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A Scoping Review of Oral Feeding Skill Development in Typically Developing Children Part II: Exploring Variability in Oral Feeding Skill Descriptions

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ABSTRACT

Purpose: This scoping review is the second in a two-part series that aims to synthesize the literature on oral feeding skills development and to create a classification system of observable skills. Building on the findings from Part 1, this article compiles and analyzes the types of feeding skills reported across studies and proposes a framework for standardizing terminology.
Method: The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews guidelines. Of the 14 studies identified in Part 1 that focused on feeding skill development, 11 included unique skill descriptions. These skills were coded and categorized into three main schemes: texture, oral function, and swallowing phase. Overlapping or redundant skills were critically assessed for their relevance and applicability.
Results: A total of 107 feeding skills were identified, revealing considerable variability in how skills are defined and reported. Categorization by texture, oral function, and swallowing phase highlighted key gaps and inconsistencies in the literature and opportunities for further investigation.
Conclusions: The development of a standardized observational measure, grounded in a core set of feeding skills encompassing texture, oral function, and swallowing phases, would be a valuable resource for clinicians and researchers alike. This framework could improve consistency in assessing feeding development, deepen understanding of underlying physiology, and enable more accurate identification of atypical feeding skills. Future work will aim to refine this skill set to inform the creation of tools for both clinical and research applications.

Oral feeding skills are fundamental to the healthy development of children, playing a crucial role in their ability to consume their required nutrition by a variety of textures, safely and efficiently. However, research on feeding skill development varies in methodologies and the number of skills measured across different studies, leaving gaps in established feeding skill norms (Delaney, Flatt, et al., 2025). To address this gap, we conducted a two-part scoping review. Part I of this scoping review synthesizes the literature and examines methodologies, populations studied, and normative data for feeding skill development (Delaney, Flatt, et al., 2025). Part I of the scoping review did not seek to analyze established assessment tools; instead, it aimed to identify the feeding skills measured across studies. Part II of this scoping review presents a comprehensive analysis of the extent, range, and nature of feeding skills examined in studies of typical feeding, with a long-term goal of developing an assessment tool based on important and observable skills relevant to feeding development.

For studies to be included in Part I of the scoping review, they needed to be peer reviewed, studying term, typically developing children 4 months of age and older, while drinking from a cup or eating solids, using direct observation. Studies also needed to provide a list of skills

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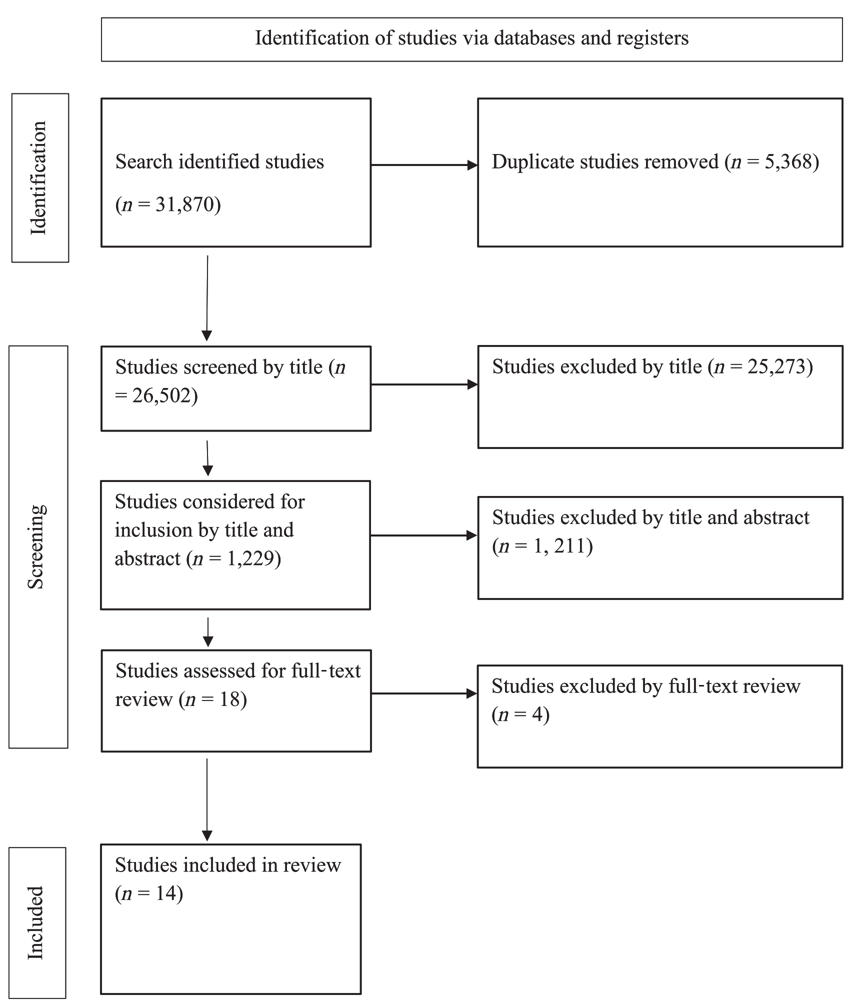
observed and ages of performance. Figure 1 demonstrates the extraction process of studies. Fourteen studies met inclusion criteria and were rated using the Mixed Methods Appraisal Tool (Hong et al., 2018) for quality assessment. The quantitative nonrandomized studies were a range of moderate (Ishida et al., 2011; Reilly et al., 1995), medium (den Boer & Schipper, 2013; Gisel et al., 1986; Şahan et al., 2021), and high (Remijn et al., 2014) quality. The quantitative descriptive studies were primarily of high quality (Gisel et al., 1986; Schwaab, 1986a, 1986b; Schwartz et al., 1984b; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014), and two were rated as medium quality (Schwartz et al., 1984a; Sheppard & Mysak, 1984). The included studies were then analyzed in greater detail to examine participant demographics, study designs, approaches to measuring feeding skills, and key findings. For further details about the search strategy and study extraction, refer to Delaney, Flatt, et al. (2025).

These analyses revealed considerable variability in sample characteristics, study methodologies, and how feeding skills were defined and measured. The normative data presented in Part I were derived from approximately 200 children each between 4–12 months and 2–5 years of age and another approximately 150 children between 8 and 44 months of age without specified ages. Most studies were published 10 years ago or longer. Feeding skill measurements routinely focused on changes in jaw, lip, and tongue positioning; chewing efficiency; and swallowing efficiency. A key finding was the lack of consistency in the measurement of feeding skills with a range of 1–30 individual feeding skills identified. Although many of the studies looked at comparable skills (e.g., tongue position when food is presented), there was no one universal way of doing so. This inconsistency may cause differences in reliability, validity, and available results. For example, chewing cycles were commonly observed, yet Gisel (1991)

Figure 1. Processes performed to include or exclude sources of typical feeding skills for infants and young children. Figure was originally published in Delaney, Flatt, et al. (2025).



defined a cycle as a singular down-and-up movement of the mandible, whereas Schwaab (1984) defined a cycle as the "opening, closing, and occlusion" of the mandible. Although they were observing a similar skill, the results do not coincide because of the discrepancies in exact measurement for that skill. Additionally, each study measured one or two types of skills, but no single study addressed all types. Differences in methods across studies and inconsistent reporting of participant characteristics limit the generalizability of findings.

Despite methodological variability across studies, several consistent feeding skills emerged as important indicators of typical development. Specifically, lip control, which supports spoon-feeding and liquid intake, typically emerges between 6 and 8 months of age and aids in bolus maintenance, especially for liquids and purees (van den Engel-Hoek et al., 2014). By 6 months of age, children begin to anticipate bite presentations by holding their mouths open, with their tongues resting behind their teeth and lips at the onset of the swallow (den Boer & Schipper, 2013; Stolovitz & Gisel, 1991). Lip pursing or puckering at the point of swallow is commonly observed in children aged 4–5 years (Schwartz et al., 1984a). For chewing, the number of chewing cycles required to break down food decreased significantly between 6 and 12 months (from approximately 29 to 17 cycles), with bite durations lasting up to 42 s at 6 months (Gisel, 1991). While the number of chewing cycles stabilized after 12 months, the duration of chewing continued to decrease, dropping from 25 to 16 s (Gisel, 1991). Chewing skills show rapid improvement between 8 and 12 months, supporting the introduction of solids, and further refinement of chewing occurs more gradually after 12 months (Gisel, 1991; Schwaab, 1986a; Schwartz et al., 1984a; Sheppard & Mysak, 1984). For swallowing, signs of difficulty included choking, gagging, and facial movements during the swallow (den Boer & Schipper, 2013; Stolovitz & Gisel, 1991). A notable finding was that 9-month-old children were more likely to choke when drinking than while eating (den Boer & Schipper, 2013). As children aged, they required fewer swallows per bite, although specific age milestones for this development were not reported. These data offer preliminary insights into the general progression of key feeding skills across broad age ranges; however, such wide age groupings may obscure critical developmental benchmarks. The lack of fine-grained, age-specific skill mapping limits the ability to identify subtle delays or deviations in feeding development, potentially delaying early detection of feeding skill dysfunction. More granular data are needed to support timely, developmentally aligned interventions that target specific motor patterns and feeding milestones.

Currently, there is no standardized list of feeding skills used across clinical or research settings, and no comprehensive review has assessed the skills included in existing studies. Notably, the application of diagnostic criteria for pediatric feeding disorder (PFD; Goday et al., 2019) is limited by the lack of detailed normative data on feeding skills since age-appropriate feeding skills is the reference benchmark used to diagnose PFD. We aim to better understand the types and numbers of skills necessary to establish normative data for age-appropriate feeding skill development and, therefore, the benchmark for PFD criteria. To gain a clear and accurate understanding of typical feeding milestones, a thorough and methodologically rigorous investigation into the specific skills involved in feeding is essential. Although standardized normative data are crucial for advancing our understanding of feeding skill development and informing clinical practice, an immediate priority is to critically examine the specific feeding skills reported in the literature. The goal of this review was not to define a set of skills but rather to compile a broad collection of skills identified in prior research and identify opportunities for standardization, with the aim of refining this list for future studies and clinical practice.

Specifically, in the current article, we seek to extend our preceding scoping review by generating a comprehensive review of the extent, range, and nature of feeding skills used in studies of typical feeding development. The objectives are to (a) compile a complete list of oral feeding skills from existing literature on typical development and (b) analyze and describe the variations in the number and types of skill descriptions.

Method

Objective 1: Comprehensive List of Skills

In Part I of the scoping review, we followed the methodology established by Arksey and O'Malley (2005) for the Preferred Reporting Items for Scoping Reviews and Meta-Analyses extension for Scoping Reviews. A librarian ran searches in PubMed, CINAHL, and PsycINFO databases using search terms for studies in English published through 2024. Rayyan software (Ouzzani et al., 2016) was used to review potential studies. For further detail on the methodology of finding studies for inclusion, refer to Part I of this scoping review (Delaney, Flatt, et al., 2025). The identified articles from Part I formed the foundation for the identification of feeding skills and their definitions (den Boer & Schipper, 2013; Gisel, 1991; Gisel et al., 1986; Ishida et al., 2011; Reilly et al., 1995; Remijn et al., 2014; Şahan et al., 2021; Schwaab, 1986a, 1986b; Schwartz et al., 1984a, 1984b; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). Some research groups had multiple articles in the list, but they used the same feeding skills across different studies (Gisel, 1991; Gisel et al., 1986; Schwaab, 1986a, 1986b; Schwartz et al., 1984a, 1984b). In these cases, we used only the original study from each research group to identify and extract the relevant feeding skills, even if those skills were used in subsequent studies by the same group (Gisel et al., 1986; Schwartz et al., 1984a, 1984b).

Skills were extracted from the studies if deemed necessary for feeding development and could be measured by direct observation. For example, the study by Sheppard and Mysak (1984) observed oral reflexes and feeding skills; therefore, the oral reflexes were not included in this review as they were not oral movements used with food or liquid. Two authors extracted and discussed all skills from the studies before deciding on inclusion. Because each study used a different approach to describing the types of skills used, the wording of those skills, and the organization of the skills, it was necessary to develop a framework to systematically organize, examine, and describe all identified skills, as depicted in Figure 2. The studies labeled skills by texture (e.g., purees), feeding task (e.g., chewing), oral structure involved (e.g., jaw movement), bolus formation, or a combination of these that help to inform our coding scheme. To account for this variability, we created three distinct coding schemes, as no single scheme could capture the full range of oral feeding skills. These three organizational schemes were based on (a) texture, (b) the function of oral structures, and (c) the phase of swallowing. Table 1 provides operational definitions for each subcategory within the three schemes, facilitating transparency and reproducibility of the coding process.

Texture

Oral feeding skills are often organized by texture, meaning that the same skill may be listed under multiple textures, which increases the total number of skills identified. The transition from liquids to table food textures is considered an important feeding milestone, and studies have demonstrated that different textures require specific skills (Remijn et al., 2014; Schwartz et al., 1984b). Therefore, an analysis of feeding skills must consider the texture associated with each skill. Although there is no standardized system describing typical texture transitions (Delaney, Staskiewicz, et al., 2025), commonly reported textures include liquids, purees, and solids. Therefore, the texture scheme consisted of liquid, puree (with semisolids included under puree), solid, or multiple textures.

Oral Function

Skills were often grouped by oral functions such as sucking, biting, and chewing. The literature describes the function of important oral structures in adults involved in oral feeding (Dodds, 1989; Dodds et al., 1990; Hiiemae & Palmer, 2003; Kennedy & Kent, 1985; Logemann, 1998). Important, observable oral structures for feeding include the jaw, lips, and tongue. For example, a function of the jaw is to open and close to accept food and to chew. A function of the lips is to assist in removing food from a utensil and to close to contain food within the oral cavity. A function of the tongue is to retrieve food outside of the oral cavity and manipulate food within the oral cavity. These previously described oral functions and our analysis in Part I formed the basis of coding each individual skill within the oral function scheme. However, the list of identified skills was more complex than these few functions. Each skill was assessed for its purpose of observation, and functions were documented. In the oral function scheme, there were 14 functions that were determined based on a review of each identified skill and how the original source worded the skill. Then, operational definitions were created for each function by the primary author. There was no limit to the number of functions that could be derived to be inclusive. These oral functions were then used to code each skill.

Swallowing Phase

Skills are often grouped into designations such as swallowing or swallowing solids. In the dysphagia literature, the sequence of physiological events for swallowing is described by Logemann (1998) and consists of the oral preparatory, oral, pharyngeal, and esophageal phases of swallowing. Direct observation is primarily possible for skills related to the oral phases of swallowing (Reilly et al., 1995; Remijn et al., 2014; Stolovitz & Gisel, 1991). General inferences of the pharyngeal and esophageal phases can be made clinically but can only be confirmed by instrumental assessment. Considering the phase of swallowing for each of these skills could allow for a thorough understanding of skills important in all phases of swallowing that might not be considered during a clinical, versus instrumental, assessment. It also allows for more

Figure 2. Visual flowchart representing the methods for skill extraction and coding of the three schemes, namely, texture, oral function, and phase of swallowing.

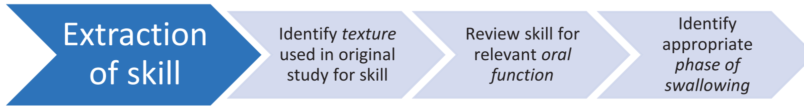


Table 1. Operational definitions for each subcategory within the three coding schemes—texture, oral function, and phase of swallowing—to classify the 107 individual skills identified from articles included in the scoping review.

Texture:	
1.	Liquid: drinkable liquid by cup or straw
2.	Puree: smooth puree or semisolid by spoon
3.	Solid: food that requires chewing
4.	More than one texture was utilized
Oral function:	
1.	Awareness: motor action demonstrating awareness of food presentation
2.	Biting: breaking off a piece of solid from a whole with the teeth or gum
3.	Chewing: type of jaw movement used to manipulate a solid
4.	Coordination: timing of initiation of bolus movement through the swallow
5.	Jaw closure: maintenance of the jaw within certain amount of closure
6.	Jaw movement: amount and pattern of a series of movements of the jaw
7.	Jaw opening: amount and type of opening of the jaw
8.	Lip closure–manipulation: lip position while manipulating the bolus
9.	Lip closure–object: lip position to touch spoon, solid, or cup
10.	Lip closure–swallow: lip position during swallow
11.	Maintenance: ability to maintain the bolus within the oral cavity
12.	Retrieval: retrieval of food lost from the oral cavity
13.	Tongue movement: type of movement of the tongue
14.	Tongue position: location of the tongue
Phase of swallowing	
1.	Pre-oral: preparation to receive food or liquid
2.	Oral phase–acceptance: acceptance of food or liquid into the mouth
3.	Oral phase–manipulation: bolus manipulation and onset of oral transit
4.	Transfer/swallow: observation of swallowing movements

translational diagnostics for those children requiring both types of assessment. There were four phases included in the swallowing phase scheme: pre-oral, oral phase–acceptance, oral phase–manipulation, and transfer/swallow. The use of swallowing phases affords the ability to ensure that the entire feeding process is addressed when assessing oral feeding skill development.

Objective 2: Analyzing and Describing Variations in Skills

The coding schemes developed in Objective 1 of this study enabled the systematic coding of feeding skills—even when the original studies did not categorize them in this way. Each scheme included clearly defined subcategories to enhance interpretability and ensure consistency. To ensure reliability and rigor, two authors independently coded each identified skill using all three schemes, assigning each skill three distinct codes. Each skill was coded according to the texture scheme as either liquid, puree, solid, or multiple textures. Each skill was coded based on the textures used in each study. Each skill was then coded for only one oral function. If more than one function was possible based on the wording of the skill, the primary author chose that function most representative of the skill. For example, the skill "anticipation of food shown by tongue protruding when spoon is 5 centimeters from lips" could qualify as the "awareness" function or the "tongue movement" function but was decidedly coded as "anticipation" given that that particular tongue movement is demonstrating the child's awareness of the food. Using this organizational scheme afforded the ability to assess the integrity of the oral mechanism rather than by individual textures. Finally, each skill was coded for its corresponding swallowing phase: pre-oral, oral phase–acceptance, oral phase–manipulation, and transfer/swallow. The pre-oral phase of swallowing represented any observations occurring up to the point of the bite presentation to the lips including position and movements of the jaw and tongue. The oral phase–acceptance of swallowing represented the observations of the oral structures as the bite presentation entered the oral cavity but before manipulation began. The oral phase–manipulation of swallowing represented the observations of the oral structures during control of the bite and during manipulation to prepare up to the point of the onset of oral transit. Finally, the transfer/swallow phase represented observations related to oral transit and swallowing.

This multidimensional approach allowed for nuanced comparisons and identification of overlaps or gaps across texture, function, and physiological phase. Overall, this framework enabled a more granular and physiologically grounded analysis of feeding skills.

Results

Objective 1: Comprehensive List of Skills

For this review, 11 out of the original 14 articles were included to avoid redundancy of skills observed by the same authors in different studies. Table 2 presents the 11 articles from Part I of our scoping review that described unique feeding skills. A total of 107 individual skills were compiled verbatim from these identified studies: den Boer and Schipper (2013; seven skills, 7%), Gisel

Table 2. Full-text articles retrieved from systematic search used to extract individual feeding skills.

Author (year)	Age	Measurements	No. of skills	Sources of skills (method or reference)
den Boer & Schipper (2013)	*N* = 52 *n* = 9 mos	% of the typically developing infants performing desired skill compared to preterm infants.	7	Origin of skills not reported
Gisel et al. (1986)	*N* = 96 2 y/o: *n* = 17 3 y/o: *n* = 19 4 y/o: *n* = 40 5 y/o: *n* = 20	% of children aged 2–5 years old prefer a certain side of the mouth for lateral tongue movements	2	Schwartz (1982; thesis), Lange (1982; thesis), Schwaab (1984; thesis)
Ishida et al. (2011)	*N* = 11 (0–18 mos; M_{age} = 13.3 mos)	% of children preferring certain spoon type with minimal "confusion" (ability to open the mouth fully without compensation), spillage, and choking	3	Carruth & Skinner (2002; parent-reported study), Delaney & Arvedson (2008; review)
Reilly et al. (1995)	*N* = 58 (8–44 mos; M_{age} = 8–21 mos)	Number and efficiency of oral motor skills in children 8–21 months old via the SOMA	30	Morris (1982; unpublished), Stratton (1981; review), Morris & Klein (1987; book), Pridham (1990; review)
Remijn et al. (2014)	*N* = 80 (6–48 mos; M_{age} = 12 mos)	Number of maximum scores for TD kids on the MOE with two different solid foods	18	Reilly et al. (1995; study), Steeve et al. (2008; instrumentation study), S. Yilmaz et al. (2004; study on kids with CP)
Şahan et al. (2021)	*N* = 19 (4–12 y/o; M_{age} = 9 y/o)	Mean score on the KCPS measuring chewing performance level	5	Serel Arslan et al. (2016; study with kids with CP only), Arslan et al. (2020; study w/o TD kids)
Schwartz et al. (1984a)	*N* = 40 4 y/o: *n* = 20 5 y/o: *n* = 20	Frequency of chews needed to swallow, duration of cycle (seconds) from time of insertion to swallow, duration of cycle (seconds) from the first bite to swallow	2	Proffit et al. (1969) and Proffit (1972; study with instrumentation), Bell & Hale (1963; saliva swallow and tongue thrust), Hanson et al. (1969; tongue thrust)
Schwartz et al. (1984b)	*N* = 40 4 y/o: *n* = 20 5 y/o: *n* = 20	Frequency of different tongue positions preferred by 4 and 5 y/o upon presentation and upon swallow	8	Ahlgren (1966; study), Lange (1982; thesis), Schwartz et al. (1984a; study)
Sheppard & Mysak (1984)	*N* = 2 (1–35 wks)	Frequency of oral and tongue movements upon stimulation and presentation of puree and liquid textures	7	Bosma (1975; review), Gesell & Ilg (1937; book chapter)
Stolovitz & Gisel (1991)	*N* = 143 6 mos: *n* = 23 8 mos: *n* = 26 10 mos: *n* = 21 12 mos: *n* = 22 18 mos: *n* = 27 24 mos: *n* = 24	Mean number of tongue positions and movements by texture, age, and gender	19	Morris (1982, unpublished), Stratton (1981; review), Morris & Klein (1987; book), Pridham (1990; review)
van den Engel-Hoek et al. (2014)	*N* = 39 (17–33 wks)	Mean duration (wks) to reach the maximum score on the OSF (i.e., develop certain feeding behaviors)	7	Morris (1982; unpublished), Skuse et al. (1995)

Note. mos = months; y/o = years old; SOMA = Schedule for Oral Motor Assessment; TD = typically developing; MOE = Mastication observation and Evaluation; CP = cerebral palsy; KCPS = Karaduman Chewing Performance Scale; wks =weeks; OSF = Observation List Spoon Feeding.

et al. (1986; one skill, 1%), Ishida et al. (2011; three skills, 3%), Reilly et al. (1995; 30 skills, 28%), Remijn et al. (2014; 18 skills, 17%), Şahan et al. (2021; five skills, 5%), Schwartz et al. (1984a; two skills, 2%), Schwartz et al. (1984b; eight skills, 7%), Sheppard and Mysak (1984; seven skills, 7%), Stolovitz and Gisel (1991; 19 skills, 18%), and van den Engel-Hoek et al. (2014; seven skills, 7%). Each study included a range of 1–30 skills. Table 3 is a comprehensive list of individual skills coded by each of the three schemes. The skills are grouped by oral function and sorted by texture and swallowing phase to allow for easier examination of skills, to identify unique skills or

Table 3. The 107 feeding skills grouped by oral function and sorted by texture and swallowing phase.

Skill number	Texture	Phase	Skill (source)
Oral Function 1: awareness (motor action demonstrating awareness of food presentation)			
1	2	1	Anticipation of food shown by keeping the tongue and jaw quiet when the spoon is 5 cm from the lips (1)
2	2	1	Head orientation to spoon (2)
3	2	1	The infant opens the mouth when the spoon reaches the mouth (9)
4	2	1	Anticipation of food shown as the tongue initiates suckling when seeing the spoon approach the mouth (1)
5	2	1	Anticipation of food shown by the tongue protruding when the spoon is 5 cm from the lips (1)
6	2	2	Anticipation of food shown as the tongue initiates suckling when the spoon touches the tongue or lips (1)
7	3	1	Associated head movements (2)
Oral Function 2: biting (breaking off a piece of solid from a whole with the teeth or gum)			
8	3	2	Controlled sustained bite (2)
9	3	2	Mouth cracker only (2)
Oral Function 3: chewing (type of jaw movement used to manipulate a solid)			
10	3	3	Reaction to food after removal from the spoon: initiates movement of food (1)
11	3	3	Reaction to food after removal from the spoon: initiates chewing (1)
12	3	3	Processing (5)
13	3	3	Processing: appearance of the bolus at midline signaled onset of the second phase, which consisted of cycles of mandible elevation and depression in combination with various lip and tongue movements (5)
14	3	3	Normal chewing function (6)
15	3	3	The child chews, but there are some difficulties in food transition to bolus (6)
16	3	3	The child starts to chew, but he/she cannot hold the food in the molar area (6)
17	3	3	The child bites but cannot chew (6)
18	4	3	Down–up movement of the jaw for chewing (11)
19	4	3	Durations (seconds) from food placement in the mouth until swallow (11)
Oral Function 4: coordination (timing of initiation of bolus movement through the swallow)			
20	1	4	Choking (4)
21	1	4	Choking while drinking (3)
22	2	3	Sequence initiated within 2 s (2)
23	2	3	Smooth rhythmic sequence (2)
24	3	3	Sequence initiated within 2 s (2)
25	3	3	The child cannot bite and chew (6)
26	3	4	Eating bread with crust (3)
27	3	4	Choking while eating (3)
28	3	4	Gagging during a meal (3)
Oral Function 5: jaw closure (maintenance of the jaw within certain amount of closure)			
29	1	2	Jaw alignment during drinking (2)
30	1	2	Internal stabilization (2)
31	1	2	Jaw alignment (2)
32	2	2	Internal jaw stabilization (2)
33	3	3	Internal jaw stabilization established (2)
Oral Function 6: jaw movement (amount and pattern of a series of movements of the jaw)			
34	1	3	Small vertical movements (2)
35	3	3	Vertical movements (2)
36	3	3	Wide vertical excursions (2)
37	3	3	Small vertical excursions (2)
38	3	3	Mandible retrusion, lateralization, and protrusion: movements associated with mature mastication (5)
39	3	3	Resolution: a break in the rhythmical procession or a cessation of movement (5)
40	3	3	Jaw movement: The mandible makes predominately vertical and slightly horizontal movements during chewing (rotary chewing) (7)
41	3	3	Jaw movement 1: only vertical direction (7)
42	3	3	Jaw movement 2: There is sometimes adequate movement from the midline (7)

(*table continues*)

Table 3. *(Continued).*

Skill number	Texture	Phase	Skill (source)
Oral Function 7: jaw opening (amount and type of opening of the jaw)			
43	2	1	Graded jaw opening to accept the spoon (2)
44	4	1	Graded jaw opening (2)
Oral Function 8: lip closure–manipulation (lip position while manipulating the bolus)			
45	2	3	Lower lip active during suck/chew/munch (2)
46	3	3	Lower lip positioned behind the teeth to suck (2)
47	3	3	Lips are closed intermittently during munch/chew (2)
48	3	3	Lip closure while eating (3)
49	3	3	Lip closure (5)
50	3	3	Lip depression (5)
Oral Function 9: lip closure–object (lip position to touch spoon, solid, or cup)			
51	1	2	Lip position: Spoon should be supported by the lower lip with the surface of the water touching the upper lip (4)
52	2	2	Food removal: no effort made (1)
53	2	2	Food removal as sucks, bites on the spoon (1)
54	2	2	Food removal by full lip occlusion (1)
55	2	2	The lower lip draws inward around the spoon (2)
56	2	2	The upper lip removes food from the spoon (2)
57	2	2	The infant closes the lips around the spoon (10)
58	2	2	The infant uses the upper lip to remove food from the spoon (10)
59	3	2	The lips close around stimulus during biting (2)
Oral Function 10: lip closure–swallow (lip position during swallow)			
60	2	4	Purse the lips to initiate swallowing (1)
61	2	4	Drawn in the lower lip to initiate swallowing (1)
62	2	4	Press the lips together to initiate swallowing (1)
63	2	4	Lips closured during swallow (2)
64	4	4	Lips pursed upon swallow (8)
65	4	4	Puckers in corners of the mouth upon swallow (8)
Oral Function 11: maintenance (ability to maintain the bolus within the oral cavity)			
66	1	3	Spillage (4)
67	2	3	The food remains in the mouth (10)
68	2	3	The food remains behind the lips while swallowing (10)
69	2	3	Reaction to food after removal from the spoon: food loss, no food retrieval, other (1)
Oral Function 12: retrieval (retrieval of food lost from the oral cavity)			
70	2	3	The lower/upper lip assists in cleaning (2)
Oral Function 13: tongue movement (type of movement of the tongue)			
71	2	3	Tongue movement when food is in the mouth: tongue and jaw in rhythmic pattern (1)
72	2	3	Tongue movement when food is in the mouth: mouth closed (1)
73	2	3	Tongue movement when food is in the mouth: tongue in midline (1)
74	3	1	The tongue protrudes beyond the lips (2)
75	3	3	Tongue movement when food is in the mouth: lateralizing (1)
76	3	3	Uses the fingers to transfer food (2)
77	3	3	Lateral tongue movements (3)
78	3	3	Centering: The initial response to lateral bolus placement was to transfer toward the midline (5)
79	3	3	Tongue protrusion 1: The tongue extends frequently beyond the teeth (7)
80	3	3	Tongue protrusion 2: The tongue extends a few times beyond the teeth (7)
81	3	3	Tongue protrusion 3: The tongue extends once beyond the teeth (7)
82	3	3	Lateral tongue movement: The tongue collects food pieces during mastication and places the food between the molars for grinding. If the tongue is not visible but there is observable temporary bulging of one of the cheeks or asymmetric activity in the corner of the mouth, this is an indication of lateral food transport and should be scored as present. (7)

(*table continues*)

Table 3. *(Continued).*

Skill number	Texture	Phase	Skill (source)
83	3	3	Lateral tongue movement 1: There is no lateral tongue movement (7)
84	3	3	Lateral tongue movement 2: There is almost no lateral tongue movement (7)
85	3	3	Lateral tongue movement 3: There is regular lateral tongue movement (7)
86	3	3	Lateral tongue movement 4: There is constant adequate lateral tongue movement (7)
87	3	3	Squashing or sucking movement: The tongue moves independently of the jaw during mastication. There is no observable squashing or sucking tongue movement. (7)
88	3	3	Squashing or sucking movement 1: There is constantly a squashing or sucking tongue movement (7)
89	3	3	Squashing or sucking movement 2: There is often a squashing or sucking tongue movement (7)
90	3	3	Squashing or sucking movement 3: There is an occasional squashing or sucking tongue movement (7)
91	3	3	Tongue movement to the left (when placed laterally on the right) (9)
92	3	3	Tongue movement to the right (when placed laterally on the left) (9)
93	3	3	Squashing or sucking movement 4: There is no squashing or sucking tongue movement (7)
Oral Function 14: tongue position (location of the tongue)			
94	2	4	Tongue on top of the teeth to initiate swallowing (1)
95	2	4	Tongue on the lower lip to initiate swallowing (1)
96	2	4	The tongue remains behind the lips while transporting food (10)
97	2	4	The tongue remains behind the lips while swallowing (10)
98	3	3	Keeps the tongue still on flow of the mouth (2)
99	3	3	Keeping the tongue in the mouth (2)
100	3	3	Tongue protrusion: The tongue does not protrude beyond the teeth during mastication unless it is used to actively remove food from the lips (equals functional use). Note that the rating for tongue protrusion should only be assessed for the oral phase and not the swallowing stage. (7)
101	3	3	Tongue protrusion 4: The tongue never extends beyond the teeth (7)
102	4	1	Tongue behind the teeth when food is presented (8)
103	4	1	Tongue on top of the teeth when food is presented (8)
104	4	1	Tongue on or beyond the lower lip when food is presented (8)
105	4	4	Tongue on top of the teeth upon swallow (8)
106	4	4	Tongue on or beyond the lower lip upon swallow (8)
107	4	4	Tongue behind incisors, jaw open upon swallow (8)

Note. Sources listed in parentheses next to skill. Texture is coded for each skill based on how it was indicated from its original source. Texture: (1) liquid (drinkable liquid by cup or straw), (2) puree (smooth puree or semisolid by spoon), (3) solid (food that requires chewing), and (4) more than one texture was utilized. Phase: (1) pre-oral phase (preparation to receive food or liquid), (2) oral phase–acceptance (acceptance of food or liquid into the mouth), (3) oral phase–manipulation (bolus manipulation and onset of oral transit), and (4) transfer/swallow (observation of swallowing movements). Sources: (1) Stolovitz and Gisel (1991), (2) Reilly et al. (1995), (3) den Boer and Schipper (2013), (4) Ishida et al. (2011), (5) Sheppard and Mysak (1984), (6) Şahan et al. (2021), (7) Remijn et al. (2014), (8) Schwartz et al. (1984b), (9) Gisel et al. (1986), (10) van den Engel-Hoek et al. (2014), and (11) Schwartz et al. (1984a).

redundancies, and to explore possibilities for narrowing the total list of individual skills to a smaller core set of skills that could be applied to future research and clinical practice.

Objective 2: Analyzing and Describing Variations in Skills

Texture

The 107 skills were grouped into four textures: liquids, purees, solids, and multiple textures. Of the 107 skills, 51% were coded as "solid" (den Boer & Schipper, 2013; Gisel et al., 1986; Reilly et al., 1995; Remijn et al., 2014; Şahan et al., 2021; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991), 31% were coded as "puree" (Reilly et al., 1995; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014), 8% were coded as "liquid" (den Boer & Schipper, 2013; Ishida et al., 2011; Reilly et al., 1995), and 10% were coded as "multiple textures" (Reilly et al., 1995; Schwartz et al., 1984a, 1984b).

Oral Function

The 107 skills were grouped into 14 different oral functions. Table 4 highlights that the highest percentages of skills listed within oral functions were for "tongue movement" (21%; den Boer & Schipper, 2013; Gisel et al., 1986; Reilly et al., 1995; Remijn et al., 2014; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991), "tongue position" (13%; den Boer & Schipper, 2013; Reilly et al., 1995; Remijn et al., 2014; Schwartz et al., 1984b; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014), and "chewing" (9%; Şahan et al., 2021; Schwartz et al., 1984a; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991).

Table 4. Number (%) of skills by phase of swallowing, function, and texture.

Phase of swallowing	Number (%) of skills by phase of swallowing	Function	Number (%) of liquids per skill	Number (%) of purees per skill	Number (%) of solids per skill	Number (%) of > 1 texture per skill	Number (%) of 107 skills
Pre-oral	9 (8%)	Awareness	0 (0%)	6 (6%)	1 (1%)	0 (0%)	7 (7%)
		Jaw opening	0 (0%)	1 (1%)	0 (0%)	1 (1%)	2 (2%)
Oral phase–acceptance	16 (15%)	Biting	0 (0%)	0 (0%)	2 (2%)	0 (0%)	2 (2%)
		Jaw closure	3 (3%)	1 (1%)	1 (1%)	0 (0%)	5 (5%)
		Lip closure–object	1 (1%)	7 (7%)	1 (1%)	0 (0%)	9 (8%)
Oral phase–manipulation	30 (28%)	Jaw movement	1 (1%)	0 (0%)	8 (7%)	0 (0%)	9 (8%)
		Chewing	0 (0%)	0 (0%)	8 (7%)	2 (2%)	10 (9%)
		Lip closure–manipulation	0 (0%)	1 (1%)	5 (5%)	0 (0%)	6 (6%)
		Retrieval	0 (0%)	1 (1%)	0 (0%)	0 (0%)	1 (1%)
		Maintenance	1 (1%)	3 (3%)	0 (0%)	0 (0%)	4 (4%)
Oral phase–acceptance/ manipulation; swallow	37 (35%)	Tongue movement	0 (0%)	3 (3%)	20 (19%)	0 (0%)	23 (21%)
		Tongue position	0 (0%)	4 (4%)	4 (4%)	6 (6%)	14 (13%)
Swallow	15 (14%)	Coordination	2 (2%)	2 (2%)	5 (5%)	0 (0%)	9 (8%)
		Lip closure–swallow	0 (0%)	4 (4%)	0 (0%)	2 (2%)	6 (6%)
Total			8 (7%)	33 (31%)	55 (51%)	11 (10%)	107

Table 3 shows the number of skills by texture and oral function to help determine which skills apply to all textures. Texture-specific skills were defined as skills within a specific oral function (present for only one texture; e.g., for "solids," texture-specific skills are "biting" and "chewing"). No texture-specific skills were identified for liquids or purees alone.

Swallowing Phase

The 107 skills were coded into four different swallowing phases: pre-oral, oral phase–acceptance, oral phase–manipulation, and transfer/swallow. Table 4 describes the skills relating to swallowing phase and oral function grouped by textures. Skills corresponded most frequently to oral phase–manipulation (57% of total skills, 61; all sources). Skills were least often associated with the remaining swallowing phases (33% of total skills; 13 for pre-oral, 15 for oral phase–acceptance, 18 for transfer/swallow; Ishida et al., 2011; Reilly et al., 1995; Schwartz et al., 1984b; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). Although most of the skills corresponded to one swallowing phase, there were 37 skills (35%) that corresponded to two or more phases because the oral function may be present in multiple phases (e.g., tongue movement can apply to any of the swallowing phases; den Boer & Schipper, 2013; Gisel et al., 1986; Reilly et al., 1995; Remijn et al., 2014; Schwartz et al., 1984b; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). Data showed that 50% of skills using only liquids (four of eight) corresponded equally to the oral phase–manipulation and swallowing phases (den Boer & Schipper, 2013; Ishida et al., 2011; Reilly et al., 1995). For purees, roughly 25% of skills (eight of 33) corresponded only to oral phase–manipulation (Reilly et al., 1995; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). For solids, nearly 40% of skills (21 of 55) corresponded only to oral phase–manipulation (den Boer & Schipper, 2013; Reilly et al., 1995; Remijn et al., 2014; Şahan et al., 2021; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991).

Study Variations

Table 5 shows the swallowing phases with corresponding functions assessed across age groups in the studies included in this review (den Boer & Schipper, 2013; Gisel et al., 1986; Ishida et al., 2011; Reilly et al., 1995; Remijn et al., 2014; Şahan et al., 2021; Schwartz et al., 1984a, 1984b; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). The proportion of studies measuring functions within each of the swallowing phases varied. All studies measured at least one function within oral phase–manipulation. Three studies measured functions within pre-oral and oral phase–acceptance (Reilly et al., 1995; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). Six studies measured functions within the transfer/swallow phases (den Boer & Schipper, 2013; Ishida et al., 2011; Reilly et al., 1995; Şahan et al., 2021; Schwartz et al., 1984b; Stolovitz & Gisel, 1991).

The proportion of total functions measured by each study averaged 27% (range: 7%–86%). Specifically, one study measured 86% of functions (Reilly et al., 1995), one study measured 50% of functions (Stolovitz & Gisel, 1991), three studies measured 29% of functions (den Boer & Schipper, 2013; Sheppard & Mysak, 1984; van den Engel-Hoek et al., 2014), one study measured 21% of

Table 5. Swallowing phase and oral functions studied for each source.

			Ages Studied and Sources											
			0–8.75 mos	9 mos	6 mos – 2 yrs	6–48 mos	8–44 mos	10–18 mos	2–5 yrs	4–5 yrs	4–5 yrs	4–5 yrs	4–12 yrs	
Phase of Swallow		Function	9	1	10	5	4	3	2	7	8	11	6	% of studies[a]
Pre-Oral		Awareness												27%
		Jaw opening												9%
Oral Phase-acceptance		Biting												9%
		Jaw closure												9%
		Lip closure-object												27%
Oral Phase-manipulation		Chewing												36%
		Jaw movement												27%
		Lip closure-manipulation												27%
		Maintenance												27%
		Retrieval												9%
		Tongue movement												55%
		Tongue position												55%
Transfer/ Swallow		Coordination												36%
		Lip closure-swallow												27%
		% of functions[b]	7%	50%	29%	29%	14%	29%	86%	21%	14%	7%	14%	

Note. mos = months; yrs = years. Sources: (1) Stolovitz and Gisel (1991), (2) Reilly et al. (1995), (3) den Boer and Schipper (2013), (4) Ishida et al. (2011), (5) Sheppard and Mysak (1984), (6) Şahan et al. (2021), (7) Remijn et al. (2014), (8) Schwartz et al. (1984b), (9) Gisel et al. (1986), (10) van den Engel-Hoek et al. (2014), and (11) Schwartz et al. (1984a).

[a]The proportion of studies measuring each function. [b]The proportion of functions measured by each study.

functions (Remijn et al., 2014), three studies measured 14% of functions (Ishida et al., 2011; Şahan et al., 2021; Schwartz et al., 1984b), and two studies measured 7% of functions (Gisel et al., 1986; Schwartz et al., 1984a). More than half of the studies (55%) included skills related to tongue function (den Boer & Schipper, 2013; Gisel et al., 1986; Reilly et al., 1995; Remijn et al., 2014; Schwartz et al., 1984b; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014). Chewing (Şahan et al., 2021; Schwartz et al., 1984a; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991) and coordination (den Boer & Schipper, 2013; Ishida et al., 2011; Reilly et al., 1995; Şahan et al., 2021) were assessed in 36% of studies. Twenty-seven percent of studies measured the following: awareness (Reilly et al., 1995; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014), lip closure–object (Reilly et al., 1995; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014), chewing (Şahan et al., 2021; Schwartz et al., 1984a; Sheppard & Mysak, 1984; Stolovitz & Gisel, 1991), jaw movement (Reilly et al., 1995, Remijn et al., 2014; Sheppard & Mysak, 1984), lip closure–manipulation (den Boer & Schipper, 2013; Reilly et al., 1995; Sheppard & Mysak, 1984), maintenance (Ishida et al., 2011; Stolovitz & Gisel, 1991; van den Engel-Hoek et al., 2014), and lip closure–swallow (Reilly et al., 1995; Schwartz et al., 1984b; Stolovitz & Gisel, 1991). Only one study (9% of total studies) assessed jaw opening, biting, jaw closure, and retrieval (Reilly et al., 1995).

Discussion

This scoping review synthesized 107 oral feeding skills observed across 11 studies in children aged 4 months and older, revealing both the richness of developmental feeding skills and a critical fragmentation in how skills are defined and measured. To address this complexity, we introduced a structured coding scheme—texture, oral function, and swallowing phase—which enabled a multidimensional analysis of observed skills. Importantly, no single framework proved sufficient to comprehensively capture the full range of feeding skills. Instead, the interplay between categories—such as texture by oral function—emerged as critical for understanding how children acquire, refine, and coordinate oral skills in response to developmental changes and feeding demands. As demonstrated in Part I of this review, these inconsistencies in skill measurement hinder meaningful cross-study comparisons. The variability in skill terminology extracted from these studies not only reflects the wide range of observable skills in typical feeding development but also highlights broader methodological inconsistencies across developmental feeding research, underscoring the absence of a standardized framework for skill selection and description (El-Kassas et al., 2024; A. Yilmaz & Topbas, 2024). Rather than merely being a limitation, this heterogeneity presents an opportunity—highlighting the need for a unified, theory-informed taxonomy that can support consistency in both clinical assessment and empirical inquiry. These findings point to an urgent need for standardized, developmentally informed tools that can reliably distinguish between typical variation and feeding dysfunction. Future research will focus on standardizing observable feeding skill descriptions across textures, oral functions, and swallowing phases to enhance study comparability, support diagnostic accuracy, and improve clinical care.

Objective 1: Comprehensive List of Skill

By introducing a structured coding scheme—organized around texture, oral function, and swallowing phase—this study offers more than just organization; it provides a conceptual scaffold through which oral motor development can be more precisely interpreted. For instance, grouping skills by oral function (e.g., tongue movement, chewing, coordination) reveals functional domains that may correspond to neural and muscular maturation pathways, offering potential insights into the physiological underpinnings of skill emergence (Fucile et al., 2025).

Moreover, the differentiation of skills by texture and swallowing phase allows for a developmental lens to be applied: Are certain textures consistently associated with earlier or later skill acquisition? Do certain functions, such as tongue lateralization or bolus transfer, only emerge with increased texture complexity? These are not simply coding outcomes but hypothesis-generating observations with implications for designing longitudinal studies on motor development and feeding readiness (Kalhoff et al., 2024). The apparent overlaps in skill wording across studies, despite subtle differences in phrasing, also bring into focus the issue of construct validity—are we measuring distinct feeding skills or simply describing the same skill with inconsistent language? This lack of definitional clarity complicates cross-study comparisons and limits cumulative knowledge building. Future research should explore whether these skills, although worded differently, represent true skill distinctions or are manifestations of measurement and rater variability.

Objective 2: Analyzing and Describing Variations in Skills

Texture-Based Skill Variability

Over 80% of the 107 identified skills were associated with purees and solids compared to a minority addressing liquids. This disproportionate focus may reflect both the greater motor demands of solid food consumption and the increased observability of oral motor actions during these tasks (Delaney & Arvedson, 2008; Matsuo & Fujishima, 2020). Indeed, chewing, tongue lateralization, and bolus formation are more visually and tactilely prominent with solids, which may explain their overrepresentation.

However, the necessity of tracking 88 different skills for these textures is questionable, especially in early childhood. The first year of life marks a critical period of transition from a liquid-only diet to more complex textures, yet observational demands must be balanced with developmental appropriateness (Cichero, 2020; Delaney et al., 2021; Samour & King, 2012). Requiring clinicians to assess dozens of subtle differences may overburden the diagnostic process and dilute clinical relevance. This trend could reflect either the increased observability of skills with more complex textures or the greater complexity of solid feeding, which demands more distinct observations. Redundancy further complicates interpretation. For example, "keeps lips closed during swallowing" appeared across multiple texture types, although likely referring to the same biomechanical action. This repetition suggests that the reported number of skills may be artificially inflated, calling for consolidated and cross-texture descriptors (Barton et al., 2018; Benfer et al., 2012; Marshall et al., 2023; Rabaey et al., 2023). Notably, feeding via cup or straw—methods often introduced during later infancy or toddlerhood—was underrepresented, suggesting a literature gap in these modes of feeding for liquids (Delaney et al., 2021).

Oral Function–Based Skill Analysis

Analyzing skills through the lens of oral function (e.g., jaw, lip, or tongue activity) allows for closer alignment with the developmental sequence of motor control. For example, research has shown that jaw stability and rhythm typically emerge before refined lip and tongue movements, reinforcing the value of developmental timing in function-based categorization (Green et al., 1997; Wilson & Green, 2009). Notably, 71% of oral functions were measured in only three or fewer studies, suggesting that many behaviors may be underexplored or inconsistently prioritized. This could suggest a genuine lack of relevance or, rather, an oversight in research focus and tool development. Interestingly, only one study—Reilly et al. (1995)—assessed the majority (86%) of the oral functions coded in this review.

Tongue function emerged as a central focus, measured more frequently than any other oral structure. This emphasis aligns with extensive evidence underscoring the tongue's pivotal role in oral bolus manipulation, propulsion, and pressure generation—functions essential to safe and efficient swallowing (Matsuo & Fujishima, 2020; Steele et al., 2015). The prominence of tongue-related skills in research and clinical practice may also reflect the greater neuromotor complexity, variability, and coordination required for its movements across different textures and swallowing phases (Reilly et al., 1995; Steele et al., 2015), particularly when compared to more stable structures such as the jaw or lips (Green et al., 1997; Wilson & Green, 2009). As feeding demands increase, the tongue's role becomes more functionally differentiated, highlighting the need for precise, operational definitions that distinguish between foundational and advanced motor functions.

However, redundancies within oral function categories remain a challenge. For instance, 10 different descriptions of "lip closure with object" may represent minimal variations of the same action. Such overlap risks inflating functional diversity without adding clinical value and highlights the need for a parsimonious and developmentally grounded taxonomy (Rabaey et al., 2023; Skuse et al., 1995). Ultimately, evaluating feeding through an oral function framework provides critical insight into the physiology of movement coordination, which is essential for identifying dysfunction, ensuring proper neuromuscular engagement, and linking impairments to developmental disorders (Benfer et al., 2012).

Swallowing Phase–Based Categorization

Classifying feeding skills by swallowing phase—from pre-oral acceptance to transfer and swallow—enables a comprehensive, time-sequenced understanding of feeding performance. This model aligns closely with both developmental and clinical frameworks, especially when mapping observed behaviors to instrumental assessments such as videofluoroscopic swallowing studies or fiberoptic endoscopic evaluation of swallowing (Arvedson, 2008; Matsuo & Fujishima, 2020). Interestingly, 74% of all reviewed skills were classified under the oral phase–manipulation and transfer/swallow, confirming a heavy emphasis on movements readily observed during mealtime. This is consistent with clinical practice, where assessments are often constrained to what is visible externally (Cichero, 2020; Gisel et al., 2000). However, such emphasis may neglect subtle but diagnostically significant behaviors in earlier phases, such as pre-oral readiness or oral-phase acceptance delays.

Phase-based analysis not only supports differential diagnosis (e.g., motor vs. behavioral feeding problems) but also permits targeted intervention at specific physiological stages. A child exhibiting delays in pre-oral behaviors (e.g., limited interest, poor mouth opening) may benefit from environmental or sensory modifications, whereas one showing inefficiency during manipulation may require motor-based therapy targeting jaw–tongue coordination (Wilson et al., 2021).

Variations Across Schemes

Analyzing feeding skills across the three organizing schemes—texture, oral function, and swallowing phase—revealed that no single framework is sufficient to fully capture the complexity of oral feeding skills. Rather than functioning in isolation, these dimensions interact dynamically to shape how feeding develops and how it should be assessed. The cross-scheme analysis (e.g., texture by oral function, oral function by swallowing phase) not only exposed overlapping terminology but helped isolate core functional components that should be prioritized for developmental evaluation and clinical intervention (Barton et al., 2018; Reilly et al., 1995).

The "texture by oral function" analysis revealed that whereas some skills—such as biting—are texture specific, others are relevant across textures but inconsistently recognized in the literature. For example, the oral function of "retrieval" was only originally coded for purees, despite its relevance for all food textures, including liquids and solids. This suggests that methodological inconsistencies or observer focus may skew our understanding of how foundational oral functions generalize across feeding contexts (Pesch & Lumeng, 2017). Expanding our observations of cross-texture skills such as retrieval or lip closure could provide a more accurate depiction of the developmental trajectory of feeding coordination.

In the "oral function by swallowing phase" analysis, the majority of oral functions (64%, nine out of 14) aligned with the oral phase–manipulation category. This is unsurprising, as the manipulation phase requires the highest degree of neuromuscular coordination, integrating jaw, lip, and tongue control to prepare the bolus for a safe and effective swallow (Matsuo & Fujishima, 2020; Steele et al., 2015). However, the fact that some oral functions also spanned phases such as oral phase–acceptance and pre-oral phase reinforces that these behaviors are not phase exclusive. Skills such as tongue retraction may begin as part of food acceptance and carry through to manipulation—highlighting the temporal and functional fluidity of feeding actions (Sasegbon & Hamdy, 2017).

The "texture by swallowing phase" analysis further refined these insights. Liquids were associated with the fewest skills, likely due to the limited bolus manipulation and the rapid progression to the pharyngeal phase, where safe swallow becomes the priority. In contrast, purees showed a more even skill distribution across phases, with a notable concentration in the pre-oral phase. This aligns with traditional feeding practices, where spoon-feeding of purees marks a child's first exposure to nonliquid textures. Given that many of the reviewed studies were conducted prior to the popularization of baby-led weaning, it is reasonable that spoon-based puree intake was the most observed feeding condition (D'Auria et al., 2018).

Furthermore, purees may provide greater visual access to oral movements, making actions such as lip closure, tongue cupping, and bolus acceptance more observable and documentable. By contrast, solid textures demanded the most skills—particularly within the oral phase–manipulation stage—reflecting their need for active bolus breakdown and intraoral transport (Cichero, 2020). This emphasizes the critical role of texture complexity in modulating motor demands and supports using phase-specific skill groupings when developing feeding assessments.

Moving Toward Objective, Physiology-Based Assessments

The field is increasingly recognizing the value of physiology-informed, motor-specific assessments that go beyond generalized observations. Standardized tools such as the Early Feeding Skills Assessment and the Schedule for Oral Motor Assessment are attempts in this direction, aiming to delineate skills across motor domains with attention to developmental trajectories and performance context (Skuse et al., 1995; Thoyre et al., 2005). Motor skills involved in feeding do not exist in isolation—they are part of broader developmental networks. For example, the ability to lean toward a spoon may reflect underlying trunk stability, and reaching for food may depend on gross motor milestones such as sitting independently (Telles & Macedo, 2008). Mapping these interrelationships could enhance our understanding of critical periods for intervention and help distinguish between typical variability and clinical concern (Carruth & Skinner, 2002).

Most clinicians and researchers gravitate toward functional outcomes such as bolus maintenance, biting, and chewing—all fundamental to achieving age-appropriate feeding milestones. These outcomes are essential markers of feeding competency and are commonly used to track intervention progress or define feeding readiness (Arvedson, 2008; Delaney & Arvedson, 2008). However, by relying solely on broad functional end points, nuances in developmental progression may be missed—especially when overlapping skills contribute to the same outcome but vary across textures or phases. Feeding skills embedded within global task descriptions (e.g., can eat solid foods or chews normally) mask the constituent motor acts such as lip closure, jaw position, or tongue lateralization. This aggregation dilutes precision and obscures potential therapeutic targets (McAllister & Costigan, 2019). Identifying individual motor components is essential for both diagnosis and intervention planning. Without isolating the movement elements involved in "chewing" or "tongue control," subtle deficits in motor planning or oral sensory processing may be overlooked, delaying intervention and complicating outcomes (Ibrahim et al., 2025). One of the most significant challenges to cross-study comparison is the prevalence of subjective descriptors. Terms such as "adequate," "controlled," "graded," or "smooth" introduce interpretative variability that complicates interrater reliability and obscures developmental trends (McAllister & Costigan, 2019). These vague descriptors likely lead to inconsistent observations by researchers and clinicians, contributing to variability in the reported age of skill mastery. For instance, observers may interpret "controlled chewing" in differing ways depending on their clinical training or contextual expectations. In fact, over one third of skills reviewed used such subjective language. This aligns with previous critiques highlighting that ambiguous descriptions limit the precision and replicability of feeding assessments (Thoyre et al., 2005).

Moreover, certain motor actions, such as chewing rhythm or jaw excursion, may not be observable through clinical observation alone. Simione et al. (2016) argue that kinematic analyses provide more objective and quantifiable measures, reinforcing the need to integrate biomechanical tools where feasible. Thus, a shift toward clearly defined, observable, and operationalized skills is not only desirable but also necessary for research rigor and clinical utility (Pesch & Lumeng, 2017). The path forward involves creating observable, developmentally anchored descriptions of feeding skills that are both clinically practical and research valid. By leveraging insights from motor development, neurophysiology, and clinical linguistics, we can build a scalable framework for scoring oral motor behaviors that accommodates both typical variation and disordered progression.

Limitations

The goal of this study was to identify a representative list of feeding skills that describe normal development.

Given the broad list of skills identified, any missing skills are likely comparable. Future studies may include additional skills, which will be considered for inclusion. The inclusion criteria of the studies limited measurement methodology to direct observation only, although we acknowledge that feeding skills can be assessed in a variety of ways. This limitation may have narrowed down the available skills for further analysis. Seeing that this review was Part II of a series, the in-depth search strategy and quality assessment of the studies was not included. Further analysis of the studies and variations in measurements across studies is discussed in Part 1 (Delaney, Flatt, et al., 2025).

Conclusions

This study aims to lay the foundation for future research focused on the individual components of feeding skills and motor actions. By establishing a set of observable and objectively written oral feeding skills, the goal is to improve the early and accurate identification of feeding skill dysfunction and to identify precise therapy targets for more effective interventions. Notably, various combinations of texture, oral function, and swallowing phases were used to categorize feeding skills, each emphasizing different aspects of feeding ability. Most of the skills were associated with solid foods, and they were not typically texture specific, suggesting that these skills are broadly applicable across different textures. The identification of redundant skills across schemes points to a need for further refinement to reduce the number of skills required in both research and clinical practice. Without a clear understanding of typical feeding skill development, evidence-based practices for diagnosing PFD remain underdeveloped. As a result, children may be misdiagnosed, and interventions may be delayed due to the lack of standardized benchmarks. Future research will prioritize the development and standardization of feeding skill descriptions. Creating a core set of objectively written observable skills that assess performance across different textures, oral functions, and swallowing phases will be crucial. This standardized framework will allow for more reliable comparisons across studies, reduce the need for extensive observations, and provide clearer insights into the physiology of both typical and atypical feeding skill development. Ultimately, this will improve clinical practice and diagnostic accuracy.

Author Contributions

Amy L. Delaney: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Anna Flatt:** Formal analysis, Writing – original draft, Writing – review & editing. **Hannah Koepp:** Data curation, Methodology, Project administration, Writing – review & editing. **Alissa V. Fial:** Data curation, Formal analysis, Methodology, Resources, Software, Writing – review & editing. **Katherine C. Hustad:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – review & editing.

Ethics Statement

There were no human subjects in this study.

Data Availability Statement

Data are available upon request from the corresponding author.

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References

Ahlgren, J. (1966). Mechanism of mastication. *Acta Odontologica Scandinavica, 24*(Suppl. 44), 9–109.

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology, 8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Arslan, S. S., Demir, N., Karaduman, A. A., Tanyel, F. C., & Soyer, T. (2020). The functional chewing training for chewing dysfunction in children with repaired EA-TEF. *Journal of Pediatric Surgery, 55*(4), 635–638. https://doi.org/10.1016/j.jpedsurg.2019.04.028

Arvedson, J. C. (2008). Assessment of pediatric dysphagia and feeding disorders: Clinical and instrumental approaches. *Developmental Disabilities Research Reviews, 14*(2), 118–127. https://doi.org/10.1002/ddrr.17

Barton, C., Bickell, M., & Fucile, S. (2018). Pediatric oral motor feeding assessments: A systematic review. *Physical & Occupational Therapy in Pediatrics, 38*(2), 190–209. https://doi.org/10.1080/01942638.2017.1290734

Bell, D., & Hale, A. (1963). Observations of tongue-thrust swallow in preschool children. *Journal of Speech and Hearing Disorders, 28*(2), 195–197. https://doi.org/10.1044/jshd.2802.195

Benfer, K. A., Weir, K. A., & Boyd, R. N. (2012). Clinimetrics of measures of oropharyngeal dysphagia for preschool children with cerebral palsy and neurodevelopmental disabilities: A systematic review. *Developmental Medicine & Child Neurology, 54*(9), 784–795. https://doi.org/10.1111/j.1469-8749.2012.04302.x

Bosma, J. F. (1975). Form and function in the mouth and pharynx of the human infant. In J. A. McNamara (Ed.), *Control mechanism in craniofacial growth* (pp. 9–23). Center for Human Growth and Development, University of Michigan.

Carruth, B. R., & Skinner, J. D. (2002). Feeding behaviors and other motor development in healthy children (2–24 months). *Journal of the American College of Nutrition, 21*(2), 88–96. https://doi.org/10.1080/07315724.2002.10719199

Cichero, J. A. Y. (2020). Evaluating chewing function: Expanding the dysphagia field using food oral processing and the IDDSI framework. *Journal of Texture Studies, 51*(1), 56–66. https://doi.org/10.1111/jtxs.12462

D'Auria, E., Bergamini, M., Staiano, A., Banderali, G., Pendezza, E., Penagini, F., Zuccotti, G. V., & Peroni, D. G., on behalf of the Italian Society of Pediatrics. (2018). Baby-led weaning: What a systematic review of the literature adds on. *Italian Journal of Pediatrics, 44*(1), Article 49. https://doi.org/10.1186/s13052-018-0487-8

Delaney, A. L. (2010). *Oral–motor movement patterns in feeding development* [Doctoral dissertation, University of Wisconsin–Madison].

Delaney, A. L., & Arvedson, J. C. (2008). Development of swallowing and feeding: Prenatal through first year of life. *Developmental Disabilities Research Reviews, 14*(2), 105–117. https://doi.org/10.1002/ddrr.16

Delaney, A. L., Flatt, A., Koepp, H., Fial. A. V., & Hustad, K. C. (2025). A scoping review of oral feeding skill development in typically developing children Part I: Methodologies, populations, and normative data. *American Journal of Speech-Language Pathology, 34*(5), 2997–3016. https://doi.org/10.1044/2025_AJSLP-25-00067

Delaney, A. L., Staskiewicz, S., Morris, S. E., Smith-Simpson, S., & Goday, P. S. (2025). A developmental texture framework for food texture progression: Implications for feeding development, oral motor skills, and pediatric feeding disorder. *Journal of Texture Studies, 56*(3), Article e70026. https://doi.org/10.1111/jtxs.70026

Delaney, A. L., Van Hoorn, M., Staskiewicz, S., Feuling, M. B., Pladies, S., Bansal, N. K., & Goday, P. S. (2021). Texture consumption patterns of 8- to 12-month-old infants: A reflection of typical feeding development. *American Journal of Speech-Language Pathology, 30*(6), 2643–2652. https://doi.org/10.1044/2021_AJSLP-21-00048

den Boer, S. L., & Schipper, J. A. (2013). Feeding and drinking skills in preterm and low birth weight infants compared to full term infants at a corrected age of nine months. *Early Human Development, 89*(6), 445–447. https://doi.org/10.1016/j.earlhumdev.2012.12.004

Dodds, W. J. (1989). The physiology of swallowing. *Dysphagia, 3*(4), 171–178. https://doi.org/10.1007/BF02407219

Dodds, W. J., Stewart, E. T., & Logemann, J. A. (1990). Physiology and radiology of the normal oral and pharyngeal phases of swallowing. *American Journal of Roentgenology, 154*(5), 953–963. https://doi.org/10.2214/ajr.154.5.2108569

El-Kassas, O., Amer, A., Abdel-Hady, H., & Abou-Elsaad, T. (2024). The transition from tube feeding to oral feeding algorithm in preterm infants: Case–control study. *BMC Pediatrics, 24*(1), Article 453. https://doi.org/10.1186/s12887-024-04909-6

Fucile, S., Snider, L., O'Brien, K., Smith, L., & Dow, K. (2025). A parent-administered sensorimotor intervention for oral feeding in infants born preterm: A randomized clinical study. *Developmental Medicine & Child Neurology, 67*(2), 208–215. https://doi.org/10.1111/dmcn.16046

Gesell, A., & Ilg, F. L. (1937). *Feeding behavior of infants*. J. B. Lippincott.

Gisel, E. G. (1991). Effect of food texture on the development of chewing of children between six months and two years of age. *Developmental Medicine & Child Neurology, 33*(1), 69–79. https://doi.org/10.1111/j.1469-8749.1991.tb14786.x

Gisel, E. G., Alphonce, E., & Ramsay, M. (2000). Assessment of ingestive and oral praxis skills: Children with cerebral palsy vs. controls. *Dysphagia, 15*(1), 23–31. https://doi.org/10.1007/s004550000033

Gisel, E. G., Schwaab, L., Lange-Stemmler, L., Niman, C. W., & Schwartz, J. L. (1986). Lateralization of tongue movements during eating in children 2 to 5 years old. *The American Journal of Occupational Therapy, 40*(4), 265–270. https://doi.org/10.5014/ajot.40.4.265

Goday, P. S., Huh, S. Y., Silverman, A., Lukens, C. T., Dodrill, P., Cohen, S. S., Delaney, A. L., Feuling, M. B., Noel, R. J., Gisel, E., Kenzer, A., Kessler, D. B., Kraus de Camargo, O., Browne, J., & Phalen, J. A. (2019). Pediatric feeding disorder: Consensus definition and conceptual framework. *Journal of Pediatric Gastroenterology and Nutrition, 68*(1), 124–29. https://doi.org/10.1097/MPG.0000000000002188

Green, J. R., Moore, C. A., Ruark, J. L., Rodda, P. R., Morvée, W. T., & VanWitzenburg, M. J. (1997). Development of chewing in children from 12 to 48 months: Longitudinal study of EMG patterns. *Journal of Neurophysiology, 77*(5), 2704–2716. https://doi.org/10.1152/jn.1997.77.5.2704

Hanson, M. L., Barnard, L. W., & Case, J. L. (1969). Tongue-thrust in preschool children. *American Journal of Orthodontics, 56*(1), 60–69. https://doi.org/10.1016/0002-9416(69)90259-0

Hiiemae, K. M., & Palmer, J. B. (2003). Tongue movements in feeding and speech. *Critical Reviews in Oral Biology & Medicine, 14*(6), 413–429. https://doi.org/10.1177/154411130301400604

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M.-P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M.-C., Vedel, I., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information, 34*(4), 285–291. https://doi.org/10.3233/EFI-180221

Ibrahim, A. F., Elsebahy, S. Y., Aldhahi, M. I., Khalaf, M. M., Torad, A. A., Mohamed Taha, M., & El-Sheikh, A. F. (2025). Influence of oromotor functions on motor development and feeding outcomes in children with cerebral palsy. *Annals of Medicine, 57*(1), Article 2479587. https://doi.org/10.1080/07853890.2025.2479587

Ishida, R., Ohkubo, M., Sugiyama, T., Honda, Y., Hosoya, M., Hattori, M., & Kawata, T. (2011). Appropriate spoon form for feeding of liquids in infant feeding development. *The Bulletin of Tokyo Dental College, 52*(3), 143–147. https://doi.org/10.2209/tdcpublication.52.143

Kalhoff, H., Kersting, M., Sinningen, K., & Lücke, T. (2024). Development of eating skills in infants and toddlers from a neuropediatric perspective. *Italian Journal of Pediatrics, 50*(1), Article 110. https://doi.org/10.1186/s13052-024-01683-0

Kennedy, J. G., III, & Kent, R. D. (1985). Anatomy and physiology of deglutition and related functions. *Seminars in Speech and Language, 6*(4), 257–273. https://doi.org/10.1055/s-0028-1085208

Lange, L. (1982). *Observation of tongue and jaw movements in four- and five-year-old Down's syndrome children* [Thesis proposal, Washington University].

Logemann, J. A. (1998). *Evaluation and treatment of swallowing disorders* (2nd ed.). Pro-Ed.

Marshall, J., Gosa, M. M., & Dodrill, P. (2023), Patient-reported outcome measures that describe the feeding skills domain for pediatric feeding disorder: A clinimetric review. *Journal of Pediatric Gastroenterology and Nutrition, 77*(1), 137–145. https://doi.org/10.1097/MPG.0000000000003798

Matsuo, K., & Fujishima, I. (2020). Textural changes by mastication and proper food texture for patients with oropharyngeal dysphagia. *Nutrients, 12*(6), Article 1613. https://doi.org/10.3390/nu12061613

McAllister, M., & Costigan, P. (2019). Evaluating movement performance: What you see isn't necessarily what you get. *Human Movement Science, 64,* 67–74. https://doi.org/10.1016/j.humov.2019.01.003

Morris, S. E. (1982). *Pre-speech assessment scale*. J. A. Preston.

Morris, S. E., & Klein, M. D. (1987). *Pre-feeding skills: A comprehensive resource for feeding development*. Therapy Skill Builders.

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—A web and mobile app for systematic reviews. *Systematic Reviews, 5,* Article 210. https://doi.org/10.1186/s13643-016-0384-4

Pesch, M. H., & Lumeng, J. C. (2017). Methodological considerations for observational coding of eating and feeding behaviors in children and their families. *International Journal of Behavioral Nutrition and Physical Activity, 14*(1), Article 170. https://doi.org/10.1186/s12966-017-0619-3

Pridham, K. F. (1990). Feeding behavior of 6- to 12-month-old infants: Assessment and sources of parental information. *The Journal of Pediatrics, 117*(2, Pt. 2), S174–S180. https://doi.org/10.1016/S0022-3476(05)80016-2

Proffit, W. R. (1972). Lingual pressure patterns in the transition from tongue thrust to adult swallowing. *Archives of Oral Biology, 17*(3), 555–563. https://doi.org/10.1016/0003-9969(72)90071-4

Proffit, W. R., Chastain, B. B., & Norton, L. A. (1969). Linguopalatal pressure in children. *American Journal of Orthodontics, 55*(2), 154–166. https://doi.org/10.1016/0002-9416(69)90125-0

Rabaey, P. A., Barlow, K., Jama, H., & Lehr, V. (2023). Investigation of assessment tools in the area of pediatric feeding evaluation: A mixed-methods study. *The American Journal of Occupational Therapy, 77*(4), Article 7704205110. https://doi.org/10.5014/ajot.2023.050040

Reilly, S., Skuse, D., Mathisen, B., & Wolke, D. (1995). The objective rating of oral–motor functions during feeding. *Dysphagia, 10*(3), 177–191. https://doi.org/10.1007/BF00260975

Remijn, L., Speyer, R., Groen, B. E., van Limbeek, J., & Nijhuis-van der Sanden, M. W. (2014). Validity and reliability of the Mastication Observation and Evaluation (MOE) instrument. *Research in Developmental Disabilities, 35*(7), 1551–1561. https://doi.org/10.1016/j.ridd.2014.03.035

Şahan, A. K., Öztürk, N., Demir, N., Karaduman, A. A., & Serel Arslan, S. (2021). A comparative analysis of chewing function and feeding behaviors in children with autism. *Dysphagia, 36*(6), 993–998. https://doi.org/10.1007/s00455-020-10228-6

Samour, P., & King, K. (2012). *Pediatric nutrition*. Jones & Bartlett Learning.

Sasegbon, A., & Hamdy, S. (2017). The anatomy and physiology of normal and abnormal swallowing in oropharyngeal dysphagia. *Neurogastroenterology and Motility, 29*(11), Article e13100. https://doi.org/10.1111/nmo.13100

Schwaab, L. (1984). *Observation of tongue and jaw movements in normal two-, three and four-year-old children* [Master's thesis, Washington University].

Schwaab, L. M., Niman, C. W., & Gisel, E. G. (1986a). Comparison of chewing cycles in 2-, 3-, 4-, and 5-year-old normal children. *The American Journal of Occupational Therapy, 40*(1), 40–43. https://doi.org/10.5014/ajot.40.1.40

Schwaab, L. M., Niman, C. W., & Gisel, E. G. (1986b). Tongue movements in normal 2-, 3-, and 4-year-old children: A continuation study. *The American Journal of Occupational Therapy, 40*(3), 180–185. https://doi.org/10.5014/ajot.40.3.180

Schwartz, J. L. (1982). *Observation of tongue and jaw movements in normal four- and five-year-old children* [Master's thesis, Washington University].

Schwartz, J. L., Niman, C. W., & Gisel, E. G. (1984a). Chewing cycles in 4- and 5-year-old normal children: An index of eating efficacy. *The American Journal of Occupational Therapy, 38*(3), 171–175. https://doi.org/10.5014/ajot.38.3.171

Schwartz, J. L., Niman, C. W., & Gisel, E. G. (1984b). Tongue movements in normal preschool children during eating. *The American Journal of Occupational Therapy, 38*(2), 87–93. https://doi.org/10.5014/ajot.38.2.87

Serel Arslan, S., Demir, N., Barak Dolgun, A., & Karaduman, A. A. (2016). Development of a new instrument for determining the level of chewing function in children. *Journal of Oral Rehabilitation, 43*(7), 488–495. https://doi.org/10.1111/joor.12399

Sheppard, J. J., & Mysak, E. D. (1984). Ontogeny of infantile oral reflexes and emerging chewing. *Child Development, 55*(3), 831–843. https://doi.org/10.2307/1130134

Simione, M., Wilson, E. M., Yunusova, Y., & Green, J. R. (2016). Validation of clinical observations of mastication in persons with ALS. *Dysphagia, 31*(3), 367–375. https://doi.org/10.1007/s00455-015-9685-3

Skuse, D., Stevenson, J., Reilly, S., & Mathisen, B. (1995). Schedule for Oral–Motor Assessment (SOMA): Methods of validation. *Dysphagia, 10*(3), 192–202. https://doi.org/10.1007/BF00260976

Steele, C. M., Alsanei, W. A., Ayanikalath, S., Barbon, C. E., Chen, J., Cichero, J. A., Coutts, K., Dantas, R. O., Duivestein, J., Giosa, L., Hanson, B., Lam, P., Lecko, C., Leigh, C., Nagy, A., Namasivayam, A. M., Nascimento, N. V., Odendaal, I., Smith, C. H., & Wang, H. (2015). The influence of food texture and liquid consistency modification on swallowing physiology and function: A systematic review. *Dysphagia, 30*(1), 2–26. https://doi.org/10.1007/s00455-014-9578-x

Steeve, R. W., Moore, C. A., Green, J. R., Reilly, K. J., & McMurtrey, J. R. (2008). Babbling, chewing, and sucking: Oromandibular coordination at 9 months. *Journal of Speech, Language, and Hearing Research, 51*(6), 1390–1404. https://doi.org/10.1044/1092-4388(2008/07-0046)

Stolovitz, P., & Gisel, E. G. (1991). Circumoral movements in response to three different food textures in children 6 months to 2 years of age. *Dysphagia, 6*(1), 17–25. https://doi.org/10.1007/BF02503459

Stratton, M. (1981). Behavioral assessment scale of oral functions in feeding. *The American Journal of Occupational Therapy, 35*(11), 719–721. https://doi.org/10.5014/ajot.35.11.719

Telles, M. S., & Macedo, C. S. (2008). Relationship between the motor development of the body and the acquisition of oral skills. *Pro-Fono Journal of Scientific Updates, 20,* 117–122. https://doi.org/10.1590/S0104-56872008000200008

Thoyre, S. M., Shaker, C. S., & Pridham, K. F. (2005). The early feeding skills assessment for preterm infants. *Neonatal Network, 24*(3), 7–16. https://doi.org/10.1891/0730-0832.24.3.7

van den Engel-Hoek, L., van Hulst, K. C., van Gerven, M. H., van Haaften, L., & de Groot, S. A. (2014). Development of oral motor behavior related to the skill assisted spoon feeding. *Infant Behavior & Development, 37*(2), 187–191. https://doi.org/10.1016/j.infbeh.2014.01.008

Wilson, E., & Green, J. R. (2009). The development of jaw motion for mastication. *Early Human Development, 85*(5), 303–311. https://doi.org/10.1016/j.earlhumdev.2008.12.003

Wilson, E., Simione, M., & Polley, L. (2021). Paediatric oral sensorimotor interventions for chewing dysfunction: A scoping review. *International Journal of Language & Communication Disorders, 56*(6), 1316–1333. https://doi.org/10.1111/1460-6984.12662

Yilmaz, A., & Topbas, S. (2024). Adaptation of Schedule for Oral Motor Assessment to Turkish and its validity and reliability: Methodological study. *Turkiye Klinikleri Journal of Health Sciences/Türkiye Klinikleri Sağlık Bilimleri Dergisi, 9*(4), 711–719. https://doi.org/10.5336/healthsci.2023-98949

Yilmaz, S., Basar, P., & Gisel, E. G. (2004). Assessment of feeding performance in patients with cerebral palsy. *International Journal of Rehabilitation Research, 27*(4), 325–329. https://doi.org/10.1097/00004356-200412000-00013