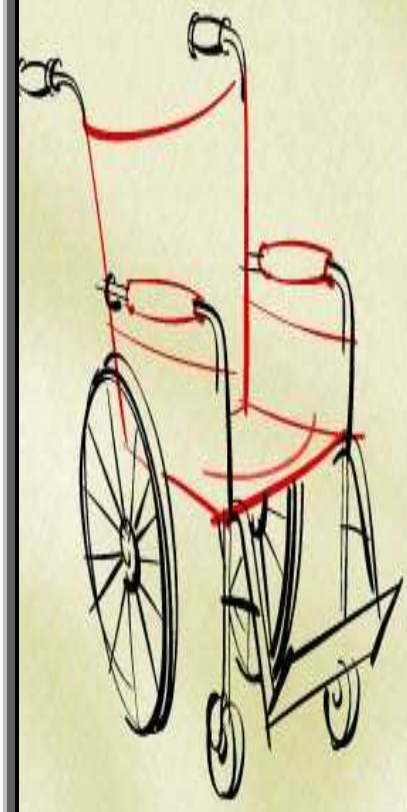
Reading material on

Disability Management

For

Medical Officers



An ISO 9001: 2008 Certified Institution

State Institute of Health & Family Welfare,
Rajasthan

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Acknowledgements

We, at State Institute of Health &Family Welfare (an ISO 9001:2008 Certified Institution), Rajasthan, sincerely acknowledge and express our gratitude to the contribution of Rehabilitation Council of India and Punarbhav, the publications of which have immensely helped in developing this reading material on disability management for Medical Officers.

I take pride, at the same time, in placing on record the contribution of each of my family member at the institute (SIHFW) for all the dogged determination put up by them in synthesizing this dossier.

The cooperation and the faith reposed in credentials of SIHFW by Project Director-Rajasthan Health Systems Development Project and his team had been a strong motivator for all of us at the Institute, and deserves a special mention.

Needless to say, our mentor & patron, Principal Secretary Health, stays as the main driver in the endeavor.

Akhilesh Bhargava
Director-SIHFW

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Chapter 1: Introduction

1.1. Burden of Disease

In the spectrum of Health, the end point of the final outcome of the disease is variable. It may be either recovery or disability or death. Medicine aims to promote health, preserve health, cure the diseases, and to rehabilitate the persons in case of consequent disabilities.

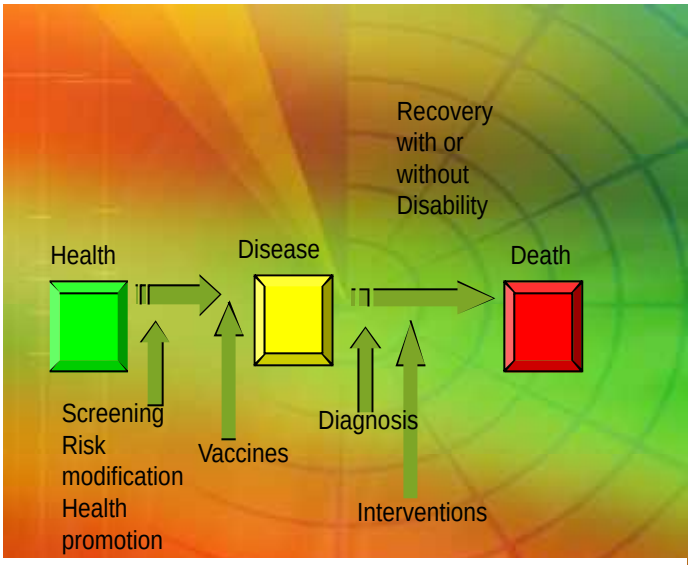


Fig:1.1; Spectrum of health and disease

National Health Policy

The National Health Policy (1983, 2002) 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 by shifting the emphasis from the curative to the preventive and promotive aspects of health care.

To further the concerns raised in the policy, Government of India has launched National Programs from time to time. The main aim of these programs is to reduce the morbidity, mortality and the possible resultant disability.

What is Disability?

A disability is a condition or function judged to be significantly impaired relative to the usual standard of an individual or group.

The term refers to individual functioning, including Physical impairment, Sensory impairment, Cognitive impairment, Intellectual impairment, Mental illness, and various types of chronic disease.

Disability prevalence:

It has been estimated by WHO that approximately 10 % of any given population suffer from disability of one kind or other. This figure is increasing through population growth, medical advances and the ageing process, says the World Health Organization (WHO).

	Census, 2001	**NSSO, 2002**
Movement	28%	51.19%
Seeing	49%	13.60%
Hearing	6%	14.74%
Speech	7%	10.37%
Mental	10%	10.10%

According to Census 2001; disabled population makes **2.50% of total population of Rajasthan**, with maximum disability in district Pali (4.27%) (Source: Ministry of Social Justice and Empowerment, Rajasthan)

The projections by NSSO made for disability are:

- 2002: 20.80 million(1.96% of pop.),
- 2012(projected): 22.5 million (1.8% of pop.)
- 2016(projected): 22.69 million`
- Locomotor disability will Increase from 51.9% to 56.7%
- Hearing/ Visual/Speech disabilities will decrease by 2.6%

Burden of Disease:

- 60 million Persons with Disability (PWD) in the country (NSSO, 2002). 10% of the disabled population of world and 15% of the disabled population of the developing countries (80% in rural areas, 49 million disabled are BPL).
- India: 40 to 80 million persons with disability At least one in twelve household has a member with disability (World Bank-Report 2009).
- Children with disability are 5 times more likely to drop from school (UN, 2010)
- In countries with life expectancies over 70 years, individuals spend on average about 8 years, or 11.5 per cent of their life span, living with disabilities. (India: avg. life expectancy is 69.89) (UN Enable - factsheet on person with disabilities).
- Eighty per cent of persons with disabilities live in developing countries, according to the UN Development Program (UN Enable - factsheet on person with disabilities).
- Women and girls with disabilities are particularly vulnerable to abuse. A small survey in Orissa, India (2004), found that virtually all of the women and girls with disabilities were beaten at home, 25 per cent of women with intellectual disabilities had been raped and 6 per cent of women with disabilities had been forcibly sterilized.
- Ninety per cent of children with disabilities in developing countries do not attend school, says UNESCO.
- The global literacy rate for adults with disabilities is as low as 3 percent and 1 percent for women with disabilities, according to a 1998 UNDP study.

- Even though persons with disabilities constitute a significant 5 to 6 per cent of India's population, their employment needs remain unmet, says a study by India's National Centre for Promotion of Employment for Disabled People, in spite of the "People with Disabilities" Act, which reserves for them 3 per cent of government jobs. Of the some 70 million persons with disabilities in India, only about 100,000 have succeeded in obtaining employment in industry.
- Research indicates that violence against children with disabilities occurs at annual rates at least 1.7 times greater than for their peers without disabilities (source :UN enable).

1.2. Disability- Adjusted Life Year (DALY):

The **disability-adjusted life year (DALY)** is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

Traditionally, health liabilities were expressed using one measure: (expected or average number of) **Years of Life Lost (YLL)**. This measure does not take the impact of disability into account, which can be expressed by: **Years Lived with Disability (YLD)**. DALYs are calculated by taking the sum of these two components. In a formula:

DALY = YLL + YLD

Where:

YLL = N* L

- **N** = number of deaths
- **L** = standard life expectancy at age of death in years

Because YLL measure the incident stream of lost years of life due to deaths, an incidence perspective is also taken for the calculation of YLD. To estimate YLD for a particular cause in a particular time period, the number of incident cases in that period is multiplied by the average duration of the disease and a weight factor that reflects the severity of the disease on a scale from 0 (perfect health) to 1 (dead). The basic formula for YLD is the following (again, without applying social preferences):

YLD = I* DW* L

- I = number of incident cases
- DW = disability weight
- L = average duration of the case until remission or death (years)

Example

Q.The calculation of DALYs of a woman who has been deaf since she was 5 and dies when she is 50 (Disability weight of deafness is set at 0.33, average life expectancy at birth in India for women = 67).

Sol: YLL = N*L
N=1 (no. of deaths)
L= 17 (standard life expectancy at the age of death)

Therefore, **YLL = 17**

YLD = I* DW* L
I= 1 (number of incident cases)
DW= .33 (Disability weight)
L= 45 (80-50) (average duration of the case until remission or death (yrs)

Therefore, **YLD = 14.85**

DALY = 31.85

DALYs for that women is 31.85

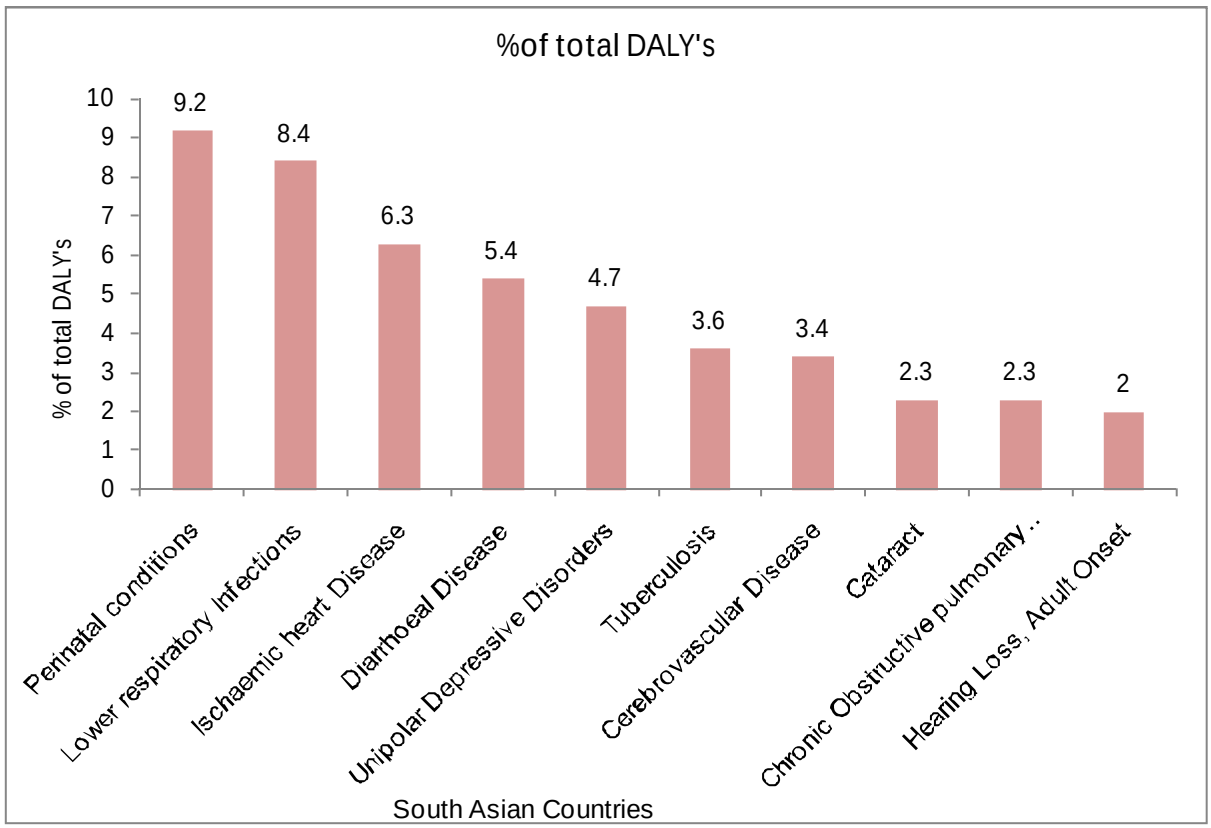
The DALY relies on an acceptance that the most appropriate measure of the effects of chronic illness is time, both time lost due to premature death and time spent disabled by disease.

One DALY, therefore, is equal to one year of healthy life lost.

Malnutrition is the leading risk factor contributing to nearly 16 percent of all disability-adjusted life years lost globally and one third of all disability-adjusted life years lost in low-income countries.

Ten leading causes of burden of disease and injury, 2001

(Source: World Bank: disease Control Priority Project, 2005)



1.3. Causes of Disability

The causes of disability are divided into three groups such as prenatal, perinatal and postnatal.

Prenatal:

1. Chromosomal causes: e.g. Down Syndrome
2. Genetic causes: e.g. phenylketonuria (increased muscle tone, and more active muscle tendon reflexes. Later, mental retardation and seizures).
3. Rh factor incompatibility: mild anemia, cerebral palsy, deafness, mental retardation, or even death.
4. environmental causes: X rays, excessive alcohol during(FAS syndrome),maternal nutrition(e.g. spinal bifida due to deficiency of folic acid),maternal disease and disorders(German Measles) ,age of mother etc.

Perinatal:

1. Low birth weight,
2. Oxygen deprivation:
3. Brain hemorrhaging
4. Infections: e.g. syphilis, AIDS, gonorrhea and herpes.

Postnatal (Childhood causes of disability):

1. Injury:
2. Malnutrition
3. Infections

1.4. The Process of Disablement

There are 4 models that describe the process of disability

1. Biomedical Model :

Biomedical model is based on **concept** of **Etiology- Pathology- Manifestation**

The model has 3 groups of variables:

- **Diagnosis and lesion**: While diagnostic labeling may be inadequate to characterize the quality and severity of the disability and handicap, it may be a relevant and even valid portal to develop a feel of the disablement process, and can be used as such in demographical and epidemiological surveys.
- **Symptoms**: Symptoms are important for determining the medical management of acute cases. Nevertheless, it has been shown that symptoms such as chest pain on exertion, chronic productive cough, breathlessness, and pain in the calves on exertion consistently reduce the daily activities that people perform.
- **Other related indicator**, such as (i) blood glucose levels and respiratory or cardiac parameters, or (ii) consulting rates, number of days in hospital, and number of days of incapacitation, are potential indicators of possible disabling consequences. However, their real value in this respect has to be precisely assessed.

Limitations:

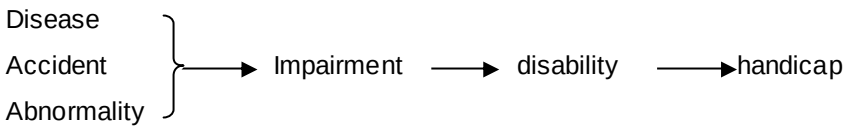
Biomedical diseases are usually inadequately considered to be “common” to humans and to social groups. Conversely it has been observed that biomedical diseases are not only defined by negative anatomical, biochemical and physiological variables, but also by particular physical, cultural and social factors.

2. The ICIDH (International Classification of Impairment, Disability and Handicaps) Model (WHO in 1980)

This the concept is based on 4 principal events:

- Something abnormal occurs within an individual;
- Someone becomes aware of this occurrence;
- The performance or behavior of the individual may be altered as a result; and
- The awareness itself, or the altered performance or behavior to which this gives rise, may place this person at a disadvantage relative to others.

The ICIDH model can be represented as follows



Impairment: any disturbance to the body's mental or physical structure or functioning, characterized by a permanent or temporary loss or abnormality of psychological or anatomical structure or function in a tissue, organ, limb, functional system or mechanism in the body.

Disability: Disability is defined as a reduction or loss of functional capacity or activity resulting from impairment. Disability is characterized by excesses or deficiencies of customarily expected behavior or functions, and represents the objectification of impairments through their effects on everyday activities.

Handicap: the social disadvantage resulting from impairment and /or a disability, entailing a divergence between the individual's performance or status and that expected of him by his social group. Handicap therefore represents the social and environmental consequence of impairment and disabilities.

3. The Situational Handicap Model

Handicap is the result of the encounter between disability and the environment situations.

The situational disablement model involves separate analysis of (1) the individual biomedical, psychological, and social process, (2) the disabling situations experienced by the person or the group, and (3) the environment of the system, assembling cultural, ecological, physical, economic, legal, religious, administrative, and other aspects.

Limitations:

It would be inaccurate and even dangerous to reduce the process of disablement exclusively to a situational experience, by erasing or ignoring the biomedical and psychological history of the individual.

4. The Quality-of –Life Model

The "quality of life" is a relative term with multidimensional concept that covers several domains, motivations, or social indicators: e.g.; functional status; disease and treatment related symptoms; psychological functioning etc.

Two conceptual frameworks apply to the quality of life model:

- ICIDH model, in which quality of life appears to be closely related to the dimension of handicap;
- The other is a concentric series of circles determining successive stages- from disease in the centre , to personal functioning, psychological status, general health perception , and social or role functioning.

Limitations:

The difficulty in this model lies in the interrelationship between the global assessment of quality of life and the separate assessments of the components of quality of life.

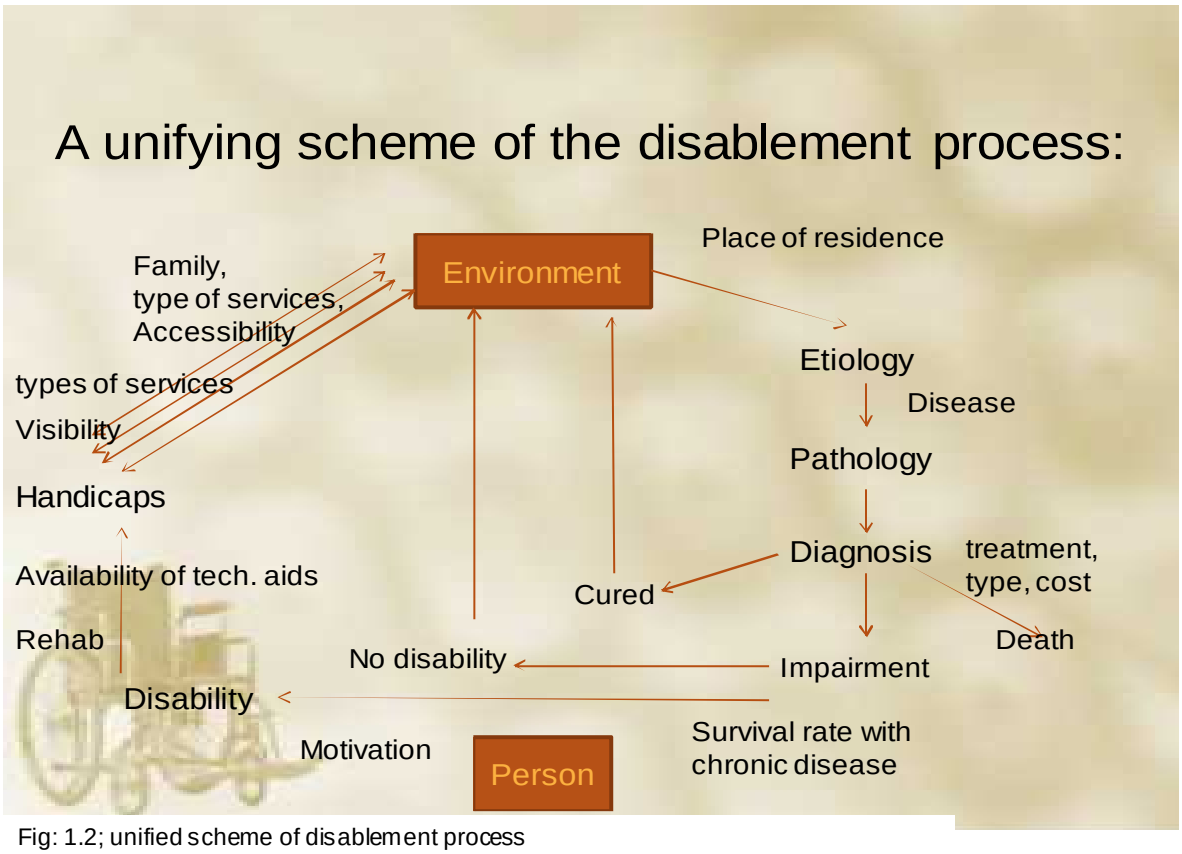


Fig: 1.2; unified scheme of disablement process

The biomedical model embraces the items on the right (including etiology, cure, impairment and death). The ICIDH model is focused on the lower half of the diagram (including impairment, disability and handicaps). The situational model covers environment, handicaps and disability. The quality-of-life model is focused on handicaps only. The factors likely to modify (positively or negatively) the process of disablement are indicated in smaller type.

Terms Related to Disablement Process:

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.

Handicap

Handicap represents the social and environmental consequence of impairment and disabilities.

1.5. ICF Classification

The International Classification of Functioning, Disability and Health (ICF), is a multipurpose classification of health and health-related domains that help us to describe changes in body function and structure

These domains are classified from body, individual and societal perspectives by means of two lists-

1. Body functions and structure, and
2. Domains of activity and participation.

In ICF, the term functioning refers to all body functions, activities and participation, while disability is similarly an umbrella term for impairments, activity limitations and participation restrictions. ICF also lists environmental factors that interact with all these components.

It shifts the focus from cause to impact, placing all health conditions on an equal footing allowing them to be compared using a common metric – the ruler of health and disability.

The Need for ICF

1. Medical classification of diagnoses alone will not have the information needed for health planning and management purposes. data about levels of functioning and disability is needed. ICF makes it possible to collect those vital data in a consistent and internationally comparable manner.
2. ICF provides the framework and classification system to measure health care needs and the performance and effectiveness of health care systems.
3. To analyze the impact of different interventions.

Underlying Principles of ICF

1. Universality
2. Parity
3. Neutrality
4. Environmental Factors

The Model of ICF

Two major conceptual models of disability have been proposed:

Medical model

Social model

Disability is a complex phenomena that is both a problem at the level of a person's body, and a complex and primarily social phenomena.

Bio-psycho-social model is based on an integration of medical and social.

ICF provides, view of different perspectives of health: biological, individual and social.

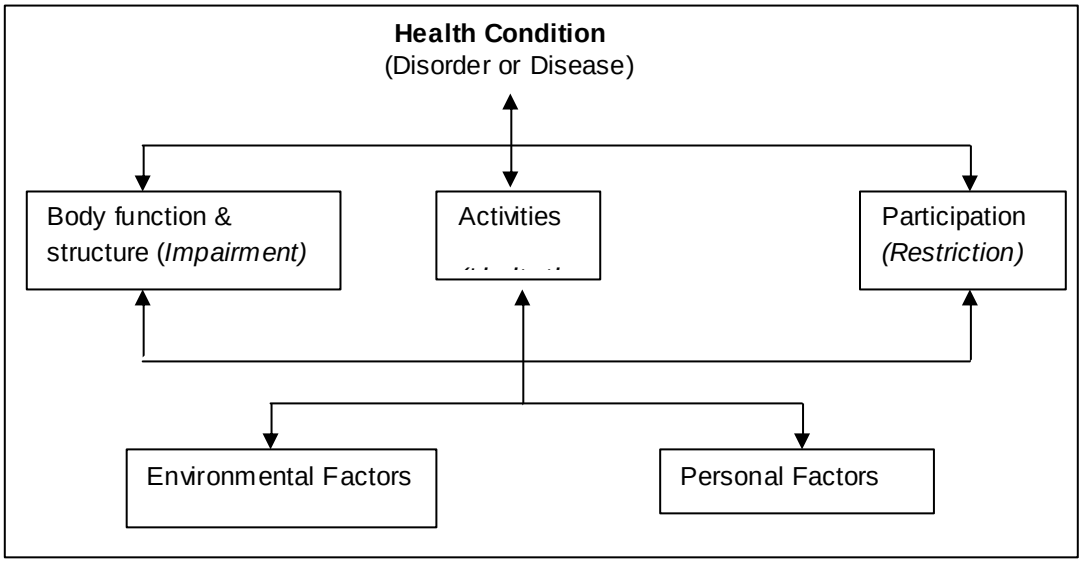


Fig: 1.3; Representation of the model of disability that is the basis for ICF

Concepts of functioning and disability:

In ICF disability and functioning are viewed as outcomes of interactions between

- **health conditions** (diseases, disorders and injuries) and
- **contextual factors** including **environmental factors** and **personal factors**

Three levels of human functioning classified by ICF:

- **Body or body part**,
- **Whole person**, and
- **Whole person in a social contex**t.

Disability therefore involves dysfunctioning at one or more of these levels: impairments, activity limitations and participation restrictions.

The formal definitions of components of ICF are:

a. **Body Functions** are physiological functions of body systems (including psychological functions).

b. **Body Structures**: anatomical parts of the body such as organs, limbs and their components.

c. **Impairments**: problems in body function or structure such as a significant deviation or loss.

d. **Activity** is the execution of a task or action by an individual.

e. **Participation** is involvement in a life situation.

f. **Activity Limitations** are difficulties an individual may have in executing activities.

g. **Participation Restrictions** are problems an individual may experience in involvement in life situations.

h. **Environmental Factors** make up the physical, social and attitudinal environment in which people live and conduct their lives.

The Qualifiers

In the case of the Activity and Participation list of domains, two important qualifiers are provided. Together, these qualifiers enable the user to code essential information about disability and health.

1. **Performance qualifier** describes what an individual does in his or her current environment.
2. **Capacity qualifier** describes an individual's ability to execute a task or an action.

The Capacity qualifier assumes a 'naked person' assessment, that is, the person's capacity without personal assistance or the use of assistive devices.

The constructs and the operation of the qualifiers are set out in the next chart:

Construct	**First qualifier**	**Second qualifier**
Body Functions (b)	Generic qualifier with the negative scale used to indicate the extent or magnitude of an impairment Example: b175.3 to indicate a severe impairment in specific mental functions of language	None
Body Structure (s)	Generic qualifier with the negative scale used to indicate the extent or magnitude of an impairment Example: s730.3 to indicate a severe impairment of the upper extremity	Used to indicate the nature of the change in the respective body structure **0** no change in structure **1** total absence **2** partial absence **3** additional part **4** aberrant dimensions **5** discontinuity **6** deviating position **7** qualitative changes in structure, including accumulation of fluid **8** not specified **9** not applicable Example: s7300.32 to indicate the partial absence

		of the upper extremity
Activity & Participation (d)	**Performance** Generic qualifier Problem in the person's current environment Example: a5101.1_ to indicate mild difficulty with bathing the whole body with the use of assistive devices that are available to the person in his or her current environment	**Capacity** Generic qualifier Limitation without assistance Example: a5101._2 to indicate moderate difficulty with bathing the whole body and implies that there is moderate difficulty without the use of assistive devices or personal help
Environmental Factors (e)	Generic qualifier, with negative and positive scale to denote extent of barriers and facilitators respectively Example: e145.2 to indicate that products for education are a moderate barrier. Conversely, e145+2 would indicate that products for education are a moderate Facilitator.	None

The following chart gives some possible examples of disabilities that may be associated with the three levels of functioning linked to a health condition.

Health Condition	**Impairment**	**Activity Limitation**	**Participation Restriction**
Leprosy	Loss of sensation of extremities	Difficulties in grasping objects	Stigma of leprosy leads to unemployment
Panic Disorder	Anxiety	Not capable of going out alone	People's reactions leads to no social relationships
Spinal Injury	Paralysis	Incapable of using public transportation	Lack of accommodations in public transportation leads to no participation in religious activities
Juvenile diabetes	Pancreatic dysfunction	None (impairment controlled by medication)	Does not go to school because of stereotypes about disease

1.6. Models of Disability:

1. **The Moral Model of Disability** refers to the attitude that people are morally responsible for their own disability.
2. **The Tragedy and/or Charity Model of Disability** treats people with disabilities as helpless victims needing care and protections.
3. **The Medical Model of Disability** views disability as a problem of the person, directly caused by disease, trauma, or other health condition which therefore requires sustained medical care.
4. **The Social Model of Disability** sees the issue of "disability" as a socially created problem and a matter of the full integration of individuals into society. Here disability is not an attribute of an individual, but rather a complex collection of conditions, many of which are created by the social environment. From this perspective, equal access for someone with an impairment/disability is a human rights issue of major concern.
5. **The Expert or Professional Model of Disability** sees as an offshoot of the medical model.
6. **The Legitimacy Model of Disability** views disability as a value-based determination about which explanations for the atypical are legitimate for membership in the disability category.
7. **The Empowering Model of Disability** allows for the person with a disability and his/her family to decide the course of their treatment and what services they wish to benefit from.
8. **The Social Adapted Model of Disability** states that surrounding society and environment are more limiting than the disability itself.
9. **The Economic Model of Disability** defines disability by a person's inability to participate in work which includes loss of earnings for and payment for assistance by the individual
10. **The Market Model of Disability** defines disability and empowers people to chart their own destiny in everyday life, with a particular focus on economic empowerment.
11. **The Spectrum Model of Disability** asserts that disability does not necessarily mean reduced spectrum of operations.

1.7. Disability Prevention

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

Fig: 1.4; a child getting immunized for polio

- **Primary Prevention**

Primary prevention can be defined as "action taken prior to the onset of the disease", which removes the possibility that a disease will occur.

This has two components

a. Health promotion
b. Specific Protection

Common examples of primary preventive measures are

- Proper antenatal, natal and post natal care, to prevent child born with disability
- Immunization
- Prevention of accidents; use of helmet

- **Secondary Prevention**

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

- **Tertiary Prevention**

Disability limitation and
Rehabilitation

1.8. 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". Rehabilitation medicine has emerged in recent years as a medical specialty. It involves disciplines such as physical therapy, occupational therapy, audiology and speech therapy, psychosocial work, prosthetics and orthotics, education, vocational guidance and placement.


Fig: 1.5; Rehabilitation after leg injury

Rehabilitation includes

- Medical rehabilitation - restoration of function.
- Vocational rehabilitation - restoration of the capacity to earn livelihood.
- Social rehabilitation - restoration of family and social relationship.
- Psychological rehabilitation- restoration of personal dignity and confidence

1.9. Community Based Rehabilitation

What is CBR-

The idea of CBR was mooted by the World Health Organization (WHO) when the technical reports of WHO of 1958 and 1969 suggested that rehabilitation services must be considered as a natural and essential part of health care services. CBR is a "systematized approach within general community development whereby Persons with Disabilities are enabled to live a fulfilling life within their own community; making maximum use of local resources and helping the community become aware of its responsibility in ensuring the inclusion and equal participation of PWDs."

Fig: 1.6; Person from the community practicing physiotherapy

In the process, PWDs are also made aware of their own role and responsibility.CBR is implemented through the combined efforts of PWDs themselves, their families, Organizations and communities, and relevant governmental and non-governmental health, education, vocational, social and other services

Objectives of CBR-

1. To ensure that PWDs are able to maximize their physical and mental abilities, to access regular services and opportunities, and to become active contributors to the community and society at large.
2. To activate communities to promote and protect the human rights of PWDs through changes within the community, for example, by removing barriers to participation.

Key principles of CBR:

- **Inclusion**

  Inclusion means placing of disability issues and PWDs in the mainstream of activities, It means 'convergence'.

- **Participation**

  Participation means the involvement of PWDs as active contributors to the CBR program from policy making to implementation and evaluation,

- **Sustainability**

  The activity initiated through the CBR program must be sustainable with strong links between GOs, NGOs, CBOs and DPOs will contribute towards sustainability. This means that DPOs and SHGs are the hub of any CBR activity.

- **Empowerment**

  Empowerment means that local people, and specifically PWDs and their families, make the program decisions and control the resources.

- **Advocacy**

  Advocacy means collective action, not an individualistic one; for mobilizing, organizing, representing, and creating space for interaction and demands.

Multi-Sectoral Support:

The basic concept inherent in the multi-sectoral approach to CBR is the decentralization of responsibility and resources, both human and financial, to community-level organizations. This calls for support from:

- **Support from Social Sector-** disability pensions, technical aids and adaptations, housing, vocational training and employment, and co-ordination of referrals for individuals who require services from other sectors.
- **Support from NGOs and the local community**.
- **Support from Health Sector -** providing promotive, preventive, curative and rehabilitative services. PHC can play a major role in this context both as a provider and supporter, in form of

  - Early identification of impairments and providing basic interventions.
  - Referrals to specialized services such as physical, occupational and speech therapies; prosthetics and orthotics; and corrective surgeries.

- **Support from Educational Sector -** assisting community schools to become more inclusive, adapting the content of the curriculum and methods of teaching, ensuring accessibility to classrooms, facilities and educational materials.
- **Support from Employment and Labor Sector -** Equal employment opportunities, on-the-job training, mentoring entrepreneurs with disabilities and providing advice on current and emerging skills requirements to vocational training centers; access to credit and self employment.

Who can be engaged in CBR?

1. All grass root level workers,
2. Supervisors or medico social workers who organize and support grass root workers
3. Professionals such as surgeon, physiotherapist, vocational trainers, counselors to whom referrals can be made from the community.

Role of CBR workers:

- Act as local advocates on behalf of people with disabilities and their families with the health services personnel
- Provide liaison and continuity of care in the community on behalf of professionals e.g. Continued supervision of home programs
- Act as directors of community initiatives to remove social and physical barriers that affect exclusion
- Provide a positive role model for service users if they themselves have a disability

The useful initiatives for CBR can be -

1. Social counseling
2. Training in mobility and daily living skills
3. Providing or facilitating access to loans
4. Community awareness raising
5. Providing or facilitating vocational training/apprenticeships
6. Facilitating information for local self-help groups, parents groups and Disabled People's Organizations (DPOs)
7. Facilitating contacts with different authorities
8. Facilitating school enrolment (school fees and contacts with teachers)

Components of CBR program:

1. Prevention of cause of disability
2. Provision of care facilities.
3. Creating a positive attitude towards people with disabilities.
4. Provision of functional rehabilitation services.
5. Empowerment, provision of education and training opportunities.
6. Creation of micro & macro income –generation opportunities.
7. Management / monitoring and evaluation of CBR projects

Steps in Implementation of CBR:

1. Identification of PWD.
2. Assessment of disabilities and needs for rehabilitation.
3. Basic services through PHC, such as drugs, dressing materials, protective footwear, counseling and training in self care.
4. Introduce / escort the person to 'Village Health & Sanitation Committee' along with his/her problems or issues.
5. Referral to secondary or tertiary care center for physical rehabilitation services.
6. Follow up of referral services.

7. Facilitating the accessibility to 'socio-economic rehabilitation services' through social welfare department by a 'CBR worker' (a health supervisor, MPW, ANM, AWW, ASHA).
8. Review meetings by all stake holders, to discuss the progress of CBR project
9. Steering of rehabilitation activities by District Nucleus and support to CBR workers.
10. Coordination with social welfare department.
11. Behavioral change communication to reduce stigma.
12. Participatory Evaluation of CBR services/projects at definite intervals.

Social mobilization is a main feature of CBR meaning, to bring people and resources together and to get disability into the social consciousness of the community and integrate the disability issue into all development programs.

Indian Initiatives in CBR:

A large number of leading NGOs realized during the early 1980s that non-institutional rural projects for persons with disabilities were indispensable. As a result they developed, presented, implemented and perfected nation-wide program on promotion of CBR. The major Indian initiatives include:

1. PL-480 Project- at Madurai
2. CBM's Initiative- at Tiruchirapalli District of Tamil Nadu
3. NAB (National Association for the Blind) RAC(Rural Activities Committee) Project,1981
   This project was implemented by various Agencies all over India.
4. District Rehabilitation Centers Scheme, Jan.1985 by GOI
5. District Blindness Control Societies,1963
6. CBR Network: CBR Network (South Asia) is an international NGO working towards.
7. Rehabilitation Council of India-

According to the Rehabilitation Council of India, the use of expression CBR is improper due to following reasons:

- Communities are very poor
- People cannot take financial responsibility for the programs
- Difficult for them to take initiative in a developmental program.
- During the day, most people in the village are away in the field, hence their involvement is not possible

As the participation of community in the rehabilitation program is crucial, the RCI has renamed the program as "Community Participatory Rehabilitation" and has launched the Bridge Course for CPR Workers.

Objectives

- To involve community in all activities of rehabilitation.
- To mainstream people with disabilities in village community.

- To enhance self esteem and guidance of people with disabilities with involvement of the community.
- To engage experts to visit rural areas to offer appropriate assistance and guidance.

8. **PWD Act** (Persons with Disabilities (Equal Opportunities, Protection of Rights & Full Participation)Persons with Disabilities Act), 1995 (effective Feb. 7, 1996):

Objectives-

a. Spell out the responsibilities of the State towards the prevention and early detection of disabilities and
b. Recognition of the rights of persons with disabilities to enjoy equality of opportunity and full participation in national life.

Apart from the objectives of preventing the occurrence of disabilities, access to free education, reservation in vacancies, provision of aids and appliances, allotment of concessional land and non-discrimination in transport on road and built environment, the Act also envisages promotion and sponsor of research and manpower development programs on various aspects including CBR.

9. **CBR Scheme** of the Ministry

The Scheme to Promote Voluntary Action for Persons with Disabilities evolved during 1998 by the Ministry of Social Justice & Empowerment, Government of India, provides grant-in-aid to voluntary organization for the promotion of CBR. The Ministry extends financial support for the following manpower:

- Rural Rehabilitation Volunteers
- CBR Personnel or Multi-rehabilitation Workers
- Social Workers
- Specialists - Therapists and Educators
- Voluntary Workers
- Project coordinators / Directors

This is first time that the Ministry of Social Justice & Empowerment has given due recognition to the concept of CBR in its major grant-in-aid scheme.

10. **National Program on Rehabilitation of Persons with Disabilities** (NPRPD)

The Ministry of Social Justice & Empowerment has introduced the National Program for the Rehabilitation of Persons with Disabilities (NPRPD) as a model for State Governments for providing rehabilitation services to such persons. To begin with, this program will be launched in 100 districts all over the country to promote comprehensive rehabilitation for all persons with disabilities at their doorstep.

11. **District Centers for Rehabilitation**

The Ministry of Social Justice & Empowerment has introduced the District Rehabilitation Centers Scheme to enhance outreach of the services and cover larger areas through network of rehabilitation services in 100 districts. The Scheme aims at utilizing the existing

infrastructure of the State Medical Colleges, rehabilitation centers, Red Cross Societies, local doctors and experts for the purpose of extending services to persons with disabilities.

The services to be provided on an on-going basis include:

- Assessment of existing infrastructure and resources in the district and assessing their potential.
- Identification of persons with disabilities
- Issuing of disability certificates
- Promotion of prevention of disability through involvement of village level workers, creation of social communication and such other appropriate means.
- Setting up of composite fitment centers to provide assessment, actual fitment, provision and follow up and repair of assistive devices

Chapter 2: Locomotor Disability

2.1. What is 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 inabilities resulting from affliction of musculo-skeletal and, or nervous system.

2.2. Causes

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

Fig: 2.1; Locomotor disability, most prevalent disability in India

Congenital and Developmental

1. Cerebral Palsy
2. Congenital Talipes Equinovarus (CTEV)
3. Meningocele, meningo-myelocele
4. Phocomelias (absence of extremities)
5. Congenital Dislocation of Hip

Acquired Causes: Infective Causes

1. Tuberculosis – (i) Spine (ii) Other Joints
2. Chronic Osteomyelitis
3. Septic Arthritis
4. Acute Poliomyelitis
5. G.B. Syndrome
6. Leprosy
7. Encephalitis
8. AIDS

Traumatic Causes

1. Traffic/domestic Accidents
2. Fall from height
3. Bullet injuries, explosions
4. Violence
5. Sports injuries
6. Natural Catastrophies like earthquakes, floods etc.

Vascular Causes

1. Cerebrovascular Accidents
2. Amputations due to peripheral vascular disease (Atherosclerosis or Berger's disease)
3. Perthes disease.

Neoplastic Causes

1. Brain Tumors
   a. Astrocytoma
   b. Meningioma

2. Spinal Tumors
    a. Meningioma
    b. Astrocytoma
3. Osteosarcoma

Metabolic Causes

1. Rickets
2. Diabetic Neuropathy
3. Vit. B12 deficiency
4. Gout

Degenerative Causes

1. Motor Neuron Disease
2. Parkinson's disease
3. Multiple Sclerosis
4. Osteoarthritis, Spondylosis

Miscellaneous

1. Muscular dystrophies
2. Lathyrism
3. Rheumatoid Arthritis
4. 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

2.3. Prevention of Locomotor Impairments

The prevention of locomotor impairments can be undertaken at three levels:

- **Primary Prevention**

Health promotion 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 immunization (like polio vaccination), legislation measures e.g. compulsory wearing of helmets to protect from head injury, enforcing road traffic rules etc.

- **Secondary Prevention**

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 minimize the suffering caused by existing deviations from good health. The patient should be rehabilitated properly to join the mainstream of life.

Rehabilitation is the restoration of the physically disabled to the maximum possible physical, educational, economic independence and social integration.

2.4. Principles of Management of Locomotor Impairments

The aims of rehabilitation management are:

1. Prevention of disability, if possible
2. Maximum reduction or elimination of the disability
3. Training the person with residual abilities to achieve independent living.

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

1. Patients for whom full recovery is expected e.g. neurapraxia, surgically repaired nerve injuries, Guillain Barre Syndrome etc.
2. Patients with permanent, but stable disabilities e.g. amputations, post polio residual paralysis, non progressive paraplegia, hemiplegia etc.
3. Patients with unstable disabilities e.g. rheumatoid arthritis, osteoarthritis, ankylosing spondylitis myopathies, leprosy 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 fecal 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 managing locomotor impairment we need to manage:

1. Motor weakness -Weakness may be complete (paralysis) i.e. negligible power or incomplete (paresis) i.e. partial weakness. 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. 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:

1. Maintaining the range of movement of joints of the affected limb,
2. Regaining or improving the muscle power in the weak muscles,
3. Strengthening of normal muscles,
4. Restoring the function of the extremity by appropriate training,
5. Provision of external appliance, splint or caliper if required.

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

- Detailed muscle charting of all affected and unaffected groups,
- Extent of contractures and deformities,
- 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.
- Presence of sensory deficit.

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

- 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.
- Gentle massage is given as a preliminary to starting exercises, to improve venous and lymphatic drainage and to help relaxation of muscles.
- 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 strengthen the weak muscles but also improve 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 fibers. In de-nervated 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

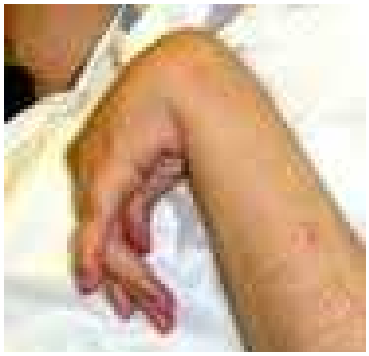


Fig: 2.2; flexed Wrist

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.

2. Spasticity: 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.

Pharmacological treatment- it includes drugs diazepam, dantrolene sodium and baclofen. An intrathecal beclofen can be used which blocks the peripheral nerves.

Orthotic treatment- includes use of splints

Casting

For surgical intervention refer to a tertiary care. Surgical intervention includes lengthening, tendon

transfer, contracture release and neuroblastic selective dorsal rhizotomy is done."Spasticity clinic" for treatment of spasticity at SMS college is one of its type.

3. Loss of Sensation: 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 co-ordination, 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, leprosy, spinabifida, transverse myelitis, diabetic neuropathy and spondylitis of the spine.

Principles of management are:

1. 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.)
2. 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)
3. Provision of padding the pressure bearing areas of shoe e.g. heel, first metatarsal head.
4. Frequent change of posture, water beds, split mattresses, 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.
5. Massage with emollients is believed to improve vitality of skin.
6. Surgical repair of severed nerves may restore sensations.

4. Pressure Ulcers: These are 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, leprosy 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.

5. Deformities and contractures: They 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 calcaneovalgus 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 stabilize. 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 patient’s 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 anesthesia, traction (skin or skeletal), casts, gradual controlled distraction (plaster distracter, JESS andIlizarov) and surgical (soft tissue and bony) correction of deformity.

6. 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, Burger's disease, atherosclerosis) etc. Amputations may also be congenital. Smoking is a contributory factor in many lower limb amputations of young adults (Burger's disease).

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

Fig: 2.3; Amputee running at an athletic event

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 severely 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 minimizes 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.

7. 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 face these problems. They include retention of urine, loss of voluntary control and over flow (incontinence), dependence on catheter, recurrent urinary tract infections, constipation, and dependence on purgatives, enemas, manual evacuation and fecal incontinence.

Goals:

a. Prevention of upper urinary track complication.
b. Prevention of lower tract complication
c. Bladder management program for reintegration of person back into community.

Bladder management includes suprapubic catheter or clean intermittent cauterization.

Pharmacological treatment depends upon detrusor muscle activity and sphincter.

In refractory causes surgical treatment (e.g. bladder augmentation, urinary diversion, sphincterotomy) may be needed. Self clean intermittent catheterization is a new procedure in the management of neurogenic bladder.

Once off the catheter, 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 fecal softening by laxatives, digital evacuation, use of suppositories and enemata. High roughage diet and plenty of fluids should also be encouraged.

8. 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 fibers 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.

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 in the form of hot packs, soaks, compresses, hydrotherapy pools. 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 -Paraffin wax is melted in an electrically heated bath and applied to the skin. Commonly used in the treatment of rheumatoid hand and foot, post operative management of fractures of the forearm and hand.

Diathermy- an efficient way of heating large areas of subcutaneous tissue and muscle, used in the fibrofasciitis, back pain, spondylosis of the spine, osteoarthritis, etc. Contraindications include patients with cardiac pacemakers, cardiac disease, with metallic implants in tissue, malignant tumours (potential for metastasis), pregnancy, menstruation and local infection.

Pulse electromagnetic therapy- promoting tissue healing, decreasing inflammation, reducing muscle spasm and pain.

Therapeutic ultrasound - It is useful in, 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)

Transcutaneous electrical neural stimulation (TENS)

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.

2.5. Activities of Daily Living

Activities of daily living (ADL) 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. ADL is classified broadly into two groups - basic and instrumental. Basic ADL includes self care and mobility activities. Instrumental ADL 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. A home management activity includes meal planning and preparation, handling of household appliances etc.

ADL helps 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: Act as an adjunct for achieving total rehabilitation. These are used to minimize 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.

2.6. Aids and Appliances

a. **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 better use of that part of the body to which it is fitted, whereas prosthesis replaces a missing part of the body.

The main purposes 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.

b. **Orthoses** –

HKAFO(Hip Knee Ankle Foot Orthosis) provides improved standing balance and better controlled forward leg swing in patients with weak hip muscles.

KAFO (Knee Ankle Foot Orthosis) provides stability at knee and mediolateral stability at ankle. 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 m

Fig: 2.4; An orthoses –cock'up splint for wrist drop

KAFO is used for weakness around the knee, ankle and foot. AFO is used for patients having weakness around the ankle and foot only.

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.

Similarly elbow flexion or extension assist orthoses and airplane splint to position 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. 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.

c. **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 Joint replacements e.g. hip, knee and Heart valves.

External prosthesis can be further classified into endoskeleton limbs (central, carbon or aluminum tube attached to socket and joints covered by foam and silicone, the tube is load bearing) and exoskeleton or conventional limbs (hollow limbs made of aluminum 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.

Fig: 2.5; Prosthesis for post amputation 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-

1. Adequate length (e.g. 12-16cms. for below knee, 8cms. to 10cms. above the level of contra lateral knee for above knee amputations).
2. Good muscle power,
3. Full movement in the proximal joint,
4. Healthy, non adherent scar,
5. Adequate but not excessive soft tissue cover with no bony spurs,
6. 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 prosthesis-

- Level of amputation,
- Type of socket
- Material of socket
- Hip, knee or elbow mechanism i.e. Type of joints to be used,
- Ankle/foot or hand/terminal appliances etc,
- Suspension
- Cosmetics.

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.

Fig: 2.6; child mobilized by Jaipur foot

d. 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.

Parallel bars are rigid and do not need to be moved by the patient. They 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: 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.

Fig: 2.7; crutches as a walking aid

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 quadruped 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 aluminum 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. 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.

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, remodeling of entrances, widening of doors, and 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.

2.7. Psycho-Social Rehabilitation

Psychological, social and economic rehabilitation of patients with motor handicaps are intimately inter-related.

Painful conditions and physical disabilities always induce some anxiety and reactive depression in the patient and relatives, and the response to incapacity depends on the patient's personality, education, and social and economic situation. Evaluation of the pre-morbid 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. Specific

Fig: 2.8; Psycho-social rehabilitation

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

The clinician has to explain and reassure his handicapped patient about his disabilities, their effect on his work and its possible solutions. This 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.

2.8. Vocational Rehabilitation

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 labeled 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, most of the physically handicap are unaware of their productive potential and available opportunities. Many take to begging or lead a forsaken life of hopeless gloom.

Fig: 2.9; Vocational rehabilitation

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

The clinician's responsibility besides the diagnosis and care of the patient is to assess 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 earnings 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:

- Those with complex lesions
- Crush injuries of the hand
- Spinal injuries especially those with weakness of extremities
- Those with head injuries including impaired higher functions and associated motor handicap
- Those with lesoins/diseases which give rise to severe residual disability e.g. poliomyelitis, cerebral palsy, multiple sclerosis, stroke etc
- Patients with multiple injuries.
- Amputees, especially upper limb amputees
- Those who need a high degree of physical fitness

In India, Vocational Rehabilitation Centers, 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.

Chapter 3: Mental Retardation


Fig: 3.1; mentally retarded child

Introduction

Mental retardation is a condition of retarded mental development present at birth or in early childhood and is characterized by

a. Limited intelligence combined with
b. Difficulty in adaptation. Mental retardation is not primarily a medical problem. It is an educational, psychological and social problem.
c. Slow learning
d. Poor social adjustment and economic productivity

Sharing of interest and responsibility amongst parents, teachers, psychologists and all those entrusted with the care of the young children with mental retardation could play important roles in the proper development of the retarded.

Mental Retardation influences all aspects of human functioning including

a. Speech,
b. Language development,
c. Hearing & visual functioning as well as
d. Muscular co-ordination.

Prevalence

National Sample Survey of India in1991 indicated that that 3 per cent of our children have mental delays and mental retardation. With 300 million children less than 16 years of age, the country may have 6 to 9million children with retardation, besides 21 million adults affected by mental retardation.

3.1. Definition

PWD Act, 1995, defines Mental Retardation as “a condition of arrested or incomplete development of mind of a person which is specially characterized by sub-normal of intelligence.”

Four assumptions are critical to this definition:

1. Valid assessment considers cultural and linguistic diversities as well as communication and behavioral 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 individualized 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.

Behavioral signs in a mentally retarded child:

- Understanding things more slowly
- Takes longer to respond to what others says and to what happened around him.
- Cannot express needs and feelings clearly
- Behaves like someone younger than him.
- Does not have the same abilities as others of the same age
- Is not able to pay attention to one person or to one activity for long
- 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.
- May have difficulty controlling his feelings.
- May have difficulty making decisions, may not know what to do, say, or where to go.

A check list for assessment, developed by National Institute for the mentally handicapped, is appended at "A".

Support needed for a child with Mental Retardation

- Care
- Encouragement to play like other normal babies..
- Attend the same school with other children.

An adult needs to participate in child's household activities.

3.2. Classification of mentally retarded children according to Educational Level

The classification employed in educational institutions is as follows:

1. Trainable (IQ 25-49)
2. Educable (IQ 50-69)

A **trainable child** is one whose social prognosis depends on sheltered living and these children will need some type of supervision for their entire life.

An **educable child** is characterized by academic retardation rather than by emotional behavioral 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 American Psychiatric Association **(APA)**

The terminology and IQ ranges for various degree of deficiency according to APA are:

Degree of Deficiency	**IQ Range**
Mild Mental Deficiency	70-85
Moderate Mental Deficiency	50-69
Severe Mental Deficiency	0-49

The **Severely Retarded** - damage to the central nervous system, brain pathology. Motor development, speech and language are retarded. Not always physically handicapped. Partial dependence and require medical and nursing care.

The **Moderately Retarded** - motor development is fair. Language and speech can be developed, and semi-dependent except for those with organic brain damage. They are also termed as **'trainable mentally retarded' (TMR)**.

The **Mildly Retarded** constitute 85% of the total population of retarded persons, slow in developing, walking, talking, feeding themselves and toilet training. 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.

Management:

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(EMR)**, the aim is to correct the deformities to enable them to walk and be independent. Need special schools.

For those, not educable but trainable **(TMR)** - train them in activities which require repetitive skills.

In severe cases the patient remains bed ridden and totally dependent on others for every activity and need training for own self care, attending to feeding, dressing and toileting. These patients often need institutional care.

Neuro-developmental therapy i.e. stimulation or enrichment programs based on the principle that environmental stimulation improves sensori motor ability which in turn improves the cognitive development, can be applied.

3.3. Etiology of Mental Retardation

(i) Genetic (endogenous causation)

(ii) Environmental (exogenous causation)

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

Three categories of genetic defects have been identified in man

A. Single mutant gene,

Each single mutant gene will exhibit four patterns of mendelian inheritance:

autosomal recessive

autosomal dominant

X-linked recessive

X-linked dominant

B. Abnormalities of chromosomes,

C. Multifactorial inheritance.

Conditions on account of genetic defects:

1. **Phenylketonuria (PKU) -** an inherited genetic defect in amino acid metabolism leading to accumulation of the amino acid in body fluids with resultant, progressive, irreversible mental retardation.
2. **Galactosemia -** metabolic disorder with inability to metabolize galactose due to the absence of an enzyme, characterized by poor growth in children, mental retardation, speech abnormality, vision impairment (due to formation of cataract) and liver enlargement.
3. **Cretinism -** 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 behavior, irritability, anemia, constipation and retardation in physical growth are early symptoms of this condition.

Fig: 3.2; Cretin child

4. **Chromosomal Anomalies:** 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 fetus shows a chromosomal aberration, parents should be suitably informed. Some examples of chromosomal syndromes are: Down's syndrome, Klinefelter's syndrome, Turner's syndrome, Triple X syndrome and Crie Du Chat syndrome.
5. **Consanguineous Marriages:** 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 abnormalities of the

brain in the children.

(ii) Environmental Causes of Mental Retardation.

A Prenatal causes (During pregnancy): Central nervous system suffers most severely in the congenital condition.

1. **Physical Trauma***:* It is quite possible that unsuccessful attempts at abortion and accidents to the pregnant mother may injure the fetus so as to lower the child's mental level.
2. **Nutrition:** 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. **Infection:** Diseases of the mother during pregnancy may affect the physical and mental development of the fetus. Rubella or German Measles during pregnancy has been established as a cause of multiple maldevelopments in the fetus.
4. **Blood incompatibility***:* Rh incompatibility between the maternal and fetal blood may result in the newborn child being severely jaundiced and mental deficiency is a possible accompaniment. There is also 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:** 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 fetus. Irradiation may produce mental retardation 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:** Toxins such as lead, nicotine, alcohol and morphine in the maternal bloodstream may affect 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 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.

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

1. **Prematurity**: People born prematurely are mentally retarded. Most of premature infants weighing less than 3 pounds at birth have several physical and mental deficiencies such as spasticism, mental retardation, speech & hearing, visual and behavioral problems.
2. **Traumatic Birth Injury***:* May lead to cerebral hemorrhage, death or even epilepsy later in

life.

3. **Asphyxia:** Lack of oxygen due to prolonged labor, applications of forceps and high sedation to the mother may lead to brain damage.

C Postnatal Causes (After the birth):

1. **Head injuries**
2. **Postnatal infections**: (encephalitis and meningitis)
3. **Frequent high fevers**
4. **Malnutrition**
5. **Lead poisoning**
6. **Socio-cultural and economic factors**

3.4. Common Conditions for Mental disabilities –

1. **Garden Variety "Familial Types":** In all physical regards they appear "like everyone 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.
2. **Microcephaly:** It is a 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 caused by the early closure of sutures of the skull so that the growing brain does not find space to expand.

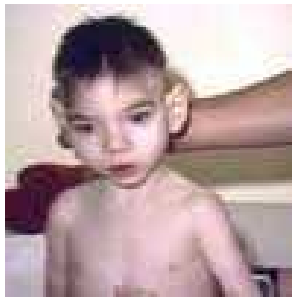


Fig: 3.4; Microcephaly

This causes extreme pressure on the brain which may be severely damaged. Microcephalies vary intellectually from moderate to profound retardation.

3. **Hydrocephalus:** Hydrocephalus or water-in-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.

Fig: 3.5; Hydrocephalis

4. **Cretinism:** In 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 characterized 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.

5. **Mongolism (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 recognized 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.

Fig: 3.6; Mongolism

6. **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 an 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 by the time the child is seven years old.

3.5. Prevention

It is suggested that primary prevention activities should receive priority in the first five years. 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. It will include:

Public Education: A preventive approach to mental retardation can succeed only in an educated, enlightened community.

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 mobilize their efforts to channelize funds and services. (iii)

Strengthening of national level organizations to co-ordinate and disseminate information to those who are interested in the field of mental retardation.

Preventive Medical Measures:

a) Maternal and Child Health Services
b) Immunization Program
c) Rh Factor Incompatibility
d) Irradiation
e) Obstetric Care
f) Genetic Counseling
g) Consanguinity
h) Malnutrition
i) Improvement of Socio-Economic Standards

- **Secondary prevention**

a. Early Identification and Treatment of Culturally Deprived Child
b. Early Identification and Handling of Children with Isolated Handicaps
c. Early Identification and Treatment of Hereditary Disorders:

- **Tertiary Prevention:** All the measures available to reduce or limit mental retardation, minimize suffering caused by the existing disease and to promote the patients adjustment to irremediable conditions. Tertiary prevention extends the concept of prevention into fields of rehabilitation. Modern rehabilitation includes psycho-social, vocational and medical components based on team work. Some of the aspects of this prevention are given below:

3.6. Management of Persons with Mental Retardation

Special Education

a. Special schools and special classes provide a more suitable curriculum,
b. A better organized daily routine and bright and cheerful environment with diverse activities,
c. Freedom of expression and movement, occupation
d. Emphasis on pre-school education
e. 3 R's (**R**eading, w**R**iting and **R**eciting)
f. training in self-care skills
g. Family contacts must be maintained through home visits during vacations or holid

Fig: 3.7; Special education for mentally challenged

h. Greater stress on prevocational and vocational training and on practical life experiences.
i. The attempt to recognize small rather than global units of the child's functioning, permitting the precise identification of his assets and building an individual program around these assets.
j. The recognition of the value of psychiatric guidance and consultation by teachers and instructors.
k. After school service program, training in sheltered workshops

Methodology of teaching children with mental retardation:

1. Repetition as often as needed.
2. Concretization
3. Making the units much smaller
4. Generalization

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.

Psycho Therapeutic Interventions:

a. Establishing communication with the child as he has poor language development and impairment of concept formation.
b. Engaging the child in shared activities
c. Verbal and non-verbal reassurances and pre-decided reinforcements
d. Showing affection in the form of small gifts, toys and candy is very helpful.
e. Establishing an appropriate school program,
f. Matching the child with suitable teachers and child-care workers,
g. Establishing order and consistency at home and building an appropriate school program,
h. Cautious use of drugs

3.7. Behavior Disorders

Definition

"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

- Disrupting for the rest of the class.
- Put undue pressure on the teacher.
- Disturb the child even more." - Pate, 1963

Some of the characteristics of the child

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.

Approach:

1. **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.
   - 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.

2. **Behavioral approach/Behavior modification program**
   - Observe the behavior carefully
   - Explain the behavior
   - Count the frequency of the behavior
   - If possible enlist the support and co-operation of the child
   - Select a reinforce that is meaningful for the child.
   - Use positive reinforcement rather than punishment
   - After a specified period of time, check the program's effectiveness.

Parental Counseling

Parent counseling 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. Counseling 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. 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.

3.8. Services for prevention, early identification, intervention, rehabilitation and integration available for the mentally retarded in the country

1. **Child Guidance Clinics:** Assessment, parental Counseling and referral services are provided.
2. **Psychological/Psychiatric Clinics:** Diagnosis and therapeutic interventions are the major functions.
3. **Pediatric 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 mounding, screen printing and various kinds of assembly work are performed. Training programs are also organized from time to time.
7. **National Institute:** National Institute for the Mentally Handicapped, Secunderabad and its Regional Centers at Mumbai, Delhi and Calcutta are conducting various training programs and researches in the area of Mental Retardation.
8. **Teacher Training Institutes:** All over the country rehabilitation and teacher training programs are being conducted by various training institutes. Certificates, Diploma and Degree level training programs are standardized 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 centers, Child Guidance Centers etc.

Chapter 4: Visual Impairment

4.1. Definitions

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

1. Total absence of sight; or
2. Visual acuity not exceeding 6/60 or 20/200 (Snellen) in the better eye with correcting lenses; or
3. 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;

Causes of Visual Impairment in India

Cataract	81%
Refractive errors	7%
Corneal opacity	3%
Glaucoma	2%
Trachoma	0.2%
Malnutrition and Vitamin A deficiency	0.04%
Other causes	7%

Source: WHO-NSPB, Study, 1981-1986

Behavioral 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
7. Writes up or down hill on paper
8. Rereads or skips lines unknowingly
9. Orients drawing poorly on page.

Fig: 4.1; Snellen‘s eye chart

4.2. Refractive Errors

The normal eyes are called emmetropic eyes. The major refractive errors are-

a. Myopia or short-sightedness which can be corrected by use of concave lenses
b. Hypermetropia which can be corrected by convex lenses
c. Presbiopia (Loss of accommodation ability of the lens due to aging), requiring bifocal lenses.

4.3. 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.

1. Cataract

Cataract is a common eye disease due to the aging process and is called "over 45 defect". A person can restore sight with the corrective devices after the removal of the defective lens. 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.

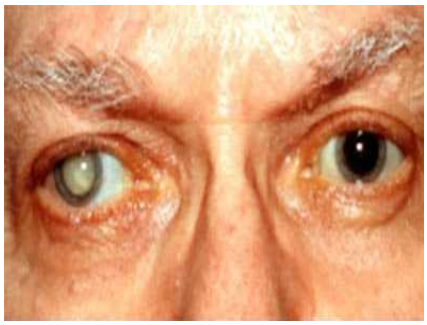


Fig: 4.2; Cataract occurs when the lens of your eye becomes cloudy

2. **Glaucoma**

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 in vision varies from slight blurring to complete blindness. In most cases, blindness can be prevented if treatment is started early.

3. **Corneal Ulcer**

Corneal ulcers frequently occur as complications of corneal abrasions or foreign body, which in turn reduces the vision from mere blurring to total blindness. In order to avoid this, eye 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 also develop in the eyes due to bacteria, virus infection, fungus, hyper sensitivity reactions, vitamin deficiency, etc.

4. **Xerophthalmia**

Xerophthalmia occurs due to vitamin 'A' deficiency. Night blindness is the earliest symptom of this disease, followed by Keratomalacia. Early diagnosis and treatment is the key to prevention Untreated condition may lead to scarring in the cornea and ulceration which in turn may result into

total blindness.

5. **Conjunctivitis**

Conjunctivitis occurs due to infection (bacteria, virus), and allergic conditions.

However, associated pathologies like diabetics and hypertension can cause serious damage to the eye.

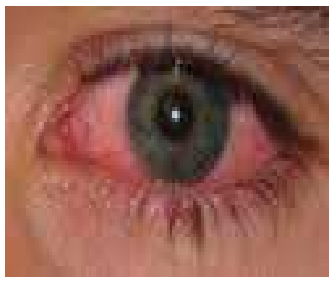


Fig:4.3; Conjunctivitis

4.4. Other Eye Disorders

In addition to these common eye diseases, the following eye diseases can also lead to visual impairment and blindness.

a. Retinal Detachment
b. Albinism
c. Astigmatism
d. Nystagmus
e. Optic Atrophy
f. Retinitis Pigmentosa
g. Trachoma

4.5. 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.

Defect in the Field of Vision

This is defined by the entire area one can see without shifting the gaze. 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 walk poorly, especially in poor illumination. Tubular vision is a condition of the loss of peripheral vision.

4.6. Psycho-social Implications of Blindness

For disabled (blind) children, parents often react outrageously and the over-protection robs the child of his independence, whereas neglect turns him to undesirable behaviors. Either way, it is the suffering child whose handicap multiplies.

Need for community orientation

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.

People 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”. 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.

Fig.4.4; A.P.J Abdul Kalam launching ‘virtual vision’ software

4.7. Prevention of blindness:

Measures

a. Improving nutrition
b. Preventing infections
c. Avoiding injuries
d. Refractive corrections

The components for the actions in national programs for the prevention of blindness are

1. Early identification
2. Early diagnosis may lead to medical/surgical intervention Prevention of residual vision. Assessment - search for additional sensory or other impairments- e.g. hearing loss, motor problems.
3. Visual stimulation - prevention of secondary cortical visual impairment.

4.8. Educational services

Louis Braille’s invention of Braille alphabet system in 1832 provided a tremendous impetus to education of visually impaired children throughout the world.

The program has various models for the service delivery such as resource model, itinerant model, combined model, cooperative model, cluster model and dual model.

Resource Model:

For a child enrolled in a school there is a special teacher besides the regular teacher to assist.

Itinerant Model:

Besides the regular teacher there is a itinerant school teacher at regular intervals.

Combined Model:

Called as Resource-cum-itinerant model, this is an educational plan which usually combines several program arrangements among teachers or within one teacher's activities.

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 program 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.

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 (Braille, Writing Devices, Mathematical devices), are some of the major plus curricular activities for visually impaired children.

4.9. Rehabilitation services

The meaning of rehabilitation is "to make a person live again." In rehabilitation process, development of vocational skills, mobility, communication skills, support from the family, community, are the main components.

Major types of rehabilitation

1. **Institute Based Rehabilitation** (IBR) service for context specific services for the clients
2. **Community Based Rehabilitation** (CBR) service

4.10. Vision 2020: The Right to Sight

Vision 2020: the right to sight, a global initiative to eliminate avoidable blindness was launched by WHO on Feb, 18, 1999. The objective of Vision 2020 is to assist member countries in developing sustainable systems which will enable them to eliminate avoidable blindness from major causes, i.e. cataract, Xerophthalmia, and other causes of childhood blindness, refractive error and low vision, trachoma and other causes of corneal blindness by the year 2020.

Chapter 5: Hearing and Speech Impairment

5.1. Definition of Hearing Impairment

According to the PWD (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;

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.

Fig: 5.1; Hearing and speech impairment

Site of Lesion:

A. Middle ear-

a. **Conductive Hearing Loss** because of infection (otitis media, osteosclerosis, ear canal collapse, atersia, stenosis)

b. **Sensorineural Hearing Loss (**a permanent impairment **because** of damaged hair cells of the cochlea or the acoustic nerve (CN VIII)) 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's disease, a unilateral disease that is characterized by vertigo (dizziness) and tinnitus (noise in the ear).

c. **Mixed Hearing Loss (**a combination of a conductive and sensorineural loss)

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 recognizing and discriminating speech, even if it has been amplified (Marting, 1990).

B. **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 localizing sound, understanding (versus hearing) speech, or understanding speech in noise. Tinnitus may also be present.

C. **Retro cochlear 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 retro cochlear 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.

5.2. Degree of Hearing Loss

Average Hearing Level (in Decibels)	**Severity of Hearing Loss**
0 - 25	Normal
26 - 40	Mild
41 - 55	Moderate
56 - 70	Moderately
70 – 90	Severe
91 +	Profound

5.3. Effects of Hearing Loss

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

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

65-95 dB	Voice pathology (cul-de-sac resonance and pitch changes) Aural-oral language seriously compromised Severe learning problems	Voice therapy added to speech therapy Hearing aid, with total communication Classroom for the hearing impaired
90 dB+	Profound hearing loss (deaf) Voice-speech sound like deaf Severe problems in academic learning	Hearing aid and total communication Voice and speech therapy Classroom (or school) for profoundly impaired

5.4. Causes of Hearing Loss

Prenatal Causes	**Perinatal Causes**	**Postnatal Causes**
Rh incompatibility	Very low birth weight infants	Sensorineural loss
Rubella	Traumatic delivery	Genetic causes
CMV - Cyto Megalo Virus	Neonatal asphyxia	Non Genetic Cause – Conductive loss – Inflammatory – Conditions of the outer ear – Meningitis – - Ear Discharge (Otitis Media) – Mumps – - Foreign Bodies – Measles – Trauma – Exposure to ototoxic drugs
Toxoplasmosis	Hypoxia	
Use of certain drugs during pregnancy	Respiratory distress	
Developmental anomalies of the ear	neonatal acidosis	
Skeletal/Craniofacial abnormalities : e.g. cleft palate & lip	Incubator noise induced hearing loss	
Neurological Disorders : e.g. Cerebral Palsy		
Epidermal/Pigmentary disorders : e.g. Waardenburg's syndrome		
Ophthalmological disorders : e.g. Usher's syndrome		
Metabolic/Endocrine/Renal disorders :e.g. Alport's Syndrome		
Chromosomal abnormalities : e.g. Down's Syndrome		
Other: e.g. Heart disease etc.		

5.5. 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 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.

To test the function & condition of the Middle Ear, an Immittance Meter is used. BSERA (Brain Stem Evoked Response Audiometry) & Oto-Acoustic Emission can be used for assessment of new-born and infants.

5.6. 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 facilitative and rehabilitative measures.
2. The critical period for acquisition of language and speech can be utilized.
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.

- History of deafness in the family.
- Rh (Blood) incompatibility
- Consanguineous marriage
- Rashes with fever during any trimester.
- lack of oxygen at birth
- Low birth weight.
- Jaundice
- Congenital structural anomalies of the ear, nose, throat, and head.

Behavior observation hearing screening by using inexpensive noise making toys e.g. Rattles, small "ghunghroo", 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 15months may be considered alarming.

In schools teachers may observe for deviation in behavior 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 audio logical check up. Children with ear discharge are highly susceptible to hearing loss.

Fig 5.2; child with rattle (jhunjhuna)

Hearing Screening

A child's reaction to sound is the best clue for assessment of the hearing system in an informal manner.

Hearing Responses

0-3 months:	Baby awakens from sleep, startles or starts crying when a loud sound is made like clap, alarm etc.
3-6 months:	Normally recognizes 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.
6-9 months:	Localizes the source of sound by turning the head.
9-18 months:	Responds by looking up when called. Understands words like 'no'. Follows simple commands like 'open your mouth' and 'close your eyes' etc.
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. Localizes 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.

Fig: 5.3; assess hearing impairment

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.

5.7. 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 presented.

The following conditions MAY BE treated either medically or surgically an E.N.T. specialist.

- Discharging Ears
- Perforation in the Ear Drum (Tympanic Membrane)
- Dislocations of Ossicles

Fig: 5.4; discharging ear

Hearing aids

- Individual/Wearable Hearing Aids
- Cochlear Implant
- Classroom Amplification Devices
- Vibrotactile Aids
- Environmental Aids
- Assistive Listening Device
- Alarming Devices

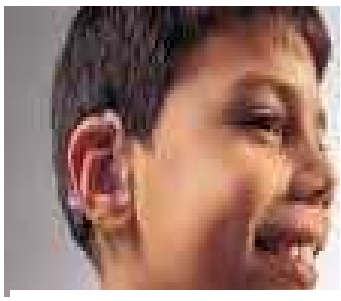


Fig: 5.5; hearing Aid

Individual/ Wearable Hearing Aids

Hearing Aid Style

- Body worn
- Post-aural
- Spectacle
- In-the-ear
- Canal aid

Hearing Aid Fitting

- Binaural
- Monaural
- Pseudo-binaural

5.8. Education

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. Education prevents the disability of hearing impairment from becoming a handicap. 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.

i. **Home Base Training Program**
ii. **Residential School**
iii. **Day Schools**

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 program will depend on the following:

- Early identification of hearing loss.
- Accurate hearing assessment
- Appropriate hearing aid prescription.
- Effective use of residual hearing through suitable programs of auditory stimulation.
- Continuous review and assessment of the progress.
- An information pack regarding hearing and communication for use by ordinary school teachers.

Types of Integration

a. Full Integration
b. Partial Integration
c. Unit in the school
d. Reverse integration

5.9. Vocational Rehabilitation

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

A vital element in the task of habilitation and rehabilitation of the persons with hearing impairment is to enable them to choose a suitable vocation and work efficiently.

The adults with hearing impairment can be referred to Vocational Rehabilitation Centre (VRC) for providing vocational training in the Industrial Training Institutes (I.T.I.)

The responsibility of placing the deaf in good jobs lies with parents of hearing impaired children, to educator, clinicians, the other group serving in social, governmental, or service capacity.

5.10. 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;
- Recognizes voices;
- Localizes 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;
- Recognizes 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;
- Has an expressive vocabulary of 1 to 3 words;
- Understands simple commands.

13-18 Months

Speech and Language Skills

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

19-24 Months

Speech and Language Skills

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

2-3 Years

Speech and Language Skills

- Speech is 50-75% intelligible;
- Understands one and all;
- Verbalizes toilet needs (before, during, or after act);
- Requests items by name;
- Points to pictures in a book when named;
- Identifies several body parts;
- Follows simple commands and answers simple questions;
- Enjoys listening to short stories, songs, and rhymes;

- Asks 1- to 2-word questions;
- Uses 3- to 4-word phrases;
- Uses some prepositions, articles, present progressive verbs, regular plurals, contractions, and irregular past tense forms;
- Uses words that are general in context;
- Continues use of echolalia when difficulties in speech are encountered;
- Has a receptive vocabulary of 500-900 or more words;
- Has an expressive vocabulary of 50-250 or more words (rapid growth during this period);
- Exhibits multiple grammatical errors;
- Understands most things said to him or her;
- Frequently exhibits repetitions-especially starters, "I," and first syllables;
- Speaks with a loud voice;
- Increases range of pitch;
- Uses vowels correctly;
- Consistently uses initial consonants (although some are misarticulated);
- Frequently omits medial consonants;
- Frequently omits or substitutes final consonants;
- Uses approximately 27 phonemes;
- Uses auxiliary is including the contracted form;
- Uses some regular past tense verbs, possessive morphemes, pronouns, and imperatives.

5.11. 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

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

- The pitch may be too high, too low or almost a monotone.
- Vocal **loudness** may also be inappropriate for the circumstance of inadequate for communication or unpleasant for the listener.

Some of the Possible Causes

- Mild temporary hearing loss
- People who work around noisy machinery, crowded workplaces etc.
- 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

- Laryngeal tumors - Vocal nodules
- Laryngeal paralysis - Contact ulcers
- 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.

Fluency Disorders

Stuttering is the most common among the fluency disorders.

Common Characteristics

- Struggles to reduce sounds, words etc.
- Repetitions of speech sounds, words, parts of sentence etc.
- Prolongations of speech sounds.

Causes

- Familial,
- Psychological,
- Genetic
- Neurogenic.

Implications

- Fears,
- Anxiety,
- Anger and
- Guilt

Fig: 5.4; Showing speech therapy session

Management

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

- For older children and adults, regular and intensive speech therapy is the must
- Psychological Counseling may help.

5.12. Articulation Disorders

Types

- Substitutions - when one sound is substituted by another sounds in the word e.g . Tate for cake
- Distortions - when one sound is spoken in a distorted way and does not sound like any known sounds
- Omissions - when a sound is omitted from the word e.g. oil for soil
- Additions - when a sound is added in a word e.g. bulue for blue

Causes

- Organic deformities of the mouth
- Hearing Impairment
- Over pampering by parents and others
- Mental retardation
- Others

Implications

- Errors in reading and writing

Management

- Provide a good speech model for the child
- Do not correct the child or make him/her conscious
- Refer to a speech language pathologist for appropriate interventions

Language Disorders

- Delayed language i.e. the child is using language which is for below her age.
- Difficulty in learning the meanings of the words,
- Difficulty in forming sentences
- Difficulty in using the language appropriately in required areas etc.

Causes

- Delayed motor mile stones
- Hearing loss
- Organic defects
- Lack of verbal stimulation
- Others

Management

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

5.13. 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 paralyzed, 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 spastic's 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, affects their speech especially 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 maximize 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 of Aphasia

a) **Non Fluent Aphasia:**
   a. 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.

b) **Fluent Aphasia:**
   a. 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.

c) **Global Aphasia**

a. In Global Aphasia the patient has difficulty in both following the commands as well as expressing himself. The patient suffers from both alexias 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.

d) **Alternative and/or Augmentative Communication**

Many of the severely affected or multiple 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.

Chapter 6. Multiple Disabilities & Miscellaneous Conditions

6.1. Cerebral palsy

Definition

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

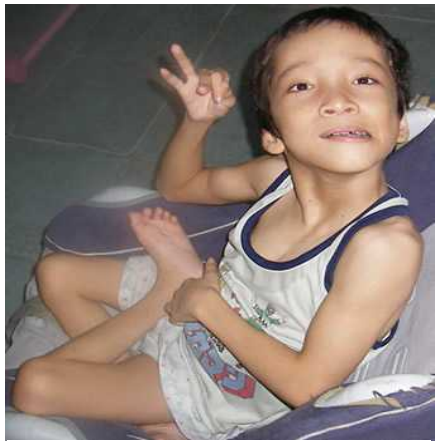


Fig: 6.1; Cerebral palsy

Causes

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

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

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

Early Symptoms

a. **Neuro behavioral:** Poor feeding, swallowing, poor sleep pattern & hyperactivity, apathy.

b. **Motor:** Abnormalities of reflex actions, Release of primitive reflexes, delayed motor development, abnormal neurological examination, and abnormal tone abnormal quality of movement.

c. **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

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

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

c. **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.

d. **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 Behavioral sysmptoms
    - Severe feeding difficulties-tube feeding
    - Severe homeostatic difficulty-temperature
    - Severe dis-regulation-sleep/wake cycle, hunger/satiety, state control
4. Abnormalities of tone and or movements
    - May be transient (honey moon period)
5. Abnormalities of deep tendon reflexes
    - Hyper reflexia
    - Increased elicitation zone
6. Persistence of abnormal primitive reflexes
   Failure of incoming posture responses
   Deviant motor development
    - Precocious head control
    - Log rolling
    - Bunny hopping
7. Delayed motor development
8. 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.
9. Postural responses
    - Righting
      Returning of the head trunk and limbs to the anatomic position
    - Protective
      Lateral, forward, posterior
    - Equilibrium

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 strength and braces.

They use:

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

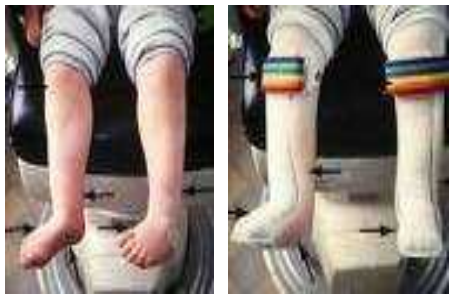


Fig: 6.2; before & after application of AFO

Proprioceptive Neuro Facilitation (PNF technique)

(Kabat, Knott and Voss)

In PNF technique we 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 facilitates reflex creeping and rolling. It uses reflex/trigger points to facilitate creeping and gradually allow it to get voluntary.

Conductive education

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

Rood's Approach (Margaret Rood)

This form of treatment application emphasizes the normalization 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 learning 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 synthesizers, 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.

6.2. Deaf/ blindness

The term deaf/ blind is a fascinating one in terms of philology as it is variously written as deaf blind, deaf-blind and deaf/blind. 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 Deaf/ blindness

'The term '' deaf/ blind' 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.

Neither there is a single definition nor one disease or syndrome which can be described as being the main cause of deaf/ blindness. Deaf/ blindness are thus a combination of visual, hearing and other additional complications which cause unique problems in communication, mobility and information. We must also take into account the cause, time of onset, relative degree of disability. For example:

- Congenital and early adventitious or pine-lingual dB
- Deaf or (pre-lingual deaf) with vision loss
- Hard of hearing with vision loss.
- Low vision with hearing loss

Causes and clinical features of deaf/ blindness

Congenital factors

a. Rubella
b. Genetic factors
c. Other syndromes

i. Cri du Chat
ii. Cat's Eye syndrome
iii. Goldenhar syndrome
iv. Noonan's syndrome
v. Norrie's syndrome
vi. Pallister Killian Syndrome
vii. PEHO Syndrome
viii. Refsums Syndrome
ix. Usher's syndrome Type I, II and III

Problems in Deaf/ blindness

The problems are 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.

Fig: 6.3; Hearing impaired children in a special school

Needs of Deaf/ blind 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.
- Communication needs are met by interpreter;
- Mobility needs are met by guide or helper;
- Learning needs are met by Intervener

Academics	**Functional curriculum**
Reading	Language and communication
Writing	Mobility
Braille	Self-help skill
Mathematics	Independent living skills
Social studies	Prevocational skills
Mobility	Social skills

Changing deaf/blind population

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 is 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 apnea due to severely obstructed breathing
- Cranial nerve VII, VIII, IX and X affected
- Dental anomaly
- Scoliosis
- Hypoglycemia or low blood sugar

6.3. 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 ranges from a mild learning and social disability to a severe impairment with multiple problems of behavior.


Fig: 6.4; Autism

The disorder may occur alone or with accompanying problems such as mental retardation. Autism is characterized 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 Behavior problem or delayed milestones or mental retardation. But these are all separate conditions and do not always accompany Autism.

Early diagnosis

Early alerting behaviors 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. presence of 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 behaviors 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) 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 behavior, 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 Behavior Modification structured integrated education
2. Dietary supplementation Vitamin B6 and magnesium Di-methyl glycine (DMG) Trace minerals and vitamins (Mg, B6)
3. Immunological Intravenous hyper-immune globulin (IVIG)
4. Pharmacotherapy
   4.1 Anti-convulsive
   4.2 Opiate antagonists
   4.3 Symptomatic pharmacotherapy
   4.4 Melatonin
   4.5 Anti-fungal therapy

Multiple studies have shown that behavioral models resulted in much more effective teaching strategies than those derived from psycho-analytic or sensory deficit models and that individualized 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

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.
2 ½ years	Saying about 200 words. Can say name. What? Questions. Uses pronouns. 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 sentences. Relates events. When? Why? How? Questions. No grammar errors. Draws pictures of house, car, and persons.
5 years	Can define simple words. Number sense to 10. Rhymes. Can execute two to three serial commands. Can print letters in name.

6.4. Specific learning disabilities (dyslexia)

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

There may be significant deficit in one or more of the following areas;

- Organization / planning
- functional literacy skills (expressing oneself and understanding conversations)
- memory
- reasoning
- problem solving
- perceptual skills

Fig: 6.5; Learning disability

Some important facts about SLD

People with dyslexia have at least average intelligence and may be having even above average intelligence. It is a lifelong 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 maximized 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.

Undiagnosed or untreated SLD may result in illiteracy, school dropout, substance abuse (drugs, alcohol), juvenile delinquency, unemployment are all consequences of this.

Criteria to decide whether a person has Specific learning disabilities (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 has given below shown that the majority of cases of SLD are genetic in nature.

Autopsies of dyslexic brains show deficiency in language centers 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 acquired 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 Behavior 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 program can be started for prevention and / or reducing the impact of the learning disability

Types of Learning disabilities

Apraxia (dyspraxia): Apraxia of speech, also known as verbal apraxia or dyspraxia, is a speech disorder in which a person has trouble saying what he or she wants to say correctly and consistently. It is not due to weakness or paralysis of the speech muscles (the muscles of the face, tongue, and lips).

Dysgraphia: It is a disorder that leads to difficulty with the act of writing, both in the technical as well as the expressive sense. There may also be difficulty with spelling.

Dyslexia: It is a learning disability that manifests as difficulty with language in its various uses (not always reading).

Attention Deficit hyperactivity Disorder: It is a neurobehavioral developmental disorder. It is primarily characterized by the co-existence of attention problems and hyperactivity, with each behavior occurring infrequently alone.

Attention Deficit (hyperactivity) Disorder (ADD / ADHD) 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.

Learning disabilities

what to look for: some first signs of trouble keeping up with the flow of expectations

	Language	**Memory**	**Attention**	**Fine motor skill**	**Other functions**
Preschool	Pronunciation problems. Slow vocabulary growth. Lack of interest in storytelling.	Trouble learning numbers, alphabet, days of week, etc. poor memory for routines	Trouble sitting still. Extreme restlessness. Inconsistent at tasks.	Trouble learning self help skills (e.g. Tying shoe laces). Clumsiness .Reluctance to draw or trace.	Trouble learning left from right (possible visual spatial confusion). Trouble interacting (poor social skills).
Lower Grades	Delayed decoding abilities for reading. Trouble following directions. Poor spelling	Slow recall of facts. Organizational problems. Slow acquisition of new skills. Poor spelling.	Impassivity, lack of planning. Careless errors. Insatiability. Distractibility.	Unstable pencil grip .Trouble with letter formation.	Trouble learning about time (temporal-sequential disorganization. Poor grasp of math concepts
Middle Grades	Poor reading comprehension Lack of verbal participation in class. Trouble with word problems.	Poor illegible writing. Slow or poor recall of math facts. Failure of automatic recall	Inconsistency Poor self-monitoring. Great knowledge of trivia. Distaste for fine detail.	Fist-like or tight pencil Illegible, slow or inconsistent writing Reluctance to write	Poor learning strategies Disorganization in time or space, Peer rejection
Upper Grades	Weak grasp of explanations. Foreign language Problems. Poor written expression. Trouble summarizing.	Trouble studying for tests. Weak cumulative memory. Slow work pace.	Memory problems due to weak attention. Mental fatigue.	(Lessening relevance offline motor skills).	Poor grasp of abstract concepts. Failure to elaborate. Trouble taking tests, multiple choice (e.g. SAT's)

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.

6.5. Mental illness

The Person with Disabilities Act of 1995 (PDA) defines mental illness as "any mental disorder other than mental retardation", subsequently redefined as ''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 lifelong 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

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

The causes can be grouped as follows-

1) Changes in the brain: 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

3) Childhood experiences: 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 experiences 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.

Rehabilitation Management of mentally ill

a. Involve patient, family, and community professionals, and non-governmental organizations
b. know the basic issues in the rehabilitation for the mentally ill.
c. Assesses the residual abilities on the priority.
d. Use 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:

Non-use of the skills causing the atrophy.

Does not have necessary skills and

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.

Chapter 7: Disability Certification

7.1. What is a Disability Certificate?

The Disability Certificate is a proof of his/her disability and an important tool for availing the benefits / facilities / rights that they are entitled to, from the Central as well as State Government under various appropriate enabling legislations.

The Ministry of Social Justice & Empowerment had notified procedures for the Medical Boards of District Civil hospitals for issuance, assessments and the format of Disability Certificate. Details of the existing procedures are listed below.

However in view of the difficulties faced by people across the country in availing of Disability Certificates and the procedural problems, the Ministry of Social Justice & Empowerment, is currently reviewing the matter and has sought comments and suggestions from the concerned agencies/users.

7.2. Conditions for obtaining disability certificate

In order to become eligible for obtaining the Disability Certificate, a person with disability should fulfill the following conditions:

1. To be an Indian citizen.
2. To possess medical reports explaining type of his/her disability.
3. The minimum degree of disability should be 40% in order to be eligible.

7.3. Procedure for obtaining certificate

Parent of a person with disability, or a person himself, should approach to the District hospital with his request for obtaining Disability Certificate providing the following documents:-

1. Copy of I.D. of the person with disability & 2 photographs showing the disability part
2. Copy of all medical and psychological reports available.

Medical Board distributes the cases to the medical sub-committees specialized for different types of disabilities, according to the medical diagnosis of the person with disability. Medical Board issues the Disability Certificate to the person with disability that he should receive from the District Hospital, after its verification by the Head of the Medical Board. The State Governments / UT Administrations may constitute the medical boards The Director General of Health Services Ministry of Health and Family Welfare will be the final authority, should there arise any Controversy/doubt regarding the interpretation of the definitions/classifications/evaluations tests etc.

7.4. Permanent/temporary certificate

The certificate would be valid for a period of five years for those whose disability is temporary. For those who acquire permanent disability, the validity can be shown as 'Permanent'.

If permanent disability certificate is not issued, then the Medical Board has to specifically mention whether the condition is progressive/non-progressive/likely to improve/not likely to improve and the Re-assessment is not recommended or re-assessment is recommended after a given period.

7.5. Procedure for Obtaining Disability Card

A parent of the person with disability, or that person himself, will approach to the District Hospital providing all necessary documents and reports .

Prerequisites for the disability card

1. Disability Certificate.
2. Two (2) personal photos.
3. Copy of I.D. of the person with disability.
4. Copy of the residence.

Disabled Welfare Department/ District hospital should issue the disability card to the person at the same time, after the sighing authority has signed it.

7.6. Advantages granted to Disability Card Holder

After perusal of the disability certificate, issued in any manner, should be a certificate valid for all practical and theoretical purposes, where the factor of an individual being a person with a disability is material.

All these schemes and services provided to Persons with disabilities differ from state wise. Some services are common but this need to standardize for every individual.

- Assistance for prosthetic aids and appliances to disabled
- Scholarship to the disabled students
- Free travels in state transport buses for disabled, issue of free bus pass
- Provision for loans for self employment
- Program for assistance for higher education to disabled
- Grant of Incentive for Marriage between Disabled & normal persons.
- Grant of Fuel subsidy to disabled person who own motorized vehicle.
- Payment of unemployment allowance to educated disabled persons
- Financial assistance to totally disabled persons
- Award of scholarships to disabled students
- Incentive for eye donors
- Reimbursement of maintenance cost of tricycles
- Supply of sarees and dhoties to disabled persons

- State award for the welfare of the handicapped
- Supply of prosthetic appliances to disabled persons
- Supply of cooling glasses, Braille watches & walking sticks
- Annual tour for disabled persons
- International day for the disabled
- Group insurance for disabled government employees
- Group insurance for disabled other than government employees
- The scheme for financial assistance towards funeral expenses of the disabled
- Supply of invalid carriages (motorized tri-cycles) to the persons with disabilities

7.7. Guidelines for evaluation of various disabilities and procedure for certification

1. To recommend appropriate modifications/alterations keeping in view the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995, Government of India in Ministry of Social Justice and Empowerment, set up four committees under the Chairmanships of Director General of Health Services-one each in the area of mental retardation, Locomotor/ Orthopedic disability, Visual disability and Speech & Hearing disability. Subsequently, another Committee was also constituted on 21-7-1999 for evaluation, assessment of multiple disabilities and categorization and extent of disability and procedures for certification.
2. After having considered the reports of these committees the undersigned is directed to convey the approval of the President to notify the guidelines for evaluation of following disabilities and procedure for certification:-
    - Visual impairment
    - Locomotor / Orthopedic disability
    - Speech & hearing disability
    - Mental retardation
    - Multiple Disabilities
3. The minimum degree of disability should be 40% in order to be eligible for any concessions/benefits.
4. According to the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Rules, 1996 notified on 31.12.1996 by the Central Government in exercise of the powers conferred by sub-section (1) and (2) of section 73 of the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 (1of 1996), authorities to give disability Certificate will be a Medical Board duly constituted by the Central and the State Government. The State government may constitute a Medical Board consisting of at least three members out of whom at least one shall be a specialist in the particular field for assessing locomotor/Visual including low vision/hearing and speech disability, mental retardation and leprosy cured, as the case may be.

5. Specified test should be conducted by the medical board and recorded before a certificate is given.
6. The certificate would be valid for a period of five years for those whose disability is temporary. For those who acquire permanent disability, the validity can be shown as 'Permanent'.
7. The Director General of Health Services Ministry of Health and Family Welfare will be the final authority, should there arise any Controversy/doubt regarding the interpretation of the definitions/classifications/evaluations tests etc.

- **Mental retardation**

1. **Definition:-** Mental retardation is a condition of arrested or incomplete development of the mind, which is especially characterized by impairment of skills manifested during the development period which contribute to the overall level of intelligence, i.e., cognitive, language, motor and social abilities.
2. **Categories of Mental Retardation**:-
   - **Mild Mental Retardation**: - The range of 50 to 69 (standardized IQ test) is indicative of mild retardation. Understanding and use of language tend to be delayed to a varying degree and executive speech problems that interfere with the development of independence may persist into adult life.
   - **Moderate Mental Retardation**: - The IQ is in the range of 35 to 49. Discrepant profiles of abilities are common in this group with some individuals achieving higher levels in visuo-spatial skills than in tasks dependent on language while others are markedly clumsy by enjoy social interaction and simple conversation. The level of development of language in variable: some of those affected can take part in simple conversations while others have only enough language to communicate their basic needs.
   - **Severe Mental Retardation**: - The IQ is usually in the range of 20 to 34. In this category, most of the people suffer from a marked degree of motor impairment or other associated deficits indicating the presence of clinically significant damage to or mal-development of the central nervous system.
   - **Profound Mental Retardation**: - The IQ in this category estimated to be less than 20. The ability to understand or comply with requests or instructions are severally limited. Most of such individuals are immobile or severally restricted in mobility, incontinent and capable at most of only very rudimentary forms of non-verbal communication. They posses little or no ability to care for their own basic needs and require constant help and supervision.

Process of Certifications:-

1. A disability certificate shall be issued by a Medical Board consisting of three members duly constituted by the Central/State Government. At least, one shall be a Specialist in the area of mental retardation, namely. Psychiatrist, Pediatrician and clinical Psychologist.
2. The examination process will consist of three components, namely, clinical assessment, assessment, of adaptive behavior and intellectual functioning.

- **Visual disability**

Definition: -

1. **Blindness** refers to a condition where a person's suffers from any of the condition, namely,
   i. total absence of sight; or
   ii. visual acuity not exceeding 6/60 or 20/200(snellen) in the better eye with best correcting lenses; or
   iii. limitation of field of vision subtending an angle of 20 degree or worse;
2. **Low Vision:** - Persons with low vision means a persona with impairment of vision of less than 6/18 to 6/60 with best correction in the better eye or impairment of field in any one of the following categories:-
   i. reduction of fields less than 50 degrees
   ii. Heminaopia with macular involvement
   iii. Altitudinal defect involving lower fields.

Process of Certification –

A disability certificate shall be issued by a Medical Board duly constituted by the Central/State Government having, at least three members. Out of which, at least one member shall be a specialist in ophthalmology.

- **Speech & hearing disability**

Definition of Hearing: - A persons with hearing impairment having difficulty of various degrees in hearing sounds is an impaired person.

Categories of Hearing Impairment

Category	Type of Impairment	D B Level	Speech discrimination	% age of impairment
I	Mild hearing Impairment	DB 26 to 40 dB in better ear	80 to 100% in better ear	Less than 40% to 50%
II (a)	Moderate hearing	41 to 60 dB in better ear	50 to 80%in better ear	40% to 50%
II (b)	Serve hearing Impairment	61 to 70 dB hearing Impairment in better ear	40 to 50% in better ear	51% to 70%
III	Profound hearing Impairment Total deafness	71 to 90 dB 91 dB and above/in better ear/to hearing	Less than 40% in better ear Very Poor discrimination	71% to 100% 100%

i. Pure tone average of learning in 500, and 2000 HZ, 4000 HZ by conduction (AC and BC) should be taken as basis for consideration as per the test recommendations.
ii. When there is only as island of hearing present in one or two frequencies in better ear, it should be considered as total loss of hearing.
iii. Wherever there is no response (NR) at any of the 4 frequencies (500, 1000,2000 and 4000 HZ), it should be considered as equivalent to 100 dB loss for the purpose of classification of disability and in arriving at the average.

Process of Certification

A disability certificate shall be issued by a Medical Board duly constituted by the Central and the State Government. Out of which, at least, one member shall be a specialist in the field of ENT.

- **Locomotor disability**

Definition-

i. Impairment: impairment in any loss or abnormality of psychological, physiological or anatomical structure or function in a human being.
ii. Functional Limitations: Impairment may cause functional limitations which are partial or total inability to perform those activities, necessary for motor, sensory or mental function within the range or manner of which a human being is normally capable.

iii. Disability: A disability is any restriction or lack. (Resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

iv. 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 musculoskeletal and/or nervous system.

Process of Certification

Disability certificate shall be issued by a Medical Board of three members duly constituted by the Central and the State Government, out of which, at least, one member shall be a specialist from either the field of Physical Medicine and Rehabilitation or Orthopedics.

Two specimen copies of the disability certificate for mental retardation and others (visual disability, speech and hearing disability and locomotor disability) is enclosed at Annexure-B.

It was also decided that whenever required the Chairman of the Board may co-opt other experts including that of the members constituted for the purpose by the Central and the State Government.

On representation by the applicant, the Medical Board may review its decision having regard to all the facts and circumstances of the case and pass such order in the matter as it thinks fit.

Revised guidelines for evaluation of the permanent physical impairment

1.1 Guidelines for Evaluation of Permanent Physical Impairment of Upper Limb

1. The estimation of permanent impairment depends upon the measurement of functional impairment and is not expression of a personal opinion.
2. The estimation and measurement should be made when the clinical condition has reached the stage of maximum improvement from the medical treatment. Normally the time period is to be decided by the medical doctor who is evaluating the case for issuing the PPI Certificate as per standard format of the certificate.
3. The upper limb is divided into two component parts; the arm component and the hand component.
4. Measurement of the loss of function of arm component consists of measuring the loss of motion, muscle strength and co-ordinated activities.
5. Measurement of loss of function of hand component consists of determining the prehensile, sensation and strength. For estimation of prehensile opposition, lateral pinch cylindrical grasp, spherical grasp and hook grasp have to be assessed as shown in Hand Component of Form A Assessment Performa for upper extremity.
6. The impairment of the entire extremity depends on the combination of the functional impairments of both components.

Arm component

Total value of arm component is 90%

1.2.1 Principles of evaluation of Range Of Motion (ROM) of joints

1. The value of maximum ROM in the arm component is 90%
2. Each of the three joints of the arm is weighed equally (30%);

Example

The intra articular fractures of the bones of right shoulder joint may affect range of motion even after healing. The loss of ROM should be calculated in each arc of motion as. Envisaged in the Assessment Form A (Assessment Proforma for Upper Extremity).

Arc of ROM	Normal value	Active ROM	Loss of ROM
Shoulder Flexion-	0-220	110	50%
Rotation	0-180	90	50%
Abduction-Adduction	0-180	90	50%

Hence the mean loss of ROM of shoulder will be 50+50+50/3 =150/3 = 50%

Shoulder movements constitute 30% of the motion of the arm component, therefore the loss of motion for arm component will be 50 X 0.3d = 15% If more than one joint of the arm is involved the loss of percentage in each joint is calculated separately as above and then added together.

1.2.2. Principles of evaluation of strength of muscles:

1. Strength of muscles can be tested by manual method and graded from 0-5 as advocated by Medical Research Council of Great Britain depending upon the strength of the muscles.
2. Loss of muscle power can be given percentages as follows

Manual muscle Strength grading	Loss of Strength in percentage
0	100%
1	80%
2	60%
3	40%
4	20%
5	0%

3. The mean percentage of loss of muscle strength around a joint is multiplied by 0.30.
4. If loss of muscle strength involves more than one joint the mean loss of percentage in each joint is calculated separately and then added together as has been described for loss of motion.

1.2.3 Principles of evaluation of coordinated activities:

1. The total value for coordinated activities is 90%. Ten different coordinated activities should be tested as given in **Form A.**
2. Each activity has a value of 9

1.2.4 Combining values for the Arm Component:

The total value of loss of function of arm component is obtained by combining the value of loss of ROM, muscle strength and coordinated activities, using the combing formula.

$$a + \frac{b\,(90-a)}{90}$$ where a = higher value, b = lower value

Example:

Let us assume that an individual with an intra articular fracture of bones of shoulder joint in addition to 16.5% loss of motion in arm has 8.3% loss of strength of muscles and 5% loss of coordination. These values should be combined as follows:

Loss of ROM - 16.5%

$$16.5+\frac{8.3(90-16.5)}{90}$$

Loss of strength of muscles - 8.3% =23.33%

To add

Loss of coordination - 5%

$$23.3+\frac{5(90-23.3)}{90}=27\ 0\%$$

So the total value of loss of function in Arm component will be 27.0%

1.3 Hand component

1. Total value of hand component is 90%.
2. The functional impairment of hand is expressed as loss of prehensile, loss of sensation and loss of strength.

1.3.1 Principles of evaluation of prehensile:

1. Total value of prehensile is 30% it includes
   a. Opposition - 8%
      Tested against - Index finger -2%
      Middle finger-2 %
      Ring -2%
      Little finger - 2%
   b. Lateral pinch -5% - Tested by asking the patient to hold a key between the thumb and lateral side of index finger.
   c. Cylindrical grasp - 6% Tested for

i. Large object of 4 inches size -3%
ii. Small object of 1 inch size - 3%

d. Spherical grasp -6% Tested for
i. Large object of 4 inches size - 3%
ii. Small object of 1 inch size - 3%

e. Hook grasp - 5% -Tested by asking the patient to lift a bag

1.3.2. Principles of Evaluation of sensation:

1. Total value of sensation in hand is 30%
2. It should be assessed according to the distribution given below:
   i. Complete loss of sensation
   a) Thumb ray 9%
   b) Index finger 6%
   c) Middle finger 5%
   d) Ring finger 5%
   e) Little finger 5%
   ii. **Partial loss of sensation:** Assessment should be made according to percentage of loss of sensation in thumb/finger(s)

1 3.3. Principles of Evaluation of strength

1. Total value of strength is 30%
2. It includes:
   i. Grip strength 20%
   ii. Pinch strength 10%

Strength of hand should be tested with hand dynamo-meter or by clinical method (grip method).

Additional weight age - A total of 10% additional weightage can be given to following accompanying factors if they are continuous and persistent despite treatment

1. Pam
2. Infection
3. Deformity
4. Mat-alignment
5. Contractures
6. Cosmetic disfiguration
7. Dominant extremity-4%
8. Shortening of upper limb

First 1" - No weightage

For each 1" beyond first 1" -2%

The extra points should not exceed 10% of the total Arm Component and total PPI should not exceed 100% in any case.

1.3.4. Combining values of hand component:

The final value of loss of function of hand component is obtained by summing up values of loss of prehensile, sensation and strength.

1.3.5. Combining Values for the Extremity:

Values of impairment of arm component and impairment of hand component should be added by using combining formula:

$$a + b\,\frac{(90-a)}{90}$$ where a= higher value, b= lower value

Example:

Impairment of Arm - 27% $64+\frac{27(90-64)}{90}$

Impairment of hand - 64% =71.8%

The total value can also be obtained by using the Ready Recknoer table for combining formula given at **Appendix.II**

2. Guidelines for Evaluation of permanent physical Impairment in Lower Limb

The measurement of loss of function in lower extremity is divided into two components: Mobility and standing components.

2.1 Mobility Component:-

1. Total value of mobility component is 90%
2. It includes range of movement (ROM) and muscle strength

2.1.1. Principles of Evaluation of Range of Movement:

1. The value of maximum range of movement in mobility component is 90%
2. Each of three joints i.e. hip, knee and foot-ankle component is weighed equally - 30%.

Example:

A fracture of right hip joint bones may affect range of motion of the hip joint. Loss of ROM of the affected hip in different are should be assessed as given in Form B (Assessment Proforma for lower extremity)

Affected Joint - Rt. Hip: Arc of Movement	Normal ROM	Active ROM	Loss in percentage
Flexion-Extension	0-140	70	50%
Abduction-Adduction	0-90	60	33%
Rotations	0-90	30	66%

Mean loss of ROM of at Hip $= \frac{50+33+66}{3} = 50\%$

Since the hip constitute 30% of the total mobility component of the lower limb the loss of motion in relation to the lower limb will be 50 x 0.30=15%

If more than one joint of the limb is involved the mean loss of ROM in percentage should be calculated in relation to individual joint separately and then added together as follows to calculate the loss of mobility component in relation to that particular limb.

Example.

Mean loss of ROM of Rt. Hip 50%

Mean loss of ROM Rt. Knee 40%

Loss of mobility component of Rt. Lower Limb will be

(50 x 0.30)+(40 x 0.30) = 27%

2.1.2. Principle of Evaluation of Muscle Strength:

1. The value for maximum muscle strength in the limb is 90%.
2. Strength of muscles can be tested by Manual Method and graded 0-5 as advocated by MRC of Great Britain depending upon the residual strength in the muscle group.
3. Manual muscle grading can be given percentage like below:

Power Grade of Muscle Strength	Loss of strength in percentage
0	100%
1	80%
2	60%
3	40%
4	20%
5	0%

4. Mean percentage of muscle strength loss around a joint is multiplied by 0.30 to calculate loss in relation to limb.
5. If there has been loss muscle strength involving more than one joint the values are added as has been described for loss of ROM.

2.1.3. Combining values for mobility component:

1. The values of loss of ROM and loss of muscle strength should be combined with the help of combining formula: $a+\frac{b(90-a)}{90}$ (a = higher value, b = lower value)

Example: Let us assume that the individual with a fracture of right hip bones has in addition to 16% loss of motion, 8% loss of muscle strength also.

Combined values

Motion-16% $16+\frac{8(90-16)}{90}$; Strength-8% =22.6%

2.2. Stability component:

1. Total value of the stability component is 90%

2. It should be tested by clinical method as given in From B (Assessment Proforma for lower extremity). There are nine activities, which need to be tested, and each activity has a value of ten per cent (10%). The percentage valued in relation to each activity depends upon the percentage of loss stability in relation to each activity.

2.3. Extra points:

Extra points have been given for pain, deformities, contractures, loss of sensations and shortening Maximum points to be added are 10% (excluding shortening). Details are as following.

i)	Deformity	In functional position In non-functional position	3% 6%
ii)	Pain	Sever (grossly interfering with function) Moderate (moderately interfering with function) Mild (mildly interfering with function)	9% 6% 3%
iii)	Loss of sensation	Complete Loss Partial Loss	9%
iv)	Shortening	First 1/2" Every 1/2" beyond first 1/2"	Nil 4%
v)	Complications	Superficial complications Deep complications	3%

3. Guidelines for Evaluation of Permanent Physical Impairment (PPI) of Trunk (Spine)

Basic guidelines:

1. As permanent physical impairment caused by spinal deformity tends to change over the years, the certificate issued in relation to spine should be reviewed as per the standard format of the certificate (**Annexure -2).**
2. Permanent physical impairment should be awarded in relation to spine and not in relation to whole body.
3. Permanent physical impairment due to neurological deficit in addition to spinal impairment should be added by combining formula. The local effects of the lesions of the spine can be conventionally divided into traumatic and non-traumatic. The percentage of PPI in relation to each situation should be valued as follows:

3.1 Traumatic lesions

3.1.1 Cervical spine injuries		**Percentage of PPI in relation to Spine**
i)	25% or more compression of one or two adjacent vertebral bodies with No involvement of posterior elements, No nerve root involvement, moderate Neck rigidity and persistent	20% Soreness.
ii)	Posterior element damage with radiological evidence of moderate parties' dislocation/subluxation including whiplash injury. a) With fusion healed, No permanent motor or sensory changes b) Persistent pain with radio logically demonstrable instability.	 10% 25%
iii)	Severe Dislocation: a) Fair to good reduction with or without fusion with no residual motor or sensory involvement; b) Inadequate reduction with fusion and persistent radicular pain	10% 15%
3.1.2. Cervical Intervertebral Disc Lesions		**Percentage of PPI In relation to Spine**
i)	Treated case of disc lesion with persistent pain and no neurological deficit	10%
ii)	Treated case with pain and instability	15%

3.1.3. Thoracic and Thoracolumbar Spine Injuries:		
i)	Compression of less than 50% involving one vertebral body with no neurological manifestation	10%
ii)	Compression of more than 50% involving single vertebra or more with involvement of posterior elements, healed, no neurological manifestations persistent pain, fusion indicated	20%
iii)	Same as (b) with fusion, pain only on heavy use of back	15%
iv)	Radiologically demonstrable instability with fracture or fracture dislocation with persistent pain.	30%
3.1.4 Lumbar and Lumbosacral Spine: Fracture		
a)	Compression of 25% or less of one or two adjacent Vertebral bodies, No definite pattern or neurological Deficit	15%
b)	Compression of more than 25% with disruption of posterior elements, persistent pain and stiffness, healed With or without fusion, inability to lift more than 10 kgs.	30%
c)	Radiologically demonstrable instability in low lumbar or lumbosacral spine with pain	35%
3.1 5 Disc lesion:		
a)	Treated case with persistent pain	15%
b)	Treated case with pain and instability	20%
c)	Treated case of disc disease with pain activities of lifting moderately modified	25%
d)	Treated case of disc disease with persistent pain and stiffness, aggravated by heavy lifting necessitating modification of all activities requiring heavy weight lifting	30%

3.2 Non Traumatic Lesions

3.2.1 Scoliosis:

Basic guideline-The largest structural curve should be accounted for while calculating the PPI and not the compensatory curve or both structural curves.

1.2.2 Measurement of Spine Deformity:

Cobb's method for measurement, of angle of curve in the radiograph taken in standing position should be used. The curves have been divided into following groups depending upon the angle of major structural scoliotic deformity.

Group	Cobb's Angle	PPI in relation to Spine
I	0-20	NIL
II	21-50	10%
III	51-100	20%
IV	101 & above	30%

3.2.3 Torso Imbalance:

In addition to the above PPI should also be evaluated in relation the torso imbalance. The torso imbalance should be measured by dropping a plumb line from C7 spine and measuring the distance of plumb line from gluteal crease.

Deviation of Plumb line	PPI
Upto 1.5 Cm	4%
1.6 - 30 Cm	8%
3.1 - 50 Cm	16%
5.1 and above	32%

3.2.4 Head Tilt over C7 spine PPI

Upto 15	4%
More than 15	10%

3.2.5 Cardiopulmonary Test

In cases with scoliosis of severe type cardiopulmonary function tests and percentage deviation from normal should be assessed by one of the following method whichever seems more reliable clinically at the time of assessment. The value thus obtained may be added by combining formula.

a. Chest Expansion	**PPI**
4 - 5 Cm.	Normal
Less than 4 cm reduction in Chest expansion	5% for each cm
No expansion	25%
b. counting in one breathe:	
Breathe Count	**PPI**
More than 40	Normal

0-40	5%
0-30	10%
0-20	15%
0-10	20%

3.2.6 Associated Problems:

To be added directly but the total value of PPI in relation to spine should not exceed 100%.

a) Pain

- Mildly interfering with ADL 4%
- Moderately restricting ADL 6%
- Severely restricting ADL 10%

b) Cosmetic Appearance

- No obvious disfiguration with clothes on Nil
- Mild disfigurement 2%
- Severe disfigurement 4%

c) Leg Length discrepancy

First 1/2" shortening Nil

Every ½" beyond first ½" 4%

d) Neurological deficit- Neurological deficit should be calculated as per established methods of evaluation of PPI in such cases. Value thus obtained should be added telescopically using combining formula.

3.3 Kyphosis

Evaluation should be done on the similar guidelines as use for scoliosis with the following modifications:

3.3.1 Spinal Deformity PPI

Less than 20 Nil

21-40 10%

41-60 20%

Above 60 30%

3.3.2 Torso Imbalance- Plumb line dropped from external ear normally falls at ankle level, the deviation from normal should be measured from ankle anterior joint line to the plumb line.

Less than 5 cm in front of ankle 4%

5 to 10 cm in front of ankle 8%

10 to 15 cm in front of ankle	16%
More than 15 cm in front of ankle	32%
(add directly)	

Miscellaneous conditions

Those conditions of the spine which cause stiffness and pain etc. are rated as follows.

	Conditions	**Percentage PPI**
A	Subjective symptoms of pain, no involuntary muscle spasm,, not substantiated by demonstrable structural pathology	-0%
B	Pain, persistent muscles spasm and stiffness of spine, substantiated by mild radiological change.	-20%
C	Same as B with moderate radiological changes	-25%
D	Same as B with severe radiological changes involving any one of the regions of spine	-30%
E	Same as D involving whole spine	-40%

	Upper Limb Amputations	**PPI & loss of physical function of each limb**
1.	Fore-quarter amputations	100%
2.	Shoulder Disarticulation	90%
3.	Above Elbow up to upper 1/3 of arm	85%
4.	Above Elbow up to lower 1/3 of forearm	80%
5.	Elbow disarticulation	75%
6.	Below Elbow up to upper 1/3 of forearm	70%
7.	Below Elbow up to lower 1/3 of forearm	65%
8.	Wrist disarticulation	60%
9.	Hand through carpal bones	55%
10.	Thumb through C.M. or though 1st MC joint	30%
11.	Thumb disarticulation through metacarpophalangeal Joint or through proximal phalanx.	25%
12.	Thumb disarticulation through inter phalangeal joint or Through distal phalanx.	15%

	Amputation level	Index Finger (15%)	Middle Finger (5%)	Ring Finger (3%)	Little Finger (2%)
13.	Amputation through Proximal phalanx or Disarticulation through M.P. Joint	15%	5%	3%	2%
14.	Amputation through Middle phalanx or Disarticulation through PP joint.	10%	4%	2%	1%
15.	Amputation through Distal phalanx or disarticulation through DIP joint.	5%	2%	1%	1%

4. Guidelines for Evaluation of PPI in cases of Short Stature/Dwarfism:

a. Recumbent length or longitudinal height below 3rd percentile or less than 2 Standard Deviation from the mean is considered to have short stature.
b. The evaluation of a Short Statured person should be considered only when it is of disproportionate variety and is accompanied by an underlying pathological conditions, e.g., Achondroplasia,Chandrodysplasia Punctata, spondyloepiphysical dysplasia,mucopoly and acchrydosis, etc.
c. The ICMR norms as enclosed at Appendix III of Annexure. A should be used as a guideline for the height.
d. Every 1" vertical height reduction should be valued as 4% permanent physical impairment.
e. Associated skeletal deformities should be evaluated, separately and total percentage of both should be added by combining formula.

5. Guidelines for Evaluation of Permanent Physical Impairment in Amputees:

Basic Guidelines:

a. In cases of multiple amputees if the total sum of permanent physical impairment is above 100%, it should be taken as 100% only.
b. If the stump is unfit for fitting the prosthesis additional weightage of 5% should be added to the value.

c. In case of amputation in more than one limb percentage of each limb is added by combining formula and another 10% will be added but when only toes or fingers are involved only 5% will be added.

d. Any complication in form of stiffness of proximal joint, neuroma infection, etc., should be given upto a total of 10% additional weightage.

e. Dominant upper extremity should be given 4% additional weightage.

5.1. Lower Limb Amputations:

1.	Hind quarter	100%
2.	Hip disarticulation	90%
3.	Above knee upto upper 1/3 of thigh	85%
4.	Above knee upto lower 1/3 of thigh	80%
5.	Through keen	75%
6.	B.K. upto 8 cm	70%
7.	B.K. upto lower 1/3 of leg	60%
8.	Through ankle	55%
9.	Syme's	50%
10.	Upto mid-foot	40%
11.	Upto fore-foot	30%
12.	All toes	20%
13.	Loss of first toe	10%
14.	Loss of second toe	5%
15.	Loss of third toe	4%
16.	Loss of fourth toe	3%
17.	Loss of fifth toe	2%

6. Guidelines for Evaluation of Permanent Physical Impairment of Congenital deficiencies of the limbs.

6.1 Transverse Deficiencies-

Functionally congenital transverse limb deficiencies are comparable to acquired amputations and can be called synonymously as congenital amputation, however, in some cases revision of amputation is required
to fit in prosthesis.

1. The transverse limb deficiencies therefore should be assessed on basis of the guidelines applicable to the evaluation of PPI in cases of amputees as given in the preceding chapter.

For example:	**PPI**
Transverse deficiency Rt. Arm complete (shoulder disarticulation)	90%
Transverse deficiency at thigh complete (hip disarticulation)	90%
Transverse deficiency Proximal Upper arm (Above elbow Amp.)	85%
Transverse deficiency at lower thigh (Above knee Amp. Lower 1/3)	80%
Transverse deficiency forearm complete (elbow disarticulation)	75%
Transverse deficiency lower forearm (Below Elbow Amp.)	65%
Transverse deficiency carpal complete (wrist disarticulation)	60%
Transverse deficiency Metacarpal complete (Disarticulation through carpal bones)	55%

6.2 Longitudinal Deficiencies:

6.2.1 Basic Guidelines

1. In cases of longitudinal deficiencies of limbs due consideration should be given to functional impairment.
2. In upper limb, loss of ROM loss muscular strength and hand functions like prehensile, etc should be tested while assessing the case for PPI.
3. In lower limb clinical method of stability component and shortening of lower limb should be given due weightage.
4. Apart from functional assessment the lost joint/part of body should also be valued as per distribution

Example:

Congenital Absence of humorous where forearm bones directly articulate with scapula

There will be mild reduction in ROM and strength of muscles in the existing joints apart from loss of body part.

Loss of shoulder joint can be given - 30%

Loss of ROM of Elbow/Shoulder & Wrist

All the components should be added together by the combining formula: $a + \frac{b\,(90-a)}{90}$

6.2.2 In cases of loss of single bone in forearm the evaluation should be based on the principles of evaluation of Arm component which include Evaluation of ROM, Muscle strength-and coordinated activities. The values so obtained should be added together with the help of combining formula.

6.2.3 In cases of loss of single bone in leg the evaluation should be based on the principles of evaluation of mobility component and stability components of the lower extremity. The values obtained should be added together with the help of combining formula.

7. Guidelines for Evaluation of Physical Impairments in Neurological conditions.

7.1 Basic Guidelines:

1. Assessment in neurological conditions is not the assessment of disease but the assessment of its effects, i.e. clinical manifestations.
2. These guidelines should only be used for central and upper motor neurone lesions.
3. Proformas (form A & B) will be utilized for assessment of lower motor neurone lesions, muscular disorders and other locomotor conditions.
4. Normally any neurological assessment for the purpose of certification has to be done six months after the onset of disease however exact time period is to be decided by the Medical

Doctor who is evaluating the case and has to recommend the review of certificate as given in the standard format of certificate.

5. Total percentage of physical impairment in any neurological condition should not exceed 100%
6. In mixed cases the highest score will be taken into consideration. The lower score will be added telescopically to it by the help of combining formula $a+\frac{b(90-a)}{90}$
7. Additional rating of 4% will be given for dominant upper extremity.
8. Additional weightage up to 10% can be given for loss of sensation in each extremity but the total physical impairment should not exceed 100%.

7.2 Table-I

Neurological Status	**Physical Impairment**
Altered sensorium	100%

7.3 Table-II

Intellectual Impairment (to be assessed by Clinical Psychologist)

Degree of Mental Retardation	IQ Range	Intellectual Impairment
Border line	70-79	25%
Mild	50-69	50%
Moderate	35-49	75%
Serve	20-34	90%
Profound	Less than 20	100%

7.4 Table - III

Speech defect	**Physical Impairment**
Mild dysarthria	Nil
Moderate dysarthria	25%
Servere dysarthria	50%

7.5 Table - IV

Type of Cranial Nerve Involvement	**Physical Impairment**
Motor cranial nerve	20% for each nerve
Sensory cranial nerve	10% for each nerve

Sensory cranial nerve 10% for each nerve

7.6 Table-V

Motor system Disability	
Neurological Involvement	**Physical Impairment**
Hemiparesis:-	
- Mild	25%
- Moderate	50%
- Severe	75%

7.7 Table-VI

Sensory System Disability

Extent of Sensory Deficit	Physical Impairment
Anaesthesia	Upto 10% for each limb
Hypoaesthesia	Depending upon % of
Paraestheis	Loss of sensation up to 30% depending
Hands/feet sensory loss	Upon % of loss sensation

7.8 Table - VIII

Bladder disability due to neurogenic Involvement

Bladder Involvement	**Physical Impairment**
Mild (Hesitancy/Frequency)	25%
Moderate (precipitancy)	50%
Severe(occasional but recurrent Incontinence)	75%
Very Severe (Retention/Total Incontinence)	100%

7.9 Table - VIII

Post Head Injury Fits and Epileptic Convulsions

Frequency/Severity of Convulsions	**Physical Impairment**
Mild – occurrence of one convulsion Only	Nil
Moderate 1-5 Convulsions/month on Adequate – Medication	25%
Severe 6-10 Convulsions/month on Adequate medication	50%
Very Severe more than 10 fits/months On adequate – Medication	75%

7.10 Table – IX (Ataxia (Sensory or Cerebella)

Severity of Ataxia	Physical Impairment
Mild (Detected on examination)	25%
Moderate	50%
Severe	75%
Very Severe	100%

8 Guidelines for Evaluation of Physical Impairment due to Cardiopulmonary Diseases

8.1 Basic Guidelines:-

1. Modified New York Heart Association subjective classification should be utilized to assess the functional disability.
2. The assessing physician should be alert to the fact that patients who come for disability claims are likely to exaggerate their symptoms. In case of any doubt patients should be referred for detailed physiological evaluation.
3. Disability evaluation of cardiopulmonary patients should be done after full medical, surgical and rehabilitative treatment available, because most of these diseases are potentially treatable.
4. Assessment of cardiopulmonary impairment should also be done in diseases which might have associated cardiopulmonary problems, e.g., amputees, myopathies, etc.
5. For respiratory assessment, routine respiratory functions test should be done, however, in cases of interstitial lung diseases, diffusion studies may be done.
6. In cases of Angina pectoris (chest pain) base line studies in resting ECG should be done. When there is persistence of symptoms, exercise or stress test should be done.

8.2 The proposed classification with loss of function is as follows:-

Group 0:	A patient with cardiopulmonary disease who is asymptomatic (i.e. has no symptoms of breathlessness, palpitation, fatigue or chest pain).
Group 1:	A patient with cardiopulmonary disease who becomes symptomatic during his ordinary physical activity but has mild restriction (25%) of his physical activities.
Group 2:	A patient with cardiopulmonary disease who becomes symptomatic during his ordinary physical activity and has 25-50% restriction of his ordinary physical activities.
Group 3:	A patient with cardiopulmonary disease who becomes symptomatic during less than ordinary physical activity so that his ordinary physical activities are 50-75% restricted.
Group 4:	A patient with cardiopulmonary disease who is symptomatic even at rest or on mildest exertion so that his ordinary physical activities are severely or completely restricted (75-100%).
Group 5:	A patient with cardiopulmonary disease who gets intermittent symptoms at rest (i.e. patients with bronchial asthma, paroxysmal nocturnal dyspnoea, etc.)

- **Multiple Disabilities:**

1. **Definition**

Multiple disabilities means a combination of two or more disabilities as defined in clause (1) of Section (2) of the Persons with Disabilities. (Equal Opportunities, Protection of Rights and Full Participation) Act, 1'995, namely -

I. Locomotor disability including leprosy cured
II. Blindness/low vision
III. Speech and hearing impairment
IV. Mental retardation
V. Mental illness.

2.Guidelines for Evaluation: -

In order to evaluate the multiple disability, the same guidelines shall be used as have been developed by the respective sub-committees of various single disability, viz. Mental retardation, locomotor disability, visual disability, and speech and hearing disability and recommended (No.S-13020/4/98-MH, dated 16th March, 2000; MOHFW).

However, in order to arrive at the total percentage of multiple disabilities, the combining formula

$$a + \frac{b\,(90-a)}{90}$$

. As given in the "Manual for Doctors to Evaluate Permanent Physical Impairment, Developed by Expert Group meeting on Disability Evaluation", shall be used, where "a" will be the higher score and "b" Will be the lower score. However, the maximum total percentage of multiple disabilities shall not exceed 100%.

For example, if the percentage of hearing disability is 30% and visual disability is 20%, then by applying the combining formula given above, the total percentage of multiple disability will be calculated as follows:- $30 + \frac{20(90-30)}{90} = 43\%$

3. **Procedure for Certification of Multiple Disabilities:-**

The procedure will remain the same as has been developed by the respective sub-committees on various single disabilities. The final disability certificate for multiple disability will be issued by Disability Board which has given higher score of disability by combining the score of different disabilities using the combining formula,

i.e., $a + \frac{b\,(90-a)}{90}$

In case, where two scores of disability are equal, the final certificate of multiple disabilities will be issued by any one of them as decided by Local authority.

Chapter 8: National Policy for Persons with Disabilities

The Government of India has enacted three legislations for persons with disabilities viz.

i. **Persons with Disability** (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995,
ii. **National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disability Act**, 1999
iii. **Rehabilitation Council of India Act**, 1992

Infrastructure:

i. Seven national Institutes for development of manpower in different areas.

ii. Five Composite Rehabilitation Centers, four Regional Rehabilitation Centers and 120 District Disability Rehabilitation Centers (DDRCs) for rehabilitation services to persons with disabilities.

iii. Several national institutions under the Ministry of Health & Family Welfare working in the field of rehabilitation, like National Institute of Mental Health and Neuro Sciences,Bangalore; All India Institute of Physical Medicine and Rehabilitation, Mumbai; All India Institute of Speech and Hearing, Mysore; Central Institute of Psychiatry, Ranchi, etc.

iv. State Government institutions also provide rehabilitation services. Besides, 250 private institutions conduct training courses for rehabilitation professionals.

National Policy Statement

The National Policy recognizes that Persons with Disabilities are valuable human resource for the country and seeks to create an environment that provides them equal opportunities, protection of their rights and full participation in society.

The focus of the policy shall be on the following:

1. Prevention of Disabilities
2. Rehabilitation Measures
    a) Physical rehabilitation,
    b) Educational rehabilitation
    c) Economic rehabilitation
3. Women with disabilities: Rehabilitate and support financially

4. Children with Disabilities
5. Barrier- free environment
6. Issue of Disability Certificates
7. Social Security
8. Promotion of Non-Governmental Organizations (NGOs)
9. Collection of regular information on Persons with Disabilities
10. Research
11. Sports, Recreation and Cultural life
12. Amendments to existing Acts dealing with the Persons with Disabilities

Chapter 9: Incentives and Concessions for PWDs

a. Free education up to the age of 18 years

b. Special schools for imparting special education, promote integration of disabled students in normal schools and provide opportunities for vocational training to disabled children.

c. Reservation of posts for the disabled upto one percent each for those who have blindness, impaired hearing or cerebral palsy for which posts will be identified by the Government every three years. Vacancies not filled up can be carried forward to the next year.

d. All Government educational institutions and aided institutions shall reserve upto 3% seats. for persons with disabilities. Vacancies are to be reserved in poverty alleviation schemes. Incentives are also to be given to employers to ensure that 5% of workforce is composed of disabled persons.

e. Disabled persons will also be entitled to preferential allotment of land at concessional rates for housing and for rehabilitation purposes.

- **Travel Concession**

A. **By Rail**

I Blind Person:

The blind person traveling alone or with an escort, on production of a certificate from Government doctor or a registered medical practitioner, is eligible to get the concession as below:

Element of concession

Class	First Class	Second Class	Sleeper Class	Season Ticket	
				First Class	Second Class
%age concession	75	75	75	50	50

The concession certificate may be issued by the Station Master on collection of the certificate form and the copy of original certificate duly attested.

II **Orthopedically Handicapped Person:**

The Orthopedically Handicapped person traveling with an escort-

Class	First Class	Second Class	Sleeper Class	Season Ticket	
				First Class	Second Class
%age concession	75	75	75	50	50

III **Deaf & Dumb Person**

Class	First Class	Second Class	Sleeper Class	Season Ticket	
				First Class	Second Class
%age concession	50	50	50	50	50

IV **Mentally Retarded Person:**

Class	First Class	Second Class	Sleeper Class	Season Ticket	
				First Class	Second Class
%age concession	75	75	75	50	50

B. By Air

I Blind Person

The Indian Airlines Corporation allows 50% concessional fare to Blind persons or single journey or single fare for round trip journey on all domestic flights.

II Locomotor Disability

Locomotor Disabled persons (80% and above) are allowed following Concession in Indian Airlines:

a. 50% of normal Economy Class INR Fare or Point to Point Fare, Full Inland Air Travel Tax and Passenger Service Fee applicable.
b. 50% of INR fare applicable to foreigners resident in India for travel on Domestic Sectors. Full Inland Air Travel Tax and Passenger Service Fee applicable.

Conveyance Allowance

Central Government employees,

S. No.	Pay Scale of Employee	Rate of Transport (in Rs.)	Allowance per month
		A-1"/"A" Class City	Other Places
1.	Employees drawing pay in the scale of Pay of Rs.8000-13500 or above	800	400
2.	Employees drawing pay in the scale of Rs.6500-6900 or above but below	400	200

	the scale Of Rs.8000-13500		
3.	Employees drawing pay below the scale or Rs.6500-6900	100	75

f. Income Tax Concessions

Relief for Handicapped

- **Under 80 DD** (Deductions in respect of medical treatment, etc., of handicapped persons)- For assesses (resident in India, an individual of a Hindu Undivided family) deduction of a sum of fifteen thousand rupees only(Rs.15,000/-).
- **Under 80DDA** (Deduction in respect of deposit made for maintenance of handicapped dependent) –

  For assesses (resident in India), an amount not exceeding twenty thousand rupees (Rs.20, 000) paid or deposited by him in the previous year out of his income chargeable to tax.
- **Under 80DDB** (Deduction in respect of medical treatment etc.,) –

  A deduction of a sum of fifteen thousand rupees only (Rs.15, 000) is allowed in respect of that previous year in which such expenditure was incurred.
- **Under 80U** (Deduction in respect of permanent disability (including blindness)-

  In computing the total income of an individual, assesses (suffering from a permanent physical disability or mental retardation as specified in rules) shall be allowed a deduction of a sum of forty thousand rupees (Rs.40,000).
- **88B** (Rebate of Income tax in case of individuals of 65 years and above) :

  An assesse (who is of the age of sixty five years or more and gross total income does not exceed one hundred and twenty thousand rupees) entitled to a deduction from the amount of income tax on his total income with which he is chargeable for any assessment year, of amount equal to 40% of such income-tax.
- **88B** (Rebate of income tax in case of individuals of 65 years and above) **:**

  An assesse (who is of the age of sixty five years or more entitled to deduction of an amount equal to hundred per cent of such income tax or an amount of ten thousand rupees only (Rs.10,000), whichever is less.

g. Reservation of Jobs & Other Facilities For Disabled Persons

- Reservations in Gr 'C' & 'D' Posts –

  3% in jobs have been made in Gr.'C' & Gr.'D' posts The category of handicapped persons benefited are the blind, the deaf and the O.H. persons. Persons with disability will be given preference at the time of recruitment in the identified Gr.'A' and 'B' posts.
- **Identification of jobs:** In order to implement these reservations, without loss of productivity some posts are identified disability wise.

- **Posting of handicap candidates:** As per the decision of Government of India Gr.'C' & Gr."D" posts recruited on regional basis and who are physically handicapped may be given posting as far as possible near to their native place within the region subject to administrative constants PH employees may be given preference in transfer case near to their native place.
- **Relaxation of ban order on recruitment to vacancies earmarked for PH persons :** As per the Government order regarding ban on filling up of non-operational vacant post will not be applicable in case of reserve vacancies to be filled up for PH persons.
- **Carry forward of vacant posts under reserve category :** As per the Government order if a reserve category of person is not available or the nature of vacancy in an office is such that the given category of person cannot be employed then the post may be carried forward for a period of 3 subsequent years.
- **Appointment of VH persons as canner in Government Deptt. :** As per the decision of Government of India it has been instructed that recanning of chairs in Government offices should be done by blind persons as far as possible when the volume of work require a full time chair canner then a suitable post may be created in consultation with the Finance.
- **Instruction to appointing authority for intimating vacancies reserved for handicap.**
- **Age Concession to PH persons:** As per the Government order it has been decided to extend the age concession of 10 years.
- **Relaxations in typing qualifications**
- **Consideration for confirmation in job for blind person**
- **Reservation for PH persons in posts filled by promotion**
- **Exemptions from payment of examinations fee**

h. Financial Assistance to Persons with Disabilities

National Handicapped Finance & Development Corporation (NHFDC)

NHFDC Scheme:

Assist a wide range of income generating activities for disabled persons. These are:

(i) For setting up small business in Service/-Trading sector: Loan up to Rs.20.00 Lakhs.

(ii) For setting up small industrial unit: Loan up to Rs.20.00 lakhs.

(iii) For higher studies/ Professional Training to cover tution fees books, stationery expenses, hostel facilities etc.

(iv) For Agricultural Activities: Loan up to Rs.5.00 Lakhs.

(v) For manufacturing/ production of assistive Devices for disabled persons: Loan up to Rs.25.00 Lakhs.

(vi) For self employment amongst persons with mental Retardation, Cerebral Palsy and Autism: Loan up to Rs.2.50 Lakhs.

Whom to Contact:-

Rajasthan Scheduled Castes & Scheduled Tribes Finance & Development
Co-operative Corporation,
Nehru Sahakar Bhawan,
Central block, 3rd Floor,
Bhawani Singh Marg,
Jaipur (Rajasthan)

i. Central Government Schemes for the Rehabilitation Of Persons With Disabilities-

Only those aids/appliances which do not cost less than Rs.50/- and more than Rs.6,000/- are covered under the scheme. However for visually, mentally, speech and hearing or multiple disabled, the limit should be Rs.8,000/- during their study period upto XII standard. The limits will apply to individual items of aid and where more than one aids is required, the ceiling will apply separately. The amount of assistance will be follows:

Total Income	**Amount of Assistance**
Upto Rs.5,000/- per month	Full cost of aid/appliance
Rs.5,001/- to Rs.8,000/- per month	50% of the cost of aid/appliance

The beneficiary should attend the Rehabilitation Centre nearest to his/her place of residence, except in the North-Eastern Region where he may be allowed travel cost for traveling outside the region till such facilities become available with that region.

Boarding and lodging expenses at the rate of Rs.30/- per day for maximum duration of 15 days would be admissible, only for those patients whose total income is upto Rs.5,000/- per month.

A list of aids and appliances is given on RCI site (www.rehabcouncil.nic.in) to be provided by ministry of social justice and empowerment.

-3% reservation for disabled in the Poverty Alleviation Program

- Under TRYSEM Program, 3% reservation to disabled people in training.
- Under ministry of rural area and employment- Organize group of person with disability in rural areas into Sangam/Group and provide them Rs.25,000/- to each group for taking up viable economic activities.
- 3% of the **Jawahar Rojgar Yojana** (JRY) funds earmark for disabled people.

- 3% reservations to persons with disability in the Rural Sanitation Program.

- Earmarking of 3% of funds for the persons with disability in the Indira Awas Yojana.

Responsibility for Implementation:

Nodal Ministry: Ministry of Social Justice & Empowerment

Other Ministries involved are-

- Home Affairs,
- Health & Family Welfare,
- Rural Development,
- Urban Development, Youth Affairs & Sports,
- Railways,
- Science & Technology,
- Statistics & Program Implementation,
- Labour,
- Panchayati Raj
- Departments of Elementary Education & Literacy,
- Secondary & Higher Education,
- Road Transport & Highways,
- Public Enterprises,
    - Revenue,
    - Women & Child Development,
    - Information Technology and
    - Personnel & Training

Chapter 10: Legal Instruments: National Acts and Rules

1. **Mental Health Act, 1987**

   An Act to consolidate and amend the law relating to the treatment and care of mentally ill persons, to make better provision with respect to their property and affairs and for matters connected therewith or incidental thereto.

2. **Rehabilitation Council of India Act, 1992 & Amendment 2000**

   An Act to provide for the constitution of the Rehabilitation Council of India for regulating the training of rehabilitation professionals and the maintenance of a central rehabilitation register and for matters connected therewith or incidental thereto.

The RCI Act was amended by the Parliament in 2000 to make it more broad based. The Act casts onerous responsibility on the Council. It also prescribes that any one delivering services to people with disability, who does not possess qualifications recognized by RCI, could be prosecuted. Thus the Council has the twin responsibility of standardizing and regulating the training of professional and personnel in the field of Rehabilitation and Special Education.

Fig: 10.1; symbol of RCI

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 standardizing the various training programs in the field of Rehabilitation, so that quality services could be planned and provided to the disabled masses.

3. **Persons With Disabilities Act, 1995**

   An Act to give effect to the Proclamation on the Full Participation and Equality of the People with Disabilities in the Asian and Pacific Region

4. **National Trust Act, 1999**

   An Act to provide for the constitution of a body at the national level for the Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities and for matters connected therewith or incidental thereto.

Annexure

Annexure 'A'

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)

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

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, lose 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 in any way different from normal? (not clear enough to be understood by other people) Yes No
10. 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 loos 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 cannot, tick "No". Once child's level of functioning is known, a program suitable for him can be developed. Demonstrate the program 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 cloths 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

30. Can he copy patterns such as round, straight or slanting lines? Yes No
31. Can the child button his cloths? Yes No
32. Can the child comb his hair without help? Yes No
33. Does the child wash his face without assistance? Yes No
34. Can the child associate the time of the day with an activity? Yes No
35. Can the child count upto 10 by rote? Yes No
36. Can the child name the colour of the object when shown? Yes No

Age range – 5-6 years

37. Can the child follow two unrelated instructions? Yes No
38. Does the child name the days of the week in order? Yes No
39. Can the child read simple words? Yes No
40. Can the child count meaningfully up to 10? Yes No

Annexure 'B'

Ready Reckon Table for $A + \frac{B\,(90-A)}{90}$

	B(1)	B(2)	B(3)	B(4)	B(5)	B(6)	B(7)	B(8)	B(9)	B(10)	B(11)	B(12)	B(13)	B(14)	B(15)
A(1)	1.99	3.98	3.97	4.96	5.94	6.93	7.92	8.91	9.90	10.89	11.88	12.87	13.86	14.84	15.83
A(2)	2.98	3.96	4.93	5.91	6.89	7.87	8.84	9.82	10.80	11.78	12.76	13.73	14.71	15.69	16.67
A(3)	3.97	4.93	5.90	6.87	7.83	8.80	9.77	10.73	11.70	12.67	13.63	14.60	15.57	16.53	16.67
A(4)	4.96	5.91	6.87	7.82	8.78	9.73	10.69	11.64	12.65	13.50	14.44	15.39	16.33	17.28	18.33
A(5)	5.94	6.89	7.83	8.78	9.72	10.67	11.61	12.56	13.50	14.44	15.39	16.33	17.28	18.22	19.17
A(6)	6.93	7.87	8.80	9.73	10.67	11.60	12.50	13.46	14.38	15.30	16.27	17.20	18.13	19.07	20.00
A(7)	7.92	8.84	9.77	10.69	11.61	12.53	13.46	14.38	15.29	16.20	17.11	18.07	18.99	19.91	20.83
A(8)	8.91	9.82	10.73	11.64	12.56	13.47	14.38	15.29	16.20	17.10	18.02	18.93	19.84	20.76	21.67
A(9)	9.90	10.80	11.70	12.60	13.50	14.40	15.30	16.20	17.10	18.00	18.90	19.80	20.70	21.60	22.50
A(10)	10.89	11.87	12.67	13.56	14.44	15.33	16.22	17.11	18.00	18.89	19.78	20.67	21.56	22.44	23.33
A(11)	11.88	12.76	13.63	14.51	15.39	16.27	17.14	18.02	18.90	19.78	20.66	21.53	22.41	23.29	24.17
A(12)	12.87	13.73	14.60	15.47	16.33	17.20	18.07	18.93	19.80	20.67	21.53	22.40	23.27	24.13	25.00
A(13)	13.86	14.71	15.57	16.42	17.28	18.13	18.99	19.84	20.70	21.56	22.41	23.27	24.12	24.98	25.83
A(14)	14.84	15.69	16.53	17.38	18.22	19.07	19.91	20.76	21.60	22.44	23.29	24.13	24.98	25.82	26.67
A(15)	15.83	16.67	17.50	18.33	19.17	20.00	20.83	21.67	22.50	23.33	24.17	25.00	25.83	26.67	27.50
A(16)	16.82	17.64	18.47	19.20	20.11	20.93	21.76	22.58	23.40	24.22	25.04	25.87	26.69	27.51	28.33
A(17)	17.81	18.62	19.37	20.24	21.06	21.87	22.68	23.49	24.30	25.11	25.92	26.73	27.54	28.36	29.17
A(18)	18.80	19.60	22.33	21.20	22.00	22.80	23.60	24.40	25.20	26.00	26.80	27.60	28.40	29.20	30.00
A(19)	19.79	20.58	23.30	22.16	22.94	23.73	24.52	25.31	26.10	26.89	27.68	28.47	29.26	30.04	30.83
A(20)	20.78	21.56	24.27	23.11	23.89	24.67	25.44	26.22	27.00	27.78	28.56	29.33	30.11	30.89	31.67
A(21)	21.77	22.53	25.23	24.07	24.83	25.60	26.37	27.13	27.90	28.67	29.43	30.20	30.97	31.73	32.50
A(22)	22.76	23.51	26.20	25.02	25.78	26.33	27.29	28.04	28.80	29.56	30.31	31.07	31.82	32.58	33.33
A(23)	23.44	24.49	27.17	25.08	26.72	27.47	28.21	28.96	29.70	30.44	31.19	31.93	32.68	33.42	34.17
A(24)	24.73	25.47	28.13	26.93	27.67	28.40	29.13	29.87	30.60	31.33	32.07	32.80	33.57	34.27	35.00
A(25)	25.72	26.44	29.10	27.89	28.61	29.33	30.06	30.78	31.50	32.22	32.94	33.67	34.39	35.11	35.83
A(26)	26.71	27.42	30.07	28.84	29.56	30.27	30.98	31.69	32.40	33.11	33.82	34.53	35.21	35.96	36.67
A(27)	27.70	28.40	31.03	29.80	30.50	31.20	31.90	32.60	33.30	34.00	34.40	25.40	36.10	36.80	37.50
A(28)	28.69	29.38	32.00	30.76	31.44	32.13	32.80	33.51	34.40	34.89	35.58	36.27	36.96	37.64	38.33
A(29)	29.68	30.36	32.97	31.71	32.39	33.07	33.74	24.42	35.10	35.78	36.46	37.13	37.81	38.49	39.17
A(30)	30.67	31.33	32.00	32.67	33.33	34.67	35.33	36.00	36.67	36.67	37.33	38.00	38.67	39.33	40.00

A(31)	31.66	32.31	34.97	33.62	34.28	34.93	35.59	36.24	36.90	37.96	38.21	38.87	39.50	40.18	40.83
A(32)	32.64	33.29	33.93	34.58	35.22	35.87	36.51	37.16	37.80	38.44	39.09	39.73	40.38	11.02	11.67
A(33)	33.63	34.27	34.90	35.53	36.17	36.80	37.43	38.07	38.70	39.33	39.97	40.60	41.23	41.87	42.50
A(34)	34.62	35.24	35.87	36.49	37.11	37.73	38.36	38.98	39.60	40.22	40.84	41.47	42.09	42.71	43.33
A(35)	35.61	36.22	36.83	37.44	38.06	38.67	39.28	39.89	40.50	41.11	41.72	42.33	42.94	43.56	44.17
A(36)	36.60	37.20	37.80	38.40	39.00	39.60	40.20	40.80	41.40	42.00	42.60	43.20	43.80	44.40	45.00
A(37)	37.59	38.18	38.77	39.36	39.94	40.53	41.12	41.71	42.30	42.89	43.48	44.07	44.66	45.24	45.83
A(38)	38.58	39.16	39.73	40.31	40.89	41.47	42.04	42.62	43.20	43.78	44.36	44.93	45.51	46.09	46.67
A(39)	39.57	4013	40.70	41.27	41.83	42.40	42.97	43.53	44.10	44.67	45.23	44.80	46.37	46.93	47.50
A(40)	40.56	41.11	41.67	42.22	42.78	43.33	43.89	44.44	45.00	45.56	46.11	46.67	47.22	47.78	48.33
A(41)	40.54	40.09	42.62	43.18	43.72	44.27	44.81	45.36	45.90	46.44	46.99	47.53	48.08	48.62	49.17
A(42)	42.53	43.07	43.60	44.13	44.67	45.20	45.73	46.27	46.80	47.33	47.87	48.40	48.93	49.47	50.00
A(43)	43.52	44.04	44.57	45.09	45.61	46.13	46.66	47.18	47.70	48.22	48.74	49.24	49.79	50.13	50.83
A(44)	44.51	45.02	44.53	46.04	46.56	47.07	47.58	48.09	48.60	49.11	49.62	50.13	50.64	51.61	51.67
A(45)	45.50	46.00	46.50	47.00	47.50	48.00	48.50	49.00	49.50	50.00	50.50	51.00	51.50	52.00	52.50
A(46)	46.49	46.98	47.47	47.96	48.44	48.93	49.42	49.91	50.40	50.89	51.38	51.87	52.36	52.84	53.33
A(47)	47.48	47.96	48.43	48.91	49.39	49.87	50.34	50.82	51.30	51.78	52.26	52.73	53.21	53.69	54.17
A(48)	48.47	48.93	49.40	49.87	50.33	50.80	51.27	51.73	52.20	52.67	53.13	53.60	54.07	54.53	55.00
A(49)	49.46	49.91	50.37	50.82	51.28	51.73	52.19	52.64	53.10	53.56	54.01	54.47	54.92	55.38	55.83
A(50)	50.44	50.89	51.33	51.78	52.22	52.67	53.11	53.56	54.00	54.44	54.89	55.33	55.78	56.22	56.67
A(51)	51.43	51.87	52.30	52.73	53.17	53.60	54.03	54.47	54.90	55.33	55.77	56.20	56.63	57.07	57.50
A(52)	52.42	52.84	53.27	53.69	54.11	54.53	54.96	55.38	55.80	56.22	56.64	57.07	57.49	57.91	58.33
A(53)	53.41	53.82	54.23	54.64	55.06	55.47	55.88	56.29	56.70	57.11	57.52	57.93	58.34	58.76	59.17
A(54)	54.40	54.80	55.20	55.60	56.00	56.40	56.80	57.20	57.60	58.00	58.40	58.80	59.20	59.60	60.00
A(55)	55.39	55.78	56.17	56.56	56.94	57.33	57.72	58.11	58.50	58.89	59.28	59.67	60.06	60.44	60.83
A(56)	56.38	56.76	57.13	57.51	57.89	58.27	58.64	59.02	59.40	59.78	60.16	60.53	60.91	61.21	61.67
A(57)	57.37	57.73	58.10	58.47	58.83	59.20	59.57	59.93	60.30	60.67	61.03	61.40	61.77	62.13	62.50
A(58)	58.36	58.71	59.07	59.42	59.78	60.13	60.49	60.84	61.20	61.56	61.91	62.26	62.62	62.98	63.33
A(59)	59.34	59.69	60.03	60.38	60.72	61.07	61.41	61.76	62.10	62.44	62.79	63.13	63.48	63.82	64.17
A(60)	60.33	60.67	61.00	61.33	61.67	62.00	62.33	62.67	63.00	63.00	63.67	64.00	64.33	64.67	65.00
A(61)	61.32	61.64	61.97	62.29	62.61	62.93	63.26	63.58	63.90	64.22	64.54	64.87	65.19	65.51	65.83
A(62)	62.31	62.62	62.93	63.24	63.56	63.87	64.18	64.49	64.80	65.11	65.42	65.73	66.04	66.36	66.67
A(63)	63.30	63.60	63.90	64.20	64.50	64.80	65.10	65.40	65.70	66.00	66.30	66.60	66.90	67.20	67.50
A(64)	64.29	64.58	64.87	65.16	65.44	65.73	66.02	66.31	66.60	66.89	69.18	67.47	67.76	68.04	68.33
A(65)	65.28	65.56	65.83	66.11	66.39	66.67	66.94	67.22	67.50	67.78	68.06	68.33	68.61	68.89	69.17

A(66)	66.27	66.53	66.80	67.07	67.33	67.60	67.87	68.13	68.40	68.67	68.93	69.20	69.47	69.73	70.00
A(67)	67.26	67.51	67.77	68.02	68.28	68.53	68.79	69.04	69.30	69.56	69.81	70.07	70.32	70.58	70.83
A(68)	68.24	68.49	68.73	68.98	69.22	69.47	69.71	69.96	70.20	70.14	70.69	71.93	71.18	71.42	71.67
A(69)	69.23	69.47	69.70	69.93	70.17	70.40	70.63	70.87	71.10	71.33	71.57	71.80	72.03	72.27	72.50
A(70)	70.22	70.44	70.67	70.89	71.11	71.33	71.56	71.78	72.00	72.22	72.44	72.67	72.89	73.11	73.33
A(71)	71.21	71.42	71.63	71.84	72.06	72.27	72.48	72.69	72.90	73.11	73.32	73.53	73.74	73.96	74.17
A(72)	72.20	72.40	72.60	72.80	73.00	73.20	73.40	73.60	73.80	74.00	74.20	74.40	74.60	74.80	75.00
A(73)	73.19	73.38	73.57	73.76	73.94	74.13	74.32	74.51	74.70	74.89	75.08	75.27	75.46	75.64	75.83
A(74)	74.18	74.36	74.53	74.71	74.89	75.07	75.24	75.42	75.60	75.78	75.96	76.13	76.31	76.49	76.67
A(75)	75.17	75.33	75.50	75.67	75.83	76.00	76.17	76.33	76.50	76.67	76.83	77.00	77.17	77.33	77.50
A(76)	76.16	76.31	76.47	76.62	76.78	76.93	77.09	77.24	77.40	77.56	77.71	77.87	78.02	78.18	78.33
A(77)	77.14	77.29	77.43	77.58	77.72	77.87	78.01	78.16	78.30	78.44	78.59	78.73	78.88	79.02	79.17
A(78)	78.13	78.27	78.40	78.53	78.67	78.80	78.93	79.07	79.20	79.33	79.47	79.60	79.73	79.87	80.00
A(79)	79.12	79.24	79.37	79.49	79.61	79.73	79.86	79.98	80.10	80.22	80.34	80.47	80.59	80.71	80.83
A(80)	80.11	80.22	80.33	80.44	80.56	80.67	80.78	80.89	81.00	81.11	81.22	81.33	81.44	81.56	81.67
A(81)	81.10	81.20	81.30	81.40	81.50	81.60	81.70	81.80	81.90	82.00	82.10	82.20	82.30	82.40	82.50
A(82)	82.09	82.18	82.27	82.36	82.44	82.53	82.62	82.71	82.80	82.89	82.98	83.07	83.16	83.24	83.33
A(83)	83.08	83.16	83.23	83.31	83.39	83.47	83.54	83.62	83.70	83.78	83.86	83.93	84.01	84.09	84.17
A(84)	84.07	84.13	84.20	84.27	84.33	84.40	84.47	84.53	84.60	84.67	84.73	84.80	84.87	84.93	85.00
A(85)	85.06	85.11	85.17	85.22	85.28	85.33	85.39	85.44	85.50	85.56	85.61	85.67	85.72	85.78	85.83
A(86)	86.04	86.09	86.13	86.18	86.22	86.27	86.31	86.36	86.40	86.44	86.49	86.53	86.58	86.62	86.67
A(87)	87.03	87.07	87.10	87.13	87.17	87.20	87.23	87.27	87.30	87.33	87.37	87.40	87.43	87.47	87.50
A(88)	88.02	88.04	88.07	88.09	88.11	88.13	88.16	88.18	88.20	88.22	88.24	88.27	88.29	88.13	88.33
A(89)	89.01	89.02	89.03	89.04	89.06	89.07	89.08	89.09	89.10	89.11	89.12	89.13	89.14	89.16	89.17
A(90)	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00

Annexure 'C' Disability Certificate)

Name & Address of the Institute / Hospital:

Certificate No. Date:

Disability Certificate

Recent photograph of the candidate showing the disability duly attested by the Chairperson of the Medical Board

This is certified that Shri/Smt/Kum……..Son/wife/daughter of Shri …….. age…….. sex ……..identification mark(s) ……..…….is suffering from permanent disability of following category :

A. Loco motor or cerebral palsy:

(i)BL-Both legs affected but not arms

(ii)BA-Both arms affected (a) impaired reach
(b) Weakness of grip

(iii)BLA-Both legs and both arms affected

(iv)OL – One leg affected (right or left) (a) Impaired reach
(b) Weakness of grip
(c) Ataxic

(v)OA – One arm affected (a) Impaired reach
(b) Weakness of grip
(c) Ataxic

(vi)BH – Stiff back and hips (can't sit or stoop)

(vii)MW (Muscular weakness) and limited physical endurance.

B. Blindness or Low Vision:

(i) B-Blind

(ii) PB – Partially Blind

C. Hearing impairment:

(i)D-Deaf

(ii)PD-Partially Deaf

(Delete the category whichever is not applicable)

2. This condition is progressive/non progressive/likely to improve/not likely to improve. Re-assessment of this case is not recommended / is recommended after a period of ……..years……..months*.

3. Percentage of disability is his/her case is …. Percent.

4. Shri/Smt./Kum……..meets the following physical requirements for discharge of his/her duties.

(i)	F-can perform work by manipulating with fingers	Yes/No
(ii)	PP-can perform work by pulling and pushing	Yes/No
(iii)	L-can perform work by lifting	Yes/No
(iv)	KC-can perform work by kneeling and crouching	Yes/No
(v)	B-can perform work by bending	Yes/No
(vi)	S-can perform work by sitting	Yes/No
(vii)	ST-can perform work by standing	Yes/No
(viii)	W-can perform work by walking	Yes/No
(ix)	SE-can perform work by seeing	Yes/No
(x)	H-can perform work by hearing/speaking	Yes/No
(xi)	RW-can perform work by reading and writing	Yes/No

(Dr……..) (Dr……..) (Dr……..)

Member Member Chairperson

Medical Board Medical Board Medical Board

Countersigned by the

Medical Superintendent/CMO/Head of Hospital (with seal)

*strike out whichever is not applicable.

Annexure 'D' : Form A

Assessment Performa for upper extremity

Name ……..Age……Sex……Diagnosis……

Address……O.P.D……Dept……

Arm component (Total Value 90%)

Arm Component	Component	Normal Value (Degrees)	Rt. Side	Lt. Side	Loss of % Rt. Side	Loss of % Lt. Side	Mean % Loss Rt. Lt.	Sum of % Loss Rt. Lt.	Combining Value Rt. Lt.	% Summary Value for component
Range of Movement (Active) Value 90% Elbow	1.Flexion-Extension Arc 2.Rotation Arc 3.Abduction-Adduction Arc	0-220° 0-180° 0-180°								
Shoulder Range of Movement (Active) Value 90% Wrist	1.Flexion-Extension Arc 2.Radio-Ulnar deviator Arc	0-160° 0-55°								
Muscle Strength Value 90% Shoulder	1. Flexion 2.Extension 3.ExtRotation 4.Int. Rotation 5.Abduction 6.Adductio									

	n									
Muscle Strength Value 90%	1. Flexion 2.Extension 3.Pronation 4.Supination									
Muscle Strength Value 90%	1.Dorsi Flexion 2.Palmar Flexion 3.Radial Deviation 4.Ulnar deviation									
Coordinated Activities Value 90%	1. Lifting overhead objects remove and placing at the same place 9% 2. Touching nose with end of extremity 9% 3. Eating Indian Style 9% 4. Combing and Plaiting 9% 5. Putting on a shirt/kurta 9% 6. Ablution glass of water 9% 7. Drinking Glass of water 9% 8. Buttoning 9% 9 Tie Nara Dhoti 9% 10. Writing 9%									

HAND COMPONENT (TOTAL VALUE 90%)

30% prehension 1.Hand Component A. Opposition (8%) B. Lateral Pinch (5%)	Movement 1. Index 2. Middle 3. Ring 4. Little	Normal Value 2] 2] 8% 2] 2] 5%								

C.Cylindrical Grasp D. Spherical Grasp E Hook Grasp	Key Holding a. Large Object (4^{o}) b. Small Object (1^{o}) a. Large Object (4^{o}) b. Small Object (1^{o}) Lifting Bag	3} 3} 6% 3} 3} 6% 5%								
2. Sensation 30%	1. Radial Side} 2. Ulnar Side} Thumb 3. Radial} Fingers 4. Ulnar}	4:1 (4.8 : 1.2)								
3.	Strength 30%	1. Grip Strength 2. Pinch Strength	20 % 10 %							

Summary value for upper extremity is calculated from component and hand component values Add 4% for dominant extremity 10%. Additional weightage to be given to infection, deformity, misalignment, contracture, cosmetic appearance and abnormal mobility.

Annexure 'E' :Form B

Assessment Performa for lower extremity

Name……Age……Sex……Diagnosis……

Address……O.P.D. No……Dept……

Diagnosis……

Mobility component (Total Value (90%)

Joint	Component	Normal Value	Rt. Side	Lt. Side	Loss of % Rt. Side	Loss of % Lt. Side	Mean % Rt. Lt.	Mean 0.30 Rt. Lt.	Combing Value Rt. Lt.	% Summary Value for mobility Component a+b(90+a) 90
Range of Movement (Active) HIP	1.Flexion-Extension arc 2.Abduction Adduction 3.Rotation arc	0-140º 0-90º 0-90º								
Range of Movement (Active) KNEE	1. Flexion Extension are	0-125º								
Range of Movement (Active) ANKLE & FOOT	1.Dors flexion Panterlexion are 2. Invesior - Extension are	0-70º 0-60º								
HH	1. Flexor Muscles 2. Extensor Muscles 3. Abductor									

	Muscles 4. Adductor Muscles 5. Rotator Muscles (Ext. Int.)									
Muscles Strength KNEE	1. Flexor Muscles 2. Extensor Muscles									
Muscle Strength ANKLE & FOOT	1.Panterliexor Muscles 2.Dorsiflexor Muscles 3. Invertor Muscles 4. Exertor Muscles									

Stability component (Total Value 90%)

Based on Clinical Method of Evaluation

1.	Walking on plain surface	10
2.	Walking on slope	10
3.	Climbing Stairs	10
4.	Standing on both legs	10
5.	Standing on affected leg	10
6.	Squatting on floor	10
7.	Sitting Cross leg	10
8.	Kneeling	10
9.	Taking turns	10
	Total	**90**

10% is given for complications like (I) Infection (ii) Deformity (iii) Loss of sensation.

Annexure 'F' : Some Referral Centers

A)Non- Governmental

1. **DISHA** Path Nirman Nagar-C Near JDA Park 302019 **Jaipur,** Phone**:** 0141-2393319
2. **AAWAZ** 24 Lal Singh Judo Colony Tonk Rd 302015 **Jaipur** , Phone**:** 0141-2722634
3. **UMANG** School, 3 / 4 , Kabir Avenue, SFS, Agarwal Farm, Mansarovar, **Jaipur**. Phone: 0141-2395099
4. **Asha Kiran** School For Hearing Impaired Children
   37 Golimar Garden 12 Awed Puri, Lalkothi 302015 **Jaipur**, Phone**:** 0141-2740571
5. **Netraheen Vikas Sansthan**
   D- Sector, Kamla Nehru Nagar, Jodhpur**,** Phone**:** 0291- 2750423
6. **Narayan Seva Sansthan** , Trust (ISO 9001:2000)
   SewaDham, SewaNagar , Hiran Magri Sector No. 4, **Udaipur** (Raj.) – 313002, Phone: +91-294-2462301-05, 2469100

B) Government

1. **Rehabilitation Research Center (RRC),**
   SMS Hospital, **Jaipur,** Phone: 0141-2561906**(Spasticity Specialty Clinic),**
   PMR Department (RRC),
   SMS Hospital**, Jaipur,** Phone: 0141-2561906
2. **Department or Physical Medicine & Rehabilitation,**
   M.B Hospital, **Udaipur**, Phone: 0294-2528811, Ext.-302
3. **Dr. Rajneesh Sharma (Assistant professor & Head),**
   Department or Physical Medicine & Rehabilitation,
   T.B.M Hospital, **Bikaner**, Phone: +91-9829118245
4. **Department of Physical Medicine & Rehabilitation,**
   Dr. S.N. Medical College, **Jodhpur,**(Upcoming center)
5. **Vocational rehabilitation center for handicaps**
   4-C, 23, Surya Path, Jawahar Nagar, Jaipur; Phone: 0141-2652232