Table 10-7	Differential Diagnosis of Mental Retardation*
EARLY ALTERATIONS OF EMBRYONIC DEVELOPMENT	
Sporadic events affecting embryogenesis, usually a stable developmental challenge	
Chromosomal changes (e.g., trisomy 21 syndrome)	
Prenatal influences (e.g., substance abuse, teratogenic medications, intrauterine TORCH infections) †	
UNKNOWN CAUSES	
No definite issue is identified, or multiple elements present, none of which is diagnostic (may be multifactorial)	
ENVIRONMENTAL AND SOCIAL PROBLEMS	
Dynamic influences, commonly associated with other challenges	
Deprivation (neglect)	
Parental mental illness	
Environmental intoxications (e.g., significant lead intoxication)*	
PREGNANCY PROBLEMS AND PERINATAL MORBIDITY	
Impingement on normal intrauterine development or delivery; neurologic abnormalities frequent, challenges are stable or occasionally worsening	
Fetal malnutrition and placental insufficiency	
Perinatal complications (e.g., prematurity, birth asphyxia, birth trauma)	
HEREDITARY DISORDERS	
Preconceptual origin, variable expression in the individual infant, multiple somatic effects, frequently a progressive or degenerative course	
Inborn errors of metabolism (e.g., Tay-Sachs disease, Hunter disease, phenylketonuria)	
Single-gene abnormalities (e.g., neurofibromatosis or tuberous sclerosis)	
Other chromosomal aberrations (e.g., fragile X syndrome, deletion mutations such as Prader-Willi syndrome)	
Polygenic familial syndromes (pervasive developmental disorders)	
ACQUIRED CHILDHOOD ILLNESS	
Acute modification of developmental status, variable potential for functional recovery	
Infections (all can ultimately lead to brain damage, but most significant are encephalitis and meningitis)	
Cranial trauma (accidental and child abuse)	
Accidents (e.g., near-drowning, electrocution)	
Environmental intoxications (prototype is lead poisoning)	

TORCH, **T**oxoplasmosis, **o**ther (congenital syphilis), **r**ubella, **c**ytomegalovirus, and **h**erpes simplex virus.
*Some health problems fit in several categories (e.g., lead intoxication may be involved in several areas).
†This also may be considered as an acquired childhood disease.

Children with **mild to moderate visual impairment** usually have an uncorrected refractive error. The most common presentation is myopia or nearsightedness. Other causes are hyperopia (farsightedness) and astigmatism (alteration in the shape of the cornea leading to visual distortion). In children younger than 6 years, high refractive errors in one or both eyes also may cause amblyopia, aggravating visual impairment.

The diagnosis of severe visual impairment commonly is made when an infant is 4 to 8 months of age. Clinical suspicion is based on parental concerns aroused by unusual behavior, such as lack of smiling in response to appropriate stimuli, the presence of nystagmus, other wandering eye movements, or motor delays in beginning to reach for objects. Fixation and visual tracking behavior can be seen in most infants by 6 weeks of age. This behavior can be assessed by moving a brightly colored object (or the examiner's face) across the visual field of a quiet but alert infant at a distance of 1 ft. The eyes also should be examined for red reflexes and pupillary reactions to light. Optical alignment (binocular vision with both eyes consistently focusing on the same spot) should not be expected until the infant is beyond the newborn period. Persistent nystagmus is abnormal at any age. If ocular abnormalities are identified, referral to a pediatric ophthalmologist is indicated.

During the newborn period, vision may be assessed by physical examination and by **visual evoked response**. This test evaluates the conduction of electrical impulses from the optic nerve to the occipital cortex of the brain. The eye is stimulated by a bright flash of light or with an alternating checkerboard of black-and-white squares, and the resulting electrical response is recorded from electrodes strategically placed on the scalp, similar to an electroencephalogram.

There are many developmental implications of visual impairment. Perception of body image is abnormal, and imitative behavior, such as smiling, is delayed. Delays in mobility may occur in children who are visually impaired from birth, although their postural milestones (ability to sit) usually are achieved appropriately. Social bonding with the parents also is often affected.

Visually impaired children can be helped in various ways. Classroom settings may be augmented with resource-room assistance to present material in a nonvisual format. Fine motor activity development, listening skills, and Braille reading and writing are intrinsic to successful educational intervention for a child with severe visual impairment.

Hearing Impairment

Decision-Making Algorithm
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Hearing Loss

The clinical significance of hearing loss varies with its type (conductive versus sensorineural), its frequency, and its severity as measured in the number of decibels heard or the number of decibels of hearing lost. The most common cause of mild to moderate hearing loss in children is a conduction abnormality caused by acquired middle ear disease (acute and chronic otitis media). This abnormality may have a significant effect on the development of speech and language development, particularly if there is chronic fluctuating middle ear fluid. If hearing impairment is more severe, sensorineural hearing loss is more common. Causes of sensorineural deafness include congenital infections (e.g., rubella and cytomegalovirus), meningitis, birth asphyxia, kernicterus, ototoxic drugs (especially aminoglycoside antibiotics), and tumors and their treatments. Genetic deafness may be either dominant or recessive in inheritance; this is the main cause of hearing impairment in schools for the deaf. In Down syndrome, there is a predisposition to conductive loss caused by middle ear infection