Catch up growth following abuse

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SUMMARY Poor growth in association with child abuse is well recognised, but the eventual outcome with respect to growth has not been clearly defined. In a study of 95 children who had suffered child abuse standard deviation (SD) scores for height and weight were significantly below the mean at presentation and improved at follow up. Sixty four children who remained at home showed significant increase in height SD scores only ($p < 0.01$). Twenty children were either taken into long term fostercare or adopted and showed significant increases in height and weight SD scores ($p < 0.001$ and $p < 0.01$, respectively). The remaining 11 children, who were fostered for short periods only, showed little change in either index. Catch up growth for height defined as a change in SD scores of one or more occurred in seven (11%) of the children at home compared with 11 (55%) of those taken into long term fostercare ($p < 0.001$). Catch up growth for weight occurred in 14 (22%) of those at home and 10 (50%) of those in long term fostercare ($p < 0.01$).

Children suffering child abuse show greater catch up growth when taken into long term fostercare. Growth patterns should be used to decide where these children are placed.

The association between child abuse and growth abnormalities is well recognised. Initial studies were based on children cared for in institutions,^{1 2 3} but later the problem was recognised in children in their own homes.^{3 4}

The definition of growth failure in the various studies has been different. Most have considered failure to thrive to be defined as weight or height, or both, below the third centile. This definition, however, excludes children whose height and weight measurements fall within the normal range but who are not achieving their genetic potential. Follow up studies are therefore important to detect such underachievement and to assess the relative benefits of various forms of placement and management.

Methods

Ninety five children referred to one paediatrician (LST) at the Children's Hospital in Sheffield formed the basis of the study. All fulfilled the criteria for child abuse and neglect warranting case conference and social work support. To permit direct comparison of children of different ages height and weight at presentation and at last clinic visit were recorded and expressed as standard deviation (SD) scores.⁵ The 95 children were then subdivided into three groups according to placement; group 1 comprised 64 children who remained at home, group 2 com-

prised 20 children taken into long term fostercare or adopted, and group 3 comprised 11 children who had short periods in fostercare and then returned home. Height and weight SD scores were calculated for each group. Catch up growth was defined as an increase in height or weight SD scores of one or more. The rate of catch up growth in the different groups was compared.

Statistics. One way analysis of variance, Student's *t* test, or χ^2 test were used as appropriate.

Results

Of the 95 children, 54 were boys and 41 were girls. Age range at time of referral was 8 weeks to 12 years and the range of follow up 9 months to 14 years. Mean height and weight SD scores at presentation and follow up are shown in Table 1. Age and length of follow up for the groups subdivided according to placement were similar (Table 2). There was no statistical difference in height or weight SD scores at presentation between the different groups. There was a significant improvement in height and weight SD scores at follow up for the whole group ($p < 0.001$ and $p < 0.01$, respectively). The greatest change in height SD scores, however, was seen in the children taken into long term fostercare ($p < 0.001$). Children who remained at home showed a smaller change in

height SD scores ($p<0.01$). Only children taken into long term fostercare showed a significant rise in weight SD scores ($p<0.01$). Catch up growth for height occurred in seven (11%) of group 1 but in 11 (55%) of group 2. The difference is significant ($p<0.001$). Catch up growth for weight was seen in 14 (22%) of group 1 and 10 (50%) of group 2 ($p<0.05$) (Table 3).

At presentation 38 out of 95 children had a height or weight below the third centile, and at follow up this had fallen to 19. However, 11 children whose height and weight were above the third centile at presentation showed catch up growth as defined.

Table 1 Mean standard deviation (standard error) scores for height and weight at presentation and follow up for 95 children suffering from child abuse

	Height		Weight	
	Presentation	Follow up	Presentation	Follow up
Total group (n=95)	-1.32 (0.1)	-0.9 (0.1)*	-1.17 (0.1)	-0.83 (0.1)**
Home (n=64)	-1.25 (0.1)	-0.98 (0.1)**	-1.1 (0.2)	-0.89 (0.2)
Fostercare (n=20)	-1.73 (0.3)	-0.8 (0.2)*	-1.38 (0.3)	-0.62 (0.3)**
Mixed care (n=11)	-0.93 (0.4)	-0.56 (0.4)	-1.07 (0.4)	-0.73 (0.4)

Comparison of SD scores for follow up and presentation: * $p<0.001$; ** $p<0.01$.

Table 2 Age at presentation and length of follow up for 95 children suffering from child abuse

	Placement of children (n=95)		
	Home (n=64)	Fostercare (n=20)	Mixed care (n=11)
Age at presentation (years):			
median	1.9	2.0	1.5
range	0.2-8.0	0.4-4.0	0.2-12.0
Length of follow up:			
median (months)	32	33	33
range (years)	0.8-8.0	0.8-14.0	1.0-4.0

Table 3 No (%) of children showing catch up growth for height and weight in 95 children suffering from child abuse

	Placement of children (n=95)		
	Home (n=64)	Fostercare (n=20)	Mixed care (n=11)
Height	7 (11%)	11 (55%)	2 (18%)
Weight	14 (22%)	10 (50%)	0 (0%)

Comparison of home v fostercare by χ^2 test: height $p<0.001$, weight $p<0.05$.

Discussion

This study shows an improvement in both height and weight at follow up for children with child abuse. The improvement in height is greatest, however, in those children taken into long term fostercare or adopted, and it was only this group of children who showed a significant improvement in weight. It could be argued that these children were the worst cases and thus had the most room for improvement. It is true that they were slightly lighter and shorter than the group who remained at home, but these differences were not significant. Their follow up weights and heights were greater than those of the children who remained at home.

This study group was similar to previous published reports in a number of respects.^{6 7 8} Forty per cent of the children had height or weight, or both, more than 2 SD below the mean, and at follow up 20% had similar measurements. Some of these children might have had genetically determined short stature, but as many of the parents themselves came from deprived backgrounds, and in view of the better growth in the fostered children, this may represent an example of the cycle of rejection. Our previous data showed that children who are at risk of abuse are smaller than their peers.¹⁴

Most studies only consider growth failure as height or weight 2 SD below the mean.⁹⁻¹² It may be more important to consider catch up growth in height and weight as this can occur in children whose initial measurements fall within the normal range. Children taken into long term fostercare have shown significantly greater catch up growth for both height and weight compared with children who remained in their own homes. It is well recognised that the worst prognosis is seen in children who have a succession of short term fostering placements,^{8 13} and our findings are in line with this hypothesis. Of the 31 children who showed catch up growth for height and weight, eleven had heights or weights within the normal range at presentation.

Why should children taken into long term fostercare grow better than their counterparts at home? The underlying basis for growth failure in abused children is complex, with dietary and psychosocial factors leading to endocrine abnormalities. The relative importance of these factors remains controversial, but dietary disturbance is probably more important in infants. It has been suggested that children may do poorly in their own homes, despite help from social workers, because the environment remains deprived, unstable, and disorganised.^{8 14} Parents who abuse their children often lack the parenting skills that foster parents possess, and various forms of intervention are possibly not

sufficient to reverse the underlying inadequacies.

Continuing growth failure is an important adverse prognostic sign for the overall intellectual and behavioural development of abused children.^{6 7 15} It is not merely physical growth that is at stake with persisting failure to thrive. Future educability, behaviour, and emotional balance are put at risk by its perpetuation. It is important, therefore, that children who are victims of child abuse should be measured regularly and their heights and weights recorded on centile charts to show the pattern of growth during follow up.¹⁶

Continuing growth failure at home should be viewed seriously, particularly because of its possible implications for other aspects of development, and if improvement in the child's environment made by increased social service input cannot show early improvement in growth serious consideration should be given to taking the child into long term foster-care. If a child has shown substantial catch up growth in foster-care it is doubtful whether early return to natural parents is appropriate. As these matters are based on interpretation of medical data, it is essential that expert medical follow up of children who are in foster homes and those who have returned to their own parents should take place.

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