis?
- Review learning objectives and discuss areas of strengths and/or weaknesses pertaining to information covered in this module.
- Present a case study from your own clinical experience and then ask the mentee to present a case study that correlates to the topics in this module.
- Model the role of a mentor; demonstrate an interest in learning, think out loud as you process questions, anticipate questions on complicated topics and breakdown activities (Barkley, 2010).

Suggested Prompts for the Mentor

(Continued)

Before moving on to module three compare your learning objectives from the self-assessment to the learning objectives of this module. The goals of this module are to ensure confidence with performing a comprehensive evaluation of the upper extremity and to gain the knowledge required to evaluate a variety of diagnoses. Have your learning objectives been met? If there are any unanswered questions or areas that require more time, explanation, or practice, take the time to review in a mentoring session. You may need additional resources or additional time to review.

Resource 2.1

Evaluation Chart

Diagnosis:					
Evaluation components:					
Provocative tests:					
Symptoms expected to see:					
What other diagnoses need to be ruled out?					
How will you explain your findings to the patient or physician?					

Resource 2.2

Pain with palpation:	Possible condition:	Provocative test?
Radial Side:		
Radial Styloid	Fracture DeQuervain's Arthritis Superficial branch of radial nerve Neuritis	
Scaphoid in the anatomical snuff box	Fracture Avascular Necrosis Scapholunate ligament injury	
Thumb first metacarpal, phalanges, MP and IP joints	Fracture Sprain/tendon injury UCL/Gamekeeper thumb	
First CMC joint	Osteoarthritis	
Scaphoid-trapezium-trapezoid joint	Synovitis or arthritis	
First dorsal compartment (APL and EPB tendons)	DeQuervain's Tendon rupture	
Third dorsal compartment (EPL tenon)	EPL tendon rupture or tendonitis	
Mid-Dorsal:		
Lister tubercle	Fracture EPL tendon rupture or tendonitis	
Lunate	Kienbock's disease Dislocation, subluxation, instability or fracture	
Capitate and capitolunate joint	Fracture Subluxation or instability Dissociation with or without arthritis	
Index, long and ring: 2nd, 3rd, and 4th metacarpals, phalanges, CMC, PIP and DIP joints	Fracture Sprain/ligament injury Volar plate injury Bossing (CMC joints)	
Scapholunate joint	Scapholunate ligament injury or dissociation Dorsal wrist ganglion cyst	

Second and 4th dorsal compartments (ECRB/ECRL and ED/EI tendons	Tenosynovitis or impingement between the extensor retinaculum Tendon rupture	
Ulnar Side:		
Ulnar styloid and ulnar head	Fracture Distal radioulnar joint injury	
Triquetrum	Fracture Lunotriquetral ligament injury TFCC injury	
Hamate	Fracture	
Small finger: 5th metacarpal, phalanges, CMC, MP, PIP and DIP joints	Fracture Sprain or ligament injury Volar plate injury to PIP joints	
Distal radioulnar joints	Arthritis Instability TFCC injury	
TFCC	TFCC injury Tear of articular disk Ligament disruption Distal radioulnar joint disruption	
Lunotriquetral joint	Lunotriquetral ligament injury or dissociation	
5th and 6th dorsal compartments (EDM and ECU tendons)	Tendonitis, tendon rupture, ECU subluxation	
Volar:		
Scaphoid tubercle	Fracture	
Pisiform	Fracture, Arthritis	
Hook of hamate	Fracture	
Distal ulnar tunnel	Ulnar tunnel syndrome (Guyon's canal) Nerve or artery injury	
Wrist and finger flexor tendons	Tenosynovitis Trigger finger Tendon rupture Dupuytren's Contracture of palmar fascia Volar wrist ganglion	

Adapted from: Wadsworth, Barch & Erickson (2011).

References and Additional Resources for Module Two:

Brand, P. & Yancey, P. (1993). *Pain: The gift nobody wants.* New York: Harper Collins.

Ellenbecker, T., Manske, R. & Kelley, M. (2011). The shoulder: Physical therapy patient management using current evidence. *In Current Concepts of Orthopaedic Physical Therapy*, (3rd ed.). LaCrosse: APTA.

LaStayo, P. & Howell, J. (1995). Clinical provocative tests used in evaluating wrist pain: A descriptive study. *Journal of Hand Therapy, 8, 10-17*.

MacDermid J.C., Tottenham, V. (2004). Responsiveness of the Disability of the Arm, Shoulder, and Hand (DASH) and Patient-Rated Wrist/Hand Evaluation (PRWHE) in evaluating change after hand therapy. *Journal of Hand Therapy, 17, 18-23.*

Prosser, R. Harvey, L., LaStayo, P., Hargreaves, I., Scougall, P., & Herbert, R. (2011). Provocative wrist tests and MRI are of limited diagnostic value for suspected wrist ligament injurues: A cross-sectional study. *Journal of Physiotherapy, 57,247-253.*

Sebelski, C. (2011). The elbow: Physical therapy patient management utilizing current evidence. *In Current Concepts of Orthopedic Physical Therapy* (3rd ed.). LaCrosse:APTA.

Valdes, K. & LaStayo, P. (2013). The value of provocative tests for the wrist and elbow: A literature review. *Journal of Hand Therapy, 26, 32-43.*

Wadsworth,M. C., Barch, E. & Erickson, M. (2011). The wrist and hand: Physical therapy patient management using current evidence. *In Current Concepts of Orthopaedic Physical Therapy*, (3rd ed.). LaCrosse: APTA.

Weiss, S. et.al. (2007). Radiography: A review for the rehabilitation professional. *Journal of Hand Therapy, 20,152-179.*

Wolfe S.W., Hotchkiss, R.N., Pederson, W.C., Kozin, S. H. eds.(2011). *Green's operative hand surgery.* Philadelphia: Elsevier.

Perform a Youtube™ search on the following topics:

- Hand Exam
- Special Tests for Evaluating the Upper Limb
- Carpal Tunnel Release
- Tendon Transfers

Module Three: Determining Prognosis and Individualized Plan of Care

Topics to be covered:

- Determining prognosis, rehabilitation potential, and expected functional outcomes and time-frame based on conditions, medical and/or surgical management and planned interventions
- Establishing goals specific to the assessment
- Interpreting data considering complications and contraindications to select interventions for the patient: adaptive and assistive devices, edema management, ergonomics, joint protection and energy conservation, manual therapy, modalities, neuromuscular reeducation, orthotics, pain management, posture and positioning, prosthetics, scar management, self-care and home management, sensory re-education and desensitization, therapeutic activity, therapeutic exercise, work conditioning and return-to-work programs, wound care and management
- Establishing an individualized plan of care based on hand and upper extremity treatment guidelines and medical/surgical management by integrating basic science, fundamental knowledge, best clinical evidence, clinical experience, and patient goals
- Consulting with and referring to other health care professionals
- Modifying the plan of care based on reassessment, outcomes, and patient characteristics
- Formulating a recommendation regarding readiness to return to life and/or work activities and for discharge.

Learning Objectives

Upon completion of this learning module the therapist will be able to:

- ✓ Formulate a plan of care based on diagnosis and patient presentation at the time of the initial evaluation.
- ✓ Identify patient deficits and compare to expected patient outcomes.
- ✓ Create functional and measurable goals for individuals and their diagnoses.
- ✓ Propose a normal course of treatment for a variety of diagnoses and discuss potential problems that may limit goal attainment.
- ✓ Explain the clinical decision making process as it applies to establishing or changing the frequency and type of treatment.

- ✓ Confidently collaborate with physicians, patients, care givers, and third-party payers to establish treatment outcomes.
- ✓ Identify the need for reassessing patient status when course of treatment requires change or discharge from therapy.
- ✓ Describe the importance of discharge planning in long term patient outcomes.
- ✓ Appraise documentation in order to improve communication and justification for services.
- ✓ Employ the attitudes and skills required to function as a member of the inter-professional team.

Reference for Review

Mentee is to review a variety of references:

Resource:	Chapters:
Skirven, T.M., Osterman A.L., Fedorczyk, J., Amadio, P.C., Feldscher, S.B. & Shin, E.K. (2020). Rehabilitation of the hand and upper Extremity. (7th ed.). Philadelphia: Elsevier.	Chapters: 15-125
Wietlisbach, C. (2020). Cooper's fundamentals of hand therapy: Clinical reasoning and treatment guidelines for common diagnoses of the upper extremity. (3rd ed.). Philadelphia: Elsevier.	Chapters: 11-16
American Society of Hand Therapists. (2012). Test prep for the CHT exam. (3rd ed.). Mount Laurel: ASHT.	Chapters 4-11, 15-22, 24-29

Suggested learning activities for the mentee:

- Continue journaling and include any questions that may arise for discussion with your mentor. Include diagnoses, evaluations per formed and results of patient reassessments. Reflect on timing of reassessments and efficacy of reassessment skills. Make note of any topics for discussion with your mentor.
- Choose two common diagnoses for the shoulder, two for the elbow, two for the wrist and two for the hand. Using the resources above, complete the table (Resource 3.1) comparing the nonoperative and operative courses of treatment. What are the expected time frames for healing? How would you determine when the patient is ready to progress with treatment? When would you change the home exercise program (HEP)? What would cause a patient to be come a candidate for operative treatment? When would you consult with the physician and other members of the inter professional team?
- Perform an initial evaluation on three patients with three different diagnoses. After reviewing the outcomes of the initial evaluation, estimate how long you think the patient will actually need to attend therapy. Document your estimation in your journal and return to them upon the patient's discharge. Were your estimates
- Perform two chart reviews. Assess your own documentation for goals that are functional, measureable and obtainable. Compare your goals to the **SMART** (**S**pecific – target a specific area for improvement, **M**easurable – quantify or at least suggest an indicator of progress, **A**ssignable – specify who will do it, **R**ealistic – state what results can realistically be achieved, given available resources, **T**ime-related – specify when the result(s) can be achieved) template. (Bovend'Eerdt, Botell & Wade, 2009).
- Choose a patient from your caseload, or consider a previous patient, with a post surgical diagnosis. Obtain a copy of the operative note and discuss the surgical approach with a hand surgeon. Now, use the Indiana Hand Center diagnosis and treatment manual to determine prognosis and length of treatment. Consider what factors would cause a delay in healing or may affect progress. Reflect on a similar patient. What promoted or delayed progression through therapy?
- Choose a diagnosis such as distal radius fracture or shoulder impingement. Make a list of every therapeutic intervention that could be use in the treatment of the condition. Now consider the patient factors such as comorbidities, level of understanding, culture, response to pain, and willingness to adhere to home programs/instruction. How will these factors influence the therapeutic interventions you choose to treat the patient and diagnosis?

Suggested learning activities for the mentee:

(Continued)

- Using a concept map (example at: https://www.libraries.psu.edu/psul/lls/students/research_resources/conceptmap.html) Choose a diagnosis or clinical question and map the many factors that influence a patient's progression through treatment (Resource 3.2). (A blank concept map can be found at: https://www.htcc. org/docs/default-source/peermentoringmanual/conceptmap12. pdf?sfvrsn=2)
- Create a case study using a current patient or fictional situation. Find a time to present this case study to your coworkers (all disciplines). Have a casual discussion regarding treatment approaches that could be used to assist this patient. Consider the background of each coworker (and their discipline) as they describe their preferred treatment approaches. What did you learn from this exercise? Did you gain perspective on a treatment approach that is not familiar to you? How does it benefit the patient to have the care and expertise different disciplines?
- Make a list of professionals that you may need to refer to. For example, individuals with specialty training in lymphedema, sports (golf, cycling, throwing), treatment of the spine, driver's retraining, pain management, vocational rehabilitation, counseling and phar macology. Reach out to these professionals within your community, either through a phone call or email to introduce yourself, and to gather information on their availability. Make a word document that lists the professional's name, contact information, and the necessary steps to make a patient referral. Change and update the document as needed.
- Develop a form letter that documents patient progress and need for continued treatment. Does your clinic use a reassessment letter to communicate with physicians and other health care providers? If not, identify the required steps in order to routinely send patient updates to physicians. What information should this letter contain? How will you communicate the need for continued therapy or the plan for discharge from therapy? Will this letter include patient goals? How do you determine when a reassessment needs to be performed?
- Consider a patient who requests to be discharged before you think they are ready, or before they have met their identified goals. What will you do to ensure continued follow through at home? What steps can you take to facilitate progress outside of the therapy clinic? Develop a protocol and/or list three ideas that allow for follow up or communication with this type of patient.
- Role play the following scenario with your mentor: A patient who has met their goals and the therapist feels is ready for discharge from therapy, however the patient does not want to be discharged and would like to continue attending therapy. All goals have been met and a home program has been established. The patient wants to continue with therapy however according to the recent reassessment they are no longer appropriate for treatment. What do you say to this patient? What other options can you provide?

Suggested Prompts for the Mentor:

- Review journal with mentee as needed and provide clarification and resources for questions.
- Facilitate discussion using questions such as: What do you know? What would you like to know more about? Has any of this information changed your practice patterns?
- Have mentee reflect upon current patient caseload and how this information impacted current patient treatment, reassessment, discharge and plans for future patient care.
- Review learning objectives and discuss areas of strengths and/or weaknesses pertaining to information covered in this module.
- Present a case study from your own clinical experience and then ask the mentee to present a case study that correlates to the topics in this module with emphasis on clinical decision making.
- Consider the steps you take when engaged in the clinical decision making process and highlight key components of clinical decision making for your mentee.
- Invite the mentee to observe in your clinic and ask for treatment suggestions on your patients.
- Identify ways your mentee has displayed good clinical decision making as it applies to patient treatment and outcomes.
- Provide resources for articles and individuals who may assist with any of the above suggested learning activities.
- Review learning objectives and discuss areas of strengths and/or weaknesses pertaining to information covered in this module.
- Present a case study from your own clinical experience and then ask the mentee to present a case study that correlates to the topics in this module.
- Model the role of a mentor; demonstrate an interest in learning, think out loud as you process questions, anticipate questions on complicated topics and breakdown activities (Barkley, 2010).

Suggested Prompts for the Mentor:

(Continued)

Before moving on to module four compare your learning objectives from the self-assessment to the learning objectives of this module. The goal of this module is to review and improve your ability to deter mine patient prognosis and establish a comprehensive plan of care. Have your learning objectives been met? If there are any unanswered questions or areas that require more time, explanation, or practice, take the time to review in a mentoring session. You may need additional resources or additional time to review.

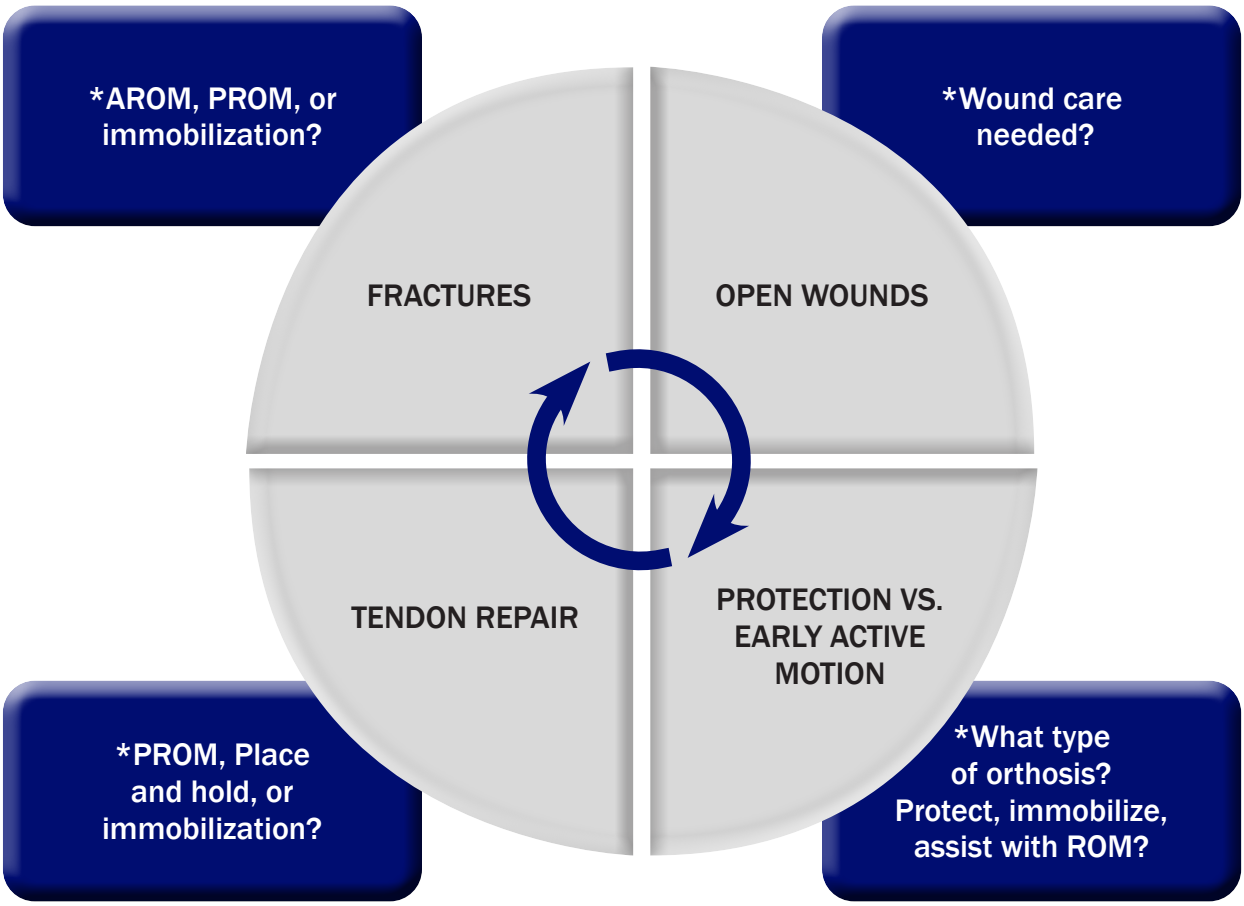
Resource 3.1

Diagnosis:

Treatment	Non-Operative	Operative
What structures are involved?		
What is the time frame for tissue healing?		
What will therapy address?		
When does treatment progress?		
How does the patient's HEP change/reflect progress through treatment?		
When would the patient be referred back to MD?		
What other disciplines may assist with care?		

Resource 3.2

Example of concept map for clinical decision making regarding orthotic fabrication after injury:



References and Additional Resources for Module Three:

Bovend'Eerdt, T., Botell, R. & Wade,D.(2009). Writing SMART rehabilitation goals and achieving goal attainment scaling: A practical guide. *Clinical Rehabilitation, 23,* 352-361.

Chesney, A., Chauhan, A., Kattan, A., Farrokhyar, F. &Thomas, A. (2011). Systematic review of flexor tendon rehabilitation protocols in zone II of the hand. *Plastic and Reconstructive Surgery 127*, 1583-1592.

Howell, J., Merritt, W., & Robinson, S. (2005). Immediate controlled active motion following zone 4-7 extensor tendon repair. *Journal of Hand Therapy, 18,* 182-190.

Evans, R. (2012). Managing the injured tendon: Current concepts. *Journal of Hand Therapy, 25,* 173-190.

Ng, C.Y., Chalmer, J., MacDonald, D., Mehta, S., Nuttall, D. & Watts, A. (2012). Rehabilitation regimens following surgical repair of extensor tendon injuries of the hand: A systematic review. *Journal of Hand and Microsurgery, 4,* 65-73.

Pang, L., Cheung, P. & Chan, J. (2005). Active mobilization after flexor tendon repair: Comparison of results following injuries in zone 2 and other zones. *Journal of Orthopaedic Surgery, 13*, 158-163.

Pettengill, K. (2005). The evolution of early mobilization of the repaired flexor tendon. *Journal of Hand Therapy, 18*, 157-168.

Sameem, M., Ignacy, T., Thoma, A. & Strumas, N. (2011). A systematic review of rehabilitation protocols after surgical repair of the extensor tendons in zones 5-8 of the hand. *Journal of Hand Therapy, 24*, 365-373.

Sueoka, S., & LaStayo, P. (2008). Zone II flexor tendon rehabilitation: A proposed algorithm. *Journal of Hand Therapy, 21*, 410-413.

Websites:

A blank concept map template can be found here https://www.htcc.org/docs/default-source/peer-mentoring-manual/conceptmap1-2.pdf?sfvrsn=2

Writing goals: https://www.smartsheet.com/blog/essential-guide-writing-smart-goals

Module Four: Implementing Plan of Care and Therapeutic Interventions

Topics to be covered:

- Implementing and modifying therapeutic interventions: adaptive and assistive devices, edema management, ergonomics, joint protection and energy conservation, manual therapy, modalities, neuromuscular reeducation, orthotics, pain management, posture and positioning, prosthetics, scar management, self-care and home management, sensory re-education and desensitization, therapeutic activity, therapeutic exercise, work conditioning and return-to-work programs, wound care and management (htcc.org)

Learning Objectives

Upon completion of this learning module the therapist will be able to:

- ✓ Identify appropriate treatment interventions for patient diagnoses.
- ✓ Display competency using the following treatment tools and techniques:
  - Adaptive equipment and assistive devices
  - Desensitization
  - Edema management
  - Ergonomic modification
  - Joint protection
  - Lymphedema management
  - Manual therapy techniques
    - Joint mobilization
    - Soft tissue techniques
    - Instrument assisted soft tissue mobilization
    - Mobilization with movement
  - Modalities
    - Cryotherapy
    - Fluidotherapy
    - Thermal/Heat
    - Iontophoresis
    - Electrical stimulation
    - Paraffin
    - Ultrasound/phonophoresis

Learning Objectives

(Continued)

- Neuromuscular re-education
- Orthotics (See Module Five)
- Patient, family and caregiver education
- Pain management
    - Graded motor imagery (laterality training, imagery, mirror therapy)
    - Stress loading
    - Relaxation techniques
- Postural awareness, modification, and adjustment
- Sensory reeducation
- Telehealth (video conferencing consultation)
- Taping techniques
- Therapeutic activities
    - Activity modification
    - Functional simulation
- Therapeutic exercise:
    - Mobility (e.g. AROM, PROM, AAROM)
    - Strengthening
    - Neural mobilization
    - Proprioceptive training
    - Tendon gliding
    - Dexterity and coordination
    - Endurance
    - Stabilization
- Work conditioning and return to work programs
- Wound care:
    - Debridement
    - Suture removal
    - Cleaning
    - Application of topical medications
    - Selection and application of dressings
    - Scar management

Reference for Review

Mentee is to review a variety of references:

Resource:	Chapters:
Skirven, T.M., Osterman A.L., Fedorczyk, J., Amadio, P.C., Feldscher, S.B. & Shin, E.K. (2020). Rehabilitation of the hand and upper extremity. (7th ed.). Philadelphia: Elsevier.	Chapters: 16, 28, 31, 33, 35, 42, 51, 53, 55, 57, 60, 62, 67, 69, 70-72, 75-83, 85-92, 96-98, 99-105, 106-125
Wietlisbach, C. (2020). Cooper's fundamentals of hand therapy: Clinical reasoning and treatment guidelines for common diagnoses of the upper extremity. (3rd ed.). Philadelphia: Elsevier.	Chapters:7-10
Coppard, B.M. & Lohman, H. (2020). Introduction to orthotics: A clinical reasoning and problem solving approach. (5th ed.). Philadelphia: Elsevier. OR Jacobs, M. & Austin, N, (2014). Orthotic intervention for the hand and upper extremity: Splinting principles and process. Philadelphia: Lippincott, Williams and Wilkins.	12,23,30-33
Bracciano, A.G. (2008). Physical agent modalities: Theory and application for the occupational therapist. (2nd ed.). Thorofare: Slack. OR Bellew, J., Micholvitz, S. & Nolan, T. (2016). Modalities for therapeutic intervention. (6th ed.). Philadelphia: F.A. Davis Company.	

Suggested learning activities for the mentee:

- Continue journaling and include any questions that may arise for discussion with your mentor. Include diagnoses, treatments provided and outcomes of those treatments. Reflect on your ability to effectively choose and use therapeutic interventions. Make note of any questions for discussion with your mentor.
- Define Health Literacy. Use the resources from Helen Osbourne's web site to assist in your understanding of the importance of health literacy and patient communication: http://www.healthliteracy.com/

Suggested learning activities for the mentee:

(Continued)

- Recognize the impact cultural differences have on communication and the therapeutic relationship. Choose two cultures different from your own and explore how those cultures act in response to eye contact, personal space, questioning, trust, timeliness, questioning, modesty and willingness to accept help from strangers.
- Use the chart (Resource 4.1) to rate your ability to perform the therapeutic interventions listed. Use this opportunity to learn more about a treatment interventions that you have never performed. Seek out new information regarding these interventions and instruct coworkers and others in what you have learned.
- Interview one hand surgeon in the community regarding his/her treatment approach to a specific diagnosis. Now interview a second hand surgeon about his/her treatment approach to the same diagnosis. Compare the two different approaches by the two different authorities. What do the surgeons do in common? What do they do differently? Create a list of questions that would help you gather information from the surgeon in order to assist and guide you in developing a treatment plan? (i.e. What type of surgery, What type of repair, integrity of the structures, precautions and potential limitations?)
- Choose two therapeutic interventions from the objectives of this module that you feel you are proficient in performing. Reflect on your experiences providing these interventions. What was it like when you first used these when treating a patient? How did you learn and become comfort able with these therapeutic interventions? Use this reflection to develop a plan to become proficient in two additional therapeutic interventions.
- Write three to five multiple choice test questions for each therapeutic intervention that you would like to know more about. Include diagnoses that would benefit from this type of treatment.
- Take a field trip to observe a therapist who is experienced in one of the following: orthotic fabrication, joint mobilization, taping, wound care, lymphedema treatment, and/or modalities. Be prepared with a list of questions that will help you apply the therapeutic intervention in your own practice.
- Differentiate between isokinetic, isometric, endurance, eccentric and concentric strengthening. Include diagnoses that would benefit. Using these principles, implement a strengthening program for a current patient.
- Find a research article explaining the benefits of graded motor imagery. Document a treatment plan for use of graded motor imagery with a patient with the diagnosis of complex regional pain syndrome (CRPS) in the upper extremity.

Suggested learning activities for the mentee:

(Continued)

- Design a home program that focuses on sensori-motor rehabilitation. List and describe a variety of activities that encourage proprioceptive feedback throughout the shoulder, elbow wrist and hand.
- Develop a template for a telehealth visit. What would the visit include? What questions would you have for your patient and what activities could be done from home? Consider how you will adapt your treatment. How will you measure joint range of motion?
- Create a video of a home program for a patient. For example, instruction in how to apply Kinesiotape™ prior to playing sports, use of gel sheeting for scar management, or nerve gliding to decrease pain from nerve compression.
- Take a continuing education instructional course in a therapeutic intervention with which you need more experience and confidence. For example: Neural mobilization, shoulder anatomy and rehabilitation, physical agent modalities, joint mobilization or wound care

Suggested Prompts for the Mentor:

- Review journal with mentee and provide clarification and resources for questions.
- Facilitate discussion using questions such as: What do you know? What would you like to know more about? Has any of this information changed your practice patterns?
- Have mentee reflect upon current patient caseload and how this information impacted the provision of current treatment, and plans for future treatment.
- Review learning objectives and discuss areas of strengths and/or weaknesses pertaining to information covered in this module.
- Present a case study from your own clinical experience and then ask the mentee to present a case study that correlates to the topics in this module.
- Use the table from Resource 4.1 to rate yourself. Compare your scores. Review the mentee's comfort level with a variety of treatment interventions. Choose two treatment interventions to review and present to the mentee. Practice these treatment interventions on one another.
- Model the role of a mentor; demonstrate an interest in learning, think out loud as you process questions, anticipate questions on complicated topics and breakdown activities (Barkley, 2010).

Before moving on to module five compare your learning objectives from the self-assessment to the learning objectives of this module. The goal of this module is to review and affirm confidence and competence at delivering the above mentioned therapeutic interventions. Have your learning objectives been met? If there are any unanswered questions or areas that require more time, explanation, or practice, take the time to review in a mentoring session. You may need additional resources or additional time to review.

Resource 4.1

RATE YOURSELF	ARE YOU PROFICIENT?		
Biofeedback techniques	YES	SOMEWHAT	NO
Compression therapy	YES	SOMEWHAT	NO
Continuous passive motion (CPM)	YES	SOMEWHAT	NO
Desensitization	YES	SOMEWHAT	NO
Design and/or selection of adaptive/assistive devices	YES	SOMEWHAT	NO
Ergonomic and activity modification in home, work, school	YES	SOMEWHAT	NO
Exercise (AROM, PROM, PRE's)	YES	SOMEWHAT	NO
Functional activity	YES	SOMEWHAT	NO
Hand writing techniques	YES	SOMEWHAT	NO
Joint protection instruction/energy conservation instruction	YES	SOMEWHAT	NO
Manual therapy	YES	SOMEWHAT	NO
Modalities	YES	SOMEWHAT	NO
Nutrition instruction	YES	SOMEWHAT	NO
Orthotic design, selection, fitting, fabrication and training	YES	SOMEWHAT	NO
Patient education	YES	SOMEWHAT	NO
Prosthetics	YES	SOMEWHAT	NO
Scar management	YES	SOMEWHAT	NO
Sensory re-education/Graded Motor Imagery	YES	SOMEWHAT	NO
Taping techniques	YES	SOMEWHAT	NO
Training in activities of daily living (ADL)/adaptive devices	YES	SOMEWHAT	NO
Wellness education	YES	SOMEWHAT	NO
Work conditioning	YES	SOMEWHAT	NO
Work hardening	YES	SOMEWHAT	NO
Wound care	YES	SOMEWHAT	NO

References and Additional Resources for Module Four:

Buonocore, S., Sawh-Martinez,R., Emerson, J., Mohan, P., Dymarczyk, M., & Thomson, J. (2012). The effects of edema and self-adherent wrap on the work of flexion in a cadaveric hand. *Journal of Hand Surgery 37*, 1349-1355.

Dilek, B, Ayhan, C., Yagci, G. &Yakut, Y.(2018). Effectiveness of the graded motor imagery to improve hand function in patients with distal radius fracture: A randomized controlled trial. Journal of Hand Therapy, 31, 2-9.

Flowers,K.& LaStayo,P. (2012) Effect of Total End Range Time on Improving Passive Range of Motion. *Journal of Hand Therapy, 25,* 48-55.

Gomes Carreir, A. J. (2010). Assessment of the effectiveness of a functional splint for osteoarthritis of the trapeziometacarpal joint of the dominant hand: A randomized controlled study. *Journal of Rehabilitation Medicine*, 469-474.

Hartzell,T., Rubinstein, R.& Herman, M. (2012). Therapeutic modalities: An updated review for the hand surgeon. *Journal of Hand Surgery, 37*, 597-621.

Howell, J., Merritt, W., & Robinson, S. (2005). Immediate controlled active motion following zone 4-7 extensor tendon repair. *Journal of Hand Therapy, 18,* 182-190.

Knygsand-Roenhoej, K. & Maribo, T. (2011). A randomized clinical controlled study comparing the effect of modified manual edema mobilization treatment with traditional edema technique in patients with a fracture of the distal radius. *Journal of Hand Therapy, 24*, 184-194.

Lalonde, D. (2014). Minimally invasive anesthesia in wide awake hand surgery. *Hand Clinics,* 30,1-6.

Sameem, M., Ignacy, T., Thoma, A. & Strumas, N. (2011). A systematic review of rehabilitation protocols after surgical repair of the extensor tendons in zones 5-8 of the hand. *Journal of Hand Therapy, 24*, 365-373.

Schultz-Johnson, K. (2002). Static progressive splinting. *Journal of Hand Therapy, 15*, 163-178.

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Osborne, H. (2013). *Health literacy from A to Z*. Burlington: Jones & Bartlett Learning.

Module Five: Orthotic Fabrication and Fitting

Topic to be covered:

- Application of a variety of orthoses for the hand and upper limb (htcc.org)

Learning Objectives

Upon completion of this learning module the therapist will be able to:

- ✓ Identify the physical properties of orthotic and prosthetic materials
- ✓ Fabricate and fit custom static orthoses for the hand and upper limb
- ✓ Fabricate and fit custom dynamic orthoses for the hand and upper limb
- ✓ Adjust and modify custom orthoses
- ✓ Choose and apply pre-fabricated orthoses
- ✓ Adjust and modify pre-fabricated orthoses
- ✓ Provide patient education for the use of orthoses

Reference for Review

Mentee is to review a variety of references:

Resource:	Chapters:
Skirven, T.M., Osterman A.L., Fedorczyk, J., Amadio, P.C., Feldscher, S.B. & Shin, E.K. (2020). *Rehabilitation of the hand and upper extremity.* (7th ed.). Philadelphia: Elsevier.	Chapters: 143
Coppard, B.M. & Lohman, H. (2020). *Introduction to orthotics: A clinical reasoning and problem solving approach.* (5th ed.). Philadelphia: Elsevier. OR Jacobs, M. & Austin, N, (2014). *Orthotic in tervention for the hand and upper extremity: Splinting principles and process*. Philadelphia: Lippincott, Williams and Wilkins.	

Suggested learning activities for the mentee:

- Gather a variety of thermoplastic materials used for orthotic fabrication. Heat the materials and determine the difference between the properties of the materials. Which type has more drape, which is more rigid, which is more comfortable? Determine which types of materials would be best for a patient with thumb arthritis as compared to a construction worker with a wrist fracture.
- Host an afterhours, or lunch and learn orthosis lab at your work place or a prearranged workspace. Invite therapists in your area to bring scrap materials and innovative design ideas to share while you supply a splint pan and tools to use.
- Demonstrate competency in fabricating a variety of custom fabricated orthoses by keeping a list. Identify appropriate diagnoses/applications for each orthosis and modifications that you have made. (List in resource 5.1).
- Demonstrate competency in choosing and applying a variety of prefabricated orthoses and keep a list of those you have used. Identify appropriate diagnoses/applications and modifications that you have made. (List in resource 5.2).
- Gather information on the use of a relative motion orthosis. What diagnosis would benefit from this type of orthosis?
- Practice applying a plaster cast to co-workers. Consider the properties of plaster and how the use of plaster could assist in decreasing joint stiffness

Suggested learning activities for the mentee:

(Continued)

- Fabricate and critique an orthosis that you have made. Does the design meet the patient's specific needs? Are the straps comfortable and secure? Does the orthosis clear important structures such as the distal palmar crease and avoid boney prominences? What is the aesthetic of the orthosis? Would you wear this orthosis?
- Take a video of yourself or a co-worker making an orthosis. Review the video. What would you have done differently? What techniques are used in the video?
- Create a patient education resource instructing a patient on the use of an orthosis. Use images and principles of health literacy to ensure the resource is easy to understand. Have a co-worker or family member provide feedback.
- Schedule an appointment to meet with a local prosthetist. Discuss the types of prosthetic devices and technology that are currently available. Determine how to make referrals to the prosthetist.

Suggested Prompts for the Mentor:

- Facilitate discussion using questions such as: What do you know? What would you like to know more about? Has any of this information changed your practice patterns?
- Have mentee reflect upon their own orthotic fabrication and fitting skills and how this information changed their way of thinking.
- Review learning objectives and discuss areas of strengths and/or weaknesses pertaining to information covered in this module.
- Present your own story of learning and growth in this area of practice.
- Reach out to other professionals within your community and prepare a list of individuals who may be willing to act as contacts for your mentee, in order to strengthen exposure and opportunities for the fabrication and fitting of orthoses

The goal of this module is to assist with developing the skills and confidence to fabricate and fit a variety of orthotics for the hand and upper limb. Have your learning objectives been met? If there are any unanswered questions or areas that require more time, explanation, or practice, take the time to review in a mentoring session. You may need additional resources or additional time to review.

References and Additional Resources for Module Five:

Baradaran, A., Baradaran, A., Ebrahimzadeh, M.H., Kachooei, A.R, Rivlin, M. & Beredjiklian, P. (2018). Comparison of custom-made versus prefabricated thumb splinting for carpometacarpal arthrosis: A systematic review and meta-analysis. Archives of Bone and Joint Surgery, 6, 478-485.

Colditz, J. (2002). Plaster of Paris: The forgotten hand splinting material. Journal of Hand Therapy, 15:0144-157.

Gandolaa, M., Zapparolib, L. , Saettac, G. , De Santisb, A. , Zerbi, A. , Banfib, G., Sansoneb, V., Brunob, M. & Paulesub, E. (2019). Thumbs up: Imagined hand movements counteract the adverse effects of post-surgical hand immobilization. Clinical, behavioral, and fMRI longitudinal observations. NeuroImage: Clinical, 23: 101838. doi: 10.1016/j.nicl.2019.101838

Hirth, M.J., Howell, J.W. & O'Brien, L. (2016). Relative motion orthoses in the management of various hand conditions: A scoping review. Journal of Hand Therapy, 29, 405-432. DOI:https://doi.org/10.1016/j.jht.2016.07.001

Midgley, R.(2016). Case report: The casting motion to mobilize stiffness technique for rehabilitation after a crush and de-gloving injury of the hand. Journal of Hand Therapy, 29, 323-333. DOI:https://doi.org/10.1016/j.jht.2016.03.013

Woulters, R.M., Tsehaie, J., Slijper, H.P., Hovius, S.E.R., Feitz, R., & Selles, R.W. (2019). Exercise therapy in addition to an orthosis reduces pain more that an orthosis alone in patient with thumb base osteoarthritis: A propensity score matching study. Archives of Physical Medicine and Rehabilitation, 100, 1050-1060.

Websites:

ASHT Hands On Orthotics Course (asht.org)

Youtube™ Videos on Orthosis Fabrication

Resource 5.1

Demonstrate competency in fabricating the following:

Orthosis	Diagnoses
Mallet	
Finger Gutter (volar and dorsal)	
Cylindrical Finger	
Volar Wrist	
Hand Based Thumb Spica	
Forearm Based Thumb Spica	
Forearm Based Dorsal Blocking	
Safe Position/ Resting Hand	
MP Extension Block	
Long Arm	
Munster/Sugar Tong	
Static Progressive Flexion/ Extension	
Dynamic Flexion/Extension	
Serial Casting	
Casting to Mobilize Stiffness	
Static Finger	
Dynamic Finger	
Buddy tapes or Finger sleeves	
Volar Wrist	
Hand Based Thumb Support	
Forearm Based Thumb Spica	
Soft Resting Hand	
Hinged Elbow	
Static Progressive Flexion/ Extension	
Dynamic Flexion/Extension	
Sports related/Playing cast	

Resource 5.2

Demonstrate competency in applying and/or modifying the following pre-fabricated orthoses:

Orthosis	Diagnoses
Static Finger	
Dynamic Finger	
Buddy tapes or Finger sleeves	
Volar Wrist	
Hand Based Thumb Support	
Forearm Based Thumb Spica	
Soft Resting Hand	
Hinged Elbow	
Static Progressive Flexion/ Extension	
Dynamic Flexion/Extension	
Sports related/Playing cast	

Closure and Moving Forward

When the learning objectives have been met, and the mutually agreed upon time has arrived, it is time for closure in the mentoring relationship. According to Zachary (2012), closure is a time to celebrate accomplishments and reflect upon the mentoring experience. Zachary suggests the steps for closure include; planning for closure in order to determine the best time for meetings to end, reflection on lessons learned, applying the learning experience to future endeavors, expressing appreciation and deciding how to move forward. Ask the questions: Will we keep in touch? What have we learned from this experience? How can we improve our mentoring skills? As the official mentoring relationship ends, reflect upon the mentoring experience and consider opportunities to continue to mentor within the occupational and physi cal therapy professions.

Mentoring Credit for CHTs

HTCC has defined three mentoring levels which may be used towards recertification for credit in Category E. These levels are defined here and may be used for up to a maximum of 30 CEU hours per 5 year recertification cycle.

To receive credit for mentoring, a signed Mentoring Contract and Mentoring Verification form with log must be submitted which includes the following:

1. Name and signature of mentor and mentee
2. Length of mentoring relationship
3. Frequency of meetings
4. Type of meetings (i.e. face to face, online, phone)
5. Identified goals for the mentoring relationship

References:

American Society of Hand Therapists (2011). P*osition paper on the hand therapist's scope of practice.*

Retrieved from http://www.asht.org

American Society of Hand Therapists. (2015). *Clinical assessment recommendations.* Mount Laurel: ASHT.
American Society of Hand Therapists. (2012). *Test prep for the CHT exam.* (3rd ed.). Mount Laurel: ASHT.

Avers, D. & Brown, M. (2018). *Daniels and Worthingham's muscle testing: Techniques of manual examination* (10th ed.). Philadelphia,PA: W. B. Saunders.

Barkley, E.F. (2010). *Student engagement techniques: A handbook for college faculty.* San Francisco: JosseyBass.

Bracciano, A. (2008). Physical agent modalities: Theory and application for the occupational therapist. New York: Slack.

Burianová, H., Sowman, P.F., Marstaller, L., Rich, A.N., Williams, M.A., Savage, G., Al-Janabi, B., de Lissa, P.& Johnson, B.W. (2016). Adaptive motor imagery: A multimodal study of immobilization-induced brain plasticity. Cerebral Cortex, 26: 1072–1080.

Cannon, N. (Ed.). (2001).*Diagnosis and treatment manual for physicians and therapists: Upper extremity rehabilitation.* (4th ed.). Indianapolis: The Hand Center of Indiana.

Community College of San Francisco. (2014). *Peer mentoring resource booklet.* Retrieved from:www.ccsf.edu.

Coker, P. (2010). Effects of an experiential learning program on the clinical reasoning and critical thinking skills of occupational therapy students. *Journal of Allied Health*, 39, 280286.

Culbertson, D. (2014). Benefits and characteristics of mentoring students and young professionals. *Journal of the American Speech-Language-Hearing Association,*42, 6773.

Dewey, J. (1938). Experience and education. New York: Touchstone.

Gandolaa, M., Zapparolib, L. , Saettac, G. , De Santisb, A. , Zerbi, A. , Banfib, G., Sansoneb, V., Brunob, M. & Paulesub, E. (2019). Thumbs up: Imagined hand movements counteract the adverse effects of post-surgical hand immobilization. Clinical, behavioral, and fMRI longitudinal observations. *NeuroImage: Clinical*, 23: 101838. doi: 10.1016/j.nicl.2019.101838

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Hagert, E. (2010). Proprioception of the wrist joint: a review of current concepts and possible implications on the rehabilitation of the wrist. Journal of Hand Therapy, 23(1):2-17. doi: 10.1016/j.jht.2009.09.008.

Hagert, E., Lluch, A.& Rein, S.(2016). The role of proprioception and neuromuscular stability in carpal instabilities. *Journal of Hand Surgery* (Eur Vol.), 41(1):94-101. doi: 10.1177/1753193415590390.

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Ladyshewsky, R. (2010). Building competency in the novice allied health professional through peer coach ing. *Journal of Allied Health*, 39, 7782.

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**Artwork for this manual will be changed upon publication and was purchased for use through dollarphotoclub.com and Adobestock.com