Interdisciplinary Design of an Adaptive Feeding Board

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Background:

Pediatric occupational therapy focuses on developing functional skills relevant to children such as play, social engagement, and fine and gross motor skills (Mulligan, 2014). Fine motor skills including grasp patterns are needed in order to complete many activities and occupations such as self-feeding, dressing, and completing other activities of daily living. Grasp patterns generally develop from the ulnar to the radial side of the hand and become more precise as the child progresses through developmental grasping milestones (Mulligan, 2014). Upon working in the occupational therapy clinic with a thirteen-year-old client living with multiple diagnoses, including autism spectrum disorder, it was determined he was not using age appropriate grasp patterns. This delay in grasp patterns has affected his ability to participate in meaningful occupations such as self feeding.

Methods:

We were presented with this client during the fall of 2018, and have continued working with him through this spring semester. We created goals for this client centered on developing age appropriate grasp patterns, aimed to improve his function, specifically in self-feeding. Interventions for this client were created blending current methods used in pediatric settings such as guided movement practices, along with innovative techniques such as customized adaptive equipment to facilitate independence (Zwicker & Harris, 2009). With theory guided in Person-Environment-Occupational-Performance model, we were able to alter various components of the intervention in order to create the just right challenge for the client, to maximize occupational performance (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996). Due our clients diagnoses, manipulating objects effectively is often challenging, and warrants the need for adaptive equipment at this time. With help from the physics department and the 3D printing lab, we made plans to create a feeding board designed to encourage age appropriate grasps, such as tip to tip or pincer patterns. The materials used to create this feeding board were biodegradable corn based plastics. Using an interdisciplinary approach, we created a total of 8 customized bowls, designed using SketchUp software, to promote our client's use of a pincer grasp for various tasks such as using his augmented communication device. Understanding the most successful shape, height, and diameter of the bowls, as well as gaining a thorough understanding of the progress of his development will help in the future for others with delayed grasping patterns.

Results:

By implementing the use of a customized feeding board, we are creating an environment that supports the occupation of self-feeding for our client, while also promoting the use of grasp patterns that can be transferred to other activities in the future. In order to evaluate the efficacy of the customized feeding board, we observed the amount of times that the client displayed various grasp patterns with the prototype tubing. We quantified immature grasp patterns, such as raking, as unsuccessful attempts, while we distinguished successful grasp patterns as bringing the thumb into contact with other fingertips to provide strength and precision to the client's fine motor

movements. We then utilized the prototypes that facilitated the most successful prehension patterns into the design for the completed feeding board.

Discussion and Conclusions

Our case study aimed to improve our client's functional independence through the maturation of grasp patterns specifically; however, utilization of the broader ideas that were used to mold this intervention could be applied to a multitude of various pediatric clients facing barriers to occupational performance. This work aims to address specific delays faced by our client in a holistic manner. By utilizing various approaches including those from neurodevelopmental theory and the PEO model, this allowed us to analyze the obstacles impeding on success in occupations such as self feeding for our client.

References

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