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Abstract.

Background: Some children with early feeding difficulties may require nasogastric, (NG) tube feeding or insertion of a percutaneous endoscopic gastrostomy, (PEG) from a young age. A small cohort of these children can develop severe oral aversions that can delay the re-introduction of oral feeding. Multi-disciplinary approaches that provide an intensive approach are deemed the most effective method of intervention to reduce NG and PEG dependency.

Method: Two children and their parents received an Intensive Approach to reduce PEG feeds, (Child A and Child B), whilst one child and her parents elected to receive a Traditional Feeding Clinic Approach, (Child C). The mean age of the participants was 4 years 4 months.

Results: Child A initially took 500 kcal (440% daily nutritional requirement) via her PEG, and 750 kcal (60% daily nutritional requirement) orally one week prior to the intensive programme, and Child B took 1200 kcal (100% daily nutritional requirement) via his PEG and 0 Kcal orally. Three months post the intervention, Child A took 100% of her nutritional requirements orally, (1300 kcal/ 100% daily nutritional requirement), and Child B had reduced PEG requirement significantly to 38% oftook 500 kcal (50% daily nutritional requirement), via his PEG, and 500 kcal orally. Child C showed no changes in PEG versus oral intake.
Children who received the intervention were able to remain focused on mealtimes for longer, with fewer instances of not leaving the table. Parents altered their language styles post coaching on the intensive intervention using fewer reprimands. No changes with these behaviours were noted with Child C.

Conclusions: Although this was a small pilot study, there are some strategies used within an intensive multi-disciplinary context that can enable children to reduce their reliance on PEG feeds significantly.

Introduction.

Feeding, eating and drinking problems (dysphagia) within a paediatric population are complex and varied, and many children with such difficulties require multi-disciplinary intervention from healthcare professionals to overcome these issues, (Puntis, 2008). Some children may have a more serious difficulty with eating and drinking that impact on swallow safety. The inability to cope with eating and drinking safely is referred to as "dysphagia". Problems in this area could include the following: inability to manage food effectively in the oral cavity to create a bolus pre-swallow, difficulties triggering a swallow, and problems with the mechanics of the swallow action itself.

Some infants and children may have complex difficulties that can lead to alternative feeding methods such including naso-gastric (NG) tube feeding, sometimes leading onto percutaneous endoscopic...
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There is a small cohort of children who have a gastrostomy (PEG) tube inserted early in their life, but who make progress medically, (such as children in whom has resolved), and who should no longer require PEG feeding. These children can be highly resistant to developing oral feeding and maintain dependence on PEG feeding.

This paper seeks to explore an Intensive Approach within a Paediatric Gastroenterology Team that developed oral feeding tolerance with children who had had prolonged periods of tube feeding. All children who participated had an early history of persistent infant reflux that impacted on feeding development and the safety of the swallow. This study will also attempt to consider the rationale for working with this population.

Prevalence.

Some studies have attempted to quantify the types and range of difficulties that children may have. Predictions vary, but Babbitt et al. (1994) report that there are up to 25% of children within a normal population who experience some eating aversions, and up to 33% within a developmental disability group. Other studies predict 40% of a...
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Sample of normal infants will have some degree of feeding difficulty in the first 15 months of life, (Northstone et al., 2001), and food aversions have been reported to affect around 4% of a normal population, (Wilensky et al., 1996). Food aversions can have a serious impact on a child’s oral motor development, (Senez et al., 1996; Hawden et al., 2000; Mathisen et al., 2002), and consequently, early monitoring and intervention is highly recommended, (Puntis, 2008).

A UK study explored early feeding with 9,360 mothers of infants born in 1991/1992, aged from 6–15 months, (Northstone et al., 2001). Up to 40% of the sample reported some degree of feeding difficulties by the time the infant was 15 months of age. Other studies reflect that the number of children with feeding aversions within a normal population may be around 4%, (Skuse et al., 1994; Wilensky et al., 1996).

There appear to be key clinical areas where there are increased likelihood of dysphagia. For example, children who were born prematurely or those with developmental delays or disorders with an early history of gastroesophageal reflux disease (GORD), severe reflux can have difficulties establishing successful feeding, (Douglas et al., 1996; Reilly et al., 1996; Mathisen et al., 2002; Vakil et al., 2006; Bhatia et al., 2009),. Infants who have GORD are likely to have lower energy intake, a significant increase in food refusal behaviours, be
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difficult and more demanding feeders and have challenging mother-child interaction during mealtimes. (Mathisen et al., 2002).

Infants and children who receive tube feeds because of complex needs are at risk of developing oral hypersensitivities and food intolerance due to prolonged tube feeding. (Senez et al., 1996; Hawden et al., 20001,12). Tube feeding, either NG or PEG feeding can reduce stress for parents during mealtimes. (Manhant et al., 200913). However, Mathisen et al. (2003) note that parent-child interaction during mealtimes can be effected. There can be long term repercussions with weaning off tube feeding due to sensory issues, (Senez et al., 199611), and reduced feelings of hunger, (Bazyk, 199014).

Consequently, these children are highly likely to develop significant difficulties in learning to tolerate eating orally. This may have an impact on the child’s social and emotional development. (Hawden et al., 2000).

Approaches to working with children who have long term feeding needs.

A multidisciplinary approach to persistent feeding disorders is recommended and where there are a range of skilled professionals can help to minimise long term and persistent problems, (Puntis, 20081). Some establishments describe services in...
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In hospitals using an in-patient multidisciplinary approach for a whole range of feeding disorders, including food refusals linked to NG and / or PEG dependence e.g. The Kennedy Krieger Institute, (Darbari, 2007), and The Graz Model in Austria, (ScheerTrabi et al, 2006).

Parents feel that tube feeding can enable both themselves and their child to have an improved quality of life, (Manhant et al, 2009). However, children who have needed tube PEG feeding for a significant amount of time, but who do not require this any longer may have difficulties weaning off their tube dependence. Senez (1996) suggests that therapists should work on the tactile, taste and olfactory aspects of development for tube feeders, whereas Bazyk (1990) stresses the importance of allowing tube PEG fed children who are planning to wean off feeds the opportunity to experience hunger. This may act as an important trigger in developing opportunities to tolerate oral feeding.

Douglas (2002) critiqued various approaches used that deal with food refusal. Due to the complex nature of feeding problems and the various aetiologies involved, it is important to reflect on a range of theoretical models linked to each child’s individual needs. Douglas recognises the fact that parental support and a mixture of psychological and therapy approaches, (e.g. messy play), are essential aspects in intervention with this population. Parental support...
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may involve specific coaching and feedback during mealtimes to 
provide confidence to ensure appropriate strategies are implemented.

Food aversion is often considered to be primarily a behavioural 
issue, with a likely organic origin, and many approaches for dealing 
with food refusal are thus behavioural in design. (Freeman et al., 2001; 
Douglas, 2002; Kelley et al. 2003; Ahern, 2006;17,18,19,20; and 
therefore some researchers have chosen behavioural approaches to 
remediate food refusal eating disorders. Approaches may include 
stimulus fading, giving contingent positive reinforcement and making 
food refusal behaviour non-functional. (Freeman et al., 1998). Single 
case studies. (Markell et al., 2001; Kelley et al. 2003), focus on specific 
shaping behaviours and training to encourage children to eat more. 
but results are not clear as to maintenance effects. Ahearn et al., (1996) 
developed an in-patient programme for three children with a range of 
food aversions. All made improvements with physical guidance and 
non-removal of the spoon. Clear definitions of mealtime behaviours 
were given, e.g. acceptance, negative vocalisations, expulsion, 
disruptions, and self-injurious behaviour and these decreased as the 
intervention progressed. Follow up improvements were noted for two 
children up to 10 months.

A few studies have attempted to evaluate interventions to 
evaluate in-patient interventions to wean children onto oral feeding 
from prolonged tube PEGtube feeding. (Blackman et al, 21,22,23,24al.
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These studies cover a wide range of ages, (from 9 months to 5 years, 5 months), and a wide range of aetiologies. Stays of up to 24 days have been reported, (Kindermann et al., 2008), and average times to wean off NG tube feeding is reported as being 9.1 days, (Kindermann et al., 2008). 11.4 days average for PEG fed children, (Byers et al., 2003), and for the two cases in the Burmucic et al (2006) study, the child fed by NG tube taking 7 days, and the child with a PEG taking 13 days. However, limitations of these approaches include; disruption to family life and routines and unnecessary hospitalisation. Actual protocols outlining the interventions are also unclear.

An out patient study was carried out by McGrath Davies et al, (2009) for 9 PEG fed children with a mean age of 27.3 months; (range: 7 months to 52 months). A key element of this programme was “pain rehabilitation” with use of medication, the rationale being that feelings of pain during feeding may contribute to significant food aversions. This was an out patient study lasting 14 weeks, with 9 out of the 10 participants feeding orally at the end of the programme. Eleven children with mild to severe learning disabilities participated in a programme to reduce dependence on tube PEG feeding, (Blackman et al., 1987). Staff carried out the intervention with the children, not the parents. It was not clear as to what the level of parental support was
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds. During and post the process, the range of children within the group had very different feeding disorders and needs, and therefore it is difficult to draw specific conclusions and possible strategy management skills to be able to replicate it. In addition, it was stated in the study that two of the children had significant swallowing issues post the study, (one of whom died due to a choking episode during eating). Consequently, the results need to be treated with caution because of the types of disorders the children within this group had.

Two studies have attempted to define in more detail their approaches. Burmucic et al, (2006) evaluated tube weaning with two children with Alagille syndrome, (2 years and 4.5 years). This paper described the intervention schedule, (an in-patient approach), and the role of each professional, including developmental psychology and speech and language therapy, (e.g. oral–motor stimulation). Interestingly, both children lost weight when beginning the programme, but gained weight as they progressed. One child weaned successfully in 7 days, the other in 13 days. Kindermann et al, (2008) worked with ten children, aged 9 – 21 months over a period of 12 days where children were admitted as in-patients. This study also included specific inclusion criteria as did the Burmucic et al, (2006) study. These criteria included the following: team agreement that the child would benefit; exclusion of significant organic issues and stable oral motor skills with no
aspiration. Children who were at risk of aspiration were excluded.

Outcomes for the Burmucic study stated that "normal feeding
behaviour and stabilization of body weight were established" for both
children, (p935), but there is little information on parental feedback
and longer term outcomes. Kindermann et al., (2008) demonstrated
success with nine out of ten of the children eating orally. All children
were eating post 1 week of intervention with a mean of 9.1 days,
(range 4–24) to wean off tube. The children were re-evaluated at 3
months and six months. At 3 months children maintained their skills. At 6
months post the intervention, eight out of ten remained on full oral
feeding.

Other studies have also attempted to define a specific
approach when dealing with this population, (Byers et al., 2003;
a mean age of 3.1 years, (range 1.8 – 5.5 years), on an in-patient
programme which lasted an average time of 11.4 days. The
programme involved largely behavioural therapists and psychologists
coaching parents using behavioural approaches. On discharge from
the programme, 44% of the population had weaned completely from
gastrostomy feeding with maintenance effects noted. McGrath Davies
et al., (2009) also carried out a tube weaning programme with nine
children with a mean age of 27.3 months; (range; 7 months to 52
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Assessment of oral motor skills was carried out to eliminate aspiration risk. Unlike other studies, this paper clearly defined the team involvement. As part of the intervention, pain rehabilitation was implemented with use of medication; the rationale being that early feelings of pain during feeding may have caused a strong association with mealtimes, and therefore contributed to significant food aversions.

This was an out-patient study lasting 14 weeks, with eight out of the nine participants feeding orally at the end of the programme.

**Background and rationale to the study.**

The studies mentioned have small samples by nature of this specific population of children. This study attempts to define a rationale for this population that could be a discussion point in providing a more consistent approach to these children and parents, and hopefully lead to further studies and investigations to exploring key themes more rigorously. At present, there is no specific recommended package of care prescribed that demonstrates the most effective intervention for children who have prolonged NG or PEG feeds but who have the oral and pharyngeal capability to take an oral diet.

A number of studies ***outline prolonged inpatient stays for children whilst participating in tube weaning programmes. Stays of up to ***days in a hospital setting are reported in the literature. Although...
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds. The reported positive outcomes are significant, limitations of inpatient/institutional programmes include:

- Staff carrying out interventions with the parental role being diminished.
- Extensive “down-time” where intervention is not possible, for example, overnight where no feeding occurs.
- Cost and training implications for small cohorts of children. If a programme is provided 24-7, then numerous additional staff require training and support to ensure consistency of approach in evenings and weekends when the core “feeding team” is less likely to be present.
- Disruption to family life, including at least one parent usually “rooming-in” with the child; exacerbated care demands in families with siblings; disruption to education if child in nursery/school.
- PEG weaning occurring in a non-naturalistic environment and increased risk of hospital-acquired infections.

PEG weaning success has also been reported following long term outpatient programmes. Weekly intervention for up to 12 months have been reported. This is a valuable model to consider, however the impact on the family of committing to travelling weekly, often over
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Long distances to tertiary centres, at least in our experience, often resulted in families not being able to access such support.

This pilot project has attempted to evaluate an intensive five day group intervention where children with food aversions who need to wean off tube-PEG feeds received a multi-disciplinary out-patient therapy package of intervention at an inner city hospital. Families were considered core to the team and directly involved in carrying out interventions from day 1. The programme was designed so that parents/carers were supported by the multidisciplinary team for one meal out of three each day; with daily advice to enable repetition of strategies in their home environment. This was compared with a parent and child who opted for the traditional feeding clinic approach that involved individual consultations.

**Method.**

**Participants.**

This study recruited five children aged from 3 years 9 months – 4 years 8 months from the paediatric gastroenterology caseload at an Inner City Hospital. Given the highly specific nature of the difficulties these children have, gaining a large sample was challenging, hence the small sample size. Two of the children were excluded from the study as both were unwell at the time of the interventions being offered.
Two children and their parents/carers elected to receive an Intensive Approach, (Child A and Child B), whilst one child and her parents/carers elected to receive the Traditional Approach, (Child C). The mean age of the participants was 4 years 4 months, (range 3 years 9 months – 4 years 8 months). The mean age of the surgical placement of the tube PEG was 8.3 months, (range 8 months – 9 months). All children had had NG tube feeding commence in the first month of life.

Put Table 1 about here.

Ethical approval was gained from the local NHS Committee and City University, London.

**Inclusion Criteria.**

Inclusion criteria were as follows:

1. Children participating had to be known to the hospital gastroenterology team, and aged between 6 months – 5 years of age.

2. Children participating should not have had any illnesses relating to aspiration over the last year, and have highly competent oral motor skills as assessed using the Paediatric Oral Skills Package – POSP. ([26 Brindley et al 1996 : Table 2](#)).
3. Children participating would have had clear evidence such as videofluoroscopy data to indicate that they had a safe swallow and no other significant risk factors that would effect the development of full oral feeding.

4. General health of participating children would be judged by doctors involved to be robust enough to sustain a progression to full oral feeding during a programme that included hunger provocation.

5. Maintenance of adequate weight during tube PEG feeds for the past year.

6. Children participating would have competent cognitive and language skills that did not fall below the first standard deviation in assessments.

Setting and materials.

The interventions offered were as follows:

1. Traditional Approach.

The child and her parent who elected this approach received an individual monthly 30 minute multidisciplinary feeding clinic appointment (dietitian, speech and language therapist, consultant
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Sessions included information collected included growth assessment, monitoring of tolerance to enteral feeding and dietary assessment, as well as a review of medications and goal setting relevant to the child’s immediate needs.

2. Intensive Approach (intervention).

Children and parents who elected to receive this approach were offered a five day intensive programme of daily group intervention.

This involved Monday to Friday outpatient attendance of 1.5 hours at an inner city hospital, but was based within the hospital playroom and school room.

Assessment pre-intervention: baseline assessments for all children of height, weight and amount of water/feed via PEG were recorded and a paediatrician assessed the child’s general health. A 7 day food diary was also completed by the parents and carers. These were analysed by a dietitian using Dietplan computer programme.

Children’s nutritional requirements were calculated using dietary nutrient RNIs (Reference Nutrient Intakes). Each child was videotaped during a mealtime. Analysis of videos included parent-child interaction strategies, child mealtime behaviours, and volume of food/drink taken orally. This provided information to inform goal setting for the intervention week. All children had their oral motor skills evaluated.
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provocation programme for children who have had prolonged periods of tube feeds. Using the Paediatric Oral Skills Package (POSP), (Brindley et al. 1996) to
ensure they met the inclusion criteria.

Assessment – acceptance to intensive programme: Three days
prior to day one of the intervention week each of the children in the
intervention group were individually assessed for a reduction in tube
PEG feeds prior to the commencement of interventions. This was
designed to stimulate hunger in the children by the start of the five day
intervention. The following matrix was used to inform PEG feed
reduction:

- If child receiving more than Child A already met over 50% of her
total energy EAR (Estimated average requirement) with orally
nutrition, then discontinue PEG feed.
- If child receiving 20-50% total EAR orally, then reduce PEG feed
by 50%.
- If child receiving less than 20% total EAR orally, then reduce PEG
feed by 30%.

The same volume of water was replaced via PEG to limit the risk of
dehydration for the 3 days pre-intervention. During the intervention
week the volume of water was reduced according to clinical
assessment by the dietitian which included; oral fluid and food intake,
and clinical observations such as number of wet nappies/toilet visits.

Child A’s tube PEG feeds were stopped prior to the intervention
week, and instead the same volume of water was given via PEG to limit
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The risk of dehydration for three days pre-intervention. Child B's PEG tube feeds were reduced by 30% (400kcal) - only as pre-intervention less than 10% of his total nutrition came from oral intake. The reduction in tube feeds was supplemented by an increase in water (400ml) via tube pre-intervention to remove risk of dehydration.

Parents agreed to keep Food Diaries for seven consecutive days prior to and during the intervention. These were analysed by a dietitian using Dietplan computer programme. An average of the daily oral intake was determined from this programme.

Put Figure 1 here.

**Intensive Approach Methodology (intervention)**

These daily sessions were 1.5 hours long and involved multidisciplinary assessment and intervention as follows:

1. **Greeting time:** Children would arrive with their parents/carers and lunch boxes/picnics would be placed unpacked on a trolley.

2. **Mat time:** Children would be informed of the routine of the session with a visual timetable. Children then participated in and would also be introduced to basic oral stimulation and desensitisation work with the speech and language therapist through “vegetable of the day”.
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This involved biting, licking, smelling, sensory and imaginative play and 
exploration using raw foods. This activity was developed by the 
speech and language therapist and carried out/led by any of the 
multidisciplinary team present, dietitian present to provide support). 

Rationale: Some researchers suggest that children experience tastes 
and textures and gain sensory stability and development from these 
experiences around 6-9 month level, and that should they miss these 
experiences, then sensory integration and development will not take
place. (Illingworth et al, 1964; Clark et al; 1990; Lawless, 1985;Senez et al,199611, 27,28,29). This task is rooted in this assumption, and enables 
children to become desensitised to and experience tastes and textures 
as well as practice skills such as chewing in a fun, non-threatening 
activity. (Wisten, 1983; Langmore, 1994; Gilmore, 2003; Senez et 
al, 199630,31,32 ).

This activity allows adults working with the child to focus on oral 
desensitisation and practice functional movements such as chewing in 
a play context. Oral desensitisation therapy is rooted in the acquired 
oral-motor disorders literature. However, the assumption that the 
alignment and integration of motor and sensory skills is an important 
aspect considered within paediatric therapy approaches, and as such 
forms the foundation for activities such as this one. (Wisten, 1983; 
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3. **Drink time:** Water only, *(up to 50 mls – 100 mls)* in a cup, no bottles or cartons.

**Rationales:** Water can have an impact on satiation, so amounts were limited pre-eating so that children could potentially take in more solid food, *(Lappalainen et al., 1993)*. This was encouraged as it was noted in pre-intervention assessment that all children were distracted throughout mealtimes with opening cartons and bottles, playing with lids and straws. **Drink time** was an opportunity to decrease distractions and encourage independence by introduction of a cup.

4. **Cooking / messy play activity:** Children *had* a specific play task around messy-play activity e.g. making fruit kebabs, fruit trifle, etc, to enable them the opportunity to experience positive feelings about food through play. **This activity was led by the speech and language therapist and play specialist.** During this time, parents/carers would *leave the room* and spend time discussing *concerns and setting clear goals for the next 24 hours,* etc, with the psychology, speech and language therapy and dietetics staff. Use of information from the video recordings such as e.g. specific language to use with the children, *(for example, decreasing not using reprimands, modifying questioning style when food is not eaten)*, suggested serving size amounts of food to target, etc, *behavioural management*
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Techniques (such as how to react if the child left the table) was shared.

(One speech and language therapist and play specialist remained with the children for messy play, and one speech and language therapist joined the dietitian and clinical psychologist with the parents for discussion of goals).

**Rationales:** Experiencing tastes and textures, oral desensitisation and encouraging fun with food remained a rationale as per activity 2. In addition, it was noted during pre-intervention assessment videos that all children were exhibiting avoidance or distraction behaviours including fixating on opening/unwrapping/preparing food to the detriment of actually eating any. Additionally parents used “language teaching” strategies at mealtimes including requesting children named foods and their attributes, at times disrupting the sequence of the mealtime by inadvertently interrupting a child as they were about to take a bite. Rationale for this activity therefore included an opportunity for children to be in a language rich learning but distraction free environment where they could also practice skills for independence including using utensils and tools and preparing food. It would be expected that at mealtimes children and parents/carers would eat in a distraction-free environment with minimal preparation activity occurring at the table.
This activity allows adults working with the child to focus on oral desensitisation and practice functional movements such as chewing in a play context. Due to prolonged periods with no or minimal oral feeding, children often develop challenging behaviours associated with eating as well as oral hypersensitivities. Oral desensitisation therapy is rooted in the acquired oral-motor disorders literature. However, the assumption that the alignment and integration of motor and sensory skills is an important aspect considered within paediatric therapy approaches, and as such forms the foundation for activities such as this one. (Winsten, 1983; Langmore, 1994; Gilmore, 2003; Senez et al, 1996).

5. Washing hands.

6. Plating Up and Eating: Parents/carers re-entered the room at this point and prepared the child’s meal. They were expected to eat with their child. Team members made sure that parents only offered their child a realistic and achievable serving size. The goal was for children to have experiences of success, i.e. finishing a plate, and having the opportunity to go back for more if they wanted. In addition, to reduce children becoming too full from just water, only 1/4 of a cup of water was allowed during the meal. If more was requested, then they would have to have finished their plate of food first. Children would be
given specific coaching and modelling from their parents, who in turn were provided with verbal support from the multidisciplinary team as required (speech and language therapist and dietitian present to provide support).

7. Washing hands.

87. Good-bye. Parents were offered the opportunity to discuss the mealtime outcomes and consequently modify goals for the pending evening meal and breakfast if required. Children were invited to play and wait in the playroom with play/support staff if there were any final specific issues pre-the next session to be discussed with parents.

Assessment Data collection and agreement.

At the beginning of the intervention, baseline assessments were carried out. These involved height, weight and amount of oral versus tube feeding the children experienced, and number of days taken to achieve full oral feeding. A food diary was also completed by the parents and carers at each stage of the process. All children
participating had their oral motor skills evaluated using the Paediatric Oral Skills Package (POSP), (Brindley et al 1996) to ensure they met the inclusion criteria.

**Day 5 of intervention:** Repeat At the end of the intervention, the same assessments of height, weight and amount of water/feed via PEG were completed for children receiving the intensive intervention. Food diary records for the intervention period were analysed by a dietitian using Dietplan computer programme.

**Assessment with a further follow-up at one month and 3 months:** Repeat assessments of height, weight and amount of water/feed via PEG were completed for all children to evaluate maintenance effects. A 7 day food diary was also completed by the parents and carers and analysed by a dietitian using Dietplan computer programme. Each child was video recorded during a mealtime at both reviews at each stage.

**Video recordings of mealtimes**

Independent blind-rating of the video recordings took place and was carried out by a health care professional who did not participate on the intervention to validate the results. The inter-rater agreement was 89%, (Agreement/Agreement x Disagreement x 100). Discussion took place where some of the meanings were unclear.
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Video analysis was undertaken for each child pre-the intervention, at one month and at three months post the group and involved distinct areas of observation linked to papers reviewed within the literature review. Child The responses were coded and observed for the children included:

- **Initiation of language**: (hypothesis; a child may initiate more language when more relaxed during a mealtime). Therefore those in the Intensive Approach may initiate more after the intervention.

- **Ignoring of parent**: (hypothesis; the child may ignore the parent less once he/she has received some intervention to support feeding).

- **Leaving the table**: (hypothesis: children receiving the Intensive Approach may leave the table less as they become more confident with eating).

The responses observed and recorded for parents /carers included:

- **Reprimands**: This included negative parental language associated directly with eating. For example “stop messing; don’t play with it” (hypothesis; with coaching, the parents may use fewer reprimands over time during mealtimes).

- **Coaxing**: This included parental language associated directly with encouraging the child to eat. For example, “put it in your mouth; take a bite; have some yoghurt now” (hypothesis; post with coaching training, the parents would use less; modify the amount of directive coaxing needed to encourage their child to eat).
• commenting This included general parental language related to the mealtime, but neither directive nor reprimanding in nature. For example, "mmm that looks yummy; oh you took a big bite". (hypothesis; parents should reduce their feelings of anxiety and therefore make more positive general comments during mealtimes about their child’s mealtime behaviour).

Descriptive data was collected for weight and height for all children. Changes in oral versus gastrostomy tube intake were calculated. Child and parent language and behaviours during mealtimes were analysed descriptively. Children's nutritional requirements were calculated using dietary nutrient RNIs (Reference Nutrient Intakes).

Results.

The results summarising outcomes for the children include weight and height measures, changes in oral and gastrostomy PEG tube feeding, and changes in the use of language by children and parents during mealtimes.

Put Table 3-2 about here.
Oral Intake vs PEG intake: These results show that the children who received the Intensive Approach, (Child A and Child B), demonstrated significant increases in oral intake (percentage of estimated average requirement) over the study period orally over three months. Child A was managing 66% of requirements orally at the beginning of the intervention period, 91% by the end of the intervention week, 96% at week 6, and 100% at 3 months. PEG feeding was stopped for Child A at the beginning of the intervention week and was not resumed. Prior to intervention Child A’s progress was such, that she did not require any gastrostomy feeds at 3 months. Child A did not restart tube feeds and supplementary water via the tube was discontinued. Child B required 100% of his feeds via had a further reduction in tube PEG; this was decreased by 400kcal on commencement of the intervention, and feeds were decreased by a further 200 kcal mid-way through the intervention week as oral intake increased/improved. Child C, who elected to receive the Traditional Approach, did not demonstrate any significant changes in percentage of estimated average requirement orally over three months.

Weight: All three children demonstrated changes in weight during the intervention period. Child A increased her weight by 0.2 kg.
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from 12.5 – 12.7 kg, (2-9th centile), during the Intensive Approach week. She had a loss of 0.1kg at the 6 week review which likely to be due to her receiving on average 91-96% average daily requirements orally, with no PEG feed “top-up”, coincided with a drastic reduction in gastrostomy tube feeds. At 3 months post the Intensive Intervention, Child A’s weight increased to 13.5kg, (9th centile). At this stage, she was taking all of her nutrition orally.

Child B maintained weight during the intervention period at 12kg (0.4th centile). He lost weight at his 6 week review to 11.7kg, dropping to (below 0.4th centile). This was attributed to an illness that he had had at the time. At the 3 month review, his weight had increased recovered to 12.2kg and he was continuing along above the Time 1 level to 12.02kg, (0.4th centile).

Child C maintained growth appropriately (12.5 - 13.5kg across the intervention period) which was expected as she maintained 100% estimated average daily requirements through a combination of PEG and oral feeds.

Put Table 5 about here.
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**Height:** All children showed changes in height over the three month period that correlated with what was expected height gain along their respective centiles on the UK growth charts.

Put Table 63 a/b/c about here.

**Parent Child Interaction:** It was hypothesised that following the intervention, mealtimes would consist of fewer the number of reprimands, a change in the number of direct coaxing or prompting the child to eat, and a more naturalistic balance of general conversation. It is impossible to make generalisations with a sample size this small. It was apparent following the pre-intervention video taping session that the parents of each child approached mealtimes in different ways; and that modifications in parent-child interaction should be applied in both cases, but with quite different goals. Goals for Child A’s parents included increased awareness of child initiations, to follow the child’s lead, less prompting and coaxing, and decreasing the amount of “chat” in order to allow more time to chew.

Conversely, for Child B, parental goals included decreasing “following the child’s lead” and increasing parent direction and coaxing to provide more specific feedback, decrease questioning.
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The most significant change in parental behaviour would decrease with coaching. Few reprimands were used by Child A’s parents. A considerable reduction in the direct coaxing of the child to eat. This followed coaching during the intervention week that included “following the child’s lead” and taking the focus away from “prompting” to eat. There was also a marked decrease in commenting.

The most significant change in parental behaviour used by Child B’s parents was a dramatic increase. Child B’s parent demonstrated an increase in commenting behaviour throughout the study period, alongside a considerable increase in coaxing and decrease in reprimands by the 3-month mark, then a final decrease in reprimands during the 3-month period.

Child C showed an even pattern of parental use of reprimands and commenting during the meal with no major changes. There was an increase in commenting noted at the 3-month review and no reason for this increase has been proposed. The original hypothesis speculated that there would be greater changes with use of reprimands, although this has not been indicated in this study.

Coaxing a child to eat food verbally was considered to be a communication aspect that would decrease during and after the
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This occurred with Child A’s parents, although Child C’s parent demonstrated less change. Child B’s parent showed an increase in Coaxing, an opposite effect to the hypothesis.

Commenting, i.e. making positive comments about the child’s mealtime experience, or how they were functioning, e.g. “Good chewing”, was considered something that would increase during and post the intervention. Interestingly, Commenting decreased for Child A, increased for Child B and was an equal pattern for Child C.

It was noted following the initial video-taped mealtimes that considerable variation in communicative styles and behaviours were used by parents in a 30 minute time-frame. Reprimands ranged from 1-20, coaxing from 24-42 and commenting from 24-57 occasions. Great variation remained at the 3 month session, however what changed for child A and B was the proportion or balance of each of the types of parental behaviour used.

Put Table 4Za/b/c about here.

**Child Behaviours:**

Child A demonstrated a net decrease in all behaviours of it was hypothesised that during and post the intervention, children would initiating more language, ignoring parents and leaving the table. It was hypothesised that Child A may increase initiation of language
following the intervention, however it should be noted that Child A’s parents had dramatically reduced the amount of language used at mealtimes in order to allow Child A sufficient time to focus on chewing and swallowing. A decrease in all verbal output from Child A therefore correlates with a calmer, quieter mealtime environment.

Child B demonstrates marked and dramatic changes in ignoring behaviours and leaving the table. There was a peak in initiation behaviours at the 6 week review, with their parents. All children demonstrated variable levels of initiation, with no distinct pattern being evident.

An assumption was made that children receiving the Intensive Approach would ignore their parents less and engage with them more during the meal. Child A and Child B showed a decrease in the number of times they ignored their parents. Child C who received the Traditional Approach showed a more even pattern across all areas measured of ignoring.

Focus on parent-child interaction strategies and styles during the intervention week resulted in sustained changes in interaction patterns in the 2 intensive study children. There were no changes in parent-child interaction strategies in the child who did not receive the intensive programme. It was thought that after the intervention, children
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**Discussion.**

This particular pilot project investigated supports the use of specific strategies to enable change to occur for children who have had long term tube PEG use. These were: 

1. **clear components of parent coaching based around language use to encourage the child;**
2. **developing parents’ perception of the food amount the child could manage orally and how to deal with this practically and emotionally;**
3. **involving the children in strategy management through visual prompting and learning from others;**
4. **modelling and support;**
5. **hunger provocation combined with, as well as clear role definition within the team.**
The results indicate that weight and height were stable and maintained along respective centiles on the growth charts for all children. Both Child A and Child B dipped below their usual centile at the 6 week review, but both recovered by the 3 month review. Child C maintained growth as expected as there were no significant reductions in PEG volume at any time throughout the three months for all three children. Child A had an increase in weight at the end of the Intensive Approach, (from 12.5kg / 2 – 9th centile to 12.7kg / 2 – 9th centile), but at 6 weeks, (Time 3), displayed a slight loss of 0.1kg. However, at Time 4, three months post the Intervention, Child A’s weight had increased to 13.5kg, (9th centile). At Time 3, Child A had recently moved onto taking all of her nutrition orally, and the slight drop in weight at that time was attributed to this. Child B did increase his weight from 12.0kg (0.4th centile), at Time 1 to 12.02kg, (0.4th centile), at Time 4. A weight loss to 11.7kg at Time 3 was attributed to a cold virus he had had just before follow up, and his mother reported that his appetite had been affected. Child C showed a high increase in weight, from 12.5 kg at Time 1 to 13.5kg at Time 4.

This study proved successful at maintaining significant decreases in the volume of PEG feed required by both of the children in the intensive programme group. The children entered the study at quite different stages of the “weaning from tube” process. Child A had been requiring 500 kcal via the PEG at entry to the study, whereas Child B...
had been requiring a full 1200 kcal via the PEG. Both participated in
the intensive programme resulting in a decrease of PEG requirement of
500 kcal for child A within the intensive week, and maintained at 3
months, and a decrease of 600 kcal achieved within the intensive
week for Child B, and maintained at 3 months. Child C was still
receiving 50% of her nutrition by tube, 600 kcal, with 600 kcal orally. Her
increase in weight and the fact that she displayed no weight loss was
attributed to her ongoing use of the tube. Child C’s mother did report
that her daughter had started to eat more of her packed lunch at
school although if she felt that C had not eaten enough orally, then she
still altered how much was taken via the tube.

All children had their average estimated calorific
requirement via tube and orally measured before and during the study
period. Child A had an estimated average frequency of 750 kcal orally
at Time 1, and 500 kcal by tube, (total = 1250 kcal). At Time 4, Child A
was able to take her 1300 kcal required intake per day orally with no
additional tube feeding necessary. This has been maintained, and
Child A no longer has a gastrostomy PEG tube. Child B still has some
tube feeding. At Time 4 his average daily oral intake was 800 kcal with
500 kcal received via his tube, (total = 1300 kcal). However, although he
still has some tube feeding requirements, he did not receive any
nutrition orally at Time 1. Child C’s PEG tube requirements continued to
be necessary throughout the 3 month project period. (Time 1).
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800kcal, and Time 4: 600kcal). McGrath Davis et al. (2009) reported a time period of 14 weeks for 8 out of 10 children to receive full oral feeding. Within this study, Child A took 12 weeks to reduce to nil by PEG, and was meeting Estimated Average Requirements orally with no additional input by week 12 — and Child B took 12 weeks to take 6800kcs orally from previously taking nothing, was taking 750 kcal orally by week 6; and 800 kcal orally by week 12. Again this was achieved with no additional input to the 1 week intensive programme.

It is difficult to make an assumption about which strategies enabled the children to make progress. It could be a combination of factors linked to sensory play to reduce food phobia, (Senez et al., 1994), developing a sense of hunger between meals, (Bazyk, 1990), and supporting and coaching the parents, (Douglas, 2002). All children displayed varying levels of texture aversions to food. The strategy used by the speech and language therapists of working with food textures to reduce food phobias was beneficial in this study as with Senez et al. (1994). The consultant and dietitian with support from the clinical psychologists and paediatricians coached the parents to enable them to allow children to experience hunger between meals as suggested by Bazyk, (1990), and Child A and Child B certainly made progress in changing their oral intake.
Parents who received the Intensive Approach changed in their coaching. They used a different balance of communicative and behavioural approaches whilst interacting with their child. Fewer Reprimands at Time 4. There was no change for Child C. Coaxing and Commenting were considered strategies that parents would use differently to support their child’s eating development. However, Child A’s parents increased rather than decreased their use of this as a strategy, and no specific pattern was noted with Child B, or Child C. Child B’s mother increased in coaxing and commenting when encouraging B to eat; this could be because he was not really eating orally at all at the beginning of the study, and that B’s mother was keen that he maintained oral feeding and therefore continued to prompt and motivate him. He also had mild oral motor difficulties, preferring not to chew foods. B’s mother found that reminding B to chew verbally and commenting on this has successful outcomes for him. Child C’s mother did not display any specific differences in Reprimands, Coaxing or Commenting during the project period. A tentative suggestion is that analysis of parent-child interaction and subsequent discussion during parental coaching about to reduce negative comments such as reprimands during mealtimes, and increase or decrease commenting and coaxing depending on individual need, can have beneficial outcomes in terms of the amounts children will attempt to make orally.
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The parental coaching used by all professionals to support the parents in this project was successful as in the literature, (Douglas, 2002). Here, a mix of psychology and therapy approaches in the areas outlined, (language use, parent confidence in amounts and types of foods given to the child, etc.), had positive outcomes.

Children who received the Intensive Approach showed differences in leaving the table. Both Child A and Child B showed improvements in this area, especially Child B. Child B attempted to avoid mealtimes initially, leaving the table 34 times at Time 1, but did not do so at Time 4. Child C, (Traditional Approach), showed no specific change in avoiding the meal and attempting to leave from Time 1 to Time 4.

Children’s behaviour and language such as initiating and ignoring the parents’ language were also evaluated. Child B particularly showed significant changes in a number of areas with fewer occasions of leaving the table (from 34 occasions to 0 following intervention) and fewer occasions of no distinct pattern was noted with initiating throughout the project, although with ignoring, Child A and Child B did show a decrease in the number of time they ignored their parents’ communication during the meal (21 to 3 occasions). (Child A at time 1 ignored her parent 7 times, and at Time 4 5 times; Child B ignored his parent 22 times at Time
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1 and 3 times at Time 4. This suggests that the parental prompting did have significant value for the children.

The literature quoted does discuss some specific parent strategies, although it has already been stated that these approaches are behavioural in origin. (Ahearn et al., 1996; Freeman et al., 1998; Markell et al., 2001; Kelley et al., 2003). Such strategies included supporting parents to use hand over hand prompting with utensils to help their child participate in the meal, as well as ignoring negative vocalisations. Benefits in the quoted studies from supporting parents in this way have been beneficial.

Conclusion.

This study was different because it attempted to define and provide a rationale for a range of strategies and component parts of treatment for children with prolonged PEG use used by members of the team, to facilitate change within an out-patient, non-acute context. In particular, specific methods were used with success. These included: parental coaching in specific areas; working with food textures; and enabling children and their parents to deal with changes in their eating behaviours, and describing therapy approaches by using a rationale.
This study does support the fact that good outcomes were obtained by close multi-disciplinary working. This study also has value in that it describes component parts of the treatment regime. Of particular interest is the use of language and communication during mealtimes and the impact this can have on the child’s ability to engage with the eating and drinking process. It was hypothesised that an Intensive Approach using specific strategies would improve outcomes, and enable children able to feed orally to reduce or wean off the tube PEG feeding totally. Success was achieved, but as the sample size was small, it is difficult to generalise these findings to a larger group.

In addition, the types of children in the literature who have received interventions to reduce tube PEG feeds have included those with a range of learning disabilities. Future studies do need to focus on specific patterns within clinical groups, but within this pilot project it is interesting to note that all three children had had an early history of GORD, all three had had early oral-sensory issues, and all three had had significant difficulties establishing feeding as infants.

The impact of early infant feeding difficulties can be highly pervasive; whilst further research is needed to replicate the findings in this project it is also clear that the initial stages of early feeding require further investigation and exploration in an
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attempt to prevent the need for long and unnecessary use of tube PEG feeds.

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Conflict of interests, source of funding and authorship.

The authors declare that they have no conflict of interests.

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All authors reviewed and contributed to the manuscript prior to submission for publication.
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**Figure 1: Session Plan.**

- **Pre-Intervention Assessment**
  - Inclusion in 5 day intensive
  - 3 day PEG feed reduction

**Mat time – Greeting/Vegetable of the Day/Drink time**

**Children**
- Cooking/Messy Play/
**Parents**
- Feedback/education session/goal setting

**Children**
- Washing Hands
**Parents**
- Preparing and plating food

**Meal time – maximum 30 minutes**

**Children**
- Play time
**Parents**
- Review of goals

**Home time**

**Review Assessment – 6 weeks**

**Repeat on 5 consecutive days**

**Review Assessment – 3 months**
Table 1: Child characteristics and medical history.
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Table 2: Summary of oral motor function before the intervention.

<table>
<thead>
<tr>
<th>Child:</th>
<th>Age at onset of study:</th>
<th>Age of gastrostomy/PEG tube insertion:</th>
<th>Gender:</th>
<th>Medical history:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child A:</td>
<td>4 years, 4 months.</td>
<td>8 months.</td>
<td>Female.</td>
<td>IUGR; GORD; premature, born at 34 weeks. Displays some mild texture aversions.</td>
</tr>
<tr>
<td>Child B:</td>
<td>3 years, 9 months.</td>
<td>9 months.</td>
<td>Male.</td>
<td>GORD; born at 41 weeks; uncoordinated sucking and swallowing pattern in infancy; “floppy larynx”; Displays some severe food texture aversions.</td>
</tr>
<tr>
<td>Child C:</td>
<td>4 years, 8 months.</td>
<td>8 months.</td>
<td>Female.</td>
<td>GORD; motor delay - floppy baby; liver disorder; premature, born at 36 weeks. Displays some moderate texture aversions.</td>
</tr>
</tbody>
</table>

*Key:*  
IUGR = Intrauterine growth retardation.  
GORD = Gastroesophageal reflux disease.
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>08 Lips, tone of lower lip</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>09 Tongue, habitual position</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10 Tongue, status at rest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11 Tongue, habitual posture</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12 Palate, structure of the hard palate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13 Palate, structure of the soft palate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14 Palate, movement of the soft palate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Key:**

- 0 = no oral motor difficulties
- 1 = mild oral motor difficulties
- 2 = moderate oral motor difficulties
- 3 = severe oral motor difficulties
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds.

Table 23: Estimated Average Requirement / intake before and after the intervention.

<table>
<thead>
<tr>
<th>Time</th>
<th>Total oral nutrition intake (kcal)</th>
<th>Nutrition from PEG (kcal)</th>
<th>Total (kcal)</th>
<th>EAR (estimated average requirement)*</th>
<th>% of EAR from oral intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intensive intervention week</td>
<td>A 750 B 0 C 600</td>
<td>A 500 B 1200 C 800</td>
<td>A 1250 B 1200 C 1400</td>
<td>A 1140 B 1050 C 1140</td>
<td>66 0 53</td>
</tr>
<tr>
<td>Final day of intensive intervention week</td>
<td>A 900 B 600 C 600</td>
<td>A 0 B 600 C 800</td>
<td>A 900 B 1200 C 1400</td>
<td>A 1140 B 1050 C 1140</td>
<td>91 57 53</td>
</tr>
<tr>
<td>6 weeks post intervention</td>
<td>A 1100 B 750 C 650</td>
<td>A 0 B 540 C 600</td>
<td>A 1100 B 1290 C 1450</td>
<td>A 1140 B 1050 C 1140</td>
<td>96 71 57</td>
</tr>
<tr>
<td>3 months post intervention</td>
<td>A 1300 B 800 C 600</td>
<td>A 0 B 500 C 600</td>
<td>A 1300 B 1300 C 1300</td>
<td>A 1140 B 1050 C 1140</td>
<td>114 76 53</td>
</tr>
</tbody>
</table>

*EAR (estimated average requirement)
Girls 4-6 years of age 95kcal/kg
Boys 4-6 years of age 90kcal/kg

Intensive Approach:
Child A
Child B

Traditional Approach:
Child C
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds.

Table 4: Weight before and after the intervention.

<table>
<thead>
<tr>
<th>Time</th>
<th>Weight in kg of the participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>12.5 12.75 12.6 13.5</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>12 12 11.75 12.25</td>
</tr>
<tr>
<td>6 weeks post-intervention</td>
<td>12.5 12.5 13.5 13.5</td>
</tr>
<tr>
<td>3 months post-intervention</td>
<td>14 13.5 13</td>
</tr>
</tbody>
</table>

Time 1 = Pre-intervention (one week).
Time 2 = Post-intervention (final day).
Time 3 = 6 weeks post-intervention.
Time 4 = 3 months post-intervention.

Table 5: Height before and after the intervention.

<table>
<thead>
<tr>
<th>Time measurement taken</th>
<th>Height in cm of the participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child A</td>
<td>80 85 90 95 100 105 110</td>
</tr>
<tr>
<td>Child B</td>
<td>80 85 90 95 100 105 110</td>
</tr>
<tr>
<td>Child C</td>
<td>80 85 90 95 100 105 110</td>
</tr>
</tbody>
</table>

Height in cm.
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds.

**Time 1** = Pre-intervention, (one week).
**Time 2** = Post-intervention, (final day).
**Time 3** = 6 weeks post-intervention.
**Time 4** = 3 months post-intervention.

Table 36 a/b/c: Language strategies used by parents before and after the intervention.
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger
provocation programme for children who have had prolonged periods of tube feeds.

Child B parent behaviours

Child C parent behaviours

Language strategies used by parents
to support mealtimes

Type of language strategy

Child A Child B Child C

Language strategies used by parents 
to support mealtimes

Type of language strategy

Child C parent behaviours

reprimands
cooxing
commenting

reprimands
cooxing
commenting

pre 6 wks 3 mths

pre 6 wks 3 mths
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds.

Table 47a/b/c: Mealtime strategies used by participant children before and after the intervention.

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reprimands used during time of Time 1, (assessment pre-Intensive or Traditional Approach).</td>
</tr>
<tr>
<td>2</td>
<td>Reprimands used during mealtimes at 6 weeks post Time 1.</td>
</tr>
<tr>
<td>3</td>
<td>Reprimands used during mealtimes at 3 months post Time 1.</td>
</tr>
<tr>
<td>4</td>
<td>Use of coaxing during time of Time 1, (assessment pre-Intensive or Traditional Approach).</td>
</tr>
<tr>
<td>5</td>
<td>Use of coaxing during mealtimes at 6 weeks post Time 1.</td>
</tr>
<tr>
<td>6</td>
<td>Use of coaxing during mealtimes at 3 months post Time 1.</td>
</tr>
<tr>
<td>7</td>
<td>Use of commenting during time of Time 1, (assessment pre-Intensive or Traditional Approach).</td>
</tr>
<tr>
<td>8</td>
<td>Use of commenting during mealtimes at 6 weeks post Time 1.</td>
</tr>
<tr>
<td>9</td>
<td>Use of commenting during mealtimes at 3 months post Time 1.</td>
</tr>
</tbody>
</table>
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds.

**Child A behaviours**

- **Initiation**: Decreased from pre to 6 wks, then decreased further to 3 mths.
- **Ignoring**: Relatively stable throughout pre, 6 wks, and 3 mths.
- **Leaving the table**: Increased from pre to 6 wks, then decreased to 3 mths.

**Child B behaviours**

- **Initiation**: Increased from pre to 6 wks, then decreased to 3 mths.
- **Ignoring**: Decreased from pre to 6 wks, then increased to 3 mths.
- **Leaving the table**: Increased from pre to 6 wks, then decreased to 3 mths.
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provocation programme for children who have had prolonged periods of tube feeds.

Child C behaviours

1 = Language initiated with parent during time of Time 1, (assessment pre - Intensive or Traditional Approach).
2 = Language initiated with parent during mealtimes at 6 weeks post Time 1.
3 = Language initiated with parent during mealtimes at 3 months post Time 1.
4 = Ignoring of parent’s communication about the meal during time of Time 1, (assessment pre - Intensive or Traditional Approach).
5 = Ignoring of parent’s communication about the meal during mealtimes at 6 weeks post Time 1.
6 = Ignoring of parent’s communication about the meal during mealtimes at 3 months post Time 1.
7 = Leaving the table during mealtime at Time 1, (assessment pre - Intensive or Traditional Approach).
8 = Leaving the table during mealtimes at 6 weeks post Time 1.
9 = Leaving the table during mealtimes at 3 months post Time 1.

Mealtime strategies used by the children.
An evaluation of an intensive desensitisation, oral tolerance therapy and hunger provoke programme for children who have had prolonged periods of tube feeds. ID JBR-10-0168 R1