This information is intended for healthcare professionals only.

HIGH TOLERANCE

HIGH ENERGY

Case study booklet supporting Nutrison PlantBased 2 kcal HP Multi Fibre

High tolerance = 93% of dietitians were satisfied with their patients tolerance. Data on file, 2024.
Nutrison PlantBased 2 kcal HP Multi Fibre is a Food for Special Medical Purposes for the dietary management of disease related malnutrition in patients and must be used under medical supervision.

NUTRICIA
Nutrison
PlantBased
2 kcal HP Multi Fibre

Less volume. Less time. More of what matters.

REAL WORLD EVIDENCE FOR NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE[1]

Nutrison PlantBased 2 kcal HP Multi Fibre is a new, unique, plant-based fibre containing tube feed designed for patients with higher energy and protein needs, and/or fluid restriction.

Evidence for the efficacy of Nutrison PlantBased 2 kcal HP Multi Fibre in everyday clinical practice has come from a multi-centre study in adult, home enteral nutrition patients recruited from community services by their managing dietitian across 17 NHS centres in the UK. The study followed 16 community-based patients for 28 days and assessed their gastrointestinal tolerance, compliance, acceptability, nutrient intake, length of feeding time, dietetic goal and anthropometry with Nutrison PlantBased 2 kcal HP Multi Fibre.

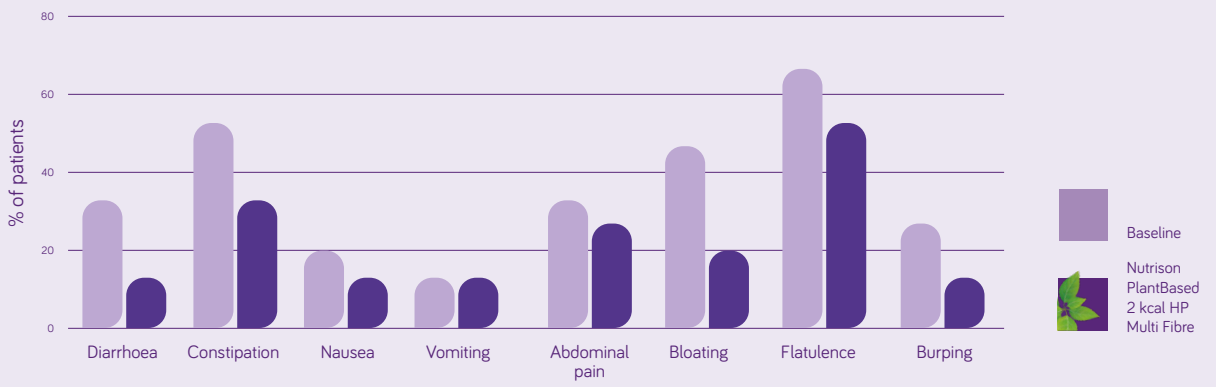
Results from three of these patients have been collated in a series of clinical case studies, which are presented in this booklet. The case studies are intended to help educate healthcare professionals about the role of Nutrison PlantBased 2 kcal HP Multi Fibre and offer practical guidance on its uses.

CONTENTS

NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE IS WELL TOLERATED WITH EXCELLENT COMPLIANCE[1]

In the UK multi-centre study, Nutrison PlantBased 2 kcal HP Multi Fibre demonstrated;[1]

Incidence of gastrointestinal symptoms reduced[1]

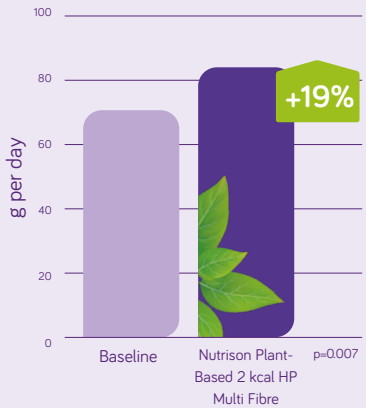


93%
of dietitians were satisfied with their patient's tolerance[1]

88%
of patients agreed they tolerated the feed well[1]

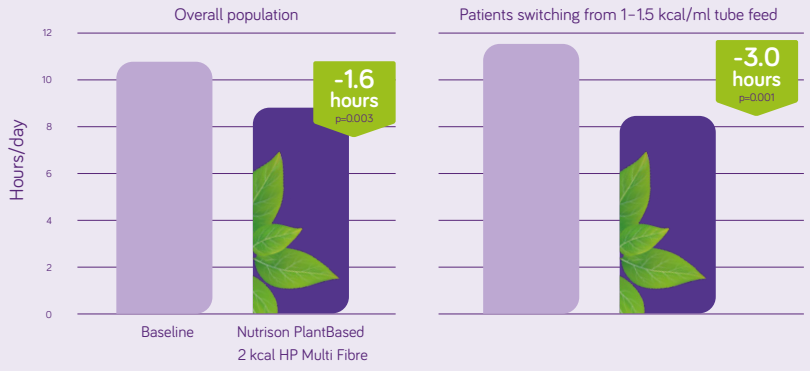
96%
compliance versus the dietitian's prescription[1]

Protein



Total mean protein intake significantly increased from 70 g/day at baseline to 81 g/day. The total mean energy intake was maintained. Mean fibre intake increased significantly from 13 g/day to 21 g/day.

Total feed time per day



Daily feeding time significantly reduced from 10.5 to 8.9 hours. Participants on a 1–1.5 kcal/ml baseline tube feed experienced a 3 hour time reduction.

Baseline

Nutrison PlantBased 2 kcal HP Multi Fibre

CASE STUDY 1

A 61-YEAR-OLD MALE; TOTAL STOMACH REMOVAL AND PARTIAL REMOVAL OF THE OESOPHAGUS

Provided by: Jo Bates, Community Rehabilitation Dietitian
North East London Foundation Trust

BACKGROUND

A 61-year-old male enterally fed via jejunostomy was recruited in the community. Following an accidental ingestion of caustic soda in 2017, he required a total stomach removal and partial removal of the oesophagus with a feeding tube inserted due to his inability to meet nutrition and hydration needs. In addition to this, he also suffered with atherosclerotic heart disease, hypertension and previously had a stroke and heart attack in 2016 and 2017, respectively. Despite being able to manage a small oral intake and remain independent and mobile, he suffered ongoing physical pain. Both the patient and his wife struggled with poor health overall, which subsequently affected their mental health and living conditions.

Prior to the accident, the patient weighed 114 kg Body Mass Index (BMI) 39.4 kg/m^2 with significant weight loss occurring due to the trauma, surgery, and tolerance issues despite being NGT fed initially. Upon handover into the community, his weight was ~77 kg BMI 27 kg/m^2. The patient reported he was lactose intolerant without an official diagnosis during the hospital admission and was thus provided with a high energy feed, which was also lactose free. However, his weight continued to decline by a further 15 kg in the following 6 months causing concern. Nutrison Concentrated was provided during this time, but tolerance issues persisted, and he eventually revealed omitting up to 50% of the feed. Once placed on Nutrison Soya Multi Fibre, the patient began taking an adequate volume of feed and his weight began to increase alongside a small oral intake.

Prior to the trial, his weight had been stable for 6 months at around 74 kg and a BMI just above the upper healthy range at 25.7 kg/m^2. Nutritional requirements at the time of recruitment were 1994 kcal/day and 74.4 g – 111 g of protein/day.

BASELINE REGIMEN

The prescribed baseline regimen was 1500 ml of Nutrison Soya Multi Fibre, JEJ fed continuously at 250 ml/hour with a goal intake of 1545 kcal and 60 g protein per day due to assumed undiagnosed lactose intolerance. The patient was tolerating this feed better than the previous options; however, some daily bloating and nausea remained. Despite trialling a range of feeding rates, timing options and medications, he preferred a high-rate evening feeding period to allow some daytime oral intake and freedom for activities. Although, he admitted during the baseline assessment that he would often reach 1000 ml and stop feeding due to feeling unwell. 'Melt-in-the mouth-crisps' were tolerated and eaten daily in large amounts for pleasure as well as some water, lemonade and occasional scrambled egg or chicken. These helped towards maintaining his weight when feed was omitted. However, this caused concern regarding his overall protein, vitamin, and mineral intake. Therefore, due to the omission of feed, his baseline of nutritional intake was approximately 1263 kcal/day and 43.4 g of protein/day (0.6 g/kg), which included 1000 ml of Nutrison Soya Multi Fibre providing 1030 kcal and 40 g protein/day.

RATIONALE AND USE OF NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE

The patient was tolerating a fibre feed and wanted to continue taking a Multi Fibre product. The dietetic goal was to improve tolerance and therefore compliance with the feed towards meeting estimated nutritional requirements, particularly protein and micronutrients. The higher energy and protein content of the plant-based feed also reduced the volume and feeding time required. Nutrison PlantBased 2 kcal HP Multi Fibre 500 ml was taken continuously providing 1000 kcal and 50 g protein, with ~1000 ml of Nutrison Soya Multi Fibre following this, both at 250 ml/hour rate.

4-WEEK RESULTS

	Requirement	Baseline Intake (Nutrison Soya Multi Fibre)	Endpoint Intake (Nutrison PlantBased 2 kcal HP Multi Fibre and Nutrison Soya Multi Fibre)
Energy (kcal/ day)	1994	1263 (1030)	2396 (2030)
Protein (g/day)	74.4	43.4 (40)	94.7 (90)

After 4 weeks, the patient's body weight had increased to 76 kg and a BMI of 26.29 kg/m^2. Daily energy intake had increased to 2396 kcal and 94.7 g of protein (1.2 g/kg body weight). Approximately halfway through the study, the patient started to take Nutrison PlantBased 2 kcal HP Multi Fibre earlier in the afternoon to allow for a break before continuing with Nutrison Soya Multi Fibre in the evening. The patient observed that the 500 ml study feed, did not cause any tolerance issues, therefore he was 100% compliant with taking the daily dose. Together with up to 1000 ml of Nutrison Soya Multi Fibre during the study, the patient often exceeded energy requirements, resulting in a slight weight gain, and fulfilling protein, vitamins, and mineral needs. Time spent feeding reduced from 6 hours to just over 5 hours, which the patient was also very happy about and he was very keen to continue taking the study feed permanently. Nutrison Soya Multi Fibre was stopped and the volume of Nutrison PlantBased 2 kcal HP Multi Fibre was increased to 1000 ml/day, acting as his sole source of nutrition, which is complete for vitamins and minerals in <750 ml. The feeding time further reduced to 4 hours and the patient fully tolerated his feed for the first time in 6 years which was a huge improvement to his quality of life. No other changes in the patient's medical condition were observed regarding decline or presence of infection during the 4-week study, however overall oral intake gradually declined over the following 6 months due to reoccurring issues from oesophageal surgery. The higher calorie, higher protein content of the Nutrison PlantBased 2 kcal HP Multi Fibre was integral in maintaining his nutritional status during this time. At the 6-month follow-up, the patient was still tolerating the feed very well and remarked that *"he can feel that his body tolerates it better"*.

SUMMARY

The dietetic goal was achieved with the prescribed dose of 500 ml Nutrison PlantBased 2 kcal HP Multi Fibre fully tolerated each day, therefore the patient achieved 100% compliance during the study. This enabled the patient to meet estimated nutritional requirements for both macro and micro-nutrients and was therefore more nutritious for the patient, which was a historical issue with other feed options. The patient remains on 1000 ml of Nutrison PlantBased 2 kcal HP Multi Fibre, which has also improved his mental wellbeing by not experiencing nausea and bloating each day. Nutrison PlantBased 2 kcal HP Multi Fibre, is nutritionally complete in <750 ml with the added benefit of the high calorie and protein formula resulting in a smaller prescribed volume and reduced feeding time which the patient was very happy about and keen to remain on it in the long term.

CASE STUDY 2

A 62-YEAR-OLD MALE; OESOPHAGEAL CANCER

Provided by: Naomi Hatchett, Macmillan Oncology Dietitian
Calderdale & Huddersfield NHS Trust

BACKGROUND

A 62-year-old male was recruited in the community, who had been established on jejunostomy feeding for 6 months following an oesophagectomy for oesophageal cancer. He required a prolonged period of enteral feeding due to post-operative anastomotic strictures requiring regular dilatation, and throughout his ongoing treatment trajectory, which included 25 days of targeted radiotherapy during the time on the trial, resulting in ongoing dysphagia and odynophagia.

On recruitment, his weight was 62.4 kg with a Body Mass Index (BMI) of 19.1 kg/m^2. His weight on diagnosis was 68 kg approximately 1 year prior, with ongoing gradual weight loss following 4 cycles neoadjuvant chemotherapy, oesophagectomy, and 4 cycles of adjuvant chemotherapy by the time of recruitment.

Prior to diagnosis, his dietary preference was a vegan or plant-based diet, however, due to the significant nutritional implications of his disease and treatment, this was relaxed by the patient. He continued to lead a very active lifestyle where he was able.

His nutritional requirements were calculated as 2495 kcal/day (40 kcal/kg) and 94 g protein/day (1.5 g/kg/day) considering his current treatment, activity levels and baseline intake.

His baseline feed was Nutrison Peptisorb Plus HEHP 1500 ml at 125 ml/hour due to a post-operative chyle leak, but this had been deemed to have subsequently resolved. Alongside the feed, he was able to tolerate small amounts of soft diet, however the quantities varied from day to day.

Baseline feed intake: 2250 kcal/day, 113 g/protein/day

Total baseline intake: 2714 kcal/day, 131 g/protein/day

RATIONALE AND USE OF NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE

The patient had been keen to continue with a vegan diet during treatment, however no suitable tube feeds were available, therefore the patient relaxed his preferences. At the time the closest plant-based feed would have been Nutrison Soya, however a high feed volume and prolonged time continuously feeding would have been required. In view of his experiences having to navigate his preferences, he consented to the use of a high-energy plant-based feed for the remainder of his treatment.

The patient was prescribed 1000 ml Nutrison PlantBased 2 kcal HP Multi Fibre continuously at a rate of 100 ml/hour for 10 hours, providing 2000 kcal, and 100 g protein, anticipating the remainder of his nutritional intake would be from oral intake, which at baseline was approximately 500 kcal and 20 g protein.

DIETETIC GOAL WHILE ON TRIAL

To maintain weight and gastrointestinal (GI) tolerance to enteral feeding, whilst able to accommodate the patients' dietary preferences.

RESULTS AND DISCUSSION

After 28 days on the trial product, the dietetic goal was met. The endpoint weight was 62.7 kg, BMI 19.2 kg/m^2. No adverse GI symptoms were reported, and the patient tolerated the feed with nil concerns.

During the trial, the patient completed his radiotherapy, with reduced oral intake until week 3, achieving resolution of the ability to tolerate intake by the end of the trial, resulting in an increased total intake by the end of the trial.

	Nutritional requirements	Baseline intake (Feed + Oral)	Endpoint intake (Feed + Oral)
Energy (kcal/ day)	2495	2714	3168
Protein (g/day)	94	130	137

The perceived benefits of receiving the trial feed were that it overall reduced time spent continuously feeding, allowing for increased oral intake when able to tolerate an oral diet. The patient was grateful to be able to receive a vegan feed, which had a positive impact on his quality of life and relationship with his nutritional care during treatment.

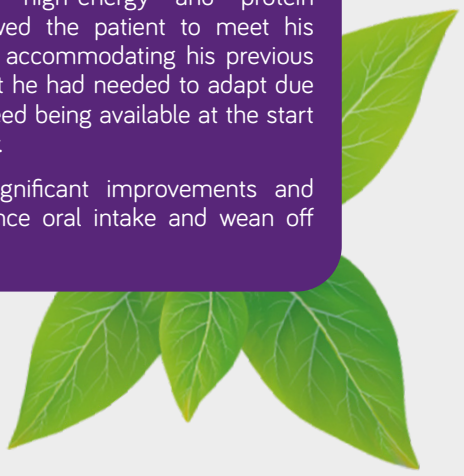
The patient would have been happy to continue with the trial feed long-term and reflected that they had wished it had been available at the start of their treatment. Due to continued improvement with oral intake, he required the feed for only 4 weeks post-trial, and subsequently had his feeding jejunostomy removed.

SUMMARY

In summary, following the 4-week trial, both patient and dietetic goals were met.

The provision of a high-energy and protein plant-based feed allowed the patient to meet his nutritional needs, while accommodating his previous dietary preferences that he had needed to adapt due to no suitable enteral feed being available at the start of his treatment journey.

Clinically, he made significant improvements and was able to recommence oral intake and wean off enteral feeding.



CASE STUDY 3

A 22-YEAR-OLD MALE; WITH LEARNING DISABILITIES

Provided by: Rebecca Martin, Advanced Dietitian
North East Yorkshire Partnership NHS Foundation Trust

BACKGROUND

The patient was a 22-year-old male with multiple profound learning disabilities secondary to chromosome deletions, who resides in the family home. He was attending day services during the week along with respite care and his family are the main carers. He also has idiopathic scoliosis, cataracts, impaired vision, hearing loss and is non-verbal.

The patient has been receiving his enteral feed through a Percutaneous Endoscopic Gastrostomy (PEG) tube since early childhood due to severe dysphagia, resulting in unsafe oral intake. All nutrition and fluid requirements are met through enteral feeding. He has a history of poor tolerance to enteral feeds evidenced by symptoms of diarrhoea, constipation, and potential abdominal pain, determined by periods of unsettled behaviour. He has difficulty gaining weight due to his high energy expenditure from constant body movements.

Baseline anthropometry: 25.5 kg and an underweight Body Mass Index (BMI) (difficult to accurately measure due to severe physical disabilities and scoliosis).

Nutritional requirements at baseline: 1500 kcal/day and 56 g of protein (2.2 g/kg body weight).

BASELINE REGIMEN

A variety of enteral tube feeds with different concentrations, protein sources and fibre content were initiated with this patient due to his history of poor tolerance. Prior to the trial, the patient was receiving 1500 ml of Nutrison Soya Multi Fibre, a soy-based tube feed, which was well tolerated with improvements seen in agitation levels and the patient's bowels were more settled.

Due to the low concentration of his tube feed (1 kcal/ml), the patient required a large volume of feed to meet energy requirements. The patient had difficulties feeding at a high rate as this could cause reflux and vomiting. As a result, the patient would have to feed overnight, increasing the overall feeding time. The patient's time not receiving feed, which was used for time out of his wheelchair, personal cares, and other activities where it was difficult to be attached to a pump, was significantly impacted. Having more feed during the night also resulted in a greater frequency of the patient pulling his tube out. The patient's weight was gradually declining as he rarely received 100% of his feed as prescribed. Bolus feeding with small volumes of highly concentrated Oral Nutritional Supplements (ONS) was tried, but the patient could not tolerate any variation of these.

RATIONALE AND USE OF NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE

The patient was switched to Nutrison PlantBased 2 kcal HP Multi Fibre as his baseline feed was also fibre-containing and he was already tolerating it well. The high energy, low volume aspect of Nutrison PlantBased 2 kcal HP Multi Fibre was chosen with the goal of improving compliance and achieving full feed volume delivery. Providing additional calories in a small volume should not only improve energy intake, but it should also reduce the amount of time attached to the feeding pump and subsequently promote weight gain.

Trial Feeding Regimen: 500 ml of Nutrison PlantBased 2 kcal HP Multi Fibre continuously at 50-125 ml/hour rate, providing 1000 kcal and 50 g protein, alongside 700 ml/day of Nutrison Soya Multi Fibre.

DIETETIC GOAL WHILE ON TRIAL

To reduce the length of time attached to the feeding pump to improve quality of life. To increase weight and to maintain gastrointestinal (GI) tolerance.

4-WEEK RESULTS

Endpoint anthropometry: 26.3 kg and an increase in estimated BMI.

	Requirement	Baseline intake	Endpoint intake
Energy (kcal/ day)	1500	1545	1721
Protein (g/day)	56	60	78

As a result of having a more concentrated feed, daily energy intake increased to 1721 kcal and protein intake increased to 78 g of protein (3 g/kg body weight). This resulted in a continued and gradual weight gain during and after the trial period. With regards to tolerance, the patient appeared to tolerate Nutrison PlantBased 2 kcal HP Multi Fibre better than his previous feed, visibly rubbing his stomach less. Initially, the reduction in water content by 14.1 g/100 ml of the plant-based feed caused some constipation, but this was resolved with additional water flushes. Less feed was required overnight, which reduced incidences of the patient pulling out his tube. Family carers reported feeling less stressed because of the weight gain and the knowledge that the intake of calories was greater. They also felt less strain as carers as less time was needed to monitor the patient whilst feeding. The family also reported being pleased that the feed was plant-based as it is guaranteed to be Halal, which was important to the family. As the feed worked so well for the patient and his family, he continued this feed after the trial period had ended.

SUMMARY

The opportunity for this patient to trial this feed came just at the right time. Through many months of trialling different feeds, we had discovered that a soy-based tube feed was the best available option. However, with only a 1kcal/ml feed to choose from, this posed problems with volume and being attached to a pump for prolonged periods of time. Quality of life improved for the patient as well as his family and carers. His health outcomes vastly improved, and it was fantastic that he could continue to benefit from this feed after the trial period had ended.

CASE STUDY 4

A 53-YEAR-OLD MALE; BOERHAAVE'S SYNDROME

Provided by: Lesley Freeman, Home Enteral Feeding Dietitian (Extended Role)
Queen Elizabeth Hospital Gateshead

BACKGROUND

Patient is a 53 year old male who was previously fit, healthy, and working full-time. He lives at home with his wife and daughter.

In August 2023, he developed sudden severe chest pain, nausea, vomiting, painful swallowing, rapid breathing, chest swelling, abdominal rigidity, and fever. He was diagnosed with Boerhaave's Syndrome, a spontaneous rupture of the oesophagus usually caused by forceful vomiting or straining.

He required emergency surgery, including a right thoracotomy, oesophagectomy, creation of a cervical oesophagostomy (neck stoma), and insertion of a jejunostomy for nutritional support. He was discharged in September 2023, with nutritional care initially provided by the tertiary centre's dietetic team as part of the UGI surgical MDT follow-up.

He has since had several appointments with the UGI surgical team to explore reconstructive options, such as a gastric pull up to enable future oral intake. He has so far chosen not to undergo further surgery.

He currently meets his nutritional requirements via his jejunostomy. He takes only small oral amounts for taste; all oral intake drains into the oesophagostomy stoma bag and does not contribute to nutritional intake.

In early 2024, the patient was referred to the Gateshead Home Enteral Feeding Team (HEFT) for ongoing enteral nutrition support and jejunostomy tube care.

BASELINE REGIMEN

At referral the patient was having 1000 ml Nutrison Energy and 500 ml Nutrison Concentrated delivered by pump at 125 ml/hour over 12 hours, along with a 60 ml Renapro Shot (100 kcal, 20 g protein, delivered as an additional bolus), See table 1 for regimen. He received additional 1000 ml of water as regular flushes throughout the day.

Weight 74 kg, BMI of 23 kg/m²

Grip strength of 30 kg (Men age range 51–55yrs old N = 32.9 kg - 50.7 kg).

	Requirements	Initial Regimen	Adjusted Regimen
Energy (kcal)	2220–2775	2600	2590
Protein (g)	74–111	117.5	119.5
Fluid (ml)	2590	2560	2580

Initially only a minor change was made, Renapro Shot was switched to 2 x Nutrison Protein Shots (2 x 40ml pots), a decision made based upon feed company contract. The patient was keen to restart regular exercise, as this played a significant part in his daily life pre-surgery, and therefore required adequate nutritional intake to support this. He was also starting a phased return to work and was keen to minimise time attached to the feeding pump, hence his decision to continue using a concentrated feed.

We discussed gradually increasing feeding rate, which he was also keen to try, and he tolerated an increased feeding rate of 150 ml/hour, reducing time attached to the feeding pump to 10 hours per day.

Calogen Extra Shots (each 40 ml, 160 kcal & 2 g protein) have been intermittently added to the patient's feeding plan during episodes of illness and during periods when Nutrison Concentrated was not available, to increase overall energy intake.

RATIONALE AND USE OF NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE

During his HEF team appointment in summer 2025, the patient reported several issues, including intermittent constipation with no bowel movements for up to 7–10 days over the previous 2–3 months, requiring frequent use of laxatives, predominantly Laxido.

He had further increased his exercise, visiting the gym 5–6 times per week and intensifying his exercise routine, likely

increasing his overall nutritional requirements, as reflected by his weight loss at this appointment. In addition, he reported new episodes of dizziness, usually in the morning, approximately an hour after completing his overnight feed.

Considering his symptoms, we decided to trial Nutrison PlantBased 2 kcal HP Multi Fibre and stop Nutrison Concentrated. The aim was to increase his energy intake to prevent further weight loss, increase protein to support higher activity levels, and improve fibre intake to help with constipation.

We discussed his episodes of dizziness and how these may be due to dumping syndrome. Possible adjustments to help could involve adjusting feed rate, which he was not keen to do in the first instance. We confirmed that his feed was being administered at room temperature and that he maintained appropriate positioning during feeding (a minimum 45 degree angle) and for one hour afterwards. The patient also confirmed that inadequate fluid intake was not an issue, as he consumed at least 1000 ml on rest days and more on exercise days, with good urine output.

A final consideration regarding the suspected dumping related dizziness was the potential benefit of adding a fibre-containing feed to help slow gastric emptying and nutrient absorption.

Weight: 72 kg, BMI: 22 kg/m²

Grip strength of 43 kg (Men age range 51–55yrs old. N = 32.9 kg–50.7 kg).

RESULTS AND DISCUSSION

Initially, 500 ml Nutrison PlantBased 2 kcal HP Multi Fibre feed was introduced alongside 1000 ml of Nutrison Energy per day, and Nutrison Concentrated and the modular supplements (Calogen Extra and Nutrison Protein Shot) were stopped. Initial stomach cramps resolved within a week.

After 3–4 weeks symptom-free, the regimen was increased to 1000 ml of Nutrison PlantBased 2 kcal HP Multi Fibre with 500 ml of Nutrison Energy daily, see table 2. No changes were made to feeding rate, as symptoms did improve with changes made to feed types.

	Requirements Estimated	Revised Feeding Regimen
Energy (kcal	2160–2700	2750
Protein (g)	72–108	130
Fluid (ml)	2520	>2500
Fibre (g)	30	15

In December 2025, the patient reported improvements in symptoms. His bowels are now opening every 1–2 days without the need for regular laxatives. He also describes feeling stronger and fuller, with no episodes of dizziness or light-headedness. This has given him the confidence to continue with his high intensity exercise plan, a really important aspect of his lifestyle.

From a practical point of view, now that he has stopped all modular feeds, he finds the current plan easier and less time consuming, supporting his quality of life. He completes his feed over 10 hours and has nothing else other than water flushes, which he can do easily and discreetly when he is out of his home.

Weight 74 kg, BMI: 23 kg/m²

Grip strength of 46 kg (Men age range 51–55yrs old. N = 32.9 kg–50.7 kg).

SUMMARY

Adjusting nutritional intervention through the introduction of Nutrison PlantBased 2 kcal HP Multi Fibre feed has had a positive effect for this patient. It has helped to increase both his energy and protein intake without increasing the time he is attached to a feeding pump, as well as simplifying feeding by removing the need for modular additions. The feed and addition of fibre were well tolerated.

This feed has introduced a new option in the nutritional management of enterally fed adults. As we see a wider variety of individuals, varying in age, underlying diagnosis, with potentially higher energy and protein requirements, this feed type offers another useful option. With the increasing awareness of the health benefits of plant-based diets generally, enterally fed patients should also be offered this option.

CASE STUDY 5

MANAGING HIGHLY VARIABLE ORAL INTAKE IN ADOLESCENCE: TRANSITION TO PLANT-BASED OVERNIGHT ENTERAL FEEDING

Provided by: Marti Roos, Paediatric Dietitian
Herefordshire and Worcestershire Health and Care Trust

BACKGROUND

The patient lives with her family, attends a special school, and regularly accesses respite care. She requires a high level of caregiver support due to complex medical needs, communication difficulties, and challenging behaviours.

CLINICAL HISTORY

She is a 16-year-old girl with cerebral palsy secondary to hypoxic-ischaemic brain injury at birth and associated severe learning difficulties. She has drug-resistant epilepsy managed with an implanted vagus nerve stimulator, vestibular aqueduct syndrome with sensorineural hearing loss, and scoliosis for which she has undergone spinal fusion. Additional comorbidities include chronic constipation, significant sleep disturbance, and depression.

She was tube fed from birth, successfully weaned at three years, and thrived with oral intake until clinical deterioration following botulinum toxin treatment under general anaesthetic at eight years of age. Subsequent dysphagia (assessed as IDDSI level 4 diet only) required reintroduction of enteral feeding, initially via nasogastric tube and later gastrostomy. A five-month ketogenic therapy trial at nine years was unsuccessful, after which care was transferred to the community HEFT dietetics team.

Her communication abilities have deteriorated over time, and she now relies on a combination of signing, gestures, pointing, and symbols. This decline has contributed to increasing frustration and challenging behaviours, including obsessive tendencies, aggression, and escalating episodes of distress, which are becoming more difficult for caregivers to manage.

Medications include antiepileptic medication, antispasmodics, antidepressant therapy, sleep-regulating agents, a sedating antihistamine, seasonal prophylactic antibiotics, hormonal contraception, and laxatives.

NUTRITIONAL ASSESSMENT

Nutritional assessment was challenging due to the patient's complex neurological condition, scoliosis, very low mobility, and highly variable oral intake. BMI was used only to monitor change over time, as its accuracy is limited in cerebral palsy and spinal deformity due to unreliable height measurement and inability to distinguish lean and fat mass. Only standard growth charts were available via electronic records. The patient is wheelchair-dependent, requires hoist transfers, and MUAC could not be obtained due to aggressive behaviour during attempts.

Nutritional intake was highly unpredictable and closely linked to mood and behaviour, with refusal at home and more consistent intake at school and respite. Periods of behavioural outbursts and seizure activity were associated with increased energy requirements, interspersed with lower-demand phases, necessitating a feeding approach that provided consistent background nutrition.

ANTHROPOMETRIC HISTORY

Linear growth progressed well, although spinal surgery resulted in a rapid increase in measured height. Weight fluctuated in response to changes in oral intake and feeding regimen, with BMI centiles remaining low during periods of nutritional instability.

Date (age)	Weight (kg)	Centile	Height (m)	Centile	BMI (kg/m²)	Centile	Clinical Interpretation & Action
October 2024 (15 yrs)	47.1	25th	164	50th	17.4	13th	Slim presentation; ribs visible. Introduction of 1.2 kcal/ml paediatric overnight feed
Jan 2025 (15 ¼ yrs)	52.3	25–50th	166	75th	18.97	32nd	Increased weight following 1.2 kcal/ml overnight feed
May 2025 (15 ½ yrs)	49.9	25th	168	75–91st	17.7	12th	Reduced oral intake; feeding plan adjusted and oral intake fortified
Oct 2025 (16 yrs)	51.4	25th	172	91st	17.4	7th	Height increased post-spinal surgery; weight improved with fortified intake and overnight feed. BMI remained low. Transition to adult feed.
Mar 2026 (16 ½ yrs)	56.9	50–75th	172	91st	19.2	28th	Height stabilised; weight and BMI normalised, improved nutritional status and no longer appeared thin

Table 1: Anthropometric History

ESTIMATED REQUIREMENTS

- Energy: 1811 kcal/day (75% EAR)
- Protein: 45.4 g/day
- Fluids: 2276 ml/day

Energy requirements were estimated at 75% of the estimated average requirement (EAR) to reflect very low mobility and variable intake, with adjustments based on anthropometric monitoring. Protein was calculated at 0.8 g/kg/day due to protein from dairy-based oral intake.

Fluids were prescribed above standard recommendations (40 ml/kg/day) due to chronic constipation, with observed clinical benefit (i.e. improved hydration and reduced dry mouth).

BASELINE FEEDING REGIMEN

At baseline, the patient received gastrostomy water feeds with added Paediatric Seravit to meet micronutrient requirements, alongside highly variable oral intake of IDDSI level 4 foods. Oral intake was mood-dependent and inconsistent, with preferred foods taken at home and more reliable intake at school and respite; there was no oral fluid intake.

As intake became increasingly unpredictable and weight loss was observed, water feeds were replaced with a 1.2 kcal/ml paediatric feed with food-derived ingredients, commenced as an overnight feed during the week, after poor tolerance of previous 1.5 kcal/ml standard and extensively hydrolysed feeds due to reflux and vomiting. Gastrointestinal symptoms improved, although laxatives and additional Paediatric Seravit remained necessary.

At weekends, when intake at respite was more consistent, overnight feeds reverted to hydration with Paediatric Seravit only. Although weight initially stabilised with no immediate concerns, weight later became static, resulting in a fall in BMI to the 7th centile, prompting further adjustment of the feeding regimen.

Parameter	Requirements	**Baseline Intake** (1.2 kcal/ml feed)	**Intervention Intake** (Nutrison PlantBased 2 kcal HP Multi Fibre)
Energy (kcal/day)	1811	600	1000
Protein (g/day)	60	18	50
Fibre (g/day)	25	5	7.5
Total feed volume (ml/day)	N/A	500 +3x 500ml water feeds	500 +3x 500ml water feeds

Table 2: Baseline versus Intervention Intake

RATIONALE AND USE OF NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE

Dietetic Goal: To provide stable overnight nutrition that consistently meets macro-and micronutrient requirements despite highly unpredictable oral intake, minimising weight fluctuation and maintaining BMI above the 25th centile.

Rationale: Nutrison PlantBased 2 kcal HP Multi Fibre was selected to provide high nutrient density within a limited volume, using an adult nutrient profile appropriate for increasing requirements associated with puberty and longer term nutritional provision stability. The feed enabled nutritional needs to be met within a 500 ml overnight regimen, avoiding disruption to daytime routine and therapy.

A higher fibre content was required as oral fibre intake declined, with constipation previously contributing to reflux and reduced acceptance of oral intake. The formulation supports gastrointestinal tolerance while allowing flexibility to adjust volume to accommodate future changes in eating patterns and facilitate the transition to adult services.

RESULTS & DISCUSSION

The patient only accepted enteral feeding overnight. Daily oral intake varied between 300–600 kcals, 14–25g protein per day on most days, but could fluctuate dramatically. Therefore, nutrition was optimised within her established routine, avoiding behavioural escalation associated with change. Use of Nutrison PlantBased 2 kcal HP Multi Fibre resulted in weight gain into the healthy range, improved gastrointestinal tolerance, and reduced laxative requirements. As micronutrient needs were fully met, Paediatric Seravit was discontinued. Regular biochemistry monitoring continued due to complex treatments and polypharmacy.

Parameter	Baseline (incl. oral intake)	Interim Regimen (1.2 kcal/ml feed)	5 months on Nutrison PlantBased 2 kcal HP Multi Fibre
Total Feeding Time (hr/day)	10 hr 15 mins (overnight water feed & water bolus)	9 hr 45 mins (feed) & 2 hr 15 mins (water boluses) = 12 hrs	8 hr 20 mins (overnight feed) & 2 hr 15 mins (water boluses) = 10 hr 15 mins

Table 3: Feeding Time Reduction

Overnight feeds were given over 8-hour 20-minute period at 60 ml/hr, and 500 ml water bolus feeds were given over 45 minutes each at 600 ml/hr.

By 6 months weight and BMI had normalised (BMI increasing from the 7th to the 28th centile) (see Table 1). Ongoing monitoring includes three-monthly weight checks, regular biochemistry review, and assessment of oral intake and gastrointestinal symptoms, with regimen adjustments informed by family, school, and respite care teams. Good communication with the wider team is encouraged.

CONCLUSION

This teenager has complex health needs and severe mental health difficulties, resulting in challenging behaviours, seizures, unpredictable oral intake across settings, limited ability to identify triggers, and highly variable requirements. An overnight enteral feed provided a consistent, stable background nutrition within a limited volume, safeguarding nutritional adequacy despite fluctuating intake while preserving the daytime routine. Feeding time has been reduced as only water boluses were required during waking hours, further contributing to improved quality of life. Caregiver feedback has been positive, with reported improvements in bowel function and reassurance that nutritional needs are being met in an otherwise volatile and unpredictable situation.

CASE STUDY 6

OPTIMISING ENTERAL FEEDING TOLERANCE IN AN ADOLESCENT PATIENT WITH A FAMILY PREFERENCE FOR A PLANT-BASED DIET

Provided by: Marti Roos, Paediatric Dietitian
Herefordshire and Worcestershire Health and Care Trust

BACKGROUND

The patient is a 14-year-old boy living with his family and receiving long-term support from the home enteral feeding dietetic service. He requires a high level of caregiver support due to complex neurological and medical needs.

CLINICAL HISTORY

He has severe hypoxic–ischaemic encephalopathy with cerebral palsy (spastic quadriplegia), scoliosis, and drug-resistant epilepsy with a Lennox-Gastaut phenotype. Additional comorbidities include gastro-oesophageal reflux disease requiring fundoplication, abnormal laryngeal anatomy with a nasopharyngeal airway in situ, and gastrostomy feeding.

He has been exclusively tube fed since birth. At 10 years of age, his mother introduced a blended diet alongside prescribed enteral feeds to improve gastrointestinal symptoms and severe reflux. His regimen comprised a 1.2 kcal/ml paediatric feed with food-derived ingredients supplemented with vegetable purées, which met nutritional requirements and was associated with marked improvements in constipation, retching, and reflux until the onset of puberty.

Small changes in routine are poorly tolerated and can trigger distress and seizure activity. Consequently, his mother has been reluctant to alter a feeding regimen she perceived as effective and well-tolerated, at times limiting her engagement with dietetic review.

Medications include antisecretory therapy, antispasmodics, benzodiazepines, sleep-regulating agents, antiepileptic and anticonvulsant therapies (including cannabinoid-based treatment), and laxatives as required.

NUTRITIONAL ASSESSMENT

Puberty is associated with rapid growth and changes in body composition, increasing requirements for energy, protein, and key micronutrients, including iron, calcium, zinc, and folate. In this patient, the onset of puberty was associated with increasing height while weight remained static, resulting in a decline in BMI and indicating that nutritional intake was no longer meeting requirements despite previous long-term stability.

Although the existing regimen of a 1.2 kcal/ml paediatric feed with food-derived ingredients had been well tolerated and effective in controlling gastrointestinal symptoms, increasing nutritional demands prompted discussion of feed optimisation. The patient's mother was understandably reluctant to change a regimen that had maintained stability for many years and expressed a preference for a plant-based approach consistent with the family's diet.

ANTHROPOMETRIC HISTORY

Weight had remained stable within a healthy range prior to puberty; however, expected pubertal growth resulted in increasing height without corresponding weight gain and a subsequent fall in BMI. Following transition to a more energy-dense overnight regimen, weight stabilised and BMI normalised.

Date (age)	Weight (kg)	Centile	Height (m)	Centile	BMI (kg/m²)	Centile	Clinical Interpretation & Action
May 2024 (13 yrs)	31.9	3rd	126	<0.4th	20.1	78th	Stable avoiding obesity
Jan 2025 (14 yrs)	33.1	<0.4th	130	<0.4th	19.6	66th	BMI nearing 50th centile on 1.2 kcal/ml paediatric overnight feed.
May 2025 (14 ¼yrs)	34.6	<0.4th	132	<0.4th	19.9	67th	Stable weight. Higher weight in anticipation of puberty and increased requirements.
Oct 2025 (14 ¾yrs)	33.3	<0.4th	135	<0.4th	18.3	35th	BMI decline with pubertal growth. Transition to adult feed
Feb 2026 (15 yrs)	35.9	<0.4th	137	<0.4th	19.1	47th	BMI normalised, ideal weight for height. Nutritional requirements for age better met.

Table 1: Anthropometric History

Given the presence of scoliosis, height measurements were undertaken by the special school nurse using specialist techniques. BMI was used only to monitor trends over time, as its accuracy is limited in cerebral palsy due to altered body composition and difficulties obtaining reliable height measurements. Despite short stature, the patient demonstrated the expected pubertal growth spurt, which continued following introduction of the nutrient-dense plant-based feed.

ESTIMATED REQUIREMENTS

- Energy: 1970 kcal/day (75% EAR)
- Protein: 42.1 g/day
- Fluids: ~1665 ml/day

Energy requirements were estimated at 75% of estimated average requirements (EAR) to reflect immobility and low energy expenditure, in line with guidance for individuals with spastic quadriplegic cerebral palsy, where requirements typically range from 65–75% EAR.[1] This estimate was used as a guide and adjusted according to tolerance, weight trends, and clinical response, recognising that increased muscle tone may elevate requirements but is often offset by reduced overall movement. The protein requirements used were standard recommended values for age and gender.

Fluid was prescribed above standard recommendations (40 ml/kg/day) due to history of constipation, increased secretions, and observed seizure exacerbation during periods of dehydration. Higher fluid provision also supported renal tolerance in the context of increased protein and micronutrient intake.

BASELINE FEEDING REGIMEN

The patient received a combination of prescribed enteral feeding and additional blended diet. His mother administered puréed vegetables via gastrostomy using a slow-plunge technique (approximately 360 ml daily with added olive oil), providing additional energy and fibre. This blended diet was originally introduced to manage severe seizures and gastrointestinal symptoms, with clear symptomatic benefit.

While the family expressed a preference for an exclusively blended diet, full nutritional requirements could not be met within the volume and feeding rate tolerated. The agreed compromise was continued use of an enteral feed containing food-derived ingredients to bridge nutritional gaps while maintaining gastrointestinal stability. Following pubertal changes and declining BMI, transition to a more energy-dense plant-based adult feed was supported to meet increasing requirements within tolerated volumes and rates.

Parameter	Requirements	Baseline Intake (1.2 kcal/ml feed)	Intervention Intake (Nutrison PlantBased 2 kcal HP Multi Fibre)	Adjusted intervention intake at 15 years
Energy (kcal/day)	1972	1104	1200	1400
Protein (g/day)	50	34	60	70
Fibre (g/day)	25	9.2	9	10.5
Total feed volume (ml/day)	N/A	920	600	700

Table 2: Baseline versus Intervention Intake

RATIONALE AND USE OF PLANTBASED 2 KCAL HP MULTI FIBRE

Dietetic Goal: To prevent undesired weight loss during puberty by meeting increased nutritional requirements and optimise overall health and immunity within tolerated feed volumes.

Rationale: Nutrison PlantBased 2 kcal HP Multi Fibre was selected to align with the family's preference for a plant-based lifestyle while providing sufficient energy density to meet the increased nutritional demands of puberty within the limited volumes and feeding rates tolerated. This approach supported macro and micronutrient adequacy and aimed to stabilise weight during a period of rapid growth. Additional water flushes and blended diet made up fluid volume.

The patient's mother was initially reluctant to consider changes due to concerns about seizure stability. However, reassurance regarding the feed's compatibility with the existing regimen and a plant-based approach enabled agreement to proceed. Intake was planned to increase around the patient's 15th birthday in line with age-related requirements. Micronutrient intake, including magnesium, was reviewed to support transition from paediatric feeds. Hydration remained adequate, with regular biochemistry monitoring recommended. Interim volumes were prescribed prior to age 15, with feed delivery adjusted according to tolerance and blended-diet intake.

RESULTS & DISCUSSION

The transition to the plant-based 2 kcal/ml feed was well tolerated, with no adverse effects on seizure activity, bowel function, or reflux. Anthropometric outcomes are summarised in Table 1, demonstrating a progressive improvement in nutritional status, with BMI increasing from the 35th to the 47th centile by five months. The patient's mother positively reported on her son's appearance, no adverse effects on seizure activity and that he was now following a plant-based diet consistent with the rest of the family.

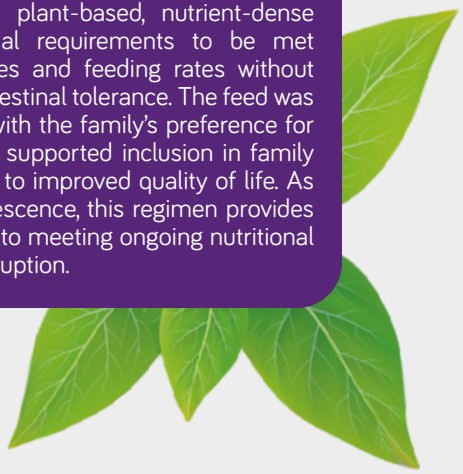
Parameter	Pre-intervention baseline	Interim Regimen (1.2 kcal/ml feed)	5 months on Nutrison PlantBased 2 kcal HP Multi Fibre
Feeding Time (hr/day)	13 hr 15 min	10 hr 30 min	10 hr 30 min

Table 3: Feeding Time Reduction

Although the transition from a 1.2 kcal/ml feed to Nutrison PlantBased 2 kcal HP Multi Fibre did not result in further reduction in feeding time, the increased nutrient density enabled greater nutritional provision within the same tolerated overnight window, supporting pubertal requirements and BMI improvement. Feeding rates were adjusted to optimise tolerance, with delivery of 400 ml overnight at 48 ml/hour and additional daytime bolus feeds of 100 ml at 140 ml/hour as tolerated, without any increase in gastrointestinal symptoms, supporting the established routine.

CONCLUSION

This patient has a complex clinical presentation with a fragile balance requiring careful management to maintain stability. Changes to feeding regimens can provoke anxiety for caregivers following the previous resolution of gastrointestinal symptoms. The introduction of a plant-based, nutrient-dense feed enabled nutritional requirements to be met within tolerated volumes and feeding rates without compromising gastrointestinal tolerance. The feed was well accepted, aligned with the family's preference for a plant-based diet, and supported inclusion in family mealtimes, contributing to improved quality of life. As the patient enters adolescence, this regimen provides a sustainable approach to meeting ongoing nutritional needs with minimal disruption.



References:

1. Romano C, van Wynckel M, Hulst J, et al. ESPGHAN guidelines for the evaluation and treatment of gastrointestinal and nutritional complications in children with neurological impairment. J Pediatr Gastroenterol Nutr. 2017;65:242–264.

INTRODUCING NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE

The UK's first and only plant-based 2 kcal tube feed[2]

High energy
2 kcal/ml

Unique[2]

High protein
10 g per
100 ml

100%
plant-based

With MF6

High quality
plant protein
55% soy
45% pea

Nutritionally
complete
in <750 ml†

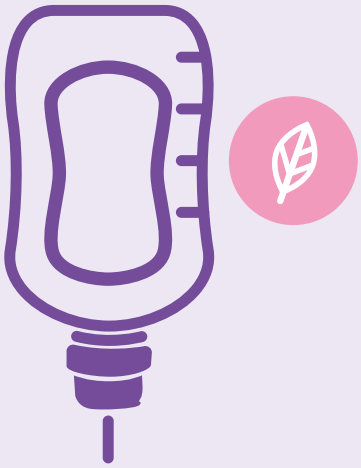
Low volume,
concentrated
feed

HIGH TOLERANCE
HIGH ENERGY

High tolerance = 93% of dietitians were satisfied with their patients tolerance. Data on file, 2024

NUTRISON PLANTBASED 2 KCAL HP MULTI FIBRE: NUTRITIONAL VALUE PER 100 ML

Energy	200 kcal
Protein	10 g
Carbohydrate	18.5 g
Lactose	<0.010 g
Fat	9.3 g
EPA + DHA	90 mg
Fibre	1.5 g
Calcium	148 mg (3.69 mmol)
Iron	2.13 mg
Vitamin D	2.66 µg
Vitamin B12	0.57 µg
Osmolarity	540 mOsmol/l
Presentation	500 ml OpTri Bottle
ACBS approval	Yes



- Vegan
- Halal certified
- Kosher approved

Scan to learn more

1. Nutricia UK ACBS trial, data on file 2024. 2. MIMS, April 2026

†Nutritionally complete in <750ml. Using a 19-49 year old male RNI for a comparator (excluding Na, K, Cl).

NUTRICIA
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2 kcal HP Multi Fibre

Less volume. Less time. More of what matters.

We extend our sincere thanks to those who participated in the trial and made it possible to bring this product to market.

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