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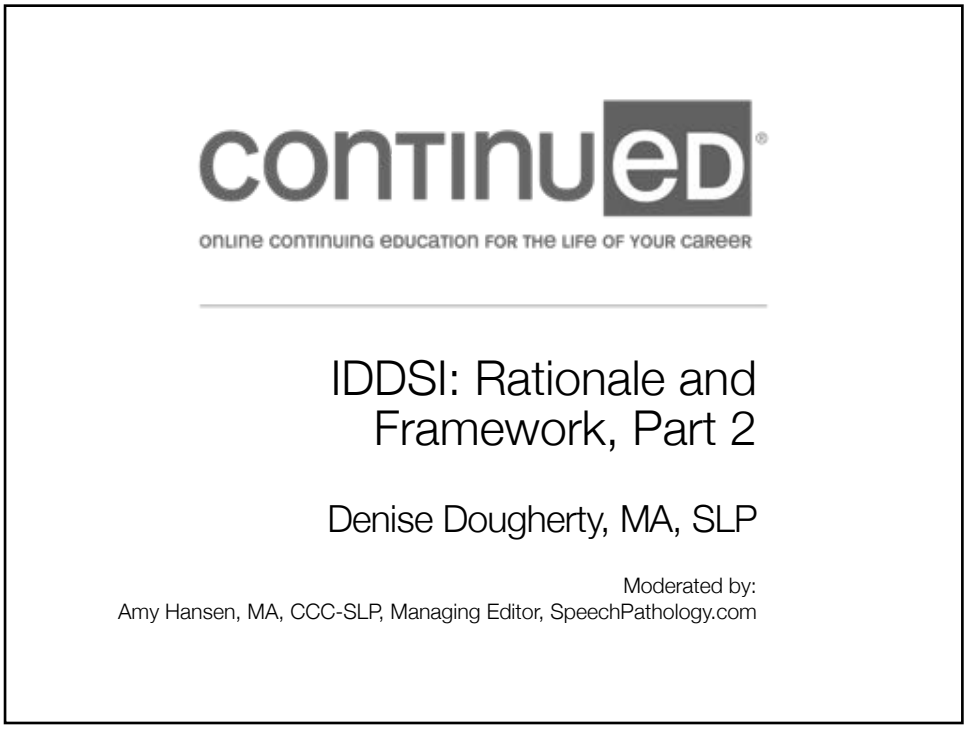
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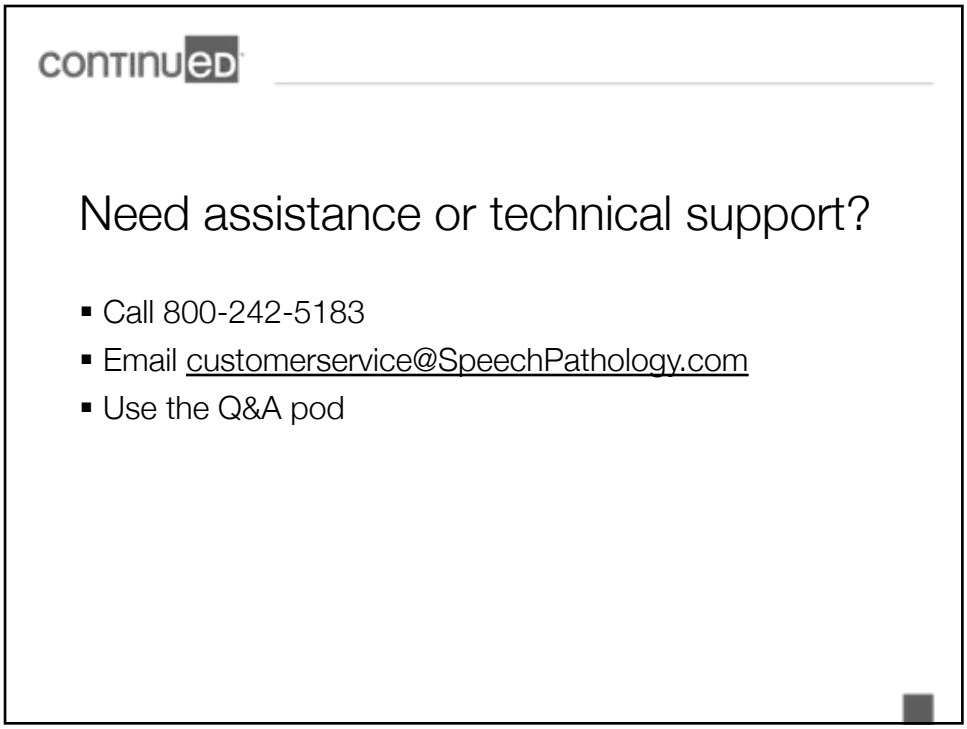
IDDSI: Rationale and Framework, Part 2
Denise Dougherty, MA, SLP
Moderated by:
Amy Hansen, MA, CCC-SLP, Managing Editor, SpeechPathology.com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IDDSI: Rationale and Framework Part 2

Denise Dougherty, MA, CCC-SLP

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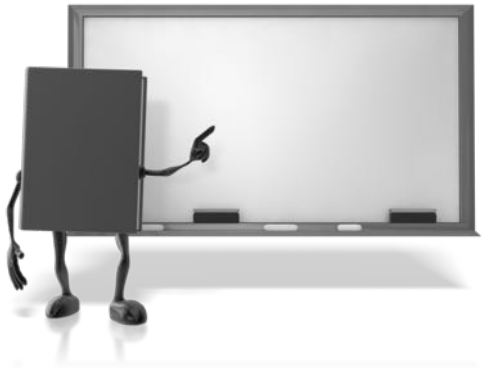

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Learning Outcomes

After this course, participants will be able to:

- Identify the levels on the continuum for liquids and solids.
- Discuss the rationale behind the IDDSI levels 0 through 8.
- Describe how to utilize the testing methods for each level to assure compliance with diet criteria.

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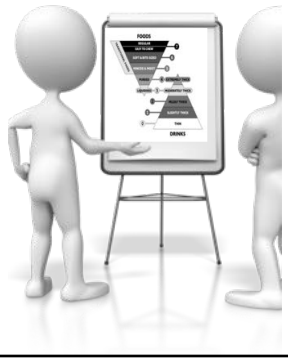
Course Description

- IDDSI framework was finalized in 2015 and provides more comprehensive guidelines for diet selection. This seminar will discuss the framework, rationale for diet and liquid selections as well as testing methods.



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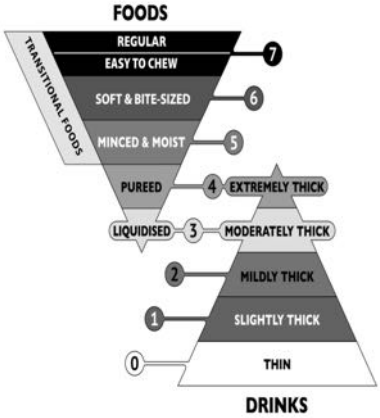
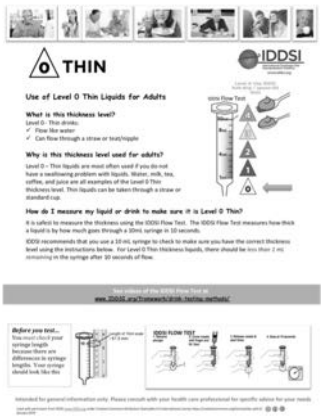
Citation for IDDSI

- The International Dysphagia Diet Standardisation Initiative 2016 @http://iddsi.org/framework/.Attribution is NOT PERMITTED for derivative works incorporating any alterations to the IDDSI Framework that extend beyond language translation. Supplementary Notice: Modification of the diagrams or descriptors within the IDDSI Framework is DISCOURAGED and NOT RECOMMENDED. Alterations to elements of the IDDSI framework may lead to confusion and errors in diet texture or drink selection for patients with dysphagia. Such errors have previously been associated with adverse events including choking and death.

- Assessed colors for suitability for those w/ color blindness to distinguish framework colors
- Changed certain colors to maximize color difference between neighboring levels
- 6 colors plus black & white individually distinguishable across all different types of color blindness testing
- Most common variant
  - red blind & green blind (5)(4)

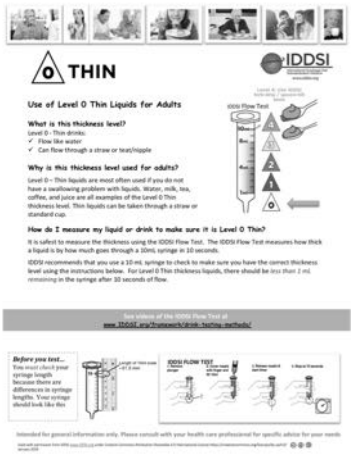


- IDDSI descriptors do not use viscosity measures
- Test liquid flow category w/ gravity flow test w/ 10 mL slip tip syringe
- Amt. remaining from 10 mL after 10 sec of flow
- Controlled conditions broadly representative of how liquid moves when swallowed (Hanson et al., 2019)



Q1

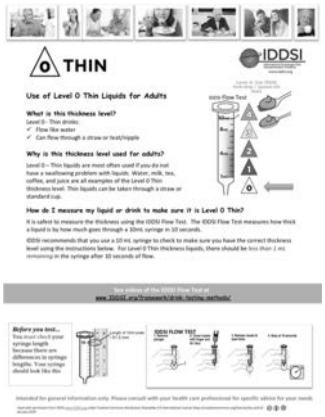
- IDDSI flow test design & measurement principles similar to Posthumus Funnel used by dairy industry to measure liquid thickness (van Vliet, 2002; Kutter et al., 2011)
- Measures:
  - time for specified amount of sample to flow
  - mass left after defined period of flow
- Closely matches flow conditions within oral cavity (Hanson et al., 2019)"



Q1

Liquid Testing

- Follow manufacturer's instructions w/ commercial thickener products
- Recommended time for fluid to thicken completely
- Test *twice* or more to ensure more reliable results
- Test liquid at **intended serving temperature**



Q2

IDDSI e-bite Newsletter October 2019

- IMPORTANT: Safety Notification
- Safety notification regarding interaction between Polyethylene Glycol (PEG 3350) laxative & starch-based thickener
- Adding PEG to starch-based thickened drink results in thin, watery consistency – negates intended thickening effect
  - Could result in aspiration for those w/ dysphagia & thickened fluids d/t inability to safely swallow thin fluids
- This interaction does not apparently occur w/ xanthan gum thickeners

Food Characteristics IDDSI E-bite Nov. 2019 newsletter

- Testing foods is complex
- Important characteristics hard to assess in a laboratory
  - moistness, stickiness, hardness & toughness
- Research - saliva & particle size
  - healthy adults chew food into small particles & mix w/ saliva until bolus lubricated, sufficiently moist to swallow
  - hard foods (nuts, raw carrots) chewed to smaller size particles than softer foods (~2mm) before swallowing
- Evidence considered when developing simple testing methods to address complexities of food properties

CONTINUED

Food Characteristics (IDDSI E-bite Nov. 2019 newsletter)

- Softness & "Fork Mash-able"
- "Fork mash-able" concept used in the past
- Depends on individual hand strength & judgement
- Thumbnail blanching pressure
  - More-consistent definition of pressure without mechanical tools or motors
  - Thumbnail blanching pressure corresponds to systolic blood pressure
  - Equivalent to low tongue compression pressure

Q3

CONTINUED

Food Characteristics (IDDSI E-bite Nov. 2019 newsletter)

- Moisture
- Spoon-tilt & fork-drip tests
- practical measure of adhesiveness & cohesiveness
- perform very quickly w/ minimal training at point of serving
- no alternative "gold standard" industrial or scientific test to define these qualities relating to swallowing safety

CONTINUED

Food Characteristics (IDDSI E-bite Nov. 2019 newsletter)

- Spoon tilt test
- Assess ability of sample to hold shape on spoon & stickiness
- People choked & died on sticky mashed potato, cheese, etc.
- Use only wrist to flick sample
  - if it doesn't immediately fall off spoon or need to use elbow/shoulder w/ 'wrist flick' it's too sticky!
- IDDSI Framework description document, page 10 includes images for reference

Food Characteristics IDDSI E-bite Nov. 2019 newsletter

- ALWAYS use clinical assessment to determine if individual is able to safely manage particular texture level of food
- Strongly recommend IDDSI testing methods, rather than less accurate methods (pictures, descriptions or lists of food/drinks) to ensure proper prep of food/drink
  - unripe banana is choking risk, ripe banana is not
- Austria published position paper outlining their support IDDSI.
- Decision d/t information gained from national & international experts, industry reps, colleagues from other disciplines & informal surveys among members.
- Support International Dysphagia Diet Standardization Initiative (IDDSI) in terms of pt. safety by June 2019 (https://www.logopaedieaustria.at/images/Dokumente/Positionspapier_IDDSI_25092019.pdf)

Food Characteristics IDDSI E-bite Nov. 2019 newsletter

- Level 5 Particle Size
- Questions following updated IDDSI framework & descriptor documents regarding minced food particle size
- Within Level 5
  - some rice dishes, or pasta (chopped spaghetti) deemed suitable for Level 5 in their settings but was unclear whether 4mm restriction applied in all dimensions
  - ambiguous in first IDDSI framework
- Discussion & research within IDDSI board & international colleagues

Food Characteristics IDDSI E-bite Nov. 2019 newsletter

- Level 5 Particle Size
- Research re: food particle size of chewed boluses in healthy adults suggests
- Particles average 2-4 mm depending on type of food being chewed
- Food particles in chewed bolus not necessarily all uniform in size
- Consider dimensions of width, depth & length of particles

Food Characteristics IDDSI E-bite Nov. 2019 newsletter

- Level 5 Particle Size
- Adult particle size - no larger than 4mm x 4mm x15 mm*
  - 4 mm - distance from point to point of dinner fork
  - Allows inclusion of rice, cut up pasta, provided "moist" criteria is also met
- Smaller anatomy of young children
  - No larger than 2mm x 2mm x 8mm* (2 mm is ½ the distance between tines of dinner fork)
- 15 mm for adults & 8 mm for children considered small enough to not obstruct airway

IDDSI E-bite newsletter Sept. 2019

- IDDSI Labeling
- Introduction & use of IDDSI labeling is voluntary
- Industry partners, companies & organizations typically consider using IDDSI labeling when aware of consumer demand
- IDDSI encourages industry partners, companies, organizations to conduct appropriate testing & evaluation of products w/ recommended IDDSI testing methods before adding IDDSI labeling

IDDSI e-bite newsletter Sept. 2019

- IDDSI does not receive updates from industry partners, companies, organizations re: IDDSI implementation or labeling
- All IDDSI users encouraged to contact industry partners, companies, organizations directly re: IDDSI implementation & IDDSI labeling or concerns re: products
- Inquiries & requests inform industry partners, companies, organizations there is a demand & possibly encourage IDDSI labeling & implementation
- IDDSI does not endorse or certify any products or services

IDDSI E-bite newsletter Sept.2019

- Mixed or dual consistency foods - both solids & liquids
- Some easily recognized (vegetables in soup broth)
- Others appear to be single consistency on plate
  - may quickly separate into 2 consistencies in mouth
  - (watermelon)
- General rule – more challenging to swallow
  - Must have adequate abilities to handle both solid & liquid component
  - More advanced oral control & swallowing coordination abilities required

Mite-e spoon
calmslp.com or Alimed
https://youtu.be/deGKJZHseRo?t=29

IDDSI E-bite newsletter Sept. 2019

- Risks assoc. w/ mixed consistencies:
- Liquid may separate, spill into pharynx during oral prep of bolus (Saitoh et al., 2007).
- May increase aspiration risk in those w/ dysphagia
- Solid particles may wash into pharynx w/ liquid component before adequately chewed
- Increased risk of choking & airway obstruction if particles enter airway

IDDSI e-bite newsletter Sept. 2019

- Must characterize both liquid & solid
- Separate components for IDDSI testing methods
- Soup w/ soft 1.2 cm sized cubes of carrot in broth classified as
  - 6-0 - Level 6 – soft and bite-sized (food) & Level 0 – thin (liquid)
- Dual consistency foods w/ thin liquid component (Level 0) & easily separates from solid component are not appropriate for people who require thickened liquids
- (Saitoh E, Shibata S, Matsuo K, Baba M, Fujii W, Palmer JB. Chewing and food consistency: Effects on bolus transport and swallow initiation. Dysphagia. 2007;22: 100–7.)

IDDSI E-bite newsletter Sept. 2019

- If Level 4 pureed food served w/ level 3 sauce - creamy mashed potato w/ moderately thick gravy
- Pt. whose diet texture prescription contains both levels 3 & 4 may be able to handle both components
- Perform clinical eval of pt's ability to handle specific mixed/dual consistency items before recommending these items be included on diet.
- (Saitoh E, Shibata S, Matsuo K, Baba M, Fujii W, Palmer JB. Chewing and food consistency: Effects on bolus transport and swallow initiation. Dysphagia. 2007;22: 100–7.)

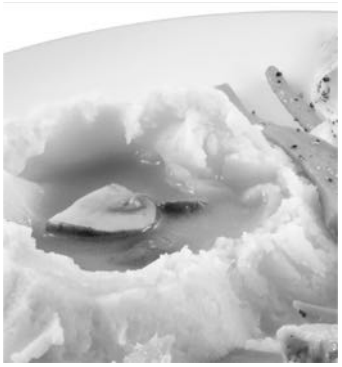


Photo by Jacques Bopp on Unsplash

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IDDSI newsletter – E-bite Feb 2020

- IDDSI IMPLEMENTATION
- Not mandatory
- Board of Directors hope global community embraces IDDSI for safety of those w/ dysphagia
- "Descriptive" not "prescriptive" framework
- Doesn't match particular dx or condition to any particular IDDSI level
- Only decide IDDSI recommendations once pt/individual assessed by clinician trained in dysphagia assessment & management

CONTINUED

IDDSI newsletter e-bite Feb 2020

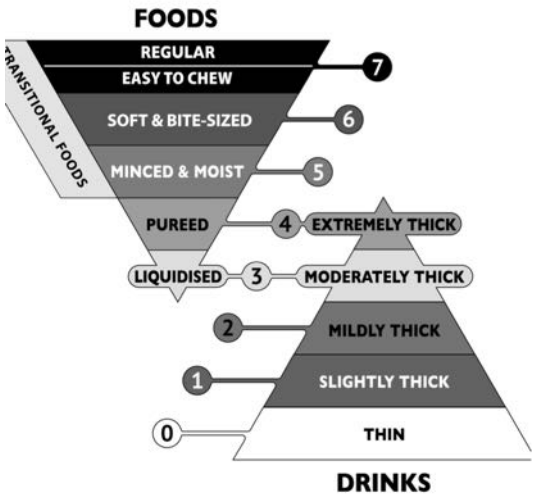
- Food/drinks consistency varies based on temperature, moisture, freshness/ripeness, method of cooking, etc.
- BEST & RECOMMENDED way to ensure food is appropriate for any IDDSI level
  - use recommended testing methods
- Offer bread/toast/biscuits/baked goods to someone on Level 6 soft & bite sized if we add lots of moisture????????
- Use Level 6 Fork pressure test to determine if food passes test

Photo by Nathália Rosa on Unsplash

Q4

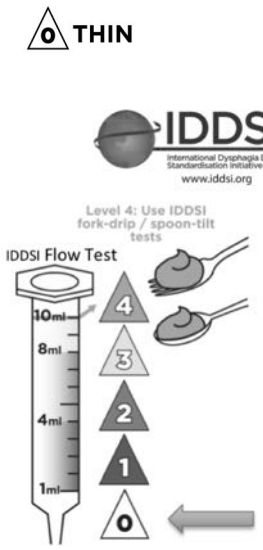
CONTINUED

Liquids



Q6

- Flows like water; fast flow, drink through any type of teat/nipple, cup or straw as appropriate for age & skills
- Rationale:
  - Functional ability to safely manage liquids of all types
- Flow test
  - Less than 1 mL remaining in 10 mL syringe after 10 seconds of flow

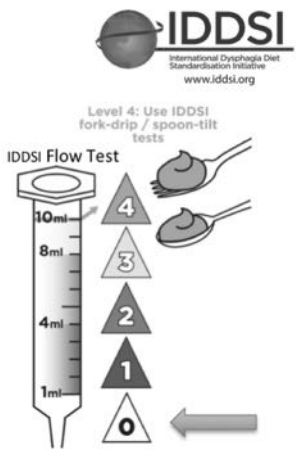


- Thicker than water
- A little more effort required vs. thin liquids
- Flows through straw, syringe, teat, nipple
- Thickness similar to most commercially available AR infant formulas “anti-regurgitation”
- Rationale
- Thickened drink w/ pediatric pop.
- Reduced flow speed yet flows through infant teat/nipple
- Consider case by case basis to flow through teat/nipple
- Adults - thin drinks too fast to control safely
- Flow Test
- 1-4 mL in syringe after 10 sec.

1 SLIGHTLY THICK

Q5

- Flows off spoon quickly but slower than thin drinks
- Sippable
- Mild effort to drink w/ standard bore straw
  - .209” or 5/3 mm diameter
- Rationale:
  - Slightly slower flow rate than thin
  - May be suitable if slightly reduced tongue control
- Flow Test
  - 4-8 mL in syringe after 10 sec.

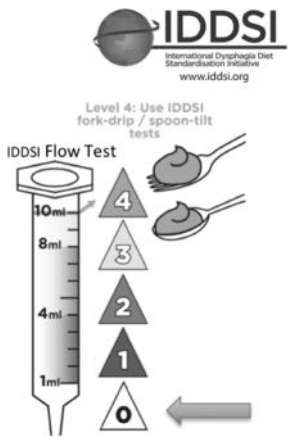


2 MILDLY THICK

- Drink from cup
- Mod. effort w/ standard or wide bore straw (.275" or 6.9 mm)
- Won't retain shape if piped, layered, molded on plate
- Eat w/ spoon, not fork - drips slowly in dollops through prongs
- No oral processing/chewing required
- Swallow directly
- Smooth texture w/ no "bit"
  - lumps, fibers bits of shell or skin, husk, particles of gristle or bone

3 MODERATELY THICK

- Rationale:
- Suitable if tongue control insufficient to manage Level 2
- More time for oral control
- Some tongue propulsion effort needed
- Pain on swallowing
- Flow Test
- `>8 mL in syringe after 10 sec.



3 MODERATELY THICK

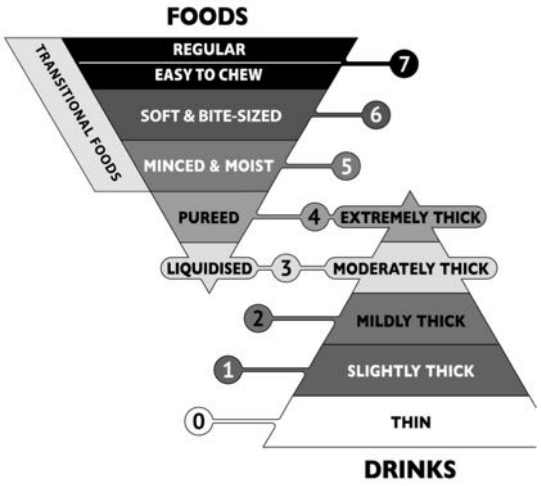
- Eat w/ spoon or fork
- Can't drink w/ cup/suck w/ straw- does not flow easily
- No chewing
- Holds shape if piped, layered or molded – liquid & don't separate
- Very slow movement under gravity - can't pour
- Falls off tilted spoon in single spoonful
- No lumps, not sticky

4 EXTREMELY THICK 4 PUREED

- Rationale
- May be easiest to control if tongue control significantly reduced
- Less propulsion effort required vs. minced and moist level 5, soft and bite sized level 6 and regular/regular easy to chew level 7
- More than liquidized/moderately thick level 3
- No biting or chewing needed
- Risk of increased oral and/or pharyngeal residue if too sticky
- Foods requiring chewing, controlled manipulation or bolus formation not suitable
- Pain on chewing or swallowing
- Missing teeth, poorly fitting dentures

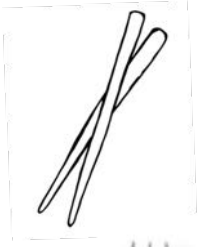
4 EXTREMELY THICK 4 PUREED

Solids



Q6

- Eat w/ fork/spoon/chopsticks (if very good hand control)
- Scoop or shape into ball on plate
- Soft & moist w/ no separate thin liquid
- Small lumps visible – easily squashed w tongue
- Pediatric
  - equal to/less than 2mm width; no longer than 8mm in length
- Adult
  - equal to/less than 4mm width; no longer than 15mm in length



5 MINCED & MOIST

- Rationale
- No biting; minimal chewing required
- Tongue force alone can separate soft small particles
- Tongue force required to move bolus,
- Pain or fatigue w/ chewing, missing teeth, poorly fitting dentures

5 MINCED & MOIST

Q7

- Fork pressure test
- Particles come through prongs of fork w/ little pressure
- Easily mashed - thumb nail doesn't blanche white
- Fork drip test
- Sits in pile/mound on fork; doesn't easily fall through prongs
- Spoon tilt test
- Holds shape on spoon; full spoonful must slide/pour off/fall off spoon if tilted/turned sideways/shaken lightly
- Slide off easily w/ very little food left on spoon; not sticky
- Scooped mound may spread or slump very slightly on plate

5 MINCED & MOIST

- Eat w/ fork, spoon, chopsticks
- Mash/break down w/ pressure from fork, spoon, chopsticks
- No knife to cut but may help load fork/spoon
- Soft, tender, moist throughout; no separate thin liquid
- Chewing required
- Pieces approp. for oral processing skills
- Pediatric
  - 8mm pieces – no larger
- Adults
  - 1.5 cm = 1.5 cm pieces – no larger

6 SOFT & BITE-SIZED

- Rationale
- Chewing required but not biting, bite size minimizes choking risk
- Requires tongue force/control to
  - move food, keep it within mouth for chewing & oral processing
  - move bolus for swallowing
- Pain/fatigue on chewing, missing teeth, poorly fitting dentures
- Fork Pressure Test
- Pressure from fork held on its side to cut/break apart/flake texture into smaller pieces
- Thumb nail size – 1.5x1.5 cm – press w/ tines of fork w/ thumb nail blanching white
- Sample squashes/breaks apart/changes shape, doesn't return to original shape when fork removed

6 SOFT & BITE-SIZED

CONTINUED

- Normal foods of soft/tender textures, developmentally & age appropriate
- Any method to eat food
- Size not restricted
  - Pediatric - smaller/greater than 8mm pieces
  - Adult - Smaller/greater than 15 mm –1.5 cm pieces
- NO hard, tough, chewy, fibrous, stringy, crunchy or crumby bits, pips, seeds, fibrous parts of fruit, husks or bones
- Include dual/mixed consistency foods/liquids if also safe for level 0 & at clinical discretion
- Thicken thin liquid portion to recommended thickness level if unsafe w/ thin

EASY TO CHEW

CONTINUED

- Rationale:
- Ability to bite, chew & orally process soft foods long enough to form swallow ready soft cohesive ball/bolus without tiring easily– doesn't necessarily require teeth
- May be suitable for people who find hard &/or chewy foods difficult/painful to chew/swallow
- Increased choking risk for those clinically identified at risk for choking
- Any size pieces
  - Restricting food piece sizes aims to minimize choking risk

EASY TO CHEW

Q8

CONTINUED

- Normal foods of various textures; developmentally age appropriate
- Any method to eat foods
- Size not restricted - may be range of sizes
  - Pediatric – smaller/greater than 8 mm pieces
  - Adults – smaller/greater than 15 mm – 1.5 cm pieces
- Includes
- Hard, tough, chewy, fibrous, stringy, dry , crispy, crunchy or crumbly bits
- Pips, seeds, pith inside skin, husks or bones
- Dual/mixed consistency foods & liquids

7 REGULAR

CONTINUED

- Rationale
- Ability to bite, chew hard or soft foods long enough to form swallow ready soft cohesive ball/bolus
- Chew all food textures without tiring easily
- Able to remove from mouth any bone or gristle that can't be swallowed safely
- Testing method is not applicable

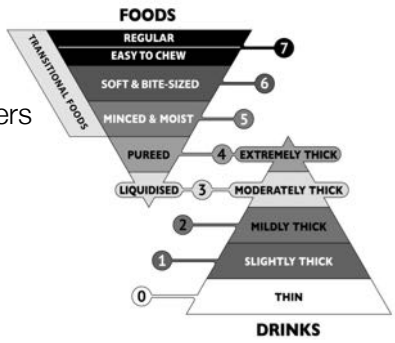
7 REGULAR

Transitional Foods

- Start as one texture & change to another when water/saliva added ***OR*** w/ temperature change
- Minimal chewing required but not biting
- Tongue pressure breaks foods once texture changed
- Teach/reteach chewing skills
- Not much nutrition
- May use w Level 5 – Minced & Moist and Level 6 – Soft & Bite Size

Q9

- May include, not limited to:
  - Ice chips
  - Ice cream/sherbet if assessed suitable by SLP
  - Wafers including communion wafers
  - Waffle ice cream cones
  - Some biscuits/cookies/crackers
  - Pringles chips
  - Shortbread
  - Veggie Stix™
  - Cheeto Puffs™
  - Rice Puffs™
  - Baby Mum Mums™
  - Gerber Graduate Puffs™



Bread

- Regular food texture – Level 7
- NOT Level 5 or 6
- Frequent cause of choking per review of choking literature
- Unable to easily break down into 4mm/smaller particles d/t fibrous nature
- Precut bread/sandwich w/ bite size guidelines for level – 1.5 for adults but SLP assesses on case by case basis!
- Utilize pre-gelled or soaked breads
- ALWAYS use testing guidelines for IDDSI

Photo by Joe Pregadio on Unsplash

Bread

- Able to bite AND chew to eat breads/sandwiches safely
- Who Knew?!
  - # of chewing strokes, strength & stamina required to make bread swallow-safe about same as required to chew & swallow peanuts safely
- Saliva required to soften for effective chewing
- Dry mouth?
  - Won't be able to sufficiently moisturize or wet dry bread for swallowing
- Becomes gummy, easily sticks in throat!
- Choking HAZARD!

Photo by Joe Pregadio on Unsplash

CONTINUED

Dentition

- Pts. w/ missing teeth/dentures may benefit from modified foods even if no true dysphagia dx
- Sudden choking deaths correlated w/ missing teeth, ill-fitting dentures & dental disease on autopsy
- Poor chewing strength assoc. w/ dentures
- Dentures - 25% chewing effectiveness w/ dentures vs. dentate individuals
- Larger, coarser chewed bolus w/ dentures
- Research suggests increased risk of coughing & choking in older adults w/ <13 teeth

CONTINUED

Pills

- Pt. specific!
- ASHA recommends assessing meds during instrumental studies
- Choking hazard even in healthy individuals w/out dysphagia dx
- IDDSI framework addresses meds:
- Level 7 & Level 6
  - may manage solid dose meds like tablets, capsules
- Level 5
  - may manage oral meds

Photo by Nathália Rosa on Unsplash

CONTINUED

Pills

- Pills, tablets, capsules considered choking risk if diet is Level 4 – Pureed/Extremely Thick
- Many meds can't be cut or crushed
- Cutting/crushing generally NOT recommended
- May have critical adverse effect
- IF meds must be modified, consider different medication administration!

Photo by Nathália Rosa on Unsplash

Oralflow pill cup

Q10

Phazix https://www.phazix.com/

- Clear, mod. thick, slippery gel placed on spoon w/ med & consumed w/ single swallow.
- Lubricates mouth/throat to smoothly carry med to stomach.
- Breaks down quickly by gastric acid
- Doesn't affect absorption rate - delivered as manufacturer intended
- All natural, pleasant vanilla flavor & aroma masks unpleasant med taste/smell
- 2.5 fl oz (75mL) tube for consumers & 0.27 fl oz (8mL) single dose stick pack for hospitals
- Level 3 IDDSI

Assure Slide

https://www.arkrayusa.com/diabetes-management/professional-care/diabetes-testing-supplies/assure-slide

- Med pass in long-term care
- Slippery lubricating gel surrounds med making it easier to swallow, more likely to reach stomach without delay
- Breaks down quickly in stomach w/ no known effect on med absorption rate
- Replace food carriers (applesauce, pudding) which can adversely affect therapeutic benefit of med
- Natural flavor & aroma mask unpleasant taste/smell of meds providing more pleasant experience

Assure Slide

https://www.arkrayusa.com/diabetes-management/professional-care/diabetes-testing-supplies/assure-slide

- Teaspoon has less sugar than applesauce: 0.55g/1 tsp. Assure Slide compared to 1.06g/1 tsp. Mott's brand applesauce.
- Convenient for med cart – No ice or refrigeration needed like food carriers.
- 2 IDDSI levels
  - Forte (IDDSI Level 4, extremely thick)
  - Zero (IDDSI Level 3, moderately thick)
- Available in 16.9 fl oz (500mL) bottle for long-term care.

- Modified Barium Swallow Impairment Profile (MBSImP™), VARIBAR® barium sulfate (Bracco Diagnostics Inc.), & International Dysphagia Diet Standardisation Initiative (IDDSI) widely recognized as initiatives promoting standardization in dysphagia eval & tx
- Accurate diagnostic information attained from MBS when paired w/ other clinical evaluations, pt. history & clinician judgment, provides basis for determining pt's. physiologic swallowing dx
- Risk/benefit analysis must be made by clinician related to pt. safety re:
  - aspiration events
  - pt. & clinician safety related to radiation exposure

Dysphagia CareStand up for standardization: Collaborative clarification for clinicians performing Modified Barium Swallowing Studies (MBSS)
By Bonnie Martin-Harris, Ph.D., CCC-SLP, BCS-S, ASHA Fellow - January 16, 2020 - Co-Authors: Catriona M. Steele, Ph.D., CCC-SLP, S-LP(C), Reg. CASLPO, ASHA Fellow & Julie Peterson, MS, CCC-SLP

CONTINUED

- Standard protocol, using standardized stimuli, recommended for answering medically important questions efficiently while limiting unnecessary radiation exposure
- Decisions to explore interventions or items beyond standard protocol must always be made in the context of purpose of exam, balancing diagnostic yield w/ pt. and operator safety and efficiency

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- Use of standardized barium products ensures reproducible results across MBSS examinations
- Not possible for standard barium products to achieve exact match to nearly endless complement of consistencies that appear in real-life foods & liquids
- VARIBAR® products mapped to levels 0-4 (thin to extremely thick) on IDDSI global framework for naming, describing and measuring texture of foods & liquids (www.iddsi.org)
- IDDSI terminology has been incorporated into MBSImP report writing template (www.mbsimp.com) as an option for those who have adopted this initiative

Dysphagia CareStand up for standardization: Collaborative clarification for clinicians performing Modified Barium Swallowing Studies (MBSS)
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Resources

- IDDSI.org
- Framework
  - International Autopsy Reports Identified Foods That Posing Choking risk!
- FAQ
- Reproducible images and handouts
- E-bite newsletter
- Videos
- Medication Studies

CONTINUED

Remember!

- Levels for liquids and solids
- Rationale for use
- Not mandatory – more comprehensive than NDD
- EASY to educate staff on testing food/liquids
- Medications and IDDSI

CONTINUED

Remember

CONTINUED

IDDSI newsletter – E-bite Feb 2020

- IDDSI DOES NOT certify, endorse, test, approve or promote any specific products or services
- IDDSI's primary goal is to foster & promote the use of IDDSI framework, standardized terminology, testing methods to improve safety, for all ages, all care settings and all cultures
- IDDSI asks all IDDSI users, companies, organizations/societies, education services to help maintain one central source for IDDSI information from the IDDSI website (www.iddsi.org). If referencing any materials from IDDSI, please make sure to include information to direct audiences back to IDDSI website

International Autopsy Reports Identified Foods that Pose Choking Risk! (5)(4)

- Hard or dry textures – require good chewing ability to break down/mix w/ saliva to make moist enough for safe swallow
  - Examples – nuts, raw carrots, crackling, hard crusty rolls
- Fibrous or tough textures – require good chewing ability/sustained chewing ability to break down to small enough pieces for safe swallow
  - Examples – steak, pineapple
- Chewing textures – sticky; stick to roof of mouth, teeth, cheeks, fall into airway
  - Examples – candies/lollipops/sweets, cheese chunks, marshmallows, chewing gum, sticky mashed potato

International Autopsy Reports Identified Foods that Pose Choking Risk! (5)(4)

- Crispy textures – require good chewing ability to break down/mix w/ saliva to make soft, rounded, moist enough for safe swallow
  - Examples – crackling, crisp bacon, some dry cereals
- Crunchy textures – require good chewing ability/sustained chewing ability to break into small enough pieces, mix w/ saliva for safe swallow
  - Examples – raw carrot raw apple, popcorn
- Sharp or spikey textures – require good chewing ability to break down into small enough soft rounded pieces, moist enough for safe swallow
  - Examples – dry corn chips

International Autopsy Reports Identified Foods that Pose Choking Risk! (5)(4)

- Crumbly textures – need good tongue control to bring crumbly pieces together, mix w/ enough saliva to hold together to be moist & safe to swallow
  - Examples – crumbly dry cakes, dry cookies, dry biscuits or scones
- Pips, seeds & white parts of fruit – hard & part of other hard or fibrous textures make it complex process to separate/remove them from mouth
  - Examples – apple/pumpkin seeds, white part of oranges
- Skins, husks or outer shells – pieces often fibrous, spiky, dry; need good chewing skills to make pieces smaller & enough saliva to make it moist OR enough skill to remove pieces from mouth. Small pieces stick to teeth/gums, catch in throat when swallowed
  - Examples – pea shells, grape skin bran, psyllium

International Autopsy Reports Identified Foods that Pose Choking Risk! (5)(4)

- Bone or gristle – pieces hard, not usually chewed & swallowed; require good tongue skills to remove them from food texture they are attached to & then remove bone/gristle from mouth
  - Examples – chicken bones, fish bones
- Round or long shaped foods – if not chewed into small pieces & swallowed whole, the shape can completely block airway causing choking
  - Examples – sausages, grapes
- Sticky or gummy textures – stick to roof of mouth/teeth/cheeks & fall into airway; require sustained & good chewing ability to reduce stickiness by adding saliva to make safe to swallow
  - Examples – nut butter, overcooked oatmeal, edible gelatin, Konjac containing jelly, sticky rice cakes, candy

CONTINUED

International Autopsy Reports Identified Foods that Pose Choking Risk! (5)(4)

- Stringy textures – difficult to break, flesh can become trapped w/ part in mouth & part in throat tied together by string texture
  - Examples – green string beans, rhubarb
- Mixed thin-thick textures – require ability to hold solid piece in mouth while thin liquid portion swallowed; after liquid portion swallowed, solid pieces chewed & swallowed; very complex oral task
  - Examples – soup w/ food pieces, cereal pieces w/ milk, bubble tea
- Complex food textures - require ability to chew/manipulate variety of food textures in one mouthful
  - Examples – hamburger, hot dog, sandwich, meatballs & spaghetti, pizza

CONTINUED

International Autopsy Reports Identified Foods that Pose Choking Risk! (5)(4)

- Floppy textures – it not chewed into small pieces, become thin, wet & form covering over opening of airway, stopping airflow
  - Examples – lettuce, thin sliced cucumber, baby spinach leaves
- Juicy food textures where juice separates from food when chewing – needs to swallow juice while controlling solid piece in mouth. Once juice swallowed, good chewing skills needed to break food into smaller pieces for safe swallow – complex oral task
  - Examples – watermelon
- Hard skins or crusts formed during cooking or heating – require good chewing skills to break down into smaller pieces while mixed w/ other food textures not affected by heating process

CONTINUED

Medication Studies

- Bushra, R, Aslam N, and Yar Khan, A. Food-Drug Interactions. Oman Medical Journal. Jan 2011: 26(2): 77-83.
- This review gives information about various interactions between different foods and drugs and will help physicians and pharmacist prescribe drugs cautiously with only suitable food supplement to get maximum benefit for the patient. Food-drug interactions can produce negative effects in safety and efficacy of drug therapy.
- McCabe-Sellers B., Frankel E.H., Wolfe J. "Handbook of Food-Drug Interactions." Boca Raton, FL: CRC Press. 2003; 12: 262-266.
- Mixing medication with foods is a common practice that may adversely affect efficacy. Commonly prescribed drugs such as aspirin, steroidal and nonsteroidal anti-inflammatory agents can cause acute inflammation if delayed in their passage through the esophagus. Food intake in relation to drug administration can have a significant impact on drug dissolution and absorption. The presence of food changes gastric motility, changes the gastric pH, and provides substances for drug and nutrient absorption.

Medication Studies

- Jacobsen, L. "A Pilot Study of the Pediatric Oral Medications Screener (POMS)." Hospital Pediatrics. 2015. DOI:10.1542/hpeds.2015-0027
- In 2010, pediatric outpatient prescriptions totaled 263.6 million in the United States. Nonadherence with a treatment regimen is correlated with increased health care utilization, costs, and increased antibiotic resistance. Pill swallowing has been identified as a major barrier to medication adherence in chronic conditions such as inflammatory bowel disease and HIV infection. Inability to swallow pills can result in expensive, hard-to-find formulations, treatment failures, and patient and family stress and anxiety.
- Patel, A . et al. "Effectiveness of Pediatric Pill Swallowing Interventions: A Systematic Review." D OI: 10.1542/peds.2014-2114
- The pediatric population has a unique set of barriers with oral medication compliance and administration due to children's inability to swallow pills, factors that can affect a child's success in swallowing pills include developmental stage, fear, anxiety, intolerance of unpleasant flavors and failure to understand the risks when not taking the medication. 50% of parents have children who cannot swallow standard-size pills. The failure to swallow pills is a barrier that can be overcome in the pediatric population with the right targeted intervention.

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Medication Studies

- Carnaby-Mann, G. and Crary, M. Pill swallowing by adults with dysphagia. Archives Otolaryngology Head and Neck Surgery. Nov 2005: 131(11):970-975.
- Dysphagia is currently estimated to affect more than 18 million adults in the United States. A recent national survey revealed that over 40% of adults in the general community experience problems swallowing pills. Of adults who reported difficulty swallowing pills, 14% disclosed that they had delayed taking a dose of their medication, and 8% had skipped a dose completely.
- Eidex, B. Achieving medication adherence: creativity, consultation and community. Drug Store News. June 2019.
- Poor medication adherence results in 33% to 69% of medication-related U.S. hospital admissions at an estimated cost of $100 billion annually. Improving rates of medication adherence in the patient population has long remained an area of focus among pharmacists. Patients who regularly take their medications as prescribed demonstrate better clinical outcomes. Moreover, adherence results impact the retail pharmacy financially.

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Medication Studies

- Forough, A. A spoonful of sugar helps the medicine go down? A review of strategies for making pills easier to swallow. Patient Preference and Adherence. 2018:12: 1337-1346.
- Making modification to medication such as crushing or splitting for ease of swallowing difficulties have been associated with increased risk of medication misadventures, adverse drug reactions, and in some cases have fatal consequences. Foods or drinks such as yogurt, jam, juices, and milk are used as an aid in which the whole pills can be hidden, or crushed tablets or capsules contents are mixed to facilitate swallowing and improve palatability of the medication particles. Mixing medicines with food or drinks increases the possibility of food-drug interactions and can potential result in increased or decreased therapeutic effect by altering the bioavailability of the drug. While understanding and resolving the underlying cause of medication swallowing problems is generally the preferred approach, sometimes this may not be possible.
- Jaspersen, D. “Drug-induced oesophageal disorders: pathogenesis, incidence, prevention and management.” Drug Saf. Mar 2000. PMID: 10738847
- Drug-induced injury of the oesophagus is a common cause of oesophageal complaints. More than 70 drugs can cause esophageal disorders such as esophagitis, an inflammation of the lining of the esophagus. Capsule or tablets that are commonly delayed in their passage through the oesophagus can also lead to acute inflammation. Many physicians and patients are not aware of this problem.

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4. https://iddsi.org/Documents/IDDSIFramework-EvidenceStatement.pdf This work is licensed under a Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International License October 10, 2016

5. The International Dysphagia Diet Standardisation Initiative 2016 @http://iddsi.org/framework/.Attribution is NOT PERMITTED for derivative works incorporating any alterations to the IDDSI Framework that extend beyond language translation. Supplementary Notice: Modification of the diagrams or descriptors within the IDDSI Framework is DISCOURAGED and NOT RECOMMENDED. Alterations to elements of the IDDSI framework may lead to confusion and errors in diet texture or drink selection for patients with dysphagia. Such errors have previously been associated with adverse events including choking and death.

6. November-2019-e-bite--Back-to-the-beginning--important-reminders-about-the-IDDSI-framework--Level-5-clarifications--Food-Testing.html?soid=1124597382375&aid=lgmiaQwI3E8

7. October-2019-e-bite--IDDSI-around-the-world--New-Webinars-Announced--Safety-Notification--and-more---.html?soid=1124597382375&aid=ec9HfZncWr8

8. September-2019-e-bite--IDDSI-in-Puerto-Rico-and-Canada--New-Webinars-Announced--Dual-Consistencies--Labeling-Reminders-and-more-.html?soid=1124597382375&aid=TG8ttAyAPR8

9. April-2019-e-bite--The-Science-Behind-the-IDDSI-Testing-Methods--Syringe-Updates--IDDSI-Congress--Hebrew-Translation-and-more---.html?soid=1124597382375&aid=_KJp_1ItORM

10. March-April-2019-e-bite--Updates-on-Syringe-Codes--Temperature-is-Important--Events-around-the-globe--Webinars--and-more---.html?soid=1124597382375&aid=AKT7FuMw4vk

11. October-2018-e-bite--Official-launch-date-for-IDDSI-in-USA-and-Territories--FNCE-2018--New-Level-7-Regular-Easy-to-Chew-and-more.html?soid=1124597382375&aid=9231QfRmFUA

12. August-2018-e-bite--Science-behind-Testing-Methods--Copyright--Greek-translation--webinars--and-more.html?soid=1124597382375&aid=zhz0jwe2RC0

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