Introducing solid food – spoon fed, baby led - which is best?

Charlotte Wright
Professor of Community Child Health, Glasgow University
Honorary Consultant Paediatrician, Yorkhill Children’s Hospital

Plan for presentation
• Why should complementary solids be introduced at age 6 months and why do mothers tend to start earlier?
• What is baby led weaning is and is it effective and safe?
• How do infants respond to feeding and how does this relate to aversive feeding problems?

Why start solids?
• As infant grows, nutrient requirements rise beyond capacity of breast milk to meet them
• Need to progress to more nutrient dense foods
  – Less bulky
  – Quicker too eat

The solid feeding equipoise
Too early          Too late

Too early
• Gut and kidneys not mature
• Lack neurodevelopmental skills
• Solids displace breast milk needed for immune protection

Too late
• Micronutrient deficiency: iron, vitamin D
• Reduced fat stores
• Slow growth
• Missed opportunity to develop tastes and feeding skills
The optimum time?
WHO recommend exclusive breast feeding to age 6 months

- Kramer MS, Kakuma R “Optimal duration of exclusive breastfeeding” Cochrane Database updated 2012
- Infants exclusively breastfed 6m have less morbidity and mortality
- Breast milk provides all nutritional needs up to age 6 months

But is breast milk really sufficient up to 6 months?

- Honduras trials of age of complimentary feeding – 4m versus 6m
  - No difference in weight gain
  - Reduced iron status in those with later solids
- Neilsson 2011 “Adequacy of Milk Intake During Exclusive Breastfeeding” PEDIATRICS 128: e907-14
  - Milk intakes higher than previous published figures
  - Increased slightly between 4-6 months, but fell when adjusted for mass
  - Steady average infant growth

But what about infants who are...

- Bottle fed?
- Large?
- Refluxing?

- Clinical discretion can always apply, but guidance needs to be clear and consistent
- Mothers everywhere think their child is the exception

Gateshead Millennium Study

- Prospective population based study of feeding and growth in NE England
- 1029 subjects born to Gateshead mothers 1999/2000
- Recruited in first week
- 4 questionnaires in first year
  - Questions on stopping breast and starting complimentary feeding, solid feeding
  - Routine weights retrieved from PCHR
  - Health check aged 13m (83%)

UK Infant feeding survey: proportion of 4 month olds who have already started solids and are still breast feeding

Change in recommended age of solids from 4 to 6m in 2003.
Reasons for starting solids

- My baby seemed hungry \( P=0.001 \)
- I thought it was the right time \( P=0.02 \)
- My family and friends told me to \( P=0.02 \)
- A book or leaflet suggested I should \( P=0.001 \)
- HF or doctor advised me

Percent agreeing, within each weaning category

How do babies react to first solids? (GMS food diaries)

Positive Reaction
- First offer 42% Fifth offer 77%
- No effect of age on reaction or rate of introduction

Infant feeding and morbidity

- Early solids (<3m vs >4m) associated with doubling of risk of diarrhoea \( p=0.02 \) at time of weaning
- Bottle feeding associated with 1.5-1.8 time increased risk of seeing GP for illness up to age 8 months \( p=0.001 \) to 0.03

Does starting solids early make you fat?

- Those weaned early were taller at all ages
- Weight gain before 6 weeks was strongest predictor of age started solids
- Weight gain after started solids was unrelated to age started solids = reverse causation
  But
- WHO cohort suggest that prolonged breast feeding does lower plane of weight gain

What first foods are offered?

GMS survey 2000
First food
- Baby rice 74%
- Commercially produced food 92%

Infant feeding survey 2010
- 47% 4-7m infants only ate commercial foods
  - 72% had only commercial foods on day before survey
- 93% 7-10 m infants ate home made food,
  - But 30% had only commercial foods on day before survey

What’s in commercial weaning foods?

- Survey of all baby foods available from 6 UK manufacturers during October 2010-February 2011
- 79% were ready made pureed foods
- 44% aimed at infants 4+ months, 2/3 sweet

<table>
<thead>
<tr>
<th>Food</th>
<th>Energy (KJ/100g)</th>
<th>Protein (g/100g)</th>
<th>Sugars (g/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial purees</td>
<td>282</td>
<td>2.3</td>
<td>10.9</td>
</tr>
<tr>
<td>Formula milk</td>
<td>281</td>
<td>1.4</td>
<td>7.6</td>
</tr>
<tr>
<td>Creamed potatoes+</td>
<td>511</td>
<td>4.0</td>
<td>2.8</td>
</tr>
<tr>
<td>butter &amp; cheese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toast with butter</td>
<td>1270</td>
<td>7.4</td>
<td>2.4</td>
</tr>
</tbody>
</table>
What is baby led weaning?
• First described by Rapley and Murkett in 2008
• Parent / web based movement
  – http://www.babyledweaning.com/
• All complimentary foods offered as bite size solids and infant left to self feed
  – Progresses at infant’s pace
  – No spoon feeding at all

What is appealing about BLW?
• Has stimulated us to realise that solid feeding now starts later, when there is greater developmental readiness
  – Standard feeding advice tends to assume much less capacity for chewing, reaching out
• Spoon feeding
  – Has high potential to be coercive
  – Is out of infant’s control
  – “designed” for premature weaning

What are the developmental requirements for solid feeding?
• Spoon feeding purees
  – Head steady and upright (3-4m)
  – Accept food into front of mouth (3-4m)
  – Move bolus to back of mouth*
• Finger foods
  – Reach out, pick up food, take to mouth (5-7m)
    • Suck / chew food and bite off piece
    • Or take whole piece into mouth
  – Chew food at front of mouth*
  – Move bolus to back of mouth*
*Acquired skill with exposure - ? Minimum age

When can infants self feed?

<table>
<thead>
<tr>
<th>UK</th>
<th>&lt; 6m</th>
<th>7-8m</th>
<th>9-10m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northstone 2000</td>
<td>43% toast 27% biscuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wright 2010</td>
<td>56% reached out for food 40% offered first finger food</td>
<td>94% reached out for food 80% offered first finger food</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carruth and Skinner 2002</td>
<td>Feeds self cracker/cookie 7.7 (6-14) months Finger food without gagging (8-9-10-12) months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carruth 2004</td>
<td>68% begun grasping foods 53% able to chew food</td>
<td>Self feed finger foods 10 months</td>
<td></td>
</tr>
<tr>
<td>Khan 2009</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UK</th>
<th>&lt; 6m</th>
<th>7-8m</th>
<th>9-10m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northstone 2000</td>
<td>34% toast 27% biscuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wright 2010</td>
<td>60% reached out for food 80% offered first finger food</td>
<td>66% reached out for food 50% offered first finger food</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carruth and Skinner 2002</td>
<td>Eats cracker/cookie 7.7 months Finger food without gagging 8.44 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carruth 2004</td>
<td>68% begun grasping foods 53% able to chew foods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khan 2009</td>
<td></td>
<td>Eats finger food 10 months</td>
<td></td>
</tr>
</tbody>
</table>
Is baby led weaning beneficial?

- Two studies found BLW to be protective against ‘obesity’ (lower weight)
- Brown (2013) found BLW infants to be more satiety-responsive, after adjusting for BF duration, timing of solids, and maternal control

but
- Observational studies rely on self selection
  - Likely to be many confounding factors
- Lower average weight could reflect undernutrition
- No randomised controlled trials yet

Is baby led weaning safe?

- 1/7 children in GMS cohort had not reached out for food by 7 months
  - Generally less developmentally advanced
- BLW assumes little or no useful solid intake in first 2 months
  - Complementary solids are needed by 6 months to ensure sufficient micronutrient intake
- Malnutrition: one study (Townsend 2012) found 5% BLW babies < -2SD for BMI and 2% < -3SD
- Choking: no horror stories – but there are anecdotes

Choking hazard or learning experience?

Baby led weaning in Nairobi

Do BLW parents actually follow BLW?

- Surveys suggest that most actually use mixed approach
- Anecdote (and logic) suggests that many parents try and give up

Spoon feeding as coercion
At present how is your baby’s Appetite?

Avoidant eating behaviour in GMS

- When given food, how often does baby?
  - Push food away, turn head, close mouth, gag, hold food in mouth, spit, throw food, cry
  - Rated: rarely (0), sometimes (1), often (2)

<table>
<thead>
<tr>
<th></th>
<th>8 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (0–1)</td>
<td>48%</td>
<td>25%</td>
</tr>
<tr>
<td>Medium (2–5)</td>
<td>35%</td>
<td>55%</td>
</tr>
<tr>
<td>High (5)</td>
<td>17%</td>
<td>20%</td>
</tr>
</tbody>
</table>

“You can’t make a child eat, but you can make a child not eat”

Maureen Black, Baltimore

How should mothers feed their child?

- Coercion / forcing
- Laissez faire / BLW
- Restraint / restriction
- Severe malnutrition / medication
- Lively, developmentally advanced, hungry baby
- Hungry baby heading to be obese

Answer = Responsively

Responsive spoon feeding

Responsive feeding