Prevention of deformities and Role of surgery in LEPROSY



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- Disability: Any restriction or lack of ability to perform an activity considered normal for a human being i.e. Impairment in function
- Deformity: Loss or abnormality of structure of the body part. i.e.
 Anatomical changes in form, shape and appearance. i.e. Altered Anatomical appearance

- HOW TO PALPATE NERVES
- WHAT ARE THE DEFORMITIES
- HOW ARE THEY CAUSED
- HOW TO PREVENT THEM
- TREATMENT OF THE DEFORMITIES

UPPER LIMB

- ULNAR NERVE
- MEDIAN NERVE
- RADIAL NERVE.
- **HIGH** ULNAR N PALSY > **LOW** ULNAR N PALSY
- MEDIAN NERVE WRIST LEVEL- low level
- HIGH MEDIAN PARALYSIS RARE ??LEPROSY
- ISOLATED MEDIAN NERVE INV RARE
- ISOLATED RADIAL NERVE INV EXTREMELY RARE.

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LOWER LIMB

- THE POSTERIOR TIBIAL NERVE ANKLE - Low level lesion.
- LATERAL POPLITEAL NERVE -NECK OF FIBULA-High / low level lesion
 COMMON TO RECOVER ON ITS OWN.

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POSTERIOR TIBIAL NERVE



PALPATION – JUST BELOW MEDIAL MALLEOLUS

SENSORY LOSS – SOLE OF FOOT

MOTOR LOSS – INTRINSIC MUSCLES OF FOOT



COMMON PERONEAL NERVE (LATERAL POPLITEAL)

PALPATION - JUST BELOW THE OUTSIDE OF THE KNEE, AT THE NECK OF THE FIBULA.

LOSS OF SENSATION - THE LATERAL SIDE(OUTSIDE) OF THE LEG AND THE DORSUM (TOP) OF THE FOOT.

MUSCLE WEAKNESS - DIFFICULTY IN RAISING THE FOOT.



ULNAR NERVE AT THE INSIDE OF THE ELBOW



PALPATION – INSIDE OF THE ELBOW – MEDIAL EPICONDYLE.

SENSATION – INNER SIDE OF FOREARM AND HAND.

MOTOR LOSS - CLAW HAND DEFORMITY OF LITTLE AND RING FINGER.







MEDIAN NERVE

PALPATION - JUST BELOW THE PALMARIS LONGUS TENDON

LOSS OF SENSATION - THE Radial SIDE 3 ½ fingers on the palmar aspect.

MUSCLE WEAKNESS – THENAR MUSCLES EXCEPT ADDUCTOR POLLICIS –

- APE THUMB DEFORMITY



RADIAL NERVE

PALPATION – SPIRAL GROW

LOSS OF SENSATION - THE DORSAL ASPECT OF HAND.

MUSCLE WEAKNESS – WRIST DROP, FINGER DROP and THUMB DROP

Ape Hand Deformity

- Median nerve palsy
- Wasting of the thenar eminence of the hand
- Inability to oppose or flex the thumb





BRAND'S HYPOTHESIS

>SUPERFICIAL

- ULNAR NERVE ELBOW
- MEDIAN NERVE WRIST
- RADIAL NERVE RADIAL GROOVE
- LATERAL POPLITEAL NERVE NECK OF FIBULA
- POSTERIOR TIBIAL NEVE BELOW MEDIAL MALLEOLUS

>AN UNYIELDING PASSAGE – CUBITAL/GUYON/CARPAL /TARSAL.

>REPETITIVE TRAUMA

WHAT ARE THE DISABILITIES CAUSED

ORGAN	PRIMARY DISABILITY	SECONDARY DISABILITY
EYE	 CORNEAL ANAESTHESIA, LAGOPHTHALMUS 	 CORNEAL ULCER, KERATITIS, CORNEAL OPACITY, BLINDNESS,
HAND	 ANAESTHESIA, PARALYSIS (CLAW) 	 CRACKS, FISSURES, ULCERS, STIFFNESS/CONTRACTURES OF FINGERS, ABSORPTION AND LOSS OF FINGERS
FOOT	 ANAETHESIA, PARALYSIS (DROP FOOT, CLAW TOES) 	 CRACKS, FISSURES ULCERS, STIFFNESS (Ankle), LOSS OF TOES



LAGOPHTHALMUS IN BOTH EYES WITH 5 mm LIDGAP ON MILDCLOSING.INVOLVEMENT OF FACIAL NERVE

Causes of Deformity

Most deformities preventable.

- Occur as a result of direct/indirect effect of damage to peripheral nerves.
- Damage to nerves occur due to
 - a. Lepra reactions
 - b. Insidious process during the course of disease-.

MODES OF ONSET AND PROGRESS OF NERVE DAMAGE. FOUR MODES

>INSIDUOUS ONSET - "Quiet nerve palsy"

EPISODIC ONSET AND SALTATORY PROGRESS -Attacks of acute or sub acute neuritis.

SUDDEN ONSET OF NERVE DAMAGE.

>LATE ONSET OF NERVE DAMAGE.

NERVE INVOLVEMENT - THREE STAGES



Grading of Disability

Disability is graded as 0,1 & 2 by WHO

Grade 0: No disability found.

Grade 1: Loss of sensation in hands and feet due to damage of peripheral nerve.

Eye is not given grade-1, disability grading for eye is either 0 or 2.

Grade 2:Visible damage or disability.

Risk factors for developing disabilities

M.B. cases

Past/present Skin lesions in the vicinity of nerve trunks

Face lesions

D Past/present reaction, nerve thickening

Pregnancy
Intercurrent infections
Mental and physical stress.

Vaccination

MONITORING AND MANGEMENT

Condition	Risk status	Monitor/Management
 PB Leprosy Skin soft and supple No thickening of nerve No lepra reaction Normal sensory / motor function 	No risk	 Need NFA once in a three months Counsel early reporting on development of sign and symptoms of impairment of nerve function

Condition	Risk status	Monitor/Management
 MB leprosy Positive skin smear Multiple skin patches Lepra reaction Nerve trunk thickened or tender but no sensory loss Pregnancy Skin lesion on or near nerve trunk On hormonal therapy 	At risk of developing NFI (Nerve Functional Impairment)	 Need NFA once in three months during MDT or every six months after completion of recommended course of MDT Counsel for early reporting on development of sign and symptoms of impairment of nerve function Regular treatment of lepra reaction. Refer, if NFI develops after the completion of the recommended course of treatment with MDT.

Condition	Risk status	Monitor/Management
 Only impaired sensation (Grade 1 disability) 	Risk of injuries or burns, blisters and ulcers risk of involvement of more nerves	 All of the above Self care to keep skin of the affected part soft and supple. Protection of insensitive part from injury. Early detection of any secondary impairment and its treatment

Condition	Risk status	Monitor/Management
 Callosities Cracks Blisters/ulcers Scars Weakness of muscles Contractures Loss of vision 	Risk of progressive damage and disability	 All the above including self care Active and passive exercises to maintain range of movement and improve strength of the muscles.

VMT for facial nerve





VMT FOR ULNAR NERVE

THE PATIENT IS ASKED TO JOIN THE STRAIGHT LITTLE FINGERS WITH THE THUMBS AND TO HOLD THE POSITION FIRMLY; THE ASSESSOR THEN TRIES TO SEPARATE THE LITTLE FINGERS FROM THE THUMBS.

N.B.: IF A LITTLE FINGER IS PARALYSED THE PATIENT WILL NOT BE ABLE TO STRAIGHTEN IT AND JOIN IT WITH THE THUMB.



VMT FOR MEDIAN NERVE

THE SAME POSITION IS USED AS BEFORE ASSESSOR TRIES TO SEPARATE THE THUMBS FROM THE LITTLE FINGERS



VMT FOR ULNAR NERVE – CARD TEST & FINGER OUT TEST



VMT FOR MEDIAN NERVE – PEN TEST - ABDUCTOR POLLICIS BREVIS



SINGLE VMT FOR ALL THE THREE Ns - BEAK TEST



VMT FOR RADIAL NERVE WRIST, FINGERS AND THUMB CAN NOT BE LIFTED.



VMT FOR POSTERIOR TIBIAL NERVE

CAN NOT WALK ON TIP TOES


VMT FOR COMMON PERONEAL NERVE

PATIENT CAN NOT LIFT THE ANKLE AND TOES

SENSORY TESTING



VST FOR THE ULNAR AND MEDIAN NERVES

HOLD THE PATIENT'S HAND WITH A BALLPOINT TOUCH

- TIP OF ALL FINGERS,
- BASE OF THENAR
- **BASE OF HYPO THENAR**
- **BASE OF INDEX AND LITTLE FINGER**

SENSATION TEST FOR POSTERIOR TIBIAL NERVE



VST FOR THE POSTERIOR TIBIAL NERVE

HOLD THE PATIENT'S FOOT, SEE FOR SENSATION

- TIP OF ALL TOES
- BASE OF ALL TOES
- HEEL

Corneal anaesthesia

- Due to involvement of the *Trigeminal Nerve*.
- Leads to Dryness of the cornea
- VSTesting wisp of cotton, standing behind pt.
- Treatment
 - patient taught to consciously blink frequently.

Examination of parts	WHO Disability Grades	Sensory Testing (ST)	Voluntary Muscle Testing (VMT)	
Hands				
	0	Sensation present	Muscle power normal (S)	
	1	Sensation absent	Muscle power normal (S)	
	2	Sensation absent	Muscle power weak or paralysed (W/P)	
Feet				
	0	Sensation present	Muscle power normal (S)	
	1	Sensation absent	Muscle power normal (S)	
	2	Sensation absent	Muscle power weak or paralysed (W/P)	
Eye		Vision	Lid gap	Blinking
	0	Normal	No lid gap	Present
	2	Can not count fingers at 6 metres	Gap between eyelids present/red eye/corneal ulcer or opacity	Absent

ROLE OF SURGERY IN LEPROSY



Neuritis Treatment

1. Medical

- 1. Rest
- 2. Steroids
- 3. Physiotherapy
- 2. Surgical
 - Decompression
- 3. RCS end stage

NERVE DECOMPRESSION



MEDICAL DECOMPRESSION WITH STEROIDS

SURGICAL DECOMPRESSION

DEFINITE INDICATION FOR SURGICAL DECOMPRESSION

- CHRONIC NERVE PAIN
- **RECURRENT NEURITIS NOT RESPONDING TO STEROIDS**
- NERVE ABCESS

 $\mathsf{PARTIAL} \, \mathsf{OR} \quad \longrightarrow \quad \mathsf{EVACUATE}$

RECENT PARESIS

PARALYSIS

NO INTERVENTION,

SKIN GETS INVOLVED.







Fascicle





CRITERIA FOR REFERRAL OF CASES

- Physical
 - Age
 - Duration of Paralysis
 - Status of Skin and Joint
- Disease
 - MDT Status
 - Reaction and Steroids
- Social

BENEFITS OF RCS

- Improved Function
- Improved Appearance Reduction of Stigma
- Prevention of secondary deformities
- Regaining Self-respect and hope for future
- Increased Self-care activities

TYPES OF RCS

- Surgical Decompression of Nerves
- Tendon Transfer Surgeries
- Correction of Deformity of Face
- Correction of Bone and Joint Deformities of Hand and Feet
- Management of Plantar Ulcers

INVOLVEMENT OF FACIAL NERVE



If 5th nerve also involved - CORNEAL ANAESTHESIA.





LAGOPTHALMOS Correction by Temporalis Transfer













INVOLVEMENT OF LOWER LIMB













SURGERIES FOR CLAW HAND

Flexion of IP joints

Hyper extension of MCP joint











Harvest of FDS tendon











EMT with <u>ECRB</u>

APE THUMB — MEDIAN NERVE PARALYSIS









TRIPLE NERVE PARALYSIS

>RARE

>ULNAR, MEDIAN AND RADIAL NERVES PARALYSED

SURGERIES FOR WRIST DROP – JONES TRANSFER WRIST → PR.TERES to ECRB EXTENSION (OR) WRIST FUSION

FINGER F.C.R. / F.C.U. → EXT.DIG. EXTENSION

 $\begin{array}{rcl} \text{THUMB EXTENSION} & \longrightarrow & \text{PALMARIS} & \longrightarrow & \text{FPL} \\ & & & \text{LONGUS} \end{array}$

Stages of ulcer formation

- **1. Stage of threatened ulceration**
- 2. Concealed ulceration
- 3. Stage of overt ulcer

Simple ulcer

- 1. Not infected
- 2. No discharge
- 3. No involvement of deeper structures
- 4. Sloping or healing edge
- 5. Healthy granulation tissue
Complicated Ulcers:

- Management
- Surgical Debridement:
- -Removal of all the septic foci.
- -Provision of adequate drainage.
- Immobilisation in a splint
- Appropriate footwear



Disintegrated foot

- Sprain or strain
- Fracture of cartilages
- **Swollen warm foot and non tender**

Management:

- Elevation of foot
- Non-weight bearing plaster cast
- Weight bearing plaster cast
- *****FAB for 18 months.
- Arthodesis / fusion of joint



Indicators for monitoring in DPMR

• Proportion of cases assessed for disability status:

Number of cases assessed for disability x 100

Number of case put on treatment

• Proportion of cases at risk of developing disability:

Number of cases assessed with VMT/ST x 100

Number of cases at risk

• **Proportion of disabled cases practicing self care:**

Number of persons practicing self care x 100

Number of persons trained in self care

GOVT. INCENTIVE FOR MAJOR RCS

- Rs.5000/- after undergoing the RCS.
- Rs.1500/- 4-6 weeks after operation.
- Rs.1500/- 3 months after operation.

• Quality indicator for RCS surgery:

No. of cases with improved functional ability at 6 months after operation x 100

Number of case operated upon during the cohort period

POD CAMP OBJECTIVES

- To manage and monitor deformities in leprosy at the field level.
- to validate impairment status and interventions there of among new patients
- provide needed health education and selfcare needed for cases with consequences
- Provision of footwear
- Teach home based self-care aids for the patients

RCS CAMP-2 types

1. Disabled patients are rendered services Referral and Identification of patient in need of RCS

2. Training of local surgeons at their own setup by sending a team of surgeons and holding the RCS camp, where in few demonstration cases are performed.

POD CAMP ACTIVITIES

- Provide health education for all patients
- Demonstrate self-care of feet, hands and eye
- Carry out examination of new patients with deformities for baseline assessment.
- Select patients for RCS.
- Fit appropriate footwear and/or protective devices.
- Teach home based ulcer care for simple ulcers.









SELF CARE KIT

- Foot scraper about 20x6x3 cm scraping surface
- Antiseptic liquid or antibiotic skin ointment
- Moisturising cream or Vaseline
- Sterilised gauze packs of 5x5 cm
- Bandages 3" width x 3 meter
- Adhesive tape
- Plastic tub 20 inch dia and 8 inch height

- Mr. Kuppan, a 52 year old agriculture labourer slipping of slippers on treatment with MB-MDT reported with slipping of slippers for past 1 months.
- Mr.Raja, 28/M, a coolie comes to hospital with complaints of frequent falls past 1 year. Ulcer under first MTH. Attributes falls to injection from quack one year ago.
- Mrs. Chellamma,42/F ulcer and the tip of little finger mild bending of fingersfor past one month muscle weakness present nerve thickening plus

PREVENTION OF DEFORMITY

- Timely detection of disease and treatment with MDT.
- Identification of high risk cases and proper monitoring
- Early detection and treatment reaction and neuritis
- Care of insensitive hands, feet and eyes
- Appropriate footwear, aids and appliances
- Enabling sensory and motor recovery –medical / surg.
- Minimising disability by splint and physiotherapy.
- Prevention of dehabilitation and destitution through CBR.



Thank You

Physiotherapy



EXERCISES TAUGHT TO A PATIENT WITH NEURITIS

FOR HANDS WITH WEAK FINGERS

CUP YOUR KNUCKLE JOINTS IN YOUR OTHER PALM AND STRAIGHTEN YOUR FINGERS AS STRONGLY AS YOU CAN.







Spiral Splint



Cock up Splint



Gutter Splint



Thumb Web splint



Stretching exercises



MCR footwear for foot drop with Straps

BASIC CRITERIA IN SELECTING PATIENTS FOR SURGERY

- ✤-DISEASE UNDER CONTROL
- **↔**-NO NEURITIS, REACTIONS ETC.
- ***-BEEN ON TREATMENT FOR ATLEAST SOME TIME**
- ***-NO SITES OF SEPTIC INFECTION**
- *-NO CONTRACTURES
- *-PATIENT MOTIVATED
- *-PATIENT NOT TOO YOUNG OR TOO OLD





Dynamic procedure

- 1. Flexor pulley insertion surgery -Direct / Indirect
- 2. Direct -ZANCOLLI'S LASSO procedure Using FDS (Long/Ring finger)
- 3. Indirect ZANCOLLI'S LASSO procedure –Palmaris Longus, ECRL
- 4. A tensor fascia lata (TFL) Tendon graft used to increase the length to the flexor pulley in Indirect LASSO
- 5. PL or ECRL LASSO preferred for patient with hyper mobile joints or long fingers.
- In hands with reversed distal transverse meta carpal arch 5th slips created to insert in ulnar side of ADM to increase arch.

Factors

- Presence of secondary impairments
- Strength of long flexors
- Strength of donor tendon
- Hyper mobility of the joints of digits
- Presence of Palmaris longus tendon
- Unassisted, assisted and contracture angle
- Heavy or light work
- Dominant or non-dominant hand

PREVENTION OF DISABILITY INCLUDES:

- ✤ Timely detection of disease and its effective treatment with MDT.
- ✤ Identification of high risk people and their frequent monitoring.
- Early detection and treatment of reaction and neuritis (acute & silent) with steroids.
- ✤ Early recognition and treatment of impairment.
- Care of insensitive hands, feet and eyes for prevention of secondary impairment (through self care).
- Provision of appropriate footwear, other aids and appliances.
- Enabling sensory and motor recovery by medical and surgical.
- Minimizing disability by use of splint and other physiotherapy measures and surgery.
- Prevention of dehabilitation destitution through CBR.



DIFFERENCE BETWEEN TYPE-1 AND 2 REACTIONS

TYPE – 1	TYPE – 2
A. SEEN IN UNSTABLE TYPES: BT,BB,BL	SEEN IN LL AND BL
B. SHIFT IN IMMUNOLOGICAL STATUS DURING REACTION	NO SHIFT IN IMMUNOLOGICAL STATUS DURING REACTION
C) INVOLVEMENT OF OTHER ORGANS - UNCOMMON	INVOLVEMENT OF OTHER ORGANS - COMMON
D) CAN BE SEEN BEFORE STARTING TREATMENT, DURING AND AFTER STOPPING TREATMENT	CAN BE SEEN ANY TIME

E. MECHANISM OF TYPE 4 (DELAYED HYPERSENSITIVITY) OF COOMBS AND GELL REACTION	ARTHUS REACTION (IMMUNE COMPLEX REACTION) Or TYPE 3 REACTION OF COOMBS AND GELL • ANTIGEN • ANTIBODY • COMPLEMENT
F. T-CELLS ARE MAINLY RESPONSIBLE	B-CELLS ARE MAINLY RESPONSIBLE
G. SYMPTOMS SEEN IN EXISTING LESIONS	CAN BE SEEN ANYWHERE MAINLY EXTREMITIES
H. CLOFAZIMINE AND THALIDOMIDE ARE NOT USEFUL	CLOFAZIMINE AND THALIDOMIDE ARE VERY USEFUL

WHO grading of disabilities

PART	GRADE 0	GRADE 1	GRADE 2
EYES	Normal, Not affected by leprosy	Affected by leprosy (corneal anaesthesia or lagophthalmos) but vision not affected (able to count fingers at 6 meters)	Impairment of vision (not able to count fingers at 6 meters)
HANDS / FEET	Normal (no anaesthesia or visible deformity)	Anaesthesia present but no visible deformity	Visible deormity present (e.g. Claw hand/ foot drop)

NERVE	MOTOR DEFICIT
FACIAL NERVE	Lagophthalmos
ULNAR NERVE	Weakness in moving the little finger out
MEDIAN NERVE	Weakness in lifting the thumb
RADIAL NERVE	Weakness in lifting the wrist
LATERAL POPLITEAL NERVE	Inability to lift up the foot
POSTERIOR TIBIAL NERVE	Inability to spread the toes



NERVE FUNCTION ASSESSMENT

- 1. Voluntary Muscle Test or VMT-TESTING FOR INVOLVEMENT OF MUSCLES
- 2. Voluntary Sensory Test or VST TESTING FOR SENSORY LOSS IN THE AREA Both should be done
- a. All patients with nerve thickening
- b. All MB patients
LAGOPHTHALMOS

- 1. WEAKNESS OF EYE
- 2. DUE TO INVOVEMENT OF THE FACIAL NERVE
- 3. LOOKS FOR ANY GAP BETWEEN THE EYELIDS WHEN THE PATIENT CLOSES HIS EYES

TO PRESERVE NERVE FUNCTION

- IDENTIFY PATIENTS AT RISK OF NERVE DAMAGE
- PERIODIC ASSESSMENT OF NERVES
- **REPORT NEW or WORSENING OF SYMTOMS.**
- REFER PATIENTS WITH NERVE DAMAGE FOR FURTHER INVESTIGATION AND TREATMENT.





