



Dysphagia and Texture-Modified Diets: Nutritional Adequacy, Dignity and the Evidence That Is Missing

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Received: 04 February 2023; Accepted: 16 July 2023; Published: 02 December 2023

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Abstract

Two syntheses of the same intervention point in opposite directions. A meta-analysis of 16 randomised trials in 1,812 adults with dysphagia concluded that texture-modified diets increase dietary intake of energy and protein, while thickened fluids reduced aspiration risk with an odds ratio of 0.59 (95% CI 0.44 to 0.79). A systematic review of 35 studies found that consumption of texture-modified diets was associated with poorer intake than regular diets, significantly so for energy and calcium, and concluded that nutrition intake was compromised. The comparator differs between them, which explains the divergence without resolving it. A further difficulty is that adequacy is commonly inferred from planned provision rather than verified at the point of consumption, so a diet may meet its texture and nutritional targets on paper while delivering less in practice.

Keywords: Dysphagia; Texture-modified diet; Thickened fluids; Nutritional adequacy; Mealtime experience

Introduction

Dysphagia is common among older adults, particularly in long-term care, and is associated with complications affecting health, nutritional status, frailty, mental state and quality of life [1,2]. Texture modification, guided by speech and language therapists, is the usual clinical response [1,3].

Texture-modified diets are prepared by chopping, tenderising or blending food into a smoother consistency, and fluids are thickened with hydrocolloids to slow flow [1,4]. Both are intended to reduce aspiration and choking risk and to ease chewing and swallowing for those with reduced masticatory ability [1,5]. International terminology for the resulting levels has been standardised [6,7].

The nutritional consequence has been examined repeatedly and the conclusions do not agree. This review examines what the randomised and observational evidence each report, why they differ, and what is not measured in either.

Objective

This review sets out to establish four things from the published literature. First, what randomised trials show about intake and aspiration on modified textures. Second, what observational comparison against regular diets shows. Third, why those two literatures reach opposing conclusions. And fourth, what remains unmeasured, particularly the distinction between food provided and food eaten, and the experience of the meal itself.

Literature Review

What the randomised evidence shows: A meta-analysis of randomised controlled trials retrieved 3,854 records and included 16 trials randomising 1,812 adults with dysphagia (Figure 2) [8]. It concluded that texture-modified diets increase dietary intake of energy and protein in this population. Thickened fluids were associated with significantly reduced risk of aspiration, with an odds ratio of 0.59 (95% CI 0.44 to 0.79) (Figure 3), and thickened fluids combined with a water protocol showed a large effect on increasing fluid intake, with a standardised effect size of 3.96 (95% CI 0.75 to 7.16) [8].

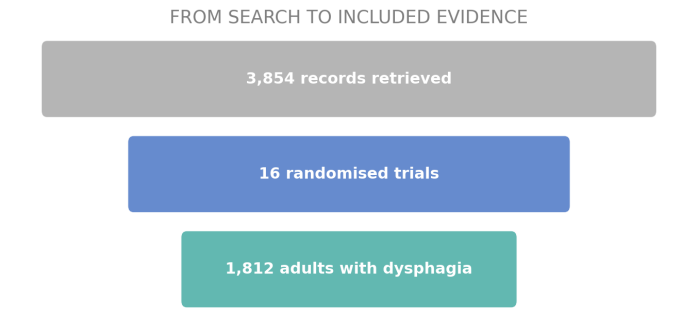


Figure 2: From search to included evidence in the randomised synthesis [8]

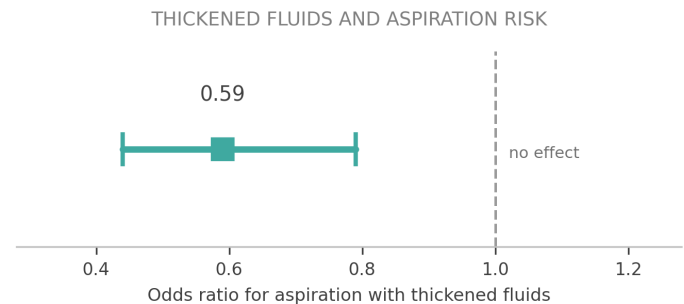


Figure 3: Thickened fluids and aspiration risk [8]

What observational comparison shows: A systematic review and meta-analysis including 35 studies found that consumption of texture-modified diets demonstrated poorer intake compared with regular diets, significantly so for energy and calcium, and concluded that nutrition intake was compromised in those consuming them (Figure 1) [9]. The same review compared presentations of modified food, reporting mean differences of 273.8 kilojoules per day (95% CI 419.1 to 128.6, $p = 0.0002$) and 12.4 grams of protein per day (95% CI 17.9 to 6.8, $p < 0.0001$) between shaped and traditional cook-fresh preparations, which the authors described as favouring the shaped presentation [9].

Table 1: Why the two syntheses reach opposing conclusions

The scale of undernutrition: Among older adults with dysphagia, 18.6 per cent are reported to be undernourished, and energy and protein intakes have been found lower in patients receiving a texture-modified diet than in those on a normal hospital diet [5]. Deficiencies are described as arising both in energy from basic macronutrients and in absorption of micronutrients [5].

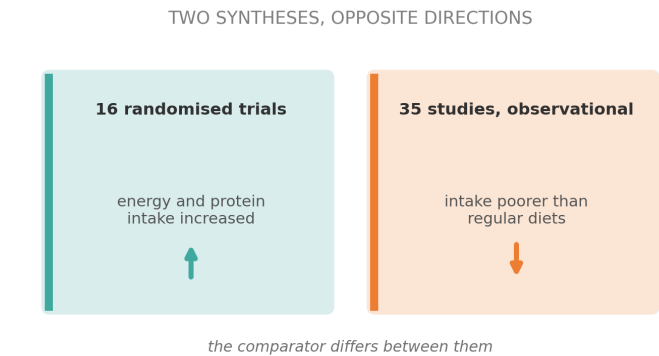


Figure 1: Two syntheses of the same intervention, opposite directions [8,9]

Synthesis	Design	Conclusion on intake
16 trials, 1,812 adults	Randomised	Energy and protein increased [8]
35 studies	Mostly observational	Poorer than regular diets [9]
Comparator, first	Usual care in dysphagia	— [8]
Comparator, second	Regular diet consumers	— [9]

Why the intervention reduces nutrient density: Texture-modified diets are inherently less nutrient dense because additional liquid is required for processing [10]. Thickening agents including starch, xanthan gum and guar gum are added to suit compromised swallowing, further reducing the nutrient density of the original food [5]. Such diets are also generally deficient in fruit, vegetables and whole grains, producing a demand for greater nutritional diversity in products designed for this population [5].

Adequacy inferred rather than measured: A review of this question argues that nutritional adequacy is often inferred from planned provision rather than verified at the level of actual consumption (Figure 4) [11]. Modified foods may meet prescribed texture requirements and planned nutritional targets while failing to deliver sufficient energy, protein and key micronutrients including calcium, vitamin D, vitamin B12, iron and zinc in practice [11].

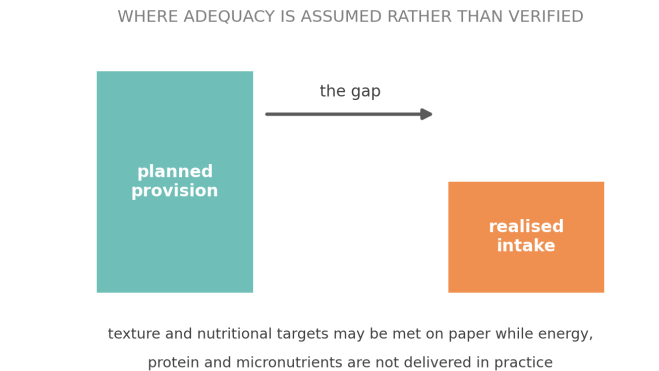


Figure 4: Where adequacy is assumed rather than verified [11]

What limits how much is eaten: The same review identifies swallowing impairment, poor appetite, fatigue, prolonged mealtimes, sensory decline and dependence on feeding assistance as limiting consumed volume, and notes that prolonged mealtimes may themselves reduce intake by increasing fatigue and the likelihood of early meal termination (Figure 5) [11]. Risk is described as greater in those with raised requirements or pre-existing deficiency, including patients with osteoporosis, vitamin D deficiency, iron deficiency anaemia, or pressure injury requiring zinc for tissue repair [11].

WHAT LIMITS HOW MUCH IS ACTUALLY EATEN

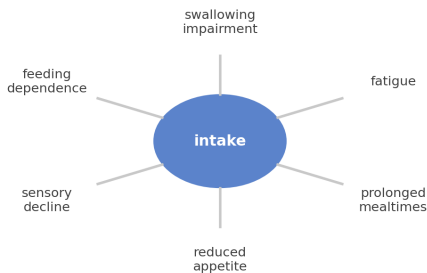
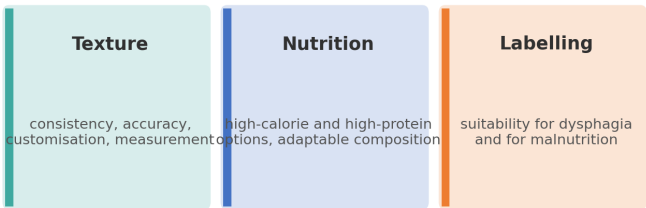


Figure 5: What limits how much is actually eaten [11]

The experience of the meal: Patients consuming these diets may have negative perceptions of the meal experience, and poor compliance with dietary recommendations has been reported [10]. Causes described include reduced mealtime pleasure from altered and restricted consistencies, prolonged mealtimes, swallowing exhaustion, physical difficulty tolerating large food and fluid volumes, dependency on being fed, and associated cognitive impairment [10].

What is being proposed: An expert consensus process produced a framework of nine criteria across three domains covering texture, nutrition and labelling (Figure 6). Ninety-one per cent of the experts perceived the proposed measures as potentially helpful in improving access to appropriate nutrition, and 61 per cent favoured a combined model for describing texture [8,12]. The nutrition domain covers availability of high-calorie options, flexibility to adjust calorie content, availability of high-protein options and adaptable macronutrient composition [8].

A PROPOSED FRAMEWORK: THREE DOMAINS



91 per cent of the expert panel judged the measures potentially helpful

Figure 6: A proposed framework across three domains [8,12]

Table 2: Reported effects of texture modification, by source

Finding	Source and direction
Aspiration risk reduced	Odds ratio 0.59 (0.44 to 0.79) [8]
Fluid intake increased	With a water protocol [8]
Energy and protein increased	Randomised synthesis [8]
Intake poorer than regular diet	Observational synthesis [9]
Undernutrition in dysphagia	18.6 per cent [5]

Direct comparison of intake against a normal diet: Energy and protein intakes of older people consuming a texture-modified diet have been compared with those on a normal hospital diet [13], and dietary and fluid intakes in care home residents requiring modified texture have been examined with attention to the contribution of snacks [16]. Prevalence and characteristics associated with modified texture use in long term care have been described [14], as have the practical issues associated with these foods [15]. In-house pureed food production has been examined from the perspective of catering staff [24].

Evidence-based recommendations and their updates: Systematic review with evidence-based recommendations on modified foods and thickened liquids has been published and subsequently updated [17,26], and expert review has addressed their use in nursing home residents specifically [25]. Position papers set out nutritional management in adult dysphagia [12], and reviews have covered management and nutritional considerations in older people [19,20]. Texture and consistency modification have been examined for their influence on swallowing physiology and function [7]. Their use in dementia and in residential aged care has been considered separately [18].

Fluid and hydration: Inadequate fluid intake among long term care residents has been quantified with its determinants [21], and the contribution of thickened drinks, food and other routes to total fluid intake in hospitalised patients with dysphagia measured directly [22]. Thickening agents themselves affect the bioavailability of water and medication and influence satiety [23], which bears on why fluid targets are difficult to reach on these regimens [21,23].

Adherence, experience and downstream effect: Compliance of older patients with safe swallowing instructions has been studied [28], and the justifications given by independent feeders for not following recommendations examined qualitatively [29]. The social and psychological burden of dysphagia was described in an early multinational study [27], and the transition of older people onto modified texture has been explored as an experience in its own right [30]. Nutrition, swallow safety and mealtime experience have been assessed together in aged care facilities [31]. Modified texture diets have been associated with decreased muscle mass in rehabilitation inpatients [32], dysphagia prevalence in nursing homes quantified in a multinational project [33], and a randomised controlled trial has tested the design and

implementation of a modified-texture diet in older adults [34].

Table 3: What is and is not established about texture-modified diets

Question	What the evidence supports
Does modification reduce aspiration?	Yes, odds ratio 0.59 [8]
Does it improve intake?	Against usual care, yes [8]
Is intake equal to a regular diet?	No [9,13]
Is adequacy verified at consumption?	Usually inferred from provision [11]
Is mealtime experience measured?	Described, rarely quantified [10,27]

Method

Search strategy: PubMed and the archives of the major clinical nutrition, rehabilitation and speech and language therapy journals were searched for studies of texture-modified diets and thickened fluids in adults with dysphagia. Search terms combined texture-modified diet and thickened fluids with nutritional adequacy, energy and protein intake, aspiration, mealtime satisfaction and IDDSI. Reference lists of the randomised synthesis [8] and the observational synthesis [9] were screened by hand for primary sources.

Eligibility: Syntheses and primary studies were included if they reported nutritional intake, aspiration risk or mealtime experience in adults consuming modified textures. Framework and terminology documents are cited for the definitions and criteria they set out and are identified as such.

Data extraction and handling: Design, population, the comparator used and the reported outcome were extracted as published. The comparator is stated alongside every conclusion about intake, because randomised trials compare modified textures against usual care within a dysphagic population while observational studies compare consumers of modified textures against consumers of regular diets, and those two designs cannot yield the same answer. This review reports published findings and does not constitute guidance on the prescription of any diet texture, fluid consistency or supplement for any individual, which are matters for the treating team including the speech and language therapist. No pooling or re-analysis was performed. Figures 1 to 6 and Tables 1 to 3 reproduce published values only. This is a narrative synthesis of published literature and was not registered as a systematic review.

Concluding Remarks

A reader consulting one synthesis would conclude that texture modification improves energy and protein intake; consulting the other, that it compromises nutrition [8,9]. Both statements are supported by their own data, and the disagreement is structural rather than a matter of one being wrong.

The comparator explains it. Randomised trials assign patients who already have dysphagia to modified textures or to usual care, so the alternative is attempting an unmodified diet with an impaired swallow [8]. Observational studies compare people consuming modified textures with people consuming regular diets, and those groups differ in swallowing function, frailty, cognition and dependency before any food is served [9,11]. The first asks whether modification helps a dysphagic patient; the second asks how dysphagic patients compare with everyone else.

Stated that way, both findings can be held at once, and the practical reading is reasonably clear. Modification improves what a dysphagic patient can safely take compared with not modifying, and it does not bring intake up to the level of someone without dysphagia. The reduced nutrient density that follows from adding liquid and thickener is a real cost of the intervention rather than an argument against it [5,10].

The measurement point in the intake-adequacy review is the one most likely to change practice. If adequacy is judged from planned provision, a service can meet its texture and nutritional specification while patients receive materially less, and the shortfall will not appear in any audit [11]. The listed causes are all downstream of the kitchen: fatigue, prolonged mealtimes, appetite, sensory decline, dependence on assistance [11]. None is addressed by reformulating the meal.

The aspiration result should not be lost in this. Thickened fluids reduced aspiration risk with an odds ratio of 0.59 and an interval excluding unity, and combined with a water protocol increased fluid intake substantially [8]. Safety is the reason the intervention exists, and the nutritional cost is a trade made against that benefit rather than an unforced error.

On the dignity dimension named in the title, the literature is descriptive rather than quantified. Reduced mealtime pleasure, swallowing exhaustion, dependency on being fed and poor compliance are reported as consequences [10], but no study reviewed here measures them alongside intake in the same patients. That is the specific gap: an intervention justified on safety, costed in nutrition, and evaluated almost never on the experience of eating.

Three limitations belong with these conclusions. The two syntheses differ in design as well as comparator, and the observational one pools heterogeneous studies of varying quality, so the contrast drawn here is illustrative rather than a formal comparison [8,9]. Reporting of texture levels varies between studies despite standardised terminology, so the intervention is not identical across trials [6,7]. And the intake-adequacy argument is made in a narrative review rather than tested by a study measuring provision and consumption in the same patients, which is precisely the study it calls for [11].

Acknowledgements

The authors thank the investigators who stated their comparator explicitly, since the apparent contradiction in this literature dissolves only when the comparison group in each synthesis is made visible.

Funding

No dedicated funding from public, commercial or charitable sources supported the preparation of this review.

Conflict of Interest

The authors declare no competing interests.

Ethics Statement

This article reviews previously published studies only. No new patient data were collected and no participants were recruited, so ethical approval was not required.

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Citation: Lombardo C, Sandell Y, Ottesen N. "Dysphagia and Texture-Modified Diets: Nutritional Adequacy, Dignity and the Evidence That Is Missing." *J Clin Nutr Heal* (2023):4; 001-006