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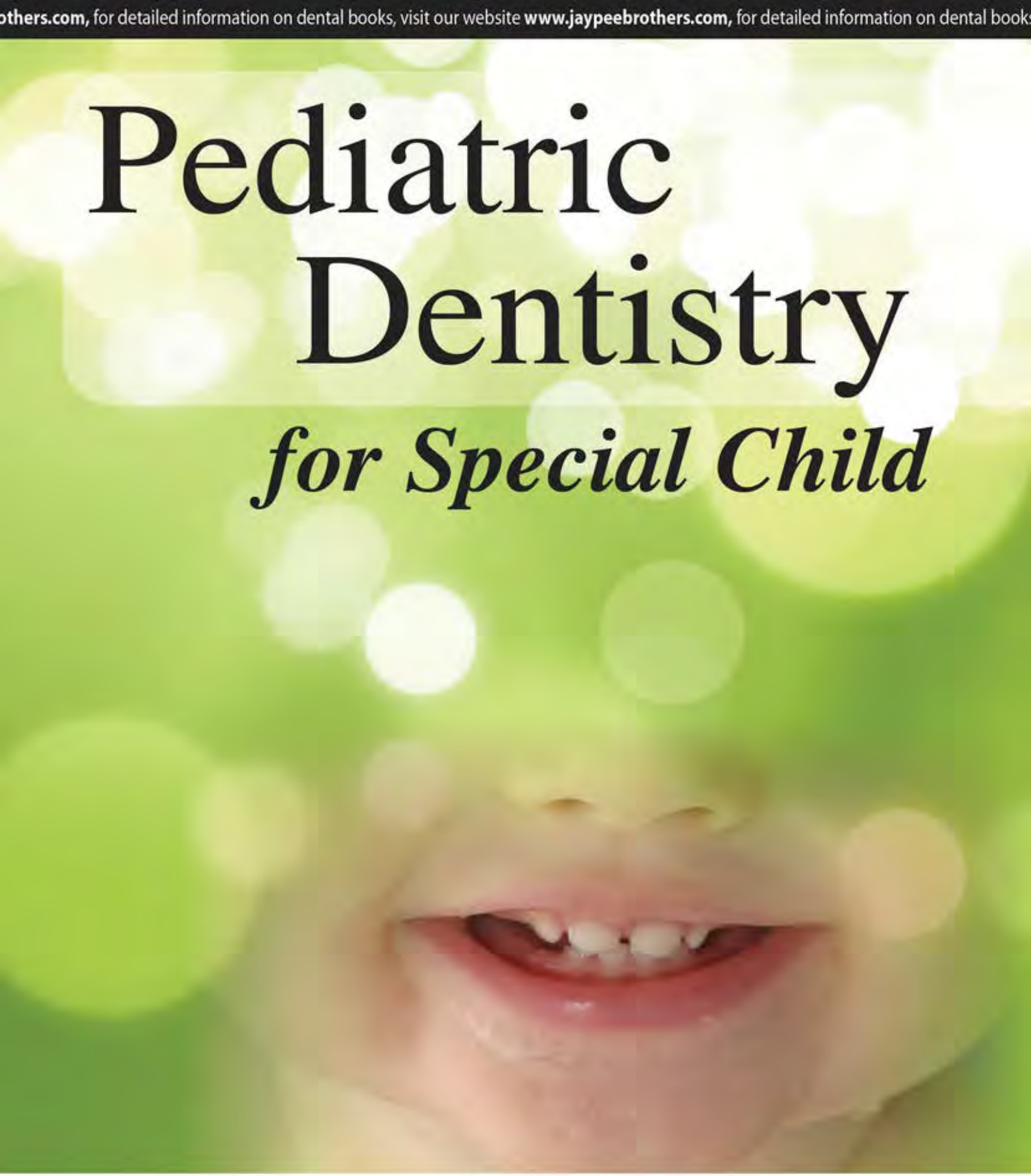
Pediatric Dentistry

for Special Child



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JAYPEE

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Chapter

2 Mental Retardation

Verma P, Tomar D

Chapter Outline

- History
- Definitions
- Epidemiology
- Classifications
- Etiology
- Etiopathogenesis
- Clinical Considerations
- Oral Manifestations
- Investigations
- Differential Diagnosis
- Diagnosis
- Multidisciplinary Approach
- Pharmacological Approach
- Dental Management
- Clinical Concerns
- Management Modifications
- Maintenance

INTRODUCTION

Mental retardation (MR) is one of the most common developmental disabilities. It is a source of pain and bewilderment to many families. Sheerenberger (1983) classifies that disability of brain and mind occurs due to brain damage. MR can be defined by a collection of symptoms, traits or characteristics. It has been renamed many times throughout the history. This is not a disease, nor should it be confused with mental illness. One of the major differences is that they are slow learners, thus these kids do not grow at an average rate and exhibit great difficulty in learning and productivity.



- Mental retardation and intellectual disability are two names for the same thing. But intellectual disability is gaining currency as the preferred term
- In fact, the American Association on Mental Retardation changed its name in 2007 to the American Association on Intellectual and Developmental Disabilities

- MR has also been an associated symptom of syndromes such as Down and Prader-Willi.
- Affecting 1–3% of the population and resulting from environmental, chromosomal and monogenic causes.
- When MR is not associated with any head injury or frank dysmorphic changes it becomes very challenging to differentiate MR from developmental delays. The diagnosis should be made very conservatively and the child should be categorized as developmentally slow rather than MR.
- Finally MR is a challenge from diagnosis till the treatment and can act as a source of potential stress to the family.

HISTORY

- The plight of individuals with developmental disabilities has been dependent on the customs and beliefs of the era and the culture or locale.
- In **Roman Empire,** the disabled children were frequently sold to be used for entertainment or amusement.

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- In ancient **Greece** and **Rome**, infanticide was a common practice.
- In **Sparta**, neonates were examined by the State Council of Inspectors and, if found to be defective, the infant was thrown from a cliff to meet its own death.
- It has been found as far back in history as the therapeutic papyri of Thebes (Luxor), **Egypt**, around 1500 BC.
- During the Middle ages (476–1799 AD) the status and care of individuals with MR varied greatly.
- With more human practices there was decline in infanticide and the establishment of homes.
- In 1690 John Locke published his famous work Concerning Human Understanding, who believed that an individual was born without inbuilt ideas. The mind is a blank slate and the care provided to these individuals will affect their personality.

DEFINITIONS

- According to **Sheerenberger (1983)**, the elements of the definition of mental retardation include: onset in childhood, significant intellectual or cognitive limitations, and an inability to adapt to the demands of everyday life.
- **American Association on Mental Deficiency or Retardation (1910)** referred to individuals with mental retardation as feeble-minded, as their development was halted at an early age or inadequate therefore making it difficult to keep pace with peers and manage their daily lives independently. Three levels of impairment were identified: idiot, development is arrested at the level of a 2-year old; imbecile, development is equivalent to that of a 2–7 years old at maturity; moron, whose mental development is equivalent to that of a 7–12 years old at maturity.
- MR can also be defined as an overall intelligence quotient lower than 70, associated with functional deficit in adaptive behavior, such as daily-living skills, social skills and communication.
- **American Association on Mental Retardation (AAMR)** defined mental retardation as "significantly sub-average general intellectual functioning accompanied by significant limitations in adaptive functioning in at least two of the following skill areas: communication, self-care, social skills, self-direction, academic skills, work, leisure, health and safety. These limitations should manifest themselves before 18 years of age".



- Intellectual disability is a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior, which covers many everyday social and practical skills. This disability originates before the age of 18. Intellectual functioning—also called intelligence—refers to general mental capacity, such as learning, reasoning, problem solving, and so on (AAIDD 2002)



- Recognizing that a numerical value alone may be neither precise nor adequate to distinguish between the abilities of a child whose intelligence quotient (IQ) is 71 and one whose IQ is 69, the AAMR defines the upper limit of subaverage general intellectual functioning as "70 to 75" when there are also significant concerns regarding adaptive abilities

EPIDEMIOLOGY

- Mental retardation is considered to be 50 times more prevalent than deafness; 28 times more prevalent than neural tube disorders and 25 times more prevalent than blindness.
- Nearly 3% of the world's population has some form of MR.
- The World Health Organization estimates that there are approximately 170 million people with MR worldwide.
- US in 1994 estimates that 89%, 7%, 4% children were respectively mild, moderate and severely affected with MR.
- McLaren and Bryson (1987) reported that the prevalence was approximately 1.25% for MR.
- Baroff (1991) suggested that only 0.9% of the population are assumed to have MR.
- Prevalence appears to increase with age and more males are identified as compared to females.
- The variability of the prevalence and incidence of MR was considerably due to changing:
  - Definition of MR
  - Regretful attitudes regarding acceptance by family and treatment
  - Extended educational services
  - Improved medical care facilities.

CLASSIFICATIONS

The degree of MR varies with its severity. The Diagnostic and Statistical Manual of Mental Disorders, (DSM-IV-TR), which is the diagnostic standard for mental health care professionals, classifies four different degrees of MR: mild, moderate, severe and profound. These categories are based on the person's level of functioning **(Figs 2.1A to D)**.

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Figs 2.1A to D: Degrees of mental retardation: (A) Mild; (B) Moderate; (C) Severe; and (D) Profound

According to Degrees of Mental Retardation

Mild

- This is also known as the "educable" category. The child appears to be normal, with a pleasant smile, follows instructions and complies with it **(Fig. 2.1A)**.
- The IQ range is 55–70.
- This is the highest functioning level and the largest category.
- Accounts for approximately 85% of individuals in this category.
- The level of functioning may change with age. The children are likely to develop communication and social skills during the preschool years in the minimal impairment in sensorimotor area.
- During the school years, academic achievement may develop to a sixth-grade level.

Moderate

- This is also known as the "trainable" category. The child again is cooperative pleasant to interact, tries to follow the command but needs repeated instruction **(Fig. 2.1B)**.
- The IQ range is 40–55.
- This is the second-highest functioning level.
- Accounts for approximately 10% of individuals in this category.
- Achievement beyond the second-grade level is not possible.
- Training in community and occupational skills can be an alternative.
- Development of communication skills in early childhood followed by personal care becomes important to this individual.
- While this group cannot read for information, unskilled and semiskilled work is possible in sheltered environments.
- Living under supervised settings.

Severe

- The IQ range is 25–40. The children in this category have poor understanding. They are dependent on their caretaker for their basic needs **(Fig. 2.1C)**.

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- This is a lower functioning level.
- Accounts for approximately 3–4% of individuals in this category.
- Speaking ability may develop with to minimal self-care skills.
- Skills are limited to simple tasks and sight recognition of "survival" words.
- Performance of tasks is usually under supervision.

Profound

- The IQ range is less than 25. Child cannot understand anything, mainly violent; mental age is below 2 years. In grown up children they are difficult to control **(Fig. 2.1D)**.
- This is the lowest functioning level.
- Accounts for approximately 1–2% of individuals in this category.
- Underlying neurological deficit usually becomes the reason for a child to come under this category.
- Training is limited.
- Continual supervision is necessary.

Unspecified Severity

- Although the clinician may face a strong presumption of MR; sometimes, it becomes difficult to classify due to inability to gauge child by standardized quotient tests because of his young age or lack of cooperation.
- This assessment is more difficult in the very young, except when presented with profound deficits.
- In such cases, the diagnosis of developmental delay should always be considered than MR.

According to Origin

Syndromic or Nonsyndromic MR

- MR can also be categorized as syndromic, if associated with dysmorphic features; or nonsyndromic, if not associated with dysmorphisms or malformations.
- In contrast, over 800 recognized syndromes listed in the Online Mendelian Inheritance in Man (OMIM) database are associated with MR.
- Some forms of MR are due to nongenetic factors and are identifiable by their associated dysmorphisms and clinical presentation. Examples include prenatal exposure to teratogens (e.g. anticonvulsants, warfarin, alcohol) or prenatal thyroid dysfunction.
- Prenatal and postnatal exposure of lead may be associated with decrement in IQ.

ETIOLOGY

Genetic

- **Chromosomal abnormalities:** Mongolism, Partial trisomies, Partial deletion and Translocations.
- **Cryptic chromosomal abnormalities:** Deletions, Duplications and Contiguous gene syndrome.
- **Gene defects:** Prader-Willi syndrome, Angelman syndrome.

Epigenetic

- Maternal intoxications
- Fetal alcohol syndrome
- Drugs
- Trauma
- Premature delivery.

ETIOPATHOGENESIS

- The manifestation of MR occurs primarily due to the defects localized to cortical structures.
- Children with cognitive impairment are found to have no structural abnormalities.
- Malformations associated with MR are of neural tube defects, hydranencephaly, and microcephaly.
- Congenital anomaly syndromes associated with malformations are limited to non-neurologic organ systems may be present in 5% of all patients with MR.
- 4% and 8% of cases associated with inborn errors of metabolism.
- Alcohol exposure to the fetus in utero may account for up to 7% to 8% of mild MR.
- Mild MR may have learning disabilities but are usually free of facial dysmorphisms, central nervous system (CNS) malformations and complications arising from that.
- Low socioeconomic status and low IQ shows the strong correlation.
- Low socioeconomic status also has strong correlation with low cognitive functionary due to nutritional status.

CLINICAL CONSIDERATIONS

- Mental retardation with Down syndrome, generally has obstructive sleep apnea.
- Children with physical and intellectual disabilities develop difficulties in swallowing, which can lead to choking, aspiration, malnutrition and poor hydration.

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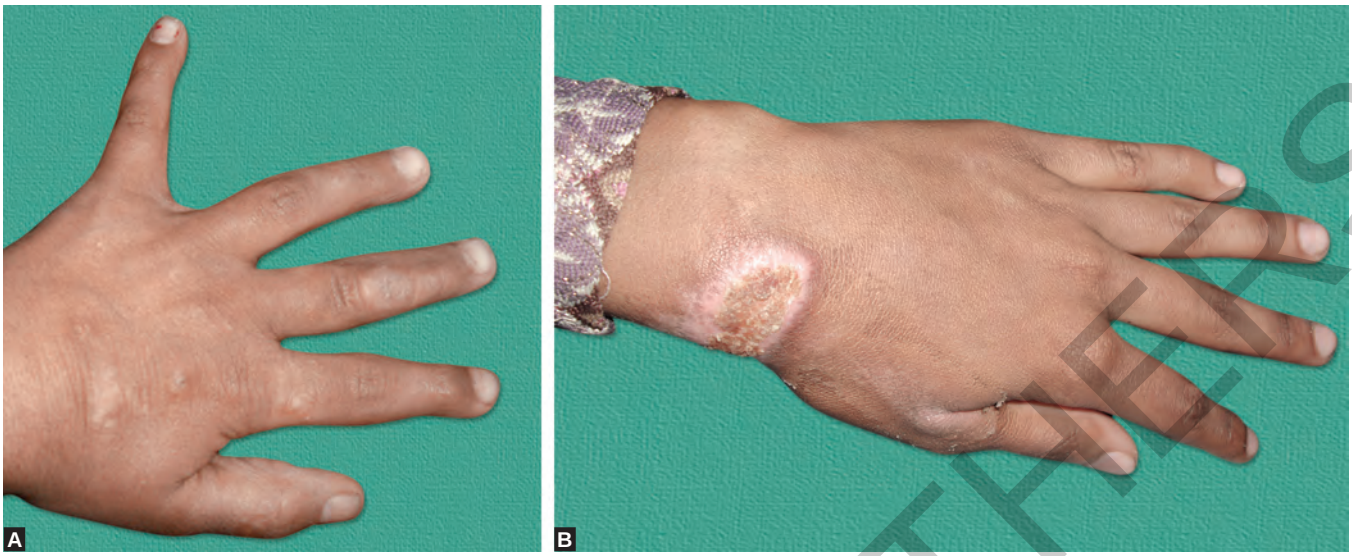
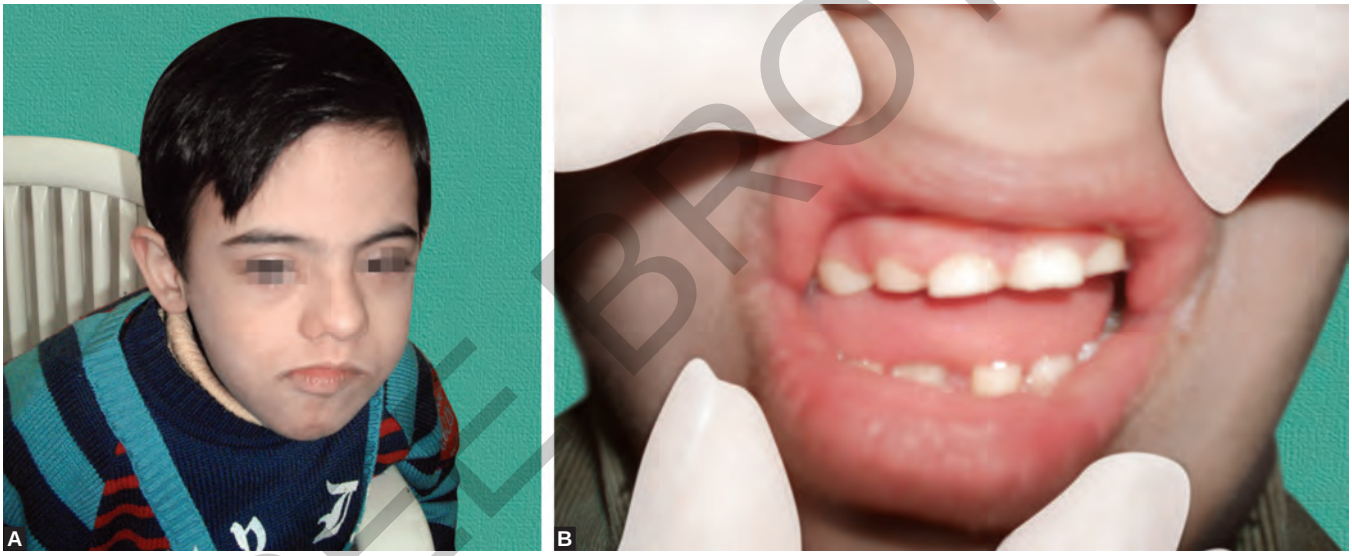


Figs 2.2A and B: Bite and burn marks due to self-injurious behavior



Figs 2.3A and B: Hyperactive jaw in mentally retarded child leading to generalized bruxism

- Aspiration is common manifestation in children with neuromuscular disorders and may cause bronchitis, pneumonia and even death from respiratory infection.
- Poor verbal skills may be due to communicating discomfort related to gastroesophageal reflux disease that may cause sore cough, throat choking due to regurgitation of acidic content into the oral cavity.
- Constipation and fecal impaction are common in MR patient and may lead to discomfort.
- Menstrual discomfort is also a source of agitation and aggression that includes self-injurious behavior. In case of uncontrolled dysmenorrhea, surgery may be a reasonable option.
- These patients are sexually active; reproduction and sexually transmitted diseases should be considered.
- Seizures are likely to be severe, occur often and difficult to control, along with self-injurious behavior **(Figs 2.2 and 2.3)**.
- Neuromuscular scoliosis is common finding with MR in particular with cerebral palsy.
- Neuropsychiatric disorders such as obsessive-compulsive disorder, attention-deficit/hyperactivity disorder, and mood disorders are found to be associated with MR **(Table 2.1)**.
- MR patients are poor predictors of pain due to delayed responses, leading to delayed diagnosis and increased morbidity.

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Table 2.1: Disorders associated with mental retardation

Disorders	*Systems*	*Possible medical phenotypic expression*
Down syndrome	• Dermatologic	• Seborrheic dermatitis affecting scalp and face, eczema affecting hands and feet, tinea infections including onychomycosis
	• Endocrine/metabolic	• Hypothyroidism, diabetes, obesity
	• ENT	• Recurring cerumen impactions, hearing loss, upper airway obstruction, obstructive sleep apnea
	• Gastrointestinal	• Gastroesophageal reflux disease, often with Schatzki's ring and Barrett's esophagus, celiac disease
	• Ophthalmic	• Strabismus, cataracts, decreased visual acuity
	• Orthopedic	• Atlantoaxial instability, patellar subluxation, hip disease
Prader-Willi syndrome	• Dermatologic	• Leg edema or ulceration, lesions on head and anterior legs from skin picking
	• ENT	• Obstructive sleep apnea
	• Gastrointestinal	• Gastroparesis, acute idiopathic gastric dilatation
	• Metabolic	• Insulin resistance, hyperlipidemia, hypertension, growth hormone deficiency, water intoxication, obesity
	• Neurologic	• Exaggerated responses to standard dosages of anesthetic and sedative agents
	• Orthopedic	• Scoliosis, osteoporosis
Cri du chat syndrome	• Cardiac	• Ventricular and atrial septal defects, and rarely Tetralogy of Fallot
	• Orthopedic	• Scoliosis, osteoporosis
	• Pulmonary	• Recurrent upper respiratory infection with otitis media
Rett syndrome	• Cardiorespiratory	Prolonged QT interval, episodic apnea or hyperpnea
Cerebral palsy	• Gastrointestinal	• Drooling, swallowing disorders
	• Neuromusculoskeletal	• Chronic pain (lumbosacral, hip, leg), muscle spasticity, seizures, osteoporosis, scoliosis
	• Pulmonary	• Recurrent infections secondary to aspiration
	• Urinary	• Incontinence
Tuberous sclerosis	• Cardiac	• Congestive heart failure, hypertension
	• Dermatologic	• Facial, ungual angiofibromas
	• Neurologic	• Seizures, obstructive hydrocephalus
	• Ophthalmic	• Retinal hamartomas or phakomas
	• Orthopedic	• Cystic defect in the metacarpals, metatarsals, or phalanges; erosions of the distal phalanges
	• Pulmonary	• Fibrosis, pneumothorax
Neurofibromatosis	• Cancer	• Neurofibrosarcoma
	• Cardiovascular	• Hypertension
	• Neurologic	• Tumors may develop in the brain, on cranial nerves, or on the spinal cord
	• Orthopedic	• Enlargement and deformation of bones, scoliosis

ORAL MANIFESTATIONS

- Nursing bottle caries or early childhood caries occurs frequently as the medication is taken in the form of syrup.
- A night-time feed containing infant formula, juice or any fermentable carbohydrate can lead to rampant decay. Similar results have been seen in demand breast-feeding.
- Altered salivary flow due to multiple medications malocclusions, fractured nonvital teeth and soft tissue complications **(Figs 2.4A to D)**.
- Speech impairment due to early loss of tooth structure and secondary caries, trauma and habits.
- Loss of space for the permanent dentition causing significant orthodontic problems, abnormal jaw development, change in mastication, affecting esthetics and a development of poor self-image **(Figs 2.5A and B)**.

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Figs 2.4A to D: Oral manifestations—(A) Malocclusion; (B) Dental decay due to deleterious oral habits; (C) Plaque; (D) Calculus



Figs 2.5A and B: Malocclusion in mentally retarded patients

- Poor oral hygiene, increased plaque and calculus may give rise to intense halitosis and accumulation of food debris in teeth and mucosa due to soft diet **(Figs 2.6A to D)**.
- Gingival overgrowth because of drugs (hydantoins), chronic infections, inflammation, traumatic occlusion, dental abrasion and hypersensitivity are commonly seen. Halitosis rises due to food remnant and food impaction on fissured tongue **(Figs 2.7A and B)**.
- Congenitally missing permanent teeth and enamel hypoplasia are commonly seen.
- Lip biting is one of the most common clinical feature along with biting of buccal mucosa.

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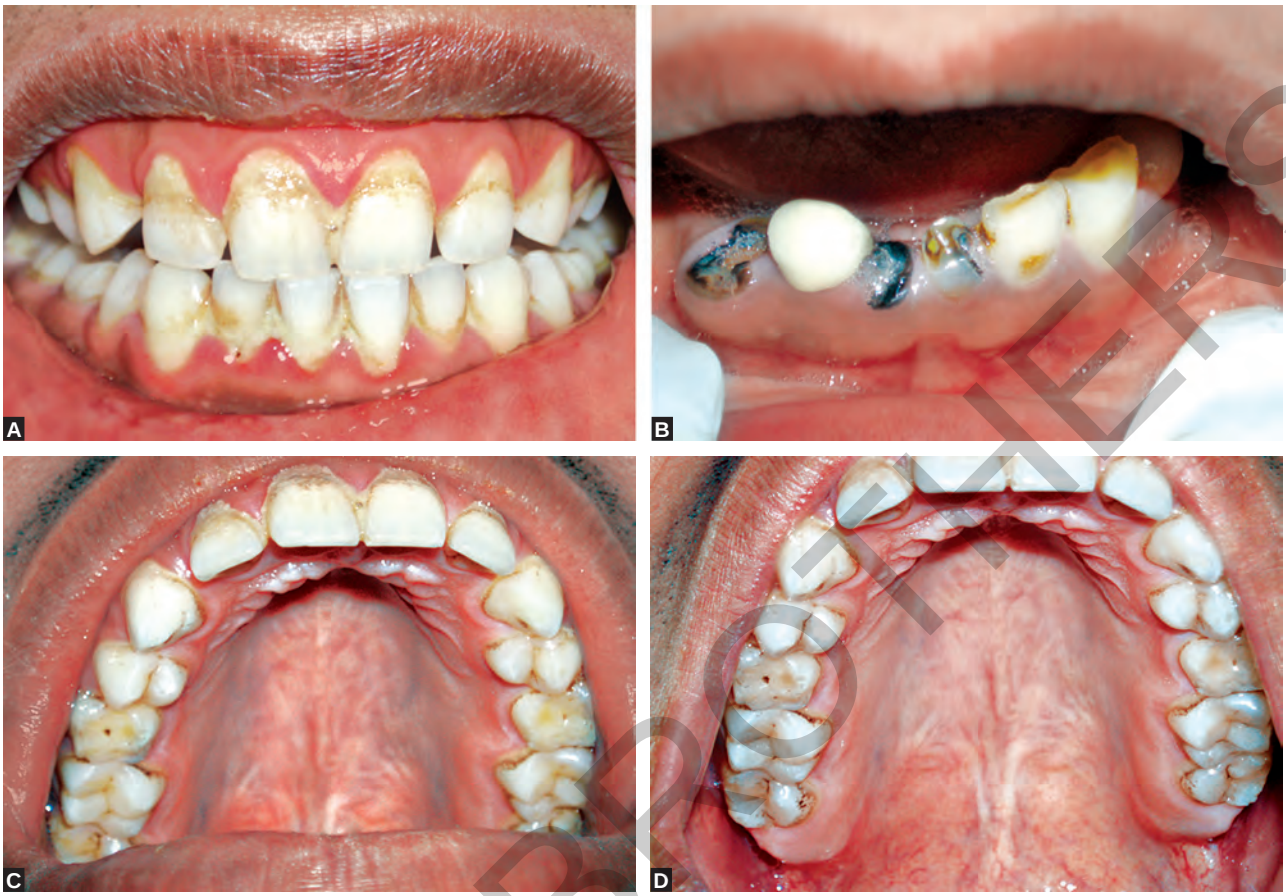
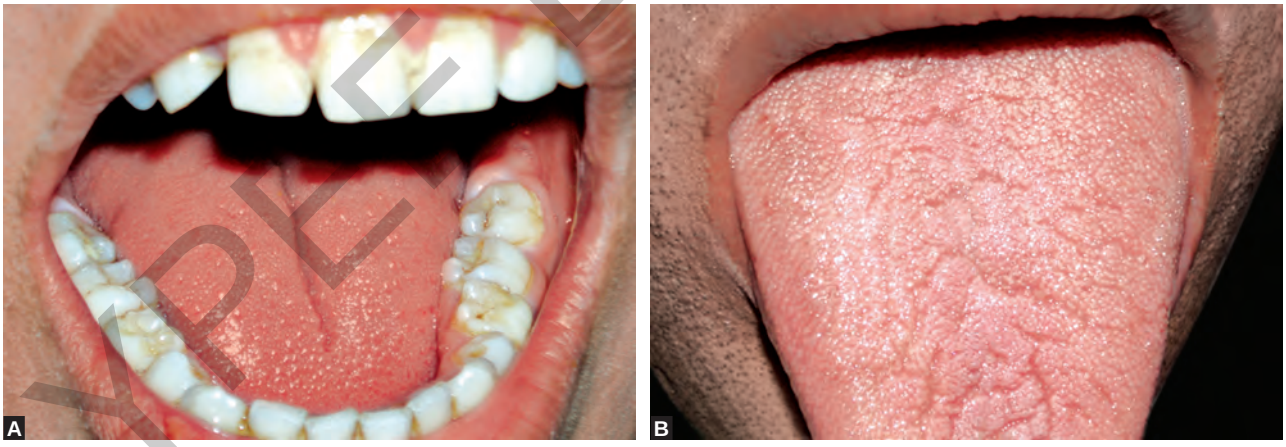


Figs 2.6A to D: Oral manifestations—(A) Hypoplastic enamel; (B) Plaque calculus ; (C) Gingivitis, and (D) Gingival recession



Figs 2.7A and B: (A) Oral manifestations; (B) Fissured tongue

- Traumatized dentoalveolar structures are again one of the most commonly manifested features.
- Self injurious behavior such as biting the digits and Lesch-Nyhan syndrome can be found very commonly in greatest mental impairment (Severe and profound) and should be controlled with behavior modification, restrain and sedation.

INVESTIGATIONS

Diagnostic Examination

- **Dysmorphism examination:** Look for dysmorphic features by conducting a physical examination, minor anomalies and structural malformations.

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- **Neurologic examination:** Perform the physical examination to rule out the neurological deficits and abnormalities.

Lab Investigations

There is no definite protocol to diagnose the condition. The physician must determine the nature and extent of the disease following a history and physical examination.

Metabolic Studies

Metabolic tests are clinically indicated in:

- Plasma amino acids (aminoacidopathies)
- Urinary organic acids (organic acidopathies)
- Urinary mucopolysaccharides and oligosaccharides (mucopolysaccharidoses)
- Plasma 7-DHC (Smith-Lemli-Opitz syndrome)
- Thyroid function tests
- Very long-chain fatty acids (peroxisomal disorders)
- Creatine kinase (in the assessment of profound central hypotonia versus myopathy).

Cytogenetics

DNA analysis of Frax promoter region can be done in prepubertal males with MR, but in the postpubertal period, the clinical manifestations of Frax are likely to be readily apparent alone. In such cases, DNA analysis will be more appropriate.

Karyotyping

Karyotyping at the 500 band level of resolution should be done in all children with MR to rule out:

- Chromosomal abnormalities (Tri 21 and others)
- Sex chromosome aneuploidy.

FISH Probic

FISH probes are indicated clinically in situations such as:

- Prader-Willi/Angelman syndrome
- Smith-Magenis syndrome
- CATCH 22
- Williams syndrome
- Wolf-Hirschhorn syndrome
- Cri du chat syndrome
- Langer-Giedion (trichorhinophalangeal) syndrome
- Miller-Dieker syndrome.

Imaging Studies (Neuroradiological Studies)

- **Brain MRI**
  - Brain imaging is mandatory in any child showing signs of developmental delay and abnormal findings such as craniofacial abnormalities and facial dysmorphism upon neurologic examination.
  - Brain MRI generally is preferred over CT scan, because MRI has greater resolution and enhanced detection of abnormalities in the progression and timing of myelination and demyelination.
- **Head CT scan:** This is the preferred imaging study for calcifications that may be identified with TORCH infectious tuberous sclerosis or craniosynostosis.
- **Echo cerebrum**
- **Skeletal films:** These are preferred for morphologic description, syndrome characterization, and growth assessment.

Psychological Examination

Psychological assessment is mandatory to confirm the diagnosis.

- Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R)
  - Ages 3 years to 7.25 years
  - Twelve subtests for assessment of verbal and nonverbal intelligence.
- Vineland Adaptive Behavior Scales
  - For neonates to adults
  - Measures ability to perform daily chores for personal and social sufficiency
  - Deficiencies in minimum two areas of adaptive skills required to meet the MR diagnostic criteria
- Stanford-binet intelligence scale
  - For ages 2–23 years
  - Fifteen subtests are laid for assessment of four key areas.
  - Visual reasoning, memory
  - Verbal reasoning, abstract
  - Short-term memory
  - Long-term memory
- Bayley scales of infant development
  - For ages 2–30 months
  - Subtest scores for receptive and expressive language, nonverbal problem-solving ability, and sustained attention
- Wechsler intelligence scale for children–IV (WISC-IV)
  - For ages 6 years to 16 years
  - Verbal and nonverbal intelligence scores derived from 12 subtests.

Electrophysiologic Studies

- Electroencephalogram, if clinically warranted
- Auditory evoked potentials in the context of audiologic assessment

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- Visual evoked potentials in cases of profound delay, cortical blindness.

DIFFERENTIAL DIAGNOSIS

- Pervasive development disorder
- Neonatal injures in child abuse
- Heavy impairment
- Language impairment
- Autistic spectrum disorder
- Boderline form of intellectual disability
- Post-traumatic stress disorder
- Learning disorder (mathematics, reading, writing)
- Cognitive deficits
- Rett's syndrome
- Childhood disintegration disorder.

DIAGNOSIS

- After ruling out the medical problems, the patient may then be given a series of intelligence tests, which are designed to determine the child's intelligence quotient. Some tests that are commonly used include:
  - The Stanford-Binet Intelligence Scale
  - The Wechsler Intelligence Scales
  - The Kaufman Assessment Battery for Children.
- A clear cut demarcation should be made between MR and developmental delay for infants and toddlers (below 2 years).
- In the absence of clear-cut evidence, it is more appropriate to diagnose the condition as developmental delay. This will acknowledge a cognitive or behavioral deficit, and will also leave provision for the diagnosis of MR at a later stage.
- Children under the age of 2 years should not be given a diagnosis of MR unless the milestones are relatively delayed or the child has a clinical condition that is highly correlated with MR.
- Final diagnosis may also include a series of interviews between a neurophysician, child, and his family.

MULTIDISCIPLINARY APPROACH

- Children with MR often have many other associated problems, thus it is necessary to come to a definite diagnosis with the help of specialists from different areas, e.g.
  - Child psychiatrist
  - Pediatrician
  - Pediatric dentist
  - Social worker
  - Special education teacher
  - Speech therapist
- This type of interdisciplinary team approach is relatively new and is essential for comprehensive assessment, treatment, and management of affected children.
- Educational initiatives require the involvement of parents and professionals in early intervention services.
- A family-centered approach begins with an assessment of the child obtaining school history from parents and school records, family and parenting history along with community resources.
- Medical, developmental and psychiatric histories are obtained. Behavioral analysis, psychoeducational, speech and language testing are completed. Medical and neurological assessments are performed.
- To assess the child, history in multiple forms is collected, i.e. medical development and psychiatric, further analyses are conducted on speech and behavior.

Cases for MR are basically done in three important steps

1. Medical care
2. Associated referral made as per pediatrician advice
3. Supportive and palliative therapy.

PHARMACOLOGICAL APPROACH

- No specific pharmacologic treatment is available for cognitive impairment in the child or adult with MR.
- Medications, when prescribed, are targeted for specific problems like psychiatric disease or behavioral disturbances.
- Development of nootropic (memory enhancers) drugs that may alter cognitive processes positively has been of interest to researchers.
- Medications currently prescribed for dementia, such as acetylcholinesterase inhibitors, are not accepted treatments for MR.
- Phosphodiesterase inhibitors enhance cortical plasticity in an animal model of fetal alcohol syndrome.
- Vitamin and mineral therapies are found to be popular but their efficacy has not been established in clinical trials.
- The use of antioxidant supplements in patients with Down syndrome is not been proved yet.
- The most common class of drugs prescribed in this population is the psychostimulants because of the coexistence of attention deficit with or without hyperactivity disorder (ADHD/ADD) in as many as 50%. The most widely used psychostimulants are methylphenidate and dextroamphetamine, which appear to enhance dopamine and norepinephrine activity in the CNS.

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DENTAL MANAGEMENT

General Considerations

- A comprehensive oral examination should be completed on all patients. This may require the assistance of family members if the patient is unable to provide accurate information.
- The dental treatment plan should be formulated according to accepted dental practice and take into consideration the following factors:
  - Mental age of their patient
  - Understanding and communication level
  - Psychological needs
  - Physical limitations
  - Accessibility issues
  - Behavior management
  - Medical conditions
  - Potential drug interactions/allergies
  - Antibiotic prophylaxis
  - Consent issues
  - Financial considerations.

Patient Assessment

- A thorough medical history that includes: chief complaint, history of present illness, past medical history, review of systems, family and social history, thorough past dental history.
- Laboratory studies should be done when appropriately required.
- Patient's mental status or degree of intellectual functioning should be assessed to allow proper communication.
- The patient's physician should be consulted regarding:
  - Timing and dental treatment
  - Patient's physical status
  - Use of restraints or mental abilities
  - General anesthesia or sedation
  - Potential drug interactions
  - Mental competency
  - Antibiotic prophylaxis
  - Existing allergic conditions.

Behavior Management

Desensitization

It may be effective with some anxious individuals. Desensitization should be the first line of treatment. The first appraisal can serve as an introductory visit in which no actual treatment should be provided.

Restraint

- The use of restraints is recognized as acceptable dental practice when appropriately applied to control behavior while administering dental care to patients with disabilities. This type of modality should be adopted in the failure of other techniques such as desensitization, TSD, etc. and should be documented simultaneously in the form of informed consent. However, this modality should only be used:
  - When necessary
  - Should be the least restrictive alternative method
  - Should not be used as punishment
  - Should not be used for the convenience of the staff
  - Should cause no physical injury to the patient.
- Restraint can be classified as:
  - "Physical restraint" which refers to one person taking a physical control over another person's arms, legs or head to minimize movements during treatment and prevent self-injury of the patient.
  - "Mechanical restraint" refers to the use of devices such as the Papoose boards, pedi-wraps, tape, straps, blankets and mouth props.
  - "Chemical restraint" refers to sedation.

Sedation

- Patients who cannot be managed with physical and chemical restraints are the good candidate for the sedation. Sedation and consulted behavior management should be given with patient's physician, family and caregiver's consent.
  - **Oral sedation** with Valium, Xanax, chloral hydrate, or hydroxyzine may be helpful in reducing patient anxiety during dental treatment **(Fig. 2.8)**.



Fig. 2.8: Child with MR being treated under sedation

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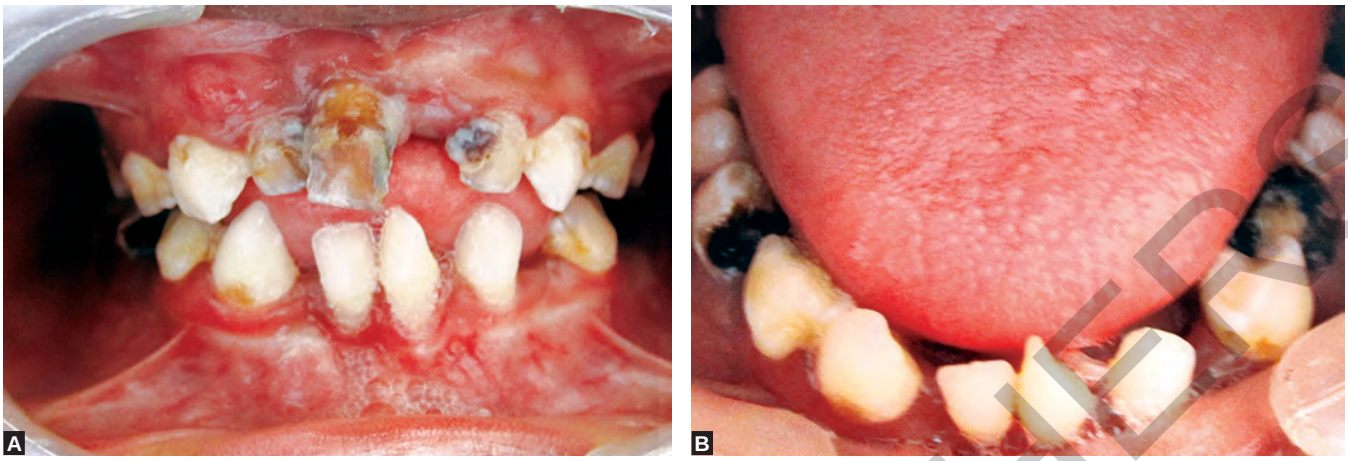

Figs 2.9A and B: Multiple dentinal caries in mentally retarded patients

- **Intravenous sedation** requires an appropriately trained team and appropriate monitoring equipment. The team must be prepared to respond to allergic, respiratory, and/or cardiac complications.

General Anesthesia

General anesthesia should be the last resort in behavior management. The treatment is advised for the noncooperative children or children who are too young to comprehend. However, the medical status should be evaluated by the pediatrician and anesthetic before the child can be considered for the procedure.

CLINICAL CONCERNS

Periodontal

- Observe their method of brushing and demonstrate brushing and flossing.
- Some cannot follow the adaptation and angles due to physical impairment and lack of cognitive skills. A powered tooth brush can be the answer to their situation.
- Reinforce the methods to caregiver, do not expect them to know everything.
- In case of use of mouthwash or rinse, choose appropriate method as gargles might not work with all the patients specially with impaired swallowing reflex, spray works equally well.
- In case, the patient is on any particular medication (sodium valproate/phenytoin) emphasize the importance of constant and daily oral care along with frequent professional prophylaxis.

Restorative

In addition to restorative care, emphasize should be made on decreasing the incidence of new caries lesion in these patients by encouraging non-cariogenic food and beverages as snacks and adding more water to their diet. Avoid using sweets as the incentive to expected exercise. Use sugar free medicine and importance of rinsing with water post-meal and medications should be explained **(Figs 2.9A and B)**.

Traumatic Injuries

- Traumatic injuries are very commonly encountered in MR patients; educate parent with immediate management of avulsion or fractured tooth along (tooth preservation) and immediate professional attention **(Fig. 2.10).**



Fig. 2.10: Traumatic injury of the teeth

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Figs 2.11A to C: Hypoplastic and missing teeth

- Physical abuse can also be present as oral trauma. If suspected, one should know how to differentiate it from traumatic injuries.

Developmental Discrepancies

- Determine the dental, mental and skeletal age of the child and clinically correlate the developing dentition.
- Keep the child under observation for any congenitally nursing teeth, hypoplasia or developmental defects **(Figs 2.11A to C).**
- The incidence of all these things helps in deciding if the patient has multiple disabilities or is syndromic MR.
- An orthopantomogram (OPG) can be very instrumental due to its noninvasive technique and an elaborate image that has ability to cover entire dentition.

MANAGEMENT MODIFICATIONS

Periodontal

- Gingivectomy may be considered for the patient with drug-induced gingival overgrowth if the tissues interfere with occlusion or oral hygiene.
- Generally periodontal packs may not be well tolerated; in that case electrosurgery or laser surgery techniques should be considered as an option.
- Due to poor oral hygiene, frequent recall examinations and prophylaxis are often indicated as often as every 2 or 3 months.
- Encourage independent oral hygiene.

Restorative

- Glass ionomer restorations may be more appropriate for patients with a high caries rate due to fluoride release.
- Stainless steel crowns may be more appropriate for restoring severely damaged teeth, when the patient's lack of cooperation precludes more complicated procedures required for fixed prosthodontics or where lack of funds is a consideration.
- In addition, bonded restorations can eliminate the need for pins and thereby reduce the overall time for the procedure.
- Sedation or general anesthesia may be required.

Endodontic

- Individuals who cannot tolerate a removable prosthesis will benefit from maintaining even severely worn teeth as occlusal stops.
- Endodontic treatment should be considered when a tooth is restorable and the patient can cooperate.
- Single-appointment procedures are advisable.
- As working-length radiographs would be difficult to obtain, an apex locator would be helpful.

Prosthetic

- Fixed prosthodontics is more appropriate than removable one if patient's oral compliance is there.
- Resin bonded bridges are more useful and less time-consuming for tooth preparation.
- Fixed prosthesis is absolutely contraindicated for epileptic patients as it may lead to trauma and aspiration during event.
- Patients must be able to remove, clean and place removable prostheses.
- Removable prosthesis and complete denture are also contraindicated for patient whose seizures are poorly controlled.
- Complete dentures are contraindicated in poor muscle control and in severe and profound MR.

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MAINTENANCE

Education

- Family has a major role to play in supporting the patient with appropriate medical care and assistance. Therefore, it is mandatory that family should be educated sufficiently in order to deliver good oral care.
- Promoting patient involvement through patient education also maximizes the patient's independence.
- Education of the family members/caregivers for providing regular supervision of daily oral hygiene.
- Caregivers should be educated in proper positioning of a patient for oral hygiene care. Pillows, bean bags, chairs and other devices should be considered.
- In-service education programs are necessary for caregivers in institutions and other residential settings such as group homes. In-service training may be presented twice a year at such facilities and can be reinforced at recall visits.

Financial Considerations

- Finance comes as a major barrier in obtaining dental care for the person who is disable which may lead to compromised treatment.
- Potential funding resources that should be investigated such as:
  - Medicaid
  - Supplemental security income
  - State or local developmental disabilities councils
  - Advocacy organizations
  - NGO
  - Religious and fraternal groups
  - Relatives of the patient
  - Patient's dental insurance, charity organizations.
- Affordable dental care may be available at:
  - Public health clinics/Government hospitals
  - Institutional outpatient clinics
  - Regional treatment centers
  - Hospitals
  - Dental institution.

Follow-up Care

- Individuals should be evaluated at least annually by a neurologist or a pediatrician with respect to management.
- To maximize the individual's functional independence, the following areas should be addressed by the physician at least annually:
  - Treatment of associated impairments
  - Pharmacotherapy
  - Behavior management
  - Educational services
  - Recreational needs
  - Family counseling.
- The annual visit well requires routine preventive medicine specialized services such as dental and gynecologic care under sedation.
- Supplemental vaccines are particularly important for those in residential placements.
- The health maintenance schedule for individuals should be organized along with ongoing monitoring, function tests. Other emerging conditions are of critical importance.

CONCLUSION

Making a difference in the oral health of a person with MR may go slowly at first, but determination can bring positive results and invaluable rewards. You can have a significant impact not only on your patients' oral health, but on their quality of life as well.

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ISBN 978-93-5250-193-9