A CENSUS OF HANDICAPPED CHILDREN IN SOUTH AUSTRALIA: FACTORS RELATED TO DENTAL CARE

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SUMMARY

A 1975 census of South Australia's handicapped children aged from birth to 16 years, inclusive, was derived from a questionnaire survey of 2,212 handicapped children. The findings of the study will assist in the setting up of a dental service for handicapped children.

In 1975, South Australia's total population projection for children from birth to 16 years, inclusive, was 380,543 and the return of 2,212 questionnaires represented 0.58 per cent of this population. The distribution of handicapped children within the State was concentrated within four subdivisions of the eight Statistical Divisions of South Australia due to the overall population distribution and to the presence of large institutions in these areas.

Ten handicaps were selected for the survey on the basis that they were either known to be the most prevalent in the community or because they could affect the delivery of dental care. The handicaps were cerebral palsy, mental retardation, epilepsy, blindness, deafness, spina bifida, mongolism, heart abnormality, muscular dystrophy and autism. Mental retardation was the most prevalent handicapping condition, followed by epilepsy, cerebral palsy and deafness. Spina bifida and deafness were predominantly single handicapping conditions; epilepsy and mongolism were frequently found to be associated with an additional handicap and heart abnormalities frequently were associated with at least two additional handicaps.

A series of chi-square tests established that sex differences were present in the population surveyed. On the basis of the 2,196

questionnaires that provided the sex of the child, the return of 1,259 questionnaires from males and 937 from females gave a ratio of 57:43 which was significantly higher than that for the State's total population from birth to 16 years, inclusive, of 51 males to 49 females. There was a significantly larger number of males with muscular dystrophy and spina bifida affected a significantly greater number of females.

The dental care status of handicapped children was recorded for those aged between three and 16 years, inclusive. A total of approximately 62 per cent had a dentist willing to provide treatment, 55 per cent were examined at least annually and treatment was provided at least once a year for 41 per cent. Approximately 58 per cent of the children were reported by their caretakers to be manageable for treatment by a dentist in his own surgery. Dental treatment was provided under general anaesthesia for 29 per cent of the children, although 39 per cent were considered to require this procedure.

In general, cost of dental care, transport facilities, inconvenient location of the dentist and the caretaker's ability to manage the child, influenced less than half of the survey population in determining the frequency with which a child visited a dentist. The frequency of dental visits during which treatment was performed, on the other hand, was affected by the availability of a dentist willing to provide care and capable of managing handicapped patients. The necessity for general anaesthesia was greater where treatment was received infrequently.

Of the children who received some form of treatment, the frequency of treatment was similar for those classified by their caretakers as

manageable or unmanageable. However, a greater proportion of unmanageable children received only emergency or partial care. In addition, a greater proportion of unmanageable children were treated under general anaesthesia or were thought by their caretakers to require this procedure.

Indices of behaviour and coordination derived from the questionnaire survey indicated that 53 and 79 per cent, respectively, of the children potentially were manageable by a dentist or had the necessary coordination for treatment in a standard type of surgery. Statistical analysis of additional data derived from a field study of 132 handicapped children confirmed that prior knowledge obtained by questionnaire was significant in predicting manageability and the coordination required for dental treatment.

As a result of the present findings, programmes of dental care for handicapped children have been introduced following the use of behaviour modification techniques. These programmes have reduced the need for general anaesthesia and also have trained institutionalized children to provide their own oral hygiene, thus freeing staff to care for the more severely handicapped individuals in their charge.

The care of handicapped patients should be included in the undergraduate dental curriculum and in postgraduate programmes for the continuing education of dentists so that a greater number of handicapped children could be absorbed into general private practice.

SIGNED STATEMENT

This project report is submitted in partial fulfilment of the requirements for the Degree of Master of Dental Surgery in The University of Adelaide.

The report contains no material which has been accepted for the award of any other degree or diploma in any University. To the best of my knowledge and belief, it contains no material previously published or written by another person except when due reference is made in the text of the report.

FRASER GEORGE GURLING

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INTRODUCTION

From a dental point of view, handicapped children are especially disadvantaged because many of them suffer from disabilities which preclude treatment by a dentist in general practice.

The oral condition of handicapped children may be directly or indirectly related to their physical or mental disabilities. Physically and mentally retarded children may not have specific dental problems but their handicap often hinders the practice of good oral hygiene and may also influence their dietary habits so that their oral health is threatened.

The dental care of handicapped children generally can be accomplished by procedures utilized for the normal child; nevertheless, many dentists are reluctant to treat handicapped patients. Before the necessary dental services can be planned, it is essential to know the numbers involved, the age groupings and distribution throughout South Australia and the types of disability suffered. Evaluation of existing services and problems associated with the reception of dental treatment may indicate possible areas where change could provide increased efficiency in the delivery of preventive and reparative care. In addition, the behavioural and coordination characteristics of handicapped children within a dental environment need to be assessed.

AIMS OF THE INVESTIGATION

The purpose of the present study was to provide a 1975 census of the handicapped child population in South Australia, in terms of numbers, sex, age, residential area and disability suffered. In addition, the problems associated with the delivery of dental care, the behaviour of the children in a dental environment and their co-ordination ability required to be assessed so that the appropriate dental services could be planned.

CHAPTER 1

REVIEW OF LITERATURE

1.1 Definitions

i. A Handicap is a long-term disadvantage which adversely affects an individual's capacity to achieve the personal and economic independence which is normal for his peers. For clarity, two divisions based upon aetiological factors have been created. First, an extrinsic handicap is a disadvantage arising from the individual's environment or circumstances. Examples include poverty, maternal deprivation, racial discrimination and residence in a depressed or disaster area. Second, an intrinsic handicap is a disadvantage arising from the individual's own characteristics, from which he cannot be separated.[1]

The World Health Organization Expert Committee on Medical Rehabilition defined a handicapped person as one whose physical and/or mental well-being is temporarily or permanently impaired, whether congenitally or through age, illness or accident, with the result that his self-dependence, schooling or employment is impeded.[2]

ii. Cerebral Palsy is a motor disturbance caused by injury to the brain. The condition usually originates in childhood and is characterized by paralysis, weakness, lack of coordination, or any other aberration of motor function caused by pathology of the motor control centres of the brain. In addition, cerebral

palsy may include learning difficulties, psychological problems, sensory defects, convulsive and behavioural disorders of organic origin.[3]

iii. Mental Retardation has been defined as sub-average general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behaviour.[4]

Åkesson stated that there are problems associated with the definition of mental retardation because it is not a disease in itself, but only a symptom which may be found in a number of different conditions. He therefore suggested that an operational definition needs to be employed if a population study is undertaken for scientific purposes only. This approach permits a meaningful comparison to be made of any study with another. However, if a field study is undertaken in order to provide more effective care of patients with, for example, impaired psychic development, an operational definition cannot be used.[5]

Kushlick and Cox reported that variations occur in the definition of mental handicaps, and described a number of criteria which are helpful in arriving at a definition. In terms of the commonly used psychometric criterion, people in an intelligence test who score less than two standard deviations below the population mean are said to be subnormal. For instance, if the mean is 100 and the standard deviation is 15, those scoring under 70 points are subnormal; those who are severely subnormal score lower than three standard deviations below the mean, their upper I.Q. limit being 54 points.[6] On the other hand, Abramowicz and Richardson

arbitrarily defined children with severe mental retardation as having an I.Q. less than 50 and children with mild mental subnormality as having an I.Q. between 55 and 70 points.[7]

Criteria based on social inadequacy have been used to define subnormality and are often arbitrarily applied by clinicians, social administrators and politicians. Definitions are necessary for handicapping categories so that children may be excluded legally from ordinary schools as unsuitable because their behaviour prevents the teacher from achieving the education of normal children to a prescribed standard. Similarly, definitions achieve the recognition of handicapped children who need additional highly specialized forms of education which may be more expensive in terms of staff and money than the type provided for normal children.[6]

Finally, clinical criteria of two types exist. There are the overt, morbid, clinical entities which are often accompanied by social and educational handicaps, equivalent to subnormality. The second major group includes children and adults, with or without pathological abnormalities, who manifest delay in achieving the expected stage of motor, intellectual and social functioning.[6]

iv. Epilepsy is characterized by one or more of the following symptoms: Paroxysmally recurring impairment or loss of consciousness, involuntary excess or cessation of muscle movements, psychic or sensory disturbance and perturbation of the autonomic nervous system.[8]

Epileptic patients may have single or multiple seizures, but inconsistencies in the definition of this condition exist. For instance, some authors include patients whose only signs are abnormal electroencephalographic tracings. Other investigators have excluded persons whose seizures are associated with recognized illness of the central nervous system.[9]

Sillanpää investigated the significance of motor handicaps in the prognosis of childhood epilepsy and defined epileptic patients as those who have had at least three recurrent seizures separated by at least one week without demonstrable external or internal causes of infection.[10]

Veall defined an epileptic as an individual who had had an episode during the two years before a survey period or who during a two year period had been on regular anticonvulsants for fits occurring earlier.[11] However, the definition of Holdsworth and Whitmore was based on a one year period for their investigation of epileptic children attending ordinary schools.[12]

v. Blindness is defined as a lack or loss of ability to see, or a lack of perception of visual stimuli due to a disorder of the organ of sight, or to a lesion in certain areas of the brain.[8]

In South Australia the standard set for blindness is that vision on Snellen test scale must be less than 6/60 in each eye after correction, the measurements being based on the metric system.[13]

vi. Deafness is the lack or loss, complete or partial, of the sense of hearing.[8]

vii. Spina Bifida is a developmental anomaly characterized by a defect in the bony encasement of the spinal cord.[8] There is defective fusion of one or more posterior vertebral arches which may be accompanied by protrusion of the meninges, spinal cord or nerve roots beyond the normal limits of the spinal canal.[14]

The two main varieties are spina bifida cystica with subdivisions of meningocele and myelomeningocele, and spina bifida occulta. A meningocele is a cystic protrusion of the leptomeninges through a midline defect in the neural arch, with the spinal cord normally situated in the canal and taking no part in the herniation. A myelomeningocele has the cord or cauda equina incorporated in the summit of the protruding sac, unfolded and usually so abnormal that it fails to conduct impulses. The spinal lesion is referred to as open or closed, denoting danger of infection where skin is either overlying and intact, or not intact.[15]

In spina bifida occulta there is a simple failure of fusion of one or more posterior vertebral arches, usually in the lumbosacral region. The defect may consist of a narrow oblique slit between the laminae or a wider palpable gap.[14]

viii. Mongolism is a type of mental retardation which is accompanied by certain distinctive facial characteristics in

addition to a scientifically defined aetiology.[16] The term was first used by J. Langdon Down in 1866 as part of his attempt to categorize disease on a racial basis.[17] The readily noticeable pathognomonic signs of mongolism include a flattened bridge of the nose, palpebral fissures which appear oblique and slanting because the outer canthus of the eye is higher than the inner, an epicanthic fold at the inner angle, a skin appearing dry and thick and a brachycephalic head with a flattened occiput.[16] In addition, children with this condition have short broad hands, a short crooked fifth finger and a fourth finger line.[18]

ix. Heart Abnormalities are commonly defined as congenital or acquired defects in heart structure and/or function.

x. Muscular dystrophy refers to inherited disorders in which there is progressive weakness and degeneration of skeletal muscles without apparent cause in either the peripheral or central nervous system.[19]

xi. Autism is defined as the condition of being dominated by subjective, self-centred trends of thought or behaviour.[8]

1.2 Classifications

i. The Handicapped: Imprecise terms with similar but ill-defined meaning have been used to describe people with less than full mental or physical capacity. This action has arisen partly from a well-intentioned desire not to attach specific labels to people and partly because of a genuine confusion both among the professions concerned and the general public, about what the different terms denote. Failure to distinguish between causes and effects seems to be at the root of the trouble; often no clear distinction is made between handicapping conditions, as defined by the diagnostic label, the manifestations in the individual and the actual limitations of capacity that result.[20]

Agerholm[1] has proposed a simple but comprehensive classification structure for intrinsic handicaps. The classification is based on 9 key handicaps of locomotor, visual, communication, visceral, intellectual, emotional, invisible, aversive and senescence.

KEY HANDICAPS	HANDICAP COMPONENTS
1. Locomotor	A. Impaired mobility in environment B. Impaired postural mobility (relation of parts of body to one another) C. Impaired manual dexterity D. Reduced exercise tolerance
2. Visual	A. Total loss of sight B. Impaired (uncorrectable) visual acuity C. Impaired visual field D. Perceptual defect
3. Communication	A. Impaired hearing B. Impaired talking C. Impaired reading D. Impaired writing

KEY HANDICAPS	HANDICAP COMPONENTS
4. Visceral	A. Disorders of ingestion B. Disorders of excretion C. Artificial openings D. Dependence on life-saving machines
5. Intellectual	A. Mental retardation (congenital) B. Mental retardation (acquired) C. Loss of learned skills D. Impaired learning ability E. Impaired memory F. Impaired orientation in space or time G. Impaired consciousness
6. Emotional	A. Psychoses B. Neuroses C. Behaviour disorders D. Drug disorders (including alcoholism) E. Antisocial disorders F. Emotional immaturity
7. Invisible	A. Metabolic disorders requiring permanent therapy (e.g. diabetes, cystic fibrosis) B. Epilepsy, and other unpredictable loss of consciousness C. Special susceptibility to trauma (e.g. haemorrhagic disorders, bone fragility, susceptibility to pressure sores) D. Intermittent prostrating disorders (e.g. migraine, asthma, vertigo) E. Causalgia and other severe pain disorders
8. Aversive	A. Unsightly distortion or defect of part of body B. Unsightly skin disorders and scars C. Abnormal movements of body (athetosis, tics, grimacing, etc.) D. Abnormalities causing socially unacceptable smell, sight or sound
9. Senescence	A. Reduced plasticity of senescence B. Slowing of physical or mental function of senescence C. Reduced recuperative powers of senescence

One of the main uses of the classification is in the building up of handicap profiles, both of individuals and of groups. The design is such that while any amount of detailed information may be collected through the subsidiary branches,

each strand of information may be traced back into one of the nine final common pathways along which the disorders can have their handicapping effect. Application of the classification must be affiliated with the basic definition of handicap as a long-term disadvantage which adversely affects an individual's capacity to achieve the personal and economic independence which is normal for his peers. When properly applied, the classification should provide information on the existence and nature of intrinsic handicaps, whether or not they manifest themselves in disability.[20]

Despite the existence of an embracing classification for all handicaps, individual handicaps have been classified.

ii. Cerebral Palsy may be classified according to the type of muscle stimulus and nature of muscle dysfunction involved. This classification includes such conditions as spasticity, athetosis, ataxia, flaccidity, rigidity and tremor.[3]

Spasticity involves hyper-irritability of muscles. The slightest stimulus to a muscle or muscle group will cause exaggerated or excessive contraction. Athetosis involves a muscle or group of muscles which will perform movements or contractions involuntarily, without the intention or voluntary stimulus to make movement. In ataxia, muscles react to stimulus but cannot perform the full contraction or movement desired; the muscle or muscle response is hypo-contractile. In the flaccidity form of cerebral palsy when the stimulus is given to perform a movement, the limb or group of muscles involved cannot

respond and the specific movement cannot be made. Rigidity results from a loss of muscle contractibility and the muscles remain rigidly in one position for a long time. Tremor occurs with involuntary quivering of muscles.[3]

Occasionally the signs of more than one type are recognized and the diagnosis will be mixed. The extent of involvement will vary so that any part or even the entire body may be affected.[3]

An additional classification system for cerebral palsy is frequently used. This system depends upon the location and extent of the neuromotor disorder resulting in a division of monoplegia, hemiplegia, double or bilateral hemiplegia, diplegia, paraplegia and quadraplegia. Monoplegia involves one limb; hemiplegia is involvement of one side of the body and usually both extremities of one side; bilateral hemiplegia affects both sides of the body with involvement more marked on one side; diplegia affects both lower extremities; paraplegia is the involvement of both lower extremities and part of the trunk and quadraplegia represents involvement of all four extremities with lower extremities more severely affected than the upper.[3]

iii. Mental Retardation is classified predominantly upon psychologically measured intelligence. The World Health Organization's International Classification for Retardates is based upon an intelligence quotient rating with a scale of borderline, mild, moderate, severe and profound. This rating is much more acceptable than the obsolete nomenclatures of idiot,

imbecile and feeble-minded, or the institutional labels of low grade and high grade.[21]

The World Health Organization's International Classification of Mental Retardation[21] is outlined below.

Three digit categories:-

310 Borderline	I.Q. 68 - 85
311 Mild	I.Q. 52 - 67
312 Moderate	I.Q. 36 - 51
313 Severe	I.Q. 20 - 35
314 Profound	I.Q. under 20
315 Unspecified	

Fourth digit sub-division used with above categories:-

.0 Following infections and intoxication

.1 Following trauma or physical agents

.2 With disorders of metabolism, growth and nutrition

.3 Associated with gross brain disease (postnatal)

.4 Associated with disease and conditions due to (unknown) prenatal influence

.5 With chromosomal abnormalities

.6 Associated with prematurity

.7 Following major psychiatric disorder

.8 With psycho-social (environmental) deprivation

.9 Other and unspecified

The above classification code numbers provide a convenient shorthand for the categorization of patients. However, Pitt, Roboz and Plant criticized the International Classification of

Diseases for Mental Retardation. These authors believed that levels of retardation should be given for both intellectual ability and social functioning, which should be expressed in standard deviation units rather than in I.Q. or S.Q. points. They also believed that a logical and temporal sequence of causes should be the basis of any future classification of a medical section of mental retardation.[22]

If a child's I.Q. is below 55 or his mental age is less than half of his actual age, he is said to be functioning at severely subnormal levels. It is usually possible to use a formed intelligence test with children whose mental age is above 18 months, unless the child is too emotionally disturbed to cooperate. Such tests as the Stanford-Binet Intelligence Scale, the Minnesota Pre-School Scale, the Merrill Palmer Test and the Peabody Vocabulary Test may be used to measure the I.Q. However, assessment of severely subnormal children can be based on what the child does in his normal daily life, particularly his locomotor behaviour, feeding attainments, dressing ability, toilet training and speech development.[23] In addition to intellectual and social functioning, adaptive behaviour must be taken into account when classifying retardation. Classification of the retarded into a number of adaptive behavioural groups can be based on standard deviations from the mean on the Vineland Social Maturity Scale.[24]

Adams stressed the importance of adaptive behaviour in the classification of mental retardation but questioned the clinical application of such measurements. He indicated that

psychologists rely almost totally on the I.Q. and that physicians also use the I.Q. rating when it is supplied, instead of assessing behavioural tendencies.[25] On the other hand, dentists are more involved with the practical aspects of a child's behaviour. An assessment based upon the ability to perform daily acts of living such as unaided dressing, reading, hygiene and toilet training are more meaningful from the dentists point of view.[26]

iv. Epilepsy: Classification of symptomatic features of epilepsy have been modified occasionally by data from electro-encephalography.[9] However, classification of epileptics appears to be associated mainly with the type of convulsive disorder manifested clinically.

There are five main types of epilepsy which are seen in children. First, grand mal which may occur at any age and is associated with generalized tonic-clonic movements. The movements are usually of five to ten minutes' duration and have non-specific EEG findings. Second, petit mal which usually occurs between four and 14 years of age. The ictal pattern is characterized by staring spells lasting a few seconds, associated at times with clonic movements of the upper extremities. Petit-mal may occur daily and the characteristic EEG finding is the three spike-wave components per second. The third type is psychomotor epilepsy (temporal lobe epilepsy) which is most commonly seen in the older child, adolescent and adult. The manifestations vary considerably and consist mostly of automatisms such as masticatory

movements, lip smacking, bizarre motor movements, and at times bizarre mannerisms which last a few minutes and may occur on a daily basis. The typical EEG finding is anterior temporal spike or slow waves. The fourth type is infantile spasms which have their onset mainly between three months and two years of age. The spells occur in a series and are of three types: flexor or salaam spells characterized by a flinging forward of the upper extremities with hip and head flexion, extensor spasms with flexion at the hip, and head-nodding spasms. A very high percentage of this fourth group are mentally retarded and have characteristic chaotic EEG findings consisting of very high voltage slow waves interspersed with high spikes called hypsarrhythmia. The fifth childhood convulsive disorder is Lennox-Gastaut syndrome which has a poor prognosis because of its frequent association with severe brain damage, mental retardation and poor response to treatment. Seizures occur usually between the age of one and nine years and include various seizure types such as atonic-akinetic spells (drop epilepsy), tonic spells, clonic spells, absence spells and grand mal spells. The EEG is characteristic, showing 1.5 to 2.5 spike wave components each second.[27]

Predictive value for the life performance of epileptic patients who may have more than one handicap, is not possible by using classifications based upon seizure type or upon aetiology. One classification concerns itself with the identification of patients who suffer from seizures only and are otherwise intact, versus those who have additional problems. The group of patients without other difficulties is called "epilepsy only" regardless of

presumed aetiology or type of seizures. The other categories are epilepsy associated with intellectual difficulties or organic mental changes, epilepsy associated with other neurological handicaps such as hemiparesis and epilepsy associated with behavioural disturbances. A classification of this type might have more predictive value in regard to day-to-day life performance than any of the others in common use and might elucidate why some epileptic patients successfully overcome adverse circumstances while others find themselves unable to do so.[28]

v. Blindness: Partially-seeing children comprise a severely handicapped group whose visual problems are very complex, difficult to analyse and seldom fully appreciated medically or psychologically. Therefore, it is important that every aspect of a child's visual competence should be investigated, including eye movements, ability to fixate, visual acuity for distance and near, stereopsis, peripheral fields, appreciation of colour, shape and size of object and coordination of eye and body in locomotion and manipulation. At school age, difficulties in reading, writing and drawing must be investigated. The preferred illumination which differs between children needs to be determined. Drive and visual comprehension are also important.[29]

In expressing the above problems of investigating the visually handicapped, Sheridan showed how a simple classification of blindness for the handicapped child was inappropriate. Sheridan stated that handicapped children could not be neatly pigeonholed.[29]

Children with visual deficiences may have significant problems in the perception and interpretation of visually evoked stimuli. The child may be rated according to his degree of vision or his intellectual capabilities. The intelligence of blind children may be compared with normal children by using the Terman-Merrill Intelligence Test which involves tactile, verbal and practical tests in about the same proportion.[30]

vi. Deaf and partially deaf children tend to be retarded in speech reception and, therefore, in learning and speech production. The ease with which communication is transacted consequently is limited and will affect personal relationships and emotional stability. Some available intelligence tests which fall into the age range of three to 16 years can measure the intelligence of hearing-impaired children and the rating achieved tends to categorize the child. The Nebraska Test of Learning Aptitude, the Wechsler Intelligence Scale for Children and the Sniders-Oomen Test are found to be most useful in measuring the intelligence of both partial hearing and deaf children.[31]

Deaf children have been categorized into the deaf and the hard-of-hearing. Deaf are those in whom the sense of hearing is non-functional for the ordinary purpose of life. This general group is composed of distinct classes based entirely upon the time of loss of hearing. The first class comprises the congenitally deaf and the acquired deaf whose sense of hearing has been lost through illness or accident. The second main category of the hard-of-hearing includes individuals in whom the sense of hearing,

although defective, is functional with or without a hearing aid.[32]

Deafness may also be classified according to the intensity of sound perceived. If a person perceives sound at hearing levels of 0 to 20 decibels, the frequencies commonly used in the human speech range, hearing is considered to be normal. If greater than 20 decibels are required for perception of sound at any frequency in the speech range of 500 to 4,000 hertz, or if there is any difficulty in discrimination of sound, hearing is considered abnormal. With mild loss of between 20 and 30 decibels, speech perception becomes difficult. With moderate loss of 40 decibels only, the loudness peaks of conversational speech can be heard and speech reception becomes virtually impossible without amplification or lip reading. However, hearing cannot be classified in terms of decibels alone. Distortion of speech sound occurs where certain frequencies are affected and translation of speech sounds becomes a problem when words are misunderstood because high frequency speech sounds are affected.[33]

vii. Spina Bifida has the following two main classifications:[14]

Spina Bifida cystica

Myelomeningocele - open or closed

Meningocele

Spina Bifida occulta

Isolated vertebral defect

Associated anomaly (occult spina dysraphism)

Myelomeningocele is the most serious type and is character-

ized by a wide defect in the posterior neural arches and a protrustion of the meninges and neural tissue. In the open myelomeningocele (synonym: myelocele, neurospinal dysraphism and rachischisis) the spinal cord is situated in the roof of the sac and takes the form of a flat neural plate at the upper end of which the central canal can usually be seen opening onto its surface. The neural tissue is uncovered and consists of an unclosed neural tube. In the closed myelomeningocele the spinal cord and/or nerve roots are situated outside the vertebral canal but the neural tube is closed and the lesion is covered with a combination of skin and membrane.[14]

In the simple meningocele the spinal cord is normal in position and usually is normal in structure. The bony defect is confined to a few vertebral segments and the protruding meningeal sac which has a narrow neck contains only cerebral spinal fluid. The meningocele is covered by more or less intact skin.[14]

Spina bifida occulta is characterized by a failure of fusion of one or more posterior vertebral arches, usually in the lumbosacral region. It is occult or concealed in the sense of only being radiographically evident except for the occasional tufts of hair, naevi or lipomata in overlying skin or subcutaneous tissue. A minority of occult lesions have associated intraspinal lesions. These are often collectively referred to as occult spinal dysraphism and include lesions such as low conus medullaris, diastematomyelia, hydromyelia, intraspinal lipoma, dermal sinus and dermoid cyst, and sacral extradural cyst.[14]

viii. Mongolism: There is no definite classification of mongolism as it is a term depicting a syndrome which is always associated with mental retardation. However, the aetiology of mongolism is associated with chromosomal anomalies and affected individuals may be classified according to the genotype even though, except for the mosaic mongoloids, the phenotype is basically uniform.

Most mongoloids have 47 chromosomes instead of the 46 found in normal individuals. The condition in which a chromosome is present in triplicate instead of the usual duplicate is described as trisomy, and the anomaly of mongolism is known as "trisomy 21". Approximately five per cent of mongoloids do not have this type of abnormality. There are two variations; one consists of a translocation of the extra chromosome from the 21st chromosome onto one of the other chromosomes so that the normal number of 46 is present. This type of defect appears to be hereditary and is a mechanism whereby familial mongolism can occur. The second type is the mongoloid mosaics who have some cells with 46 chromosomes and other cells with 47 chromosomes.[34]

The standard mongol with mosaicism has characteristic physical features and mental ability, but these may blend into the normal population so that clinical recognition is sometimes impossible and chromosome analysis becomes necessary for identification.[35]

ix. Heart Abnormalities are either congenital or acquired. Congenital heart disease includes many conditions such as ventricular septal defect, patent ductus arteriosus, mitral stenosis, aortic stenosis, atrial septal defect, pulmonic-valve stenosis, aortic-valve stenosis, tetralogy of Fallot and transposition of the great vessels. Acquired heart disease includes rheumatic fever with valvular disease or with carditis and arthritis.[36,37]

Congenital heart disease may be classified according to anatomic and hemodynamic factors, including the direction of shunt. Although overlap occurs, three divisions can be seen; dominant right to left shunts, dominant left to right shunts or no shunt at all.[38]

Dominant right to left shunt defects include tetralogy of Fallot, origin of both great vessels from the right ventricle with pulmonary stenosis, pulmonary atresia, tricuspid atresia, transposition of the great vessels, truncus arteriosus, single ventricle, hypoplastic left heart syndrome, abnormal positions of the heart such as dextrocardia and levocardia, pulmonary arteriovenous fistula, ectopia cordis and diverticulum of the left ventricle.[38]

Dominant left to right shunts or no shunt defects include the ventricular septum, atrial septum and sinus venosus abnormalities, patent ductus arteriosus, aorticopulmonary septal defect, fistula of a coronary artery, ruptured sinus of Valsalva, pulmonary stenosis with normal aortic root, pulmonary arterial

branch stenosis, pulmonary valvular insufficiency, coarctation of the aorta, anomalous pulmonary venous return, congenital aortic stenosis, congenital mitral stenosis, congenital mitral insufficiency, pulmonary venous hypertension, anomalies of the aortic arch, anomalous origin of coronary arteries, primary pulmonary hypertension and cardiovascular manifestations of Marfan's syndrome.[38]

x. Muscular Dystrophy: Traditionally, disorders of muscle have been divided into two broad categories. In the first category, the so-called myopathies, the disease is primarily in the muscle itself with no evidence of structural abnormality in the nervous system or peripheral nerves. In the second category, the so-called neuropathies or neurogenic atrophies, the muscle weakness is secondary to an abnormality in the peripheral nerve, somewhere along its course from the anterior horn cell to the neuromuscular junction.[39]

Myopathies are subdivided into muscular dystrophies, acquired myopathies and congenital myopathies. The muscular dystrophies are genetically determined, progressive disorders associated with degenerative changes in the muscle.[39]

Walton and Nattrass classified muscular dystrophy into the Duchenne type which includes the childhood pelvi-femoral type, an X-linked recessive trait, the autosomal dominant Facioscapulo-humeral type, and the autosomal recessive Limb-girdle type.[40] However, because isolated cases of muscular dystrophy are common, the classification proposed by Walton and Nattrass has practical

difficulties in application. For example, muscular dystrophy of similar severity with distribution as Duchenne type occurs in females, with autosomal recessive inheritance.[41,42] Similarly, X-linked muscular dystrophy may have a later onset and milder course, similar to the Limb-girdle type.[19]

Moosa classified muscular dystrophy according to the clinical distribution and severity of muscle weakness, subdivided on the basis of inheritance.[19] A classification which seems to overcome some of the difficulties in distribution and severity of muscle weakness and the mode of inheritance is as follows:

Clinical type	Inheritance
Duchenne	
Pelvic girdle (severe form)	Sex-linked recessive (usual) Autosomal recessive (rare)
Limb-girdle	
Pelvic girdle (variable, usually mild form)	Autosomal recessive (usual) Sporadic Sex-linked recessive (Becker type) Autosomal dominant (rare)
Scapulo-humeral	Autosomal recessive Sporadic
Facio scapulo humeral	Autosomal dominant (usual) Autosomal recessive (rare)

xi. Autism: A 14-point scale proposed by Clancy, Dugdale and Rendle-Short stated that seven or more behavioural manifestations must be present before a diagnosis of autism can be made.[43] The 14 points are:

(1) great difficulty in mixing and playing with other children

(2) acts as if deaf

(3) strong resistance to any learning

(4) lack of fear about realistic dangers

(5) resists change in routine

(6) prefers to indicate needs by gesture

(7) laughs and giggles for no apparent reason

(8) not cuddly as a baby

(9) marked physical over-activity

(10) no eye contact

(11) unusual attachment to a particular object or objects

(12) spins objects

(13) repetitive and sustained odd play

(14) "stand-offish" manner

Capute, Derivan, Chauvel and Rodriguez considered that Clancy's scale may be useful as a screening device to detect infantile autism, but that the classical criteria of Kanner was more diagnostic.[44]

Kanner classified children as autistic by criteria which included marked inability to relate to people and to situations from birth, leading to persistent isolation, failure to use language for the purpose of communication, obsessive desire for maintenance of sameness, fascination for objects and the handling of these with skill, appearance of good cognitive potential and the presence of cold, obsessive, intelligent parents.[45]

1.3 Occurrence

The terms prevalence and incidence are still used incorrectly at times in the dental literature.[46] Prevalence means the conditions existing at a particular time and incidence is the change in a condition over a period of time. These definitions have been accepted by an Expert Committee of the World Health Organization in 1962.[47] Within the present report reference will be made to both prevalence and incidence of disabilities.

i. The Handicapped: There is little information on the number of handicapped children in the population and on those requiring different forms of specialized treatment. Many investigators have relied upon estimates rather than upon direct statistical evidence.

During 1967 it was estimated that in Victoria there were 25,000 sick and handicapped children of which 3,500 had mental defects and 2,500 had cerebral palsy. The remaining 19,000 children had abnormalities such as cardiac defects, cleft palate, epilepsy, deafness, blindness, diabetes, haemophilia or asthma.[48] In the same year it was estimated that 10,000 South Australians living in the community and not in mental hospitals suffered from intellectual retardation, dementia or psychoses.[49]

It was estimated that in 1971 there were 41,000 handicapped individuals in Australia under the age of 20 years. This figure was derived from the number of invalid pensioners aged 16 to 20 years in New South Wales and Victoria in June, 1970. The

number was then applied to the total population of Australia. When residents of mental hospitals were included, the number was increased to 44,000.[2]

A survey conducted in 1971 by the New South Wales Branch of The Australian Dental Association contacted 80 organisations, 65 of which responded to reveal 2,600 handicapped children in their care. Approximately 1,500 additional children were in State institutions, making a total population of 4,100. The investigators questioned the degree of response on the basis of previous estimates of between 10,000 and 15,000 mentally handicapped children in New South Wales.[50]

A working party in Birmingham estimated a total of 50,000 handicapped children in England and Wales, 11,000 of whom were thought to be resident in institutions.[51] Franks suggested that 3-4 per cent of the total population in the United Kingdom in 1974 could be regarded as severely handicapped and in need of help in rehabilitation.[52] Illingworth estimated that 2 per cent of children in England were handicapped at birth and this figure rose to 4 per cent at 5 years of age.[53]

ii. Cerebral Palsy is the commonest locomotor disorder in childhood.[54] A number of studies in Great Britain confirmed that the prevalence of cerebral palsy in childhood was at least 2 per 1,000.[55] However, a decrease has been reported in the incidence of infantile cerebral palsy in Bristol in 1953-62 compared with 1943-53.[56] In addition, a decreased incidence of cerebral diplegia in low birthweight children has been recorded in

Sweden[57] and England.[58] There has been an increase in the proportion of patients with spastic diplegia in the United States.[59]

iii. Mental Retardation: Comparison of surveys showing the occurrence of mental retardation is difficult because of ambiguity in defining the degree of retardation. However, Abramowicz and Richardson reviewed 27 community studies of severe mental retardation, defined as I.Q. less than 50. They reported that the best approximation of the true prevalence rate of severe mental retardation in children appeared to be between 3 and 5 per 1,000. In reliable studies that present prevalence rates for older children, the median true prevalence of severe mental retardation was 3.7 per 1,000, and the average true prevalence was 3.96 per 1,000. Cases of severe mental retardation in a community can be missed and there may be a tendency to over-estimate a child's potential by classifying him as mild rather than severely mentally retarded. Therefore, the average figure of 4 per 1,000 age specific population is probably a fair estimate of the number of severely retarded children who require services in a community.[7]

The World Health Organization estimated that between 1 and 3 per cent of the world's population was mentally retarded.[2] The American Association on Mental Deficiency Supplement indicated that at school age detection was facilitated because of the school's emphasis on intellectual functioning. Approximately 3 per cent of the school population were found to be mentally retarded.[4] In Australia, the Senate Standing Committee on Health and Welfare was told that at one particular time, the point of true prevalence was

closer to 1 per cent than to 3 per cent. If the mildly retarded were also included, the prevalence would approach 2 per cent.[2]

iv. Epilepsy: A tendency exists for incorrect diagnosis of epilepsy resulting in a 20 per cent exaggeration in the level of incidence. Five individuals in every thousand have epilepsy and probably eight in every thousand children are epileptic. Some epileptic children are relieved of their symptons as they grow older.[60]

Meighan, Queener and Weitman reviewed the prevalence of epilepsy. They stressed the inability to make clear comparisons between studies because of the variation in criteria used to define epilepsy. The prevalence of epilepsy varied from 1.5 or 1.9 per 1,000 to 18.6 or 20.0 per 1,000. The median rate was 3.8 per 1,000.[61]

An epidemiological study of epilepsy by Hauser and Kurland reported that the mean annual incidence rate for convulsive disorders in the population over a 33 year period was 48.7 per 100,000. If age-specific incidence rates were considered, the rates were higher for children less than one year and generally were lower in each successive age group until age 60, beyond which they increased. No significant difference was noted for the incidence rates when computed against sex.[9]

The prevalence of epilepsy among mongoloids in hospitals in London and the south-east of England was reported to be 5.8 per cent. Under the age of 20 the prevalence was 1.9 per cent and

between 20 and 55 years a fluctuation occurred around 6 per cent, except for a peak of 12 per cent between 30 and 34 years. Over 55 years the prevalence was 12.2 per cent.[11]

v. Blindness: It was estimated that in the United States of America less than 1 per cent of the total population met the criteria for legal blindness. With the inclusion of individuals afflicted with visual loss the number suffering from a visual handicap approximated 20 million. Ten per cent of the estimated 450,000 legally blind persons were under 20 years of age.[62]

South Australia was estimated to have a prevalence of 0.5 per 1,000 visually handicapped children aged from birth to 16 years.[63]

vi. Deafness: The incidence of deafness in pre-school children, whether congenital or acquired, generally has been estimated as 0.5 to 1.0 in 1,000.[64]

The prevalence of profound deafness in a number of European countries and in North America was reported to be approximately 0.5 in 1,000 but when partial deafness was included the rate was considerably higher.[65] Research by the National Acoustic Laboratories showed the incidence of deafness in children born in South Australia between 1957 and 1967 was 3.95 for every 1,000 births. The national average was 2.54 per 1,000 births.[66]

vii. Spina Bifida: The incidence of spina bifida among South African children was reported to be 0.46 per 1,000 live births

for Africans and 0.37 per 1,000 for Indians.[15] In Europe the combined incidence of spina bifida and the related condition, anencephaly, ranged from 1.0 to 10 per 1,000 births.[67,68] The overall incidence of spina bifida cystica in the United Kingdom was reported to be approximately 2.5 per 1,000 births.[69] The Adelaide Children's Hospital proposed a prevalence rate of spina bifida cystica of 0.95 per 1,000 total births. Nearly half of the children die, reducing the figure to approximately 0.48 per 1,000.[70]

viii. Mongolism: The combined results of nine surveys in Europe, North America and Australia reported an average of 1.51 and a range of 1.15 to 1.9 mongoloids per 1,000 births. Within India, but excluding Madras, the mean frequency was 1.19 with a range from 0.73 to 1.6 per 1,000 births.[71] Collmann and Stroller calculated the incidence of Down's syndrome during the years 1942-1957 in 780,168 live births in the State of Victoria. The rate for this period was 1.45 per 1,000 or one affected individual in 688 live births, irrespective of sex.[72]

The prevalence of Down's syndrome in Denmark was 1.30 per 1,000 in a predominantly male population of 3,840, with a mean age of 20 years. However, the prevalence among 5,049 Danish children born during 1969-1971 was 0.79 per 1,000. A decreased frequency of births with Down's syndrome was thought to be associated with a decrease in the number of children born to women aged 35 years and older.[73]

West Jerusalem had the highest reported rate of Down's syndrome for an unbiased population. A rate of 2.4 per 1,000 among 42,340 births between 1964 and 1970 has been reported.[74] An investigation into the incidence of Down's syndrome in Sweden between 1968 and 1970 showed a rate of 1.32 per 1,000 which was lower than the rates reported for previous studies in this country.[75]

An increased frequency of Down's syndrome occurred with an increase in maternal age.[72] For example, the average incidence of mongolism for all maternal ages was approximately 1.4 in 1,000 live births.[76] The incidence increased from 0.4 in 1,000 for a maternal age of 20 to approximately 18.5 in 1,000 for a maternal age of 45.[16] If a parent had a child with Down's syndrome, without any previous family history of the condition, Gardner and Veale[77] suggested that the risk of another child being born with Down's syndrome was less than 1 in 101. These investigators emphasized that their estimate was based on a heterogeneous sample.

A tendency for seasonality to occur in Down's syndrome has been explained hypothetically by Janerich and Jacobson. They proposed that seasonality and the underlying cause of Down's syndrome were related to the status of the mother's endocrine system during the meiotic divisions which take place just before conception. They believed that the adrenal hormones may play a protective role against Down's syndrome through modification of oestradiol-receptor concentration in the developing follicle. The adrenal secretions diminish with age so that the increasing risk

of Down's syndrome in the approach of menopause may result from progressive loss with age of a protection afforded by adrenal secretory activity.[78,79]

ix. Heart Abnormality: The data recorded for the incidence of congenital heart disease differ widely because the results of studies are influenced by the parameters used by different investigators. Factors affecting frequency data include live-born, still-born or a combination of each; diagnosis based on a single examination or on longitudinal observations; longitudinal investigations which include only patients selected in the new-born period, or involving the total new-born population; investigations undertaken by paediatric cardiologists, paediatricians without special training or other personnel.[80]

The incidence of congenital malformations of the heart has been reported to range in different countries from 3.2 to 10.3 per 1,000 with a mean of 7.1 per 1,000.[80] An investigation of heart disease in 34,168 Indian children aged from one day to 12 years reported an incidence of 25 per 1,000. A total of 51.5 per cent had acquired heart disease and 48.5 per cent had congenital heart disease. Of the acquired heart disease 45.5 per cent was rheumatic in aetiology and 6 per cent was non-specific myocarditis.[81]

The incidence of congenital heart disease in Liverpool children from 1960 to 1969, inclusive, has been reported to be 6.6 per 1,000 total births. However, the authors suggested that this figure may represent a degree of under-reporting. No consistent

seasonal variation in the incidence of any of the main congenital lesions was observed. The incidence of congenital heart disease in the siblings of affected propositi was 2 to 3 times that expected.[82]

Lambert and Hohn stated that between 5 and 10 per 1,000 live born infants had congenital cardiovascular malformations.[83] Johnson estimated the incidence of congenital heart disease to be approximately 8 per 1,000 live births. However, the true incidence of malformation of the human heart is not known because its occurrence in the aborted foetus is not documented.[84]

South Australians are estimated to have an incidence of 10 in 1,000 congenital heart defects and approximately 0.1 in 1,000 acquired heart defects.[85]

x. Muscular Dystrophy: The prevalence of myopathies has been reported to approximate 4 in 100,000 in Northumberland and Durham, England.[40] In North Carolina, U.S.A. a crude population case rate for caucasoids was 5.37 per 100,000. Corresponding rates for non-caucasoids was 3.49 per 100,000, representing 2.5 times standard error difference which was attributed to either racial or case finding efficiency differences.[86] One study in Northern Italy recorded a rate of 5.42 per 100,000.[87]

A 1970 epidemiological survey in the State of Victoria found 93 affected children, of whom 88 were thought to represent the Duchenne type of muscular dystrophy. The incidence figure for the years between 1957-1963 was 0.2 per 1,000 live male births.

A higher incidence was noted in children of Maltese and Italian origin.[88]

xi. Autism: It has been estimated that among English school children aged five to 15 years there were four or five in every 10,000 with marked autistic symptoms. In about one third of cases autism occurred in association with other abnormalities such as spasticity or epilepsy.[89]

1.4 Dental Health Status of the Handicapped

The presence of dental plaque is necessary for the initiation of both dental caries and inflammatory periodontal disease.[90] Oral hygiene is therefore mandatory to prevent these pathological processes. In general, oral hygiene is poorer in the handicapped than in normal patients and is parallelled by a greater incidence of gingivitis and advanced periodontal disease.[91]

Franks et al. suggest that there is little to show that handicapped patients have a greater incidence of caries and periodontal disease for reasons other than poor oral hygiene.[92] Some patients are capable of being taught basic oral hygiene procedures but others, among them the most severely mentally and physically handicapped, are always going to need help.[93]

Handicapped children may have additional environmental factors affecting oral health. For example, sweets may have been used by caretakers to bribe, reward or placate a child. A disproportionate amount of family time, patience and money is required to care for the special child. This fact often affects the relevant importance placed on parental participation in preventive home care and reduces the available money for payment of dental care.[94]

Cerebral palsy children show a marginally higher caries rate and a significant increase in gingivitis, especially in older children.[95] Kaneko investigated the oral condition of 45 severely handicapped children in an institution, the majority suffering from cerebral palsy. The oral hygiene was poor, gingivitis was prevalent, there was a low caries incidence but an increase of caries with age was suspected.[96] Other

studies have demonstrated a varied incidence of caries, when compared with controls, from no difference[97] to a slightly higher incidence in the cerebral palsied,[98] When older non-institutionalized cerebral palsied patients were compared with their siblings, oral cleanliness was reported to be poorer in the former, leading to more periodontal disease.[98]

A direct relationship is detected between the I.Q. and the standard of oral hygiene, with the poorest hygiene occurring in those of lowest I.Q. Powell's assessment of oral hygiene in female retardates, aged from five to 50 years with I.Q.'s below 50, showed oral hygiene to be closely allied to the I.Q. rating if the environment were kept constant.[99]

Murray and McLeod described the dental condition of 343 severely subnormal children aged between two and 16 years. A high proportion of carious lesions were untreated and the standard of oral cleanliness and gingival health decreased with increasing age.[100] Similar results were reported by Rosenstein, Bush and Gorelick in a handicapped group ranging in age from 14 to 43 years.[101]

Pollack and Shapiro compared the caries experience of normal children with a group of 263 mentally retarded children, aged 14 to 22 years. The group consisted of 68 severely retarded, 89 moderately retarded and 106 mildly retarded. The caries experience of the combined retarded group was not greater than a control normal group but a higher caries experience was found in the severely retarded group.[102]

Sandler reported a steady increase in the incidence of periodontal scores in institutionalized patients from the youngest age group to the oldest. Inpatients were found to be frequently more difficult to handle

and presented behavioural problems during oral hygiene care. However, because institutionalized patients had controlled diets the incidence of caries was lower compared with outpatients.[103] Svatun found that access to dental care decreased with increasing age and was thought to be associated with the residence of younger patients in institutions.[104]

Diphenylhydantoin (Dilantin) is used for the control of grand mal seizures. Gingival hyperplasia is associated with dilantin therapy, the reported incidence being approximately 40 to 63 per cent.[105,106] Babcock reported that there appeared to be no correlation with sex or duration of drug therapy,[107] although Lawrence claimed that dosage and duration of therapy affected the hyperplasia.[106] No apparent correlation existed between the concentration of diphenylhydantoin in the gingivae or any other tissue and the degree of gingival hyperplasia.[108] Recent studies have demonstrated that gingival hyperplasia associated with diphenylhydantoin can be prevented or reduced with plaque control.[109,110]

One study of 120 blind students in America indicated a relatively low caries rate and a high plaque score. The authors stressed that teaching oral hygiene and obtaining successful motivation were difficult because disclosing agents were of no effect. The sense of touch had to be utilized.[62]

Reports of dental decay in mongoloids indicate a lowered incidence of caries as well as caries-free mouths.[111,112,113,114,115] Decreased caries rates in mongoloids has been reported to be associated in part with delayed tooth eruption.[116,117,118]

Although biochemical changes noted in trisomic 21 mongoloids are not identical to alterations seen in subjects with translocation,[119] an

elevated non-specific esterase activity has been noted in the saliva of patients with Down's syndrome. It is likely that carbonic anhydrase is at least partly responsible for this non-specific esterase activity noted in parotid glands.[120] The lower caries incidence in Down's syndrome patients may be associated with elevated pH and sodium bicarbonate levels in parotid saliva.[121] It has been postulated that glandular carbonic anhydrase influences the conversion of carbon dioxide and water into carbonic acid which dissociates spontaneously into a hydrogen ion and a bicarbonate ion. The carbon dioxide and water may enter the salivary glands from either the blood or may be formed in the glands by aerobic respiration.[122] Subsequently, the hydrogen ions are transferred to the blood and sodium ions from the blood are transferred to the salivary glands and secreted with the bicarbonate ion. This series of events may account for the pH and sodium bicarbonate rise with resultant decreased caries.[120] Differences in tooth morphology when compared to a normal population could also possibly affect the incidence of caries attack.[123,18]

Periodontal disease has been found to be prevalent in mongoloids.[112, 113,116] Cutress compared the oral hygiene and periodontal health of mongoloid children aged between ten and 24 years of age. This investigator found that institutionalized patients showed a greater susceptibility to periodontal disease than similarly housed and cared for mentally retarded patients. The incidence of caries was also recorded for mongoloid subjects aged five to 24 years. The institutionalized patient had a lower caries rate but similar mental and genetic defects compared with children who resided at home. When the environment was normalized there was little difference among mongoloid, mentally retarded or normal children.[117,124]

However, an average of 98 per cent gingival involvement and more advanced periodontal disease has been reported in mongoloids compared with non-mongoloids.[101]

The most severe form of periodontal destruction seen in Down's syndrome has been described as periodontosis by Brown.[34] The severity of periodontal disease in mongoloids has been attributed to a number of factors such as a metabolic block in collagen maturation,[125] Bacteroides melaninogenicus levels in plaque[126] and poor vascularization.[127] Poor or impaired circulation in subjects affected with Down's syndrome produces reduced tissue resistance to infection, especially in areas of terminal vascularization such as teeth and gingival tissue.[18] Other investigations have shown that periodontal disease in mongoloids cannot be attributed to factors such as serum citric acid levels[128,129] or Bacteroides melaninogenicus in plaque.[130]

Grainger reported that many handicapped children are unable to clean their teeth adequately.[131] The question arises as to whether they can be instructed to improve their own oral hygiene or whether parents or guardians have to be relied upon. The investigation of Reynolds and Block on the effectiveness of two months' oral hygiene instruction for 60 individuals with a mental age between eight and thirteen years showed a significant reduction in the mean plaque score. These investigators concluded that if mentally retarded children can learn basic skills required to function in a school environment they should be capable of mastering toothbrushing.[132]

Abramson and Wunderlich applied behavioural modifying techniques to train nine severely retarded boys aged between nine and fifteen years to bush their teeth. A programme whereby some degree of skill was attained

and was immediately reinforced by rewards was used and yielded highly significant results.[133] Horner and Keilitz trained eight mentally retarded adolescents to brush their teeth successfully by creating opportunities for independent performances in addition to verbal instruction, modeling, demonstration and physical assistance. A predetermined stereotype sequence of toothbrushing steps was offered as a means of simplifying training procedures.[134]

Handicapped children should not be considered as only mentally retarded. Muscular defects, congenital abnormalities and many other conditions retard a child's future development. Involuntary hand and arm movements and partial or total paralysis may make it difficult to control or grip a toothbrush. Other individuals have problems of restricted movements when encumbered with braces or artificial limbs.[135] Green investigated preventive care for children with multiple handicaps. This author emphasized home care as the most influential factor in the control of dental disease. The responsibility for dental home care of children with multiple handicaps lies with the caretaker during the day and night.[136]

Brown introduced individually designed home care and preventive programmes for dentally handicapped children. Emphasis was placed on controlling dietary factors responsible for dental caries and on the role of oral hygiene procedures in reducing periodontal disease. Because Brisbane's water supply was not fluoridated, fluoride supplements and home application of fluoride pastes or gels were prescribed for children with high caries rates. Mechanical toothbrushes also were lent to patients to assist parents in the oral hygiene regime for each child. The programme resulted in a marked decline in new carious lesions and a significant improvement in oral cleanliness in all age groups. Gingival health did not

improve, but the measuring techniques distinguishing improvement in gingivitis and pocketing were considered too coarse to detect changes. The programme, however, assisted in the control of the progress of periodontal disease in a diverse group of handicapped children and young adults.[137]

Usher investigated the use of chlorhexidine gel on debris and gingival inflammation in 40 mentally handicapped children ranging in age from two to 19 years. Chlorhexidine gluconate gel (0.5 per cent) was applied each week-day morning for three weeks. Even though cooperation from subjects proved difficult an improvement in oral hygiene occurred with decreased gingival inflammation.[138]

Dental hygienists can improve oral hygiene by providing oral prophylaxis on a three-monthly basis. Nichol suggested that the hygienists can also provide caries preventive treatment, radiographic examinations and can assist in counselling on nutritional and other problems.[139]

Fairview Hospital and Training Centre in Oregon carried out extensive investigations of dental health in individuals with handicapping conditions ranging from no arm or hand use, partial or non-speaking, to mental retardation classified as either moderate, severe or profound. Many of the patients were non-ambulatory and others suffered from severe handicaps such as blindness or deafness. Because approximately 52 per cent of the patients could not brush their own teeth, dental nurses provided rubber cup prophylaxis, hygienists scaled teeth and student dental assistants and three senior boy residents acted as oral hygiene assistants. This team improved the oral hygiene of individuals in an experimental group by 53 per cent.[140] On the other hand, Wren considered that this type of

programme was inadequate and advocated that teaching be tailored to individual and family orientations.[26]

1.5 Dental Treatment of the Handicapped

The actual dental needs of the handicapped may not differ greatly from normal individuals, but the provision of treatment is usually more difficult.[141] The reception of comprehensive dental care may be affected seriously by one or more medical, physical, mental, emotional or environmental problems.[137,142,143]

Turner made the point that the survival prognosis of children suffering from hydrocephalus, spina bifida and cardiac defects was improving and this fact increased the problems of providing adequate dental services for a larger population of handicapped individuals than previously.[144]

Ideally, dental undergraduate courses should provide training to equip students with a knowledge of the factors involved in the dental care of the handicapped. Mink and Sorenson adopted an elective approach because they found that some students showed little interest even in the treatment of normal children. Presenting such students with more difficult patients was considered undesirable from both the students' and the patients' view.[145] Dyer believed that the training of personnel to deliver treatment should be in State institutions for the retarded because the dentist would thus become familiar with the overall problems related to such patients.[146]

Centralization of specialized facilities may introduce transport problems for patients. Rosenbaum advocated the appropriate application of knowledge, interest and skill to those in need at the most suitable place and time. In other words, a service should be positioned in relation to the patient.[147] Pool reported that mobile dental units were used in

the United Kingdom as an aid to early counselling and preventive treatment of handicapped children.[148] Kostlan advocated the use of dental auxiliaries and the cooperation of school teachers in any dental care programme for handicapped children.[149] Marshall stressed the advantages of a private dentist providing treatment and described the success afforded by an understanding of the total family.[150] A dentist orientated to the needs of children and with knowledge of the patient's non-dental problems also was paramount.[151]

When planning a dental programme, Wren stressed that consideration should be given to the patient's span of attention which is often reduced. Even though a direction was understood, the patient's concentration would often lapse with the slightest distraction.[26]

Studies have shown that although a number of handicapped children require dental treatment in special centres, the majority who have less severe forms of subnormality should be manageable by practitioners in a normal general practice. The less severely handicapped include children with I.Q.'s between 50 and 80 who may be attending schools for the educationally subnormal. Also included are children with the milder varieties of cerebral palsy such as congenital hemiplegia and mild spasticity, deaf and partially deaf children, blind and partially sighted children. Although these types of handicapped children are capable of being treated in general practice, they require careful management and a willingness on the part of the practitioner to modify his normal treatment procedures to allow for the disabilities of the child.[152,153] For example, seating positions for the athetoid cerebral palsy child should conform to flexion rather than extension to reduce primitive thrust patterns, and for the spastic child flexion will prevent constant contractions.[154]

Murray and McLeod illustrated the potential need of dental care amongst severely subnormal children. They studied a group of children of very low intelligence in London and found approximately one-third of the parents experiencing special problems associated with obtaining dental treatment for their children. These investigators reported that in England and Wales the level of restorative treatment in handicapped children was far below that occurring in normal children.[100] Wren made the point that inadequacy on the part of the dentist in coping with management problems of some handicapped children may provide reasons for a relatively low treatment status of these patients.[26] Dyer considered that the range of treatment techniques should be varied according to the degree of acceptability of treatment by the patient.[146] Atraumatic and successful treatment of handicapped patients depends on the sense of responsibility and efficiency of the dental assistant.[155]

A survey of the members of the American Academy of Pedodontics and an equal number of general practitioners in the United States revealed that pedodontists used pre-medication more routinely than general practitioners. However, both groups limited the use of general anaesthetic procedures in their private offices.[156]

The most widely used method of psychosedation for dental treatment is "Relative Analgesia". Some cooperation is required, however, for the success of this method of patient control.[131] Turner found that nitrous oxide-oxygen administration techniques, as well as intravenous sedation, required at least a minimal level of communication between operator and patient, and an airway that could be kept patent with minimal effort. Although the levels attained for sedation may be conscious or semiconscious,

these techniques are not meant to substitute for full general anaesthesia when this procedure is indicated or required.[157]

The Spastic Centre in New South Wales offered two sets of control for patients requiring dental care. The patients were divided into "chair" and "general anaesthetic" treatment categories.[158] The behaviour of mentally retarded patients often makes dental examination and treatment difficult if not impossible. Because of limitations in behaviour or ability to cooperate, provision for the administration of general anaesthesia becomes necessary for some patients.[159]

Kostlan reported that 60 per cent of 343 subnormal children aged between two and 16 years were found to require general anaesthesia.[149] Athetoid movements could be controlled with intravenous injection of diazepam, although the reduction of aggressiveness was only mild.[160] Dental examinations and extractions were reported to be facilitated by intravenous diazepam which provided a useful alternative to general anaesthesia.[161,162] General anaesthesia, however, is both safe and practical if certain standards are adhered to, making it possible for severely mentally retarded patients to receive the dental care that they otherwise would be denied.[159] For instance, Rich treated all patients showing various forms of severe mental affliction, mongolism, autism, spasticity and severe subnormality under general anaesthesia. However, consideration of the medical conditions which could contra-indicate general anaesthesia must be given priority in this group.[163] Factors such as heart defects, brain damage, diabetes, kidney disease, chronic chest disease and liver conditions which the anaesthetist considered warrant concern, had to be taken into consideration.[95,164]

Glazzard and Sword reported that before a final decision is made regarding the advisability of general anaesthesia, certain questions should be answered. Is a general anaesthetic in the best interest of the child or is it a means of avoiding some difficult problems for the dentist and parents? What future routine maintenance and emergency care will be arranged? Have plans been made for follow-up examinations and maintenance care? Will preventive programmes be introduced?[165]

Robertson and Ball found that some mentally handicapped and maladjusted children accepted conventional dental care much more readily once the initial conservative treatment had been performed under general anaesthesia.[166]

1.6 Behavioural Characteristics of the Handicapped

Kushlick developed a comprehensive survey method which used behaviour as the measurement of the handicapping conditions. He proposed two scales to determine the relevant behavioural characteristics of the mentally handicapped. The social and physical incapacity scale rates individuals according to continence, ambulance and the presence of specific disruptive behaviours; the second scale covers speech, self-help and literacy. Both of these scales reflect the degree of dependency of the handicapped upon others. Kushlick summarized the difficulties in surveying the handicapped and commented that knowledge of the prevalence of people with different clinical syndromes does not indicate the nature of the management problems involved in their care. Even at the same chronological age, the behaviour of people with the same clinical syndromes often differs as much as those found among people with different syndromes.[167]

The potential behaviour of any individual is genetically determined but environmental factors play the most important role in determining the form of behaviour that eventuates.[168] For instance, most children have either learned or created images of the dental situation.[169]

Numerous studies have focussed attention on factors which could influence behaviour of children in a dental environment. Variables such as maternal anxiety,[170,171,172] duration of appointment,[173] age of the child,[174] birth order,[175] dental environment,[176,177] the presence of the mother during treatment,[178] previous favourable or unfavourable medical contact,[172,179] socioeconomic status of the family,[172,180] conscious and subconscious factors[181] and previous dental experiences[182,183] could contribute in varying degrees towards the acceptance of dental treatment by

children.

One survey in New Zealand reported that 0.2 per cent of 35,625 children exhibited deviant behaviour, rendering them unmanageable by normal procedures utilized by School Dental Nurses.[184]

Handicapped children pose additional problems which could influence their acceptance of dental treatment. For instance, many physically handicapped children, although quite cooperative, cannot sit normally in a dental chair.[153] Abnormal patterns of movement are present in cerebral palsy children and these patterns stem from key-points such as the head, neck and spine. The shoulder, shoulder girdle, hips and pelvis also act as key-points in control. Abnormal postures due to the position of the head will be more permanent in the spastic child, intermittent in the athetoid child and seen on the affected side only in the hemiplegic. If the child's head is turned or bent to one side the arm and leg towards which the face is turned straightens and the hand opens. However, the arm and leg on the crown side of the skull bends and the hand shows a closed fist. The patterns of abnormal reactions are clearly seen when the child is lying on his back or is standing upright. The head and shoulders should therefore be maintained in a symmetrically neutral position and the body kept in flexion to minimize abnormal movement.[185]

Giddon et al. have suggested that the concept of body image evolves from sensations and perceptions within the body and from perceptions of the self communicated to the child through the reactions of people such as family, friends, peers and health professionals. The development and emergence of a body image is integrated with the socialization process

which involves internalization of social standards of attractiveness and normality.[186] Goffman has reported that a large part of internalized social standards reinforce the perception for the physically handicapped that he is inferior and stigmatized.[187] Similarly, the deaf may be made to feel stupid, inferior or incompetent because of their difficulties in communication.[188]

Hall suggested that behavioural problems may result from deficiencies of developmental needs. These needs include love and security, recognition as an individual and for achievement, new experiences and help in managing them, responsibility and help in regulating emotional responses of anger, rage, fear and grief.[48]

The mentally retarded experience fears and anxieties similar to those experienced by normal individuals. Society contraindicates overt emotions even during potentially stressful experiences such as dental treatment. Mentally retarded persons, however, seldom conform to this convention and often display uninhibited behaviour when receiving dental care.[189]

Mental retardation is not necessarily an isolated entity. For example, some children with spina bifida can be further handicapped by varying degrees of mental retardation. It is of interest that the mean intelligence quotient of untreated spina bifida children has been shown to be higher than treated survivors.[190] Lorber analysed 524 unselected cases of spina bifida children. A total of 20 per cent of 110 infants with major defects at birth who had received no treatment were of normal intellectual development at 2 to 4 years of age. However, all had severe physical handicaps and a short life expectation.[191]

Preliminary results of a Swedish investigation into the mental function of children with treated myelomeningocele showed half the children functioned at an average mental level of I.Q. 90-110; one third were below average with an I.Q. of 70-90; 9 per cent were rated as retarded with an I.Q. below 70 and 8 per cent were rated above I.Q. of 110.[192] There appeared to be good evidence to suggest that stability with time, rather than variability, was characteristic of the I.Q. scores obtained by children with malformations of the central nervous system.[193]

Hunt and Holmes investigated reasons for the lower intelligence of treated spina bifida cystica children. Intelligence was not related to the function of the shunt at the time of assessment, to the number of revisions of the shunt, or to the rate of increase in head size during the first four weeks of life. It was concluded that the best indication of late intelligence could be gained at birth from the thickness of the pallium and the sensory level of the lesion.[194,195] The pallium is the grey matter covering the cerebral hemispheres, characterized by a distinctive layering of the cellular elements.[8]

Sousa et al. have described a functional scoring system which described quantitatively the current functional status of individuals with spina bifida. One of their criteria was the child's ability to clean teeth. These investigators concluded that the degree of independent achievement in daily living activities by children with spina bifida was related to the level of paralysis. However, social and environmental factors may also influence the level of self-achievement and behaviour.[196]

A child's behaviour may be modified by a situation or set of situations, resulting in reactive disorders. Reactive disorders may be

defined as cases in which the behaviour or symptoms are primarily a reaction to an event or situation, which is emotionally traumatic to the particular child, and which demonstrably is causally related to the symptoms or behaviour. There is no simple correspondence between severity of trauma and the degree of reaction. Two children having different constitutions and experience will react differently to the same apparent stress.[197]

A number of techniques have been developed to alter the behaviour of children undergoing dental care. The degree of handicap a child suffers and the capacity to communicate and cooperate with a dentist are factors to be considered when devising a reasonable and acceptable treatment sequence.

Modification of a child's behaviour has been shown to be justified where the desired behavioural change can be achieved by employing certain procedures.[198] For example, the presentation of a filmed peer model displaying positive, coping behaviour during a dental visit has been found to be effective in reducing disruptive behaviour in children who are experiencing their first dental treatment.[199] Leeds and other investigators advocated the use of the same behaviour management techniques for the care of any child patient. For instance, procedures such as tell-show-do, desensitization, understanding, firmness when necessary and tender loving care could be adopted to promote suitable operative conditions.[94,200]

The reduction of anxiety is of major importance. Relaxation exercises of deep breathing with suggestion control, and shaping exercises of training and clarification can reduce apprehensive feelings. An increase in pain threshold results together with increased cooperation.

Visual and verbal reinforcement is needed, however, to maintain favourable behaviour for dental treatment.[169]

Specific handicapping conditions often have related characteristics which may influence the provision and acceptance of dental care. For example, children with cerebral palsy may have difficulties in communication, low intelligence, poor concentration, convulsions, apprehension and posture defects.[95] Epileptic patients may suffer seizures and may be taking medication which renders them slow and docile.[201]

Children with Down's syndrome are usually contented and affectionate individuals, although exceptions exist, and aggressiveness and destructiveness may occur. Stubborness is often reported as a characteristic of mongolism. The development of language, motor and coordination skills and personal and social behaviour are very much retarded.[34]

In this literature review an attempt has been made to provide background information on the ten handicapping conditions surveyed. The occurrence of these handicaps in Australia and overseas has been cited and the dental health status outlined. The provision of dental care and the associated behavioural characteristics in a dental environment are described.

Authors differ widely in their approach to the problem of providing comprehensive dental care for handicapped children. However, a number of studies emphasize the need for special dental care facilities because the oral health of many of these children is reported to be poor and reflects neglect in prevention of disease, health education and operative treatment.

CHAPTER II

MATERIALS AND METHODS

An attempt was made to contact all handicapped children in South Australia by approaching the organizations listed in the Directory of Social Welfare Resources.[202] In addition, permission was given by the Education Department to obtain information on children enrolled in special classes in primary and secondary schools, special schools and speech and hearing centres.

The majority of the caretakers could not be interviewed because anonymity had to be maintained. Therefore, it was decided to adopt a questionnaire approach in order to contact the maximal number of children. Before the questionnaires were issued, two letters requesting cooperation were circulated to the organizations and to the Education Department schools in which the children were enrolled (Appendices 1,2).

A draft questionnaire was designed after consultation with staff of The University of Adelaide's Departments of Statistics and Community Medicine, the South Australian Education Department and various organizations involved in the care of handicapped children. The questionnaire was coded to identify the organization to which the child was affiliated and each child was given a serial number within the organization.

An introductory statement (Appendix 3) in the questionnaire explained that information was being sought to enable the setting up of a dental service for handicapped children. Because of the nature of the study, the questionniare was anonymous and it was stressed that names and addresses

of the children would not be required. As some children had multiple handicaps and were associated with several organizations they could receive more than one questionnaire. A request was made for one form only to be completed and returned.

The first part of the questionnaire contained personal data, including first letter of Christian and surnames, the sex, birth date and postcode of the child's residence. These data allowed recognition of duplicate forms where more than one questionnaire had been completed for the same child.

The second page of the questionnaire listed the 10 specific handicaps and one open-ended category for additional non-specified handicaps. The specified handicaps were cerebral palsy, mental retardation, epilepsy, blindness, deafness, spina bifida, mongolism, heart abnormality, muscular dystrophy and autism. This list was selected after consultation with staff from the Department of Community Medicine, The University of Adelaide, because the handicaps were considered to be the most prevalent in the child population and also because they could complicate the delivery of dental care. Only one broad category for each handicap was assessed. It was decided that any attempt to subdivide the handicaps into classification types or degrees of severity would not be possible because the respondents would be unable to supply this information.

The questionnaire was designed also to determine the functional criteria which were relevant to dental treatment. These criteria were sitting up, sitting still, using arms and/or legs, talking and walking, seeing, hearing, following spoken instructions, attention span, control of

bladder and/or bowels and fear of strangers. Respondents were requested to mark whether a specific function would influence the delivery of dental care to a significant, minor or insignificant degree.

Pages three and four of the questionnaire were related to the need for, and the type and regularity of dental care received before and during 1974. The influence of transport, dental costs, the child's behaviour and the availability of a suitable dentist also were included in this section.

Information obtained from each page of the questionnaire was coded for transfer to punched cards.

In order to test the questionnaire, a pilot study was conducted at Suneden School where 27 retarded children were enrolled. A total of 26 questionnaires were returned and as a result of difficulties experienced in completing certain sections, a number of changes were made to simplify the format and to eliminate areas of ambiguity.

Explanatory letters were enclosed with the revised questionnaires sent to institutions for subsequent distribution to caretakers of enrolled children (Appendices 4,5,6). An instruction slip was attached to each questionnaire to explain the method of return. (Appendix 7). Questionnaires also were posted to children by the Crippled Children's Association; children living at home, but on waiting lists to enter various institutions, were contacted by the institutions.

Questionnaires were returned either to institutions and forwarded to the author, or were returned directly by the caretakers. A number of questionnaires were collected personally from other centres.

To improve the response, the staff of the Crippled Children's Association distributed a second questionnaire to the non-responders with a note explaining that the information required had not been supplied (Appendix 8). Headmasters of the Special Schools of the Education Department were requested to distribute further questionnaires to the non-responders in their charge (Appendix 9).

In order to determine the distribution of handicapped children in South Australia, the postcode supplied on the questionnaire was converted to the statistical divisions of the State. Because of overlaps of post-codes within these divisions, two criteria were applied. First, if a town was within a statistical division in country areas, the postcode was not altered. Second, in the division of Adelaide, if the statistical division divided the postcode, the minor area was combined with the major portion of the code. The statistical boundaries within South Australia are shown in Appendices 10 and 11.

The children were divided into two age groupings, birth to 2.99 years and three to 16 years, inclusive, calculated as at January 1, 1975. They were grouped in this way because children under three years of age usually have minimal need for dental treatment. The younger age group, therefore, was excluded from the dental care portion of the study.

In order to assess a child's behaviour and coordination, respondents were requested to indicate the degree of handicap associated with each of the eleven specified functional criteria and the effect the handicap had in complicating a visit to a dentist. Because of the broad nature of the questionnaire and the manner in which it was distributed, only very basic functions were assessed as having significant, minor or no

effect in the delivery of dental care. The eleven criteria were divided into three groups to represent a child's cooperation, communication and coordination potentials.

The cooperation potential was determined by assessing whether sitting still, following spoken instructions, attention span or fear of strangers were described as presenting significant, minor or no problem in the delivery of dental care. If one or more of the criteria presented a significant problem the child was classified as having poor cooperation. If the four criteria presented a minor or no problem the child was considered to have sufficient cooperation for dental management.

The communication potential was determined by assessing whether talking, seeing and hearing were described as presenting significant, minor or no problem to the delivery of dental care. If one or more of the criteria presented a significant problem the child was classified as having poor communication. If the three criteria presented a minor or no problem the child was considered to have sufficient ability to communicate for dental management.

The co-ordination index was determined by assessing whether sitting up, using arms and/or legs, walking or controlling bladder and/or bowels were described as presenting significant, minor or no problem to the delivery of dental care. If one or more of the four criteria presented a significant problem the child was classified as having poor coordination. If the four criteria presented minor or no problem the child was considered to have sufficient coordination for dental management.

So that a child's behaviour in a dental environment could be

assessed, the cooperation and communication potentials were combined to give a behavioural index. If either or both of the potentials were poor the child was considered to be unmanageable and if both potentials were not poor the child was considered to be manageable.

In order to test the validity of the behavioural and coordination indices a sample of 132 children consisting of 68 males and 64 females, were assessed by means of a field study.

Table 1 describes the test group arranged according to handicap and number of individuals. It should be noted that a child with multiple handicaps appears more than once in this table.

Table 1

Handicap	Number
Cerebral Palsy	15
Mental Retardation	129
Epilepsy	17
Blindness	6
Deafness	6
Spina Bifida	4
Mongolism	26
Heart Abnormality	18
Muscular Dystrophy	1
Autism	3
Other	13

The field study was conducted in a fully equipped dental caravan which was parked in the grounds of Minda Home, an institution housing

approximately 600 mentally retarded children and adults. To reduce the children's anxiety the caravan remained next to an assembly hall for at least three weeks before the author and a dental assistant occupied the unit. At all times, surgery attire was worn by the survey team. Initial contact with the children was made by visiting them in the school classrooms. The second contact was made when the children visited the dental caravan in class groups with their teachers. The third contact consisted of a class group and their teacher attending the caravan so that the author could carry out a dental examination with a mirror and probe while each child was seated in a dental chair. Finally, the child's individual behaviour and coordination were assessed by the author and an observing dentist during an oral examination with a mirror and probe. The behaviour was assessed subjectively as being good and manageable, or poor and unmanageable. The child's coordination was judged subjectively as being coordinated or uncoordinated by the examiner and the observing dentist.

The assessment of manageable or unmanageable behaviour in a dental surgery was based upon the dentists' previous experience of normal children in paedodontic clinical practice. The criteria used to determine acceptable behaviour were those described by Kohlenberg et al. whereby the child was required to sit in a semi-supine position in the dental chair, pay attention to the dentist, open the mouth and hold it open even after the introduction of a dental instrument.[203]

The assessment of coordination was based on the child's ability to walk to the dental chair, climb into it unaided and sit in a semi-supine position. When the examining and observing dentists failed to agree in the

assessment of a child's behaviour and coordination, the more unfavourable assessment was recorded and transferred to punched cards.

Following the clinical assessment of behaviour and coordination, the field trial was concluded by having the teachers complete two assessment sheets for each child (Appendix 12). These assessment sheets were identical to the relevant sections of the original questionnaires, but because of a time lapse of one year it was considered inadvisable to use the original data for comparison with the child's subsequent behaviour and coordination during the field trial. The information from the assessment sheets was transferred to punched cards and analysed.

In reporting the present findings, no probability tests were undertaken other than the investigation of sex differences derived from the questionnaire survey and the behaviour and co-ordination indices derived from the field survey at Minda Home.

Because the survey represented an almost complete census of the State's population of handicapped children, the view was adopted that only the situation as it existed in January, 1975, was reported. Consequently, the statistical analysis which was used involved expressing the results in tabular form only.

CHAPTER III

FINDINGS

3.1 Response

Table 2 gives the organizations contacted and the numbers of questionnaires distributed and returned.

Table 2

Organizations	NUMBER OF QUESTIONNAIRES Sent	Returned			
		Total	Incomplete or no handicap	Duplicates	Total Relevant
Special Schools	797	725	28	37	660
Opportunity Classes in Primary Schools and Special Small Classes	594	429	202	35	192
Special Classes in Secondary Schools	512	354	270	6	78
Speech and Hearing Centres (Education Department)	193	156	5	5	146
Estcourt House Adelaide Children's Hosp. Minda Home Ru Rua Nursing Home Strathmont Centre	378	378	22	7	349
Townsend House S.A. Oral School	119	114	0	3	111
Altala Day Centre Bresle Day Centre Kent Town Day Centre St. Patrick's School Our Lady of Fatima School Suneden School Barkuma School	209	178	1	5	172
Woodville Spastic Centre Spina Bifida Assoc. Non Attending Strathmonts Autistic Children's Assoc.	401	295	8	46	241
Cystic Fibrosis Assoc.	58	5	0	0	5
Crippled Children's Assoc.	1003	342	26	58	258
TOTALS	4264	2976	562	202	2212

Table 2 shows that a total of 4,264 questionnaires were sent out and 2,976 were completed and returned. Of the questionnaires returned, 562 were discarded because insufficient data were provided, or the handicapping condition was not considered to affect the delivery of dental care. Duplicates of 202 questionnaires were returned but the information from only one was included in the data. As a result of the survey relevant information from a total of 2,212 handicapped children was analysed.

3.2 Sex Distribution

Table 3 sets out the numbers of handicapped children in South Australia in 1975, grouped according to sex and age.

Table 3

Sex	Age (yrs.)	Numbers	Total
Males	<3	62	
	3 - 16	1197	1259
Females	<3	52	
	3 - 16	885	937
Age/sex not specified			16
			2212

The ratio of 57 males to 43 females was tested against the State's Census figures of 51 males to 49 females. Table 4 shows that there was a significant difference between these two sets of figures.

Table 4

	Males	Females	Total
Observed	1259	937	2196
Expected	1119.96	1076.04	2196

$$\chi_1^2 = 35.2, \quad P < 0.001$$

A series of chi-square tests indicated that statistically significant sex differences were present in the proportion of males and

females affected by only two of the specified disabilities. There was a significantly greater proportion of males with muscular dystrophy ($\chi^2_1 = 6.83$, $P = 0.009$) and spina bifida affected a significantly greater proportion of females ($\chi^2_1 = 15.11$, $P = 0.000$). Table 5 gives the frequency of muscular dystrophy and spina bifida in males and females.

Table 5

		No	Yes	Total
Muscular Dystrophy				
	Male	1218	41	1259
	Female	923	14	937
	Total	2141	55	2196
Spina Bifida				
	Male	1219	40	1259
	Female	874	63	937
	Total	2093	103	2196

3.3 Age Distribution

Table 6 gives the numbers of children grouped according to sex, age and handicap. A child with multiple handicaps appears more than once in the Table.

Table 6

Handicap	MALES Years <3	MALES Years 3-16	MALES Total	FEMALES Years <3	FEMALES Years 3-16	FEMALES Total
Cerebral Palsy	24	142	166	18	106	124
Mental Retardation	31	712	743	28	516	544
Epilepsy	7	152	159	5	133	138
Blindness	5	75	80	2	41	43
Deafness	2	176	178	4	106	110
Spina Bifida	4	36	40	7	56	63
Mongolism	15	132	147	7	106	113
Heart Abnormality	9	55	64	3	57	60
Muscular Dystrophy	4	37	41	2	12	14
Autism	1	40	41	2	20	22
Other	2	131	133	1	110	111

3.4 Distribution of Specified Handicaps

The recording of specific handicaps showed that some children suffered from a single handicap but that others had up to five handicaps. Tables 7 to 16 give the number and percentage of children with the specified handicap, with one additional and with at least two other handicaps.

An open-ended category was provided in the questionnaire for the entry of other non-specified handicaps such as scoliosis, haemophilia, polyneuritis, talipes, poliomyelitis, asthma, hyperactivity, congenital lack of limbs and amputation.

Table 7

	Number	%
Cerebral Palsy only	117	5.29
Cerebral Palsy/Mental Retardation	91	4.11
Epilepsy	6	0.27
Blindness	1	0.05
Deafness	6	0.27
Spina Bifida	1	0.05
Mongolism	0	0.00
Heart Abnormality	1	0.05
Muscular Dystrophy	2	0.09
Autism	0	0.00
Other	1	0.05
/At least two other handicaps	67	3.03
Total with Cerebral Palsy	293	13.25
Total without Cerebral Palsy	1919	86.75
TOTAL SAMPLE	2212	100.00

Table 8

	Number	%
Mental Retardation only	640	28.93
Mental Retardation/Cerebral Palsy	91	4.11
Epilepsy	141	6.37
Blindness	21	0.95
Deafness	16	0.72
Spina Bifida	4	0.18
Mongolism	112	5.06
Heart Abnormality	18	0.81
Muscular Dystrophy	14	0.63
Autism	22	0.99
Other	34	1.54
/At least two other handicaps	186	8.41
Total with Mental Retardation	1299	58.73
Total without Mental Retardation	913	41.27
TOTAL SAMPLE	2212	100.00

Table 9

	Number	%
Epilepsy only	42	1.90
Epilepsy/Cerebral Palsy	6	0.27
Mental Retardation	141	6.37
Blindness	4	0.18
Deafness	1	0.05
Spina Bifida	3	0.14
Mongolism	1	0.05
Heart Abnormality	0	0.00
Muscular Dystrophy	0	0.00
Autism	0	0.00
Other	2	0.09
/At least two other handicaps	99	4.48
Total with Epilepsy	299	13.52
Total without Epilepsy	1913	86.48
TOTAL SAMPLE	2212	100.00

Table 10

	Number	%
Blindness only	42	1.90
Blindness/Cerebral Palsy	1	0.05
Mental Retardation	21	0.95
Epilepsy	4	0.18
Deafness	5	0.23
Spina Bifida	1	0.05
Mongolism	0	0.00
Heart Abnormality	1	0.05
Muscular Dystrophy	0	0.00
Autism	0	0.00
Other	1	0.05
/At least two other handicaps	47	2.12
Total with Blindness	123	5.56
Total without Blindness	2089	94.44
TOTAL SAMPLE	2212	100.00

Table 11

	Number	%
Deafness only	212	9.58
Deafness/Cerebral Palsy	6	0.27
Mental Retardation	16	0.72
Epilepsy	1	0.05
Blindness	5	0.23
Spina Bifida	0	0.00
Mongolism	0	0.00
Heart Abnormality	4	0.18
Muscular Dystrophy	0	0.00
Autism	1	0.05
Other	5	0.23
/At least two other handicaps	39	1.76
Total with Deafness	289	13.07
Total without Deafness	1923	86.93
TOTAL SAMPLE	2212	100.00

Table 12

	Number	%
Spina Bifida only	86	3.89
Spina Bifida/Cerebral Palsy	1	0.05
Mental Retardation	4	0.18
Epilepsy	3	0.14
Blindness	1	0.05
Deafness	0	0.00
Mongolism	0	0.00
Heart Abnormality	1	0.05
Muscular Dystrophy	1	0.05
Autism	0	0.00
Other	2	0.09
/At least two other handicaps	4	0.18
Total with Spina Bifida	103	4.66
Total without Spina Bifida	2109	95.34
TOTAL SAMPLE	2212	100.00

Table 13

	Number	%
Mongolism only	85	3.84
Mongolism/Cerebral Palsy	0	0.00
Mental Retardation	112	5.06
Epilepsy	1	0.05
Blindness	0	0.00
Deafness	0	0.00
Spina Bifida	0	0.00
Heart Abnormality	15	0.68
Muscular Dystrophy	0	0.00
Autism	0	0.00
Other	1	0.05
/At least two other handicaps	49	2.22
Total with Mongolism	263	11.89
Total without Mongolism	1949	88.11
TOTAL SAMPLE	2212	100.00

Table 14

	Number	%
Heart Abnormality only	15	0.68
Heart Abnormality/Cerebral Palsy	1	0.05
Mental Retardation	18	0.81
Epilepsy	0	0.00
Blindness	1	0.05
Deafness	4	0.18
Spina Bifida	1	0.05
Mongolism	15	0.68
Muscular Dystrophy	0	0.00
Autism	0	0.00
Other	1	0.05
/At least two other handicaps	72	3.25
Total with Heart Abnormality	128	5.79
Total without Heart Abnormality	2084	94.21
TOTAL SAMPLE	2212	100.00

Table 15

	Number	%
Muscular Dystrophy only	28	1.27
Muscular Dystrophy/Cerebral Palsy	2	0.09
Mental Retardation	14	0.63
Epilepsy	0	0.00
Blindness	0	0.00
Deafness	0	0.00
Spina Bifida	1	0.05
Mongolism	0	0.00
Heart Abnormality	0	0.00
Autism	0	0.00
Other	0	0.00
/At least two other handicaps	10	0.45
Total with Muscular Dystrophy	55	2.49
Total without Muscular Dystrophy	2157	97.51
TOTAL SAMPLE	2212	100.00

Table 16

	Number	%
Autism only	26	1.18
Autism/Cerebral Palsy	0	0.00
Mental Retardation	22	0.99
Epilepsy	0	0.00
Blindness	0	0.00
Deafness	1	0.05
Spina Bifida	0	0.00
Mongolism	0	0.00
Heart Abnormality	0	0.00
Muscular Dystrophy	0	0.00
Other	1	0.05
/At least two other handicaps	14	0.63
Total with Autism	64	2.89
Total without Autism	2148	97.11
TOTAL SAMPLE	2212	100.00

Table 17 provides a summary of distribution and prevalence rates of handicaps in South Australian children aged from birth to 16 years, inclusive.

Table 17

Handicap	Total Number	Prevalence Rate in S.Aust./1,000	% with single handicap	% with one other handicap	% with at least two other handicaps
Cerebral Palsy	293	0.8	39.9	37.2	22.9
Mental Retardation	1299	3.4	49.3	36.4	14.3
Epilepsy	299	0.8	14.1	52.8	33.1
Blindness	123	0.3	34.1	27.7	38.2
Deafness	289	0.8	73.4	13.1	13.5
Spina Bifida	103	0.3	83.5	12.6	3.9
Mongolism	263	0.7	32.3	49.0	18.7
Heart Abnormality	128	0.3	11.7	32.0	56.3
Muscular Dystrophy	55	0.1	50.9	30.9	18.2
Autism	64	0.2	40.6	37.5	21.9

It can be seen that mental retardation followed by epilepsy, cerebral palsy and deafness were the most prevalent handicaps. Spina bifida and deafness were predominately single handicapping conditions; epilepsy and mongolism were handicaps found most frequently associated with another handicap. Heart abnormalities were most frequently associated with at least two other handicaps.

3.5 Geographic Distribution

Table 18 sets out the distribution of the children according to 12 geographic regions determined by postcode within eight statistical divisions in South Australia.

Table 18

Region	Statistical Division			Number
1	1	Eastern Suburban, Inner Eastern, City	Adelaide	350
2		South Eastern Hills, South West Coastal	Adelaide	427
3		Western Suburban, Inner Western, North Western Suburban	Adelaide	389
4		North Eastern Suburban, Para	Adelaide	649
5	2	Central		20
6	3	Kangaroo Island		3
7	4	Mount Lofty Ranges		34
8	5	Murray		72
9	6	South East		66
10	7	Eyre		12
11	8	Northern, Far North	Northern	132
12		Non-representative postcodes		58
			TOTAL:	2212

Fifty-eight respondents gave a postcode which was not listed in the postcode directory. These children were therefore not listed in any specific South Australian Statistical division and were placed in group 12.

A total of 1,815 children resided in the Adelaide Statistical Division, representing 82% of the handicapped child population in the present study.

The distribution of specific handicaps within the 12 geographic regions of South Australia is shown in Table 19.

Table 19

HANDICAP	REGION 1	2	3	4	5	6	7	8	9	10	11	12
Cerebral Palsy	44	54	71	67	5	0	4	6	9	5	17	11
Mental Retardation	209	228	228	422	7	0	15	49	34	4	74	29
Epilepsy	63	48	41	114	1	0	3	6	5	0	14	4
Blindness	25	17	11	50	2	0	2	3	1	0	5	7
Deafness	51	49	54	94	0	1	8	1	11	2	12	6
Spina Bifida	20	18	21	24	2	2	5	4	2	0	4	1
Mongolism	37	59	40	77	0	0	2	10	8	0	24	6
Heart Abnormality	20	24	27	38	0	0	0	4	1	0	9	5
Muscular Dystrophy	9	14	11	11	1	0	0	2	0	0	7	0
Autism	14	9	13	21	1	0	1	4	0	0	0	1
Other	26	47	40	80	3	1	2	8	9	5	19	4

Table 20 shows the distribution of handicapped children grouped according to sex and age within the 12 geographic regions of South Australia.

Table 20

	MALES			FEMALES		
Region	< 3yrs	3-16yrs	Total	< 3yrs	3-16yrs	Total
1	5	169	174	6	168	174
2	12	235	247	11	166	177
3	10	217	227	9	149	158
4	16	356	372	12	261	273
5	2	10	12	1	7	8
6	0	2	2	0	1	1
7	2	16	18	2	14	16
8	0	40	40	1	30	31
9	2	34	36	1	29	30
10	1	5	6	1	5	6
11	8	79	87	5	38	43
12	4	34	38	3	17	20
TOTAL	62	1197	1259	52	885	937

Note: Age/Sex not specified by 16 respondents

3.6 Dental Care

The information concerning treatment before 1974 was not considered to be sufficiently reliable for analysis because of the caretakers' inability to remember accurately events which had occurred some years previously. These data therefore, have been deleted from the present report.

Tables 21 to 31 describe the dental care received and the factors influencing the delivery of dental care for handicapped children in South Australia, aged between three and 16 years, inclusive.

Each table is divided into two parts. In the first section the results are expressed as a percentage of the surveyed population aged between three and 16 years, inclusive. In the second section the results are expressed as a percentage of the number of children aged between three and 16 years, inclusive, with specific handicaps. A child with multiple handicaps appears more than once in this section.

Table 21 groups the children according to the availability of a dentist willing to provide treatment.

Table 21

Handicap	Number	Availability of a dentist willing to provide treatment: Available %	Not available %	Did not know or no response %
	2082	62.1	15.8	22.1
Cerebral Palsy	248	55.6	14.5	29.9
Mental Retardation	1228	58.5	19.9	21.6
Epilepsy	285	61.8	21.4	16.8
Blindness	116	64.7	19.8	15.5
Deafness	282	70.6	9.6	19.8
Spina Bifida	92	62.0	6.5	31.5
Mongolism	238	60.5	21.0	18.5
Heart Abnormality	112	63.4	18.8	17.8
Muscular Dystrophy	49	55.1	24.5	20.4
Autism	60	58.3	15.0	26.7
Other	241	69.7	12.9	17.4

Table 21 shows that 62.1 per cent of the children had a dentist willing to provide treatment. Cerebral palsied children and those with muscular dystrophy recorded the greatest difficulty in finding a dentist willing to provide care; deaf children had the least difficulty.

Table 22 groups the children according to the frequency of dental examinations.

Table 22

Handicap	Number	Frequency of dental examinations: Never or no response %	<1/yr %	≥ 1/yr %
	2082	15.2	29.7	55.1
Cerebral Palsy	248	8.1	17.3	74.6
Mental Retardation	1228	15.7	34.4	49.9
Epilepsy	285	9.1	35.1	55.8
Blindness	116	13.8	31.0	55.2
Deafness	282	17.0	24.8	58.2
Spina Bifida	92	14.1	19.6	66.3
Mongolism	238	21.0	31.9	47.1
Heart Abnormality	112	17.0	24.1	58.9
Muscular Dystrophy	49	14.3	28.6	57.1
Autism	60	21.7	33.3	45.0
Other	241	12.1	31.1	56.8

This table shows that 55.1 per cent of the children attended a dentist for an examination at least once a year. Autistic, mongoloid and mentally retarded children were examined least frequently and children with cerebral palsy were the most frequently examined.

Table 23 groups the children according to the frequency of dental treatment.

Table 23

Handicap	Number	Frequency of dental treatment: Never or no response %	<1/yr %	≥ 1/yr %
	2082	28.2	30.4	41.4
Cerebral Palsy	248	22.2	25.8	52.0
Mental Retardation	1228	28.2	34.0	37.8
Epilepsy	285	25.6	32.6	41.8
Blindness	116	31.9	31.0	37.1
Deafness	282	28.8	26.2	45.0
Spina Bifida	92	38.0	19.6	42.4
Mongolism	238	37.8	29.4	32.8
Heart Abnormality	112	29.5	25.0	45.5
Muscular Dystrophy	49	28.6	26.5	44.9
Autism	60	40.0	30.0	30.0
Other	241	28.2	26.6	45.2

This table shows that 41.4 per cent of the children attended a dentist for treatment at least once a year. Autistic and mongoloid children received the least frequent treatment and children with cerebral palsy were treated most frequently.

Table 24 groups the children according to whether transport was important in determining the frequency of dental visits.

Table 24

Handicap	Number	Importance of transport in determining frequency of dental visits. None or no response %	Minor %	Major %
	2082	68.2	14.9	16.9
Cerebral Palsy	248	66.5	13.7	19.8
Mental Retardation	1228	69.3	13.5	17.2
Epilepsy	285	72.7	11.2	16.1
Blindness	116	71.6	17.2	11.2
Deafness	282	67.7	16.3	16.0
Spina Bifida	92	60.9	22.8	16.3
Mongolism	238	68.9	15.1	16.0
Heart Abnormality	112	69.6	14.3	16.1
Muscular Dystrophy	49	59.2	14.3	26.5
Autism	60	71.7	18.3	10.0
Other	241	70.5	15.4	14.1

This table shows that transport influenced the frequency of dental visits for 31.8 per cent of the children. Those with muscular dystrophy or spina bifida experienced the greatest inconvenience; epileptic children were inconvenienced the least.

Table 25 groups the children according to the importance of cost in determining the frequency of dental visits.

Table 25

Handicap	Number	Importance of cost in determining frequency of dental visits: None or no response %	Minor %	Major %
	2082	56.1	25.9	18.0
Cerebral Palsy	248	52.4	33.9	13.7
Mental Retardation	1228	59.9	23.0	17.1
Epilepsy	285	63.8	20.4	15.8
Blindness	116	61.2	19.0	19.8
Deafness	282	51.8	29.1	19.1
Spina Bifida	92	51.1	30.4	18.5
Mongolism	238	63.0	22.7	14.3
Heart Abnormality	112	58.9	24.1	17.0
Muscular Dystrophy	49	49.0	24.5	26.5
Autism	60	65.0	15.0	20.0
Other	241	55.6	24.5	19.9

This table shows that the cost of dental care influenced the frequency of dental visits for 43.9 per cent of the children. Those with muscular dystrophy were influenced the most, followed by children with spina bifida or deafness. Autistic children were least affected by the cost of dental care.

Table 26 groups the children according to the importance of caretaker management in determining the frequency of dental visits.

Table 26

Handicap	Number	Importance of caretaker management in determining frequency of dental visits: None or no response %	Minor %	Major %
	2082	57.8	25.5	16.7
Cerebral Palsy	248	53.7	28.2	18.1
Mental Retardation	1228	49.9	30.2	19.9
Epilepsy	285	49.8	28.4	21.8
Blindness	116	52.6	31.9	15.5
Deafness	282	66.0	22.7	11.3
Spina Bifida	92	70.6	20.7	8.7
Mongolism	238	60.5	23.1	16.4
Heart Abnormality	112	66.1	20.5	13.4
Muscular Dystrophy	49	47.0	26.5	26.5
Autism	60	26.7	40.0	33.3
Other	241	66.8	21.2	12.0

This table shows that for 42.2 per cent of the children the frequency of dental visits was influenced by the ability of the caretaker to manage the children. Autistic children were influenced the most and spina bifida children the least.

Table 27 groups the children according to the importance of a dentist's location in determining the frequency of dental visits.

Table 27

Handicap	Number	Important of dentist's location in determining frequency of dental visits: None or no response %	Minor %	Major %
	2082	56.8	20.3	22.9
Cerebral Palsy	248	56.0	21.4	22.6
Mental Retardation	1228	52.9	20.1	27.0
Epilepsy	285	47.3	21.8	30.9
Blindness	116	49.2	28.4	22.4
Deafness	282	61.4	17.7	20.9
Spina Bifida	92	59.7	20.7	19.6
Mongolism	238	50.9	25.6	23.5
Heart Abnormality	112	59.9	20.5	19.6
Muscular Dystrophy	49	53.1	30.6	16.3
Autism	60	51.6	26.7	21.7
Other	241	66.0	20.3	13.7

This table shows that for 43.2 per cent of the children the frequency of dental visits was influenced by the location of a dentist. Epileptic and blind children were affected the most, children with other handicaps not specifically listed in the survey, and deaf children were influenced the least.

Table 28 groups the children according to the ability of a dentist to manage and treat a child in a dental surgery.

Table 28

		Ability of dentist to manage and provide treatment in a dental surgery		
	Number	Un-manageable %	Manageable %	Did not know or no response %
	2082	16.0	57.5	26.5
Handicap				
Cerebral Palsy	248	16.5	53.2	30.3
Mental Retardation	1228	21.2	48.7	30.1
Epilepsy	285	27.7	42.5	29.8
Blindness	116	17.2	53.4	29.4
Deafness	282	11.7	68.1	20.2
Spina Bifida	92	7.6	69.6	22.8
Mongolism	238	17.6	51.7	30.7
Heart Abnormality	112	13.4	62.5	24.1
Muscular Dystrophy	49	10.2	67.3	22.5
Autism	60	33.3	36.7	30.0
Other	241	8.7	66.8	24.5

This table shows that 57.5 per cent of the children were manageable by a dentist. Children with either spina bifida, deafness or muscular dystrophy were the least difficult to manage; autistic and epileptic children were the most difficult to manage.

Table 29 groups the children according to treatment status during 1974.

Table 29

Handicap	Number	Treatment status during 1974: Did not visit dentist or no response %	No treatment required %	All necessary treatment provided %	Emergency treatment only %	Un-successfully sought treatment %	Partial treatment obtained %
	2082	38.5	17.3	30.5	8.3	1.6	3.8
Cerebral Palsy	248	21.9	29.0	40.7	3.6	0.8	4.0
Mental Retardation	1228	45.0	14.9	25.6	9.0	1.8	3.7
Epilepsy	285	46.9	16.5	24.6	7.4	1.4	3.2
Blindness	116	48.2	14.7	26.7	7.8	1.7	0.9
Deafness	282	34.4	17.7	34.0	10.3	1.1	2.5
Spina Bifida	92	28.2	27.2	37.0	2.2	1.1	4.3
Mongolism	238	44.0	18.1	26.1	5.5	2.5	3.8
Heart Abnormality	112	35.7	19.6	35.7	4.5	1.8	2.7
Muscular Dystrophy	49	36.7	16.3	32.7	6.1	0.0	8.2
Autism	60	38.3	16.7	21.7	15.0	5.0	3.3
Other	241	36.5	18.3	34.0	5.0	0.8	5.4

This table shows that 30.5 per cent of handicapped children received all necessary dental treatment and 17.3 per cent did not require any treatment. Children with cerebral palsy or with spina bifida received the most total care and autistic children received the least. Compared with other groups, a high proportion of autistic and deaf children attended a dentist for emergency care only; a comparatively large number of

autistic children unsuccessfully sought dental treatment; a comparatively high percentage of blind children did not visit a dentist at all during 1974.

Table 30 groups the children according to the use of general anaesthesia for dental treatment.

Table 30

Handicap	Number	Use of general anaesthesia: Used %	Not used %	Did not know or no response %
	2082	29.2	55.7	15.1
Cerebral Palsy	248	52.0	41.1	6.9
Mental Retardation	1228	30.7	48.3	21.0
Epilepsy	285	31.6	43.5	24.9
Blindness	116	19.0	55.2	25.8
Deafness	282	22.7	67.0	10.3
Spina Bifida	92	33.7	62.0	4.3
Mongolism	238	31.1	52.9	16.0
Heart Abnormality	112	38.4	46.4	15.2
Muscular Dystrophy	49	36.7	59.2	4.1
Autism	60	36.7	50.0	13.3
Other	241	20.7	68.5	10.8

This table shows that 29.2 per cent of the children received general anaesthesia for dental treatment. Children with cerebral palsy

or heart abnormalities were treated most frequently under a general anaesthetic. Blind and deaf children, as well as children with other unspecified handicaps, were treated the least frequently under a general anaesthetic.

Table 31 groups the children according to the need for general anaesthesia for dental treatment.

Table 31

		Need for general anaesthesia		
	Number	Required	Not required	Did not know or no response
		%	%	%
	2082	38.7	39.2	22.1
Handicap				
Cerebral Palsy	248	53.6	27.4	19.0
Mental Retardation	1228	49.3	29.5	21.2
Epilepsy	285	56.5	28.4	15.1
Blindness	116	46.6	40.5	12.9
Deafness	282	27.0	51.8	21.2
Spina Bifida	92	27.2	40.2	32.6
Mongolism	238	45.0	26.5	28.5
Heart Abnormality	112	50.0	27.7	22.3
Muscular Dystrophy	49	28.6	51.0	20.4
Autism	60	73.3	11.7	15.0
Other	241	31.1	51.0	17.9

This table shows that 38.7 per cent of the children were considered by respondents to require a general anaesthetic for dental treatment.

Autistic children were reported to have the greatest need; deaf children and those with spina bifida or muscular dystrophy were considered to have the least need for a general anaesthetic.

3.7 Reasons for Lack of Dental Treatment

Some handicapped children had never visited a dentist and an attempt was made to discover the reasons. The factors related to treatment frequency, child manageability and the use of and need for general anaesthesia were investigated as a possible cause for non-attendance.

1. Factors Associated with Treatment Frequency

Children aged between three and 16 years, inclusive, were divided into four treatment-frequency groups according to whether they had never visited a dentist, had visited a dentist less than once a year, had visited annually or more often than annually. The results are shown in Tables 32-41. It should be noted that a total of 12 questionnaires were not completed with regard to treatment frequency.

Table 32 shows the availability of a dentist willing to treat handicapped children, expressed as a percentage of the number of children in each category of treatment frequency.

Table 32

Availability of a dentist willing to provide treatment

Treatment frequency	Total number	Available %	Not available %	Did not know or no response %
Never	576	40.5	17.0	42.5
<1/yr	632	61.4	19.8	18.8
1/yr	413	68.8	19.9	11.3
>1/yr	449	85.0	4.5	10.5

It can be seen that a greater percentage of children who were treated annually or more often than once a year had a dentist willing to provide care.

Table 33 gives the frequency of dental examinations of handicapped children expressed as a percentage of the number of children in each category of treatment frequency.

Table 33

Treatment frequency	Total number	Frequency of dental examinations: Never or no response %	<1/yr %	1/yr %	>1/yr %
Never	576	51.7	20.3	16.5	11.5
<1/yr	632	1.2	74.2	14.2	10.4
1/yr	413	0.7	4.6	62.7	32.0
>1/yr	449	0.4	2.2	9.6	87.8

This table shows that there was a tendency for children to be examined and treated with similar frequency.

Table 34 shows the importance of transport in determining the frequency of visits to a dentist, expressed as a percentage of the number of children in each category of treatment frequency.

Table 34

Importance of transport in determining frequency of dental visits

Treatment frequency	Total number	None or no response %	some %	very %
Never	576	69.7	16.8	13.5
<1/yr	632	72.3	14.7	13.0
1/yr	413	68.3	14.0	17.7
>1/yr	449	61.0	13.8	25.2

It can be seen that transport became more important when the frequency of dental treatment increased.

Table 35 shows the importance of the cost of dental care, in determining the frequency of visits to a dentist, expressed as a percentage of the number of children in each category of treatment frequency.

Table 35

Importance of cost in determining frequency of dental visits

Treatment frequency	Total number	None or no response %	some %	very %
Never	576	53.7	29.5	16.8
<1/yr	632	60.0	23.6	16.4
1/yr	413	60.3	23.0	16.7
>1/yr	449	50.6	27.6	21.8

It can be seen that the cost of dental treatment was claimed to influence the frequency of dental visits for approximately half the children in the first and last categories of the treatment frequency groups.

Table 36 shows the importance of caretaker management ability, in determining the frequency of visits to a dentist, expressed as a percentage of the number of children in each category of treatment frequency.

Table 36

Importance of caretaker management in determining frequency of dental visits

Treatment frequency	Total number	None or no response %	some %	very %
Never	576	58.3	25.9	15.8
<1/yr	632	54.3	29.2	16.5
1/yr	413	60.3	25.7	14.0
>1/yr	449	60.6	19.8	19.6

It can be seen that the ability of the caretaker to manage the child influenced less than half of the children in determining the frequency of visits in all of the treatment frequency groups.

Table 37 shows the importance of the dentist's location, in determining the frequency of visits, expressed as a percentage of the number of children in each category of treatment frequency.

Table 37

Importance of a dentist's location in determining frequency of dental visits

Treatment frequency	Total number	None or no response %	some %	very %
Never	576	60.5	22.0	17.5
<1/yr	632	53.5	22.8	23.7
1/yr	413	57.6	17.9	24.5
>1/yr	449	56.8	17.1	26.1

It can be seen that the dentist's location influenced less than half of the children in determining the frequency of visits in all of the treatment frequency groups.

Table 38 shows the ability of a dentist to manage and treat a child in his own surgery, expressed as a percentage of the number of children in each category of treatment frequency.

Table 38

Ability of dentist to manage and provide treatment in a dental surgery

Treatment frequency	Total number	Un-manageable %	Manageable %	Did not know or no response %
Never	576	6.1	43.9	50.0
<1/yr	632	21.7	58.7	19.6
1/yr	413	23.0	64.4	12.6
>1/yr	449	14.5	67.3	18.2

It can be seen that as the treatment frequency increased a greater percentage of children were manageable by a dentist.

Table 39 shows the treatment status of handicapped children during 1974, expressed as a percentage of the number of children in each category of treatment frequency.

Table 39

Treatment Status During 1974

Treatment frequency	Total number	Did not visit or no response %	No treatment required %	All treatment provided %	Emergency treatment only %	Unsuccessfully sought treatment %	Partial treatment provided %
Never	576	69.9	25.3	0.5	1.2	2.8	0.3
<1/yr	632	45.6	14.9	17.1	18.0	0.6	3.8
1 yr	413	19.4	18.4	46.2	8.2	2.2	5.6
>1/yr	449	4.8	9.8	74.4	3.6	0.9	6.5

It can be seen that 74.4 per cent of the children who were treated more often than once a year received all necessary treatment during 1974 compared with 17.1 per cent of the children who attended less frequently than once a year. Children who were treated less frequently than annually were more likely to receive emergency care than those who attended more frequently.

Table 40 shows the use of general anaesthesia for dental treatment of handicapped children, expressed as a percentage of the number of children in each category of treatment frequency.

Table 40

Treatment frequency	Total number	Use of general anaesthesia: Used %	Not used %	Did not know or no response %
Never	576	1.4	91.0	7.6
<1/yr	632	38.0	38.8	23.2
1/yr	413	42.9	42.9	14.2
>1/yr	449	40.3	47.4	12.3

It can be seen that general anaesthesia was used for approximately the same proportion of children in each of the three treatment frequency categories.

Table 41 gives the respondent's opinion of the need for general anaesthesia for dental treatment of handicapped children, expressed as a percentage of the number of children in each category of treatment frequency.

Table 41

Treatment frequency	Total number	Need for general anaesthesia: Required %	Not required %	Did not know or no response %
Never	576	42.5	26.0	31.5
<1/yr	632	45.1	34.0	20.9
1/yr	413	39.2	45.8	15.0
>1/yr	449	23.6	58.1	18.3

It can be seen that the need for general anaesthesia decreased as the treatment frequency increased.

2. Factors Associated with Child Manageability by a Dentist

In addition to the regularity of visits to a dentist for treatment, some children aged between three and 16 years, inclusive, proved to be unmanageable by the dentist in his own surgery. An attempt was made to discover whether child manageability influenced the delivery of dental care. The children were grouped according to whether they were unmanageable or manageable. The results are shown in Tables 42-51. It should be noted that a total of 7 questionnaires were not completed with regard to manageability.

Table 42 shows the availability of a dentist willing to treat handicapped children, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 42

Availability of a dentist willing to provide treatment

Manageability by dentist	Total number	Available %	Not available %	Did not know or no response %
unmanageable	333	56.8	34.2	9.0
manageable	1197	75.0	11.0	14.0
did not know	545	37.1	15.0	47.9

It can be seen that 75 per cent of the children who were manageable had a dentist willing to provide treatment compared with 56.8 per cent of the unmanageable children.

Table 43 shows the frequency of dental examinations of handicapped children, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 43

Manageability by dentist	Total number	Frequency of dental examination: Never or no response %	<1/yr %	1/yr %	>1/yr %
unmanageable	333	4.3	37.5	19.2	39.0
manageable	1197	8.4	28.4	27.2	36.0
did not know	545	37.3	27.5	17.6	17.6

It can be seen that the manageability of the child did not appear to affect the frequency of the dental examinations.

Table 44 shows the frequency of dental treatment of handicapped children, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 44

Manageability by dentist	Total number	Frequency of dental treatment: Never or no response %	<1/yr %	1/yr %	>1/yr %
unmanageable	333	10.9	41.1	28.5	19.5
manageable	1197	21.6	31.0	22.2	25.2
did not know	545	53.3	22.4	9.4	14.9

It can be seen that the proportion of unmanageable children receiving dental treatment decreased as the frequency of attendance increased.

Table 45 shows the importance of transport in determining the frequency of visits to a dentist, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 45

Manageability by dentist	Total number	Importance of transport in determining frequency of dental visits: None or no response %	some %	very %
unmanageable	333	70.9	14.1	15.0
manageable	1197	69.5	15.0	15.5
did not know	545	21.5	15.4	63.1

It can be seen that the importance of transport on the frequency of dental visits was similar for manageable and unmanageable children.

Table 46 shows the importance of the cost of dental care, in determining the frequency of visits to a dentist, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 46

Manageability by dentist	Total number	Importance of cost in determining frequency of dental visits: None or no response %	some %	very %
unmanageable	333	64.0	21.3	14.7
manageable	1197	57.5	24.8	17.7
did not know	545	48.4	31.2	20.4

It can be seen that the importance of cost on the frequency of dental visits was marginally greater for the manageable children than for those who were unmanageable.

Table 47 shows the importance of caretaker management ability in determining the frequency of visits to a dentist, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 47

Manageability by dentist	Total number	Importance of caretaker management in determining frequency of dental visits: None or no response %	some %	very %
unmanageable	333	32.5	35.1	32.4
manageable	1197	71.1	19.5	9.4
did not know	545	44.6	32.3	23.1

It can be seen that caretaker management was an important factor in determining the frequency of dental visits for children in the unmanageable category.

Table 48 shows the importance of the location of a dentist in determining how often a child visited a dentist, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 48

Manageability by dentist	Total number	Importance of a dentist's location in determining frequency of dental visits		
		None or no response %	some %	very %
unmanageable	333	37.9	19.8	42.3
manageable	1197	65.0	18.9	16.1
did not know	545	50.8	23.7	25.5

It can be seen that the dentist's location was an important factor in determining the frequency of dental visits for the unmanageable children.

Table 49 shows the treatment status of handicapped children, during 1974, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 49

Manageability by dentist	Total number	Treatment Status During 1974: Did not visit a dentist or no response %	No treatment required %	All treatment provided %	Emergency treatment only %	Unsuccessfully sought treatment %	Partial treatment provided %
unmanageable	333	43.9	10.5	24.9	12.0	2.4	6.3
manageable	1197	27.5	21.0	37.6	8.4	1.7	3.8
did not know	545	58.5	13.6	18.9	5.9	0.9	2.2

It can be seen that during 1974 unmanageable children were less likely to visit a dentist, received less total care but a greater proportion of emergency treatment, than those who were manageable. Moreover, double the percentage of manageable children did not require any dental treatment at all.

Table 50 shows the use of general anaesthesia for dental treatment of handicapped children, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 50

Manageability by dentist	Total number	Use of general anaesthesia: Used %	Not used %	Did not know or no response %
unmanageable	333	53.5	21.0	25.5
manageable	1197	28.5	65.5	6.0
did not know	545	16.3	55.6	28.1

It can be seen that general anaesthesia was used in the dental treatment of 53.5 per cent of the unmanageable children compared with 28.5 per cent of those who were manageable. Respondents of the latter were more positive in answering the questionnaire as only 6 per cent did not know whether general anaesthesia had been used.

Table 51 shows the need for general anaesthesia for dental treatment of handicapped children, expressed as a percentage of the number of children in each category of manageability by a dentist.

Table 51

Manageability by dentist	Total number	Need for general anaesthesia: Required %	Not required %	Did not know or no response %
unmanageable	333	78.1	11.7	10.2
manageable	1197	25.3	56.9	17.8
did not know	545	44.2	17.4	38.4

It can be seen that compared to manageable children approximately three times the number in the unmanageable category required general anaesthesia for dental treatment.

3. Use of and Need for General Anaesthesia

The use of general anaesthesia for the provision of dental care for handicapped children aged between three and 16 years, inclusive, was related to the respondent's opinion of the necessity for general anaesthesia. In addition, the respondent's opinion on the necessity for general anaesthesia was related to its actual use.

Tables 52 and 53 show the results of the correlations between the use of and the need for general anaesthesia. It should be noted that totals of 11 and 10 questionnaires, respectively, were not completed with regard to the use of and the need for general anaesthesia.

Table 52 shows the need for general anaesthesia for the dental treatment of handicapped children, expressed as a percentage of the number of children who had or had not received general anaesthesia for dental care.

Table 52

Had general anaesthesia	Total number	Need for general anaesthesia: Yes %	No %	Did not know or no response %
yes	608	56.3	28.8	14.9
no	1159	26.3	51.2	22.5
did not know	304	51.3	15.5	33.2

It can be seen that 56.3 per cent of the children who had previously had general anaesthesia for dental care were considered to need this procedure. However, 28.8 per cent of the group who had been treated under general anaesthesia were considered not to require the procedure.

Of the 1,159 children who had not been treated under general anaesthesia, 26.3 per cent were considered to require the procedure.

Table 53 shows the use of general anaesthesia for the dental treatment of handicapped children, expressed as a percentage of the number of children who needed general anaesthesia.

Table 53

Need for general anaesthesia	Total number	Had general anaesthesia: Yes %	No %	Did not know or no response %
yes	806	42.4	37.8	19.7
no	816	21.4	72.7	5.9
did not know	450	20.2	57.6	22.2

It can be seen that 42.4 per cent of the children who required general anaesthesia for dental care were treated by this procedure. However, 37.8 per cent who required general anaesthesia failed to receive it.

Of the 816 children not considered to require a general anaesthetic 21.4 per cent were treated by this procedure.

3.8 Index of Behavioural Characteristics Derived from the Questionnaire Survey

Table 54 gives the behavioural characteristics within a dental environment which the author assumed were possessed by specifically handicapped children, aged between three and 16 years, inclusive, listed according to the index of behaviour outlined on page 2.6 of this report.

Table 54 is divided into two parts. In the first section the results are expressed as a percentage of the total surveyed population aged between three and 16 years, inclusive. In the second section the results are expressed as a percentage of the number of children aged between three and 16 years, inclusive, with specific handicaps. A child with multiple handicaps appears more than once in this section.

Table 54 groups the children according to the assumed behavioural characteristics within a dental environment.

Table 54

Handicap	Number	Assumed behavioural characteristics: Manageable %	Assumed behavioural characteristics: Unmanageable %
	2082	52.8	47.2
Cerebral Palsy	248	43.1	56.9
Mental Retardation	1228	48.7	51.3
Epilepsy	285	40.0	60.0
Blindness	116	8.6	91.4
Deafness	282	26.2	73.8
Spina Bifida	92	88.1	11.9
Mongolism	238	52.5	47.5
Heart Abnormality	112	48.2	51.8
Muscular Dystrophy	49	69.4	30.6
Autism	60	15.0	85.0
Other	241	68.0	32.0

It can be seen that 52.8 per cent of the total population were assumed to be manageable in a normal dental surgery. Spina bifida children potentially were the easiest for a dentist to manage; blind and autistic children potentially were the most difficult.

Table 55 shows the handicapped children aged between three and 16 years, inclusive, grouped according to assumed behavioural characteristics within a dental environment. The results are expressed as a percentage of the number of children with one specific handicap only and with one or more additional handicaps.

Table 55

	Total number	Assumed behavioural characteristics: Manageable %	Unmanageable %
Cerebral Palsy only	103	63.1	36.9
/one additional handicap	88	38.6	61.4
more than one additional handicap	57	14.0	86.0
Mental Retardation only	622	61.2	38.8
/one additional handicap	436	40.9	59.1
more than one additional handicap	170	22.5	77.5
Epilepsy only	42	83.3	16.7
/one additional handicap	151	39.7	60.3
more than one additional handicap	92	20.6	79.4
Blindness only	39	5.1	94.9
/one additional handicap	33	15.1	84.9
more than one additional handicap	44	6.8	93.2
Deafness only	210	26.7	73.3
/one additional handicap	38	34.2	65.8
more than one additional handicap	34	18.7	81.3
Spina Bifida only	75	90.7	9.3
/one additional handicap	13	92.3	7.7
more than one additional handicap	4	25.0	75.0

Table 55 continued

	Total number	Assumed behavioural characteristics: Manageable %	Unmanageable %
Mongolism only	80	53.2	46.8
/one additional handicap	119	54.2	45.8
more than one additional handicap	39	50.0	50.0
Heart Abnormality only	11	100.0	0.0
/one additional handicap	39	56.8	43.2
more than one additional handicap	62	32.7	67.3
Muscular Dystrophy only	27	96.3	3.7
/one additional handicap	15	46.7	53.3
more than one additional handicap	7	14.3	85.7
Autism only	23	26.1	73.9
/one additional handicap	23	8.7	91.3
more than one additional handicap	14	7.1	92.9
Other only	154	87.7	12.3
/one additional handicap	48	50.0	50.0
more than one additional handicap	39	12.8	87.2

This table shows that where the handicap was not associated with additional handicaps, the potential behaviour of the majority of children was assumed to be manageable except for blind, deaf and autistic children.

In every condition except spina bifida, heart abnormality and mongolism, a greater percentage of the children's potential behaviour was assumed to be unmanageable if one additional handicap existed.

With the exception of mongoloid children, if more than one additional handicap existed a greater percentage of the children's potential behaviour was assumed to be unmanageable.

3.9 Index of Coordination Characteristics Derived from the Questionnaire Survey

Table 56 gives the coordination characteristics within a dental environment which the author assumed were possessed by specifically handicapped children aged between three and 16 years, inclusive, listed according to the index of coordination outlined on page 2.5 of this report.

Table 56 is divided into two parts. In the first section the results are expressed as a percentage of the total survey population aged between three and 16 years, inclusive. In the second section the results are expressed as a percentage of the number of children, aged between three and 16 years, inclusive, with specific handicaps. A child with multiple handicaps appears more than once in this section.

Table 56 groups the children according to the assumed coordination characteristics within a dental environment.

Table 56

Handicap	Number	Assumed coordination characteristics: Coordinated %	Uncoordinated %
	2082	78.6	21.4
Cerebral Palsy	248	51.6	48.4
Mental Retardation	1228	77.7	22.3
Epilepsy	285	62.8	37.2
Blindness	116	68.1	31.9
Deafness	282	93.3	6.7
Spina Bifida	92	35.9	64.1
Mongolism	238	87.8	12.2
Heart Abnormality	112	85.7	14.3
Muscular Dystrophy	49	42.9	57.1
Autism	60	73.3	26.7
Other	241	71.4	28.6

It can be seen that approximately one-fifth of the total population were assumed to have poor coordination under normal dental surgery conditions. Deaf children potentially were the most coordinated and children with spina bifida, muscular dystrophy or cerebral palsy potentially were the least coordinated.

3.10 Manageability and Coordination Characteristics Derived from the Field Survey

The results of the field survey to test the indices of behaviour and coordination assumed from the completed questionnaires are shown in Tables 57 and 58.

Table 57 gives the statistical association between the assumed behaviour derived from the questionnaires and the behaviour assessed during the field study.

Table 57

	Assumed behaviour		
Assessed behaviour	Manageable	Unmanageable	Total
Manageable	55	8	63
Unmanageable	21	48	69
Total	76	56	132

$$\chi_1^2 = 43.6 \ (p < 0.001)$$

It can be seen from the chi square value that prior knowledge of a child from questionnaire data was significantly helpful in predicting whether a child would be potentially manageable or unmanageable for dental treatment.

Table 58 gives the statistical association between the assumed coordination derived from the questionnaires and the coordination assessed during the field study.

Table 58

Assessed coordination	Assumed coordination: Coordinated	Assumed coordination: Uncoordinated	Total
Coordinated	86	8	94
Uncoordinated	23	15	38
Total	109	23	132

$$\chi_1^2 = 18.03 \ (p < 0.001)$$

It can be seen from the chi square value that prior knowledge of a child from questionnaire data was significantly helpful in predicting whether a child would be potentially coordinated or uncoordinated for dental treatment.

Tables 57 and 58 show that the information derived from the questionnaires provided a valid basis on which to predict whether a child would be potentially manageable or unmanageable, coordinated or uncoordinated, for dental treatment.

CHAPTER IV

DISCUSSION

4.1 Response

When the present study commenced in 1975, no register of handicapped children existed in South Australia so that the total population involved and the types of handicaps affecting this population were unknown. The data represent the findings from all children who could be contacted and from whom completed questionnaires were received. The distribution of questionnaires to areas known to cater for the handicapped probably influenced the composition of the sample so that severely affected individuals would have been more likely to have been included in the study. Some children with mild handicapping conditions, on the other hand, may not have been contacted because they attended normal schools. These factors may help to explain the apparently low prevalence rates of some of the handicaps surveyed.

Five institutions returned completed questionnaires for all of the handicapped children in their care and a high rate of return was obtained from other areas. However, problems in sampling were encountered in the groups of children enrolled in Education Department schools and The Crippled Children's Association. The main difficulty was that the handicapping condition which placed the children within these areas had no relevance to the present study. For instance, questionnaires were sent to 1,106 children enrolled in Opportunity and Special classes in Education Department schools. A total of 783 forms were returned but only 270 were included as the remainder referred to children who were slow learners or

had other disabilities not related to the survey. Furthermore, The Crippled Children's Association divided their enrolment into 296 children with severe handicaps and 707 with minor abnormalities such as talipes and knock-knee.[204] The return of 258 questionnaires thus represented 87 per cent of the severely handicapped chidren.

The lowest return of completed questionnaires was from the caretakers of children with cystic fibrosis. Discussions with staff of The Adelaide Children's Hospital revealed that this severe handicap involved regular physiotherapy, frequent admission to hospital and diet control. Accordingly, dental care could have a low priority so far as the general welfare of the child was concerned and probably accounted for the poor response of 8.6 per cent from caretakers of the children enrolled in The Cystic Fibrosis Association.

In spite of the shortcomings mentioned above, it was estimated that the sample collected represented approximately 80 per cent of the more severely handicapped children in South Australia. This estimation of the percentage return was based upon extensive discussions with people involved in the provision of services for handicapped children in the State.

South Australia's total population projection for children from birth to 16 years, inclusive, for 1975 was 380,543[205] and the return of 2,212 relevant questionnaires represented 0.58 per cent of this population. Based upon an approximated 80 per cent response rate it was estimated that there were 2,765 handicapped children in South Australia at the time of the survey, representing 0.73 per cent of the population aged from birth to 16 years, inclusive.

The Commonwealth provides a Handicapped Child's Allowance for severely handicapped children who have a physical or mental disability requiring constant care and attention, either permanently or for an extended period. Under the Act a child is defined as a person who has not attained the age of 16 years.[206] A total of 2,436 children in South Australia were in receipt of the allowance as at August 30th, 1977,[207] representing 0.67 per cent of the State's child population from birth to 16 years.

The 1975 rate of 0.73 per cent calculated from the present survey is higher than the Department of Social Security's 1977 estimate of 0.67 per cent. Apart from the fact that the rates were calculated two years apart and the present census included children aged from birth to 16 years, inclusive, a fairly stringent medical examination is necessary before a child qualifies for the handicapped allowance. The present survey may have included some children who failed to satisfy the Department's criteria for the allowance.

4.2 Sex Distribution

Sixteen caretakers failed to state the sex of the child, but the return of 2,196 questionnaires comprising 1,259 from males and 937 from females gave a ratio of 57:43 which approximates the ratio of 58:42[207] derived from children who qualified for a handicapped child's allowance. Both ratios are higher than that for the State's total population from birth to 16 years, inclusive, of 51 males to 49 females.[205]

For the specific handicaps surveyed, significant differences in sex distribution were found only in children affected by spina bifida and muscular dystrophy. The ratio for spina bifida in South Australia has been reported to be 65 females to 35 males;[208] the ratio derived from the present study of 61:39 approximated these proportions. The survey revealed a significantly higher proportion of males with muscular dystrophy and this finding agrees with the overall known sex distribution of the disease.[209]

4.3 Prevalence of Handicaps

It is not feasible to compare the prevalence rates of specific handicaps obtained by investigators in different countries. Nevertheless, prevalence rates are administratively useful for the planning of facilities and manpower needs and the information derived from the present study has been particularly useful in showing the areas of special dental needs. The way in which these needs are being met is discussed in later sections.

4.4 Geographic Distribution

The present survey showed a distribution of handicapped children concentrated in Regions 1 to 4 within the Statistical Division of Adelaide which contains the highest concentration of South Australia's population. The majority of the children were cared for by various residential organizations, the three main centres being Strathmont which is within the North Eastern Suburban Statistical Subdivision Boundaries (Region 4), Minda Home in the Western Suburban Statistical Subdivision Boundaries (Region 3) and Woodville Spastic Centre located within the North Western Suburban Statistical Subdivision Boundaries (Region 3). The provision of institutionalized care within the zones of greatest population accounts for the State's distribution of handicapped children.

The questionnaire requested the postcode of the child's residence and some respondents provided the postcode of the family residence when, in fact, the child was housed in an Adelaide institution. The response from the Northern and Far North regions of the State shown in Table 18 therefore, should not be taken to imply that all the children reside there and that treatment centres may be needed in these areas.

4.5 Dental Care

The findings of the study showed that 62.1 per cent of the children had a dentist willing to provide treatment. Many of the children were cared for by the Dental Clinic at The Adelaide Children's Hospital which is the main treatment centre for handicapped children in South Australia. In addition, the Woodville Spastic Centre was serviced fortnightly by a private practitioner, and a number of children were treated at the Royal Adelaide Hospital's Dental Department. Children attending Special Schools in some country areas were treated by the Dental Health Branch of the Public Health Department and the remainder sought care from private practitioners.

Recently, dental care has been extended to children attending Strathmont Centre by the Royal Adelaide Hospital and the Dental Health Branch of the Public Health Department. A high proportion of the handicapped children attending the Autistic Children's Association, Special Schools at Minda Home, Townsend House and Dover Gardens Primary School, as well as children attending a number of additional metropolitan and rural Special Schools, are cared for by the Dental Health Branch of the Public Health Department.

Discussions with a number of parents of handicapped children have shown dental care was often not sought because they were unaware of the facilities mentioned above. This fact emphasizes the need for better information to be made available to health and welfare agencies who are most likely to be in contact with these families. The recent handbook "Same but Different" published by the Department of Special Education, Torrens College of Advanced Education, supplies urgently needed general

advice and some limited dental information.[210]

Children with muscular dystrophy or cerebral palsy were reported to experience the greatest difficulty in finding a dentist willing to provide care. Muscular dystrophy is a disease in which children tend to cough frequently and are likely to swallow, or inadvertently inhale, dental debris; moreover, these children are a high general anaesthetic risk and dental procedures under local or general anaesthetic require specially trained personnel. The cerebral palsied child lacks muscular coordination so that dental care under local anaesthesia is difficult. Comprehensive dental care is provided under general anaesthesia for the majority of cerebral palsied children in the State by the Woodville Spastic Centre and The Adelaide Children's Hospital. Additional treatment facilities under general anaesthesia do not appear to be necessary although it would be helpful if routine dental care were available in normal dental surgeries.

The author has found that a number of children with cerebral palsy can be treated under local anaesthetic if the operator is aware of factors which limit muscular spasms. For instance, these children are easier to treat if they are seated in flexion and kept in a symmetrically neutral position. Postural positioning, combined with the use of rubber bite blocks, aid in patient control and assist in the delivery of routine dental treatment.

The factors affecting the delivery of frequent dental treatment predominately were the availability of a dentist willing to provide care and capable of managing handicapped patients. As might be expected, the ability of a dentist to manage and treat a child in his own surgery increased according to the frequency of dental visits. It is highly desirable, therefore, that every effort be made to encourage dentists to

undertake the necessary training to care for handicapped patients so that the ability of a handicapped child to attend the dentist frequently can be increased.

Autistic and mongoloid children received the least frequent dental care. The reasons are that autistic children have unpredictable behavioural characteristics and children with mongolism have communication problems and tend to be stubborn and distrustful until they can assimilate new experiences. The delivery of dental care therefore requires considerable time and patience. Nevertheless, guided by information derived from the literature, the author has now planned treatment programmes involving behaviour modification techniques which have resulted in the delivery of preventive care and dental treatment under local anaesthetic for a number of autistic and mongoloid children.

During 1974 the dental needs of approximately half the children were adequately met, in that all necessary treatment was received or on examination no treatment was required. A higher proportion of autistic children received emergency treatment only or unsuccessfully sought dental care. This pattern of attendance equates with the previously discussed management problems of autistic children. Deaf children also received a comparatively high proportion of emergency treatment. These children experience communication problems which are most successfully overcome if the dentist is able to communicate with the child by sign language. In the author's experience, a small investment of time mastering a simple course in sign language has ensured a high degree of success in carrying out routine dental treatment.

The unpredictable behaviour and coordination patterns of many

handicapped children affect a dentist's willingness to deliver comprehensive care. If more personnel could be trained in conditioning techniques, many handicapped patients would qualify for treatment under normal dental surgery conditions.

A variety of behaviour modification techniques are now available to dentists in helping normal or handicapped children to accept treatment with a minimum of unfavourable emotion. Each child should be individually assessed to evaluate which technique or combination of techniques is most applicable. An added factor which has to be taken into account is that many handicapped children have learned that their condition permits them to escape from experiences which are uncomfortable. The literature supports the view that procedures of shaping, rapport building and visual imagery can be used singly, or in combination with nitrous oxide-oxygen psychosedation, to alleviate anxiety or fears of dentistry. In addition, modeling procedures are available for long-term relief of anxiety. These techniques are especially beneficial in introducing dental treatment to handicapped children. For greater treatment success, dentists need to familiarize themselves with the types of handicap and the pattern of behaviour and coordination each potentially presents.

Although 16 per cent of the population surveyed were considered by their caretaker to be unmanageable by a dentist, the success of the behaviour modification programmes mentioned above should reduce the number of unmanageable children and the need for additional general anaesthetic facilities. Predictably the data showed that a greater proportion of unmanageable children received, or were reported to require, general anaesthesia for dental care. However, general anaesthesia is used unnecessarily for many children who would be suitable for treatment under

local anaesthesia if behaviour modification techniques were employed beforehand. For instance, these techniques have been successful in the dental care programme recently introduced by the author at Minda Special School for mentally retarded children. Approximately 90 per cent of the children can now be treated without the need for general anaesthesia.

Epileptic children were reported to be difficult to manage, but the author's experience has been that they do not as a rule present management problems. It is suggested that many dentists are reluctant to provide care under a local anaesthetic because of the possibility of the epileptic child having a seizure. Provided the child's convulsions are controlled by medication, or the type and frequency of seizure is known, treatment can be carried out successfully with the aid of rubber dam and a bite block.

General anaesthesia for dental treatment was used for 29.2 per cent of the children and thought by respondents to be necessary for the treatment of 38.7 per cent. The highest percentage of children receiving general anaesthetic care were those with cerebral palsy; the rate of 52 per cent was because the majority were treated at Woodville Spastic Centre where general anaesthetic facilities were provided fortnightly.

It is noted that 21.4 per cent of the children were not considered by their caretakers to need a general anaesthetic, but this procedure was used by the dentist. It is well known that there is a tendency for some dentists routinely to use general anaesthesia for the majority of handicapped patients because the dentists are of the opinion that any other form of treatment would not succeed. The use of general anaesthesia should be restricted to the treatment of children who require extensive restorative

work which would otherwise entail numerous sessions and overtax the coping ability of the child. Other indications for the use of general anaesthesia include patients for whom conditioning techniques have been tried unsuccessfully, or those who initially are totally unable to co-operate.

The data showed that 56.3 per cent of the children who had previously received dental care under general anaesthesia were still considered by the caretakers to require the procedure for future treatment. However, the need for general anaesthesia was found to decrease as the frequency of attendance for treatment increased. The rationale of providing dental care under general anaesthesia is not upheld if the gradual degeneration of tooth supporting tissues in many handicapped people is considered. The maintenance of gingival health is essential for proper oral function and the provision of frequent prophylaxis is often necessary. Training the majority of handicapped children to accept the delivery of dental care under normal conditions is more efficient, safer and cheaper.

The cost of dental care, transport facilities, inconvenient location of a dentist and the caretaker's ability to manage the child influenced the frequency of dental visits in less than half of the surveyed population. Transport was rated as the least important factor. However, a greater proportion of children with muscular dystrophy were influenced by the cost of dental care compared with other handicaps. A handicap such as muscular dystrophy places such a high demand on family time, patience and money that extra finance required for dental care probably occupies a low priority in some family budgets.[94] It is worth noting also that the problems encountered by handicapped children whose parents have limited financial means, are reported to be at least triple those faced by handi-

capped children of more affluent parents.[142]

In contrast to the findings relating to the total population surveyed, caretaker management and the location of a dentist were the most important factors in determining the frequency with which unmanageable children visited a dentist. As already stated, it would be helpful if information could be provided for families and welfare agencies on the facilities available for dental care of the handicapped in South Australia.

4.6 Behavioural Characteristics

In practice, the behavioural index described in this report was useful in predicting whether a child would be potentially manageable or unmanageable for dental treatment. It is recognised that the behaviour of a child in a dental environment is influenced by many factors. However, the author has found that the majority of handicapped children who can learn skills under the guidance of special educationalists can cope with normal dental treatment and also can be trained to carry out oral hygiene procedures.

A particularly successful programme for manageable children in institutions resulted in effective oral hygiene being achieved by the children themselves following a course of training. In the past, periodontal problems have been reported to be severe in institutions housing the handicapped, mainly due to lack of sufficient staff to carry out efficient daily toothbrushing for the inmates. The new programme comprises a structured and progressive method of toothbrushing in 13 stages. With teeth in contact the anterior labial segments are brushed up and down; the left and right buccal segments are brushed similarly, after which the mouth is opened and four occlusal segments are cleaned. Lastly the lingual and palatal aspects are brushed. Depending on individual ability, progression from stages one to 13 is accomplished with daily practice after two weeks; after six months' training most children achieve at least stage seven.

The programme has not only improved periodontal health but also has provided satisfaction for the handicapped in that they have achieved a measure of self-help. After more intensive training a smaller proportion

of the unmanageable children also have been successful in cleaning their own teeth. In this way the totally dependent children have been reduced in number and are now receiving more intensive help from the available staff.

4.7 Coordination Characteristics

Coordination characteristics of handicapped children within a dental environment presented fewer difficulties than those related to their behaviour. In fact, 78.6 per cent of the children were assumed to be able to receive treatment under normal dental surgery conditions. The majority of the children with spina bifida, muscular dystrophy or cerebral palsy potentially were the least coordinated, but a high proportion of these already were receiving regular dental care.

Minor modifications of dental surgery facilities may be required in some instances for the successful treatment of poorly coordinated children. A useful method has been to seat a physically handicapped child in a modified bean bag which fits to the child's body contour and results in greater cooperation because of increased comfort for the patient. In addition, abnormal movements of cerebral palsied children can be limited by maintaining the child in flexion and in a symmetrically neutral position.

CHAPTER V

CONCLUSIONS

The present study has made possible the planning and implementation of preventive and treatment programmes of dental care for handicapped children. Furthermore, self-care in oral hygiene has been achieved by careful conditioning and training of children in institutions. This has resulted in a degree of independence which has released staff to care for the oral hygiene of the more severely handicapped.

A need exists for the parents of handicapped children to be made more aware of the available treatment facilities and the success afforded by preventive measures. Instruction in the techniques of cleaning children's teeth or training the child in self-help should be readily available. In addition, parents and staff of welfare services need to be made familiar with existing dental services so that frequent examinations can be made and treatment provided if required.

Many handicapped children do not receive dental treatment because it is thought that their behaviour requires the use of general anaesthesia. In fact, by shaping, rapport-building and modeling, good cooperation is frequently obtained and the necessity for general anaesthesia markedly reduced. Undergraduate and postgraduate courses should be included in the dental curriculum and in continuing education programmes to familiarize students and practising dentists with the most prevalent types of handicap and the associated behavioural and coordination characteristics. Methods of reducing the unfavourable characteristics could be outlined to simplify the delivery of treatment under routine conditions.

Existing general anaesthetic facilities meet the present needs, particularly if more of the less severely handicapped can be trained to accept dental treatment under local anaesthesia.

To accommodate the physically handicapped, dental chairs often need minor changes such as the addition of modified bean bags to improve patient comfort; a number of children also can be treated while seated in a wheel chair. It may therefore be necessary for dentists to adapt their surgeries in a number of ways to assist in the delivery of care to some handicapped children.

The information derived from this study has identified the handicapped child population and the scope and type of dental care previously available to children with different types of handicap. In addition, the data will assist in the planning of additional services which are required to adequately meet the needs outlined in this report.

CHAPTER VI

APPENDICES

1. Letter of Introduction (1)

THE UNIVERSITY OF ADELAIDE

Adelaide · South Australia · 5001

Department of Dental Health
'Phone 223 4333

March 25, 1975.

Dear

I am writing to seek your permission for Dr. Fraser Gurling to obtain information on the handicapped children enrolled in your Organisation. Dr. Gurling is a member of the staff of the School Dental Services and he has been granted a year's leave of absence to undertake postgraduate study in our Department.

In the future it is planned that the School Dental Services will provide dental care for handicapped children. As the first stage in the programme of study we have arranged, Dr. Gurling will "determine the population of handicapped children in South Australia, the age range, area of residence and the type of handicap" and present a thesis on this.

Later he will be engaged in a second and a third stage and these will relate to (1) dental needs, and (2) proposals for a service to meet these needs.

I should be most grateful if your Organisation could assist Dr. Gurling in his investigation. If you are agreeable, he will in the near future circulate a questionnaire for completion by parents and guardians of the children. It would be greatly appreciated if you could aid in the distribution and collection of these questionnaires. Dr. Gurling will get in touch with you to discuss this matter with you.

Yours faithfully,

A.M. HORSNELL,
Professor.

2. Letter of Introduction (2)

THE UNIVERSITY OF ADELAIDE

Adelaide · South Australia · 5001

Department of Dental Health
'Phone 223 4333

Dear

In the future it is planned that the School Dental Service will provide dental care for all handicapped children in South Australia. Although many of these children do not show any physical abnormalities some have conditions which are a problem to a dentist and prevent their receiving adequate care.

Dr. Fraser Gurling, a member of the School Dental Service, has been granted a year's leave of absence so that he can undertake postgraduate study in the Department of Dental Health. His activities during this time are being directed to an investigation of handicapped children in this State and setting up of a dental service for them. Dr. Gurling has prepared an anonymous questionnaire which has been designed to determine the difficulties some parents have in obtaining suitable dental care for their children. Mr. E. Lasscock, the Superintendent of Special Education, has given Dr. Gurling permission to contact you and to seek your co-operation in distributing this questionnaire.

If your School is not too far from Adelaide, Dr. Gurling will deliver the questionnaires personally and will explain the scheme to you; the more distant Schools will receive the questionnaires by post.

Although your School may be served by a Dental Clinic at the present time, a questionnaire should still be completed by the parents of all the handicapped children who are enrolled with you.

Questionnaires are being distributed to Special Schools for Mentally Retarded Children, Special Small Classes, Opportunity Classes in Primary Schools, Special Classes in Secondary Schools (children up to 16 years) and Speech and Hearing Centres. For this reason your School has been included in the survey.

I should be most grateful if you would assist in the distribution and return of the questionnaires. You will appreciate that a high response from the parents is essential so that we can obtain the necessary information to ensure the successful setting up of a dental service for handicapped children.

Yours faithfully,

ELIZABETH A. FANNING,
Reader in Preventive Dentistry.

3. Questionnaire - first page

FOR OFFICE USE ONLY

Serial Number C1 [ ][ ][ ][ ][ ][ ] C6

Location Code C7 [ ][ ][ ][ ] C10

THE UNIVERSITY OF ADELAIDE

DEPARTMENT OF DENTAL HEALTH

DENTAL SURVEY OF HANDICAPPED CHILDREN IN S.A.

At the present time plans are being made to set up a dental service for handicapped children in South Australia. The information obtained from the questionnaire will enable the School Dental Service to design suitable clinics in the areas where they are required.

As we do not need to know the names and addresses of the children, the questionnaires are being forwarded to you via the Organisations or Schools in which your child is registered. It is possible that you may receive more than one questionnaire and if so, would you please complete and return only ONE for each child in your care. Please return all the other questionnaires you may receive, but mark them with an X in this box: [ ]

FIRST LETTER OF CHILD'S SURNAME:

(For example, Smith would be S)

C11 [ ]

FIRST LETTER OF THE CHILD'S FIRST TWO CHRISTIAN NAMES:

(If only one christian name fill in box C12 only)

C12 C13 [ ][ ]

SEX: (please tick appropriate box)

C14

MALE [ ] 1

FEMALE [ ] 2

DATE OF BIRTH: (give the Day, Month and Year)

Day .....

Month .....

Year .....

C15 C16 [ ][ ] Day

C17 C18 [ ][ ] Month

C19 C20 [ ][ ] Year

POSTCODE OF THE CHILD'S RESIDENCE:

C21 [ ][ ][ ][ ] C24

P.T.O.

3. Questionnaire - second page

We are interested in your child's ability to carry out tasks of everyday living. In order to help us determine this, please answer the following questions as accurately as possible by ticking the appropriate boxes so ☑

1. Please tick all of the following conditions, if any of them apply to the child:

(1)	Cerebral Palsy	☐ C25
(2)	Mental Retardation	☐ C26
(3)	Epilepsy	☐ C27
(4)	Blindness	☐ C28
(5)	Deafness	☐ C29
(6)	Spina Bifida	☐ C30
(7)	Mongolism	☐ C31
(8)	Heart Abnormality	☐ C32
(9)	Muscular Dystrophy	☐ C33
(10)	Autism	☐ C34
(11)	Other (specify ....)	☐ C35

2. Please indicate if your child has a problem with ANY of the following which could possibly complicate a visit to a dentist:

Please answer ALL of the eleven sections by ticking appropriate boxes.

		A significant handicap 1	A minor handicap 2	No handicap 3	
(1)	Sitting up	☐	☐	☐	C36
(2)	Sitting still	☐	☐	☐	C37
(3)	Using arms and/or legs	☐	☐	☐	C38
(4)	Talking (if old enough)	☐	☐	☐	C39
(5)	Walking (if old enough)	☐	☐	☐	C40
(6)	Seeing	☐	☐	☐	C41
(7)	Hearing	☐	☐	☐	C42
(8)	Following spoken instructions	☐	☐	☐	C43
(9)	Attention span	☐	☐	☐	C44
(10)	Control of bladder and/or bowels	☐	☐	☐	C45
(11)	Fear of strangers	☐	☐	☐	C46

P.T.O.

3. Questionnaire - third page

DENTAL CARE

Please answer ALL OF THE FOLLOWING QUESTIONS by ticking the appropriate boxes so ☑

1. Do you have a dentist who is willing to treat the child? — C47

YES	☐ 1
NO	☐ 2
DON'T KNOW	☐ 3

2. How often has the child been EXAMINED by a dentist? — C48

(1) Has never been examined	☐ 1
(2) Examined less than once a year	☐ 2
(3) Examined once a year	☐ 3
(4) Examined more than once a year	☐ 4

3. How often has the child been TREATED by a dentist? — C49

(1) Has never been treated	☐ 1
(2) Treated less than once a year	☐ 2
(3) Treated once a year	☐ 3
(4) Treated more than once a year	☐ 4

4. How important would each of the following be in determining how often the child was taken to a dentist?

(1) Transport facilities	a. not important	C50 ☐ 1
	b. some importance	☐ 2
	c. very important	☐ 3
(2) Cost	a. not important	C51 ☐ 1
	b. some importance	☐ 2
	c. very important	☐ 3
(3) Difficulty YOU HAVE in managing the child	a. not important	C52 ☐ 1
	b. some importance	☐ 2
	c. very important	☐ 3
(4) Inconvenient location of a dentist	a. not important	C53 ☐ 1
	b. some importance	☐ 2
	c. very important	☐ 3

P.T.O.

3. Questionnaire - fourth page

C54

5. Has a dentist been unable to treat the child in his own surgery because he found the child too difficult to manage?

YES ☐ 1
NO ☐ 2
DON'T KNOW ☐ 3

6. DURING 1974 to the best of your knowledge the child (Tick ONE box only)

C55

(1) Did not visit a dentist ☐ 1

(2) Visited a dentist ONLY in an emergency such as the care of an aching or fractured tooth ☐ 2

(3) Visited a dentist for general care but no teeth required treatment ☐ 3

(4) Visited a dentist for general care and although treatment was required none was provided ☐ 4

(5) Visited a dentist for general care and some but not all the necessary treatment was provided ☐ 5

(6) Visited a dentist for general care and all necessary treatment was provided ☐ 6

C56

7. PRIOR TO 1974 to the best of your knowledge has ALL necessary treatment been provided by a dentist?

YES ☐ 1
NO ☐ 2
DON'T KNOW ☐ 3

C57

8. Has the child ever had a general anaesthetic for dental treatment?

YES ☐ 1
NO ☐ 2
DON'T KNOW ☐ 3

C58

9. Do you consider at this time the child would require a general anaesthetic for fillings?

YES ☐ 1
NO ☐ 2
DON'T KNOW ☐ 3

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

4. Explanatory Letter to Respondents

THE UNIVERSITY OF ADELAIDE

Adelaide · South Australia · 5001

Department of Dental Health
'Phone 223 4333

April 2, 1975

Dear Parent or Guardian:

At the present time plans are being made to set up a dental service for handicapped children in South Australia. This questionnaire is being sent to you so that you can provide us with details of the child's age, the previous dental treatment received and the type of handicap possessed by the child in your care. The information obtained from the questionnaire will enable the School Dental Service to design suitable clinics in the areas where they are required.

As we do not need to know the names and addresses of the children, the questionnaires are being forwarded to you via the organisations in which the child is registered. It is possible that you may receive several questionnaires and if so, would you please complete and return only ONE for each child in your care.

Thanking you for your co-operation in the matter.

Yours sincerely,

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

5. Explanatory Letter to Headmasters

THE UNIVERSITY OF ADELAIDE

Adelaide · South Australia · 5001

Department of Dental Health
'Phone 223 4333

May 6, 1975.

Dear

Further to the recent letter you will have received from Dr. Fanning, I am now seeking your assistance in the distribution of the enclosed questionnaires. These questionnaires are being sent to pupils attending Special Schools for Mentally Retarded Children, Special Small Classes, Opportunity Classes in Primary Schools, Special Classes in Secondary Schools (children up to 16 years) and Speech and Hearing Centres. For this reason your School has been included in the survey.

I should be most grateful if you would forward one questionnaire to the parent or guardian of each pupil in the above category. When the questionnaires have been completed, they are to be returned to the Department of Dental Health, University of Adelaide. Could you also enclose a note to me to indicate the number of forms distributed and the number returned.

I am most appreciative of your co-operation in this matter and I hope it does not cause you too much inconvenience.

Yours faithfully,

DR. FRASER G. GURLING

6. Explanatory Letter to Organizations

THE UNIVERSITY OF ADELAIDE

Adelaide · South Australia · 5001

Department of Dental Health
'Phone 223 4333

June 3, 1975

Dear

Further to the recent letter you would have received from Professor Horsnell, I am now seeking your assistance in the distribution of the enclosed questionnaires.

I would be most grateful if you would forward one questionnaire and one self-addressed envelope to the parents or guardian of each child enrolled in your Organisation. Could you please return to the above address all of the unused forms, so that I may gauge the response rate, and also an account for your expenses.

I am most appreciative of your co-operation in this matter and I hope it does not cause you too much inconvenience.

Yours faithfully,

DR. FRASER G. GURLING

Enc.

7. Instruction Slips to Respondents

Dear Parent or Guardian:

The Education Department is collaborating with the Department of Dental Health of the University of Adelaide to determine the type of dental facilities required to treat handicapped children. Your co-operation in completing the attached questionnaire and returning it to the child's School as soon as possible would be greatly appreciated.

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

Dear Parent or Guardian:

The Crippled Children's Association is collaborating with the Department of Dental Health of the University of Adelaide to determine the type of dental facilities required to treat handicapped children. Your co-operation in completing the attached questionnaire and returning it in the self-addressed envelope would be greatly appreciated.

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

Dear Parent or Guardian:

The Organisation in which your child is registered is collaborating with the Department of Dental Health of the University of Adelaide to determine the type of dental facilities required to treat handicapped children. Your co-operation in completing the attached questionnaire and returning it to the Centre the child attends would be greatly appreciated.

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

Dear Parent or Guardian:

The Organisation in which your child is registered is collaborating with the Department of Dental Health of the University of Adelaide to determine the type of dental facilities required to treat handicapped children. Your co-operation in completing the attached questionnaire and returning it in the self-addressed envelope would be greatly appreciated.

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

Dear Parent or Guardian:

The Intellectually Retarded Service is collaborating with the Department of Dental Health of the University of Adelaide to determine the type of dental facilities required to treat handicapped children. Your co-operation in completing the attached questionnaire and returning it to the Day Centre the child attends would be greatly appreciated.

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

8. Explanatory Slip to Respondents

Dear Parent or Guardian:

The Crippled Children's Association is collaborating with the Department of Dental Health of The University of Adelaide to determine the type of dental facilities required to treat handicapped children. When this information is available the School Dental Service will provide free dental treatment for these children.

Because a number of parents have not yet supplied the information we need, the survey is being repeated and we should be most grateful if you would assist us by completing and returning the enclosed form in the reply-paid envelope as soon as possible.

Elizabeth A. Fanning,
Reader in Preventive Dentistry.

9. Letter of Request to Headmasters

THE UNIVERSITY OF ADELAIDE

Adelaide · South Australia · 5001

Department of Dental Health
'Phone 223 4333

July 31, 1975

Dear

Following our recent telephone conversation, Mr. Sharman and Mrs. Duncan, a senior social worker, and myself discussed methods of obtaining a much higher return of the dental questionnaires. For diplomacy sake, we thought it best if the request to the parents for greater cooperation came from yourself, as the questionnaires are potentially anonymous. Could you possibly compose a letter to each parent along the lines of your concern for the poor response and how you feel that it is essential that each form is returned? A more efficiently planned free dental scheme for their children will therefore be available sooner. If the parents have difficulties in completing the questionnaire, you could suggest that either the school staff or social workers would be more than willing to assist.

I have made a list of the initials, sex and birth date of each child who has returned a form so you can determine those outstanding. Could you please send one of the new forms to the parent of each child who is not on this list, with your letter attached.

I would greatly appreciate your checking and correcting each returned questionnaire for mistakes on the reverse side of the first page (the diagnosis and functioning questions). Would you also please keep a record of the number of forms distributed and returned.

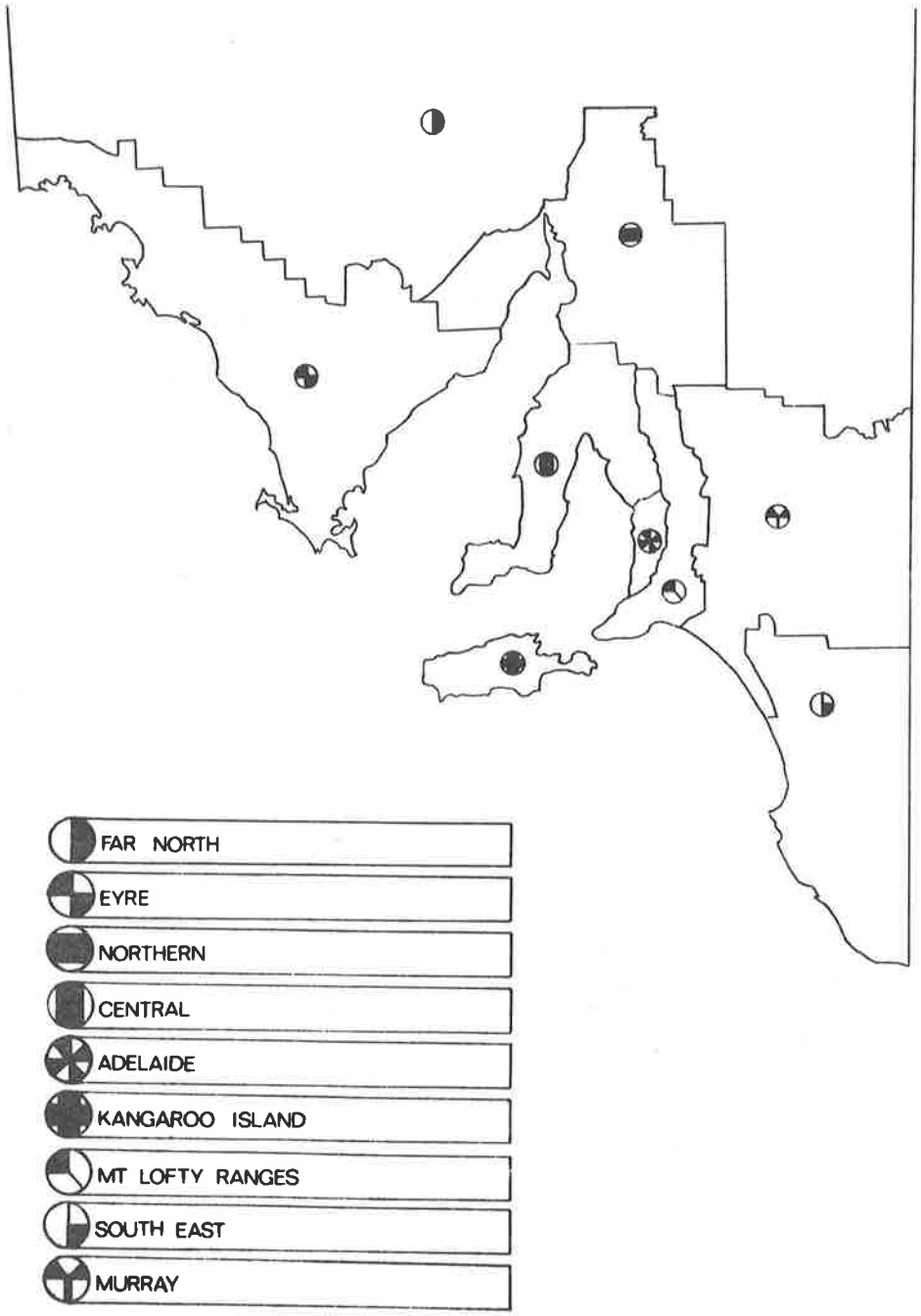
Could you please post all of the completed questionnaires to me as soon as possible. Please enclose your record of numbers distributed and returned.

I greatly appreciate your past assistance and sincerely hope that this does not inconvenience you too much.

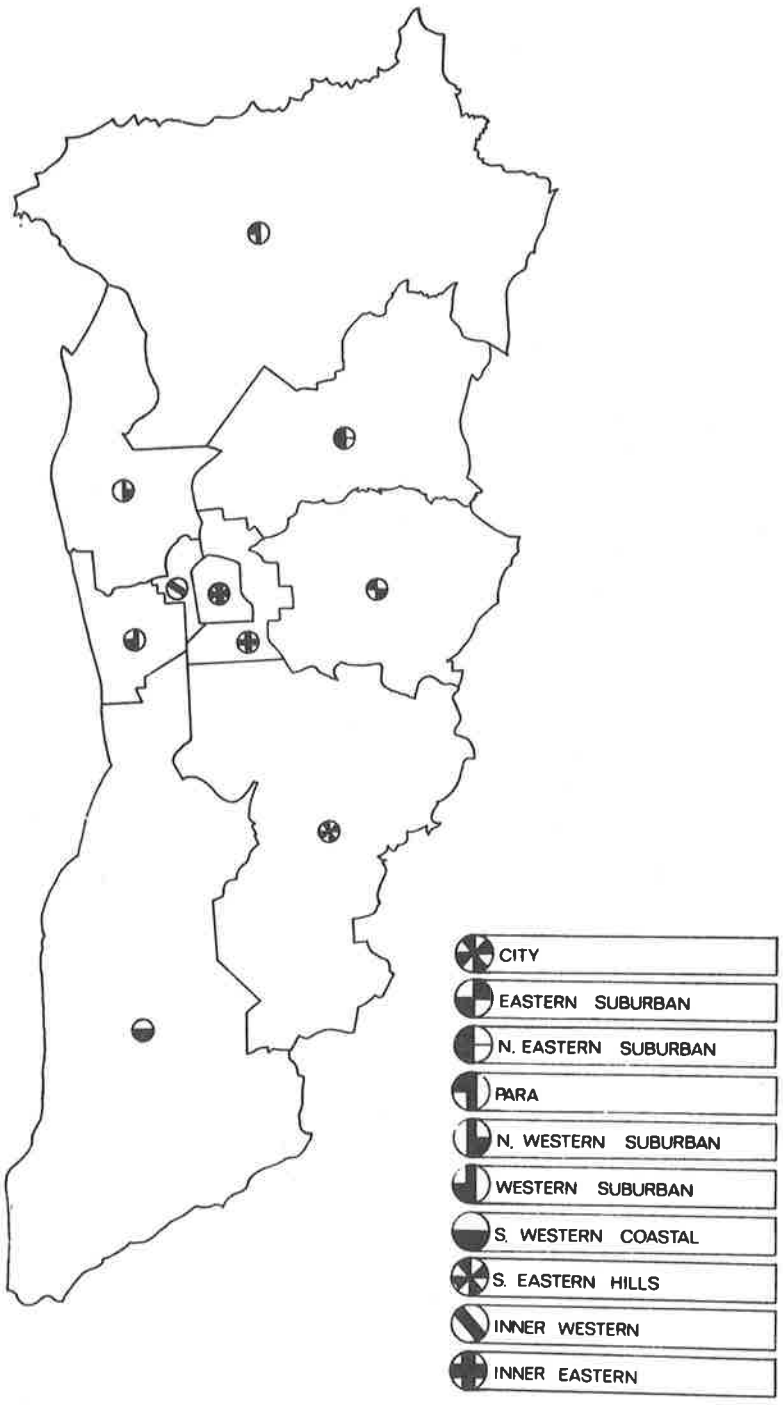
Yours sincerely,

DR. FRASER G. GURLING

10. Map: Statistical Boundaries in South Australia



11. Map: Statistical Boundaries in Adelaide Division



12. Behavioural and Coordination Assessment Sheet - first page

BEHAVIOURAL AND COORDINATION ASSESSMENT OF HANDICAPPED CHILDREN

Sex of Child

Male ☐ C1

Female ☐ C2

Date of Birth: C3 C4 ☐☐ Day; C5 C6 ☐☐ Month; C7 C8 ☐☐ Year

Please tick all of the following conditions, if any of them apply to the child:

Cerebral Palsy	☐ C9
Mental Retardation	☐ C10
Epilepsy	☐ C11
Blindness	☐ C12
Deafness	☐ C13
Spina Bifida	☐ C14
Mongolism	☐ C15
Heart Abnormality	☐ C16
Muscular Dystrophy	☐ C17
Autism	☐ C18
Other (Specify	☐ C19

P.T.O.

12. Behavioural and Coordination Assessment Sheet - second page

Please indicate if the child has a problem with ANY of the following which could possibly complicate a visit to a dentist:

Please answer ALL of the eleven sections by ticking appropriate boxes.

	A significant handicap	A minor handicap	No handicap	
	1	2	3	
Sitting up	☐	☐	☐	C20
Sitting still	☐	☐	☐	C21
Using arms and/or legs	☐	☐	☐	C22
Talking (if old enough)	☐	☐	☐	C23
Walking (if old enough)	☐	☐	☐	C24
Seeing	☐	☐	☐	C25
Hearing	☐	☐	☐	C26
Following spoken instructions	☐	☐	☐	C27
Attention span	☐	☐	☐	C28
Control of bladder and/or bowels	☐	☐	☐	C29
Fear of Strangers	☐	☐	☐	C30

OFFICIAL USE ONLY

BEHAVIOURAL ASSESSMENT

C31

Manageable	☐ 1
Unmanageable	☐ 2

COORDINATION ASSESSMENT

C32

Coordinated	☐ 1
Uncoordinated	☐ 2

CHAPTER VII

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