AMERICAN ACADEMY OF PEDIATRICS

Committee on Genetics

Health Care Supervision for Children With Williams Syndrome

ABSTRACT. This set of guidelines is designed to assist the pediatrician to care for children with Williams syndrome diagnosed by clinical features and with regional chromosomal microdeletion confirmed by fluorescence in situ hybridization.

ABBREVIATIONS. WS, Williams syndrome; FISH, fluorescence in situ hybridization.

INTRODUCTION

Williams syndrome (WS, also Williams-Beuren syndrome), now recognized to be caused by a microdeletion of chromosome 7, is a multisystem disorder first identified as a distinct clinical entity in 1961.[1] It is present at birth and affects boys and girls equally. As routine genetic amniocentesis does not typically detect chromosome microdeletions, children with WS usually come to the attention of pediatricians during infancy or childhood. Initially thought to be a rare genetic disorder, increased awareness of the clinical features and establishment of a reliable diagnostic test have revealed WS to be one of the more commonly recognized genetic disorders in childhood. Williams syndrome is characterized by dysmorphic facies (100%), cardiovascular disease (most commonly supravalvar aortic stenosis [80%]), mental retardation (75%), a characteristic cognitive profile (90%), and idiopathic hypercalcemia (15%)[2–5] (Table 1).

The diagnosis historically has been made on the basis of clinical criteria (Fig 1), but recently it has been shown that 99% of patients with WS have a hemizygous submicroscopic deletion of 7q11.23 detectable by fluorescence in situ hybridization (FISH).[6–8] Chromosome analysis and the Williams Syndrome Chromosomal Region FISH test are recommended for confirmation of the diagnosis. (A child with the clinical features of WS and a negative FISH result should be referred to a clinical geneticist for further evaluation.) The deleted portion of the chromosome includes the *ELN* gene that codes for the structural protein elastin, an important component of the elastic fibers found in the connective tissue of many organs. The *elastin* deletion explains some of the characteristics of WS, such as some of the facial features, hoarse voice, bladder and bowel diverticula, cardiovascular disease, and orthopedic problems. The pathogenesis of other characteristics, such as hypercalcemia, mental retardation, and unique personality traits, remains unexplained. One possibility is that the loss of 1 or more genes contiguous to the *ELN* gene contributes to the phenotype.

The pediatrician can use knowledge of the clinical manifestations (Table 1) and natural history of WS to anticipate medical problems and to educate the family. Most children with WS are described as having similar facial features.[4,9] Although these features are often subtle, they tend to become more distinctive with advancing age. Facial features often include periorbital fullness, short nose with bulbous nasal tip, long philtrum, wide mouth, full lips, and mild micrognathia. Infants have full cheeks and a flat facial profile, whereas older children and adults often have a long narrow face and a long neck.[10,11] Blue- and green-eyed children with WS have a prominent "starburst" pattern to their irides (stellate iris).[12] Mild prenatal growth deficiency and a postnatal growth rate about 75% of normal are consistently observed features of the condition.[8,13]

The majority of children with WS have cardiovascular anomalies.[1,2,4] The most common cardiovascular defect is supravalvar aortic stenosis, an often progressive condition that may require surgical repair.[10,11] Peripheral pulmonary artery stenosis is often present in infancy and usually improves over time. Coarctation of the aorta, renal artery stenosis, and systemic hypertension are complications that when present may worsen over time.[4,11,14,15] Because the elastin protein is an important component of elastic fibers in the arterial wall, any artery may become narrowed.

Idiopathic infantile hypercalcemia is an intriguing feature of WS that can contribute to the presence of extreme irritability, vomiting, constipation, and muscle cramps associated with this condition.[4,9] Symptomatic hypercalcemia usually resolves during childhood, but lifelong abnormalities of calcium and vitamin D metabolism may persist. Hypercalciuria is common and predisposes to nephrocalcinosis. The cause of the abnormality in calcium metabolism is unknown.

An infant with WS often has difficulty feeding and may be brought for medical care because of gastroesophageal reflux, colic, or failure to thrive.[4,9,16] Other medical problems include Chiari I malformation, strabismus,[12] hyperopia,[12] chronic otitis media, hypodontia, malocclusion, bowel or bladder diverticula, hernias, joint laxity, joint contractures,[17] kyphosis, lordosis, renal or urinary tract malformations,[14,15] hypothyroidism, and rectal prolapse.

Children with WS have a unique cognitive and

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

TABLE 1. Medical Problems in Williams Syndrome* by Organ System and Age

Organ System	Incidence (%)	Age		
		Infancy	Childhood	Adult
Ocular and visual				
Esotropia	50	x		
Hyperopia	50		x	x
Auditory				
Chronic otitis media	50	x	x	
Hypersensitivity to sound	90	x	x	x
Dental				
Malocclusion	85		x	x
Microdontia	95		x	x
Cardiovascular				
Any abnormality (total)	80	x	x	x
SVAS	75	x	x	x
SVPS	25	x	x	x
PPS	50	x		
Renal artery stenosis	45	x	x	x
Other arterial stenosis	20		x	x
VSD	10	x		
Hypertension	50		x	x
Genitourinary				
Structural anomaly	20	x	x	x
Enuresis	50		x	
Nephrocalcinosis	<5	x	x	x
Recurrent urinary tract infections	30			x
Gastrointestinal				
Feeding difficulties	70	x	x	
Constipation	40	x	x	x
Colon diverticula	30		x	x
Rectal prolapse	15	x	x	
Integument				
Soft lax skin	90	x	x	x
Inguinal hernia	40	x		
Umbilical hernia	50	x		
Prematurely gray hair	90			x
Musculoskeletal				
Joint hypermobility	90	x	x	
Joint contractures	50	x	x	x
Radioulnar synostosis	20	x	x	x
Kyphosis	20			x
Lordosis	40		x	x
Awkward gait	60		x	x
Calcium				
Hypercalcemia	15	x		x
Hypercalciuria	30	x	x	x
Endocrine				
Hypothyroidism	2	x	x	x
Early puberty (but rarely true precocious puberty)	50		x	
Diabetes mellitus	15			x
Obesity	30			x
Neurologic				
Hyperactive deep tendon reflexes	75		x	x
Chiari I malformation	10	x	x	x
Hypotonia (central)	80	x	x	
Hypertonia (peripheral)	50		x	x
Cognitive				
Developmental delay	95	x	x	
Mental retardation	75		x	x
Borderline intellectual functioning	20		x	x
Normal intelligence	5		x	x
Impaired visuospatial constructive cognition	95		x	x
Behavioral				
Attention-deficit hyperactivity disorder	70		x	
Generalized anxiety disorder	80		x	x

* Percentages based on the following: 1) review of rates of complications in several reports of series of patients with Williams syndrome, and 2) database of 315 children and adults with Williams syndrome evaluated by Colleen A. Morris, MD. SVAS indicates supravalvar aortic stenosis; SVPS, supravalvular pulmonic stenosis, PPS, peripheral pulmonary artery stenosis; and VSD, ventricular septal defect.

behavioral profile.[3,5,18] Cognitive, motor, and language delay are universal, and in 75% of the children, mental retardation is ultimately diagnosed.[19,20] Older children demonstrate a relative strength in language and auditory memory, with a significant weakness in visuospatial cognition.[5,18] Behavioral problems may include hypersensitivity to sound, sleep problems, attention-deficit/hyperactivity disorder,[20] and anxiety. Overfriendliness and an empathetic nature are commonly observed.[17]

	Scored Points*
Growth (Past or Present Evidence of) *If 3 of 5 items are checked, score 1 point*	_____
[ ] Post-term birth > 41 wk gestation [ ] Failure to thrive/height and weight < 5th percentile [ ] Vomiting or gastroesophageal reflux [ ] Prolonged colic > 4 m irritability [ ] Chronic constipation	
Behavior and Development *If 3 of 6 items are checked, score 1 point*	_____
[ ] Overly friendly personality [ ] Hypersensitivity to sound [ ] Anxiety [ ] Developmental delay or mental retardation [ ] Visuospatial problems [ ] Delayed speech acquisition, followed by excessive talking	
Facial Features *If 8 of 17 items are checked, score 3 points*	_____
[ ] Bitemporal narrowing [ ] Epicanthal folds or flat nasal bridge [ ] Strabismus (present or past) [ ] Short nose or anteversion of nares [ ] Full cheeks [ ] Long philtrum [ ] Small, widely spaced teeth [ ] Wide mouth [ ] Prominent ear lobes [ ] Broad brow [ ] Periorbital fullness [ ] Stellate lacy iris pattern [ ] Bulbous or full nasal tip [ ] Malar hypoplasia (flat cheek bones) [ ] Full prominent lips [ ] Malocclusion [ ] Small jaw	
Cardiovascular Problems (by Echocardiography) (a) *If 1 of 2 items are checked, score 5 points*	_____
[ ] SVAS† [ ] Peripheral pulmonary artery stenosis	
Cardiovascular Problems (b) *If 1 of 3 items are checked, score 1 point*	_____
[ ] Other congenital heart disease [ ] Cardiac murmur [ ] Hypertension	
Connective Tissue Abnormality *If 2 of 6 items are checked, score 2 points*	_____
[ ] Hoarse voice [ ] Inguinal hernia [ ] Bowel or bladder diverticula [ ] Long neck or sloped shoulders [ ] Joint limitation or laxity [ ] Rectal prolapse	
Calcium Studies *If 1 of 2 items are checked, score 2 points*	_____
[ ] Hypercalcemia [ ] Hypercalciuria	
Total Points:	═══

* If the score is < 3, a diagnosis of Williams syndrome is unlikely. If the score is ≥ 3, FISH studies should be considered. (Mean score for Williams syndrome was 9 [standard deviation = 2.86]. The scoring system is based on a study of 107 persons with Williams syndrome [confirmed by FISH] evaluated by Colleen A. Morris, MD; Frank Greenberg, MD; Paige Kaplan, MD; Martin Levinson, MD; and Barbara Pober, MD; with data analysis by Carolyn B. Mervis, PhD and Byron F. Robinson, MA; presented at the 1994 Williams Syndrome Association Convention; July 31, 1994; San Diego, CA.)

† If supravalvar aortic stenosis (SVAS) is present, referral to a geneticist and FISH studies are recommended.

Fig 1. Williams syndrome diagnostic scoring table: clinical diagnosis.

The medical care of children with WS requires an understanding of the natural history of the disorder, awareness of potential clinical complications, and ongoing assessment and periodic review at appropriate ages (Fig 2). Because the clinical manifestations during the neonatal period are variable, the diagnosis may not be suspected during early infancy. Accordingly, this statement includes a series of evaluations that should be considered at the time the diagnosis is suspected clinically; the diagnosis

	Infancy (NB - 1 Year)					Early Childhood (1-5 Years)						Late Childhood	Adolescence
	Neonatal	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos	18 mos	24 mos	3 yr	4 yr	5-13 yrs Annual	13-21 yrs Annual
Diagnosis													
Karyotype/FISH Review†	•												
Phenotype Review†	•												
Recurrence Risks†	•												
Anticipatory Guidance													
Early Intervention	•	•	•	•	•	•	•	•	•				
Family Support	•	•	•	•	•	•	•	•	•	•	•	•	•
Support Groups†	•	•				•						• ¶	
Long-term Planning						•						• ¶	• ¶
Sexuality												•	•
Therapy (pt, ot, speech)										§ **		§ **	§ **
Medical Evaluation													
Growth feeding	o	o	o	o	o	o	o	o	o	o	o	o	o
Thyroid Screening	o ‖											o #	o #
Hearing Screening			s/o			s/o ‡			s/o ‡		s/o ‡	s/o ¶	s/o ¶
Vision Screening	s/o	s/o	s/o	s/o	s/o ‡	s/o			s/o	s/o	s/o ‡	s/o §	s/o §
2-Arm Blood Pressure	o			o		o			o	o	o	o	o
Cardiology Evaluation†	**					**			**	**	†	** ¶ §	** ¶ §
UA/BUN/Cr†	o					o			o	o	o	o #	o #
Urine Ca/Cr†	o ††					o				o		o ¶	o ¶
Serum Calcium†	o								o			o	o
Renal Ultrasonography†	o												
Musculaskeletal Eval	o					o			o	o	o	o	o
Pneumorax									•				
Psychosocial													
Development	s/o	s/o	s/o	s/o	s/o	s/o	s/o	s/o	s/o	s/o	s/o	s/o	s/o
School Performance										o	o	o	o
Socialization						s			s			s	s

*Assure compliance with the AAP "Recommendations for Preventive Pediatric Health Care
†Or at time of diagnosis
‡Discuss referral to specialist
§As needed
**Referral

‖Per state law
¶Once in this age group
#Every 2 years
††If hypercalciuria found, 2 repeat carine calcium (am and pm) should be sent. If still positive, repeat serum calcium, renal ultrasound for nephrocalcinosis and initiate dietary counseling
• = To be performed
S = Subjective (by history)
O = Ojbective (by a standard testing method)

Fig 2. Health supervision for children with Williams syndrome*.

should be confirmed by FISH analysis. The evaluations include the following:

- Complete physical and neurologic examination
- Growth parameters plotted on WS growth charts (Fig 3A–F)
- Cardiology evaluation
  –Full clinical evaluation by a cardiologist with expertise and experience in pediatric patients that includes 4-limb blood pressure measurements and echocardiography
- Genitourinary system evaluation
  –Ultrasonography of bladder and kidneys
  –Renal function studies (serum urea nitrogen and creatinine levels)
  –Urinalysis
- Calcium determinations (serum calcium, spot urine calcium, and creatinine levels) (Table 2)
- Thyroid function tests
- Ophthalmologic evaluation
- Multidisciplinary developmental evaluation (older than 2 years)
- FISH to determine ELN deletion

Referral to a clinical geneticist should be considered for individualized assessment and recommendations; a more extensive discussion of the clinical manifestations, natural history, recurrence risks, and future reproductive options; and evaluation of genetic risks for other family members.

SPECIAL CONSIDERATIONS FOR THE CHILD DIAGNOSED WITH WS

1. Do *not* give multivitamin preparations to children with WS because of the potential deleterious effects of vitamin D. Recommend diligent use of sunscreen to minimize autologous production of vitamin D.
2. Perform periodic cardiovascular evaluations, even after a baseline examination with normal findings.
3. Baseline cardiology evaluation should be performed by a cardiologist with pediatric expertise and experience.
4. Screen for the development of hypertension periodically according to guidelines of the American Academy of Pediatrics.
5. Establish a medical home with clear emphasis on continuity of care and the role of the family members as partners in the ongoing management and care of the child.

HEALTH SUPERVISION FROM BIRTH TO 1 YEAR (INFANCY)

Examination

1. Review and note clinical features and confirm diagnosis with FISH analysis
2. Routine health maintenance examinations and baseline evaluation
3. Growth and developmental evaluations using WS growth charts (Fig 3A–F)
4. Baseline cardiology evaluation by a cardiologist with pediatric expertise and experience
5. Review feeding issues (reflux, refusal, disordered suck or swallow, vomiting or symptoms of colic).
6. Consider pediatric ophthalmologic evaluation for strabismus, amblyopia, and refractive errors
7. Check for inguinal hernia
8. Objective hearing assessment at 6 to 12 months (recurrent otitis media is common)
9. Blood pressure measurement (both arms) annually and careful evaluation of femoral pulses
10. Early recognition and management of constipation
11. Pediatric anesthesia consultation for any child requiring surgery (several reports of unexpected deaths have been associated with the administration of anesthesia)[22]

Laboratory

1. Williams Syndrome Chromosomal Region FISH to confirm clinical diagnosis
2. Serum creatinine level
3. Urinalysis
4. Calcium levels
   a. Serum*
   b. Spot urine test to determine calcium-creatinine ratio†
5. Thyroid screen for newborns (according to state mandate)
6. Baseline ultrasonographic examination of the bladder and kidneys

Anticipatory Guidance

1. Individual support for the family (by family, friends, clergy), support groups, or both (see list)
2. Review increased risk for otitis media
3. Feeding (difficulty in transition to textured foods)
4. Do *not* prescribe multivitamin preparations containing vitamin D
5. Refer to early childhood intervention program

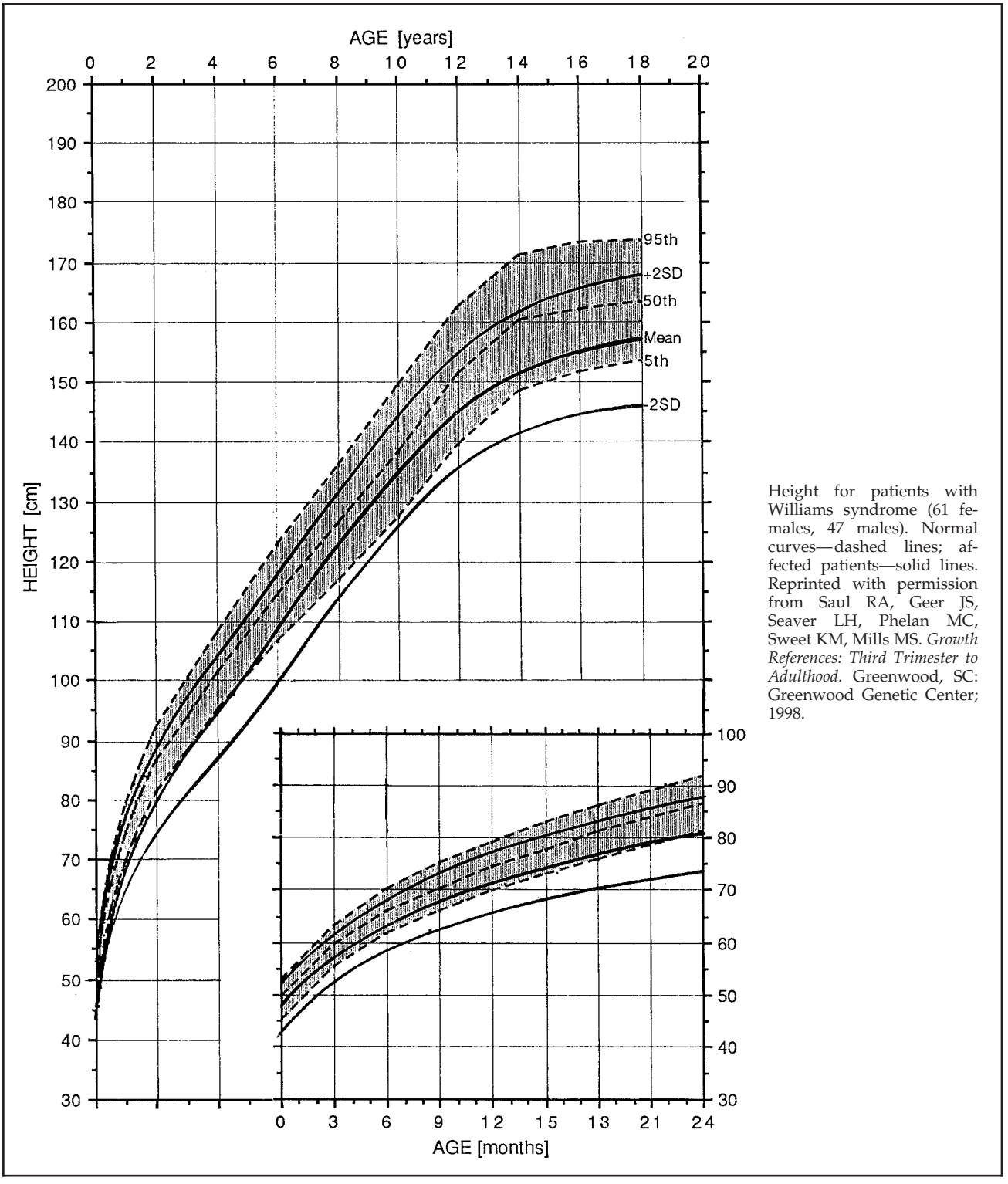
HEALTH SUPERVISION FROM 1 TO 5 YEARS (EARLY CHILDHOOD)

Examination

1. Annual health maintenance examinations and baseline evaluation (including careful auscultation of chest and abdomen for murmurs or bruits)
2. Developmental evaluation and growth evaluation using WS growth charts (Fig 3A–F)
3. Annual cardiology evaluation from 1 to 5 years
4. Feeding issues: watch for rectal prolapse and avoid constipation with stool softeners if necessary
5. Annual hearing and vision screening; objective audiologic evaluation and an ophthalmologic evaluation before age 3 years
6. Orthopedic issues: musculoskeletal and neurologic assessments to evaluate joints, muscle tone, spasticity, and hyperactive reflexes[17]

*If hypercalcemia is found, dietary calcium restriction should be implemented and diet should be monitored in conjunction with a pediatric dietician/nutritionist. Referral to a pediatric renal specialist should be considered.

†If hypercalciuria is found, 2 repeated urine studies of the calcium-creatinine ratio (morning and afternoon) should be performed. If the level is still elevated, repeat measurement of the serum calcium level and perform renal ultrasonography for nephrocalcinosis. Assess dietary calcium intake.[21]



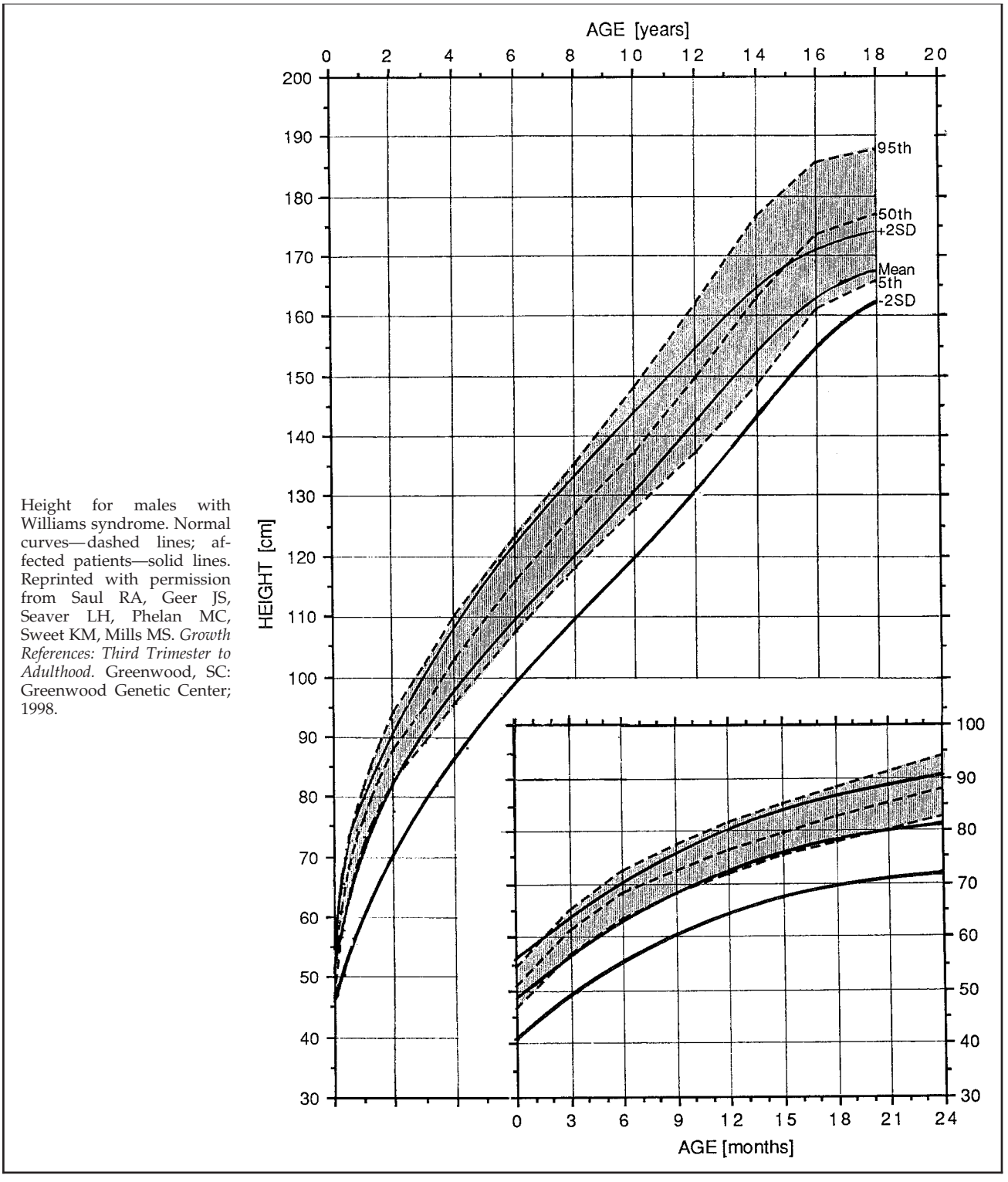
Height for patients with Williams syndrome (61 females, 47 males). Normal curves—dashed lines; affected patients—solid lines. Reprinted with permission from Saul RA, Geer JS, Seaver LH, Phelan MC, Sweet KM, Mills MS. *Growth References: Third Trimester to Adulthood*. Greenwood, SC: Greenwood Genetic Center; 1998.

Fig 3A. Williams syndrome—stature, females.

7. Pediatric anesthesia consultation for any child requiring surgery (several reports of unexpected deaths have been associated with the administration of anesthesia)[22]
8. Annual blood pressure measurement (both arms) and careful examination of femoral pulses
9. Multidisciplinary developmental assessment and treatment in early intervention programs (0–3 years) or school based programs (3 years and older)[1,5,19]
10. Dental referral

Laboratory

1. Yearly urinalysis
2. Annual total calcium measurement if the level was elevated at baseline or as needed if the child becomes symptomatic; if level was normal, measure every 2 to 3 years
3. Urinary calcium-creatinine ratio every 2 years
4. Thyroid function test every 4 years



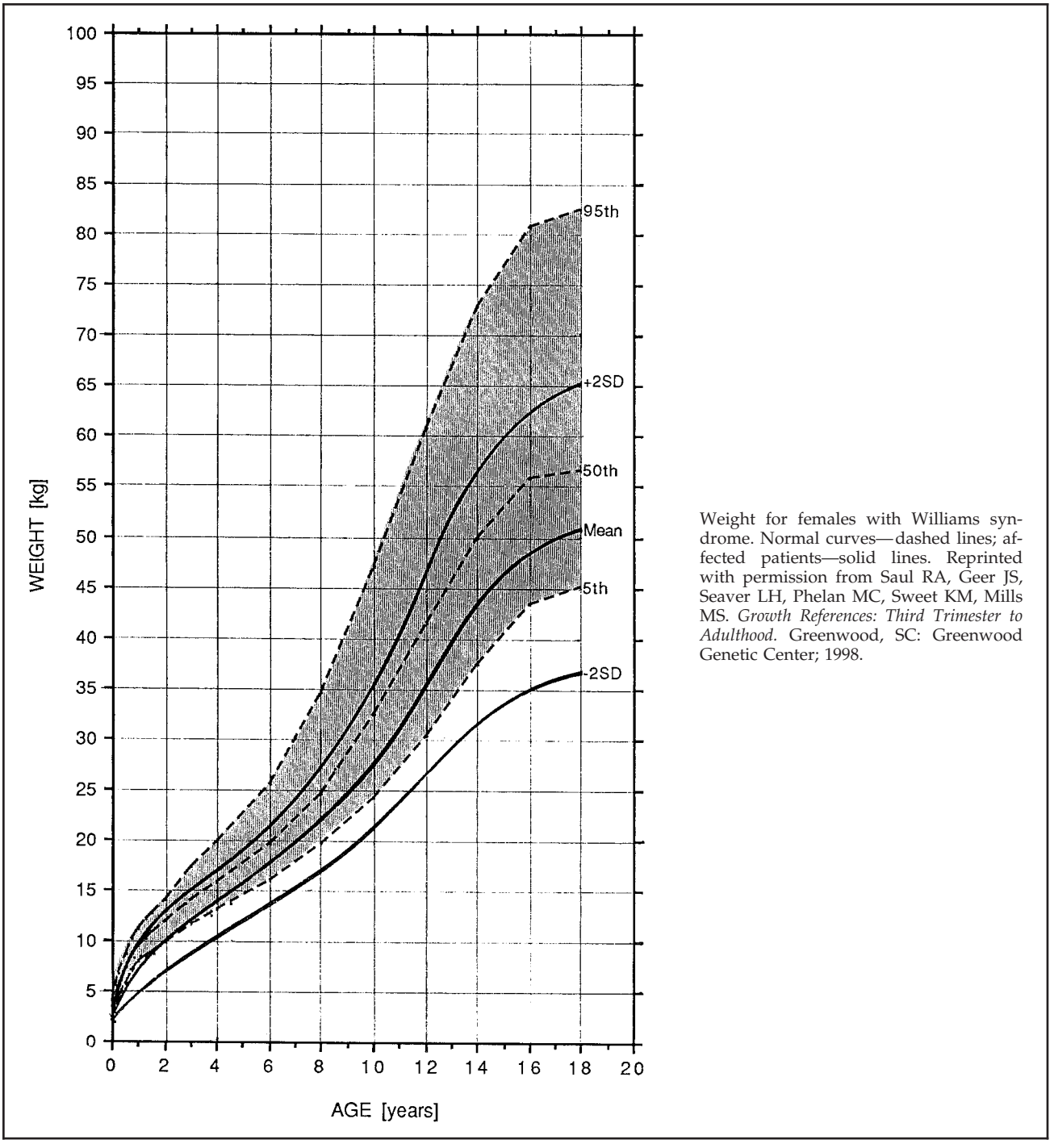
Height for males with Williams syndrome. Normal curves—dashed lines; affected patients—solid lines. Reprinted with permission from Saul RA, Geer JS, Seaver LH, Phelan MC, Sweet KM, Mills MS. *Growth References: Third Trimester to Adulthood.* Greenwood, SC: Greenwood Genetic Center; 1998.

Fig 3B. Williams syndrome—stature, males.

5. Serum creatinine level every 4 years

Anticipatory Guidance

1. Individual support for the family (by family, friends, clergy), support groups, or both
2. Review increased risk for otitis media
3. Ongoing feeding and dietary assessments
4. Therapy as needed (physical, speech and language, and occupational, including sensory integration)
5. Review constipation as a possible problem
6. Children with unexplained fever should be evaluated for urinary tract infection
7. Discuss developmental status, early intervention programs, and preschool programs



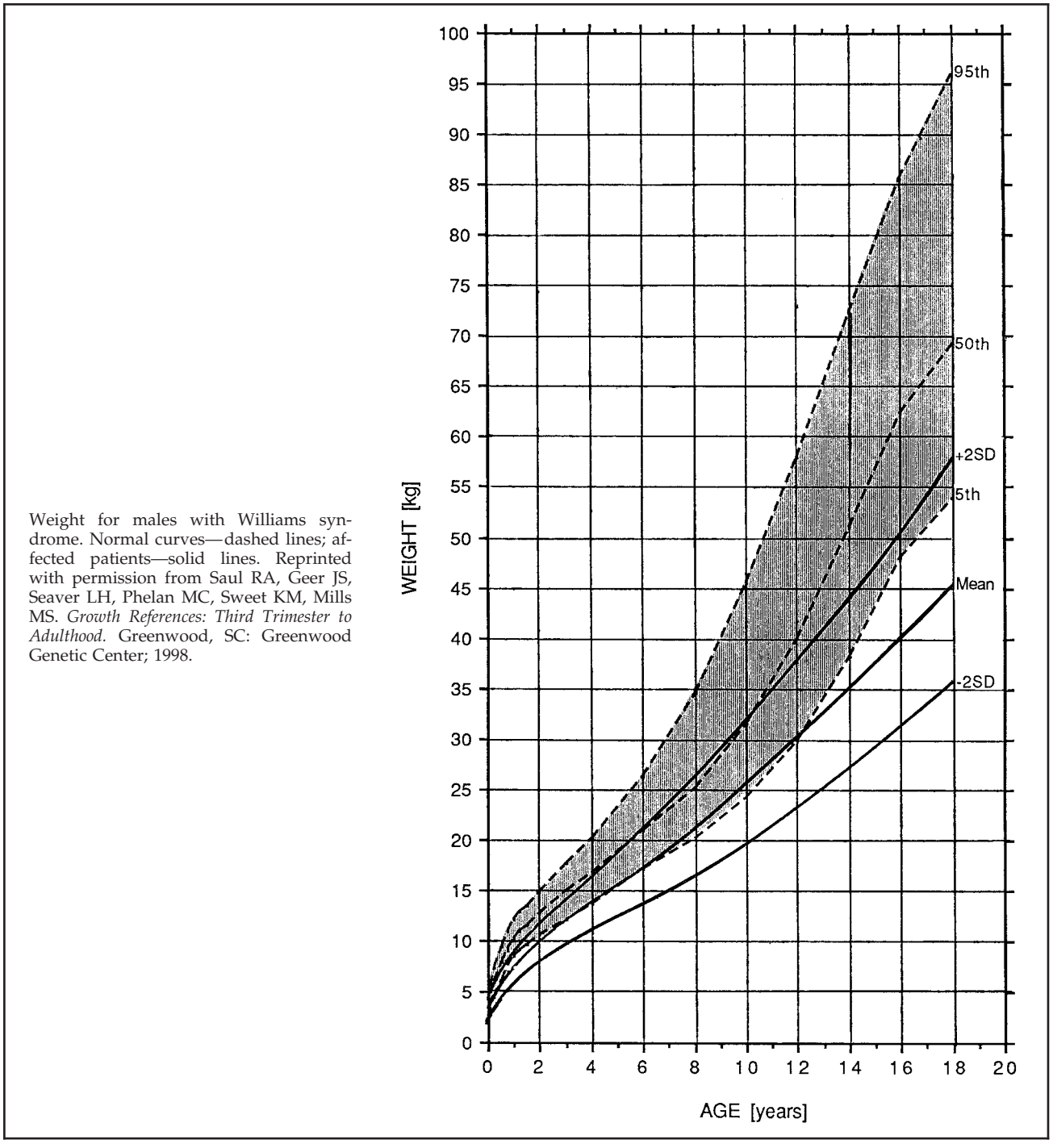
Weight for females with Williams syndrome. Normal curves—dashed lines; affected patients—solid lines. Reprinted with permission from Saul RA, Geer JS, Seaver LH, Phelan MC, Sweet KM, Mills MS. *Growth References: Third Trimester to Adulthood*. Greenwood, SC: Greenwood Genetic Center; 1998.

Fig 3C. Williams syndrome—weight, females.

HEALTH SUPERVISION FROM 5 YEARS TO 12 YEARS (LATE CHILDHOOD)

Examination

1. Annual health maintenance examinations and baseline evaluation
2. Developmental evaluation and growth evaluation using WS growth charts (Fig 3A–F)
3. Annual blood pressure measurements (both arms) and careful evaluation of femoral pulses
4. Cardiology evaluation as indicated by previous clinical findings. If results of previous evaluations are negative, repeated cardiology evaluation (for arterial stenoses, hypertension) should be performed at puberty
5. Ophthalmologic evaluation for strabismus and hyperopia
6. Orthopedic problems (eg, joint limitation, kyphosis, lordosis, scoliosis, and spasticity)



Weight for males with Williams syndrome. Normal curves—dashed lines; affected patients—solid lines. Reprinted with permission from Saul RA, Geer JS, Seaver LH, Phelan MC, Sweet KM, Mills MS. *Growth References: Third Trimester to Adulthood.* Greenwood, SC: Greenwood Genetic Center; 1998.

Fig 3D. Williams syndrome—weight, males.

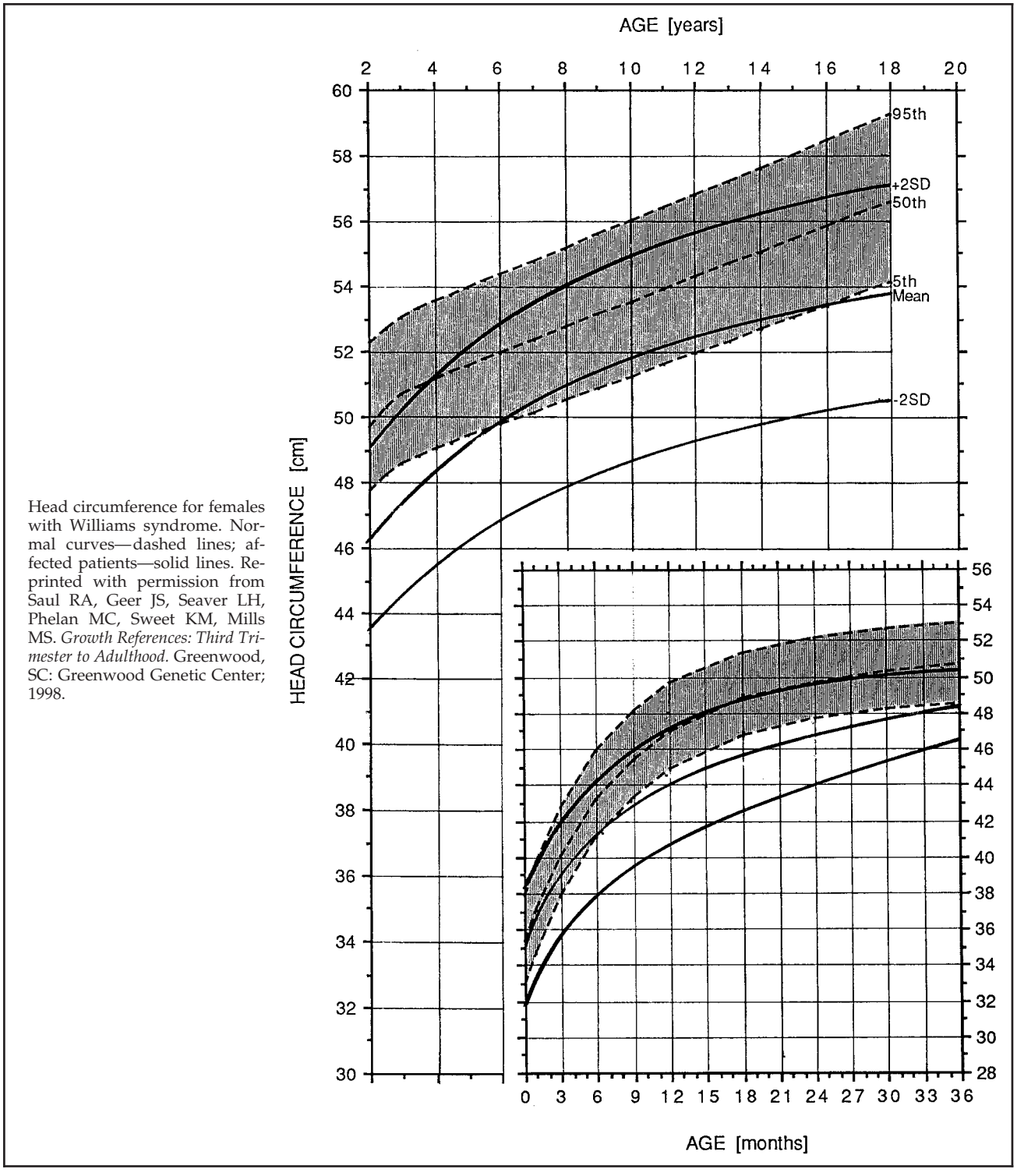
7. Hearing and vision screening annually
8. Pediatric anesthesia consultation for any child requiring surgery (several reports of unexpected deaths have been associated with the administration of anesthesia[22])
9. School readiness and placement and Individual Educational Plan at 5 years
10. Developmental and psychoeducational assessment; formal evaluation for attention-deficit hyperactivity disorder, anxiety, or both and discussion of treatment options[23]

Laboratory

1. Yearly urinalysis
2. Thyroid function tests every 4 years
3. Annual total calcium level if baseline result was elevated or child becomes symptomatic; otherwise measure level every 4 years
4. Urinary calcium-creatinine ratio every 2 years
5. Serum creatinine level every 2 to 4 years

Anticipatory Guidance

1. School readiness and placement



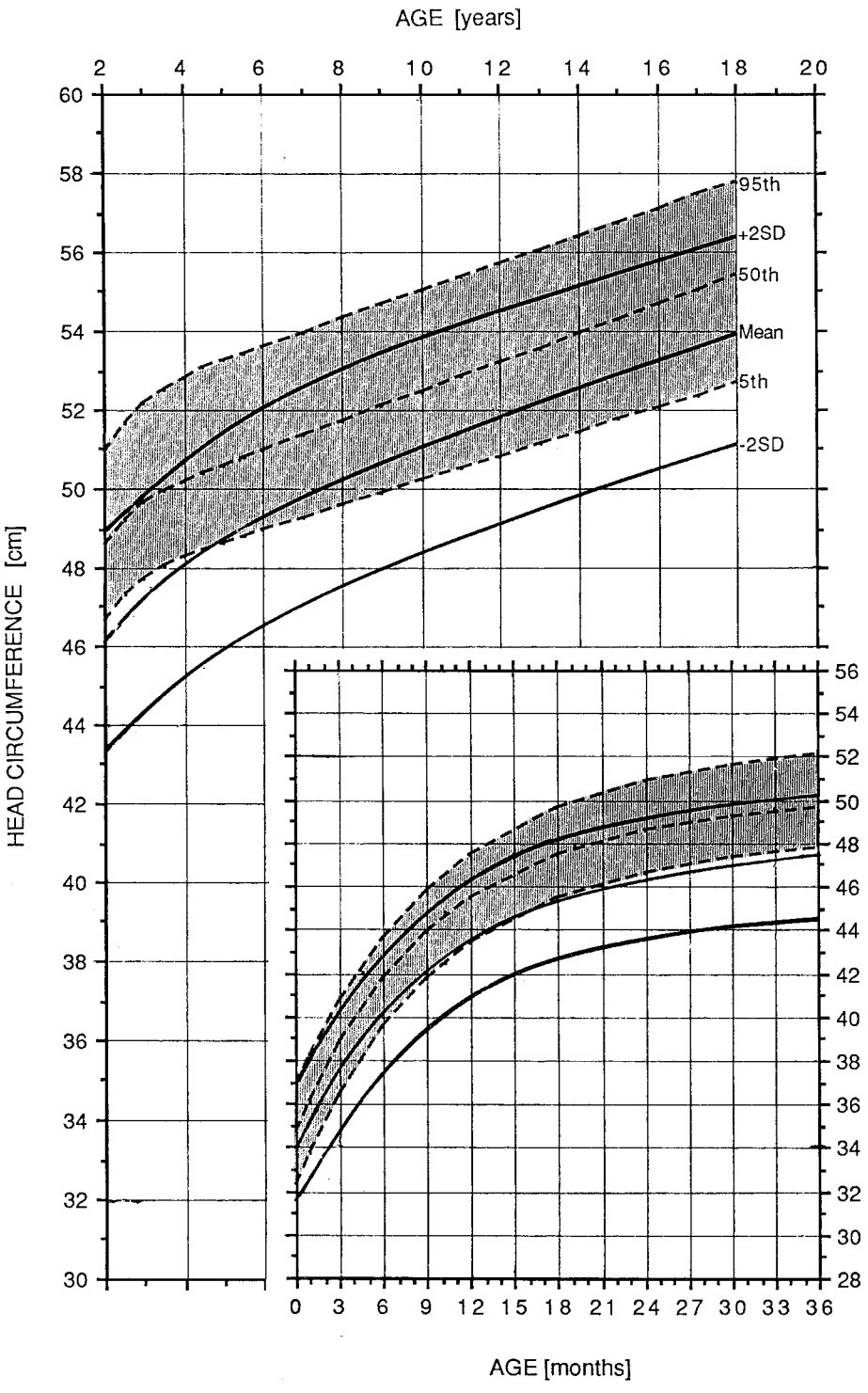
Head circumference for females with Williams syndrome. Normal curves—dashed lines; affected patients—solid lines. Reprinted with permission from Saul RA, Geer JS, Seaver LH, Phelan MC, Sweet KM, Mills MS. *Growth References: Third Trimester to Adulthood.* Greenwood, SC: Greenwood Genetic Center; 1998.

Fig 3E. Williams syndrome—head circumference, females.

2. Therapy as needed (physical, speech and language, and occupational, including sensory integration)
3. Long-term vocational planning
4. Discuss sexuality and adolescence; puberty is often early in WS, but true precocious puberty is rare
5. Discuss diet and exercise as obesity may become apparent in late childhood
6. Discuss treatment options for anxiety (counseling, relaxation techniques, and medications)
7. Estate planning for parents of a child with special needs

HEALTH SUPERVISION FROM 13 YEARS TO 18 YEARS (ADOLESCENCE)

Progressive medical problems including hypertension, progressive joint limitations, recurrent urinary



Head circumference for males with Williams syndrome. Normal curves—dashed lines; affected patients—solid lines. Reprinted with permission from Saul RA, Geer JS, Seaver LH, Phelan MC, Sweet KM, Mills MS. *Growth References: Third Trimester to Adulthood.* Greenwood, SC: Greenwood Genetic Center; 1998.

Fig 3F. Williams syndrome—head circumference, males.

tract infections, and gastrointestinal problems are common beginning in this age group and continuing throughout adult life.

Examination

1. Annual health maintenance examinations and baseline evaluation; blood pressure measurement (both arms)
2. Developmental evaluation and growth evaluation using WS growth charts (Fig 3A–F)
3. Cardiology evaluation if indicated by previous clinical findings
4. Pediatric anesthesia consultation for any child requiring surgery (several reports of unexpected deaths have been associated with the administration of anesthesia[22])
5. Consider ophthalmologic evaluation for hyperopia
6. Orthopedic problems (eg, joint limitation, kyphosis, lordosis, scoliosis, and spasticity)

TABLE 2. Normal Values for Random Urinary Calcium-Creatinine Ratios[21]

Age	Calcium-Creatinine Ratio (mg/mg ratio) (95th Percentile for Age)
<7 mo	0.86
7–18 mo	0.6
19 mo–6 y	0.42
Adults	0.22

7. Hearing and vision screening annually
8. Developmental and psychoeducational assessment; school placement and resource enhancement; vocational training; social skills training for peer interaction[10,11]
9. Gastrointestinal issues: consider diverticulitis and diverticulosis, cholelithiasis, and chronic constipation in adolescents with abdominal pain
10. Screen for generalized anxiety disorder[19]

Laboratory

1. Yearly urinalysis
2. Thyroid function test every 4 years
3. Total calcium level only if adolescent becomes symptomatic, otherwise, every 4 years
4. Urinary calcium-creatinine ratio every 2 years
5. Bladder and renal ultrasonography at puberty and every 5 years thereafter
6. Serum creatinine level every 2 to 4 years

Anticipatory Guidance

1. School placement
2. Therapy as needed (physical, occupational, speech, and language)
3. Discuss diagnosis with the adolescent; support groups for the adolescent (see American Academy of Pediatrics statement on "Transition of Care Provided for Adolescents With Special Needs")[24]
4. Discuss sexuality and reproductive issues
5. Encourage career counseling
6. Foster independence
7. Assist in transition to adult care (especially for cardiology care). Many pediatricians feel comfortable continuing to provide primary care well into young adulthood
8. Encourage daily exercise to include range of motion
9. Encourage prompt medical attention for urinary tract or gastrointestinal symptoms
10. Mental health issues

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RESOURCES FOR PARENTS

March of Dimes, 1275 Mamaroneck Ave, White Plains, NY 10605; Telephone: 914/428–7100; http. //www.modimes.org

The Williams Syndrome Association, PO Box 297, Clawson, MI 48017; Telephone: 248/541–3630; http://www.williams-syndrome.org

Williams Syndrome Foundation, University of California, Irvine, CA 92679; Telephone: 949/824–7259; http://www.wsf.org

Health Care Supervision for Children With Williams Syndrome

Committee on Genetics

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