Manual for Training of
PHC Medical Officers

Prepared for :
National Programme on Orientation of Medical Officers
Working in Primary Health Centres to
Disability Management

Sponsored by :
REHABILITATION COUNCIL OF INDIA
(A Statutory Body Under the Ministry of Social Justice and Empowerment)

23 A, Shivaji Marg, (Near Karampura Complex),
New Delhi-110015

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Manual for Training of PHC Medical Officers

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The Rehabilitation Council of India is a Statutory Body set up by the Govt. of India to regulate the training, education of rehabilitation Professionals/Personnel and register the names of rehabilitation Professional/Personnel who possess the recognised rehabilitation qualification in the Central Rehabilitation Register. The Council standardises curricula and lays down policy parameters regarding rehabilitation qualifications of various categories of Professionals/Personnel dealing with the person with disabilities in the country. At present, the RCI Act covers the following categories of professionals.

(i) Audiologists and Speech Therapists;
(ii) Clinical Psychologists;
(iii) Hearing Aid and Ear Mould Technicians;
(iv) Rehabilitation Engineers and Technicians;
(v) Special Teachers for Education and Training of the Handicapped;
(vi) Vocational Counsellors, Employment Officers and Placement Offices dealing with the handicapped;
(vii) Multipurpose Rehabilitation Therapists and Technicians;
(viii) Speech Pathologists;
(ix) Rehabilitation Psychologists;
(x) Rehabilitation Practitioners in Mental Retardation;
(xi) Rehabilitation Practitioners in Mental Retardation;
(xii) Orientation and Mobility Specialists;
(xiii) Community Based Rehabilitation Professionals;
(xiv) Rehabilitation Counsellors/Administrators;
(xv) Prosthetists and Orthotists;
(xvi) Rehabilitation Workshop Managers; and
(xvii) Such other category of Professionals/Personnel as the Central Govt. may, in consultation with the Council, notify from time to time.

The Council has standardised 55 training programmes in different categories of disabilities i.e. form certificate level to post graduate level and Institutions/Universities recognised by the RCI conduct these programmes. The Council keeps on updating and adding new training programmes as per the requirement of the country.

More than 123 training Institutions/Universities have been accorded approval to run various training programmes in the field of Special Education/Rehabilitation of the disabled. The Council has also registered a large number of Professionals/Personnel in the Central Rehabilitation Register and issued them registration certificates. These certificates and valid for employment and self practice in their field of disabilities.

The training institutes who run or intend to run any training programme in the field of rehabilitation of the disabled are required to seek approval of RCI as per provisions of the RCI Act. The ambit of the RCI covers all modes of Rehabilitation Professionals/Personnel training and all types of Organisations (GOs/NGOs) in the country which offer training to Rehabilitation Professionals in different fields of disabilities, be it an institution or an affiliated college of education or a Department of a University. For further details, contact Mr. J. P. Singh, Member Secretary, RCI.

MAJOR H.P.S. AHLUWALIA
Chairman
Preface

India has a large number of disabled population numbering about 100 million. This number is expected to increase substantially by the year 2020 in view of the rapid changing demographic profiles and morbidity patterns. No country can afford to carry such a heavy load of disability, as it would affect the quality of human living and the productivity of the Nation. Services for prevention, early detection, intervention and rehabilitation in rural India, even after 52 years of independence are minimal. Hence, there is an urgent need to develop services for the disabled in rural areas, by building up the linkages through convergence.

Rural health infrastructure with its vast network of sub-centres, Primary Health Centres, CHCs and district hospitals is the only delivery mechanism that could offer services in rural areas with suitable training of personnel like doctors, ANMs, multipurpose health workers and strengthening of the existing infrastructure. This network could deliver the required services in rural areas with minimum costs. Rehabilitation Council of India has, therefore, taken up a 3-day National Programme for the orientation of Medical Officers of the Primary Health Centres throughout the country on various issues relating to disabilities.

Clear standards and effective quality assurance within clinical teams must be the way forward - "prevention is better than cure". Good medical and rehabilitation practices and sound medical governance are the keys to the way forward, for an integrated management of disabled persons. The task is to extend this good practice forward by building up linkage at the grass root level and promote referral.

This is the first time the linkage is being built up at Primary Health Centre which on an average covers 30,000 population, with an ancillary support of sub-centres covering 5000 population each. This is the best outreach to spread the referral on Disability mode contemplated by the Rehabilitation Council of India. For this purpose, this Manual dealing with the four areas of disabilities i.e., Mental Retardation, Hearing and Speech Impairments, Visual Impairments and Locomotor Disability has been prepared for guiding the process of curriculum impartation at the training centres. The Manual has been prepared by a body of distinguished experts working in each of these areas to serve as a useful basic document for the doctors working in the Primary Health Centres. I trust this humble effort of RCI which is taken up on a massive scale will accrue benefits to the service of persons with disabilities. I finally appeal to the Doctors working in the Primary Health Centres to serve with empathy in the area of disability.

Dr. Thakur V. Hari Prasad

Chairman

Rehabilitation Council of India
PREFACE TO THE REVISED EDITION

Rehabilitation services in the form of prevention, early identification, intervention and rehabilitation have all along been neglected and the reach of the services is scattered in far-flung pockets. Their reach is not more than one per cent of the entire disabled population. Even after 50 years of planned development, the rehabilitation services have not reached to the rural areas. At present PHC’s are the only structures, which are functioning through out the country and have the necessary infrastructure for providing services. It was felt that by sensitizing the doctors working in the PHC’s on some of the important aspects of prevention, early identification and intervention, they would be in a position to render valuable services for people in rural areas. Hence RCI has proposed a three day training programme of all the 30,000 Medical Officers in all over India on prevention, early identification and rehabilitation of disabled.

For training of Medical Officers this manual has been prepared and distributed to all the Master Trainers as well as to the Medical Officers being trained. The manual has received a lot of appreciation, for its comprehensive coverage and presentation from various people working on disability issues. However, from the experience gained in the implementation of the programme and keeping conformity with the Persons with Disability Act, 1995, it had become necessary to update the manual. Earlier the manual dealt with four areas of disability, i.e. Mental Retardation, Hearing and Speech Impairments, Visual Impairments and Locomotor Disability. Now another chapter on “Multiple Disability and Miscellaneous Conditions” has been added to make it comprehensive.

I am sure that the revised manual will prove more useful for all the users and help in providing better services to persons with disability.

(MAJOR H.P.S. AHLUWALIA)
Chairperson
REHABILITATION COUNCIL OF INDIA
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The Council expresses special thanks to the committee formed for the revision of the manual.

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Any suggestions to improve this Manual will be highly appreciated

(J.P. Singh)
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# CONTENTS

*Preface*

*Acknowledgements*

I. General Introduction

1. Introduction 5
2. Definitions of Terms Concerned with Disability Process 6
3. Disability Prevention 7
4. Rehabilitation 8
5. Rehabilitation Services in India 9
6. Rehabilitation Council of India 10
8. Community Based Rehabilitation 11
    References 13

II. Locomotor Disability

1. Definition of Locomotor Disability 19
2. Causes of Locomotor Impairments 19
3. Prevention of Locomotor Impairments 21
4. Principles of Management of Locomotor Impairments 22
5. Aids & Appliances 35
6. Maintainence and Care of Aids and Appliances 42
7. Psycho-Social Rehabilitation 44
III. Mental Retardation

1. Introduction
2. Prevalence
3. Definition
4. Understanding the Nature of the Problem
5. Needs of the children with Mental Retardation
6. Classification
7. Associated Disabilities
8. Etiology of Mental Retardation
9. Prevention
10. Management of Persons with Mental Retardation
11. Methodology of Teaching Children with Mental Retardation
12. Services for Prevention, Early Identification, Intervention Rehabilitation and Integration Available for the Mentally Retarded in the Country

References 48

Appendix ‘A’ 102-106

IV. Visual Impairment

1. Evolutionary Process in the Change of Attitudes
2. Limitations of Blindness
3. Definitions

References 101

Appendix ‘A’ 102-106
4. Refractive Errors
5. Common Eye Diseases
6. Other Eye Disorders
7. Loss in the Visual Field
8. Psycho - Social Implications of Blindness
9. Need for Community Orientation
10. Effects of Early Blindness on Personality Development
11. Orientation & Mobility
12. Daily living Skills
13. Educational Services
14. Plus Curricular Activities
15. Rehabilitation Services
16. Early Identification of Visually Impaired Children
17. Auxiliary Services
18. Conclusion

References

V. Hearing and Speech Impairment

1. Definition of Hearing Impairment
2. Prevalence
3. Classification of Hearing Loss
4. Degree of Hearing Loss
5. Effects of Hearing Loss
6. Causes of Hearing Loss
General Introduction
<table>
<thead>
<tr>
<th></th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Definitions of Terms Concerned with Disability Process</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Disability Prevention</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Rehabilitation</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Rehabilitation Services in India</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>Rehabilitation Council of India</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>Persons with Disabilities Act, 1995</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Community Based Rehabilitation</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>13</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

Some diseases have a short course and some prolonged course. The end point of the final outcome of the disease is variable. It may be either recovery or disability or death. The goals of medicine are to promote health, to preserve health, to cure the diseases, and to rehabilitate the persons in case of disabilities.

National Health Policy

The National Health Policy evolved by the Ministry of Health and Family Welfare in 1983 lays stress on the preventive, promotive, curative and rehabilitation aspects of health care and points to the need of establishing comprehensive primary health care services to reach the population in the remotest areas of the country.

One of the important steps in the action plan is to shift the emphasis from the curative to the preventive and promotive aspects of health care. To further this step the Government of India has launched National Programmes from time to time like the National Malaria Eradication programme, National Tuberculosis Programme, National Leprosy Eradication Programme, National Programme for Control of Blindness, Iodine Deficiency Disease Programme, Diarrhoeal Disease Control Programme, Universal Immunization Programme, and, the National Aids Control Programme. The main aim of these programmes is to reduce the incidence of certain diseases, and the resultant disability subsequently arising out of them.

Disability Incidence

Although there are no comprehensive surveys to know the exact incidence of disability it has been estimated by WHO that approximately 10 per cent of a given population suffer from disability of one kind or other. In India some sample surveys have been conducted and it is estimated that at least 2-5 per cent of Indian population is suffering from some kind of disability. It is also evident that India has a large number of disabled population because of the population explosion.

The Process of Disability

It is important to understand the process of genesis of disability, especially from the point of view of prevention of disability. To explain it let us take the example of a person who has met with a
traffic accident and has lost his one leg below the knee (impairment).

The loss of the leg by this person will result in decreased mobility, like walking, running, going to place of work etc. (Functional Limitation). In addition to the physical loss of the limb, the patient also suffers from psychological setback and it can also lead to loss of his earning capacity. In addition to the consequences of the disability upon the disabled person himself, the family, the society and the nation as a whole also has to face the consequences of the disability. The family has to directly face the burden of supporting the disabled person physically, socially, and, mentally. The society has to cope up with the increased demands and the country as a whole has to spend on the care of the disabled and decreased productivity because of the disability resulting in low G.N.P. (Gross National Product).

2. DEFINITIONS OF TERMS CONCERNED WITH THE DISABILITY PROCESS

Impairment

An impairment is a permanent or transitory anatomical, physiological or psychological loss or abnormality e.g. a missing limb, paralysis after polio, mental retardation etc.

Functional Limitation

Impairment may cause functional limitations which are partial or total inabilities to perform those activities necessary for motor, sensory or mental functions within the range and manner of which a human being is normally capable e.g. walking, seeing, speaking, hearing etc.

Disability

It is defined as an existing difficulty in performing one or more activities which in accordance with the subject’s age, sex and normative social role are generally accepted as essential basic components of daily living.

There are many components that interact with each other in disability process.

1. The patient
2. The Environment
The patient has two components - disease and psychological response.

The environment also has two components - social and vocational.

Disease factors are reciprocally influenced by psychological factors. On the other hand social factors are mutually influenced by vocational factors. That means that the patient and the environment mutually influence each other resulting in a disability.

In 1998, the WHO has proposed revision of these definitions (ICIDH-2 betadraft - unpublished). These are as follows:-

**Impairment**

An impairment is a loss or abnormality of body structure or of a physiological or psychological function.

**Activity Limitation**

Activity is the nature and extent of functioning at the level of the person. Activities may be limited in nature, duration and quality.

**Participation Restriction**

Participation is the nature and extent of a person’s involvement in life situation in relationship to impairments, activities, health conditions and contextual factors. Participation may be restricted in nature, duration and quality.

**3. DISABILITY PREVENTION**

The old dictum “prevention is better than cure” still holds good in the modern day world. Prevention is usually defined at three levels - primary, secondary and tertiary prevention.

**Primary Prevention**

Primary prevention can be defined as “action taken prior to the onset of the disease”, which remove the possibility that a disease will occur. Primary prevention may be accomplished by measures
Manual for Training of PHC Medical Officers

designed to promote general health and well being and quality of life of the people or by specific protective measures. It includes the concept of “positive health”, a concept that encourages achievement and maintenance of an “acceptable level of health that will enable every individual to lead a socially and economically productive life. It concerns an individual’s attitude towards life and health and the initiative he takes about the positive and responsible measures for himself, his family and the community.

Common examples of primary preventive measures are

1. Proper antenatal, natal and post natal care, to prevent child born with disability
2. Avoid consanguineous marriages
3. Prevention of accidents
4. Proper immunisation to prevent diseases like polio

Secondary Prevention

It can be defined as”action which halts the progress of the disease at its incepient stage and prevents complications. The specific interventions are “early diagnosis and adequate treatment”. It is largely the domain of the clinical medicine.

Tertiary Prevention

When the disease process has advanced beyond its early stages it is still possible to accomplish prevention by tertiary prevention. It signifies intervention in the late pathogenesis phase.

Tertiary prevention can be defined as all measures available to reduce or limit impairments and disabilities and minimise suffering caused by existing disability. The tertiary phase of prevention is also called rehabilitation, which includes physical, psychosocial and vocational measures taken to restore the patient back to normal or near normal condition.

4. REHABILITATION

Rehabilitation has been defined as the “combined and coordinated use of medical, social, educational and vocational measures for training and retraining the individual to the highest possible level of functional ability”. It includes all measures aimed at reducing the impact of disabling conditions
and at enabling the disabled to achieve social integration. Social integration has been defined as the active participation of the disabled people in the mainstream of community life. Rehabilitation medicine has emerged in recent years as a medical speciality. It involves disciplines such as physical therapy, occupational therapy, audiology and speech therapy, psychosocial work, prosthetics and orthotics, education, vocational guidance and placement.

1. By medical rehabilitation we mean restoration of function.
2. Vocational rehabilitation means restoration of the capacity to earn livelihood.
3. Social rehabilitation means restoration of family and social relationship.
4. Psychological rehabilitation means restoration of personal dignity and confidence of the disabled person.

5. REHABILITATION SERVICES IN INDIA

In India, the nodal ministry to plan the rehabilitation services for the disabled persons is the Ministry of Social Justice and Empowerment. The medical rehabilitation component is being taken care of by the Ministry of Health and Family Welfare. The other Ministries involved are Labour, Human Resource Development, Information and Broadcasting, Rural Development and Urban Development etc.

Intra sectoral and inter sectoral coordination amongst the various ministries is the key factor for the smooth implementation of the various rehabilitation programmes.

Presently, there are National level institutions in each area of disabilities viz. locomotor, hearing and speech, visual and mental retardation. These are under the direct control of the Ministry of Social Justice and Empowerment. Some of them have regional centres in various states. Their main activities are provision of nodal services in their respective area, manpower development, research and planning. They also act as referral centres, when the patient’s needs cannot be dealt with at the peripheral levels.

An Artificial Limb Manufacturing Corporation (ALIMCO) has been set up at Kanpur to produce aids and appliances required by the disabled persons to assist in regaining their lost functions.

Under the Ministry of Health and Family Welfare, there are Rehabilitation centres in some of the Medical colleges, which provide institutional based rehabilitation services and also engaged in manpower development in the speciality of rehabilitation, both medical and paramedical. They
Iso act as referral centres.

In addition to these, a large number of Non-Governmental Organisations (NGO’S) are providing need based services specially in the area of education, training and therapeutic interventions.

6. REHABILITATION COUNCIL OF INDIA

Rehabilitation Council of India (RCI) which is a statutory body came into being in 1993, on the lines of Medical Council of India, whose primary function is to regulate the manpower training by standardising the various training programmes in the field of Rehabilitation, so that quality services could be planned and provided to the disabled masses.

7. PERSONS WITH DISABILITIES ACT, 1995

In the year 1995, a Bill entitled “Persons with Disabilities, (Equal opportunities, Protection of Rights and Full Participation) Act, 1995” was passed by the Parliament, which was made into a law. The Purpose of the Bill is to fix responsibilities on the Central and State Governments to the extent their resources permit, to provide services, create facilities and give support to people with disabilities in order to enable them to have equal opportunities in participating as productive and contributing citizens of the country to their fullest extent. It fixes its responsibilities on the governments (Central and State) to ensure that disabilities do not prevent individual citizens of this country from living a dignified life and making full contribution by each in accordance with his/her ability. This act provides a framework within which specific demands can be made by the disabled persons in order to ensure that the promises made in this Act are honoured by the Government. It is hoped that the Act will enable the fellow citizens with disabilities to become equal partners in Nation building and valuable contributors to socio-economic development of the country.

The Government has from time to time announced concessions for the people with disabilities to facilitate their lives, such as concessions in travel, income tax rebate priority in house allotment etc.

In spite of all these developments, it is estimated that at present, no more than 2-3 per cent of the people who are benefitted from the rehabilitation services. More so, these services are confined to the urban areas only. With the result, the rural disabled population is still deprived of any rehabilitation services.
8. COMMUNITY BASED REHABILITATION

(With this pace, it may even take 100 years to provide universal coverage and rehabilitation to all. Therefore a new strategy termed Community Based Rehabilitation (CBR) was evolved, which has been well experimented in developing countries and found extremely useful to rehabilitate the people with disabilities in the community setting and with community participation). Community Based Rehabilitation is characterised by active role of people with disabilities, their families, and the community in the rehabilitation process. In CBR, knowledge and skills for the training of disabled people are transferred to disabled adults themselves, to their families, and to the community members. A community committee promotes the removal of physical and attitudinal barriers and ensures opportunities for people with disabilities to participate in school, work, leisure, social and political activities within the community. A person is available in the community to work with disabled people and their families in rehabilitation activities. Disabled children attend the local school. Community members provide local job training for disabled adults. Community groups assist the families of disabled people by providing care for their disabled children or adults, transportation, or loans to initiate income-generating activities. Community resources are supported by referral service within the health, education, labour, and social service systems. Personnel with skills in rehabilitation technology train and support community workers, and provide skilled intervention, as necessary.

The World Health Organisation (WHO) model of Community Based Rehabilitation (CBR) is a unique concept, which transfers knowledge and skill to the family member of a Person With Disabilities (PWDs) by using manual and its training packages (TPs) as field tested tools, in order to rehabilitate the disabled person within the community. It also provides referral support from health posts, schools, training centres, and non-governmental organisations (NGOs) whenever and wherever needed. The programme operates through a village level committee called Community Rehabilitation Committee (CRC), which varies in its constitution in different countries, but it is essential for this CRC to be EMPOWERED. The person with disabilities is served through a network of family trainer, local supervisors (LS) and Middle level worker (MLW). The family trainer uses the Training Packages (TPs) to train the PWDs. The local supervisor (LS) identifies and assists the family trainer in this job, monitors the progress and ensures access to referral support when needed and the mid level worker runs the first level referral support and train the local Supervisors (LS). As such the CBR needs to be integrated into Primary Health Care for its effective implementation, monitoring and evaluation. However, need based and system based adaptations are necessary for any country for practice of CBR. In India these adaptations are essentially state/
province based due to its large size and widespread variations of practices.

Hence, health-owned models, welfare-owned models, NGO-owned models and various community owned models of CBR are available in India, which essentially follow the same philosophy of, but differs in its method of transfer and component of knowledge and skill, referral support network, name and number of supervisory, supportive and facilitative staff, text of training packages, primary sources of funding etc.

The final success of any CBR project of PWDs is community ownership, which is essential for sustainability of the programme. Unless and until a development programme is supported from within the community totally, it will remain dependent on outside resources which may be withdrawn any time, thus resulting in failure of programme. The same is true with CBR programme. However, it should not be misunderstood that governmental programmes, running in or developed for community are an outside support. They are as integrated to community structure as any other thing.
REFERENCES

Locomotor Disability
1. Definition of Locomotor Disability 19
2. Causes of Locomotor Impairments 19
3. Prevention of Locomotor Impairments 21
4. Principles of Management of Locomotor Impairments 22
5. Aids and Appliances 35
6. Maintainence and Care of Aids and Appliances 42
7. Psycho-Social Rehabilitation 44
8. Vocational Rehabilitation 46

References 48
1. DEFINITION OF LOCOMOTOR DISABILITY

Locomotor disability is defined as a person’s inability to execute distinctive activities associated with moving, both himself and objects, from place to place, and such inability resulting from affliction of musculo-skeletal and, or nervous system.

2. CAUSES OF LOCOMOTOR IMPAIRMENTS

The causes of locomotor disability can be classified as congenital and acquired. The various common causes are as follows:

**Congenital and Developmental**

(a) Cerebral Palsy  
(b) CTEV  
(c) Meningocele, meningo-myelocele  
(d) Phocomelias  
(e) Congenital Dislocation of Hip

**Acquired Causes: Infective Causes**

(a) Tuberculosis  
  1. Spine  
  2. Other Joints  
(b) Chronic Osteomyelitis  
(c) Septic Arthritis  
(d) Acute Poliomyelitis  
(e) G.B. Syndrome  
(f) Leprosy  
(g) Encephalitis  
(h) AIDS

**Traumatic Causes**

(a) Traffic Accidents
Manual for Training of PHC Medical Officers

1. Air
2. Water
3. Road
4. Rail
(b) Domestic Accidents
(c) Fall from height
(d) Bullet injuries, explosions
(e) Violence
(f) Sports injuries
(g) Natural Catastrophies like earthquakes, floods etc.

Vascular Causes

(a) Cerebrovascular Accidents
(b) Amputations due to peripheral vascular disease (Atherosclerosis or Buerger’s disease)
(c) Perthes disease.

Neoplastic Causes

(a) Brain Tumors
   1. Astrocytoma
   1. Meningioma
(b) Spinal Tumors
   1. Meningioma
   1. Astrocytoma
(c) Osteosarcoma

Metabolic Causes

(a) Rickets
(b) Diabetic Neuropathy
(c) Vit. B12 deficiency
(d) Gout
Degenerative Causes

(a) Motor Neuron Disease
(b) Parkinson’s disease
(c) Multiple Sclerosis
(d) Osteoarthritis, Spondylosis

Miscellaneous

(a) Muscular dystrophies
(b) Lathyrysm
(c) Rheumatoid Arthritis
(d) Iatrogenic

The causes of locomotor impairment can also be classified depending on the site of involvement as:

1. Cerebral Causes examples: CVA
2. Spinal Causes examples: Traumatic paraplegia
3. Radicular Causes examples: Radiculopathies
4. Nerve Lesions examples: Peripheral Nerve Injury
5. Muscular Lesions examples: Dystrophies
6. Bony Causes examples: Fractures and Dislocations

Locomotor impairment can lead to the following:

(a) Paraplegia/Paraparesis Paralysis or paresis of lower half of body
(b) Monoplegia/Monoparesis Paralysis or paresis of one limb
(c) Hemiplegia/Hemiparesis Paralysis or paresis of one half of body
   (d) Quadriplegia/Quadriparesis Paralysis or paresis of all four limbs
   (e) Amputations Loss of a limb or part thereof
   (f) Deformities Contractures/Varus/Valgus

3 PREVENTION OF LOCOMOTOR IMPAIRMENTS

The prevention of locomotor impairments can be undertaken at three levels:
(a) Primary Prevention
   1 Health promotion
   2 Specific protection
(b) Secondary prevention
   1 Early diagnosis and treatment
(c) Tertiary prevention

Primary Prevention

This applies to the condition in which the measures are taken before the occurrence of disease. In health promotion the general health of the people is improved by health education regarding prevention of accidents for e.g. environmental modifications like safety measures at work place and at home, nutritional interventions providing diet Vitamin-A supplementation etc., life style and behavioral changes, general and personal hygiene and sanitation. Specific protection is provided by immunisation (like polio vaccination), legislation measures e.g. compulsory wearing of helmets to protect from head injury, enforcing road traffic rules etc.

Secondary Prevention

It is defined as action which halts the progress of disease at its incipient stage and prevents complications. Early detection and treatment of the disease to prevent secondary complications and long term disability e.g. in case of traumatic paraplegia, early treatment prevents occurrence of pressure sores. Deformities in early stages of poliomyelitis can be prevented by proper positioning and exercises etc.

Tertiary Prevention

The measures available to reduce impairments minimise the suffering caused by existing deviations from good health. The patient should be rehabilitated properly to join the mainstream of life.

4. PRINCIPLES OF MANAGEMENT OF LOCOMOTOR IMPAIRMENTS

Rehabilitation is the restoration of the physically disabled to the maximum possible physical, educational, economic independence and social integration.
The aims of rehabilitation management are:

i. Prevention of disability, if possible
ii. Maximum reduction or elimination of the disability
iii. Training the person with residual abilities to achieve independent living.

The locomotor impaired patients may be classified into the following groups:

i. Patients for whom full recovery is expected e.g. neurapraxia, surgically repaired nerve injuries, Guillain Barre syndrome etc.
ii. Patients with permanent, but stable disabilities e.g. amputations, post polio residual paralysis, non progressive paraplegia, hemiplegia etc.
iii. Patients with unstable disabilities e.g. rheumatoid arthritis, osteoarthritis, ankylosing spondylitis myopathies, Hansen’s disease etc.

The locomotor impaired patients often suffer from the following problems:

Motor weakness, paralysis/paresis, spasticity, sensory loss, pressure ulcers, deformities and contractures, loss of limb or its parts, urinary and faecal incontinence, urinary retention, pain etc. There may be associated hearing, speech, visual problems, mental retardation or higher function problems. The resultant problems arising out of locomotor impairment subsequently limit the function of the patient in his various activities of daily living (ADL). For example

(a) Transfers,
(b) Mobility, ambulation, transportation,
(c) Self care activities like toileting, bathing, grooming,
(d) Social and leisure activities,
(e) Work place activities.

The principles of management of locomotor impairments are as follows:

**Motor weakness** - Weakness may be complete (paralysis) i.e. negligible power or incomplete (paresis) i.e. partial weakness. It severely affects all areas of daily living. Either one limb may be affected (monoplegia), both lower limbs (paraplegia), upper and lower limb of one side (hemiplegia), or all the 4 limbs (quadriplegia). Common causes are spinal injuries, nerve injuries, cerebrovascular
accidents (CVA), cerebral palsy, post polio residual paralysis and myopathies. The exact features depend upon the cause, the area affected, the type of weakness (upper or lower motor neuron) and its severity. For example, weakness of hand causes complex disabilities like impaired dexterity, hand writing, grasp, hold, pinch and proprioception. Weakness of lower limbs causes varying degree of difficulty or inability to walk.

Rehabilitation interventions are called for:

i. Maintaining the range of movement of joints of the affected limb,
ii. Regaining or improving the muscle power in the weak muscles,
iii. Strengthening of normal muscles,
iv. Restoring the function of the extremity by appropriate training,
v. Provision of external appliance, splint or caliper if required.

For planning treatment, total functional assessment of the affected limb(s) is done including:

1. Detailed muscle charting of all affected and unaffected groups,
2. Extent of contractures and deformities,
3. Functional status of the affected limb e.g. hand function, type of grip, grasp, manipulative ability, pattern of walking in lower limb involvement, presence of shortening etc.

After proper assessment and planning, management is based on the following principles:

1. Remedial therapeutic interventions in the form of passive movements wherein full range of movement is given to each joint to overcome contractures and joint stiffness.
2. Gentle massage is given as a preliminary to starting exercises, to improve venous and lymphatic drainage and to help relaxation of muscles.
3. Remedial exercises are advised to suit the muscle power of various groups. Assisted exercises are given to muscles whose power is grade-I and gravity eliminated exercises are given to muscles whose power is grade II. The elimination of gravity is achieved by doing exercise with limbs in sling suspension or exercise under warm water in special pools or tanks (hydrotherapy). The warmth also stimulates the muscle and improves circulation. Exercises against gravity are given to muscles whose power is grade-III. Exercises against resistance (by sandbags/springs) are given to muscles which show grade IV power. Thus graded exercises not only strengthens the weak muscles but also improves
function by further strengthening the normal muscles. This facilitates the functional training e.g. ambulation etc. Electrical stimulation of muscles generates contractions, prevents atrophy and maintains the vitality and contractility of muscle fibres. In denervated muscle, galvanic current is used, if the nerve supply is intact faradic current is used.

Appliances, calipers and splints (now-a-days called Orthoses) may be required to prevent deformity due to muscle imbalance, stabilize unstable joints affected by the motor weakness, provide relief from weight bearing, facilitate walking and maintain a stable posture. The aim of surgical management is to attempt to make the best use of the available muscle power and make the limb functionally as useful as possible. The principles are correction of established deformities by surgical soft tissue release, improvement of muscle balance and local function by appropriate tendon transfer and stabilization of un-stable joints by fusion. Physiotherapy is continued in the post-operative period to prevent contractures and reeducate the transferred muscles in their altered role.

Lastly occupational and vocational training is given to make the patient socially productive.

**Spasticity**

Muscle tone is a state of contraction or tension found in a normal muscle. Spasticity is defined as a state of increased muscle tone proportional to the velocity of stretch applied. Common spastic conditions are cerebral palsy, cerebro-vascular accident with hemiplegia, Spinal injuries and tuberculosis of the spine. Spastic muscles usually have varying degrees of weakness and incoordination. Repetitive activities requiring rhythmic contraction and relaxation are impaired. Sustained spasticity and muscle imbalance leads to extremely disabling contractures and deformities. For example in cerebral palsy adduction contractures of thighs causes ‘scissoring’ (locking the legs and feet together) which renders walking almost impossible. Other examples are equinus deformity at the ankle, flexion deformity at the knee, pronation deformity of the forearm with flexion at wrist and fingers, the whole upper limb being internally rotated. Control of spasticity is necessary to improve muscle balance, strength, coordination, range of movement of joints so that appropriate training for ADL, walking and vocational rehabilitation may be started.

Therapeutic interventions like passive range of motion exercises, hydrotherapy, maintenance of proper posture etc. are helpful in control of spasticity. In addition, removal of any irritating focus below the level of lesion also helps in controlling spasticity.
Drugs that reduce spasticity are diazepam, dantrolene sodium and baclofen. In unremitting and severe spasticity nerve blocks of peripheral nerves, motor points and subarachnoid blocks are advocated.

Surgical options are release of tight tendons and selective section of dorsal spinal roots (to reduce the afferent input from muscle spindles) usually L2 to S1.

**Loss of Sensation**

Very often accompanies motor weakness. It may be completely insensate or partial (numbness). All or some of the modalities of sensation are affected e.g. spinothalmic sensations-pain, temperature and posterior column sensations-position sense, vibration, pressure; two point discrimination is impaired in lesions of the cerebral cortex.

Besides the obvious limitations of not having the proper sensations, execution of motor activity is severely affected by sensory loss, especially the loss of posterior column sensations. Thus coordination, dexterity, initiation of voluntary movements and muscle tone are impaired. Loss of pain and temperature sense predisposes the affected area to recurrent injuries, pressure ulcers, and non healing wounds and trophic changes. The result is often amputation of the affected limb. Common causes of sensory loss or impairments are- Spinal injuries, peripheral nerve injuries, Hansen’s disease, spinabifida, transverse myelitis, diabetic neuropathy and spondylitis of the spine.

**Principles of management are:**

i. full explanation and education as to avoid any further injury to the affected area by meticulous care (keep away from hot/cold/sharp objects, use of protective gloves etc.)

ii. Regular medical follow up and training for self observation to detect early appearance of any new wound or injury (the patient should inspect all the affected areas daily in front of a large mirror)

iii. Provision of padding the pressure bearing areas of shoe e.g. heel, first metatarsal head.

iv. Frequent change of posture, water beds, split mattressses, pillows to position the affected areas freely suspended and accessible to ventilation. This is to prevent skin breakdown of the affected areas and pressure sores.
v. Massage with emollients is believed to improve vitality of skin.

vi. Surgical repair of severed nerves may restore sensations.

**Pressure Ulcers**

Also called bed sores or decubitus ulcers, are simply areas of necrosis as a result of prolonged and excessive pressure on the soft tissues. Contributing factors are immobility, motor weakness, loss of sensation, excessive perspiration, urinary and faecal soiling, rough and crinkly bed sheet and lack of care. Bony prominences, the sacrum, the trochanters, back of the heels, are common sites.

Conditions, notoriously associated with pressure ulcers are spinal injuries with paraplegia, tuberculosis of the spine with paraplegia, spina bifida, diabetic neuropathy, Hansen’s disease and patients bedridden for a prolonged period due to any cause.

The key strategy of management is prevention. The sacral, trochanteric and heel areas are regularly inspected. General care of the skin, cleanliness, 2 hourly turning, use of water/air beds, split mattresses are other important measures. Treatment is by daily dressing, removal of necrotic slough and control of infection. When clean granulations appear, skin grafting or fasciocutaneous flaps may be required.

**Deformities and contractures:**

Commonly accompany motor disabilities and further contribute to the disabilities. A deformity is defined as an abnormal position, which is not passively correctable, assumed by a part of the body as a result of some disease or injury. Factors contributing to development of deformity are habitually faulty posture, muscular weakness, muscle imbalance, gravity, faulty walking pattern, unequal growth at the epiphyseal plate and limb length discrepancy (shortening). Poliomyelitis, cerebral palsy, spinal dysraphism, arthrogryposis multiplex congenita, spinal tuberculosis, spinal injuries, trauma to extremities (fractures), rickets, clubfoot, stroke, rheumatoid arthritis, ankylosing spondylitis are common conditions associated with various deformities. Examples are equino-varus, equinus or calcaneo-valgus feet in polio, cerebral palsy, genu varum or valgum in rickets, hip flexion, abduction, external rotation contracture in polio, severe bilateral adduction contracture of thighs (scissoring) in cerebral palsy, claw hand due to ulnar nerve palsy, kyphosis in tuberculosis spine, scoliosis (congenital, idiopathic and paralytic) etc., swan-neck deformity in rheumatoid arthritis etc.
Correction of deformity and contractures is necessary to improve local function, appearance, posture, balance, stability, walking, fitting of appliances and relief of pain.

Appliances used to prevent or correct deformities and contractures are called orthoses. They are named according to the joints they stabilise. For ankle, - ankle foot orthosis (AFO), for knee, knee ankle, and foot orthosis (KAFO), for the cervical, thoracic and lumbao-sacral spine-(CTLSO) etc. They are made up of metallic rods, locks, foam, felt, leather straps etc. Poly-ethylene and poly-propylene are being used now because of their light weight. Some appliances have ‘dynamic’ corrective potential i.e. use of the appliance and the patients own movements exert a corrective influence on the deformity e.g. dynamic cock up splint for wrist drop in radial nerve paralysis, Milwaukee brace in idiopathic scoliosis, dynamic foot drop splint (AFO, with dorsiflexion assisting spring), floor reaction orthosis (FRO) in weakness of quadriceps.

Other measures include passive mobilization, manipulation under anaesthesia, traction (skin or skeletal), casts, gradual controlled distraction (plaster distracter, JESS and Ilizarov) and surgical (soft tissue and bony) correction of deformity.

Amputation-

Loss of limb in part or whole may be due to trauma or disease. Common causes are crush injuries of limb, leprosy, gangrene (dry or moist), malignant tumours (osteosarcoma) and peripheral vascular diseases (diabetes, Buerger’s disease, atherosclerosis) etc. Amputations may also be congenital. Smoking is a contributory factor in many lower limb amputations of young adults (Buerger’s disease).

Lower limb amputations are more common than upper limb amputations. Below knee amputations are the most common.

The psychological trauma of loss of one’s limb is obvious. Lower limb amputations, especially above knee amputations entail severe locomotor disability. Upper limb amputations severly limit activities of daily living and occupational ability. Other problems are infection of stump, pressure sores, neuroma, phantom limb and pain and contractures. Ideally artificial limb (prosthesis) should be fitted to the stump at the earliest This hastens rehabilitation and minimises the phantom sensations. Tremendous advancement has taken place in the fabrication and fitting of prostheses. Computer aided design and manufacture has simplified the procedure.
An above knee prosthesis consists of a quadrilateral socket, knee joint, shin piece and foot piece. Below knee prosthesis contains a patellar tendon bearing (PTB) socket, shin piece and foot. Indian versions of prosthetic feet (e.g. Jaipur and Madras foot) allow multiplanar mobility at fore and hind foot and can be used without a shoe. Similarly various types of hands are available for upper limb amputees e.g. Doren’s hooks, cosmetic hand and myoelectric hand.

Fitting of artificial limbs to the amputee and training him in their use is an overall medical responsibility. Efficient fabrication and proper fitting and training are all done under medical supervision by prosthetist and orthotist. Proper gait training is given by the physiotherapist. The doctor has to play an active role on all these processes.

**Neurogenic Bladder and Bowel**

Bladder and bowel problems often accompany paraplegia and quadriplegia. Thus, spinal injuries, tuberculosis of spine, spinal dysraphism patients, as also spastic children (CP) face these problems. They include retention of urine, loss of voluntary control and overflow (incontinence), dependence on catheter, recurrent urinary tract infections, constipation, dependence on purgatives, enemas, manual evacuation and faecal incontinence. Some dreaded long term complications of bladder and bowel dysfunction and repeated catheterization are chronic prostatitis, stricture urethra, hydronephrosis and chronic renal failure. Bladder and bowel dysfunction due to impaired neural control are commonly called ‘neurogenic’ bladder and bowel. They may be upper motor neuron type (spinal reflex are not intact). The reflex centre for bladder and bowel control is at S2-3 level in the cord and this is controlled by the inhibitory influence of the higher centres in the cerebral cortex. (UMN) type is known as automatic bladder or reflex bladder. Residual urine is minimal due to frequent reflex emptying. LMN type is known as autonomous bladder. Emptying is by local myoneural reflex, residual urine is large (300-400 cc) due to spasm of the internal sphincter.

Aim of bladder management:

i. avoidance of overdistension
ii. Prevention of infection
iii. restoration of continence by bladder training.

Relief of bladder overdistention by prompt catheterization/drainage is a must to prevent irreversible detrusor damage. When drainage is established, the following other measures are taken...
to prevent ascending infection and calculus formation:

1) liberal fluid intake, (2-3 liters/day),
2) Prophylactic antibiotics,
3) Daily bladder wash.

Retraining of bladder is done over several weeks when reflex emptying is established. This is done by catheter clamping intermittently (UMN) or abdominal and suprapublic compression (LMN, Crede’s manoeuver). Self clean intermittent catheterization is a new procedure in the management of neurogenic bladder.

Once off the cathetar, male patients use some type of incontinence device for collecting urine, such as a condom or urosheath apparatus draining into a leg bag. It gives them a sense of security, while in public places. No satisfactory collecting device has been developed for female patients. Most of them use sanitary pads, or remain on permanent indwelling catheter.

Bowel care includes faecal softening by laxatives, digital evacuation, use of suppositories and enemata. High roughage diet and plenty of fluids should also be encouraged.

Pain:

It is a subjective feeling and not quantifiable or measurable. It is nature’s warning that there is imminent damage to the system. Important painful conditions with locomotor impairment are rheumatoid arthritis and its variants, acute gouty arthritis, osteoarthritis, ankylosing spondylitis, the low backache syndrome (degenerative, disc prolapse, sprain, sciatica), fractures, soft tissue injuries (ligament, tendon injuries, meniscal injuries of knee), painful neuromas and phantom pain in amputees, causalgia, reflex sympathetic dystrophy etc.Pain receptors are located mainly in the free nerve endings in the skin. There are many neurotransmitters of pain, the most important of which is a peptide called substance-P.

The first stage of the physiological transmission of pain sensation is through the sensory nerve fibres which end in the posterior horns of the spinal cord. In the second stage the impulses travel via the spinothalmic tracts to the thalamus. The third step takes it to the cerebral cortex where pain perception occurs.
There is a gating mechanism in the dorsal horn of the spinal cord (gate control theory). This is at the junction of the first sensory and the second sensory neuron. Large diameter "A" fibre activity is stimulated by heat, cold and touch. Fine 'C' - fibre activity is stimulated by pain. If the gate mechanism is blocked by stimuli from ‘A -fibres, pain stimuli through ‘C' - fibres can not go through the gate upwards to the brain. For example, rubbing and massaging of the painful area relieve pain by blocking the gate and preventing pain stimuli going through.

Pain modulation occurs both by the blocking mechanism as well as by chemical modulators like endorphins and opioid peptides found in the brain and spinal cord. They inhibit the release of substance ‘P’ and thus reduce pain.

The patient’s complaint i.e. clinical pain is the combination of the physical sensation and the mental reaction to the pain.

The first essential in the management of pain is the diagnosis of pain in all its dimensions. Such a diagnosis includes the physical, mental, emotional as well as the socio-cultural contribution to the pain. Besides, analgesics, several physical modalities of pain relief are available. Heat, a very commonly employed mode is transmitted in ways, by conduction (movement of heat from warmer to cooler parts), convection (actual flow of liquid or gas) and radiation.

Hot water is probably the most widely used agent for conductive heating in the form of hot packs, soaks, compresses, hydrotherapy pools. Commonly used hot packs are canvas containers with a silicon gel that absorbs and gives off moist heat for 20-30 minutes. They can be moulded to the contours of different parts of the body. Whirlpools and hot baths may be selective as the treatment of choice in situations (e.g. poliomyelitis) where it is desirable to exercise the part while heat is being applied or the area to be heated is large.

Wax baths are a convenient form of heating for the extremities. Paraffin wax is melted in an electrically heated bath and applied to the skin by immersion of the part or by brush at 48-49 degree celcius. Usually six or seven layers of wax are used and towels wrapped around the limb for further insulation for 20-30 minutes. Removal of wax may form part of the exercise therapy for hand. This is very effective in the treatment of rheumatoid hand. Heat should not be applied in the presence of impaired sensation, circulatory dysfunction, fragile skin and near open wounds.

Diathermy acts by placing the patient in an electric field created by high frequency alternating...
current. Secondary heating effect is produced by agitation and vibration of the molecules in the patient’s tissue. The assigned frequency is 1.2 megacycles with a wave length of 11 meters. It is the most efficient way of heating large areas of subcutaneous tissue and muscle. It is especially used in the fibrofasciitis, back sprain, spondylosis of the spine, osteoarthritis, tennis elbow etc. Contraindications, besides the one already mentioned for heat include patients with cardiac pacemakers, cardiac disease, with metallic implants in tissue, malignant tumours (potential for metastasis), pregnancy, menstruation and local infection.

Microwave diathermy is similar but has a higher frequency (2456 and 915 MHz) and shorter wavelength than shortwave diathermy.

In pulse electromagnetic therapy, short waves are pulsed in packages with sufficient rest intervals so that the heat is rapidly dissipated, preventing a cumulative rise in tissue temperature. A base frequency of 27.12 MHz is used.

All the above modalities are useful for their effect on promoting tissue healing, decreasing inflammation, reducing muscle spasm and pain.

Therapeutic ultrasound is a physical agent with its effect due to heating and mechanical agitation within tissues. Most commonly used frequency is 1MHz. Ultrasound causes heating of tissues, increased local metabolism, nutrient turnover, alteration of tissue excitability, vasodilatation and interruption of the pain-spasm cycle. It is particularly useful in haematoma resorption and tissue regeneration. It is useful in rheumatoid arthritis, osteoarthritis, soft tissue injuries, sprains, blunt trauma with contusion and haemarthrosis. It should be used with caution near epiphyses, neural, reproductive tissues and body cavities and in presence of metallic implants.

Laser (Light Amplification by Stimulated Emission of Radiation) emits infrared rays photonemission by neo-helium or gallium arsenide emission. Its wave length is 904 nm (Single wavelength beam). Therapeutic effects are reduction of oedema, stimulation of metabolism (increased mitrochondrial and M-RNA activity), promotion of healing. Traditionally it is given in short pulses. Calculation of appropriate dose and its delivery are still evolving. Contra-indications are pregnancy (especially in the 1st trimester) tumours, visual defects, in infants (especially on the head).

Transcutaneous electrical neural stimulation (TENS) acts by blocking the ‘gate’ for pain
transmission and release of endogeneous endorphins and enkephalines. It is applied in 2 basic forms-low intensity or high pulse (100 per second) and high intensity, low pulse (10 per second). The latter gives better pain relief. It is very useful in low backache syndromes and neck pain.

Cryotherapy (ice massage, ice baths, ice towels and cold packs) act by initial vasoconstriction followed by vasodilation, reduction of muscle spasm and limited anaesthesia. It is useful as a first aid after injury to promote clotting and haemostasis, reduce pain and oedema following recent trauma, surgery, exacerbation of arthritis. It is also useful to reduce spasticity in stroke or spinal injuries. It should not be used in cold allergy.

Drugs used for pain relief are mainly of 2 types. First are the various groups of non steroidal anti-inflammatory drugs (NSAID). Newer agents with cartilage protective action and fewer gastric side effects is being introduced e.g. nimuselide, etc. The second group is the narcotic analgesics that induce sedation besides altering the emotional reaction to pain e.g. morphine, codeine, pethidine etc. Tramadol is a drug in this group with minimal sedative effect. An average musculo-skeletal pain responds very well to NSAIDS. Narcotic analgesics are reserved for intractable or severe pain. Meprobamate, carbamazepine etc are effective for control of severe neurogenic pain e.g. neuralgias, causalgia (a state of sympathetic dysfunction with increased local excitability and vascular changes) and phantom pain in amputations.

NSAIDS are also available for local application in the form of emollients. They are combined with counter-irritant agents like camphor, menthol, alcohol, gum resins in gel form. They are often very useful in musculoskeletal pain due to local disease like tennis or golfer’s elbow, Dequervain’s tenovaginitis and fibro-fascitis.

Local injections of hydrocortisone or other steroids with lignocaine are very effective. In pain due to planter fasciitis, tennis elbow, Dequervain’s disease and ganglion at the wrist.

Listening by the doctor with concern and sympathy, to patients expression of pain may be both diagnostic and therapeutic.

Suffering is a negative emotional reaction to pain, consisting of fear, anticipation of pain, worry and depression. Hence higher levels of intervention e.g. distraction, relaxation, behavioural modification, a holistic approach to life, spiritual enlightenment and a sporting approach to pain should be encouraged.
Activities of daily living:- Activities of daily living (A.D.L.) include those tasks that a person regularly does at the basic and instrumental level to prepare or adjust for participating in his or her day to day work. A.D.L. is classified broadly into two groups - basic and instrumental. Basic A.D.L. includes self care and mobility activities. Instrumental A.D.L. includes use of environment hardware and devices, communication skills and home management activities. Self-care activities are dressing/undressing, feeding, toileting, bathing, grooming etc. Mobility activities are movement in bed, transfers, wheelchair mobility, indoor/outdoor ambulation and managing of public and private transport. Environmental hardware and devices facilitate a disabled person in opening/closing doors and windows, use of telephone/computer etc. Communication skills include ability to read, write, do typing work, and, operating a computer. Home management activities includes meal planning and preparation, handling of household appliances etc.

A.D.L. help to gain maximum independence, to achieve function, to ambulate and to communicate etc. Thus, a person with residual physical disability can function in as near normal way as possible and can be socially integrated by giving adequate training in activities of daily living. To achieve it, use of self help devices may be called for in some cases.

Self-help devices:- As the name indicates these are devices to promote self sufficiency in patients with residual permanent disabilities. Thus, they act as an adjunct for achieving total rehabilitation. These are used to minimise the amount of assistance needed from other persons. They are also prescribed to increase function of residual muscle power and skill involved in various motions. For example a person who cannot hold a spoon due to inadequate grip strength may be provided with a universal cuff applied to the palm in which spoon or fork can be fixed, so that he can pick up food and eat without any person’s assistance.

Mental Retardation

It is commonly associated with cerebral palsy, Down’s syndrome, multiple sclerosis, stroke, Alzheimer’s disease, senile dementia and AIDS.

The aim of management is to help the child or patient acquire maximum possible cognitive, intellectual, functional skill and ability. It should be individualised considering the patient’s intelligence, developmental age and the associated motor disability. Attempt should be made to assess the contribution of the motor disabilities to the problem of mental retardation.

Mild cases are managed by measures to correct the motor disabilities and sent to ordinary
schools. In moderate cases, in children or patients who are educable, the aim is to correct the deformities to enable them to walk and be independent. Such patients should be educated in special schools for the mentally handicapped. For children or patients who are not educable but trainable, the aim is to train them in activities which require repetitive skills so that they could be productively employed. In severe cases the patient remains bedridden and totally dependent on others for every activity. The aim in such cases is to train them to do their own self care, attending to feeding, dressing and toileting. These patients often need institutional care.

More recently stimulation or enrichment programmes, based on the principle that environmental stimulation improves sensori motor ability which in turn improves the cognitive development. This is known as neurodevelopmental therapy. Activities are provided that minimise the impact of risk factors that might interfere with their future ability to lead a productive life.

Associated auditory, visual and speech impairments should be evaluated in detail and appropriate intervention should be started. They are described in the respective sections on these impairments.

Impairments of higher function associated with locomotor disabilities include anxiety, depression, low self-esteem feeling of dependence and suicidal tendencies. Attention should be given to these problems and the attending specialist must develop an intimate rapport with the patient so that he confides these problems in him. Often the sympathetic attitude of the doctor goes a long way in reducing these problems. Severe or unmanageable cases should be referred to the psychiatrist.

5. AIDS AND APPLIANCES

Orthotics - The term orthotics encompasses the provision of splints and appliances which improve the function and appearance of a patient. An orthosis is an appliance which is added to the patient, to enable to better use to be made of that part of the body to which it is fitted, whereas a prosthesis replaces a missing part of the body.

The main purpose for which orthoses may be prescribed are:

1. Prevention and correction of deformity,
2. Relief of pain by limiting motion or weight bearing,
3. Immobilization and protection of weak, painful or healing musculo-skeletal segments,
4. Reduction of axial load (weight bearing),
5. Improvement of function.

Dynamic splints are used to correct and prevent deformities. A person who manufactures the orthosis is called an orthotist. He follows the prescription of rehabilitation specialist, takes the measurement, selects the appropriate materials and component parts in order to manufacture the required appliance. In addition, prevention and correction of contractures, strengthening of muscles, training of patient in donning and doffing of the appliance and to use it, including gait training are as important as the production of the appliance. Manufacturing an appliance for the locomotor disabled which is cosmetically and functionally acceptable to him, as well as durable, long lasting, training him in its use and availability of repair facilities goes a long way in his overall rehabilitation management. The new nomenclature for orthoses uses the first letter of each joint that the orthosis crosses in correct sequence with letter O’ for orthosis at the end e.g. AFO, KAFO, HKAFO.

Orthoses for the lower extremity are commonly called calipers. HKAFO (Hip Knee Ankle Foot Orthosis) consists of a pelvic band (if necessary) which is a padded steel band between the greater trochanter and iliac crests posteriorly and laterally with a velcro buckle strap in front. It is connected to a metallic side bar (called upright) laterally through a hip joint that allows only flexion and extension. It could also be ischial weight relieving caliper in which patient bears weight on the ischial seat and the weight is transmitted from the ischial seat through metal uprights and shoe sole to the ground. Rest of the HKAFO is same as KAFO. HKAFO provides improved standing balance and better controlled forward leg swing in patients with weak hip muscles. Its disadvantages are difficult donning and doffing, decreased step length and significant increase in lumbar spine movements to compensate for limited hip motion.

KAFO (Knee Ankle Foot Orthosis) provides stability at knee and mediolateral stability at ankle. It uses 3-point force application system i.e. posterior thigh, anteriorly over knee and posteriorly over calf. This is provided by a thigh band, anterior knee cap and calf band posteriorly. Various common types are A/K wooden splint, conventional KAFO with knee, ankle joints, metal uprights and shoe or a polypropylene KAFO with moulded posterior ankle foot shoe insert and posterior thigh plates connected by two metal uprights knee joints with locks. No ankle joint is used. Advantages are its light weight, easy to don and doff and that it can be worn with different shoes. A KAFO is used for weakness around the knee, ankle and foot. AFO is used for patients having weakness around the ankle and foot only. It provides mediolateral stability at the ankle. Conventional
AFO consists of two metal uprights, a calf band, ankle joint, metal sole plate which is incorporated in shoe. Stopper is used to limit dorsiflexion or planter flexion depending on requirement of the patient. Inside or outside T strap can be added to control a valgus or varus deformity. Polypropylene AFO moulded to the back of the calf and sole is very light, comfortable and can be used as a shoe insert.

Another common lower extremity orthosis is a patellar tendon bearing orthosis (PTB) which is usually prescribed in fracture of leg bones. Through this orthosis the patient bears weight in the patellar region and the force is transmitted through the uprights and the shoe to the ground, thereby partially relieving the weight from the fracture site.

In the upper limb, mobility and function are more important than stability. A common upper limb splint is dynamic metacarpophalangeal joint-hand and wrist hand orthosis (WHO) with extension assist spring dorsally (in wrist and hand drop due to radial nerve paralysis), the so called dynamic cock up splint: Other dynamic hand splints are the:- knuckle bender splint (flexion assist) and the opponens (in median nerve paralysis). Static finger orthosis for correction of swan neck and boutonniere deformity in rheumatoid arthritis are also commonly prescribed. These are simple splints with a rigid bar and spiral or circular velcro straps.

Another common orthosis is static wrist-hand orthosis to support the wrist while allowing finger and thumb movement. Various assistive devices are often attached e.g. support for thumb, metacarpophalangeal, interphalangeal joints for condition like rheumatoid arthritis, nerve injuries, tendon repair and burns etc.

Similarly elbow flexion or extension assist orthoses and airplane splint to positon the shoulder at 90 degree abduction and immobilize glenohumeral joint are used in conditions associated with more proximal weakness.

Spinal orthoses are commonly used in spinal injury and tuberculosis. For example, Taylor’s brace is a TLSO (thoraco-lumbo-sacral orthosis) used to immobilize the thoraco lumbar spine. It limits forward and lateral flexion especially at the thoraco-lumber junction. It consists of a pelvic band, 2 posterior uprights connected by 2 bars and shoulder, groin straps. A cervical collar is commonly used to limit neck motion in cervical spondylosis, tuberculosis or injury. It is made of plastic (soft) or metal (hard). Better cervical orthosis are four post brace and SOMI (sterno,occipito,mandibular, immobilizer) brace.
Prosthetics - Any artificial substitute for lost part of the body is called prosthesis. Prosthetics can be defined as an art which deals with prescription, design, fabrication and fitting of artificial limbs in a scientific manner.

Prosthesis can be for external or internal use. The external prosthesis is used for upper and lower limbs. Internal prostheses are used as.

i) joint replacements e.g. hip, knee
ii) heart valves.

External prosthesis can be further classified into endoskeletal limbs (central, carbon or aluminium tube attached to socket and joints covered by foam and silicone, the tube is load bearing) and exoskeletal or conventional limbs (hollow limbs made of aluminium or plastic, the outer layers are load bearing). A third type is the temporary pylon prosthesis with two metallic side struts, used for immediate, post amputation prosthetic fitting.

The aim of prosthetic rehabilitation is to achieve maximum function out of the remaining stump. A good stump, ideal for prosthetic fitting should have

(i) adequate length (e.g. 12-16cms. for below knee, 8cms. to 10cms. above the level of contralateral knee for above knee amputations).
(ii) good muscle power,
(iii) full movement in the proximal joint,
(iv) healthy, non adherent scar,
(v) adequate but not excessive soft tissue cover with no bony spurs,
(vi) normal skin sensations.

The amputations may be the end of the management of the local disease, but it is the beginning of the phase of retraining of the stump for prosthetic fitting and functional restoration.

Essentials of stump care to achieve a good prosthetic fitting are (i) Compression bandages with elastic crepe to improve its shape, (ii) stump exercises to improve its motor power and movement in the proximal joint, (iii) stump hygiene to maintain the skin and scar in good condition.

Attention to the following details should be given in order to prescribe a prosthesis-

1. level of amputation,
In the last few decades, great advances have been made in the fitting and fabrication of prosthesis due to continuous refinements in the material sciences. Modular prosthesis can be assembled quickly, because, except the socket which is custom made, the other parts are marketed in various sizes.

A conventional below knee prosthesis consists of a rounded socket, a shin piece, ankle joint, a foot and shoe. A PTB (Patellar Tendon Bearing) socket is snugly fitted and moulded around the ligamentum patellae and the tibial condyles for load distribution in these areas.

A conventional above knee prosthesis has a conical socket with knee joints. Rest of it is similar to a below knee prosthesis. Modern above knee prosthesis has a quadrilateral, total contact, socket of the suction type that does not require any suspension straps.

SACH (solid ankle cushion heel) foot with wooden core, covered by rubber, is the conventional prosthetic foot. A shoe is required for using it. Jaipur foot is more suitable for Indian conditions. It allows barefoot walking because it looks exactly like a normal foot and is cosmetically well accepted. It permits squatting, cross legged sitting and walking on uneven surfaces.

The components of an upper limb prosthesis are socket, elbow joint or arm cuff (as per the level), forearm sheath piece with wrist unit, terminal device, harness and control cable system. Commonly used terminal devices are split hooks (for heavy work), cosmetic hand with movable fingers and recently the myoelectric hand.

Walking aids-

These are used to increase the mobility of a patient, as they enable some of the body weight to be supported by the upper limbs. There are different types of walking aids e.g. parallel bars, walking
frames, crutches and sticks, and many different subtypes in each group. It is important to select the correct walking aid for a particular patient. Selection depends upon-

1. Stability of the patient,
2. Strength of the patient’s upper and lower limbs,
3. Degree of coordination of movement of the upper and lower limbs,
4. Degree of relief from weight bearing required.

These aids may be sufficient in themselves or they may have to be used with calipers or other appliances.

After a prolonged illness, many patients are generally weak. This can be minimized by good nutrition and a well-planned progressive course of exercise. When a walking aid is used, part of the body weight is taken by the muscle of the shoulder gridle and upper limbs. While planning rehabilitation of the patient particular muscles that should be assessed in this context are:

1. Flexors of the fingers and thumb to hold the hand grips firmly.
2. Dorsiflexors of the wrist to obtain the best functional position for powerful finger flexion.
3. Extensors of the elbow to stabilise the elbow in slight flexion when the body weight is taken through the upper limb.
4. Flexors of the shoulder to move the walking aid forward.
5. Depressors of the shoulder gridle to support the body weight.

Regaining confidence in walking takes time. When walking is commenced it is important to eliminate the fear of falling and to avoid too speedy progress.

Parallel bars are rigid and do not need to be moved by the patient. The patient can concentrate entirely on moving his lower limbs correctly. The patient looks at the mirror kept at one end of the bar without looking at the feet. This is useful in loss of proprioception (position sense). The elbow should be in 30 degree flexion while walking. Parallel bars are useful in early gait training in unstable patients.

If parallel bars are not available a walking frame is useful initially when a patient is unstable and fearful of falling. But the pattern of walking acquired in a frame is difficult to change. The standard walking frame is light rigid, stable and easy to use. It consist of four aluminium alloy
tubes arranged in a rectangle and joined together on three sides by upper and lower horizontal tubes. One long side of the rectangle is open. The lower ends of the vertical tubes are fitted with rubber tips. Hand grips are fitted to the short upper horizontal tubes on each side. The elbow should be at 30 degree flexion while holding the hand grips which should be at the level of greater trochanter. The patient stands in the walking frame, lifts the frame a little distance forward and then walks up to the frame still holding the handgrips.

Crutches are very commonly used walking aids. There are 3 main types of crutches axillary, elbow and gutter. Common axillary crutches are made of wood. They consist of double upright joined at the top by a padded axillary support, a hand grip and a non slip rubber covering the lower end. The length of the crutch and position of handgrip should be adjustable to fit any individual. All degrees of weight relief are possible with axillary crutches. These are indicated if non weight bearing on one limb is required e.g. after a fracture or when crutch walking is commenced initially.

Elbow crutches are less cumbersome, less stable than axillary crutches but more stable than walking sticks. They are prescribed for patients who can bear some weight on feet but need an aid for balance and confidence. Gutter crutches are indicated when there is weakness of elbow, flexion deformity at elbow or pain in the hand. The flexed elbow and forearm rests on the gutter and transmits the body weight.

While walking with elbow or axillary crutches the elbow should be at 30 degree flexion., Tripod and quadriped walking aids are used for elderly patients with lower limb injuries and those with neurological conditions. They confer more stability than walking sticks and elbow crutches.

Walking sticks are made of wood or aluminium with a curved handle, with rubber tip at the lower end. Walking sticks are light and easy to use, they assist balance, provide moderate support for a lower limb to improve gait and help in the relief of pain.

When ambulatory capacity is permanently lost due to total paraplegia, wheel chairs are advised. These are simply arm chairs on wheels.

The modern chairs are fabricated with hollow metal tubes with solid seats and detachable side arm supports. The rear wheels are larger in diameter.
In portable wheel chairs, the seat is made of canvas and the whole unit can be collapsed sideways and transported in a vehicle.

More sophisticated and recent advances include battery power driven wheel chairs and even stair climbing wheel chairs.

At the rural level, especially for indoor mobility a floor level four wheel self-propelled trolley is very useful.

Outdoor mobility aids are hand propelled three wheelers which are very useful under Indian conditions and hand operated automobiles.

6. MAINTAINENCE AND CARE OF AIDS AND APPLIANCES

Orthosis:

1. Check the moving joints of the caliper off and on.
2. If any joint moves tight or any play in joint due to some mechanical fault, get it checked and repaired immediately.
3. Check all the screws, nuts and bolts daily.
4. Caliper, splint and other orthosis should be cleaned once a week. Wash (plastic parts only) and dry.
5. When the protective coating (Electroplating) on the steel up right (bars) wears off, the steel will get rusted. If so, get these parts polished.
6. Keep leather parts of caliper clean and dry.
7. Polish the shoes daily and keep them dry.
8. Keep the caliper away from water and mud.
9. Oiling of all the caliper joints once in a week with machine/mobile oil is necessary.
10. The upper leather padding of a caliper can be cleaned by a wet cloth and to prevent damage due to sweating, use any talcum power.
11. Shoes should be kept in good repair, particularly the heels. If soles and heels get worn and uneven, it will cause change in walking pattern and excessive energy consumption.
12. Caliper should be taken off while sleeping.
Prosthesis:

I. A. Cleaning the socket.

Wash daily with mild soap and water. Rinse thoroughly with a cloth wet with warm water. Dry thoroughly.

B. Care of the finish

When the protective coating on the wood socket or wooden parts wear off, the wood will absorb moisture. This should not be allowed to happen.

II. The knee friction mechanism

A. Adjustment of the friction mechanism is needed when the shank swings through too rapidly or too slowly.

B. If the knee begins to extend backwards (hyperextended) and noise comes from the knee joint, the extension stop (back strip of the knee joint) probably needs replacement, or, the extension stop bumber will need to be replaced to avoid this problem.

III. Care of the foot piece and shoe.

A. If the foot gets wet at any time remove the shoe and dry the foot as soon as possible. Always dry other parts of prosthesis leg that become wet.

B. Shoes should be kept in good repair, particularly the heels. If soles and heels get worn and uneven, it will cause uncomfortable change in gait (walking pattern) and excessive energy consumption.

C. The person with amputation should be sure that all his shoes have heels that are of the same height in order to maintain proper alignment for the prosthesis.

IV. Care of the leather

A. Keep all leather parts clean and dry. Use mild soap for cleaning
B. If leather becomes stained and starts smelling, visit the prosthetic workshop for replacement of the leather.

V. Miscellaneous

A. Do not use sandpaper, files, knives, saws or make any repairs on the prosthesis.

B. Visit the prosthetics and orthotics workshop at regular intervals for checkup of the appliance. In this way costly repairs or adjustments can be avoided.

**Architectural Barriers:**

Patients with locomotor impairments cannot afford to negotiate narrow entrances and lanes, elevated platforms cemented or wooden door-steps and stairs. To facilitate their unimpeded mobility, it is necessary to provide special ramps, remodelling of entrances, widening of doors, construction of slopes instead of stairs, creation of flat, plain floors without raised platforms or barriers. These modifications should cover not only the personal residence of the locomotor impaired patients but also the public places frequented by them.

7. **PSYCHO-SOCIAL REHABILITATION**

Indeed, the process of rehabilitation is never complete unless the psychosocial aspects are duly taken care of. Psychologic, social and economic rehabilitation of patients with motor handicaps are intimately inter-related. Together, they provide the crowning glory to the entire success story of a patient’s ultimate rehabilitation. The attending doctor is the fulcrum of such efforts. The key to success is the right attitude of the doctor and other members of the team. The doctor must extend his horizons beyond the diagnosis and treatment of the patients. They benefit from such treatment only when it is conceived and planned from the outset with the effect on the patients working capacity and his home life in mind. The likely residual disabilities their effect on his work/occupation and the need for retraining must be assessed with the most compassionate attitude.

Illness and injury always induce some anxiety in the patient and relatives, and the response to incapacity depends on the patients personality, education, and social and economic situation. Motivation may be described as the expression of the patient’s personality when striving to overcome adversity, and thus, it is also an expression of his response to rehabilitation. Evaluation of the
premorbid personality and adequate assessment of the social, educational and economic circumstances are as important in rehabilitation as a realistic delineation of the prognosis and likely functional handicap. It is within this area that the art of medicine is as important as the science for the methodology available for the quantitative assessment of personality and motivation of the physically disabled is not readily achieved and not generally acceptable and simply applied techniques have been described.

Painful conditions and physical disabilities undoubtedly bring about reactive depression. Severe disability limiting social activities and contacts will clearly be accompanied by personality changes. The psychological trauma of amputation is obvious and the appropriate preparation of patients for ablative surgery is being increasingly introduced.

Specific psychological problems of patients with motor handicaps include depression, anxiety, feeling of insecurity, loneliness, behavioral disorders, affective disorders, personality disorders, suicidal tendencies, dependence, low self-esteem, irritability, impaired psychomotor coordination, malingering and hysteria.

Although patients with locomotor disorders undergo a variety of personality changes in response to their disabilities, no specific personality types have been identified which may be more prone to locomotor/physical handicaps or an impaired response to it.

There is no gain saying the fact that economic independence is the single most important measure contributing to a sound psychologic and social restoration of the handicapped. It goes a long way in ameliorating the specific problems of insecurity, dependence, anxiety, depression, social isolation, low self-esteem and emotional disorders.

The clinician, besides his role in the diagnosis and cure of patients has to carry out the sacred duty of explaining and reassuring his handicapped patient about his disabilities, their effect on his work and its possible solutions. Thjs may not necessarily require the services of a specialized rehabilitation unit or an expert psychiatrist. A little change in the attitude of the treating doctor, can easily accomplish this supposedly difficult task. A genuine interest in the patient’s welfare is the key to success in this hallowed work.
8. VOCATIONAL REHABILITATION

Whatever the stage of economic development of country, none of its citizens (above all, the handicapped people) can be left out of the planning for the care and improvement of conditions for them, certainly not in a welfare state.

While even the able-bodied are handicapped in doing one thing or the other, the handicapped have certain obvious limitations. Those limitations however, do not warrant their being labelled as ‘Vocationally’ handicapped. With increased emphasis on the utilization of all man-power and the obvious need to offer opportunity to everyone to utilize his capacities, the productive potential of the handicapped has to be developed to enable them to find their places in national economy.

Despite tremendous progress in rehabilitation medicine and a marked change in our attitude towards the rehabilitation of the locomotor or physically handicapped, much headway has not been made in their placement. Most of them are unaware of their productive potential and available opportunities. Many take to begging or lead a forsaken life of hopeless gloom. The handicapped and his family certainly deserve a caring sympathetic and positive attitude from the attending doctor and other medical personnel. Above all, the doctor must express a genuine interest in the overall well being of his handicapped patients, including their financial well being. They benefit to the fullest extent from treatment only when that treatment is conceived and planned from the outset with the effect on the patient’s working capacity and his home life in mind.

Vocational Rehabilitation is the process of exploiting the avenues for gainful occupation of a disabled individual.

The clinician’s responsibility is not restricted simply to the diagnosis and care of the patient. There is a further responsibility of assessing the patient’s capacity and recommending the appropriate rehabilitation and training for any patient likely to be left with some locomotor disability. These patients will need assessment of:

1. What work can be done,
2. Whether new employment is necessary and, if so, whether retraining is indicated,
3. What assistance is needed at home,
4. Whether the expected earning will be enough for sustenance,
5. What other Govt./Agencies aids and facilities are available.
The team approach to such problems is mandatory and many involve the medical social worker, vocational advisor, employment officer, occupational therapist, N.G.O’s etc. (besides the doctor).

Patients who need placement services include:

1. Those with complex lesions e.g.
2. Crush injuries of the hand
3. Spinal injuries especially those with weakness of extremities
4. Those with head injuries including impaired higher functions and associated motor handicap
5. Those with lesions/diseases which give rise to severe residual disability e.g. poliomyelitis, cerebral palsy, multiple sclerosis, stroke etc.
6. Patients with multiple injuries.
7. Amputees, especially upper limb amputees
8. Those who need a high degree of physical fitness
9. For their work
10. For their sporting activities

All such patients benefit from an integrated retraining programme for work at the final stages of their rehabilitation.

The number of patients in these categories with lesions of traumatic origin is small compared with the total number of patients with medical locomotor disorders in the population as a whole. Whether or not such patients need rehabilitation in a special unit is dictated by the severity of the causative disease.

In India, Vocational Rehabilitation Centres, working under the Ministry of Labour, Directorate General of Employment and Training are entrusted with the work of vocational assessment, training and placement of the disabled.

Note for the Master Trainer:-

The diagrams in the pages can be shown to the PHC Doctors on transparencies, so as to give them an idea about the deformities, equipment, therapy interventions, orthotics and prosthetics. It will be more relevant where arrangements for field visit do not exist.
REFERENCES

5. Vocational Text Book for Physiotherapy and Occupational Therapy Dr. H.C. Goyal et.al., EDCIL, Directorate of Vocational Education, Government of Karnataka.
DEFORMITIES OF THE LOWER LIMB
VARIOUS TYPES OF EXERCISES

Passive exercises for knee joint

Passive exercises for knee joint for tendo-achillis

Active assisted exercise for elbow flexors

Resistive exercise for quadriceps muscle
EXERCISE EQUIPMENTS
Therapeutic Cycle Saw

Rehabilitation Rug Frame

Rehabilitation Lathe

Ankle Exerciser
EQUIPMENTS FOR PERCEPTUAL MOTOR TRAINING
EQUIPMENTS FOR PERCEPTUAL MOTOR TRAINING
AMBULATION TRAINING EQUIPMENTS
AMBULATORY AIDS
LEFT HELD DEVICES

Modified Utensils

Long-handled Brush

Universal Cuff

Reachers

Commode Chair

Shower Chair

SELF HELD DEVICES
Locomotor Disability

- NAVICULAR PAD
- THOMAS HEAL
- REVERSE THOMAS HEAL WITH LATERAL SIDE WEDGE

- METATARSAL INSOLE PAD
- METATARSAL BAR
General Introduction

Locomotor Disability
POLYPROPYLENE AFO SHOE INSERT

TOE PICK-UP

PTB ORTHOSIS
General Introduction

Locomotor Disability
SOFT CERVICAL COLLAR

FOUR POST COLLAR (Anterior side)

FOUR POST COLLAR (Posterior side)
General Introduction

Locomotor Disability
Manual for Training of PHC Medical Officers

LUMBOSACRAL CORSET

MILWAUKEE BRACE
Locomotor Disability
Mental Retardation
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>Prevalence</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>Definition</td>
<td>76</td>
</tr>
<tr>
<td>4</td>
<td>Understanding the Nature of the Problem</td>
<td>77</td>
</tr>
<tr>
<td>5</td>
<td>Needs of the Children with Mental Retardation</td>
<td>77</td>
</tr>
<tr>
<td>6</td>
<td>Classification</td>
<td>77</td>
</tr>
<tr>
<td>7</td>
<td>Associated Disabilities</td>
<td>81</td>
</tr>
<tr>
<td>8</td>
<td>Etiology of Mental Retardation</td>
<td>82</td>
</tr>
<tr>
<td>9</td>
<td>Prevention</td>
<td>87</td>
</tr>
<tr>
<td>10</td>
<td>Management of Persons with Mental Retardation</td>
<td>93</td>
</tr>
<tr>
<td>11</td>
<td>Methodology of Teaching Children with Mental Retardation</td>
<td>94</td>
</tr>
<tr>
<td>12</td>
<td>Services for Prevention, Early Identification, Intervention, Rehabilitation and Integration Available for the Mentally Retarded in the Country</td>
<td>99</td>
</tr>
</tbody>
</table>

References: 101

Appendix ‘A’: 102-106
1. INTRODUCTION

Mental retardation is not a disease or a single entity. It is rather a term applied to a condition of retarded mental development present at birth or in early childhood and is characterised mainly by limited intelligence combined with difficulty in adaptation. Mental retardation is not primarily a medical problem. It is an educational, psychological and social problem. There is considerable ignorance amongst the general public about the concept of mental retardation. It is noticed that social outlook among the public and even amongst some professionals towards the retarded is not only indifferent but also unhealthy and demoralising.

Mental retardation is an impaired mental ability. A retarded child learns more slowly and at maturity his capacity to understand will be significantly less than normal. He finds difficulty in learning, social adjustment and economic productivity. In the present era of scientific advancement however, there are ways by which these less fortunate ones can be helped. If parents, teachers, psychologists and all those entrusted with the care of the young children with mental retardation could equally share interest and responsibility in this field, they could play important roles in the proper development of the retarded. The task of the society is not to neglect those who are mentally retarded, but to care for and educate them.

Mental Retardation is not just confined to intellectual retardation. It may influence all aspects of human functioning including speech, language development, hearing & visual functioning as well as muscular co-ordination. Quite a number of children with mental retardation, have seizures from time to time. However, (a substantial) children with retardation particularly those with milder forms of retardation have retained considerable educational and training potential which needs to be developed through appropriate education and training.

2. PREVALENCE

A study conducted by the National Sample Survey of India in 1991 said that 3 per cent of our children have developed mental delays often associated with mental retardation and several non-official studies have also suggested that 2 to 2.5 per cent children have mental retardation. India has about 300 million children under 16 years of age. This means that the country may have 6 to 9 million children with retardation. Besides about 21 million adults are affected by mental retardation.
3. **DEFINITION**

Persons with disability (equal opportunities, protection of rights and full participation Act. 1995 defines Mental Retardation as follows:

“Mental retardation means a condition of arrested or incomplete development of mind of a person which is specially characterised by sub-normal of intelligence.”

Another very common definition by American Association On Mental Retardation (AAMR) 1992 is Mental Retardation refer to significantly sub-average general intellectual functioning with concurrent deficits is adaptive behaviour and manifested during the developmental period. Mental Illness d.”

It is evident from the above given definition that three things need to be born in mind:

1. Intelligence should be significantly sub-average.
2. This should have occurred in the developmental period i.e. up to 18 years of age and
3. Behaviour should be significantly inappropriate.

“Mental Retardation refers to substantial limitations in present functioning. It is characterised by sub-average intellectual functioning, existing concurrently with related skill areas: communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure and work. Mental Retardation manifests before the age of 18”.

*Four assumptions are essential to the application of the definition:*

1. Valid assessment considers cultural and linguistic diversities as well as communication and behavioural differences.

2. The existence of limitations in adaptive skill occurs within the context of community environments typical of the individual’s age, peers and is indexed to the person’s individualised need of support.

3. Specific adaptive limitations often coexist with strength in other adaptive skills or other capabilities and
4. With appropriate support over a sustained period, the life functioning of the person with mental retardation will generally improve.

4. UNDERSTANDING THE NATURE OF THE PROBLEM

This is important for prompt identification and appropriate intervention. One might come across a child who shows the following behavioural signs:

1. Understanding things more slowly
2. Takes longer to respond to what others says and to what happened around him.
3. Cannot express needs and feelings clearly
4. Behaves like someone younger than him.
5. Does not have the same abilities as others of the same age
6. Is not able to pay attention to one person or to one activity for long
7. May remember only for a short time what he has been told or what has happened in the past. Or may not remember these things at all.
8. May have difficulty controlling his feelings.
9. May have difficulty making decisions, may not know what to do, say, or where to go.

A check list for assessment called Screening Schedule developed by National Institute for the Mentally Handicapped is appended at “A”.

5. NEEDS OF THE CHILD WITH MENTAL RETARDATION

1. The baby needs encouragement to play like other babies. The baby must be played with and talked to just like one talks to and play with any other baby.
2. Similarly, the child needs to play with other children, needs to communicate with others, need to take care of himself and needs to get around alone.
3. He needs to go to school with other children. Schooling will develop his abilities.
4. An adult needs to participate in household activities.
5. Needs to participate in the activities of the community.
6. With training such children can participate atleast partially if not completely in all the above activities.

6. CLASSIFICATION

Classification of mental retardation should be based both on the nature of the primary disability,
and the severity of the mental handicap. Classification, although not an end in itself, is an important step in clinical analysis and is often as useful guide to research, prevention and treatment.

There have been various attempts to produce classification of these heterogeneous collection of people designated as mentally retarded.

Classification According to Gross Physical Characteristics

(i) Garden Variety “Familial Types”:
In all physical regards they appear “like every one else”, yet these seemingly normal people when faced with simple intellectual tasks become confused, inept and perform in a manner more appropriate to a chronological age much less than theirs. They do not suffer from severe types of intellectual deficiency.

(ii) Microcephaly
Microcephaly is one type of mental deficiency in which, the individual has an abnormally small head. The major distinguishing feature is cone shaped cranium with a circumference of less than 19” in adulthood as contrasted to a normal figure of 22”. It is believed to be caused by the early closure of sutures of the skull so that the growing brain does not find space to expand. This causes extreme pressure on the brain which may be severely damaged. Microcephalies vary intellectually from moderate to profound retardation.

(iii) Hydrocephalus
Hydrocephalus or water-on-brain is often associated with severe mental defect. Hydrocephalic cases are noted by a globular enlargement of the cranium resulting from the accumulation of abnormal amounts of cerebrospinal fluid, both face and body remain normal in size.

(iv) Cretinism
The child appears normally at birth. Towards the end of the first year, they show signs of sluggishness and apathy, growth is stunted, hands and feet are stumpy and malformed. The face is characterised by a flat nose, widely spaced eyes, thick lips, dry skin and hair, a large protruding tongue and flabby ears. Hearing is frequently defective. The intellectual level correlates with the degree of biological defect. Cretinism is a condition in which there is deficiency of thyroid gland function and if not treated early, will cause progressive mental retardation. A child may be born with complete absence of the thyroid gland. The child may be given thyroid regularly for years.

(v) Mongolism (Down’s Syndrom)
Now-a-days the child with mongolism is often described as having Down’s Syndrome. A
Down’s Syndrome baby is “born different”. He is different both physically and mentally from a normal baby. The physical differences consist of some reduction in body and head size and some physical characteristics which can often be recognised at birth. They have slanting eyes with epicanthic folds, the ears may be small, the tongue may be big and thick, thin lips, misshapen teeth, hands and feet are stumpy, clumsy and broad short stature with short broad fingers and toes. The small head contains a brain that is also small, which accounts for the reduced mental capacity.

Down’s syndrome is the commonest of the numerical chromosomal anomalies found in humans. There are 47 chromosomes instead of 46.

**Classification According to Educational Level**

The classification employed in educational institutions is as follows:

(i) Trainable (IQ 25-49)
(ii) Educable (IQ 50-69)

A trainable child is one whose social prognosis is sheltered living. Such living may be in a sheltered workshop, an occupational centre, sheltered job within community, a residential facility or the home. The important consideration is that these children will need some type of supervision for their entire live.

An educable child is characterised by academic retardation rather than by emotional behavioural problems. The reasons for his retardation may lie with him, with the teacher, with the school system, with the family or with two or more of these. It is necessary to determine the relation between his mental ability and school achievement.

**Classification According to AAMR**

American Association of Mental Deficiency (AAMR) has used intelligent test scores as basis for categories the levels of mental retardation. The degree of mental retardation suggests the probable level of functioning the individual is capable of achieving. It also suggests the kind of problems that one might anticipate they will create and present to themselves, their families and their community. The terminology and IQ ranges for various degrees of retardation according to AAMR are given below:
### Degree of Retardation

<table>
<thead>
<tr>
<th>Degree of Retardation</th>
<th>IQ Range</th>
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<tbody>
<tr>
<td>Profoundly retarded</td>
<td>0-24</td>
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<tr>
<td>Severely retarded</td>
<td>25-39</td>
</tr>
<tr>
<td>Moderately retarded</td>
<td>40-54</td>
</tr>
<tr>
<td>Mildly retarded</td>
<td>55-69</td>
</tr>
<tr>
<td>Borderline</td>
<td>70-84</td>
</tr>
</tbody>
</table>

The profoundly retarded usually have considerable central nervous system impairment and organic pathology is present to an unusual extent. Many present other types of handicapping conditions in addition to mental retardation such as blindness, deafness, epilepsy and gross impairment of physical co-ordination. Speech is usually absent and sensory-motor development is very poor. Frequently repetitive behaviour like head-banging, biting etc. may be seen. They need constant care and supervision and they are highly dependent on others for the satisfaction of their needs.

The Severely Retarded present some of the same characteristics and problems associated with the profoundly retarded but to a lesser degree. In a large number of cases there is a considerable damage to the central nervous system as well as organise brain pathology and other handicapping conditions. Motor development, speech and language are retarded. They are often but not always physically handicapped. They are depended on others but not completely and many of them require medical and nursing care.

The Moderately Retarded present less complicated neurophysiological conditions as compared to the profoundly and severely retarded. Fewer types of other handicapping conditions are present. In most cases, motor development is fair. Language and speech can be developed, they are semi-dependent except for those with organic brain damage. They are capable of profiting from specialised training aimed at the development of self-help skills and social awareness. They are also termed as ‘trainable mentally retarded’ (TMR).

The Mildly Retarded constitute 85% of the total population of retarded persons. They approached the low average in terms of physical characteristics. They are usually slow in developing, walking, talking, feeding themselves and toilet training. Few observable physical signs are present to assist in diagnosis but identification of a child as a mentally retarded is usually not made until
one or possibly two years. Motor development is relatively normal, eye-hand co-ordination is somewhat below normal, social and communication skills may develop by special training. They are educable within limits and are usually termed as ‘educable mentally retarded (EMR). Adults with training can work in competitive employment and they are able to live independent lives.

Classification According to APA

The terminology and IQ ranges for various degree of deficiency according to American Psychiatric Association (APA) are given below:

<table>
<thead>
<tr>
<th>Degree of Deficiency</th>
<th>IQ Range</th>
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<tr>
<td>Mild Mental Deficiency</td>
<td>70-85</td>
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<tr>
<td>Moderate Mental Deficiency</td>
<td>50-69</td>
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<tr>
<td>Severe Mental Deficiency</td>
<td>0-49</td>
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</tbody>
</table>

7. ASSOCIATED DISABILITIES

Autism:

Autism is a cluster of behaviours which stems from a basic cognitive deficit, from a variety of causes [Rutter, 1985]. The basic criteria for autism are social impairment, language abnormality and insistence on sameness, a pattern established before three years of age. When young, children are aloof and withdrawn, very much in a world of his or her own, but as they get older they may seek social contact in inappropriate ways. Eye contact is not always absent particularly in older children, but may be inappropriate in length stares or quick peeps. Individuals with autism do not interact in social play and do not understand the unspoken rules. They can treat people as objects or become very attached to inanimate object, instead.

Cerebral palsy:

Cerebral palsy affects each child differently. A mildly affected child will learn to walk with slightly unsteady balance. Other children may have difficulty with using their hands. A severely affected child may need help learning to sit and may not be independent in daily tasks.
Cerebral palsy is found in every country and in all types of families. About one in every three hundred babies born will have, or will develop, cerebral palsy. By therapy, special education and applied technology, children with cerebral palsy can lead productive lives. He is a child first his disability comes only after that.

**Epilepsy**

Fits or an epileptic attack are sudden, usually brief periods of unconsciousness or change in mental state, often with jerking movements. Children who have once had a epileptic fit with a high fever, will have it again when they have a fever-especially if other persons in the family have had epileptic attacks with fever. Fits that come only with fever usually stop occurring by the time the child is seven years old.

**8. ETIOLOGY OF MENTAL RETARDATION**

When the mentally retarded are classified according to the cause of their deficiency, the basic division is into endogenous and exogenous causation. Endogenous is roughly equivalent to primary, ‘familial’ or ‘hereditary’. Endogenous literally means originating with the body and should refer to those forms of mental retardation that are genetically determined. Exogenous, the second major etiological classification is called ‘secondary’, ‘acquired’ or ‘environmental’.

**Genetic Causation (Hereditary factors operating before conception)**

Genetic abnormalities are a common cause of disease, handicaps and death among infants and children. Three categories of genetic defects have been identified in man (1) single mutant gene, (2) abnormalities of chromosomes, (3) multifactorial inheritance. Each single mutant gene will exhibit four patterns of mendelian inheritance:

1. autosomal recessive
2. autosomal dominant
3. X-linked recessive
4. X-linked dominant

It is estimated that nearly 90 per cent of diseases can be traced to inborn defects of metabolism and genes in parents that can be transmitted from one generation to another. Those causing mental retardation are:
1. **Phenylketonuria (PKU):** This is an inherited defect in amino acid metabolism. At least 4 per 1,00,000 births are born with this defective metabolism which prevents the body from absorbing properly an amino acid found in many forms called phenylanine. PKU is an in born error of amino acid metabolism due to homozygosis of a recessive gene.

2. **Galactosemia:** This is another metabolic disorder in which there is the inability to metabolise galactose due to the absence of an enzyme. Galactosemia is an inborn error of carbohydrate metabolism inherited as an autosomal recessive trait.

3. **Cretenism:** This is an inherited deficiency of the thyroid gland function, which, if not treated early, results in progressive mental retardation. Complete absence of the thyroid gland, lethargy, sluggish behaviour, irritability, anaemia, constipation and retardation in physical growth are early symptoms of this condition.

4. **Chromosomal Anomalies:** Since the normal human chromosomes of an individual consist of autosomes and sex chromosomes of an individual consist of autosomes and sex chromosomes, it is reasonable to assume that there are two broad categories of chromosomal disorders: autosomal and sex chromosomal anomalies. Normal chromosome number in human being is 46 i.e. 44+XX in the female and 44+XY in the male. Developmental balance is so delicate that most of the chromosomal aberrations are associated with mental retardation. There is no treatment available for chromosomal disorders. However, whenever indicated a prenatal diagnosis may be carried out and if the foetus shows a chromosomal aberration, parents should be suitably informed. Some examples of chromosomal syndromes are: Downs syndrome, Klinefelter’s syndrome, Turner’s syndrome, Triplo X syndrome and Crie Du Chat syndrome.

5. **Consanguineous Marriages:** Intelligence depends largely on genes inherited from both parents. Abnormal genes can produce mental handicap more often in the children of parents who are blood relatives. The nearer the relationship of the parents, the more frequent is the occurrence of mental handicap and of abnormalities of the brain in the children. Many children of such marriages will be normal. But the chances of abnormal children are higher in such marriages than in those between unrelated parents. Almost all inherited diseases are also common in consanguinous marriages i.e. marriages between blood relatives.

**Environmental causes of Mental Retardation.**

There is a wide variety of possible environmental causes of mental retardation. The type of
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environment a child has during the first five years of life, the formative years, can make a considerable difference in intelligence.

A. Prenatal causes (During pregnancy) The differentiation between cases of mental retardation due to prenatal environmental causes and cases of mental retardation due to hereditary factor is very difficult to make. Both the groups are congenital. Any organ or tissue of the body may be affected but the central nervous system suffers most severely in the congenital condition. Congenital cases are often still born; others show obvious symptoms at birth but survive for many years; and sometimes symptoms do not appear for weeks, months or even years.

1. Prenatal Physical Trauma: It is quite possible that unsuccessful attempts at abortion and accidents to the pregnant mother may injure the foetus so as to lower the child’s mental level.

2. Prenatal Nutrition: A large number of studies suggest that the nutritional status of the pregnant mother may significantly affect the mental level of the offspring. Malnutrition in mother is a very serious cause for mental retardation in the child.

3. Prenatal Infection: An evidence that diseases of the mother during pregnancy may affect the physical and mental development of the foetus is quite convincing. Rubella or German Measles during pregnancy has been established as a cause of multiple maldevelopments in the foetus.

4. Blood incompatibility: Rh incompatibility between the maternal and foetal blood may result in the newborn child being severely jaundiced and mental deficiency is a possible accompaniment. There is also an evidence that mother-child blood incompatibility in the classical major blood groupings (A, B and O) may also be a factor in causing some cases of mental deficiency.

5. Radioactivity: It was discovered that X-ray irradiation of mothers during pregnancy resulted in abortions or in a wide array of congenital defects and deformed skulls. These malformations were caused by the direct effect of high levels of irradiation on the young foetus. A second way in which irradiation may produce mental retardation is by the production of mutations. A mutation is an alteration in the complicated chemical nature of the gene. Mostly the mutant genes produce some kind of harmful effect.

6. Toxic Agents: It is generally believed that toxins such as lead, nicotine, alcohol and morphine in the maternal bloodstream may effect the developing embryo and possibly be responsible for lowering the mental level of the offspring. An excessive use of drugs by a pregnant mother has an
unpredictable and a damaging effect on the brain of the unborn child.

7. **Asphyxia:** This is an important cause brought about by the low supply of oxygen. This happens, if a pregnant mother lives in a high altitude, where there is less supply of oxygen or if she is subject to some shock, bleeding or diabetes.

8. **Hydrocephaly:** Hydrocephaly or water in the brain is often associated with Mental Retardation. This is accumulation of cerebrospinal fluid in the cranium or the skull due to a disturbance of circulation or absorption in the body. The head grows much bigger but the growth of the brain is restricted. Epilepsy, blindness, deafness and paralysis may occur in addition to ‘Mental Retardation’.

9. **Microcephaly:** This is a condition of an abnormally small head or an elongated shaped head. This is caused by the early closure of the sutures of the skull or the cranium so that the brain does not find space to grow fully. This causes extreme pressure on the brain, which may be severely damaged. Irradiation of the mother during pregnancy and maternal Rubella can cause this condition.

B **Natal Causes (At the time of birth)** During birth, the brain can be damaged by too fast a delivery or a prolonged difficult delivery or heavy maternal sedation or prematurity or traumatic birth injury or asphyxia.

1. **Prematurity:** Extensive long-range studies have established that people born prematurely are mentally retarded. Studies indicated that 70 per cent of premature infants weighing less than 3 pounds at birth have several physical and mental deficiencies such as spasmism, mental retardation, speech & hearing, visual and behavioural problems.

2. **Traumatic Birth Injury:** Formerly it was estimated that from 6 to 10 percent of the cases of mental retardation resulted from birth injuries. Natural birth is quite painful experience to the infant and the mother. The child’s head is subjected to the strain of passing through a relatively narrow passage through the pelvic region. The delicate blood vessels of the infant are prone to damage during this process. Cerebral haemorrhage can occur at this time. In acute cases, it may even lead to death or even epilepsy later in life. However, difficulties in labour due to malpositioning of the foetus or other complications may still damage the infant’s brain at birth. Bleeding within the brain is probably the most common result of such birth trauma.
3. **Asphyxia:** Lack of oxygen can occur at the time of birth due to several causes. Prolonged labour and high sedation given to the mother just before delivery can lead to lack of oxygen for the child which may result in damage to the brain. Sedation and prolonged labour must be avoided as far as possible. Forceps should be used only as a last resort and with utmost care so as not to damage the delicate brain of the infant.

C. **Postnatal Causes (After the birth):** Many of the prenatal and natal causes of mental retardation also operate postnatally. However, there are some additional factors whose effects are primarily postnatal.

1. **Head injuries:** These may be due to a fall or an accident on the road or in the play field. Physical hitting on the head will result in many harms later in life to the child.
2. **Postnatal infections:** All brain infections involve the hazard of permanent brain damage and mental retardation. Infections, especially encephalitis and meningitis in infancy or early childhood may leave mental retardation as an after effect.
3. **Frequent high fevers:** This has a very harmful effect on the brain of a growing child.
4. **Malnutrition:** This is another important cause of mental retardation. Extreme malnutrition during the first years of the developmental stage of the child can cause permanent damage to the brain.
5. **Lead poisoning:** Children eating chips of paint or other items containing lead and occupational exposure of adults to lead fumes in industry may cause lead poisoning. Mental retardation is one of the multiple symptoms in this condition.
6. **Socio-cultural and economic factors:** Mental retardation respects neither class nor race. It occurs in families rich and poor, learned and uneducated. There are no exceptions. Children from deprived backgrounds can become retarded because of lack of early opportunity for intellectual growth. The harsh brutalities of a life of extreme poverty may affect the child’s mental growth. Thus it can be seen that the causes may be either in biological system or in the genetic condition. But in addition to these there are some other causes which are peculiar to India and may sometimes cause mental retardation. These include social, cultural, dietary and nutritional aspects.
9. **PREVENTION**

It is generally recognised that prevention is the ultimate goal of all efforts to combat mental retardation. Mental retardation poses two main problems: (a) The task of prevention of these conditions which are of biological or socio-cultural origin; and (b) the second problem is amelioration of these conditions wherever possible by biological, social or educational means. The identification of etiological factors is essential for a sound programme of prevention. The oft repeated aphorism “prevention is better than cure” is especially relevant in regard to mental retardation. Since many factors are involved in the etiology of mental deficiency, preventive measures are also diverse. The three types of activities of primary, secondary and tertiary prevention are presented as overlapping pyramids.

It is suggested that primary prevention activities should receive priority in the first five years and the other activities should be given relatively low priority in terms of research, service and funds. The basis is to use a rational development activities and distribution of funds into activity that will give benefits.

**PRIMARY PREVENTION**

Techniques for primary prevention of all the known pathological conditions leading to mental retardation are by no means complete. However, quite a few pathological conditions are known to be amenable to preventive measure.

**Public Education**

A preventive approach to mental retardation can succeed only in an educated, enlightened community. Public education is of particular importance in enforcing preventive measures against mental retardation. The public has to be taught that mental retardation is a symptom producing a handicap and not a curse or visitation (disaster looked upon as punishment from God). The mentally retarded people have feelings of love and hate, anger and compassion, and have a need for affection and a sense of belonging like all of us. As citizens they have fundamental rights which include the best that medicine and education have to offer and the right to the pursuit of happiness. Public education has to proceed on several levels- (i) dissemination of the available knowledge through public media like newspapers, radio and television, (ii) to bring together the parents and interested public to mobilise their efforts to channelise funds and services. (iii) Strengthening of national
level organisations to co-ordinate and disseminate information to those who are interested in the field of mental retardation.

**Preventive Medical Measures**

Improvement of prenatal, natal and postnatal care is a recognised cornerstone in all efforts to prevent mental retardation. Chromosomal anomalies have known that the age of the mother is correlated with the incidence of mental retardation. This preventive measure as such is not an expensive one; it needs proper counselling and education of the parents and this is the need of the hour. This would imply that raising the family might be completed around the maternal age of 30 or so with appropriate spacing between one or two children. Parents need to be dissuaded from having children after maternal age of 35. Recent researches have also shown that if the children are born at an early maternal age, the incidence of mental retardation is also quite high. Therefore, the early pregnancy should also be avoided.

**A) Maternal and Child Health Services:**

Some of the problems in the existing MCH services are their location, inadequate supplies and poor support by a referral system. All these need urgent correction. Presently, a large number of paramedical personnel are working in the field but they are not able to serve the rural population, as they are not forming a link with specialised institutions in the cities. Though such a referral system has been much talked of, there is very little effort to increase the confidence of the rural population in the peripheral health centres. Unless the confidence is generated mere creation of facilities will be of no avail. It has been reported that more than half the women have haemoglobin of less than 11G/100 ml and significant number have other vitamin deficiencies. It is important to note that women from lower socio-economic groups give birth to premature children more than those from high socio-economic status. It appears to be very clear that the rural public have very little confidence in peripheral health centres and professionals. In view of the above, the needs of MCH services such as: (a) better clarity about the role of paramedical staff, (b) provision of them adequate supplies (c) and support for their work and reasonable expectations. Such an approach will enhance their prestige in the community and their acceptance as social changers and programme implementers.

**B) Immunisation Programme:**

The increased use of immunisation techniques for the common childhood illnesses such as measles, mumps and whooping cough, which can have neurological consequences, would also have a
significant impact in reducing incidence of pathological conditions. India has been successful to a great extent in complete eradication of dreadful diseases like small pox with the help of World Health Organisation. Other immunisation facilities could also be brought into effect. Compulsory testing of blood group of the child at birth may also be introduced.

C) **Rh Factor:**

If the mother’s Rh factor is negative and that of the child is positive, immature blood cells are produced in the infant, sometimes causing jaundice leading to damage to the brain. Replacement of the baby’s blood can be done after careful blood tests and grouping. An Rh-negative mother should always deliver a child in a hospital where there are facilities for immediate exchange transfusion, under careful supervision.

D) **Irradiation:**

X-Rays during pregnancy have harmful effect on the chromosomes of the mother and the baby resulting in injury or damage to the tiny brain cells. A pregnant mother’s abdomen should never be screened, particularly in the first trimester. Screening of inborn errors of metabolism and chromosomal abnormalities should be carried out in suspected cases after birth as well at the prenatal stage. Abortion should be permitted after proper diagnosis and the approval of at least two doctors if the prenatal test shows a disorder associated with mental retardation.

E) **Obstetric Care:**

Better ante-natal and obstetric care would have an impact on the incidence of mental deficiency. Regular medical check-up with the onset of pregnancy alongwith the provision of milk and other nutrients like multi-vitamins may be made for those who cannot afford themselves and this would be a national investment in the long run. In India the hospital facilities for child delivery are not so readily available in rural areas. Care must be taken that if hospitalisation is not possible, services of trained personnel is made available during the birth of each child even in the remotest part of India.

**Genetic Counselling**

Genetic counselling, which usually involves the question of the desirability of future offspring by the parents, siblings and sometimes more distant relatives, can be done by private practitioners and
staff physicians in clinics and hospitals. Genetic counselling has to be preceded by an exact diagnosis which may require biochemical and cytogenetic studies. With some exceptions, conditions known to be caused by a dominant recessive gene are quite predictable, in that the children of affected person have a 1 in 2 chance of inheriting a disorder. The parents of one child with such a condition run a 1 in 4 risk of having a second affected child. This is true in PKU and galactosemia. Genetic counselling is becoming increasingly popular in the western countries. Linked with this, is the possibility of parental detection of down’s syndrome through amniocentesis. If the diagnosis is positive, termination of pregnancy would be desirable. Similarly, rubella vaccinations might have a significant impact in reducing the number of severely handicapped children who would be born.

**Consanguinity**

Related to genetic counselling is the problem of consanguineous marriages which are common in some communities in India. Parental consanguinity often produces mental retardation in the offspring. Counselling of individuals at present in certain communities could be started which describe the potential hazards of this traditionally sanctioned pattern of marital relationships between close relatives. The nearer the relationship of the parents, the higher is the risk for their children. The need in this area is for public education and legislation.

**Malnutrition**

Malnutrition, whether during the reproductive cycle or after birth, frequently impairs intelligence by causing irreversible effect upon brain growth and behaviour. Malnutrition may not always be due to deficiency of food. Number of cultural influences may contribute to it. For example, habits of eating polished rice or avoiding intake of meat, fish and eggs on religious grounds. Fasting prescribed by certain religions, if prolonged, weakens the resistance. Personal food habits like boiled and fried vegetables with enough spices and chilly also lay an important role in the development of malnutrition. In general poverty seems to be a constant companion of malnutrition. Protective foods like milk, fruits, butter, almonds, fish, meat, eggs are costly items and may be out of reach of poor people. There would be very little malnutrition if all available food in the country could be equitably distributed in accordance with physical needs.

**Improvement of Socio-Economic Standards**

Basic to any real improvement in this area is the raising of the standards of living and education among disadvantaged, section of the population. An effective programme has to attack the basic
social and economic conditions that give rise to malnutrition, prematurely obstetric hazards, under and over stimulation. People who are with good vocational training compete successfully in the labour market and are likely to be more secure economically and hence are inclined to think in terms of securing good health and education for themselves and their families. A co-ordinated effort by social agencies, government authorities and community leaders to strengthen family stability through vigorous case work, financial aid and rehabilitation of individual family members would be of great importance. Only a cohesive, economically and emotionally secure family could offer proper support for both intellectual and emotional growth of the mother and child.

SECONDARY PREVENTION

Early Identification and Treatment of Culturally Deprived Child

Cultural deprivation consists of a complex set of conditions like lack of stimulating environment, lack of verbal communication with adults, poor sensory experience and low socio-economic status giving rise to poverty and other deleterious environmental factors. Cultural deprivation is such a global and undifferentiated concept that it invites attention to identify the nature of the deficit and to see where and when the infant of the poor class parents is most likely to be experientially deprived. One of the important features of the poverty stricken family in India is that of overcrowding. Many persons live in little space and they have a large family. In such a crowded atmosphere, the activities of the child are very much restricted. Moreover, the child gets very little stimulation from the adults who are poor models of spoken language. Seldom such parents, who are preoccupied with problems associated with their poverty or who are chronically in a state of disorganisation and apathy, ask the child questions that will force him to use language to identify relationships and to organise sequences of his experiences in a linguistic form. Since the play-material and the space are highly limited, opportunities to learn language are markedly reduced. Thus a child in a poor crowded family, beyond his first year, has very little opportunity to develop at an optimal rate, in the direction demanded for later adaptation in school and society.

Early Identification and Handling of Children with Isolated Handicaps

There is a growing recognition of the existence of a large number of infants and children with isolated motor, sensory, perceptual, behavioural and intellectual difficulties. By some estimates the number comes to about 5 per cent of the general school population. Etiology varies from hereditary factors to mild brain damage. The early history in many of these children suggests some prenatal, natal or postnatal difficulties.
The perceptual difficulties may manifest themselves in disturbance of body image, spatial relationships and design recognition. These difficulties often give rise to many learning problems. Perceptual training aimed at overcoming these difficulties is still in the experiential stage. It is to be hoped that practical methods in this area will emerge shortly, with specific recommendations as to appropriate play materials and play methods. The sensory deficits such as deafness and blindness in the child can be helped by intensive use of the remaining normal sensory pathways which enable the developmental and socialisation process to progress along normal lines by maintaining communication between the child and his environment.

Deficiency in motor area may manifest itself as general clumsiness and poor co-ordination, which interfere with the mastery of motor skills such as writing. Early identification of this handicap in a younger child helps the parents delay introduction of such activities as bicycle riding or ice-skating. Isolated scholastic difficulties may involve number concepts, reading, and handwriting or abstract thinking. Help in these areas, by way of small groups or individual tutoring, may make it possible for the child to keep up with his age-mates.

Distractibility and hyperactivity due to mild brain damage or due to unspecified constitutional factors present stumbling blocks to learning and may serve as the starting point of child-parent and child-teacher conflict. Small classes for such children allow the teacher more flexibility and a more liberal behaviour policy than is possible in a regular classroom.

All of these handicaps are very taxing to the child, his parents and his teachers. These handicaps may contribute to the development of serious psychiatric difficulties such as uncontrollable aggressive behaviour, difficulties in group adjustment, withdrawal and passivity.

Early Identification and Treatment of Hereditary Disorders:

1. It is estimated that nearly 90 per cent of the diseases can be traced to inborn defects of metabolism and genes in parents that can be transmitted from one generation to another. Within two weeks of birth of a baby, the mother should get in touch with a doctor of the hospital where she delivered to give PKU and other tests to diagnose the condition before it afflicts the baby. It is one of the types of mental deficiency, which is preventable. A low phenylalanine diet supplemented by milk within the first six weeks of life is the best preventive measure for mental retardation in the child. Known ‘carriers’ among parents should be advised not to
intermarry and have children. The peculiar odour and green colouring of the urine can be detected through a simple test called the diaper test. A blood test will also show this disease.

2. Galactosemia can be detected through simple blood and urine tests. In galactosemia, treatment requires the omission of milk from the infant’s diet. Milk may be reintroduced into the diet in moderate quantities at the age of 4 or 5, since by that time the child apparently develops alternative metabolic pathways for handling galactose.

3. The use of iodised tablets after consulting a paediatrician is an effective measure for prevention of cretinism. Residing in high altitudes should be avoided by the mother when she is pregnant.

10. MANAGEMENT OF PERSONS WITH MENTAL RETARDATION

Special Education

A vast majority of educable mental retarded can be helped to become useful members of the society. Training and rehabilitation of mentally retarded will prevent delinquency and will also check any deterioration of the personality, which would be inevitable without special training.

Special schools and special classes provide a more suitable curriculum, a better organised daily routine and right and cheerful environment with diverse activities, freedom of expression and movement, occupation etc. so that improvement in social adjustment is brought about. Family contacts must be maintained through home visits during vacations or holidays. Family members should be allowed to visit regularly at other times. A few of the new trends in special education may be mentioned here:

(i) The lessened emphasis on academic performance and greater stress on prevocational and vocational training and on practical life experiences
(ii) The attempt to recognise small rather than global units of the child’s functioning, permitting the precise identification of his assets and building an individual programme around these assets
(iii) The recognition of the value of psychiatric guidance and consultation by teachers and instructors.

The current emphasis on pre-school education may be considered as the most important innovation in the field of special education. It is now generally recognised that early intervention may accelerate mental, social and psychological development and removes faulty learning habits.
Some people advocate such intervention in infancy, regarding this age group as most malleable and responsive to environmental changes.

The type of education, care and training required for different categories of the retarded is not the same. Early identification and intervention are some of the prerequisites. The principle of normalisation should be maintained as far as practicable. Many families do not even recognise the presence of a retarded child, unless the problem is a severe one when they try to look for some help from outside agencies.

Adequate provisions for this section of people need to be made. They could be best educated in special schools leading ultimately to pre-vocational training. The moderately retarded needs a special educational programme which should aim at development in major learning areas. In addition to basic education in 3 R’s, training in self-care skills needs to be given. Adequate trained personnel may be employed in such institutions. After school service programme, training in sheltered workshops should follow. The scope of preventive measures in India is still not broad because of paucity of resources such as technical personnel, material and finances. Despite this, there seems to be optimism regarding this issue. With the limited resources available in India it would be desirable to have a co-ordinated effort in the mobilisation of all possible avenues in an attempt to hold the incidence of mental retardation to a minimum. The help of the Government both at the central, state and local levels as well as private groups are needed in this effort.

11. METHODOLOGY OF TEACHING CHILDREN WITH MENTAL RETARDATION

In teaching educable children the following major principles should be born in mind.

1. Repetition as often as needed.
2. Concretization
3. Making the units much smaller
4. Generalisation
5. The educable child can often reach the 4 or 5 class level. In some cases they may be able to be integrated in the ordinary school.

The trainable child may have to go to a special school. There are about 900 special schools in India. There are some institutions in certain cities which impart vocational training to persons with mental retardation.
Teaching Strategies:

*Remember the following while teaching/training children with mental retardation:*

1. Children learn through imitation
2. Provide all possible opportunity to the child to interact with children of his age in the community.
3. Play way method is best suited method to teach such children.
4. Divide or break down whatever you need the child to do, into small steps. Proceed step by step. It might take the child a week just to pick up the first step.
5. Give the training regularly and systematically.
6. Do not be impatient.
7. Start the training with what the child already knows and then proceed to the skill in which the child needs to be trained.
8. Reward each effort. Best reward is praise or show of affection. Reward immediately.
9. Sometimes use tangible rewards like biscuits or a thing that the child likes.
10. Never over reward.
11. Gradually fail administering the reward.
12. Use the training materials which are appropriate, attractive and locally available.
13. Assess the child periodically, preferably once in four or six months.
14. *Remember the child with mental retardation learns very slowly.*
15. Keep encouraging the parents and telling them not to be rejected at the slow progress, nor feel threatened by child’s failure.
16. Try to include community participation which making community aware and dispelling misconceptions and myths.

**Psycho Therapeutic Interventions**

The emotional problems of the mentally retarded differ in many ways from those of children with normal intelligence. Consequently, they often require methods of treatment not commonly employed with the latter group. This applies a particularly to the moderately or severely retarded; the mildly retarded may profit greatly from conventional play and activity group therapy. The main obstacle to effective psychotherapy is the difficulty in establishing communication with the child because of faulty language development and impairment of concept formation. The therapist has to operate on a very concrete level in order to reach the child and above all he has to be flexible and pragmatic. Engaging the child in shared activities is probably the most effective way to establish a meaningful
relationship but firm limits have to be established and adhered to consistently, particularly in children with difficulty in impulse control. Verbal and non-verbal reassurances and pre-decided reinforcements should be used generously and situations should be set up that permit the child to succeed. In addition, concrete evidence of affection in the form of small gifts, toys and candy is very helpful. Many would call it relationship therapy or good mothering but it certainly is psychotherapy in the broad sense of the term.

Individual and group psychotherapy may be effective only if they are integral parts of a structured programme involving the total milieu of the child, including his home and day or residential school. Establishing an appropriate school program, matching the child with suitable teachers and child-care workers, establishing order and consistency at home and building an appropriate school programme, are all essential components of such a total programme. The psychiatrist’s role is primarily that of co-ordinator and adviser of such programmes. Drugs play an important role in the psychiatric treatment of the mentally retarded. Since most of the drugs are not without hazards, caution is indicated in their use and excessive dosage should be discouraged. This is especially true of children living at home or in institutions without constant medical supervision.

**Behaviour Modifications**

**Definition:**

It has been defined by several authors in different Ways. Some of the important definitions are

“*If* a child’s behavior has a detrimental effect on the child’s own adjustment or if it interfered with the lives of other people, then it is said that the child is behavior disordered”.

Kirk, .1962

“*If* a child’s behavior is so inappropriate that his \ her presence in the classroom would be

1. Disrupting for the rest of the class.
1. Put undue pressure on the teacher.
1. Disturb the child even more.

Pate, 1963
**How Common is it?**

IA is generally estimated that 6-10% of school children have noticeable behavior problems.

The incidence is greater in boys than girls.

**SOME OF THE CHARACTERISTICS OF THE CHILD**

1. **Delay in social cognitive development**
   - They literally forget their own contributions to a conflict.
   - They do not learn from their own past experiences or the experiences of other children.
   - They do not recognize how their behavior affects others in a negative way.
   - They possess minimal strategies for solving social problems.
   - They remain ego-centric and socially isolated from their peers with no sense of wrong doing.

2. **Ecological approach**

   - This approach takes into account all the features of a child’s life: Home, School, and Community.
   - When there is a discrepancy between the child’s skills and abilities and the demands and expectations of the environment, the child is likely to have a behavior problem. So, this model advocates a comprehensive system of assistance.
   - More help for the parent, teacher.
   - Centers in the community to provide counseling services for the child and parents.
   - Government policies makers to pay more attention to the needs of children to battle loneliness, fear, abuse, addiction, and school failure.

**We Need to Look at the Troubled Social System that Exist, or Just the Troubled**

**Factors which will Facilitate Socially Responsible Behavior:**

1. **To restrain their impulses**
   - To deal with frustration
Manual for Training of PHC Medical Officers

2. **To assess social reality**
   1. To be realistic about rules
   1. To understand how their behavior affects others

3. **Group pressure skills**
   1. Managing competitive challenges
   1. To stay calm

4. **Stress management**
   1. Adjusting to new situations
   1. Accepting responsibility for one’s own action.

5. **Social problem solving skills**
   * learning from experience- own and others.

2. **Low academic achievement.**
   1. Most do not like
   1. They have not developed academic survival skills, like-finishing work, following instructions etc.
   1. Their problem interferes with learning
   1. They have low confidence and limited faith in their own ability to learn.
   1. Their motivational level is low.
   1. They have, feelings of worthlessness.

   They resist CHANGE. Sameness provides them with a sense of security, even if it is unpleasant.

**LEARNING REQUIRES ‘RISK TAKING’ AND A WILLINGNESS TO CHANGE**

3. **Delayed** development in the use of language and communication skills
   1. They enrage others with their verbal outbursts.
   1. They make excuses for their behavior.
   1. As long as he is criticized he remains in control.
   1. This negative feedback helps to keep their world steady and predictable.

   For this child words are both a sword and a shield

98
STRATEGIES TO HELP THEM

There are different approaches.

I. Behavioural approach/Behaviour modification programme.
   1. Observe the behaviour carefully
   1. Explain the behaviour
   1. Count the frequency of the behaviour
   1. If possible enlist the support and co-operation of the child
   1. Select a reinforcer that is meaningful for the child.
   1. Use positive reinforcement rather than punishment
   1. After a specified period of time, check the program’s effectiveness.

   If the program is not working, DO NOT blame the child.

Parent Counselling

Parent counselling is of paramount importance. The approach to parents has to be flexible and pragmatic. Some parents need help only in coming to grips with their feelings about the child and require a conventional dynamic casework approach. Counselling with parents at times lead to acceptance of their having a retarded child which is a strenuous, arduous and exacting task. Judiciously used support, reassurance, guidance and practical advice as to the management of the child are often indicated. Home making services, temporary placement of the child in institutions and similar arrangements increase the parents’ effectiveness of giving them periodic relief. Group therapy permits the sharing of burdens and the receiving of reassurance from similarly afflicted parents. Many parents can keep their retarded children at home, at least for the first few formative years, with appropriate guidance, support and interest of the professionals.

12. SERVICES FOR PREVENTION, EARLY IDENTIFICATION, INTERVENTION, REHABILITATION AND INTEGRATION AVAILABLE FOR THE MENTALLY RETARDED IN THE COUNTRY

1. Child Guidance Clinics: Assessment, parental Counselling and referral services are provided.

2. Psychological/Psychiatric Clinics: Diagnosis and therapeutic interventions are the major functions.
3. **Paediatric Clinics**: Identification and treatment of associated sensory and motor handicaps.

4. **Special schools**: Imparting educational and vocational training, with co-curricular activities.

5. **Integrated schools**: Normal and disabled children including MR are educationally and socially integrated.

6. **Sheltered Workshops**: Wages are paid for the work done in the workshop. Mostly work such as cardboard work, tailoring, weaving, carpentry, plastic moulding, screen printing and various kinds of assembly work are performed. Training programmes are also organised from time to time.

7. **National Institute**: National Institute for the Mentally Handicapped, Secunderabad and its Regional Centres at Mumbai, Delhi and Calcutta are conducting various training programmes and researches in the area of Mental Retardation.

8. **Teacher Training Institutes**: All over the country rehabilitation and teacher training programmes are being conducted by various training institutes. Certificates, Diploma and Degree level training programmes are standardised by the Rehabilitation Council of India (RCI), New Delhi. The trained teachers provide their services in Special Schools whereas Rehabilitation workers work in the rehabilitation centres, Child Guidance Centres etc.
REFERENCES

6. VHAI 1993, Module for Training Urban Community Health Volunteers, Voluntary Health Association of India.
USE OF CHECKLIST FOR ASSESSMENT

Use the following checklist called screening schedule to find out whether the child is having mental retardation. There are three schedules (NIMH Screening Schedules – 1988) given below. The first schedule is for children below 3 years. The second schedule is for children between 3-6 years. The third schedule is for children who are 7 years and above. Take help of parents to fill in the checklist/schedule.

SCREENING SCHEDULE I (BELOW 3 YEARS)

<table>
<thead>
<tr>
<th>Stage No.</th>
<th>Child’s Progress</th>
<th>Normal Development Age Range</th>
<th>Delayed Development if Not Achieved by the</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Responds to name/voice</td>
<td>1-3 months</td>
<td>4th month</td>
</tr>
<tr>
<td>2.</td>
<td>Smiles at others</td>
<td>1-4 months</td>
<td>6th month</td>
</tr>
<tr>
<td>3.</td>
<td>Holds head steady</td>
<td>2-6 months</td>
<td>6th month</td>
</tr>
<tr>
<td>4.</td>
<td>Sits without support</td>
<td>5-10 months</td>
<td>12th month</td>
</tr>
<tr>
<td>5.</td>
<td>Stands without support</td>
<td>9-14 months</td>
<td>18th month</td>
</tr>
<tr>
<td>6.</td>
<td>Walks well</td>
<td>10-20 months</td>
<td>20th month</td>
</tr>
<tr>
<td>7.</td>
<td>Talks in 2-3 word sentences</td>
<td>16-30 months</td>
<td>3rd year</td>
</tr>
<tr>
<td>8.</td>
<td>Eats/drinks by self</td>
<td>2-3 years</td>
<td>4th year</td>
</tr>
<tr>
<td>9.</td>
<td>Tells his name</td>
<td>2-3 years</td>
<td>4th year</td>
</tr>
<tr>
<td>10.</td>
<td>Has toilet control</td>
<td>3-4 years</td>
<td>4th year</td>
</tr>
<tr>
<td>11.</td>
<td>Avoids simple hazards</td>
<td>3-4 years</td>
<td>4th year</td>
</tr>
</tbody>
</table>

Other Factors

<table>
<thead>
<tr>
<th></th>
<th>Has fits</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>Has physical disability</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### SCREENING SCHEDULE – II (3-6 YEARS)

Note: Observe the following and if any of the items is answered ‘Yes’ suspect mental retardation in the child.

1. Compared with other children, did the child have any serious delay in sitting, standing, or walking?  
   - Yes
   - No

2. Does the child appear to have difficulty in hearing?  
   - Yes
   - No

3. Does the child appear to have difficulty in seeing?  
   - Yes
   - No

4. When you ask the child to do something, does he seem to have problems in understanding what you are saying?  
   - Yes
   - No

5. Does the child sometimes have weakness and/or stiffness in the limbs and/or difficulty in walking?  
   - Yes
   - No

6. Does the child sometimes have fits, becomes rigid, loose consciousness?  
   - Yes
   - No

7. Does the child have difficulty in learning to do things like other children of his age?  
   - Yes
   - No

8. Is the child not able to speak at all?  
   - Yes
   - No

9. Is the child’s speech unclear?  
   - Yes
   - No

10. Is the child’s speech in any way different from normal? (not clear enough to be understood by other people)  
    - Yes
    - No

11. Compared to other children of the same age, does the child appear in any way backward, dull or slow?  
    - Yes
    - No

### SCREENING SCHEDULE – III (7 YEARS AND ABOVE)

Note: Observe the following and if any item is answered ‘Yes” suspect mental Retardation.

1. Compared with other children, did the child have any serious delay in sitting, standing or walking?  
   - Yes
   - No

2. Can the child not do things for himself like eating, dressing, bathing and grooming?  
   - Yes
   - No

3. Does the child have difficulty in understanding when you say “do this or that”?  
   - Yes
   - No

4. Is the child’s speech unclear?  
   - Yes
   - No

5. Does the child have difficulty in expressing, without being asked what the child has seen/heard?  
   - Yes
   - No
6. Does the child have weakness and/or stiffness in the limbs and/or difficulty in walking or moving his arms?  
   Yes  No
7. Does the child sometimes have fits, becomes rigid or looses consciousness?  
   Yes  No
8. Compared to other children of his age, does the child appear in any way backward, dull or slow?  
   Yes  No

Note: Screening Schedule 2 and Screening Schedule 3 ensure the prompt Identification of every single child with mental retardation. Do not worry if the questions sometime identify persons with handicaps other than mental retardation. Such persons can be later assessed. Our chief concern is the identification of children/persons having mental retardation.

USE OF CHECKLIST FOR PROGRAMMING:

Note: Use the following checklist (NIMH Assessment Checklist) to find out child’s level of performance. Keep the checklist in front of you and observe if the child can do the activity. If the child performs the activity tick “Yes”, If he can not, tick “No”. Once child’s level of functioning is known, a program suitable for him can be developed. Demonstrate the programme activity to the parents so that they can train the child following the specific instructions and methods. Call parents and the child for regular follow-up.

ASSESSMENT CHECKLIST:

AGE RANGE: 0-6 Months

1. Does the child smile at others?  
   Yes  No
2. Does the child hold his head erect when placed at his abdomen?  
   Yes  No
3. Does the child make sounds like ‘ta-ta-ta’ ‘na-na-na’?  
   Yes  No
4. Does the child roll from back on to stomach?  
   Yes  No
5. Does the child use his whole palm to grasp?  
   Yes  No

AGE RANGE: 7-12 Months

6. Does the child respond to name?  
   Yes  No
7. Does the child sit without support?  
   Yes  No
8. Does the child crawl on his stomach?  Yes  No
9. Does the child stand by holding on to an object?  Yes  No
10. Does the child pick up things with his thumb & his index finger?  Yes  No

**AGE RANGE: 1-2 YEARS**

11. Does the child stand without support  Yes  No
12. Does the child say ‘ma’, ‘papa’, ‘tata’?  Yes  No
13. Does the child walk without support  Yes  No
14. Does the child drink by himself from a glass or a cup?  Yes  No
15. Does the child show body parts when asked  Yes  No
16. Can he greet others when reminded?  Yes  No

**AGE RANGE: 2-3 YEARS**

17. Does the child jumps with both the feet together?  Yes  No
18. Does the child give verbal answer to simple questions?  Yes  No
19. Does the child hold a pencil properly?  Yes  No
20. Does the child indicate his toilet needs?  Yes  No
21. Can the child say his name?  Yes  No
22. Does the child speak simple sentences with 2-3 or more words?  Yes  No
23. Can the child match colors?  Yes  No

**AGE RANGE: 3-4 YEARS**

24. Does the child brush his teeth?  Yes  No
25. Can the child unbutton his clothes  Yes  No
26. Does the child point to common objects by their use?  Yes  No
27. Can the child walk up and down the stairs on alternate feet?  Yes  No
28. Can the child eat by himself?  Yes  No
29. Does the child differentiate big from small objects?  Yes  No
### AGE RANGE – 4-5 YEARS

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can he copy patterns such as round, straight or slanting lines?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child button his clothes?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child comb his hair without help?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the child wash his face without assistance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child associate the time of the day with an activity?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child count upto 10 by rote?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child name the colour of the object when shown?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### AGE RANGE – 5-6 YEARS

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can the child follow two unrelated instructions?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the child name the days of the week in order?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child read simple words?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the child count meaningfully up to 10?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Visual Impairment
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evolutionary Process in the Change of Attitudes</td>
<td>111</td>
</tr>
<tr>
<td>2. Limitations of Blindness</td>
<td>112</td>
</tr>
<tr>
<td>3. Definitions</td>
<td>112</td>
</tr>
<tr>
<td>4. Refractive Errors</td>
<td>114</td>
</tr>
<tr>
<td>5. Common Eye Diseases</td>
<td>114</td>
</tr>
<tr>
<td>6. Other Eye Disorders</td>
<td>116</td>
</tr>
<tr>
<td>7. Loss in the Visual Field</td>
<td>117</td>
</tr>
<tr>
<td>8. Psycho-Social Implications of Blindness</td>
<td>117</td>
</tr>
<tr>
<td>9. Need for Community Orientation</td>
<td>118</td>
</tr>
<tr>
<td>10. Effects of Early Blindness on Personality Development</td>
<td>118</td>
</tr>
<tr>
<td>11. Orientation and Mobility</td>
<td>119</td>
</tr>
<tr>
<td>12. Daily Living Skills</td>
<td>120</td>
</tr>
<tr>
<td>13. Educational Services</td>
<td>121</td>
</tr>
<tr>
<td>14. Plus Curricular Activities</td>
<td>122</td>
</tr>
<tr>
<td>15. Rehabilitation Services</td>
<td>123</td>
</tr>
<tr>
<td>16. Early Identification of Visually Impaired Children</td>
<td>123</td>
</tr>
<tr>
<td>17. Auxiliary Services</td>
<td>125</td>
</tr>
<tr>
<td>18. Conclusion</td>
<td>125</td>
</tr>
</tbody>
</table>

References 126
1. EVOLUTIONARY PROCESS IN THE CHANGE OF ATTITUDES

There has been an evolutionary process throughout history in changing attitudes about the blind and blindness. Thousands of years ago, it was a disgrace in certain societies to have a disabled child who could not be strong enough to become a warrior. Therefore, such societies had no place for disabled people. And at that time the attitude was very clear: disability was undesirable, totally negative and clearly such a person could not—moreover, according to their point of view should not—be permitted to interfere with the daily things of life.

These attitudes prevailed for many hundreds of years and it was not until the time of the crusades, the great religious wars, A.D., 1,000-1,200 that blindness became a symbol of punishment. It is a historical fact that 300 Roman soldiers, when captured in a battle during the Roman Crusades, were blinded (because they had been very severe, very brutal soldiers). Some people still think that the child was punished because he was sinful, or the mother, or father are being punished by God, because they have committed a sin in life. So the idea of sin, the idea of misbehavior, and the idea that God retaliates, became associated with the public’s attitude toward disability. What is important is to understand that there was a gradual shift in the attitude of society that came about. So we could see a series of attitudes, first of disregard and rejection, isolation and abuse, gradually shifting over a period of hundreds of years to the second phase which is characterised by pity and alms-giving, and of benevolence.

The third major stage is that of development of positive attitudes towards the blind. It is the one about which we are most immediately concerned, the period in the history of blind rehabilitation and education where everyone is beginning to recognize the need for independence of the visually disabled. Now, what do we mean by independence for the visually disabled? This has many implications. We should expect him to lead a life in which he has an opportunity for education, up to whatever level is appropriate, and consistent with that level of education meant for sighted children. We should expect him to become economically and physically independent. But it has taken us many years to recognize that the blind individual can be economically independent, and can maintain a strong personal identification with groups. If fact, it is easier to talk about what the blind cannot do, but it needs a conviction to tell all the things a blind can do.

One of the first things that educators have identified is the fact that blind children are more like sighted children than unlike them, and that is very important. We have research now to show us that there are certain important developmental problems which occur, that are a result of the child
not being able to perceive the world in the same way as sighted children do but, at the same time, after recognizing that he is more like than unlike sighted children, we can identify ways in which compensatory skills are developed. If we teach the child the proper compensatory skills for learning, we are not automatically guaranteeing that he is going to be a self-sufficient, economically independent, and emotionally adjusted adult but these are the means to reach the goal of independence.

2. LIMITATIONS OF BLINDNESS

According to Lowenfeld (1975) blindness imposes three basic limitations on the individual. Firstly, it restricts the range and variety of experiences, secondly it restricts the ability to get about; and finally, it limits the control of the environment and the self in relation to it. The terminologies used by Lowenfeld have sociological, psychological and educational implications on blindness. According to him, the visually disabled individual gets a reduced experience and, therefore, loss of sight cannot be interpreted as the ‘loss of experience’. The sociological implication is that visually disabled persons do have experiences but those are limited in comparison with sighted persons. The psychological implication is that blindness does not mean ‘loss of life’ since blind persons are more like than unlike sighted persons in terms of basic needs. The educational implication is that the reduction of experience imposed by blindness can be overcome by appropriate training to the affected individual. Education and rehabilitation programmes for visually disabled children are growing in large numbers in the present world and the independence of disabled persons is assured in every respect.

3. DEFINITIONS

According to Persons with Disability Act 1995 blindness refers to a condition where a person suffers from any of the following conditions, namely:-

(i) total absence of sight; or
(ii) visual acuity not exceeding 6/60 or 20/200 (snellen) in the better eye with correcting lenses; or
(iii) limitation of the field of vision subtending an angle of 20 degree or worse;

Persons with low vision means a person with impairment of visual functioning even after treatment or standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive device;
Low Vision: WHO (1992) defines that a person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception or a visual field of less than 10 degrees from the point of fixations, but who uses, or is potentially able to use vision for the planning or execution of a task.

Causes of Visual Impairment in India

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>81%</td>
</tr>
<tr>
<td>Refractive errors</td>
<td>7%</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>3%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>2%</td>
</tr>
<tr>
<td>Trachoma</td>
<td>0.2%</td>
</tr>
<tr>
<td>Malnutrition and Vitamin A deficiency</td>
<td>0.04%</td>
</tr>
<tr>
<td>Other causes</td>
<td>7.0%</td>
</tr>
</tbody>
</table>


Management of Visual Impairment

1. Early identification.
2. Early diagnosis may lead to medical/surgical intervention Prevention of redidual vision. Assessment - search for additional sensory or other impairments- e.g. hearing loss, motor problems.

Behavioural Signs of Visual Problems

1. Eye Movement Abilities (Ocular Motility)
2. Head turns as read across page
3. Loses place often during reading needs finger or marker to keep place.
4. Displays short attention span in reading or copying
5. Too frequently omits words
6. Repeatedly omits “small” words
4. REFRACTIVE ERRORS

The normal eyes are called emmetropic eyes. In the case of larger eyeballs, the light rays focus before the retina. This condition is known as myopia or short-sightedness. In order to diverge the light rays so that they can get focused at the retina, concave lenses have to be used by those who are affected by this refractive error. In other cases, the light rays are not focused on the retina. This focal length is in such a way that the focal point lies behind the retina. This condition is known as hyperopia or far-sightedness. This type of refractive error is common and is corrected by convex lenses which help to bend the light rays more so that they can converge at the macula.

The lens, due to its elasticity, adjusts itself according to the distance of the objects. Less adjustments are required for distant objects for which the light rays are parallel and more adjustments are required for the near objects. The process of adjustment of lens in focusing the near objects on the retina is known as accommodation. Due to the aging process, the accommodation ability of the lens is lost and this condition is known as presbiopia. Persons affected by this defect need bi-focal lens which doubles the focal length, thereby enabling the person to perceive the correct image.

5. COMMON EYE DISEASES

Most of the common eye diseases affect the front portion of the eye. Some are curable in nature. An analysis of such diseases will be useful for professionals who may be working with visually disabled children suffering from these defects.

Cataract

Cataract is a common eye disease in the developing countries. This is a defect due to the aging process and is called “over 45 defect”. In this condition, the lens which is transparent in nature becomes opaque and the light rays are absorbed. A person can restore sight with the corrective devices after the removal of the defective lens. It is not the development of a layer over the lens but the opacity of the entire lens itself. Even though this is a common eye disease usually found in grown up persons, children too are sometimes found with this defect which is called congenital
cataract. Pregnant mothers affected by german measles or rubella during the first trimester of the pregnancy consequently give birth to children with congenital cataract.

**Glaucoma**

Glaucoma is very dangerous. Total blindness will result unless necessary attention is given in time. Intra-ocular pressure is a function of the ratio between the formation of aqueous in the eye and the resistance to outflow of aqueous from the eye. Glaucoma occurs due to the increase in the intra-ocular pressure beyond that degree which is consistent with the continued health and function of the eye. The degree of interference by glaucoma in vision varies from slight blurring to complete blindness. In most cases, blindness can be prevented if treatment is started early.

**Corneal Ulcer**

A foreign body is the cause for most common corneal disorders, and ulcers frequently occur as complications of corneal abrasions or foreign body. When the foreign body stays in the cornea, it may lead to ulcer which in turn reduces the vision from mere blurring to total blindness. In order to avoid this the eyes should be washed with clean water when the foreign body stays in the eye and on any account the eye should not be rubbed. Corneal ulcers are developed in the eyes due to bacteria, virus infection, fungus, hyper sensitivity reactions, vitamin deficiency, etc.

**Xerophthalmia**

Xerophthalmia is a general term applied to the vitamin ‘A’ deficiency disease. Night blindness is the earliest symptom of this disease. At the onset, the conjunctive and cornea lose their normal lustre and become dry and thickened. Keratomalacia is the severe form of xerophthalmia. Early diagnosis and treatment will be the best way in checking this defect. Uncared condition may lead to scarring in the cornea and ulceration which in turn make the eye totally visionless.

**Conjunctivitis**

Conjunctivitis is the commonest eye disease caused due to bacteria, virus infection, allergic conditions, etc. Inflammation in the eye is the earliest symptom. This defect is usually cleared within a short period with the help of anti-bacterial agents.
In addition to these diseases, diabetics and hypertension can also cause serious damage to the eye.

6. OTHER EYE DISORDERS

In addition to these common eye diseases, the following are listed as possible eye diseases.

Retinal Detachment

The most sensitive third layer of the eye is firmly attached with two distinct points, the ora serratta anteriorly and the optic disc posteriorly. In the rest of the choroid, the retina has contact with choroid but is not attached. A serious blow to the head may sometimes cause detachment of the retina from its position. Myopic eyes can also cause retinal detachment. No physiological symptoms are evident for this defect.

Albinism

Due to the absence of pigment in the iris, skin and hair, affected children report poor visual acuity, and often the defect is accompanied by refractive errors. The albino children are very sensitive to light. Dark sun glasses are suggested for these children as safety measures.

Astigmatism

This is a type of visual defect in which the refractive error prevents the light rays from coming to a single focus on the retina because of different degrees of refraction in the various meridians of the eye.

Nystagmus

A defect in which the eyeball moves rapidly and presents involuntary jerks.

Optic Atrophy

This defect is caused due to the degeneration of the tissue of the optic nerve. The light sensation cannot reach the brain and may lead to blindness.
Retinitis Pigmentosa

This is a defect due to the hereditary degeneration and atrophy of the retina.

Tracoma

This is a form of infection caused by a specific virus which in the chronic form produces severe scarring of the eyelids and cornea.

7. LOSS IN THE VISUAL FIELD

In addition to the eye diseases, there are some defects caused due to the loss in the field vision. These defects are the blind areas or suppressed areas anywhere in the field of vision. Those with marked visual loss move cautiously in unfamiliar places.

Defect in the Field of Vision

This is defined by the entire area one can see without shifting the gaze. In field defect, the individual does not see in a particular portion of the eye. In visually impaired individuals, a reduction in field of vision can be considered a handicapping condition.

Loss of Peripheral Vision

In this condition, the central vision of the individual is intact, but it is surrounded by totally suppressed peripheral retina. Due to the suppressed retina, a blind area is formed around the central visual field. The individuals affected by this loss of vision travel poorly, especially in poor illumination. Tubular vision is a condition of the loss of peripheral vision.

Professional literature and research indicate that a little care to the eye can prevent major disasters. Doctors and teachers of visually disabled children can play an important role in educating the child, and especially the parents, regarding the eye care. When children with eye defects are detected, he should refer them to the ophthalmologist immediately.

8. PSYCHO-SOCIAL IMPLICATIONS OF BLINDNESS

Really speaking psycho-social development of visually disabled child is not affected so much by
the disability, but it is disrupted by the emotional overtones of the disability. It is now a well-known fact that children tend to achieve as much, and only as much, as their parents aspire them to achieve. Once parents stop treating the child as a developing individual, once they refuse to accept his capabilities and limitations, both, in a realistic manner, his self-concept is bound to be severely affected. Over-protection robs him of his independence, neglect turns him to undesirable behaviours. Either way, it is the suffering child whose handicap multiplies.

9. NEED FOR COMMUNITY ORIENTATION

People in the media need to be educated about visual disability. The community needs information not only on the realities of visual disability but also on the techniques which make both the visually disabled and sighted persons comfortable. How do you manage a visually disabled person? How do you greet him? How do you show him where to sit down? How do you talk to him? Print and non-print material on such themes need to be developed for orientation of the community.

Some people are so inhibited that they hesitate about being with a visually disabled person. They also become hypersensitive. They are afraid to use certain words such as “see” and “look”. Regular classroom teachers are frequently faced with this problem and instead of saying “look at this” to mean “explore and learn to understand this”, they say “here, feel this”. Most people are well intended, but misdirected in this way. They do not want to offend a visually disabled person. They need to be told that “visually disabled” persons are not frightened by words “see” and “look”. Proper community education is the answer to these misplaced misconceptions.

10. EFFECTS OF EARLY BLINDNESS ON PERSONALITY DEVELOPMENT

Personality is treated as the total quality of the individual’s behaviour as it is revealed in his thought, action, expression and attitude. Among these, the attitude forms the base for all other components and undoubtedly contributes to the development of the self-esteem of the individual. In the case of visually disabled children, their attitudes toward the world and the vice versa play an important role in the making up of the self.

Parents are the most important people in the life of the sighted child as also that of the visually disabled. The habilitation and / or rehabilitation of the visually disabled should, in fact, start from the family. The parents are generally ignorant about implications of blindness on the personality development of the child. Early of blindness in particular has a lot of effect on the
personality development of the child. Parents can play a significant role in the life process of the non-seeing child. In most of the places, parents also like to render maximum assistance to the visually disabled children. But their unawareness of the right methodology in the treatment of such children keeps them away from providing possible assistance. This is the time for the schools and organisations working for the visually disabled to offer guidance and counselling programmes to the families of these children. It is therefore very evident that the parents of these children should be involved in planning the educational programmes for them. In doing so, the parents would be able to appreciate their role in assisting the child to get ready for his total habilitation and/or rehabilitation. It is generally thought that family is the foremost non-formal agency in the rehabilitation process of visually disabled individuals.

11. **ORIENTATION AND MOBILITY**

‘Blindness imposes the restriction on ability to move about and a control over the self and environment in relation to it (Lowenfeld, 1975). Therefore, the significance of mobility and orientation in the rehabilitation process of the visually impaired individuals is indisputable. There are three ways of mobility possibilities for a visually impaired person. They are 1. unassisted mobility, 2. mobility with the help of sighted companion and 3. mobility by using both manual and electronic device.

*Use of Mobility Devices:*

Though sophisticated electronic appliances have come up, long cane is still believed to be a great companion of visually impaired persons.

1. **Long Cane.** The long cane is known as the ‘white cane’ which is widely used by visually impaired individual. The cane can help in finding surfaces of different textures, stairs, etc. A person should use certain clues and landmarks while using long cane for his independent travel. Teaching of long cane techniques should be assisted by the efficient use of tactile maps. The long cane techniques include:

1. using cane while walking with a sighted person.
1. walking on a shoreline.
1. trailing with cane
1. diagonal technique
1. touch technique
2. touch and drag technique
3. touch and slide technique
4. three-point tap technique for walking
5. using cane on stairways.
6. exploration of immediate environment with care.
7. side stepping using the cane.
8. road crossing; safety crossing.
9. getting into a bus, car, train, and bullock cart with the long cane
10. rural training; using kerbs while walking, drawing water from well, etc.
11. doorways – getting in and getting out.
12. direction walking; squaring off.
13. using landmarks and clues for mobility.

Long cane is considered to be the most appropriate mobility device for the visually impaired individual.

**Mobility Maps:** Mobility maps help the individual in cognitive mapping and spatial pattern of each route. Therefore, teaching of tactile map reading enables the individual for his better orientation of the environment which is a pre-requisite for effective mobility.

**12. DAILY LIVING SKILLS**

Daily living skills are necessary for every visually impaired person for his day-to-day living and independent functioning in the society. These skills may be treated as basic survival skills. Development of daily living skills instills confidence in the child for his mainstreaming with non-disabled children.

Efficient use of daily living skills depends upon the ability in sensory training as well as the mobility training of the child. For example, in a combined activity of going to the market and buying vegetables, the skill of going to the market is mobility, whereas the skill of buying, tendering change, speaking to the people, etc, are daily living skills. Some common daily living skills are: 1. eating manners, 2. using toilets, 3. dressing, 4. body hygiene: cleanliness, 5. body hygiene: personal grooming, 6. taking bath, 7. washing clothes, 8. handling money, 9. shopping, 10. proper use of electrical appliances, 11. shaving, 12. food preparation, 13. cleaning a place, 14.
using medicines, etc., Daily living skills of an individual are the means of his proper social development. The skills should be in accordance with the norms of any society. Teaching these skills to visually impaired may be difficult but not impossible.

13. EDUCATIONAL SERVICES

Formal education system for visually impaired children came only after starting of the School for the Blind in 1784 in Paris where Louis Braille studied and worked as a teacher. Until then, people did not consider the possibility that a visually impaired person could learn. Louis Braille’s invention of Braille alphabet system in 1832 provided a tremendous impetus to education of visually impaired children throughout the world. From the 18th century to even now education of the visually impaired children in residential school is an accepted model all over the world. The first school for the blind in India was started by Christian Missionaries in 1886 in Amritsar. This system is more than hundred years old in India and it provides education and hostel facilities free of cost. There are approximately 300 special schools in India which serve approximately 30,000 visually impaired school-going children. In order to provide education for more number of visually impaired children, placement of them in the general education system becomes inevitable. This system of education is broadly called ‘Integrated Education’. It aims at normalizing the life and education of visually impaired children in the least restrictive environment along with non-disabled children in general schools.

This integrated education has been functioning world over since the second half of the 20th century. The programme has various models for the service delivery such as resource model, itinerant model, combined model, cooperative model, cluster model and dual model. The descriptions of these models are as follows:

**Resource Model:** This is an educational plan in which the visually impaired child is enrolled in a regular class. Within the campus, a special teacher called resource teacher is available to the child as well as his regular teacher. The regular teacher assumes major responsibility for the visually impaired child’s general programme. The resource teacher is responsible for instructions in special techniques or skills required for the visually impaired child.

**Itinerant Model:** In this model, visually impaired child is enrolled in a regular class in his home school where his needs are met through the combined efforts of the regular teacher and those of visiting itinerant teacher qualified to offer this special service. Among these models Resource and itinerant models are being implemented in large numbers by both governmental and non-governmental agencies.
**Combined Model:** This model can also be called as Resource-cum-itinerant model. This is an educational plan which usually combines several programme arrangements among teachers or within one teacher’s activities. A district may have a combination, in which three primary schools are under resource basis and four middle / secondary schools or on itinerant basis; or, one teacher may serve a small group of primary visually impaired children in a resource room setting in one school on a daily basis, morning only, and serve several visually impaired children at the secondary level on an itinerant basis in the afternoons, using the resource room of the resource setting as his base.

**Cooperative Model:** This is an educational plan in which the visually impaired is enrolled with a special teacher in a special room from which he goes to the regular classrooms for a portion of his day. In this plan the special room becomes his ‘home room’. The special teacher plans and is responsible for his programme in co-operation with regular classroom teachers.

**Dual Teaching Model:** In this model the regular teacher assumes the responsibility of the regular teacher as well as the resource teacher. The regular teacher takes care of visually impaired child in addition to the regular classroom teaching. This model is more suitable for a country like India as the visually impaired population is scattered in villages and the transportation is inaccessible.

Both integrated and residential schools should play a complementary role in the education of visually impaired children. Residential schools can serve as resource centres for integrated programmes by providing material service, manpower facilities, supportive services, etc.

14. **PLUS CURRICULAR ACTIVITIES**

Plus curricular skills are those skills which are peculiar to blindness. Braille, orientation and mobility, and use of assistive devices and appliances are some of the major plus curricular activities for visually impaired children.

**Braille:** In both integrated and special schools, blind children are taught through braille. In this system, the letters are formed by a combination of raised dots in a cell. The area of Braille cell is 6 mm x 3.6 mm. The cell consists of six dots and can be arranged into 63 combinations or characters. Braille reading is slower than print reading. However, visually impaired children who are familiar with contracted braille are able to read faster than those who read open Braille. India is unique in the sense that it has a common Braille Code for all the 15 India languages framed with the assistance of UNESCO.
**Writing Devices:** Braille Slates are used for writing braille. While writing the child has to punch dots downward from right to left and then turn the paper and read from left to right by feeling the upward impressions of the dots. Stylus is used for punching the dots in braille cells. Braille typewriters are also used wherein the typing gives direct upward impression of dots.

**Mathematical devices:** Blind children can also learn mathematics and science though they are abstract subjects. They use devices such as Abacus and Taylor Frame for doing calculations in arithmetic. Geometrical devices are also used by visually impaired children to understand shapes.

In teaching visually impaired children, teachers should try to duplicate the learning experience given to sighted children. If these children are not able to follow the duplicated experience, some experiences can be modified. In case, modified experiences are difficult for the visually impaired children, substituted experiences can be given. Under unavoidable circumstances, a learning experience may have to be omitted. Experiences indicate that most of the learning experiences, say more than 90%, can be duplicated for visually impaired children. The children having better plus curricular skills can learn well too.

15. **REHABILITATION SERVICES**

The meaning of rehabilitation is “to make a person live again.” In total rehabilitation process, development of vocational skills, mobility, communication skills, support from the family, community, etc., should be enlisted. In rehabilitation too, there are two major types. One type is Institute Based Rehabilitation (IBR) service whereas the other is the Community Based Rehabilitation (CBR) service. The CBR approach is necessary to serve more number of adult blind persons in India and many national and international agencies have agreed in principle that even hospitals should provide comprehensive services that include prevention, curation, and rehabilitation. However, the institution based approach may also be needed for context specific services for the clients. Therefore, the approach in both education and rehabilitation should be based on the needs of the clients.

16. **EARLY IDENTIFICATION OF VISUALLY IMPAIRED CHILDREN**

The manpower development document of the Rehabilitation Council of India (1995) reports that not even five percent of the visually impaired population is currently enjoying educational facilities. The reason is that present educational system is not able to take the education to the doorsteps of the children. To provide education to those uncovered population, appropriate strategies need to be adopted for locating them for early intervention services. Early intervention would solve many of
the potential problems of the child later in life. Research studies also indicate that the children identified and provided services early in life find integration in the community natural, real, and effective. Some of the following methods may be adopted for the early identification of visually impaired children.

**Eye Hospitals:** Established eye hospitals and the Ophthalmologists can provide reliable information regarding the number of visually impaired children, the incidence and the prevalence of blindness in that particular locality.

**Eye Camps:** Eye camps may serve as source centres for detecting persons who have difficulties in vision. Eye camps can also reveal the incidence and prevalence of visual impairment among the elderly persons too require rehabilitation services.

**Population Centres:** The Statistics available from population centres may serve as the base for making door-to-door survey to find out the actual number of visually impaired children for placement in schools.

**Voluntary Organisations:** Reliable statistical data regarding the disabled population and expertise for implementation of special education programmes may be available from the voluntary organisations which are involved in the service of the disabled.

**Through School Teachers:** Teachers who work in rural areas have more access to the community and they can obtain reliable information from parents, Parents Association and Parent-Teacher Association regarding the presence of visually impaired children.

**Through School Children:** The school teachers may ask non-disabled children of the school to bring information about the children who behave differently while seeing, who fumble over the objects, etc. On the basis of the information brought by school children, the teacher can pursue the matter for locating visually impaired children for medical care and placement in school.

**Through Village Functionaries:** The village head, village administrative officer, village workers and village nurses can help in the identification of visually impaired children and placement in schools.

The survey techniques discussed in this section are not exhaustive. Local specific techniques may be designed and used for identification of visually impaired children.
17. AUXILIARY SERVICES

Unlike general education, the education of visually impaired children demands more material, more equipment, individualised instruction, supplementary reading material, assistance of the volunteers, etc., Local support in the form of auxiliary assistance will definitely enrich any educational or rehabilitation programme for visually impaired persons. Some of the useful auxiliary services are as follows:

**Brailling Service:** Brailling service is purely technical and requires expertise. Experience has shown that braille presses could not meet the entire textbook needs of visually impaired children because of their inadequate capacities. Frequent changes of books also affect the uniform braille text production and dissemination. Therefore, service of volunteers could be solicited for brailling work for the benefit of visually impaired children.

**Reader and Recording Service:** Once the reading skill is developed, and the purpose of reading is for acquiring content, the amount of reading required makes it difficult for a braille reader to be fully competitive with his sighted classmates. In order to increase the learning momentum of the child, two major alternatives emerge - The services of a ‘live’ reader and recorded services. Since most visually impaired children cannot afford live readers, they can be provided recording services by volunteers arranged by schools.

18. CONCLUSION

To conclude, visually disabled persons are not fallen souls. They have capabilities just like others and the society should provide opportunities to bring out those latent potentialities. Positive attitude towards them will make them socially amicable, psychologically adjustable and educationally sound. Medical intervention, education and rehabilitation programmes, community involvement and parents’ involvement programmes and such multi faceted approaches are vital for the betterment of the life and education of visually impaired children. The unlimited opportunities and experiences extended to them make them physically fit, mentally alert and totally independent in the community.
REFERENCES

1. All Colours Are There (1995). A collection of essays on the experiences, the present challenges and visions of services to the visually impaired and to other disabled people in South Asia. Published by the CBM International, South Asia Regional Office, Bangalore.
Hearing and Speech Impairment
1. Definition of Hearing Impairment 131
2. Prevalence 131
3. Classification of Hearing Loss 131
4. Degree of Hearing Loss 133
5. Effects of Hearing Loss 133
6. Causes of Hearing Loss 134
7. How is Hearing Assessed 135
8. Identification and Intervention 136
9. Medical and Surgical Intervention 138
10. Hearing Aids 138
11. Education 139
12. Vocational Rehabilitation 142
13. Language and Speech Development 143
14. Articulation Disorders 150
15. Speech Language Disorders in Special Population 151

References 154
1. **DEFINITION OF HEARING IMPAIRMENT**

According to the Persons with Disabilities (Equal opportunities, protection of rights and full participation) Act, 1995, “hearing impairment” means loss of sixty decibels or more in the better year in the conversational range of frequencies;

2. **PREVALENCE**

No precise data about the prevalence of hearing impairment is available. However, National Sample Survey of India conducted a sample study in 1991. According to this survey India has about three and a half million deaf people. But this study had counted largely those who are profoundly deaf. Experience shows that a large number of people retain usable hearing. The number of such people may be much larger.

3. **CLASSIFICATION OF HEARING LOSS**

Hearing loss can be classified on the following basis:

**Age of Onset**

Congenital : Hearing loss at the time of birth
Acquired : Hearing loss acquired any time in one’s life.

**3.2 Site of Lesion:**

**Conductive Hearing Loss**

A conductive hearing loss occurs when the transmission of sound is interrupted. This occurs in the outer ear or, more frequently, in the middle ear. In children, the most common cause of middle ear dysfunction is otitis media, or middle ear infection. In adults, the most common cause of conductive hearing impairment is otosclerosis, a disease of the middle ear ossicles which may cause the footplate of the stapes to attach to the oval window. The most common cause of conductive hearing impairment among the geriatric population is ear canal collapse. Other less common causes of conductive hearing loss are aural atresia (closed external auditory canal), stenosis (narrow external auditory canal), and external otitis (infected and swollen external auditory canal; also known as “swimmer’s ear”).

131
Sensorineural Hearing Loss

A sensorineural hearing loss occurs when the hair cells of the cochlea or the acoustic nerve (CN VIII) are damaged. The impairment is associated with the loss of hearing through bone conduction, and it is considered a permanent impairment. Causes of sensorineural hearing loss include:

1. Ototoxicity, or damage from drugs (including certain antibiotics);
2. Infections, such as meningitis or maternal rubella;
3. Genetic factors, such as certain birth defects that result in partially developed or missing parts of the cochlea or auditory nerve;
4. Syphilis or anoxia contracted during the birth delivery;
5. Presbycusis associated with the effects of aging;
6. Meniere’ disease, a unilateral disease that is characterized by vertigo (dizziness) and tinnitus (noise in the ear).

Mixed Hearing Loss

Mixed hearing losses involve a combination of a conductive and sensorineural loss. Both air and bone conduction pathways are involved so the hearing loss is partially conductive and partially sensorineural, but the hearing by bone conduction is typically the better of the two (Bess & Humes, 1990). The sensorineural component of mixed hearing loss determines the amount of speech sound distortion that is present. Thus, bone conduction audiograms are the best indicators of the degree of difficulty a client will have recognising and discriminating speech, even if it has been amplified (Marting, 1990).

Central Auditory Disorder

Central auditory disorders stem from problems within the central auditory system, caused by damage that occurs somewhere along the auditory nerve or within the cochlear nuclei. Clients with central auditory disorders may have difficulties localising sound, understanding (versus hearing) speech, or understanding speech in noise. Tinnitus may also be present.

Retrocochlear Pathology

Retrocochlear pathology involves damage to the nerve fibers along the ascending auditory pathways
from the internal auditory meatus to the cortex. This damage is often, but not always, the result of a tumor (Bess & Humes, 1990). Depending on the pathology, a hearing loss may or may not be detected when hearing is tested with pure tones. However, many clients with retrocochlear pathology perform poorly on speech-recognition tasks, particularly when the speech signal is altered by filtering, adding noise, and so forth. Several speech-recognition tests as well as auditory brainstem response (ABR) tests and other auditory evoked potentials help identify the presence of retrocochlear pathology. Such testing is clearly beyond the province of the speech-language pathologist and, depending on their training and the equipment available to them, some audiologists as well.

4. DEGREE OF HEARING LOSS

<table>
<thead>
<tr>
<th>Average Hearing Level (in Decibels)</th>
<th>Severity of Hearing Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 25</td>
<td>Normal</td>
</tr>
<tr>
<td>26 - 40</td>
<td>Mild</td>
</tr>
<tr>
<td>41 - 55</td>
<td>Moderate</td>
</tr>
<tr>
<td>56 - 70</td>
<td>Moderately</td>
</tr>
<tr>
<td>70 – 90</td>
<td>Severe</td>
</tr>
<tr>
<td>91 +</td>
<td>Profound</td>
</tr>
</tbody>
</table>

5. EFFECTS OF HEARING LOSS

Effects of Hearing Loss on Communication and Types of Habilitative Intervention with Children

<table>
<thead>
<tr>
<th>Hearing Loss (500, 1K, 2K)</th>
<th>Communication Effects</th>
<th>Habilitation Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-40 dB</td>
<td>Misses hearing many consonants</td>
<td>Possible surgical correction</td>
</tr>
<tr>
<td></td>
<td>Difficulty in auditory learning</td>
<td>Fit with hearing aids</td>
</tr>
<tr>
<td></td>
<td>Mild speech-language problem</td>
<td>Auditory training</td>
</tr>
<tr>
<td></td>
<td>Speech-language retardation</td>
<td>Needsspeech-language therapy</td>
</tr>
<tr>
<td>40-65 dB</td>
<td>Learning disability</td>
<td>Speech-language placement</td>
</tr>
<tr>
<td></td>
<td>Hears no speech at normal loudness levels</td>
<td>Special education placement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fit with hearing aid</td>
</tr>
</tbody>
</table>

133
65-95 dBVoice pathology (cul-de-sac resonance and pitch changes)Voice therapy added to speech therapy
Aural-oral language seriously compromisedHearing aid, with total communication
Severe learning problemsClassroom for the hearing impaired

90 dB+Profound hearing loss (deaf)Hearing aid and total communication
Voice-speech sound like deafVoice and speech therapy
Severe problems in academic learningClassroom (or school) for profoundly impaired

6. CAUSES OF HEARING LOSS

1. The causes mentioned below are based upon WHEN the deafness occurs and whether or not there is a genetic element to the etiology.
2. There MAY BE a genetic element in both prenatal & postratal causes of deafness.
3. The nature of the loss MAY BE conductive or sensorineural or mixed.
4. Hearing Loss MAY OCCUR in a variety of SYNDROMES. In some, it is an essential element of the syndrome, in others, it is an optional inclusion.
5. The causes of hearing loss, further, can be classified as under:

Prenatal Causes:

1. Maternofoetal rhesus in compatibility.
2. Rubella
3. CMV - Cyto Megals Virus
4. Toxoplasmosis
5. Use of certain drugs during pregnancy
6. Developmental anomalies of the ear
7. Skeletal/Craniofacial abnormalities : e.g. cleft palate & lip
8. Neurological Disorders : e.g. Cerebral Palsy
9. Epidermal/Pigmentary disorders : e.g. Waardenburg’s syndrome
10. Ophthamological disorders : e.g. Usher’s syndrome
11. Metabolic/Endocrine/Renal disorders : e.g. Alport’s Syndrome
General Introduction

Chromosomal abnormalities: e.g. Down’s Syndrome
Other: e.g. Heart disease etc.

Perinatal Causes:

- Very low birth weight preterov infants
- Traumatic delivery
- Neonatal asphyxia
- Hypoxia
- Respiratory distress
- Neonatal acidosis
- Incubator noise induced hearing loss

Postnatal Causes:

- Sensorineural loss - Conductive loss
- Genetic cause - Inflammatory
- Non Genetic Cause - Conditions of the outer ear
- Meningitis - Ear Discharge (Otitis Media)
- Mumps - Foreign Bodies
- Measles
- Trauma
- Exposure to ototoxic drugs

7. HOW IS HEARING ASSESSED

Hearing is assessed using the concept of INTENSITY and FREQUENCY. This is accomplished by determining the softest sound the ears can detect called THRESHOLD. These sounds are mostly of a single frequency of vibration, called A PURE TONE. They MAY BE speech stimuli. An AUDIOMETER generates these tones.

These sounds are fed to the ear by an earphone (for Air conduction Threshold estimation)

- a BC-bone conduction vibrator (for BC threshold estimation)
- Loudspeakers (for sound field measurement)
The Thresholds are plotted on an AUDIOGRAM. Different equipment and procedures are used for hearing assessment. To test the function & condition of the MIDDLE EAR, an IMMITTANCE METER is used. Testing of young infants is difficult. It requires a lot of experience and knowledge of physiological testing of new-borns and infants. BSERA (Brain Stem Evoked Response Audiometry) & Oto-Acoustic Emission can be used for assessment of new-borns and infants.

8. IDENTIFICATION AND INTERVENTION

Early IDENTIFICATION and appropriate INTERVENTION at the right time helps the person overcome their disability & enables them to be a useful, productive member of the society. It also helps in integration.

Need for Early Identification

1. It gives more time for habilitative and rehabilitative measures.
2. The critical period for acquisition of language and speech can be utilised.
3. It helps in reducing the effect of hearing loss, correction of the problem and at times preventing deterioration of the problem.
4. Better opportunities for integration into the society.
5. Demonstrate higher receptive and expressive language, better personal-social and speech skills in early childhood

Suggested Frame Work for Early Identification

A high risk register should be maintained to identify children At RISK for hearing impairment. It should include the following factors.

1. History of deafness in the family.
2. Rh (Blood) incompatibility
3. Consanguineous marriage
4. Rashes with fever during any trimester.
5. Lack of oxygen at birth
7. Jaundice
8. Congenital structural anomalies of the ear, nose, throat, and head.
Behaviour observation hearing screening by using inexpensive noise making toys e.g. Rattles, small ghungroo, dropping a marble into an empty brass lota of 1 liter capacity from the brim etc.

Failure to say the first meaningful word by the age of 15 months may be considered alarming.

In schools teachers may observe for deviation in behaviour of the children as significant for hearing impaired.

At all levels, once a child is suspected of having a hearing problem he must be referred for a more complete detailed diagnostic Audiological check up.

Children with ear discharge are highly susceptible to hearing loss.

**Hearing Screening**

Careful observation of the behaviour of the child often leads to identification of hearing impairment. A child’s reaction to sound is the best cue for assessment of the hearing system in an informal manner. A knowledge of the development of hearing responses is helpful in identification of children with hearing impairment.

**Hearing Responses**

<table>
<thead>
<tr>
<th>Age</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 months</td>
<td>Baby awakens from sleep, startles or starts crying when a loud sound is made like clap, alarm etc.</td>
</tr>
<tr>
<td>3-6 months</td>
<td>Normally recognises mother’s voice - stops crying on hearing her voice. Smiles when spoken to, stops playing and appears to listen to sounds especially when pleasant and new sounds are made - toys etc.</td>
</tr>
<tr>
<td>6-9 months</td>
<td>Localises the source of sound by turning the head.</td>
</tr>
<tr>
<td>9-18 months</td>
<td>Responds by looking up when called. Understands words like ‘no’. Follows simple commands like ‘open your mouth’ and ‘close your eyes’ etc.</td>
</tr>
</tbody>
</table>
18 months to 2 year 6 months: Responds to requests like ‘give me’ and commands like ‘bring the ball’ and ‘throw the ball’. Points to the objects named.

Please Check if the child:

1. Responds to various soft and loud sounds.
2. Localises the source of sound on both left and right sides.
3. Has not stopped babbling after 6-8 months of age.
4. Prefers to play with noise making toys.
5. Has started using the meaningful words like mummy, papa, bye-bye etc. by the age of 1 year 6 months.
6. Follows simple commands even when not accompanied by gestures.
7. Understands speech even in the absence of visual cues.
8. Responds to calls from a distance of 5-10 ft.
9. Has no speech - articulation and voice problems.
10. Does not need to tune the TV or radio too loud.

Any problems with respect to the above mentioned factors may be due to the presence of a hearing loss and the child should be investigated for the same.

9. MEDICAL AND SURGICAL INTERVENTION

Discharging Ears are a major threat to hearing loss since the hearing loss may go undetected if the discharge is not timely treated. By preventing loss from discharging & treating such ears, subsequent hearing loss can be prevented.
The following conditions MAY BE treated either medically or surgically an E.N.T. specialist.

1. Discharging Ears
2. Perforation in the Ear Drum (Tympanic Membrane)
3. Dislocations of Ossicles

10. HEARING AIDS

1. Individual/Wearable Hearing Aids
2. Cochlear Implant
11. EDUCATION

A formal attempt in educating the deaf started more than a century back with the establishment of the first school for the deaf in Bombay in the year 1885. There has been an increase in the number of such school form 35 before independence to about 500 schools at present. However this increase is not proportionate to the ever increasing deaf population.

Most schools provide education up to primary level a few are middle schools and only about 15 schools have facility for tenth class and 10+2 system. All these schools are either in big cities towns or cosmopolitans. Proper classroom and/or individual amplification systems are being used effectively only in a few schools where as in most schools children are taught without any amplification.
Hearing impairment from birth constitutes an educational handicap that affects thousands. A greater number become similarly handicapped during infancy and childhood. Education prevents the disability of hearing impairment from becoming a handicap. The degree of hearing impairment, its etiology and the child’s age at the onset of deafness can all affect a child’s potential to communicate and to learn language and speech. Accordingly, no single form of educational provision can possibly meet the individual requirements of all children with impaired hearing. A variety of educational options must be available if the needs of all hearing-impaired children are to be met. Children with hearing impairment can be educated in many kinds of programs, depending on the child’s needs, the availability of ongoing programs in the local area, and the parents’ wishes.

The parents may choose any of the several modes of communication for education of the child with hearing impairment, including AUDITORY/VERBAL, AUDITORY/ORAL, TOTAL COMMUNICATION SIGN LANGUAGE, CUED SPEECH, or a combination of modes.

The parents may choose any of the several methodologies for education of the young child with hearing impairment.

**Home Base Training Program**

For very young children with hearing impairment the parent may follow a Home Base Training Program under the guidance of an special educator of the hearing impaired children/ audiologist & speech therapist. (May follow the John Tracy Clinic correspondence for the pre-school hearing impaired child, 806 West Adams Bouleward, Los Angeles, California, U.S.A. 90007. The lessons are dispatched free on request from the parents of hearing impaired children). They may attend a Parent - Infant program. They may attend a Pre- school program.

**Residential School**

Residential schools are operated in most States so that deaf children who have no services available in their local community can have the training they need. The residential program can care for children with various types of hearing losses and specific instructional needs. The environment of the institution offers a good opportunity for socialisation and exposure to deaf adults, an experience that is not always available in a child’s local community. Of course, there are also disadvantages to the residential programs. The child and family may find it difficult to shift back and forth. In
addition, the children do not get as much interaction with hearing children and do not have as many opportunities to enter usual family routines.

**Day Schools**

In these settings, children live at home, but attend a school for deaf children. These schools are usually located in large metropolitan areas that have enough deaf children to support an environment that (like the residential school) separates them from hearing children for education.

**Similar to Ordinary Children**

Here the option similar to ordinary children means that the hearing impaired children study the same subjects along with normal hearing children in ordinary school with or without special support. This is also called integrated education. The success of the programme will depend on the following:

1. Early identification of hearing loss.
2. Accurate hearing assessment
3. Appropriate hearing aid prescription.
4. Effective use of residual hearing through suitable programmes of auditory stimulation.
5. Continuous review and assessment of the progress.
6. An information pack regarding hearing and communication for use by ordinary school teachers.

**Types of Integration**

1. Full Integration
2. Partial Integration
3. Unit in the school
4. Reverse integration

**Day Classes with Hearing Children**

Day classes are classes for pre-school children with hearing impairment that are self-contained, although they may be in a building with hearing peers. The children with hearing-impaired are provided with many opportunities to have instruction and participate in activities with the hearing students, but the emphasis on separated instruction allows teachers to focus specifically on the needs of the hearing-impaired children.
Resource Room

Resource rooms and itinerant services are provided for hearing-impaired students who can function in a classroom for hearing students, but need some special instruction from a trained specialist. For most hearing-impaired students, this arrangement provides the least restrictive environment. Resource rooms are not usually practical for the very young pre-school child, however. The younger child needs a program that has a very heavy language orientation, which is not always available in pre-school classes for normal children. Parents may choose to send their hearing-impaired youngster to a normal pre-school and make private arrangements for special assistance.

12. VOCATIONAL REHABILITATION

The learning of skills which are functional and related to subsequent vocational skills are known as pre-vocational skills.

A vital element in the task of habilitation and rehabilitation of the persons with hearing impairment consists of providing such technical and pre-vocational education necessary to enable them to choose a suitable vocation and work efficiently and become useful independent citizens.

The adults with hearing impairment can be referred to Vocational Rehabilitation Centre (VRC) for a thorough assessment of their aptitude for a particular vocation and placement for training. The adults with hearing impairment can be provided vocational training in the Industrial Training Institutes (I.T.I.) such other Government and non-Government training institutes e.g. Technical Centre for the Adult Deaf, Hyderabad, Multipurpose Training Centre for the Deaf, New Delhi etc. They can also be provided on the job training as apprentices.

The responsibility of placing the deaf in good jobs is very important and belongs to not only the rehabilitation counsellor or the local employment office, but to many people engaged in the service of the hearing impaired. They may range from parents of hearing impaired children, to educator, clinicians, the other group serving in social, governmental, or service capacity.

For Placement of the trained adults with hearing impairment; a referral can be made to the Special Employment Exchanges, VRC’s and such other Government and Non-Government agencies.
13. LANGUAGE AND SPEECH DEVELOPMENT

0-6 Months

Speech and Language Skills

- Repeats the same sounds;
- Frequently coos, gurgles, and makes pleasure sounds;
- Uses a different cry to express different needs;
- Smiles when spoken to;
- Recognises voices;
- Localises sound by turning head;
- Listens to speech;
- Uses the phonemes /b/, /p/, and /m/ in babbling;
- Uses sounds or gestures to indicate wants.

7-12 Months

Speech and Language Skills

- Understands no and hot;
- Responds to simple requests;
- Understands and responds to own name;
- Listens to and imitates some sounds;
- Recognises words for common items (e.g., cup, shoe, juice);
- Babbles using long and short groups of sounds;
- Uses a song-like intonation pattern when babbling;
- Uses a large variety of sounds in babbling;
- Imitates some adult speech sounds and intonation patterns;
- Uses speech sounds rather than only crying to get attention;
- Listens when spoken to;
- Uses sound approximations;
- Begins to change babbling to jargon;
- Uses speech intentionally for the first time;
- Uses nouns almost exclusively;
1. Has an expressive vocabulary of 1 to 3 words;
2. Understands simple commands.

**13-18 Months**

**Speech and Language Skills**

1. Uses adult-like intonation patterns;
2. Uses echolalia and jargon;
3. Uses jargon to fill gaps in fluency;
4. Omits some initial consonants and almost all final consonants;
5. Produces mostly unintelligible speech;
6. Follows simple commands;
7. Receptively identifies 1 to 3 body parts;
8. Has an expressive vocabulary of 3 to 20 or more words (mostly nouns);
9. Combines gestures and vocalisation;
10. Makes requests for more of desired items.

**19-24 Months**

**Speech and Language Skills**

1. Uses words more frequently than jargon;
2. Has an expressive vocabulary of 50-100 or more words;
3. Has a receptive vocabulary of 300 or more words;
4. Starts to combine nouns and verbs;
5. Begins to use pronouns;
6. Maintains unstable voice control;
7. Uses appropriate intonation for questions;
8. Is approximately 25-50% intelligible to strangers;
9. Answers “what’s that” questions;
10. Enjoys listening to stories;
11. Knows 5 body parts;
12. Accurately names a few familiar objects.
2-3 Years

Speech and Language Skills

1. Speech is 50-75% intelligible;
2. Understands one and all;
3. Verbalises toilet needs (before, during, or after act);
4. Requests items by name;
5. Points to pictures in a book when named;
6. Identifies several body parts;
7. Follows simple commands and answers simple questions;
8. Enjoys listening to short stories, songs, and rhymes;
9. Asks 1- to 2-word questions;
10. Uses 3- to 4-word phrases;
11. Uses some prepositions, articles, present progressive verbs, regular plurals, contractions, and irregular past tense forms;
12. Uses words that are general in context;
13. Continues use of echolalia when difficulties in speech are encountered;
14. Has a receptive vocabulary of 500-900 or more words;
15. Has an expressive vocabulary of 50-250 or more words (rapid growth during this period);
16. Exhibits multiple grammatical errors;
17. Understands most things said to him or her;
18. Frequently exhibits repetitions—especially starters, “I,” and first syllables;
19. Speaks with a loud voice;
20. Increases range of pitch;
21. Uses vowels correctly;
22. Consistently uses initial consonants (although some are misarticulated);
23. Frequently omits medial consonants;
24. Frequently omits or substitutes final consonants;
25. Uses approximately 27 phonemes;
26. Uses auxiliary is including the contracted form;
27. Uses some regular past tense verbs, possessive morphemes, pronouns, and imperatives.
3-4 Years

Speech and Language Skills

1. Understands object functions;
2. Understands differences in meanings (stop-go, in-on, big-little);
3. Follows 2- and 3-part commands;
4. Asks and answers simple questions (who, what, where, why);
5. Frequently asks questions and often demands detail in responses;
6. Produces simple verbal analogies;
7. Uses language to express emotion;
8. Uses 4 to 5 words in sentences;
9. Repeats 6- to 13-syllable sentences accurately;
10. Identifies objects by name;
11. Manipulates adults and peers;
12. May continue to use echolalia;
13. Uses up to 6 words in a sentence;
14. Uses nouns and verbs most frequently;
15. Is conscious of past and future;
16. Has a 1,200-2,000 or more word receptive vocabulary;
17. Has a 800-1,500 or more word expressive vocabulary;
18. May repeat self often, exhibiting blocks, disturbed breathing, and facial grimaces during speech;
19. Increases speech rate;
20. Whispers;
21. Masters 50% of consonants and blends;
22. Speech is 80% intelligible;
23. Sentence grammar improves, although some errors still persist;
24. Appropriately uses is, are, and am in sentences.
25. Tells two events in chronological order;
26. Engages in long conversations;
27. Uses some contractions, irregular plurals, future tense verbs, and conjunctions;
28. Consistently uses regular plurals, possessives, and simple past tense verbs.
4-5 Years

Speech and Language Skills

1. Imitatively counts to 5;
2. Understands concept of numbers up to 3;
3. Continues understanding of spatial concepts;
4. Recognises 1 to 3 colors;
5. Has a receptive vocabulary of 2,800 or more words;
6. Counts to 10 by rote;
7. Listens to short, simple stories;
8. Answers questions about function;
9. Uses grammatically correct sentences;
10. Has an expressive vocabulary of 900-2,000 or more words;
11. Uses sentences of 4 to 8 words;
12. Answers complex 2-part questions;
13. Asks for word definitions;
14. Speaks at a rate of approximately 185 words per minute;
15. Reduces total number of repetitions;
16. Enjoys rhymes, rhythms, and nonsense syllables;
17. Produces consonants with 90% accuracy;
18. Significantly reduces number of persistent sound omissions and substituions;
19. Frequently omits medial consonants;
20. Speech is usually intelligible to strangers;
21. Talks about experiences at school, at friends’ homes, etc;
22. Accurately relays a long story;
23. Pays attention to a story and answers simple questions about it;
24. Uses some irregular plurals, possessive pronouns, future tense, reflexive pronouns, and comparative morphemes in sentences.

Classification of Speech and Language Disorders

1) Language Disorders in Preschool & School Age Children
2) Articulation (Speech Sound) Disorders
3) Fluency Disorders
4) Voice Disorders
5) Speech & Language Disorders in Special Populations

a) Hearing Impairment
b) Cleft Palate
c) Cerebral Palsy
d) Neurogenic Disorders
e) Aphasia

Voice Disorders

1. Voices vary in pitch, loudness and quality
2. Listeners react to them according to their own individual standard
3. Voice is considered to be defective if the vocal PITCH is appropriate for the age/sex of the speaker.

Some of the Possible Causes

<table>
<thead>
<tr>
<th>Organic Cause</th>
<th>Functional Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Neuromuscular dysfunction</td>
<td>Vocal Above</td>
</tr>
<tr>
<td>1. e.g. cerebral palsy</td>
<td>e.g. constant</td>
</tr>
<tr>
<td>1. Paralysis of the vocal folds</td>
<td>clearing of the throat</td>
</tr>
</tbody>
</table>

The pitch may be too high, too low or almost a monotone.

1. Vocal LOUDNESS may also be inappropriate for the circumstance of inadequate for communication or unpleasant for the listener.

Some of the Possible Causes

1. Mild temporary hearing loss
2. People who work around noisy machinery, crowded workplaces etc.
3. Aggressive or insecure personalities.
The most common among voice disorders are vocal quality deviations e.g. hoarse and breathy voice.

Some of the Possible Causes

1. Laryngeal tumors - Vocal modules
2. Laryngeal paralysis - Contact ulcers
3. Speech-Language pathologist’s consultation especially to manage voice disorder following IMPROPER voice usage to eliminate vocal abuse & misuse by retraining speakers habits.

Management

Medical examination by an ENT doctor to rule out medical/surgical intervention.

1. Speech - Language pathologist’s consultation especially to manage voice disorder following IMPROPER voice usage to eliminate vocal abuse & misuse by retraining speakers habits

Fluency Disorders

Stuttering is the most common among the fluency disorders.

Common Characteristics

1. Struggles to reduce sounds, words etc.
2. Repetitions of speech sounds, words, parts of sentence etc.
3. Prolongations of speech sounds.

Causes

1. There are a number of causes
2. e.g. familial, psychological, genetic or neurogenic.

The most important cause is the maintaining cause i.e. that particular reason applicable to the individual which causes stuttering in him/her.
Implications

1. It is important to differentiate stuttering from developmental disfluency which often normal children who are still learning to speak show.

1. Often such childrens and adults develop feelings of fears, anxiety, anger and guilt.

Management

1. For very young children who may show disfluency parental counselling and therapy by a speech language pathologist often helps.

1. For older children and adults, regular and intensive speech therapy is the must

1. Psychological Counselling may help.

14. ARTICULATIONS DISORDERS

Types

1. Substitutions = when one sound is substituted by another sounds in the word e.g. Tate for cake

1. Distortions = when one sound is spoken in a distorted way and does not sound like any known sounds

1. Omissions = when a sound is omitted from the word e.g. oil for soil

1. Additions = when a sound is added in a word e.g. bulue for blue

Causes

1. Organic deformities of the mouth

1. Hearing Impairment

1. Over pampering by parents and others

1. Mental retardation

1. Others

Implications

1. Important to differentiate between speech sounds errors reduced by very young children who are learning to speak (below 3-4 years of age) and the speech sounds errors produced by older children.

1. Uncorrected articulations errors may lead to future reading and writing problems
Management

1. Provide a good speech model for the child
2. Do not correct the child or make her conscious
3. Refer to a speech language pathologist for appropriate interventions

Language Disorders

1. They may be:
2. Delayed language i.e. the child is using language which is for below her age.
3. Specific language impairment in this the child may be having a difficulty in any one aspect of language e.g. difficulty in learning the meanings of the words,
4. Difficulty in forming sentences
5. Difficulty in using the language appropriately in required areas etc.

Causes

1. Delayed motor milestones
2. Hearing loss
3. Organic defects
4. Lack of verbal stimulation
5. Others

Management

Referred to a speech language pathologist or a special educator or a clinical psychologist

15. SPEECH LANGUAGE DISORDERS IN SPECIAL POPULATION

a) Cerebral Palsy

Speech production is often impaired because of uneven abnormal breathing patterns, inadequate swallowing reflex, lip, tongue, jaw etc. movements may be paralysed, weak or poorly co-ordinated laryngeal muscles too may be weak.
Language may be poor

These children may also have hearing loss and/or associated visual problems. These may further affect their speech and language production.

Management

Schools for cerebral palsy and the spastics society. Speech language therapist referred for communication and feeding problems

b) Hearing:- Impairment

They have difficulty in all areas of communications although early identification and management reduces the nature of difficulties.

c) Cleft Palate and/or Lip

They may have difficulty in all aspects of speech productions and language. In almost cases speech tents to be nasal. Associated hearing loss, further, effects their speech specially if it is of a mild degree and goes uncorrected. Post cleft palate repair or with the use of prosthesis speech therapist recommended so that the child learns use to maximise the use of the structural changed and speak clearly.

D) Mental Retardation

Delay in language skills and in speech productions depending upon the degree of mental retardation and management received.

Speech language therapy helps the child communicate depending upon the potential and severity of retardation.

e) Aphasia:

It is an acquired language disorder that results from neurological impairments that can affect various language modalities including auditory and reading comprehension, oral and written expression and gesture. Aphasia can be of various types.
**Classification:**

A simplified classification recognizes:

**Fluent/Non Fluent Aphasia** based on the patient’s comprehension or the ability to produce spontaneous speech and evaluates the patient’s comprehension or the ability to name objects, repeat phrases and follow written and oral commands.

**Non Fluent Aphasia:**

In non fluent Aphasia the patient can follow commands, but is unable to name or repeat phrases. (Broca’s Aphasia or expressive Aphasia). Sometimes the patient is able to follow commands but cannot name objects (Trans cortical Motor Aphasia).

These patients can also have agraphia or the inability to express in writing what they wish to convey.

**Fluent Aphasia:**

In Fluent Aphasia (Wernicke’s Aphasia or receptive Aphasia) the patient can speak but cannot repeat phrases or follow commands and the content of his speech is poor. The patient may have alexia or the inability to understand written language and inability to read.

**Global Aphasia:**

In this condition the patient has difficulty in both following the commands as well as expressing himself. The patient suffers from both alexia as well as agraphia. Such patients carry poor prognosis.

Speech and language management of Aphasia depends upon the patient’s pre morbid lifestyle and communication needs.

3. **Alternative and/or Augmentative Communication**

Many of the severely affected or multiply disabled children/adults may not be able to speak and or write. They would benefit from an augmentative or alternative mode of communication such as communication boards, bliss symbol.
REFERENCES

Multiple Disabilities & Miscellaneous Conditions
1. Cerebral Palsy 159
2. Deafblindness 166
3. Autism 170
4. Specific Learning Disabilities 175
5. Mental Illness 180

References 187
1. CEREBRAL PALSY

Definition

According to PWD Act, 1995 - ‘‘Cerebral Palsy’’ means a group of non-progressive conditions characterised by abnormal motor control resulting from brain insult or injuries occurring in the pre-natal, peri-natal or infant period of development.

Causes

Prenatal: Infection - TORCH, Prenatal anoxia, Prenatal Haemorrhage, Metabolic disturbances, exposure to x-rays & bleeding in the first trimester.

Perinatal: Hypoxic ischemic encephalopathy, neuronal necrosis periventricular leukomalacia, Intra ventricular haemorrhage, Non asphyxial stroke & Hypoglycaemia & other complex metabolic insults, Anoxia.

Postnatal: Head injuries, infections such as meningitis, encephalitis & brain abscess.

Early Symptomatology

Neuro behavioural: Poor feeding, swallowing, poor sleep pattern & hyperactivity, apathy.


Associated Problems: Apart from epilepsy, a child may often have voice & articulation disorders. Such children may also have visual or hearing problems. These may need to be treated by appropriate professionals depending on nature & extent of impairments. Thus, the management of a cerebral palsied child has to be multidisciplinary process to be helped by interdisciplinary team.

Management of Cerebral Palsy

The management of the cerebral palsy depends on the number of problems and also differs with each child. The treatment of the individual with cerebral palsy is a 24 hour-a-day process. The
treatment team may consist of different professionals. The main aim is to intervene in their problems as early as possible and help each child to reach the maximum level of potential in all the areas of development to achieve functional independence. A variety of special methods of treatment are used for these children.

**Surgery:** May be required to correct deformities, if any.

**Drugs:** Drugs are given, if any cerebral palsy is associated with epilepsy or to control the hypertonicity.

**Special modalities of treatment:** Modalities like Neuro-developmental therapy, Sensory stimulation, Proprioceptive neuromuscular facilitation, Conductive education Vojta’s reflex therapy & Biomechanical methods are used for the treatment of cerebral palsy children.

**Schooling:** The child is able to benefit from a normal education, provided the associated problems are not severe, and the school is able to provide the needed support services. In case of such disability the child could be considered for placement in a special school where all the support services are available.

**Early Diagnosis**

1. Perinatal asphyxia multi system organ failure-heart, kidney, liver, intestines
2. Neonatal predictive diagnosis
   - Periventricular leukomalacia
   - Intra ventricular haemorrhage
   - Persistently abnormal neonatal neurological
3. Suggestive neonatal neuro behavioural symptoms
   - Severe feeding difficulties-tube feeding
   - Severe homeostatic difficulty-temperature
   - Severe dis regulation-sleep/wake cycle, hunger/satiety, state control
1 Abnormalities of tone and or movements
   May be transient (honey moon period)

1 Abnormalities of deep tendon reflexes
   Hyper reflexia
   Increased elicitation zone

1 Persistence of abnormal primitive reflexes
   Failure of incoming posture responses
   Deviant motor development
      - Precocious head control
      - Log rolling
      - Bunny hopping

1 Delayed motor development

1 Persistent primitive reflexes
   - Tonic neck reflexes in which the limb posture and the tone are influenced by the rotation of the head e.g. ATNR.
   - Progression reflexes in which cyclic movements of the lower limbs are elicited by plantar stimulation e.g. stepping reflex.
   - Tonic labyrinthine reflexes in which the posture of the spine and the limbs are influenced by the degree of flexion or extension of the neck.

1 Postural responses
   - Righting
      Returning of the head trunk and limbs to the anatomic position
   - Protective
      Lateral, forward, posterior
   - Equilibrium
      Complex multiple adjustments to maintain posture and movements.
TYPES OF CEREBRAL PALSY

Types

**Dystonia**  Spastic, hypotonic, atonic  
Dystonic

**Dyskinetic**  choreo athetoid, ataxic

**Distribution**  
Hemiplegia  
Diplegia  
Quadriplegia  
Monoplegia and triplegia  
Double hemiplegia

**Severity**  
All four limbs  
two limbs  
Gross motor functions

**Prognosis for walking**  
Must be sitting independently by 24 months  
Must have all protective responses by 3 years.

**Intelligence**  
Typically normal, but about 66% below mean learning disabilities

**Seizures, Contractures, malnutrition**
REHABILITATION MANAGEMENT OF CEREBRAL PALSY

Management of CP is from rehabilitation or the habilitation approach with early intervention essential to help each child reach the maximum level of potential in all areas of development to achieve functional independence. A wide variety of treatment approaches are used.

A variety of theoretical models are used for treatment:

Bio-mechanical Model:

The model uses muscle education and braces (it was propounded by Dr. W.M. Phelps). They use:

1. Active assisted movements
2. Active resisted movements
3. Synergy
4. Relaxation
5. Balance
6. Reach/grasp
7. Braces (Orthosis)

Proprioceptive Neuro Facilitation
(Kabat, Knott and Voss)

They use movement patterns for development of normal movements. They use proprioceptive sensory input to facilitate movement.

Vojta’s reflex therapy
(Vastav Vojta)

It is a form of therapy which facilitate reflex creeping and rolling. It uses reflex/trigger points to facilitate creeping and gradually allow it to get voluntary.

Conductive education
(Andras Peto)
Manual for Training of PHC Medical Officers

It is a form of therapy which involves group work which is an all day programme. Movements are facilitated using ladder back chair and slatted plinth. Use of rhythmic intention is used to facilitate conscious correct movements.

**Rood’s Approach**  
(Margaret Rood)

This form of treatment application emphasize the normalisation of tone and desired muscular responses through the application of specific sensory stimulation. It aims to facilitate a progress through development sequence of sensorimotor control (for example, Rocking on all fours before crawling). All movements used in treatment must be purposeful. The principles of repetition are applied to strengthen and consolidate normal patterns of ability and mobility.

**Neuro developmental therapy**

It was designed by Karl and berta Bobbath in the 1940’s. This therapy believes that abnormal reflexes cause abnormal patterns and therefore, abnormal movements. Therefore, the use of reflex inhibiting patterns to inhibit abnormal tone and to facilitate normal movement. They also propounded that normal movements could be developed, if the area is given a feel of normal movements.

**FUNCTIONAL AUGMENTATIVE DEVICES**

**Objective**

To replicate for the developing disabled child the same functional experience and capacity as the normally developing child of the same age or stage. Functional augmentation reduces both disability and handicap, prevents secondary deprivation and learned helplessness and maintains the normal derive to competence. In cases where function develops late, prior augmentation facilitates acquisition of the relevant skills, to allow independent living for the severely motor disabled.

**Postural augmentation**

Provision of the custom seating at around seven to ten months prevents deficits in upper limb and hand eye co-ordination in CP. Standing boards at 10 to 12 months prevent bone fractures and hip dysplasia and train the brain to regard the upright posture as normal.
Augmentation mobility

Powered or self-propelled wheelchairs at 2 to 3 years of age enhance cognitive development and reduce helplessness in children with poor ambulatory prognosis or who are making minimal progress toward walking. Powered/self propelled chairs or tricycles allow independent mobility.

Augmentative Communication

Singing, picture boards Bliss or other symbol or work boards, electronic word/symbol scanning devices, speech synthesisers, word processors, voice or keyboard activated (smart keys/pointers) computer communications.

Environmental control devices

Noise or voice activated or joy stick/keyboard activated opening closing electric/radio/TV/food preparation aids, emergency signals.
2. **DEAFBLINDNESS**

The basis concept of current twentieth-century philosophy is the uniqueness of the individual. The uniqueness is especially apparent among those who are deafblind. The term deafblind is a fascinating one in terms of philology as it is variously written as deaf blind, deaf-blind and deaf/blind. We are using the term as deafblind since “deafblindness is a condition presenting other difficulties than those caused by deafness and blindness. It is an umbrella term that includes:

- the blind and profoundly deaf child;
- the blind and severely or partially hearing child;
- the partially sighted and profoundly deaf child;
- the partially sighted and severely or partially hearing child.

**Definition of Deafblindness**

*Des Policy Statement “Educational Provision for Deafblind Children”*

“The term ‘deafblind’ is used to describe a heterogeneous group of children who may suffer from varying degrees of visual and hearing impairment, perhaps combined with learning difficulties and physical disabilities which can cause severe communication developmental and educational problems. A precise description is difficult because the degrees of deafness and blindness, possibly combined with the different degrees of other disabilities, are not uniform and the educational needs of each child will have to be decided individually.

There is no definition that can satisfy all the involved professional. Equally there is no one disease or syndrome which can be described as being the main cause of deafblindness. Deafblindness is thus a combination of visual, hearing and other additional complications which causes unique problems in communication, mobility and information. We must also take into account the cause, time of onset, relative degree of disability. For example:-

1. Congenital and early adventitious or pine-lingual dB/
1. Deaf or (pre-lingual deaf) with vision loss
1. Hard of hearing with vision loss.
1. Low vision with hearing loss
CAUSES AND CLINICAL FEATURES OF DEAFBLINDNESS

Congenital factors :-

1. Rubella
2. Genetic factors
3. Other Named syndromes
   - Cri du Chat
   - Cat’s Eye syndrome
   - Goldenhar syndrome
   - Noonan’s syndrome
   - Norrie’s syndrome
   - Pallister Killian Syndrome
   - PEHO Syndrome
   - Refsums Syndrome
   - Usher’s syndrome Type I, II and III

Problems in Deafblindness

The problem is just not blindness or deafness: nor is it one of communication or perception. Children are unable to use their distance sense of vision and hearing to get a clear un-distorted view of the world. The problems is complex, because, such children may:

- lack the ability to communicate with their environment in a meaningful way;
- have a distorted perception of the world;
- lack the ability to anticipate future events or the results of their actions;
- be deprived of many of the basic extrinsic motivations;
- have medical problems which lead to serious developmental delay/lag;
- be mislabeled as retarded or emotionally disturbed;
- be forced to develop unique learning styles to compensate for their multiple handicap;
- have extreme difficulty in establishing and maintaining interpersonal relationships.
Needs of Deafblind Children

Education

Early Education must concentrate on:
- Use of multi-sensory approach and use of residual senses with smell, touch etc.
- Communication and language taught in meaningful natural situation.
- Development of bonding, body contact, awareness of self and others,
- Parents are the ACTIVE partners in the teaching process.

<table>
<thead>
<tr>
<th>Academics</th>
<th>Functional curriculum</th>
</tr>
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<tbody>
<tr>
<td>Reading</td>
<td>Language and communication</td>
</tr>
<tr>
<td>Writing</td>
<td>Mobility</td>
</tr>
<tr>
<td>Braille</td>
<td>Self-help skill</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Independent living skills</td>
</tr>
<tr>
<td>Social studies</td>
<td>Prevocational skills</td>
</tr>
<tr>
<td>Mobility</td>
<td>Social skills</td>
</tr>
</tbody>
</table>

*Communication* needs are met by interpreter;
*Mobility* needs are met by guide or helper;
*Learning* needs are met by Intervenor.

CHANGING DEAFBLIND POPULATION

CHARGE Association noted by an American doctor in the year 1979. CHARGE is used as a acronym to describe a group of people who exhibit at least four of the features prefixed by the letters in the acronym and including one or other of Choanal atresia and or Coloboama.

- C Coloboama of the iris and or retina, usually in the lower part of the eye and has difficulty in central vision.
- H Heart defects such as tetralogy of fallot, patent ductus arteriosus, arterial septal defects and ventricular defects.
- A Unilateral or bilateral blockage of the nose and one of the major criteria for diagnosis.
R Retarded growth and development. Growth retardation may be due to severe feeding difficulties, reflux, breathing problems, chest infections and multiple surgical procedures leading to a prolonged hospitalization.

G Genitalia anomalies such as incomplete development or under-development of external genitalia. Often hormonal problems exist.

E Ear anomalies in the external, middle or inner ear.

Apart from these critical features of the condition there are other anomalies which are found in the people with CHARGE Association, including:
- Cleft lip
- Facial Palsy
- Kidney abnormalities
- Malformations of the larynx, esophagus and trachea
- Abnormal tongue size
- Delayed and abnormal dental development
- Malformed or absent semi-circular canal
- Sleep apnoea due to severely obstructed breathing
- Cranial nerve VII, VIII, IX and X affected
- Dental anomaly
- Scoliosis
- Hypoglycemia or low blood sugar
3. AUTISM

Autism is a disorder of development that affects the communication and social abilities of those suffering from it. Autism is a ‘spectrum disorder’ in which the severity of symptoms range from a mild learning and social disability to a severe impairment with multiple problems of behaviour. The disorder may occur alone or with accompanying problems such as mental retardation. Autism is characterised by pronounced withdrawal from personal contacts, an obsession for preserving sameness, and either mutism or incommunicative use of language.

Autism can set in suddenly or can be a step-by-step process. It may begin with a loss of interest in food or in play and progress to a loss of toilet training and eventually giving up of all contact with reality. The disorder usually occurs at the age of three or four years. The autistic children show an unremitting fear for their lives, and, their withdrawal from social life is a defense against unbearable anxiety. In the face of the danger they feel for their safety, they often take refuge in mutism or behind a ‘nonsensical language’ or an endless repetition of a word or a phrase. The reaction of people with autism to the imagined danger is to either take a flight or hide behind silence or a total withdrawal from relationships with others. They try to become nonexistent as social beings. They are obstinately determined to not get involved with the world around them.

Autism is by no means a rare disorder and is more common than Down’s Syndrome, But a majority of autistic people in India have not been diagnosed and do not receive the services they need. This is because of lack of awareness and misunderstanding about autism among the medical professionals at large.

The characteristics of autism may mislead to a diagnosis of epilepsy, hyperactivity and Attention Deficit Disorder. In its milder form autism may be misunderstood as learning disability or behaviour problem or delayed milestones or mental retardation. But these are all separate conditions and do not always accompany Autism.

EARLY DIAGNOSIS

Early alerting behaviours found in autism are:
- ‘Empty gaze’
- Not looking at faces
- Not paying attention to voice
- Hypersensitivity to non-speech noise
- Not pointing
- Lack of initiative in seeking visual attention
- Absence of shared gaze

These concerns expressed by parents or noted by experienced observers should begin consideration of possible autism.

**Diagnostic criteria for Autistic Disorder**

A. A total of six (or more) items (1), (2) and (3) with at least two from (1) and one each from (2) and (3);

1) qualitative impairment in social interaction, as manifested by at least two of the following
   (a) marked impairment in the use of multiple nonverbal behaviours such as eye-to-eye gaze, facial expression, body postures and gestures to regulate social interaction.
   (b) failure to develop peer relationships appropriate to developmental level.
   (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g. by a lack of showing, bringing or pointing out objects of interests)
   (d) lack of social or emotional reciprocity

2) qualitative impairments in communication as manifested by at least one of the following:
   (a) delay in or total lack of the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
   (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others.
   (c) stereotypes and repetitive use of language or idiosyncratic language
   (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.

3) restricted repetitive and stereotyped patterns and behaviour, interests and activities, as manifested by at least one of the following:
   (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
(b) apparently inflexible adherence to specific, nonfunctional routines or rituals
(c) stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole-body movements)
(d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas with onset prior to age 3 years. (1) social integration, (2) language as used in social communication or (3) symbolic or imaginative play

C. The disturbance is not better accounted for by Rett’s Disorder or Childhood Disintegrative Disorder.

**INTERVENTIONS**

1. Educational and Behaviour Modification structured integrated education
2. Dietary modification
   - Gluten+case in free
   - Sulphate free
3. Dietary supplementation
   - Vitamin B6 and magnesium
   - Di-methyl glycine (DMG)
   - Trace minerals and vitamins (Mg, B6)
4. Immunological
   - Intravenous hyper-immune globulin (IVIG)
5. Pharmacotherapy
   5.1 Anti-convulsives
   5.2 Opiate antagonists
   5.3 Symptomatic pharmacotherapy
   5.4 Melatonin
   5.5 Anti-fungal therapy

Multiple studies have shown that behavioural models resulted in much more effective teaching strategies than those derived from psycho-analytic or sensory deficit models and that individualised intensive schedules of offering social skills training, communication programs, peer modeling and parent involvement and support all contribute some benefit.
WHEN TO REFER TO SPEECH PATHOLOGY?

12 Months  
no consonants  
not directing gaze to any named object  
not following any verbal cues

18 months  
using no words with meaning

24 months  
not saying or understanding 2 concept phrases

36 months  
difficult to understand to strangers  
not using some 3 or 4 word phrases  
not understanding some verbs

48 months  
not easily understood by strangers  
obviously faulty sentence construction

60 months  
unable to recount events, tell story  
disordered or irrelevant speech  
cannot understand discussions  
name-or word-finding difficulties  
unable to generate rhymes  
sequencing difficulties

NORMAL COMMUNICATION DEVELOPMENT

6 week  
Social Smiling

8 weeks  
interpersonal synchrony

9 months  
Long strings of tuneful babble

12 months  
Word or sentence-like babble. Few words. Turns to name. Stops to “No”. Follows” conversations. Understands simple commands. Waves “bye-bye”. Comes to outstretched arms.

13 months  
Proto-declarative functions-points to object of interest  
Follows adults point or gaze. Shares interest.  
Proto-imperative functions : Points to desired object
2 years  Says many single words. Uses two-concept two-word phrases. 
Understands 200 words. Name a few objects in book. Only 50% comprehensible 
to strangers. Shows interest in pre-writing activities.

Understands verbs. Listens to ‘‘story’’.

3 years  speech 75% comprehensible to strangers. Using and understanding some 
prepositions.

4 years  Speech fully comprehensible although some developmental errors and omissions 
persist. Knows full name and address. Listens to 6-7 word sentence. Relates 
house, car, persons.

5 years  can define simple words. Number sense to 10. Rhymes. Can execute two to 
three serial commands. Can print letters in name.
4. SPECIFIC LEARNING DISABILITIES (DYSLEXIA)

Specific Learning Disabilities (SLD) affect person’s ability to acquire, process, and/or use either, spoken, read, written or nonverbal information.

There may be significant deficit in one or more of the following areas;
- Organisation / planning
- functional literacy skills (expressing oneself and understanding conversations)
- memory
- reasoning
- problem solving
- preceptual skills

Some important facts about SLD

People with dyslexia have at least average intelligence and may be having even above average intelligence.

It is a life long condition, which can be overcome with educational intervention. There is no cure as such.

The use of early identification techniques and appropriate educational intervention is very important. This is based on the individual’s specific strengths and needs. The prognosis for a productive life can be maximised through the use of these techniques.

SLD is a hidden difficulty. It is because of this sometimes, the diagnosis and subsequent intervention is delayed. Moderate cases sometimes go unnoticed without a diagnosis.

Many societal problems are the direct result of undiagnosed or untreated SLD. Social competence and emotional maturity may suffer. Illiteracy, school dropout, substance abuse (drugs, alcohol), juvenile delinquency, unemployment are all consequences of this.

Criteria to decide whether a person has an SLD or not?

A multidisciplinary assessment, interviews and observation are used to determine whether the
following criteria are met:-

Has average or above average intelligence
Exhibits discrepancy between potential and actual achievement
Performs poorly because of difficulty in one or more of the following areas:
Listening
Speaking
Reading
Written expression
Mathematics
Reasoning
Difficulties in concentration and attention, memory and social skills may also be present.

People with disabilities of learning which are primarily caused by physical disabilities, sensory impairment, mental retardation, emotional disturbances, cultural or economic disadvantage should not be considered having specific Learning Disability. Any of the above could be accompanied by a learning difficulty, but, it cannot be term Specific Learning Disability (SLD).

CAUSES OF SPECIFIC LEARNING DISABILITIES

The findings of recent research as given below shown that the majority of cases of SLD are genetic in nature.

Autopsies of dyslexic brains show deficiency in language centres of the brain.
Blood flow in the brain of dyslexic people engaged in linguistic tasks suggest shift linguistic analysis to other parts of the brain
Symmetry of the right and left superior temporal plane
DNA samples in blood supplies from 90 families where a parent and the child was dyslexic were taken. It was found that the section of chromosome linked to dyslexic problems is close to the genes that control immunity.
A specific area of the left brain fails to activate when the people with dyslexia try to read

SLD can be acquire due to prenatal, natal or post natal factors.
**Pre-natal factors:**

Medications taken by the mother  
Illnesses of the mother, during the pregnancy  
Rubella, high blood pressure, etc  
Nutrition  
Rh factor

**Natal factors:**

Prolonged too hasty a birth  
Oxygen deprivation  
Injury to head during birth  
Low birth weight  
Premature birth

**Post natal factors:**

Fits  
Epilepsy  
Trauma or injury to the head

**EARLY IDENTIFICATION OF SLD**

Till the child is about 6 years old he cannot categorically be said to be ‘‘dyslexic’’. Early indications are present even prior to this age (Kindergarten Behaviour Index). These indicators can be used to screen children to find out whether they may be ‘‘at risk for a learning disability. If the majority of the indicators are present, the child should be immediately referred for detailed assessment by the special educators and psychologists so that an early intervention programme can be started for prevention and / or reducing the impact of the learning disability

**Types of Learning disabilities**

APRAXIA (DYSPRAXIA), The inability to motor plan, to make an appropriate body response.
DYSGRAPHIA - Difficulty with the act of writing, both in the technical as well as the expressive sense. There may also be difficulty with spelling.

DYSEXIA - Difficulty with language in its various uses (not always reading).

AUDITORY DISCRIMINATION - perceiving the differences between sounds and the sequences of sounds.

VISUAL PERCEPTION - the ability to understand and put meaning to what one sees.

Attention Deficit (hyperactivity) Disorder (ADD / AD HD) may be accompanied by learning disabilities (about 20% of children with LD may have accompanying ADD). It is characterized by hyperactivity, distractibility and impulsivity. It interferes with the individual’s ability for learning.
### GENERAL INTRODUCTION

**LEARNING DISABILITIES**

**WHAT TO LOOK FOR: SOME FIRST SIGNS OF TROUBLE**

**KEEPING UP WITH THE FLOW OF EXPECTATIONS**

<table>
<thead>
<tr>
<th>Preschool</th>
<th>LANGUAGE</th>
<th>MEMORY</th>
<th>ATTENTION</th>
<th>FINE MOTOR SKILL</th>
<th>OTHER FUNCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pronunciation problems. Slow vocabulary growth. Lack of interest in story telling.</td>
<td>Trouble learning numbers, alphabet, days of week, etc. poor memory for routineness</td>
<td>Trouble sitting still. Extreme restlessness. Impersistence at tasks.</td>
<td>Trouble learning self help skills (e.g. Tying shoe laces). Clumsiness. Reluctance to draw or trace.</td>
<td>Trouble learning left from right (possible visual spatial confusion). Trouble interacting (poor social skills).</td>
</tr>
<tr>
<td>Middle Grades</td>
<td>Poor reading comprehension. Lack of verbal participation in class. Trouble with word problems.</td>
<td>Poor illegible writing. Slow or poor recall of math facts. Failure of automatic recall</td>
<td>Inconsistency Poor self-monitoring. Great knowledge of trivia. Distaste for fine detail.</td>
<td>Fist-like or tight pencil. Illigible, slow or inconsistent writing Reluctance to write</td>
<td>Poor learning strategies Disorganization in time or space, Peer rejection</td>
</tr>
<tr>
<td>Upper Grades</td>
<td>Weak grasp of explanations. Foreign language Problems. Poor written expression. Trouble summarising.</td>
<td>Trouble studying for tests. Weak cumulative memory. Slow work pace.</td>
<td>Memory problems due to weak attention. Mental fatigue.</td>
<td>(lessening relevance of fine motor skills).</td>
<td>Poor grasp of abstract concepts. Failure to elaborate. Trouble taking tests, multiple choice (eg. SAT’s)</td>
</tr>
</tbody>
</table>

Note: These are guideposts for parents, teachers and other involved. They should not be used in isolation, but may lead you to seek further assessment. Many children will, from time to time, have difficulty with one or more of these items. They should always be reviewed in a broader content of understanding about a child.
5. MENTAL ILLNESS

Traditionally, disabilities have been associated with conditions, physical and mental, where a handicap has been obvious and tangible such as physical sensory handicaps and mental retardation. Recently, there is increasing attention to disabilities associated with other conditions such as cardiac disease and chronic mental illnesses.

Mental Illnesses are among the most distressing and incapacitating conditions. Many of them tend to run a chronic or recurrent course and thereby impose a severe burden on the affected individual, the family and the community. The stigma associated with mental illnesses further aggravates the social burden and interferes with effective treatment. Disability associated with mental illnesses rank among the most widespread and severe public health problems.

After years of struggle by Government non-Government agencies, mental illness got included in the Person with Disabilities Act of 1995 (PDA). The Act defines mental illness as any mental disorder other than mental retardation. However certain objections were raised to this simple definition and the final report of the Amendment Committee has recommended that the definition of mental illness may be so amended as to read that mental illnesses are “disorders of the mind that result in partial or complete disturbance in the person’s thinking, feeling and behavior which very often results in recurrent or persistent inability or reduced ability to carry out activities of daily living, self care, education, employment & participation in social life. These disorders would include Schizophrenia, Obsessive Compulsive disorder, moderate or service depression of at least three years duration with proof of continuous treatment.

Schizophrenia is the most severe of the mental illnesses, often causing life long disability for its sufferers and a substantial financial burden to society, both in loss of productivity and in services to care for disabled people.

EXTENT OF THE PROBLEM:

We known from mortality statistics that over the last century human life expectancy has increased as never before, using instruments such as the DALY (disability adjusted life year) we can shift the focus from how people are dying to how they are living. What DALY does is to quantify not only the number of deaths but also the impact of premature death and disability on a population, continuing them in to a single unit of measurement of the overall “burden” of disease. Five of the 10 leading causes of disability worldwide (major depression schizophrenia, bipolar disorders, alcohol use and
obsessive compulsive disorder) are mental problems.

About the extent of the problem worldwide, mental disorders accounted for approximately 12% of all disability-adjusted life years lost in 1998 (WHO)

- 4% of the 200 millions disabled in the world suffer from mental disorders (WHO estimates)
- Mental disorders (psychoses & depression) figure among the ten leading causes of burden (Murray & Lopez). It is estimated that in 2004, depression will be leading cause of disability in women.
- In India there are probably about 5-6 millions disabled by mental illness. All of them require active rehabilitation inputs and welfare measures apart from medication.

**CAUSES OF MENTAL ILLNESS**

There are varieties of reasons either alone or in combination can result in mental illnesses. In organic mental disorders, there is a definite pathology in the brain which result in altered behavior. In all other conditions, there is evidence of both biological as well as environmental factors contributing to the development of the illness. The causes can be grouped as follows.

1. **Changes in the brain**: Any change either in the structure or functioning of the Brain can give rise to mental illness, biochemical changes at the level of nerve cells are the cause in majority of the severe type of cases (psychoses). Here brain looks normal on examination. Damage to the structure of the brain by any of the following reasons can result in mental illness.

   a) Infections b) Injury c) Poor blood supply d) Bleeding e) Tumors f) Alcohol take for long periods g) Nutritional deficiencies h) Untreated fits and i) Degenerative diseases.

2. **Hereditary factors**: In few cases of mental illnesses, there can be some one in the family suffering from a similar illness. But in most cases, there would not be anybody in the family who has mental illness. The proneness for developing mental illness is transmitted to an individual but whether an individual would actually manifest the illness depends on many other factors.

3. **Childhood experiences**: Proper love, affection, suitable guidance, encouragement and discipline are necessary for healthy growth of a person. If they are not available and there are repeated unhappy experience in the childhood, they can also contribute in development of mental illness in later life.
4) **Home atmosphere**: Frequent quarrels, misunderstanding among family members, lack of warmth and trust among them can have untoward effects on the person. Such a person when faced with stress and strain can breakdown as he lacks the skills to adjust and control his emotions.

**Definition of Disability**

The World Health Organisation collaborative study on measurement and reduction of disabilities defined disability as ‘disturbances in the performances of social roles that would normally be expected of an individual in his habitual milieu, arising in association with diagnosable mental disorder.'

**Major Areas of Disability**

Disorders of the mind produce disability mainly in the following areas of a person’s functioning:

1. Activities of daily living including self care-grooming, dressing, bathing, keeping self and environment clean, looking after one’s health etc.

2. Social relationships including communication skills, ability to form relationships and sustain them, social skills required for daily activities.

3. Occupational functioning - ability to acquire a job hold it. Cognitive and social skills required for the job, doing housework or studying as a student.

Occupational functioning is especially important since it affects the livelihood of people suffering from this illness, especially those between the ages of 25 & 45. Unable as they are to hold a job, their families face untold suffering and burden.

**Disability Classification**

WHO brought out the International Classification for Impairments, Disabilities and Handicap (ICIDH-1) in 1980. This classified dysfunctions into those occurring at an organ level (impairment), at the action level (disability) and societal level (handicap).

The second version of ICIDH is a classification of disablements and functioning which are umbrella
terms covering three dimensions (a) body structure and functions (b) personal activities and (c) participation in society. These dimensions of health related experience are termed as impairments of structure & function, activities (formerly disabilities) and participation (formerly handicap). ICIDH-2 is the International Classification of Impairments, Activities (replacing disabilities) and participation (replacing handicaps).

Impairment is any loss or abnormality of psychological, physiological or anatomical structure or function. Loss of foot, defective vision or mental retardation

Impairment may be visible or invisible, temporary or permanent, progressive or regressive. Further one impairment may lead to another disability. Because of the impairment the affected person may not carryout certain activities considered normal for his age, sex, etc. Disability is any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being.

Handicap is defined as a disadvantage for a given individual, resulting from impairment or disability that limits or prevents the fulfillment of a role that is normal (depending upon age, sex and social and cultural factors) for that individual.

An example in more concrete terms and from the domain of mental illness is;

- Hallucinations, Delusions, memory disturbance-impairment
- Cannot work, or cannot take care of personal needs-disability
- Unemployment-handicap.

**Measurement of Disability**

There have been isolated attempts to measure & quantify disabilities in chronic hospitalized patients. In recent times, the issue of assessing disabilities and social functioning has been quite contentious, reflected in the plethora of measurement techniques that have been devised, without any degree of international agreement. Weissman et al (1981) have comprehensively reviewed 28 instruments which measure social adequacy, social adjustment, social functioning, social competence and social dysfunction. One important problem bedeviling researchers in the field was the absence of an unified theoretical framework to base the assessments on. To overcome some of these obstacles, the WHO initiated in 1976 a pilot project aiming to explore the applicability, reliability and validity
Manual for Training of PHC Medical Officers

of a set of instruments and procedures designed for severe psychiatric disorders in several countries. This study which was conducted in seven countries primarily developed a set of instruments, the most important being the disability Assessment Schedule (DAS) and the Psychological Impairments Rating Schedule (PIRS).

Disability Assessment Schedule (DAS):

The DAS was designed to fill the gap in the existing range of instruments for the assessment of social behaviour in psychiatric patients. This instrument has undergone two revisions. It has 4 sections which include a total of 96 items. The sections are Overall Behaviour, Social Role domains. Patient in hospital, and Modifying factors. An abridged version of this was used in the International Study of Schizophrenia, a multi-country follow-up of schizophrenia patients - coordinated by the WHO-NIMH.

For the last few years, there has been a lot of work on DAS-II coordinated by the WHO. A cross-cultural applicability study done in several countries resulted in an exploration of the domains covered, the constituent items and the wording. 300 items over 6 domains were reduced to 89. Psychometric studies have been completed.

The 6 domains of WHO-DAS-II are:

1. Understanding and communicating
2. Getting around
3. Self care
4. Getting alongwith people
5. Life Activities (Household and work)
6. Participation in society.

Field trials WHO-DAS II in 21 centres in 19 countries has been completed. The figure shows that the nature and severity areas of difficulty experienced in day to day life is similar irrespective of the type of disorder, mental or physical.

The Schedule for the Assessment of Psychiatric Disability (SAPD)

The modification of the DAS was done during the course of the ICMR study on ‘Factors affecting the course and outcome of schizophrenia at Madras. (THARA et al, 1988). The modificatios took
the form of deletion of some items which elicited very poor response in our culture, and regrouping them under the areas of Personal, Social and Occupational Disability. Part IV is Overall Disability which is the subjective assessment of Global Disability. The SAPD has been used by several researchers in India.

Outpatient and inpatient care is available in psychiatric hospitals and general hospital psychiatric units. There are programmes for day-care,-respite-care and custodial-care. There are facilities focusing on rehabilitation and education. Then there is the practice sector. Treatment options for an individual can be availed at any of these sectors.

The modalities for treatment can be medications electroconvulsive therapy (ECT) and various kinds of psychotherapies.

**Rehabilitation Management**

Psycho-social Rehabilitation is an essential component of the management of the chronic mentally ill along with medical treatment. This form of management is evolving in the Indian context with the involvement of professionals, families and non governmental organizations. However, the concepts, process and techniques are not familiar to families and the public. It is necessary for people who are involved in the management of the mentally ill to know the basic process involved in the rehabilitation of the mentally ill. In the area of psycho-social rehabilitation varieties of intervention techniques in different settings are being practiced. There is no uniformity among the different settings, about the type of patient population saved, therapeutic techniques and management. Considering this, it is necessary to know the basic issues in the rehabilitation for the mentally ill. When one considers rehabilitation, the three major players are the patient, family, and community. It is essential to view the patient in the context of family that in turn forms the community in the larger perspective. Therefore these three components have to be given adequate attention while planning rehabilitation services. Rehabilitation starts once the patient attends the consultation room for the first time. The initial phase is assessment of the residual abilities is drawn out depending on the priority. Usually patients with chronic mental illnesses present with disabilities in multiple areas. Most often it may not be feasible to remedy all the areas simultaneously. Therefore, the important areas are taken up for specific intervention. Disability intervention of the individual has been done, using individual and group approaches. Different forms of techniques are used like behavioral modification, skills training, vocational training, socialization and communication enhancement training, motivation enhancement training, affective enhancement training and problem solving skills training etc.
Individuals suffering from chronic mental illness can develop skill deficits in two forms:

In the first instance one can see that the individual, after onset of the illness does not use the skills, thereby causing the atrophy of the skills. This is illustrated by a common example of a tennis champion losing his winning touch once he is out of practice for a year. Secondly, due to the early onset of the illness the patient might not have found the skills necessary for living. These two groups of people require training, to be a successful individual in society, therefore the need for living skills training. Medication alone may not be sufficient for the above reasons. Medical treatment in the long term management. So a combination of regular medicines and psycho-social management is recommended for the chronically mentally ill.
REFERENCES

1. Persons with Disability Act, 1995