



# DELAYED PUBERTY – AN AYURVEDIC APPROACH

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## ABSTRACT -

Developmental delay is a term that indicates slower development of a child in four main domains that is – motor, mental, social and communication skills when compared to

children of the same age. When more than one domain is affected, it is termed as 'Global

Developmental Delay.' Puberty that happens late is called delayed puberty. Delayed puberty refers to the delayed in the appearance of secondary sexual characteristics in boys and girls at adolescents. The most common cause of delayed puberty is functional delay in production of gonadotropin-releasing hormone (GnRH). GnRH deficiency causes delays in the secretion of LH and FSH and the subsequent and the subsequent gonadal secretion of sex steroids and in gametogenesis.

As per ayurveda, an imbalance of the tridosha – vata, pitta and kapha especially vata and manas may be responsible for the retardation of growth. The various types of multidimensional Ayurvedic treatment modalities have been resorted to in the selected cases in the study. The subjects have shown considerable improvements in the potency, strength and complexion improvement in sexual health therapeutic procedures can be very well made use in the management of developmental delay.

Keywords: Ayurveda, Delayed puberty, global developmental delay

## INTRODUCTION-

Puberty that happens late is called delayed puberty. This means a child's physical signs of sexual maturity don't appear by age 12 in girls or age 14 in boys. This includes breast or testicle growth, pubic hair, and voice changes. These are known as secondary sexual characteristics, appear by age 12 in girls or age 14 in boys.

- This includes breast growth, pubic hair, and voice changes. These are known as secondary sexual characteristics.
- Delayed puberty may run in families.

- Treatment depends on the cause of the problem. In many cases, when the cause is treated, puberty proceeds normally.
- Delayed puberty can cause embarrassment and stress for adolescents. Emotional support can help adolescents in dealing with their delayed puberty.

When a child exhibits early signs of puberty, it is defined as precocious puberty. This condition occurs when the first signs of puberty appear before 8 years in females and 9 years in males. However, this activity discusses delayed puberty for females and males. In females, delayed puberty is the lack of breast development by 13 years, a delay of over 4 years between thelarche and completion of puberty, or a lack of menarche by 16 years. In males, a pubertal delay is evident by a lack of testicular enlargement by 14 years or more than 5 years between testicular enlargement and completion of puberty.<sup>1</sup> Puberty represents the maturation of the hypothalamic-pituitary-gonadal (HPG) axis. Development of acne, axillary or pubertal hair, and body odor are a result of adrenal androgen secretion and defined as adrenarche.<sup>2</sup> Adrenarche is independent of the HPG axis. Therefore, a child could display signs of adrenarche but still have a diagnosis of pubertal delay.<sup>3</sup>

In ayurveda term puberty for child or adolescents period must of the ayurvedic Samhita considered balyavastha it is considered up to 16 year.

According to sushruta Samhita 'Bala' upto 1 years is called ksheerpanad and from 2 to 16 years is called Annada ,but in arogyakalpadruma , balyavastha is considered upto 12 years of age. In Kashyap Samhita 12-16 years is considered as koumara stage. According to acharya charak , the balyavastha divided into parts in which first was Aparipakwa dhatuna upto 16 years. There as others consider 10-16 years as kaishora stage. In balya stage ,dhatus are in the developing stage. This is the kapha predominant stage. Growth and Development in teenage period in both sex. The changes happening in this stage can be explained on the basis of development of Dhatus. There are many hormonal secretions takes place considered as pitta mental and social changes happening here can be attributed to the mental faculties of Dhaturaratha.

## COMMON CAUSES FOR DELAYED PUBERTY -

Delayed puberty most often has no known cause. In some cases, it may run in families. In other cases, it may be caused by any of these:

### Delayed Puberty in Males and Females

Common causes of delayed puberty for both males and females can be from functional hypogonadotropic hypogonadism - this is normally a temporary clinical state brought on by different stresses to the body, including chronic illnesses such as severe persistent asthma, sickle cell anemia, cystic fibrosis, or ulcerative colitis. Any cause of nutritional deficiency also merits consideration. While eating disorders occur more in females, it would be wrong to dismiss them in males. The provider should also investigate any external causes for malnutrition, including the patient's social situation at home. In developing adolescents, psychological causes must also be investigated and frequently correlate with the above conditions mentioned. A rarer cause of hypogonadotropic

hypogonadism that is congenital is panhypopituitarism. However, this typically results in growth hormone deficiency as well and should be considered if a patient presented early in age with severe short stature.<sup>5</sup>

### **Delayed Puberty in Males**

In males, a common cause of pubertal delay is a constitutional delay of puberty and growth (CDPG). CDPG occurs when there is a decrease in the tempo of growth. The patients are generally healthy adolescent males, who appear short for age. At birth, they are an average size. However, their rate of growth slows down around 3 to 6 months of age. When they reach 3 or 4 years of age, the patients will be growing below but parallel to the 3rd percentile line. As their male peers experience puberty and a growth spurt, the patient will continue to have a lower growth velocity (2 to 4 cm/year) and pubertal delay. In normal boys, the growth spurt occurs at a testicular volume of 10 ml, which is between Tanner stage 3 and 4 (usually ages 13 to 15). In boys with CDPG and delayed puberty, their growth spurt occurs at a later age, generally between 15 to 17 years of age.<sup>4</sup> When the patient finally experiences puberty, his catch-up growth will continue until he reaches his predicted target height, which may not occur until he is older than 17 or 18 years. The patient's bone age will experience delay compared to his chronological age by 2 or more years; the bone age will also correlate with his current height. History will typically reveal a sibling or parent that was a "late bloomer." For example, the father may not have experienced a growth spurt until 15 or 16 years of age. CDPG is normally a diagnosis of exclusion. However, it is often difficult to differentiate between CDPG and hypogonadotropic hypogonadism.

Hypogonadotropic hypogonadism occurs when there is a permanent delay in the maturation of the HPG axis. There is the partial or complete deficiency of gonadotropin-releasing hormone (GnRH), causing decreased luteinizing hormone (LH) and follicle-stimulating hormone (FSH) release, which ultimately leads to decreased testosterone production.<sup>5</sup> Hypogonadotropic hypogonadism may be idiopathic or congenital. If the patient has anosmia, or the absence of smell, Kallman syndrome (KS) merits strong diagnostic consideration. Kallman syndrome results from a genetic mutation of the KAL1 or FGFR1 (fibroblast growth factor receptor 1) genes.<sup>6</sup> The development of the olfactory system has a tight connection with the migration of GnRH neurons during early embryogenesis. When an issue occurs with GnRH migration, the olfactory system becomes negatively impacted, leading to the loss of smell. Other associated physical findings may include cleft lip, cleft palate, hypodontia, eye defects, or hearing impairments. A brain MRI may help to support the diagnosis or rule out the presence of a tumor or lesion along the HPG axis. Brain tumors such as adenomas and craniopharyngiomas are rare causes of hypogonadotropic hypogonadism, but they are a more common cause of pubertal delay in males than in females. Such masses disrupt the HPG axis, causing a downstream decrease in sex hormones. Suspicion for a cranial mass is advisable when a child presents with headaches, dizziness, vomiting, and changes in vision.

On the other hand, hypergonadotropic hypogonadism results when there is a primary gonadal failure. Testosterone levels are low, causing an increase in GnRH, LH, and FSH. The etiology of hypergonadotropic hypogonadism can be either acquired or congenital. Acquired causes include radiation to testes for malignancy, surgery for cryptorchism or torsion, or an infection such as orchitis from mumps. In males, the most common congenital form of primary gonadal insufficiency is Klinefelter syndrome. Klinefelter

syndrome is due to aneuploidy of the sex chromosomes, most commonly resulting in a 47, XXY karyotype. Patients present with tall stature, disproportionately long limbs, eunuchoid body habitus, gynecomastia, and neurological or behavioral problems. However, the hallmark sign is small (less than 4 ml) but firm testes; this usually leads to infertility due to oligospermia or azoospermia.<sup>7</sup> Lastly, patients with hypergonadotropic hypogonadism could have vanishing testis syndrome, also known as testicular regression syndrome (TRS). TRS occurs in 5% of cryptorchism cases. While the cause of TRS is still unclear, the hypothesis is that an event of vascular thrombosis or torsion, occurring in the antenatal or perinatal period, causes testicular degeneration. Therefore, a fetus who initially developed normal testes in utero will be born with non-palpable testes and a rudimentary spermatic cord.<sup>8</sup>

### **Delayed Puberty in Females**

Constitutional delay in puberty and growth is less common in females. When it does occur, family history normally includes a sibling or parent who was a "late bloomer." However, functional hypogonadotropic hypogonadism is much more common in females. It usually develops secondary to conditions that reduce total body fat, which is commonly associated with anorexia nervosa or excessive exercise in females. Both involve a significant reduction in calories that also decreases the body's leptin concentration, resulting in gonadotropin deficiency. Decreased LH and FSH secretion combined with lower body fat depresses estrogen production and secretion, thus delaying puberty. Kallman syndrome can also be a cause for delayed puberty in females, but it is very rare and more common in males. This predilection is because KS is an X-linked recessive genetic disorder, but can also be autosomal dominant. In females, hypergonadotropic hypogonadism results from primary ovarian failure and is either acquired or congenital. Acquired causes include receiving radiation therapy for the treatment of cancers and malignancies. Autoimmune destruction of the ovaries could also lead to hypergonadotropic hypogonadism. However, this is usually associated with other autoimmune disorders in patients who have more than one autoimmune diagnosis like type I diabetes mellitus or Hashimoto thyroiditis (autoimmune polyglandular type I or type II syndromes). When hypergonadotropic hypogonadism is associated with short stature, Turner syndrome (TS) must be a consideration. Turner syndrome results from a partial or complete absence of an X chromosome, producing the 45, X karyotype.

THAT MEANS THIS ARE SOME IMPORTANT CAUSES -

- Chromosomal problems
- Genetic disorder
- Chronic illness
- Tumors of the pituitary gland or hypothalamus
- Underactive pituitary gland (hypopituitarism)
- Underactive thyroid (hypothyroidism)
- Abnormal development of the reproductive system
- Inability of the body to use androgen hormones (complete androgen insensitivity syndrome)
- Too much exercise
- Severe lack of eating (anorexia)

A child is at risk for delayed puberty if he or she has any of these:

- Parents or siblings with delayed puberty
- Chronic medical conditions
- Congenital syndrome
- An eating disorder

## SYMPTOMS-

The symptoms are a lack of secondary sexual characteristics.

Common signs in girls can include:

- No breast growth by age 12
- More than 5 years between first breast growth and first menstrual period
- No menstrual period by age 15

Common signs in boys can include:

- No testicular enlargement by age 14
- No pubic hair by age 15
- More than 5 years to complete adult genital growth

The signs of delayed puberty can be like other health conditions. Make sure your child sees his or her healthcare provider for a diagnosis.

## DIAGNOSIS -

In addition to a complete health history and physical exam, diagnosis of delayed puberty may include:

- **Blood tests-** These are done to check hormone levels, look for chromosomal problems, and check for chronic disorders that may delay puberty. These may include diabetes or anemia.
- **X-ray-** This test uses a small amount of radiation to make images of tissues inside the body. An X-ray may be done of the left hand and wrist. This can estimate your child's bone age. With precocious puberty, bone age is often older than calendar age. Precocious puberty means your child's body begins changing into that of an adult (puberty) too soon. This change would occur before age 8 in girls and before age 9 in boys.
- **Sonography**
- **CT scan -**This test uses a series of X-rays and a computer to make detailed images of the body. A CT scan can show bones, muscles, fat, and organs. CT scans are more detailed than regular X-rays.
- **MRI-**This test uses a large magnets and a computer to make detailed images of tissues in the body.



## COMPLICATIONS-

Delayed puberty can cause embarrassment and stress for adolescents.

## DIFFERENTIAL DIAGNOSIS-

### Delayed Puberty in Males and Females

- Chronic illnesses: sickle cell anemia, inflammatory bowel disease, cystic fibrosis, celiac disease, etc.
- Psychological: depression, anxiety
- Social: poor environment at home

### Delayed Puberty in Males

- Constitutional delay of puberty and growth
- Hypogonadotropic hypogonadism
  - Acquired
    - Chronic illness: cystic fibrosis, sickle cell anemia, celiac disease, etc.
    - Psychosocial: anxiety, depression
  - Genetic
    - Kallman syndrome
    - Brain mass or tumor
- Hypergonadotropic hypogonadism
  - Acquired
    - Radiation therapy
    - Testicular surgery
  - Genetic
    - Klinefelter syndrome
    - Testicular regression syndrome

### Delayed Puberty in Females

- Constitutional delay in puberty and growth
- Hypogonadotropic hypogonadism
  - Acquired
    - Chronic illness: cystic fibrosis, sickle cell anemia, celiac disease, etc.
    - Psychosocial: anorexia nervosa, excessive exercise, depression, anxiety

- Genetic:
  - Kallman syndrome
  - Brain mass or tumor
- Hypergonadotropic hypogonadism
  - Acquired
    - Radiation therapy
    - Surgery to ovaries
  - Genetic
    - Autoimmune ovarian failure
    - Turner syndrome

## AYURVEDIC TREATMENT

Management of delayed puberty is based on correcting the cause.

Ayurveda suggests *Vajikarana chikitsa* for men to become endowed with physique, potency, strength, and complexion and improvement in sexual health.

Apart from that, Ayurveda also suggests some diet (*ahar*) and lifestyle changes (*vihar*) to that may help in pubertal delay arising due to nutritional deficiencies. This includes:

## DIET RECOMMENDATIONS (AAHAR)

- Consume nutritious food such as milk, ghee, eggs, poultry, fresh fruits, nuts, cereals and vegetables
- Avoid foods that increase vata or cause indigestion, contain excess salt and are astringent
- Quit alcohol/smoking

## LIFESTYLE CHANGES (VIHAR)

- Follow a systematic daily way of life (*Dincharya*) that includes appropriate sleeping and waking patterns, good quality and time for sleep, sexual activities, and exercises
- Avoid activities that lead to stress
- Avoid performing excessive exercises, however moderate exercises may be beneficial.
- Avoid suppression of urges (*vegavidharan*)

Daily exercise of about 30-60 minutes helps to maintain the hormone levels and acts as a stress-buster too. Practicing yoga which emphasizes on service, asanas, meditation and pranayama


## MEDICATIONS(SHODHAN AND SHAMAN CHIKITSA)

Management of delayed puberty is based on correcting the cause. Ayurveda suggests Vajikarana chikitsa for men to become endowed with physique, potency, strength, and complexion and improvement in sexual health.

### SHAMAN CHIKITSA-

- Manovaha strotas chikitsa
- Medhya rasayan chikitsa
- Satvavijay chikitsa
- Sangyasthan chikitsa

### PANCHKARMA-

- 
- Nasya
  - Shirodhara
  - Abhyangam
  - Lepan

In modern science-

Treatment for delayed puberty depends on the cause of the problem. In many cases, when the cause is treated, puberty proceeds normally. If the delayed puberty is inherited, no treatment is usually needed. In some cases, treatment may be done with hormone therapy. This helps to cause secondary sexual characteristics to occur. In other cases, surgery may be done to correct a physical problem.

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