



Oral health status and suggestive preventive programs of physical disable children and adolescent

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Introduction

Improved standards of care available to the community together with the development of medical skills, more and more handicapped babies are serving the hazards of early infancy and childhood, so that the number of children handicapped by one or more conditions may therefore increase (Franks et al, 1974)

As members of the community the physical disable people will be depending upon the community to provide services to meet their health care needs, thus helping them attain a standard of living comparable to that other citizens (McIver et al, 1979).

The development of such physical disable as mental retardation, cerebral palsy down syndrom, autism and intellectual disability are present during childhood or adolescence and last a life time. They affect mind, body and the skills people use in the everyday of life, so that people with disabilities often need extra help to achieve and maintained good oral health (Nunn JH et al, 1993).

Oral hygiene is often consider as a problem source of the health inequalities in person with neuromotor and mental retardation, so the most common dental disorders (dental caries, gingivitis) which are affecting the normal population are to be seen in physical

disable patient but these disorders may occur either more often with increase severity or at younger age than might be considered for normal person (Waldman HB et al, 2006).

Another dental problem that required attention among physical disable person is traumatic dental injury beside the psychological, esthetic and function problem (Sultana et al, 2010).

Review of Literature

1.1.1 Physical Disable

1.1.2 Definition:

In 1980 the word health organization defined a handicapped word in the context of health experience as "a disadvantage from agiven individual resulting from an impairment or a disability that limit or prevent his fulfillment of a role that is normal (depending on age, sex, social and culture factors) for that individual.(Donaldson,1983).Another definition of physical disable persons 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, recreation, educational and vocation nature (Hennequin M Faulkso, 2000).

Oral health is an important aspect of health for all child and it is the more important for children with special health needs. Individuals with disabilities or illness receive less oral care than normal population, inspite of high level of dental disease among them(Manish Jain, Anmol Mathur, 2009).

The word health organization has defined physical disable as Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Thus disability is a complex phenomenon, reflecting an interaction between features of a person's body and features of the society in which he or she lives.(Solomon, Andrew,2011)

Classification of handicapped patient:

The disabilities affecting child may be grouped according to the time of the onset into two major categories(Persson,2000).

1. Physical disabilities that are developmental origin and those acquired later in the life ,sothe former category comprise condition such as mental retardation, cerebral palsy ,epilepsy ,autism and visually impaired that are present either at birth or are acquired during the development

2.Acquired disabilities generally result from trauma such as spinal cord head injury, from chronic disease including arthritis, cancer, diabetes, neurological disorder, psychiatric disorder.

1.1.2.1Physical Disabilities:

There are a number of different kinds of physically disable producing varying degree of incapacity, The most common kinds of particular concern to the dentist are:

- Neuromuscular disorders.
- Disorder of nervous system.
- Diseases of the joint.
- Musculo-skeletal proplem.

1.1.2.1.1 Neuro muscular disorders:

These are disorders of the perpheral motor and sensory systems and these illness involve one or more of the structure concerned with the segemental spinal reflex.(Nelson et.al,1987). Which are dividied into:

1. Paralytic Poliomyelitis.
2. Muscular Dystrophy.
3. Myasthenia gravies.

Muscular dystrophy:

Group of progressive chronic diseases of the skeletal (striated musules) characterized by the degeneration of muscle with replacement by fat or fibrous ,so after sufficient musculature has atrophied,deformity begin to occure. If deformity is sever enough,disability is the result (Lang BM Lipson,1983).

Also facial experssion impaired due to muscle weakness,lips are prominent due to weakness of the orbicularis oris to give the apperance of (tapir mouth) and patient cannot whistle or purse lips (Martens, 2000).



Figure (1) children with Neuro muscular disorders(Persson,2000).

1.1.2.1.2Disorders of nervous system:

- A. Cerbral disorder.
- B. Hydrocephalus .
- C. Spine bifida.

A-Cerebral palsy:

Defined as a static, non progressive neuromuscular condition composed of a series of syndromes that result from damage to the brain it is one of the most common crippling conditions of childhood, it is non specific disease but a group of disorders of varied causes.(Darby M,WilkinsM,2005).

Classification of cerebral palsy:

The American Academy for Cerebral Palsy (AAP) classified cerebral palsy as follow as:

- 1) Physiological (motor) classified.
- 2) Topographic.
- 3) Etiologic.
- 4) Neuroanatomic.
- 5) Supplement.
- 6) Functional.
- 7) Therapeutic.

The two most popular and useful classification employ are physiologic and topographic (Aoki,2000).

Physiologic(motor)classification.

This depend on the type of the motor involvement,they include six categories:

Motor disorders:

A. Spasticity: This category account for approximately 50% to 75% of the cerebral palsied population .it is characterized by exaggerated muscle contraction stiff and Jerky movement (Churchill L,2003)

B. Athetosis:This condition results from damage to the basal ganglion (Pool and Davis,1981).it characterized by relatively slow and seemingly purposeless or uncoordinated movement of the limbs or the entire body drooling ,and speech defects are also common ,damage to the brain involves chiefly the extrapyramidal tracts .Muscles contract involuntarily with twisting movement of apposing muscle groups(Darby M,Wilkins M,2005).

C. Tremor:This condition result from lesion of the basal ganglion ,children those affected may exhibit intentional or unintentional tremor depend on the degree of the involvement .it account 5% of cerebral palsied (Shobha,Tandon,2001).

D.Ataxia:This condition result from the lesion of the cerebellum affecting children exhibit poor or complete lack of balance and an unsteady gait(Darby M, Wilkins M,2005). characterized by uncoordination during planned or purposeful movement i.e that muscle response to a stimulus but cannot complete a contraction

E.Rigidity: This condition result from damage to the basal ganglion affecting persons display muscle stiffening when movements are attempt resistance to passive movement and in ability to bend. (Shobha,Tandon,2001).

F.Mixed:This condition involve two or more types appearing in the same person,it account (5-20)% of cerebral palsied population .(Darby M,Wilkins M,2003).



Figure(2) children with motor disorders(Aoki,2000).

The topographic classification of cerebral palsy :

Classification done according to the limb involvement include:

- 1.monoplegia :that are involvement of one limb .
- 2.paraplegia :that are involvement of two limb.
- 3.hemiplegia:that are involvement of both limbson the same side of the body.
- 4.trioplegia:that are involvement of three limbs.
- 5.quadruplegia :that are involvement of four limbs.

6. diplegia: that are involvement of the lower limbs and minor involvement of upper limbs.
7. double hemiplegia (Hennequin MF Faulkso, 2000).

1.1.2.1.3 disease of joints:

Arthritis:

Arthritis means inflammation of the joints as a result of infection or auto-immune disease. There are many kinds of arthritis, the main four types are:

Fibrositis, gout, arthritis and rheumatoid arthritis (Persson et al, 2000).

Rheumatoid arthritis is the greatestcrippler, usually causes severe disability by affecting several joints at the same time, characterized by chronic inflammation affecting many joints with pain and progression limitation of movement. (Cawson, 2005). Rheumatoid arthritis affects children in the developmental years it interferes with dental growth and development, inflammation of the temporomandibular joint can slow or temporarily stop the growth of the mandible, resulting in micrognathia and anterior open bite. (Lange 1983, Aoki, 2000).

1.1.2.1.4 Musculoskeletal problem:

- A. Metabolic bone disease.
- B. Amputation.
- C. Genetic skeletal dysplasia.

A. Metabolic bone disease:

Rickets:

In children defective absorption of calcium due to deficiency of vitamin D causes rickets. The essential feature of rickets is defective calcification under development of the skeleton (Cawson, 2005). The main effects are bowing of the growing ends of the bone due to epiphyseal defects, bending of the weakened bones, deformities of the spine, pelvis and legs result in reduced stature (Nelson, 1987). The child has large, prominent frontal bones which give the head an enlarged square appearance (Hennequin M Faulkso, 2000).

B. Amputation:

Amputation is classified as congenital (due to improper development), traumatic (due to accidents) or elective (in which the upper or lower extremities are removed by surgery because of congenital or traumatic conditions) (Mistea AG, Karid AG, 2011).

C. Genetic skeletal dysplasia:

It is a developmental defect affecting the skeleton contributes a major portion of the short stature and skeletal deformities at all ages, they include dysplasia (disorders of the growth), dyostoses (malformation of the bone) idiopathic osteolyses (pathological resorption of bone and chromosomal aberrations with skeletal malformation (Nelson et al, 1987, Marten L, Mark L, 2008).

1.1.2.2 Auditory handicapped (physical disable) child:

Hearing difficulty is one of the most common defects found in children and adults, hearing loss ranges from partial to complete (Ahibora B, 2000). When there is impairment of hearing to the extent that it has no practical value for the purpose of communication. A person is considered deaf when hearing is defective but functional without hearing and the terms "hard of hearing" or "partially deaf" (Shobha Tandon, 2001).

1.1.2.3 Visual handicapped (physical disable):

A legally blind person is one who with the best optical correction can see less at 20 feet than a person with normal vision can at 200 feet (visual acuity is 20/200). The partially sighted person has visual acuity ranging from 20/70 to 20/200 in the better eye but has a residue of useful sight that makes it possible to use this as the chief channel of learning and approach to the brain (Jindal M, Saif Khan, Hashmi S, 2009).

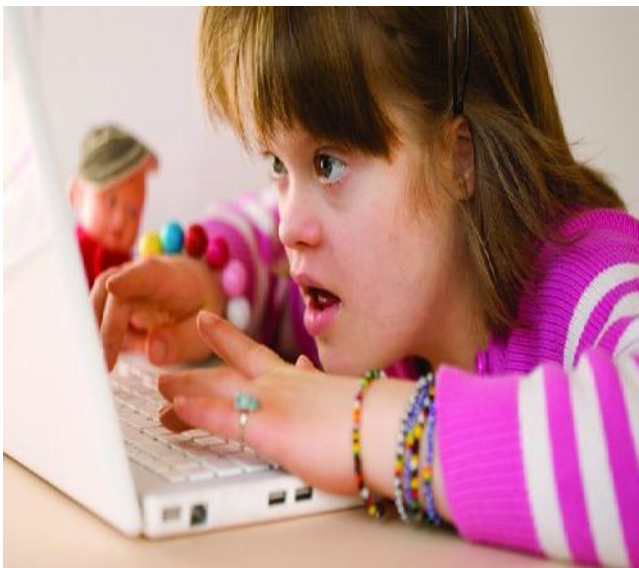
1.1.2.4 Down's Syndrome:

Down's syndrome (DS) was first described by John Langdon Down in 1866. He called the condition "mongolism" because of the distinctive skin fold, known as an epicanthic fold, in the corner of the eye. Lionel Penrose and others changed the designation to Down's syndrome (Rubin and Farber, 1999; Cummings, 2003). In 1959, Jerome Lejeune and his colleagues discovered that the presence of an extra

copy of chromosome 21 is the underlying cause of Down's syndrome and also was known as trisomy 21 (Cummings, 2003). It was the first chromosomal abnormality discovered in humans and has also been observed in other primate species, including the Chimpanzee. It occurs in 0.5% of all conceptions and one in 900 live births (Behrman and Kliegman, 2004).

1.1.2.4.1 Etiology of Down's syndrome:

The causes of Down's syndrome are unknown, but a variety of genetic and environmental factors have been proposed, including radiation, viral infection, hormonal levels, and genetic predisposition. Etiology of Down's syndrome To date the only factor clearly related to autosomal aneuploidy is advanced maternal age. In fact, a relationship between maternal age and Down's syndrome was well established 25 years before the chromosomal basis for the condition was discovered (Scriver et al, 2001; Cummings, 2003). The incidence of trisomy 21 correlates strongly with increasing age that is young mothers have a low probability of having trisomy 21 children, but the risk increases rapidly after the age of 35 years. At maternal age of 20, the incidence of Down's syndrome is 0.05%; by maternal age of 35 the risk has climbed to 0.9%; and at maternal age of 45 years, 3% of all newborns have trisomy 21. The risk of recurrence of Down's syndrome in subsequent children born to the same mother is 1% irrespective of maternal age.



Figure(3) children with Down's syndrome (Behrman and Kliegman, 2004).

1.2.1 Importance of Oral health:

Health of an individual and health of a society are recognized as being interrelated not only is a healthy human being necessary for a healthy society, healthy society is necessary for a healthy human being. (Doris J, Stiefel, 2002).

Oral health is an important aspect of health for all children, and the most important for the children with special health needs. Individual with disabilities or illnesses receive less oral care than normal population, in spite of the high level of dental disease among them. It has been reported that dental treatment is the greatest unmet health need of the disabled child, so that child with mental disabilities have poor oral health as compared to their normal children which makes function of the oral cavity like eating, swallowing, speaking, chewing, drooling difficult for them result in malocclusion, compromising esthetics and poor oral hygiene so, good oral health is required for them because severity of medical condition and perceived general health are significantly correlated with dental functional status and severity of dental disease therefore, the children with disabilities the effect of dental disease on general health and function appears greater than for similar groups without disabilities. (Manish J, Anmoo Mathar, 2009).

1.2.2 Oral health status of physically disabled children:

The most common dental disorders affecting the physically disabled are:

1. dental caries.
2. gingival and periodontal disease.
3. traumatized teeth.

1.2.2.1 Dental caries:

The World Health Organization (1988) defined dental caries as a bacterial disease of the dental hard tissues it begins with acid demineralization of the outer enamel surface and if not arrested or treated the dissolution of the enamel continues into the dentine and pulp increase cavitation and loss of tooth substance so that dental caries is a multifactorial disease in which there is interplay of three principle factors which are the host (teeth), the micro organism and their substrate (diet), in addition to another factor is the (time) must be considered in the etiology of the dental caries (Murry et al, 2005). The genetic factors may also be affecting susceptibility of the teeth and resistance to

dental caries which explain individual variation to dental caries even under identical controlled condition. (Murry et al., 2005). Other definition of dental caries is a slowly progressing, irreversible microbial disease of calcified tissues of the teeth, characterized by demineralization of inorganic portion and destruction of organic portion (Chandra and Chandra, 2000). At the crystal level initiation of the carious process may be inevitable but progression of a microscopic lesion to a clinically detectable lesion is not a certainty because in its early stages the process can be arrested and a carious lesion may become inactive. Is a slowly progressing, irreversible microbial disease of calcified tissues of the teeth, characterized by demineralization of inorganic portion and destruction of organic portion (Murry et al., 2003). At the crystal level, initiation of the carious process may be inevitable but progression of a microscopic lesion to a clinically detectable lesion is not a certainty because in its early stages the process can be arrested and a carious lesion may become inactive. However progression of the lesion into dentin can ultimately result in bacterial invasion and death of the pulp and spread of infection into the pulp and spread of infection into the periapical tissues, causing pain (Kidd and Bechal, 2008). The development of dental caries is a dynamic process of demineralization of the dental hard tissues by the products of bacterial metabolism, alternating with periods of remineralization. (Cawson, 2003).

1.2.2.2 Theories of Dental Caries:

Various theories have been proposed trying to explain, dental caries the early theories of dental caries are:

- 1) the Legend of Worm 5000bc .
- 2) Endogenous theories
- 3) Exogenous theories which are divided into :
 - 1- Millers chemioparasitic theory..(acidogenic theory).
 - 2- Proteolytic theory.
 - 3- Proteolysis theory.
 - 4- Sucrose –chelation theory.

1-Millers chemoparasitic theory (acidogenic theory).

In the 17th and 18th century, there emerged the concept that teeth were destroyed by acids formed in the oral cavity.

Robertson (1895) proposed that dental decay was caused by acid formed by fermentation of food particles around teeth.

2.Parasitic theory(septic theory):

- Dubos (1954) postulated that micro organisms can have toxic effects on tissue.
- Early microscopic observation of scrapings from teeth and of the caries lesion by Antoni Van (1632\1723) indicated that micro organisms were associated with the caries process.

3.Millers (chemo parasitic theory):

This theory was proposed originally by W.D. Miller in 1890. He made the significant observation that many organisms can produce acid from the fermentation of sugar and showed that several oral micro organisms have this property .

Stage of chemo –parasitic theory:

First stage: is decalcification or softening of the tissue (preliminary stage).

Second stage : There is dissolution of the softened residue of the enamel and dentin. (later stage).

4.Proteolytic theory:

The evidence given by the acidogenic theory was considerable but it was not conclusive, and alternative explanation was given in the form of proteolytic theory. Micro organisms invade enamel lamellae and the acid produced by the bacteria.

5.The proteolysis chelation theory:

- This theory was originated by Schatz and Martin in 1955 .it proposed that some of the products of bacterial action on enamel, dentin, food and salivary constituents can form chelates with calcium.
- A chelation is a process in which there is complexing of the metal ion to form complex substance through coordinate covalent bond.

6.Sucrose –chelation theory:

Eggs-Lura (1967) proposed that sucrose itself and not the acid derived from it can cause dissolution of enamel by forming unionized calcium saccharates. So, the most acceptable theories of dental caries is chemoparasitic theories. (Krishna M, Dasar P, 2010).

1.2.2.3 Caries Prevalences among Physically disable children and adolescents:

Many studies have been conducted in different parts of the world to determine the prevalence and severity of dental caries among physically disabled children and adolescents. There are conflicting accounts of prevalence of dental disease in physically disabled children. Most of these studies have suggested that very little difference exists between the incidence and prevalence of the dental decay seen in the physically disabled population and those in the normal population. (Murry and McLeod, 1973; Brown, 1980).

In Iraq studies, Abbas et al (1990) examined 49 physically disabled persons aged 10-19 years and found that 14% of them were caries free with a mean DMFT of 3.68.

In Daib et al (1995) it was found that total physical disabled children had significantly higher dmft values than total auditory physically handicapped in both sexes. Whereby the total physically handicapped male had significantly higher dmft values than total auditory handicapped male. The same relationship was true for the total females. Also, the total physically handicapped had significantly higher dmft values than total visually handicapped children. While there was no significant difference in mean dmft between total visual and total auditory handicapped children.

Dental caries experience in Down's syndrome has been controversial, despite the number of studies conducted over the past decade or more. Reports of studies have indicated low caries experience in Down's syndrome individuals (Morinushi et al, 1995; Cogulu et al, 2006). These observations have been questioned by many researchers whether they are inherently resistant to caries or not. Other studies demonstrated little or no difference in their caries experience when compared with other groups (Cutress, 1971; Maclaurin et al, 1985; Yarat et al, 1999).

In Iraq, limited studies were conducted regarding dental caries severity among Down's syndrome. Faris (1990) reported a higher caries severity in primary dentition among Down's syndrome compared to control group, while the opposite was recorded in permanent dentition. Al-Saffar (2004) showed a lower caries experience in primary dentition among Down's syndrome children than normal children with no statistical significant difference.

In Indian study Jindal M, Ahamed M, Hashmi H (2009) in these studies most of the blind students examined were having poor oral hygiene. Total 80 students were examined, of which 44 (55%) were having poor oral hygiene and among them 22.7% were having dental caries. While in the study of Ajami B, Rezay Y (2007) dental caries experience of children with hearing impairment was lower than that of children with mental retardation and visual impairment, so that the filled component in the mental retardation was lower than visual impairment and hearing impairment, which are indicating a lower amount of restoration treated relative to untreated caries lesions in mental retardation. The decay component of mean dmft + DMFT index was the greatest component of the three groups.

1.2.2.4 Factors affecting caries prevalence in physical population.

1.2.2.4.1 Age.

Age is a powerful variable that should always be taken into account in caries studies. Age of the children was by far the strongest determinant of caries experience and increased caries with age should be interpreted as a result of being exposed to a number of unfavorable factors over time, so the irreversibility and accumulative nature of dental caries may explain the increase in its rate and severity with age, so that DMFT indices increased markedly in all physically disabled children that have supported by several studies (McDonald R, Avery D, 2004).

In Iraqi studies (Daib, 1995) it was found that children with physical handicaps had higher dmfs values than auditory handicapped in all age groups, but only in the young age group as well as in the total sample. In the physically handicapped males had significant higher dmfs values than auditory handicapped males.

In another Iraqi study (Radhi, 2009) the result of this study children with Down's syndrome dental caries has been reported to have high incidence in adolescent period. That is an increase not only the change in the oral condition but also because of neglected patterns in the physically handicapped children and probably a lack of health consciousness in the earlier period of the life (Behrman RE, Kliegman RM 2002).

1.2.2.4.2 Gender:

The Gender is another factor affecting in the dental caries ,that are between males and females of the significant difference in caries prevalence many studies on different types of physical handicapped children have shown greater caries experience in females than in the males (Murry,2003).this difference can be partially explained through the earlier eruption of the teeth in the girls than in the males which are provide longer period of exposure of the teeth to the oral environment .

On the other hand there some studies which have shown no significant difference in caries experience between male and females physically handicapped children (Nunn and Murry,2005).

1.2.2.4.3 Diet.

Dental caries is fundamentally diet bacterial disease ,sugar is the most important dietary item in relation to the caries etiology (Shaw,2006). Many clinical,epidemiological and experimental animal studies have shown positive relation between sugar and dental caries(Martin Sangune C,2006).however the frequency of intake rather than the total amount of fermentable carbohydrates per day so, the diet is the critical factors in the development of dental caries (IvancicJokic N, Majstorovic M,2007). Many physically handicapped children receive a high amount of the carbohydrate diet because their parents often try to please their child by providing sweets for him and establishing conditions that are lead to caries .the percentage of disabled children which have been taken carbohydrate containing food more than 7 times per day by many studies ,and also strong relation between daily carbohydrate intake and dental caries..(Goe LC, Baysac MA,2005).

1.1.2.3.4 Socioeconomic status.

The influence of socioeconomic status on caries experience has been reported in the servuyon healthy children .A number of studies have been pointed out to the inverse relation between caries experience among childrens and different social indices ,social class,in comof the family, parents occupation, parents level of education (Sogi GM,Bhaskar DJ,2002).

Social and economic factors that determined utilization of dental care by “normal person” also serve as for disabled persons.(Lukacs JR, Largaespada

LL,2008).many studies found that the mean family income of the disabled children was lower than the national average and also many families have an extra financial due to medical costs ,education expenses,and transportation costs which are higher for the children with physical disabled (Weddell JA, Sanders BJ, Jones JE,2004).

1.1.2. 4.5 Hypoplasia:

Hypoplasia is another factor affecting in the prevalence of dental caries that are amelogenesis occurs occurs in two stages .in the first stage the enamel matrix forms and in the second stage the matrix undergoes calcification sothat the systemic or local factor that interference with the normal matrix formation cause enamel surface defects and irregularities referred to as “enamel hypoplasia” and enamel hypoplasia or enamel hypocalcification which are reported to be susceptible to dental caries . (van Houtem CM, de Jongh A, Broers DL,2007).

Defect of enamel and dentine are more prevalent when the physical disabled child are association with developmental abnormalities many clinical investigations have been under taken to determine the relation ship between hypoplastic defects of enamel and systemic disabilities(Cawson ,2005)

Risk Factors For Dental Caries in disabled child:

- Dietary constituents and form.
- Liquid oral medicine.
- Poor oral clearance/ stagnations.
- Resistance to mouth cleaning.
- Infrequent attendance.
- Attitude of caregivers.

1.2.3 Gival health and periodontal disease:

Periodontal disease(definition).

periodontal disease has been defined as any pathological process affecting the periodontal tissues but almost invariably refers to a group of inflammatory conditions of the supporting tissues of the teeth that are caused by bacteria and includes two basic forms which are the common diseases found in the humans, gingivitis and periodontitis as well as other less common periodontal diseases (Haake, 2002).

Gingivitis is an inflammatory condition of the gingiva which is almost always present in all form of gingival disease, because bacterial plaque, which causes inflammation and irritating factors which favor plaque accumulation are often present in the gingival environment. In general, gingival disease is classified into two major forms, dental plaque induced gingivitis and non plaque induced gingivitis (Delaney and Keels, 2000; Haake, 2002). Periodontitis is the most common type of gingival disease and result from extension of inflammatory process initiated in the gingival to the supporting periodontal tissues (Delaney and Keels, 2000; Haake, 2002). The prevalence and severity of gingivitis increased with age beginning at approximately 5 years of age reaching their highest point in puberty then decreased gradually but remaining relatively high throughout the life (Jenkins, 2001). laque is the main local factor related to the variation in the prevalence of periodontal disease, it can be defined as the soft deposits that form the biofilm adhering to the tooth surface or other hard surfaces in the oral cavity, its broadly classified as supra gingival or sub gingival based on its position on the tooth surface .Dental calculus represents the mineralized bacterial plaque and can be recognized as supra gingival or sub gingival calculus (Lang et al, 2003).

1.2.3.1Epidemiology of Periodontal Disease among Physically disable children and adolescents:

The incidence of gingival and periodontal disease among physical disable individuals varies considerably with the degree and type of physical disable condition(Van Houtem CM, de Jongh A, Broers DL,2007)..

The main factor related to gingival\periodontal problem in physical disable individuals is the inadequacy of plaque removal from the teeth .motor coordination problem and muscular limitation in neuromuscular disabled individuals and the difficulty in understanding .the importance of oral hygiene in mentally disable individuals have resulted in the progression of the inflammatory disease(Behrman RE, Kliegman ,2004).

Few studies have compared the periodontal disease of the individual with different type of the physical disable children these studies are Gugush(1991) conducted a study in Pretoria to compare oral health status of three group of impairments ,visual ,physical and auditory handicapped there were significant

difference for the presence of calculus ,the physically disabled individuals consistently indicated the highest proportion of bleeding ,calculus accumulation and shallow pocket.

In Iraqi study Daib et,al (1995)that are total auditory handicapped had significantly lower periodontal index than total visually and physically handicapped patient .the distribution of physically visually and auditory handicapped according to severity of the disease so the auditory handicapped had mild inflammation which was significantly higher than visually 9.09% and physically handicapped which are 4.23%and the same relation found concerning both sexes ,while 66.47%of the auditory handicapped had moderate gingival which was significantly lower than the physical handicapped 80.42% and the same relation was present for males while of females the percentage of physically ,auditory handicapped who had moderate gingivitis was no significantly higher than visually handicapped females and sever gingivitis was present in small proportion of auditory handicapped (1.63%) which is significantly lower than visually which are about 9.09%and physical handicapped (15.34%)and the same relation was true for the male.

The prevalence of periodontal disease in Down's syndrome subjects points to (bruxism, malocclusion, tongue thrusting, poor oral hygiene) and systemic factors (poor circulation, decreased humoral response, general physical deterioration at an early age and genetic influences) combining to influence disease susceptibility. Gingivitis is exacerbated by excessive plaque formation and difficulties in establishing effective tooth-brushing habits. Progress to periodontitis and early tooth loss are frequent consequences (Morgan, 2007).

In Iraqi study Dr.Radhi(2009)The study revealed that 100% of children with Down's syndrome were affected by gingivitis among study and control group. Data revealed a higher mean of plaque index among the study group compared to the control group, Total males and females of the study group had higher mean plaque index at each age groups compared to the control group, Moderate type of gingivitis was the most common type among the study group compared to the control group. Total males and females had a higher mean of gingival index among the study group than the control group.

In Indian study (Jindal M, Ahamed M, Hashmi, 2009) in this study most of the blind students examined were having poor oral hygiene. total 80 visually impaired students were examined out of which 44 (55%) were having poor oral hygiene and among them 22.7% were having dental caries. twenty nine percent of blind students were having fair oral hygiene and among them 57% developed dental caries which was highest. this indicates that blindness alone is not a significant risk factor for higher prevalence of dental caries and periodontal disease and hence by taking care of blinds in education set-up associated with appropriate training can result in acceptable health status similar to normal population.

1.2.3.2 Soft diet and periodontal disease:

Physical character of the diet may be important factor in the etiology of periodontal disease (Carol B, Sandra G, Patricia S, Kristin T, James R, Tammar H, 2004). Numerous experimental studies in animals have shown that the physical character of the diet may play some role in the development of gingivitis (Dinesh Rao, Hegde Amitha, 2005).

Soft diet may lead to plaque and calculus formation (Al-Qahtani Z, Wyne, 2004) while hard and fibrous food provide surface cleansing action and stimulation which result in less plaque and gingivitis, so the diet which are more chewing and use of the masticatory function can reduce the periodontal disease considerably. (Solomon, Andrew, 2011).

Handicapped population have tendency to eat soft food especially patients with neuromuscular disorder (Murryj, Nunnj, Steelj, 2003).

In motor disabilities if the motor deficit affects the oral and pharyngeal musculature, mastication difficulty may required the patient to eat soft diet. (Manish Jain, Anmol Mathur, Leena sawla, 2009).

1.2.3.3 Malocclusion and periodontal disease:

Malocclusion exerts varied defects in the etiology of gingivitis and periodontitis disease, abnormal occlusion usually results in an increase in the number of stagnation areas of the m, also irregular alignment of the teeth make plaque control difficult to be removed (Barnett ML, 2006).

Many investigation have reported that malocclusion occur more often in physically handicapped than in the healthy population (Orlend et al 1987). In many study 40% of the children showed malocclusions Class II malocclusion was more seen in MR and VI children. Malocclusion can complicate the child's disability, resulting in dental trauma (e.g. a large over jet predisposes the children to trauma in those with seizures, periodontal disease (promoted by crowding or eruption problems), functional problems (mastication, drooling, speech impairment and even temporomandibular joint dysfunction (Al-Qahtani Z, Wayne AH, 2009).



Figure (4) Developmental defects from high fever or medications can create under-mineralized, decay-prone enamel (Barnett ML, 2006).

1.2.4 Traumatic dental injury:

Traumatic injury may varied in severity, they may result in a simple loss of enamel or it may lead to multiple type of trauma affecting both soft and hard oral tissue, the etiology of traumatic dental injury was mostly due to struck or forces to ward teeth or soft tissue (Rahul Bhowate, A Dubey, 2005).

In Iraqi study Daib et al (1995) the prevalence of visally, physically and auditory handicapped with traumatized teeth were 31.31%, 23.28% and 11.87% respectively, the percentage of auditory handicapped affected by trauma was significantly lower than physically and visually handicapped.

Although the percentage of handicapped male with traumatized teeth was higher than female in all age groups of the three groups of handicapped separately, but the difference were not significant.

The trauma to the teeth may be more prevalent if patient trips, falls or bumps into objects frequently blind child can be expected to display a higher frequency of traumatic fractures of their teeth because blind child tends to be more prone to accidents than a child with a normal vision.(Jindal M,Ahamed M,2009).



Figure (5)Occurs more frequently in people with mental retardation, abnormal reflexes, or muscle incoordination(Solomon, Andrew,2011).

1.2.5 Missing Permanent teeth Delayed Eruption and Enamel Hypoplasia:

Are more common in people with intellectual disability and coexisting conditions than in people with intellectual disability alone.

- Examine a child by his or her first birthday and regularly thereafter to help identify unusual tooth formation and patterns of eruption.
- Consider using a panoramic radiograph to determine whether teeth are congenitally missing. Patients often find this technique less threatening than individual films.
- Take appropriate steps to reduce sensitivity and risk of caries in your patients with enamel hypoplasia(Batshaw ML, Shapiro B, Farber MLZ,2007).



Figure (6)Variations in the number, size and shape of teeth((Barnett ML,2006).

1.2.6 Damaging oral habit:

Are a problem for some people with intellectual disability. Common habits include bruxism; mouth breathing; tongue thrusting; self-injurious behavior such as picking at the gingiva or biting the lips; and pica, eating objects and substances such as gravel, cigarette butts, or pens. If a mouth guard can be tolerated, prescribe one for patients who have problems with self-injurious behavior or bruxism. (Weddell JA, Sanders BJ, Jones JE,2004)

Barriers to oral health and assessing care:

Dental problem were identified as among the most prevalent unmet need by case managers of regional centers providing community services for persons with development disabilities. (Manish Jain,Anmol Mathur,Leena sawla,2009).

Following are the barriers to the oral health care of special children :

1. Fear and anxiety :several studies indicate a high level of fear and anxiety in person with disabilities.extreme fear was inversely related to frequency of dental visits and perceived oral health status (Crall JJ,2007).
2. Dependency: persons with severe physical and mental disabilities who are dependent on caregivers for daily oral care characteristically have poor oral hygiene and a greater prevalence of periodontal disease.(Larry Lawton ,2002).
3. Financial barriers: persons with severe physical and mental disabilities, are unable to pay the cost of care ,deprived with respect to income ,has high rate of unemployment and no dental insurance.

4. Poor skills: since most of the mentally disabled children are not able to use tooth brush in a proper manner and unable to perform oral hygiene procedures adequately which leads to poor oral hygiene and periodontal problems (Stfanovska E, Nakova M, Radojkova V, 2010).

5. Unwillingness by dentist: private practitioners do not feel to treat the patient with mental retardation or with some other disabilities as it requires more time and efforts. Patients with such complex needs require the services of special programs, clinics, and facilities staffed by personnel with advanced training and experience (Doris J, 2002).

6. Ability to accept treatment: this depends on number of factors like mood, motivation, ability to think logically, accept and understand the treatment plan and ability to cooperate with dental treatment. They have less ability to accept the treatment (Darby M, Wilkins E, 2005).

Preventive dental treatment consideration:

Oral health is an integral part of total health, not an isolated element. Prevention of oral disease and infection is the key to the oral care of persons with disabilities. Thus dental care providers must manage the disabling condition and modify treatment as necessary in order to deliver quality dental care and preventive oral health protocols (Van Houtem CM, de Jongh A, Broers DL, van der Schoof M, Resida GH, 2007).

1. Pre-treatment assessment: Professionals should take proper medical history, and should have proper consultation with their vision to evaluate their medical status. Information should be carefully collected by their caregivers or the guardian regarding their oral hygiene practices at the time of the first appointment only; the preferred timing and length of the appointment depends on the individual particular disability (Doris J, 2002).

2. Patient management: The appropriate method of behavior management must be determined; modalities may range from ensuring a calm, friendly atmosphere, to behavior modification, to use of pharmacological sedation and physical restraints, and combination of strategies (Siklos S, Kerns KA, 2008). To do proper management, one should keep following in mind:

- **Establish a relaxed environment:**

To relax the patient, dental staff must greet and welcome the patient, avoid keeping the instruments with a dangerous outlook, openly which might scare the patient.

- **Communication skill:**

Communicating in a soft voice and using a gentle touch will go a long way toward helping the patient relax. Communicating with a person who has special needs also often requires patience (Larry Lawton, 2002).

- **Tell show do:**

Before doing any step of the procedure, tell the patient and show the instrument going to be used in the procedure. Start with least fear-producing object or procedure and move towards the higher grades.



Figure (7) Head of Dental and Eye Care Services (Siklos S, Kerns KA, 2008).

- **Use of suitable aids:**

An adjustable mouth prop will allow the patient to open the mouth for a long period of time; it will also prevent the trauma to the dentist's finger. These patients may require more stabilization of the head. Oral hygiene procedure is best achieved for mentally handicapped children with children lying supine on the floor, couch, or bed and the head supported on the mother's lap (Kumar S, Sharma J, Duraiswamy P, Kulkarni S, 2009).

3. Systemic prevention of oral disease: Full use must be made of safe, effective and readily applied chemotherapeutic agents as fluoride and chlorhexidine, so the preventive program must be :

1. Simple to be use.
2. Low in cost.
3. Have the full cooperation of administrators, medical and nursing staff, personal care attendants and clients (Manish Jain, Anmol Mathur, Leena sawla, 2009).

The resulting benefits will be far reaching in terms of reduced morbidity, decreased pain and suffering and savings in cost through reduced need for treatment, enhanced well-being, social acceptance and quality of life of the individual (Darby M Wilkins E, 2005).

4. Oral health Preventive Protocol: The oral health status of these group with disabilities should be improved by heightened awareness of the fundamental need for effective preventive from earliest age through pediatricians, health visitors, community and primary care teams.

1. Oral health education :which are includes:

a. All programmes of oral health promotion for children with disabilities should have specific, measurable, appropriate, realistic and time related (SMART) objectives. The objective should include policy development, improved availability of healthy choices, improvements in oral hygiene skill and provision of services (Larry Lawton, 2002).

b. Diet: the role of sugar in promoting the dental caries process has been derived from numerous epidemiological, laboratory, and clinical studies. A balanced diet is essential for nutrition as well as a part of the preventive program for the handicapped children. The outcomes of several clinical studies show that chewing xylitol containing diet reduces caries and mutans streptococci level (Hayes C, 2010).

c. All program activities should have an educational component, and an oral health assessment should be included as part of general health assessment.

and often need a help of their caregivers, some studies have shown that persons with disabilities show significant reduction in plaque and gingival index through mechanical control of plaque (Kumar S, Sharma J, Duraiswamy P, Kulkarni S, 2009).

2. Home Dental Care:

The instruction and home care regime of the physically disabled patient will depend on the type and severity of the disability. The individual who has a mild physical or mental disability can be taught a simple brushing such as roll method.

It should begin in infancy; The dentist should teach the parents to gently clean the incisors daily with a soft cloth or an infant tooth brush.

Oral Hygiene Devices include:

- 1- Modifying tooth brush handles.
- 2- Electric tooth brushes.
- 3- Floss-holding devices.
- 4- Interproximal brushing.

1. Modifying tooth brush Handles:

If the patient has adequate dexterity to produce the small strokes needed to brush properly, a manual tooth brush may produce satisfactory results even if the patient has a weakened hand grasp or uses orthotic splints or other adaptive appliances as bicycle grips, tennis balls and styrofoam mold (Darby M, Wilkins E, 2005).

In a well-controlled study of children with cerebral palsy who received modified tooth brushes, plaque removal was increased by 28% to 35% over that achieved when conventional tooth brushes were used. (Stefanvskva E, Nakova M, Radojkova V, 2010).

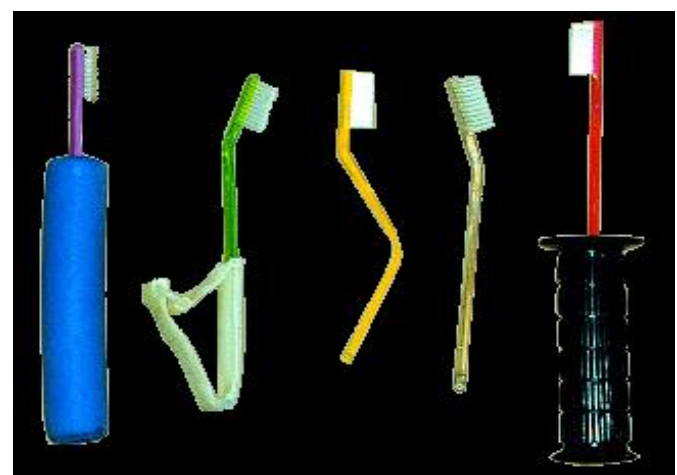


Figure (8) Modifying tooth brush Handles (Stefanvskva E, 2010)

2. Electric tooth Brushes:

They are used in Compromised patient, Muscular Dystrophy patient, but the devices cannot hence be universally recommended for 3 reasons:-

- Their increased weight.
- The difficulties in using their on/ off switch.
- An overzealously used electric tooth brush can cause considerable damage to the hard and soft tissue in a short time (Mulligan R,2011)



Figure(9) Electric tooth Brushes(Mulligan R,2011).

3. Floss Holding Devices:

These devices used if the patient has the necessary interest and skills ,flossing can be taught or reinforced ,a floss holder can be a usefull devices if the patients manual dextertity is limited,or a mechanical flossing is also acceptable.(Manish Jain, AnmolMathur, LeenaSawla ,2009).

4. Interproximal Brushing:

They require fine motor skills therefor preassembled interproximal brushes for disabled patient are advisable.

The use of inter proximal brush is often beneficial in :

1. If the gingival recession has occurred to such an extent that he papilla no longer fills the interdental space.
2. In spaces where adjacent teeth are missing(Liu H,Chen C,2010).

Dentifrices:

Many type of dentifrices have been studies for their effectiveness to remove dental plaque and debris with a tooth brush but the fluoriated Dentifrices have been given the greatest attention during recent studies as caries preventive agent (Edwards S,2001).

A low –foaming tooth paste may be advised if the individual is unable to tolerate the foaming action or unable to spite out;additionally dipping the tooth brush into fluoride mouth wash and then brushing the teeth in the usual way will ensure that the teeth will benfit from the caries preventive effects of fluoride ,or using flouride gel.A regular tooth paste should be used only for patients who can expectorate Advice the caregiver to use a disclosing agent to visualize plaque biofilm so using a disclosing agent will ensure that procedure is being completed properly(van Houtem CM, de Jongh A, Broers DL, van der Schoof M, Resida GH,2007).

Plaque control:

It can done by mechanical means or chemical means
Mechanical Plaque control:

The mechanical removal of dental plaque from tooth surfaces have conclusively been demonstrated to be an effective method of controlling dental caries(Lansing, Michael J,2009).the most dependable mode for controlling plaque is by mechanical cleansing with tooth brush and cleaning aids (Stefanovska E,Nakova M,Radojkova V,2010). However most of the mentally disability are not able to handle tooth brush properly and oftenneed a help of their caregivers ,some studies have shown that persons with disabilities show significant reducation in plaque and gingival index through mechanical control of plaque (Kumar S, Sharma J, Duraiswamy P, Kulkarni S,2009).

Chemical Plaque control:

Use of chlohexidine ,the treatment of choice for gingivitis ,is indicated in developmentally disabled ,medically compromised and dependent populations

who are unable to remove plaque by mechanical means (Drab M, Wilkins E, 2005). Various studies have demonstrated that chlorhexidine is well tolerated by persons with a disability. For persons unable to use chlorhexidine as a mouth wash, the agent can be effectively swabbed on a toothbrush, or used as a gel. Acceptance and compliance by clients and caregivers are the key to successful administration (Persson RE, Truelove EL, Leresche L, 1991).

3. Fluoride:

The benefit of the fluoride for the prevention and control of dental caries is well documented. Special emphasis should be played on ensuring adequate systematic fluoride for disabled patients.

- Dentists should first determine the concentration of fluoride in patient daily water supply.
- If Fluoride level is between (0.7 – 1.0 ppm), no supplementation is normally required.
- If fluoride level < 0.7 ppm, various forms of fluoride supplementation is necessary (i.e. drops, tablets & rinses)
- Dentifrice containing a therapeutic fluoride compound should be also used daily.
- Clinician suggests:
 - 1- Daily regimen of rinsing 0.05 % sodium fluoride solution
 - 2- Nightly application of a 0.4 % stannous fluoride brush-on gel has also been successfully used to decrease caries in children.

If the patient will not tolerate the use of tooth paste, then a toothbrush dipped in fluoride mouthwash (0.2% sodium fluoride) as a part of mouth cleaning routine, will deliver an equivalent amount of fluoride but in a vehicle that the patient may find more acceptable for professional use. Fluoride varnish are the safest and the most practical method for the patient with physical disabilities (Edwards S, Darby M, Wilkins E 2005).

4. Preventive Restoration and treatment need:

1- Pit & fissure sealants .

Sealant application may be more difficult in some compromised patient, because it may be more difficult to control intraoral moisture contamination, salivary pooling is often seen in **Cerebral palsy & muscular dystrophy** patient because they have swallowing

difficulties for the short time needed to apply. To aid in Moisture control, the patient should be seated upright rather than reclining position. For the younger patient.

2- Amalgam or long-wearing composite to prevent further breakdown & decay.

3- Stainless crowns with severe bruxism and interproximal decay to increase the longevity of the restorations so that restoration of the dentition to its normal form should consider the emergency treatments like relief of the pain, pulpal abscess drainage and extraction of the grossly destructed teeth.

5. Orthodontic treatment :

Orthodontic treatment for the children with disabilities has long been neglected, and this treatment need should be taken into account in future planning of oral health care (Al-Qahtani Z, Wayne AH, 2009).

Individual with Physical, Medical, Mental or emotional problems often have a greater need for dental care than their healthy counterparts. This may be because the disability itself has oral manifestations, but more commonly it is due to :

- The limited capabilities of the individual or the family members to understand and to perform important oral hygiene tasks.
- A lack of ability to perform dental care .
- Assessments should be made of patient's sensory, Cognitive and functional abilities and be used to customize a preventive plan.
- Dental preventive procedure such as sealant, fluoride's and chemical plaque control should be considered for each patient as a part of any treatment.
- In the disabled population has been shown to develop gingival/periodontal disease .If dental care and health awareness is instituted early and supported by parents or caregivers, then home efforts or complicated treatment needs can be kept to a minimum.
- Tooth brushing should be performed by the parents or supervisor for children with physical disability.
- Chlorhexidine is effective antimicrobial solution that like to be a relative for mechanical tooth brush for disabled patient.
- A significant differences were found between the number of handicapped children and

adolescents affected by traumatic dental injuries among three groups of handicapped studies .By which the number of affected handicapped were significantly lower in auditory rather than physically and visually handicapped

Conclusion

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Suggestions

- 1.Emphasized the importance of the behaviour of family and institutions towards people with physical disability in order to let a project of primary preventive .
- 2.Educational programs are needed to be initiated for center staff,parents and the handicapped to improve

dental health knowledge by which reinforce desire behaviour and change poor dietary habits.

3.Planning educational programmes to motivate the handicapped children as well as parents and center staff for proper oral hygiene measures.

4.Implementation of an efficient preventive program ,which include adequate systemic flouridation along with other for topical flouride.he denta

5. Better orientation of the graduating and practicing dentists to play an important role in improving the dental health of handicapped children.

6. Language signs (hand signs) must be available to the dentists who work in the institutes so that they can communicate easily with the deaf patient .

References

- Al-Qahtani Z, Wyne AH. Caries experience and oral hygiene status of blind, deaf and mentally retarded female children in Riyadh. *J AM Clin Periodontol* 2009; 27:37–40.
- Al-Taie. Clinical And Microbiological evaluation of dental health education programs among groups of physical disabled students in Baghdad, Iraq. Master Thesis, College of Dentistry, University of Baghdad,2001.
- Aoki T. Child health for handicapped children.7th ed. London and New York, University press, 2000.
- Barnett ML. The oral-systemic disease connection. *J Am Dent Assoc* 2006;137:55-65.
- Batshaw M, Shapiro B, Farber M. Developmental Delay & Intellectual Disability. In : Batshaw M, Pellegrino L, Roizen NJ, eds. *Children With Disabilities* 6th ed. Appleton and Lance .Stamford,Connecticut,2007.
- Behrman R, Kliegman R, Jenson H.: Nelson textbook of pediatrics. 17th ed. Saunders, University Press,2004.
- Behrman R, Kliegman R.: Nelson essentials of pediatrics. 4th ed. Saunders, University Press, 2002.
- Callahan S, Cooper W. Continuity of health insurance coverage among young adults with disabilities. *J Dent Child* 2007;119:1175-80.
- Cawson R, Odell E ,Porter S. Cawson's essentials of oral pathology and oral medicine. 7th ed. Churchill Livingstone, Spain. 2002.
- Cawson R, Odell E ,Porter S. Cawson's essentials of oral pathology and oral medicine. 7th ed.,London and New York, Churchill Livingstone,2005.
- Ceyhan A, Gunseli G, Ozlem M. Oral Health Status of Disabled Individuals Attending Special Schools in Ankara, Turkey. *J AM Dent Assoc* 2010; 4:361–366.

- Chandra S . Textbook of preventive dentistry. 2nd ed. New Delhi, University Press, 2000 .
- Crall J. Improving oral health for individuals with special health care needs. *Paediat Dent* 2007;29(2):98-104.
- Cummings M. Human heredity principles and issues. 6th ed. Thomson, Canada. 2003, PP:155-157.
- Cutress TW. Trace elements in saliva. In: Curzon M ,Cutress T eds. Trace elements and dental disease,4th ed . Great Britain. 1983:107-115.
- Darby M, Wilkins E. Dental hygiene care for clients with special needs. In: Wilkins E. Clinical practice of the dental hygienist,9th ed. Lippincott. Philadelphia, 2005:761-770.
- Delaney J ,Keels M. Pediatric oral pathology of Soft tissue and periodontal conditions. *Dent Clin North Am* 2000; 47(5):1125-1147.
- Diab B. Oral health status And Treatment Needs among Groups Of Handicapped Children And Adolescents In Baghdad, Iraq .Master Thesis, College of Dentistry, University of Baghdad,1995.
- Dinesh R ,Hegde A ,Avatar K .Oral Hygiene status of disabled children and adolescents attending special schools of South India, *AM J Dent* 2005;2:107-13.
- Donaldson R. Physically handicapped persons in Essential community medicine. 4th ed .Oxford, University Press,1983 .
- Doris J, Stiefel M .Dental Care Considerations for Disabled Adults, *Spec Care AM J Dent* 2002;22(3):265-395.
- Edwards S. Prevention of disability on grounds of suffering. *AM J Clin Ethics* 2001; 27:380-382.
- Franks A ,Winter G. Management of the handicapped and chronic sick patient in the dental practice *Brit Dent J* 1974;136:20-23.
- Goe L, Baysac M, Todd K, Linton J. Assessing the prevalence of dental caries among elementary school children in North Korea: *J Dent Assoc* 2005;3:112–116.
- Haake S. Etiology of periodontal diseases. 9th ed. Saunders Elsevier, China, 2002.
- Hennequin M, Faulks O, Roux O. Accuracy of estimation of dental treatment need in special care patients. *J Dent Child* 2000;28:131-6.
- Ivancic N, Mestrovic M, Bakarcic D. Dental caries in disabled children. *J Dent Assoc* 2007; 22(3):265-395.
- Jenkins W. The prevention and control of chronic periodontal disease. In: Murray J. Prevention of oral disease. 3rd ed. Oxford ,University Press, 2001.
- Jindal M, Ahamed M , Hashmi H. Practic Oral Health status and dental caries prevalence among visually impairment students in residential institul of Aligarh, Master thesis ,collage of Dentistry ,University of India,2009.
- Kidd E , Bechal J. Essential of dental caries, the disease and its management. 2nd ed. Oxford ,University Press, Hong Kon,2008.
- Krishna M , Dasar P. Principles and Practice of Public Health Dentistry.1st ed . New Delhi,India,2010.
- Kumar S, Sharma J, Duraiswamy P, Kulkarni S. Determinants for oral hygiene and periodontal status among mentally disabled children and adolescents. *J Am Dent Assoc* 2009;27:151.
- Lange B ,Entwistle B ,Lipson L.Dental management of the handicapped Approaches for dental auxillaries .5th ed . Oxford ,university Press, 1983.
- Liu H Chen . The impact of dietary and tooth-brushing habits to dental caries of special school children with disability *Am J Clin Nutr* 2010; 36-56.
- Manish J, Anmol M, Leena S. Oral Health status among mentally disabled subjects in India. *J Oral Sci* 2009;51(3):333-340.
- Martens L, Marks L, Goffin G, Gizani S. Oral hygiene in 12-year-old disabled children in Flanders, Belgium, related to manual dexterity. *J Dent Child* 2008;28:73-80.
- Mary E,Darila I, Maritza Gil .Dental caries in People with mental retardation and Down’s syndrome. *J Dent Assoc* 2006;30:599-604.
- McDonald R, Avery D, Dean J. Dentistry for the child and adolescent. 8th ed. Mosby, USA. 2004;60: 174-202.
- McIver F ,Machen J. Prevention of dental disease in handicapped people in dentistry for the handicapped patient. 5th ed . Boston,1979.
- Mitsea A, Karidis G, Donta-Bakoyianni C, Spyropoulos N. Oral health in Greek children and teenagers, with disabilities. *J Clin Periodontol* 2011;26:11-28.
- Mulligan R, Wilson S. Design characteristics of floss-holding devices for persons with upper extremity disabilities. *J Dent* 2011; 4(4): 168-172.
- Murray J, Nunn J, Steele J: The prevention of oral disease. 4th ed. Oxford University Press, Italy, 2003.
- Murry j, Nunn j, Steel j. The prevention of oral diseas.4th ed .Oxford ,university press,2005.
- Nelson W, Behrman R, Vaughan C. Nelson textbook of pediatrics .13th ed. Philadelphia ,1987.

- Nunn J, Gordon P, Carmichael C .Dental disease and current treatment needs in a group of physically handicapped children . J Dent Child 1993; 389-96.
- Nunn J, Murray J. The dental health of handicapped children in Newcastle. Br Dent J 1987;162:9-14.
- Oreland A, Heijbel L, Jegell S ,Person M. Oral function in the physically handicapped with or without severe mental retardation . J Dent Child 1989;20:54-98.
- Persson R, Truelove E, Leresche L. Therapeutic effect of daily or weekly chlorohexidin rinsing on oral health of physically disable children. Oral surg oral med oral pathol 1991; 72:184-191.
- Pool E, Davis W. Dental care for the handicapped patient. Br Dent J 1980; 20:267-270.
- Radhi N. Oral Health Status In Relation to Nutritional Analysis and Salivary Constituents among a Group of Children with Down's Syndrome, In Comparison to Normal Children In Baghdad,Iraq .Master Thesis, College of Dentistry, University of Baghdad,2009.
- Rahul B, Dubey A. Dentofacial changes and oral health status in mentally challenged children ,J Oral Sci 2005;23(2):71-73.
- Rubin E, Farber J. Pathology of oral disease. 3rd ed. USA, University Press, 1999.
- Shobha T. Textbook of pedodontics And Dental Care for special child.1st ed. Hyderabad ,India,2001.
- Siklos S, Kerns K. Assessing the diagnostic experiences of a small sample of parents of children with autism spectrum disorders. J Den Res 2007;28:9-22.
- Sogi G, Bhaskar D. Dental caries and Oral Hygiene Status of school children in Davangere related to their Socio - Economic levels. J Indian Soc Pedo Prev Dent 2002;20:152-7.
- Solomon P, Andrew K. The New Wave of physical disable Rights Activists. J Oral Sci 2011;40-79.
- Stefanovska E, Nakova M, Radojkova V. Tooth Brushing intervention program me among children with mental handicapped . J Dent Child 2012;111(5)299-302.
- Sultana G Nahar I M ,Amzad H, Mohammad B . Oral health status of disabled children, . J Den Res 2010; 36: 61-63.
- Van H ,Jongh A, Broers D, van M, Resida G. Dental care of disabled children living at home. J Dent Child 2007;114:129–133.
- Waldman H, Swerdloff M, Perlman S. Children with mental retardation grow older. J Dent Child 2006;66:266-72.
- Weddell J, Sanders B, Jones J. Dental problems of children with disabilities. In McDonald RE, Avery DR, Dean JA. *Dentistry for the Child and Adolescent*. 8Th ed St. Louis and MO. 2004: 524-556.

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