

are made to force feeds after his requirements, as judged by disinclination to take more or passing off to sleep, have been met. Detailed charts showing amounts in a feed have been kept for some of these babies over a period of time. The results have been most instructive and fully confirm Wallgren's observations on breast-fed babies.

Though I am not in complete agreement with the views expressed by some that a healthy baby cannot be overfed, experience has taught that underfeeding is a very much more common fault than overfeeding.

REFERENCES

- Hilditch, T. P. & Meara, M. L. (1944). *Biochem. J.* **38**, 29.
 Kon, S. K. & Mawson, E. H. (1950). *Spec. Rep. Ser. med. Res. Coun., Lond.*, no. 269.
 Ross, C. A. C. (1950). *Lancet*, **258**, 716.
 Ross, C. A. C. (1951). *Lancet*, **261**, 190.
 Stearns, G. (1939). *Physiol. Rev.* **19**, 415.
 Wallgren, A. (1945). *Acta. Paediatr., Stockh.*, **32**, 778.
 Williamson, M. B. (1944). *J. biol. Chem.* **156**, 47.

Difficulties of Infant Feeding

By A. V. NEALE, *Department of Child Health, University of Bristol*

There is no field of practical infant management of greater importance than that connected with the quick, precise and satisfactory solution of problems concerning alleged or real difficulties in infant feeding. In all spheres of paediatric practice there is a regular flow of such disorders, and each example needs individual consideration in order to find the correct solution. Like many other apparently simple clinical matters, the proper assessment of a feeding difficulty may call for the highest ability, either in detecting an unsuspected minor disturbing influence or in recognizing a potentially serious organic cause. A good understanding of the relationship between mother and infant is necessary as a background; an infant-welfare clinic will usually provide abundant training and experience in the social and psychological factors involved. Perhaps the increasing tendency for a mother to discover a feeding difficulty is a sign of present-day anxieties and, not least, is often a reflexion of socio-medical difficulties in accommodation, adaptation or adjustment, arising out of the housing problems of young parents.

Psychological considerations. Undoubtedly, worries and troubles in the mother's mind are the essential matter in very many instances; they may arise through the sheer lack of common sense of a young, ignorant and somewhat emotionally immature woman, or strangely enough, they may be the reaction of the elderly, knowledgeable mother who is carrying an unusual load of anxiety about her first and possibly last baby. A careful and quietly observant approach must be made by the doctor wishing to discover the whole truth. A mother may be quite reticent over the facts really helpful for understanding her problem as a whole. It is certainly no occasion for hasty and superficial methods. The whole story quietly told and explored is essential. An air of sympathetic understanding of the mother's feelings and sense of responsibility must be revealed, and a genuine wish to understand and help must be shown.

There is reason to believe that some cases of difficult feeding fail to reach a satisfactory solution because the doctor, midwife, nurse or health visitor will not attend to these simple preliminaries. A clear, quick and accurate analysis can only be made when the doctor is really informed upon the subject. The adviser should have a thoroughly competent knowledge of the physiology of lactation. A wrong decision, and one which may at the same time give the mother a false sense of security may simply deepen the difficulties.

It is here that mention should be made of the many very simple technical errors in breast feeding that can be easily adjusted, but that may unfortunately be quite overlooked, or worse still, grossly exaggerated, and may lead on to bad advice about possible weaning. Also, most regrettably, that pernicious story is still all too often heard about human milk not being suitable to the baby, a remark which might be regarded as the highest evidence of the lowest clinical ability in paediatrics. Doctors or midwives must remember their special responsibility in guiding the mother through the crucial first month of efficient, normal, natural lactation, which will give her effective confidence to continue and enable the baby to have a flying start in nutrition, and even, probably, provide certain psychological advantages.

Early feeding difficulties may be very disturbing to the lactational mechanism itself, and vicious cycles may quickly arise. There is much to be said, therefore, for a preventive approach, which concerns itself particularly with maintaining the association between mother and baby ('rooming-in') during the puerperium, so that an early, self-controlling procedure of nursing is created; sudden changes are thus avoided from hospital routine to home management. Otherwise many young and inexperienced mothers tend to worry themselves into infant-feeding difficulties and to develop a fatalistic attitude towards a failing lactation. Success in avoiding the difficulties breeds contentment with a real feeling of achievement and understanding in the mother, and it should be remembered that the achievement of success may mean well for subsequent occasions. On the other hand, unsolved and disappointing breast-feeding difficulties can run seriously counter to maternal hope and may occasionally give rise to some sense of inferiority.

The mother's health. Analysis of a feeding difficulty will obviously include such factors as the health of the mother and baby, including the presence of congenital defects or debilitating sepsis or prematurity. The mother's health is important. She may have a badly planned daily routine and is declining through excessive zeal and over-conscientious and obsessional attention to detail, through insufficient rest and sleep, or through a post-puerperal anaemia. In addition, she may have an anxious worried feeling about her husband, about finance, and about her domestic work, all leading her to imagine that the baby is unwell and to suspect that her own milk is unsuitable. Clearly a check on all such possibilities is only part of the individual clinical investigation. No detail in advice must be omitted. Distraction through excess of visitors, lack of peace and comfort at feeding times, coupled with apprehension through lack of experience and sound advice, may all be important. Many mothers contend heroically with most embarrassing circumstances, in noisy overcrowded flats with very poor facilities, and where their relations with their neighbours

are spoilt perhaps by a restless, crying, ill-fed baby that chooses the night season for its major disturbances. Sometimes a noisy flat overhead will prevent a baby from following its own essential rhythm of sleep so that the nervous reaction creates a feeding difficulty. Lack of fresh air and long confinement through the winter in a top flat without access to the open air are bad factors contributing to the situation.

Such are some of the common, modern factors to be remedied when possible. Small doses of phenobarbitone may be extremely useful in some circumstances. Much of the disharmony in mother and baby can be prevented or diminished by reassurance and advice from an experienced mothercraft sister, an almoner, or the doctor if not too busy to appreciate the real significance of the small causes alleged. Infant-welfare centres can certainly excel in such work, and where antenatal, lactational training can be given too, an even greater defence against this kind of feeding difficulty can be built up. Experienced nurses are convinced that most difficulties in breast and bottle feeding arise from the mother's lack of knowledge and experience in looking after a new baby. The mother may be genuinely nervous of handling the baby and lack confidence in her ability to care for it properly, or she may not understand the importance of holding the baby comfortably or how to overcome its tendency to swallow air. Distension of the stomach with air may be a major factor in difficult feeding. It may arise in a variety of ways, but it should be recognized that the baby's own quick, restless temperament and method of approach to the meal are contributory. How much of the last is cause or effect cannot be elucidated without some understanding of the baby's early emotional responses, which should certainly not be neglected in studying infant feeding and its difficulties. In their varied responses babies are definitely individuals, a fact which emphasizes again the difficulties that overelaborate, mechanical routine in infant feeding may create. A self-demand programme, especially in breast feeding, has often remedied difficulty arising from a mother's too conscientiously clock-regulated routine. An intelligent mother soon learns how long it takes to feed her healthy, vigorous baby, and the breast is often emptied in a surprisingly short time. Dawdling about at breast feeding is unwise; it leads to exhaustion of mother and baby. Air may be swallowed during continued sucking at the emptied breast. Ten minutes at each breast is the aim. Difficulty will arise through the baby's fatigue if its efforts at the breast are unduly prolonged. It is better to preserve the baby's vigour by a complementary feed rather than allow such secondary upsets to occur. Peculiar disturbances of rhythm are occasionally seen; for instance a baby aged 6 weeks took 7 oz. at the 6.0 a.m. feed; at 10.0 a.m. he was sound asleep and showed no interest when put to the breast, but with persuasion he took 1 oz.; he then slept soundly till 4.0 p.m. when he woke and took a normal feed. Clearly there was no real difficulty in this instance.

Difficulties may arise if parents have busied themselves too much with book knowledge so that each minor detail of the child's health is overexaggerated. The mother should study her baby intelligently and without fear, and so learn by observation, if not by instinct, her own baby's requirements but, as a skilful ward sister put it, 'it is important that the baby should be really wanted in the home', otherwise the

feeding difficulties appear to be endless. The psychological situation is, thus, continually important and often strikes the dominant note.

In breast feeding, inadequately developed nipples, or nipples recurrently sore or cracked, or over-engorged breasts which are painful to the mother and which make it almost impossible for the baby to take proper hold of the nipple constitute special difficulties but suggest their own remedies. An adverse psychological reaction or undue apprehension on the part of the mother may lead to failure of the preliminary mechanism that 'lets down' the milk within the gland so that the initial pumping action of the baby's mouth is less effective and difficulty quickly becomes apparent.

The feed. A complementary artificial feed may not be immediately acceptable. A change of taste or temperature or differences between the nipple and the teat may disconcert the infant. A rate of flow that is too rapid may frighten or overpower the baby, or one that is too slow may tire it and cause air to be swallowed. A change of the person holding the baby for a complementary or supplementary feed is not wise, for 'it's bad enough to have different food but it's the "last straw" if mother is not even holding him'.

Many mistakes of technique can be made in bottle feeding. The bottle may be held at the wrong angle to the mouth; the person feeding may be inattentive; the feed may be too hot or too cold, or badly mixed or inconsistently sweetened; the food or the person preparing it may be unnecessarily changed, causing the texture or taste to be unfamiliar; the milk if peptonized may have become bitter if treated for more than 20 min.; lactic-acid milk may have curdled through heating to about 100° F. All such mistakes are obviously matters of possible importance.

Causes of difficulty in both breast and bottle feeding may be a block in the nasal airway; a silent sore throat and pharynx or a cold leading to loss of appetite; over-heating or chilling; irritation from a wet or rough napkin; gastric air-bolus; too great delay in feeding; or even the presence of the teat under the tongue when no amount of effort is in the least successful! However, after all these matters have been attended to, there is still the inexplicable factor that some persons can persuade most babies to take their feeds and some persons cannot; but continuous concentration, a steady pull on the nipple or the teat, a comfortable nurse and baby, with a warm pleasing feed, a peaceable atmosphere, together with optimism, all combine towards avoidance of difficulty in feeding.

Primary metabolic disorder is rarely concerned with difficulty in feeding. Occasionally a drug with an irritating taste may be secreted with the breast milk. Trials of so-called galactogogues such as thyroid extract may convey a diarrhoeal influence to the feeds. An untreated cretin, after several weeks of life, may have appreciable difficulty in maintaining its feeding status. Allergic sensitivity to cow's milk may be very real and call for special measures. Lethargy in neonatal jaundice may bring the added danger of dehydration unless a means is found of supplying enough fluid by frequent small feeds or by temporary oesophageal feeding. The newborn infant that suffers a big loss of weight in the first week of life becomes lethargic and loses appetite, so that a short period of oesophageal feeding may be necessary to restore vigour and weight. Refusal of food by a baby with a previously good record, may be the first

sign of infective toxaemia and requires alertness to make a diagnosis and, if necessary, special measures to supply fluid and prevent aggravation of the condition by dehydration. Retropharyngeal abscess or even irritant pharyngitis may seriously interfere with normal swallowing. Anorexia in a baby with gastro-enteritis is a grave sign.

Mentally abnormal infants. Abnormal babies such as Mongols, and those likely to prove mentally abnormal through severe injury or asphyxia at birth, through cerebral agenesis, or through genetic causes, may show apathy towards feeding and reveal poor powers of sucking. Assessment of such conditions may be uncertain, but in severe cases with bad prognosis the feeding difficulty may not be pursued too officiously. Special care in diagnosis must be given to such possibilities as neonatal meningitis (*Bacterium coli*) or subdural haematoma.

Underfeeding. In the healthy baby underfeeding is the commonest problem. Difficulties arising from the feed itself are usually due to errors in the quantity or method of reconstitution rather than in the actual composition. A wide range in the efficiency of the intestinal digestive enzymes ensures that the healthy infant has a wide tolerance except for a gross excess of fat. In underfeeding or insufficiency from difficult feeding associated with air swallowing and secondary vomiting, the baby fails to thrive, constantly cries from hunger and abdominal pain, and has gaseous intestinal tension, constipation or a mucinous diarrhoea. The quantity of the feeds should be judged according to the infant's own metabolic requirements; some infants require up to 80 Cal./lb. body-weight daily to satisfy them and give a steady gain in weight, which frequently proves to be more than the standard. The average rate of weight gain is greatest in the first 6 months and greatest of all in the first 2-12 weeks.

Overfeeding. Mothers and some midwives frequently attribute certain signs, particularly loss of weight, to overfeeding, but this is rarely correct. Absurd miscalculations in making up feeds usually provide the answer. True overfeeding sometimes occurs in the breast-fed baby in the first 10 days, when the milk comes suddenly and in great abundance, and is likely to be of high fat content; the quantity and consistency of this creamy deep-yellow milk usually soon adjusts itself to the baby's needs and of course no question of weaning should ever arise in such circumstances.

Prematurity. Nearly all infants of less than $3\frac{1}{2}$ lb. weight need oesophageal feeds for at least the first week of life. Feeding with a pipette or spoon is contra-indicated owing to the danger of the feed being inhaled. If the premature baby cannot suck from the ordinary boat-shaped bottle it needs oesophageal feeds, or it will become unnecessarily exhausted and fail to get enough, with dehydration and excessive weight loss as the consequences. The difficulties peculiar to the feeding of premature babies are many, but with good progress bottle or breast feeding can be introduced gradually.

Two-hourly feeding is contra-indicated; it causes too much disturbance and handling which in turn introduce their own difficulties.

Congenital malformation. Cleft lip and palate, micrognathia, choanal stenosis or atresia present particular problems. In the last, the feeding difficulty is a continual dilemma for the infant, but the difficulty can be slowly overcome by perseverance. Extreme degrees of micrognathia require a special technique in feeding to aid the mouth floor and bring the tongue forward so as to keep the pharynx accessible for

swallowing. In severe cases of cleft lip and palate the infant's normal process of oral pumping and swallowing is quite disorganized, and oesophageal feeding may be necessary for a period, followed by spoon feeding, with the baby held as upright as possible; a shovel-shaped spoon makes the administration of fluid easier and reduces spilling. Actually, babies with cleft lip only, can usually pump better at the breast than at the bottle, since the breast tissue tends to close the gap. In cases, however, where an early operation is contemplated some surgeons prefer spoon feeding from the start, so that the baby becomes accustomed to the method of feeding which will be necessary after the operation. Congenital pyloric stenosis is still, unfortunately, too often confused with feeding difficulty, and the old-time story is still heard of changing the feed or even of taking the baby off the breast.

Malformations of the oesophagus may present some important problems in infant feeding. Mention must be made of the urgency of diagnosis in the swallowing difficulty caused by congenital oesophageal atresia; delay of more than 6 h in recognizing the condition is serious. Disorder caused by hiatus hernia may be alarming and the periodic, intractable vomiting, with possible haematemesis, which it causes may create acute feeding difficulty. Functional oesophageal regurgitation due to a lax cardiac sphincter (congenital chaliasia) is a common cause of feeding difficulty, and much waste of food and failure to gain weight may occur; the tendency may continue for several months and may be remedied only by the ingenious use of thickened feeds or of small amounts given frequently, but spontaneous recovery is the rule. Simple rumination causes no disturbance in feeding.

Continuous gastric-drip feeding has particular use in the recurrent vomiting caused by lax oesophageal sphincter or sometimes in cases of hiatus hernia; at the end of 2 months if difficulty persists cereal feeding can be begun, the thicker medium tending markedly to diminish the oesophageal reflux. These techniques are very valuable for relieving this particular form of feeding problem. Spoon feeding also may have special temporary advantages. The feeding difficulties consequent upon gastro-enteritis, pyloric stenosis or any other organic alimentary obstruction will naturally be remedied only by treatment of the primary cause. Oesophagitis due to thrush infection may produce special difficulty in swallowing; treatment is urgent.

It is sometimes forgotten that difficulty in infant feeding may be due to underlying congenital heart disease; collapse or struggling or refusal to take the feed at any stage may arise from the cardiac embarrassment with or without cyanosis, and in one particular form where the coronary artery arises from the pulmonary artery, a kind of anginal reaction of exhaustion may be noticed during feeding.

When the infant swallows, a peculiarly specialized action with the tongue plays a highly important part in the pumping action and the pharyngeal projection of the fluid. In infancy, the tongue is naturally more anchored at the frenum than later, so that tongue tie, if it ever exists as such, is not a cause of feeding difficulty.