A CASE OF PRECOCIOUS PUBERTY IN A FEMALE

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(RECEIVED FOR PUBLICATION NOVEMBER 23, 1960)

Sexual precocity is considered to be present when indications of genital maturation become apparent in boys before the age of 10 years and in girls before the age of 8 years (Seckel, 1946). It is customary to divide these cases into two groups. In those with true precocious puberty maturation with spermatogenesis or ovulation has occurred in a normal manner, but at an abnormally early age; in those with pseudoprecocious puberty, premature development of the secondary sex organs, but without spermatogenesis or ovulation, has occurred as a result of an ovarian or adreno-cortical tumour, unusual sensitivity of end-organs to normal hormonal stimulation, or exogenous application of sex hormones or other compounds (Talbot, Sobel, McArthur and Crawford, 1952). In a small proportion of cases true precocious puberty is associated with tumours or cysts in the region of the hypothalamus or with post-meningitic or post-encephalitic lesions, but in the majority diligent and repeated search fails to reveal any abnormality in the nervous system or endocrine glands (Wilkins, 1957). Such cases are generally referred to as 'idiopathic' or 'constitutional' (Novak, 1944), and it is suggested that the genetic factor or factors that determine the time of hypothalamic sex maturation must be at fault (Seckel, 1946). In a small percentage of cases there is a heredo-familial tendency (Rush, Bilderback, Slocum and Rogers, 1937; Jacobsen and Macklin, 1952).

Precocious puberty of idiopathic origin represents simply the early appearance of normal phenomena, and many of the physical and laboratory examinations reveal findings normal for older children (Lloyd, Lobotsky and Morley, 1950). Except for the hazard of precocious pregnancy and the possibility of subnormal stature, the prognosis of girls with idiopathic precocious puberty is good, and it does not appear that the menopause is accelerated or that premature senility occurs (Talbot *et al.*, 1952; Jolly, 1955).

The following case of precocious puberty occurring in a female child appears to present features of sufficient interest to warrant publication.

Case History

The infant was born on July 15, 1953, the youngest of a family of six; she has three brothers, aged 13, 7 and 5 years, and two sisters, 11 and 3 years, all of whom show normal development. The birth weight was 8 lb. 14 oz. and during the first four or five months her progress followed the expected course. About the age of 5 months, however, enlargement of the nipples was first noticed, to be followed shortly afterwards by commencing breast development and the appearance of pubic hair. Two menstrual periods, each of two days' duration, then occurred at the age of 9 and 11 months.

At the age of 20 months she was first admitted to the Dunedin Hospital for investigation. The height was then 35 in. and the weight 35 lb. The facial expression was extremely mature for an infant of 20 months, while the stature was that of a stocky child of considerably older age (Fig. 1a). Breast development was proceeding, the areolae and nipples being already well developed. There was a growth of fine pubic hair and the external genitalia were typical of early adolescence. The clitoris was not enlarged. Neurological and radiological examination revealed no evidence of a cerebral tumour, and nothing abnormal was palpable within the abdomen. On rectal examination the cervix and uterine body were felt distinctly, and appeared to be well developed. No swelling was detected in the fornices suggestive of an ovarian tumour. The skeletal age determined radiologically was 4½ years (Gray, 1935). The 72-hour excretion of 17-ketosteroids was 0.3 mg. Since no evidence had been elicited inconsistent with a diagnosis of idiopathic or constitutional precocity, the child was sent home.

At the age of 27 months she was readmitted for further investigation and assessment. The facial expression and general bodily build were at this time considerably more mature than on the occasion of the first examination seven months previously (Fig. 1b), while breast and genital development had both progressed well into the adolescent stage. During this interval of seven months the height increment had been equivalent to approximately 15 months of average growth at this age and the weight increment to 18 months (Stuart and Stevenson, 1959). The most significant feature, however, was the extent of the skeletal development, which in seven months had progressed by 5½ years to reach the equivalent of 10 years (Gray, 1935). Although repeated examinations still failed to reveal any evidence

FIG. 1.—The child (a) 1 year 8 months; (b) 2 years 3 months; (c) 3 years 3 months.

inconsistent with the diagnosis of constitutional precocious puberty, in order to confirm this diagnosis it was decided to explore the pelvic organs surgically, and at the same time to palpate the adrenal glands. On the day before operation it happened that the child had her third menstrual period. At operation the uterus was found to have developed precociously, the body being larger than the cervix. There was no evidence of any ovarian tumour, but the left ovary was larger than the right and contained a recent corpus luteum and also a small follicular cyst deep in its substance. Nothing abnormal could be felt in the adrenal areas. A wedge of tissue removed showed normal cellular ovarian stroma, scattered throughout which were numerous primitive follicles with no histological evidence of neoplasm or other abnormality. The fourth menstrual period occurred six weeks later, since when periods

have recurred without intermission every 28 days. Each is preceded by a few hours of lower abdominal discomfort and lasts for three to four days.

The child has since been admitted to the Dunedin Hospital on four occasions for reassessment of physical and mental development, the more important features of which have been summarized in Table 1. Some of these features will now be considered in more detail.

Physical Development

Growth in Weight and Height. Reference to the records kept by the Plunket infant welfare nurse showed that for the first four months growth in both weight (Fig. 2) and length had followed the expected course for an infant of slightly above average birth weight. During the remainder of the first year, however, when deceleration in growth normally occurs, increase in

TABLE 1
SUMMARY OF CHILD'S PHYSICAL AND MENTAL DEVELOPMENT

Chronological Age	6 months	9 months	1 year	1 year 8 months	2 years 3 months	3 years 3 months	4 years 2 months	5 years 9 months	6 years 11 months
Weight (lb.)	21	26½	30	35	42	52	63	79	82½
Height (in.)	26½	29½	31	35	39	44	47½	52	53½
Skull circumference (in.) ..	17½	18	—	19	—	20½	—	21½	21½
Bone age (years)	—	—	—	4½	10	14	15½	17	18
Dental age (years)	—	—	—	1½	—	—	4	6½	7
Mental age (years)	—	—	—	—	2½	4½	6	7½	9½

weight had continued at an almost uniform rate, with the result that at the age of 12 months the child's weight of 30 lb. was about 5 lb. in excess of the expected weight. Her length at this age was 31 in., also slightly above the average.

During the subsequent four and a half years growth in both weight and height were unusually rapid (Fig. 1c), so that at the age of 5 years 9 months her weight corresponded with that of an average New Zealand girl of 10 years, and her height with one of 8½ years (New Zealand Department of Health, 1956). Measurements taken 14 months later indicated, however, that this phase of rapid growth was by then coming to an end, and in particular that little further increase in height could be expected. Although early acceleration in growth had to some extent compensated for this premature cessation, it was obvious that the child would inevitably remain short in stature. During this latter period, also, she had lost much of the plumpness frequently associated with adolescence, and now had become much slighter in build.

TABLE 2

SKELETAL AGE, DETERMINED BY REFERENCE
TO VARIOUS PUBLISHED NORMS

Chrono- logical Age	Region Examined	Skeletal Age (years)		
		Flecker (1942)	Gray (1935)	Greulich and Pyle (1959)
Year Month				
1 8	Hand	5	4½	6½
2 3	Hand	8	10	9½
3 3	Elbow	11	14	—
4 2	Elbow	13	15½	—
5 9	Elbow	14	17	—
6 11	Shoulder and pelvis	20	18	—

Skeletal Development. One of the most striking features of this case was the pattern of skeletal development (Table 2). After an initial period of extremely rapid epiphyseal development the rate of skeletal maturation had approximated to the normal, but with the bone age consistently about 11 years in advance of the chronological age (Fig. 3). The closure of the upper femoral epiphysis before the age of 6 years 11 months provided additional evidence that growth in stature was by this time coming to an end, while serial measurements of the skull showed that no further increase in circumference had occurred between the ages of 5 years 9 months and 6 years 11 months, as indicated in Table 1. A somewhat similar pattern of skeletal development has been recorded by Greulich and Pyle (1959) in a case of precocious puberty in which the first menstrual period had occurred when the child was 7 months of age (Fig. 3).

Dental Development. Two criteria in common use for the assessment of the maturation of the dentition are tooth emergence and tooth calcification. Adequate norms are not available for the emergence of deciduous

FIG. 2.—Weight-age curves to 20 months:

A—The child's weight-age curve;
B—Expected weight-age curve for infant of birth weight 8 lb. 14 oz. (From N.Z. Plunket Society's graph.)

teeth nor for the calcification of the permanent dentition of New Zealand children and American standards have consequently been used. Data compiled by Leslie (1951) provide norms for the emergence of permanent teeth of New Zealand children. In Table 3 the number of deciduous teeth which had emerged when the child was 20 and 50 months of age has been compared with the mean number of deciduous teeth present in 'middle class' American girls of comparable ages (Meredith,

FIG. 3.—Bone age in relation to chronological age:

A—McGeorge and Connor's patient;
B—Greulich's patient;
C—Normal development curve.

TABLE 3
EMERGENCE OF DECIDUOUS AND PERMANENT TEETH: COMPARISON WITH NORMS

Dentition	Child		Norms	
	Chronological Age	No. of Teeth Present	Chronological Age	Mean No. of Teeth Present
Deciduous teeth	20 months	12	*18 months	12·4
	50 months	20	24 months *42-53 months	16·4 20
Permanent teeth	5 years 9 months	4	†6 years	3·78
	6 years 11 months	7	†7 years	8·83

* 'Middle-class' American girls (Meredith, 1946).

† New Zealand girls (Leslie, 1951).

1946), and the number of permanent teeth present at 5 years 9 months and at 6 years 11 months with the mean number of permanent teeth in groups of New Zealand girls of comparable ages. The dental age reached by the child at each of these latter chronological ages has also been assessed (Table 4) from the extent of formation and calcification of the mandibular left permanent first molar (Gleiser and Hunt, 1955). These data indicate that deciduous and permanent tooth emergence had occurred within normal age limits, while two observations of the formation of the mandibular left permanent first molar show the close relationship between the chronological age and the dental age. The general conclusion is, therefore, that there is nothing remarkable about the rate of development of the dentition in this case.

TABLE 4
DENTAL AGE ASSESSED FROM STAGE OF DEVELOPMENT OF MANDIBULAR LEFT PERMANENT FIRST MOLAR

Chronological Age	Dental Age
5 years 9 months	*6 years 1 month
6 years 11 months	*7 years

* Gleiser and Hunt (1955).

Development of Physical Skills

Although an assessment of the child's physical skills had unfortunately not been undertaken during infancy, her mother reported that she had sat up at the age of 8 months, crawled at 10 months and walked without assistance at 18 months. In an analysis of 25 cases of precocity, half of which had reached puberty during the first year of life and the remainder during the second year, Dennis (1941) found that the age at which walking commenced varied from 9 to 18 months, with a mean of 13·58 months, while in a series of 34 cases, Jolly (1955) found that only one child had walked at a significantly early age, the remainder at the normal times.

At the age of 6 years 11 months our patient was referred for assessment to the University of Otago School of Physical Education. Her physical skills in terms of whole body movement were then found to be well ahead of her years, while her control of running, jumping, catching, throwing, aiming and balance were all remarkable for a child of her age. Perhaps her most

outstanding skills were speed in running and force in throwing. Girls of all ages have often found difficulty in over-hand throwing, but she could throw a tennis ball over-arm at a target 20 feet away with surprising force and accuracy. It was deduced from a series of over 20 movements in which she was tested, that she was not only skilful for her age, but also for her size. There are as yet no standard norms in such skills in New Zealand, but she was far superior to certain American standards specified as being normal for a child of her age.

On a hand dynamometer she constantly produced a grip of 18 kg. with her right hand and 22 kg. with her left. These figures correspond with the norms of American girls of 10 and 12 years of age respectively (Brooks, 1929; Metheny, 1940). The question of handedness was somewhat puzzling, as although she performed most complex skills with her right hand, when asked to do things with her left hand she could do them fairly easily. When she was gripping the dynamometer the upper arm muscles, which are auxiliary to these movements, were noted to be unusually hard. The general impression gained was one of quite extraordinary strength, a characteristic of cases of sexual precocity which has also been commented upon by Dennis (1941) and by Jolly (1955).

Her powers of general relaxation were tested on two occasions by Rathbone's technique and by the Roper technique. Initially, observation of her various movements showed that she was unusually tense. When she was seen again, although the number of residual tensions in her movements had diminished markedly, there still remained some residual habitual tension, probably psychogenic in origin. The child was found to have a good sense of rhythm, and was very quick to pick up quite difficult rhythms from a gramophone record and from drum beats.

Psychological Development

The Longitudinal Picture. The child was first referred to the University of Otago Child Guidance Clinic for assessment of intelligence and general behaviour at 2 years 3 months, when it was tentatively estimated that her mental age was 2 years 11 months, giving an intelligence quotient of 133. On the second visit at 3 years 3 months it was definitely established that the child was of superior intelligence, with an I.Q. of 135 on the

Terman-Merrill Revision of the Stanford-Binet Test. This high rate of mental development continued uniformly over the subsequent observation period of four and a half years, and seemed to be unrelated to her accelerated growth in other respects. Remarkable motor development and co-ordination was noted in the first testing, and this was sustained in subsequent examinations, as is well illustrated by her performance on the Goodenough Draw-a-man Test, where at the age of 5 years 9 months she scored a drawing age of 11 years (Fig. 4). It is also seen in her high ability in free expression drawings (Figs. 5 and 6) and in her remarkably good printing and figuring. On the Minnesota Rate of Manipulation Test she showed very highly developed hand-eye co-ordination and execution in both gross and fine movements, and at the age of 5 years 9 months exceeded the norm for 8-year-olds. Her verbal expression and content were consistent with her mental age and were extremely highly developed on the last test occasion at the age of 6 years 11 months.

On the first three test occasions (ages 2 years 3 months; 3 years 3 months; and 4 years 2 months) she was found to be emotionally stable and socially mature for her age, and no abnormal mental or personality manifestations were detected, although she was slightly withdrawn on the third occasion. On subsequent testings her lack of fluency of personality was further noted; she tended to be serious and lethargic, but responded when stimulated. On the Raven Controlled Projection Test and the Rosenzweig Picture Frustration Tests there were an unusual number of aggressive responses. Some signs of tension appeared during testing, for example, chewing

FIG. 4.—Goodenough Draw-a-man Test: Chronological age 5 years 9 months; performance age 11 years.

FIG. 5.—Crayon drawing at 5 years 3 months.

FIG. 6.—'Travelling circus train', drawn at 6 years 11 months.

of fingers and undue preoccupation with manipulating her handkerchief. Most of the above symptoms appeared concurrently with commencing school. Here she was regarded a little differently by the other children, being the centre of attention because of her leadership qualities, and was on one occasion observed showing her breasts to the group. However, the school reports did not record any emotional or social problems in the school setting.

She commenced school at the beginning of 1958 at the age of 4 years 6 months and the teacher considered her ready to start reading immediately. Throughout the first year she was found to be performing at an average level in a bright group in both reading and number work. The only activity in which she then showed more maturity than her fellows was in drawing. Early in 1959, at the age of 5 years 5 months, she was still performing at the average level of a fast-moving group of age range 6 years—6 years 3 months. In the middle of the year her reading age of 6 years 1 month on the Schonell Graded Word Test matched her chronological age and was not testable on the Schonell Simple Prose Test, while her arithmetic age was 6 years 4 months on the Schonell Diagnostic Arithmetic Test. Both these tests indicate that in relation to her mental age she was retarded in these subjects. Her writing and printing were exceptionally good. She was promoted to the standards in the usual way in 1960, and on retesting in the middle of the year at the age of 6 years 11 months her reading age was 9 years 5 months, an increase of 3 years 4 months during the 12-month period. This indicates that she was then performing at the level of her mental age of 9 years 6 months, and was therefore no longer retarded. Her arithmetic age was then 7 years 9 months, indicating some remaining retardation in

arithmetic, but this is likely to be remedied as she passes through the standards.

The Present Picture

Appearance and General Impression. At the age of 6 years 10 months the patient has the appearance of a girl much older than she actually is. She is a big, rather tall girl, well proportioned, and has a facial maturity, poise and co-ordination of movement beyond her years. Her general behaviour, including speech content and expression, is very mature for her age, but not more than would be expected of a girl of her intellectual level.

Intellectual Functioning. On the Wechsler Intelligence Scale for Children the patient scored a Full Scale I.Q. of 138, her highest score being on the Information Sub-test. This was confirmed by an I.Q. of 139 on the Terman-Merrill Revision of the Stanford-Binet Test. She is highly endowed verbally, but is not particularly fluent in the person-to-person situation. However, on tests of creativity of ideas and fluency of expression she scored very highly.

School Performance and Adjustment. Her present school performance is in keeping with her intellectual level and she is only slightly retarded in arithmetic. She has remarkable ability in printing and writing, and her executive ability in drawing and art work is outstanding. It seems that, all other circumstances being favourable, she could be accelerated by one standard in the near future.

Relations with the teacher and attitude to school are very good. She is reported, on the Bristol Social Adjustment Guide (Child in School), to be friendly

and willing, to smile readily, to be keen to answer and to appreciate praise. She is also a good mixer, gets on well with those of her own age, is healthily noisy and boisterous in play, but inclined to be placid in school. The teacher reports that she is sometimes moody and fidgets a little, but there are no behaviour problems in the school setting.

Home Life. The patient is the seventh child in a family of eight, living in a rural area. The mother reports that there were no difficulties at birth and that the child passed her milestones of weaning, walking and talking normally and little ahead of the other children. The home background has been warm and affectionate and very stable. The Bristol Social Adjustment Guide (Child in the Family) records that the parent-child and parent-parent relationships are good and that the child is very attached to her siblings and is liked by them. This was confirmed by the Bene-Anthony Family Relations Test, in which no undue ambivalent or egocentric responses were recorded, and the distribution of incoming and outgoing feelings to various members of the family was normal. On Bellak's Children's Apperception Test the interpretations were consistent with a complete absence of tension and maladjustment in the family setting. Only two negative responses were recorded—a fear of animals and shyness with strangers who visit the home. This was noted earlier in her placidity in school and her tenseness and withdrawal symptoms in the earlier clinic sessions.

Emotional and Social Adjustment. As mentioned earlier, the child is considered to be socially mature and emotionally well adjusted, but on the third examination some indications of emotional tension were noted and she was slightly socially withdrawn in the clinic setting. Apart from this, observation and reports indicate that she is adjusting very well both to her sexual precocity and to her home and school setting. She plays equally well with both sexes of her own age, brings companions to her home and visits others. She reacts to punishment in the normal way, and the Rosenzweig Picture-Frustration Test indicates that she characteristically turns her feelings and actions outwardly on to the environment when she is frustrated.

On the 'Day at School' and 'Day at Home' tests she gave an account of the normal activities of a 6-year-old. Her interests and pastimes are those ordinarily indulged in by her friends of similar age. On the 'Myself' test her concept of self does not depart from that of a bright child of her own age group. Her main hobbies are reading, drawing and 'dressing up'.

Attitude to Her Condition. Her attitude to coming to the hospital and to the child guidance clinic is one of apparent acceptance, ostensibly to see how well she can do some 'puzzles' and for a short holiday in the city. The parents have been co-operative, and have played a supportive role in her temporary absences from home, visiting her frequently and giving simple assurances and explanations. They have good insight into the child's needs, an example being their explanation

to her of her menstrual periods. They have assured her that the reason for this is that she has developed a little earlier than other girls. They encourage her to use the lavatory on her own during these periods. They have not felt it necessary to give her any direct sex information not appropriate to her age, nor do they draw attention to her condition by overemphasizing it. Her teachers are known to the parents and co-operate fully. Her siblings realize that she is a little different from them for the same reason given to the patient by the parents. The attitude of other children at school is not known, but the teachers have not noticed anything out of the ordinary. It was not thought appropriate to draw direct attention in the clinic to her precocious sexual development in order to get the child's own attitude to her condition. However, in response to the question 'Why do you think we are all trying to help you?' she replied 'So that I will keep well'.

Her mother says the family are particularly fortunate in that they live in a small closely-knit rural community and that therefore they can both preclude and remedy any undesirable attitudes towards the child's unusual condition.

Discussion

Diagnosis. The diagnosis of so-called 'constitutional' precocity rests upon the occurrence of premature but orderly sexual maturation, together with the absence of any evidence pointing to an organic basis for the abnormality. In the present case, although no relevant physical signs were detected, consideration was given to the possibility of a granulosa tumour of the ovary, and an exploratory laparotomy was accordingly performed. This step was apparently unnecessary, since granulosa tumours are exceedingly rare, particularly in childhood, and in children have always been palpable by the time symptoms are apparent (Jolly, 1955). It has therefore been recommended (Novak, 1944; Gross, 1953) that laparotomy should be performed only if there is a palpable mass, the absence of which should be confirmed by bimanual examination under anaesthesia. Jolly makes the further point that when a mass is palpable only under an anaesthetic it is usually found to be a follicular cyst of one ovary, a not uncommon condition in children with precocious puberty.

Relative Degrees of Precocity Occurring in Various Systems. In normally developing children there is a close relationship between sexual maturity on the one hand and skeletal maturity and the adolescent growth spurt on the other (Shuttleworth, 1938a; Buehl and Pyle, 1942; Simmons and Greulich, 1943). A girl who develops her secondary sex characters early has her adolescent height spurt early, reaches 90% of her mature height early and undergoes the changes in ossification of her hand,

FIG. 7.—Composite development chart. The age at which child passed various developmental milestones (chronological age) has been plotted against the average age at which normal children pass corresponding milestones (developmental age). The dental age curve approximates closely to the curve of average normal development for all systems. For sources of norms, see text.

S: sex age; SK: skeletal age; W: weight age;
H: height age; D: dental age.

wrist and knee early (Tanner, 1955). This normal association continues to be manifest in cases of sexual precocity. Among the tissues more or less responsive in the hypothalamic group to the stimulation of growth hormone, gonadotropins and androgens or oestrogens, and in the adrenogenital group to the stimulation of androgens, the following order of decreasing responsiveness was established (Seckel, 1950): gonads (in the hypothalamic group only), non-gonadal primary genitalia, secondary sex characteristics, skeletal epiphyses, body and organ masses and metaphyses of long bones. Two tissues, on the other hand, the teeth and the central nervous system, responded little or not at all to the 'hormonal crisis' of sexual precocity. These developmental patterns have been illustrated by Seckel by means of biological growth charts based upon detailed study of three cases of hypothalamic precocity, and one case of adrenogenic virilism.

A chart of similar type (Fig. 7) has been con-

structed to illustrate the various developmental patterns shown by our own patient. In this the chronological ages at which the child passed various developmental milestones have been plotted against the average ages at which the corresponding milestones are generally passed by normal children. From these curves it is evident that the effects of the precocious stimulant upon various anatomical and physiological systems have differed considerably in both extent and rate. As in Seckel's cases, the most marked degree of precocity occurred in relation to sexual development, followed in descending order by skeletal development, weight and height increments. Throughout the period of observation mental development proceeded at a uniform rate slightly above average, while the eruption and calcification of the teeth were normal for age.

Tanner (1955) has pointed out that there is some general factor of bodily maturity, creating a tendency for a child to be advanced or retarded as a whole, but that within this there are set groups of more limited maturities which vary independently of each other. Thus the correlations between dental and skeletal development, and between intelligence test score and reproductive maturity, though positive, are both low. Further, in precocious puberty there is advancement of genital and skeletal maturity without any corresponding effect upon the teeth (Taft, 1941; Seckel, 1950; Jolly, 1955; Resch, 1958). These observations do not support the statement of Schour and Massler (1943) that in precocious puberty the apposition of enamel and dentine is accelerated, but not to the same degree as is skeletal growth.

The failure of the dental tissues to respond to the same extent as other tissues in precocious puberty has promoted several explanations of the phenomenon. One explanation that has received wide notice is that 'the most intensive development of teeth occurs prior to the onset of the endocrine stimulation which, by hypothesis, is responsible for the timing of the menarche and of patterns of growth in all other available measurements. The period of most active eruption of permanent teeth is from 9½ to 10½ years, whereas the period of most active growth in other available measurements occurs approximately two years later' (Shuttleworth, 1938b). Tooth development, however, includes actual formation, movement within bone before eruption and clinical emergence into the mouth. Kraus (1959) has placed initial calcification of the deciduous dentition as early as 12 weeks *in utero*. Formation of the permanent third molars continues until adulthood. Thus there is ample opportunity for hormonal influence on the dentition in precocious

puberty. But for some inexplicable reason the dental tissues do not seem to be affected.

Psycho-sexual Precocity. Most reports of precocious sexual development deal mainly with the somatic aspects of the cases, but in more recent studies psychological reports are available. Keene and Stone (1937) in their review of 80 cases, reported that only 15 patients were tested for intelligence, and that the mental development of these was somewhat below the average. Other workers (Leiner, 1920; Gesell, Thoms, Hartman and Thompson, 1939; Seckel, 1950; Jolly, 1955) have also reported average intelligence, and use this as evidence that mental growth is not affected by the sexual precocity. As Gesell puts it, there is 'a preferential immunity of the central nervous system to certain forms of endocrine imbalance'. The high level of intelligence in the present case is not inconsistent with this latter hypothesis, but further longitudinal and cross-sectional studies of the mental development of these patients are necessary to confirm it.

When we turn to other aspects of psychological development which are more directly environmentally conditioned, we see that the patient under consideration is no more mature socially and emotionally than her high level of intelligence would warrant, and that she is 'child-like' with regard to psycho-sexual development. In the studies of Hampson and Money (1955) and of Jolly (1955) it is concluded that there is little relationship between psycho-sexual maturity and constitutional precocious bodily development of the kind we are dealing with here. Tanner also claims that behaviour is unaffected by the stimulus of glandular secretion, and that children with precocious puberty seldom show signs of heterosexual activity. An interesting study by Rafferty and Stein (1958) of the effect of early menarche on ego-development states that the evidence for heterosexual drive being increased is not great, but it is not easy to demonstrate this conclusively, since psychological maturation is complexly determined. While our own case largely confirms the above hypothesis, it is difficult to discriminate between precocious behaviour due to general constitutional factors and that due to accelerated psychological growth. We must wait upon further studies of the growth curves of such children and more precise studies of their psychological behaviour and personality development along the lines suggested by the work of Rafferty and Stein.

Guidance and Management. Idiopathic or constitutional sexual precocity is due to the precocious

secretion of pituitary gonadotropins, and no method of preventing this is at present available. Consequently the statement made by Morse in 1897 that 'The medical treatment of this condition is absolute abstinence from all therapeutic measures. The psychological treatment, however, is important' remains equally true today. Money, Hampson and Hampson (1957) have formulated a valuable guide to the psychological and social management of these cases. In summary they state that the psychological development of these children resembles in manner and speed that of their somatically normal siblings, and correlates with the variety of life experiences encountered and transacted. Sexually precocious children are capable of regulating their sexual conduct as well or as badly as normal adolescents. Dependent on general social experience, sexually precocious children may or may not be precocious in social maturation, but seem to benefit from association with children closer to them in body maturity than in chronological age. It is safe and desirable to speed up school entrance and progress, provided the degree of acceleration is consonant with I.Q. rating, and provided there is some individual instruction and coaching. Care must be taken not to forget or disregard the chronological age of the sexually precocious child, and to avoid setting standards and expectations of performance to which the child cannot conform. In the case at present under consideration the child has been particularly fortunate in that parents, school and social setting all provide optimum conditions for sound development.

Summary

A detailed study has been made of the first seven years of the life of a child in whom the initial signs of sexual development were observed at the age of 5 months and the first menstrual period occurred at 9 months. The diagnosis of 'constitutional' precocious puberty was based upon the occurrence of premature but orderly sexual maturation, together with the absence of any evidence pointing to an organic lesion. Exploratory laparotomy at the age of 27 months demonstrated normal ovarian tissue with a recent corpus luteum.

Weight and height charts were available from birth, while subsequent physical and mental development was assessed on six occasions between the ages of 1 year 8 months and 6 years 11 months. Studies included somatic measurements, dental examinations, skeletal and dental radiographs, the features of sexual development, an assessment of physical skills, psychometric tests, and detailed investigation

of emotional and social adjustment at home and at school.

As has been previously observed, the effects of the precocious stimulant upon various anatomical and physiological systems differed considerably in both extent and rate. The most marked degree of precocity occurred in relation to sexual development, followed in descending order by skeletal development and weight and height increments. Mental development proceeded at a uniform rate slightly above average and appeared to be uninfluenced by other factors, while the eruption and calcification of the teeth were normal for age. The child was no more mature socially and emotionally than her high level of intelligence warranted, while psycho-sexual development showed no precocity.

Cases of this type require no active medical treatment, but psychological guidance should be available to the patient, the parents and the teachers in order that the various agencies may be co-ordinated to promote the child's optimum adjustment. If reasonable care is taken in these matters there is no reason why the psychological prognosis should not be as good as the medical.

Our thanks are due to Associate Professor J. E. Caughey, who referred the child to the Paediatric Department; to Professor J. L. Wright for reports on pelvic examinations and laparotomy; to Dr. F. Desmond for the histological report on ovarian biopsy tissue; to Dr. A. C. Begg for serial radiological determinations of the bone age; to Mr. M. R. Kean for reports on the dentition; to Associate Professor P. A. Smithells for assessment of physical skills; and to Dr. R. Seddon for the initial intellectual assessment of the child. Details of development during the first 18 months were obtained from the records of the Plunket Society. Illustrations were prepared by the Department of Medical Photography.

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