DENTAL HEALTH CARE AT THE DISABLED CHILDREN'S REHABILITATION CENTER IN RIYADH

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العناية بالصحة العامة للأسنان لدى الأطفال المعوقين في جمعية الأطفال المعاقين بالرياض

روجعت الملفات الطبية لـ ٦٦ طفل معاق تتراوح أعمارهم بين ٣ و ١٤ سنة تم عـلاجهم في جمعية الأطفال المعاقين بالرياض ما بين مارس ١٩٩٣ إلى يولية ١٩٩٤م.
الهدف من هذه الدراسة هي وصـف أنواع مشاكل الأسنان الموجودة في الطفل المعاق ومراجعة الأسبـاب المؤدية للإعاقة وتحديد أسلوب علاج الأسنان المتبع وتجميع طرق الترويض المستخدمة في العناية بالأسنان.
تم تسجيـل المعلومـات الشخصية والسنية والطبية للمرضى ومشـاكل الأسنـان وطرق العـلاج المختلفة المقـدمة. وقـد تبين أن ٧٨,٨٪ من الإعاقـة كانت شلل مخي وكان مـن أهم أسبابها خلقي أو لأسبـاب ولادية وقد وجد أن نسبة تسـوس الأسنان لدى المعاقين ٧٩٪ وأن صحة الفـم كانت متدنية لـدى ٣٧,٨٪ وأن ٢٤٪ كانوا يعانـون من صرير الأسنان كما لوحـظ أن نسبة سوء الأطباق كانـت ١٥٪. أما العلاج المقدم كـان يشمل تنظيف وقائي للأسنـان بنسبة ١٥٪ وعلاج تحفظي لـلأسنان ويشمل البتر الجزئي للـب الأسنـان بنسبـة ٨١,٨٪ والقلع ١٨٪ وتقـويـم الأسنـان ٣٪ ولتسهيـل العـلاج ولتقبـل المريض لـه استخـدمـت المهدئات مثل الفالرنجان بجرعة ٥ ,١٣الفنيرغان بجرعة ١ مجم/ كجم من وزن مع استخدام التخدير الموضعي.
واستخدمت برنـامج المنع الجزئي لتقليل الحركات اللاإرايـة للمعاق لقد تبين من البحث أن تجربة تـوفير علاج الأسنان لإطفال المعاقين في مركز جمعية الأطفال المعاقين بالرياض ناجحة.

Abstract

Sixty-six disabled children, 3 to 14 years old, attending the Disabled Children's Rehabilitation Center (DCRC) in Riyadh between March 1993 and July 1994 were evaluated before and after treatment. The types of dental problems found in the disabled child, the causes of the handicap, the pattern of dental treatment carried out and the management techniques used in providing care are reported. Personal, medical and dental data were recorded and analyzed. Main etiologic factors for disabilities were congenital or due to perinatal events and 78.8% of the children had cerebral palsy. The oral problems included dental caries 79%, poor oral hygiene 37.8%, bruxism 24% and malocclusion 15%. The treatment modalities carried out were prophylaxis in 15%, restorations including pulp therapy in 81.8%, exodontia in 19.7% and interceptive orthodontics in 3%. All types of treatment were achieved under local anesthesia [LA] with or without restraint. Premedica-tion such as Vallergan 3.5 mg/kg or Phenergan 1 mg/kg body weight was used for proper management of the patients. An aggressive prevention program is recommended along with other proven methods in the dental care of disabled children. The experiment of making dental treatment readily available to the disabled children in Riyadh appears to be succeeding.

Introduction

Dental management of the handicapped child has received scant attention in the literature compared with the normal child. Until recent years, the management of the handicapped child was not even mentioned in the undergraduate curriculum of most dental schools in different parts of the world. This partly explains why the handicapped child has not received its fair share of dental management in the community.

The Department of Health, Education and Welfare of the United States, in its Rehabilitation Act of 1973' defined a handicapped person as one who has a physical or mental impairment which substantially limits one or more major life activities such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning and working. In addition, a handicapped person has a record of such impairment (has a history of or has been classified as having a condition that limits major life activities); and is regarded as having such an impairment.

Nowadays, the term "**disability**" is preferred to the "**handicapped**". The term disability refers to any impairment that restricts or limits daily activity in some manner.[2] The disability may be developmental in origin or acquired." Developmental disabilities are handicapping conditions identified in early childhood and usually persist throughout an individual's life. Etiologic factors of developmental disabilities are medically broad based and are due to a variety of conditions which include cerebral palsy, Down's syndrome, mental retardation, autism,

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seizure disorders, hearing and visual impairments, congenital defects, and even social or intellectual deprivation.3 The acquired disabilities are caused by a disability factor later in life and include neuromuscular disorders, traumatic injuries, and psychiatric disorders producing various forms of physical and mental disabilities in the individual.3

In 1979, the Journal of Dental Education[4] published guidelines for predoctoral dental training in the care of the handicapped. In 1985, curriculum guidelines for dental students managing patients with minor disabilities[5] and a curriculum for general practice residents in care of the developmentally disabled child were published.[6] These events marked the beginning of closer attention to the dental health of the disabled. In 1990, the Journal of Education published an updated Curriculum Guidelines for training General Practice residents to treat a person with a handicap[7] as approved by the American Association of Dental Schools.

A survey of the availability of dental services to the developmentally disabled residing in a community in north central Florida, USA, showed that dentists were reluctant to provide services for a variety of reasons including : patient is too uncooperative, inadequate knowledge and preparation, lack of proper equipment necessary to treat this group of special patients, and financial disincentives.[8] Similar reports abound.[9] " The clinical management of special patients may require additional staff members, extra time, various behavior modification techniques including physical restraint, and or sedation for which the dentist may not be reimbursed.[8] These factors account for why the disabled child has difficulty in obtaining dental treatment in most of the world.

In 1988. in Riyadh, the capital of the Kingdom of Saudi Arabia, the Welfare Association for Handicapped Children now known as the Saudi Benevolent Association for Handicapped Children, - as a charity foundation, - established a Handicapped Children's House [HCH] which is now called the Disabled Children's Rehabilitation Center [DCRC]. The primary objective of the center is to render a comprehensive care for disabled children from birth to the age of 12 years. The center functions both as a medical center and as a school in addition to rehabilitation of the children. It also serves to assist the families of the children to accept the facts of retardation. The state of the art medical facilities in the center include a pediatric dental clinic where this study was carried out.

The purposes of this study were to describe the types of dental problems found in the disabled child in the Disabled Children's Rehabilitation Center [DCRC], collate the causes of handicapped children, determine the pattern of dental treatment carried out on the disabled children- both curative and preventive and to catalogue the management techniques used in providing dental care.

Materials and Methods

In a prospective study, all the handicapped children who attended the Pediatric Dental Clinic at the DCRC in Riyadh between March 1993 and July 1994 were evaluated from their first visit till treatment was completed by the pediatric dentist. The following information on each child was recorded.

* Age, sex, medical diagnosis of the handicap, the cause, type of disability, and extra-oral findings.
* Intra-oral findings included state of oral hygiene, periodontal disease, dental caries, trauma to anterior teeth, malocclusion, bruxism, supernumerary teeth or missing teeth, and tooth discolorations.
* Types of dental treatments carried out.
* Behavioral management technique.

Details on the medical history of each child were obtained from the hospital file and at regular meetings with the physician, surgeon and pediatrician when necessary. The pediatric dentist recorded all the data relevant to clinical dentistry as management progressed to completion. These data were later analyzed.

Results

The clinical findings and treatment carried out by the pediatric dentist are presented in Tables 1-6. There were 39 boys and 27 girls who attended for treatment during the period of the study for a total of 66. Nearly half [30] were between the age of 3 and 5 years and two of the children were 14 years old though the center normally looks after children from birth to age 12 years (Table 1).

Medical diagnosis (Table 2) showed that 52 (78.8%) of the children treated had cerebral palsy, two were epileptic, one with Spina Bifida while others (II) constitute 16.7%.

Table 1. Distribution of the children treated in the pediatric dental clinic at DCRC Riyadh by age and sex.

Sex	Age Group			
	3-5 yrs	**6-10** yrs	**11-14 yrs**	**Total**
Male	**19**	**15**	**5**	39
Female	**11**	**14**	**2**	27
Total	**30**	**29**	**7**	**66**

Table 2. Medical diagnosis of the disabled children at DCRC, Riyadh.

Diagnosis	No. of Children	%
Cerebral Palsy	**52**	78.8
Epilepsy	**2**	3
Spina Bifida	**1**	1.5
Other	**11**	16.7
Total	**29**	66

Table 3 presents the etiology of the disability and medical diagnosis of the 66 children, 34 of which are congenital or unknown while prematurity, birth asphyxia and forceps delivery accounted for 39%.

Table 4 shows that 25 children or 37.8% had poor oral hygiene. As many as 15% had good oral hygiene while 39.4% were ranked fair. Overall, calculus was present in 3 males and 1 female with the age-group 9 years and above.

Table 3. Etiology of the handicap by number and percentage.

Diagnosis	No. of Children	%
Prematurity	**8**	12
Birth Asphyxia	**16**	24
Forceps Delivery	**2**	3
Viral Infections	**3**	4.5
RTA	**3**	4.5
Unknown/congenital	**34**	52
Total	**66**	**100**

Table 4. Oral hygiene status of the handicapped children.

Oral Hygiene	No. of Children Male & Female	%
Good	**10**	15.2
Fair	**26**	39.4
Poor	**25**	37.8
Not recorded	**5**	**7.6**
Total	**66**	**100**

Fifty five or 83.3% of the children examined and treated had no gingivitis while 10 (15.2%) had. It was only in one child that gingivitis had advanced to periodontal disease.

Fifty two (79%) of the children had dental caries with 35 (53%) in the posterior teeth only, while 13 (20%) had caries in both anterior and posterior teeth. Four children (6%) had caries in the anterior teeth only and all the caries were in the upper jaw.

Malocclusion was present in 10 (15%) of the children with anterior open bite being the most common form of malocclusion (Table 5). Excessive overbite and overjet in the anterior teeth as well as unilateral crossbite in the posterior teeth also occurred. One child had both excessive overjet and protrusion of the upper anterior teeth.

Three out of 39 boys (7.7%) and one out of 27 girls (3.7%) or 4 out of 66 children [6%] had traumatized anterior teeth. Bruxism was present in nearly one out of four (24.2%) of the disabled children. One 11-year-old child had

Table 5. Type of malocclusion present and percentage of total malocclusions.

Type of Malocclusion	Number	%
Excessive overbite	2	**20**
Excessive overjet	1	**10**
Anterior open bite	4	**40**
Protrusion upper anterior teeth	2	**20**
Anterior crossbite (unilateral)	**1**	**10**
Posterior crossbite (unilateral)	1	**10**

a mesiodens, another had teeth #83 and 84 missing while a third child had two fused teeth, #72 and 73 as well as #82 and 83.

Often, the child is mentally retarded and presents the problems of behavioral management. A typical child, [x] generally, does not sit back in the dental chair and would frequently move forward or even attempt to get out of the chair. The child also may not respond to requests to open his or her mouth and when the mouth is opened, the child may close it on any instrument or the handpiece applied to the mouth.

It was therefore necessary to use restraint with the cooperation of the parents and the dental assistant. In most cases, this was inadequate and the use of premedication together with "**Pedi Wrap**" and mandatory use of local anesthesia were necessary. Vallergan at the dose of 3.5 mg/kg body weight or Phenergan (1 mg/kg body weight) were the drugs used as intraoral premedication one hour before treatment to ensure that each child was well prepared to allow adequate dental treatment.

Table 6 shows the types of treatment carried out on all the children seen at the pediatric dental clinic of the center. Fifty-four (81.8%) of the children had their teeth restored while 13 [19.7%] had their teeth extracted. Interceptive orthodontics occurred only in 2 children. The restorations carried were mostly amalgam and glass ionomer cements and, to a lesser extent, composites and stainless steel crowns. Pulp treatment consisted of 8 pulpotomies in primary molars and 3 pulpotomies in anterior primary teeth.

Table 6. Treatment carried out by type and percentage.

Type of Treatment	No. of Children	%
Prophylaxis only	**10**	15.2
Restorations	**54**	81.8
Extractions	**13**	19.7
Interceptive orthodontics	**2**	**3.0**

Discussion

Nearly 80% of the children treated have cerebral palsy with most of them presenting as being both mentally retarded and physically disabled. Therefore, they all presented problems in behavioral management. The etiology of these mishaps as earlier reported in a review by Tesini and Felton3 are due to congenital, natal and perinatal causes.

It is typical of disabled children to have poor oral hygiene and periodontal disease particularly in the mentally retarded due to lack of proper oral hygiene.[12 ~25] The oral hygiene and periodontal disease findings in this study are not typical of the literature. This is due to the special preventive program at the DCRC in Riyadh. This program includes a weekly demonstration of oral hygiene instructions to the children and the aids or teachers who directly supervise to help carry out the oral hygiene procedures on the children. This study supports the reports of Nicolai and Tesini[26] that the oral hygiene of institutionalized mentally retarded individuals can be improved through the training of direct care staff. Calculus was found in only 4 children- 3 boys and one girl, all aged 9 years and above.

Dental Caries & Malocclusion

The findings that 79% of the children had caries while 15% had malocclusion reflect the other major problems of the disabled child in addition to poor oral hygiene and periodontal disease.[x,3,-,SJ8,122,23,2528]

Bruxism

The phenomenon of bruxism, which is defined as non-functional contact of the teeth and includes clenching, quashing, grinding and tapping of the teeth,[3] occurred in 24.2% of the children. This is in agreement with studies that reported bruxism to be practiced with much greater frequency in children and adults with developmental disabilities30 compared with approximately 15% of normal school-aged children.[3]

Treatment Carried Out

Due to the major problem of dental caries, 81.8% of the children needed and had restorations in their teeth. Only 19.7% had extractions. The typical situation in different parts of the world is that of neglect of the disabled child such that most of the caries is untreated with very poor oral hygiene.[101217-21n23] In this study, all the children had their restoration needs met and more than half of them have good or fair oral hygiene. This appears to be an indication of proper oral health care by the parents, the supervising staff at the center and the dental team of dental hygienist and pediatric dentist who are all responsible for an aggressive prevention program for the children. Appliance therapy in interceptive orthodontics was reduced to minimum and was often avoided to prevent any complications that may arise from the use of an orthodontic appliance.

Preventive Program for Children at the DCRC

After the medical diagnosis of the disabled child, members of the dental staff confer with the physician, surgeon, pediatrician, speech therapist, psychologist, dietician, physical therapist, and occupational therapist. The primary objective is to combine their efforts to diagnose, treat, and assess the problems of treatment of each child admitted into the center. This is followed by regular meetings to continually assess the progress and treatment needs of each child. The pediatric dentist effects all operative treatment needed by each child using various behavior modification techniques of restraint and conscious sedation. Since most of the children with mental retardation cannot perform the oral hygiene procedures themselves but always require the assistance of a supervisor or aid in the school, and parent/guardian at home, the dental hygienist carries out a Special Preventive Program as follows.

A. In the classrooms of children admitted to the center :

- Weekly Oral Health Education [OHE] to supervising staff [i.e. aids or direct care staff] and to the few children in each class who may be able to help themselves.
- Weekly individualized hygiene instructions.
- Step by step demonstration of oral hygiene procedures to small groups of children and direct care staff who are called aids in DCRC. This procedure includes teaching of preventive techniques such as positioning of the child, toothbrushing, and flossing where appropriate.
- Use of disclosing solution to highlight areas of poor oral hygiene on the teeth.
- Dietary counselling to supervising staff.
- Providing continual Oral Health Instructions [OHI] to aids and teachers. This is sometimes complimented by the use of audio-visual material.

B. In the dental clinic of the center :

- Initial prophylaxis.
- Monthly application of topical fluoride.
- Periodic scaling and prophylaxis.
- Continuous motivation of children who can cope with special toothbrushes.
- Continuous motivation of the accompanying aid [direct care staff].
- Motivation of the parents when the children are discharged and attend the clinic from home.

This report on the disabled children at the DCRC in Riyadh suggests that the objectives of the center are being achieved and that the experiment of Special Prevention Programs for the children is succeeding. The regimen of an aggressive prevention program as practiced in this center is recommended along with other proven methods in the dental care of disabled children. As reported in earlier studies particularly from Scandinavia, the major thrust in the management of the oral health of the disabled child should be prevention.[17-26,31~36] The center's existing prevention

program embraces patient education when the child is trainable, as well as training of parents and staff, integration of oral health care into the day to day life of the child and regular preventive professional care which includes orthodontic and nutritional preventive services. This concept is similar to the prevention protocols recently recommended by Tesini and Fenton.

The experiment of making dental treatment readily available to the disabled child in Riyadh appears to be succeeding. This has encouraged the Saudi Benevolent Association for the disabled children to proceed with the establishment of a similar DCRC in Jeddah.

References

1. U.S. Department of Health, Education and Welfare. Federal Register Part IV. Washington DCGovernment Printing Office 1977;42:226-78.
2. National Institute on Disability and Rehabilitation Research. Disability Statistics. Rehab Brief 1993;14:1-4.
3. Tesini DA, Fenton SJ. Oral health needs of person with physical or mental disabilities. Dent Clin North Am 1994;38:483-98.
4. Bentz GH. Curriculum guidelines for dentistry for the handicapped. J Dent Educ 1979;2:637-41.
5. Curriculum guidelines for dentistry for the person with a handicap. J Dent Educ 1985;49:118-22.
6. Jolly D, Brody H, Glassman P. Dental services for persons with developmental disabilities. A curriculum for general practice residents. Spec Care Dent 1987;7(4).
7. Curriculum guidelines for Training General Practice Residents to treat the person with a handicap. J Dent Educ 1990;54:293-96.
8. Burtner AP, Jones JS, McNeal DR, Low DW. A survey of the availability of dental services to developmentally disabled persons residing in a community. Spec Care Dent 1990;10:182-84.
9. Block WJ, Walken JW. Effect of an extramural program on student attitudes towards dental care for the mentally retarded persons. Am J Ment Defic 1980;85:262-67.
10. Stiefel DJ, Shaffer SM, Bigelow C. Dentists availability to treat the disabled patient. Spec Care Dent 1981;1:244-49.
11. Nowak AJ. Dental care for handicapped patient, past, present, future. Dentistry for the Handicapped. St. Louis:CV Mosby, 1976;3-20.
12. Snyder JR, Knopp JJ, Jordan WM. Dental problems of non-institutionalized mentally retarded children. Northwest Dent 1960;39:123-33.
13. Magnusson G, De Val R. Oral conditions in a group of children with cerebral palsy. Odont Rev 1963;14:385-402.
14. Smith CE, Williams JE, Lloyd JL. Dental health status of the mentally retarded in an institution population. J Tenn Dent Assoc 1966;46:138-46.
15. Fishman SR, Young WD, Haley JB. The status of oral health in cerebral palsy children and their siblings. J Dent Child 1967;34:219-27.
16. Butts JE. Dental status of mentally retarded children. A survey of the prevalence of certain dental conditions in mentally retarded children in Georgia. J Publ Health Dent 1967;27:195-211.
17. Goyings ED, Rieske DM. The periodontal condition of institutionalized children: Improvement through oral hygiene. J Publ Health Dent 1968;28:5-15.
18. Swallow JN. Dental disease in children with Down's Syndrome. J Ment Defic Res 1964;8:102-18.
19. Gullickson JS. Oral findings of mentally retarded children. J Dent Child 1969;36:59-63.
20. Cutress TW. Dental caries in trisomy 21. Arch Oral Biol 1971;16:1329-44.
21. Murray JJ, McLeod JP. The dental condition of severely subnormal children in three London Boroughs. Br Dent J 1973:134:380-85.
22. Brown JP, Schodel DR. A review of controlled surveys of dental disease in handicapped persons. J Dent Child 1976;43:313-20.
23. Tesini DA. An annotated review of the literature of dental caries and periodontal disease in mentally retarded individuals. Spec Care Dent 1981;1:75-87.
24. Mann J, Wonerman JS, Lavie G, Carlin Y, Garfunkel A. Periodontal treatment needs and oral hygiene for institutionalized individuals with handicapping conditions. Spec Care Dent 1984;4:163-66.
25. Thornton JB, Al Zahid S, Campbell VA, Marchetti A, Bradley, EL Jr. Oral hygiene levels and periodontal disease prevalence among residents with mental retardation at various residential settings. Spec Care Dent 1989;9:186-90.
26. Nicolaei AB, Tesini DA. Improvement in the oral hygiene of institutionalized mentally retarded individuals through training of direct care staff: a longitudinal study. Spec Care Dent 1982;2:217-21.
27. Nowak AJ. Dental disease in handicapped persons. Spec Care Dent 1984;4:66-9.
28. Vigild M. Prevalence of malocclusion in mentally retarded young adults. Community Dent Oral Epidemiol 1985;13:1183-84.
29. Pieper K, Dirks B, Kessler P. Caries, oral hygiene and periodontal disease in handicapped adults. Community Dent Oral Epidemiol 1986;14:28-30.
30. Perlman S, Friedman C, Tesini DA. Prevention and treatment considerations for people with special needs. Skillman NJJohnson & Johnson Inc, 1991.
31. Suomi JD. Prevention and control of periodontal disease. J Am Dent Assoc 1972;83:1271-87.
32. Johnson R, Albertson D. Plaque control for handicapped children. J Am Dent Assoc 1972;84:824-28.
33. Poulsen S, Agerback N, Melsen V, Korts DC, Glavind L, Rolla G. The effect of professional tooth cleaning or gingivitis and dental caries in children after one year. Community Dent Oral Epidemiol 1976;4:195-99.
34. Axelsson P, Lindhe J. The effect of plaque control program on gingivitis and dental caries in school children. J Dent Res Spec Issue 1977;C56:C142-8.
35. Axelsson P, Lindhe J. Effect of controlled oral hygiene procedures in caries and periodontal disease in adults. J Clin Reriodontol 1978;5:1-17.
36. Stiefel DJ, Rolla RR, Truelove EL. Effectiveness of various preventive methodologies for use with disabled persons. Clin Prev Dent 1984;6:17-22.