



Research Paper

Orthodontic consideration in special needs children with mental retardation

Mahasweta Dasgupta¹

1. Corresponding author, Consultant Orthodontist, Siliguri, West Bengal

ABSTRACT:- Orthodontics treatment is indicated specially for the children who have some degree of mental retardation, as they suffer frequently from malocclusion. Different approaches have been suggested from psychological, pharmacological to physical restraints in order to treat the special needs children. This article presents a review of such procedures carried out to provide optimum orthodontic treatment for the mentally retarded child.

KEYWORDS:- special needs children, mentally retarded, orthodontic treatment

Received 05 Jan, 2021; Revised: 18 Jan, 2021; Accepted 20 Jan © The author(s) 2021.

Published with open access at www.questjournals.org

I. INTRODUCTION

The term “mental retardation stirs a variety of emotions in different individuals. It has been defined by the American Association of Mental Deficiency as

Intellectual disability (ID), also known as **general learning disability**, and **mental retardation (MR)**, is a generalized neurodevelopmental disorder characterized by significantly impaired intellectual and adaptive functioning. It is defined by an IQ score under 70 in addition to deficits in two or more adaptive behaviors that affect everyday, general living.

There are four main criteria to judge

- 1- Significantly subaverage intellectual functioning - an intelligence quotient of two standard deviations below the mean or an IQ of less than 70
- 2- Significant impairment in adaptive behavior: language, school achievement, social adjustment, and sensory motor skills
- 3- Numbers 1 and 2 must be present together
- 4- Numbers 1 and 2 must have been diagnosed as being present during the developmental period or prior to 18 years of age

II. CLASSIFICATION OF MENTAL RETARDATION

They were described in the Mental Deficiency Act of 1927 which divided into the grades of

IDIOT:- He is an individual who is “unable to guard himself against common physical danger”. He is severely defective and his IQ grade is given as less than 25

IMBECILE:- He is a person who is incapable of managing himself or his affairs, or, in the case of children, of being taught to do so. He can be taught to guard himself against common dangers and even to do certain tasks under supervision. His IQ is in the range of 25 to 49.

MORON:- A moron is a person who requires care, supervision, and control for his own protection and for the protection of others, or in the case of children, incapable of receiving education at school. He has a IQ of 50 to 70.

For many years the potential abilities of people with intellectual disabilities were poorly understood, and such individuals were often treated as inferior.

Considering the drawbacks of the above classification the term “mental disability” was proposed.

A classification of mental disability is presented in Table.

Degree of mental disability	SB -IV	WISC –III	COMMUNICATION	SPECIAL REQUIREMENT FOR ORTHODONTIC CARE
Mild	67-52	69-55	Should be able to speak well enough for most communication requirements	Treat as a normal child. Mild sedation or nitrous oxide oxygen analgesia may be beneficial.
Moderate	51-36	54-40	Has vocabulary and language skills such that child can communicate at basic level with others	Mild to moderate sedation may be beneficial. Use positive reinforcements and restraints, general anaesthesia may be required in cases of severe dental decay.
Severe Profound	35 or below	39 or below	Mute or communication in grunts. Little or no communication skills	Same as for moderately retracted.

III. ORTHODONTIC PROBLEMS

MAJOR PROBLEMS:-

- Impaired motor control
- Incoordination
- Tonal problem
- Joint contracture and deformities
- Skeletal malformation
- Muscle weakness

ASSOCIATED PROBLEMS:-

- Cognitive problems
- Visual/auditory problems
- Oral motor dysjunction
- 1. Communication/speech problems
- 2. Feeding
- 3. Drooling
- Behavioural problems

The tongue is oversized and there is the further complication of narrow arches, it can become the source of a most damaging, almost continual lateral force which may further worsen the malocclusion.

Habits, such as thumb- and fingersucking, tongue-thrusting, have been responsible for the malocclusion in the majority of cases. The retarded child, as he is motivated by his mental age. Mentally, a retarded child grows 5 to 8 months within a 12 month period, he continues to indulge in infantile habits longer than a normal youngster.

The tooth structure is inclined to malformations, and the absence of teeth, both congenitally and as a result of poor hygiene, is more frequent. Also, these mentally disturbed children are more nervous and often have tooth-grinding habits that wear away the surfaces.

- The time the patient is brought to the orthodontist the malocclusion is severe. Open-bites, cross-bites. and crowding in different degrees are the most common orthodontic problems.

IV. INCIDENCE OF ORTHODONTIC PROBLEMS

The mentally disabled individuals in the present study had 83% incidence of definitive malocclusion. 20-36% of children in general population have been found to have a definitive malocclusion

Further Down syndrome subjects appeared to exhibit highest incidence Angle class III malocclusion when compared to other groups. These results could be due to altered cranial–base relationships and reduced maxillary size in Downs syndrome patients.¹

Angle class II malocclusions were the most common form of malocclusion in individuals with Cerebral palsy which confirms with the previous studies . It has been established that lip incompetence, and failure of the maxillary orbicularis muscle In palsy patients is the cause of excessive overjet in them.²

V. ORTHODONTIST - PATIENT RELATIONSHIP

A short attention span, restlessness, hyperactivity, and erratic emotional behavior may characterize patients. The Orthodontist should assess the degree of mental disability by consulting the patient's physician or other caregiver if the patient does not live with the parents.

The following procedures have proved beneficial in establishing Orthodontist –patient rapport and reducing the patient’s anxiety about dental care:-

1. Give the family a **brief tour of the office** before attempting treatment. Introduce the patient and Family to the office staff. This Will familiarize the patient With the personnel and facility and reduce the patient's fear of the unknown. **Allow the patient to bring a favorite item (stuffed animal, blanket, or toy) to hold for the visit.**
2. The **tell-show-do technique** is a familiar approach to orient the child to new elements of dental treatment. We all fear things we donot understand. So it becomes very difficult for a retarded child to overcome these fears.
3. Be repetitive; speak slowly and in Simple terms. Make sure explanations are understood by asking the patient if there are any questions. If the individual has an alternative communication system, such as a **picture board or electronic device**, be sure it is available to assist with dental explanations and instructions.
- 4 Give only one instruction at a time. Reward the patient with compliments after the successful completion of each procedure.
- 5 Actively listen to the patient. People with mental disability often have trouble with communication, and the dentist should be particularly sensitive to gestures and verbal requests.
- 6 Invite the parent into the operatory for assistance and to aid in communication with the patient.
- 7 Keep appointments short. Gradually progress to more difficult procedures (e.g., anesthesia and bonding procedures) after the patient has become accustomed to dental environment.
- 8 Schedule the patients-Visit early the day-When the dentist, the Staff: and the patient will be less fatigued.

VI. THE INITIAL EXAMINATION

It is recommended that that three procedures be attempted on the first appointment for the normal average child walking into the dental office :

oral examination: oral radiographs; and dental prophylaxis.

The same is true for the retarded child; however the process is slower and the approach is different.

An example of this would be utilizing a **tongue blade** to accomplish **the inital examination of the child's mouth.** Should utilize this technique , there may be a problem of biting and breaking mirrors during the inital examination.

If the child shows a tendency to bite, and has difficulty opening or refuses to open his mouth, a mouth block or a mouth gag might be used. Padded and wrapped tongue blades are easy to use, disposable, and inexpensive. The Open Wide mouth prop has a durable foam core on the end of a tongue depressor. Rubber bite blocks can be purchased in various sizes to fit on the occlusal surfaces of the teeth and stabilize the mouth in an open position. The bite blocks should have floss attached for easy retrieval if they become dislodged in the mouth
Some modifications that may be made to a toothbrush to help persons with poor fine motor skills improve their brushing techniques. Although many types of grips are available, using the patient's hand to custom-design a handle has often had good results. Electric toothbrushes have also been used effectively by children .Daily flossing, with supervision or the use of floss holders, is essential to maintain optimal gingival health.

RADIOGRAPHIC EXAMINATION

Radiographs are frequently a problem and gagging is sometimes difficult to cope with. Although the panographic radiograph is an excellent diagnostic aid in the mentally retarded child, the lateral Jaw film can also be utilized to obtain a reasonable overview in cases in which the patient will not accept the motion of the panographic x-ray machine.

For patients with limited ability to control film position, **intraoral films with bite-wing tabs** are used for all bite-wing and periapical radiographs.

An 18-inch (46-cm) length of floss is attached through a hole made in the tab, to facilitate retrieval of the film if it falls toward the pharynx.



Figure 1. Radiographs with bite tab with floss attached

VII. BEHAVIOUR MODIFICATION

- Progressions
- Backward chaining
- Hypnosis
- Kinesthesia
- Audio Analgesia

PROGRESSIONS

Progression learning *involves segmenting the skill to be learned into a number of simple and sequential component parts*, or progressive steps.

Used when learning complex skills, including both cognitive and psychomotor skills.

For example, teaching a patient to insert a cervical headgear for the first time could be sequenced into the following progression:

- ❖ Show the patient how to place the face-bow inside his or her mouth with *no* attempt to put it into the molar band tubes. Have the patient demonstrate this.
- ❖ Next, show the patient how to insert the right end of the facebow into the right molar tube. Again, have the patient demonstrate.
- ❖ Show and have the patient demonstrate how to insert the left side of the facebow into the left molar tube.
- ❖ Show the patient how to fasten the cervical strap around the back of neck; have the patient demonstrate.
- ❖ Show and have the patient demonstrate the steps for removal of the headgear, and so on.
- ❖ Other patient procedures, or skills, that could be formulated into progressions are placement of retainers, activation of palatal expanders, and oral hygiene procedures etc.

BACKWARD CHAINING

The last steps in a sequence, from beginning to end, are taught first, working backwards toward the first step in the progression..

Some activities in orthodontics that could be backward chained are headgear placement, the use of intraoral elastics, placement (and removal) of retainers, and activation of palatal expanders.

The removal of the headgear is a much easier task than its insertion.

Similarly, patients first learn to remove elastics and retainers before they learn to place them.

Likewise, patients or parents are first asked to remove the **activation key for a palatal expander** before they are asked to place and turn the key.

HYPNOSIS

Hypnosis, and other techniques closely associated with hypnosis, can be used for fearful and apprehensive patients.

Clinical situations in which hypnosis or a closely related technique could be used are: impression making, bonding, debonding, and extraction of very loose deciduous teeth.

For an apprehensive patient about to receive braces, you may question the patient about favorite hobbies, activities, sports, or vacations.

You might then focus on a patient's favorite summer vacation.

While placing a band around the patient's molar tooth, you *paint a verbal picture of a scene from the patient's vacation, describing in detail the ocean scene using words and language that embraces the patient's senses (sight, sound, smell, and touch).*

KINESTHESIA

Patients have expressed fear, apprehension, and dislike for impressions.

The following strategy can be used in conjunction with impression making.

Make them aware of their breathing: tell them, particularly, to breath slowly by moving their stomach in and out.

This *diaphragmatic breathing* has been to produce a relaxing response, that is, a decrease in metabolism, heart rate, blood pressure, breathing rate, and muscle tension.

While the patient focuses on diaphragmatic breathing, insert the impression tray in the patient's mouth;

One could also have the patient raise his or her legs and then arms.

This technique helps keep the patient focused on something other than the unpleasant procedure, the idea being that the patient cannot focus on 2 thoughts at one time (leg and arm lifting and the impression material).

AUDIO ANALGESIA

White noise or audio analgesia means providing a sound stimulus of such intensity that patient finds difficult to attend to anything else.

VIII. ORTHODONTIC TREATMENT IMPRESSION MAKING

Usually the first step after initial examination and radiographs is to obtain the diagnostic cast. Several studies done in this aspect have recommended using partial stock trays for right and left halves of the arch. The first cast is placed into the second impression prior to pouring, to obtain a cast of the complete arch.³



Figure 2:-Partial stock trays right and left

ORTHODONTIC BONDING

The use of a multiband appliance with light wires was found to be the most effective appliance and the use of removable appliances was not recommended.

One technique recommends use of a rubber dam for a patient under general anaesthesia. The average time required for the application of a rubber dam on a full arch is only 2 minutes.⁴

Advantages:-

1. It eliminates the danger of aspiration of fluids (such as water, etching gel, or saliva) and solid particles (such as brackets or elastomeric modules).
2. It permits general field isolation from saliva and from the tongue and cheeks, enhancing the chances of long-term success of bonding to enamel.

This assumes major importance in the present context, since excessive salivation is a feature in a large percentage of disabled patients⁶ particularly those with cerebral palsy⁷

3. Visibility and access in the working field are improved. Many disabled children, such as Down's syndrome patients, have an enlarged or forward-positioned tongue⁸, which is otherwise difficult to displace from the field of operation, particularly when a throat pack is present and especially in the mandibular arch.
4. When the procedure is complete, removal of the rubber dam results in almost 100 per cent elimination of the post-treatment debris, leaving the post-anaesthetic recovery period relatively free of aspiration danger. This is particularly important with specific disabilities, such as cerebral palsy or muscular dystrophy, in whom the cough reflex is impaired⁹.

The disadvantages include:

- (1) possible damage to the gingival tissue due to inappropriate clamp application¹⁰
- (2) possible (but rare) allergic reactions to rubber¹¹;
- (3) the remote possibility of aspiration of a detached clamp¹²;

The initial arch wire was also prepared on the model, cut to the desired length, and annealed at both ends as needed.

This is important in order to facilitate bending the ends distal to the molars and to prevent subsequent slippage of the wire from the tubes, which can easily occur with small diameter initial wires.

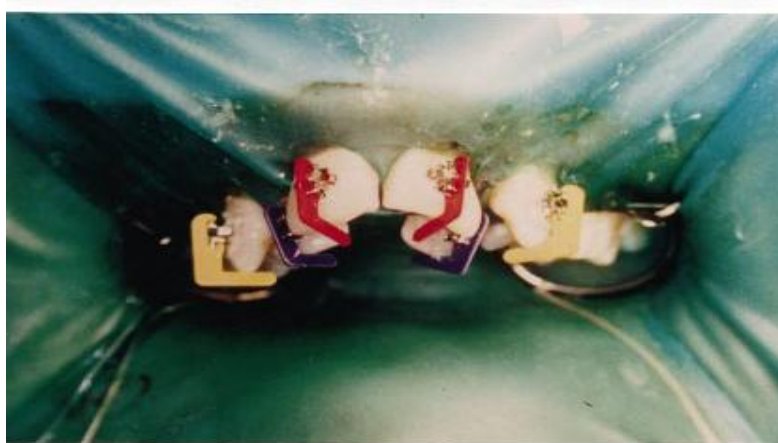


Figure 3.Orthodontic bonding after application of rubber dam⁴

IX. PROTECTIVE STABILIZATION.

The use of protective stabilization is indicated in the following situations:

- A patient requires immediate diagnosis and/or limited treatment and cannot cooperate because of lack of maturity, mental or physical disability.
- A patient requires diagnosis or treatment and does not cooperate after other behavior management techniques have failed.
- The safety of the patient, staff, parent or practitioner would be at risk without the use of protective stabilization.

The following are commonly used for protective stabilization:

BODY

- Papoose Board
- Triangular sheet
- Pedi-Wrap
- Beanbag dental chair insert
- Safety belt

Extra assistant

EXTREMITIES

- Posey straps
- Velcro straps
- Towel and tape

Extra assistant

HEAD

- Forearm-body support
- Head positioner
- Plastic bowl



A.Pediwrap



B.Papoose board



C.Posey straps

D.Leg straps

E.Head positioned

Figure 4 (A to E):-Different methods of protective stabilization(Image source)⁵

X. PHARMACOLOGICAL MANAGEMENT

The spectrum of methods used for pain and anxiety control may be divided into conscious methods (such as oral; intramuscular; inhalation with nitrous oxide and oxygen, and intravenous sedation)

unconscious methods which include

intravenous or inhalation deep sedation and general anaesthesia (GA) with endotracheal intubation (Malamed, 1995)

Sedation - Drugs are used systemically to produce sedation.

Gases(Nitrous oxide)

Antihistamines(Hydroxyzine,Promethine,Diphenhydramine)

Benzodiazepines(Diazepam,Midazolam,Lorazepam)

Sedative hyponotics(Barbiturates,Choral Hydrate)

Narcotics(Meperidine,Fentanyl)

Narcotics antagonist(Naloxone)

Dissociative agent(Ketamine)

XI. CONCLUSION

It goes without saying that we cannot issue a set of rules for orthodontic treatment of the retarded child.

Often the Orthodontist will be dealing with a highly emotional or excitable patient. In some instances, cooperation will be either lacking entirely or poor.

The first consideration is motivation.

The second factor is treatment plan. We have to modify the treatment technique according to each patient, not adapting patient to appliance but adapting appliance to patient.

If the child trusts the operator, he will go along with anything; so understanding the needs of the child is most important step.

REFERENCES

- [1]. Rao D, Hegde S, Naik S, Shetty P Malocclusion in Individuals with Mental Subnormality-A Review. Oral health Dent Manag 2014 Sep 13(3):786-91 PMID 25284558
- [2]. Shukla D, Bablani D, Thapar R, Gupta P Craniometry and Malocclusion in Mentally Disabled Subjects in India. Anthropology 2014.2332-0915
- [3]. Topouzelis N, Kotsiomiti E, Arhakis A. An alternative impression technique for individuals with special care needs. Spec Care Dentist. 2010 Nov-Dec;30(6):266-70
- [4]. Chaushu S, Zeltser R, Becker A. Safe orthodontic bonding for children with disabilities during general anaesthesia. European journal of orthodontics 22(2000)225-228
- [5]. <https://www.muhammadharaty.com/lecture/17672/Dr--Saad-gasgus/dental-care-of-children-with-special-needs-pptx>
- [6]. Oreland A, Heijbel J, Jagell S, Persson M. Oral function in the physically handicapped with or without severe mental retardation ASDC Journal of Dentistry for Children 56:17-25 1989
- [7]. Franklin DL, Luther F, Curzon ME. The prevalence of malocclusion in children with cerebral palsy. European Journal of Orthodontics. 18:637-643
- [8]. Malamed SF. Sedation: a guide to patient management. Mosby, St. Louis. 1995
- [9]. Vogel JE, Mulliken JB, Kaban LB. Macroglossia: a review of the condition and a new classification. Plastic and reconstructive surgery. 78:715-723. 1986
- [10]. Neiburger EJ 1990 Hazards of the rubber dam. New York state dental journal. 56:442-444.
- [11]. Blinkhorn AS, Leggat EM. An allergic reaction to rubber dam. British Dental journal. 156:402-403.
- [12]. Alexander RE, Delholm JJ. Rubber dam ingestion, an operative risk: report of a case. Journal of American Dental Association. 82:1387-1389. 1971