Constitutional Delay of Growth and Puberty: A Guide for Parents and Patients
GROWTH AND GROWTH DISORDERS – SERIES NO: 10
(THIRD EDITION, SEPTEMBER 2000).

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**INTRODUCTION**

**Constitutional delay of growth & puberty** is a condition in which temporary short stature occurs along with delayed pubertal development in otherwise healthy teenagers. It is more accurate though to describe it as a delay of puberty and growth as it is the delayed puberty which causes the delay in growth. Other terms which are used to describe this condition may include constitutional delay, short/delay, growth delay or even just delay. They all mean the same thing.

Constitutional delay of growth and puberty is a common condition which is seen more in boys than in girls. It is probably the most common condition seen by specialists at growth clinics. Constitutional delay can produce extreme anxiety, particularly in boys, often because of short stature in comparison with friends of the same age and the apparent lack of genital development. Reassurance that the changes of puberty will soon begin is often all that is required, but some children may also need medical help in order to advance the timing of puberty and the subsequent growth spurt.

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Constitutional delay of growth is not a medical disorder, but a temporary condition. If treatment is necessary for an individual child, it must be emphasised that they are normal, and it is only that their “body clock” for puberty has just started later than in their friends.

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**THE TIMING OF PUBERTY**

Puberty is the process of the body maturing into adulthood, with the appearance of secondary sexual characteristics and the development of the ovaries or testes, eventually resulting in the ability to have children. The physical characteristics of puberty include breast development in girls, enlargement of the penis and the growth of testes in boys, as well as pubic hair and underarm hair in both sexes. Development of the testes in boys can be easily assessed through simple examination in the clinic to establish the stage of puberty they have reached by the size of the testes. The doctor will assess the size of the testes by comparing them to a set of standard beads called an orchidometer. The equivalent assessment of the ovaries in girls cannot be done in the clinic and may require the simple technique of using an ultrasound scan to assess the maturity of the ovaries.

The average age for the onset of puberty in boys is 12 years and in girls 1 1/2 years. Surprisingly, the age difference between boys and girls starting puberty is only half a year, although it is often thought to be much more. In girls, the start of breast development, which is an early event in their puberty, happens at the same time as the growth spurt. In boys, the pubertal changes involving the growth of the testes and penis are less socially obvious and the growth spurt, being a relatively late event, happens mid-way during the
physical changes. The comparatively late start of the growth spurt in boys explains why the difficulties associated with pubertal delay are more common in boys than girls. It may be entirely normal for a boy to enter puberty at 14 years of age and not experience a growth spurt until 17 years, by which time he would be considerably shorter than his peers, and may be experiencing social problems.

The onset of puberty in boys and girls is triggered by the increase in gonadotrophin releasing hormone [GnRH] secretion from the hypothalamus which stimulates the pituitary gland. The pituitary gland then releases the two gonadotrophins — Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH) — which stimulate the testes or ovaries to develop. This process starts much earlier in childhood than is normally appreciated. There are various glands and hormones that are involved in this process of puberty, which continues as sexual maturation in adult life. [Figure 1, overleaf]

When there are no physical signs of puberty by 14 years in a girl and 14½ years in a boy then investigations should be carried out to find the cause, and treatment commenced. There is no benefit in waiting many years for the spontaneous onset of puberty in a child with the expected diagnosis of constitutional delay. Such a course of action is unnecessary and may produce considerable psychological difficulties.

**THE HARMONY OF PUBERTY**

The events of puberty have a characteristic pattern in the timing of their appearance. This pattern should remain the same even if the start of puberty is either delayed or early. By this we mean that the development of breasts or genitalia and the appearance of pubic hair always occur in a fixed order. In addition, the spontaneous growth spurt occurs at a particular stage of either breast development in girls or size of genitalia in boys. Even though the age at which puberty starts may vary considerably between individuals, the same pattern of normal puberty is retained. Indeed, the absence of this normal pattern points to a hormonal abnormality. This pattern will allow your specialist to determine whether your child’s late puberty is a characteristically normal process of delay or whether there is a hormone abnormality which needs investigation. Keeping this normal pattern of the appearance of secondary sexual characteristics, and the timing of the growth spurt, is the most significant feature of constitutional delay and is the key to the diagnosis.
**HORMONES AFFECTING PUBERTY**

The hormone-producing glands and the hormones produced

![Diagram of hormone production]

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<th>GLAND:</th>
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<td>Stimulates the pituitary gland to produce the gonadotrophins.</td>
<td>LH: controls the production of testosterone from the testes in boys, and triggers ovulation and controls the menstrual cycle in girls. FSH: controls sperm production in boys and starts the ova ripening and helps control the menstrual cycle in girls.</td>
<td>Controls male sexual development and helps control sperm growth and function.</td>
<td>Act with LH and FSH to control the menstrual cycle. OESTROGEN also controls female sexual development.</td>
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**Figure 1.**

**GROWTH AT PUBERTY**

It is impossible to assess any young person’s growth during adolescence without relating it to the stage of pubertal development. The two events fit together in a characteristic way. There is a wide variation in the ages at which puberty begins (between the ages of
9 and 14 years) and the time it takes to progress through puberty. Such variation is illustrated by the “shaded areas” on the Tanner growth charts during the early teenage years. Growth in this age group depends on what stage the physical signs of puberty are at, not on how old the adolescent is.

**Bone Age**

When you are born there are wide gaps between the ends of the long bones and they allow space for the bones to grow. As you get older and increase in height, the gaps lessen and on the completion of puberty the bones fuse and no more growth is possible. This pattern of bone maturity is established by taking an X-ray of the left hand and wrist and the pattern corresponds to a specific “bone age” which is then compared to the child’s chronological [actual] age. Your specialist will arrange for your child to have an X-ray of their left hand and wrist. This will allow a bone age assessment to be done which is needed to decide how much time remains for your child to grow. Although this appears complicated, it can generally be stated that if the bone age is delayed by 2 years, and this can be quite normal, instead of stopping growing at 17 years of age, your child will continue to grow for an extra 2 years until 19 years of age. This is why there may be sufficient time to catch-up and the whole pattern of growth is just delayed.

Most children who are small for their age will have a delayed bone age and some tall children can have advanced bone ages. With this information a growth specialist can determine how much growth is still possible and this will help in the prediction of an individual’s potential adult height.

**THE PUBERTAL GROWTH SPURT**

During mid-childhood, between 5 and 7 years of age, there is a slight growth spurt. After this, growth slows down progressively until the beginning of the pubertal growth spurt. During the late childhood years it is entirely normal to grow at only 3 or 4 cm per year at the age of 14 years and even as little as 1 cm per year in the later teenage years, if puberty is delayed. Indeed, it may be that growth almost ceases before the start of the growth spurt in those children with extremely delayed puberty.

As an example, Figure 2. illustrates growth in a boy who had constitutional delay of puberty and, consequently, a delay of his growth spurt. His physical signs of puberty started at the age of 14 years but the growth spurt was delayed until the age of 16 years.
Figure 2. Distance (above) and velocity (below) charts from a boy with constitutionally delayed puberty. The onset of puberty was at 14 years and he continued to grow at an extended 50th centile velocity until the onset of the growth spurt at 16 years. The typical pattern of growth is shown on the ‘distance’ chart. NB: The age axis applies to both charts.

On his height chart, shown at the top of Figure 2., it can be seen that his growth progressively falls away from within the normal range during the early teenage years. His growth pattern is delayed and he becomes relatively short in comparison to his friends of the same age. The problem begins to correct itself as growth increases during the growth spurt but this is of little/no help to the child who, at the age of 16 years, is 15 cm shorter than the shortest of his friends.

Unfortunately, when the growth spurt is delayed, as occurs in constitutional delay of growth and puberty, the peak growth rate of the growth spurt is reduced. Also, boys who have constitutional delay of growth and puberty tend to progress through puberty more slowly. The problem is therefore made worse because final height and sexual development are reached at an even later age than would be expected.
It has always been thought that the timing of the onset of the growth spurt had no effect on final adult height because there is only a delay in the bone age. The harmony of the normal growth is maintained in children with constitutional delay of growth and puberty, therefore the predicted adult height should be appropriate for the mid-parental heights. If the predicted height is not appropriate for the parents’ heights, then an alternative diagnosis should be sought.

However, more recently, it has been demonstrated that children who have extremely delayed puberty may not reach a final height appropriate for their parental height. This may be associated with poor or inadequate growth of the spine due to late secretion of sex hormones. Our understanding of this problem is still being assessed through research, but treatment may be medically important for the prevention of osteoporosis (thin and fragile bones) in later life and is an additional indication to offer treatment to children with constitutional delay of growth and puberty.

**GROWTH HORMONE SECRETION DURING PUBERTY**

The growth spurt is dependent upon the secretion of sex steroids and growth hormone. Growth hormone levels are difficult to assess in early puberty in boys and just before puberty in both sexes. The change in growth hormone levels parallels the change in the rate of growth (growth velocity). As the rate of growth slows down, there is a gradual decrease in the levels of growth hormone secretion and at the beginning of the growth spurt there is a significant increase. Before the start of the growth spurt, growth hormone secretion may be reduced well below the ranges expected in a younger child. This is entirely normal and explains why tests of growth hormone in this age group are extremely difficult to interpret. The most important method of distinguishing between growth hormone deficiency and delay of growth and puberty is the pattern of growth and development, as well as the clinical experience of the specialist. Children with constitutional delay of growth and puberty do not have growth hormone deficiency and treating them with growth hormone is not as effective at increasing their growth rate as administering sex steroids. Also there is no evidence that growth hormone treatment will substantially increase their final height.

**Other diagnoses which should be excluded:**

**Gonadotrophin Deficiency**

It is often difficult to distinguish gonadotrophin deficiency from constitutional delay of growth and puberty. In gonadotrophin deficiency, gonadotrophin releasing hormone (GnRH) secretion from the hypothalamus is either absent or disordered and this results in the failure to trigger the pituitary to release the gonadotrophins: follicle stimulating hormone (FSH) and luteinizing hormones (LH). In constitutional delay of growth and puberty the stimulus for the release of gonadotrophins is
merely delayed. If gonadotrophin deficiency is suspected because of absent puberty or puberty which has started but does not continue (often referred to as arrested puberty), special X-rays of the pituitary will need to be taken and special hormone tests done. Hormone measurements to distinguish between CDGP and gonadotrophin deficiency can be difficult to interpret. It is not unusual to find that the diagnosis remains uncertain and that it is only after puberty has been induced that a definite diagnosis can be made.

**Gonadal Failure:**
Measuring gonadotrophins in the blood may reveal the diagnosis of gonadal failure. In this condition the testes or ovaries do not respond to the stimulus of the gonadotrophins and so do not produce testosterone or oestrogen.

**Turner Syndrome:**
Any girl with delayed puberty and/or short stature should undergo a chromosome assessment (karyotype) to exclude Turner Syndrome as a possible diagnosis.

**Bone Dysplasia:**
If the bone age is *not* delayed in relation to chronological age, or if there are any other characteristic features such as disproportion between spine and leg length, a diagnosis of abnormal bone development needs to be considered. However, children with delayed puberty, for whatever reason, tend to have a relatively shorter spine than leg length and this needs to be thought about in any assessment of disproportion between the length of the spine and the length of the legs.

**Growth Hormone Deficiency:**
Children with growth hormone deficiency in this age group usually will be very much shorter than those with constitutional delay.

**PSYCHOLOGICAL EFFECTS**

Once the diagnosis of constitutional delay has been made, the requirement for treatment depends on the extent of psychological disturbance in the individual child. It may be that reassurance that a child’s pattern of development is normal, and that their expected adult height is within the normal range and appropriate for the parents’ heights, is all that is required. However, many children, particularly boys, have great difficulty in coping with this condition and frequently have incorrect ideas about future sexual function and fertility. They may be considerably shorter, and appear much younger, than their friends. Reassurance that future growth will be entirely normal may provide little consolation during the emotional times of adolescence. At this time of life there are many social changes – adaptation to adult life and the commencement of relationships with the opposite sex, as well as the importance of school examinations and future employment.
In some boys this may result in immature behaviour ie. acting the child, whereas in others it may result in aggressive, anti-social behaviour. Under these circumstances, such boys require therapeutic help rather than hormone investigations. When treatment is proposed it is especially important to offer explanations and reassurances both to the patients and the parents, as well as emphasising that the child is not suffering from any disease.

**SOCIAL AND SCHOOL CONCERNS**

The emotional and social difficulties for adolescents with constitutional delay of growth and puberty relate mostly to their height and, as they get older, to their lack of sexual development. Some children who are small are treated according to their size and not their age. We all have to learn how to do things over a period of time and so if such children are constantly having things done for them, particularly by parents, they do not develop the skills of socialising or of performing everyday tasks appropriate to their age. This only reinforces an immaturity that may already exist. It is important to encourage independence appropriate for their age, thus reinforcing a sense of achievement and confidence. Helping to solve some of the practical problems of short stature, eg. reaching light switches, taps and high shelves, as well as allowing their children to perform tasks appropriate for their age, will allow parents to show their child that an imaginative approach to problem solving is a skill that can be developed. This reinforces a positive approach to challenges ie. “you can do it — it may need some thought but you can do it”, rather than highlighting reasons why such things should not be attempted ie. “you’ll not be able to do that, let me help you / do it for you” which can be a common approach by parents.

As they get older, children may be excluded from peer group activities and games which are height related and, even though they may be physically skillful and could compensate for their lack of height, they are often not given the chance. Though wanting to have the credibility of a teenager, they often “play the child”. They are therefore seen as immature and so may be excluded from social discussions with their classmates about relationships with the opposite sex which can create feelings of isolation, inadequacy and loneliness. Many of these emotional difficulties could be lessened considerably if other people, especially teachers, were aware of the vulnerability of the child and the problems he/she faces at this critical time. The small teenager can be a natural target for bullying and sometimes inappropriate skills are developed to compensate in order to survive with some self-esteem. Teachers can be of extreme importance in helping to improve these situations by enabling the young adult to be seen to succeed in activities that others may find difficult. Also, teachers can encourage class integration and acceptance of physical and emotional differences. This may require considerable imagination on the part of the teaching staff, nevertheless, their help should be sought.
Bullying and teasing, however “friendly”, can cause particular distress in the teenage years. These problems, often exaggerated by mental and emotional immaturity, can affect performance at school which may seem to deteriorate with lack of concentration and a label of under achievement or low ability. This can be progressive, resulting in feelings of low self-esteem and poor social relationships if it is not recognised and sympathetic help offered.

**TREATMENT OF CONSTITUTIONAL DELAY**

It is important to appreciate that the normal duration of puberty in boys and girls is between two and three years. If a child is being treated for delayed puberty, it may be that progress through puberty will be quicker than this in order to bring them into line with their peer-group. However, it is important that progress through puberty should not be faster than one to two years because progress that is too rapid may be difficult for a child to adjust to. In addition, the duration of puberty is important for an adequate growth spurt and for the quality of breast development in girls.

It is useful to consider that there are two features of delayed puberty that can be treated. These are:

- Growth acceleration, and
- Advancement of secondary sexual characteristics

**Girls:** Girls with constitutional delay can be treated with low dose ethinyl oestradiol (oestrogen), given as a daily tablet, for six months to a year. This will induce breast development at an early stage with an appropriate growth acceleration. Usually breast development progresses and it becomes obvious that the child’s own puberty is overtaking the development produced by the administered oestrogen. Oestrogen tablets can then be withdrawn with the confidence that puberty will proceed naturally.

**Boys:** Boys with constitutional delay may be treated by one of two options. Many boys are more concerned about their short stature than by their relative lack of sexual characteristics and a growth spurt can be started by using a low dose of anabolic steroids, such as oxandrolone, given either as one or half a tablet every day for three to four months (this is an appropriate medical use of anabolic steroids and should not be confused with the abuse of high doses taken by some athletes). However, for some boys, the start of pubertal development and the development of secondary sexual characteristics is as important as the start of the growth spurt. In such boys, testosterone is given as this will start the development of secondary sexual characteristics as well as the associated growth spurt, whereas the anabolic steroid treatment will stimulate only a growth spurt. Testosterone may be given as a long acting intramuscular injection at monthly intervals for three to four months. Oral testosterone is also available, but it is
less reliable in its absorption from the intestines. If either treatment is continued for three months, and the boy is established in early puberty, then the induced growth spurt will continue after the treatment is stopped. When pubertal development has progressed enough, the growth acceleration triggered by the treatment becomes difficult to tell apart from the spontaneous growth spurt of puberty. It is important to emphasise that these treatments (anabolic steroids or testosterone) do not alter the final height achieved, only the tempo of growth and the age at which it is achieved.

**Other Treatments**

Development of the ovaries and testes can be stimulated using gonadotrophins (injections of human chorionic gonadotrophins) in boys, or pulsatile gonadotrophin releasing hormone (GnRH) treatment in boys or girls. Such treatment options are more applicable to children with gonadotrophin deficiency however, and are unnecessary in most children with constitutional delay.

Growth hormone treatment has been used for constitutional delay of growth and puberty. However, growth hormone secretion is normal in such children but to produce the pubertal growth spurt requires the presence of oestrogen or testosterone. Thus, treatment with testosterone or oestrogen, in order to stimulate their own growth hormone secretion, may be considered more appropriate than using growth hormone itself. Certainly, growth hormone probably offers no advantage over treatment with anabolic or sex steroids.

**GONADOTROPHIN DEFICIENCY OR CONSTITUTIONAL DELAY?**

Gonadotrophin deficiency may be mistaken for extreme constitutional delay. Growth of the testes is dependent on gonadotrophin stimulation. If the testes do not grow during testosterone treatment this points to a diagnosis of gonadotrophin deficiency. An increase in testicular volume to a normal size during gonadotrophin therapy confirms the diagnosis of constitutional delay. If doubt remains, testosterone treatment should be stopped after the successful induction of puberty and the adolescent’s own pattern of continued sexual maturation observed. In constitutional delay, sexual maturation will be sustained, although there may be a short delay before the child’s own endogenous puberty continues either to maintain or advance sexual maturation. In individuals with gonadotrophin deficiency, if testosterone treatment is stopped, progression of puberty will stop and, if not restarted, will regress.
A PATIENT’S STORY

The following is an extract from a long letter written by an A'-level pupil. It was written while waiting for an appointment to see a Growth Specialist. He writes critically and with enormous insight into the problems of a boy with delayed puberty.

“It is difficult to express how desperate and helpless I feel, there being absolutely nothing I can do about this. I often get very upset, but I found it very difficult to release my tension. When I do, this results in huge arguments, often over petty inconsequential things. ‘Everything comes to those who wait’ may be applicable in some cases, but I feel I have waited long enough. I am constantly being mistaken for being much younger than I am, and I do not wish to be told to leave pubs, and adult rated films, when I’m 18! I lose, a great deal of my confidence with girls I feel fine talking to them normally, but asking to go out with someone is something I couldn’t consider, and I can’t understand many 17 year olds wishing to go out with someone who looks like a 14 year old!

It may be difficult for you to understand how I feel – it’s certainly difficult for me to convey it – but all I can say is that I feel utterly powerless, and I often feel quite depressed over this matter. This, I fear, will begin to affect my school work, which is very important as I am approaching my A’ levels.”

Not surprisingly he did do well in his A’ level examinations, although he also received some therapeutic help to advance his puberty and growth.

QUESTIONS AND ANSWERS

1. Q. Is there anything wrong with me?
   A. Constitutional delay of growth and puberty is a condition and not a disease. The body clock has slowed down physical development and maturity is delayed. If no treatment is offered then puberty will progress normally, it will just occur at a much later age than average.

2. Q. Do I need treatment?
   A. This depends very much on the individual adolescent. Some are severely affected by their relative short stature and delayed sexual development. If the adolescent is experiencing psychological difficulties, particularly if they are being constantly teased and physically bullied, then treatment should be offered. However, the decision to accept any treatment should be discussed openly between the specialist, the adolescent, and his/her parents.

3. Q. Will I grow up to be as tall as my friends?
   A. Yes, with or without treatment. In constitutional delay, the timing of your growth spurt will be extremely delayed. Although you will reach a height appropriate for
your parents heights, it will take longer than in your friends. Indeed, you may be
growing until your early twenties. Your specialist, when he/she has seen the x-
ray of your hand and wrist, will be able to tell you how tall you should become.
Whether treatment is accepted or not will probably make no difference to your
final adult height.

4. Q. Why has this happened?
A. Remember there is nothing medically wrong with you. It is just unlucky that the
start of your puberty has been delayed and will commence at a later age than in
most of your friends. The condition tends to run in families and it is likely that
your parents had constitutional delay when they were young. However they may
have forgotten this! There is nothing that you could have done to change your
body’s “time clock” for starting puberty.

5. Q. Are there any side effects from treatment?
A. Both anabolic steroids and testosterone have been used for more than 40 years
for the treatment of constitutional delay of growth and puberty. This experience
has shown that there are very few side effects. Of course, you may experience
mood swings, behaviour changes and minor acne — but this is more a
complication of the start of the adolescent years rather than the result of
treatment.

6. Q. Will I have normal sexual function?
A. Yes. It is just that reaching adult sexual maturation may take a little longer than
in most of your friends. In constitutional delay of growth and puberty, your
sexual drive, sexual function and fertility should be entirely normal once you have
matured.

7. Q. Will treatment alter my final height?
A. No. Your final height will be neither increased nor decreased. It is just that you
will be able to achieve your final height with treatment at an earlier age than if
you had received no treatment. In other words, it should keep you in step with
your friends.

8. Q. After the start of treatment, what changes will I see and how soon will they
occur?
A. You will notice that you have started growing faster within a few months of
starting treatment. In addition, with testosterone treatment, your penis will grow
and you may have more frequent morning erections.
ADDITIONAL INFORMATION:

Bullying: Parents should know that there is Government backing for an active anti-bullying policy in all schools, so no worried parents should be fobbed off. The size of the school is not a valid argument for doing nothing about the humiliation and distress of an individual pupil. The Department for Education has sent a guidance pack, “Action Against Bullying” to every primary and secondary school in the country. The pack explains that bullying can be either physical or verbal. Bullying is not always recognisable to the teacher and this is where parents come in. They can encourage the children to talk and to be on the look out for bullying. Any child who says he or she is being bullied should be listened to very carefully.

Find out if the school has set a bullying policy. If it has not, suggest it instigates one. Children are often very reluctant to tell their parents if they are being bullied and these six signs could indicate that your child is being bullied at school:

1. Reluctance to go to school, with unlikely pleas of sudden illness.

2. Fear of the journey to and from school because bullying frequently occurs outside the school gate.

3. Your child starts saying that he/she has been called names or that certain people don’t like him/her – always listen to this kind of remark carefully.

4. Things go missing – money, school clothes, lunch boxes these are all things that a bully may be demanding.

5. Hunger because your child’s lunch money has been taken.

6. Bruises and scratches – never presume that your child is just clumsy.

If your child is being bullied, report it to your child’s form teacher immediately. If the problem is not solved after this, go on to contact as necessary:

- the head of department
- the head teacher, a school governor, or the Local Education Authority (listed in the telephone directory)

At the latter, ask to speak to an officer in charge of bullying, or the educational psychologist for the school. If you are not satisfied with the response, contact the Director for Education. You might first want to speak to a support organisation for parents such as the Anti-Bullying Campaign (see over).
FOR INFORMATION AND HELP

The Anti-Bullying Campaign runs a telephone helpline on 0171 378 1446, 9:30am to 5:00pm, Monday to Friday.

For the free leaflet “Stop Bullying”, send a large s.a.e. to Kidscape, 152 Buckingham Palace Road, London SW1W 9TR.

The advice pack sent out by the Department for Education to all schools is called “Action Against Bullying”, by Margaret Johnstone, Pamela Munn and Lynne Edwards. Ask at your child’s school if you can see a copy. You can also order it from the Scottish Council for Research and Education, 15 St John’s Street, Edinburgh EH8 8JR. It costs £4.95 including postage.

Childline 0800 1111 (often engaged, but please keep trying as you will get through).

ALWAYS REPORT ANY BULLYING TO YOUR CHILD’S GP AND SPECIALIST and remember BULLIES NEED HELP TOO! Do not be tempted to punish a bully yourself, or tell your child to swing with his fists! These bullies are children too and they would not behave this way if they did not have a problem.

AGE IDENTIFICATION

For places where age notification is important, like cinemas, you could always get a travel pass, which states your age and has a photograph for identification. This can save embarrassment when with your friends.

CLOTHES & SHOES

Finding clothes and shoes in teenage styles to fit the smaller individual has presented problems for many teenagers with a delay in their growth and development. However, there are now many shops which are fashionable and trendy clothes sold by size and not by age. The following places cater for both boys and girls:

The Gap
Marks & Spencer
SUMMARY

Constitutional delay of growth and puberty is a common condition which may cause considerable distress as it occurs at such a critical time of life. Indeed, we are never more aware of our physical appearance than during adolescence. The diagnosis does not depend on hormone tests, but on clinical assessment, the pattern of growth, and the appearance of a delayed bone age. When indicated, mainly for psychological reasons, treatment is usually very effective and so should be offered early. It should be emphasised that there will be no effect on final adult height; the individual will simply reach their genetic potential within a time frame comparable with their peers.