SPECIAL CHILD MANAGEMENT

Contents

Definition

- The world Health organization (1980) has defined a handicapped person as one who over an appreciable period is prevented by physical or mental condition from full participation in the normal activities of their age groups including those of a social, recreational , educational and vocational nature

- AAPD- a person should be considered dentally handicapped of there is pain, infection or lack of functional dentition that affects him/her

    A) restrict consumption of a diet adequate to support growth and energy needs

    B) delay growth and development

    C) inhibits – learning ,communication and recreations

Classification

Frank and Winter(1974) :

- Blind/Partially sighted
- Deaf/Partially deaf
- Educationally subnormal
- Epileptic
- Maladjusted
- Physically handicapped
- Speech abnormality
- Senile

Nowak(1976) :

- Physically handicapped
- Mentally handicapped
- Convulsive disorder
- Communication disorders
- Systemic disorders
- Metabolic disorders
- Osseous disorders
- Malignant disorders

According to disability:

- Physical handicap
- Mental handicap
- Sensory handicap
- Medical handicap
- Multi handicap

Agerholms classification:

- Intrinisic category
- Extrinisic category

Table 23-1

Accessibility Guidelines

External/Internal Building Features	Gradient	Length	Width	Surface, Other Specifics
Parking space	1:50 max slope	Standard	Auto: 96 inches Van: 144 inches	Nonskid, paved, sign-posted, adjacent to walkway
Walkway	1:12 max slope	Not applicable	36 inches	Nonskid, no obstructions, overhangs, smooth
Passenger loading zone	Flat	20 feet	60 inches	Same as above
Curb ramps	1:12 max slope		36 inches	Nonskid, side flair <1:10 slope
Door	5-foot entrance and exit platform area	Standard	32-inch minimum; preferably 36 inches	Away from prevailing winds, lever with 10-lb pull, auto-assisted door available, kick plate
Interior ramp	1:20 max slope	72-inch minimum length if rise > 6 inches	36 inches	Nonskid, handrails
Wheelchair lift	Bilevel	8-foot max drop	36×48 inches	Nonskid, dependent on specific chair
Corridor		Standard	48 inches/64 inches	New facility, no obstacles
Flooring	Flat, firm carpet	Not applicable	½-inch maximum thickness	No doormats, level thresholds

Signs	Braille, raised letters	Above 5 feet	Readable	Near latch of office door
Waiting room	Flat	Standard	36-inch aisle One cleared area: 36×52 inches	No carpet pad, well insulated, minimum low-frequency background noise
Restrooms	Flat		32-inch stall min, preferably 36 inches	Nonskid, magnetic catch door
Public telephone	No higher than 4 feet	3 feet above floor	26-inch clearance	Phone directory near phone, adjustable volume control
Elevator	Flat		54×68 inches	Nonskid, call and control box 48 inches high, include Braille or incised letters
Operatory	Flat 8×10 feet	Standard	32- to 36-inch door	Nonskid, rotating or movable chair, drill, and suction

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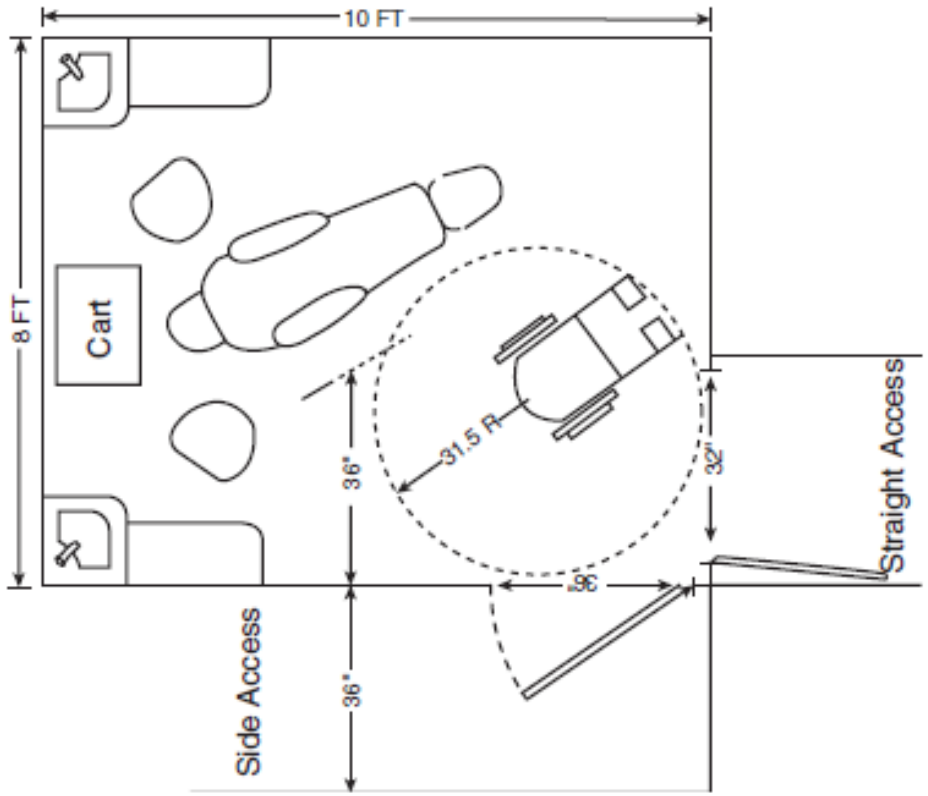

Figure 23-1 An accessible dental operatory floor plan designed for either a straight or side access doorway. (From Bill DJ, Weddell JA. Dental office access for patients with disabling conditions, *Spec Care Dentist* 6:246-252, 1986.)

- Doorways - 4 inches (10 cm) wider than normal.
- where floor circulation space is at a premium, aisle passage in the operatory area should be planned .
- The required wheelchair turning space and top space under furniture and fixtures may be more readily accommodated if one operatory is specifically designed with **a movable dental chair, instrument control unit, and suction system**.
- A wider radius for turning space is desirable to accommodate the wheelchair extensions and adaptations that are required for some persons.
- Dental chairs should be adjustable for height to match different wheelchair designs.

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CEREBRAL PALSY

- Cerebral palsy - not a specific disease entity - collection of disabling disorders - insult and permanent damage to the brain - prenatal and perinatal periods - during which time the central nervous system is still maturing
- involve muscle weakness, stiffness, or paralysis, poor balance or irregular gait, and uncoordinated or involuntary movements. .

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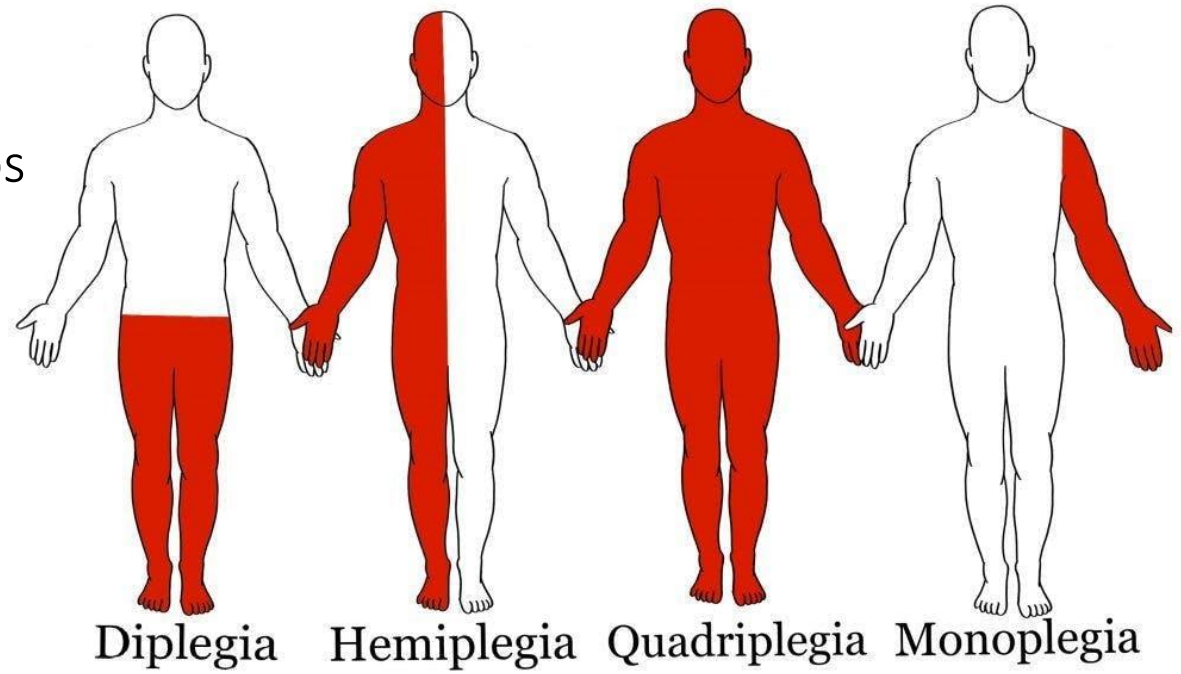
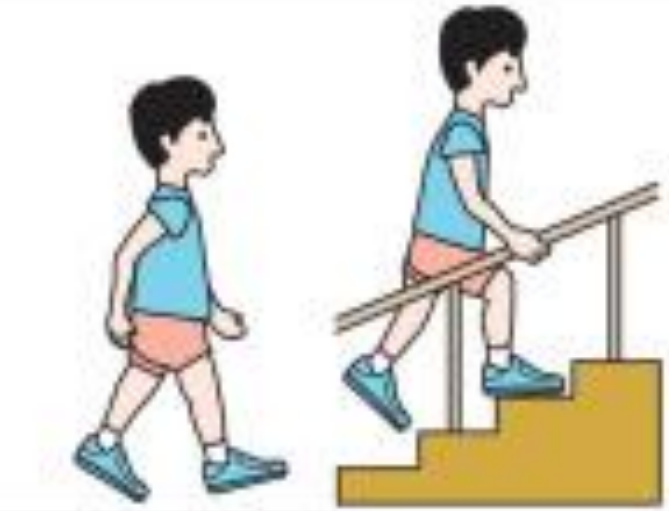
- Monoplegia—involvement of one limb only
- Hemiplegia—involvement of one side of the body
- Paraplegia—involvement of both legs only
- Diplegia—involvement of both legs with minimum involvement of both arms
- Quadriplegia—involvement of all four limbs



The Gross Motor Function Classification System

GMFCS Level I

Children walk indoors and outdoors and climb stairs without limitation. Children perform gross motor skills including running and jumping, but speed, balance and coordination are impaired.



GMFCS Level II

Children walk indoors and outdoors and climb stairs holding onto a railing but experience limitations walking on uneven surfaces and inclines and walking in crowds or confined spaces.

GMFCS Level III

Children walk indoors and outdoors on a level surface witl an assistive mobility device. Children may climb stairs holding onto a railing. Children may propel a wheelchair manually or are transported when traveling for long distances or outdoors on uneven terrain.

GMFCS Level IV

Children may continue to walk for short distances on a walker or rely more on wheeled mobility at home and school and in the community.

GMFCS Level V

Physical impairment restricts voluntary control of movement and the ability to maintain antigravity head anc trunk postures. All areas of motor function are limited. Children have no means of independent mobility and are transported.

Spastic (approximately 70% of cases) :

A. Hyperirritability of involved muscles, resulting in exaggerated contraction when stimulated

B. Tense, contracted muscles

C. Limited control of neck muscles, which results in head rolling

D. Lack of control of the muscles supporting the trunk, which results in difficulty in maintaining upright posture

E. Lack of coordination of intraoral, perioral, and masticatory musculature; possibility of impaired chewing and swallowing, excessive drooling, persistent spastic tongue-thrust, and speech impairments

Spastic Gait

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Dyskinetic (athetosis and choreoathetosis) (approximately 15% of cases)

A. Constant and uncontrolled motion of involved muscles
B. Frequent involvement of neck musculature, which results in excessive movement of the head
C. Possibility of frequent, uncontrolled jaw movements, causing abrupt closure of the jaws or severe bruxism
D. Frequent hypotonicity of perioral musculature, with mouth breathing, tongue protrusion, and excessive drooling
E. Chewing and swallowing difficulties
F. Speech problems

Ataxic (approximately 5% of cases) :

A. Inability of involved muscles to contract completely so that voluntary movements can be only partially performed

B. Poor sense of balance and uncoordinated voluntary movements (e.g., stumbling or staggering gait or difficulty in grasping objects)

C. Possibility of tremors and an uncontrollable trembling or quivering when attempting voluntary tasks

- Mixed (approximately 10% of cases)

A. Combination of characteristics of more than one type of cerebral palsy (e.g., mixed spastic-athetoid quadriplegia)

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Three of the most common reactions :

Asymmetric tonic neck reflex :

If the patient's **head is suddenly turned to one side, the arm and leg on the side to which the face is turned extend and stiffen.** The limbs on the opposite side flex.

Tonic labyrinthine reflex :

If the patient's head suddenly **falls backward** while the patient is supine, the back may assume the position known as postural extension; **the legs and arms straighten out, and the neck and back arch.**

Startle reflex :

This reflex, which is frequently observed in persons with cerebral palsy, consists of sudden, **involuntary, often forceful bodily movements**. This reaction is produced when the patient is surprised by stimuli, such as sudden noises or unexpected movements by other people.

General Characteristics

1. **Intellectual disability :** 60% of persons with cerebral palsy - some degree of intellectual disability.
2. **Seizure disorders :** 30% to 50% of cases - occur primarily- infancy and early childhood. Most - controlled by anticonvulsant medications.
3. **Sensory deficits or dysfunctions :** Impairment of hearing and visual 35% of persons with cerebral palsy. Most common visual defect - strabismus.
4. **Speech disorders** : Half of patients with cerebral palsy - some speech due to lack of control of the speech muscles.
5. **Joint contractures** : spasticity and rigidity - disuse of muscle groups.

Oral Characteristics

PERIODONTAL DISEASE:

- Periodontal disease and poor oral hygiene - great frequency - not be physically able to brush or floss adequately - another individual -performed infrequently and inadequately.
- phenytoin to control seizure activity - gingival hyperplasia.

DENTAL CARIES :

The incidence of caries - greater.

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MALOCCLUSIONS :

prevalence - twice.

Common - protrusion of the maxillary anterior teeth, excessive overbite and overjet, open bites, and unilateral crossbites.

Primary cause - disharmonious relationship between intraoral and perioral muscles.

Uncoordinated and uncontrolled movements of jaws, lips, and tongue - impaired chewing and swallowing, excessive drooling, tongue-thrust, and speech impairment

BRUXISM :

Common - athetoid cerebral palsy.

Severe occlusal attrition of the primary and permanent dentition - loss of vertical interarch dimension.

Temporomandibular joint disorders

TRAUMA :

Persons with cerebral palsy - more susceptible to trauma - maxillary anterior teeth.

Increased tendency to fall– increased flaring of the maxillary anterior teeth.

Susceptibilities also include aspiration and ingestion of a foreign body

Dental consideration

1. For a young patient, the wheelchair may be tipped back into the dentist's lap.

2. If a patient is to be transferred to the dental chair, ask about a **preference for the mode of transfer**. If the patient has no preference, the two-person lift is recommended.

3. Make an effort to stabilize the patient's head throughout all phases of dental treatment.

4. Try to place and maintain the patient in the **midline of the dental chair**, with arms and legs as close to the body as feasible.

5. Keep the patient's **back slightly elevated** to minimize difficulties in swallowing. (It is advisable not to have the patient in a completely supine position.)

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6. On placing the patient in the dental chair, determine the patient's degree of comfort and assess the position of the extremities. **Do not force the limbs into unnatural positions**. Consider the use of pillows, towels, and other measures for trunk and limb support.

7. Use stabilization judiciously to control failing movements of the extremities.

8.For control of **involuntary jaw movements**, choose from a variety of mouth props.

9. To minimize startle reflex reactions, **avoid** presenting stimuli such as **abrupt movements, noises, and lights without forewarning the patient**.

10. Introduce intraoral stimuli slowly to avoid eliciting a **gag reflex** or to make it less severe.

11. Consider the use of the rubber dam, a highly recommended technique, for restorative procedures.

12. Work efficiently, quickly and **minimize patient time in the chair** to decrease fatigue of the involved muscles.

13. Sedation or general anesthesia may be an option for **more complex patients**.

SPINA BIFIDA

- Spina bifida is a type of congenital neural tube defect that results in the malformation of spine and spinal cord
- Occurs due to failure of neural tube to close spontaneously between 3rd and 4th week of in-utero development

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- Exact causes are unknown - the following factors are considered to play a role in neural tube defects

  - Drugs – valporic acid
  - Malnutrition
  - Chemicals
  - Exposure to radiation before conception
  - Low red cell folate levels
  - Hyperthermia
  - Maternal obesity/diabetes
  - Genetic determinants

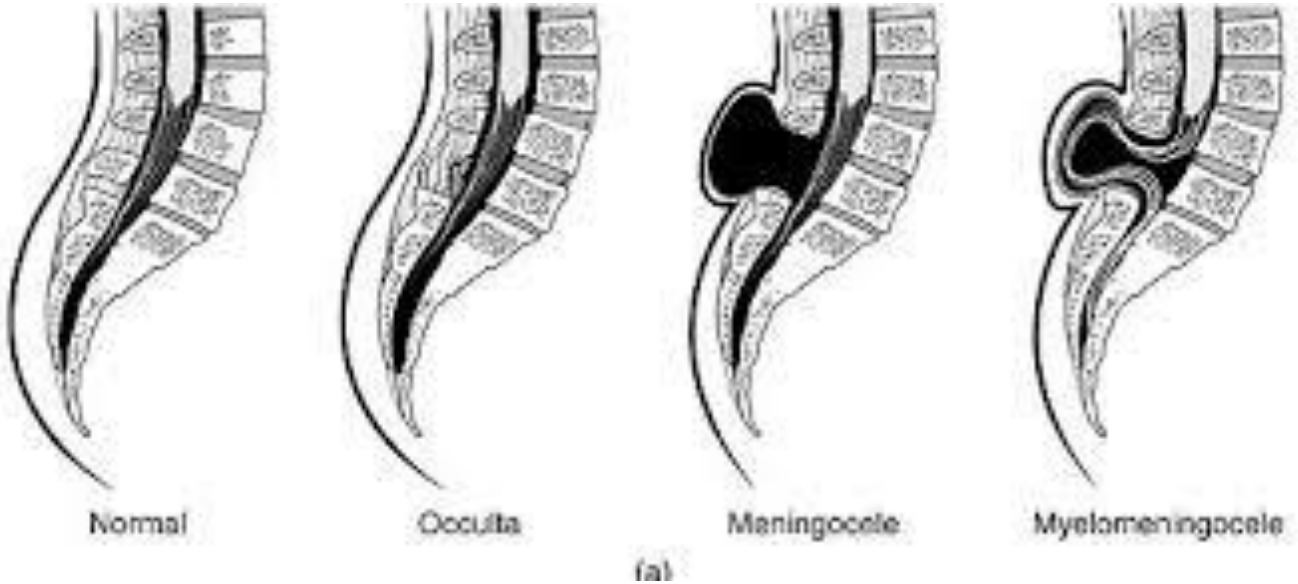
Classification

- Spina bifida is classified as follows:

Spina bifida occulta

Meningocele

Myelomeningocele



- Spina bifida occulta:

An anomaly of midline defect of vertebral bodies without any protrusion of the spinal cord or meninges

Patients are asymptomatic

Lack neurologic signs

Do not have an associated spinal cord malformation

Meningocele:

- Herniation of the meninges through a defect in the posterior ventral arches
- Spinal cord is usually normal – sometimes may be tethered
- Fluctuant midline mass - transilluminate - along the vertebral column - usually in lower back
- Covered with full thickness skin & asymptomatic - surgery may be delayed or sometimes not required - pose no immediate threat
- Leaking CSF or thin skin covering - immediate surgery to prevent meningitis
- Some associated with hydrocephalus
- Symptoms of constipation and bladder dysfunction may develop due to the increase in the size of the lesion

Myelomeningocele:

- Most severe form of spina bifida - aperta or open form - Involves vertebral column and spinal cord
- Produces dysfunction of many organs and structures like skeleton, skin, gastrointestinal and genitourinary tracts in addition to the peripheral nervous system and the CNS
- Extent & degree of neurologic defects depend on the location of the myelomeningocele - common site is lumbosacral region
- Newborns typically have a sac-like cystic structure covered by a thin layer of partially epithelialized tissue or an exposed flat neural placode without overlying tissues

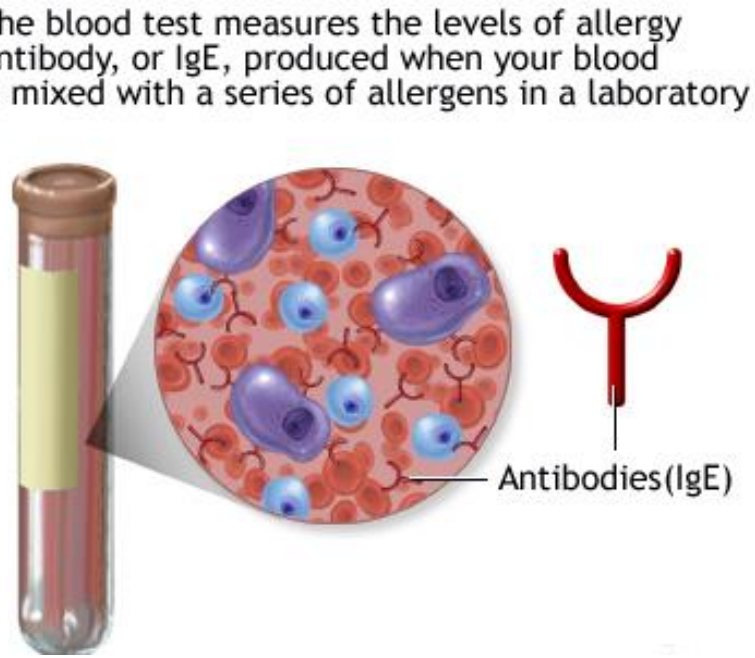
Other conditions commonly found in individuals with myelomeningocele are:

- Hindbrain herniation – leads to caudal displacement of cerebellum, pons and medulla and elongation of fourth ventricle, which impedes CSF flow - causing hydrocephalus
- Children have respiratory symptoms, stridor, vocal cord dysfunction and swallowing and feeding problems which may require gastrotomy tube placement
- Orthopedic complications – spine deformities include scoliosis, lordosis and kyphosis
- Risk of hip dislocation is more leading to problems with sitting
- Abnormalities of foot
- Osteoporosis – begins at childhood and becomes more severe - Fractures of lower extremities are common

- Neurogenic bladder and bowel
- Latex allergies – increased exposure plays an important role
- Care givers should of aware of products containing latex or that have a cross reactivity such as foods containing avocado, bananas or kiwi fruit
- Radioallergosorbent testing is used for the identification of potential allergens.
- Tethered cord syndrome - manifests as change in gait and

bowel or bladder function, increasing scoliosis,

back pain or orthopedic changes



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Oral Characteristics

- No unusual dental problems

More prone to childhood dental caries –

- Impairment makes providing oral hygiene measures difficult
- Liquid oral antibiotics given for the treatment of persistent urinary tract infection,
- Frequent snacking
- Fermentable carbohydrate rich diet
- Parental anxiety concerning the disability frequently delays the dental care for these children

Dental care

- Prevalence of latex allergy 28-67%
- Early and repeated mucosal exposure to latex allergens - multiple surgeries involving catheterization for urinary bladder and for placement of shunts for hydrocephalous
- Symptoms include urticaria, conjunctivitis and anaphylaxis
- Children with spina bifida must be tested for latex allergy
- Children tested negative for latex allergy are capable of becoming allergic in the future

Proper latex precautions are mandatory in the dental operatory:

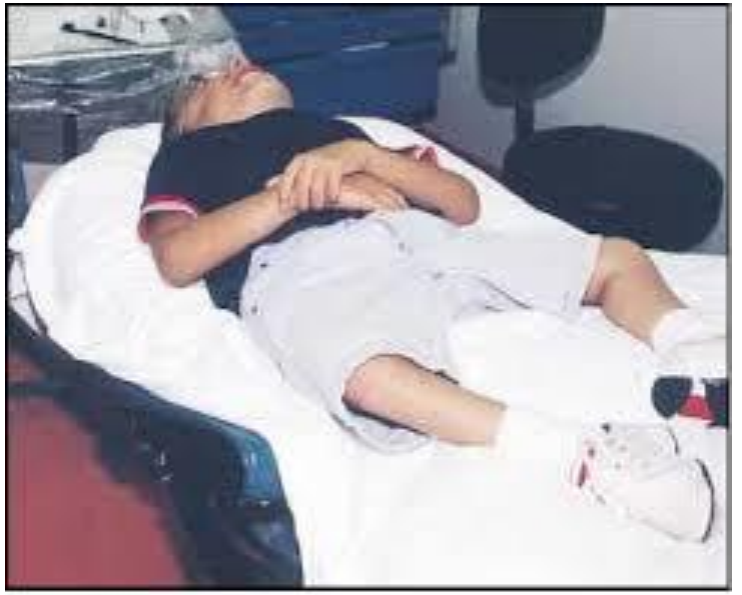
- Latex products such as gloves, dental dams, mouth props, orthodontic elastics, toothbrush handles, polishing points, radiographic films, suction tips and impression materials should be avoided
- Handling of non-latex products while wearing latex gloves or with unwashed hands pose a great risk of transfering latex allergens to nonlatex products

Best time for appointment

- at the beginning of a working session - settling of airborne latex particles
- when the office has been professionally vacuumed and cleaned to remove the latex allergen particles
- Mild reaction to latex - managed by immediate removal of latex object and administration of an antihistamine
- Emergency prefilled syringe with injectable epinephrine should be kept ready if exposure occurs

In Appointment

- While seating a child with spina bifida –
- Care to reduce any potential irritation to the gibbus (hump)
- Using pillows, a mattress pad, stabilizing cushions or a body-size beanbag
- Child is allowed to shift his/her weight for every 20minutes - to maintain circulation and prevent pressure sores
- Children with lower limb deformities pose difficulty in shifting to dental chairs - treatment given with child seated in the wheelchair



- High risk of developing bladder and rectal carcinomas - due to high amount of radiation exposure over time
- Radiographs are to be taken by dentists only when absolutely indicated
- Pulmonary function abnormalities - maintenance of adequate airway is necessary during the time of sedative or anesthesia procedures

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MUSCULAR DYSTROPHIES

- Primary myopathy which has a genetic basis
- Progressive atrophy and weakness of skeletal muscles with resultant disability and deformity
- Muscle fibres are eventually degenerated and replaced by fatty and fibrous tissues
- Fatal because of the recurrent respiratory infections
- Prevalence is 4 per one lakh children

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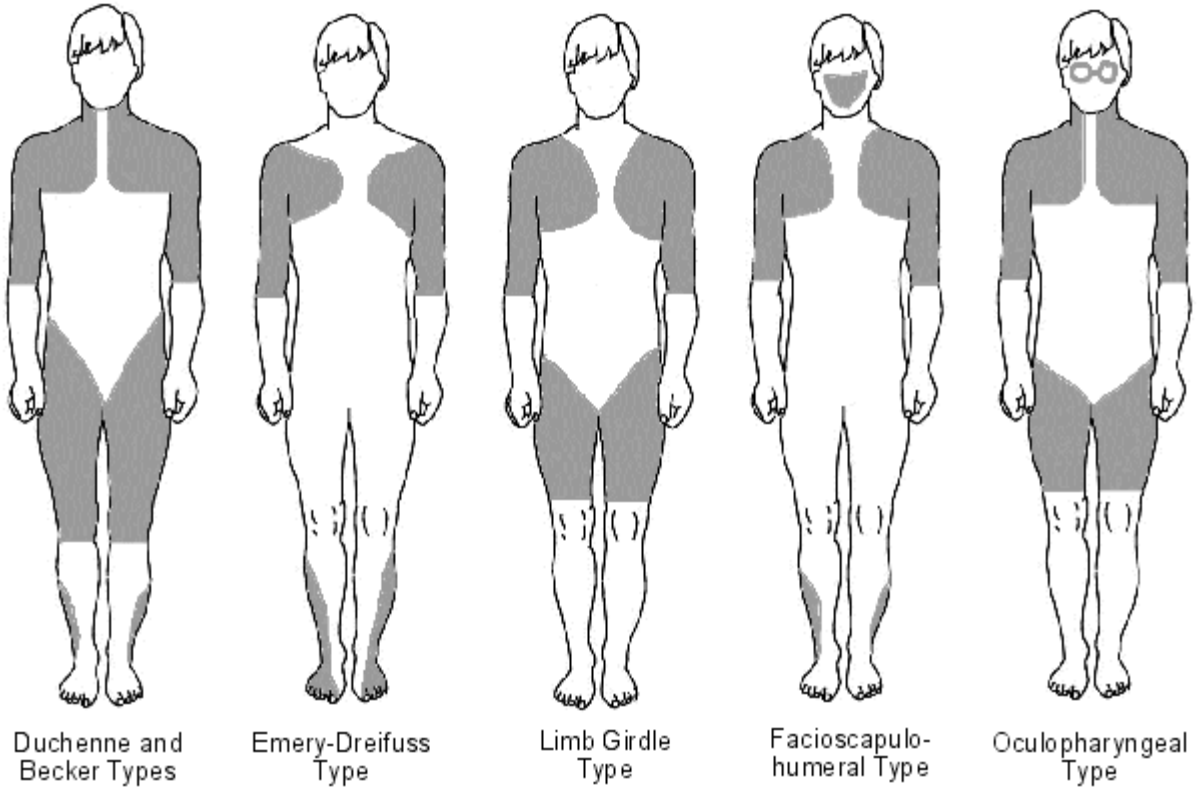
Classification

The different types of muscular dystrophies are:

- Duchenne and Becker Muscular Dystrophies
- Emery-Dreifuss Muscular Dystrophy
- Myotonic Muscular Dystrophy(Steinert disease)
- Limb-Girdle Muscular Dystrophies
- Facioscapulohumeral Muscular Dystrophy



Main areas of muscle weakness in different types of dystrophy

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Duchenne and Becker Muscular Dystrophies:

- Most common type
- Principally affects voluntary muscles and smooth muscles are affected to a very less extent
- Inherited as an X-linked recessive trait - boys are more affected
- Infants are rarely symptomatic with normal or mildly delayed early gross motor milestones
- Poor head control may be the first sign of weakness
- Facial muscle weakness is a late event
- Child is able to walk only by two years of age
- By 7 years - most of the children get confined to wheelchair and develops scoliosis

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- Progression of muscle weakness continues into the second decade of life
- Functions of distal muscles - not affected allowing the child to eat, hold a pencil and operate a keyboard
- Involvement of respiratory muscle is seen as a weak and ineffective cough and frequent infections progressing onto decrease in respiratory reserve
- Pharyngeal muscle weakness can lead to aspiration, nasal regurgitation of liquids and nasal voice quality
- Anal and urethral weaknesses are late manifestation

- Classic features - enlargement of the calves and wasting of thigh muscles - caused by hypertrophy of muscle fibres, fat infiltration into the muscles and by proliferation of collagen
- Next common site of hypertrophy - tongue followed by the forearm
- Thoracic cavity progressively compresses the lung capacity and also compresses the heart
- Individuals need ventilator support
- 50-80% of the patients die of cardiomyopathy
- Intellectual impairment occurs in about 20-30% of the population
- Death occurs by 18-20 years of age due to respiratory failure during sleep, heart failure or occasionally aspiration and airway obstruction

Emery-Dreifuss Muscular Dystrophy:

- Rare X-linked dystrophy
- Manifest between 5-15years of age
- Progression of the condition is very slow - many individuals may survive to late adult life
- Facial weakness does not occur
- Intellectual function is normal
- Cardiomyopathy is the common cause of death

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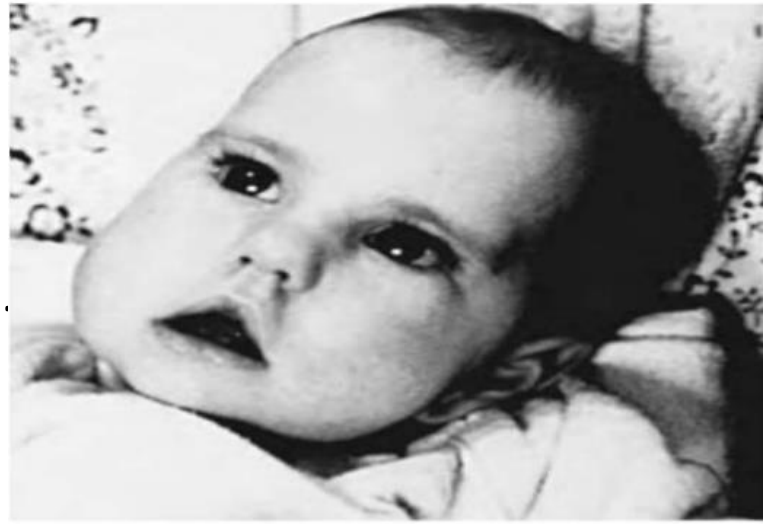
Myotonic Muscular Dystrophy(Steinert disease):



- Second most common type inherited as an autosomal dominant trait.
- Causes multiple organ dysfunction
- Infants almost normal at birth or facial wasting and hypotonia can be the early manifestations of the disease
- Characteristic facial appearance consists of an inverted V-shaped upper lip, thin cheeks and scalloped concave temporalis muscles
- Head may be narrow with high arched palate because the weak temporal and pterygoid muscles in late fetal life - do not exert sufficient lateral forces on the developing head and face

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- Tongue - thin and atropic
- Wasting of the sternocleidomastoids gives the neck a long, thin cylindrical contour
- Myotonia is a slow relaxation of muscle after contraction

    Can be elicited by asking the patient to make tight fists and then quickly open the hands

    Can also be demonstrated by pressing the tongue using the edge of a wooden tongue blade against its dorsal surface and observing a deep furrow that disappears slowly

- Speech is often articulated poorly and slurred
- Difficulties in swallowing occur with high risk for aspiration.
- Ocular muscle and GIT involvement are seen along with cardiac and endocrine abnormalities
- In females uterine muscle involvement is also seen

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Limb-Girdle Muscular Dystrophies:

- Mainly affects the muscles of hip and shoulder girdles
- Manifests by late childhood or early adult life
- Usually patient gets confined to wheel chair by 30 years of age
- Cardiac involvement is not seen and intellectual functioning is normal

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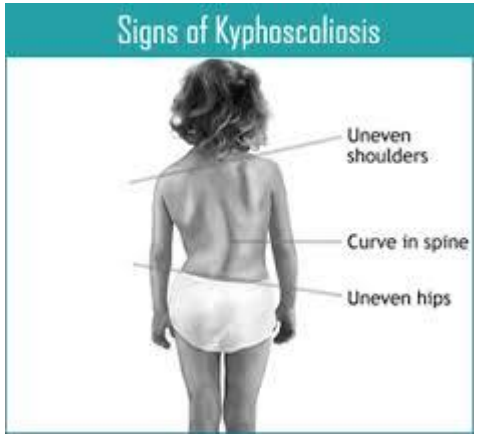
Facioscapulohumeral Muscular Dystrophy:

- Shows the earliest and most severe weakness in facial and shoulder girdle muscles
- Facial weakness differs from that of myotonic dystrophy in that the mouth is rounded and appears puckered because the lips protrude
- Incomplete closure of eyes during sleep is a common sign of upper facial weakness
- Pharyngeal and tongue weakness may not be present
- Muscles of hip girdle and thighs eventually lose strength and undergo atrophy
- Finger and wrist may be the first to be involved
- Lumbar lordosis and kyphoscoliosis are common complications



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Oral Characteristics

In children with Duchenne Muscular Dystrophy,

- Oral musculatures undergo atrophy - masked by overgrowth of the connective tissue and adipose tissue - results in the **pseudo hypertrophy of the orbicularis oris, masseter muscles and muscles of lips and tongue**
- Activity of the **masseter muscles reduces** progressively & along with the large hypotonic tongue - causes transverse **widening of the alveolar arch** - especially the mandibular arch with an associated **cross bite**
- Hypotonia of the orbicularis oris - **mouth breathing habit**

- Presents with anterior open bite & develops tongue thrusting habit and posterior cross bite
- Children also present with masticatory and swallowing problems, decreased protective reflexes and reduced ability to clear secretion from the oropharynx
- May cause post swallow residue - leads to complications such as **choking, and feeling of food sticking in the throat and risk of aspirations and nasal reflux**

- Other orofacial dysfunctions - impaired facial expression, unintelligible speech, deviant production of consonants, dysphagia and drooling - attributed to impaired lip function and tongue motility
- In few - delayed eruption of permanent teeth is noted, most frequently in relation to premolars
- Anomalies of second premolars also occurs in high frequency

Dental care

- For children with muscular dystrophy - dental care should begin as early as possible
- If children are confined to wheelchair- shift
- Intensive preventive measures and frequent recall visits are mandatory as these children are generally not cooperative for the dental treatment
- **Children with muscular dystrophy - react severely to general anesthesia, leading to malignant hyperpyrexia**

- Dangerous complication of GA - occurs in individuals with an underlying muscle disease
- Clinical features - sustained **rise in body temperature, metabolic acidosis and widespread rigidity**
- Occurs as a result of sudden and massive release of calcium from the calcium-storing membranes in the muscle cells when exposed to general anesthetic agents
- Oral rehabilitation under general anesthesia is **absolutely contraindicated** in children with muscular dystrophy

- **Orthodontic treatment is contraindicated** in these children because of the changing muscular forces
- For children with impaired masticatory efficiency - parents should be suggested to adjust meals in terms of less solid food and to make the child to drink water to clear the oropharyngeal area
- Tooth movement is a part of the disease and the development of anterior and posterior cross-bites are common and hence prosthetic appliances may become non-functional

Juvenile Idiopathic Arthritis

- Juvenile idiopathic arthritis (JIA), a broad term that describes a clinically heterogeneous group of arthritis of unknown cause, begins before 16 years of age.
- The hallmark feature of JIA is chronic inflammation of the joints
- The cause of JIA is still poorly understood and none of the available

drugs for JIA can cure the disease

- Patients with JIA experience a myriad of symptoms, including lethargy,

reduced physical activity, poor appetite and flu-like symptoms

- The cardinal clinical features include persistent swelling of one or more joints, limited range of motion in the joints and pain during movement lasting at least 6 weeks
- Females are much more frequently affected with almost all types of JIA than males

ILAR = International League of Associations for Rheumatology

Systemic arthritis	Onset age: throughout childhood Number of joints affected: variable Systemic features: quotidian fever + ≥ 1 of the following: erythematous rash, myalgias, lymphadenopathy, hepatosplenomegaly or serositis.
Oligoarthritis	Onset age: early childhood, peak 2–4 years Number of joints affected: persistent: ≤ 4; extended: ≥ 4 joints after the first 6 months
RF-positive polyarthritis	Onset age: late childhood, adolescence Number of joints affected: ≥ 5 joints Serological test: IgM RF-positive
RF-negative polyarthritis	Onset age: biphasic distribution, early peak 2–4 years, later peak 6–12 years Number of joints affected: ≥ 5 joints Serological test: IgM RF-negative
Enthesitis-related arthritis	Onset age: late childhood or adolescence Number of joints affected: variable, usually ≤ 4 Other diagnoses: enthesitis
Psoriatic arthritis	Onset age: biphasic distribution, early peak at 2–4 years, late peak at 9–11 years Number of joints affected: variable, usually ≤ 4 Other diagnoses: psoriatic rash, family history of psoriasis, dactylitis or nail pitting
Undifferentiated arthritis	Onset age: N/A Patients who do not satisfy inclusion criteria for any other category

Barr T, Carmichael NM, Sándor GK. Juvenile idiopathic arthritis: a chronic pediatric musculoskeletal condition with significant orofacial manifestations. Journal-Canadian Dental Association. 2008 Nov 1;74(9):813.

Oral Manifestations of JIA

- Temporomandibular joint: limited opening with progressive open bite
- Effect on mandibular growth: retrognathia
- Effect on upper limb function with swollen joints in the hands: difficulty with fine-motor movements required for tooth brushing and flossing

Medications:

- oral medications associated with increased caries risk because of sugar content of elixir
- Formulations methotrexate possibly resulting in stomatitis or oral ulceration
- Salivary abnormalities: lower levels of Ca++, PO4, K+, lysozyme and IgA than those of healthy controls

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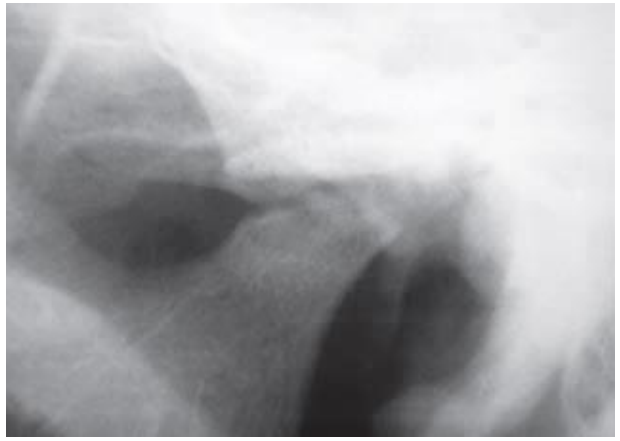

condylar appearances here with flattening and irregular resorption of the condylar head

Figure 3c: Frontal view of malocclusion with anterior open bite.

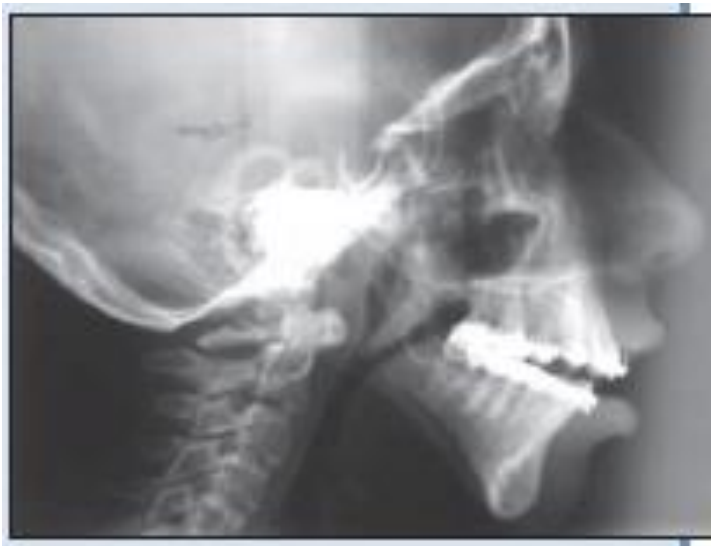

Figure 3a: Lateral cephalogram of a more representative case of JIA showing retrognathia, anterior open bite and lip incompetence.

Barr T, Carmichael NM, Sándor GK. Juvenile idiopathic arthritis: a chronic pediatric musculoskeletal condition with significant orofacial manifestations. Journal-Canadian Dental Association. 2008 Nov 1;74(9):813.

Dental Management

- Regular dental checkups that include extensive instruction about oral hygiene play an important role.
- For patients with upper-limb involvement, electric toothbrushes are recommended to help promote better debridement.
- Fluoride treatments, dietary changes and sealants should be used as needed.
- Sugar free formulations of patient medications should be used whenever possible.
- Opening exercises to ensure adequate range of motion of the TMJ have also been suggested.
- Orthodontic appliances, applied during the prepubertal growth spurt may help minimize changes in occlusion and aid mandibular growth.

Hearing impairment

- Condition in which the individual is unable to detect or perceive the sound frequencies in full/partial capacity that can be heard by people in surrounding
- About 1 in 600 neonates has a congenital hearing loss
- If an impairment is severe enough that dentist and child cannot communicate verbally, the dentist must use sight, and touch to communicate and to allow the child to learn about dental experiences.

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Classification

According to severity of condition WHO

- **No impairment-**

  25dB (better ear)- no/ very slight hearing problem

- **Slight impairment**

  26-40dB – able to hear and repeat words spoken in normal voice at 1 meter.

  counselling hearing aid may need

- **Moderate impairment**

  41-60dB -able to hear and repeat words spoken in normal voice at 1 meter

  counselling hearing aid may need

- **Severe impairment**

  61-80dB – able to hear some words when shouted

  hearing aids are needed. If no aid- lip reading and signing should be taught

- **Profound impairment including deafness**

  81dB or greater- unable to hear understand a word when shouted

  hearing aids are needed. Additional rehabilitation -lip reading and signing should be taught

Grade 2,3,4 – disable hearing impairment

Implications of Auditory Disability Relative to International Standards Organization (ISO) Reference Levels*

Iso (DB)	Disability	Speech Comprehension	Psychological Problems in Children
0	Insignificant	Little or no difficulty	None
25	Slight	Difficulty with faint speech; language and speech development within normal limits	Child may show a slight verbal deficit
40	Mild-moderate	Frequent difficulty with normal speech at 3 feet (91.4 cm); language skills are mildly affected	Psychological problems can be recognized.
55	Marked	Frequent difficulty with loud speech at 3 feet (91.4 cm); difficulty understanding with hearing aid in school situation	Child is likely to be educationally retarded, with more pronounced emotional and social problems than in children with normal hearing.
70	Severe	May understand only shouts or amplified speech at 1 foot (30.5 cm) from ear	The prelingually deaf show pronounced educational retardation and evident emotional and social problems.
90	Extreme	Usually no understanding of speech even when amplified; child does not rely on hearing for communication	The prelingually deaf usually show severe intellectual disability emotional underdevelopment.

*Reference levels are in decibels relative to threshold in young patients with normal hearing.

Adapted from Goetzinger CP. The psychology of hearing impairment. In Katz J, ed. *Handbook of Clinical Audiology*, 2nd ed. Baltimore, 1978, Williams & Wilkins.

According to type

- **Conductive**: hearing loss due to obstruction to the flow of sound from the environment to the inner ear

  pathology-atresia, osteosclerosis, perforation, cholesteatoma, otitis

  loss- reversible

- **Sensorineural**: reduced auditory threshold sensitivity

  dysfunction may be located in inner ear cochlea, auditory nerve or CNS auditory system

  cause- genetic, drug induced ototoxicity , noise induce hearing loss, infections – measles, mumps, syphilis, meningitis

- **Mixed** : combination of both conductive and sensoneural

According to involvement

- **Unilateral hearing loss/ single deafness**

limited to one ear

Affect the localization of sound and distinguishing the background

- **Bilateral hearing loss**

involve both ear

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Etiology

Prenatal factors

- Viral infections

  such as rubella and influenza

- Ototoxic drugs

  such as aspirin, streptomycin, neomycin,kanamycin

- Congenital syphilis

- Heredity disorders

(e.g., Alport, Arnold-Chiari, Crouzon,Hunter, Klippel-Feil, Stickler, Treacher Collins,and Waardenburg syndromes)

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Perinatal factors

- Toxemia late in pregnancy
- Prematurity
- Birth injury
- Anoxia
- Erythroblastosis fetalis

Postnatal factors

- Viral infections, such as mumps, measles, chickenpox, influenza, poliomyelitis, meningitis
- Injuries

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Manifestation

- Clinical :

Hearing impairment with/ without speech impairment

Lack of social and emotional developments

Lack of learning

Low self esteem

- Oral:

Mouth breathing

Xerostomia

Increased prevalence of dental caries

Increased risk of periodontal infection

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General consideration

- Assessment :

  level of impairment of child

  Type of communication skill used

  Preferred method of communicating method

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Lip reading

- Commonly practiced modality
- Obstacle- poor lightening, moustaches slangs and quick lip movement
- Dentist should refrain from wearing mouth mask during communication
- Refrain from technical terms
- Make speech loud and clear

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Before conversation

- Patient should face towards you
- Do not move your head while making conversation
- Proper distance not too close or too far
- Do not block light – hamper your visibility

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Dental consideration

- Employ the tell-show-feel-do approach.
- Use visual aids and allow the patient to see the instruments, and demonstrate how they work.
- Hearing-impaired children may be very sensitive to vibration
- Display confidence; use smiles and reassuring gestures to build up confidence and reduce anxiety. Allow extra time for all appointments
- Avoid blocking the patient's visual field, especially with a rubber dam

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- Adjust the hearing aid (if the patient has one) before the hand piece is in operation, because a hearing aid amplifies all sounds.
- Many times the patient will prefer to have it turned off.
- Make sure the parent or patient understands explanations of diagnosis, treatment, and payment

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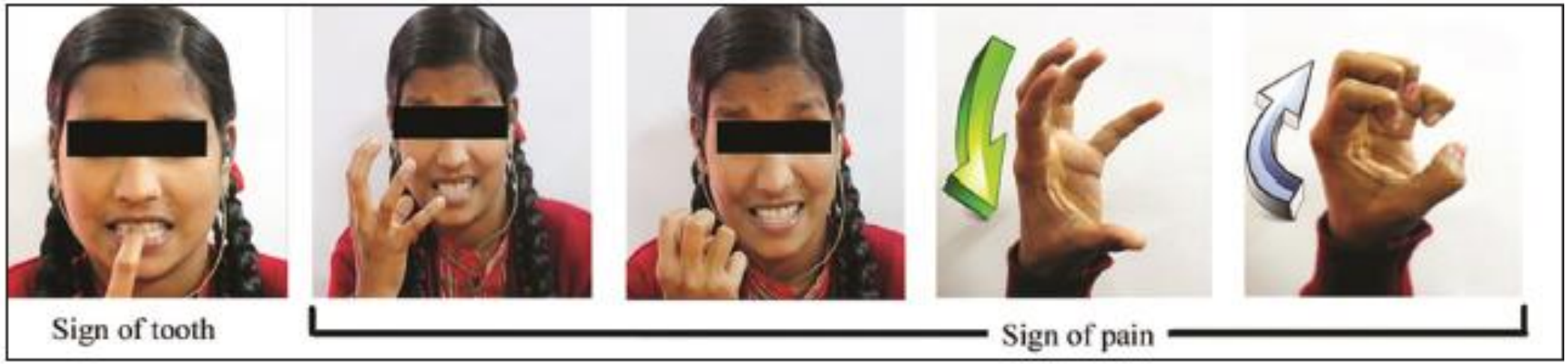
Jain S et al (2017)



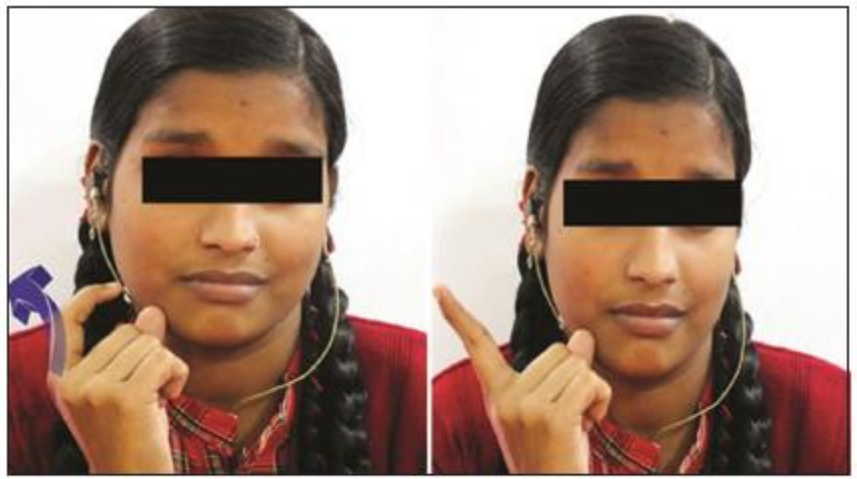


Figure 2: Swelling

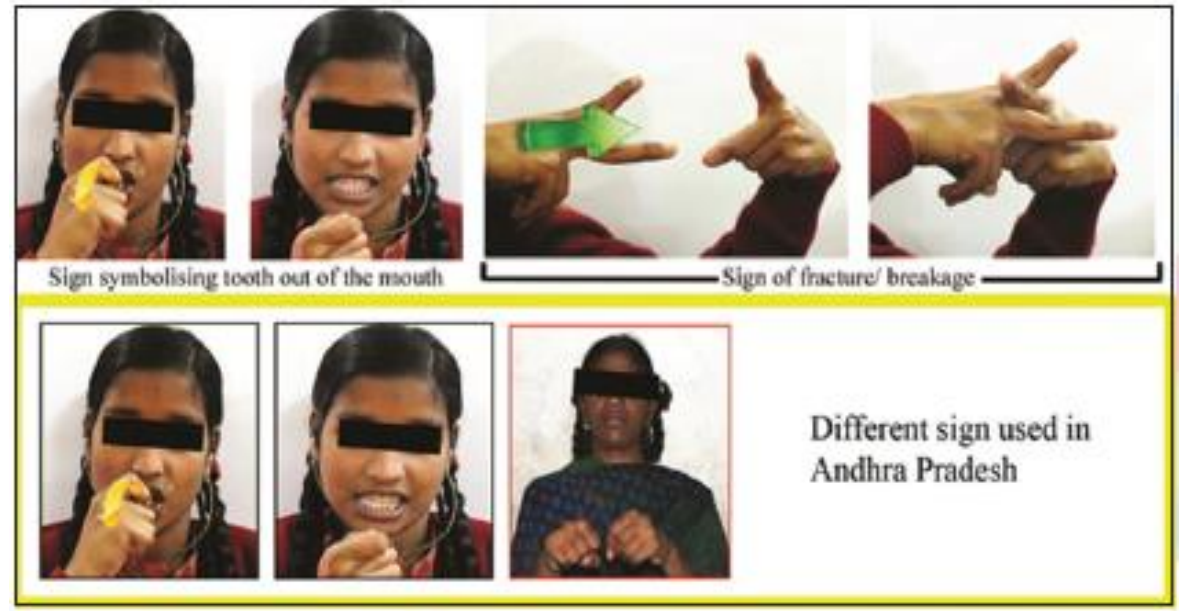


Figure 3: Broken tooth (Expressed by the sign symbolising 'tooth out of the mouth' followed by the sign of 'breakage/fracture')

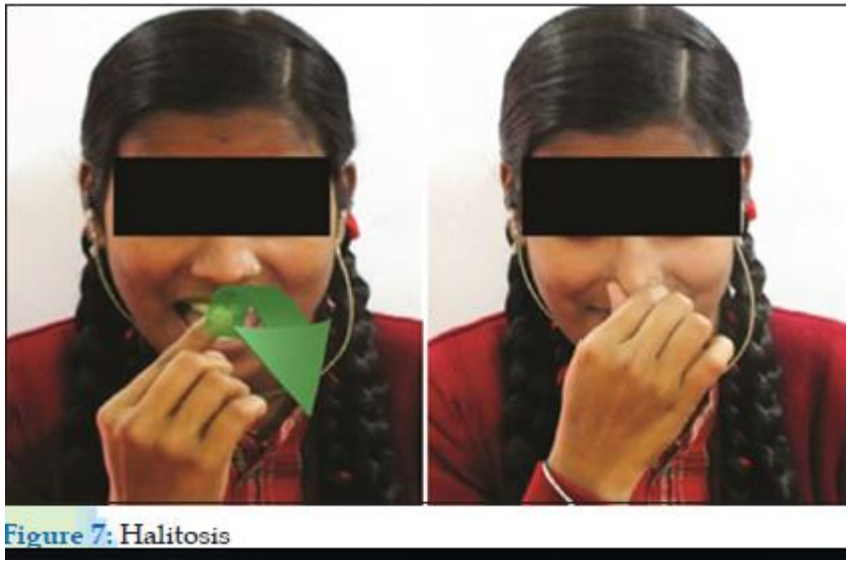


Figure 7: Halitosis

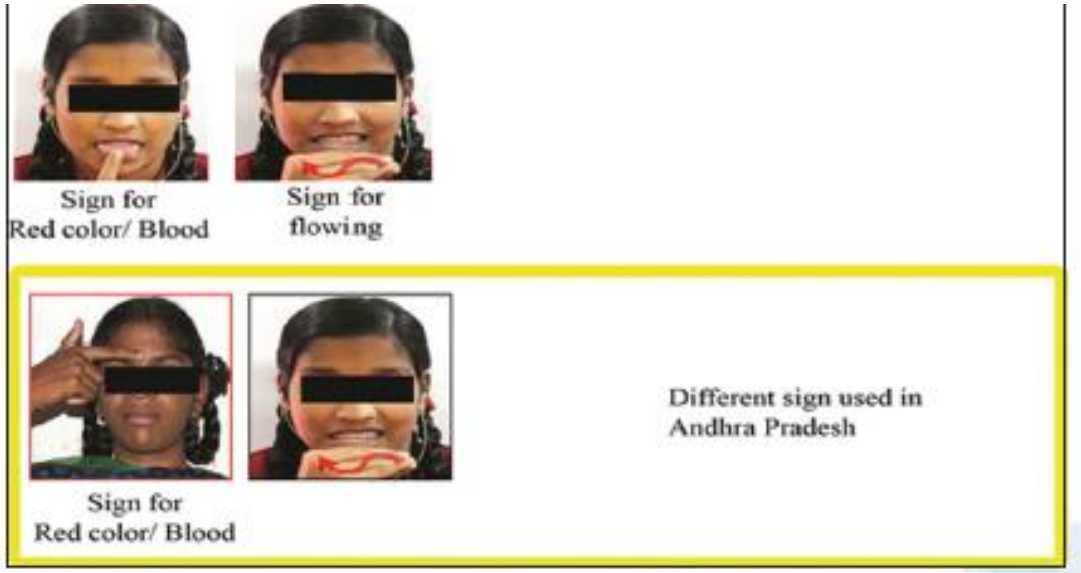


Figure 6: Bleeding form gums (Expressed by the sign of 'blood/red

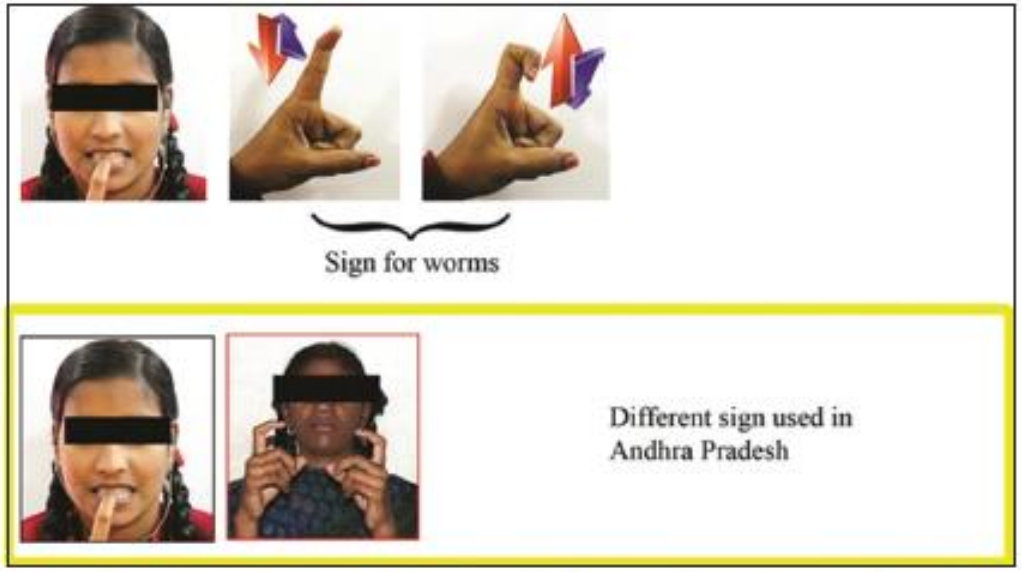


Figure 4: Decayed teeth (Expressed by showing the tooth followed by the sign of 'worms')

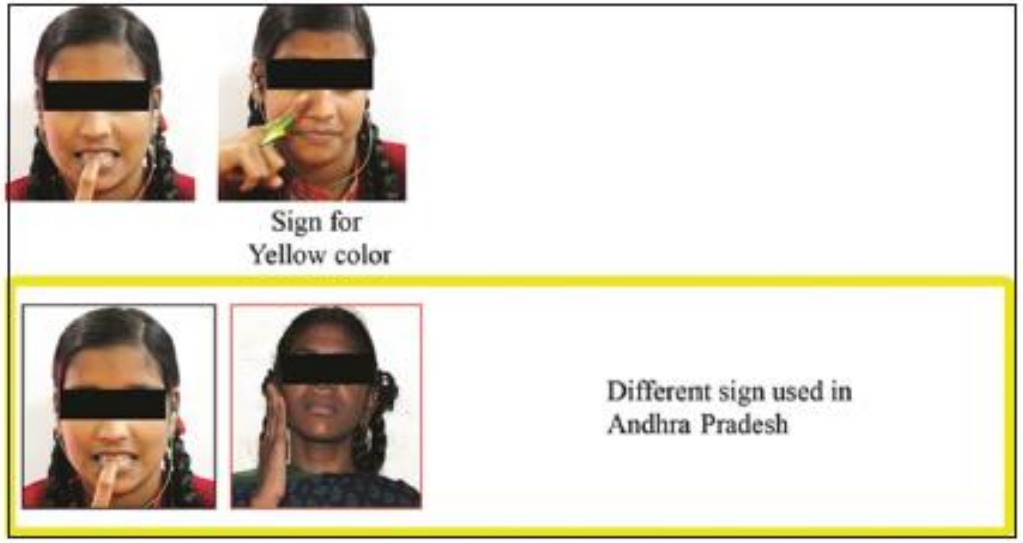


Figure 5: Discoloured teeth/Yellowish deposits on teeth (Expressed by showing the teeth followed by the sign of 'yellow colour')

Figure 9: X-Ray (expressed in signs as finger spelled symbol of alphabet 'X' followed by sign of a 'black coloured film')

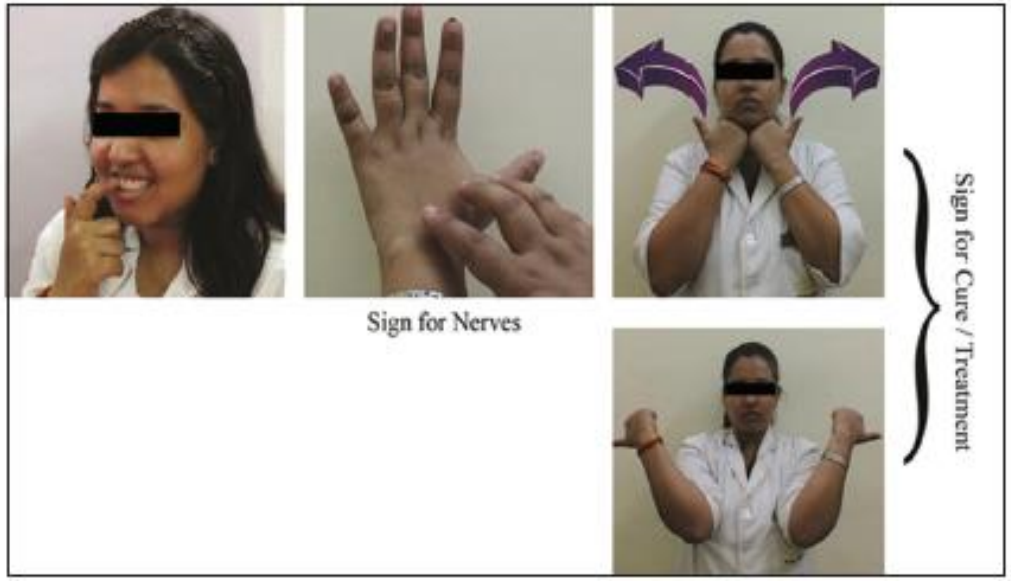


Figure 11: RCT (it is explained to general patients in layman term as "Curing the nerves of the tooth" so is explained in signs by showing the teeth followed by the signs of 'nerve' and 'cure/treatment')

Figure 10: Restoration (expressed by showing the tooth followed by signs of 'filling' and 'packing')

Figure 12: Extraction (symbolised as pulling the teeth out)

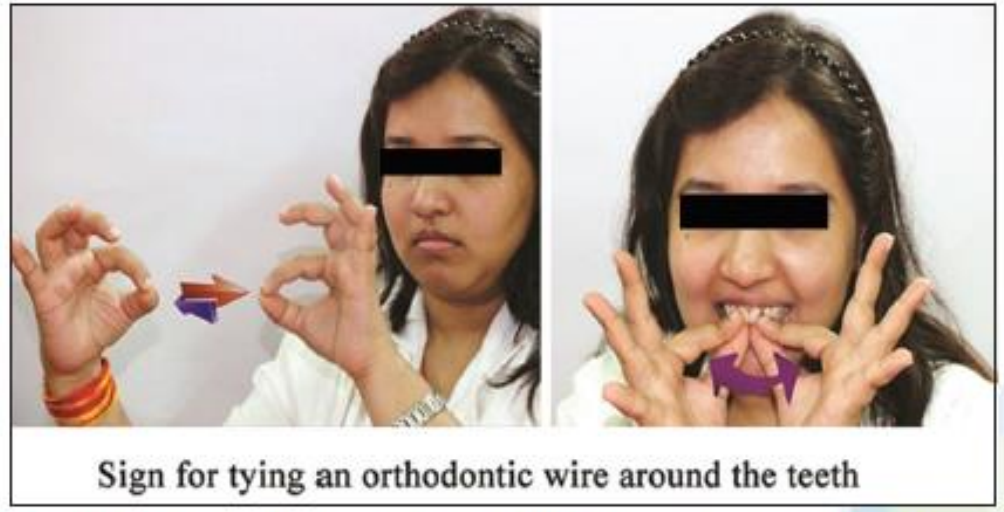


Figure 14: Orthodontic treatment (symbolised by wrapping/tying a

Jain S, Duggi V, Avinash A, Dubey A, Fouzdar S, Sagar MK. Restoring the voids of voices by signs and gestures, in dentistry: A cross-sectional study. Journal of Indian Society of Pedodontics and Preventive Dentistry. 2017 Apr;35(2):116.

Comparison of oral health status and DMFT score of special children and normal children in Burhanpur city

Table 4: Comparison of oral hygiene status of normal children and special children

Oral health findings	Normal children	Special children	z-value	P- value
Debris index	0.7(0.38)	0.86(0.46)	1.17	0.089
Calculus index	0.45(1.51)	0.65(0.7)	1.65	0.834
OHI-S	1.15(0.72)	1.51(0.93)	2.10	0.034

Table 5: Prevalence of calculus in dumb and deaf children and normal children.

	Boys				Girls				Total				p value
Dumb and deaf Children	With calculus		Without calculus		With calculus		Without calculus		With calculus		Without calculus		
	N	%	N	%	N	%	N	%	N	%	N	%	
	71	36.04	126	63.96	74	32.31	155	67.69	145	34.04	281	65.95	
Normal Children	Boys				Girls				Total				0.834*
	With calculus		Without calculus		With calculus		Without calculus		With calculus		Without calculus		
	N	%	N	%	N	%	N	%	N	%	N	%	
	64	35.16	118	64.83	49	32.03	104	67.97	113	33.73	222	66.27	

Sharma A, Todkar M, Pandya H, Panwar M, Das M. Comparison of oral health status and DMFT score of special children and normal children in Burhanpur city.

Visual impairments

- Functional limitation of eye due to disorder or disease resulting in visual handicap
- According to WHO

Level:

- Normal vision: range 20/10, 20/13, 20/16, 20/20, 20/25
- Near normal vision: range 20/28, 20/30, 20/40, 20/50, 20/60

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Low vision:

- Moderate visual impairment: range 20/70, 20/80, 20/100
- Severe visual impairment:

range 20/200. 20/250, 20/320, 20/400

Visual field 20 degree or less

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Blindness

- **Profound visual impairment**

range 20/250, 20/630, 20/800, 20/1000

CR at less than 3m

visual field 10 degree or less

- **Near total visual impairment**

Visual acquity less than 20/1000

Count fingers at 1m or less

Hand motion 5m or less

Visual field 5 degree

- **Total visual impairment**

no light perception

Total blindness

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Etiology

Prenatal causes

- Optic atrophy
- Microphthalmos
- Cataracts
- Dermoid and other tumors
- Toxoplasmosis
- Cytomegalic inclusion disease
- Syphilis
- Rubella
- Tuberculous meningitis
- Developmental abnormalities of the orbit

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Postnatal causes

- Trauma
- Retrolental fibroplasia
- Hypertension
- Premature birth
- Polycythemia vera
- Hemorrhagic disorders
- Leukemia
- Diabetes mellitus
- Glaucoma

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Table 2 Oral and dental implications of some ophthalmic disorders

Disease/Syndrome	Ocular defect	General medical features	Oral/dental anomalies
Congenital:			
Congenital syphilis	Uveitis	Deafness, infection risk before 2 years of age, cardiovascular and neurological complications	Hutchinson's incisors, Moon's molars, possible micrognathia
Cross syndrome	Microophthalmia, cloudy cornea	Learning disability	Gingival enlargement
Ehlers-Danlos syndrome	Fragile cornea/sclera, early sight loss	Cardiovascular and respiratory anomalies, possible platelet defects	Periodontal disease (rare), microdontia, root morphology anomalies, pulp stones
Lacrimo-auriculo-dento-digital syndrome	Hypoplasia/aplasia of lacrimal puncta		Microdontia, hypodontia, dark/grey thin enamel, midface hypoplasia
Marfan's syndrome	Dislocated lens, retinal detachment	Cardiac and respiratory anomalies	High arched palate, TMJ anomalies
Oculo-facio-cardio-dental syndrome	Congenital cataract, micro-ophthalmia	Renal impairment, hearing impairment	Radiomegalic canines, delayed eruption, open apices, malocclusions
Patau's syndrome (Trisomy 13)	Microphthalmia, anophthalmia	Cardiac defects, polydactaly	Microcephaly, clefts, malocclusion, hypodontia, ectopic teeth
Rieger syndrome	Hypoplasia of iris, corneal/lens/ Pupilary defects	Hepatosplenomegaly	Hypodontia, maxillary/mandibular hypoplasia, taurodontism

Riley Day syndrome	Corneal ulceration, early sight loss	Hypotension, pyrexia, dysphagia, breath holding, kyphoscloiosis	Crowding, early tooth loss, bruxism, tooth surface loss, traumatic ulceration, hypersalivation, reduced pain stimuli
Rutherford syndrome	Corneal opacity	Learning disability, aggression	Gingival enlargement, delayed eruption, dentigerous cyst
Treacher Collins syndrome	Colombomas	Cardiac anomalies, hearing loss, increased risk of oesophageal carcinoma	Malar and mandibular hypoplasia, clefts, malocclusion, spacing, ectopic and hypoplastic teeth, microstomia, blind oral fistulas
Turner's syndrome	Ptosis, striabismus, amblyopia, cataracts	Scoliosis, hearing loss, hypertension, cardiac defects/murmurs	Retrognathia, reduced crown height and root length, decreased enamel thickness
Zimmerman-Laband syndrome	Retinitis pigmentosa, cataracts	VSD, cardiomegaly, syndactyly	Gingival enlargement, delayed eruption

Mahoney EK, Kumar N, Porter SR. Effect of visual impairment upon oral health care: a review. British dental journal. 2008 Jan;204(2):63.

Oral manifestation

- Visual impairment- don’t have direct implication on dentition. Only secondary limitation due to the handicapping conditions
- Hypo-plastic teeth and trauma in anterior teeth
- Incidence in dental caries increases – poor self care
- Secondary disease like diabetes mellitus, any associated syndrome have dental implication
- Self implicated injuries- traumatic tooth brushing

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- Self injuries habits- lip biting, cheek biting and bruxism leading to oral manifestation in children
- Xerostomia another reason for dental decay – likely to be on some medication
- Certain drugs to be avoided in some visual impairment eg) atropine in glaucoma patient

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Dental consideration

- Physical access
- Ensure a clean passage, no rigs, no hanging plants, escort the patient to the operatory area
- Inform the patient about the immovable furniture and sharp edges if any
- Use contrast color to avoid any injuries and differentiate walls from floor
- Post the tactile or braille maps in the walls and elevator

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Dental management

- Determine the degree of visual impairment
- Establish rapport; afterward offer verbal and physical reassurance
- Paint a picture in the mind of the visually impaired child by describing the office setting and treatment.
- Introduce other office personnel very informally.
- When making physical contact, do so reassuringly. Holding the patient’s hand often promotes relaxation.

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- Avoid direct light – patient may sensitive
- Explain every procedure
- Explain the smell of every material before placing it in oral cavity
- Make them feel the touch on their hand before it goes to oral cavity
- Differentiate between the sounds of instrument

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- Teach them the value of rinsing
- Motivate them and teach them correct brushing techniques
- Discourage of self inflicting habits
- Do modification as per their convenience in brushing and flossing

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- Based on this '**Audio tactile performance technique' (ATP)** - a specially designed health education method - to educate these children regarding oral hygiene maintenance – M. Hebbal & AV Ankola

Audio –

✓First verbally informed about the importance of teeth & method of brushing

Tactile -

✓Made to feel the teeth on large sized model

✓Brushing on the model using the Fones method with assistance

✓Repeated until the child could perform with ease

Performance -

- ✓Child is asked to feel is/her own teeth with their tongue to appreciate any deposits to be appreciated by feeling of roughness
- ✓Child is asked to brush his/her own teeth with assistance of one of the trained educators
- ✓Child is also taught regarding the amount of tooth paste to be used

Hebbal M, Ankola AV. Development of a new technique (ATP) for training visually impaired children in oral hygiene maintenance. European Archives of Paediatric Dentistry. 2012 Oct 1;13(5):244-7.

Speech impairments

- Speech is the skilled, willful and elaborate movements of muscles used for initiating sound plus the molding of these sounds into meaningful oral communication.
- Speech is the most complex and highly organized voluntary activity in which a number of mechanisms are involved . Vital physiological purposes such as- breathing, swallowing and hearing are involved

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Classification

- The phonatory system is divided into

Voice activating airstream eg) respiratory

Voice generator eg) vocal fold

Voice resonator eg) oral, pharyngeal and nasal cavity

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According to the area of phonatory system involved

- Disorder of voice(dysphonia) are impairments – due to physical reasons such as involvement of larynx
- Speech sound disorder- difficulty producing specific sound – s , r
- Phonetic disorder- difficulty in producing sound physically
- Dysarthia –by damage of nerve leading to paralysis of speech
- Disorder of frequencies- apraxia, sluttering, delayed speech

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Etiology

- Functional

  environmental

  Psychological development

  Habit

- Secondary organic voice disorder

  Mucosal irritation

  Recurrent laryngitis

  Chronic hypertrophic laryngitis

Organic or structural variation

  Primary organic voice disorder

  Asymmetry of vocal fold

  Neuromotor disorder

  Trauma to vocal fold- cyst, polyps, senile atrophy

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Dental associated defects

Speech defects can occur either due to faulty dentition

- Cleft lip and palate
- Jaw alignment- prognathic mandible
- Malocclusion – class III
- Cross bite and open bite produce alveolar sounds – s, sh, z, zh, th, t, d
- Anterior spacing
- High palate- s, z, th, r, l, k, g.
- Narrow palate: s, z, th

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Dental management

- Generally children with speech impairment also have hearing impairment
- Assess the degree of impairments
- Make use of non verbal communication
- Pen, pencil and notebook should be handy for child to convey doubts
- Make sure the child vision is not hampered
- Any spoken instruction should be supplied with written instruction

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- Avoid being over sympathetic toward the child
- If mild disorder like structuring explain the simple exercise at home
- Assess the speech pathology due to underlying problems – spacing, cross bite and open bite
- Don’t interrupt while they are talking
- Be patient and good listener

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Reference

- Nelson Textbook of pediatrics Volume 3. First south asia edition
- McDonald and Avery’s Dentistry for the child and Adolescent.First South Asian Edition
- PV Hegde. Understanding and Management of Special Child in Pediatric Dentistry. First edition