Bolus Feeding in Adults: A Practical Guide

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The following enteral feeding specialists met and came to a consensus on the use of bolus feeding in adults:

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The views expressed in this document are those of the expert panel and contributors, and not necessarily those of Nutricia Ltd or the NHS Trusts.

Introduction

Bolus feeding is a method of enteral tube feeding. The practice of bolus feeding has evolved over time in response to the preferences and needs of individual patients using enteral tube feeding, their social circumstances and the experience of the healthcare professionals caring for them.

A recent survey of bolus feeding practices in the UK reported that one third of patients receiving home enteral tube feeding were receiving part or all of their nutrition via bolus feeding[1]. However, despite the widespread use of bolus feeding, there is a limited evidence base to inform its practice.

This guide brings together a wealth of experience from healthcare professionals specialising in enteral tube feeding. It aims to provide a definition of bolus feeding and practical guidance to healthcare professionals who are considering the use of bolus feeding with adults.

NB: Guidance on medication administration is not within the scope of this document

An online version of these guidelines is available at bolusfeeding.co.uk

Definition of bolus feeding

The administration of feed through an enteral feeding tube as a series of smaller volume feeds given at regular intervals.

Up to 500 ml of feed over a maximum of two hours* can be given in one 'bolus', depending on the person's tolerance and the enteral access route. A typical bolus is 200 - 250ml but individual patients may tolerate more or less than this.

Bolus feeds can be delivered with an enteral syringe or bolus set using a plunger, gravity or a feeding pump.

**Administration of feed over more than two hours is considered by the working group to be intermittent feeding.*

Bolus Feeding in Adults: A Practical Guide at a Glance

Each section is explained in more detail inside - see the relevant colour coded sections.

Advantages and Disadvantages

An outline of the potential advantages and disadvantages of bolus feeding compared to continuous pump feeding

Patient centred considerations

Factors to consider when determining if bolus feeding is suitable for your patient

Regimen Guidance

Considerations to optimise the bolus feeding regimen

Methods

An overview of the main methods used for bolus feeding:

- Enteral syringe with plunger
- Enteral syringe or bolus set using gravity
- Feeding pump

Advantages

Duration	Reduced time required for each feeding occasion
Flexibility	Timing of bolus feed administration can be optimised to: • empower patients to have some control over when they wish to receive their feed • mimic a 'normal' eating pattern, which may resolve any problems relating to patients reporting hunger • help support blood glucose control for patients living with diabetes (dependent on insulin prescription) • enable uninterrupted activity/ rehabilitation sessions
Technical	Bolus feeding via syringe with gravity or plunger: • eliminates the need to use a feeding pump, which may be confusing for some patients • avoids noise disturbance from feeding pump
Practicality	Often considered simpler to understand and administer Volumes of bolus feeds can be tailored to available feed presentations which may reduce waste Feeding without use of pump reduces use of electricity Easier to transport feed and syringe when feeding outside the home than carrying a pump and pack of feed Provide a break for medications that require administration on an empty stomach

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Social	For dependent patients: • allow more flexibility in feeding to allow for work/social outings • administration of feeds by family and/or carers can provide more frequent opportunities for involvement and social interaction, to fit with family life and mimic normal meal times • bolus feeding enables one feeding episode to be administered within one care call which may be safer than being left unsupervised on a continuous pump feed • timing of feeds can be arranged when carers and/or family are available
Safety	For patients who are agitated, moving around in bed or unable to maintain an upright position for prolonged periods, feeds can be administered when the patient is in the correct position Provide a break between feeds to allow restoration of gastric pH which may help to minimise gastric colonisation[2,3]
Nutrition	Administration of a concentrated protein bolus may support muscle growth and minimise muscle loss when compared to continuous feeding[4,5] Administration can be optimised to: • potentially help improve bowel movements[6] • use as a 'top up' for patients who have a variable oral intake or are transitioning from tube feeding to oral diet

Disadvantages

Duration	Can be time consuming: • if a high number of bolus feeds are required each day, in addition to water flushes and medications • if bolus feeds of a large volume are being administered, or if a viscous feed is being used • due to the time taken for preparation and post-bolus feed cleaning of the syringe • if bolus feeding through a narrow bore tube
Flexibility	Frequent or large volume bolus feeds may reduce time available to participate in activity/rehabilitation and for these patients overnight feeding, with or without daytime bolus feeds, may be more suitable
Social	For dependent patients: • increased feeding occasions may be perceived by the patient as an invasion of privacy or a burden on their family/ carers • bolus feeding may not be suitable when carer visits are not frequent or long enough • district nurses and carers cannot always guarantee arrival time so some flexibility in the timings of feeds is important

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Practicality	A degree of strength is required to hold the syringe steady for the duration of the feed and/or push the plunger A degree of manual dexterity and visual acuity are required for connecting the syringe to the feeding tube, using the plunger and decanting the feed Fatigue, for example from treatments/ appointments, may reduce willingness to bolus feed Frequent or lengthy feeds may cause fatigue for some patients Bolus feeding through a narrow bore tube can increase risk of blockage Use may be limited in nasogastric tube feeding for various reasons including increased pH testing to confirm position of tube, difficulties with self administration and narrow bore tubes can make the feed run very slowly If the patient coughs during gravity bolus feeding, feed can be forced back out of the tube and syringe, causing a spillage It can be difficult to avoid getting the end of the syringe covered in feed when pulling it up into the syringe barrel. The person administering the feed may need to have a piece of gauze or tissue to wipe the end of the syringe to prevent spillage Use of oral nutritional supplements requires a large number of bottles to be stored and recycled If feeding outside the home, need to find somewhere suitable to prepare and administer feed Continued >

Safety	Large and/or rapid administration of bolus feeds are not always well tolerated Bolus feeding is not always well tolerated in post pyloric feeding and should be used with caution Bolus feeding may not be suitable for patients with a history of vomiting, aspiration, severe reflux, gastroparesis, previous gastrointestinal surgery and/or dumping syndrome and should be monitored closely for signs of intolerance e.g. incidence of bloating, reflux, nausea or vomiting
Nutrition	Frequent or large volume bolus feeds may have a negative effect on appetite when transitioning from enteral feeding to oral diet It can be difficult to meet fluid requirements on a bolus feeding regimen where patients are reliant on care calls or with a reduced frequency of bolus feeds

Patient Centred Considerations

The decision regarding the use of bolus feeding as the chosen method of enteral tube feeding should be patient centred and based upon the individual's symptoms, social circumstances and preferences. It is important to discuss the options with the patient and/or their carers and to complete a comprehensive assessment to determine the best enteral feeding regimen.

The following questions can be a useful guide in determining whether bolus feeding is suitable:

1. Would bolus feeding be safe and well tolerated?	Consider past medical history, gastrointestinal symptoms and ability to tolerate volumes required for bolus feeding
2. What are the patient's social circumstances?	Consider the patient's daily commitments and activities and whether the timing and frequency of bolus feeding would be suitable
3. What is the availability of care, if required?	If the patient is not self-caring, consider whether the carers can commit to the timing and frequency required for bolus feeding and whether this aligns with the patient's wishes
4. What would the patient prefer?	Consider the patient's preference after discussing the advantages and disadvantages
5. Do the patient and/or their carer have sufficient strength and dexterity?	Consider whether the patient and/or their carer have the upper body strength and hand dexterity required to administer the feeds via bolus feeding with a syringe via gravity or using the plunger

Guidance for specific conditions

There are no specific clinical conditions within which bolus feeding is contraindicated, as the decision is based upon each individual's needs. However, there are a number of conditions within which bolus feeding is commonly suitable and utilised. The following table outlines some examples of the pros and cons for bolus feeding within these specific patient groups.

Patient Group	Pros	Cons
Head and Neck Cancer	• For patients who are active, including those who work, bolus feeding offers more flexibility to fit within their daily schedule and avoids interfering with independence • For patients with regular treatments, bolus feeding offers more flexibility to fit around appointments and enable assistance from nursing staff if required, and may reduce the risk that feeds are missed	• For patients with a nasogastric tube, bolus feeding may be difficult • Self-caring patients may become fatigued from treatment and could struggle with the frequency and process required to bolus feed • Nausea and vomiting from treatment may limit the tolerance for bolus feeding • Patients taking high doses of analgesia due to radiotherapy treatment are at high risk of constipation and bolus feeds containing fibre may not be effective in encouraging bowel movements

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Patient Group	Pros	Cons
Learning Disabilities	• Enables flexibility to ensure feeds are administered when the patient is in the most suitable feeding position • Suitable alternative for patients who cannot tolerate continuous feeding via pump • Allows greater scope for being active for people who are out and about or have a busy activity programme • Each feeding episode is another 'activity' and chance for interaction	• Patients may not like repeated interventions required for bolus feeding • Patients with severe scoliosis may not tolerate the volumes required for bolus feeding due to altered anatomy
Stroke or Brain Injury	• For patients undergoing rehabilitation, bolus feeding offers more flexibility to fit around appointments and may reduce the risk that feeds are missed • For patients who are agitated or moving around in bed, bolus feeding can allow feed to be administered at times when the patient is in the correct feeding position	• For patients requiring care, frequency or duration of care calls may not be sufficient to support bolus feeding

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Patient Group	Pros	Cons
Critical Care	• Increased likelihood that the patient receives the total volume of feed prescribed[7]	• More nursing time is spent on looking after the patient's feed compared to continuous feed
Neuro-degenerative conditions	• Can be titrated against oral intake; if oral intake reduces, bolus feeding can be increased	• Patients may feel full and uncomfortable if large volumes of feed are given at one time

Post pyloric feeding *(Check whether your local NHS Trust policy has specific guidance about bolus administration of tube feeds into the jejunum)*	Bolus feeding should not be routinely used as the first line method of enteral tube feeding in patients requiring post-pyloric feeding. However, it has been used successfully and may be suitable as an alternative for patients who do not wish to have continuous feeding. Use extra precautions, i.e. initiate feeding with smaller boluses and monitor for signs of intolerance including pain, vomiting, abdominal discomfort, bloating and irregular bowel movements and measure blood biochemistry if there are signs of malabsorption.[8]

Regimen Guidance

The bolus feeding regimen should be patient centred and meet nutritional, lifestyle and clinical needs whilst also minimising product wastage and ensuring cost-efficiency.

Volume and frequency of feeds

- Consider the patient's previous intake when determining appropriate volume of bolus feeds
- Consider a concentrated feed that provides nutritional adequacy and that the patient can tolerate
- Use the largest volume that the patient can tolerate to reduce the frequency of feeds and subsequent burden on the patient and/or their carers
- Discuss with the patient and/or their carers to ensure the timing of bolus feeds fits within daily routine, e.g. timing of medications, rehabilitation sessions, appointments, work and social commitments
- Confirm with the patient the flexibility around timing and volume of feeds, i.e. is the timing and volume of each feed fixed or can they vary the timing and volume of each feed provided the total volume is administered daily?
- Discuss with the patient where feeding will take place and consider impact on timing and volume of feed as well as space and equipment needed
- Consider the contribution of water for flushes and medications as part of the total volume of fluid being administered
- Ensure the patient has sufficient equipment to bolus feed safely and regularly, remembering that equipment such as giving sets and containers can be safely reused within a 24 hour period to avoid unnecessary ancillary wastage

Starter regimen

- If there are concerns that the patient may not tolerate the total bolus volume initially, start on a reduced volume and increase gradually while monitoring tolerance

Hydration

- For regular feeding intervals, attempt to meet the patient's fluid requirements during the bolus feed and medication administration to reduce the frequency of

bolus feeds and flushes required throughout the day
- When there are long breaks between feeds, ensure hydration is maintained through water flushes if possible and pre and post each feed

Nutritional completeness

- The range of feeds available allows for the macro-nutrient requirements of patients to be easily met
- Many oral nutritional supplements have lower concentrations of electrolytes than some tube feeds, however remember to consider the contribution of medications to a patient's total electrolyte intake
- Monitor blood levels and signs of insufficiency if there are concerns regarding electrolyte intake

Administration method

Choose the most suitable method of bolus feeding based upon patient and/or carer preference and capability. Each method has its merits and will be very dependent on patient preference, social circumstances, support, dexterity, etc. Ensure the patient and/or carers are involved in the decision of method of administration.

Bolus by plunger:

- Can be helpful if flow rate is slow with gravity bolus
- Provides patient and/or carers with more control of rate
- Requires a degree of dexterity and strength to push the plunger to administer the feed
- Can be quite fiddly and messy as syringe is refilled and reconnected
- May not be suitable for patients experiencing nausea or vomiting

Bolus by gravity:

- Prevents excessive force, or too fast administration which may affect tolerance
- May be easiest if dexterity is poor
- Flow may be slower with more viscous feed, if back pressure is high or tube is narrow
- Requires a degree of strength to hold the syringe steady for long enough to administer the bolus feed without spillage

Bolus by pump:

- Beneficial when a larger volume or a specific rate is required
- Good for patients and/or carers who cannot hold the syringe for the duration of the feed

Methods

Bolus feeds can be delivered using different methods dependent on patient and/or carer preference or circumstances. These include the use of:

- 60 ml enteral syringe (ENFit tip) or bolus set and to administer the feed via gravity
- 60 ml enteral syringe (ENFit tip) to administer the feed using the plunger
- Feeding pump

NB: For all methods refer to your local policy

For all methods of feed administration

- Always wash hands before and after preparing for and administering the feed
- Prepare the equipment on a clean tray or table and ensure all the equipment is clean, assembled and fit for purpose
- Check the feed instructions, label and expiry date
- Ensure the patient is sitting upright (or head and shoulders are raised by at least 30 degrees if they have difficulty sitting upright) during feeding and for a short duration after feed administration (45 minutes is suggested but duration may vary according to patient preference, tolerance and circumstances)
- If using a nasogastric tube it is important to check the position of the tip of the tube before administering any fluids by measuring the pH value of the gastric aspirate[9]. If using a nasojejunal tube, check the position at the nose and any reported discomfort, nausea or vomiting. For all other feeding tubes, the position should be checked as required by local policy
- If using a low profile gastrostomy tube, attach the extension set before administering the feed
- Flush the tube with water before and after the administration of feeds using the enteral syringe with a plunger or via gravity (refer to local policy

for the type of water used). A minimum of 30ml is recommended but amend according to patient's fluid requirements and restrictions

- Following administration of feed, dispose of or wash and air-dry all equipment, as per manufacturer's recommendations or local policy. Ensure the cap on the end of the feeding tube is replaced securely to avoid gastric leakage. The cap on the end of the giving set can be replaced to keep this clean allowing the giving set to be reused again for the next bolus (reuse up to 24 hours)
- Reseal and refrigerate any leftover feed and use within 24 hours or as per manufacturer's recommendations or local policy. When bolus feeding smaller volumes from a larger pack, it is recommended to decant the required volume and allow it to reach room temperature while keeping remaining feed sealed and refrigerated

Administration of feed using an enteral syringe with plunger

Equipment required

- 60 ml enteral feeding syringe
- Extension set (for low profile gastrostomies)

1. Complete steps for all methods of feed administration
2. Ensure the clamp on the enteral feeding tube (if present) is closed
3. Draw the prescribed feed up into the enteral syringe (may need to have a piece of gauze or tissue to wipe the end of the syringe to prevent dripping)
4. Attach the filled syringe onto the end of the feeding tube or extension set and open the clamp (if present)
5. Push the plunger to gently administer the feed. Administration of each syringe should last on average 20 seconds, but some patients may be able

to tolerate it faster, while others may need to take longer

6. Close the clamp on the feeding tube (if present) before removing the syringe
7. Refill the syringe and repeat steps 3-6 until the prescribed volume of feed has been administered
8. On completion of the feed, administer water flush
9. Close the clamp (if present), disconnect the syringe and replace the cap on the end of the feeding tube to keep it clean for next planned bolus feed
10. The cap on the end of the giving set can be replaced to keep this clean. This allows the giving set to be reused again for the next bolus (reuse up to 24 hours)

Administration of feed with an enteral syringe or bolus set using gravity

Equipment required

- 60 ml enteral feeding syringe and/or bolus feeding set
- Extension set (for low profile gastrostomies)

1. Complete steps for all methods of feed administration
2. Ensure the clamp on the enteral feeding tube (if present) is closed
3. Take the plunger out of the enteral syringe
4. Secure the barrel of the enteral syringe or the end of the bolus set to the end of the feeding tube or extension set
5. Slowly pour the feed into the syringe, holding it upright to ensure no feed spills out and open the clamp on the tube (if present)
6. Hold the syringe at a comfortable height above the feeding tube to allow the feed to run through the feeding tube. It is important the feed does not run through too fast as this can affect tolerance. Adjust the height of the syringe and therefore speed of administration according to patient comfort and

tolerance. Administration of each syringe should last on average 20 seconds, but some patients may be able to tolerate it faster, while others may need to take longer

7. Refill the syringe and repeat steps 5-6 as required until the prescribed volume of feed has been administered
8. On completion of the feed, administer water flush
9. Close the clamp (if present)
10. Disconnect the syringe and remove the extension set if low profile gastrostomy
11. Replace the cap on the end of the feeding tube to keep it clean for next planned bolus feed
12. The cap on the end of the giving set can be replaced to keep this clean. This allows the giving set to be reused again for the next bolus (reuse up to 24 hours)

NB: If using gravity only to administer feed and flushes the tube may be more likely to block due to sediment build up. It is suggested to flush the tube at least once a day using a syringe with the plunger to remove feed build up

Administration of feed using a feeding pump

Equipment required

- Feeding pump
- Feed reservoir or container (if decanting required)
- Giving set
- Syringe for use in flushing the tube
- Extension set (for low profile gastrostomies)

1. Complete steps for all methods of feed administration
2. Connect the prescribed feed to the enteral giving set or decant the feed into the reservoir or container
3. Connect the giving set to the enteral pump

4. Switch on the pump
5. Prime the giving set to ensure the feed is administered throughout the length of the giving set
6. Programme the pump to deliver the required amount of feed and the delivery rate as prescribed by the regimen
7. Attach the giving set to the feeding tube and open the clamp
8. Start the pump to administer the feed
9. If the pump has been set to deliver a specific volume of feed, or to feed over a specific period of time, once this is complete the pump will alarm and can be turned off
10. Close the clamp on the feeding tube (if present) and disconnect the giving set
11. Administer water flush
12. Replace the cap on the end of the feeding tube to keep it clean for next planned bolus feed
13. The cap on the end of the giving set can be replaced to keep this clean. This allows the giving set to be reused again for the next bolus (reuse up to 24 hours)
14. If a reservoir or container has been used for decanted feed, this can be reused as per manufacturers guidelines (reuse up to 24 hours)

Summary

This guide has been put together based on available evidence, best practice and professional experience. It is designed to aid healthcare professionals in deciding on the appropriateness of bolus feeding according to patient preference and circumstances and to give guidance on the available methods of administration of a bolus feed. This practical guide also aims to provide an evidence base to empower healthcare professionals to review current policies and procedures and to support education of peers, patients and their carers on the practice of bolus feeding.

References

1. Simons R, White S, Topen S, et al. A survey of bolus feeding practices in the UK home enteral feeding population. BAPEN 2016

2. Stroud M, Duncan H, Nightingale J. Guidelines for enteral feeding in adult hospital patients. Gut 2003;52(Suppl VII):vii1–vii12

3. Williams T, Leslie G. A review of the nursing care of enteral feeding tubes in critically ill patients: part 1. Intensive and Critical Care Nursing 2004;20: 330-343.

4. Bohe J, Low JF, Wolfe RR et al. Latency and duration of stimulation of human muscle protein synthesis during continuous infusion of amino acids. J Physiol. 2001;532:575-579.

5. West DW, Burd NA, Coffey VG et al. Rapid aminoacidemia enhances myofibrillar protein synthesis and anabolic intramuscular signalling responses after resistance exercise. Am J Clin Nutr. 2011;94:795-803.

6. de Brito-Ashurst I, Preiser J-C. Diarrhea in critically ill patients: the role of enteral feeding. JPEN J Parenter Enteral Nutr. 2016 Sep;40(7):913-923.

7. Aguilera-Martinez R, Ramis-Ortega E, Carratala Munuera C et al. Effectiveness of continuous enteral nutrition versus intermittent enteral nutrition in intensive care patients: A systematic review. JBI Database of Systematic Reviews and Implementation Reports. 2014;12(1):281-317.

8. White S. Understanding bolus feeding. CN Focus April (2016); 8 (1): 27-29.

9. NHS National Patient Safety Agency. Patient Safety Alert NPSA/2011/PSA002: Reducing the harm caused by misplaced nasogastric feeding tubes in adults, children and infants. March 2011. www.nrls.npsa.nhs.uk/EasySiteWeb/getresource.axd?AssetID=129697&

Notes

NUTRICIA
Advanced Medical Nutrition

An online version of these guidelines
is available at bolusfeeding.co.uk