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## Perceptions Regarding Hand Therapy Content in Entry-level Occupational Therapy Programs

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# Perceptions Regarding Hand Therapy Content in Entry-level Occupational Therapy Programs

## Abstract

There are a substantial number of Certified Hand Therapists reaching retirement age in the next decade, however, there are few newer graduates who are pursuing this specialty. Students' lack of clinical knowledge has shown to be a barrier to successfully completing a hand therapy fieldwork affiliation. The purpose of the study is to investigate: (1) the perceptions of the clinicians working in hand therapy and students regarding the integration of hand therapy content in entry-level occupational therapy programs, and (2) the perceptions of both groups as to which content is deemed essential for a successful hand therapy fieldwork placement. This study utilized a survey design. Data was collected from 207 clinicians and 25 students via SurveyMonkey. The data were analyzed using descriptive statistics, chi-squared analysis, and t-test analysis via R studio statistical software. Participants placed the highest emphasis on foundational knowledge when ranking topic importance, which included muscular anatomy, skeletal anatomy, nervous system anatomy, palpation, and surface anatomy. Greater than 90% of participants (n=186 clinicians; n=23 students) also felt topics including kinesiology, biomechanics, tissue healing principles, fractures, tendinopathies, goniometry, and orthotic fabrication and training were very important to student success in hand therapy. Results also indicated that the greater number of students a clinician supervised, the higher they ranked student knowledge and skill level ( $p=.02$ ). These clinicians also reported stronger feelings that students would benefit from additional hand therapy curriculum content ( $p=.053$ ). Further study of the variability among occupational therapy curricula may be warranted, as well as studying the knowledge level needed with certain topics, and the level of independence needed with specific clinical skills to promote success in hand therapy.

## Keywords

Hand therapy, occupational therapy curriculum, fieldwork, content integration

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## Perceptions Regarding Hand Therapy Content in Entry-Level Occupational Therapy Programs

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### ABSTRACT

There are a substantial number of Certified Hand Therapists reaching retirement age in the next decade, however, there are few newer graduates who are pursuing this specialty. Students' lack of clinical knowledge has shown to be a barrier to successfully completing a hand therapy fieldwork affiliation. The purpose of the study is to investigate: (1) the perceptions of the clinicians working in hand therapy and students regarding the integration of hand therapy content in entry-level occupational therapy programs, and (2) the perceptions of both groups as to which content is deemed essential for a successful hand therapy fieldwork placement. This study utilized a survey design. Data was collected from 207 clinicians and 25 students via SurveyMonkey. The data were analyzed using descriptive statistics, chi-squared analysis, and t-test analysis via R studio statistical software. Participants placed the highest emphasis on foundational knowledge when ranking topic importance, which included muscular anatomy, skeletal anatomy, nervous system anatomy, palpation, and surface anatomy. Greater than 90% of participants (n=186 clinicians; n=23 students) also felt topics including kinesiology, biomechanics, tissue healing principles, fractures, tendinopathies, goniometry, and orthotic fabrication and training were very important to student success in hand therapy. Results also indicated that the greater number of students a clinician supervised, the higher they ranked student knowledge and skill level ( $p=.02$ ). These clinicians also reported stronger feelings that students would benefit from additional hand therapy curriculum content ( $p=.053$ ). Further study of the variability among occupational therapy curricula may be warranted, as well as studying the knowledge level needed with certain topics, and the level of independence needed with specific clinical skills to promote success in hand therapy.

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## **Introduction**

Hand therapy is a common specialty practice area in occupational therapy (OT). Hand therapy is defined as “the art and science of rehabilitation of the upper limb, which includes the hand, wrist, elbow, and shoulder girdle” (Hand Therapy Certification Committee [HTCC], 2020, p.1). There are about 6,000 Certified Hand Therapists (CHTs) in the United States, of which 85% are OTs versus physical therapists (PTs; Keller et al., 2016; Short et al., 2018). Additionally, some OTs specialize in hand therapy in outpatient settings but are not CHTs. However, recently there has been a decline in new graduates pursuing the hand therapy specialty (Keller et al., 2022; Ye, 2021) and a substantial number of CHTs are expected to retire in the next decade (Short et al., 2020). In 2017, the HTCC decreased the required years of clinical practice to encourage younger clinicians to pursue the CHT credential (Keller et al., 2022). Despite this, the mean age of CHTs continues to rise (Keller et al., 2022).

There is an inherent need for more OT graduates to pursue hand therapy due to these shortages. Researchers have found that a barrier to student success in hand therapy may be a lack of clinical knowledge (Short et al., 2018; Valdes & Castelli, 2023; Valdes et al., 2022; Ye, 2021). If students are not adequately prepared to complete a hand therapy fieldwork due to lack of clinical knowledge, it may prevent them from specializing in hand therapy. This study sought to investigate the perceptions of clinicians and students regarding the integration of hand therapy content in entry-level OT programs, and which content was essential for student success at a hand therapy fieldwork placement.

## **Fieldwork in Hand Therapy**

A successful fieldwork experience in hand therapy may promote more OTs to become CHTs or specialize in hand therapy (Patterson & D’Amico, 2020; Short et al., 2018). Recent OT graduates and novice practitioners are highly influenced by their fieldwork experiences when deciding on a practice area to pursue (Patterson & D’Amico, 2020; Rezaee et al., 2014). An individual’s fieldwork experience helps to connect didactic coursework education and OT practice by applying the students’ clinical knowledge to authentic scenarios (American Occupational Therapy Association [AOTA], 2016). This experience is a critical component to prepare the student to become a successful future clinician (AOTA, 2016).

In general, there is a shortage of fieldwork placements for OT students, but there is specifically a lack of hand therapy affiliations due to clinician hesitancy to accept fieldwork students because of lack of clinical knowledge (Evenson et al., 2015; Short et al., 2018; Valdes & Castelli, 2023; Valdes et al., 2022; Ye, 2021). In a survey conducted by Short (2018), 40% of 2,080 participants agreed or strongly agreed that students were not prepared with adequate knowledge to be successful in a hand therapy specialty rotation. However, 74% of participants reported that they would be more inclined to accept fieldwork students if they had further preparation (Short, 2018).

Students learn foundational knowledge during the didactic portion of their academic program, but most of their clinical application skills are developed and refined during their fieldwork affiliations, which prepares them to become successful clinicians (Greiner, 2015; Kasch et al., 2003; Ye, 2021). Students have reported feeling uncertain regarding their technical intervention skills as new graduates (Hodgetts et al., 2007). In the specialty area of hand therapy, these skills are highly emphasized, which impacts students' confidence in their abilities. In a recent study, a dyad model of peer-assisted learning (PAL) was found to promote success in a hand therapy setting (Aguilar et al., 2023). When two students with similar knowledge levels provided peer support, it helped to promote confidence, as well as enhance learning in multiple areas such as communication, clinical reasoning, and general knowledge of upper extremity conditions (Aguilar et al., 2023).

### **Barriers and Variability to Hand Therapy Content Integration**

There is limited data exploring how hand therapy content is included in OT programs (Schofield, 2017; Schofield & Schwartz, 2020; Short et al., 2020). Erickson et al. (2017) performed a survey study to provide guidelines for integrating hand therapy content into an entry-level PT program, however, there has yet to be any similar studies for OT programs. Further research is needed to ascertain a more in-depth look at what specific content could be added into the OT curriculum to better prepare students for success in a hand therapy fieldwork placement.

It is difficult to determine what content and skills should be emphasized in entry-level OT programs, due to the breadth of the scope of practice (Erickson et al., 2017; Schofield & Schwartz, 2020; Schofield, 2017; Ye, 2021). The Accreditation Council for Occupational Therapy Education (ACOTE) standards are broad and designed to prepare individuals to become generalists in the field of OT, so there is significant variability in how specialty content like hand therapy is integrated into independent institutional curriculums (ACOTE, 2018). The ACOTE standards require OT programs to include orthotic fabrication, fit, and management training into the curriculum (ACOTE, 2018), however, the method and the extent to which these institutions incorporate this content into their program varies greatly (Schofield & Schwartz, 2020). Similarly, when looking at the breadth and depth to which anatomy content was integrated throughout various OT programs, Schofield (2017) discovered there was substantial variability across institutions, due to varying faculty opinions regarding how anatomy content should be incorporated into the curricular design. Additionally, Short et al. (2020) noted the wide variability of hand therapy integration into OT programs. Some programs included hand therapy content in 0-1 courses, whereas others included hand therapy content into more than six courses throughout the OT curriculum (Short et al., 2020).

A lack of faculty with the specialized knowledge and experience in hand therapy limits the integration of hand therapy content into the curriculum and contributes to curriculum variability across institutions (Schofield, 2017; Schofield & Schwartz, 2020; Short et al., 2020). Short et al. (2020) found that hand therapy content should be taught by an individual who is a certified hand therapist (CHT), however, most OT faculty do not hold this credential. With only 3% of CHTs having the necessary doctoral degree to teach in

an accredited OT program, this is a significant barrier to integrating hand therapy content into the OT curriculum (Keller et al., 2016; Short et al., 2020). Some faculty believe hand therapy content can be applied to various practice settings, whereas others feel that hand therapy content is too advanced for a program designed to train generalists (Short et al., 2020). This demonstrates the lack of unity across faculty regarding the inclusion of hand therapy content into OT programs (Schofield, 2017; Schofield & Schwartz, 2020; Short et al., 2020). Furthermore, there is also a disconnect between students and faculty regarding what skills and knowledge are pertinent (Hodgetts et al., 2007). In a study performed by Hodgetts et al. (2007), students felt they lacked knowledge related to different practice settings, as well as clinical skills that were expected of them.

### **Bridging the Gap to Enter into Hand Therapy**

It has been suggested that new graduates who are interested in pursuing hand therapy should participate in a hand therapy fellowship following graduation, as a bridge between earning an OT degree and pursuing a CHT credential (AOTA, n.d.). The HTCC and the American Society of Hand Therapists (ASHT) recommend OTs participate in either a fellowship or mentorship program to support their entry into the hand therapy setting. However, most accredited hand therapy fellowships require, at minimum, participation in a Level II hand therapy fieldwork or at least one year of clinical experience in an outpatient setting, which entailed some hand experience (AOTA, n.d.; ASHT, n.d.; HTCC, n.d.). Both HTCC and ASHT also provide links to continuing education opportunities to develop specialized upper extremity knowledge and treatment skills (ASHT, n.d.; HTCC, n.d.), although the extra cost of these classes may prove to be a barrier to a new graduate. However, in 2018, ASHT began offering free online study material, called The Upper Extremity Institute, for all ASHT members (ASHT, n.d.). They also now provide a mentorship program, where clinicians looking to expand their upper extremity rehabilitation knowledge can apply to be paired with a mentor (ASHT, n.d.).

### **Problem and Purpose**

If a student did not participate in a hand therapy fieldwork affiliation, it may prove difficult to pursue this specialty if the didactic portion of their OT program did not include sufficient hand therapy content. Hand therapy practitioners believe students are not adequately prepared to complete a hand therapy affiliation (Short et al., 2018). There is an increasing need for OTs to pursue a hand therapy specialty with many CHTs reaching retirement age. Therefore, this research examined which content areas could be better incorporated into entry-level OT programs to better prepare students for successful completion of a hand therapy fieldwork experience and to potentially pursue a hand therapy specialty. The purpose of the study was twofold; (1) to investigate the perceptions of the clinicians working in hand therapy and recent graduates/students regarding the integration of hand therapy content in entry-level OT programs, and (2) to investigate the perceptions of both groups as to which content is deemed essential for a

successful hand therapy fieldwork placement. This in turn, will aim to provide suggestions for integrating hand therapy content into an entry-level OT program curriculum, so that students have adequate foundational knowledge to successfully complete a fieldwork affiliation in the outpatient hand therapy setting.

### **Methods**

This study used a descriptive survey design to gather data. Best practices were utilized to develop the two surveys to ascertain the perspectives of clinicians, recent graduates and students regarding what hand therapy content is deemed essential for entry-level OT students to be successful in a hand therapy fieldwork placement (Creswell & Creswell, 2023; Taylor, 2017).

### **Survey Design**

The survey was designed by the co-researcher. Hand therapy content areas were determined based off previous related literature (Erickson et al., 2017; Valdes et al., 2022). The clinician survey was a 19-item survey, whereas the recent graduate/student survey was a 20-item survey. Both surveys contained a variety of demographic questions, Likert scale questions, matrix questions, and one open-ended response. Questions addressed prior experience and knowledge related to hand therapy, perceptions of student preparedness, topic areas deemed most important for successful completion of a hand therapy fieldwork experience, and perceptions regarding OT curriculums in relation to hand therapy content.

Per best practices (Creswell & Creswell, 2023; Taylor, 2017), surveys were piloted to CHTs as well as students who had recently completed their hand therapy fieldwork affiliation. Feedback was received and minor edits were made to clarify two questions. The clinician survey was then submitted to the ASHT Research division and peer-reviewed once more. Minor edits were suggested, and these edits were then reflected in the student survey as well. The university's Institutional Review Board also provided ethical approval of the study prior to piloting and distribution.

### **Survey Participants and Data Collection**

A combination of convenience sampling and snowball sampling was utilized to maximize the number of participant responses. Two emails were sent two weeks apart to all ASHT members to recruit clinician participants. Various academic fieldwork coordinators and program directors of OT programs in the United States were contacted via e-mail to distribute the survey to OT students and new graduates. Participants for both surveys were also recruited through various social media groups and peers.

The inclusion criteria for clinicians encompassed working as an OT primarily in the field of hand therapy and have supervised at least one Level II fieldwork student. For the student/new graduate population, participants must have completed a Level II fieldwork experience in hand therapy within the past three years in the United States.

Data was collected anonymously via SurveyMonkey for a total of 30 days. Participants completed an informed consent prior to beginning the survey and were informed that participation was completely voluntary, and they could withdraw from the study at any time. The number of participants contacted is unknown, as the survey was distributed through multiple avenues.

### **Data Analysis**

Once data were collected, data were downloaded from SurveyMonkey to Excel (Microsoft Corporation, 2018). The raw data in the excel spreadsheet was cleaned for missing data and data was excluded from participants who did not meet the inclusionary criteria of this study. Data were then analyzed using R studio statistical software. The researchers utilized descriptive statistics and other statistical methods including Chi-square analysis and t-test to evaluate results of the study. Chi-square analysis and t-test analysis were used to ascertain trends regarding what factors influenced perceptions of student preparedness for a hand therapy fieldwork affiliation. A chi-square analysis was used to determine correlations between clinician perception of student preparedness with numbers of years' experience as an OT and CHT, as well as number of fieldwork students supervised. A chi-square analysis was also used to determine correlations between student perception of preparedness with fieldwork experience sequence and number of courses that contained hand therapy data within the curriculum. A p-value of .05 was used to determine significance. A t-test analysis was used to determine correlations between student perception of preparedness with type of OT program and inclusion of a hand therapy elective within the curriculum. Descriptive statistics were utilized to assess student preparedness, compare results of the student and clinician surveys to determine which topic areas are deemed most important for student success in a hand therapy fieldwork experience, as well as student perception regarding how well certain content was integrated into their OT curriculum. Student perceptions regarding how well content was integrated into their curriculum was then compared against importance level ratings. When determining significance, a value of 60% or greater agreement among participants was used when analyzing descriptive statistics.

## **Results**

### **Participants**

There were 286 clinician participants, however, only 207 participants met the inclusionary criteria and completed the survey in its entirety. There were 42 recent graduate/student responses, however, only 25 met all inclusionary criteria and completed the entirety of the survey. Due to the low response rate from the student/new graduate population, the findings are deemed exploratory.

Out of the 207 clinician participants, nearly 64% (n=132) were practicing OTs for 21+ years and 88% (n=183) of participants were CHTs. Of the 207 of the clinician participants, 88 (42.5%) of them had supervised more than six Level II fieldwork students and 70.5% (n= 146) of participants have supervised at least three Level II fieldwork students (see Table 1). Of the 25 student participants, 60% (n=15) of participants were from the Northeast and 76% (n=19) of participants were Masters of



Occupational Therapy (MOT) students while 24% (n=6) were entry level Occupational Therapy Doctorate (OTD) students. About 64% (n=16) of students completed their hand therapy fieldwork for their second Level II experience and 88% (n=22) of participants reported hand therapy content was integrated into 1-3 courses throughout their curriculum. This data is presented in Table 2.

**Table 1***Clinician Demographics*

	<b>n=207</b>		<b>n(%)</b>		
Years as OT	<b>&lt; 5 years</b> 16 (7.7)	<b>6-10 years</b> 24 (11.6)	<b>11-15 years</b> 24 (11.6)	<b>16-20 years</b> 11 (5.3)	<b>21+ years</b> 132 (63.8)
Years in Hand Therapy Setting	<b>&lt; 5 years</b> 26 (12.6)	<b>6-10 years</b> 26 (12.6)	<b>11-15 years</b> 23 (11.1)	<b>16-20 years</b> 32 (15.5)	<b>21+ years</b> 100 (48.3)
Certified Hand Therapist	<b>Yes</b> 183 (88.4)	<b>No</b> 24 (11.6)			
Certified Hand Therapist Years	<b>&lt; 5 years</b> 26 (14.2)	<b>6-10 years</b> 34 (18.6)	<b>11-15 years</b> 26 (14.2)	<b>16-20 years</b> 32 (17.5)	<b>21+ years</b> 65 (35.5)
Fieldwork students Supervised	<b>1-2 students</b> 61 (29.5%)	<b>3-5 students</b> 58 (28%)	<b>6+ students</b> 88 (42.5%)		

**Table 2***Student Demographics*

	<b>n=25</b>		<b>n (%)</b>			
Graduation Year	<b>2019</b> 2 (6.3)	<b>2020</b> 3 (12.5)	<b>2021</b> 8 (28.1)	<b>2022</b> 8 (31.2)	<b>2023</b> 4 (18.8)	
Program	<b>Masters</b> 19 (76)	<b>Doctorate</b> 6 (24)				
Fieldwork Rotation	<b>First</b> 6 (24)	<b>Second</b> 16 (64)	<b>Third</b> 3 (12)			
Region	<b>Northeast</b> 15 (60)	<b>Mid Atlantic</b> 1 (4)	<b>Midwest</b> 2 (8)	<b>South</b> 4 (16)	<b>Southwest</b> 1 (4)	<b>West</b> 2 (8)
Hand Therapy Elective	<b>Yes</b> 4 (16)	<b>No</b> 21 (84)				
Hand Therapy Courses	<b>1 to 3</b> 22 (88)	<b>4 to 5</b> 2 (8)	<b>6+</b> 1 (4)			

## Descriptive Statistics

### **Student Preparedness**

Clinician participants were asked to rate in general, how prepared they felt students were for a hand therapy fieldwork rotation, and whether they would benefit from additional hand therapy content within their curriculum. The majority of clinicians felt that students were either minimally prepared or somewhat prepared for a hand therapy fieldwork experience. However, more than 74% (n=154) of clinicians felt that students would benefit very much from additional hand therapy content in their OT curriculum to increase student preparedness (see Table 3). Student participants were asked their perception regarding how prepared they felt entering a hand therapy fieldwork experience. Sixty percent (n=15) of students felt that they were not prepared to enter a fieldwork experience in the hand therapy setting (see Table 4).

**Table 3**

#### *Clinician Descriptive Responses*

	<b>n= 207</b>	<b>n(%)</b>			
Overall Student Preparedness	<b>Not at all Prepared</b> 15(7.2)	<b>Minimally Prepared</b> 93(44.9)	<b>Somewhat Prepared</b> 86(41.5)	<b>Well Prepared</b> 11(5.3)	<b>DTA</b> 2(1)
Benefit from Additional Hand Therapy Content	<b>Not Very Much</b> 3(1.5)	<b>Somewhat</b> 44(21.3)	<b>Very Much</b> 154(74.3)		<b>DTA</b> 1(0.5)

**Table 4**

#### *Student Descriptive Response*

	<b>n= 25</b>	<b>n (%)</b>
Preparedness Rating	<b>Yes</b> 10(40)	<b>No</b> 15(60)

### ***Importance of Topics in Relation to a Successful Fieldwork Experience in Hand Therapy***

Participants were then asked to rank the level of importance of various topics related to a successful hand therapy fieldwork experience. These topics were grouped by foundational knowledge, common conditions of the upper extremity, assessment skills, and treatment techniques. The data were analyzed by comparing the perception of importance of these topics between the clinician and student groupings. The data were organized between topics deemed minimally and somewhat important, or important and very important (see Appendix A). There is a strong agreement between clinicians and students regarding the importance of most of the topics in relation to a successful fieldwork experience in hand therapy. The topics with the most significant ratings of importance among both the clinicians and students were surface anatomy and palpation of the upper extremity, skeletal anatomy of the upper extremity, muscular anatomy of the upper extremity, fractures, goniometry, and orthotic fabrication and training. Both sets of participants placed the highest emphasis on topics within the foundational knowledge category, but most topics within the common conditions, assessment skills, and treatment techniques, were also deemed very important.

### ***Student Perception Regarding Integration of Hand Therapy Topics into OT Curriculum***

Student participants were then asked to rank how well these same topics were integrated into their OT curriculum. Data were analyzed by comparing the student perception of how well these topics were integrated into the curriculum and presented in comparison to the level of importance ratings (see Appendix A). Students reported that most foundational knowledge topics were well integrated into their curriculum, except for vascular anatomy, tissue healing principles, and cortical representation of the upper extremity. About half of the assessment skill topics were also deemed well-integrated into their curriculum. These topics included goniometry, manual muscle testing, sensation assessments, functional outcome measures, dexterity and fine motor coordination assessments, and grip and pinch strength. Student perceptions were more divided among the common conditions and the treatment techniques categories. Regarding common conditions, the consensus was that cartilage injuries were not integrated well into their curriculum, but osteoarthritis and rheumatoid arthritis were integrated well. Lastly, in regard to treatment techniques, students agreed that wound care and nerve gliding were not well integrated into their curriculum, however, activity and environmental modifications were integrated well.

### **Correlations**

Using chi-square analysis with a p-value of  $<0.05$  as statistically significant, clinician demographics were analyzed to determine any correlations in regard to student preparedness for a hand therapy fieldwork experience. There was no statistical significance between a clinician's years' experience as an OT ( $p=.662$ ) or CHT ( $p=.861$ ) and their perceptions regarding student preparedness for a hand therapy fieldwork experience (see Table 5). There was also no correlation between number of fieldwork students supervised and perceived overall level of preparedness ( $p=.104$ ; see Table 5). However, a positive correlation was shown between the number of students the

clinicians supervised and how prepared they felt students were when assessing specific knowledge and skills ( $p=.02$ ; see Appendix B). Clinicians who supervised more students, also felt that students would benefit from additional hand therapy content integrated into their curriculum, however, this value was only borderline statistically significant ( $p=.053$ ; see Appendix B). When looking at student perceptions, no statistical significance was found between student preparedness and courses with hand therapy content ( $p=.776$ ) and order of fieldwork rotation ( $p=.791$ ; see Table 6). Two t-test analyses were conducted to compare student perception of preparedness for a hand therapy fieldwork with 1. point of entry into the field (MOT or OTD;  $p<.0001$ ) and 2. participation in a hand therapy elective ( $p=.061$ ). Using a p-value of  $<0.05$  as statistically significant, no statistically significant correlations were found with these variables (see Table 7). Although the correlation between student perception of preparedness and point of entry into the field had a p-value of  $<.0001$ , the confidence interval was .57-1.1 so this value was deemed insignificant.

**Table 5**

*Clinicians: Chi-Squared Tests of Student Preparedness*

	Chi statistic	degrees of freedom	p- value
By Years as OT	13.15	16	0.662
By Years as CHT	13.36	20	0.861
By Number of Fieldwork students	7.7	4	.104

**Table 6**

*Students: Chi test of Preparedness*

	Chi statistic	degrees of freedom	p- value
By Fieldwork Experience	1.04	3	0.791
By Number of Courses	5.11	2	0.776

**Table 7**

*Students: t-Test of Preparedness*

	t statistic	CI	p-value	p-value
By Elective	-1.92	.49 to .01.	0.061	0.061
By Program	6.34	0.57 to 1.1.	$>0.0001^*$	$>0.0001$

\*not significant because contains 1 in the confidence interval

## Discussion

The purpose of this study was to examine clinician and student perceptions regarding the integration of hand therapy content in entry-level OT curricula. The demographics of participants accurately reflected what was found in the literature review, as most clinician participants had been practicing for 21+ years and less than 8% (n=16) of participants had been practicing for less than 5 years. This demonstrates the limited number of new graduates pursuing this specialty and the need for more OTs to pursue hand therapy, being that a large percentage of hand therapists are nearing retirement age in the next decade (Short et al., 2018). Furthermore, there were only 25 student participants, which may be reflective of Short's (2018) assertion that clinicians are apprehensive to accept Level II fieldwork students in the hand therapy setting due to their lack of preparation and clinical knowledge.

Short et al.'s (2018) study found that 40% of clinicians felt students were not prepared to be successful in a hand therapy fieldwork affiliation due to lack of knowledge. Similarly, the results of this study indicate that 52% (n=108) of clinicians felt students were either not at all prepared or minimally prepared for a Level II hand therapy fieldwork experience. From the student perspective, 60% (n=15) of student participants in this study reported they did not feel prepared entering into a hand therapy fieldwork affiliation. However, from a faculty perspective, 86% of participants believed that the current level of hand therapy content integration is sufficient for student success in a hand therapy fieldwork experience (Short et al., 2020). This demonstrates a clear divide between clinician, student, and faculty perspectives and the potential need for further hand therapy content integration within the OT curriculum in order to better prepare students for a successful fieldwork experience.

In this study, 88% (n=22) of student participants reported that hand therapy content was only integrated into 1-3 courses throughout their curriculum, similar to Short et al.'s (2020) study where most OT faculty participants reported hand therapy content was integrated in 2-3 courses. However, there was substantial variability across programs, as some included hand therapy content in 0-1 courses, whereas others incorporated content into 6+ courses (Short et al., 2020). There have been other studies that also demonstrated the variability of content integration throughout different OT programs in the United States due to the differing interpretations of the broad ACOTE standards (Schofield, 2017; Schofield & Schwartz, 2018). Specifically, these studies looked at orthotic fabrication and anatomy.

Schofield and Schwartz (2018) studied the wide variability of orthotic fabrication into different OT programs. They found that most programs incorporated orthotic fabrication into an existing course vs. a standalone course and included about 5-10 hours of orthotic instruction (Schofield & Schwartz, 2018). However, there was significant variability across programs. The results of this study revealed that only 44% of student participants felt that orthotic fabrication was well integrated into their coursework, although more than 90% of all students (n=24) and clinician (n=193) participants felt this

content was important or very important for the hand therapy setting. Further research may be warranted to determine specifically how many hours of orthotic content is deemed necessary to improve student preparedness.

Schofield (2017) emphasized the substantial variability in which the breadth and depth of anatomy is incorporated into different OT curriculums. Opinions were divided regarding whether anatomy should be included into the OT curriculum as a standalone course or integrated into other courses throughout the curriculum, but it was noted that anatomy content taught should be directly related to OT practice (Schofield, 2017). It was also further supported that OT curriculums should have a strong anatomy foundation to best prepare students for their clinical experience (Schofield, 2017). In Giles et al.'s (2021) study, regardless of perceived preparedness or prior anatomy coursework, nearly all students involved reported they would have benefitted from an additional online anatomy review course. As indicated by the results of this study, foundational knowledge of surface, skeletal, muscular, and nervous system anatomy were among the topics that had the highest importance rating among both clinicians and students in relation to a successful hand therapy fieldwork experience. Additionally, Short et al.'s (2018) study further supported this notion. Seventy-six percent of participants in Short et al.'s (2018) study asserted that students should be very knowledgeable in anatomy, which is also reflected in this study's results, as more than 90% of clinician participants reported that foundational knowledge of anatomy is either important or very important for successful completion of a hand therapy experience.

When looking at the ranking of specific topic importance in relation to a successful hand therapy fieldwork experience, this study yielded similar results to other studies performed (Erikson et al., 2017; Valdes, et al., 2022). Erikson et al.'s (2017) study examined hand therapy content integration into entry-level physical therapy programs. It was supported that there should be detailed coverage of anatomy and kinesiology, with the exception of vascular anatomy, as well as an emphasis on common upper extremity conditions such as distal radius fractures, osteoarthritis, tendinopathies, nerve compressions, and edema (Erikson et al., 2017). Regarding assessment and interventions, Erikson et al. (2017) asserted that students should be independent with scar/wound assessment, edema measurements, palpation, goniometry, joint integrity, muscle length, sensory assessment, grip and pinch strength, manual muscle testing, self-report functional assessments, the use of physical agents, strengthening, joint mobilization, massage, muscle lengthening and passive stretching as an entry-level clinician (Erikson et al., 2017). Valdes et al. (2022) performed a study analyzing which topics hand therapy clinicians deemed most important in preparation for a hand therapy fieldwork experience with the intent to incorporate those topics into a competency exam prior to fieldwork placement. All topics were deemed either important or very important, but anatomy was the most highly emphasized, along with range of motion assessment and interpersonal skills and therapeutic communications (Valdes et al., 2022). These findings coincide with the results of this study as well.

Although there was no statistical significance between student preparedness and number of courses taken that included hand therapy content, order of fieldwork experience, or point of entry into the field (MOT or OTD), this could have been influenced by the low student response rate. Additional research may be warranted with a larger and more broad sample size in order to increase generalizability and better evaluate these variables.

The results also demonstrate that there was no correlation between number of years of clinical experience and how prepared clinicians felt students were entering a hand therapy fieldwork experience. This indicates that expectation levels are equal among clinicians with varying levels of experience. However, clinicians who had supervised more fieldwork students, ranked student preparedness higher when assessing specific knowledge and skills. This may suggest that clinicians with more experience supervising students, may be more familiar with the amount of hand therapy content students typically obtain during their didactic coursework, so their expectations regarding clinical knowledge are more realistic. However, more than 74% (n=154) of clinicians still believed that students would benefit very much from additional hand therapy content within their OT curriculum.

### **Limitations**

Limitations of this study include a relatively small sample size of student participants. There was also a large discrepancy between the number of clinician and student participants, which may have impacted results. Additionally, about 60% (n=15) of student participants reported attending a university in the Northeastern region of the United States. This limits the results generalizability, as curriculums may vary greatly across different regions of the country.

### **Future Research**

The findings of this study are only exploratory due to the low student response rate. Further research should be done with a larger sample size to support these findings, as well as with a more diverse group of student participants to improve generalizability of these results, as the majority of the student participants attended schools in the Northeastern region of the United States.

Further research is also warranted to delve deeper into the variability of OT curriculums, looking at specific topic areas. In Schofield and Schwartz's (2020) study, the extent to which orthotic fabrication was integrated into various OT curriculums was examined. However, additional research is needed to take a broader look at how other hand therapy related topics are integrated throughout different OT curriculums, to establish which topics could potentially be further incorporated to improve student preparedness and success for a hand therapy fieldwork experience.

Lastly, research similar to Erikson et al.'s (2017) study regarding hand therapy content integration into the entry-level PT curriculum is needed. Research could be done to examine what knowledge level is needed for various hand therapy topics and what level of independence is needed with various clinical skills to establish guidelines for hand therapy content into the OT curriculum.

### **Implications for Occupational Therapy Education**

Hand therapy is a highly specialized field of OT that requires substantial clinical knowledge and clinical mentorship to successfully pursue the specialty. It was found in Short et al.'s (2018) study that 74% of participants were more likely to accept fieldwork students in the hand therapy setting if students had more preparation. By integrating more common upper extremity conditions, including fractures, tendinopathies, and arthritis into didactic coursework, this could provide students with additional clinical knowledge to better prepare them for a fieldwork experience in this specialty area. However, research has shown that there are many barriers to implementing additional hand therapy content into OT curricula (Short et al., 2018; Valdes et al., 2022; Ye, 2021). Some of these barriers include the broad scope of the profession and differences in interpretations of ACOTE standard across programs, limited faculty members with appropriate credentials, and the division of faculty opinions regarding the necessity for additional hand therapy content (Schofield, 2017; Schofield & Schwartz, 2020; Short et al., 2018; Valdes et al., 2022; Ye, 2021).

Short et al. (2018) suggested implementing specialty tracks into the OT and PT curricula, as well as providing more opportunities for observation hours in the field to better prepare students for a hand therapy fieldwork experience. Even simply offering an elective or extra-curricular opportunities would be beneficial to expose students to more hand therapy content, if interested. Schofield (2017) proposes that there should be vertical integration of anatomy content throughout the curriculum to develop and improve clinical application. With repetition of content throughout didactic coursework, this foundational anatomy knowledge can then be expanded upon to various clinical scenarios to enhance comprehension and understanding of applied anatomy for clinical practice. Enhancing anatomy content in the OT curriculum can not only improve student preparedness for a hand therapy specialty, but also many other practice areas. Schofield (2017) found that "detailed knowledge and understanding of upper limb anatomy and how injury, disease, or other conditions affects function was viewed as essential for all practicing occupational therapists" (p. 249). In regard to the student perspective in Hodgetts et al.'s (2007) study, including additional intervention ideas and intervention plans into the curriculum would also help to better prepare students for entry into the field.

### **Conclusion**

There is an inherent need for more OT practitioners to pursue hand therapy, however, many clinicians working in hand therapy are apprehensive to supervise fieldwork students due to their lack of clinical knowledge. If students are not provided with enough background knowledge to successfully complete a level II fieldwork experience in the hand therapy setting, fewer new graduates will pursue this specialty. This study aimed



to look at the perceptions of clinicians and students to evaluate which topic areas are most important for a successful hand therapy fieldwork rotation, as well as perceptions regarding student preparedness and how well content areas are currently integrated into the OT curriculum. Data analysis revealed that there was a higher emphasis on foundational knowledge when assessing topic importance, but certain common upper extremity conditions, assessment methods, treatment techniques were also deemed very important. It was determined that students believe anatomy and kinesiology content and certain assessment skills are already well-integrated into their curriculum, however, there is a lack of integration of common upper extremity conditions and treatment techniques. There were no correlations found between demographics assessed and perception of student preparedness. Occupational therapy programs may consider integrating additional common upper extremity conditions and treatment techniques into already established courses within the curriculum to improve clinical application skills and relevance to practice. Occupational therapy programs may also consider offering an elective course or extra-curricular opportunities that focus on hand therapy content, to better prepare the students that are interested in this specialty.

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## Appendix A

Descriptive Statistics: Importance Ratings	Clinician Importance Ratings (%)		Student Importance Ratings (%)		Student Perception of Integration into Curriculum (%)		
	Minimally + Somewhat Important	Important + Very Important	Minimally + Somewhat Important	Important + Very Important	Not at all + Not well	Neutral	Well + Very Well
<b>Foundational Knowledge</b>							
Surface Anatomy and Palpation of the Upper Extremity (UE)	6.3	93.7*	0	100*	18	20	64*
Anatomy of the UE: Skeletal System	1.9	98.1*	0	100*	4	12	84*
Anatomy of the UE: Muscular System	0.5	99.5*	0	100*	4	20	76*
Anatomy of the UE: Nervous System	4.4	95.6*	0	100*	16	20	64*
Anatomy of the UE: Vascular System	38.6	61.4*	36	64*	52	24	24
Tissue Healing Principles	8.2	91.8*	8	92*	40	20	40
Kinesiology and Biomechanics	7.2	92.8*	8	92*	12	16	72*
Cortical Representation of the UE	32.8	67.2*	32	68*	32	28	40
Movement and Task Analysis	14	86*	4	96*	4	4	92*
<b>Common Conditions of the UE</b>							
Fractures	4.4	95.6*	0	100*	32	28	40
Tendon ruptures or lacerations	22.7	87.3*	8	92*	52	36	12
Tendinopathies	7.8	92.2*	0	100*	32	36	32
Dupuytren's disease	30	70*	4	96*	44	40	16
Complex Regional Pain Syndrome (CRPS)	32.8	67.2*	24	76*	44	16	40
Peripheral Nerve Compressions	44.4	55.6	28	72*	20	48	32
Skin conditions	44.4	55.6	28	72*	24	24	52
Carpal instabilities	48.3	51.7	32	68*	72	20	8
Cartilage injuries	33.8	66.2*	8	92*	64*	16	20
Finger ligament or volar plate injuries	27	73*	16	84*	56	36	8
Osteoarthritis and rheumatoid arthritis	11.6	88.4*	0	100*	12	24	64*
Amputations	46.9	53.1	20	80*	32	24	44
<b>Assessment Skills</b>							
Goniometry	2.9	97.1*	0	100*	0	4	96*
Manual muscle testing	14.9	85.1*	0	100*	0	12	88*
Edema measurements	17.9	82.1*	8	92*	4	48	48
Special tests (differential diagnosis)	25.6	74.4*	8	92*	32	40	28
Sensation assessments	18.4	81.6*	16	84*	0	0	100*
Self-report functional measures	25.6	74.4*	16	84*	4	28	68*
Dexterity + Fine motor coordination	36.7	63.3*	16	84*	8	24	68*
Joint integrity	30.5	69.5*	12	88*	36	44	20
Muscle length (flexibility + tightness)	24.7	75.3*	12	88*	40	40	20
Grip and pinch strength	12.1	87.9*	40	60*	4	12	84*
Postural Analysis	28.2	71.8*	16	84*	24	24	52

<b>Treatment Techniques</b>							
Manual techniques	15.9	84.1*	4	96*	52	20	28
Use of modalities	33.3	66.7*	12	88*	36	16	48
Strengthening	14.5	85.5*	3.1	96.9*	44	20	36
Orthotic fabrication + training	6.8	93.2*	4	96*	12	36	44
Wound care	27.6	72.4*	16	84*	64*	24	12
Scar and contracture management	15.4	84.6*	4	96*	48	32	20
Sensory re-integration	30.9	69.1*	16	84*	20	36	44
Nerve gliding/mobilization	26.5	73.5*	12	88*	68*	20	12
Activity and environmental modifications	22.2	77.8*	12	88*	0	8	92*
Movement pattern re-training (i.e. FMC)	24.1	75.9*	8	92*	28	16	56

\*Indicates value is statistically significant

**Appendix B**

Clinicians: Chi-squared Test Student Supervised By Knowledge/Skill	Chi statistic	degrees of freedom	p-value
<i>Overall Student Preparedness</i>	18.15	8	0.02*
<i>Additional Hand Therapy Curriculum</i>	12.42	6	0.053**
Surface Anatomy and Palpation of Upper Extremity (UE)	5.41	6	0.493
Anatomy of UE: Skeletal System	2.49	6	0.869
Anatomy of UE: Muscular System	2.83	4	0.587
Anatomy of UE: Nervous System	4.43	6	0.618
Anatomy of UE: Vascular System	8.13	6	0.23
Tissue Healing Principles Including Integumentary Anatomy	4.89	4	0.298
Kinesiology and Biomechanics	5.67	6	0.461
Cortical Representation of the UE	3.95	6	0.684
Movement Tasks Analysis	2.88	6	0.824
Fractures i.e. distal radius, metacarpal, phalangeal	7.37	6	0.288
Tendon ruptures or lacerations, flexor and extensor	3.35	6	0.7632
Tendinopathies: flexor tenosynovitis, lateral epicondylitis.	2.85	6	0.828
Dupuytren's disease	6.07	6	0.415
Chronic Regional Pain Syndrome	1.15	6	0.98
Peripheral nerve compressions i.e. CTS, CuTS, radial tunnel	2.26	6	0.894
Skin conditions, burns and grafts	2.26	6	0.894
Carpal instabilities i.e. DISI, VISI	4.79	6	0.572
Cartilage injuries i.e. TFCC	5.09	6	0.532
Finger ligament or volar plate injuries	3.75	6	0.71
Osteoarthritis and rheumatoid arthritis	4.46	6	0.615

Amputations	0.982	6	0.986
Goniometry	2.27	6	0.894
Manual Muscle Testing, Gross and Isolated	8.36	6	0.213
Edema Measurements	0.606	6	0.142
Special Tests, differential diagnosis	4.4051	6	0.622
Sensation Assessments, SWMF, 2PD etc.	4.609	6	0.595
Self-report functional measures	4.61	6	0.595
Dexterity Fine motor control Assessments i.e. nine hole peg test	8.79	6	0.186
Joint Integrity	5.71	6	0.457
Muscle Length, Flexibility, and Tightness	6.24	6	0.397
Grip/Pinch Strength	7.23	6	0.3
Postural Analysis	6.26	6	0.395
Manual techniques: massage, stretching joint mobilization	6.258	6	0.395
Use of modalities: electrical stimulation, iontophoresis, ice, heat	2.384	6	0.881
Strengthening	3.53	4	0.473
Orthotic fabrication, orthotic training, custom and prefabricated	3.24	6	0.778
Wound Care	6.2	6	0.402
Scar and contracture management	7.5615	6	0.272
Sensory Reintegration	5.89	6	0.434
Nerve gliding mobilization	4.24	6	0.644
Activity and environmental modifications, assistive devices	4.5824	6	0.598
Movement pattern re training i.e fine motor coordination	4.5	6	0.61