sounds and syllables (*ssssstuttering*). Resonance or voice disorders include problems with the pitch, volume, or quality of a child's voice that distract listeners from what is being said.

Language disorders can be either receptive or expressive. Receptive disorders refer to difficulties understanding or processing language. Expressive disorders include difficulty putting words together, limited vocabulary, or inability to use language in a socially appropriate way.

Speech-language pathologists (speech or oral-motor therapists) assess the speech, language, cognitive communication, and swallowing skills of children; determine what types of communication problems exist; and identify the best way to treat these challenges. Speech-language pathologists skilled at working with infants and young children are also vital in training parents and infants in other oral-motor skills, such as how to feed an infant born with a cleft lip and palate.

Speech-language therapy involves having a speech-language specialist work with a child on a one-on-one basis, in a small group, or directly in a classroom to overcome a specific disorder using a variety of therapeutic strategies. Language intervention activities involve having a speech-language specialist interact with a child by playing and talking to him or her, using pictures, books, objects, or ongoing events to stimulate language development. Articulation therapy involves having the therapist model correct sounds and syllables for a child, often during play activities.

Children enrolled in therapy early (<3 years of age) tend to have better outcomes than children who begin therapy later. Older children can make progress in therapy, but progress may occur more slowly because these children often have learned patterns that need to be modified or changed. Parental involvement is crucial to the success of a child's progress in speech-language therapy.

Cerebral Palsy

Decision-Making Algorithms
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Limp
In-Toeing, Out-Toeing, and Toe-Walking
Bowlegs and Knock-Knees
Hypotonia and Weakness

Cerebral palsy (CP) refers to a group of nonprogressive, but often changing, motor impairment syndromes secondary to anomalies or lesions of the brain arising before or after birth. The prevalence of CP at age 8 in the United States is 3.6 per 1000; prevalence is much higher in premature and twin births. Prematurity and low birth weight infants (leading to perinatal asphyxia), congenital malformations, and kernicterus are causes of CP noted at birth. Ten percent of children with CP have acquired CP, developing at later ages. Meningitis and head injury (accidental and nonaccidental) are the most common causes of acquired CP (Table 10-10). Nearly 50% of children with CP have no identifiable risk factors. As genomic medicine advances, many of these causes of idiopathic CP may be identified.

Most children with CP, except in its mildest forms, are diagnosed in the first 18 months of life when they fail to attain motor milestones or show abnormalities such as asymmetric gross motor function, hypertonia, or hypotonia. CP can be characterized further by the affected parts of the body (Table 10-11) and descriptions of the predominant type of motor disorder (Table 10-12). Comorbidities in these children often include epilepsy, learning difficulties, behavioral challenges, and sensory impairments. Many of these children have an isolated motor defect. Some affected children may be intellectually gifted.

Treatment depends on the pattern of dysfunction. Physical and occupational therapy can facilitate optimal positioning and movement patterns, increasing function of the affected parts. Spasticity management also may include oral medications (dantrolene, benzodiazepines, and baclofen), botulinum toxin injections, and implantation of intrathecal baclofen pumps. Management of seizures, spasticity, orthopedic impairments, and sensory impairments may help improve

Table 10-10 Risk Factors for Cerebral Palsy

PREGNANCY AND BIRTH
Low socioeconomic status
Prematurity
Low birth weight/fetal growth retardation (<1500 g at birth)
Maternal seizures/seizure disorder
Treatment with thyroid hormone, estrogen, or progesterone
Pregnancy complications
Polyhydramnios
Eclampsia
Third-trimester bleeding (including threatened abortion and placenta previa)
Multiple births
Abnormal fetal presentation
Maternal fever
Congenital malformations/syndromes
Newborn hypoxic-ischemic encephalopathy
Bilirubin (kernicterus)
ACQUIRED AFTER THE NEWBORN PERIOD
Meningitis
Head injury
Car crashes
Child abuse
Near-drowning
Stroke

Table 10-11 Descriptions of Cerebral Palsy by Site of Involvement

Hemiparesis (hemiplegia)—predominantly unilateral impairment of the arm and leg on the same (e.g., right or left) side
Diplegia—motor impairment primarily of the legs (often with some limited involvement of the arms; some authors challenge this specific type as not being different from quadriplegia)
Quadriplegia—all four limbs (whole body) are functionally compromised.