

A Worthwhile Collaboration: Integrating Optometry and Occupational Therapy in the Treatment of Children

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ABSTRACT

Background

Vision deficits are highly prevalent in children with neurodevelopmental disorders including those with motor delays, learning and reading difficulties, and maladaptive behaviors. These deficits can interfere with their participation and performance in everyday life activities and therefore, require a comprehensive approach to therapy. As such, optometrists and occupational therapists are an optimal team to provide interprofessional collaborative care, reported in research as best practice, in the treatment of these children. However, little is

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known about the long-called-for collaboration between these professions. The purpose of this study was to explore factors and implications associated with a collaborative practice between optometrists and occupational therapists in the co-management of vision deficits in the pediatric population.

Methods

A qualitative, descriptive design was employed to explore perceptions of collaborative practice among teams of optometrists and occupational therapists in the remedial care of children with visual deficits. Following IRB approval, co-located optometrists and occupational therapists were recruited for this study. Semi-structured interviews served as the primary data collection tool to investigate the factors and implications of collaborative practice.

Results

Eleven professionals provided informed consent and took part in this study, including five occupational therapists and six optometrists. Following thematic analysis, four overarching themes emerged including 1) professional boundaries, 2) co-located, integrated practice, 3) professional growth, and 4) improved patient care. Participants indicated that although barriers exist, exercising humility, upholding patient-centered focus, maintaining mutual respect, communicating frequently, and co-location were factors that enable collaboration. Positive outcomes related to both the provider and the patient were further highlighted supporting the interprofessional collaboration between these professionals.

Conclusions

The findings of this qualitative study add to the body of evidence underpinning interprofessional collaborative practice. Furthermore, this study supports the coordination of care, through optometry and occupational therapy collaboration, in the treatment of visual deficits in children with special needs.

INTRODUCTION

Several similarities exist between the professions of optometry (OD) and occupational therapy (OT) including the theoretical underpinnings that guide each profession and their goal of improving their patients' quality of life. While pediatric OTs strive to enable and enhance a child's participation in meaningful daily life activities, ODs aim to identify and treat vision deficits that impede a person's performance in everyday tasks.^{1,2} Vision deficits can interfere with a child's engagement in activities of daily living such as reading, writing, play, social interactions, and safe navigation of environments.² Hence, both professions have a key role in the management of these concerns.^{2,3} Furthermore, there is a high prevalence of vision dysfunction identified in children who are frequently referred to OTs.^{2,3} As such, OTs are in a unique position to aid in identifying and treating vision problems.

Researchers have studied the correlations between vision deficits and neuro-developmental diagnoses.³⁻¹³ The prevalence data varies greatly throughout the literature and can depend on many factors such as the specific visual skill being addressed, the diagnosis of the patient, and the assessment tools used. Areas of vision commonly examined in research include refractive errors,³⁻⁵ binocular function,^{3,5-10} accommodative ability,^{5,8,11} ocular motor skills,⁸ and visual information processing skills.^{7,12,13} These vision skills have been noted to co-exist with motor delays, learning and reading challenges, and maladaptive behaviors. For example, refractive errors, accommodation ability, binocular vision dysfunction, and visual perception delays were found to be statistically more common in children diagnosed with Developmental Coordination Disorder than their typically developing peers.^{4,11,12} Moreover, studies suggest that binocular vision underlies the development of proficient eye-hand coordination and fine motor skills.^{9,10} In particular, fine motor skills requiring localization

within three-dimensional space rely heavily on binocular vision function.⁹

Visual deficits have also been found to co-occur with learning and reading difficulties. In a study of school-aged children, completed at a center for learning disabilities in India, 62.8% of children were identified with binocular vision deficits.⁸ More specifically, this study found a high correlation of non-strabismic binocular disorders in children with specific learning disabilities. Goldstand et al.⁷ also found that students with reading difficulties scored significantly poorer in visual efficiency skills when compared to a control group. Furthermore, those students who failed the vision screening in this study had significantly lower academic scores overall. Considering the age of the students in this study, the authors also suggest that vision deficits frequently go undetected in schoolchildren due to their hidden nature and may be construed as maladaptive behaviors. Other studies support this finding as well. Convergence insufficiency, a non-strabismic binocular disorder, was found to statistically correlate with behavioral and emotional problems in children as identified on two standardized assessment tools.⁶ This study also showed a statistically significant post-treatment improvement in ADHD-like behaviors as well as in the areas of somatic complaints, anxiety/depression, and internalizing. In a study of preschool-aged children, moderate hyperopia was associated with poorer scores of sustained attention as measured by a standardized assessment.¹³ Furthermore, this study concluded those children with hyperopia and binocular vision problems scored significantly worse in sustained attention, visual motor integration, and visual perceptual skills when compared to their emmetropic peers. In another study investigating a visual perceptual program, the authors found that visual perceptual deficits led to students' maladaptive behaviors including fight and flight reactions.¹⁴ This study found anecdotal evidence for improved academic

performance, motivation, and fewer flight reactions deriving from teacher feedback.

Considering the prevalence data, it should not be surprising that OTs are often identified as a primary profession in screening vision deficits; particularly in adult neurorehabilitation programs.^{15,16} Herron,¹⁶ found statistical correlations between vision deficits identified in the OT's screening and those resulting from an OD's comprehensive evaluation. This study's outcomes support the validity of OT's accuracy in screening for vision disorders. In a retrospective review of a vision clinic in a school for children with special needs, OTs were identified as valuable members in assisting vision exams, educating parents and teachers, and implementing recommended interventions.³ Although research supporting OT's roles in screening and treating children with vision deficits is limited, many clinicians advocate for interprofessional collaboration between ODs and OTs. Optometrists have developed models of care that further support collaborative practice and can provide valuable guidance to the successful management of vision deficits in children.^{2,17}

Interprofessional collaborative practice (IPCP) is supported in the literature as best practice for providing high quality, patient-centered care aimed at improving health-related outcomes, patient experiences, and decreased costs.¹⁸ The Interprofessional Education Collaborative (IPEC), a leader in IPCP, created four core competencies designed to guide teams including: "roles and responsibilities", "communication", "values and ethics", and "teams and teamwork".¹⁸ Each competency provides a number of essential related skills to facilitate the success of teams. Several studies recognize the importance of these skills while also suggesting that co-location of clinicians can be advantageous to the growth of teams.¹⁹⁻²² Specifically, regular interactions and frequent communication, eased by the proximity of clinicians, facilitate the development of positive relationships and mutual respect

among other skills outlined in IPEC's core competencies.²⁰⁻²¹ One study compared factors of teamwork and team effectiveness between professionals employing interdisciplinary and multidisciplinary approaches. Although all teams were co-located, the interdisciplinary teams, collaborating through regular team meetings and jointly carrying out treatment plans, performed significantly better on most outcome measures than the multidisciplinary groups working in parallel.¹⁹

Research investigating IPCP has primarily focused on the skills and competencies needed for effective collaboration. Currently, there is not a strong evidence base that addresses provider-related and patient-related outcomes. Likewise, few studies examine the effectiveness of interprofessional collaboration between ODs and OTs. One peer-reviewed case study outlined an OD/OT collaboration in the management of a patient returning to care due to ongoing post-concussion symptoms.²³ The results of this case report revealed that an interprofessional collaborative approach was needed for this patient's full recovery. The authors further suggest that initiating collaboration at the start of care results in a faster and more complete recovery. Another study, with 29 participants with a history of stroke, highlighted the benefits of integrating OD vision care into a physical therapy vestibular program. The outcome measures were significantly improved in a four-month treatment program.²⁴ Although these studies help to support evidence for patient-related outcomes of IPCP, they are solely focused on the adult population. No studies were found addressing the effectiveness of IPCP, among ODs and OTs, in the care of children.

To determine the effectiveness of collaborative practice in the context of OD and OT teams, an examination of current programs and clinicians' perceptions must first be established. Therefore, this study aimed to explore and describe various aspects of collaboration within teams of ODs and OTs who are practicing

direct interprofessional care with a focus on the pediatric population. More specifically, this study was designed to investigate the facilitators and barriers, in addition to provider and patient outcomes of IPCP.

METHODS

Considering the gaps in current literature, a qualitative, descriptive design was used to study OD/OT teams employing an interprofessional collaborative approach in the treatment of children.²⁵ Interviews were selected as the data source to detail perceptions related to facilitators and barriers of IPCP, as well as provider-related and patient-related outcomes. Salus University's Institutional Review Board approved this exempt study. Each participant signed an informed consent including two signatures, one for participation and one for audio recording, and returned to the lead author via email or fax.

Participants

Collaboration between ODs and OTs has been stressed as an integral factor in the care of many patients^{2,17,23} with the proximity of professionals being an advantageous piece.¹⁹⁻²² Therefore, purposeful sampling was used to seek out licensed OD and OT practitioners providing collaborative care in

co-located programs to children with remedial vision deficits. Carried out by the lead author, this sampling technique provided the most knowledgeable contributors regarding this study's aim.²⁵ Twelve individual participants were contacted via email following an internet search for teams of ODs and OTs, 4 declining response. An advertisement on the Vision Rehabilitation Facebook group page produced one additional participant while two participants were contacted after being suggested by one of the original participants. In total, 5 OTs and 6 ODs were included in this study. Eight of the 11 total participants, 4 OD/OT teams, provided services within a co-located program while 3 participants were individual members of previously co-located, collaborative teams. Demographic information obtained included years of practice in their respective fields (mean= 23 years) and years of collaborative practice (mean = 15 years). To maintain participant confidentiality, pseudonyms were assigned and accessed only by the lead author. Participant pseudonyms and their data are provided in Table 1.

Data Collection

The lead author conducted semi-structured interviews either paired or individually, to gather a more in-depth understanding of

Table 1. Participant Demographics

Individual vs. Team	Participant Pseudonyms	Profession	Years of experience	Years of collaboration	*Current co-location
Individual 1	Pat, In1	OT	22	7	No
Individual 2	Dr. Brown, In2	OD	20	5	No
Individual 3	Dr. Fish, In3	OD	19	5	No
Team 1	Dr. Smith, T1	OD	42	35	Yes
	Sharon, T1	OT	35	35	Yes
Team 2	Dr. May, T2	OD	7	2	Yes
	Jessica, T2	OT	13	2	Yes
Team 3	Dr. Davis, T3	OD	21	18	Yes
	Marcy, T3	OT	22	18	Yes
Team 4	Dr. Lee, T4	OD	32	25	Yes
	Kelly, T4	OT	15	11	Yes

*designates those participants who are currently practicing in co-located, share space.

Table 2. Interview Questions

1. Tell me about how you collaborate with the OD/OT on your team.
2. Do you feel that collaboration with the OD/OT is generally easy or difficult? <ul style="list-style-type: none"> • <i>If the participant states it is easy...</i> <ul style="list-style-type: none"> • What makes it easy for your team? • Can you tell me about a time that collaboration was more difficult? • <i>If the participant states it is difficult...</i> <ul style="list-style-type: none"> • What makes it difficult for your team? • Can you tell me about a time that collaboration was easy?
3. What do you see as the strengths of your program?
4. If you could change 1 or 2 things within your program, what would that be?
5. Thinking about a recent or memorable case, how do you think using an interprofessional collaborative approach impacted the outcome for the patient?
6. What do you think holds ODs and OTs back from providing services in a collaborative nature?*
7. How has your collaboration with an OD/OT changed you as a provider?*

the participants' views.²⁶ The interviews were offered via Zoom²⁷ a web-based conferencing platform, or phone and were left to the preference of the participant. Four interviews were conducted via Zoom providing both audio and visual inputs, while six were completed over the phone. One phone interview involved the OD/OT dyad, per their request, while all other interviews were conducted individually for a total of ten interviews, each lasting 30-60 minutes.

Interviews began with an opportunity for the participants to ask questions about the informed consent or the study in general and followed with simple questions relating to demographic information and general procedures used in their programs. The remainder of the interview consisted of a semi-structured guide based on five open-ended questions listed in Table 2. Two questions were added to the guide after the emergence of common data in the first few interviews and are noted in Table 2 with an asterisk. Probing was used to gain clarification and more in-depth information throughout all interviews. Before concluding the conversation, the participants were asked to add any additional information pertaining to the study aim not addressed in previous questions. Nine of the interviews were audio-recorded and transcribed verbatim by the lead author. One interview was not

recorded due to an error in technology and field notes were taken immediately following the meeting.

Data Analysis

Data analysis, using an inductive approach, was completed through the process of active reading, reflective memos, and coding.²⁶ Data and investigator triangulation were used to maximize the rigor and trustworthiness of this study.²⁶ Strategies for triangulation include data collection from multiple sources and consensual review by faculty mentors and experts in the fields of optometry and occupational therapy. This consensual review was used throughout the data analysis process to help establish inter-rater reliability. Saturation of data collection was deemed achieved when consistent key themes emerged relating to each of the research questions. The final four participant interviews were used to validate the codes and preliminary themes generated from the first seven interviews.

Each interview transcription was read and coded to capture the participants' perceived barriers and facilitators as well as the impact of collaboration on both the professional and the patient. Four coded transcriptions were reviewed by peers for their consensus. Next, each code was evaluated for frequency and importance throughout all interviews and

organized into collections of ideas and quotes. These ideas and quotes were then analyzed to develop themes and were reviewed by peers. Finally, emails were sent to five participants for validation of data and quotes with two participants returning confirmation of responses.

RESULTS

Four overarching themes emerged from the data obtained from in-depth, semi-structured interviews provide valuable insight into current IPCP among ODs and OTs. These four broad themes include: "professional boundaries", "co-location and integrated practice", "professional growth", and "improved patient care". The first two themes provide a means to IPCP while the remaining two themes highlight the outcomes.

Professional Boundaries

Understanding one's professional roles and those of team members were identified as critical skills in the success of teams. These skills are also described under the Interprofessional Education Collaborative's core competency of "roles and responsibilities".¹⁸ Dr. Davis, T3 shared this competency of role understanding as being an asset of his program saying:

The big strength is that I know and understand OT and she knows and understands vision, and we know what we are capable of doing and what we are not capable of doing so that we send the child to the best place and we get quicker results because of that.

Awareness of one's capabilities and limitations is fundamental to being an effective team member. Jessica, T2 stated the importance of clinicians to "feel comfortable and confident in one's strengths as a therapist and what you can bring to the table." Dr. Fish, In3 also shared an example of knowing her limits in the following quote:

We were seeing where they [patients] couldn't tolerate any touch like they

couldn't wear the eye patch, they couldn't hold the stick, they couldn't coordinate their bodies to get in and out of the swing and so I would refer to her [OT] for very specific things; like we can't integrate their Moro reflex, your turn. Or they need gross motor stuff, have at it.

Dr. Lee, T4 illustrated this concept with this example:

[I] can work with the therapist, with the patient using the prisms and help guide with prism use, and the therapists are so good at understanding the risk involved in the situation. That, as an OD, I wasn't trained in that.

Understanding and acknowledging the strengths and expertise of team members are also crucial and can be a barrier in the development of teams. Without this, accomplishing effective collaboration can be difficult. Dr. Smith, T1 stated, "without knowing what the strengths and limitations of each field is, it is hard to know how to work together." Kelly, T4 added, "the knowledge base just isn't out there for a lot of people to even know that it would be something that could be a collaborative effort." Dr. Davis, T3 also described this as a barrier to professionals coming to together stating:

...ignorance ... or [professionals] willfully unknowing about each other's abilities... when you find someone that you can work with that does a good job, it makes it a whole lot easier. And they know their limits and they know your limits and that is the hard part.

Dr. Smith, T1 described how recognizing her strengths, as well as that of the OTs, led to reciprocal learning in the following quote:

I'd do something like an eye movement task and they would get really sick and dizzy. Sharon, T1 would know how to deal with all of those things. And she didn't

know the impact of lenses. It was a real cooperative learning situation.

Many participants stated the need for further education, beyond what each profession learns in school, to aid in understanding the roles and strengths of the other's profession. Dr. May, T2 expressed this saying "I think there is a lack of awareness of what the other does. What each offer and what the benefit is. I didn't know what OT did until I met Jessica, T2 four years ago." Sharon, T1 added:

I wish more OTs would understand, I would never practice vision therapy per se alone, without a doctor above me because it goes beyond what we as OTs know and are trained to do. Way beyond that. There is a lot of misunderstanding of OTs because they are claiming to do vision therapy.

Outlining one another's roles utilizing clear, concise dialogue, while making no assumptions, is also key. Not every optometrist has the knowledge and skillset to provide a comprehensive functional vision evaluation on a child. Likewise, not all occupational therapists have expertise in sensory integration or vision development. Dr. Davis, T3 reported that "99% of optometrists don't know or do pediatrics enough to be able to help OTs." Dr. Smith, T1 said, "if you don't really spend time with each other, there are still a lot of assumptions." Dr. Brown, In2 expressed that we need to find a way to identify ourselves stating:

Your [OT] education and emphasis is very diverse. Not every OT understands sensory integration ... so that makes it hard ... I don't know how we identify ourselves in a way that says "oh you know this bit of information so we can talk about this.

Overlap exists between the roles of the two professions that can facilitate integrated care. However, these blurred boundaries can also result in conflict. Most participants shared concerns about overreach and described

how it can be detrimental to IPCP. Marcy, T3 stated, "unfortunately, there is turf wars that do happen but that is not best practice in our opinion." Sharon, T1 discussed this sense of overstepping boundaries in the following quote:

It is territorial and I think that is what is happening for OTs and ODs right now. For instance, there have been ODs that say they are doing OT and there are OTs that say they are doing vision therapy and it is a territorial battle.

Dr. Lee, T4 described a situation in which overreach negatively impacted the collaboration with another therapist.

She [OT] was being too assertive with her evaluation and assessment of patients visually and moving forward too fast before realizing that no, you can't go there yet. I had to pull the reigns back on her and that was a little awkward.

Not only does overreach impact team cohesiveness, but it also can impact patient care. Three participants shared experiences of patients not getting the proper treatment due to their needs extending past the capabilities of the professional. Dr. Brown, In2 shared the following experience:

I lecture a fair amount to OTs and physical therapists in an adult concussion setting and they are all doing Brock String on all of these patients with brain injuries and none of them know what they are doing with it. They want to. They really want to help their patients... but this is not the right tool to start with for everybody.

Sharon, T1 discussed observations she made of therapists working on motor skills saying:

We have got to work together because I would walk in the office and they [vision specialists] were doing a lot of motor stuff because as ODs and vision therapists they

knew they were supposed to but never knew the [developmental] progression.

Maintaining a focus on patient-centered care rather than provider-driven can help minimize conflict arising from overreach. Most participants conveyed the importance of patient-focus as a leading factor in the success of their collaboration as well as their program. Dr. Smith, T1 stated, "my whole goal is to get the best results for the patients, and if that means other people need to support that patient in some way, that has always been my philosophy." Sharon, T1 added the following quote:

It is not about us; it's about let's get this patient what they need. If they need both of us, great. If they need one or the other, great ... let's get them what they need because that is really what we are supposed to be doing.

Two of the participants suggested a need for boundaries or guidelines. These guidelines, when written following state bylaws and practice regulations, can aid in clarifying the line between professions and decrease the sense of needing to protect one's profession. Sharon, T1 stated:

There need to be some boundaries working together. This is your area, this is your expertise, you do this, give me input. I will do mine, give you input. Where you are not feeling like you are going to lose the patient or they are going to one-up you.

Dr. Lee, T4 added the following:
[We] need to establish guidelines for therapists. What all can you do vision-wise without stepping over the law that is written for the state? ...there is a way for us to work together and to grow this collaboration right here if everyone talks about guidelines that are for the best outcome. It protects vision therapy; it protects OTs and PTs from crossing the line for liability.

Co-located, Integrated Practice

Co-location and integration of services were identified by a majority of the participants as a factor enabling IPCP. Proximity can not only aid in understanding each other's roles and expertise but also supports in-depth communication and problem-solving. Dr. Smith, T1 shared, "it is really difficult when you are not in the same place or conversing often about that patient." Kelly, T4 added, "I think it helps certainly that we are in the same building space at least because of availability because that helps and encourages more teamwork." Dr. Davis, T3 expressed the importance of co-location stating:

Understanding each other's professions, you know, that is a tough thing to do. I know it every day because I see it every day. If you don't see OTs every day, how are you going to know what they do?

Many participants described the use of an open-door policy or "chats" in the hallway while others have scheduled collaboration time. Dr. Lee, T4 and Kelly, T4 shared their use of a weekly team meeting to discuss patients and engage in shared learning. Dr. Lee, T4 further expressed his consistent availability, through phone texting and daily face-to-face connections with patients and therapists, as a crucial factor in the effectiveness of their collaboration.

Another aspect important for IPCP, fostered by co-located practice, is the development of trusting relationships enhanced through mutual respect. Appreciation for one another's skills, ideas, and opinions can strengthen relationships as well as communication among team members. Dr. Davis, T3 demonstrated mutual respect with his team member in the following quote:

I know what she knows and she knows what I know. That makes it a whole lot easier because we understand and if I have trouble with a patient and I say "hey, what do you think about this" and if she has

troubles with a patient, she says “hey, what do you think about this” and we give each other ideas and that happens a lot.

Sharon, T1 expressed:

I have been here long enough where Dr. Smith, T1 and one of our other docs are very respectful and know my background and know that instead of telling me what to do, we can talk back and forth. They will give suggestions, I will give suggestions. So, it is not bad but it takes a while to develop that.

Alternatively, a lack of mutual respect can greatly impact the cohesiveness of a team and its capabilities overall. Sharon, T1 also shared an experience in which a lack of mutual respect impacted their relationship, collaborative efforts, and their program as a whole. She stated:

They [new ODs to the practice] don't necessarily follow the same protocols or communicate the same as we always have ... it's not the kind of situation that is “ok, let's talk about this. Are we all agreeing on this page?” It's not like that. It's “well, I am doing this and I am doing this that is the way it is going to be.” It really changes the dynamics of how the practice is set up and the protocols. It is discouraging because I don't feel just being here as long as I have, that we don't have the same feeling, comfort in the practice that we did for years.

Although no longer co-located, Pat, In1 also shared the importance of having a good rapport and trusting relationship with the OD he works with. He added that being separate from the OD, however, has allowed him to increase patient access to care due to difficulties they experienced with insurance billing. He stated, “being out of the optometry office has allowed us credentialing-wise to be much more open to a lot more insurance companies.” He was not the only participant that expressed this

as a barrier to integrated practice. Nine of the 11 participants indicated frustration with insurance billing within combined practices. Dr. Smith, T1 shared, “I wish that we had a better way to bill for OT services. We choose not to and a lot of patients could have come but they go to other OTs.” On the other hand, two teams acknowledge insurance billing as a competing factor; however, they seem to be able to make it work. Dr. May, T2 stated, “it does take more work billing and that part of it administratively”, while Dr. Lee, T4 described insurance as a “never-ending battle” but that “it is working out so far so good”.

Professional Growth

All participants shared that their experiences in interprofessional collaboration have resulted in professional growth one way or another. Many ODs and OTs alike shared statements such as “how has it not changed me”, or “it just made me a better optometrist”, and “it makes us more well-rounded therapists.” All the participants further described that collaboration has provided them with a broader perspective allowing them to see past their professional knowledge and be more aware of other participating factors. Pat, In1 stated, “I always ask ‘what if he can't see'? All of a sudden, they wind up and go ‘well now it all makes sense.’” Dr. May, T2 added:

It has definitely expanded my horizons in understanding the person sitting in my chair... By understanding that it is more than just the bi-senses, there are eight senses and just being able to understand those things and being able to take OTs knowledge and rework it in my mindset, and incorporate it into my model of vision, to then be able to explain it to parents in a way they get it.

To further expand on this concept, Dr. May, T2 described a case in which the patient's behaviors could be construed as negative or oppositional rather than a child attempting to

meet his sensory needs. She shared, "he can't process things the way he needs to and that is why he is behaving the way he is." With this broader perspective, she made a referral to the OT on her team and "sees that there are weeks where he doesn't get seen in OT prior to VT and it is a lot harder for him to engage and sit still."

A few of the participants shared how the quality of humility is not only an important skill to possess but has further developed as a result of their professional relationships and collaborative efforts. Jessica, T2 and Kelly, T4 shared the following:

I think there is a certain amount of humbleness that goes into collaborating as a team. I think you need to be a person that is open to that. Open to saying that you don't have all the answers, open to saying that our paths do cross and I can do this but you can actually do this too and it is okay for us both to be able to do it and to do it well. [Kelly, T4]

I used to be very protective of my profession's roles but since working in a collaborative practice, I have been able to relax this feeling and see that they do overlap but also know that my profession as an OT can bring a lot to the practice. [Jessica, T2]

Professional development, identified by six participants, is an additional benefit of interprofessional collaboration. While some described having more tools to utilize in treatment, others use their increased knowledge to aid practitioners with educational opportunities and program development. These advancements stem from integrating the knowledge of both professions. Dr. Davis, T3 illustrated this saying, "I travel the world lecturing. I lecture a lot on vestibular, on sensory processing, on how to do an exam on special needs patients using deep pressure, light touch concepts... because I have learned from my [OT]." Dr. Lee, T4 added his professional growth relating to program development stating:

It took Kelly, T4 a couple of years to keep poking me with it [sensory integration]... Then, I got a craving to learn more about it. I am all over sensory integration. It is probably my number one passion... I am on a mission right now to develop the multi-sensory training, both equipment-wise and protocol, and I can't wait to get that released here later this year.

Another common sub-theme resulting from positive experiences in IPCP is job satisfaction. Half of the participants correlate interprofessional collaboration with job satisfaction including feelings of enjoyment, fun, and less stress. Participants used phrases such as "it makes it more enjoyable", "it is fun to collaborate", "discussing patients in-depth together is a real treat", "I would not love my job nearly as much", and "I have more enjoyment in my work, it is more relaxed".

Improved Patient Care

One final prevailing theme is that of improved patient care. There was widespread agreement that IPCP resulted in improved patient outcomes, quicker progress, and patient satisfaction. The use of a collaborative approach has led to a cooperative learning and problem-solving environment allowing for a broader treatment approach using the expertise of more than one person. Dr. Smith, T1 shared:

They were tough patients and people didn't know how to handle them... It was a real cooperative learning situation and through observation, we found how much more effective we were when we could both work together... you get to go beyond each other's skills, you get to collaborate and go beyond what each can do by themselves.

Dr. Lee, T4 discussed:

The strength of the program is that it does integrate the minds and brainpower of optometry, developmental optometry/neuro-

optometry, with occupational therapy, and that combination, is synergistic. The outcome is greater than the sum of the individual professions working with that patient.

As a team, Dr. Davis, T3 and Marcy, T3 shared case stories that demonstrated the effectiveness of their collaboration. This case was a young patient, 5th or 6th grader with a “super high IQ but couldn’t read.” The patient came to Dr. Davis, T3 who realized he had severe sensory issues and promptly referred for OT. The patient participated in both OT and vision therapy in addition to other outside services such as nutrition. Dr. Davis, T3 reported his progress as “a child who is a genius IQ that can’t read in the 5th or 6th grade and go to being the top graduate at Georgetown Law school.” Marcy, T3 further stated that their collaborative care approach “gave them [the family] new glasses, new lenses to look at their son through and a new way to look at everything that was going on in their family.” She further described it as a “miracle to the family.”

In addition to improved patient outcomes, half of the participants reported faster progress when using a collaborative approach. Although not all the case stories shared were directly related to children as this study’s focus, many shared that integrated sessions and cooperative problem-solving lead to immediate observable changes for the patient. Jessica, T2, however, shared a case about a young child who had long term goals of stacking blocks and other fine and visual-motor tasks. She reported that after identifying behaviors with a possible visual basis, she consulted with the optometrist on her team. After a joint session, in which prisms were introduced, Jessica, T2 observed “immediate changes in fine motor capabilities and ability to walk the hallway” without constant tactile input.

Using an integrated approach, such as in the case Jessica, T2 shared, allows each profession to see the impact of the other

which can also expedite therapy. Dr. Smith, T1 described that using a collaborative approach allowed her and the OT to work concurrently sharing:

If you are not collaborating, sometimes they are in OT 6, 9, 12 months, a year or 2 and we could have already started vision therapy and we haven’t because they [the patient] are doing their program and waiting until they are done to do ours. It doesn’t have to be that way but that is often what happens.

Patient satisfaction is another outcome discussed by several respondents. Seven participants expressed the success of the patients resulted in ongoing referrals and additional outside referral sources. One participant shared the unexpected referral of a patient from an orthopedic surgeon. Dr. May, T2 shared a conversation between herself and a local pediatrician who said:

I should have started listening to you and what you were saying 15 years ago when we first started this journey ... I have heard so many stories from parents of students that you have helped that I just feel like I can’t just listen to research, I have to listen to what you have to say.

DISCUSSION

Interprofessional collaboration has long been recognized as best practice in health-care¹⁸; however, more research is needed to identify the patient and provider-related outcomes of IPCP. To address this gap in the literature, particularly in teams of ODs and OTs in the treatment of children, insights from the practitioners themselves needed to be investigated. The purpose of this study was to explore the factors and implications of interprofessional collaboration between these two professions. The themes emerging from this study closely align with and provide further support to current literature regarding IPCP in a variety of healthcare settings.

As documented in the literature and suggested by the participants of this study, many factors exist that can either facilitate or hinder IPCP. The Interprofessional Education Collaborative (IPEC) acknowledges these intricacies and has created a framework providing core competencies stemming from exhaustive literature that can guide professionals to successful IPCP.¹⁸ Several of the facilitators and barriers outlined from this study's participants correlate to concepts identified within the core competencies including role understanding, mutual respect, developing trusting relationships, and using effective communication methods. The first two themes of this study, "professional boundaries" and "co-location, integrated practice", emerged as dominant factors and provide insight into facilitators and barriers to IPCP among OD and OT teams.

Awareness of one's skills and limitations, while acknowledging those of team members, has been well documented in IPEC's core competencies and current research as a fundamental skill in the development of IPCP.^{18,20,28,29} OTs integrated into primary care teams report the importance of communicating and educating team members about their roles and expertise, thus increasing referrals.²⁰ MacDonald et al.²⁸ suggested specific behaviors are associated with understanding the professional roles of others including communicating professional boundaries, seeking and respecting the contributions of others, addressing stereotypes, appreciating overlapping professional skills, and valuing the benefits of collaboration. Many of these behaviors are reflected in the participant responses of this study; particularly, humbleness and humility, mutual respect and trust, and overlap of professions. The study by Suter et al.²⁹ supports these behavioral indicators while adding when over-reach is perceived, territorial feelings developed and the need to be protective of their scope of practice emerged. These authors further add that overreach, caused by "role blurring", can

result in "serious risk for conflict".²⁹ Echoed by participants of this study, Suter et al.²⁹ noted "defining clear boundaries and demarcating individual contributions", as well as "focusing on the patient's needs" are strategies to reduce conflict and overcome this barrier.

The second theme emerging from the respondents of this study is that of "co-located, integrated practice". The Standard Framework for Levels of Integrated Healthcare,²² although targeting behavioral health and primary care providers, advocates that integration is imperative to achieving improved patient care and lowering healthcare costs. This framework suggests that although co-location is not required, the proximity of professionals leads to increased communication and development of trusting relationships; both of which were voiced by participants of this study. In particular, mutual respect and the development of trusting relationships are identified as an essential piece of the foundation of IPCP^{28,30} with co-location of services being a pivotal factor in developing these relationships.^{20,21}

While the co-location of services is a significant facilitator in IPCP, it can often come with added difficulties. Concerns of allocating space and reimbursement were two barriers discussed among family physicians engaged in IPCP.²¹ This study's participants shared these concerns, notably regarding insurance billing and reimbursement. Further attention and problem-solving in this area are needed for individuals desiring a co-located, integrated practice model.

The outcomes of interprofessional collaboration are not yet well-rooted in literature and are an area of need for further research. The participants of this study shared widespread agreement on both provider-related and patient-related outcomes. Provider benefits included professional growth and development, broader perspective, and job satisfaction. Humility was identified as both an area of need for successful collaboration and an area of growth as a result of IPCP, adding to the current evidence.²⁸ Showing humility while

maintaining focus on the patients' needs can help to reduce conflict often originating from the overlap of roles.²⁸⁻²⁹

Job satisfaction is another identified outcome of this study that is shown to statistically correlate with IPCP.³¹ Stuhlinger et al.'s³¹ study identified job satisfaction and quality of care as two positive outcomes resulting from shared language and knowledge, mutual respect, frequent communication, and psychological safety. Other provider-related outcomes such as professional development and obtaining a broader perspective for patient care, identified by respondents of this study, have not been established in the literature.

Patient-related outcomes, specifically resulting from IPCP among teams of ODs and OTs, have been highlighted through case reports in the literature outlining suggested models for collaboration. Although the results of this study regarding improved patient care are anecdotal, they provide further evidence to support these case studies as well as patient outcomes reported from other healthcare teams. In a review of literature, all 20 studies reported at least one patient-related benefit including health-related outcomes, decreased costs, and patient satisfaction.³² While not all studies in this review suggested positive results, none of the studies reported negative outcomes.

One additional area frequently reported by respondents in this study is patient satisfaction. Many participants reported positive outcomes resulted in more referrals and referral sources. This is concurrent with the findings from a scoping review which reported 57% of studies identified increased patient satisfaction with teams from a variety of professions and contexts.³³ Furthermore, this review concluded that patient satisfaction scores were greater among teams presenting a comprehensive team-based approach.

Limitations

Several limitations should be considered in this study. First, participant bias may exist

because this study limited the focus to ODs and OTs who practice collaboration in an integrated, co-located manner. Although three of the participants were not currently co-located, the interview questions were primarily based on past experiences of integrated practice. Despite the differences in their collaboration efforts, the findings remained consistent among the participants. However, future studies might consider exploring professionals who are not co-located to examine how their collaborative efforts differ from those examined in this study.

Another limitation to recognize is the possibility of participant self-selection bias. The respondents in this study may have consented to participate based on their positive experiences with IPCP. Likewise, practitioners who declined response to recruitment emails and advertisements may have chosen to opt-out due to negative or failed experiences. However, considering the exploratory nature of this study, the inclusion of non-co-located participants, and the consistency of results to previous research, the effects of self-selection bias are likely minimal. Nonetheless, this possible bias should be regarded when interpreting the results.

One final limitation to consider is researcher bias. Although investigator triangulation was utilized in the data analysis of this study, data collection was carried out by a single individual. This could have been mitigated by utilizing another professional, namely an optometrist, during the interview process. Although most of the probes used to gather more detailed data were general and utilized throughout all interviews, an additional interviewer may have probed differently eliciting additional or alternative insights. This should be considered in future studies exploring interprofessional collaboration, particularly in those using a qualitative research design.

Clinical Implications

Although the findings of this study are not surprising based on previous literature, they do

serve as a foundation for ODs and OTs to begin to explore options for IPCP. This study highlights obstacles that can impede the development of teams such as role understanding and overreach of professional boundaries. Insurance concerns such as credentialing pitfalls and billing difficulties can also be a hindrance, particularly within co-located practices. Exercising humility, upholding a patient-centered focus, maintaining mutual respect, communicating frequently, and proximity of professionals were viewed as factors that can alleviate these barriers. Additionally, understanding and acknowledging the core competencies set forth by IPEC can further support IPCP. As suggested in previous studies, demarcation of boundaries may also be necessary. One participant of this study recommended the development of guidelines, following respective state bylaws and practice regulations, to serve as an enabler to enhance collaboration. However, widespread agreement among stakeholders would be vital in determining the need for and development of such guidelines and is another consideration for future research.

Models of collaborative practice between these two professions have been advocated for some time now. Such models have been proposed by Scheiman,³ in his Inter-Relationship Model, and Hellerstein and Fishman's¹⁷ Integrated Approach that provide valuable guidance to the successful management of vision deficits in children. However, as demonstrated in this study, the need for additional skills and interprofessional competencies cannot be refuted. Utilizing tools such as the IPEC Core Competencies alongside the proposed practice models can only enhance the success of the collaboration between ODs and OTs. In doing so, teams may realize the benefits of collaborative practice, such as professional growth and improved patient outcomes, as expressed by the participants in this study. Using this study as a foundation, future research should objectively explore these benefits further to provide an evidence base with measurable outcomes.

Many of the participants in this study shared a desire to incorporate other allied health professionals into their practice such as physical therapy, speech-language pathology, chiropractic care, and nutrition. Considering the similarities of the results of this study and previous studies examining a variety of healthcare professionals and settings, the data can be transferable to adding other professionals to an OD/OT team. However, additional research would be beneficial to augment the knowledge base including additional or alternative factors that may play a role in larger teams.

CONCLUSION

This study sought to explore perceptions of OD and OT practitioners providing vision remediation services utilizing a collaborative approach. Several facilitators and barriers were discussed by participants in addition to a number of provider and patient-related benefits. The findings of this study not only add to the body of evidence underpinning IPCP but can serve as a foundation for future research. Such studies should examine the effectiveness of OD/OT collaboration, as well as within larger teams, using measurable, objective data collection and analysis of patient outcomes. Finally, this study strongly supports the coordination of care, through OD and OT collaboration, in the treatment of visual deficits in children.

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