5-1-2022

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Recommended Citation
Trewin, Audrey; Mailloux, Zoe; and Schaaf, Roseann C, "Evaluation of MealSense©: A Sensory Integration-Based Feeding Support Program for Parents." (2022). Department of Occupational Therapy Faculty Papers. Paper 86.
https://jdc.jefferson.edu/otfp/86

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Evaluation of MealSense©: A Sensory Integration Based
Feeding Support Program for Parents

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EVALUATION OF MEALSENSE©: A SENSORY INTEGRATION BASED FEEDING SUPPORT PROGRAM FOR PARENTS

Abstract

**Importance:** Children with autism often experience feeding challenges related to difficulties in sensory integration.

**Objective:** Evaluate the content, acceptability, and usefulness of MealSense©, an online parent education program for children with autism who have feeding challenges related to poor sensory integration.

**Design:** A descriptive study in which experts reviewed and rated MealSense© content for consistency with Ayres Sensory Integration® principles and evidence-based practices in feeding.

**Participants:** A convenience sample of expert reviewers (n = 5) and parents of children with autism and feeding challenges (n = 5).

**Results:** Expert ratings (n = 5) met criteria, showing that MealSense© is consistent with Ayres Sensory Integration® and evidence-based practices in feeding. Parent ratings (n = 5) met criteria showing that MealSense© is acceptable and useful.

**Conclusion and Relevance:** MealSense© shows acceptability and usefulness for parents of children with autism is consistent with Ayres Sensory Integration® and evidence-based practices in feeding.

**What this Article Adds:** This article provides preliminary support for MealSense© as an evidence-based tool to supplement direct intervention for children with autism and feeding difficulties. Further research is needed to determine the efficacy of MealSense© for improving the transfer of feeding skills into the home environment.
Feeding is a fundamental occupation, needed for optimal health and an area frequently addressed by pediatric occupational therapists. Feeding difficulties, such as selective eating, negative mealtime behaviors, food refusal and reduced acceptance of textured foods (Cermak et al., 2010; Kral et al., 2013; Kuschner et al., 2017; Marshall et al., 2014; Nadon et al., 2011; Provost et al., 2010; Zimmer et al., 2011), are prevalent in 48 to 89% of children with autism spectrum disorder (ASD), limiting successful participation in the essential daily occupation of eating and impacting quality of life for many children and families (Ledford & Gast, 2006). Parents of children with ASD report high stress levels and identify eating as one of the most frustrating occupations for their child (DeMyer, 1979; Hayes & Watson, 2013).

Sensory integration is defined as “the neurological process that organizes sensations from one’s body and from the environment and makes it possible to use the body effectively in the environment” (Ayres, 1989). Multiple studies have shown a correlation between feeding challenges and sensory integration difficulties for children with ASD (Ausdereau et al., 2018; Cermak et al., 2010; Nadon et al., 2011; Schreck et al., 2004; Suarez et al., 2012). For example, sensory sensitivity may be a factor in food selectivity for children with ASD, particularly tactile sensitivity (Cermak et al., 2010; Nadon et al., 2011; Schreck et al., 2004; Suarez et al., 2012). Thus, addressing the underlying sensory integration challenges related to feeding may lead to improved mealtime behaviors.

Parent education, which refers to programs that are designed to teach parents skills or provide them with information (Schultz et al., 2011), is an evidence-based component of feeding intervention for children with ASD (Adamson & Morawska, 2013; Howe & Wang, 2013). Parent education can provide natural learning opportunities in the home that extend intervention beyond
the clinic environment (Steiner et al., 2012). Parent implemented intervention is also cost-effective and can increase the rate of progress in therapy (Steiner et al., 2012).

Recent interest in online strategies and telehealth intervention for individuals with ASD has been successful in meeting specific educational concerns of parents (Kobak et al., 2011; Vismara et al., 2013.) Web-based parent education programs may address the identified barriers for parents to attend educational programs outside of the home, such as travel time, cost, and childcare as well as the additional time needed to schedule in real-time and costly equipment required (Heitzman-Powell et al., 2013; Vismara et al., 2013). Furthermore, parent education delivered virtually may be useful for times when in-person intervention is not possible, as seen during the 2020 COVID-19 pandemic.

To address the need for an online program that educates parents of children with ASD about the impact of sensory integration challenges on feeding and that provides a means of carryover of feeding skills from the therapeutic environment into the home, we developed MealSense©, a web-based, parent education program.

**MealSense© Program Development**

MealSense© is a self-paced, online educational program for parents of children with ASD who have feeding difficulties related to challenges in sensory integration. The MealSense© program was developed by the authors, utilizing current evidence in ASI and feeding, alongside feedback from experts in sensory integration, feeding, knowledge translation, and online instruction. While primarily a sensory-based feeding program, MealSense© acknowledges that feeding is a multifaceted occupation that may be impacted by factors related to motor, behavior, and social functioning. Designed as a supplement to direct intervention, MealSense© targets the transfer of feeding skills from the clinic into the home environment through incorporation of
knowledge translation (KT) strategies and emphasizes education about sensory integration factors that may contribute to feeding difficulties. A detailed outline of MealSense© content is described in Table 1.

ASI is an evidence-based practice for children with autism that is frequently requested and utilized (Schoen et al., 2019). Given the correlation between feeding challenges and sensory integration difficulties principles from ASI (Ayres, 1979; Schaaf & Mailloux, 2015) were a key perspective included in the MealSense© program. MealSense© includes sensory-rich experiences, encouraging active engagement of the child, and offering activities at the just-right challenge (Parham, et al., 2011).

The Knowledge to Action (KTA) framework (Field et al., 2014) and knowledge translation strategies were also included in the MealSense© program. KTA is a complex and dynamic process of knowledge creation and application that facilitates knowledge use by guiding the translation of knowledge into sustainable and evidence-based interventions (Field et al., 2014). KTA strategies utilized in MealSense© included adding parent reflections, tips for completing the modules, and modification of parent worksheets to allow monitoring of progress.

The purpose of this project was to answer the following research questions: 1) Do expert reviewers consider MealSense© consistent with principles of Ayres Sensory Integration® (ASI)? 2) Do expert reviewers view MealSense© as adhering to best practices in feeding? and 3) Do parents of children with ASD and feeding difficulties rate MealSense© as acceptable and useful?

Methods

In this descriptive study, we distributed electronic surveys (Qualtrics) and a MealSense© program link to expert reviewers and parents of children with ASD and feeding difficulties to obtain feedback about content, acceptability, and usefulness.
Participants

Expert reviewers (n=5), recruited via convenience sampling by emailing local pediatric clinicians who had experience in both sensory integration and feeding, were pediatric occupational therapists who met the following inclusion criteria: 1) a minimum of 4 years of clinical experience in occupational therapy, 2) advanced training and education (certification) in sensory integration, 3) a minimum of three years of experience working with children who have feeding difficulties, and 4) a minimum of three pediatric feeding continuing education courses.

Parent participants (n=5) were a convenience sampling from the first author’s place of employment, a large therapy clinic devoted to treatment of children with developmental and learning disorders. Eligibility criteria included: being fluent in English and having a child between two to eight years of age with a diagnosis of ASD (no other medical diagnosis) and who had at least one feeding goal related to sensory integration difficulties on a current treatment plan.

Five parents of children with ASD reviewed the program. Mothers comprised 80% of the sample and fathers were 20%. They ranged in age from 35-39 years (80%) and over 45 years (20%), 40% were white/Caucasian, 40% Hispanic, and 20% Asian. Eighty percent of participants reported having two dependents (80%) and 20% having more than 5 dependents in the home. Twenty percent completed high school, 60% college, and 20% graduate school.

Data Collection

This study was by the Thomas Jefferson Institutional Review Board and determined to be exempt from review.

Instruments
Program-specific surveys were developed and reviewed by a survey expert, for clarity and to ensure that the items were clear and relevant to the research area. Survey questions used Likert scoring, with 4=strongly agree, 3=agree, 2=disagree, and 1=strongly disagree and were distributed via Qualtrics. The expert survey was designed to evaluate program consistency with ASI (12 questions) and best practices in feeding (7 questions). The parent survey was designed to evaluate program acceptability, defined as adherence, reasonable time to complete, usability, clarity, and satisfaction and program usefulness (applicability and transferability) (Cooper et al., 2007; Kuschner et al., 2017; Burchett et al., 2013). We also emailed a program link to parents for access to MealSense© content and an anonymous survey link (13 questions) to evaluate acceptability and usefulness of MealSense©. A table of revisions was developed to summarize expert and parent feedback and identify revisions.

**Data Analysis**

Data were analyzed by determining the mean score for each question. Since responses of 3.0 and 4.0 indicated agreement, a mean score of 3.0 or above was considered acceptable.

**Results**

**Findings from expert review of content for consistency with ASI**

Results from expert reviewers (n=5) indicated a mean score of 3.0 or above on each of the 12 questions related to adherence to ASI principles, indicating that MealSense© content was consistent with the principles of ASI. As shown in Figure 1, experts indicated that MealSense© content addresses sensory exploration during mealtime (mean score 4.0), provides mealtime tasks at the “just-right” level for the child (mean score 4.0), factors the child’s interests into mealtime-related experiences (mean 4.0), addresses mealtime factors related to posture (mean score 3.8), encourages parent-child collaboration during mealtime (mean score 3.8), and provides
strategies that support the child’s ability to be successful during mealtime (mean score 3.8).

Survey items with the lowest mean score (3.0), but which still met criteria were related to MealSense® addressing ocular skills and bilateral motor control.

Findings from expert review of content for inclusion of best practices in feeding

Results from expert reviewers indicated a mean score of 3.0 or above on each of the 7 questions related to best practices in feeding. As shown in Figure 2, the highest ratings were as follows: the modules teach feeding as a multifaceted occupation (mean score 4.0), parent education is used to support the child’s feeding (mean score 4.0), and environmental barriers to mealtime participation are considered (mean score 3.8). Survey items with the lowest mean score, but which still met criteria included that MealSense© incorporates behavioral strategies as appropriate (3.4), addresses acquisition of feeding in a sequential way (3.4), and directs parents to consider environmental strengths (3.4).

Findings from parent review of acceptability and usefulness

Results from parent participants (n=5) indicated a mean score of 3.0 or above on each question. As shown in Figure 3, the highest survey responses were that the modules could be completed in a reasonable amount of time (mean score 4.0), information is presented in a logical way (mean score 4.0) and modules were easy to understand (mean score 4.0). High survey responses were also obtained on the following questions: each module was easy to navigate (mean score 3.8), entire website is easy to navigate (mean score 3.8), satisfaction with information (mean score 3.8), I would recommend the program (mean score 3.8), and information applies to feeding needs (mean score 3.8). The survey item with the lowest mean score (3.0), but which still met criteria included that MealSense© parent activities were perceived to be completed in a reasonable amount of time.
Discussion

Findings from this study suggest that MealSense©, demonstrates consistency with ASI and best practices in feeding and that parents perceive it as acceptable and useful. To our knowledge, this is the first evidence-based, online parent feeding support program for children with ASD that emphasize education about the sensory integration factors that can contribute to feeding difficulties.

Feeding is an important occupation that contributes to a child’s growth and development (American Occupational Therapy Association [AOTA], 2017) and successful mealtime participation can enhance a family’s quality of life (Ausderau et al., 2019; Henton, 2018; Meral & Fidan, 2015). Family-centered feeding interventions that address feeding and mealtime behaviors for children with ASD, such as for the MealSense© program presented here, are needed (Henton, 2018) and findings from this study lend support for the MealSense© program.

As a parent education program, MealSense© is not intended to provide direct intervention which adheres to principles of ASI as designated by ASI Fidelity Measure (Parham et al., 2007). However, the findings of this study suggest that ASI principles were readily operationalized into the MealSense© program, showing that these principles may be utilized outside of the traditional direct intervention, in an online parent education program.

One important aspect of the MealSense© program is that it is an online parent education tool that supports the occupation of feeding in the home environment. Implementation of virtual interventions can become unexpectedly important, as was the case during the 2020 COVID-19 pandemic. Since families were not able to participate in face-to-face intervention during that time, the necessity for innovative program delivery models in a virtual environment were even more salient (Jang et al., 2012; Steiner et al., 2012).
Potential benefits of implementing a program such as MealSense© in this format is its cost-effectiveness and accessibility. Challenges may include the lack of ability to answer questions for parents in real time and parent completion of modules in a timely manner. Utilizing MealSense as a supplement to direct intervention may help address these potential downsides of the program.

Descriptive feedback and quantitative data from expert reviewers identified principles of ASI that may benefit from further development, including addressing oral motor skills and bilateral motor control. Similarly, best practices in feeding that may benefit from further emphasis include addressing behavioral strategies, sequential development of feeding skills, and considering environmental strengths. Future iterations of MealSense© may benefit from more emphasis on these specific areas.

Limitations

Although the MealSense© program showed strong adherence to Ayres Sensory Integration© and best practices in feeding, more research is needed to evaluate the efficacy of MealSense©. Next steps will include pilot testing with parents to provide initial data about the efficacy of MealSense© related to changing feeding behaviors and participation in mealtime in the home setting.

Limitations of this study include that both participant groups were convenience samples, which may limit our ability to generalize findings. In addition, the sample size was small (n=5) for both experts and parents, and response bias may have influenced reviewer feedback.

Implications for Occupational Therapy

The results of the study have the following implications for occupational therapy practice:
• KT strategies may facilitate the usefulness of parent education programs related to sensory integration and feeding.

• MealSense© provides an example of an online educational tool for parents of children with ASD and may be especially useful for times when in-person visits are not possible.

Conclusion

There is a need for parent education feeding programs for children with ASD that address the sensory integration factors that can impact feeding behaviors and that facilitate the transfer of skills into the home. This study provides preliminary support for MealSense©, a web-based program designed to educate parents about their child’s sensory integration related to addressing feeding needs for children with ASD and for supporting the carryover of skills into home.

Acknowledgments

We thank Dr. Isabelle Beaudry Bellefeuille for reviewing the first iteration of MealSense© and providing feedback related to feeding content. We would also like to thank Dr. Amy Carroll, for contributions in knowledge translation, and Dr. Mary Cohen, for feedback related to online instruction.
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https://doi.org/10.1177/1757975913476904


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Figure 1 Expert data related to consistency with ASI. Likert scoring with strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1.

*Note.* *n=3.*

Figure 2 Expert data related to best practices in feeding. Likert scoring with strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1.

Figure 3 Parent data related to acceptability and usefulness. Likert scoring with strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1.
### Table 1 MealSense© Content Outline

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