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Sequential Oral Sensory Approach to Feeding (16-19 May 2016)
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This was a 4 day course run by Dr Kay Toomey a paediatric psychologist and Dr Erin Ross a speech pathologist. They work together to run the SOS feeding Solutions clinic, assessing and treating young children with feeding problems at the STAR Centre in Colorado USA. This approach addresses problematic feeding, by using a systematic desensitisation approach with a focus on skills development. A comprehensive multidisciplinary assessment of the whole child (including health and physical status, all motor systems, sensory development, developmental levels and cognition, learning and behaviour, nutrition and environment) is at the core of this approach. It supports parents to understand and gain skills to help change their children's eating. Interventions focus on direct work either in individual or group settings carried out by the therapists and psychologists and supported by parents. The course was attended by wide range of professionals including Occupational Therapists, Speech and Language Therapists, Dietitians, Clinical Psychologists and some education staff.

The aims of the course were:

1. To identify oral sensory, cognitive and emotional developmental milestones key to feeding.
2. Recognise and describe the major reasons children won't eat, based on learning theory principles.
3. Identify physical, behavioural, motor, oral motor and sensory factors as part of a feeding assessment.
4. Apply behavioural and social learning principles and systematic desensitisation strategies to feeding problems.
5. Create and implement a SOS feeding programme for young children in group or individual settings.

Prevalence of feeding problems:

A wide variety of studies suggest that 20% of children up to 5 years have some kind of feeding and/or growth problem. 5-10% of children in this age group were identified as having significant feeding or growth problems.

Children with developmental issues often present with feeding problems FIRST. There is a strong link with ASD and some evidence to show that these children have poor skills acquisition and had started to restrict their diet by 15 months old

Special populations at risk:

- Preterm infants lag behind in skill acquisition. Evidence of problems in both earlier(25-36.6 weeks) and later preterm (34-36.6 weeks)
- Developmental disabilities: These were different kinds of problems for different populations e.g. children with Cerebral Palsy – tended to have dysphagia + poor oral motor skills, children with Down Syndrome had poor oral motor + selectivity by texture. They may also have sensory difficulties that might not always be diagnosed or recognised as a disorder.
- Growth problems: there are different ways of looking at this depending on the population - developed countries, US, special health and developmental needs. No real consensus in the data. Good growth doesn't always mean good development. This was a less clear area.

We also discussed problem feeding in the context of the DSM V new classification of ARFID – avoidant/restrictive feeding disorder. This is manifested by persistent failure to meet appropriate nutritional needs not related to a medical condition. This is not the traditional eating disorder diagnosis, but these children experience significant struggles with eating and nutrition. Symptoms typically start in infancy or childhood but can persist into adolescence or adulthood.

Developmental Milestones to feeding:

We looked in detail at all the developmental milestones important for the development of eating skills. These included motor, sensory, cognitive and communication milestones. As a speech and language therapist I was particularly interested in the detailed oral motor milestones that are critical for feeding:

2.5-3.5 months - Head control and semi flexed posture

4-6 months – hand to mouth play Reaching skills – reaches for bottle or spoon,

6-7 months – trunk control for independent sitting, stable head control, transfers from one hand to another, holds bottle in 2 hands

8-10 months – trunk rotation and weight shift, begin to move in and out of postures, voluntary release patterns, uses fingers to take food to mouth and to put in mouth to move food, start cup drinking

10-12months – independent sitting in a variety of positions, pincer grasp, poking with index finger and uses fingers to self feed

12-14 months – co feeding with parent, whole hand grasp of spoon, hold and tip bottle, holds cup with 2 hands

14-16 months – efficient finger feeding, 16-18mths - some practical utensil use

18-18months – pick up, dip and bring food to mouth, increasing utensil use- can scoop purees

24-36months – uses fingers to fill spoon, increasing fork skill, open cup drinking, one - handed cup holding

The presence of reflexes and how they fade or remain also impacts on developing oral motor skills. The following reflexes present at term have a great impact on how early feeding develops.

- Rooting →32 weeks PCA (post conceptual age)
- Gag →32 weeks PCA
- Transverse tongue reflex →28 weeks PCA
- Non nutritive sucking →11 weeks PCA
- Nutritive sucking →34-36 weeks PCA
- Coordinated suck, swallow breathe →37 weeks PCA

What became evident was that a more detailed oral motor assessment than I have previously carried out, will provide vital information for assessment and treatment and is equally important for children who do not have a diagnosis of any specific physical disability.

While assessment is multi disciplinary and may involve Occupational therapist, physiotherapist, psychologist and education staff, the key thing is pulling all the assessments together in the context of eating. They have found that feeding problems are mostly physical and skills base. This is often missed in children who do not have a specific medical diagnosis. Manipulating appetite without addressing the skills deficit is unlikely to be successful – skills support intake.

A clear idea of developmental levels and learning is also important. We can't expect a child to eat above their highest developmental level – this will have led to failure in the past.

Environment: Looking at recent studies of mothers eating habits and how they impact on children termed problem feeders, the impact was found to be associative rather than causative. The role of deprivation and neglect has been overstated. Environment is NOT the root cause of feeding problems but can often become problematic as a response to the problems presented. It is important to get the environment right when working on eating.

TOP TEN MYTHS ABOUT EATING

1. Eating is body's priority – No it is behind breathing and autonomic systems and postural stability
2. Eating is instinctive- No only for the first 4-6 weeks of life then reflexes fade and child starts learning to eat.
3. Eating is easy – No it requires integration of lots of processes.
4. Eating is a 2 step process –No there are 32 steps to eating
5. Its not okay to play with your food – No play is the most effective way of teaching new skills
6. Child will eat if hungry and won't starve themselves –No, they have to recognise hunger and have the skills to eat what they are offered.
7. Children only need to eat 3 times daily – No its better to eat more consistently throughout the day
8. Child who won't eat have behavioural OR organic problem – No its usually both
9. Certain foods are eaten at certain times of the day/certain foods are healthy – No these are mostly arbitrary rules
10. Mealtimes are a proper social occasion – No skills are the most important thing

The SOS Approach:

- Myths about feeding interfere with treatment
- Systematic desensitisation is the best and first approach to treatment
- Normal development of feeding is best route for treatment
- Food hierarchies/choices help sensory systems shift slowly into accepting new foods
- Majority of children referred for behavioural feeding problems also had medical/organic problems

Hunger: Up till 3 years of age children will eat until they have had enough – not until they are full. Saturation is driven by calories. Children have an internal calorie SET POINT that can be hard to change.

Behavioural and learning principals:

We spent some time on the different behavioural and learning approaches.

Classical conditioning: won't eat if it hurts – nausea, vomiting, and pain will be appetite suppressants.

Operant conditioning: After 6 months praise will increase positive behaviour. Under 7 years – adults imitating is rewarding e.g. eating when child is eating

Parents may be rewarding for refusal to eat e.g. making favourite food after refusal to eat first food.

Stress levels are important. Children won't be able to eat when they are stressed as adrenaline is an appetite suppressant

Positive reinforcement was emphasised

Positive reinforcement – praise, play with food, object reward

Negative reinforce – made to stay in chair, force fed – very aversive Giving food child can't manage is aversive

It takes the typically developing child 2-3 years to learn how to eat so progress may be slow and need to go through all the stages.

Eating new foods: after 12 months old the first reaction to new foods is to reject them, At 9-16 months a child will eat food from their parents plates. Emphasised the need for repetition. A child needs to chew and swallow a food 10 times before eating it regularly.

We also looked at Piagets theory of cognitive development and how this relates to eating and the development of feeding distress.

Below 3years don't have theory of mind →primitive stress response.

3 years and above can worry about what will happen in the future → hypervigilance

Feeding distress combined with increasing cognitive abilities leads to emotions being laid over the top of physical problems and to negative beliefs developing.

Attachment provides the framework in which the child learns self regulation.

We need to get a strong developmental history and information of the first 2 years of life.

Sensory development: The impact of sensory development on eating was discussed in some detail and the need for Occupational therapy input for assessment and therapy .

Sensory development begins in-utero with nervous system development and brain growth. The brain is dynamic and undergoes continuous change in response to useful and repetitive stimuli.

Arborization – growth of neurons making new connections with each other.

Pruning – unless dendric connections are useful and repeatedly used they are pruned to allow for greater efficiency

ASD – some research suggests that they can't prune and have excess connections..

Environment will also impact on number of connections.

Sensory Systems:

1. Visual
2. Tactile

3. Auditory
4. Olfactory - smell
5. Gustatory – taste
6. Proprioception – position, location orientation
7. Vestibular – balance and orientation in space
8. Interoception – ability to read internal body signs – sleep, temperature, appetite, emotion etc.

Eating – proprioceptor in jaw joint changes every time you chew. The head will move around as you eat constantly adjusting your sense of balance. Interoception will affect ability to recognise hunger, temperature etc.

Postural stability is very important and they looked at lots of different seating and ways of adjusting this.

Eating is the most difficult sensory task that children do.

Taste: in young infant taste receptors mostly at back of mouth and they experience taste differently from an older child.

Taste milestones: develop in utero from 12 weeks gestation when swallowing begins to include 3 months can detect flavour differences to 8 years have taste buds of an adult.

Flavour of amniotic fluid reflects flavours of mothers diet, as does flavour of mothers milk. Infants are more accepting of new flavours if they have experience of a variety of flavours.

Olfactory: newborn can recognise mother by smell within hours of breast fed.

Sensory Integration: being able to attend and then withdraw attention is key to managing sensory world.

Habituation: is a protective response and involves closing down the nervous system when too much stimulation from outside. This is essential to the newborns capacity for survival and helps deal with overwhelming demands on the immature sensory system.

Eating: Have to integrate all 8 of your sensory systems

Sensory Processing Disorder:

- Modulation – how you react to stimulation – over/under normal response.
- Discrimination – ability to tell differences along each senses continuum e.g. warm, hot, freezing, lukewarm (temperature continuum)

Over responsive child usually actively avoids non preferred foods and is negative and defiant or fearful and cautious

The under responsive child has fewer and slower responses to stimuli. They require a higher intensity and longer duration to elicit a response. They may withdraw and be difficult to arouse and/or may not register the information. They may lack hunger or thirst or saturation awareness. They may be self stimulation during meals e.g. rocking or humming.

Some children can be OVER and UNDER responders – they may have different modulation patterns across different systems.

We looked at a selection of videos demonstrating under and over responsiveness.

STEPS TO EATING

This is the structure used by the SOS approach. It is a 32 step process with a hierarchy of steps to improve tolerance. It starts with “tolerates” and goes up to “interacts with”.

We can use the structure to document where the child starts in the steps with each food (baseline) and chart changes over the weeks.

Developmental food continuum:

- Breast /bottle (0-13 months)
- Baby food cereals (5 months)
- Cereals + food puree mixed (5.5 months)
- Food puree stage 1(6 months)
- Thicker food cereals and thicker food purees (7 months)
- Soft mashed table foods (8months)
 - Hard munchables
 - Meltable hard solids
 - Soft cubes
 - Soft mechanical
- Mixed texture

Hard munchables are important for beginning food exploration. Experience with hard solid foods in the mouth helps move child's gag back in mouth, teaches lateral movements to practice moving food in the mouth and helps strengthen jaw and increase kinaesthetic awareness flex

Lots of food examples were given of the different textures for all the stages above.

GENERAL TREATMENT STRATEGIES

Start with what they are already doing. Use:

- A social modelling (family meals, demonstrating good feeding behaviours)
- B. structured meal/snack times (same place, cues, routines etc. Need postural stability) One preferred foods and several foods on table for exposure
- C. Reinforcement (praise, good parent child interactions, sibling eating)
- D. Accessing the cognitive – skills development from whatever level they are at.

MANAGEMENT OF FOOD JAGS

Food Jags are defined as when the child wants the same food prepared the same way over and over again. Eventually children get burned out with food jags and they get more and more restrictive.

Preventing food jags: Offer any one particular food only every other day. Need to change shape, colour, taste, then texture.

Aim for a "just noticeable difference – big enough to be noticed, small enough that they will still eat it!

Treatment programme and Therapy meals:

Criteria for selection Look at picky eaters vs problem feeders.

Picky eaters: are generally still growing. They are likely to be less restricted and eat with family – though may be different foods. Eats at least one food from most food groups, tolerates new foods on plate, Can regain foods lost due to "burnout".

Problem Feeders: The following red flags were identified for more long term significant problems with eating requiring intervention.

RED FLAGS!

- Ongoing poor weight gain or weight loss
- Ongoing coughing, choking or gagging during meals
- Ongoing problems with vomiting
- More than one incident of gastro oesophageal reflux
- History of traumatic choking incident
- History of breathing problems with ongoing respiratory issues
- Inability to transition to baby food purees by 10 months
- Inability to transition to table food solids by 12 months
- Inability to transition to cup by 16 months
- Not weaned off most baby foods by 16 months
- Avoidance/aversion fo all foods in specific texture or food group
- Food range of less than 20 foods
- Cries or arches at most meals
- Family fighting about food/feeding
- Parents repeatedly report child difficult for everyone to feed.
- Parent history of eating disorder and child with poor weight gain.

REASONS CHILDREN WON'T EAT

1. Pain and discomfort:

- GORD is a medical diagnosis for 51% of children with a major feeding issue.
- Others include neurological diagnosis, cardio-pulmonary, food intolerance etc. Constipation was diagnosed in 15% of children with major feeding problems. Treated constipation first with 12-24 week programme which increased appetite and growth.

2. Immature motor skills – oral motor, swallow etc.

3. Sensory processing problems

4. Learning/behavioural difficulties

5. Nutritional – inadequate intake, nutritional deficits

Additional Factors may also be a) child factors b) parent factors and c) environmental factors

We need to look at the history from conception. When did skills fall apart?

Look at current skills level – where do we start to build skills? Child needs appropriate skill first before appetite develops.

Observations:

- Look at responses to situation generally
- Skills level
- Skills deficits
- Reaction to food
- Physiological changes and stability.

Child factors – ability to attend and imitate, cues from child, responses to parent, development and temperament.

Parent factors – cognitive level, stress, knowledge of child development, cultural background, family history, beliefs.

Environmental factors- who feeds, where, how, what, routines

Look at child's skills and deficits. Parent behaviour is usually explained by the child's behaviour (not usually what caused the problem)

THErapy MEALS: A programme of intervention will include "therapy meals". These are food exposure sessions based around play. Ten foods (including one drink) are used with a focus on moving the child up in the steps to eating hierarchy with different foods. All food types outlined above would be used in the session. These sessions may be group or individual.

Three goals

1. Skill development- bottom up approach
2. Experience a wide range of foods – systematic desensitisation and positive reinforcement
3. Movement up the "steps to eating" hierarchy

Systematic desensitisation:

1. Teach muscle relaxation
2. Graduated hierarchy of stimuli
3. When patient becomes anxious go back to the last successful step
4. Child always in control
5. When the goal is skill, there is always positive reinforcement.
6. Always use "live" situations and real foods – no oral motor exercises.
7. Each exposure step is paired with a positive social experience
8. Stick to the steps hierarchy to move in graded steps

Look at conditioning cues – what do we need to change? People, utensils, place, time etc

Communication: Use language to assist the child to eat and to manage maladaptive behaviours: Don't use demands, commands or questions. How we talk during the meal is critical!

Use positive language e.g. "you can..."

Use statements about what you expect the child to do and to clarify the rules e.g. "food stays on the table" but can have a scraps bowl or hide it under a napkin, or give it to another person

Be specific about what you are reinforcing e.g. "good mashing that with your teeth"

Use language to describe food e.g. "a big smell"

Group vs individual therapy

Group – social, 12 weeks, parents not present, opportunities to watch/imitate other children

Individual – can be more specific to needs, can be flexible time, parents always present.

SESSION STRUCTURE:

1. Child participates in sensory motor activity – obstacle course, gym etc
2. March to feeding room with song
3. Sit at table and wash and dry hands and face

4. Pass around plates and napkins
5. Present foods one at a time – all in clear plastic bags
6. Child never forced to eat – encouraged to smell touch, play etc
7. Introduce each food in a fun way and link it to the previous food
8. Clean up routine – scrape plates, wipe table, washes hands

Food Hierarchies:

- Choose 7-14 foods
- Always start with a preferred food
- Last food usually a chewier, sweeter food
- Drink to finish
- Foods remain the same for the first 3 sessions
- Then begin to change 25-50% of foods

Need to have:

- One protein, one starch, 1 fruit or vegetable, 1 drink
- 1 hard munchable, 1 meltable hard solid, 1 puree
- Each food linked to food before. Smaller sensory changes to start with.

Present a wide range of foods – range drives up volume of food taken!

Lots of detail was given about preparing food hierarchies and how to break down to small steps. We also looked at how to do this in school and home settings.

Lots of tips were given about running groups and roles of different helpers. Group needs one clear leader. There were also lots of examples of how to implement the steps to eating and how to break this down into small incremental steps.

Research and data:

Creech (2006) – looked at behaviours during a structured mealtime. 10 children 17-31 months. Found increase in positive mealtime behaviours and food interaction though no change to self feeding skills. They found decrease in negative mealtime behaviours, sensory responses and food rejection.

SOS approach internal audit – children transitioning off tubes who start on step 1 of hierarchy take average time of 24 months

Parent education programmes – parents liked these when in conjunction with hands on “treatment

Summary:

This course covered all the objectives outlined above in detail. There were lots of practical examples and video of session which was extremely useful

The SOS approach has been demonstrated to significantly reduce the frequency of child and parental problems using the Behavioural Paediatric Scale (Owen et al., 2012). Children with neurological difficulties including ASD have been shown to demonstrate a consistent positive trend in progressing with the steps to eating (a graded sensory exposure program as part of SOS; Benson et al., 2013). It also supports children to transition from peg fed to full oral diet in an average of two years (Toomey & Ross, 2011).

In our CAMHS LD team we have started to introduce individual food groups for several children. We are planning further multidisciplinary individual interventions and some groups later in the year. We are getting increasing numbers of referrals involving restrictive eating, particularly with the ASD population. This has given us an evidence based structure for interventions and we are putting in a proposal for further resources to develop this within our team.

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