feeding and, in some cases, bottle feeding as well

- Although frenulotomy is a simple low risk procedure, it should be carried out only by those who have been trained in the procedure[25]
- It can be justified only if it is likely to lead to significant improvement in the comfort and the continuation of breast feeding, or of other longer term problems for the child
- We do not know the true prevalence of significant tongue tie
- There is no evidence one way or the other about inheritance
- On current evidence, there is no justification for actively searching for tongue tie during routine examination, but when mothers are having difficulty in breast feeding this should be considered as one of several possible causes
- The diagnosis should rest primarily on observation and analysis of feeding difficulties rather than the static appearance of the tongue
- It may be wise to be particularly cautious in making this diagnosis in the first two or three days before lactation is established
- The problem is of sufficient interest and importance to merit further studies of both breast and bottle fed babies, in which more precise case definition, measures of inter-observer reliability of pre- and post-intervention assessment, and ultrasound imaging are likely to play a key role
- Given the evidence that breast feeding has many advantages for both mother and baby, funding should be sought for carefully planned definitive studies on the issue.

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Parental consent was obtained for publication of the babies in figure 1

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Endocrinology

Children with diabetes benefit from exercise

J I Wolfsdorf

Commentary on the paper by Massin *et al* (see page 1223)

How much physical activity do children require to obtain beneficial health and behavioural effects? The recent report concerning the effects of regular physical activity on health and behavioural outcomes in 6–18 year old youth recommends that school age youth should participate daily in at least 60 minutes of moderate to vigorous physical activity that is developmentally appropriate, enjoyable, and involves a variety of activities.[1] There is strong evidence for beneficial effects of physical activity on: musculoskeletal and cardiovascular health, adiposity in overweight youth, and blood pressure in mildly hypertensive adolescents. Physical activity also has a beneficial effect on anxiety, depression, and self-concept. The 60 minutes or more of physical activity can be achieved in a cumulative manner in school during physical education, recess, intramural sports, and before and after school programmes.

Exercise requires considerable alterations in fuel metabolism and presents unique challenges for the person with type 1 diabetes mellitus (T1D).[2] During the first 5–10 minutes of moderate intensity exercise, skeletal muscle glycogen is the major fuel for working muscle. With increasing duration of exercise, plasma glucose and non-esterified fatty acids (NEFA) predominate, and to meet the increased demand for fuel, a complex hormonal and autonomic response increases hepatic glucose production and mobilisation of NEFA from adipose tissue. Plasma insulin concentration decreases and levels of the counter-regulatory hormones (adrenaline, noradrenaline, glucagon, cortisol, and growth hormone) increase, resulting in enhanced hepatic production of new glucose from gluconeogenic substrates such as lactate and glycerol. Large quantities of the glucose transporter protein GLUT4 are recruited to the membrane of contracting muscle, independently of insulin, increasing glucose transport into muscle.[3] These changes result in the increased fuel supply required to match glucose utilisation by exercising muscle and prevent hypoglycaemia. After prolonged exercise, liver and muscle glycogen stores are low and hepatic glucose production is accelerated. Resynthesis of muscle glycogen is, initially, largely a result of increased GLUT4 transporter activity and insulin sensitivity.

Glucose homoeostasis, which depends on the balance between tissue glucose uptake and hepatic glucose release, is influenced by the plasma levels of insulin and counter-regulatory hormones. The normal regulation of insulin secretion is lost in T1D, and current methods of replacing insulin do not permit patients to mimic precisely the exquisite complexity of the normal physiological adaptations to exercise. Consequently, the child with T1D frequently experiences periods of either excessive or insufficient insulinaemia during exercise. When plasma insulin levels are relatively high, exercise causes blood glucose to decrease, whereas when insulin levels are low, and especially if diabetes is poorly controlled, vigorous exercise can aggravate hyperglycaemia and stimulate ketoacid production.[4] The child whose diabetes is out of control (marked hyperglycaemia with ketonuria) should not exercise until satisfactory glycaemic control has been restored.

Exercise acutely lowers the blood glucose concentration to an extent that depends on its intensity and duration and the concurrent level of insulinaemia.[2] In part, this results from accelerated insulin absorption from the injection site owing to increased regional blood flow and the massaging effect of contracting limb musculature.[5] If exercise is planned, the preceding insulin dose should be reduced by 10–20% and the injection given in a site least likely to be affected by exercise; for example, the anterior abdominal wall in the morning preceding a sports event. Because young children's physical activities tend to be spontaneous, this advice is often difficult to implement consistently. Extra snacks (for example, 10–15 g carbohydrate per 30 minutes of vigorous physical activity depending on the child's age) before and, if the exercise is prolonged, during the activity are used to compensate for unplanned bursts of increased energy expenditure.

Exercise may be more predictable in older children and adolescents, and hypoglycaemia can usually be prevented by a combination of anticipatory reduction in the pre-exercise insulin dose or a temporary interruption of basal insulin infusion in patients who use continuous subcutaneous insulin infusion (CSII) together with supplemental carbohydrate before, during, and after physical activity. The optimal strategy in the individual child depends on the intensity and duration of the physical activity and its timing relative to the child's usual dietary and insulin regimen. After prolonged or strenuous exercise in the afternoon or evening, the pre-supper or bedtime dose of intermediate acting insulin should be reduced by 10–30% (or an equivalent temporary reduction in overnight basal insulin delivery in patients using CSII). To further reduce the risk of nocturnal or early morning hypoglycaemia caused by the lag effect of exercise,[6,7] the bedtime snack should be larger than usual and contain carbohydrate, protein, and fat. Frequent overnight blood glucose monitoring is essential until sufficient experience has been obtained to appropriately modify the evening dose of insulin after exercise.

In this issue, Massin *et al* report the results of an observational study of the amount and intensity of physical exercise, measured by 24 hour monitoring of heart rate, in preschool, school age children, and adolescents with T1D.[8] The structured diabetes education programme at the authors' centre includes the recommendation to obtain regular physical activity. The message is reinforced by encouraging regular physical exercise at clinic visits and by attendance at diabetes camp where children learn about the effects of different types of physical activity on glycaemia. The study involved a "snapshot" of the lives of these children on a single weekday, and it is possible that subjects knowing that their physical activity was being measured affected the results. The majority of children with diabetes receiving care at this centre met the paediatric recommendations for physical activity and compared favourably to their non-diabetic peers. The authors also observed a significant inverse association between mean annual glycated haemoglobin and the amount of time spent in light and moderate physical activity in school age children.

Despite its limitations, the study suggests that light and moderate physical activity may be associated with better glycaemic control in school age children, but not in teenagers. What might explain the difference between children and teenagers? Diabetes management is even more challenging during puberty, and glycaemia is typically less well controlled than before puberty and in adulthood. This is attributable to a combination of the endocrinological changes characteristic of puberty[9] and less meticulous adherence to diet and insulin administration.

Although physical exercise is complicated for the child with T1D by the need to prevent hypoglycaemia, with proper guidance and preparation, participation in exercise can and should be a safe and enjoyable experience. Despite the lack of compelling evidence that physical training and exercise per se improve glycaemic control in children and adolescents with T1D,[10–16] exercise clearly offers many health and psychological benefits for people with and without diabetes. At least 60 minutes of moderate to vigorous physical exercise daily should be a component of a comprehensive programme of diabetes management in children. With the increased prevalence of overweight and obesity in the population, children and adolescents with T1D may also be overweight or obese.[17] For these children, exercise is a critical component of a weight management strategy. Exercise ameliorates risk factors (obesity, hypertension, and hyperlipidaemia) for cardiovascular disease,[18] but equally important, children with diabetes are likely to benefit from the enjoyment and enhanced feeling of self-worth derived from participation in physical activity with their peers.

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Management

Inter-hospital transport for children *and* their parent(s)

R C Tasker

Commentary on the paper by Davies *et al* (see page 1270)

Each year, out of a child population of 10.5 million in England and Wales, approximately 10 000 need treatment in paediatric intensive care units (PICU).[1] Almost half of these children are transported between the referring hospital and their regional PICU by a specialist team; currently, the Department of Health recommends that parents should not routinely travel with their sick child in the ambulance.[2] So, should we be allowing parents to accompany their critically ill child during inter-hospital transport—or should they make their own way? In this issue, the PICU team from Guy's Hospital report their experience of having the child's parent accompany them during inter-hospital transport.[3] An emphatic "yes" comes from the South Thames Acute Retrieval Service (STARS) that covers the south of England: they still "continue to provide the service" and hope that their "results may inform other services that are considering adopting a similar policy".

In many respects it has been an error to have not considered, before now, the question of parents accompanying their critically ill child. Over 10 years ago the American Academy of Pediatrics stated: "it is sometimes beneficial when transporting the anxious and sick child to have a parent accompany him or her in the transport vehicle".[4] In our defence, we could cite certain hurdles to progress—concerns about accident insurance for passengers, shortage of space in the ambulance, and staff anxiety because of the added burden of supporting relatives during transport.[5] The reality, however, is that the culture has evolved to exclude parents—we have streamlined the transport process and it avoids potential parental complications, by not having them there. The report by Davies and colleagues[3] reminds us that, like other areas in acute paediatric care, it is time to hear what parents feel and want, and now do something about it.

If we trace the pathway of care from acute presentation to later transfer to the PICU, we already know much about parents. First, in accident and emergency practice there has been growing interest in letting them stay by their child when procedures are performed, or at least giving them the choice about it. For example in the 1980s, Bauchner *et al* surveyed 253 parents and found that 78% would want to be present should their child need a blood test or insertion of an intravenous catheter.[6] In follow up studies, the same authors found, first, that parents chose to be present in 31 of 50 (62%) such procedures,[7] and second, as a consequence, they were less anxious and more satisfied with their child's care.[8] More recently, in a survey of 400 parents presented with five emergency department scenarios, Boie *et al* found that parents exhibited a hierarchy or order in their preference.[9] They were less inclined to be present with more invasive procedures, which, in decreasing order, were: venepuncture, 97.5%; suturing a laceration, 94%; lumbar puncture, 86.5%; resuscitation of a conscious child, 80.7%; and resuscitation of an unconscious child, 71.4%. However, irrespective of these preferences, Boie *et al* found that if a child was likely to die, most parents would want to be present. Second, we know that there is likely to be a conceptual gap between what physicians think is appropriate for parents to see and what parents consider is their choice to decide. In the survey by Boie and colleagues,[9] only 6.5% of parents wanted the attending physician to determine their presence by their child. In a similar emergency department study, but this time surveying 645 emergency staff (306 physicians and 339 nurses) on views about six scenarios, Beckman *et al* found that almost half of the physicians believed that they alone (44%) should decide whether parents should be present.[10] This difference in viewpoint—between parents and physicians—is not altogether unexpected given the cultural history of our specialty: there was a time when parents were excluded from many aspects of hospital paediatric care (for example, bedside visiting for inpatients, peri-operative transfer between the ward and the operating theatre, induction of anaesthesia, etc). Now, child *and* parent centred care is essential to what we practice—that is, good medicine in the context of listening to patients' and parents' voices, openness, good communication, and developing a relationship based on trust. In essence, what we should learn from the studies reported by Boie and colleagues[9] and Beckman and colleagues[10] are the reasons underlying the gap between 6.5% and 44%, in parents and physicians respectively.

Third, in children who are critically ill, transport to a regional PICU is often the next step after presentation to the emergency room.[11 12] Patients may well have undergone resuscitation and there could be significant risk of adverse outcome. In 1995, Woodward and Fleegler (from the Transport Services of the Children's Hospital of Philadelphia) had a unique opportunity to survey two groups of parents: a group