FRESENIUS KABI
caring for life

Patient cases

Tube feeding in older people.
What Fresubin® can do for your patients.

Tube feeding in older patients

Older people are at risk of malnutrition when living in the community, as well as in hospital and in care homes. Malnutrition in older patients may arise from loss of appetite, dysphagia and neurological, digestive or metabolic impairments.[1,2]

The loss of body weight and muscle mass may also result in a cycle of frailty.[3] When the required intake of energy and protein cannot be met by oral nutrition, then enteral tube feeding may bridge the gap and prevent the progression of frailty.[4,5]

The following four example cases illustrate how different patients in the geriatric field may benefit from tube feeding.

Case 1

Long term tube feeding after stroke

Clinical summary

Presentation/clinical history

Mrs A, 68 years, is a retired school teacher

- Bed-/chair-bound after an ischaemic stroke 2 years ago.
- Living at home with her husband.
- Current diagnoses: dysphagia, decubitus grade 3 with delayed wound healing.
- Due to dysphagia, Mrs A receives nutrition via a gastrostomy tube.
- Following a weight loss 3 months ago, feed was increased from 1500 to 2000 ml of a 1 kcal/ml feed.
- Past medical history: hypertension, stroke
- Medication: warfarin, paracetamol, omeprazole, metoclopramide, bisacodyl

Weight history

2 years ago	72.5 kg (BMI: 27.0 kg/m²)
18 months ago	67.7 kg (BMI: 25.2 kg/m²)
3 months ago	65.1 kg (BMI: 24.2 kg/m²)

- Small weight loss of **3.8 %** over past 18 months;
  Total weight loss since diagnosis: **10.2 %**

Meeting protein needs in long-term tube feeding patients may aid wound healing.[6,7]

Nutritional assessment

Estimated nutritional requirements

- Energy: 1875 kcal[8,9]
  (20 kcal x 65.1 kg + 1.2 activity factor due to being bed/chair bound and 1.2 stress factor due to pressure sore)
- Protein: 98 g (1.5 g/kg)[3,6]
- Fluid: 2177 ml (using the 100/50/15 formula)[10]

Dietetic assessment

- Home visit. Patient unable to take full feed volumes due to nausea. Receives approx. 1500 kcal, 60 g protein and 2000 ml fluid via tube and 150–200 kcal from small tasters of pureed food. Bowels opening only 1–2 times per week, treated by laxative bisacodyl.
- The gap between nutritional requirements and actual intake increases the risks of malnutrition and delayed wound healing.[7] Due to poor mobility, Mrs A is at risk of vitamin D deficiency.[11]

Aim

- Promote wound healing and prevent any further weight loss.

Tube feeding with Fresubin

Nutrition therapy

Type of feeding tube: Freka GastroTube (15Fr) in situ with 5 ml water in balloon

- Continue with small tasters of food as per speech and language therapist recommendations and for quality of life.
- Increase energy density of feeding to reduce volume and minimise nausea.
- Increased protein density of feed meets requirements and aid in wound healing.[6]
- Include vitamin D to help improve muscle strength and muscle function.[12,13]
- Use fibre feed to help maintain gut physiology.[14–16]
- Ensure adequate fluid flushes throughout the day.

Fresubin 2 kcal HP Fibre is high in protein and energy to meet the increased needs of patients with pressure ulcers in a low volume.

Day

Feeding regime

1 — 2

1000 ml Fresubin 2 kcal HP Fibre for 13.5 hr at 75 ml/hr (approx. 7 a.m.–8.30 p.m.) with 150 ml water flushes pre- and post-feed and medication.

1000 ml Fresubin 2 kcal HP Fibre for 12 hr at 100 ml/hr (approx. 7 a.m.–7 p.m.) with 150 ml water flushes pre- and post-feed and medication (approx. 4 x daily) providing 2000 kcal, 100 g protein, 15 g fibre, 20 µg vitamin D and 2200 ml fluid.

Monitoring/Follow Up

2 Telephone call: feeding well-tolerated, no complaints of nausea, constipation persists.

5 Telephone call: continues to manage well, bowels moving with no problems, taking full feed volume.

14 Home visit: weight stable at 65.2 kg. No problems with bowels. Feeding well-tolerated and continues with oral tasters therefore should be meeting requirements.

30 Home visit: feels less nauseous. Plans to commence physiotherapy at day centre next week.

45 Call from day centre: Weight 66.4 kg – now meeting requirements. Continues with 1000 ml Fresubin 2 kcal HP Fibre and oral tasters. Back to standard 3-monthly review.

Meeting full nutritional requirements including 20 µg vitamin D per RDD which may improve muscle strength and muscle function as well as reducing the risk of fractures and falls.[12,13]

Therapeutic outcome

3 months after change of feeding regime

- Mrs A's weight increased, now stable at 65–67 kg.
- Pressure ulcer healing well.
- Nausea and constipation resolved, no anti-emetics or laxatives required on a regular basis.
- 1000 ml of Fresubin 2 kcal HP Fibre provides 15 g fibre to maintain gut physiology[14–16] and 100 g protein to support the healing of pressure ulcers.[4]
- Fish oil may have cardiovascular protection benefits.[17]
- Continue with 1000 ml Fresubin 2 kcal HP Fibre long term as patient's weight stable, bowels regular and nausea resolved.

Case 2

Tube feeding with gastroparesis

Clinical summary

Presentation/clinical history

Mr D, 78 years, living alone at home

- Mr D was admitted to accident and emergency department due to growing concerns over frailty and reports of a fall following 4–6 weeks of nausea and vomiting.
- Diagnosis: hip fracture, corrective fixation surgery completed and under investigation for vomiting.
- Poor intake, regular vomiting reported following any oral intake.
- Nutritional screening identified high nutritional risk.
- Past medical history: rheumatoid arthritis, cataracts
- Using a Zimmer frame as walking aid at home.
- Medication: cyclizine, metoclopramide
- Biochemistry: Na 145 mmol/l, K 3.8 mmol/l, Ur 6.3 mmol/l, Cr 101 µmol/l, Ca 2.3 mmol/l, PO_4 1.1 mmol/l, Mg 0.82 mmol/l

Weight history

8 months ago	83.0 kg (BMI: 28.1 kg/m²)
Current weight	71.0 kg (BMI: 24.0 kg/m²)

- Niece reports low oral intake due to poor mobility and persistant nausea
- **14.5 %** weight loss over past 8 months

Early enteral nutrition following surgery reduces malnutrition risk.[18]

Nutritional assessment

Estimated nutritional requirements

- Energy: 2045 kcal[8,9]
  (20 kcal x 71 kg + 1.2 stress factor due to fracture and 1.2 activity factor due to reduced mobility)
- Protein: 106.5 g (1.5 g/kg)[3]
- Fluid: 2265 ml (using the 100/50/15 formula)[10]

Dietetic assessment

- Reviewed patient on ward. Significant weight loss of 14.5 % reported. Patient reports nausea, vomits approx. 3–4 x daily despite anti-emetics. Bowel movement normal. Biochemistry indicates dehydration risk due to raised Na, Ur and Cr. Oral intake poor, approx. 500 kcal and 10 g protein. Likely to be catabolic due to vomiting and not meeting nutritional requirements.
- Post-pyloric tube feeding recommended, as patient continues to vomit despite anti-emetics[19] and not meeting nutrition or hydration requirements orally.

Aim

- Maintain nutritional status and keep BMI in healthy range to aid rehabilitation.

Tube feeding with Fresubin

Nutrition therapy

Type of feeding tube: Freka 8Fr naso-jejunal feeding tube

- A feed with high protein intake is required to meet Mr D's increased needs and to aid recovery from surgery.
- Due to Mr D's reduced mobility, he may also be vitamin D deficient; therefore a feed which can meet these needs may also help to prevent further falls and fractures.[12,13]

Day

Feeding regime

Fresubin HP Energy is a high protein feed to meet the needs of patients following surgery.

1. 500 ml Fresubin HP Energy at 25 ml/hr x 16 hr (400 ml) approx. 7 a.m.–11 p.m. with 30 ml sterile water flushes pre- and post-feed and medication.
2. 1000 ml Fresubin HP Energy at 50 ml/hr x 16 hr (800 ml) approx. 7 a.m.–11 p.m. with 30 ml sterile water flushes pre- and post-feed and medication.
3. 1000 ml Fresubin HP Energy at 75 ml/hr x 13.5 hr approx. 7 a.m.–8.30 p.m. with 30 ml sterile water pre- and post-feed and medications providing 1500 kcal, 75 g protein and 890 ml fluid.

Monitoring/Follow Up

2 Feed tolerated well at 25ml/hr, but patient vomited again after breakfast. In the evening, bowel movement.

3 Vomiting improved a little with anti-emetics. Feed well-tolerated as prescribed. Oral intake remains poor – managing approx. 500 kcal and 10 g protein. Feeding rate increased to 75 ml/hr x 16 hr with 30 ml sterile water flushes. Feeding volume not increased, as oral intake likely to increase due to improving nausea.

6 Weight 69.9 kg. Oral intake increased to approx. 750 kcal, 20–25 g protein and 1200–1500 ml fluid. Enjoying soup and bread, no main courses. Total intake 2250 kcal, 100 g protein and 2100–2400 ml fluid thus meeting estimated nutritional requirements. Biochemistry within reference ranges, urine output and bowel movements normal. Continue feed with Fresubin HP Energy 1000 ml, increase rate to 100 ml/hr for 10 hr with 30 ml sterile water flushes pre- and post-feed (all medications oral).

7 Rehabilitation for hip continues. No vomiting. Oral intake stable at approx. 750 kcal and 25 g protein daily. Metoclopramide continues. Suspected gastroparesis diagnosis – to be investigated.

9 Mobility improved, physio happy with progress, patient managing to walk with Zimmer frame. No further episode of vomiting. Weight 70.8 kg. Weight stable therefore meeting nutritional requirements. Continue with Fresubin HP Energy at 100 ml/hr x 10 hr.

15 Patient referred to gastroenterology department for percutaneous endoscopic jejunostomy (PEJ) placement as gastroparesis diagnosis confirmed – oral intake unlikely to improve. Weight 70.8 kg. Feeding well-tolerated. Oral intake at approx. 700–900 kcal and 25–30 g protein.

21 PEJ tube placed – protocol followed with water 50 ml/hr for 6 hr following insertion.[20] Decision to commence feeding again tomorrow and then to discharge home in approx. 2 days. District nurses will manage feed in patients home therefore regime changed to accommodate availability – Fresubin HP Energy 1000 ml at 85 ml/hr for approx. 12 hr (7 a.m.–7 p.m.) with 30 ml water flushes pre- and post-feed (informed that cooled/boiled should be water to flush PEJ tube).[19]

Therapeutic outcome

6 weeks after start of enteral tube feeding

Mr D's increased protein needs[3] were met easily with Fresubin HP Energy.

- Enteral tube feeding with Fresubin HP Energy enabled Mr D to meet his nutritional requirements despite gastroparesis and initial vomiting.
- Weight increased and stable at 71.7 kg.
- His higher protein needs[3] were met easily with Fresubin HP Energy.
- The vitamin D content (20 µg per RDD) may improve muscle health and muscle function and may also reduce the risk of falls and fractures.[12,13]
- The fish oil in Fresubin HP Energy may have cardiovascular protective benefits.[17]
- Mr D is now at home and mobile around his home environment. He continues to top-up his oral intake with 1000 ml Fresubin HP Energy per day.

Case 3

Tube feeding due to aspiration pneumonia

Clinical summary

Presentation/clinical history

Mrs C, 70 years, is a housewife who lives with her husband

- Admitted to the medical assessment unit 2 days ago with confusion, lethargy and shortness of breath.
- Diagnosed with a chest infection and exacerbation of COPD and possible aspiration pneumonia, commenced IV antibiotics.
- Referred to the dietitian, as nutritional screening and poor oral intake indicates high nutritional risk. Also referred to speech and language therapist as coughing observed at meal times.
- Past medical history: osteoarthritis, COPD
- Medication: calcium/vitamin D supplement, saline nebuliser, paracetamol, IV antibiotics
- Biochemistry: Na 144 mmol/l, K 3.6 mmol/l, Ur 8.6 mmol/l, Cr 110 µmol/l, Ca 2.3 mmol/l, PO_4 0.98 mmol/l, Mg 0.72 mmol/l

Enteral nutritional support should commence early to minimise malnutrition risk.[20]

Weight history

- Previous situation: Mrs C reports no weight loss, but clothes seem loose

Current weight	55.4 kg (BMI: 21.1 kg/m²)

- No calculated weight loss but visually evident

Nutritional assessment

Estimated nutritional requirements

- Energy: 1994 kcal[8,9]
  (20 kcal x 55,4 kg + 1.2 stress factor due to infection and 1.5 activity factor due to low mobility)
- Protein: 66.5 g (1.2 g/kg)[3]
- Fluid: 2031 ml (using the 100/50/15 formula)[10]

Dietetic assessment

- Reviewed patient on ward. Patient bed-bound. Catheter in situ, contents poor and dark in colour. On IV fluids 8-hourly (1500 ml). Bowels moved today – soft. Biochemistry indicates dehydration, but improving with IV fluids.
- Oral intake minimal, managing 2–3 small glasses of full cream milk and 2–3 cups of tea with 2 teaspoons of sugar daily, approx. 500 kcal and 10 g protein. Family reports no recent weight loss but do report coughing with drinks in particular.
- High risk of malnutrition: low intake and BMI at lower end of healthy range.
- Short-term nasogastric tube feeding[21] is indicated, as lethargy and shortness of breath significantly reduces oral intake.

Aim

- Maintain nutritional status and meet nutritional requirements.

Tube feeding with Fresubin

Nutrition therapy

Type of feeding tube: Freka 8Fr nasogastric tube

- Low re-feeding syndrome risk, but feed to start slowly and monitor biochemistry to ensure stability.[20]
- Higher calorie feed is needed to prevent fluid overloading. Hydration requirements will be met after 2 days of tube feeding. Then IV fluid to be discontinued.
- A feed with calcium and the RDD of 20 µg vitamin D is required to help reduce the risk of fractures and falls.[12,13]
- A feed containing fibre is also indicated to help maintain gut physiology.[14-16]

Fresubin Energy Fibre is a high energy tube feed to meet increased energy needs in a small volume.

Feeding regime

Day

1. 500 ml Fresubin Energy Fibre at 25 ml/hr x 16 hr (400 ml) approx. 7 a.m.–11 p.m. with 100 ml water flushes pre- and post-feed.
2. 1000 ml Fresubin Energy Fibre at 50 ml/hr x 16 hr (800 ml) approx. 7 a.m.–11 p.m. with 100 ml water flushes pre- and post-feed.
3. 1000 ml Fresubin Energy Fibre at 75 ml/hr x 13.5 hr approx. 7 a.m.–8.30 p.m. with 100 ml water flushes pre- and post-feed providing 1500 kcal, 56 g protein, 15 g fibre and 960 ml fluid.

Monitoring/Follow Up

2 Feed well-tolerated, currently running at 25 ml/hr. Mrs C remains lethargic and slightly confused, unable to recall oral intake. Reviewed by speech and language therapist, abnormal swallow diagnosed. To commence thickened fluids and mashed diet.

3 Biochemistry checked. Dehydration now corrected: not overloaded. IV fluids to be discontinued. Feeding without problems at 50 ml/hr. Increase rate Fresubin Energy Fibre to 75 ml/hr x 13.5 hr to reach full feeding volume.

4 Breathlessness improved significantly. Weight 56 kg, meeting nutritional requirements. Tolerating feed as prescribed. Bowels moving, no problems reported. Continue with feeding on Fresubin Energy Fibre at 100 ml/hr x 10 hr with 100 ml water flushes pre- and post-feed.

7 IV antibiotics completed. Patient more mobile around ward. Bowels moving well, urine output good. Oral intake significantly improved. Managing at least 1/2 of mashed main meals and enjoying thickened full cream milk (3–4 glasses daily). Fresubin Energy Fibre at 100 ml/hr x 5 hr in the evening, as patient is not meeting nutritional requirements orally.

10 Patient more alert today and continues to be mobile. Managing meals and 3 glasses of thickened full cream milk. Feeding well tolerated at 100 ml/hr x 5 hr. Oral intake approx. 1700–1800 kcal and 65 g protein. Thus, patient is meeting nutritional requirements for weight maintenance. Request weight from nursing staff.

11 Weight 56.8 kg. Feeding discontinued, nasogastric tube removed. Oral intake back to normal, managing 2–3 mashed courses at meals with thickened full cream milk in-between meals. Bowels moving well, urine output normal. Patient feeling well and looking forward to getting home.

13 Mrs C discharged from hospital, back to independent life on thickened fluid and mashed diet. Instructed to contact GP for referral to community dietitian if oral intake decreases. For review by community speech and language therapist.

Mrs C was able to meet her full nutritional requirements within 3 days with all macro- and micronutrients including the RDD of 20 µg vitamin D and 15 g fibre.

Therapeutic outcome

At discharge, 2 weeks after start of enteral tube feeding

- Mrs C's weight increased, stable at 56.8 kg with BMI in healthy range.
- All micronutrients provided including 20 µg vitamin D per RDD which may improve muscle strength and muscle function and may also reduce the risk of falls and fractures.[12,13]
- Maintenance of gut physiology was promoted by 15 g fibre in 1000 ml Fresubin Energy Fibre.[14-16]
- Short-term nasogastric tube feeding with Fresubin Energy Fibre aided Mrs C to recover from aspiration pneumonia by meeting her full nutritional requirements, helped to reduce complications[4] and allowed her to be discharged home independently on a texture modified diet.

Case 4

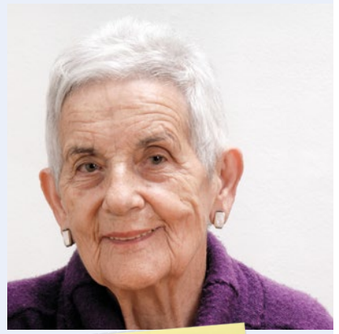
Tube feeding with depression

Clinical summary

Presentation/clinical history

Mrs E, 80 years, is a frail lady living alone

- Admitted to hospital for investigation into significant weight loss and urinary tract infection. Low mood reported since husband passed away 3 years ago.
- Mrs E looks frail and emaciated.
- Nursing staff requests dietetic review for possible tube feeding.
- Past medical history: depression, hypertension, history of falls, previous hip fracture
- Medication: mirtazapine, calcium and vitamin D supplement, paracetamol
- Biochemistry: Na 140 mmol/l, K 4.4 mmol/l, Ur 6.2 mmol/l, Cr 72 µmol/l, Ca 2.5 mmol/l, PO_4 1.1 mmol/l, Mg 0.62 mmol/l



Weight history

5 years ago	51.1 kg (BMI: 21.3 kg/m²)
Current weight	38.7 kg (BMI: 16.1 kg/m²)

- Very significant **24.3 %** weight loss over past 5 years and BMI very low

Nasogastric tube feeding helps nutritional requirements to be met quickly following admission with a PEG meeting longer term needs.[20]

Nutritional assessment

Estimated nutritional requirements

- Energy: 1393 kcal[8,9]
  (20 kcal x 38.7 kg + 1.2 stress factor due to infection and 1.5 activity factor due to low mobility)
- Protein: 58 g (1.5 g/kg)[3]
- Fluid: 1780 ml (using the 100/50/15 formula)[10]

Dietetic assessment

- Mrs E is unable to meet her nutritional requirements – oral intake very poor, managing approx. 1/4 of meals. On 12-hourly subcutaneous fluids due to poor vein access.
- Very significant 24.3 % weight loss reported over past 5 years. BMI low, magnesium low, at high risk of re-feeding. Start feeding cautiously – don't exceed 50 % of requirements on day 1 of feeding.[20]

Aim

- Maintain nutritional status and meet nutritional requirements.

Tube feeding with Fresubin

Nutrition therapy

Type of feeding tube: Freka 8Fr nasogastric tube

- Nasogastric tube feeding on Fresubin Original Fibre due to risk of re-feeding syndrome. A 1 kcal/ml feed is indicated in the first instance.
- A feed containing fibre is also indicated to maintain gut physiology.[14-16]
- Due to refeeding syndrome risk, low magnesium to be corrected, multivitamin and 100 mg thiamine twice daily to be commenced prior to feeding[19,20]
- Continue to monitor biochemistry and stop IV fluids tomorrow to prevent fluid overloading.

Fresubin Original Fibre is normo-caloric nutritionally complete feed and suitable for cautious feeding i.e. patients at risk of re-feeding syndrome.

Day

Feeding regime

1 500 ml Fresubin Original Fibre at 25 ml/hr x 16 hr (400 ml) approx. 7 a.m.–11 p.m. with 100 ml water flushes with medication pre- and post-feed to meet hydration requirements. Don't increase rate of feed until biochemistry checked.

2 1000 ml Fresubin Original Fibre at 50 ml/hr x 16 hr (800 ml) approx. 7 a.m.–11 p.m. with 100 ml water flushes pre- and post-feed providing 800 kcal, 30.4 g protein, 12 g fibre and 870 ml fluid.

Monitoring/Follow Up

2 Feeding commenced at 25 ml/hr and well-tolerated. Biochemistry checked. Urine and stoma output without problems. Mg supplementation continued. Continue with Fresubin Original Fibre at 50 ml/hr x 16 hr.

4 Reviewed patient on ward. Oral intake not improved but feed well-tolerated. Biochemistry within reference ranges, Mg supplementation stopped as level now 0.8 mmol/l. Increase feed to 1000 ml Fresubin Original Fibre at 75 ml/hr (approx. 13.5 hr), providing 1000 kcal, 38 g protein, 15 g fibre and 1040 ml fluid.

7 Oral intake still very poor due to low mood equivalent to 200 kcal and 5 g protein, but managing approx. 500 ml of fluids daily. Feed provides > 80 % of requirements. As Mrs E's protein requirements are not being met and her energy and fluid requirements are relatively low; change feed to Fresubin 1200 Complete (1000 ml at 75 ml/hr x 13.5 hr) providing 1200 kcal, 60 g protein, 15 g fibre, 1040 ml and all micronutrients.

9 Weight 40.1 kg, meeting nutritional requirements. Biochemistry parameters stable within normal ranges. Fresubin 1200 Complete tolerated well. Increase feeding rate to 100 ml/hr x 10 hr to reduce length of time on feeding.

14 Tolerating feed well, weight stable at 40.3 kg, but oral intake still very poor, despite change of anti-depressant, mood not improving.

20 Patient referred to gastroenterology department for percutaneous endoscopic gastrostomy (PEG) as oral intake not improved[21], likely to be longer-term problem.

27 15Fr Freka PEG sited – water running as per protocol, to recommence feeding in 3 hr.

29 Feed continues on Fresubin 1200 Complete at 100 ml/hr with 100 ml fluid pre- and post-feed. As her condition is stable, Mrs E is able to be transferred back home. Mrs E will be unable to complete daily administration of feed independently therefore community nursing team will attend patient home 2 x daily to start and stop feed as well as carer to provide personal hygiene. Letter to GP and referral to community dietitian.

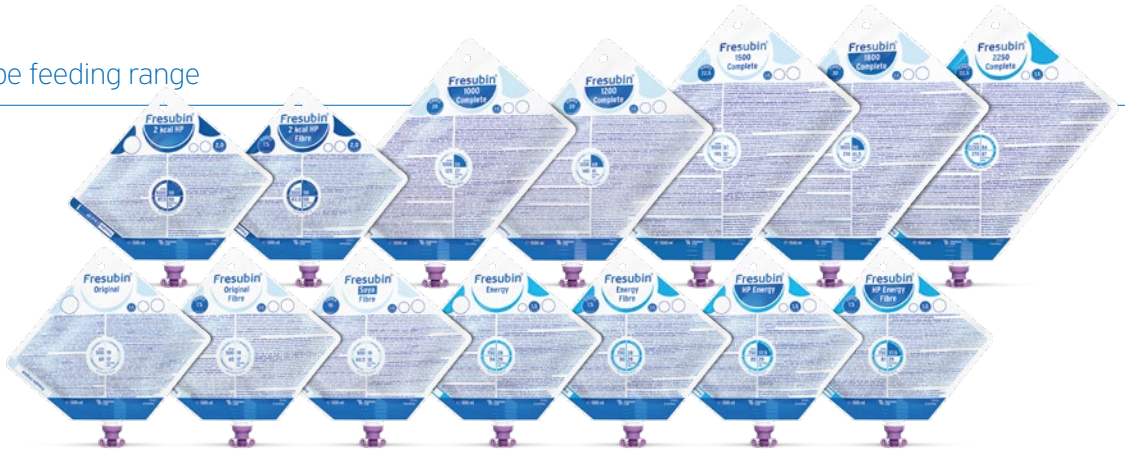
Fresubin Original Fibre was tolerated providing vital nutrition in the initial phase of feeding. Fresubin 1200 Complete provides high protein, low energy and all micronutrients to meet Mrs E's nutritional requirements in a low volume.

Therapeutic outcome

8 weeks after start of enteral tube feeding

- Mrs E is back living in her own home with care at home provided by community nursing teams to help with personal care and her PEG. Oral intake still poor but she is now able to attend a local day centre to socialise.
- Nasogastric tube feeding enabled Mrs E to meet nutritional requirements quickly following admission with a PEG meeting longer needs.
- Fresubin Original Fibre was tolerated providing vital nutrition in the initial phase of feeding.
- Fresubin 1200 Complete provides high protein, low energy and all micronutrients and is nutritionally complete in one EasyBag.
- Fibre provided by both enteral feeds help maintain gut physiology.[14-16]
- The vitamin D content (20 µg per RDD) may improve muscle strength and muscle function and may also reduce the risk of falls and fractures.[12,13]
- Both Fresubin Original Fibre and Fresubin 1200 Complete contain fish oil which may provide cardiovascular benefits.[17]
- When a change of feed was required, Mrs E retained these benefits since all Fresubin standard enteral tube feeds are nutritionally complete per recommended daily dosage including 20 µg vitamin D per RDD.

Fresubin tube feeding range



The **Fresubin** tube feeding range at a glance

With fish oil
- In the recommended daily intake for adults for cardiovascular protection[17,22,23]
- Included in all Fresubin standard tube feeds

High-quality protein
- Quality of protein mixture in line with WHO and FAO recommendations[24]
- Non-dairy protein blends also available – for patients with intolerances, allergies, individual preferences

Vitamin D
- With all micronutrients for complete nutrition including the recommended 20 µg vitamin D per RDD in all Fresubin standard tube feeds per RDD – in line with the latest nutrition recommendations[4]
- Prevents a vitamin D deficiency[11,12]
- Reduces the risk of fractures and falls by improving muscle strength and muscle function[12,13]

Fibre blend
- Fibre-enriched versions of all Fresubin standard tube feeds
- Blend of soluble/insoluble and fermentable/infermentable fibres to maintain gut physiology[14-16]

Broad tube feed range
- Broad range of products to meet the individual needs of patients with a wide range of physical conditions
- 27 state-of-the-art products designed to help you provide your patients with a best-fit enteral nutrition solution

References

1. Wells JL, Dumbrell AC. Nutrition and aging: assessment and treatment of compromised nutritional status in frail elderly patients. Clin Interv Aging. 2006;1(1):67-79.
2. Stratton RJ, Green CJ, Elia M. Disease-related malnutrition: An evidence-based approach to treatment. CABI Publishing, Wallingford, UK 2003.
3. Deutz NE, Bauer JM, Barazzoni R, Biolo G, Boirie Y, Bosy-Westphal A, et al. Protein intake and exercise for optimal muscle function with aging: recommendations from the ESPEN expert group. Clin Nutr. 2014;33(6):929-936.
4. Volkert D, Berner YN, Berry E, Cederholm T, Coti Bertrand P, Milne A, et al. ESPEN Guidelines on Enteral Nutrition: Geriatrics. Clin Nutr. 2006;25(2):330-360.
5. Morley JE, Vellas B, van Kan GA, Anker SD, Bauer JM, Bernabei R, et al. Frailty consensus: a call to action. J Am Med Dir Assoc. 2013;14(6):392-397.
6. National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Cambridge Media: Perth, Australia; 2014.
7. Guo S, Dipietro LA. Factors affecting wound healing. J Dent Res. 2010;89(3):219-229.
8. ASoCN. Recommendations for enteral and parenteral nutrition in adults. 2 ed. Vienna: AKE – Österr. Arbeitsgemeinschaft für Klinische Ernährung; 2008.
9. World Health Organization, Food and Agriculture Organization of the United Nations, United Nations University. Human energy requirements: Report of a Joint FAO/WHO/UNU Expert Consultation 2004.
10. Chidester JC, Spangler AA. Fluid intake in the institutionalized elderly. J Am Diet Assoc. 1997;97(1):23-28.
11. Hilger J, Friedel A, Herr R, Rausch T, Roos F, Wahl DA, et al. A systematic review of vitamin D status in populations worldwide. Br J Nutr. 2014;111(1):23-45.
12. Bischoff-Ferrari HA, Willett WC, Orav EJ, Lips P, Meunier PJ, Lyons RA, et al. A pooled analysis of vitamin D dose requirements for fracture prevention. N Engl J Med. 2012;367(1):40-49.
13. Bischoff-Ferrari HA, Dawson-Hughes B, Staehelin HB, Orav JE, Stuck AE, Theiler R, et al. Fall prevention with supplemental and active forms of vitamin D: a meta-analysis of randomised controlled trials. BMJ. 2009;339:b3692.
14. Shankardass K, Chuchmach S, Chelswick K, Stefanovich C, Spurr S, Brooks J, et al. Bowel function of long-term tube-fed patients consuming formulae with and without dietary fiber. JPEN J Parenter Enteral Nutr. 1990;14(5):508-512.
15. Bass DJ, Forman LP, Abrams SE, Hsueh AM. The effect of dietary fiber in tube-fed elderly patients. J Gerontol Nurs. 1996;22(10):37-44.
16. Lochs H, Allison SP, Meier R, Pirlich M, Kondrup J, Schneider S, et al. Introductory to the ESPEN Guidelines on Enteral Nutrition: Terminology, definitions and general topics. Clin Nutr. 2006;25(2):180-186.
17. Lee JH, O'Keefe JH, Lavie CJ, Marchioli R, Harris WS. Omega-3 fatty acids for cardioprotection. Mayo Clin Proc. 2008;83(3):324-332.
18. Weimann A, Braga M, Carli F, Higashiguchi T, Hübner M, Klek S, et al. ESPEN guideline: Clinical nutrition in surgery. Clin Nutr. 2017;36(3):623-650.
19. Stroud M, Duncan H, Nightingale J. Guidelines for enteral feeding in adult hospital patients. Gut. 2003;52 Suppl 7:vii1-vii12.
20. NHS NIfHaCE. Nutrition support in adults: Oral nutrition support, enteral tube feeding and parenteral nutrition. Clinical Guideline 32 ed. London 2006.
21. Löser C, Aschl G, Hébuterne X, Mathus-Vliegen EM, Muscaritoli M, Niv Y, et al. ESPEN guidelines on artificial enteral nutrition – percutaneous endoscopic gastrostomy (PEG). Clin Nutr. 2005;24(5):848-861.
22. Kris-Etherton PM, Grieger JA and Etherton TD. Dietary reference intakes for DHA and EPA. Prostaglandins Leukot Essent Fatty Acids. 2009;81(2-3):99-104.
23. International Society for the Study of Fatty Acids and Lipids (ISSFAL): Recommendations for Dietary Intake of Polyunsaturated Fatty Acids in Healthy Adults, Report June 2004.
24. World Health Organization, Food and Agriculture Organization of the United Nations, United Nations University. Protein and amino acid requirements in human nutrition. Report of a joint FAO/WHO/UNU expert consultation (WHO Technical Report Series 935), 2007.

FRESENIUS KABI
caring for life

Fresenius Kabi Deutschland GmbH
61346 Bad Homburg
Germany
Phone: +49 (0) 61 72 / 686-0
Enteral.nutrition@fresenius-kabi.com
www.fresenius-kabi.com

739463 I (GB 02.18/IS)